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Reader's Guide

This book of abstracts contains all the abstracts of the presentations, the poster presentations and the keynote lectures registered for the IKUWA 8 conference 'Telling the Exciting Tales or Our Past' organized in Ostend (Belgium) from October 13th to October 17th 2025.

The book of abstracts is a collection of the abstracts as submitted earlier this year. In September a quick review procedure was organized mainly for checking crucial data. All the requests for changes and corrections that reached us by October 8th 2025 have been implemented. Information that reached us after October 8th is not included.

The abstracts are in alphabetical order on the surname of the first author, regardless of type (poster presentation, oral presentation, keynote lecture). The table of contents first shows the title of the abstract, followed by the names of the authors. For every abstract, except those of keynote lectures, it is specified to which session it belongs and whether it is a poster presentation, an oral presentation or a keynote lecture.

We sincerely thank all the participants for their appreciated contributions and apologize for possible errors that may have been included.

The book of abstract is not the end of the process, it's only the end of the beginning. We intend to publish the conference proceedings before the next IKUWA conference takes place in 2029. We will invite in due course all the participants to contribute to the IKUWA 8 proceedings.

Sincerest thanks to Sylvia Mazereel, Brecht Dewilde and Saar Lecomte for their much appreciated contribution to the elaboration of the book of abstracts.

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Using GIS and Satellite imagery in monitoring the changes in coastal cultural heritage sites along the Nile Delta

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The fluvial – marine Nile Delta coast of Egypt has always been a preferred location for human settlement and activity. However, it is subject to serious coastal changes as it is located at a low altitude. Hence, it has been designated as a vulnerable zone to climate change combined with geological and anthropogenic factors such as rapid and uncontrolled coastal development and agricultural. Moreover, it is also subject to coastal erosion and diminished sediment flow as result of constructing dams across the Nile in Upper Egypt. This led to considerable changes in the coastline, which is responsible for widespread and significant damage to the archaeological and heritage sites along the study area. Therefore, several sites were found submerged under the seawater or buried by sediments.

This research is mainly focusing on evaluating and monitoring the shoreline changes along the Nile Delta coast of Egypt, using Geographical Information System (GIS) in addition to comparing satellite imagery with the historic records of archaeological sites, many of which are already lost.

Finally, the research will look at reconstructing the paleo landscape of the coastal archaeological and heritage sites around the study area, which is fundamental in documenting, and managing the sites that are currently in danger and the sites that would be impacted in the near future unless action is undertaken to reduce future environmental impacts.

Keywords: Nile Delta; GIS; Coastal Threats; Coastal Developments; Climate Change

Presentation in session D2: Where Land meets Sea: Transdisciplinary Approaches to Investigate Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Ayla's excavations revealed the significance of its seaport through the discovery of various portable artifacts

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Ayla, the ancient name of Aqaba during the Islamic period, is located in a magnificent position on the Gulf of Aqaba. The city played a significant role not only as a maritime trade hub for ancient civilisations that settled in the area, but also as one of the rest stop destinations for Muslim pilgrims who were travelling from the Levant and North Africa to the Holy Land in Hijaz even to this day.

Several excavations have been conducted at the site over the past century, revealing abundances of valuable information. During these excavation seasons, many cells and storage rooms facing the sea were discovered, used to store commodities for both import and export. Furthermore, numerous portable finds from all over the world unearthed provide clear evidence of the city's commercial activity not only throughout Islamic history but also along the city's history.

There is no doubt that Ayla had a seaport since the earliest civilisations in the region. Ayla's port is mentioned in a lot of historical written sources, while unfortunately, the archaeological evidence regarding this field is absent due to a lack of archaeological work on this aspect. However, recently there was a sole survey along the seashore that confirmed the presence of the city's seaport, although further excavation is needed. Additionally, there is substantial evidence highlighting the activity of its maritime trade.

Ayla was also known for its kilns, which manufactured distinctive products. The most famous of these were the Ayla amphorae, known for their unique designs and craftsmanship. These amphoras were widely distributed across various cities, underscoring Ayla's central role in regional trade networks. This type of amphora was spread around the world via maritime commercial trades.

This paper highlights the significance of Ayla's commercial activities and peruses the valuable insights offered by the numerous portable finds from the Islamic city. These discoveries provide compelling evidence of the city's active role during the Islamic period, taking into account the importance of Ayla's seaport in facilitating trade and cultural exchange.

Keywords: Ayla; Islamic; Commercial; Seaport; Finds; Ware; Excavation

Poster presentation in session H1: Maritime Archaeology of the Arab World (Lucy Semaan, Crystal El Safadi, Lucy Blue)

The Semiotics of Seas and Oceans in Shaping the Identity of the Self and the Other in Omani Novel: Selected Samples

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This study examines the semiotics of seas and oceans in Omani fiction and their role in shaping the Arab-Omani self-identity in relation to the foreign other. It focuses on analyzing "*The Arabian Sea Trilogy"* by Younis Al-Akhzami: "*Barr Al-Hikman"* (2016), "*Ghubbat Hashish"* (2018), and "*Ras Madrakah"* (2022).

The theme of seas and oceans is deeply embedded in Omani narratives, reflecting the profound relationship between Omanis and the sea and its influence on their literary, and cultural production. The Arabian Sea and the Indian Ocean have been depicted in Omani fiction as arenas of power struggles between the self and the other, East and West, urban and Bedouin communities.

The Arabian Sea Trilogy presents an epic narrative that chronicles the profound transformations experienced by Omani coastal communities as tradition clashes with modernity. The novels highlight the struggles of humble fishermen whose livelihoods are threatened by the sudden invasion of massive foreign ships, which appear as an ominous force disrupting their traditional way of life. The Trilogy also examines the broader impact of urban modernity, where vast ports and commercial enterprises dominate the sea, while concrete buildings obstruct sunlight and fresh air, altering the coastal landscape. Additionally, the narrative delves into the history of shipwrecks near Bedouin settlements, questioning the validity of stereotypes about Bedouin hostility and their relationship with the sea.

This research will investigate how Omani fiction portrays the foreign other and how the sea serves for constructing these representations. It seeks to answer key questions regarding the role of maritime environments in shaping cultural perceptions of the self-other Identity in Omani narratives.

Keywords: Seas And Oceans; Identity; Self; Foreign Other; Omani Novel

Presentation in session D4: The Double Narrative of Man and Water – Approaches and Perspectives (Martina Seifert, Andreas Külzer, Aylin Güngör)

Virtual Dissemination Strategies based on 3D Photogrammetric Reconstruction for the Social Appropriation of Underwater Cultural Heritage in Colombia: The Case of the San José Galleon Shipwreck

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The use of technologies for the recording and detailed documentation of underwater archaeological sites has been the subject of development and improvement in recent years. More and more alternatives are available not only to analyze but also to disseminate the information provided by sites such as shipwrecks, which can tell about significant moments in human history. The challenges of diving in this type of archaeological context are many, especially in depths that are inaccessible to autonomous diving. This is the case of the San Jose Galleon Shipwreck, which sank off the coast of Cartagena de Indias (Colombian Caribbean) on the 8th of June in 1708 during a battle between the Spanish and the English Crowns. Since its location, the Colombian government has been developing and implementing capacities for the documentation, research, protection and dissemination of Underwater Cultural Heritage in order to carry out detailed studies of this shipwreck, while at the same time structuring products to reach both specialized and non-specialized audiences. Thanks to several training strategies in photogrammetry and 3D documentation, skills have been installed through the articulation of archaeologists, oceanographers, hydrographers and underwater robotics technicians, so that by means of a remotely operated vehicle (ROV) it is possible to obtain the necessary data to reconstruct the archaeological context in three dimensions. As a result of these reconstructions, strategies and products have been developed in recent years to make the results of the research and the diversity of the heritage of this site visible in an easily understandable way.

The aim of this paper is to present the whole process developed by Colombia to develop the 3D modelling of the San José Galleon, but at the same time, how this has served to build and publish various results for dissemination and diffusion for knowledge and social appropriation. In addition to products for analytical purposes, such as Digital Elevation Models (DEM), orthophotomosaics and Point Cloud Models, strategies related to Virtual Reality, Augmented Reality, Windows applications, mobile video games, and navigation simulators have been developed.

Keywords: Virtual Dissemination; 3D Photogrammetric Reconstruction; Social Appropriation; Underwater Cultural Heritage; San José Galleon; Colombia

Presentation in session K1: The Use of 3D Modelling in Underwater Archaeology (Johan Opdebeeck, Rob van Haarlem)

The participation of Jesús Alberto Aldana Mendoza at the IKUWA 8 congress is made possible thanks to the participation grant awarded by VLIZ (Vlaams Instituut voor de Zee, Flanders Marine Institute) its philanthropic work 'The Sea as a good Cause' with sponsorship from C-hotels.

Phenomenology of Climate Change: An Ethnoarchaeological Approach to the Senses and Meanings of Climate Alterations in a Lacustrine Amphibious Culture Community in the Colombian Caribbean.

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Climate change poses one of humanity's most pressing challenges, significantly impacting diverse regions like Latin America and the Caribbean across political, educational, cultural, and economic dimensions. Evidence indicates widespread environmental effects, including the melting of glaciers, altered plant and animal ranges, and increasing droughts and extreme precipitation in Colombia, with forecasts predicting significant temperature increases by 2040 and the end of the century. Vulnerable communities, particularly the poorest and most marginalized, are disproportionately affected, highlighting the need for a broader understanding of climate change experiences rooted in local contexts.

To better understand climate change's implications, a phenomenological approach is suggested, emphasizing how individuals perceive and experience this phenomenon. This perspective acknowledges that subjective experiences shape how communities interpret climate changes, informing their responses and adaptations. Ethnoarchaeology, by studying living societies through an archaeological lens, provides valuable insights into the material aspects related to climate change and human responses. It examines various factors, including technology, waste management, and the historical perceptions of climate changes within communities.

In the Caribbean region of Colombia, particularly in areas linked to bodies of water, communities exhibit "amphibious culture," adapting to both aquatic and terrestrial environments. This unique cultural framework offers a lens for understanding resilience and coping strategies in the face of climate impacts. The Ciénaga Grande de Santa Marta, a crucial wetland ecosystem, is emblematic of the challenges posed by climate change, suffering from environmental degradation due to human activity.

Exploring how these communities perceive climate change involves understanding their connections to the environment and how these relationships are being altered. An ethnoarchaeological approach reveals that different communities have distinct interpretations of climate change based on their geographical and cultural contexts. However, research on this topic in Colombia remains scarce. Current studies suggest weak correlations between perceptions of climate change and various socio-economic factors, emphasizing the need for inclusive dialogue that recognizes local knowledge systems.

In conclusion, while studies from an ethnoarchaeological perspective are limited, they demonstrate progress in integrating climate analysis within interdisciplinary frameworks, illuminating localized practices and perceptions that inform adaptation and mitigation strategies against climate change.

Keywords: Climate Change; Amphibious Culture; Ethnoarchaeology; Meanings and Significations

Poster Presentation in session E1: Rivers versus Past and Present Climate Change: Effects, Stakes and Adaptations (Marion Foucher, Attila Tóth, Annie Dumont)

From Cargo to Culture: The Role of Merchant Ships in Shaping 18th Century Consumption Patterns in the Baltic Sea Area

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Shipwrecks preserved in the cold and dark waters of the Baltic Sea offer unparalleled insights into history. Thanks to advanced maritime archaeological methods, interdisciplinary analyses, and the unique preservation of organic materials such as plant remains, the study of shipwrecks has opened new pathways for understanding early modern maritime trade. These findings reveal a wealth of information about the vibrant trade networks connecting Europe to its colonies.

Historical sources indicate that vast quantities of sugar, tobacco, dyes, coffee, textiles, as well as food and beverages like wine and fruit, were transported to major ports in the Gulf of Finland, such as Tallinn and St. Petersburg. However, written records often omit private commissions from royal courts, making shipwrecks invaluable for studying the history of goods, including plant and animal remains.

In this presentation, we explore three shipwrecks from the Gulf of Finland that shed light on the material culture and cargoes of ships whose origins trace back to South and Central America, the streets of Paris, Asia, and Europe's production hubs. These hubs supplied textiles, wines, and other commodities destined for Scandinavia and beyond.

Luxuries such as Meissen porcelain, pocket watches, and embroidered dresses found from the Borstö 1 wreck exemplify elite consumer culture, contrasted with the ship's practical and traditional utensils, like tin plates and glazed ceramic bowls.

The Vrouw Maria wreck reveals tobacco boxes, thousands of clay pipes, barrels of coffee and grapes, and dyes that reflect fashion trends and social habits. Smoking transcended social classes, and imported tobacco held prestige. In the 19th century, coffee became increasingly accessible, while exotic fruits remained luxuries.

The Jussarö II wreck showcases mustard jars, wine and caper bottles, and oyster shells, hinting at the refined tastes of the elite. Maille, known for producing vinegar and mustard, was one of the suppliers to the Russian court.

Together, these shipwrecks illustrate the diversity of consumer goods traded between the West and the East during the mid- to late 18th century. Despite the fragility of plant remains and the fading colours of textiles, meticulous research has yielded significant findings, such as identifying plant remnants even in small barrel samples. Shipwrecks not only preserve objects but also provide an extraordinary window into the historical use of plants.

Keywords: Shipwrecks; Maritime Archaeology; Maritime Trade; 18th Century; Consumption

Presentation in session I1: From Local Impact to Global Networks: The Archaeology of Cultural Exchange (Sarah Ward, Tânia Manuel Casimiro)

The Canopic Branch of the Nile: A Key Trade Route Linking Egypt and the Mediterranean until the End of the Late Period

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The Canopic Branch of the Nile served as a crucial commercial and navigational passage for nearly 4,500 years, remaining active from the Early Dynastic Period until the Late Roman Period in the fifth century AD. As the largest and oldest of the former Nile branches in the western Delta, it played a significant role in Egypt's economic and political history. It was the primary trade route in the Delta, hosting some of the earliest commercial stations and river ports that facilitated trade between Egypt and the Mediterranean world.

During the Late Period (664–332 BC), commercial activity along the Canopic Branch flourished. Naucratis emerged as a major trade hub, linking Egypt to Mediterranean markets through ports like Heracleion and Canopus. Archaeological findings, including sunken ships and cargo remains, highlight the scale of this maritime trade. Greek merchants imported goods such as olive oil and wine, while Egypt exported wheat, textiles, and other commodities.

Beyond commerce, the Canopic Branch held strategic importance in political and military affairs, particularly during the fifth and fourth centuries BC. As the main gateway into Egypt from the Mediterranean, it provided the fastest access to the heart of the Nile Delta, making it a focal point in various historical events.

This study adopts both analytical and historical approaches, utilizing archaeological evidence such as port remains, shipwrecks, and trade-related artifacts, alongside textual references from papyri and classical sources. The findings reaffirm the Canopic Branch's role as a major commercial artery, emphasizing its importance in connecting Egypt with the wider Mediterranean economy.

Keywords: Mediterranean Sea; Maritime Trade; Canopic Branch; River Ports; Late Period

Presentation in session D1: Take a Deep Breath. Underwater Cultural Landscapes of the Ancient Mediterranean (Mari Yamasaki, Emilio Rodríguez-Álvarez)

Uncovering the Past: The San Pedro de Alcántara Shipwreck and Its Possible Connection to the Fernando

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Off the coast of the municipality of Marbella lie the remains of a large-scale shipwreck from the Modern Era, characterized by a robust construction typical of military vessels. It is located on a sandy seabed at a depth ranging between 6 and 7 meters.

Documentary research conducted at the General Archive of Simancas (Valladolid) and the General Archive of the Navy (Viso del Marqués), combined with ongoing archaeological investigations, suggests that the remains of the San Pedro de Alcántara shipwreck may correspond to a Spanish military vessel built in the mid-18th century, named *Fernando*, which sank in 1760 off the coast between the municipalities of Estepona and Marbella (province of Málaga, Spain).

The significance of this Spanish Navy vessel lies in the fact that it was one of four experimental ships built to support the implementation of a new shipbuilding system introduced during the period of the Marqués de la Ensenada, known as Jorge Juan's English system.

The ongoing research is interdisciplinary, combining documentary and archaeological investigation with auxiliary techniques to provide relevant data that may confirm whether these remains indeed belong to the *Fernando*.

This study will lay the foundation for its dissemination and public awareness, even considering its potential promotion from various perspectives. In doing so, these historical episodes will be brought closer not only to the scientific community but also to the general public through different outreach initiatives.

Keywords: Shipwreck San Pedro De Alcántara; Military Vessel; Fernando; Navy; Jorge Juan's System; Shipbuilding

Poster presentation in session G5: Shipwreck Studies (Marnix Pieters)

Archaeological and Paleobiological Heritage in the Intertidal Zone: VESTIGIUM Project

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"VESTIGIUM: Intertidal Archaeology and Paleobiology. Heritage on the Beaches of Cádiz as an Economic and Social Participation Driver" is an R&D&I project under the Complementary Plan for Marine Sciences and the Recovery, Transformation, and Resilience Plan. Led by the IAPH through its Underwater Archaeology Center, the project aims to investigate, protect, conserve, and promote the heritage present on the beaches of the province of Cádiz as a means of economic growth and social engagement.

The project will develop 3D models of each archaeological site and reconstructions of their chronological evolution, alongside enhanced mapping through drones equipped with LiDAR sensors, marine and terrestrial geophysics, and dating techniques such as radiocarbon (C-14), thermoluminescence, and molecular biology analysis.

Since underwater cultural and natural heritage serves as a key source of identity and an economic asset within the blue economy, the project prioritizes fostering a meaningful connection with society, encouraging public awareness and involvement in the preservation of our past. Additionally, collaboration with tourism entrepreneurs is considered essential, as they will ultimately implement the planned tourist routes and promote awareness of the need to protect these cultural assets.

"Vestigium" aims to lay the groundwork for expanding these research and outreach efforts along the entire Andalusian coastline, advancing a sustainable economic development model that highlights the historical and natural richness that defines us.

Throughout the presentation, the project's objectives and the results achieved so far will be analyzed.

Keywords: Heritage; *Archaeology;* Intertidal; Conservation and Dissemination

Presentation in session F1: Turn the Tide – Methods to Unmud Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

The megalithic coastal fortification of the Phoenician harbour-city of Arwad, Syria: archaeological and architectural analysis

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The paper presents the main research issues and methodological approaches of the study of the megalithic coastal fortification of the Phoenician harbour-city of Arwad island in the eastern Mediterranean, Syria. The maritime and coastal archaeological zone of the island is exceptionally large, consisting of a coastal settlement, harbour infrastructures and associated fortification systems. The coastal fortification of Arwad island was among the most outstanding archaeological remains to be mentioned and described by historians, geographers and early travelers as early as the 4th century BC. The archaeological remains of the coastal fortification are today submerged, silted and/or eroded, severely affected by geomorphological and anthropogenic impact. However, their state of preservation and their extent is impressive.

In 2021, systematic archaeological investigations using 3D topographic recording, remote sensing and photogrammetric mapping revealed the city's successive defensive systems and uncovered fundamental insights into distinct construction techniques and architectural characteristics, shedding light on the strategies employed to protect the urban centre of ancient city of Arwad from both human and natural threats. The main key aspects concerning the fortification's construction process have been addressed starting from quarries exploitation to terrain adaptation methods and construction scenarios.

This analysis not only enhances our understanding of the city's historical importance but also highlights the Phoenicians' advanced engineering skills, that aimed at achieving the maximum adaptation to the island's emerged terrain, demonstrated by different construction techniques to optimise defensive capabilities and minimise construction challenges. Finally, this work represents the first comprehensive and systematic mapping of the ancient coastal fortification at Arwad, integrated in a custom-built GIS database to be constantly updated with future documentation data, which offers track changes over time, including coastal erosion, human impact, and environmental degradation.

Keywords: Arwad Island; Phoenician Harbour; Coastal Archaeology; Coastal Fortification; Construction Techniques; Defensive Architecture

Presentation in session H1: Maritime Archaeology of the Arab World (Lucy Semaan, Crystal El Safadi, Lucy Blue)

River Archaeology in Wallonia (Belgium): Review of several decades of discoveries and interventions in watercourses.

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With the first underwater archaeology site opened in 1963 at the exit of the cave of Han-sur-Lesse (Province of Namur), Wallonia has been a pioneer in this new discipline. However, in the absence of adequate legislation, research directly related to water, both in terms of rescue and preventive archaeology, remained limited for decades, despite the exceptional discovery in 1975 of Gallo-Roman boats and their port facilities in a silted channel in Pommeroeul (Province of Hainaut). Since the regionalization of archaeology in Wallonia in 1989, sporadic terrestrial discoveries, often fortuitous and directly related to the fluctuating natural landscape typical of rivers, are increasingly reported and inventoried in abandoned meanders or on ancient banks, but often in isolation. Concurrently, the work on the equipment of Walloon watercourses is not anticipated or followed up despite the many remains reported for decades during dredging, maintenance, or repair work. The beds and banks of watercourses are often considered context-less sites.

For nearly 30 years, diving, within an archaeological approach, has however begun to focus on other watercourses, including the Meuse and the Sambre, under the impulse of a non-governmental association. After fruitful dives, it finally leads to a recognition of the archaeological heritage related to water and the importance of raising awareness among the scientific community regarding the vulnerabilities of this heritage. Numerous publications and scientific articles have now emerged, but the theme remains fundamentally still on the fringe of scientific initiatives and interests. Therefore, recently, the archaeology of rivers and aquatic landscapes in general are officially taken over by the Agence Wallonne du Patrimoine - AWaP (Public Service of Wallonia). This communication will focus on providing an overview of the archaeological heritage related to the Walloon watercourses to illustrate the diversity of themes and, on the other hand, discuss the existing potential and the links to be forged with other actors managing Walloon watercourses.

Keywords: River Archaeology; Vulnerabilities; Protection and Management of Fluvial Heritage; Inland Navigation; Watercourse Development

Presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Facing the Sea: An Evaluation of Coastal and Underwater Archaeological Contexts in the Gulf of Almería and Their Contribution to City-Territory Interpretation During the Roman Period.

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This study examines the potential of the Gulf of Almeria's maritime and underwater cultural heritage and its impact on understanding within a historical narrative. The SINVS VRCITANVS project focuses on the maritime connectivity of the Almeria coast, using an interdisciplinary methodology that includes history, archaeology and geoarchaeology. This study enhances the relevance of port spaces and anchorages in the economic articulation of the western Mediterranean Sea, especially focused on the Roman city of *Urci* and its *territorium* as a case of study. Through the analysis of coastal structures and underwater contexts, enclaves such as *Portus Magnus*, the *Charidemi Promontorium* and the anchorage of Torregarcía, this research shows evidence of commercial activity and the exploitation of marine resources and their significance to understanding the terrestrial and maritime organisation. In addition, sites such as *Turaniana*, in Roquetas de Mar, have been evaluated and are relevant for understanding the internal dynamics of the Almeria coast in Roman times. Preliminary results underline the need to integrate the study of maritime and underwater cultural heritage into the historical interpretation of the region, moving beyond a predominantly terrestrial vision.

Keywords: Seascape; Underwater Archaeology; Gulf of Almeria; Maritime Connectivity; Roman Economy

Presentation in session D4: The Double Narrative of Man and Water - Approaches and Perspectives (Martina Seifert, Andreas Külzer, Aylin Güngör)

D-ESCARS project: Digitalization and systematic study of the maritime cultural value of the boat shelters on Formentera Island (Spain).

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D-ESCARS Project is an initiative dedicated to digitalising and systematically studying the Maritime Cultural Heritage of the so-called “Escars/Varaderos” (Boat Shelters) on Formentera Island, Spain. This project is led by the Institut Balear d’Estudis en Arqueologia Marítima (IBEAM), the Fundación Colombia Anfibia, and the University of Helsinki. The research focuses on the traditional wooden structures used to protect small boats and preserve and promote this unique cultural heritage through digital technologies, ensuring its conservation and enhancing its role within the local community. The project aims to create high-resolution 3D models by employing terrestrial and aerial photogrammetry. These models will be used for research, documentation, and educational purposes, making the heritage more accessible to the public. In addition to digitalisation, the project integrates an ethnographic approach, conducting interviews with local communities to document their traditional knowledge. This interdisciplinary methodology highlights the link between cultural heritage, identity, and environmental sustainability. The project also aligns with international efforts to redefine cultural heritage conservation by integrating tangible and intangible aspects. In this sense, this paper aims to present the research results, which incorporates perspectives, theoretical and interpretative frameworks, methods, techniques and technologies from different fields of knowledge. This research seeks to characterise these assets of cultural interest systematically and establish mechanisms that allow knowledge of social appropriation associated with the maritime cultural landscape of the Formentera Island and its elements.

Keywords: Boat Shelters; Maritime Cultural Heritage; Interdisciplinarity; Digital Technologies; Formentera Island; Spain

Poster presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Looking for the hidden Paleolithic of northern Iberia. Surveying the late Pleistocene landscapes of the continental shelf of the Bay of Biscay

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Northern Spain is one of the classic areas for the research of the Paleolithic. Yet the lowest part of the later Pleistocene territories that have been drowned by the Holocene sealevel rise have seldom been considered. This communication presents the preliminary results of PaleoSuB, a research project funded by the Spanish agency for R+D which attempts to explore the possibilities to identify and study archaeological remains of the late Paleolithic and the early Mesolithic in the southern sector of the continental shelf of the Bay of Biscay. This area presents several traits which make it promising for this type of research: -The density of Paleolithic and Mesolithic sites near the current coastline is among the highest in Europe, suggesting that they are part of a larger network of settlements including the now submerged areas of the continental shelf. -The continental shelf of northern Spain is very narrow. Therefore, the area to be explored is relatively small, and the potentially submerged sites should be close to the current coastline. -There are submerged karstic areas, similar to areas with known cave and rock shelter sites, that can be explored. The results of a preliminary intensive exploration performed with the research vessel Ramón Margalef are discussed in this communication.

Keywords: Submerged Prehistoric Sites; Underwater Archeological Survey; Submerged Landscapes; Paleolithic; Mesolithic; Spain

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Paléogéographie de la Baie de Bourgneuf depuis la fin de la Transgression flandrienne

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In the Collective Project on the Bay of Bourgneuf (Dieulefet et al. 2020-2023), a palaeogeographic approach has enabled the proposal of a schematic evolution of the bay during the Holocene in four foundation phases, which are quite different from the model established and used until today (Verger 1957, 2009). This scheme identifies the Fromentine gully as the key to the evolution of the Bourgneuf bay after the Holocene glacial retreat.

The studies carried out have made it possible to identify the sedimentary structures and thus to show the filiation of the geomorphological processes that took place on either side of the Fromentine Gully, to locate the fossil peat bogs or to measure the evolution of the sedimentary environments. All of which allows us to affirm that the Fromentine Gully is none other than a breach in the barrier beach that connected Noirmoutier to the rocky promontory of the Pont d'Yeu.

The consequences of such a conclusion are crucial, since the opening of the breach, in addition to being the origin of the insularity of Noirmoutier in protohistory, is a violent process that has led to regressive erosion that is still ongoing. More generally, the hydrodynamics of the Bourgneuf bay are at the origin of a new model and of particular currents that have been wisely exploited by the riverine populations, making the Bourgneuf bay an original development model around the island of Bouin and the Daim canal.

The presentation is divided into 4 parts. The first describes the post-glacial relief in order to better understand the eustatic dynamics and the evolution of the coastline. The second allows us to characterise the Holocene sedimentation and to note the anachronism between the development of the peat bogs, the fixation of the gravel-beach barrier and the presence of the Fromentine gully. The third is devoted to the opening of the Fromentine Breach and its impact on the relief and the passage of the Gois. Finally, the fourth chapter examines the relationship between the particular hydromorphology of the Bourgneuf bay and the ancient developments.

Keywords: Bay of Bourgneuf; Noirmoutier; Palaeogeographic Approach; Schematic Evolution; Holocene; Island

Poster presentation in session D2: Where Land meets Sea: Transdisciplinary Approaches to Investigate Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Adaptation des sociétés aux évolutions hydromorphologiques de la Basse-Loire en lien avec les changements climatiques

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Les études archéologiques et environnementales menées sur la Basse-Loire depuis le début des années 2000 ont permis d'identifier les cycles hydrologiques du fleuve répondant à des changements climatiques et/ou à des forçages anthropiques et d'en mesurer les conséquences sur l'activité des sociétés riveraines.

Cette connaissance approfondie de l'évolution du fleuve permet aussi d'appréhender plus facilement la nature et la localisation des sites archéologiques sachant que les périodes de calme hydrologique sont propices à l'installation d'aménagements fixes dans le lit de la Loire (duits, chaussées, pêcheries, quai…). Elle limite aussi les biais prospectifs par une meilleure compréhension de la taphonomie des vestiges archéologiques qui, selon l'hydromorphologie passée du fleuve, ont potentiellement été enfouis ou détruits.

La présentation est structurée en 4 parties. La première traite de l'évolution hydromorphologique du fleuve après la transgression flandrienne par l'identification des entités géomorphologiques témoins de son état passé. La seconde revient sur le séquençage des cycles hydrologiques et leur déclenchement dû à un changement climatique et/ou un forçage anthropique. La troisième rend compte des conséquences taphonomiques de l'évolution hydromorphologique de la Loire. Enfin, la quatrième partie est consacrée à l'adaptation des sociétés riveraines aux évolutions du fleuve grâce aux résultats de plusieurs opérations archéologiques (le port antique de Rezé et les aménagements médiévaux et modernes dans le lit du fleuve).

Keywords: Fleuve; Climat; Archéologie; Taphonomie; Paléogéographie; Antiquité; Moyen âge

Presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

Guns and a mysterious warship: Traces of the Swedish Navy in Mecklenburg Western-Pomerania

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In 2016, the archaeological assessment of a geophysical anomaly along the Nord Stream 2 gas pipeline route led to a surprising discovery: the wreck of a small warship was found in shallow water at the entrance to the bay of Greifswald in northeastern Germany. The armament and inventory indicated an early 18th-century date and linked the vessel to the Swedish navy. The site was left in situ, protected by an exclusion zone and monitored; however, systematic investigation only commenced in 2023 with the organisation of annual Maritime Archaeology Summer Field Schools, which were conducted in collaboration with the State Authority for Culture and Monuments in Mecklenburg-Western Pomerania, as well as the universities of Leiden and Rostock. This paper presents the results of the recent investigations and sheds light on Swedish naval operations in Pomerania during the Great Northern War.

Keywords: Navy; Sweden; Baltic; Shipwreck; Pomerania; Fieldschool

Presentation in session G2: The Lost Navy (Patrik Höglund, Niklas Eriksson, Minna Koivikko)

Impacts of climate change at coastal and shallow submerged archaeological sites in the Aegean and Ionian Sea and remediation strategies

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Coastal erosion is one of the most serious threats in the Mediterranean affecting ancient harbour-cities, today partly submerged, coastal fortifications of all periods, industrial installations, sea-front communities, as well as shallow-lying architectural remains and shipwrecks, among many other remains, that will be severely impacted or disappear in the near future. Several monitoring strategies have been proposed, as well as advanced documentation techniques to digitally save cultural heritage that is in imminent danger or enhance its in situ protection. This paper explores these challenging issues as they have been observed and monitored at certain ancient harbour-cities in the Aegean and Ionian Sea in Greece. It discusses the problems of conservation that we face during coastal and underwater archaeological fieldwork and monitoring techniques through decades, the lack of adequate preservation measures after excavation, but also issues of data resolution in recorded databases that we are creating and using for monitoring purposes employing diverse recording methods and techniques. Finally, we will discuss remediation strategies that can be adopted mainly by developing high resolution underwater and coastal surveying technologies, as well as enhancing the upskilling and reskilling of the new blue skill force of Europe in academic and life-long learning level in order to tackle more efficiently the imminent challenges our maritime cultural heritage is currently facing.

Keywords: Coastal erosion; Aegean and Ionian Seas; Monitoring; Life-long learning

Presentation in session O1: Preserving of UCH (Jordy Moies)

Legal framework for scientific diving in Spain: theory and practice

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Spain has been a member of UNESCO since 1953 and a signatory to both the 2001 Convention and the 2009 Convention on the Protection of the Underwater Cultural Heritage. As a nation with an extensive coastline, Spain recognises the extraordinary archaeological potential that lies beneath its waters and the importance of preserving its underwater cultural heritage.

In response to the value of UCH, underwater archaeological excavations have been carried out by public institutions and private companies since the 1980s. However, the practice of scientific diving, and in particular archaeological diving, faces a poorly developed regulation in Spain, which is closely linked to the regulations applied to commercial diving.

The first mention of scientific diving in Spanish law is found in the *Order of 14 October 1997*, which clearly specifies that it is governed by commercial diving regulations. *Royal Decree 550/2020, of 2 June*, continued to fail to provide specific regulations adapted to the needs of scientists. This fact limits scientific development relating to research and care of the sea.

Therefore, this poster aims to encourage reflection, share experiences, gather opinions from different specialists and discuss strategies to develop scientific diving on a solid and sustainable basis. The following topics, based on the Spanish experience, are raised for discussion: the requirements for diving training, the necessary qualifications, the working tools and whether or not scientific diving should be separated from commercial diving.

In the absence of formal training, the need to train future scientists has led to the creation of individual and original initiatives by various institutions. In this context, the innovative solutions developed within the framework of the Master's Degree in Nautical and Underwater Archaeology of the University of Cadiz are presented. This programme includes a month of practical training, both in the pool and at sea, with the aim of providing students with all the necessary skills, both in archaeology and diving, to participate in underwater excavations.

Keywords: Scientific Diving; Commercial Diving; Legislation; Training; Sustainability of the Seas

Poster presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

Inventory and Georeference of Maritime Cultural Heritage in Portugal

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In recent years, Portugal has made significant updates and improvements to its archaeological information management system, as well as the associated Geographic Information System (GIS) regarding underwater and maritime archaeology.

This paper presents the historical background of this system, alongside the conceptual frameworks, challenges, and methodologies that have shaped the recent systematization of archaeological data pertaining to terrestrial, mixed, and underwater environments, including their georeferencing processes. It aims to raise critical questions such as: what connections have been established between archaeological remains and written sources how these connections are exposed; which information remains public versus confidential; and how this data is disseminated.

These decisions are key concepts that are often underestimated within archaeological research, despite their profound implications for the protection, preservation, and enhancement of underwater and maritime cultural heritage. Furthermore, they are indispensable for ensuring effective governance and management of this unique, highly vulnerable, finite, and non-renewable underwater and maritime cultural heritage.

By adopting this approach, the Portuguese State aims to adhere to its legal obligations, oversight responsibilities, and international commitments, including the 1992 European Convention on the Protection of Archaeological Heritage, the 2001 UNESCO Convention on the Protection of Underwater Cultural Heritage, and the 2009 Faro Convention on the Value of Cultural Heritage for Society.

Keywords: Maritime Archaeology; Underwater Archaeology National Center; Inventory of Archaeological Heritage; GIS

Presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Underwater Archaeology in the Lower São Francisco River, Brazil: the shipwreck of Neópolis, Sergipe (eighteenth – nineteenth centuries)

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This communication presents the results of the research carried out in a shipwreck archaeological site, located in downtown Neópolis, state of Sergipe, Brazil. About 50 meters away from the river port, between 5 and 10 meters deep, the site is formed mainly by the remains of a wooden vessel with copper sheathing, sunk between the end of the eighteenth century and the first decades of the nineteenth century.

The main objective of this presentation is to report the scientific data obtained so far, as well as to discuss the continuity of the work.

There is a strong justification to develop the next steps of the research, beginning with the fact that the archaeological site is extremely important for the History of Brazil. It is most likely related to the country's Independence (*c.* 1822). In addition, it is located very close to the riverbank, at a shallow depth, making it easy for looters. Nevertheless, the site is also threatened by great variation of tide, intense rain or drought, hydropower plants water flow control, salinity and sewage discharge, which creates difficult conditions for the study and conservation of the site. On the other hand, this same proximity with land is an excellent opportunity to local community get involved in the protection of the archaeological site, stimulating the diffusion of the importance of the Underwater Cultural Heritage (UCH) in a country that has not yet ratified the 2001 UNESCO Convention.

Finally, the characteristics of this cultural resource and the easy access to it would: 1, allow systematic and frequent monitoring of conservation conditions; 2, promote a long-term fieldwork school for undergraduate and graduate students; and 3, develop scuba diving heritage tourism. These initiatives would allow a great advance in terms of valuing the UCH in the country, still threatened by contemporary treasure hunting.

Keywords: Brazil; São Francisco River; Shipwreck; UCH; Colonial Independence; Local Community

Presentation in session G5: Shipwreck Studies (Marnix Pieters)

The 17th century ‘Ore-shipwreck’ in Gdańsk harbour fairway area and its cargo.

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The F53.15 ‘Ore-shipwreck' constitutes the remains of a midsize sailing ship of ca. 20 meters in length. The wreck was discovered in 2009, is located on Bay of Gdańsk (Baltic Sea) in Gdańsk harbour fairway area, ca. 700 meters north of Westerplatte, at a depth of 5 meters. The ship was made of wood originating from the region of Gdańsk Pomerania in the first half of the 17th century. The ship’s tonnage (capacity) is estimated at ca. 60-70 lasts.

The ship carried iron ore (osmund) in 78 pine barrels, as well as ca. 200 iron rods. In the bow part of the wreck, columns of stacked semi-finished vessels made of brass sheet were recorded. The ship’s load was probably imported to Gdańsk from Sweden, and after processing in Gdańsk, was scheduled to be carried further, in full or in part, to the Western European ports. The cargo discovered on the wreck weighs about 25 tons (10-12 lasts). During the disaster, the vessel was not fully loaded or part of the cargo was recovered soon after it. Probably the ship, stranded, protruded above the water surface, which allowed to save part of the cargo.

This situation corresponds to the shipwreck described in the book written by the mayor of Gdańsk. As it was noted in 17th December 1623 powerful windblow pushed the merchant vessel sailing fromSweden to Gdańsk towards the shore. Eventually it crashed in the area of the entrance to the port in front of the Wisłoujście Fortress. On 18 December, Gdańsk merchants and shipowners Hans Schultze, Zacharias Wohlsen, Alexander Demdster, Peter Corneliesen and Mathias Clemens appeared in front of the mayor's office. On behalf of themselves and the absent skipper Michael Kitzerow, they filed a complaint about the clumsy rescue operation carried out by the Dutch skipper Simon Volkeers. The merchants applied for the return of the salvaged part of the goods stored in the Wisłoujście Fortress. A total of 284 barrels with Swedish osmund, 1 with copper and 1/2 barrel of salmon marked with the marks described by the merchants were excavated.

Keywords: Ore; Shipwreck; Baltic Sea; Bay of Gdańsk; XVII Century; Brass Vessel

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

No country for old ships? First millennium watercraft and water transport in the southern North Sea region of the European mainland. Evidence, challenges and potential for nautical archaeological research

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The distribution maps for nautical archaeological evidence in Northwest Europe during the first millennium A.D. had been mostly blank in the southern North Sea region of the Northern Netherlands and North Germany. This void between the beacons of evidence in Denmark and the western Baltic Region in the North and the Rheine-Meuse Scheldt delta in the West left room for a number of hypothesis on the development of early watercraft and shipping for a long time. Despite a cultural landscape characterised by intertidal marshlands, river estuaries and artificial dwelling mounts to protect its inhabitants from spring tides, ships and shipping were rarely an integrated part of archaeological research in this region.

Recent studies at the NIhK (Lower Saxony Institute for historical coastal Research), funded by the ministry for research and culture of the federal state of Lower Saxony, was focussing on this circumstance. During research in archives and storages of local archaeology departments and museums, new nautical archaeological evidence was identified and old finds and features re-assessed as well as digitally documented and put into context. It was possible to fill blank spots with evidence for early water transport in relation to inland waters and the Sea.

This talk will present the results of this archaeological study; the challenges that nautical archaeology on early shipping faces today in the southern North Sea region, its Museums and in storages; but also the potential this widely waterlogged and today completely re-shaped landscape holds for future research.

Keywords: Southern North Sea; First Millennium A.D.; Watercraft; Maritime Cultural Landscape

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

The Early Urban Development of Antwerp: Archaeological Insights in a Riverine Context

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This paper explores the urban genesis of Antwerp during the Early and High Middle Ages, with a focus on the role of the Scheldt and Schijn rivers in shaping the settlement's growth, trade, and identity. The rivers provided crucial infrastructure, influencing the city's spatial organization and development. From the late 10th century, the Scheldt also became an important political boundary, impacting regional power dynamics.

Drawing on both older and more recent archaeological excavations, this presentation examines how new findings have enhanced our understanding of the early settlement's morphology and identity. The excavations offer crucial insights into how the settlement was structured and how it interacted with its riverine environment. Furthermore, this paper highlights the role of archaeological research in revealing the physical and social dynamics of Antwerp's early urbanization. In addition, the paper reflects on how understanding the city's historical relationship with its riverine context can inform and inspire future spatial developments along the waterfront, offering opportunities for sustainable integration of the city's heritage.

Keywords: Riverine Landscapes; Urban Genesis; Middle Ages; Trade Networks

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Vestigium Project: Paleobiological Heritage in the Intertidal Landscape

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The **Vestigium Project** seeks to foster the social development of intertidal territories through scientific research on the cultural and natural heritage of six key sites along the coast of Cádiz, Spain. By integrating archaeological, documentary, and paleobiological studies, the project enhances the interpretative narratives used by cultural and environmental stakeholders in various tourist routes, contributing to the sustainable development of this Andalusian coastal region.

A fundamental aspect of this initiative is the application of paleobiological methodologies to address the limited public awareness of paleontological sites from different geological periods, including the **Pliocene** (3.5 million years ago), the **Pleistocene** (780,000 years ago), and the **Holocene**. These timeframes correspond to significant climatic and ecological transformations, as well as interactions between past human populations and the southern European coastline.

The project has already yielded significant discoveries, such as over **600 Early Pleistocene animal footprints** found in Tarifa, providing valuable evidence of prehistoric faunal activity. Additionally, traces of domesticated animal footprints, teeth, and plant root remains, dated to the **Middle Ages**, have been identified near archaeological structures that were later submerged due to marine transgressions, potentially indicating human presence in the area. Another noteworthy finding is the presence of shell middens, initially believed to be recent, but now radiocarbon-dated between the **Middle Ages and the Early Modern Period**. These results not only expand our understanding of past landscapes but also offer critical insights into long-term environmental changes and their implications for present-day biodiversity management.

Beyond its scientific contributions, the Vestigium Project aims to integrate these findings into heritage conservation and public outreach efforts. The results will be disseminated in academic journals, but their most profound impact will come from their incorporation into the cultural and eco-tourism routes being developed by local governments and private enterprises. By bridging scientific research, cultural heritage, and regional development, the project underscores the importance of preserving intertidal ecosystems while making their historical significance accessible to both scholars and the general public.

Keywords: Paleobiology; Intertidal Heritage; Pleistocene Footprints; Archaeological Sites; Biodiversity Management; Eco-tourism

Poster presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Open access and legacy data on underwater cultural heritage inventories: an experience on the Tagus Mouth (Portugal)

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Over the last few decades, a growing number of scientific and economic activities have made frequent use of geophysical methods, including geology and oceanography studies, prospection of submerged resources, coastal monitoring programs or studies conducted prior to the installation of infrastructures, such as submarine cables or offshore energy structures. The data collected in these campaigns is a source with considerable potential in underwater archaeology, especially when carried out in areas with difficult diving conditions, as is the case with the area at the access to the port of Lisbon. The SUNK project was designed to use a minimum impact methodology on that area, allowing for a sustainable study and management of the underwater cultural heritage existing at the mouth of the Tagus River. The research included an assessment of multibeam and magnetometer data, open access or made available by Portuguese public institutions. They provided the location of targets that revealed, during diver inspection previously unknown archaeological sites, but which were also used in the site recording and monitoring.

The sites were surveyed using georeferenced photogrammetry on a yearly basis. This non-intrusive strategy makes it possible to monitor the evolution of archaeological sites through direct observation and quantitative analysis of geophysical data and photogrammetry. It also provides data for the systematic characterization of the archaeological sites, as distinct areas of the wrecks are exposed over time.

Research conducted since 2018 has allowed us to document and monitor previously known sites, like Bugio 1 (c. 1700) and Bugio 2, which is probably the remains of the Portuguese nau *São Francisco Xavier* lost when returning from India in 1625. Furthermore, eight other Modern-Age shipwrecks were discovered, the most outstanding being Parede 1 and Carcavelos 12, featuring artillery ordnance and ammunition, dating from the early 18th century or late 19th century, and probably related to the Napoleonic Wars.

This paper will explore the potential of open access and legacy data on underwater cultural heritage research, particularly in the implementation of a minimum impact methodology.

Keywords: Tagus Mouth; Early Modern Archaeology; Maritime Archaeology; Cultural Heritage Management; Inventories

Presentation in session M1: An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Two Decades of contributions from preventive archaeology in the French maritime space

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In recent decades, the protection of French maritime cultural heritage has faced the growing impact of development projects in coastal and offshore sectors: port infrastructures, telecommunications or energy transmission cables, anchorages, dredging, offshore wind farms, etc. Occasionally, projects were monitored as early as the 1980s and examined by the DRASM; however, it was with the Heritage Code in 2001 that the legal framework for preventive archaeology, a public service mission, was very clearly defined "on land and underwater" with the aim of "detecting, conserving, or safeguarding archaeological heritage through scientific study" within appropriate timeframes. In 2011, a dedicated unit was set at INRAP to carry out the Ministry of Culture's requirements for underwater preventive archaeology. As part of the system of the at-sea 'evaluation', the DRASSM acquired specific resources in 2012 to meet operational requirements in order to inventory and contribute to the updating of the national archaeological map, as well as to study and protect through research; but also to preserve sites and collections and promote the efforts of an ambitious policy serving a common good, the maritime heritage.

In this context, for nearly 15 years, the development of preventive archaeology of the maritime space, an integral part of archaeology, has been strengthened. Based on development projects and examples of maritime preventive archaeology operations (diagnostics, excavations and 'evaluations'), scientific and methodological contributions will be presented. This progress report will present the lessons learned for the preservation of maritime cultural heritage, a common European and human property in light of the 2001 UNESCO Convention on the protection of the underwater cultural heritage. It will also provide an opportunity to look ahead to the need to continue developing multidisciplinary and pluridisciplinary cooperations, while keeping a full attention on future geostrategic challenges, including climate change, new technologies and serving the general interest.

Keywords: Preventive Archaeology; France; Development-led Archaeology; Scientific Contributions; DRASSM

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

L'agglomération portuaire gallo-romaine de Pommeroeul et son chaland (Belgique, Hainaut)

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C'est au cours de l'été 1975 à Pommerœul, lors de travaux de terrassement du canal Hensies-Pommeroeul, que des objets archéologiques sont mis au jour à 2,5m de profondeur. Léonce Demarez, archéologue amateur, est le premier sur les lieux, puis les archéologues du Service National des Fouilles, Guy de Boe et François Hubert investissent la zone.

Les vestiges permettent de révéler un site occupé de la période néolithique à l'époque romaine. L'occupation la plus importante se dévoile sous la forme d'une agglomération portuaire gallo-romaine située au croisement de la route Bavay-Blicquy et de la rivière, La Haine. Une situation qui lui confère un rôle commercial et artisanal prépondérant dans la cité des Nerviens.

Le site de Pommeroeul est connu pour son matériel archéologique hors du commun, tels que de nombreuses chaussures et surtout des embarcations gallo-romaines dont un chaland et une pirogue.

Grâce à une mobilisation des équipes et des pouvoirs publics, ce mobilier archéologique exceptionnel, propriété du SPW/AWaP, a pu être conservé et restauré pour être finalement exposé à Ath, à l'Espace gallo-romain.

50 ans après la découverte du site où en sont les connaissances ? Comment ces vestiges sont-ils mis en avant par l'Espace gallo-romain ? Les bateaux sont-ils visibles du grand public ? Comment ces vestiges sont-ils conservés ?

It was during the summer of 1975 in Pommerœul, during earthworks on the Hensies-Pommeroeul canal, that archaeological objects were unearthed at a depth of 2.5 metres. Léonce Demarez, a local archaeologist, was the first on the scene, followed by archaeologists from the National Excavation Service, Guy de Boe and François Hubert.

The remains revealed a site occupied from the Neolithic period through to Roman times. The most significant occupation took the form of a Gallo-Roman port settlement located at the intersection of the Bavay-Blicquy road and the river, La Haine. This location gave it a prominent commercial and artisanal role in the city of the Nervii.

The Pommeroeul site is known for its extraordinary archaeological finds, such as numerous shoes and, above all, Gallo-Roman boats, including a barge and a dugout canoe.

Thanks to the efforts of teams and public authorities, these exceptional archaeological artefacts, owned by the SPW/AWaP, have been preserved and restored and are now on display in Ath, at the Espace Gallo-Romain.

Fifty years after the discovery of the site, what is the current state of knowledge? How are these remains showcased by the Espace Gallo-Romain ? Are the boats visible to the public? How are these remains preserved?

Keywords: Chaland; Rivière; Bateau; Pommeroeul; Gallo-romain; Agglomération; Port

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Two Danish slave ships in Costa Rica? Community-Based Archaeological Investigation of Cahuita's Underwater Wrecks.

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One of the most historically well-documented Danish slave voyages took place from 1708-10. The ships *Fridericus Quartus* and *Christianus Quintus* left Copenhagen in late 1708 and arrived at the Danish forts in present-day Ghana, where 800 enslaved Africans were forced on board. After a difficult journey and short on food and water, the ships arrived in the Caribbean in January 1710. Due to navigational errors, the ships never made it to the Danish West Indies, but sailed more than a thousand nautical miles too far, before being abandoned on a Central American coast.

Crew members as well as logbooks eventually made it back to Copenhagen, while the enslaved where set free on the unknown coast. But where were the ships?

In the coastal waters of Costa Rica in the Caribbean inside Cahuita National Park, lie two shipwrecks, potentially the wrecks of the two Danish slave ships. Prior investigations suggested a connection to the transatlantic slave trade. Detailed examinations reveal two distinct wreck sites, with one displaying cannons, anchors, and scattered bricks reminiscent of the fate of Christianus Quintus. The second wreck, presents a unique preservation scenario with neatly stacked bricks hinting at potential ship remnants beneath.

This project is an example of community archaeology, where local community steward the process and actively participate in exploring and preserving their maritime heritage. The photogrammetric models done in May 2023, defined the position of the wrecks hidden under the sediment, and furthermore guided the fieldwork and the excavation which was carried out in September 2023 in collaboration with Centro Comunitario De Buceo Embajadores & Embajadoras del Mar, Costa Rica's National Museum and the national park authorities SINAC. A small test excavation in the area where the bricks were stacked on the assumed wreck of *Fridericus Quartus*, revealed intact structural elements and providing a glimpse into the ships' tragic history. Well-preserved bricks, burnt wood, ship's timber and clay pipes, were recovered and ongoing analyses are contributing to our understanding of what happened to the ships, the enslaved and the crew.

Keywords: Community Archaeology; Slave Ship, Photogrammetry; Excavation; Natural Science; Costa Rica

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

Non-intrusive Approach to the Naval Architecture of the San José Galleon

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This paper addresses the progress in the study of naval architecture of the *San José* galleon. The state of the art, the theoretical framework and the main written and iconographic sources are shortly presented. The visible wooden structures in the main site were traced in an open-source Geographic Information System (GIS). This graphical output is associated with a table of attributes that contains the quantitative and qualitative characterization of the ship timbers. Finally, eighteenth-century lines drawings have been superimposed to the archaeological record and two Blue Prints for three-dimensional modelling of the hull have been created based on the works of Gaztañeta.

Keywords: San José; Galleon; Naval Architecture; GIS; 3D Modelling; Nautical Archaeology

Presentation in session K3: Digital Reconstruction of Shipwrecks (Hendrik Lettany)

Quantum Entanglements: Tangible and Intangible Underwater Cultural Heritage in Africa

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In quantum theory, entanglement refers to particles becoming linked so that the state of one instantly influences the state of another, regardless of distance. In this keynote lecture, I consider the issue of entanglement in the underwater tangible and intangible cultural heritage of Africa. The focus is on three places and cases: South Africa (and the role of the undersea in configurations of ancestral connections), Lamu, Kenya (and the role of submerged cities and buoyant boats in the crafting of history and identity) and third, Namibia (and the role of Shark Island, Skeleton Coast and the offshore, in shaping historical memory of colonialism, genocide and new narratives of industrial heritage). The keynote lecture offers that, the underwater is hardly ever a homogeneous space in which specialists can identify clearly demarcated and politically untroubled 'heritage', the underwater is a place that is continuously being remade, rendered symbolic and spiritually powerful. Such spaces are contested, as different groups seek to imbue it with character and meaning that aligns with their values and ideals. Finally, there is 'sentience' in the underwater realm and the existence of intra-action (Barad 2007) there. The latter hints at diverse transmaterialities and diverse logics, which in turn further diversify the 'underwater', as a place of diverse 'identities' and becomings. These complexities diversify what we understand by underwater tangible and intangible cultural heritage since 'heritage' is not merely that which can be cognitively apprehended by humans, much 'heritage' lies beyond our perceptual abilities.

Keywords: Quantum theory; entanglement; South Africa; Kenya and Namibia.

Keynote lecture

Investigating the Existence of Roman Sailortowns: A Comparative Archaeological Study

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This paper examines the applicability of the sailortown concept—historically associated with the maritime districts of early modern Euro-American port cities—to the Roman world, using a comparative archaeological approach. Drawing from historical research on the social dynamics of sailortowns, this study identifies key social characteristics of these spaces, including ethnic diversity, high crime rates, a significant sex work industry, and a vibrant hospitality sector. These characteristics are then used to interpret archaeological evidence from Victorian London's Ratcliffe Highway, allowing for the development of an "archaeology of sailortowns"—a framework for identifying these urban-maritime spaces in the material record. This model is then applied to Pompeii, a well-documented but relatively small Roman port town, to assess the extent to which its waterfront districts align with the sailortown pattern. The findings suggest that while distinct cultural differences exist between Roman and Victorian societies and ports, archaeological evidence from Pompeii exhibits notable parallels with the sailortown model. Furthermore, both case studies highlight the diverse and dynamic nature of sailortown spaces, challenging the notion that they are confined to the context of Euro-American empire. This study contributes to the broader discourse on Roman urbanism and maritime archaeology, offering new perspectives on how transient maritime communities shaped the social and material landscape of port cities across different historical periods.

Keywords: Sailortowns; Port Cities; Maritime-urban Landscapes; Pompeii; Euro-American Imperialism; Urbanism

Presentation in session D1: Underwater Landscapes of the Ancient Meditterranean (Mari Yamasaki, Emilio Rodríguez-Álvarez)

The British Massey Pump: the Amazing Innovation That Did Not Save Franklin

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This paper will describe the innovative Massey Patent bilge pump, deriving information from archival sources as well as archaeological evidence. Only three Massey pumps are known to be in existence, all of them on British Arctic shipwrecks in Canada: one was found in 2010 on the wreck of HMS *Investigator*, a second in 2014 on the wreck of HMS *Erebus* and a third in 2016 on the wreck of HMS *Terror*. Of the three pumps, only a pump head from HMS *Erebus* has been raised and studied. These pumps are highly praised in historical sources, by captains and those using them alike. Crafted from cast copper alloy in an innovative design, they featured a groundbreaking dual-action design, enabling them to both draw in and expel water with remarkable efficiency, at every stroke of the pump brake. The *Erebus* pump under study originated from Sir John Franklin's flagship of the ill-fated 1845 expedition to discover the Northwest Passage side-by-side with HMS *Terror*. Departing from England, the expedition ended in disaster with both ships becoming beset in ice and deserted by their crews in 1848. The passage was ultimately found by the crew of the HMS *Investigator* in 1853 while searching for the lost Franklin expedition. To fully grasp the context in which these pumps were used on board, in conjunction with common bilge pumps, it is essential to understand the Franklin expedition and the underwater archaeological site of the HMS *Erebus*. Additionally, to appreciate the innovation behind Massey pumps, a brief exploration of the evolution of ship bilge pumps, their mechanisms, and their underlying physics is fundamental.

Keywords: Arctic; Underwater Archaeology; Shipwreck; Water Management

Presentation in session G3: Trying Not to Sink: Managing Water on Ships (Thierry Boyer)

Management and Protection of Underwater Archaeology: A Perspective from Ireland

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Since the National Monuments Act was amended in 1987 to afford protection to all wrecks over 100 years old, the Irish State has been committed to developing a capacity to deal with the responsibilities resulting from such far-reaching legislative change. To address these responsibilities, the Underwater Archaeology Unit (UAU) of the National Monuments Service was set up in 1997 to deal with the management and protection of underwater archaeology in Ireland. The UAU has a wide brief in relation to the protection of underwater cultural heritage (UCH) and has developed a threefold approach in this regard. The approach comprises: 1) designating sites and compiling an inventory of historic wrecks as a management resource, 2) providing guidance on archaeological mitigation to minimize development impacts in marine settings, and 3) conducting dive surveys, excavations, and studies of significant wrecks and archaeological sites.

This talk will illustrate the range of strategies the NMS is employing to document, map, and protect underwater sites and will discuss some of the challenges faced when dealing with climate change, treasure hunting, and a growing threat from salvors of wrecks in Irish waters. Additionally, the role of the National Monuments Service in the planning process will be highlighted, emphasizing its efforts to ensure that marine developments—such as offshore wind farms, subsea cables, pipelines, and oil and gas infrastructure—do not adversely affect UCH.

Recent heritage legislation enacted in 2023 further strengthens the protection of UCH and positions Ireland to ratify the 2001 UNESCO Convention, with hopes for ratification in 2025, pending government approval. The paper will also present an overview of the results from some of the dive projects carried out by the UAU over the last 25 years, demonstrating how these initiatives foster greater public awareness and appreciation of this aspect of our cultural heritage.

Keywords: Heritage Management; Wrecks; Legislation; UNESCO; Development; Survey; Inventory

Presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Mapping, Documenting, and Inventorying Shipwrecks off Ireland's Coast and Inland Waterways

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Since the amendment of the National Monuments Act in 1987, granting protection to all wrecks over 100 years old, the Irish State has been dedicated to developing the capacity to actively map, document, and preserve historic wrecks in Irish waters. As part of these efforts, a three-year project concluded in 2000, creating an inventory of approximately 7,000 historic wrecks. This initiative laid the groundwork for ongoing efforts to expand the database, incorporating newly discovered wrecks, validating locations through ground-truthing, and enhancing the quality and accuracy of the information. This presentation will provide an overview of the Wreck Inventory of Ireland Database (WIID) and its online viewer which now contains records for over 18,000 wrecks. It will trace the evolution of the inventory over the last 25 years, highlighting its vital role as a management resource for state authorities regulating archaeological activities. Additionally, the WIID supports other governmental departments, including the Navy, Department of Defence, Receiver of Wreck, and planning regulators, to minimize development impacts on these underwater cultural heritage sites. Collaboration has been fundamental to these efforts, particularly with initiatives like INFOMAR, which focuses on mapping Ireland's seabed and locating wrecks. Equally important is the engagement with local divers, fishermen, and the general public. Their input has been instrumental in reporting and documenting numerous new discoveries annually, enriching the database further. This talk will highlight the range of strategies the NMS employs to safeguard underwater heritage which includes an active programme of diving, surveys and investigating wrecks while also addressing challenges such as climate change, treasure hunting, and threats posed by salvage. It will also discuss the impact of recent heritage legislation enacted in 2023, which mandates the maintenance of an inventory of historic wrecks. This legislation further bolsters the protection of underwater cultural heritage and aims to secure additional resources for this critical work.

Keywords: Shipwreck Inventory; Heritage Protection; Wrecks; Diving

Presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

Archaeological investigations of the submerged stone structure Blinkerwall- Preliminary results

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In the autumn of 2021, geologists conducting a high-resolution multibeam echosounder survey off the German coast in the southwestern Baltic Sea discovered a curious stone wall almost 1 km long in 21 m of water. The structure is located on basal till close to the shoreline of a sunken lake and has a number of features that suggest an anthropogenic rather than geological origin. The stone wall, named 'Blinkerwall' in reference to its geographical location, was the focus of further multi-disciplinary investigations in 2022 and 2023. These have led to the current hypothesis that the structure may represent a Late Pleistocene or Early Holocene reindeer hunting track.

The study of the "Blinkerwall" offers a unique opportunity to understand the traditions, subsistence strategies, mobility patterns, hunting strategies and territorial developments of the first hunter-gatherers to follow the retreating ice sheets in northern Europe. However, due to its depth, size and lack of comparable studies in the Baltic Sea, archaeological field work is challenging.

In this paper we want to give an overview of the archaeological activities carried out in 2024 and 2025 and discuss further interdisciplinary methodological approaches for the study of this and other submerged Stone Age megastructures in the Baltic Sea.

Keywords: Baltic Sea; Stone Age; Drive Lane; Field Work; Hunting Architecture

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

An interpretation of drill construction & operation based on Homer's description in the Odyssey.

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Drill was one of the most popular tools in the shipwright toolbox all over the history.

The drill described in Homer's Odyssey was operated by at least three workers and described as the one used to drill on ship's plank.

I, throwing my weight upon it from above, whirled it round, as when a man bores a ship's timber with a drill, while those below keep it spinning with the thong, which they lay hold of by either end, and the drill runs around unceasingly… (Odessey, book IX:383–386, translated by Murray)

In our interpretation of the drill, we state that one worker pressed the drill down and the other two or more workers were applying the moment needed to the rotation of the drill. A thorough reading of Homer's text led us to the understanding that the workers were applying the rotating moment on the drill simultaneously means their forces were added up and balanced to keep the bending moment on the drill shaft as minimal as possible. Among the setup options offered in this work, a hypothetical structure of a drill that consists of a closed loop thong operated by two workers was chosen. In this solution, the drill rotates continuously in one direction and the drill bit has a Single-bevelled sharpened tip. Calculations of the force and the moments applied in the solution offered were made according to the estimated force an average worker can produce. The solution seems to satisfy the 'technical specifications' derived from Homer's text as well as the production abilities and materials available in Homer's era.

Keywords: Homer; Odyssey; Bow-drill; Ship-building; Moment

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Projects to enhance the Cultural Heritage of the Aquatic Environment in the Madeira Archipelago

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The Madeira Archipelago has been of particular importance in world expansion since the 15th century. Although previously mentioned in some sources, it wasn't until Portuguese colonization that this territory was given the role of an interlocutor for sailors in the Atlantic. Currently considered one of the most attractive tourist regions, with frequent awards in this area, archaeology is beginning to gain a prominent place, not only in terms of preserving collective memory and cultural identity, but also as a tourist attraction. In recent years there has been a great increase in archaeological activity in the Madeira Archipelago, both on land and at sea. In a region where the orography limited the potential for occupying the territory, the sea and ingenuity, combined with the need for dignified survival, stimulated a large nautical industry. The Cultural Heritage of the Aquatic Environment is currently recognized as a key element in the humanized landscape and in the development of the Madeira Archipelago, and several projects have been carried out to enhance the Underwater Cultural Heritage.

The relative success of most of these projects has allowed us to develop a relationship with the local community, which is increasingly demanding with regard to the scientific results obtained and the way in which we make them available to the general public, without detriment to their potential in the work of maritime tourism operators sustainably working in the Madeira Archipelago.

In this sense, the development of underwater archaeology in the Madeira Archipelago has seen a recent increase in projects to enhance cultural heritage, which have been translated into research projects due to popular pressure, which has recognized the potential for tourism and for revealing cultural identity.

Keywords: Cultural Identity; Nautical And Underwater Tourism; Maritime Tourist Operators; Macaronesia; Transatlantic Navigation; Economic And Cultural Sustainability

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Community Waterscapes: A heritage-based interdisciplinary initiative to improve water awareness in Hull, UK

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This paper presents 'Community Waterscapes', an interdisciplinary research and knowledge exchange initiative at the University of Hull, UK, which works with communities to explore the city's rich cultural history and heritage of living with water. At its heart the project employs a participatory, 'bottom up' approach, working with residents to share, identify, record and understand locally significant watery history and heritage. In doing so, Community Waterscapes seeks to connect local heritage and community histories to contemporary environmental and social challenges, with an emphasis on growing community awareness and resourcefulness to future water hazards and climate change (addressing several UN Sustainable Development Goals 11, 13, 14, 17.)

Our presentation explores the ways in which the project has collaborated with communities in order to record and document local tangible and intangible heritage, discussing a series of heritage workshops, the creation of a publicly accessible digital story map, and an artistic engagement with the public. In doing so it shares some of the community created records from, significant landmarks and buildings around the city, favourite walks and changing landscapes, lived experiences of flooding, experiences of sailing or living by the water, local knowledge related to the dynamic Humber estuary, and multi-generational family histories of working in the maritime industry. Drawing upon these experiences we present how this process resulted in generating a dialogue around the intricate relationship between water, community and material culture and how various elements have collectively shaped people's understanding and experiences of watery environments over time.

As a result, we hope to present how Community Waterscapes has improved environmental awareness for those taking parts (e.g., flood risk and coastal erosion, expected to worsen with climate change) while simultaneously helping to reconnect people with their watery heritage, which had weakened since the collapse of the local fishing industry in the last quarter of the 20th century. We conclude by presenting how heritage and stories of the past have helped to develop the project participants' agency in being able to share, understand and document their own watery heritage.

Keywords: Maritime Heritage; Sustainable Development; Ocean Literacy; Hydrocitizenship

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

Chinese porcelain from shipwrecks as a tool for a chronological framework for cultural exchanges: a case study from the south of the Netherlands

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The supply of oriental porcelain played an important role in the emerging consumer society in early modern Europe. From the 16th century onwards, porcelain led to different patterns of consumption and appropriation with social competition, interactions with locally produced material objects and global imaginary. To grasp these processes, an interdisciplinary approach is required in which archaeological sources should not be missing as direct material evidence of the consumption of porcelain.

To become a chronological framework to study cultural exchanges caused by the import of Chinese porcelain, reliable dating of the porcelain found during archaeological excavations is essential. Porcelain from wrecks of East Indiaman that sank on their return voyage to Europe and from the inter-Asian trade are of inestimable value in this respect. In this case study, a practical application is illustrated for the southern Netherlands. In order to compare the Chinese porcelain found in the southern Netherlands (roughly today's Belgium) with that from shipwrecks, a typology had to be drawn up. A division was made into fabrics, shape types and decoration, further divided into decoration themes and decoration schemes. This resulted in search schemes in which the emergence, peak and disappearance of certain characteristics, such as decoration patterns, can be chronologically captured.

Combining dating elements from this typology can lead to the refined and reliable dating of objects. This is demonstrated for the south of the Netherlands. There are some challenges associated with applying this method, which is why the necessary criticism must be applied, which will be discussed in the presentation. The method applied to the southern Netherlands can also be applied to porcelain found elsewhere in order to better map the time frame of the supply and consumption of porcelain. To make the dating method easier to apply widely, a systematic typology of the porcelain from shipwrecks should be used in the future.

Keywords: Chinese Porcelain; Early Modern Period; Shipwreck Finds; Dating Methods; Consumption

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Assessing Pollution Potential Risk at Shipwreck Sites off the Irish Coast

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While shipwreck sites represent a vital form of underwater cultural heritage, many from the 20th century pose significant threats to the environment as potential sources of hydrocarbon pollution. These vessels, particularly from the First and Second World Wars, contain fuel reserves that are at risk of being leaked into the marine ecosystem. Ireland's geographical characteristics, namely its proximity to the British Isles and the English Channel made the island nation a frequent backdrop for vessels sunk in combat. Whether it was attributed to actions by surface and submarine craft, sea mines, and navigational mishaps, hundreds of oil-fueled ships now permanently rest on the seafloor around Ireland. The Instability and Pollution Potential Mapping of Irish Shipwreck Sites for a National Risk Assessment Database (I-PoINT) serves as an effort to create an inventory of these possible environmental disasters. Using three dimensional photogrammetric surveys, geochemical analyses, and CFD modelling, this project seeks to identify, map and rank the distribution of relevant shipwrecks. By preemptively categorizing these sites, government officials and heritage managers can consider remediation strategies, including oil removal, before disaster strikes. Similarly, predictive measures can help coastal communities plan for counteracting the toxic legacies of shipwrecks that are not candidates for mitigation. Researchers from interdisciplinary backgrounds are combining their expertise in archival records, remote-sensing, and machine learning to take the actions necessary to prevent catastrophe. This presentation will cover both the methodologies being utilized and specific cases to illustrate the importance of considering the often overlooked hazards of potentially-polluting wrecks, and how actions, both reliable and repeatable, can be taken in areas that lack the necessary inventories.

Keywords: Potentially Polluting Wrecks; Risk Assessment; Shipwreck Inventory; Ireland

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

The Maritime and Industrial Cultural Landscape of Baru during the 18th century: A Microregion in Cartagena de Indias (Colombia)

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The island of Barú, located to the south of the bay of the port of Cartagena de Indias, has historically been a territory of difficult access and control. During the 17th and 18th centuries, despite its proximity to the urban area of the city, it was conceived as an inhospitable area, characterised by dense mangrove and ragged vegetation that hindered its surveillance and regulation by the Spanish authorities. This isolation made it a strategic space where maritime transport through estuaries and mangrove channels played a central role in the dynamics of mobility and exchange.

These conditions made Baru a refuge for those seeking to escape colonial authority. The island served as a hideout for runaway slaves, deserters and illegal traders operating outside the law. Illicit trade found in Baru an ideal enclave for the circulation of goods outside government control, generating unofficial exchange networks that were integrated into the clandestine economy of the Caribbean.

At the same time, the island was also home to landowners who exploited its abundant resources through the hacienda system. Production units were established for extractive activities such as lime and salt mining, timber exploitation, as well as agriculture, fishing and livestock farming. Lime production, in particular, left a significant material imprint on the landscape, with the construction of kilns and wells that transformed the territory.

This paper analyses Barú as a micro-region within the territorial complex of Cartagena, exploring its geographical, economic and social particularities. It is based on the analysis of historical sources and recent biophysical studies to reconstruct its landscapes, as well as the analysis of the location of settlements and production areas, supported by an archaeological survey in one of the haciendas, historical cartography, military engineers' diaries and notarial documents from the 18th century. Based on these elements, the existence of a maritime-historical-industrial landscape in Barú is proposed, framed within the dynamics of Cartagena de Indias, but with particular characteristics that reflect the interaction between clandestinity, production and illegal trade.

Keywords: Lime Production; Maritime Cultural Landscape; Cartagena de Indias; Colombia; Hacienda; Micro-region

Presentation in session D4: The Double Narrative of Man and Water (Martina Seifert, Andreas Külzer, Aylin Güngör)

Intersectoral Model for the Management, Protection and Investigation of the Archaeological Context of the San José Galleon Shipwreck, Cartagena de Indias, Colombia

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One of the main challenges in the management of Underwater Cultural Heritage is the articulation of the entities responsible for its protection and conservation. The Colombian case is a particular one, since it was only at the beginning of the new millennium that the first initiatives for the management of this vulnerable heritage began to be structured. In the Caribbean, particularly, a large number of archaeological contexts have been recorded in both shallow and deep waters; in the case of the latter, the famous San José Galleon stands out. This ship, sunk during the Battle of Baru off the coast of Cartagena de Indias on the night of June 8, 1708, has been the focus of discussion for years. Therefore since 2022, the Colombian State, on behalf of the Sectors of Culture and Defense, with regulatory competence in the management of underwater heritage, worked together to carry out a joint initiative to ensure comprehensive protection of this shipwreck located 600 meters deep. Thus for the first time, entities such as the Colombian Institute of Anthropology and History (ICANH), the Ministry of Cultures, Arts and Knowledge, the Colombian Navy (ARC), and the Maritime Authority (DIMAR), with the support of the Ministry of Science, Technology and Innovation, joined forces to act on the matter. In this order of ideas, the purpose of this paper is to present and discuss the construction and application of the intersectoral model for the management, protection and study of the archaeological context of the San José Galleon Shipwreck. In this way, the main interdisciplinary results obtained to date, the challenges of this inter-institutional articulation, and the future challenges for the safeguarding of this context will be presented. Likewise, the work carried out by the academy with the local communities of Cartagena de Indias will be addressed as a strategy for the social appropriation of knowledge. In short, the integral management of the San José Galleon has been and will be possible only through the organized work of the different sectors of society and the direct and indirect impact they have on the region's Underwater Cultural Heritage.

Keywords: Intersectoral Model; Management; Protection; Investigation; San José Galleon; Cartagena de Indias; Colombia.

Poster presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Aquileia waterscape. Ships, routes and ports of the northern adriatic metropolis

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Aquileia, which was the most important Roman city on the Adriatic, was not built directly along the coast, which is low and sandy here, with a morphology that the ancient authors already defined as *importuosa* (unsuitable for portuality), but near a sort of hinge between the plain and the sea, that is, in a waterscape near the lagoon. The decision to found Aquileia right here was therefore lucid, it was a matter of exploiting a position that allowed an easily transport of goods to and from the inland, to be then exchanged with the merchant ships engaged in the Mediterranean routes.

Until not long ago, however, there was little evidence of the passage of ships in these waters, a situation that has changed since the spring of 2021. In recent years, no less than four new shipwrecks have been discovered in the waters of Grado, the barrier island that separates the Adriatic from the lagoon of the same name which, due to the rise in sea level, today covers part of what in Roman times was supposed to be the southern outskirts of Aquileia. Submerged ruins have been documented in the lagoon that suggest the existence of a widespread port, where cargo was transshipped from the larger ships to the flat-bottomed ones that could more easily reach the urban port, as well as travel the internal fluvial-lagunar routes that connected the entire Upper Adriatic arc.

In view of the information potential of this water territory, in 2023 the University of Udine launched a research project, called "Aquileia Waterscape. Ships, routes and ports of the northern Adriatic metropolis", aimed at better defining the relationship between the city with sea and lagoon; a study that is also possible thanks to the new technologies available, such as an aerial drone, equipped with hyperspectral and multispectral cameras, and an unmanned surface vessel equipped with sonar systems, built by our university's engineering laboratories to navigate in extremely shallow waters.

The presentation will be an overview of the results achieved so far through the research conducted on new wrecks and submerged structures.

Keywords: Waterscape; Lagoon; Adriatic; Aquileia; Shipwrecks; Inland Navigation; Harborage

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Integrating Underwater Cultural Heritage into to the Management of the World Heritage Site of the Seaport City of Valparaíso, Chile. Challenges and advances of a complex case study

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Valparaíso, located on the central coast of Chile (33˚S), rapidly evolved from a marginal and secondary Hispanic colonial port on the West Coast of South America to become one of the largest *entrêpots* in the Pacific rim. Inserted in the global maritime trade, the rise of Valparaíso during postcolonial times was closely connected to its role as a relevant capitalist finance and banking centre, and as result of economic activity the size of the city and its population consequently increased. In 2003 the Historic Quarter of the Seaport City of Valparaíso was inscribed on the World Heritage List by UNESCO, as an extraordinary example of industrial-age heritage associated with the international sea trade of the late 19th and early 20th centuries. For nearly two decades research driven and CRM projects in maritime and underwater archaeology undertaken in Valparaíso have examined the considerable archaeological record of the bay including primarily 19th and early 20th century wreck sites and harbour facilities. The investigation of historically contextualised shipwrecks and its artefactual evidence at different periods represents a primary source of archaeological and historical data to gain a better understanding of the evolving maritime cultural landscape of a modern harbour in South America. In turn, this knowledge provides relevant opportunities for scientific research, public education and sustainable tourism. However, contradictorily, a comprehensive integration perspective for the management of both land and sea cultural resources is still absent and the importance of UCH and its potential contribution to the Outstanding Universal Values of the World Site remains largely unrecognised. This presentation identifies the critical issues and discusses the main challenges and advances of this complex case study.

Keywords: Valparaíso; Harbours; Underwater Archaeology; UCH Management; World Heritage List

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Climate Chance: Resilience and Adaptation in the Maritime Heritage of Tierrabomba and the Rosario Islands (Cartagena de Indias, Colombia).

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In 2024, an international workshop was held, supported by National Geographic, the International Council on Monuments and Sites (ICOMOS), and the Climate Heritage Network, in collaboration with the "Preserving Legacies: Creating a Future for Our Past" team. The goal was to develop a collaborative strategy for knowledge transfer regarding the effects of climate change on the Maritime Cultural Landscape of Cartagena de Indias (Colombia), with special attention to Tierrabomba Island and the Rosario Islands. The aim was to raise awareness among the local community, government authorities, and various regional and international audiences about the threats of climate change to the territory and its cultural heritage. The two case studies, Tierrabomba Island and the Rosario Islands, have played a crucial role in shaping the historical trajectory of the city and its influence on the entire Caribbean. However, since the 18th century, climate phenomena have become increasingly evident, influencing the ways in which local communities are organized, as well as the loss of territories and heritage sites located in coastal areas. In the past sixty years, these changes have become more frequent and intense, highlighting the urgent need for adaptation and mitigation strategies to protect the coastal areas of the Colombian Caribbean. Moreover, the maritime landscape is a fundamental part of the identity of the island populations, who face a high risk of disappearing, along with their memory and cultural heritage. Therefore, the purpose of this paper is to present the results of this project, which aims to recognize, document, and transmit this heritage, as well as the risks it faces due to climate change, through narratives that include the resilient voices of local communities and showcase possible alternatives to recover the territory or adapt to these increasingly evident impacts.

(translate by Chat GTP)

Keywords: Climate Change; Cultural Maritime Landscape; Collaborative Research; Cartagena De Indias; Tierra Bomba Island; Rosario Islands; Colombia

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

Drowned landscapes of the Belgian middle coast

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Over the past decades, interdisciplinary research has improved our understanding of the Holocene evolution of the Belgian coastal plain. Once a dynamic landscape of tidal channels, dunes, and salt marshes, this region has been transformed by natural processes and human intervention into the developed coastline of today. Studying past environments, their geomorphological changes, and the ways in which people adapted to them provides valuable insights into long-term coastal evolution and resilience, enhancing our ability to assess the archaeological potential of these now-submerged environments.

Recent investigations have focused on the submerged landscapes off the Belgian middle coast, revealing complex palaeo-environments now buried beneath the seabed. High-resolution seismic surveys, sediment cores, and dating techniques (radiocarbon and luminescence) have been used to map and analyse these offshore features. The results indicate the presence of ancient tidal systems, tidal inlets, and sand barriers, many of which have undergone multiple phases of erosion and deposition during the Holocene. Radiocarbon dating indicates that some of these features originated as early as 8,000 years ago, while others remained stable or evolved until more recent centuries. Additionally, drowned peat layers and soil deposits identified in intertidal and subtidal zones represent former land surfaces, now submerged due to rising sea levels and shifting coastal dynamics. Further offshore, preserved coastal deposits beneath the Stroombank sandbank provide evidence of large-scale erosion and sediment redistribution that shaped the modern coastline. These areas, once suitable for settlement, resource exploitation, or transportation, now offer a unique opportunity to study human-environment interactions in coastal settings.

By reconstructing these past landscapes, we can gain deeper insights into how communities responded to environmental changes, including sea-level rise and shifting coastal dynamics. Such research informs models of coastal evolution and long-term environmental change and plays a key role in identifying potential archaeological sites. Land-sea transitional zones are known to be rich in archaeological remains, and understanding their evolution is essential for assessing cultural heritage preservation in the nearshore area. Integrating geological and archaeological perspectives into the study of submerged landscapes is therefore crucial for uncovering the history of human resilience and adaptation along the changing coastlines of the past.

Keywords: Submerged Landscapes; Coastal Evolution; Tidal Systems; Coastal Barriers; Landscape Archaeology; Holocene

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Beyond Environmental Threats: Integrating Environmental and Archaeological Approaches to Pacific WWII Underwater Cultural Heritage

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Across the Blue Pacific lie more than 3,800 shipwrecks from WWII and nuclear testing programs. Containing significant quantities of petrochemicals and explosive ordnance, these potentially and actively polluting wrecks (APW/PPWs) pose increasing risks of oil and chemical spills as 75+ years of corrosion inevitably lead to structural collapse.

The Major Projects Foundation, in collaboration with regional partners, has implemented a comprehensive program of survey and assessment targeting the highest-risk APW/PPWs across the region. Notably, these technical surveys constitute the first comprehensive investigation of many vessels since their sinking, generating dual-purpose documentation that addresses both environmental risk management and underwater cultural heritage (UCH) preservation imperatives. Projects in Chuuk Lagoon, Federated States of Micronesia—which hosts the largest concentration of high-environmental risk PPWs in the Pacific—and the Bikini Atoll World Heritage Site demonstrate how environmental risk assessment methodologies produce valuable data for UCH management.

Our methodology documents not only environmental hazards but also meticulously records these wrecks as significant yet understudied UCH resources. Through the integration of archival research on vessel histories with detailed site surveys, we have established a substantial archaeological database that documents site formation processes and preserves historical information regarding these vessels' contributions to broader Pacific cultural history.

This presentation examines how these technical surveys address the toxic legacies of war while simultaneously generating essential baseline documentation for the management of these sites as protected underwater cultural heritage for future generations.

Keywords: Polluting Wrecks; Pacific: Underwater Cultural Heritage

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Combining underwater cultural and natural heritage to empower sustainable tourism development in EU Outermost Regions – The ecoRoute approach

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Outermost Regions often depend on small economies particularly due to seasonality and accessibility challenges. Moreover, despite tourism being a major pillar of their economy, the underwater cultural and natural heritage (UCNH) is not widely considered as potential for blue and green growth. To achieve sustainable development in these areas, smart strategies that promote underwater cultural heritage are required, combined with the marine environment in a single context. In EU Outermost Regions, where there is cultural and natural heritage of high value present, the promotion of UCNH sites could contribute to reinforce tourism flows in the areas through quality thematic tourism offerings.

Motivated from the above, the ecoRoute project is aimed at transforming three island destinations: Azores, Madeira and Martinique, into smart destinations of underwater cultural and nature tourism (UCNT). With a multidimensional and inclusive approach based on sustainable and eco-friendly practices, it targets to further raise public awareness about the protection of UCH and the preservation of biodiversity, and about the beneficial impact of circular blue and green economy on all aspects of tourism services; especially in relation to climate change impacts posing emerging threats to island communities.

The ecoRoute strategies for sustainable management and responsible protection of UCNH sites have an ecological focus and a central goal at community engagement. Considering various aspects of sustainability (environmental, cultural, social, economic), the ecoRoute approach suggests interventions spanning across multiple levels: i.e. smart regional strategies and action plans, stakeholders' capacity and community involvement, support to policymaking and improving the blue economy for UCNT tourism, design of smart eco-tourism packages, local interventions to support smart tourism integrated into circular economy, promotion of green practices for managing UCNH sites and diving operations.

ecoRoute project "Multidimensional and integrated approach fostering smart underwater cultural and nature tourism offer in Outermost Regions" (Grant Agreement 101124681) is co-funded by the European Union through the EMFAF Program.

Keywords: Underwater Cultural Nature Tourism; Green Tourism Paths; Outermost Regions; Sustainability Strategies; Social Campaigns; Stakeholders' Engagement

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Imitation, counterfeiting, and ontological appropriation. Cultural Exchange through Chinese influences in European ceramics (1560-1780)

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Blue-on-white tin-glazed earthenware was made in Europe since the medieval Muslim occupation of the Iberian Peninsula, with an increase in the late Middle Ages. Early Modern production is characterized by different styles, and around the mid-16th century, the decoration of European tin-glazed earthenware started to resemble, if not overtly imitate, Chinese porcelain. European potters were widely aware of and participated in this trend, considering that most porcelain objects are mentioned in historical documents as made in different European countries. Archaeological and documentary evidence shows that this type of blue-on-white earthenware started out as a luxury product, however, in the first half of the 17th century, the production of this type of earthenware increased to the point that a wider demographic could obtain it, reflected by the thousands of these objects frequently found in varied archaeological contexts. These commodities were consumed in their countries of origin and circulated around Europe and the globe. The purpose of this paper is to discuss, how the appropriation of motifs of Chinese porcelain by the European tin-glazed earthenware industry can have an ontological reading.

Keywords: Trade; Circulation; Globalization; Exchange; Appropriation

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Identifying the Presence and Development of Nautical Iconography in Lisbon

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Lisbon has occupied a central role in seafaring, navigation, and voyages of exploration since it was established as the Portuguese capital in the 12th century. Along with a connection to the famous explorers of the Age of Sail who colonised several territories for the Portuguese Empire, the city was also connected to navigation through the maritime activities of trading, fishing, and even religion. It is then surprising that there is virtually no research on the nautical iconographic representations encountered throughout the city. This dissertation aims to map and catalogue the iconography present in the three neighbourhoods of Belém, Baixa Pombalina, and Alfama that are connected to the maritime past of Lisbon. With the catalogue, the dissertation will examine the different types of iconographies and how these have evolved through time and argue on the impact the maritime past of the country had on their presence.

Keywords: Nautical Iconography; GIS; Photographic Database; Age Of Sail; Portuguese History

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Ship depictions from the Kanli Kula fortress, Herceg Novi and other sites in the Bay of Kotor

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Ship graffiti are an international phenomenon and these engravings depict a vast variety of vessels from a vast chronological range. In this paper I will present ship graffiti in the Kanli Kula fortress in Herceg Novi (Bay of Kotor, Montenegro), one of the two known ship graffiti sites from this region. The graffiti are located in a water cistern that at some point lost its original function and became a prison. There are more than 160 ship graffiti, primarily galleys, and other zoomorphic graffiti in this fortress built in the first half of the 16th century. From the style and execution of these graffiti, it is obvious that people who made them had a knowledge of ships' appearances. I partially recorded these engravings, making photogrammetry models and tracings from photographs. Data from the Historical Archive of Kotor was used to compare the graffiti with ship types employed in the area in the 17th and 18th centuries. Other ship graffiti examples are located in the church of St. Tryphon in Morinj, as well as ship votive depictions from the church of Our Lady of the Rocks in Perast. These will be used as *comparada* considering their different contexts. Considering the development of the maritime trade in the Bay of Kotor between the 15th and the 18th centuries, it is indisputable that ships were of vital importance for this entire region and its hinterland. Documents from the Kotor Archive shed light on a variety on ship types sailed in the area and also provide a *corpus* of documentation regarding the rowers on state (Venetian) galleys. Studying these ship graffiti and archival documents can perhaps answer a challenging question: can we identify any particular ship type from these representations? And what did these representations mean to those who made them?

Keywords: Ship Graffiti; Bay Of Kotor; Galleys; Fustas; Rowers

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Blue Economy and Heritage: Sustainable Port Development through Underwater Cultural Heritage management. PortSub project

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The PortSub project, titled "Patrimonio Cultural Subacuático en espacios portuarios de Andalucía. Hacia la investigación, protección y gestión inteligente y sostenible en el marco de la economía azul" explores how ports should integrate Underwater Cultural Heritage (UCH) into their management policies. It analyzes the economic, social, and operational dynamics of three pilot ports to assess past and present interactions with UCH. This project also examines the existing UCH in each area, generating a comprehensive study on port activities, their impact on UCH over time, and how to manage it efficiently and responsibly in the future through digital twins and internal port policies.

The lack of cataloguing and awareness of UCH leads to several issues:

1. Conservation Threats: Without proper documentation, UCH is vulnerable to damage and destruction from various maritime activities.

2. Spatial Planning Obstacles: Uncharted UCH can complicate maritime spatial planning, leading to conflicts between heritage preservation and economic development.

3. Economic Growth Impacts: Coastal and port areas may miss out on the economic benefits that UCH can offer, such as tourism and educational opportunities.

Despite its historical and cultural significance, UCH is often overlooked in marine spatial planning strategies. This neglect results in inadequate conservation efforts and missed opportunities for integrating UCH into sustainable development frameworks. The absence of systematic cataloguing and consideration of UCH in policy-making processes exacerbates these issues, leaving this valuable heritage at risk of being forgotten or damaged by ongoing port activities and expansions.

The primary objective of the Por-Sub project is to address these issues by recording, digitalizing, and disseminating UCH using new technologies. Other ressult is the develop a toolkit or guide for the "Smart and Sustainable Management of Underwater Cultural Heritage in Port Areas," facilitating their development and growth within the blue economy framework. A key outcome is the creation of a quality seal with specific categories to identify ports that demonstrate a responsible attitude towards UCH. This seal will serve as a benchmark for ports that implement internal management policies and awareness programs aimed at port workers and auxiliary companies.

Keywords: Sustainable Development Frameworks; UCH In Port Spaces; Marine Spatial Planning; Digital Twin; Andalusian Ports

Presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Does It Usually Cause Devastation to Collect Artifacts Underwater? Hobby Collectors in Penghu, Taiwan: A Look at Their Interest and Motivation

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This study seeks to examine the motivations and activities of hobby collectors in Penghu through the archaeological ethnography technique. The Penghu Archipelago is situated in the mid of Taiwan Straits between Taiwan and China. Despite its limited extent, the archipelago possesses a lengthy and intricate coastline. Moreover, historical reasons have rendered the waterways encircling Penghu abundant in ancient artifacts, encompassing Pleistocene animal fossils and earthenware from several historical epochs. Local hobby collectors can readily access these historical materials owing to their geographical advantages. Nonetheless, instead of pursuing economic advantages, the author noted that their goals originated from a fascination with local history. Consequently, they collected underwater relics within their constrained capacities. These operations encompass retrieving antiquities from the coastline, actively recovering pieces from the devastated location for marine development, or acquiring artifacts that have entered the antique markets. Nonetheless, collecting operations are frequently seen as illegal or as functioning inside a legal gray area in Taiwan. Consequently, hobby collectors are hesitant to disclose their collections to the public. Nonetheless, they are prepared to share or donate specific artifacts to trusted researchers for study purposes, thereby enhancing academic knowledge. While these efforts do not entirely conform to legal and ethical standards, they have somewhat aided in the preservation and advancement of local history. Consequently, this article emphasizes that not all artifacts collecting activities are detrimental. The analysis indicates that certain hobby collectors contribute positively to the preservation of submerged cultural treasures and underscores the necessity for academia to keep an appropriate connection with them.

Keywords: Penghu; Underwater Cultural Heritage; Hobby Collectors; Underwater Artifacts Collection; Archaeological Ethnography; Heritage Management

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

The participation of Ying Cheng at the IKUWA 8 congress is made possible thanks to the participation grant awarded by VLIZ (Vlaams Instituut voor de Zee, Flanders Marine Institute) its philanthropic work ‘The Sea as a good Cause’ with sponsorship from C-hotels.

Mapping deep-sea shipwrecks: A review of 10 years of research and missions in Corsica

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The Drassm started its activities of verification and research at sea on shipwrecks at great depths (over 60 m) again in 2013, thanks to the deployment of the new oceanographic ship André Malraux. Until then, only two wrecks in the Strait of Bonifacio were definitely known and documented, while for the rest of Corsica, only general indications were available from a number of fishers trawling the sea. Thanks to the new ship, it was then possible to undertake the search, inspection, and identification of numerous wrecks at great depths (between 100 and 750 m) off the east coast of Corsica and in the Strait of Bonifacio.

This activity was further enhanced by the arrival in 2021 of a second oceanographic vessel, the Alfred Merlin, and a new ROV (Remotely Operated Vehicle), skillfully designed and built by Drassm in collaboration with the LIRMM (University of Montpellier - CNRS) robotics department. Between 2013 and 2024, more than 30 wrecks were verified and documented, spanning a chronology from World War II to the Hellenistic era. These wrecks are “capsules” of immense cultural and biological richness, providing us with a wealth of unprecedented data that are crucial for reconstructing the history of numerous civilizations and studying the unique benthic species that inhabit them.

These wreck-capsules are increasingly threatened by bottom trawling, the installation of underwater cables, and, for the shallower sites, the advancement of technologies that render deep-sea environments more accessible to humans. As a result, the documentation and mapping of these sites, many of which are still intact, has become a priority task for Drassm.

The presentation will provide a review of 10 years of activity, the technical and scientific developments, and the main scientific results.

Keywords: Shipwreck; Deep-sea; Robot; Corsica; Antiquity; World War Period; Innovation

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Expanding Public Engagement in Maritime Archaeology: Digital Storytelling and Volunteer-Led Initiatives

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Maritime archaeology provides a unique lens through which we can explore our shared human history, and as an organisation MAT had gathered decades' worth of archaeological archival material containing stories from a range of site types and periods. Analysis of our online and volunteer demographics in 2021, revealed that our website and YouTube audiences were predominantly male (70% and 95% respectively), and there was a higher number of older ages within our volunteer group. This highlighted two particularly under-represented groups – women and young people – that we aimed to increase representation and participation. We developed *Fathoming the Future*, a project designed to reach new audiences by using digital storytelling, volunteer-led engagement, and interactive public events. A key aim of this initiative was to involve our under represented audiences in the design and development of the project (co creation), to ensure approaches to uncovering and sharing new stories to highlighting lesser-known aspects of maritime heritage achieved a more inclusive and diverse narrative.

Central to *Fathoming the Future* was the role of volunteers, who not only helped bring maritime archaeology to life but were also encouraged to pursue topics they were passionate about. Through tailored workshops, volunteers gained new skills and shared what underwater cultural heritage means to them. They contributed meaningfully to the project, by creating blogs, videos, podcast segment recordings, or 3D models that captured new audiences. These digital storytelling outputs, shared via online platforms and in-person exhibitions, helped bridge the gap between academic research and public interest, making maritime archaeology more accessible and engaging.

Our outreach extends across multiple locations, including Southampton and our associated museum on the Isle of Wight. At these sites we have held several interactive events on our Discovery Bus and at the Shipwreck Centre and Maritime Museum, allowing direct engagement while empowering volunteers to act as advocates for maritime heritage. This paper will explore the impact of *Fathoming the Future*, and how we are expanding the narrative beyond traditional audiences and ensuring that maritime heritage remains accessible, relevant, and engaging for future generations.

Keywords: Digital Storytelling; Volunteer Engagement; Public Outreach; Diversity In Heritage; Interactive Events

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Identifying wrecks in the Medieval waters of Finland

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The maritime cultural heritage of the Baltic Sea in the medieval period has been interpreted from many coastal and underwater sites in countries like Sweden, Germany, Poland and Estonia, among others. However, Finnish waters have revealed minimal direct material evidence of the vessels that possibly sailed them and facilitated the interaction the exchange of artefacts that appear in the terrestrial archaeological record. Apart from the fragments of the 12th century 'Lapuri' clinker boat, there are no maritime finds before the mid-16th century. This absence of evidence begs questions which cannot be answered from terrestrial finds and historical records alone, such as the degree of intracoastal and extra-coastal activity, or the character, frequency and density of interactions between as yet unproven vessels and landing sites, or whether 'Finland's' coastlines were largely a thoroughfare for maritime traffic between distant actors, or its communities' more active participants.

Since 2019 the Maritime Archaeological Society of Finland (MAS) has been engaged in studying 'skeleton wrecks', characterised for retaining their bare frames but with few features or finds to identify their date, function and origin. 5 wrecks were identified in 2023-24 as medieval, ranging from the early 1200s to the late 1500s, using detailed photogrammetric modelling and a combination of radiocarbon and innovative dendrochronological sampling. This extends our existing knowledge of Finnish maritime heritage back some 400 years. In time it is hoped this approach will discover the first Iron Age vessels in Finnish waters. To fully realise the data from these and future sites the citizen science team at MAS recently expanded its methodology to include limited excavations, commencing with Hamnholmarna, the earliest of these wrecks. This talk will explore this research process and begin to frame changes in maritime traffic diachronically through the medieval period within Finnish waters but also with the wider Baltic trade and cultural networks.

Keywords: Finland; Medieval; Shipwreck Discovery; Citizen Science; Fieldwork

Poster presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riika Tevali, Patrik Höglund, Priit Lätti)

Exploring the Maritime Archaeological potential of Finnish lakes.

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Finland has been called the 'land of a thousand lakes'. In fact, it has over 187,000 lakes over 5 acres, with over 300 larger than 10 km², with Finland's land area comprising an average 10 % water, and 20% in provinces dominated by lakes. These watery sites and shorelines have great potential for exploring the cultural heritage of Finland, in a land where the networks of lakes and rivers provided easier highways for trade and travel in the summers and icy roads in winter. However, these environments have received considerably less research than sites in coastal waters, for a myriad of historical, organisational and logistical reasons. Archaeological research in inland waters has largely been conducted on known wrecks, or through haphazard discoveries made by local dive clubs, or research conducted on cultural sites on the foreshore, or more often where there is commercial and private expansion of waterfronts and harbours requiring statutory archaeological inspection.

This presentation focusses on a case study carried out exploring the foreshore and underwater environments around the important Finnish Iron Age site of Tursiannotko on the foreshore of lake Pyhäjärvi in the Pirkanmaa region. By reconstructing the environmental topography of the site, in particular incorporating lake level changes through time, the Iron Age village could be visualised entirely differently, generating new insights into how it functioned. The research highlighted the need to provide a maritime and landscape archaeology perspective to counterbalance the traditional terrestrial-orientated approach. The small, proactive, citizen science diving team proved effective in a region with no cultural heritage teams skilled or available to conduct underwater or semi-wet research. By interacting with the local diving clubs and reaching out to community groups interested in researching and curating their own cultural heritage the foundations were laid for future such projects. This type of project represents the essentials for an alternate model for research, low-tech, small budget, community-based, self-managing, rather than waiting for heritage agencies to provide the direction and organisation, instead by working in cooperation with them where they cannot.

Keywords: Finland; Lakes; Maritime Cultural Landscape; Citizen-science; Community Engagement

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Values of ocean heritage for sustainable management: storytelling, connection, and identity

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Marine cultural heritage (MCH) encompasses tangible sites and artefacts, such as shipwrecks and lighthouses, alongside intangible expressions including stories, memories, and place-identity. Despite its significance, MCH remains underrepresented in marine spatial planning (MSP) and is often reduced within cultural ecosystem services (CES) frameworks to tourism, recreation, or vague cultural connections. Greater attention is needed to assess how MCH is valued in order to integrate its social and cultural dimensions into management.

This study investigates social values of MCH through Flickr data relating to shipwrecks in England and Wales (2013–2023). A total of 1,562 posts were analysed using topic modelling, thematic coding, manual image inspection, and spatial visualisation, with each method contributing complementary insights.

Findings highlight three interlinked value dimensions: place-based (identity, memory, and local attachment), aesthetic (fascination with wrecks, seascapes, and the interplay of cultural and natural heritage), and relational (storytelling, commemoration, and knowledge exchange). These demonstrate that tangible and intangible aspects of MCH are inseparable in shaping public values, with spatial patterns revealing strong regional attachments, particularly in Cornwall, Norfolk, Liverpool, and the Isle of Wight.

By recognising the cultural, social, and aesthetic significance of MCH alongside ecological and economic considerations, this research underscores the need for more holistic management frameworks. Embedding community narratives and intangible heritage into planning can make ocean heritage more visible and valued, supporting sustainable and inclusive marine governance.

Keywords: Marine Cultural Heritage; Cultural Ecosystem Services; Social Values; Maritime Heritage; Shipwrecks; Marine Management; Coastal Management

Poster presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

From aniseed to a wedding dress. The research of an exceptionally well preserved 17th century Dutch merchant vessel (Wadden Sea, Netherlands).

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It was world news in 2016; sports divers had retrieved hundreds of objects from a 17th-century shipwreck - the Burgzand Noord 17 - off the coast of Texel (Wadden Sea, Netherlands). The finds, almost 1,500 objects in total, included book covers, silverware, big logs of boxwood, carpet parts and even a complete dress. All sorts of theories circulated about the ship's origins; it might even have belonged to the Scottish-English royal Stuart family. It was soon clear that this was incorrect and that it was a *Straatvaarder*, a ship that traded with the Mediterranean area. This is an underexplored part of the maritime history of the Netherlands, while this trade was much more extensive in the 17th century compared to the East and West Indies trade. Much is still unknown about the ships that sailed to the Mediterranean and it is a very complex history.

The finds have now been handed over to the authorities and a basic report has been made, but much is still unclear. Not only about the exact origin and route the ship took, but also about the site itself; how much exactly has been preserved and what can still be expected here? For this reason, in the summer of 2024, the Dutch Cultural Heritage Agency excavated three trenches in this very well-preserved shipwreck, which sits almost upright in the seabed and is preserved from bow to stern; in the bow to the first deck and in the stern with almost the complete constable's room preserved with parts of the second deck above it.

It is hoped that the results of this survey can provide more context to the finds recovered by the sports divers without documentation. This wreck offers a unique opportunity to further investigate this complex trade flow.

This lecture will present the latest results and will compare this wreck to similar finds, in order to comprehend these type of merchant vessels trading on the Mediterranean.

Keywords: Shipwreck; Mediterranean Trade; 17th Century; Dutch; Ship's Consruction; Straatvaart

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Building community-led maritime archaeology in New Zealand: successes and future needs

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Maritime archaeology in New Zealand has historically been underdeveloped, often depending on expertise from internationally trained archaeologists. Recent initiatives have adopted citizen science approaches, inspired by Australian models, to engage local communities in underwater cultural heritage. Programs such as GIRT Scientific Divers and AIMA/NAS have been instrumental in providing avocational training, equipping individuals with the skills necessary to actively participate in maritime archaeology.

This presentation examines the challenges, successes, and broader impacts of citizen science and community archaeology through the award-winning *HMS Buffalo* Re-examination Project. The *HMS Buffalo*, wrecked on 28 July 1840 off Buffalo Beach, Whitianga, was initially surveyed in the mid-1980s by Australian archaeologists who found it buried under sand. In 2020, a dive revealed the wreck fully exposed and upright on the seafloor, presenting a unique opportunity for a comprehensive community-led survey.

Supported by the AIMA Scholarship and local businesses, the project trained local volunteer divers in underwater archaeological recording techniques, resulting in a detailed site plan and a 3D digital model of the shipwreck. The project also engaged the wider local community through open days and educational sessions, allowing non-divers, including school groups, to connect with the shipwreck and its history. The findings informed the development of an educational program delivered by the Mercury Bay Museum, which continues to promote the historical, social, and environmental significance of the *HMS Buffalo* to local schools.

This project exemplifies a sustainable model for community-led maritime archaeology, creating a legacy that extends locally, nationally, and globally. It shares and promotes the session's focus on the role and importance of avocational archaeology and citizen science groups in the management and protection of underwater cultural heritage. The *HMS Buffalo* Re-examination Project demonstrates how empowering local communities through training and engagement can lead to significant contributions to maritime archaeology and heritage preservation. Whilst this is a start, there is a need for more vocational programmes in New Zealand to continue to build on this momentum!

Keywords: Maritime Archaeology; Citizen Science; HMS Buffalo; Underwater Cultural Heritage; Community Engagement

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

Extreme climate events on marine biodiversity: possibilities for understanding based on the UCH present in Brazilian MPAs

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The Atlas of Shipwrecks Project (Brazilian Navy) pointed out the existence of about 2,125 shipwrecks on the Brazilian coast. Of these, only 1,005 shipwrecks have solid spatial data, with more than 30% of them occurring in the 19th century and more than 60% happening in the 20th century, which means that most of this UCH consists of metal hulls. Within this submerged realm, the two World Wars (1914–1945) left a legacy of 65 shipwrecks in Brazilian waters. Many of the wrecks identified as potentially polluting wrecks (PPWs) are precisely those sunk as a result of these wars, particularly oil tankers, but also other cargo and mixed-use vessels. The Coastal-Marine biome of Brazil is protected by 220 Marine Protected Areas (MPAs) at all governmental levels. By cross-referencing geographical data on the occurrence of shipwrecks from the Atlas Project with the limits of the MPAs, we found 288 shipwrecks within the limits of 49 MPAs. Of these, 85% areas where the direct use of portions of natural resources by local human populations is allowed; and 15% are fully protected areas, safeguarding unique places for species and ecosystems. The Management Plan is an indispensable document for the implementation of an MPA in Brazil, but only 25 of the areas with shipwrecks have this document. This communication shows that the management plans of the studied MPAs proved to be inefficient regarding the diagnosis of the characteristics of UCHs, their potential risks to biodiversity, and on biodiversity itself. We intend to present this situation through a case study: the cargo ship Lili, which sank on Arvoredo Island, Santa Catarina, in 1957. MPAs are the only spaces where the State or some non-governmental organization is making any effort to manage the territory. However, it should take into account all aspects that affect the conservation of natural resources. This means that UCH is part of the underwater landscape of the MPA and must be the object of diagnosis so that it is possible to understand how cultural assets interact with biodiversity aspects.

Keywords: Marine Protect Areas; Underwather Cultural Heritage; Shipwreks; Marine Biodiversity

Presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

Safeguarding the Past, Planning the Future: Underwater Cultural Heritage in Italy's Maritime Spatial Plans

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On September 25, 2024, the Italian Minister of Infrastructure and Transport approved the Maritime Spatial Plans (MSPs) through Ministerial Decree No. 237. These plans align with the objectives of Directive 2014/89/EU, which establishes a framework for maritime spatial planning to foster the sustainable growth of the maritime economy, the development of marine areas, and the responsible use of marine resources.

The plans were developed by the Technical Committee established under Legislative Decree 201/2016, comprising five ministries and fifteen maritime regions, under the coordination of the Ministry of Infrastructure and Transport (MIT), the national competent authority for maritime spatial planning. The scientific support was provided by the research consortium including CNR-ISMAR, IUAV, and CORILA.

The MSPs cover three maritime areas corresponding to the sub-regions of the Marine Strategy Framework Directive (Western Mediterranean-Tyrrhenian, Adriatic, and Central Mediterranean-Ionian). They provide strategic guidelines for each maritime area, sub-area, and planning unit, serving as a reference for sectoral and local planning initiatives, as well as for granting permits and authorizations.

The approval of these plans marks a significant achievement, built on a decade of research through national and European projects and close collaboration with national and regional authorities. The MSPs represent a starting point for the expected process of implementation and adaptive management.

This article examines the key phases of the maritime spatial planning process in Italy, focusing on the methodologies and governance mechanisms involved. Particular attention is given to how underwater cultural heritage has been addressed within the plans, highlighting strategies for its protection and integration into sustainable maritime management.

The plans are available for consultation on the official website of the competent authority: https://www.mit.gov.it/documentazione/pianificazione-dello-spazio-marittimo.

Keywords: MPS; Italy; Underwater Cultural Heritage

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

Commerce and craftsmanship in the 17th century: A study of Dutch silver objects from the Batavia shipwreck

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An ongoing material study has shed new light on a remarkable collection of 17th-century silver recovered from one of the most infamous shipwrecks in maritime history—Batavia, which sank off the coast of Western Australia in 1629. The collection currently consists of a variety of object types: vessels, furniture ornaments, tableware, detached decorative elements, and other fragments. Originally commissioned by Francisco Pelsaert for the Dutch East India Company (VOC), these silver objects were intended to help open a lucrative market for European precious-metal goods in Mughal India.

The silversmiths tasked with producing these objects worked under strict time and stylistic constraints, requiring them to adapt their manufacturing strategies to accommodate for this. Their decision-making is reflected in the surviving objects and reveals both the pressures faced by, and the ingenuity of, their makers. Over the course of hundreds of years, saltwater, shifting sediments, and marine life altered the chemical and physical nature of these delicate works, obscuring many details of the original craftsmanship. By the time of excavation in the 1970s, the objects had been fundamentally transformed and fragmented. Conservators subsequently used silversmithing techniques such as etching, soldering, annealing, and reshaping to stabilize and restore the pieces for display, introducing new materials and permanently altering the objects' physical and chemical properties. In some cases, fragments also became disassociated from one another, complicating the interpretation of the objects and obscuring the intention of their makers.

Building on previous archaeological and art historical research, the aim of this material-based approach has been to disentangle these phases of intervention, allowing the objects- and ultimately the craftspeople who created them- to tell their intended story. Examining the artefacts in this way lays the empirical groundwork for future analysis and interpretation, ensuring a more comprehensive grasp on the complex narratives embedded in these objects.

Keywords: Batavia; Silver; VOC; Amsterdam; Mughal Empire

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Bruges and the Sea: The Outer Harbour System of a Medieval Maritime Metropolis

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At the intersection of far-reaching land and sea routes, Bruges evolved into the preeminent late medieval metropolis of Europe—a place where goods, people, and ideas converged to form a unique cultural and productive environment. The city's international renown, which continues to resonate today, was shaped by the presence of local and foreign power-holders such as the Flemish Counts and Burgundian dukes, but also by artists such as Jan van Eyck, foreign merchants, as well as local artisans and labourers. This status was only attainable through Bruges' connection to the North Sea. This maritime linkage was facilitated by a combination of man-made canals and dikes on the one hand and a natural tidal creek system on the other hand. This system underwent substantial change in the early twelfth century following the catastrophic breakthrough of a tidal channel known as the Zwin. Human resilience however, turned this calamity into an opportunity.

Along the 15-kilometre-long sea inlet, a chain of outer harbours emerged on its banks: Damme, Monnikerede, Hoeke, Mude, and Sluis, (lost) harbours now located across modern-day Belgium and the Netherlands. Each of these port towns fulfilled a distinct maritime function within a highly integrated socio-economic network dominated by Bruges, the Counts of Flanders, and later the Burgundian dukes. International maritime actors, including for instance the German Hanse, Venetians, Genoese, French, and Castilians, also left their mark, contributing to the formation of a maritime landscape where seafarers and merchants from across Europe intersected.

However, due to both natural and politico-economic factors, Bruges and the Zwin gradually declined in significance. The outer harbours shrunk or even disappeared entirely from the landscape. As a result, a unique subsoil archive has been preserved, acting as a time capsule for one of the most remarkable periods in European maritime history.

Since 2013, Ghent University, in collaboration with various partners, has been conducting archaeological, geological, ecological, and historical research into the medieval outer harbour system of Bruges. Central to this investigation is the study of the diachronic interaction between human communities and the sea. Employing both invasive and non-invasive methodologies, the research focuses on the landscape development, evolution, and embankment of the tidal creek system, on the morphology and functioning of the harbour towns and their port infrastructure, and on the material culture that characterises the international maritime communities which visited and inhabited the region. This includes, among other aspects, the study of the complex process of ship ballasting.

The keynote lecture will provide an overview of 2000 years of maritime connectivity in the Bruges region, with particular attention to the landscape-archaeological investigation of the harbour of Hoeke.

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Keywords: Bruges, outports, tidal inlets, harbours, landscape-archaeology

Keynote presentation

Lost in the river: animals and daily life of medieval Brussels

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Within the historic centre of Brussels, excavations over a huge area have revealed the well-preserved remains of a medieval harbour along the Senne River. This watercourse, essential to the city's origins and development, saw continuous occupation from the 10th to 16th centuries. The riverbanks were gradually reinforced in the 12th century, and by the 14th–15th centuries, the Senne was canalised, as indicated by a stone quay wall and boat dock. These transformations reflect the river's critical role in shaping the city's economy and infrastructure. A diverse range of artifacts, including fish traps, pottery, metal objects and leather goods, have been unearthed, alongside an extensive collection of animal remains, providing crucial insights into medieval diet, economy, and waste disposal practices.

The faunal assemblage, primarily from the 14th–15th century channelled riverbed, consists largely of consumption refuse, with clear evidence of butchery marks on bones. Remains of domestic livestock such as cattle, sheep, and pigs, together with poultry (geese and chicken) and a variety of fish species from both marine and freshwater environments, indicate not only a diversified food supply, but also the activities of butchers operating nearby. In addition to these dietary remains, the excavation uncovered whole carcasses of dogs, cats, and horses, discarded into the river, as well as small bones, likely originating from human excrements. Evidence of artisanal activities, such as horn, bone, and antler processing, suggests that craft industries were also located near the river.

These findings highlight the Senne River's dual role as both a resource and a repository, illustrating medieval Brussels' complex human-environment interactions. The study of these animal remains offers valuable data on urban food consumption, and waste disposal in the medieval period. Despite centuries of transformation, the river remains a key witness to the city's past.

Keywords: Archaeozoology; Medieval Brussels; Faunal Remains; Senne River, Urban Waste Disposal

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Echoes in the sediment: reconstructing the Senne through molluscs and caddisflies

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The Senne River has shaped the landscape and development of Brussels for centuries. However, its course and environmental conditions have been continuously altered by human interventions. This study compares freshwater mollusc and caddisfly (Trichoptera) remains from two archaeological sites, one Gallo-Roman (1st-3rd century AD) and one medieval (10th-16th century AD), to reconstruct changes in river flow, sedimentation, and water quality over time.

At the Gallo-Roman site, a previously unknown river meander of the Senne river was uncovered, initially characterized by fast-flowing water, as indicated by coarse sand and gravel deposits. Over time, sedimentation patterns show a shift to finer materials, such as silt and organic muds. suggesting a transition to slower-moving or stagnant water before the meander was ultimately cut off. The site is located within a rural environment.

In contrast, the medieval site, located within the historic centre of Brussels, represents a heavily modified urban river environment. Mollusc remains indicate predominantly slow-moving water, with occasional stagnant conditions. The discovery of caddisfly larvae cases, including the confirmed presence of *Brachycentrus subnubilus*, suggests that despite extensive waste dumping, parts of the medieval Senne still maintained sufficient water quality for oxygen-dependent species.

By combining data from these two sites, this study attempts to document the Senne's hydrology, sedimentation, and aquatic ecosystems in a rural and urban environment. The findings describe the river's natural environment alongside increasing human impact, from early riverbank modifications in Gallo-Roman times to the canalization and pollution of the medieval period.

Keywords: Senne River; Freshwater Molluscs; Caddisflies; Sedimentation; Environmental Reconstruction; Human Impact

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

‘Belgian’ shipwreck sites present beyond Belgian waters: challenges and opportunities

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The master’s dissertation of Willem De Cuyper (De Cuyper 2020) focused on assembling all the information related to identified shipwreck sites with a verifiable link to the territory of present-day Belgium but currently located in foreign waters. It comprised two parts.

The first part investigated how the available archaeological information relates to Belgium's maritime history as described in literature. To achieve this, a preliminary inventory was created based on a screening of databases from foreign agencies and organizations, supplemented by an extensive literature and web research. This resulted in a list of 128 shipwreck sites. An important number of these is related to World War I and World War II and is mainly situated in British and French waters. Notably, several Belgian ships, such as the 'Léopoldville', were used as troop transports during the wars and became targets for German U-boats.

The second part explored how the compiled archaeological data could stimulate and enhance research, management, public access and international collaboration. A case study of the 'Léopoldville' provided inspiration for further work referring to successful practices from international examples, such as the Utrecht (Manders et al. 2016). The study revealed the complexities of conducting archaeological research on shipwrecks in foreign waters but also highlighted the benefits and possibilities for public access.

For this paper the preliminary database has been modified and expanded to allow beyond case study level assessing risks concerning pollution and to address management issues related to protection, preservation *in situ*, and promoting responsible access to the shipwreck, while raising public awareness.

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Keywords: Shipwreck Sites Database; Verifiable Link; Belgium; Maritime History; Inventory; Management

Poster presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Using Caulking Material to Determine the Provenance of Ship Timbers

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This study investigates the potential of caulking material analysis as a method for determining the provenance of shipbuilding and repair sites. We present findings from multiple case studies in the Low Countries, examining caulking materials recovered from shipwrecks and repurposed ship timbers used in various structures, and dating to the medieval and postmedieval period. The analyses focus on the botanical composition of the caulking material, particularly mosses, as well as pollen trapped within these materials. The dendrochronological analysis of the associated timbers provides exact dating and serves as a reference for timber provenance. Our results demonstrate that these combined approaches can provide valuable insights into the history of ship construction and repair. Moreover, they offer clues about the geographical origins of the caulking material itself, helping to pinpoint where a ship was originally built or maintained.

Keywords: Caulking; Provenancing; Archaeobotany; Palynology; Dendrochronology

Presentation in session G1: Analysis of Caulking and Luting Materials (Kristof Haneca, Koen Deforce)

Double Dutch Shipwreck of a 17th-Century Cargo Ship in the Former Dutch Zuiderzee

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In 2012, members of Stichting Archeos Fryslân identified a potential shipwreck in the Dutch Wadden Sea near Kornwerderzand, following a fisherman's report of snagged fishing gear. Sonar imaging revealed the contours of a buried ship measuring 31 by 6 meters.

Between 2022 and 2023, exploratory dives confirmed the wreck to be an armed cargo vessel from the late 17th to early 18th century, likely of the *cat ship* or *fluyt ship* type, widely used in maritime trade during that period. The ship exhibits hallmark features of Dutch shipbuilding, including double pine planking.

Dive expeditions documented significant structural details, including a double hull construction known as *double Dutch*. Artifacts such as a leather shoe sole, a swivel gun, clay pipes, and pottery fragments were recovered. Dendrochronological analysis revealed that the vessel was constructed around 1676 using timber sourced from eastern Germany and the Swedish island of Gotland. The ship likely operated between 1680 and 1700, with its stranding attributed to the challenging navigation conditions of the former Zuiderzee.

This study highlights the ship's unique design and historical significance in Dutch maritime trade with Scandinavia and the Baltic region. Ongoing research aims to definitively identify the vessel as a *fluyt ship* and uncover its name, cargo, and the circumstances of its stranding. The findings will contribute to exhibitions and further research on Dutch maritime heritage.

Keywords: Shipwreck; Fluyt Ship; Dutch Shipbuilding; Dutch Maritime Baltic Trading; Underwater Archaelogy

Poster presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riika Tevali, Patrik Höglund, Priit Lätti)

Research Challenges and Significance of Holocene Archaeological Remains in the Riverbed at the Resurgence of the Han-sur-Lesse Cave (Belgium)

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The Han-sur-Lesse Cave is one of the most emblematic caves in southern Belgium. Since the early 20th century, numerous archaeological excavations have highlighted an exceptional heritage ranging from the Mesolithic to the Modern Times. The uniqueness of the Cave lies in its early tourist exploitation starting at the end of the 18th century, and the presence of an underground river: the Lesse. These two factors have led to a bias in the archaeological study of the site: nearly non-existent remains in the dry galleries due to modifications made to the cave, and abundant materials in an exceptional state of preservation in the riverbed. The underground river remained untouched until 1963, the start of underwater archaeological excavations. Immediate discoveries in the Lesse and the precocity of the archaeological approach in an underground river context have partly obscured the exceptional nature of the archaeological site. The human adventure has rightly received extensive media coverage, while paradoxically, the archaeological site remains largely unknown to the scientific community and the general public outside of Belgium's borders. Consequently, creating an archaeological synthesis has become a major research challenge. In this presentation, we showcase the results of the last 15 years of research, which have integrated new excavations that include studies of underwater stratigraphy, taphonomic mechanisms, and geomorphologic features of the riverbed, as well as artifact associations—and have conducted a comprehensive inventory of findings from previous excavations. These initiatives have yielded significant results that illuminate the nature and exceptionality of the site's occupation at the resurgence of the Han-sur-Lesse Cave during the Holocene, while considering the transformations of the natural landscape.

Keywords: Inland Water Archaeology; Cave Studies; Mesolithic; Neolithic; Bronze Age; Iron Age

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Special Management and Protection Plan - PEMP Fort Bahía: Instrument for the Safeguarding of the Fortified Maritime Cultural Landscape of the World Heritage Site Cartagena de Indias (Colombia)

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The socio-historical importance of Cartagena de Indias (Colombian Caribbean) during the colonial period, led to the design and construction of several defensive structures in its territory to prevent enemy invasions of the Spanish Crown. These took place between the 16th and 18th centuries, by empires such as the English and French. Over the years, a whole system of fortifications was built, consisting not only of large fortifications, but also of other types of military constructions, port facilities, civil infrastructures, production plants and the natural elements of the environment. Thus, over the decades, a Fortified Maritime Cultural Landscape was conceived and configured, exposed to constant attacks that led to modifications to improve its functioning. As a result of all this, the complex system ended up with different fortifications, batteries, farms, roads, maritime routes, shipwrecks, docks and other anthropic elements that today constitute the diverse Maritime Cultural Heritage of the region. There are also many submerged archaeological contexts which represent the Underwater Cultural Heritage (UCH) of this landscape. Since 1984, Cartagena de Indias has been declared a World Heritage Site and the entities in charge of the subject have structured protection and safeguarding mechanisms; this is the case of the Special Management and Protection Plan - PEMP Fort Bahía. The goal of this paper is to present the development of this Plan, which has been structured in an interdisciplinary and interinstitutional way in order to promote and guarantee, among other things, the management and protection of the goods and contexts belonging to the Underwater Cultural Heritage. Thanks to the different phases of this plan, which include the diagnosis and research of the different cultural and natural components that compose this landscape, it has been possible to carry out governmental, academic and community articulation. All this in order to build the necessary mechanisms that will allow the short and long-term conservation of the components of the Bay of Cartagena de Indias, given its importance and historical relevance for the Caribbean and the world.

Keywords: Management; Protection Plan; Fortified Maritime Cultural Landscape; World Heritage Site; Cartagena De Indias; Colombia

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Charting shipwrecks using multibeam echosounders and visualisation in the shipwreck database of Flemish Hydrography

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Bathymetric data nowadays are collected mainly using multibeam echosounders (MBES) which use underwater acoustics to chart the seabed with high detail. The acquisition and processing of MBES data, which serve as input for the database, has been finetuned based on accumulated experiences and technical improvements over time. As a hydrographic office we are responsible to determine the shallowest point for each shipwreck to guarantee safe navigation and to update and maintain these values in official hydrographic products. However, to determine this shallowest point, the acquisition of the multibeam data needs to be done as good as possible and delivers very detailed information of the complete shipwreck and the surrounding seabed. Several technical upgrades made by MBES manufacturers have been tested and are used if they provide extra information, including water column data, extra detections, adapted filtering, high density acquisition and special processing options.

The Flemish Hydrography manages a publicly accessible shipwreck database. This recently upgraded online tool offers a diversity of shipwreck information: a location map of all the shipwrecks on the Belgian Continental Shelf, a detailed search engine and, for each wreck, a historical overview, properties, detailed images of the multibeam data and a 3D visualisation option.

In this contribution, an overview of the bathymetric data acquisition and the investigation into MBES options is presented and the pro's and con's will be discussed. Also, an overview of the shipwreck database and its functionalities is presented.

Keywords: Multibeam Echosounder; Shipwrecks; Point Clouds; 3D Models; Visualisation, Database

Presentation in session K3: Digital Reconstruction of Shipwrecks (Hendrik Lettany)

The Exciting Tales of Our Past: The Importance of Relevance, Connections and Community

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As underwater and maritime archaeologists, we can and often do capture the attention of the media. This can be through any variety of news stories, digital presentations, and film. All have their place, appeal, and pitfalls. One of the pitfalls is striving for media impact through “impressions” or the number of stories published and or broadcast, and the estimated millions or billions reached. Let us speak not only to “big” finds and “famous” sites but also those which are more local, and that connect us in the present to everyday life in the past and excite the interest of the public and inspire young people to join the field. Let us speak to what we see, based on our actually working with others who in tandem can yield data and interpretation on issues such as marine biodiversity, ocean health, climate change impacts, ocean acidification, conservation, and how the powerful human connections we offer through access to the past, and the thrill of exploration and discovery we can provide to our colleagues in the aquatic world.

Keywords: media; appeal and pitfalls; ‘”famous sites versus more local sites”; thrill off exploration and discovery

Keynote presentation

Cannons found on the Flemish Beach

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For the past 30 years, the government has systematically surveyed and cleared World War ammunition from the Flemish beaches, often uncovering older archaeological finds, including cast-iron cannons. Between 1994 and 2024, eleven cannons were excavated, mostly on the West Coast (De Panne and Koksijde), and some found further east (Oostende and De Haan).

Improved collaboration over the last decade between Flanders Heritage, the authority responsible for the beach and clearance contractors has sped up the registration of archaeological finds, explaining why most reported cannons date from the past five years.

Seven cannons have been studied: five are 17th-century naval cannons (three Swedish, two English) and two are smaller 18th-century British swivel guns. Four cannons are still covered in concretion and await further research.

These heavy naval guns did not wash ashore from far. They may have been deliberately thrown overboard, lost in storms, or come from a nearby shipwreck. Even though no direct evidence of wrecks close to the cannons has been found, on one occasion some oak wreck beams were found at 240 meters near a cannon and two pairs of similar cannons were found close to each other respectively in De Panne and Koksijde. The other cannons however were isolated finds.

The abundance of 17th-century cannons near the West Coast may relate to the historical maritime activity near Dunkirk and Ostend during a turbulent but prosperous period, including privateering. Despite their isolation, these cannons hold potential to fill gaps in the maritime history of the North Sea during the 17th and 18th centuries.

Special thanks to Nico Brinck (cannon historian, Terschelling – The Netherlands) for the indispensable help in identifying the discussed cannons.

Keywords: beach clearance; World War Ammunition; 17th century naval cannons; Flanders

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Poster presentation in session Q2: Unity in Diversity (Kalle Virtanen)

Transient Harbour structures: An Example from Contemporary Practice at Mandvi

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Over the last decade, there has been an increased scholarly emphasis on the archaeological investigation of shipyard sites around the world. Despite the prevailing notion that small shipyards with limited activities pose insurmountable challenges for identification based on structural evidence in the archaeological milieu, numerous examples have emerged to contradict this assumption. Shipyard finds along the Thames estuary and around the Southern Baltic helps support this. Many of these structures were temporary, leaving little archaeological evidence. This paper investigates the use of temporary shipyard structures in a contemporary context at the Mandvi shipyard located along the Rukhmavati estuary in Kutch, Gujarat. The construction framework for establishing temporary tidal dockyards and slipways is clarified by analysing satellite imagery data collected over the last decade using Google Earth Pro, supplemented with pedestrian surveys and interviews with local shipwrights and sailors. This study advances our understanding of artificially induced morphological dynamics in shipyards, allowing for more accurate identification of temporary shipbuilding and landing structures in the archaeological record.

Keywords: Harbours; Mandvi; Estuary; Ethnographic Study; Shipyard Archaeology

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Inventorying and raising awareness about maritime archaeological heritage from Operation Dynamo

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Operation Dynamo, a pivotal event at the start of the Second World War, enabled the repatriation to Britain of a total of 338,226 Allied soldiers who had been encircled by the German Army in what came to be known as the 'Dunkirk pocket'. For nine days and nights, from 26 May to 4 June 1940, more than a thousand ships - flying British, French, Belgian, Dutch, Polish, Danish, Norwegian and Swedish flags - sailed through the Straits of Dover along three routes (Z, Y and X) to rescue as many soldiers as possible. It is estimated that 305 of these units were lost. Although among the wrecks of the evacuation, two are now in English waters and nine others in Belgian waters, the majority of these remains lie in waters under French jurisdiction. Since 2023, a project to inventory these remains has been underway, led by Claire Destanque (independent archaeologist) and Cécile Sauvage (Drassm). The project is based on Claire Destanque's university work and involves a number of partners: archaeologists and geophysicists (Drassm, Historic England, MSDS Marine), local authorities (Urban community of Dunkirk) and local divers (Dunkirk diving club - C.P.E.S.M.D.E). At sea and on the foreshore, geophysical surveys and assessments are revealing an exceptionally well-preserved heritage and documenting it before it inevitably disappears. A number of projects are also underway to promote this heritage to the general public, with the aim of sharing this common heritage.

Speakers:

Keywords: Second World War; Shipwrecks; Systematic Inventory; Archaeology Of Modern Conflicts; Dunkirk

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

A river with a story: development of a specific methodology to study the ancient Senne river in Brussels

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In July 2015 a rescue excavation took place to recover the remains of a previously unknown ancient branch of the Senne river on the site of Tour & Taxis in Brussels (Belgium). Such a large-scale excavation of a river branch required the development of a specific approach, where the close collaboration of archaeologists and many natural science specialists showed to be a crucial factor. Multiple logistic and scientific challenges were met to accurately document and correlate the river and the traces of human activities during the salvation operation. In order to cope with these challenges a protocol was elaborated focussing on the realisation and geoarchaeological study of multiple sedimentary profiles across the river bed, the excavation of the archaeological features and structures related to the river management, and an extensive sampling campaign for the natural science specialists (geoarchaeologists, archaeozoölogists and archaeobotanists). This resulted in a large and varied dataset, permitting to document the evolution of the river bed and the impact of the management activities, but also to reconstruct the surrounding landscape (De Cupere et al., 2017).

In the spring of 2019, the remains of the medieval harbour in the historical center of Brussels were discovered during construction works. This instigated the largest rescue excavation in Brussels where the stakes were high: documenting the evolution of the river, understanding the impact of the embankments, but also documenting the progressing urbanisation and its impact on the river in a very limited amount of time (Ghesquière et al., 2024). Armed with the experiences of the previous salvation operation, a large-scale operation was conducted, following an adapted protocol. The present contribution intends to discuss how the experiences of the two large-scale rescue operations forged our research framework for tackling comparable contexts in the future.

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Keywords: River Evolution; Landscape Archaeology; Interdisciplinarity; Brussels; Research Framework

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Legacy and modernity: Archaeology of Maritime Landscape of an Atlantic shoreline

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This paper presents a recent research on the coastal maritime landscape of french Atlantic coast. This coastline is characterized by a wide intertidal zone and high tidal range. When the sea retreats, the foreshore becomes an extension of the land and a garden on the sea. The oceanic coastal societies of the past have succeeded in exploiting resources, creating port facilities and navigation techniques for their growth by seizing the coastline and adapting to changing constraints. The Land-Sea continuum has become a vast and complex maritime network with urban, port and artisanal areas interconnected with maritime routes. The chosen lab is the Bay of Bourgneuf (France). Its vast maritime complex combining anchorages, ports and inland waterways interconnected with ancient islands that have now disappeared. Its nautical space is also characterised by navigation on three scales: inland, coastal and long-distance navigations. To understand the complex maritime dynamics, we need to look at the social and environmental dynamics over the long term and take a fresh look at this 'worked' maritime area. As part of a vast network of North European maritime exchanges, this area between land and sea still bears the markers of these ancient activities of production and export, as well as resistance to hazards and openness to the ocean. The transformations that have taken place on the coast and in the marshes bear witness to a major dynamic and to the extensive work carried out by the local population over several centuries. While the history of this bay dates back thousands of years, a close look will be taken at the Early modern periode, during which there was a major activity linked to the sea, and whose still visible traces can be illuminated by a transdisciplinary research who combined archaeology, geoarchaeology and history approach. The aim is to (re)discover a part of the maritime past of a multi-faceted coastline that has evolved into an archaeological reservoir of human practices and their interactions with the ocean. From 'worked' to 'inherited' territory, the Baie de Bourgneuf is a fascinating case in point.

Keywords: Maritime Landscape; Atlantic; Maritime Archaeology; Geoarchaeology; Marine Geosciences

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

The shipwreck of the W.A. Scholten near Dover

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Willem-Albert Scholten 1819-1893) was a major industrialist who amassed his wealth in the potato starch industry. He was also a major shareholder in the " Netherlands America Steamship Company (NASM). In 1873, he invested 600,000 guilders in the newly established company and negotiated to have a ship after him. The W.A. Scholten was built in 1875 in Glasgow by Napier & Sons. Between 1875 and 1887, the ship operated under the Holland America Line (HAL). In this period the W.A. Scholten successfully navigated past icebergs multiple times. However, in 1887, disaster struck. Shortly after departing Rotterdam for New York, the W.A. Scholten, a ship named after a major Dutch industrialist, was rammed on November 19, 1887 by the Rosa Mary near Dover. Of those on board, 116 passengers and 16 crew members lost their lives, while 76 were rescued. In the register of burials in the Burial Ground of the Parish of S. MARY THE VIRGIN in Dover 26 castaways have been buried. Some were crew members, others passengers heading for America. In the subsequent trial in Dover, the crew of the W.A. Scholten was held responsible, though they firmly claimed the Rosa Mary had struck their ship. Divers from the "501 Divers Folkestone" have dived several times to the wreck, recovering primarily pottery produced by Petrus Regout/the Sphinx factory in Maastricht. The destination of this cargo were the United States of America. The year 1887 is a marvelous " terminus ante quem" for the Maastricht ceramics decorated with dozens of decorations. In 2026, the recovered amount of pottery will be in the center of an exhibition in the former factory in Maastricht.

Keywords: Shipwreck; Collision; Holland-America Line; Maastricht Ceramics

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Beyond the Model: Exploring the (Post)Photogrammetry Process for the BZN17 Shipwreck

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The BZN17 research excavation of 2024 focused on three key trenches across the shipwreck: the constable's quarters, the main mast/hold, and the forecastle. Using videogrammetry, we produced a total of 15 photogrammetric models, including two that capture the areas between these trenches. The models were post-excavation color-corrected and stitched together using reference points to create a cohesive representation of the site.

Our research addresses several critical aspects:

- How to achieve high-quality images and coverage in challenging underwater environments.
- The method of combination of individual models to form a comprehensive site model.
- Methods for processing color differences between models to ensure consistency.
- Post-processing techniques to enhance the overall quality and usability of the model.
- Strategies for annotating the finished model to facilitate further analysis and interpretation.

This study aims to advance the methodologies for underwater archaeological documentation and analysis, providing insights into the practical applications of photogrammetry in maritime archaeology. It aims to move beyond the creation of a model and the basis for a 2D site map, towards a 3D vectorized line-drawing of the full site to provide a basis for further analysis and possible reconstruction.

Keywords: Photogrammetry; Site-recording; Modeling; Color Corrections; Annotations

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

Submerged Settlements and the Historical Harbour in the Bay of Sozopol, Bulgaria: Six Thousand Years of Dynamic History on the Western Black Sea Coast

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In the late 1920s, during the construction of Sozopol's first modern port, dozens of well-preserved ceramic vessels from the Archaic and Classical periods were dredged from the seabed. About 60 years later, another dredging uncovered also prehistoric materials, prompting underwater excavations in the late 1980s and early 1990s.

After a break of more than 20 years, research was resumed in 2020 by the Bulgarian Centre for Underwater Archaeology, continuing to the present day. Extensive underwater excavations, marine geophysical surveys, archival research and GIS analysis have established that the dynamics of human activity in the area of today's Sozopol Bay are closely linked to changes in the natural environment. During the Late Chalcolithic and Bronze Ages, people inhabited pile-dwelling settlements along the shores of a calm bay. As sea levels rose, the settlements gradually shifted southward. Over the following millennia, the rising sea completely submerged the prehistoric settlements and by the middle of the first millennium BC, the site had taken on a form similar to what we recognise today.

The sheltered bay was highly valued by the Greeks, who founded the colony of Apollonia Pontica on its shores at the end of the 7th century BC. One of its greatest assets, which became the foundation of its wealth, was its magnificent natural harbour. It has remained in continuous use since Archaic times, as demonstrated by layers of port materials discovered during the underwater excavations. The rich finds highlight the ebb and flow of the city's economy through the centuries.

Keywords: Submerged Settlements; Copper Age; Bronze Age; Ancient Harbours; Greek Colonisation, Black Sea; Apollonia Pontica

Presentation in session D1: Underwater Landscapes of the Ancient Mediterranean (Mari Yamasaki, Emilio Rodríguez-Álvarez)

Data quality over quantity: Bouldnor Cliff Mesolithic assemblage and modern inventories

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Archaeological inventories are often described as “incomplete” and “replete with unknowns” (Huggett 2020). However, inventories should erase those unknowns: more information = more conclusions. A balance should be found between the complexity of the inventory, usefulness, and impact. The challenges of inventorying are showcased using the assemblage from the submerged landscape of Bouldnor Cliff as a case study. When assessing such an expansive collection, there are many factors to consider, including the environmental toll of data storage itself.

Bouldnor Cliff is a Mesolithic submerged landscape that the Maritime Archaeology Trust has worked with for over two decades. There is a breadth of lithics, worked timber, sediment samples, and evidence of human habitation that, due to the ongoing nature of the investigation, forms an ‘open’ archive, which needs documentation and further study. I have been working in that capacity; fulfilling the inventory needs for the assemblage and working to showcase the impact of this unique site. It is herein that the topic of this abstract has arisen: where do inventories become more complex than useful? Why not 3D scan every artefact? When inventorying items, the impetus should be on fast, accurate information. This often includes using techniques that may seem outdated. Instead of scanning, processing, and uploading a model of every artefact, tools like calipers, expert assessments, and categorised descriptions can be equally effective. The key is to consider methodology case-by-case and evaluate the toll that incurs.

There should be clear consideration for how the data will be stored, alongside the artefact-based analysis. Data storage currently accounts for more carbon emissions than the commercial airline industry (Jackson & Hodgkinson 2022). “Dark data”, or data used once and stored forever remains a significant challenge, with over half of digital data falling into that category (Jackson & Hodgkinson 2022).

This case study will address choosing inventory methodology, what data is useful, and how to understand the hidden impact of inventories on the environment. The physical toll of excavation is well documented and justified, and now it is time to address and justify the data toll.

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Keywords: Data; 3D Modeling; Mesolithic; Environmental; Archives; Submerged Landscape

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Preliminary results of a new research project in the Kupa River (Sisak, Croatia)

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The Kupa River is located on the crossroad of communications between Italy, the Balkans, Pannonia, and the Adriatic. Throughout history it functioned as an important navigable waterway, its use attested from prehistory to the modern period. The strategic position of its confluence to the Sava River favored the development of a fortified protohistoric settlements of *Segestica*, succeeded by the prosperous Roman colony of *Siscia* (modern-day Sisak in Croatia).

Archaeological material collected through the years from the Kupa in Sisak represents one of the largest such collection extracted from any European river. Unfortunately, a very limited amount of those were extracted through organized archaeological research, while systematic research of this very important site has been completely omitted.

An international underwater archaeological research project has been launched in 2021 as a joint effort between the Sisak Municipal Museum, Croatian company NavArchos and the French laboratory Centre Camille Jullian UMR 7299. It is aimed at systematically studying, through a diachronic and multidisciplinary approach, the nautical aspects of the Kupa River throughout prehistory and the Roman period.

This ongoing research project has so far resulted in discovery and documentation of a number of interesting features and submerged remains: those of a Roman fortification system; a Roman wooden bridge; a Roman underwater aqueduct; Roman harbor structures; a Roman flat-bottomed barge; and a number of dugout boats dated from the Iron Age to the Late Antiquity that present certain unique and interesting features. This paper is aimed at presenting those discoveries and the preliminary results of our research project.

Keywords: Underwater Archaeology; Fluvial Archaeology; Kupa River; Sisak; Croatia; Dugout.

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Les fouilles du Rhône, à Arles : à la recherche du port Romain/The Rhône river excavations, in Arles: in search of the Roman port

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Depuis la fin des années 1980, le Rhône, à Arles, est l'objet d'investigations archéologiques. Les différentes campagnes de carte archéologiques conduites par le Drassm puis de fouilles d'épaves menées à partir de 2008 par le Musée départemental Arles antique et le Centre Camille Jullian révèlent la richesse des artefacts conservés au fond du fleuve. Alors que le tissu urbain de la ville n'a gardé aucun vestige de son port romain – à l'exception de maçonneries conservées des premières piles du pont de bateau – ce sont des milliers d'amphores, de céramique et une multitude d'objets en lien avec les activités portuaires que l'on retrouve dans les sédiments du fleuve formant une accumulation désignée comme dépotoir portuaire. Ce sont aussi une dizaine d'épaves de différents types de bateaux (radeau, barges, barque, allège fluviales, navire maritime) datés du Ier au IVe s. qui se révèlent au milieu de cette accumulation d'objets qui livre aussi des découvertes plus surprenantes comme le buste présumé de Jules César et autres sculptures en marbre ou en bronze.

La reprise des opérations dans le Rhône depuis 2023 avec une équipe mixte du musée départemental Arles antique, du Centre Camille Jullian et de l'Inrap, avec la collaboration du Drassm, a pour ambition la recherche et l'étude du port romain d'Arles à travers la fouille systématique des épaves et des dépotoirs associés. Propriété de l'État français, tout ce patrimoine culturel issu du Rhône a pour vocation à être conservé, restauré, étudié et valorisé auprès des publics au sein du musée archéologique d'Arles.

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Since the late 1980s, the Rhône, in Arles, has been the object of archaeological investigations. Various archaeological mapping campaigns carried out by the Drassm (French Department of Underwater and Archaeological Research) and subsequent shipwreck excavations led by the Musée départemental Arles antique and the Camille Jullian Center since 2008 have revealed the richness of artifacts found in the river. While the city's urban fabric has preserved no trace of its ancient port – except for masonry preserved from the first piles of the roman boat bridge – thousands of amphorae, ceramics, and a multitude of objects related to the commerce and the activities of the port have been found in the river sediments, forming an accumulation designated as a "port garbage dump". Among these are also about fifteen shipwrecks of different types of boats (raft, barges, craft, river lighters, sea-going ship) dating from between the 1st and the 4th century AD. They are revealed amidst this accumulation of objects that also yield more surprising discoveries such as the presumed bust of Julius Caesar (the founder of the roman colony of Arles) and other marble or bronze sculptures.

The resumption of archaeological operations in the Rhône since 2023 with a mixed team from the Musée départemental Arles antique, the Camille Jullian Center, and Inrap, in collaboration with Drassm, aims to research and study the sea-river port of the Roman city of Arles through systematic excavations of shipwrecks and associated dumps.

All this cultural Heritage coming from the Rhône river belongs to the French State and is intended to be preserved, restored, studied, and showcased to the public within the Archaeological Museum of Arles.

Keywords: Rhône; Port Romain; Commerce; Dépotoirs Portuaires; épaves; Patrimoine / Rhône; Roman Port; Commerce; Port Garbage Dump; Shipwrecks; Cultural Heritage

Presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Tracing a ship's provenance through its timbers: the case of "Levante Shipwreck", Formentera Island (Spain).

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In 2022, a shipwreck was reported by a tourist to local authorities in Formentera Island (Spain). Located about 90 meters from the shore at a depth of 3.5 meters, the so-called "Levante Shipwreck" consists of a well-preserved wooden structure of transversal and longitudinal ship elements. A first inspection by nautical archaeologists and conservators of IBEAM, revealed an apparent lack of artefacts around the wreck site, hindering a quick chronological assessment. In 2023, an archaeological survey was carried out to document the wreck's structure using photogrammetry and archaeological data recording, and to collect samples for species identification and dendrochronology. During the underwater inspection of the exposed elements, it was determined that all the planking and framing components correspond to a species of deciduous oak (*Quercus* subg. *Quercus*). The samples collected for tree-ring analysis from five structural timbers (three frames and two planks) presented numerous tree rings. Dendrochronology revealed high similarity of the growth patterns in those timbers, suggesting that the wood originated from the same oak forest. However, the comparison of the growth patterns with reference tree-ring chronologies from all over Europe, did not result in a date. Radiocarbon wiggle matching provided a likely date around 1800. The lack of additional material culture and clearly distinct constructive features in the exposed structure hindered inferences about the potential construction place of the ship. Stable oxygen isotopes on two timbers are being analysed in an attempt to pinpoint the provenance of the wood. The results will be presented in the regional context of the ship, as this site contributes to expanding dendrochronological databases from areas where historical shipbuilding timber sources remain undocumented.

Keywords: Mediterranean Shipwreck; Provenance; Isotope Dendrochronology; Stable Isotopes; Oak Timber; Lead Sheeting

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Traces on the bottom. 80th anniversary of the maritime evacuation of prisoners from Nazi concentration camps in the Baltic Sea Region.

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The end of World War II marked a series of significant events in the "war theater" of East Prussia, which stretched along the southern shores of the Baltic Sea from Königsberg through Pilawa (Pilau) and Hel to the Bay of Lübeck. The author explores this region and these topics in the following article, highlighting previously unknown details of the sea evacuation of KL Stutthof prisoners to the area around the Bay of Lübeck and subsequently to Denmark and Sweden, as well as new archaeological discoveries linked to the so-called "Operation Hannibal" along the Vistula Spit coast. Newly discovered wrecks lying in the shallow waters of the Baltic coast in Gdansk Bay shed light on the tragic episodes of the last weeks of the war and serve as a valuable source of information for maritime archaeologists and historians working with coastal martime landscape. Wrecks in shallow water are dangerous, and their management is a hot issue for maritime authorities. The author presents new research in this field along with reflections on the protection of underwater sites connected to World War II. In May 1945, the convoys of towed prisoner barges departed from Gdansk Bay towards Hel and then continued to Sassnitz on Rügen, proceeding further through Warnemünde to the Bay of Lübeck. The sea journey of thousands of Stutthof prisoners and those from other camps like Neuengamme and Ravensbrück ended tragically on May 3rd in the Bay of Lübeck. Barges and many ships, such as the “Cap Arcona,” “Deutschland,” and “Thielbeck,” were bombed by the Royal Air Force and sank in flames, with imprisoned victims of Nazi terror.

Keywords: 2nd World War; Shipwrecks; Convoys; Sonar Scanning; Gdansk Bay

Presentation in session G5: Shipwreck Studies (Marnix Pieters)

The Siege of Rhodes of 1480: Textual and Iconographic Sources for an Underwater Archaeological Search

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The siege of Rhodes by the Ottoman Turks in 1480 was one of the most important military events of the 15th century. Commanded by the Hospitaller Grand Master Pierre d'Aubusson, and played out largely on the surrounding waters, the successful defence has been immortalised in several written sources and art works, yet the small number of underwater archaeological findings attributed thereto is intriguing. To date four wrecks have been indirectly related to one of the three consecutive sieges of 1440, 1480 or 1522. The purpose of this presentation is to analyse the textual and iconographic sources on the event, the key one being the *Descriptio obsidionis Rhodiæ* by Guillaume Caoursin (1480), with a view to identifying those elements that are of value in the search for underwater archaeological traces thereof. These sources provide rich information on late medieval maritime warfare and watercraft in the Eastern Mediterranean and suggest that the archaeological potential with regard to the last decades of the Hospitaller presence on the island can be explored further.

Keywords: Rhodes; Knights Hospitaller; Ottoman Turks; Siege Of Rhodes 1480; Medieval Shipwrecks; 'cogs'

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Recycling ship timbers and ballast stones in architecture : the example of the French Atlantic coast from the 16th to the early 19th century

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In territories such as islands where wood is rare, shipwrecks are a precious resource of materials. The recycling of wreck wood is directly linked to the opportunity offered by the sinking and looting of the ship, while the recycling of ballast stones is intrinsically linked to maritime trade and unballasting. Recycling consists in reusing an element by giving it a new purpose, thus diverting it from its original function.

Pieces of wood recovered from the shipwreck and ballast stones are recycled in terrestrial architecture. The oral surveys and archaeological fieldwork conducted as part of PhD research identified 115 remains of ship timbers and 310 ballast stones recycled as wall cladding and paving stones in architecture in France, particularly in edifices in Brittany, Vendée, Loire-Atlantique, and Charente-Maritime. Most commonly, these materials include planks, masts and frames. These remains are recycled in the framework into purlins, joists, tie beams, also as floors, lintels and posts, in variety of buildings, such as houses, chapels and farm buildings. The recovered materials, often in good condition, show their adaptability to local architecture. The ballast stones come in a variety of shapes, but the round shape of some of them is a clue to their identity, as they are not the preferred shape in buildings. Too many of them could compromise the stability of a masonry structure.

This heritage, often overlooked, needs to be studied in collaboration with local communities in order to identify and preserve these remains before they disappear during renovations.

Keywords: Shipwreck; Wreck; Ballast; Recycling; Architecture; Atlantic

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Rivers and mountains – navigating the prehistoric northern alpine forelands

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The UNESCO Cultural Heritage „Prehistoric Pile Dwellings around the Alps“ connects several hundred stone and bronze age pile dwellings in six countries around the alps – not only today, but also in prehistory. Three of the most important rivers in Europe have their sources in the Alps: Rhine, Danube and Rhone. If you follow them upstream, you reach the most important Alpine passes, which enable north-south and east-west connections over the mountains. In recent years, great progress has been made in the dating and inventorying of sites in both wetland and glacial archaeology, so that very large data sets are now available from the northern foothills of the Alps. In this talk I will explore the relationship of settlements to waterways between the Stone and Bronze Ages (4300-800 BCE) on different temporal and regional scales, compare the changing importance of water and land routes over time and reflect on the significance of these routes as important communication axes for goods, people and innovations.

Keywords Neolithic; Bronze Age; Rivers; Pile Dwellings; Waterways; Communication Routes

Presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

The Drowning of Dogger Bank – implications of a geological palaeolandscape evolution study on archaeology of submerged landscapes

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Thanks to extensive geotechnical and geophysical site investigations supporting wind farm development at Dogger Bank, geological studies of palaeolandscapes have revealed networks of rivers, marshes, and coastal environments. These palaeolandscapes became inundated around 8,000 years ago during postglacial sea-level rise. Detailed study of seismic stratigraphy during the transition from a terrestrial to a marine landscape has revealed how certain geomorphologies reacted to changes in rainfall patterns and marine transgression. Here, we speculate how humans may have reacted to these palaeoclimatic changes, and the effect of rising sea level on populations, based on studies of Middle Mesolithic populations elsewhere.

Study of fluvial geomorphology of extensive palaeochannel networks across Dogger Bank, supported by palaeoclimate modelling, has revealed a transition from arid, dry, low rainfall climate to humid, wet, and high rainfall climate in the Late Pleistocene, resulting in two distinct geomorphologies of channels, and the later development of marsh areas. These rivers and marshes would have been important to human populations. These low-lying areas would have drowned rapidly, in the time of a single generation, during marine inundation. This would have had profound effects on human populations on Dogger Bank and the surrounding Doggerland area.

Keywords: Dogger Bank; rising sea level; Middle Mesolithic; palaeoclimate modelling; wind farm development

Poster presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Achievements and challenges for Underwater Cultural Heritage in Latin America

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As in other parts of the world, the first approaches to underwater cultural heritage in the extensive region of Latin America took place in the framework of treasure hunting and searching for souvenirs. In some places, this situation continued until very recent times or even persists to the present day.

Fortunately, however, in the last decades there has been a significant growth in the archaeology of aquatic environments and cultural heritage management, both associated with widely accepted professional and ethical standards.

This presentation consists of an overview of the research and management of water-related cultural heritage, with an emphasis on underwater contexts in view of their differences from the usual conditions in terrestrial environments. The origins and current situation of the most active Latin American countries in the field are summarized. Mexico's pioneering role in the process since the mid-1980s (embodied in the figure of Pilar Luna Erreguerena), and the particularly inspiring effect it had on countries such as Brazil, Argentina and Uruguay are highlighted.

Reference is then made to countries that seem to be in a promising situation, where there are conditions - especially related to human resources and/or institutions - that should allow an initiation or growth of underwater archaeology and underwater cultural heritage management in the near future. In any case, the achievements that have already been made and which create positive and solid foundations are highlighted.

Finally, in an attempt to understand the current panorama at the regional level and perhaps partly predict the paths to follow in the coming years, a series of questions are posed regarding the variables that may affect the level of development in different countries.

The main ones relate to the UNESCO Convention on the Protection of the Underwater Cultural Heritage: Is there a correlation between the level of development of the discipline and the fact of having ratified (or not) the Convention? Is there a positive impact after ratification - in the case of States Parties? What role have the technical assistance missions provided by the Convention's Scientific and Technical Advisory Body (STAB) played for the countries that requested them? Is it worthwhile for Latin American countries to ratify the 2001 Convention?

Other considerations taken into account relate to the role of language and financial resources in Latin America, and the global agendas that delineate, or should delineate, the way forward in the region.

Keywords: Underwater archaeology, maritime archaeology, shipwrecks, UNESCO 2001 Convention

Keynote presentation

Protecting the past, engaging the present: Tourism and Underwater Cultural Heritage

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The global expansion of tourism, a product of demographic growth and economic development, creates new demands and expectations from the traveller, requiring a pressing need for new products to enter the market. This situation is also reflected in the expanding number of people wishing to visit submerged cultural sites such as shipwrecks, sunken aircraft, submerged cities, ancient harbours and more. When these remains are of a certain age, or even if they are not but bear some cultural significance, they usually fall into the category of underwater cultural heritage. As such, they are normally protected by the country´s national legislation, or even by international treaties in the case of the State Parties to the 2001 UNESCO Convention on the Protection on the Underwater Cultural Heritage. In this context, touristic pressure can become a challenge for implementing the 2001 Convention and other regulatory frameworks related to heritage.

The authors present a variety of touristic initiatives involving underwater cultural heritage, which are proving to be successful both in terms of offering appealing and marketable experiences while also preserving the heritage in a sustainable manner. Some can inspire countries in which the 2001 Convention is being implemented and/or where its ratification is being considered.

Keywords: Tourism; Unesco 2001 Convention; Underwater Heritage; Cultural Management; Blue Economy

Presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

The Swedish Frigate Falken, a discovery made online

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The wreck of the Swedish warship *Falken,* located in the Gulf of Finland, has recently been identified. It was built in Stockholm in 1631, and for two decades, it was regularly used as a warship for convoy service and diplomatic transport. In 1651, the ship ran aground and sank outside Porkala Add in the Finnish archipelago on its way to Stockholm from Reval.

The wreck was discovered in the 1970s but has received limited attention. Its identification was possible thanks to a 3D model published online by the Finnish Maritime Archaeological Society. This presentation will present current research around the wreck, emphasizing the value and importance of making archaeological material, such as collections and 3D models, available online for researchers around the world.

Keywords: Shipwreck; Baltic Sea; 17th Century; Warship; Wreck Identification; Historical Archaeology

Presentation in session G2: The Lost Navy (Patrik Höglund, Niklas Eriksson, Minna Koivikko)

The čikat bay modern shipwreck, island of Lošinj

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An intact modern shipwreck has been discovered in Čikat bay in 2022 by Neno Starčić from the diving centre Subseason from Lošinj. The Lošinj Museum conducted the initial investigation on the reported site, and in 2023 began the systematic research in cooperation with the Croatian Conservation Institute, Department for Underwater Archaeology. The aim of the research was to define the spread of the ship's construction and the overall extent of the site. Due to unfavourable weather and diving conditions, the excavation area was confined to approximately 40 square meters. The second research campaign revealed a part of the ship's construction of a new 30 square meters. The excavated section of the site included visible elements of the ship's construction (mast, double ribs, stringer, futtocks and planks), the ship's anchor, five iron artillery pieces, numerous pieces of ship's pottery and glassware (cups, stoppers, bottles), several cannon balls and musket shots, remains of rope, as well as two scattered clusters of regular stones, which might have been the ship's ballast. The wooden construction points towards an extremely sturdy ship with double ribs, probably 30 meters of length. Following the direction of the visible parts of the ship's construction, it may be assumed that a large section of the shipwreck still lies under the sediment. The artillery pieces are poorly conserved and overgrown, which prevents reading their characteristics or dating, but the preliminary identification of the stamp found on several ceramic vessels indicate their origin from northern Italy, most likely from the second half of the 18th century. The site lies at the depth from approximately 25-27,5 meters, on a mild slope that turns into sandy plateau covered in sand and seaweed (Posidonia Oceanica).

Keywords: An Intact Modern Shipwreck; Island Losinj; North Adriatic Sea

Poster presentation in session O1: Preservation of UCH (Jordy Moies)

The fishing-canning activities in the Latin colony of Carteia (Strait of Gibraltar): The Cetaria XIV and the coastal archaeology.

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The Colonia Libertinorum Carteia was the first Latin colony outside the Italian peninsula, and was founded on the axis of the Strait of Gibraltar to improve Rome's direct control over this strategic area through its important port. Texts, epigraphy and numismatics inform us of the economic importance of fishing and canning activities in this city in Roman times. Carteia was the main political and economic site of the Strait of Gibraltar together with the city of Gades. In recent years we have developed an R&D&I research project focused on the study of the buildings used for this productive activity in Carteia (where salted fish and garum sauce were produced). We have been able to locate more than 13 of these buildings (cetariae). Here we present the latest results, which allow us to confirm the presence of a new salting factory which corresponds to the oldest known in the city, and is therefore of great interest. This cetaria has been excavated because it was at risk of disappearing due to the presence of a seasonal stream that partially cut through the structures and which was the reason for its discovery. In this paper we present this new building, its dating relevance and its haileutic contexts (hooks, salting amphorae, etc.). This cetaria was made up of at least 7 tanks where the city's famous salted fish were produced. We now know that it was built in the late Roman-Republican period and that it was abandoned at the end of the 1st century AD, possibly as a result of the relocation of the port suburbium due to coastal dynamics.

Keywords: Amphora; Garum; Salsamentum; Vat; Roman Empire.

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Navigation and fluvial archaeology on the Tarn river using archival data and a GIS-based approach

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This study is part of the BOSCA research project (Bois d'Oeuvre, SylviCulture et Acheminement), specifically within its second area of research, focusing on navigation and fluvial archaeology. The research aims to initiate investigations on the Tarn river, a tributary of the Garonne river, through a documentary analysis and the integration of collected data into a Geographic Information System (GIS), serving as a foundation for future field prospecting, including subaquatic surveys. The research questions center around the evolution of navigation and river infrastructure on the Tarn river, as well as the socio-economic implications of waterborne transport from the early modern period to contemporary times. The study seeks to establish a comprehensive inventory of river-related archives, cartographic resources, and historical records documenting navigation and riverbank modifications along the segment between the villages of Saint-Sulpice-la-Pointe and Gaillac by the consultation of departmental archives, land registry and historical plans. Additionally, a GIS was created to spatially organize and help analyze historical and archaeological data, allowing for a geohistorical reconstruction of the river's navigation system over time. The principal findings highlight the dynamic interactions between natural fluvial evolution and human intervention, such as the construction of ports, mills, barrages, and bridges, as well as the decline of navigation with the rise of rail transport in the 19th century. The study also reveals the conflicts between mill owners and boatmen regarding water management, particularly concerning the obstruction of navigation routes by industrial infrastructures. Furthermore, evidence suggests the longstanding role of the Tarn as a crucial trade route, with archaeological and documentary traces of timber floating and wine transport from antiquity to the early 20th century. Future research perspectives include sonar prospecting in September 2025, thorough underwater field surveys to locate submerged structures and new GIS integration to refine historical landscape analysis using national archival resources. This work also constitutes the basis of my Master's thesis in the Master MoMArch (Master of Maritime and Coastal Archaeology) at Aix-Marseille University. This study provides a crucial groundwork for understanding the legacy of fluvial navigation in southern France and contributes to broader discussions on fluvial archaeology and heritage conservation.

Keywords: Navigation; Timber Floating; Fluvial Archaeology; GIS Integration; Archival Research; River Infrastructures

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Intertidal shipwrecks: challenges, opportunities and management

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Intertidal shipwreck sites are sites that are located in the area where the ocean meets land. The presence of archaeological and cultural heritage remains in this dynamic zone makes it subject to various types of natural and cultural threats that greatly impact the sites' conditions and management. Despite the presence of challenges and threats and its existence within these special circumstances, such sites have unique survival opportunities.

Existence in dynamic areas, such as the intertidal zone, adds a special feature to these sites. So, in the case of underwater archaeological sites, there are more opportunities to apply protecting and managing practices. But in this special case of intertidal and beached sites, it is very difficult to control all circumstances to manage or even study these sites.

Challenges and threats that face such sites are various; sometimes challenges are of a natural character, such as tide range, sedimentation process, changes in coastal morphology, winds, waves, currents, and chemical properties of seawater and its effect on archaeological material. However, the main challenge we must deal with in such cases is the frequent exposure to wetness and dryness during water movement. Exposure duration could be as short as a few minutes or hours, while in other cases it could extend for days or weeks. In both cases there is an imbedded threat that affects the site.

In addition to natural threats, there are a number of anthropological (cultural) threats such as: looting, fishing, and urban development. On the other hand, opportunities are also numerous, it depends on the location of the site, the surrounding environment, nature of the remains, and the community around the site.

For opportunities, they are numerous too. So those sites are used as educational resources for school students, and they are also considered a good option to achieve sustainable tourism, which is one of the sustainable development goals. Also, it could be used in public engagement and community awareness raising, especially for children and non-divers.

Keywords: Intertidal; Beached; Coastal; Management; Tides; Threats; Challenges

Poster presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Submerged lake deposits in the shallow coastal areas of the Baltic Sea- preservation conditions and implications for archaeological research

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During the last 15,000 years, the water level of the Baltic Sea has fluctuated several times by up to 30 m, resulting in the Baltic Ice Lake, the Yoldia Sea, the Ancylus Lake and the present Littorina (Baltic) Sea. As a result of repeated transgressions and regressions, ancient limnic and terrestrial deposits such as gyttja and peat sediments are often found in the coastal areas of the Baltic Sea. Due to low sediment input - the Baltic Sea is sediment-starved in many areas - these deposits are not covered but are exposed on the seabed, where they are subject to erosion by waves and currents. This geologic setting is of great interest for archaeological research, as riverbeds, lake shores and coastal areas were the preferred habitat of Mesolithic societies during the early to middle Holocene. As a result, Stone Age remains are regularly eroded from these ancient lake deposits and are washed ashore. In addition, the outcropping limnic sediments offer the possibility to identify and investigate underwater Stone Age settlement sites. However, the total number of sunken paleo-lakes, their exact locations, the course of their ancient shorelines, as well as their absolute depths remain largely unconstrained. Furthermore, the rate of modern-day erosion of peat and limnic deposits, and thus the release of archaeological finds, is largely unknown. Over the past decades, the Institute for Baltic Sea Research Warnemünde conducted multiple sediment echosounder, side-scan sonar, and multibeam echo sounder surveys between Wismar Bay and the Darss Sill. Theses data allow to reconstruct the structure of sunken paleo-lakes and to identify outcropping peat and limnic deposits at the seabed. Between 2002 and 2013, some areas where mapped in a repeated manner, allowing to derive information on changes in the areal extent of peat and limnic deposits and allow to constrain the cumulative erosion volume of the last 12 to 23 years. Results of a comparative analysis of two submerged palaeolakes are presented here. We also discuss the implications for the preservation of known and unknown archaeological archives and the potential for the survey of new sites.

Keywords: Baltic Sea; Submerged Lake Deosits; Paleo-lakes; Sediment Echosounder; Side-scan Sonar; Multibeam Echo Sounder

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Les traditions nautiques du fleuve Niger, un héritage insoupçonné

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En Europe, la connaissance du domaine piroguier relève majoritairement de l'archéologie. En Afrique, où le réseau « Ouest et Centre » africain de voies navigables représente plus de 8000 km (Sénégal, Niger, Bénoué, Congo, bassin du Tchad), la rareté de références matérielles anciennes occulte l'ancrage profond des traditions piroguières. Seule la pirogue *Dufuna* âgée de 8000 ans (Nigéria), fournit un jalon archéologique plurimillénaire.

En revanche, l'héritage contemporain de ces traditions défie l'effacement du temps et fourmille d'enseignements. En témoigne le fleuve Niger sur lequel les traditions nautiques n'avaient fait l'objet d'aucune analyse typologique et spatiale, globale et comparative. La synthèse des données recueillies éclairent la richesse piroguière d'un fleuve long de 4200 km.

Sur le Niger Occidental (1556-1961/2012)

Entre Bamako et Tombouctou on relève 9 catégories de pirogues, qui se répartissent entre trois aires hydrographiques distinctes. Nonobstant la pirogue monoxyle, la première aire présente une forte densité de pirogues double-monoxyles. La seconde est le foyer ancestral de la pirogue « Djenné » dont résultent 6 variantes. Cette dynamique d'innovations vernaculaires est l'œuvre du Bozo piroguier-charpentier, « premier habitant » du Delta intérieur, une « mer » de 30 000 km^2 en période de crue. La troisième aire abrite la pirogue « Niafunké ».

L'expansion de la pirogue dite « Djenné », construite en planches sciées clouées, matérialise ce continuum d'innovations techniques. Cette créativité vernaculaire alimente aujourd'hui un parc de 53 000 unités de pêche, auquel s'ajoutent les pirogues de transport.

Sur le Niger Oriental (1897-1954)

Parmi les 9 catégories de pirogues inventoriées, entre Tombouctou et le Delta maritime, la pirogue « Banghawi » (polyxyle-cousue) marque la disparition de la chasse traditionnelle à l'hippopotame. La pirogue « Habara » (monoxyle-expansée-exhaussée) des pêcheurs Sorkawa se distingue par son expansion fluviale sur l'ensemble du Niger Oriental. La production de cette pirogue relève de l'art du feu, une industrie propre au delta maritime.

Les lieux de production ou les usagers déterminent l'appellation de chaque catégorie de pirogue. Les caractéristiques architecturales reflètent des spécificités chronologiques, culturelles et forestières. Elles enrichiront sans nul doute les grilles de lecture européennes.

Keywords: Niger; Pirogues; Architecture; Traditions Nautiques; Bois; Techniques; Innovations

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Mobilising Heritage Information in Marine Spatial Planning: the MDE Heritage Accelerator project

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Pressure on marine space in the waters around England is increasing rapidly to meet societal objectives for net zero, nature recovery, food security, economic growth and so on. Various initiatives by public bodies are underway to map the characteristics and uses of the sea, including Marine Spatial Prioritisation (MSPri) and the Whole of Seabed approach.

Unfortunately, currently available marine heritage information is not well-suited to such initiatives. In consequence, heritage may be inadequately considered in marine spatial planning, introducing unnecessary risks to sensitive heritage and overlooking the opportunities for heritage to contribute to societal objectives.

The MDE Heritage Accelerator project addresses this concern by remobilising heritage information created by offshore development to improve both project-specific and strategic decision-making, especially in the context of offshore wind expansion. The project will significantly enhance heritage information in the Crown Estate's Marine Data Exchange (MDE) and integrate it with Historic England's National Marine Heritage Record (NMHR), both of which can be accessed publicly.

During development, geophysical and geotechnical surveys are processed and interpreted for developers by heritage consultants. This mechanism creates huge amounts of heritage information, but it is often held in archives like the MDE as report pdfs for individual areas with bespoke methodologies. This information is not readily reusable. Detailed spatial data created by heritage assessments – GIS layers and supporting digital information – are not typically available.

The project will retrospectively capture detailed heritage information in MDE and integrate it within NMHR, ensuring that it is consistent, accessible and attuned to the needs of developers and regulators. By embedding improved practices, existing and future development-led data will be more effectively found, accessed, combined, and reused to inform environmental assessment of specific projects and strategic assessment of plans and programmes. The project will also combine this enhanced information into heritage sensitivity/opportunity maps to directly support spatial planning, whilst engaging stakeholders and the public with the many discoveries and insights arising from marine development-led archaeology.

This presentation will introduce this major new project - which runs from April 2025 to March 2027 - and share initial findings.

Keywords: Marine Spatial Planning; Marine Development; Offshore Wind; Heritage Information; Sensitivity/Opportunity Mapping; Geophysics; Geoarchaeology; England

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

Emerging Challenges and Opportunities (Wei Ji) for the study of Submerged Prehistoric Archaeology, a perspective from the LOTE Project.

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Recent years have seen great advances in the study of submerged prehistoric landscapes and continental shelf archaeology around the world. Such research is providing new insights into the Late Palaeolithic (24,000 to 10,000 years ago) and Mesolithic (10,000 to 6,500 years ago) landscapes that existed around the world and were submerged by global sea level rise following the end of the last glaciation. These once terrestrial landscapes are of enormous strategic interest in heritage terms and are central to the study of prehistoric heritage, past sea-level rise and climate change, and indigenous community representation.

The areas containing these landscapes are increasing in importance as global offshore development accelerates to meet the challenges of achieving Global Net Zero. These changes are generating new challenges for researchers as more and more of the world's continental shelves are being earmarked for marine infrastructure expansion. However, the rate of proposed development, combined with the current state of knowledge have brought us to a critical juncture. This talk will argue that collaboration across marine stakeholders provides a unique opportunity to gain data and information that will provide novel insights into major archaeological research questions and provide invaluable new data on the archaeology of now submerged prehistoric areas.

To illustrate these developments, this talk will present the results of several research projects that are being undertaken across the globe by staff by the Life on the Edge project (LOTE) based at the University of Bradford (UK). The talk will discuss developing and implementing new techniques that are to explore these previously inaccessible, submerged landscapes and to locate archaeological sites that have the potential to provide insights into the impacts of sea level rise on human occupation in the past and assist in the heritage management of offshore areas.

Keywords: Submerged Landscapes; Heritage Management; Geophysics

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

The Wreck of the Shah Muncher, Singapore Strait, 1796

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Horsburgh, in his indispensable Sailing Directions of 1811, writes "The *Shah Munchah* (sic) a large and valuable ship from China bound for Bombay, … was totally lost, by the tide horsing her upon the rock whilst in stays". From a contemporary captain's journal, "… the crew were all saved in their boats, but the ship went to pieces immediately, and nothing but their lives saved". That fateful day was 8 January 1796.

The wreck was discovered in 2019, with excavation taking place over the ensuing two years (the site was at risk of looting and was slated for development). Distinctive stratigraphy revealed the wrecking process, whereby heavy destructive elements such as ballast stones and zinc ingots have protected the underlying ceramics. The boulder-strewn seabed was so inundated by cargo that it was levelled.

At 1,000 tons burthen, the *Shah Muncher* is the largest of the very few Country ships that have been excavated. Country ships were Indian built, privately owned merchant vessels that operated under license from the East India Company. The surviving manifest provides a broad view of her cargo, which included 585 tonnes of soft sugar, 483 tonnes of zinc, and 20 tonnes of porcelain. The total recorded cargo weight was 1,190 tonnes.

Some recovered artefacts were for shipboard use, such as stoneware pots, bronze mortars and bottles of wine. But most were for trade, and many were not on the manifest. They include stone plinths, agate medallions, glass beads, betelnut cutters, bracelets, silver-plated pots, and brass leaf. Surviving ship's gear includes anchors, cannons, bilge pump valves, deadeyes, pulley blocks, and rope. Articulated hull structure suggests great strength provided by thick teak hull planking with full-length longitudinal scarfs.

While the *Shah Muncher* sank twenty-three years before Raffles re-established the port of Singapore, the ship, her cargo, and her multi-ethnic crew echo the first traders. She is therefore of great historical significance to the city-state, which largely owes its existence to its nodal location between the Indian Ocean and the South China Sea.

Keywords: Country Ship; Canton Bombay Trade; Singapore Strait; Chinese Ceramics

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Writing the story of an early 16th century Dutch water ship in its regional context

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The ZO31 shipwreck in Zeewolde (the Netherlands) was first reported in 1972 after being discovered during agricultural work in the Dutch Flevoland polder. It was identified as an almost intact water ship—a specialized vessel used in the former Zuiderzee to transport live fish from fishing boats directly to markets. A 1980 survey determined that the shipwreck's wood was well-preserved and could remain buried. However, recent investigations revealed signs of deterioration, prompting its excavation due to its significance and representativeness as a water ship. The excavation took place as part of the Flevoland Maritime Archaeology Field School, organized by the Cultural Heritage Agency of the Netherlands.
Between 2022 and 2025, the wreck site has been systematically excavated, and its finds and timber elements meticulously documented. Dendrochronological samples collected in 2023 indicated that the trees used for the ship's construction were felled after 1500 CE. However, the absence of bark edges on these samples prevented a more precise dating. Determining the exact felling date is crucial for establishing when the ship was built. To address this, 85 additional samples were collected in 2024, and another 103 in 2025 from various timbers and cargo. Preliminary results from timbers with complete sapwood indicate that the oaks were felled in 1518/19 CE and sourced from the eastern Netherlands or northwest Germany, but repair planks from the bun are made from Baltic oaks cut around 1520.
This ongoing research aims to determine the provenance of all timber elements and cargo while employing 3D documentation techniques to reconstruct the vessel's construction history. By integrating these findings, we seek to uncover the ship's construction place, its operational history, and the regional wood technology of the period. This study contributes to the broader understanding of domestic shipbuilding practices in a northern European context. We will present the latest results of this exciting research.

Keywords: Water Ship; Domestic Shipbuilding; Timber Supply; Dendrochronology; 3D Modelling

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

The SS Newton (1881) and the archaeology of Ponta de São Lourenço on the island of Madeira, Portugal.

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The archaeological site of Ponta de São Lourenço is the easternmost location on the island of Madeira, situated in Portugal's outermost Atlantic region. The island's main international port was Funchal, which served as a port of call for supplies and coal on transatlantic voyages.

With the work previously carried out at the site, it was possible to identify and record the archaeological context that is assumed to be that of the SS Newton, which sank in 1881. This project was the first underwater archaeological survey in the Autonomous Region of Madeira.

This English-flagged ship, built in Greenock, Scotland, by MacNab & Co., had belonged to the Liverpool, Brazil and River Plate Steam Navigation Co. since 1866. It essentially operated on the route between the United Kingdom and South America. Built of iron, 76 metres long, with a beam of 9.5 metres and a depth of 6.1 metres, it was powered by a machine made up of two inverted cylinders with a single propeller that delivered a maximum of 90 hp, reaching a maximum speed of 9 knots. It had a displacement of 1324 tons.

On 9 April 1881, she returned to her home port of Liverpool from Salvador da Baía in Brazil, carrying a cargo of around 1,200 tons of sugar and coffee. After a short stop in Funchal, and heading for Ponta de São Lourenço, where the ship's course was to be altered to the northern quadrants, the captain miscalculated the trajectory and rounded the point too close to the coast, running aground in the shallows, where he sank a few days later.

The archaeological study carried out provides interdisciplinary data for the construction of a historical narrative about the life of this ship, from its construction to the present day. This approach also analyses Madeira Island as an important port of call on the great transatlantic routes.

Keywords: Underwater Archaeology; Maritime Cultural Landscape; Steam And Iron Archaeology; Contemporary Archaeology; 19th Century, Shipbuilding

Poster presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Two Ships Graffiti from Jerusalem: Evidence of Pilgrimage from the 4th to the 13th centuries CE

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The proposed paper will bring into discussion two ships graffiti that are rare visual evidence to pilgrimage to the Holy Land and especially to Jerusalem.

The first ships graffiti was incised on the wall of a drainage channel dated to the 4th-6th century CE. This graffiti is a unique visual of the arrival of pilgrims who disembark from three sailing ships and approach the shore with raised hands as orants.

The second ship graffito was incised on the wall of a room in a khan discovered in Jerusalem at the New Gate in the Old City. This graffito dates to the Mamluk period, 13th century CE.

The discussion will be aimed on the ships type, their construction and propulsion. Both graffiti are rare if not unique finds in Israel or the Eastern Mediterranean which evidence to the travelling and pilgrimage to the Holy Land and Jerusaelem from the Byzantine to the Mamluk.

Keywords: Ship Type; Graffiti, Pilgrimage; Byzantine; Mamluk; Periods

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Methodology for the reconstruction of historical coastal structures and assess their functional role over time

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Historical coastal structures have played a pivotal role in shaping maritime societies, serving as key elements in port organization, trade, and defense. Today, these structures are preserved as underwater and coastal archaeological sites, forming an essential part of cultural heritage. Understanding their original function, evolution, and structural degradation is fundamental to reconstructing past societies and their relationship with the coastal environment. This study presents a comprehensive and reliable methodology that integrates archaeology and modern coastal engineering techniques by means of the use of hydrodynamic laboratory testing, numerical modeling, and archaeological analysis to reconstruct historical coastal structures and assess their functional role over time. The approach introduces physical modeling techniques traditionally used in coastal engineering, enabling researchers to reconstruct the original morphology of submerged and eroded structures, extract degradation curves based on the structure deformation, simulate wave-structure interactions using cutting-edge statistical and numerical tools, and determine crest height variations to infer the role of the structure within the broader harbour system. This methodology is based on a transdisciplinary framework, integrating geophysical, archaeological, and climatic data to refine laboratory experiments and numerical simulations. By bridging coastal engineering with archaeology, it provides a novel perspective on historical maritime infrastructure. The effectiveness of this methodology has been demonstrated at the underwater and coastal archaeological site of Aegina, Saronic Gulf, Greece, once a thriving commercial and naval port complex dating from the 5th to 3rd centuries BC, now submerged or partially submerged. The application of this approach has enabled the complete reconstruction of the Rubble Conical Structures (RCS)—built over 2,500 years ago—while also mapping their dynamic functionalities and degradation processes over time. By expanding current knowledge of historical maritime structures, this innovative methodology enhances our understanding of human-environment interactions within their natural and historical contexts, offering new insights into the resilience and evolution of ancient coastal infrastructure.

Keywords: Reconstruction; Coastal Structures; Laboratory Experiments; Numerical Simulation; Human-environment Interactions; Dynamic Functionalities; Ancient Greece

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Water supply points and sanctuaries related with sea trade and navigation in the ancient Mediterranean coasts

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Over the past two decades, research on water supply points and sanctuaries associated with navigation has experienced substantial growth, both in terms of knowledge and the number of archaeological sites discovered. This progress has been facilitated by advancements in techniques for diving within underwater cavities, alongside the dedicated work of speleologists and cave divers who have explored and documented these sites, often located in confined spaces. The development of understanding in this area has been particularly noteworthy on the island of Mallorca, where numerous archaeological sites have been identified in recent decades, including Font de ses Aiguades (Gràcia et al., 2001; Colom y Járrega, 2018; Fumás et al., 2022) and Cova des Drac des Rafal des Porcs (Deyà, Colom y Gràcia, 2022). This session will thus provide an opportunity to explore a topic that has traditionally been underrepresented in the historiography of nautical and underwater archaeology yet holds significant value for reconstructing ancient navigation routes and the associated rituals of these voyages.

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Keywords: Submerged caves, underwater archeology, freshwater, water supply points, ancient sanctuaries

Presentation in session D1: Underwater landscapes of the ancient Meditterranean (Mari Yamasaki, Emilio Rodríguez-Álvarez)

Taken At The Flood: supporting submerged heritage and green futures

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More and more of the world's continental shelves are being earmarked for marine infrastructure development. These once terrestrial landscapes are also of strategic interest for investigation of prehistoric heritage, past sea-level rise and climate change, and indigenous community representation. However, inadequacies in the provisions of current legislature and EIA standards, combined with the rate of proposed development, have brought us to a critical juncture. To date, there has been a lack of success in locating submerged prehistoric sites at distance from the current shore, and our opportunity to do so reduces with each new development. The expanding data and knowledge base provided by development offers significant opportunities for collaboration and is an asset to the management of heritage, if focused correctly.

The Taken at the Flood (TATF) project seeks to foster dialogue between marine developers and heritage professionals to work towards improved heritage impact assessment protocols and prospection methodologies for submerged prehistoric heritage. Combining development data with archaeological potential maps and inundation models will enable stakeholders to improve landscape characterisation and better target areas of archaeological interest. New methods of investigation may then be trialled on these sites and advanced archaeological assessments designed. Such processes will enable stakeholders in marine development to better understand the nature of past human activity in a manner that informs our shared responsibility for heritage management.

Keywords: Palaeolandscapes; Development; Green Energy; Modelling; Archaeology

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Sailing the Frictional Sea: Sailing Mobility a Necessary Basis of Maritime Interactions

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Material culture, in its many forms, provides evidence of the existence of maritime interactions, but it provides only fragmentary evidence on the functioning of these interactions. To understand how maritime networks evolved, we need to understand how maritime interactions were conducted. The sea is not a frictionless surface. It has a topography of its own, defining the limits of what could be sailed. The limiting factors are the wind patterns, the ships' technological abilities and the mariners' limits and abilities. This foundation layer of what could be sailed, including preferred routes and seasons, defines the constraints or envelope of all other layers of influence in maritime networks, such as commercial, social, and political influences. A comprehensive understanding of maritime networks can benefit from an interdisciplinary approach, which introduces potential sailing mobility analyses as an underlying element in such studies.

Recent research at the University of Haifa developed methods to measure sailing mobility, and the associated toolkit provides the ability to apply a rich set of mobility measures in examining historic maritime contexts. The methods simulate sailing passages throughout a 15-year sample of meteorological data at hourly temporal resolution, thus preserving the characteristic variabilities of Mediterranean winds. Novel output measures include, among others, the monthly probability of completing a passage within the mariners' limits of reasonability and the length of time spent waiting to depart with favourable winds. Rather than net sailing duration, these measures are key indicators in evaluating sailing mobility.

Persistent Etesian winds affect the eastern Mediterranean region between mid-May and mid-September. These winds impede inter- and intra-regional sailing mobility, highlighting the utility of crosswind passages. A study of Middle Bronze Age Cypro-Levant maritime interactions, evident in material culture findings, is elucidated by examining potential summertime sailing mobility in the Levant basin. Investigating both breeze-driven coastal sailing and direct passages in the Cypro-Levant area exposes the likely location of a maritime network's hub on the Levant coast, corroborating the material culture findings.

Keywords: Sailing Mobility; Seafaring; Ancient Sailing Routes; Maritime Networks; Maritime Interactions

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Marine species and sea-related representations in Casma iconography, north-central coast of Peru (9th-14th c., CE)

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Recent archaeological work has revealed that the north-central coastal region of Peru had been the territory of a cultural entity that we recognize today as "Casma" between the 9th and 14th centuries AD. Some aspects of this culture remain largely unknown and require further investigation, particularly its iconography. It appears mainly on molded ceramics, ornamented by anthropomorphic and zoomorphic motifs, as well as scenes that can also occur on painted textiles. As in other coastal cultures, this abundant iconographic repertoire includes notably representations related to the sea and the coastal environment. Various animals such as seabirds, fish (including rays) and other marine species are sometimes depicted alone, sometimes in maritime scenes like navigation and/or fishing, but also in other compositions such as fighting scenes in a marine setting and scenes related to sacrifice. Identifying the recurring figures, their features, and occurrences in scenes allows us to better understand the importance of sea-related representations in Casma ideology, and more broadly the interactions of this coastal culture with its environment.

Keywords: Coastal Peru; Casma Polity; Andean Iconography; Marine Species; Marine Ideology

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

Navigating paradigms: a comparative analysis of indigenous watercraft performance and seafaring strategies in the rugged coastlines of the Pacific Americas

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Studying the past of past peoples that lived in maritime and aquatic environments without including watercraft would be like studying present societies without automobiles. However, how boats were integrated in the economics and everyday life of past seafaring peoples, particularly in the case of small-scale and/or hunter-gatherer societies, has yet to be fully explored. How and to what extent did the type of watercraft technology used by seafarers shape the relationship they had with their landscape and seascape? How did watercraft and seafaring support the settlement patterns archaeologically documented? How did watercraft support the kind of social interaction that we see in prehistoric or historical times? In summary, how was watercraft technology implemented not just as a technical innovation but in a social context? Attempting to answer any of these questions presents major challenges. Beyond the archaeological visibility of watercraft, a key issue is that theoretical models and archaeological predictions concerning aquatic movement are less developed than in terrestrial cases. In this work, we apply an explorative and comparative approach to different study cases of the Pacific Northwest Coast of North America and the Fuego-Patagonian archipelago of Southern South America. These rugged coastlines present similarities, yet a diverse range of maritime worlds, in an environmental sense (including estuaries, inland seas and ocean shorelines) but particularly in social and technological terms. Indeed, they provide different paradigms of small-scale and/or hunter-fisher-gatherer social and organizational strategies, including different types of seagoing watercraft technology. A combination of traditional and computational methods has been explored, including the analysis of ethnohistoric and archaeological data; experimenting with Computational Fluid Dynamics (CFD) techniques to evaluate the hydrodynamic capacities of actual 3d-models of indigenous watercraft; and the development of an Agent-based modelling (ABM) approach to explore how environment, watercraft and social strategies interacted and varied in the two regions and their respective internal variation.

Keywords: Northwest Coast; Fuego-Patagonia; Watercraft; Ethnography; Computational Fluid Dynamics; Agent-based Modelling

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

The azorean deep waters and underwater archaeological sites management: survey and inventory experiences.

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Located in the middle northern Atlantic, the archipelago of the Azores was an important hub for Atlantic shipping. From their discovery in the 15th century, by the Portuguese, to present days, with international aviation, the Azores have played a strategic role at the crossroads of the Atlantic, both in supporting trade routes and as the scene of countless conflicts between different powers that have fought throughout history. Many of these voyages were interrupted in the Azores parallel, partly due to bad weather, but also to navigational errors or war conflicts. Due to volcanic origin of the Atlantic archipelagos, the occurrence of steep cliffs that form abruptly cut coastlines and deep water near the coast is higher than on the continental shelves. Consequently, the probability of finding shipwrecks in deep waters is higher. The Azores are a good example of how archaeological heritage management should be adjusted to deep-water contexts. The oceanographic feature of the archipelago indicates that bathymetries near the coast easily reach depths below -1000 meters. In this environment, underwater archeological surveys are very difficult without proper tools to access these depths. Based on historical data and lists of known shipwrecks, underwater archeological inventory has been carried out in the Azores for more than three decades, involving different work teams as well as the authorities responsible for heritage management, who have gathered historical and archeological data over time. This presentation will discuss how archeological surveys have been adapted to optimize searching in the deep and volcanic waters of the Azores. By using side scan sonar or operated submarines, the data available allows us today to know more properly the sedimentation of archeological sites, their main threats and ways to protect them. From the identification of the site of the World War II German submarine, the U581, deposited at a depth of -800 meters, to the intensive survey of the southern coast of Terceira Island, where the main port for shipping of early modern European expansion was located, it will be present some of the methods and knowledge of the Azores' underwater archeological heritage in deep waters.

Keywords: Azores; Middle Northern Atlantic; DeepSea Archaeology; Survey; Underwater Culture Heritage Management

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

Tenerife Underwater Archaeological Map Project

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This project, originated from a private own initiative, was created from the registered final thesis of a master's degree. It has been operational since 2019 and has built the basis for the Underwater Heritage management in the Canary Islands (Spain). It is based on a continuous and proactive daily work with administration and citizenship; and not only concern aspects about UWH locations, but also, ways of develop a concrete normative and specific law basis regarding the archaeological interventions and its necessities, linked to the texts of the Spanish National Plan about UWH, which was carried out from the UNESCO 2001 Convention. It considers a new management system that can be accessible from a wide range of departments as well as provide control. In fact, all the archaeological underwater sites and materials will be easily manageable. Also, this is a tool for the protection of the heritage as well as a database, where all results of research can be located, recorded and consulted. The project also consists in research that includes the investigation of all types of documentation, from any source known about the target themes, in the executing archaeological interventions, the conservation and restoration, the divulgation and diffusion of the results, and expands the knowledge about the impact UWH has and in which ways citizens should treat it. Also, we evaluate local communities and offer them a way to get profit from the results of the researches in sustainable, safety, protected, healthy and controlled way. Since this work has not received any public funds for its development, but the economic support from the creator itself, a crowdfunding campaign has been the financial livelihood in order to continue the research and the positive achievements it has so far obtained. Those partial results will be exposed to demonstrate the scope of the project.

Keywords: New Spain Fleet; Multilevel Research; Management; Proactive Divulgation; Private Initiative; Crowdfunding

Presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Post-Glacial Human SEASCAPE with submerged Stone Age Megastructures hidden in the Western Baltic Sea?

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During the late Pleistocene, when the Weichselian glaciers had retreated, Northern Europe was populated by mobile hunter-gatherers. Due to their non-sedentary life style, traces of these societies are, however, difficult to find, hampering our understanding of their life. Shallow basins of the western Baltic Sea only drowned in the Holocene and may therefore preserve man-made structures and landscapes from these times. In 2021 we discovered a 1 km long stonewall at the seafloor in the Bay of Mecklenburg (Germany). Sediment samples indicate that the wall stands on basal till adjacent to a sunken lake, whose youngest phase was dated to 9143±36 years BP. The stonewall likely represents a Late Pleistocene drive lane for hunting reindeers. From legacy hydroacoustic data we have evidence for comparable yet unexplored possible Stone Age megastructures elsewhere in the Western Baltic Sea. In the new SEASCAPE project, funded by The Leibniz Association, we propose that submerged Stone Age megastructures have survived unnoticed in the Western Baltic Sea. Combining expertise from the Leibniz Institute for Baltic Sea Research Warnemünde (IOW), the Leibniz-Zentrum für Archäologie (LEIZA), Kiel University and the University of Rostock, we aim to (1) identify these structures and map them in high resolution, (2) reconstruct their paleo-environment and landscape, and (3) validate their anthropogenic origin and untangle their function. This will make them key sites to learn about the traditions, subsistence strategies, mobility patterns and territorial developments of the hunter-gatherers that followed on the ice. The uncovered SEASCAPE of Stone Age megastructures, which might be better preserved than its North Sea counterpart Doggerland, due to reduced storm-wave erosion at the seafloor, will inspire cross-disciplinary follow-up projects.

Keywords: Stone Age; Submarine Geomorphology; Western Baltic Sea; Hunter-gatherers; Blinkerwall; Drive Lane

Poster presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Digital photogrammetry in the arduous waters of the Bulgarian Black Sea

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With digital photogrammetry becoming more accessible, it has established itself as a major tool for documenting underwater archaeological sites. However, the conditions of the Black Sea present a further set of challenges such as very low visibility, lack of light and floating particles. To overcome them, a flexible approach is adopted to achieve fast and reliable results.

In this paper is presented, a cost-effective methodology that can provide them. It is influenced by the experience gained from abroad as well as the work of the Centre for Underwater Archaeology along the Bulgarian Black Sea coast. It has been successfully applied to several underwater archaeological sites of different characters. They range from the submerged fortifications such as those in Nessebar and Kavarna, the remains of which are spread over a large area; to the inundated prehistoric settlement at the bay of Ropotamo River and in the harbour of Sozopol, whose archaeological remains are more than 2 m deep into the seabed; and on a shipwreck such as the Urdoviza shipwreck in Kiten, a 24 m well preserved ship. To document them a set of action cameras are used that are attached to a common frame and shoot at a different angle. That way enough overlap is produced even in the lowest of visibilities. Afterwards, the images are corrected in open-source software and processed in Agisoft Metashape. The workflow is adapted to remove most of the interference from the seawater.

That provides millimetric accuracy and submillimetric resolution which has made the method essential for underwater documentation in Bulgaria. On-site, the results from the photogrammetry survey are crucial for managing the workflow of excavations and afterwards for the archaeological analysis. Furthermore, as underwater archaeological sites are not accessible to the general public, the results of digital photogrammetry are very fitting for public outreach and bringing awareness to the underwater cultural heritage.

Keywords: 3D Documentation; Remote Sensing; Action Camera; Low-cost; Metashape

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

A River that reads like a Book: The Story of Brussels as told by the fluvial Deposits in the medieval Harbour

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During the course of 2019, the building of the Brussels city administration center enabled a team of archaeologists to “dive” in the medieval Senne river, while keeping their feet dry. This large scale preventive archaeology intervention, carried out on a 6000 m^2 plot, brought to light a stratigraphy of unexpectedly well preserved river layers at the site that was once the medieval city harbour. The sampling and study strategy elaborated in concert with the paleoenvironmental sciences team benefited from the experience acquired during previous similar interventions. Developing across the pre-Holocene alluvions, the medieval stratigraphy extends from the 10th to the 16th century. The oldest moving and meandrous river beds make way for a primitive bank reinforcement in an obvious will to straighten the Senne in the course of the 13th century, facilitating the port activities. The development of both city and trade in the next centuries lead to the progressive petrification of the quay wall and its infrastructures, channeling the water.

This presentation will shed light on the contribution of the interdisciplinary approach to the knowledge of the medieval river in various aspects, while focusing on the impact of human activities on the current dynamics evolution. Seeing as the harbor is situated on the last part of the *intra-muros* course of the Senne before it exits the city, the river bottom acted as a landing place for numerous artefacts and ecofacts deposited on site but also brought downstream by a dense network of urban branches and tributaries, constrained by watermills and locks. The sediments and the materials preserved within open an unprecedented window on the human activities directly or indirectly connected to the water: navigation, trade and transport of goods livestock and people, fishing but also artisanal and domestic activities and disposal of the generated waste.

The history of Brussels and its evolution is told by the river that flowed through its heart until the 19th century, when the covering and later diverting made it disappear from the sight and memory of the local residents.

Keywords: Brussels; Medieval Harbour; Senne River; Medieval Archaeology; Fluvial Deposits

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Anchor points in a fluid world – investigating Mesolithic coastal landscapes

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The significance of the coastal maritime landscape to Mesolithic hunter-fisher-gatherer (HFG) communities cannot be underestimated. In this final period in which the hunter-gatherer lifestyle dominated in Europe, HFG groups were living in exceptionally dynamic coastal areas across Europe and exploiting resources distinct to these areas such as fish, shellfish and marine mammals, as well as taking advantage of available terrestrial resources. Arguably, this culminated in the Late Mesolithic in formation of large and perhaps complex societies based on specialist coastal adaptation, in many areas of Europe.

This paper presents the approach and first results of a current PhD study conducted under the international, interdisciplinary and intersectoral HORIZON MSCA Doctoral network ArCHe Archaeological Coastal Heritage: Past, present and future of a hidden prehistoric legacy (ArCHe) project, see www.arche.uio.no. The current study goes beyond site-specific and resource-based investigation to re-evaluate existing data with a view to better understand human-environment interaction in the Mesolithic. This will incorporate less tangible motivations for coastal landscape dwelling including social and communicative meaning and function and cosmological aspects of HFG populations, with special focus on the use of the coastal landscape (and seascape). The project approaches this issue using several interdisciplinary methods and this paper will focus on the application of GIS techniques, including coastal reconstruction, viewshed analysis and least cost analysis to existing data from three discrete coastal areas of Atlantic Europe - Southeast Norway, Northern Spain and Western France. The three areas under study are very diverse in their current climate, topography, preservation and survival, as well as material expression. Comparing them will allow us to bridge knowledge gaps between these areas and give a fuller understanding of hunter-gatherer-fisher landscape interaction in coastal Mesolithic Europe.

Keywords: Mesolithic; Coastal; Hunter-Fisher-Gatherer; Human-Landscape Interaction; GIS

Presentation in session D2: Coastal Marine Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Sustainable Development in the Great Lakes: Balancing Partnerships & Prehistoric Archaeology

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Global sea level rise since the Last Glacial Maximum fundamentally changed our planet. Vast landscapes which were once dry and habitable became submerged, significantly decreasing the habitats available for human populations and plant and animal communities. These global processes of sea level rise and habitat restriction also occurred in large inland waterways such as lakes and rivers. The North American Great Lakes are some of the largest bodies of fresh water on the planet, with diverse ecological, climatic, and cultural environments. Some of the largest cities in the United States and Canada are on Great Lakes coastlines, and as such, represent areas of rapid development. Although known as the "rust belt" due to substantial industrial decline in the 1980s, the region is still in a state of constant growth. As some areas, such as southern Wisconsin, seek to balance growth and sustainability, development on coastlines, harbors, and offshore can impact prehistoric shorelines and landscapes. While there is a long history of nautical archaeological investigations in the Great Lakes, older archaeological records have often not been studied. New research in Lake Michigan is focused on 1) reconstructing past prehistoric shorelines and landscapes, 2) creating a database of "find spots" known in community, 3) modeling past river systems, and 4) characterizing high areas of concern for development. The project also seeks to create partnerships in the community in order to catalog and assess previously collected data and gain access to future data collected during development projects. This research seeks to balance investigations of previously undocumented areas offshore as well as focus on nearshore areas that are more likely to be impacted.

Keywords: Underwater Archaeology; Great Lakes; North America; Partnerships; Development

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Tracing Global Networks Through Ceramics: Interdisciplinary Insights from the HMS St. George Wreck

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The *HMS St. George*, a British naval vessel wrecked off the Danish coast in 1811, represents a significant case study for exploring the material culture of early 19th-century naval life.

Interdisciplinary methods, including typological analysis, provenance studies, and archaeometry, are employed to identify the ceramics' origins, production techniques, and trade pathways. Archival research compliments this by contextualizing the artifacts within historical supply chains and the logistical operations of the Royal Navy. In addition, the integration of Geographic Information Systems (GIS) enables the spatial analysis of artifact distribution across the wreck site, revealing patterns that inform on the ship's organization, its sinking process, and subsequent site formation processes. Furthermore, the data available by accessing provenance and archaeometric studies have provided a scientific basis for tracing the ceramics' materials to specific production centres, while typological studies also aid in classifying and comparing these artifacts within broader archaeological and historical frameworks. The interplay between tangible artifacts and historical records highlights the global networks of trade and cultural exchange underpinning maritime life during the Napoleonic era.

By bridging the gap between material culture and archival research, this study constructs a comprehensive narrative of the *HMS St. George*'s role in maritime history. This study focuses on the ceramics recovered from the wreck, examining their role in daily life aboard the ship and their broader implications for understanding global trade networks and cultural exchange during the Napoleonic era. It is aimed to contribute to the state of the art in shipwreck archaeology by demonstrating the potential of interdisciplinary approaches to uncover new insights into underwater cultural heritage and material culture studies.

Keywords: HMS St. George; Ceramics; Provenance Studies; Maritime Archaeology; Archaeometry

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Inventorying wrecks in Lake Constance – challenges and obstacles

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Lake Constance, the third largest lake in Central Europe, is known for its rich heritage of prehistoric pile dwellings, which are preserved in shallow water in many places on the lake's shoreline. In addition, we know monuments from medieval and modern times such as wrecks, landing sites, piers, fishing structures, etc. from the shallow water zone.

Due to the tradition in pile dwelling archaeology, monuments from medieval and modern times had been out-of-focus. In the last decade, techniques, which enable to easily reach deeper parts as well as the depth of Lake Constance (up to 251 m deep) have been developed. We observe endangerments by wreck hunters, invasive species and climate change, which may destroy heritage we might not know. To gather knowledge about possible heritage objects within Lake Constance, Landesamt für Denkmalpflege im Regierungspräsidium Stuttgart (State Office for Cultural Heritage Baden-Wuerttemberg; LAD) runs a project from 2022-2027. The project aims to inventory wrecks, especially in the deeper parts of Lake Constance. We started with identifiying anomalies in bathymetric and sidescan sonar data. In a second step, position, size and shape are checked by sidescan sonar. The third step is a survey by ROV or diving team, depending on the depth of the object. After that, we decide if the specific object is of interest for the cultural heritage inventory.

Lake Constance is a waterbody surrounded by five Federal states (Bundesländer/Kantone), which are part of three different countries: Baden-Wuerttemberg and Bavaria (Germany), Thurgau and St. Gallen (Switzerland), and Vorarlberg (Austria). Within the part of Lake Constance called Obersee (Upper Lake), there is no international agreement about the border between those states, which causes obstacles for the cultural monument preservation.

This presentation will focus on topics such as incomplete inventories, monument designation of modern wrecks and inventorying cultural heritage within an international water body without borders.

Keywords: Lake Constance; Inventorisation; Cultural Monument Designation; Wreck Archaeology; Deep-Sea Archaeology

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Integrating Underwater Cultural Heritage and Climate Adaptation Planning: Challenges and Opportunities

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There is a wide consensus on the overall potential impacts of climate change on the future preservation of coastal and underwater cultural heritage. However, due to the complexity of different natural processes, it has been difficult to establish direct links between climate change (CC) impacts, the different climatic and socio-economic scenarios and maritime cultural heritage. The limited integration with climate and coastal sciences, and the lack of a coherent approach aligning with the Intergovernmental Panel on Climate Change (IPCC) guidelines to evaluate risk induced by CC, means that underwater cultural heritage is frequently left out in climate adaptation planning.

This work presents the challenges and opportunities of alignment with IPCC risk analysis methodolgies through the four phases of the Adaptation Policy Cycle: 1) Assessment, including the conceptualization and analysis of risk, and impact evaluation issues; 2) Planning, with the identification and assessment of adaptation options; 3) Implementation, where the selected adaptation measures are resourced and managed; and 4) Monitoring, in which the previous phases are followed up on their success or failure, generate knowledge and correctives measures if needed.

While cultural heritage is increasingly having a presence in IPCC and related reports, it remains unsystematic and superficial. The ability of underwater cultural heritage researchers and practitioners to incorporate IPCC terminology and methods will enhance, not only the visibility of the field and heritage needs, but also engage in interdisciplinary work generating new knowledge and understandings. Moreover, a successful integration within mainstream climate adaptation planning will enhance inter-sectoral synergies (both in terms of coordinated/joint activities and in resource sharing), prevent maldaptation and generate more effective preservation measures.

Keywords: Climate Change; Adaptation Planning; Risk; Impacts; Underwater And Coastal Cultural Heritage

Presentation in session O1: Preserving of UCH (Jordy Moies)

Social perception of intertidal cultural heritage in the vestigium project

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Through the Vestigium project, we aim to contribute to the economic development of Andalusia by revalorizing our archaeological and paleontological heritage located in the intertidal zone along the coastal strip between the municipalities of Cádiz and Tarifa. Recognizing that heritage is a social construct, the project promotes collaborative work among scientists, institutions, and the local community, emphasizing the importance of social participation in the conservation and dissemination of heritage.

Therefore, one of the key pillars of the project is to identify how society perceives its heritage in order to design strategies for disseminating this knowledge through participation and social inclusion, fostering a sense of belonging and responsibility towards these resources, operating under the premise that "what is known is preserved."

To this end, we have developed a working methodology that incorporates scientific data and social demands organized around three main lines: Establishing and developing cultural routes linked to the territorial space defined in the project, taking into account the accessibility of different social sectors, thus ensuring a cultural tourism that accommodates diversity; defining the content of adapted outreach and educational materials that respond to the various demands of citizens; and designing communication strategies to develop activities aimed at transmitting knowledge of the intertidal archaeological and paleobiological heritage and disseminating the project's results, coordinating events and activities that enhance the appreciation of cultural and natural heritage.

To achieve this, information has been collected on the awareness of heritage elements, data on tourist activities, surveys targeted at the local population have been designed, interviews have been conducted with stakeholders in these areas, and criteria have been generated to identify the accessibility of the goods on which the proposed knowledge transmission activities will rely.

All of this will enable the development of a model that can be replicated anywhere along the Andalusian coast. In this way, Vestigium not only benefits the Cádiz region but can also serve as a model for other coastal communities interested in leveraging their intertidal heritage as an economic and social engine.

Keywords: Participation; Inclusion; Local Community; Economy And Cultural Assets

Poster presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Conservation during the archaeological works of the Herakles Project. Methodology and best practices

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The methodology of underwater archaeological excavations has evolved since the beginning of the discipline, not only from a technological point of view, but also because the objectives and questions that researchers seek to answer have changed. As a result, in recent decades there has been a growing concern for the conservation of underwater heritage, from the moment it is found to its long-term preservation without the need for intervention. The aim of the Heracles project, carried out by the University of Cádiz between 2020 and 2023, was the location of archaeological sites in the area of the Bay of Algeciras. This poster explains the three main lines of action for conservation during the archaeological work carried out: preparation of protocols for the whole team, diagnosis of the state of conservation, and methods of protection.

The first block consisted of determining how to identify a vulnerable find and how each member of the team should act, prioritising documentation. Next, the factors and risks of alteration had to be assessed, and the level of conservation status determined. Finally, non-intervention, protection in situ or, exceptionally and in specific cases, preventive extraction was carried out. For the latter, very specific methods, designed for each type of material, were used to minimise alterations during the process. This set of guidelines developed during the Herakles project is part of a methodology that is present in many research projects in underwater archaeology, but in most cases, they are unwritten rules or are applied arbitrarily, without formalising the protocol that is essential for working with interdisciplinary teams to be as effective as possible.

The criteria and methods used are based on the standards set by the 2001 UNESCO Convention and the Green Paper: National Plan for the Protection of Cultural Heritage (2007), always giving priority to in situ conservation.

Keywords: Conservation; Best Practices; In Situ Conservation; Documentation; State Of Conservation; Underwater Archaeological Sites

Poster presentation in session O1: Preservation of UCH (Jordy Moies)

A Multi-faceted Expansion, Update and Re-Analysis of a Maritime Archaeology Database: Ancient Shipwrecks of the Mediterranean and the Roman Provinces. A.J. Parker, BAR International Series 580 1992.

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It has been 32 years since A.J. Parker released his seminal work. Yet, the literature still lacks a comprehensive update, expansion, and re-analysis of all known ancient Mediterranean shipwrecks.

In 2022, the author conducted research that resulted in a substantial expansion and update of Parker's 1992 catalogue raisonné and the creation of a new database titled *Green 2022*, which encompassed 2,100 wrecks with over 126,000 data fields. Employing interdisciplinary techniques, such as GIS, the author aimed to confirm, modify, challenge, or introduce new ideas relative to Parker's research.

Three notable examples of conclusions drawn from *Green 2022* that pertain to ancient Mediterranean seafaring are as follows. First, an updated graph illustrating shipwrecks by century enhances our understanding of the expansion and decline of Roman trade, revealing new evidence supporting a resurgence of eastern trade during the Byzantine Empire. Second, the distribution and density of shipwrecks have shifted more towards the eastern Mediterranean, with the region now accounting for 28.5% of all Roman-period shipwrecks, compared to 23.4% in 1992. Third, an analysis of shipwreck concentration across the 22 Roman Sea zones provides a revised perspective on Parker's distribution of shipwrecks by modern countries, highlighting three eastern Mediterranean zones – Mare Icarium, Mare Ligusticum, and Mare Myrtoum – that now rank among the top five.

Examining the *Green 2022* dataset has made significant breakthroughs in research. The result is an enhanced understanding of the role of ships, maritime trade, technology, and connectivity of eastern Mediterranean seafaring within the broader context of the Mare Nostrum.

Keywords: Ancient Mediterranean Shipwrecks; Database; A.J. Parker; Geographic Information Systems (GIS); Amphorae.

Poster presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

ENDURE: Sustainable preservation of underwater archaeological sites: A novel approach to cultural heritage management

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Cultural heritage is the legacy of tangible, intangible and natural heritage assets of a society that is inherited from past generations. Preserving the remains of the past for the benefit of future generations is common in international heritage policy. Current management practice advocates preserving underwater cultural heritage (UCH) where it lies on the seabed, in situ. However, this practice is questioned due to a lack of understanding of the entangled threats posed by multiple natural and anthropogenic drivers. In a rapidly changing ocean environment and increasing human exploitation of the marine environment, it is necessary to develop new concepts for assessing and preserving this resource. With over 3,000,000 shipwrecks and thousands of submerged prehistoric sites lying on the floors of the world's oceans, ENDURE aims to disentangle both natural and anthropogenic decay processes, determine their cumulative and interactive effects on UCH and proposes a novel conceptual framework to preserve this heritage based on site entropy. This will be achieved by: 1) Detect, visualise and interpret the products of natural and anthropogenic decay of shipwrecks and submerged prehistoric sites using marine remote sensing techniques integrated with natural and anthropogenic variables in a GIS platform; 2) Determine key natural processes and rates of decay of archaeological materials in situ and in the laboratory; 3) Remotely identify and rank simultaneous decay processes, including increasing threats to hidden and largely inaccessible heritage sites using ecosystem modelling, and 4) Propose novel intervention methods to mitigate threats to UCH and where not possible, strategies for curated decay. Ultimately, ENDURE's holistic structured framework can be synergistically integrated and implemented by stakeholders and marine practitioners for a sustainable preservation of the marine environment and the world's underwater cultural legacy.

Keywords: Sustainable Management; Ecosystem Modelling; Decay; Preservation

Presentation in session O1: Preserving of UCH (Jordy Moies)

Reassessing the Maritime Silk Road: A Future Archaeological Perspective

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The 21st-century Maritime Silk Road was promoted as a transformative initiative that linked global economies through port investments and expanded trade networks. However, its long-term material legacy remains uncertain. Grounded in critical interpretivism and framed within critical heritage theory, particularly heritage futures, this interdisciplinary mixed-methods paper adopts the speculative perspective of future archaeologists in 2520 CE to critically examine the physical remnants of the initiative. It incorporates archival research, archaeological methodologies, historical reconstruction, and maritime site analysis to challenge dominant narratives, highlighting how power dynamics shape our understanding of the past.

Key findings highlight a disconnect between geopolitical narratives and tangible archaeological evidence. Investigations of major ports such as Gwadar, Hambantota, and Kyaukpyu suggest limited infrastructure and connectivity, challenging contemporary claims of their strategic importance. Shipwreck distribution patterns further complicate the conventional understanding of trade flows, with evidence pointing to regional rather than truly global integration. Wrecks such as *Emerald Star* and *Wakashio* illustrate the role of bulk carriers and shipbreaking industries, raising questions about safety practices and economic drivers in maritime commerce.

This study also considers the challenges of interpreting maritime sites over long temporal distances. Issues of preservation, archival biases, and the selective nature of the archaeological record complicate the reconstruction of past economic systems. By imagining the future excavation of these sites, this research critiques present-day assumptions about global trade, infrastructure investment, and sustainability. By bridging past, present, and future, this speculative approach invites scholars to rethink the impact and historical positioning of the Maritime Silk Road, highlighting the complexities of interpreting large-scale trade networks in the longue durée.

Keywords: Maritime Silk Road; Shipwrecks; Underwater Archaeology; Heritage Futures; Asia.

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Integrating Cultural Heritage and Ecological Conservation: A Multidisciplinary Approach to Protecting the British Sergeant Shipwreck off the Eastern Coast of Sri Lanka

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The British Sergeant, a World War II oil tanker that sank off the eastern coast of Sri Lanka in 1942, rests at depths of 11–25 meters and holds dual significance as both a heritage-listed war memorial and an ecologically rich artificial reef. Although protected under Commonwealth cultural frameworks, the site remains vulnerable to unauthorized salvage operations, destructive fishing methods, emerging dive tourism, and the absence of a coordinated conservation framework. Notably, despite its evident ecological significance, studies on this wreck remain limited or are not readily accessible in the public domain.

This study presents baseline data on the wreck fauna of the site, based on technical diver-led surveys supported by photo and video documentation. A total of 49 fish species were recorded along with 10 genera of hard and soft corals, including *Tubastraea* spp. and *Dendronephthya* spp., which were predominantly colonizing the amidship hull and outer bow sections. The presence of juvenile stages of commercially significant species underscores the wreck's function as a nursery ground, facilitating the replenishment of fish populations and enhancing the sustainability of local fisheries. As an accessible dive site surrounded by abundant marine life, it also holds potential for sustainable tourism, benefiting both conservation efforts and the community. Furthermore, given the wreck's unique and extensive ecosystem, being the sole structure within the surrounding region, the findings provide a strong rationale for designating the site as a Protected Area to enhance conservation measures.

Findings from this study aid in addressing critical gaps in existing protection frameworks for shipwrecks, where conservation efforts often prioritize either archaeological or environmental objectives. These findings underscore the importance of adopting an integrated, multidisciplinary conservation approach that brings together heritage management and ecological protection. Furthermore, it is essential to communicate the ecological value and associated benefits of these sites to local communities through collaborative monitoring programs. Such engagement can strengthen site protection and long-term sustainability. This integrated conservation strategy could function as a replicable model for other shipwrecks across Sri Lanka, demonstrating how interdisciplinary research can unify heritage preservation with ecosystem conservation while supporting the well-being of local communities.

Keywords: underwater cultural heritage, artificial reefs, integrated conservation, community-based monitoring; shipwreck ecology, interdisciplinary research

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

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The Lost Narratives; British Maritime Archaeology Pioneers and their Contributions

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The beginning of maritime archaeology in Britain included several significant contributors, but the most widely known are those who wrote books or taught at universities. However, to tell the story correctly, we need to look at other characters; each contributed something unique and original to the nascent discipline of archaeology underwater. Each of these people has left traces of their work, some as books, some as archives, and some only as oral history. In this paper, we look at four pioneers, Alan Bax, Margaret Rule, Rex Cowan and Peter McBride, whose stories and legacy have been recorded or saved by The SHIPS Project CIC. The SHIPS Project is actively involved in capturing the stories and archives of the famous and less well-known pioneers who have helped shape our discipline of maritime archaeology.

For example, Lieutenant Commander Alan Bax, with his business partner Jim Gill, started the School of Nautical Archaeology Plymouth (SNAP) at Fort Bovisand. Alan Bax wrote the first manual for underwater archaeology in the UK in 1969, and yet, few people remember his contribution. For many of these people, the opportunity is lost to get background and context to the stories in their archives because they are no longer with us. We need to take the opportunity now to capture the tales of the few that remain because they are the last witnesses to historical events that are not reliably documented elsewhere.

The saving of archives is an important step. However, they are limited in value without interpretation and explanation because archives often contain only fragments of a story, with the beginning and end often missing. Piecing these together requires a combined effort with the numerous people involved in the story being considered in the perspective of telling. This puts a time limit on the process, showing that the best time to rescue any archive or hear any story is today.

Keywords: Archives; Tales; Oral Histories; British Maritime Archaeololgy; Lost Histories; Legacy Data

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

Beneath the mud: reviving a drowned medieval landscape from the tidal flats of North Frisia, German Wadden Sea

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Since 2015, the RUNGHOLT project investigates a cultural heritage preserved beneath recent tidal flat deposits in the Wadden Sea of North Frisia: the medieval cultivated landscape drowned by the 1362 AD “Grote Mandränke”.

In the so-called ‘type case’ approach, we conduct interdisciplinary research based on systematic geophysical prospection, geoarchaeological investigations and archaeological survey, to gain new insight into the coastal landscape’s complex development, including extensive medieval cultivation measures and the impact of major storm surges.

Geophysical prospection, combined with coring, analyses of palaeoenvironmental parameters, dating and archaeological evidence together reveal the layout and structure of the drowned medieval coastal landscape, including settlement patterns, coastal infrastructure and strong human impact during medieval times.

For southern North Frisia (Nordstrand area), we found that medieval land reclamation obviously moved systematically westward from flood-protected marsh areas into an extensive fen and bog landscape. Here, peat formation dominated from c. 800 BC to at least 1000 AD but remains are mostly missing in the local stratigraphy. Instead, we found 12th to 14th cent. AD settlement remains directly on top of a pre-800 BC fossil marsh. From this distinct hiatus of c. 2000 years, we conclude that cultivation measures widely included the complete removal of peat to use the underlying marshland for agricultural purposes. This type of cultivation is also supported by typical so-called “Hufen” settlements found in the study area.

Around the northern Halligen (Hooge area), we found evidence of peat extraction for salt production on an industrial-like scale. Excavations around a salt production terp and dating of the extraction fields show this form of land use to be already well established in the 13th cent. AD.

In sum, we found peat extraction for both cultivation of fossil marshes and salt production to have lowered the ground surface, likely below mean high water of that time and thus clearly increased the study area’s coastal vulnerability. For our study area, we consider intense human-environment interactions as decisive trigger for the devastating effects of the 1362 AD “Grote Mandränke” storm surge and establishment of tidal flats that are nowadays part of the UNESCO World Heritage “Wadden Sea”.

Keywords: Wadden Sea; Medieval Land Loss; Human Impact; Storm Surges; Geoarchaeology; Archaeology; Geophysics

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Show Me Our Boats: Analysing the Interpretation and Presentation of Egyptian Boats and Shipwrights Practices in the Display Context of the Egyptian Museums

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For millennia, Egyptians have interacted with their surrounding waterways, the Mediterranean to the north, the Red Sea to the East, and the Nile River flowing south-north. These waterways have been the lifeblood of Egyptian maritime history, facilitating activities such as fishing, sailing, navigation, shipbuilding, trade, and military service. Such aspects of Egyptian maritime life were evidenced by the different finds housed in several museums and the iconography preserved in archaeological sites around Egypt.

However, despite the rich narratives of the Egyptian maritime activities, the displays of its remains in the Egyptian museums, particularly the boats, are rarely comprehensive. This lack of a complete narrative of the Egyptian maritime heritage to the broader public hinders the interpretation of the Egyptian boats' significance from ancient times to modern history and their link to the living heritage of Egyptian boat building practices, which is crucial for maintaining the educational objectives of heritage public presentation.

This research addresses the problems of Egyptian boats' display in Egyptian museums by analysing the current boat exhibitions to conclude the strengths and weaknesses. Then, through an analytical comparison with worldwide examples of boat/ship displays, and through surveying local communities' feedback, this research identifies best display methods that can be applied and proposes recommendations for improving the display narratives of Egyptian boats. The research aims to enhance the public interpretation of Egyptian maritime activities by presenting the remains of ancient boats and boat models. It also aims to engage local communities and empower them to understand, interact with, and interpret their perception of Egyptian maritime heritage.

Keywords: Maritime Heritage; Public Interpretation; Museum Display; Boat Exhibitions; Local Communities; Maritime Ethnography

Poster presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Shifting Sands, Ebbing Tides: Investigating newly uncovered wrecks on Portmarnock's Velvet Strand

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The dynamic marine environment of Portmarnock's Velvet Strand, a 5 km sandy coastline north of Dublin Bay, has long concealed fragments of Ireland's maritime history. This vibrant marine landscape is characterised by the constant movement of sand, shaped by natural tidal cycles and storm activity. Adjacent to bustling historic shipping lanes and major ports, this coastline has been the site of numerous wrecking events, with at least 47 losses documented in historical records of vessels from Ireland, Britain, Canada and France. These vessels range from fourteenth-century trading ships to 19th-century fishing vessels and twentieth-century coal boats, with some wrecking events leading to the tragic loss of life and remarkable rescue attempts by lifeboat crews and local communities.

While ten wrecks were located during fieldwork in the 2000s, shifting sands in 2024 revealed three additional wrecks, offering a rare opportunity for examination. The National Monuments Service, responsible for managing, promoting, and protecting Ireland's vast underwater cultural heritage, led a rapid survey and research program, employing techniques such as walkover surveys, detailed recording, photographic documentation, and drone imaging. Critical to this effort was a detailed examination of the Wreck Inventory of Ireland Database, which catalogues over 18,000 shipwrecks off Ireland. After locating and recording the wrecks, efforts sought to identify and contextualize these wrecks within Ireland's maritime history. However, confirming their identities and correlating them with historical records presents ongoing challenges. Limited tidal windows and the ever-shifting sands can limit opportunities to record the wrecks in sufficient detail. Many of these vessels exhibit similar construction styles and design features, making it difficult to differentiate them. Additionally, the original specifications and construction details of these ships often remain undocumented or difficult to track down in historical archives. However, a number of wrecks have been provisionally identified and further research is ongoing. This presentation will outline progress made to date and will highlight the broader significance of these discoveries in understanding Ireland's rich maritime past.

Keywords: Shipwrecks; Inventory; Dublin; Tides; Survey; Research; Identity

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

The Lost Navy at Vaxholm Identifying, Mapping and Documenting Sailing Warships in the Stockholm archipelago

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In maritime and naval history literature there have long been information of deliberately sunk warships in various locations in Swedish waters.

In the Lost Navy´s *Atlas Module*, maritime archaeologists from Vrak – Museum of Wrecks (part of the Swedish National Maritime and Transport Museums) have investigated a number of places and mapped, documented and identified almost 30 wrecks at various locations in Sweden. In many cases, the life-cycles of the ships has been highlighted as a contribution to research and to increase the historical status and attractiveness of the specific location and/or wreck. In connection with the *Atlas Module* a methodology for identifying intentionally sunk warships has developed which has proven successful. The results have been presented in a database with over 1000 ships from the 1400s to the mid-1800s.

This presentation will outline the results from the area around Vaxholm island in the Stockholm archipelago. There is evidence that facilities were built and everything from stone and wood constructions to floating boom systems were erected in the area as early as the mid-16th century. With constructions in the straits, the aim was to direct an attacking enemy towards Vaxholm's strategically located fortress and protect the inlet to Stockholm.

But to seal the straits also old ships were sunk and there are several archival records of decommissioned warships being scuttled around Vaxholm. In The Lost Navy program, a number of those wrecks have been found of which the most well-known is the big ship *Äpplet*, *Vasa's* sister ship from 1628. But there are other important finds such as the medium sized war ships *Apollo* and *Maria* from 1648 as well as the two Danish warships *Tu Löver* and *Nellebladet*, captured in 1644.

Keywords: Warships; Scuttle; Vaxholm Island

Presentation in session G2: The Lost Navy (Patrik Höglund, Niklas Eriksson, Minna Koivikko)

A unique ship wreck found with a unique cargo

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In December 2017 a ship wreck was found in the Stockholm archipelago. The wreck is unusually well preserved for a ship built with clinker technique. It also has its cargo still in place. There are about over 100 barrels , mostly containing so called osmund iron. Ther is also iron bars that was a new product at this time, butter and tarNo similar wreck has ever before been found in Swedish waters.

The date of the ship is based on dendro. It date´s the wreck to 1540´s (provenance Stockholm) and has been repaired in the 1550´s (provenance, south of Finland).

The wreck has three masts (the main mast still standing in its original place) and all it's the rigging seems to be intact at the site. It seems that the wreck is almost totally intact so it's a unique ship wreck in many ways.

In 2024 a barrel with osmund iron was salvaged for the first time in Sweden. When the barrel was documented it was clear that the barrels with Osmund iron had a different construction. The construction might have to do with custom in Stockholm where you had to show the whole content before export. The excavation gave some stunning result that can give more clues to how the export was organized and how the ships looked like sailing the cargo.

Iron exports was then, and still is, one of Sweden's most important exports but the knowledge of historic cargo ships, the trade routes and the quality of the iron is almost unknown. This ship is one of the most important finds to date and can tell us much more about how the iron was transported, how export was organized and what kind of ships were constructed for iron cargo. We can also reconstruct the rig of a three masted clinker built cargo ship which will give us more knowledge about how a big cargo ship sailed.

Based on the archaeological surveys this paper discusses the shipwreck, its construction, export, the rigging, the cargo and the possibilities for further study of the history of the Swedish iron industry through a ship wreck still fully equipped and comparable to a time capsule from 1550. This is the time just after the Swedish king broke with the Hanseatic league and wanted to control the export himself.

Keywords: Cargoship; Archaeology; Barrels; Iron; 1500s

Poster presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riika Tevali, Patrik Höglund, Priit Lätti)

Wreck Management Between Environmental Hazards and Cultural Heritage – Strategies for Minimal-Invasive Oil Recovery from Historic Wrecks in the Baltic Sea

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The Baltic Sea contains thousands of historic shipwrecks, which serve as valuable maritime cultural heritage but also pose significant environmental risks due to leaking pollutants such as heavy fuel oil or munitions. The uncontrolled degradation of these wrecks could lead to severe ecological damage.

The conflict between environmental protection and heritage preservation becomes particularly evident when salvage or decontamination efforts are necessary. Traditional approaches often involve the complete recovery of wrecks, whereas the EU Interreg project **BALTWRECK** pursues an alternative strategy: developing and applying minimal-invasive techniques for pollutant removal. This method aims to mitigate environmental risks while preserving the historical integrity of the wrecks as much as possible.

This presentation will explore the legal and technical challenges of wreck management, highlight the conflicts between environmental protection and cultural preservation, and present innovative solutions.

Keywords: Wreck Management; Environmental Protection; Cultural Heritage; Baltic Sea; Oil Recovery; Baltwreck; Pollutant Remediation

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Examining the impact of the application of planning and curatorial frameworks in development led projects on UCH- Case studies from three countries

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This paper derives from many years of experience of working on development lead projects in the maritime sector. The increasing number of projects and therefore geophysical, hydrographic, geotechnical and baseline archaeological research is growing rapidly across the globe. This paper will explore offshore developments located in England, Ireland and Germany and compare how legal frameworks, curatorial feedback and expectations from within the archaeological community form the outcome of data assessments, protection and promotion.

In the UK large infrastructure projects in the marine sector are developed within the framework of The Marine and Coastal Access Act 2009. All applications for seabed development must include an assessment of potential impacts on Underwater Cultural Heritage (UCH) as a result of the planned construction and all associated activities.

Traditionally the developers, after leasing the seabed from The Crown Estate, are required to undertake surveys and contract a competent archaeologist to assess the data as well as present potential impacts. However, in some cases, surveys and assessment are being undertaken before the seabed is leased to the developer. The aim is to reduce the uncertainty and risk for developers and line up with other European countries.

The common denominator for all development led surveys both in the maritime sector and onshore is that investigation extent and survey parameters are determined by the area of development in the first instance rather than research questions. Further, the level of investigations is steered by the specific countries legislation rather than determined by the potential impacts the development may cause to UCH.

This paper will discuss and compare the impact of working within legislative frameworks in three countries and how the differences result in how UCH is detected and studied during and following seabed surveys, as well as how direct and indirect impacts of the developments are recognised as well as how mitigation and protection is applied throughout project stages. The paper will also touch upon the lack of data sharing between developers, projects and archaeological consultants including how we disseminate the data collected.

Keywords: Territorial Planning; Curatorial Frameworks; Seabed Development; Baseline Archaeological Research; Impacts On UCH; Geophysical Data Collection

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

“Is Marine Archaeology Even a Thing?” Ocean Heritage and the Sustainable Development Agenda

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In this keynote, I will explore how the archaeology and history of our oceans can contribute meaningfully to addressing today’s global challenges and advancing sustainable development in coastal and marine contexts. Efforts to achieve ocean sustainability are too often framed solely in scientific and policy terms—overlooking, and at times actively excluding, the deep and diverse cultural heritage that reflects millennia of human interaction with the sea.

By examining Marine Cultural Heritage (MCH)—encompassing the full spectrum of past human engagements with the marine environment—we can uncover critical insights that help shape more holistic, equitable, and effective strategies for the future.

As the UN Decade of Ocean Science for Sustainable Development (2021–2030) progresses, we face a pivotal opportunity to ensure that the human dimensions of the ocean are not side-lined. The problem lies in how we effectively communicate this to policy makers and the wider ocean science community. This lecture will argue that understanding our historical relationships with marine spaces is not only vital for a richer comprehension of human history, but also fundamental to designing sustainable and inclusive ocean policies and practices.

Keywords: Marine Cultural Heritage; future strategies; UN Decade of Ocean Science for Sustainable Development (2021-2030); global challenges

Keynote presentation

Integrating Cultural Heritage into the UN Ocean Decade: The Cultural Heritage Framework Programme

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The UN Decade of Ocean Science for Sustainable Development (2021–2030) presents an unprecedented opportunity to integrate cultural heritage into marine conservation, governance, and public engagement. The Cultural Heritage Framework Programme (CHFP) is at the forefront of this effort, advocating for the recognition of maritime and underwater cultural heritage as essential to achieving the Ocean Decade's sustainability and inclusivity goals. By bridging traditional ecological knowledge, archaeological insights, and contemporary marine science, CHFP fosters a more holistic understanding of our ocean's past, present, and future.

This presentation will outline CHFP's key objectives and initiatives, highlighting its role in shaping ocean policies that acknowledge historical human-ocean interactions. Case studies from global partnerships will illustrate how cultural heritage contributes to marine spatial planning, community-led conservation, and resilience strategies. Moreover, the role of storytelling and media in amplifying cultural heritage narratives will be examined through the work of SeaVoice Magazine, a platform that engages public audiences with heritage-focused ocean storytelling.

By discussing the interdisciplinary nature of CHFP, this presentation will emphasize the importance of including cultural perspectives in ocean conservation dialogues. It will also explore how networks of archaeologists, Indigenous communities, historians, and marine scientists can collaborate to ensure cultural heritage is embedded within global marine protection frameworks. The presentation will conclude with a call for further interdisciplinary cooperation and an exploration of future directions for cultural heritage within the Ocean Decade.

Keywords: Cultural Heritage; Ocean Decade; Maritime Archaeology; Traditional Ecological Knowledge; Marine Conservation; Policy Integration; Public Engagement

Presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

An Excavation Tool for Deep Water Archaeology

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Only a handful of shipwrecks in deep water have been excavated and a smaller number have been excavated using archaeological methods. Much of the fieldwork done so far has been limited to the recovery of items from on top of the seabed where they are easily accessible. Excavation has been limited to a depth of up to two metres below seabed level and only in small areas. The excavation and recovery of very large objects or very small objects is difficult to do remotely, so often only robust and manageable finds have been recovered.

The preservation conditions in deep water can allow significant ship structure to survive along with well-preserved cultural material from the ship. When the structure collapses this becomes a three-dimensional jumble of objects with sediment trapped in the spaces between. On these sites we may find large and heavy objects such as a cannon or ship's timber lying alongside small and delicate objects such as a ceramic cup; both must be accurately positioned, recorded in situ then recovered undamaged. Excavation of similar complex sites with collapsed ship structure intermixed with cultural and human remains has been undertaken by divers in shallow water, but this has yet to be attempted using remote intervention methods in deep water. One reason why this has not been attempted is that the tools are not available to allow the remote excavation of a shipwreck to archaeological standards.

In this paper, the author proposes a novel robotic tool designed to undertake a remote archaeological excavation in deep water. The tool can be constructed and assembled using available technology and then deployed and operated using methods currently in use offshore.

Keywords: Archaeology; Deep Water; Excavation; Recovery; Robotics

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

Technology Transition in a Guyana Canoe Society

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The dugout canoe is the preeminent object of material culture of the Indigenous Warrau people of the village of Imbotero, Guyana, and is central to its cultural heritage. Set within a mangrove swamp in the extreme northwest of the country, Imbotero is nearly devoid of dry land, and canoes are essential for virtually every landscape engagement and activity. These include economic activities – primarily farming, fishing, and resource gathering – and the non-economic domains of education, religious observance, and social relations. Everyone in the village over the age of four is a canoeist, and canoes are central to individual and social identity.

Two seasons of fieldwork were conducted in Imbotero. Based on changes observed in the space of a single year and comparisons to past practices as gathered from ethnohistorical reports, it is clear that Imbotero's canoe heritage is changing. Technological change was observed in canoe forms, construction techniques, and propulsion methods. In place of the centuries-old use of adzes and axes to fell trees and do the initial hollowing of the canoe and rough-shaping of its exterior, some builders now use chainsaws, which make the work quicker and easier but create new entanglements and cause certain old ones to fray. The traditional square-bowed, paddle-propelled voyaging canoe has disappeared, replaced by a new type designed to carry an outboard engine – again, making canoe-related work quicker and less strenuous, but altering users' embodied relationship with the canoe and their engagement with the landscape through which they pass.

Simultaneously, the village is experiencing social and economic changes that influence the frequency of canoe use, canoe-related economic activities, landscape engagement, and the adoption of alternative watercraft types. While canoes remain the dominant mode of transportation in Imbotero, these changes have implications for the persistence of its cultural heritage.

Keywords: Dugout Canoe; Logboat; Technology Change; Coastal And Marine Cultural Heritage; Maritime Cultural Landscape

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

Through centuries and across miles – understanding the significance of the Barangaroo Boat through its reconstruction at the Australian National Maritime Museum.

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Discovered during the construction of Sydney's metro system, the Barangaroo Boat is the oldest known Australian colonial-built vessel ever located, archaeologically excavated, recorded digitally in 3D and conserved in Australia. The boat has been assessed as being of State and National significance, however, ongoing research, may also deem it of International significance.

Dating from the late-18th or early-19th century, at a time when boat building was strictly controlled in the convict colony of New South Wales, this clinker-built boat exhibits a unique and idiosyncratic building method that reflects the colonial spirit of enterprise in the use of indigenous timbers and demonstrates a make-do and adaptive attitude in its construction when access to specialist boat building skills and materials were restricted.

Shortly after the boat's archaeological recovery in 2019, the Australian National Maritime Museum commenced discussions with Sydney Metro – who held ownership of the boat – regarding the boat's future disposition. These discussions resulted in the parties agreeing to work together to have the Barangaroo Boat Hull preserved and displayed at the museum.

Sydney Metro was responsible for the documentation and conservation of the boat's hull – this kind of work had not been attempted in Australia since the conservation and reconstruction of the partial *Batavia* hull in Fremantle, Western Australia in the late 1980s and it has never been attempted on a wreck made of native Australian timbers.

The museum is now in the planning stages of the boat reconstruction and interpretation project and is facing numerous conservation and curatorial dilemmas in preserving this unique item of maritime cultural heritage.

This paper discusses the recent research conducted to solve these dilemmas but focuses on one of the more surprising elements of this research: the unexpected contribution to the interpretation of the vessel which may earn it the status of being internationally significant - the Barangaroo Boat demonstrates boat building traditions that trace their origins back to northern Europe traversing centuries and many nautical miles these traditions found their way to Australia in the early 1800s, but time and place forced adaptations that may be unique to the Australian context.

Keywords: Recent Discoveries; Research Methods; Recording; Conservation; Reconstruction; Exhibition; Museum

Presentation in session G5: Shipwreck Studies (Marnix Pieters)

Anping Jars of Magong Harbor: Manufacturing Specialization and Dutch East India Company Trade Networks in 17th Century Maritime Asia

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Anping jars were among the most prominent containers for trade goods circulating in Asian waters during the early seventeenth century. Although manufactured in northern Fujian, China, these vessels have been predominantly discovered at East and Southeast Asian port cities and shipwrecks, particularly at sites connected to Dutch East India Company (VOC) activities, including the fort at Fenggui Peninsula and Magong Harbor on the Pescadores Islands (present-day Penghu, Taiwan). Despite the Dutch maintaining only a brief presence on Penghu Island, evidence suggests that seventeenth-century trade wares found on the island are strongly associated with their commercial activities. While previous research has examined the mass production of Anping jars, studies have been constrained by the limited availability of complete specimens. The discovery of forty-four intact Anping jars from a salvage archaeological project at Magong No.1 Harbor, preserved by their underwater context, presents a unique opportunity to advance our understanding of their manufacture and connection to the VOC. This project employs advanced 3D scanning technology to generate detailed micro-morphological visualizations for analyzing whether a standardized and specialized production system was formed to meet the needs of mass production and long-distance maritime transportation. The high-resolution digital models will enable precise measurement and comparative analysis of manufacturing characteristics. These quantitative data points will help identify workshop signatures and production standards that may reveal the organization of labor and quality control measures implemented by Fujian potters. Additionally, through integration with historical records and archaeological surveys, this research will further illuminate the relationship between Anping jars and Dutch VOC commercial activities in the region. By contextualizing these artifacts within broader trade networks, this study aims to enhance our understanding of early modern maritime commerce and cultural exchange between China and European colonial powers in East and Southeast Asia.

Keywords: Anping Jar; Magong Habor; VOC; Pescadores Islands; 3D Scanning

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Reimagining Underwater Archaeology Through Contemporary Art: A Co-creational experiment

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Despite various initiatives, promoting underwater archaeology in Taiwan remains challenging, primarily due to accessibility issues. Most sites are located in deep, hazardous diving environments. Additionally, limited archaeological findings make it difficult to generate public interest. The project, "Contemporary Art, Underwater Archaeology, and Archaeoacoustics Integrated Interdisciplinary Virtual Reality Exhibition-Performance," represents a collaborative effort between archaeologists and contemporary artists to transform professional underwater investigation into an immersive musical performance that seamlessly blends technology and humanities. The implementation integrates underwater archaeology of Second World War wrecks with archaeoacoustics while incorporating site-specific musical historical elements into the creative process. The underwater archaeological work process and dive performances were filmed and recreated, while sonar sounds were transformed into a unique soundscape for the exhibition space. Visitors to the exhibition navigate between physical installations featuring recovered archaeological artifacts and interpretive materials, and virtual spaces where they can assume different avatar roles to engage with and explore underwater scenes. This mixed reality (MR) technology allows participants to access underwater cultural heritage in innovative ways while simultaneously co-creating an artistic experience through their interactions with the virtual environment. The immersive nature of this approach breaks down traditional barriers between audience and exhibition, fostering a deeper connection to historical narratives that might otherwise remain abstract or distant. This experimental interdisciplinary collaboration aims to achieve cultural sustainability through artistic innovation, leading people to rethink the meaning of these wrecks and their broader historical significance within Taiwan's maritime heritage. The exhibition is deliberately hosted in a contemporary art museum, strategically reaching visitors who typically might not engage with archaeological themes commonly found in history museums, thereby expanding the audience for underwater cultural heritage. Transferring an academic subject into a contemporary art format requires negotiation and mutual understanding between disciplines. The presentation will share not only the project itself but also audience feedback and perspectives from the archaeologist involved in this boundary-crossing work.

Keywords: Underwater Archaeology; Public Archaeology; Contemporary Art; Taiwan; MR Technology

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Archaeology at the tip of the pincers: Latest robotic research campaigns on the Lune shipwreck (2022 - 2025)

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The Lune, a French royal vessel from the early reign of King Louis XIV, built in the Indret arsenal, near Nantes, on the Loire river, between 1639 and 1642, was lost on 6 November, 6, 1664 just outside Toulon harbour (Var, Mediterranean). Discovered in 1993 during a test dive by Ifremer's Nautile submarine, this wreck, lying at a depth of 90 meters, has been the subject of a multi-year archaeological research program since 2012. Given its depth, the site is being studied thanks to the development of dedicated robotic engineering. As an extraordinarily well-preserved archaeological site of great historical importance, the Lune has established itself over the years as the ideal experimental laboratory for designing and developing the excavation methods and robotic technology that will be needed in the future to study shipwrecks located at great depths. This presentation will provide an update on the 2022 to 2025 excavation campaigns, during which archaeologists were able to use robots to carry out several soundings on the wreck, while developing a systematically spatialized recording system for artifacts, as well as investigative methods specifically adapted to operations conducted at great depths. The robotic partnerships developed around the excavation of the Lune have thus enabled the development of robotic systems and working methodologies that now meet the highest standards of archaeological research, despite environmental and depth constraints.

Keywords Lune shipwreck, Louis the 14th, survey, 17th century, ROV, methodology, technology, great depth

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

L'archéologie au bout des pinces: Dernières campagnes de recherches robotisées sur le site de La Lune (2022 - 2025)

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La Lune, vaisseau royal français du début du règne du roi de France Louis XIV, construit au sein de l'arsenal d'Indret, près de Nantes, sur la Loire, entre 1639 et 1642, s'est perdue le 6 novembre 1664 à la sortie de la rade de Toulon (Var, Méditerranée). Découverte en 1993 lors d'une plongée d'essai du sous-marin *Nautile* de l'Ifremer, cette épave, qui repose par 90 m de fond, fait l'objet depuis 2012 d'un programme pluriannuel de recherches archéologiques. Compte tenu de sa profondeur, c'est grâce au développement d'une ingénierie robotique dédiée que le site est étudié. Site archéologique extraordinairement bien conservé et d'une grande importance historique, la *Lune* s'est ainsi imposée au fil des années comme le laboratoire expérimental idéal pour concevoir et mettre au point les méthodes de fouille et la technologie robotique qui seront nécessaires à l'avenir pour étudier les épaves localisées à très grande profondeur.

Cette présentation se propose de faire le point sur les campagnes de fouille 2022 à 2025 au cours de laquelle les archéologues ont pu, à l'aide de robots, réaliser plusieurs sondages sur l'épave tout en développant un système d'enregistrement systématiquement spatialisé des artefacts ainsi que des méthodes d'investigation spécifiquement adaptées aux opérations menées à grande profondeur. Les partenariats robotiques développés autour de la fouille de la *Lune* ont ce faisant permis de mettre au point des systèmes robotiques et des méthodologies de travail qui permettent désormais, en dépit des contraintes de milieu et de profondeur, de satisfaire aux exigences les plus hautes de la recherche archéologique.

Mots clefs : Lune, Louis XIV, sondage, XVIIe siècle, ROV ; méthodologie, technologie, grande profondeur.

Présentation dans la session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

The Lost Navy at Karlskrona. Aspects on intentionally sunk warships in the Karskrona archipelago, Sweden

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The town Karlskrona in southern Sweden was established in the 1680s, when the whole naval base – the admiralty, shipyard, ship builders and workers with families – were moved from Stockholm. Karlskrona was thus founded solely as a base for the navy.

When the naval base was constructed, many old warships were used for embankments and as foundations for quays, bridges and other facilities. Later, from the second half of the 18th century, an important part of the naval bases defence was to block off the straits in the archipelago, often by sinking decommissioned warships. This appears to have been the case well into the 19th century. This is one reason Karlskrona's archipelago harbours a large number of wrecks.

Some of these wrecks have never been verified or visited by maritime archaeologists or sport divers, others have been known for decades. But even in the cases when there are known wrecks, the identity and number of ships has been uncertain. There have been reports of well-preserved wrecks as well as wrecks lying scattered in piles of planks or buried beneath heaps of stone. Sonar mapping has verified that there indeed are wrecks in some locations, but for others there are very scarce or no information at all.

Maritime archaeologists from Vrak – Museum of Wrecks, have in the Lost Navy-programs *Atlas Module* been able to identify and document around 15 wrecks in the Karlskrona archipelago. But the investigations have also provided new knowledge about why the ships were sunk and how the sinkings were arranged. This research is made in connection with the sub-project *Wrecked, Sunk, Discarded or Broken up? Life-cycles of ships in the Swedish navy 1620-1840*, which among other things aims to research the final phases of a ship's life-cycle and how the decommissioned ships were sunk.

Keywords: Warships; Naval Wrecks; Maritime Archaeology; Naval History; Early Modern

Presentation in session G2: The Lost Navy (Patrik Höglund, Niklas Eriksson, Minna Koivikko)

Chasing the Shore? Archipelago societies' adapting to the changing landscape of Southwestern Finland throughout the Bronze and Iron Age

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Nordic Bronze Age and Iron Age societal organisation have been interpreted primarily from agrarian viewpoints with land use as one of the guiding factors for settlement. However, the influence of the sea and fluvial systems is often overlooked in the context of settlement patterns, despite the fact that a number of the sites were directly connected to the maritime environment. The border zones between land and water would have affected both mobility and subsistence strategies. This research aims to address the gap in our understanding of prehistoric archipelago societies by asking the research question: How did landscape changes influence societies connected to the maritime landscape from the Bronze Age to the Iron Age in the archipelago of southwestern Finland? To address this question, the research method involves the analyses of the spatial pattern and distribution of ancient sites, in conjunction with palynological data from the archipelago of Southwestern Finland. The spatial analysis of sites and pollen provides data on the development of archipelago societies and their adjustment to the changing environment. Due to shore displacement resulting in the raised shorelines, the immediate access to marine resources would have decreased over time, affecting the society's capacity for mixed subsistence strategies. However, the pollen data does not contain any significant signals that demonstrate a shift in subsistence strategies before the Viking Age. This research discusses the possibility of settlement following the retreating coastline throughout the Bronze and Iron Age, thereby counterbalancing agrarian interpretations by highlighting the importance of the maritime landscape for Bronze and Iron Age archipelago societies.

Keywords: Bronze Age; Geographical Information Systems; Iron Age; Maritime Landscape; Palynology; Shore Displacement.

Presentation in session D4: The Double Narrative of Man and Water (Martina Seifert, Andreas Külzer, Aylin Güngör)

Baiheliang and Raoudha Nilometre as Hydrological Heritage

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Baiheliang Ancient Hydrological Inscription and Raoudha Nilometre in Cairo are both on World Heritage Tentative Lists of each State Party. The former is an underwater cultural heritage site of the Yangtze river in China, and the latter is a hydrological heritage site of the Nile river in Egypt. Baiheliang or White Crane Ridge is the stone ridge along the river's south bank, on which ancient hydrological inscriptions for recording the water level changes, as well as poems of praise to the river and auspicious fish carvings for makers indicating water levels, have been inscribed in Chinese characters or in the 'Phags-pa' script since 764. Contrariwise, Raoudha Nilometre is a structure measuring the river's clarity and water levels during the annual flood season. The structure itself, which started to be constructed in the early 8th century on Roda island, consists of two parts, viz. the three-storey well and in its axis the graduated marble pilaster for measuring the flood, and tunnels which communicate with the river through three openings.

In terms of outstanding universal value, both sites stand out as the earliest examples of hydrological work in human history, constituting water-related landscapes. Since the Three Gorges Hydropower-Complex project was finished in 2009, Baiheliang has been completely submerged. Therefore, Baiheliang Underwater Museum was built for the purpose of keeping to make inscriptions public; it is a huge underwater iron container, which covers a part of inscriptions. Visitors go down to the container from the ground using the escalator or staircase and see the inscriptions under *preservation in-situ* circumstances through windows on the dried corridor behind the container. Although scientific divers periodically enter into the container and do inspection and cleaning of the inscriptions, their maintenance outside the container or on its buffer zone does not always seem to be sufficient. Along the Yangtze river, in addition, there are many hydrological inscriptions other than Baiheliang. In Egypt, similarly, a few more nilometre sites exist except for Raoudha Nilometre.

Keywords: Baiheliang; Raoudha; Inscription; Nilometre; Hydrological Heritage; Underwater Cultural Heritage

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Protectively marking heritage to enable effective enforcement

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Wreck sites have been protected by law for fifty years now but how does protection work when it comes to enforcement? Heritage crime in the UK has received increased attention over the last two decades, partly due to a change in attitude towards our shared heritage but also because of improved technology and the raising of awareness to the threats that culturally valuable heritage assets are subject to. Marine heritage crime is particularly problematic to police due to the isolated nature of sites, the lack of a forensically viable crime scene and because there is a lack of awareness of the legislation protecting sites. Experience gained from previous prosecutions and potential offences, highlighted a clear need for more efficient and effective mechanisms for preventing, investigating and prosecuting marine heritage crime. Marine technology in general can be very costly, especially in terms of long-term monitoring equipment. The UK marine area is especially challenging to monitor because the seabed can be highly dynamic, the conditions are very changeable, and the water column is often turbid. The technology required has to be cost-effective and able to withstand the harsh conditions of the marine environment.

Following a long development process, in 2024 MSDS Marine deployed underwater forensic markings for the first time as part of a project funded by, and delivered for, the English and Dutch heritage agencies, Historic England and RCE. This paper will explore the background to the project, the challenges involved in creating underwater forensic markings and the opportunities their deployment creates.

Keywords: Shipwrecks; Protection; Heritage Crime; Technology; Enforcement; Awareness

Presentation in session L3: Heritage Crime (Alison James, Martijn Manders, Paul Jeffery)

Lessons from the Galley: Foodways on merchant ships in the Baltic Sea 1400-1700

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Shipwrecks are a source material with great potential for studies of various historical societal issues. One such issue involves foodways - in a broad sense, food culture. The often well preserved environments and objects related to food and drink found in shipwrecks have significant potential to shed light on the living conditions onboard. Ships were to some extent comparable to larger households since they required similar functions – people needed food and drink, necessitating a kitchen for meal preparation and cooking, along with space for eating, storing utensils, provisions, and other items.

Despite the numerous well-preserved merchant ships from the Middle Ages and early modern period found in the Baltic Sea, our understanding of daily life onboard remains limited. While some research has been done concerning foodways on for example large naval ships and fluit ships, less is known about life on other types of ships.

One focus of the project 'The Galley - Food and living conditions on merchant and naval ships in the Baltic Sea, during the 1400-1600's' is to investigate the living conditions of crew members on merchant ships from the 15th to the 17th centuries and how this changed over time. The theoretical approach is foodways with a particular focus on the galley (cook room) and other areas and artefacts related to food and drink. Where did the crew store their food, how was it prepared, cooked and consumed? Where was the galley placed? Were there any room for hierarchies among these small crews? and how did this affect life onboard merchant ships? Which archaeological finds and other sources of information can be used to shed light on these aspects of life onboard?

Keywords: Merchant Ships; Baltic Sea; Foodways; Galley; Maritime Archaeology; Medieval; Early Modern

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

Threats to Our Ocean Heritage: Project Results and Experiences with the UN Decade

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While the UN Decade for Ocean Science (2021-2030) has hundreds of endorsed ocean science activities, projects, and programmes relating to natural heritage and ocean biosciences, there are very few endorsements that focus on cultural heritage. The Cultural Heritage Framework Programme, led by the Ocean Decade Heritage Network was the first. This paper will discuss The Ocean Foundation's recently completed project funded by the Lloyd's Register Foundation, *Threats to Our Ocean Heritage*, which included three volumes on UCH destruction from bottom trawling, potentially polluting wrecks, and deep sea mining. It also included three workshops on potentially polluting wrecks, designed to bring a global network of experts and stakeholders together to work towards proactive approaches to PPW and global standards. The project was an endorsed activity and presents a case study in how the UN Decade can be used to bring cultural heritage to the table with natural heritage and bring underwater archaeology to the ocean sciences. Deep sea mining in particular is a future threat to focus on as the regulations are still being moulded and there is great advocation for a moratorium on the practice.

Keywords: Underwater Cultural Heritage; Bottom Trawling; Deep Sea Mining; Potentially Polluting Wrecks; UN Decade

Poster presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

Including Maritime Archaeology with History in Maritime Museums

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For museums, like Het Scheepvaartmuseum, that do not conduct archaeological excavations, it might seem unlikely that an archaeologist can find a niche within the collections and research departments. However, there is a wide range of diverse perspectives and research angles that can be found when you combine historical research with archaeological expertise and knowledge. This has been a goal of the collections department at the museum. How can we present maritime archaeology alongside our existing material and help the visitors learn more about the field?

This paper highlights some case studies in which archaeology has helped strengthen museum research and, in turn, helped diversify the maritime heritage being presented. The museum is currently working with the Dutch Cultural Heritage Agency (RCE) on an exhibition highlighting the field school they run excavating a sixteenth-century vessel on reclaimed land and exploring ways that field school participants can be involved in the museum work. A main goal of the exhibition is to make maritime archaeology more accessible to the visitor and help a younger generation see that it is a career path possible in the Netherlands.

Other case studies also involve work with organisations outside the museum, and especially outside of the Netherlands. We have a partnership with the Rock Foundation, based in Western New York, to bring their expertise of Haudenosaunee history and culture into the museum through an exhibition on the Atlantic World and a forthcoming publication. The Rock Foundation's collection consists of mainly archaeological material and our two institutions have been working together to share more of the Dutch perspective on the material in NY and the Haudenosaunee perspective in the Netherlands.

To keep the maritime heritage sector sustainable and relevant to the public, interdisciplinary methods are needed. Historians, archaeologists, art historians, and museum professionals must work together, sharing resources and perspectives to bring new insights and exciting analysis to the public, and then listen to the feedback and input that the public gives. For the longevity of our field, and success of museums, this is essential.

Keywords: Museums; Archaeology; Interdisciplinary Projects; Field Schools; Co-creation; Cultural Heritage

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

The fish weirs of Yap and Palau and the value they have for contemporary communities.

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Stone-walled tidal fish weirs have been an important part of traditional Indigenous fishing systems for thousands of years. The many islands in Oceania using fish weirs can have similar, as well as different socio-cultural, biological and marine ecology relationships. Given their connection with the environment (land and sea), they form a cultural landscape that can reflect islanders' cultural identity.

A collaborative project with the Yap State Historic Preservation Office in the Federated States of Micronesia has been operating for several years. The aims have been to investigate, preserve and promote an awareness about traditional Indigenous fishing techniques, traditional cultural practices, and Traditional Ecological Knowledge (TEK).

This work is now being extended to nearby Palau where similar fish weirs (*beng*) have been used. Working with the Palau Bureau of Cultural and Historical Preservation, the Palauan community and Traditional Owners later in 2025, we will begin a project to document the *beng*, and their associated socio-cultural and environmental connections; other traditional cultural practices employed in fishing; and where and how TEK is employed. We will compare them with currently employed modern fishing techniques and marine conservation to see if we can inform about sustainable fishing and marine conservation efforts.

An aim is also to take several coral samples to assist in dating the *beng* and in interpreting geographical and environmental impacts. Through dating the corals we can see when the busy periods of construction took place, and coupled with climate and sea level data, we can investigate what factors played major roles in the location, construction and use of the *beng*. Dating within the one weir system will help us to understand when the various sections were built and assist to interpret why they were built that way.

We consider that their needs to be proactive preservation of fish weirs, not just as static reminders of past lifeways but contributing in a way forward at this critical time of declining fish stocks, climate change and ocean degradation.

Keywords: Yap; Palau; Fish Weirs; Climate Change; Traditional Ecological Knowledge

Presentation in session F2: Fish Weirs (Paul Montgomery, Magdalena Nowakowska)

Byzantine-Period Ship Caulking and Hull Waterproofing Methods Based on Archaeological and Textual Evidence

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While the presence of caulking and pitch has been noted on the hulls of a number of excavated Byzantine and early Islamic period shipwrecks, detailed analyses of the materials used in waterproofing the hulls of Byzantine ships have only rarely been published since the excavation of the first Byzantine-period shipwrecks in the 1960s. Fortunately, finds of well preserved shipwrecks from this period have increased, particularly in the past two decades. This paper will present preliminary findings from the archaeobotanical and chemical study of caulking materials from a selection of the Yenikapı shipwrecks excavated by the Istanbul Archaeological Museum and currently under study by the Institute of Nautical Archaeology and Koç University; these include the preliminary results of microscopic identification of caulking fibers from ships' plank seam caulking and waterproof coatings on hull surfaces as well as preliminary results of GC-MS analyses of resins remains from a selection of the shipwrecks. Some of the shipwrecks themselves also provide evidence for re-caulking and maintenance episodes such as marks from caulking irons on planking edge fasteners or the application of pitch to rotten areas in the hull. These findings will be compared with Byzantine and post-Byzantine textual references to caulking and waterproofing materials and previous findings from late antique and medieval shipwreck sites in the eastern Mediterranean. This evidence should help to understand resource exploitation and the manufacturing industries related to ship maintenance that were required to outfit both naval fleets and commercial vessels. These findings may also suggest future avenues for research, such as investigations into the origins of plant materials as well as the need for terrestrial survey to identify tar production facilities and other sources for waterproofing materials.

Keywords: Byzantine Ships; Caulking Fibers; Pitch; Yenikapı Shipwrecks; Waterproofing; Hull Maintenance

Presentation in session G1: Analysis of Caulking and Luting Materials (Kristof Haneca, Koen Deforce)

Challenges in the Search for Denmark's Submerged Landscapes

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In recent years, large areas in Danish waters have been subject to numerous geophysical and geotechnical surveys as the development of windmill farms is progressing to meet the goals of more sustainable energy sources in 2030. This presents a great opportunity to investigate vast former landscapes, get a clearer picture of the local geology, and discover wrecks. Part of the Danish waters are located in the Baltic sea where there are no shipworms, so even the older wooden wrecks can be well-preserved. The Viking Ship museum is responsible for these areas of the Danish waters, and the number of wrecks and wreck parts discovered during the geophysical investigations is fascinating.

There is also great potential for locating submerged stone age settlements, however, in contrast to the number of wrecks discovered, the search for prehistoric sites can be a lot more challenging. As yet, there are no proven methods for locating sites in deep waters (30m+). The models used for locating late Mesolithic and Neolithic sites are not confirmed to be appropriate for late Palaeolithic/early Mesolithic sites. And, as the contractors are not obliged to put aside funds for research as such, results from the investigations can rarely contribute with any insights in how to further develop models. Furthermore, as geophysical surveys begin to overlap in certain areas, it is becoming evident that interpreting sub-bottom profiler data is just that, an interpretation. Data from different projects can be interpreted differently and, within a project, the interpreted data may not be confirmed, but rather contradicted, by geotechnical samples.

The logistics for carrying out submarine archaeology also pose their own challenges making it difficult to verify potential sites picked out during the data assessment phase of an investigation.

This presentation examines some of the Viking Ship Museum's previous investigations, looks at the potential for finding further submerged archaeological sites and discusses what improvements could be made to aid future investigations.

Keywords: Denmark; Baltic; Historic; Prehistoric; Geophysics; Survey;

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

Reed-bundled Rafts: interregional trade and local transport in the marshes of Iran and the neighboring countries from antiquity to modern time

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Trade and exchange via waterways do not solely rely on large seagoing ships; canoes and rafts also play a vital role as connectors in interregional nautical networks. In Iran, iconographic evidence from the 4th millennium BCE onwards depicts the use of rafts and canoes. By the early 1st millennium BCE, rafts were used for both trade and military purposes in the marshes of southwest Iran. Prior to the establishment of modern roads, slender canoes were the only means of transportation for people, goods, fishing and reeds collection, linking local settlements along the banks and on the natural and man-made islands in the middle of the marshes to regional trade systems.

Today, the marshes of southwest Iran share borders with Iraq. Even though Iraqi marshes are documented in 20th century scholarship; the Iranian side remains largely understudied. To the east, Iran's marshes share borders with Afghanistan. Although these marshes are mentioned in some official reports, S. Kalantar's recent ethnographic surveys (*Boats of Iran*, 2024) in the eastern (Hamun) and western (Shadegan) marshes of Iran are pivotal for exploring the impact of reed-bundled rafts on the people and culture of the marshes in Iran and its neighboring countries.

This paper primarily focusses on contemporary rafts, known as *teutan*s, in the eastern marshes. We will discuss their construction technique and sequences, material, propulsion, cost, utility and efficiency. Our ethnographic studies show that *teutan*s are highly efficient watercraft in terms of stability and maneuverability. They can be built in just two to four days by two to three people. Capable of carrying heavy loads, such as cows and camels, *teutans* are made from *typha*—an abundant material in the marshes—making them a cost-effective solution for local transportation.

These findings support the descriptions of reed-bundled watercraft in the ancient Mesopotamian marshes, as recorded in the cuneiform archives of Bel-ibni and Eanna (650-585 BCE). In this paper, based on our ethnographic study, we will also discuss the efficiency of the 1st millennium BCE watercraft including maneuverability in the military context and their capacity and low cost in trade.

Keywords: Raft; Marshlands; Teutan; Iran

Presentation in session H1: Maritime Archaeology of the Arab World (Lucy Semaan, Crystal El Safadi, Lucy Blue)

A case study: The story of an amphora seen through analytical data, archaeological context and conservation practices

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Maritime archaeological artefacts are discovered in significant numbers during regular and rescue excavations along the Black Sea coast. However, they rarely undergo detailed analytical studies, particularly concerning aspects of technology and/or manufacturing processes related to transportation vessels. Among thousands of amphora shards, specific ones stood out as the most unusual type for its context—a harbour accumulation of ceramics featuring diverse typologies and dating. They are assembled in an amphora, associated with the Dressel 24 similis, one of the two whole examples found in Bulgarian borders. This atypical find for the Balkan Peninsula, combined with the unique colour of its engobe, has captured the interest of various researchers. They aim to illuminate the artefact's story through archaeometric analyses and further socialize the find by conservation and restoration treatment. Combined with the archaeological context this will enhance our understanding of technology, trade, and cultural connections during Antiquity between the Aegean and the Black Sea. Understanding the manufacturing processes, combined with the meticulous examination of each step from the clay slurry to the purpose of the engobe reveals the diversity of data, amplifying the story of the object itself. The imprint of time and environment, as the last chapter of the storyline, is also taken into account, encircling the diversity of processes that occur underwater and their impact on this specific vessel. After all, what is the purpose of cultural heritage if not to explore every aspect that science can unveil and to share the story of an object that has remained silenced for decades beneath the waves?

Keywords: Object Biography; Technology; Dressel 24 Similis; Environment Pollution; XRF Spectrometer

Presentation in session Q1: Analysis and Conservation (Jeroen Vermeersch)

Hellenistic shipwrecks of the island Šćedro, Croatia

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More than twenty-five underwater sites have been registered in the seabed of the small island of Šćedro in the central eastern Adriatic. Among them, three completely in situ preserved cargoes of Hellenistic ships dating from the 3rd to 1st century BC were found. The shipwrecks on the island of Šćedro are a unique, fully preserved underwater cultural unit in the Adriatic and Mediterranean. The cargoes of the amphorae of the Šćedro 2 and 3 shipwrecks are among the earliest ancient shipwrecks in the Adriatic.

The shipwreck of Šćedro 1 was found in 2017 at a depth of 44 metres. Two hundred and twenty-six wine amphorae of the Lamboglia 2 type from the 2nd-1st centuries BC lie on the sandy bottom. Most of them are still sealed with disc-shaped ceramic lids. They are neatly lined up in three rows one above the other. The amphorae on the seabed have the shape of a ship 17 metres long and 7 metres wide. Lead bars measuring 1.2 and 0.4 metres in length were found to the south of the shipwreck.

The Šćedro 2 shipwreck was found in 2020 at a depth of 62 metres. Greco-Italic wine amphorae of type VI? from the 3rd century BC lie on an area measuring 17 x 7 metres and more than 1.5 metres high. They are arranged in three clearly visible rows on top of each other on the sea sand.

The Šćedro 3 shipwreck was discovered in 2023 at a depth of 50 metres by an AU vehicle. This ship also carried Greco-Italic type VI wine amphorae from the 3rd century BC on board. The upper row of amphora can be seen over an area of 6 x 4 metres, while the lower rows of amphorae are still buried in the sea mud, so that their rims can only be seen exposed on the surface.

Greco-Italic wine amphorae were primarily produced in the Magna Graecia region. Their production spread to the Apennine Peninsula. The wine transported in these amphorae was traded throughout the Mediterranean as well as east Adriatic.

Keywords: Eastern Adriatic; Island Of Scedro; Helenisam; Shipwrecks; Amphorae

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Shipping up to boston (and beyond) – rhenish stoneware as a marker for european colonial expansion

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Rhenish stoneware has long been trade around the North Sea and the Baltic. But when the colonial expansion of Spain and Portugal started in the 16th century, these vessels became part of a global exchange network. At that time most vessels were used as serving vessels both onboard as well as in the early colonial settlements. With the great number of Dutch and German sailors and soldiers in both Spanish and Portuguese services stoneware mainly from Cologne and Frechen entered the new world. But also Dutch and English colonists depended on continuous supply of this type of pottery.

At the beginning of the 17th century, the development split into two directions. Potters mainly in Frechen and the Westerwald region continued to produce a range of different household vessels, which were mainly exported to the colonies in North America and the Caribbean. Unlike French stoneware, Rhenish wares can be found in almost all European settlements oversees.

With the development of an ovoid bottle in early 17th century Frechen, decorated with a stylised bearded face, the so-called Bartmann or Bellarmine jug were used for transporting and storing all kinds of liquids. Finds from shipwrecks as well as mainly Dutch historic sources from the VOC show the use for storing mercury, medicinal ointments and spirits such as Brandewijn and Jenever. *Baertcannen* became the brand name for these sturdy containers.

The presentation will give an overview of the use and distribution of Rhenish stonewares both onboard European ships as well as in European and indigenous settlements in the Americas, Africa and Asia in the 16th and 17th centuries.

The paper will focus on the changing role of Rhenish stoneware vessels in the global network of trade and colonial expansion, where these well datable finds often provide a good indicator for European activities or contacts with indigenous populations.

Keywords: Rhenish Stoneware; Bartmann Jug; Container; VOC; Pottery Trade

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Protected Shipwreck sites and their fight against crime!

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Maritime archaeology by its very nature is out of sight of most people, beneath the waves. But it is just at risk from heritage crime as terrestrial archaeology, perhaps more so in some instances, and when it is a target of crime it can be even harder to spot and to react to. In England, Shipwrecks of significance are protected by law under the Protection of Wrecks Act 1973. Due to the nature of marine sites policing them is difficult, and it is really the Licensee (a voluntary custodian to the site) who monitor the wreck. Licensee's and their teams have long been recognised as essential to the system that helps to manage historic wreck sites in England's territorial waters. In 2019 funding from Historic England allowed MSDS Marine to develop a crime prevention tool kit for shipwreck sites. As part of this project, we looked at how at "risk" sites were from heritage crime, and took the role of the Licensee's team a step further by introducing Site Security Champions to their portfolio. This paper will look at what a heritage crime is: the opportunities, and challenges in trying to protect our marine heritage, and how the above project aided in this.

Keywords: Heritage Crime; Community Engagement; Marine Protection; Champions; Crime Prevention

Presentation in session L3: Heritage Crime (James Alison)

The Umluj Shipwreck: A Window into Red Sea and Indian Ocean Trade

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The Umluj shipwreck, discovered off the Red Sea coast of Saudi Arabia, constitutes one of the most remarkable underwater archaeological finds in the region to date. Recently excavated under the auspices of the Saudi Heritage Commission, in partnership with the University of Naples "L'Orientale" (Italy) and the UNESCO Chair for Underwater Cultural Heritage (Egypt), the project has brought to light the remains of a large 18th-century merchant vessel. Resting at a depth of 18–22 meters, the wreck measures over 40 meters in length and 16 meters in width, with substantial portions of the hull still preserved alongside an extraordinary assemblage of cargo. The most striking feature is a mound of nearly one thousand ceramic water jars, encrusted and stabilized by coral accretions, which testifies to large-scale provisioning and trade practices. Associated finds include an extensive corpus of Chinese blue-and-white porcelain cups, Ottoman clay pipes, coconuts, glass fragments, and other organic remains, which illuminate the ship's role in sustaining the dynamic commercial networks that connected the Red Sea to the Indian Ocean and beyond. Methodologically, the project has employed high-resolution digital photogrammetry, systematic underwater mapping, targeted excavation, and wood sampling, producing a detailed 3D reconstruction of the site. Preliminary archaeobotanical and timber analyses, which identified pine and oak, point toward northern Red Sea shipyards and construction traditions. Beyond its contribution to the study of 18th-century maritime commerce and shipbuilding, the Umluj project also represents a milestone in capacity building, with Saudi archaeologists receiving advanced training in underwater excavation and conservation. Very well-preserved, and one of only two 18th-century wrecks currently known in the Red Sea, the Umluj shipwreck provides invaluable evidence of the 18th-century economy. Its ongoing study underscores both the scientific value of submerged 18th-century cultural heritage and the strategic importance of safeguarding it within Saudi Arabia's heritage framework and Vision 2030 agenda.

Keywords: Saudi Arabia; Red Sea; Umluj; Trade; Chinese porcelain; 18th-century

Poster presentation in session H1: The Underwater Archaeology of the Arab World (Lucy Semaan, Crystal El Safadi, Lucy Blue)

Documenting the maritime archaeology of Pakistan

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Despite Pakistan's strategic position in the Western Indian Ocean and its extensive maritime history, underwater archaeological research in the country remains significantly underdeveloped. While Pakistan's terrestrial archaeology has received considerable attention, its maritime and underwater cultural heritage remains largely unexplored. The country's rich historical legacy spans millennia, encompassing the Indus Civilization, ancient ports in the Indus Delta linked to Alexander the Great, the Sassanian Empire, Buddhist and Brahmin dynasties, the advent of Islam in the 8th century, Central Asian incursions, the Mughal period, and the colonial era leading up to independence in 1947. Given this vast historical depth, Pakistan's coastal and riverine landscapes hold immense potential for maritime archaeological discoveries, yet systematic research remains limited.

In recent years, initiatives such as the *Pakistan Maritime Heritage Survey* and the *Digital Heritage Trails Project* have taken important steps toward documenting and preserving this heritage. The *Pakistan Maritime Heritage Survey* seeks to systematically assess and record maritime archaeological sites, including submerged structures, shipwrecks, and ancient ports, contributing to a foundational understanding of Pakistan's maritime past. Meanwhile, the *Digital Heritage Trails Project* employs advanced digital documentation techniques, including photogrammetry and 3D modeling, to create immersive and interactive heritage experiences. These projects not only support heritage conservation but also enhance public engagement and awareness by making Pakistan's maritime history more accessible.

This lecture will explore the scope and significance of maritime archaeology in Pakistan, highlighting recent efforts to investigate and document underwater cultural heritage. Particular focus will be given to research along the coastal regions of Sindh and Balochistan, the Indus River Delta, and the broader coastline hinterland. Additionally, the presentation will address the challenges of maritime heritage management and the potential for future research and conservation initiatives.

Keywords: UCH; Arabian Sea; Indus Delta; Maritime Archaeology; Western Indian Ocean

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Enhancing Ocean Heritage Governance in Egypt's Exclusive Economic Zone: Bridging Policy Gaps for Sustainable UCH Management

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Egypt's Exclusive Economic Zone (EEZ) holds a wealth of Underwater Cultural Heritage (UCH) that remains largely unprotected due to policy gaps, regulatory fragmentation, and industrial development pressures. The Enhancing Ocean Heritage Governance in Egypt's EEZ project, completed in June 2025, aimed to address these challenges by fostering interdisciplinary collaboration, assessing legal and institutional frameworks, and developing actionable strategies for integrating UCH into Egypt's maritime governance. This presentation will summarize the project's findings, highlighting key challenges, policy recommendations, and next steps for sustainable UCH management.

A critical gap identified was the absence of a unified legal framework for UCH protection in Egypt's EEZ. While Egypt is a signatory to the 2001 UNESCO Convention on the Protection of the Underwater cultural Heritage and the United Nations Convention on the Law of the Sea (UNCLOS) (1982), implementation remains weak, with no specific offshore regulations in place. The project's workshops and stakeholder consultations evidenced that offshore energy development, particularly oil and gas activities, continues to pose significant threats to UCH, including physical damage and a lack of industry-specific preservation guidelines. Additionally, limited deep-sea archaeological surveys and a lack of institutional coordination further hinder conservation efforts.

To address these issues, the project proposed key policy and practice recommendations, including amending national legislation to include mandatory cultural heritage impact assessments, developing industry-specific UCH guidelines, and establishing a dedicated interagency body for maritime heritage governance. The project also emphasized capacity-building initiatives, such as a specialized training workshop for oil and gas stakeholders, and the development of detailed policy recommendations and case studies in collaboration with industry and governmental actors. Looking ahead, the project sets the groundwork for sustained interdisciplinary cooperation and improved heritage policies to safeguard Egypt's underwater cultural legacy in the EEZ.

Keywords: Underwater Cultural Heritage (UCH); Egypt's Exclusive Economic Zone (EEZ); Heritage Governance; UNESCO 2001 Convention; Marine Development

Presentation in session J3: Offshore Renewables and Maritime Archaeology (Mark James, Victoria Boothby)

Multidisciplinary Project for the Study of Rivers in Veneto Region (Italy)

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This report focuses on applied problems related to rivers research in northern Italy through a multidisciplinary approach that integrates geophysics, geomorphology, archaeology, and cultural heritage preservation.

The advantage of this approach using inflatable kayaks, light geophysical, and coring equipment is obtaining comprehensive coverage of data that includes hard-to-reach areas.

With the help of the river current, large sections of rivers can be scanned quite quickly. In areas with obstacles, the kayak and equipment can often be carried along the bank.

It presents low-cost methods for river monitoring and analysis, including:

1) Geophysical scanning of river bottoms to create underwater maps that help determine river morphology, identify anthropogenic objects, and detect archaeological features;
2) Coring of the river bottom and river banks. Core samples from rivers and canals will allow analyzing the morphology of river formation for reconstructing the variability of the landscape. It also helps to understand the evolution of the landscape and the role of rivers in the formation of settlements and cultures.
3) Acquisition of digital 3D data of architectural monuments and archaeological features using photogrammetry. These can promote tourism and education, as well as support sustainable practices for the protection of nature and archaeological monuments.
4) Creation of a GIS system that may become the digital fingerprint of the rivers of the Veneto region as part of the “Blue Economy.” A systematic approach to the comprehensive study of rivers, which can then be scaled to different regions of Italy and Europe.
5) Monitoring the condition of architectural monuments, e.g., city walls, towers, and historical buildings, "from the water side".
6) Valorization of ancient river routes contributes to the preservation of cultural and historical heritage, allowing for the exploration of important trade and transport paths that connected various civilizations.

Keywords: River Research; River Archaeology And Cultural Heritage; River Landscape Evolution; Remote Sensing Methods; Low-cost Survey Approach

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage

Palaeolandscape visualisations as tools for earth science communication and public outreach in the UNESCO Global Geopark Schelde Delta (Belgium - The Netherlands)

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The UNESCO Global Geopark Schelde Delta is situated across the border of NW Belgium and the SW Netherlands. Its main goal is to increase public awareness of geology and landscape development in its rich interaction with human influence and climate change past and present.

In this region older geological units are often deeply buried under recent coastal or fluvial deposits. Palaeolandscapes were very different from today's, especially when looking back more than a few thousand years. This makes these topics difficult to envisage and comprehend for the general public. Therefore, the Geopark is creating visualisations of the palaeolandscape at various locations and at different moments in the past.

Interdisciplinary teams of geoscientists work in close collaboration with computer artists/designers to create a realistic and complete 3D-model of the past landscape including flora, fauna, and human presence (if applicable). As such, these palaeolandscape visualisations can be considered as 'scientific works of art'. They can take the form of one or more 'still photographs' of an area or allow an interactive virtual reality 'walk -through' of part of the 3D-visualisation.

The visualisations are based on scientific data obtained for different purposes. Palaeo-geomorphology and past changes in climate, sea level, tides, vegetation, and fauna all have to be considered. Actual field data at the site is usually limited and often reference must be made to modern analogues, which, in the case of e.g. ice age climates, may come from other parts of the world. Even then, care has to be taken to not just project this present-day field situation from high latitudes to our mid-latitude region during the last ice age. The need to present a very concrete image of the landscape sometimes pushes the boundaries of scientific knowledge and thus yields new research questions to resolve.

At present, the palaeolandscape visualisations illustrate key events or settings of the last ca. 50.000 years. However, we will gradually extend the time horizon to the whole geological history

of the Geopark region encompassing the last fifty million years, while also expanding the number of sites visualised in this way.

Keywords: Palaeolandscape; Visualisation; Virtual Reality; Coastal; Archaeology; Geology; UNESCO Global Geopark Schelde Delta

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Gathering information for citizen science monitoring of polluting wrecks

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There are thousands of potentially polluting wrecks that are threatening our marine environment and the safety of those that use it. This data gathering project will create a framework for a potentially polluting wrecks citizen science monitoring scheme to make both the environment and water-users safer.

This Lloyd's Register Foundation funded pilot project will use the diverse membership of the Nautical Archaeology Society to visit their fellow ocean lovers to raise awareness of this imminent threat and to find out what they already know about potentially polluting wrecks. Boat operators and beach walkers, divers and deckhands, hydrologists and harbour masters, swimmers and sailors will all be encouraged to take part, to help with this challenge for our heritage and environment.

The project will also consult with the industry side of the challenge, to get a balanced understanding of how data can be effectively gathered and used to solve the potentially polluting wrecks issue. Relevant government and industry groups will be consulted to ensure that data capture is fit-for-purpose. Research will also be undertaken to create the parameters of a user-friendly reporting system. The resulting app and database will encourage participation from water-users and will provide meaningful feedback to encourage ongoing reporting of polluting wrecks in the long term.

This year long project will focus on gathering data about polluting wrecks in UK waters. This will provide the ground-work that will inform the next stage of the project – a fully participatory citizen science PPWs monitoring scheme. This pilot study will also establish a methodology that can be extended internationally. The Nautical Archaeology is well placed to see this expansion through its International Training Partners in sixteen different countries and through the UNESCO 2001 Convention Accredited NGO network of which it is the secretariat.

Keywords: Potentially Polluting Wrecks; Citizen Science; Monitoring; Environmental Challenge; Crowdsourcing; Data Management

Poster presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Citizen science in UCH round table discussion

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This round table will conclude the session with a discussion led by the Maritime Archaeological Society of Finland and the Nautical Archaeology Society with invited panellists from fellow NGOs. The panellists will discuss volunteer citizen science involvement in UCH projects and will encourage participation from the audience. The round table will provide the opportunity for NGOs who did not give presentations to share their relevant projects as well as to develop the synergies between the projects described through presentations in this session.

Keywords: Roundtable; Discussion; Citizen Science; Underwater Cultural Heritage; Collaboration

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

Introduction to the Nautical Archaeology Society's Training Programme

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The Nautical Archaeology Society has been leading the way in training citizen scientists for over four decades. While based in the UK, the NAS's internationally accredited training programme is run in over twenty countries by in-country training partners providing a localised version of the standardised syllabus. This short paper will introduce the role of the Nautical Archaeology Society in training and citizen science involvement in UCH projects to complement a similar paper by the co-chair organisation the Maritime Archaeological Society of Finland.

Keywords: Citizen Science; Training; Underwater Cultural Heritage; International; Volunteers

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

Planigraphic Analysis of the Complex of 17th-Century Sunken Ships off the coast of Bulgaria (Based on Materials from the BSMAP Project)

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As part of the "South Stream" project, an instrumental survey off the Bulgarian coast covered an area of over 860 square kilometers. Of the 2,862 previously identified anomalies, at least 36 objects were determined to be sunken ships of varying sizes and constructions. This selection includes 14 ships and 22 boats. The archaeological finds in the study area are unevenly distributed, forming groups. These consist of a central cluster and a peripheral zone extending significantly to the southeast. The specific characteristics of most boats and the structural similarity of the sailing ships within a limited area serve as strong indicators pointing to a single-event occurrence.
It is most likely that the majority of the objects within the central cluster are interrelated and perished simultaneously in the last third of the 17th century. The significant proportion of identical boats, along with the absence of large sailing ships among the wrecks, suggests not a battle as the cause of the mass sinking, but rather a sudden storm. The construction, larger size, and proportions of the boats are characteristic of longboats, which were consistent companions of large flotillas. Considering that the length of a longboat is comparable to half the keel length of the mother ship, they were typically towed.
In our case, it is plausible that all the large boats were simply torn loose during the storm. If the boats had been deliberately cut away to keep up with a flotilla of Zaporizhian Cossacks, we would not expect to find them lying on the seabed alongside lighter but still larger and similarly structured vessels.

Keywords: BlackSeaMap Project; Boats; Planigraphy; Longboats

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

Wrecks in Peace: Insights from Research on the UNESCO World Heritage Site Suomenlinna

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Suomenlinna, a UNESCO World Heritage site in the Baltic Sea, preserves significant underwater cultural heritage. Beneath its waters lie wooden remains, including the repurposed first ships of the Swedish Archipelago Fleet, now serving as waterbreaks, and the final remnants of the Russian Baltic Fleet's sailing warships—silent witnesses to the defensive actions of the Crimean War. These submerged wrecks provide unique insights into the maritime past, but their lost identities and fragmented biographies pose challenges to uncovering their stories in the murky, cold waters of the Baltic Sea.

Suomenlinna is home to the ongoing research project The End of Glory Days: Biography of the Swedish Wrecks as Blue Heritage of Suomenlinna, which forms part of the international program The Lost Navy: Sweden's 'Blue' Heritage c. 1450–1850. This project seeks to document and interpret the history of naval vessels, with a particular focus on the Archipelago Fleet. This presentation shares not only the latest research findings and observations but also the experience of engaging the public—ranging from local residents to the site's one million annual visitors. It emphasizes the importance of critically reflecting on the narratives we present from military history, particularly in light of current global conflicts.

Keywords: Suomenlinna; Baltic Sea; Underwater Cultural Heritage; UNESCO World Heritage; Public Engagement

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Unexpected! Celtic ritual deposit from the 3rd c. BC found in the Lake Jezuickie (Central Poland)

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In April 2024, archaeologists from the University of Warsaw conducted underwater research of the Lake Jezuickie (Central Poland), discovering several objects, including: sickles, fragments of iron sword scabbards and chain belts. The way and style of their production suggests that they were made by Celtic blacksmiths. We are dealing not with accidentally lost objects, but with tools and weapons intentionally thrown into the water (the selection of the finds is similar to so-called 'hoards' of iron objects). Until now, it was believed that the Celts appeared in Central Poland as late as the first century BC. The new discovery would move this date back by about 200 years (the site is dated to the 3rd c. BC, most probably Phase LTB2 or C1). Moreover it is the only Celtic lake deposit from the Central Europe. That gives rise to associations with famous sacrificial sites like La Tène (Switzerland) or Llyn Cerrig Bach (Wales).

Keywords: Celts; Sacrificial Sites; Weapons; Agricultural Tools; Rituals; Iron Age

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

3D underwater archaeological documentation in Austrian lakes

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The underwater archaeology of Upper Austria's lakes provides valuable insights into prehistoric settlements and historical artifacts. This study highlights recent investigations in Lakes Mondsee and Attersee, emphasizing the role of image-based 3D modeling in the precise documentation of archaeological remains—an increasingly urgent task due to the growing threat of invasive quagga mussels. These lakes contain significant cultural heritage, including prehistoric pile dwellings, sunken boats, cars, aircraft parts, and intentionally discarded artifacts. Archaeological prospection focuses on mapping unexplored areas through sonar technology, supplemented by diver-led inspections. Side-scan sonar captures high-resolution images of the lake floor, multibeam sonar generates detailed bathymetric 3D models, and sediment sonar reveals subsurface structures. Research divers employ systematic photogrammetry to create highly detailed 3D models for analysis and long-term monitoring. This project is conducted in close collaboration with the UNESCO World Heritage management team for the **Prehistoric Pile Dwellings Around the Alps**. 3D models have been successfully produced for a 1550 CE logboat, car wrecks, teleprinters, an aircraft tank, and prehistoric pile dwellings at **Sprungturmgrube in Attersee** and **Station See in Mondsee**. However, increasing quagga mussel infestations threaten the visibility and preservation of submerged sites, particularly fragile wooden remains. Additional risks include looting and water level fluctuations. Artificial lighting enhances photogrammetry in shallow waters, while GNSS survey buoys improve georeferencing. Urgent documentation is essential to safeguard Austria's underwater cultural heritage before environmental and human-induced factors alter these sites.

Keywords: IBM; Underwater 3D Documentation; Austria; Pile Dwellings; Quagga Mussel Infestation

Presentation in session Q2: Unity in Diversity (Kalle Virtanen)

An Inventory of Submerged Heritage in the former Zuiderzee

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Miriam Kruijssen – Rijksdienst voor het Cultureel Erfgoed (Cultural Heritage Agency of the Netherlands)

Water has always been a defining factor in the Netherlands. Many towns and cities developed along waterways, shaping a distinctive cultural landscape. Dikes were constructed to protect the land from flooding and to reclaim land from the sea. Harbors facilitated shipping and trade. As a result, the Netherlands has an extensive record of submerged heritage, which have been the focus of much archaeological research.

There is significantly more submerged heritage beneath the water's surface than shipwrecks alone. These remains have often received less attention. Over time, storms, sea level rising and other events have caused entire settlements to become submerged. Currently, the Cultural Heritage Agency of the Netherlands is conducting an inventory to map this "drowned heritage." This includes submerged villages and towns, castles, and prehistoric landscapes.

The current inventory focuses on the former Zuiderzee region, now known as the IJsselmeer and Markermeer. A range of sources is used in this project. One of the key resources are different databases: the national database Archis (Archaeological Information System), which consolidates all archaeological research and findings in the Netherlands, mainly from professional archaeologists and another database is PAN (Portable Antiquities of the Netherlands), which records discoveries by amateur archaeologists and independent finders.
In addition, historical maps are analyzed, and various geophysical surveys, such as side-scan sonar and multibeam recordings, are examined. While many of these images have previously been analyzed with a focus on shipwrecks, they are now being re-evaluated with a broader archaeological perspective.
At the moment, the project covers the former Zuiderzee and will be expanded in the future to include all other Dutch (inland) seas and waterways.
This presentation will cover several examples of this research, such as Castle Wijdenes and the old harbor of Hoorn.

Keywords: Drowned Settlements; Submerged Heritage; Underwater Archaeology

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Putting a forensic spin on Underwater and Coastal Cultural Heritage inventories: challenges and opportunities

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Scientific literature describing forensic recovery operations of human skeletal remains in a maritime context, both underwater and coastal, remains to-date limited as it is not always possible to authorize the publication of such material, which is sensitive both to the victims and their surviving families. Forensic practitioners, particularly archaeologists, involved in such recoveries must rely on historic assemblages to extract information on field methods which they can adapt to suit their needs. This in turn presents unique challenges for the non-maritime heritage experts: there is vast material, both published and unpublished, in multiple languages, produced by multiple organisations and institutions. Another major challenge is the post-exhumation transportation and conservation of waterlogged skeletal remains with forensic significance (including potential significance), as it is another largely uncharted area. The author sets the premises and the conceptual design of a maritime heritage inventory from a forensic perspective, seeking to turn these challenges into an opportunity to combine different fields and provide a streamlined search tool to scientists involved in such operations. A specialised search tool linked to a depository will enable them to optimize their choices depending on the terrain, available means, and personnel, as well as inform them on the particularities and possible caveats concerning the material they are using to fulfil their investigation.

Keywords: Maritime Heritage Inventory; Forensic Recovery; Decision Making; Conservation Of Waterlogged Finds; Human Skeletal Remains

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

River, man and wood... Interaction of river and man on the example of the river Hron and old royal city Banská Bystrica, Slovakia

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The old royal mining town of Banská Bystrica, founded in the middle of the 13 th century, is situated in the mountainous region of Slovakia. Since the earliest times, the local settlement has been linked to copper and silver mining. In addition to the mining and processing of metals, the river was of inherent importance to the local population. In the past, the river was a determining factor in the founding and development of the town. We assume, therefore, that the river also formed a link between the barbarians living in the Carpathian Mountains and the civilisations beyond the Danube. This lecture is part of the author; long-term interest and research on the Hron river, not only from the perspective of archaeology, but also as a social phenomenon. The lecture will guide you through the history of the coexistence of the local communities and river. It focuses on the relationship between the earliest communities in the territory of the later city and the river and the extent to which water had impacted the urban planning of the medieval city. This is based on archaeological finds recovered from the city over the last 40 years. The main part of the lecture, however, will deal with the system of wood catching and its transport to the city from the 16 th century onwards. At that time the river functioned as a strategic transport artery. This was a period of proto-industrial development of the mining business, which resulted in a significant consumption of timber from the surrounding forests. Wood was used not only for construction purposes in the town or mines but mainly in metallurgy in the form of charcoal. This made the question of how to transport this precious material to the final consumer more and more urgent. For this purpose, a unique system of "rakes"; was developed, of which only a few remnants remain in the country today. In this lecture we will focus on the different parts of this system with use of archival sources. We will show old plan documentation supplemented by rich photographic documentation, as this system was still in operation at the beginning of the 20 th century. The rake system with the adjacent charcoal burning and processing area formed a real industrial suburb typical for the cities in the times of the Industrial Revolution. We will also partly touch upon rafting, one of the forms of livelihood of the local population since time immemorial. We will also try to look at the different parts of the system from today´s point of view so that the listener can imagine how the country has changed in the last 100 years. We will conclude by pointing out how man has tried to tame the river in the last 100 years in an effort to expand the space for city expansion. In doing so, he has also changed the landscape beyond recognition.

Keywords: River; waterway; post; Medieval; proto-industrial; wood; mining

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Sunken Stone Age Megastructures: What has been built, what has survived, and what can we resolve with marine geophysical methods?

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The record of known megastructures (meters to hundreds of meters) from the stone-age is constantly increasing. This encompasses both terrestrial constructions, which often survived in low populated arid regions, as well as submerged structures that usually remain hidden at the bottom of lakes and seas. For terrestrial structures, satellite imagery has been a game-changer with respect to the recognition of large structures, such as desert kites, which were used as traps for hunting game animals. Marine and lacustrine regions are in contrast less accessible, and their record of Stone Age megastructures is therefore generally less complete compared to their terrestrial counterparts. It is only today that sensor technology and navigational advances allow the construction of marine maps on a sub-meter scale, revealing the peculiar structures at the seabed. In the new SEASCAPE project, funded by The Leibniz Association, we aim to make use of these technological advances to systematically explore the existence of submerged Stone Age megastructures within the shallow basins of the western Baltic Sea which only became submerged in the Holocene. To assist this search, we developed a catalogue that reflects three basic considerations:

1. What are the spatial scales of megastructures that are known from the Late Pleistocene and Early Holocene?
2. What is the survival potential of the different constructions in the western Baltic Sea, considering geologic parameters such as sedimentation rate and wave energy?
3. Which marine geophysical methods are needed to find these structures at the seabed?

Answering these questions, and synthesizing the information in a digital catalogue, will assist to plan and optimize marine geophysical explorations campaigns in the coming years, aiming to identify sunken megastructures from the Stone Age.

Keywords: Stone Age; Megastructures; Baltic Sea; Late Pleistocene; Marine Geophysics

Poster presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Prehistoric Occupations of the Meuse and Sambre Rivers Confluence : the Grognon Archaeological Site (Namur, Belgium)

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The development-led archaeological operation carried out by the *Agence Wallonne du Patrimoine* on the Grognon site (Namur, Belgium), from 2017 to 2019, made it possible to collect important new data on the prehistoric occupations of the site, at the confluence of the Sambre and Meuse rivers. The geological, palaeobotanical, palaeozoological and archaeological studies, encompassing an area of almost 3000 m², were able to link the evolution of the landscape with that of human activities during the Holocene. We now know, thanks to a favorable sedimentary context, abundant and well-preserved organic material and the remarkable permanence of occupations, that the Grognon was visited during most of the Mesolithic, between 9400 and 6200 BC, as well as during the Neolithic, between 4500 and 2700 BC. During these two periods, we see prehistoric populations adapting their settlements and activities to variations in water levels and the location of emerged areas. Finally, the study of the techno-typological evolution of lithic tools and ceramics makes it possible to establish a chrono-cultural framework of reference for periods that are still poorly known in Southern Belgium.

Keywords: Belgium; Wallonia; Mesolithic; Neolithic; Palaeoenvironment; Chrono-cultural Framework; River Confluence

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Making the Seemingly Impossible, Possible: Combining 9,000-year-old Submerged Prehistoric Archaeology, Virtual Reality, and Artificial Intelligence

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Submerged beneath the world's waters are countless archaeological sites. Hidden beneath the waves, prehistoric landscapes are an essential component of the global archaeological record, and one that is not always easy to investigate. While high energy shorelines, coastal erosion, and development plague nearshore deposits, the potential for more intact sites further offshore and in deeper water has its own logistical challenges. The North American Great Lakes have experienced fluctuating water levels since their creation. Notably, during the early Holocene all five lakes had a significant low stand, where water levels were much lower in each basin, resulting in large areas of dry land habitats for people, plants, and animals. In the Lake Huron basin alone, lower water levels created an additional 250,000 hectares of available territory. Much of this landscape was a central limestone and dolomite feature that cut across the basin, the Alpena-Amberley Ridge. While connected on either side to the mainland, this narrow land bridge feature would have funneled animal and human movement and offers an ideal setting for submerged prehistoric landscape investigations as portions of it are far offshore and not buried by modern or historical sediments. However, the ancient landscape is vast and ephemeral prehistoric signatures are difficult to find. In order to model the past landscape and locate archaeological sites – interdisciplinary approaches were developed combining archaeology, anthropology, traditional ecological knowledge, and computer science. Most notably a virtual world was created which incorporates archaeological data, traditional ecological knowledge perspectives, and artificial intelligence. The virtual world serves as a tool for archaeological investigations as well as public outreach and education.

Keywords: Submerged Landscapes; Virtual Reality; Artificial Intelligence; Great Lakes; North America

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Waterscape in the Canche Valley (France). Quentovic - The growth and development of a river port by the sea

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Quentovic was a major economic and administrative centre throughout the Early Middle Ages. Located on the left bank of the River Canche at Visemarest (Pas-de-Calais, commune of La Calotterie), this early medieval port was part of a vast network of emporia that ensured the movement of people, goods and ideas around the English Channel, the North Sea and the Baltic. Its northern position in the kingdom of Neustria, at the crossroads of sea and land routes, made it ideally suited to cross-Channel relations and provided a direct connection to the north and south of the continent via an ancient Roman road.

Its location, at the head of the Canche estuary, also means that it is relatively well protected from storm flooding. But the river dynamics in this intertidal sector are quite marked, requiring the construction of facilities and work to adapt to changes in the Canche. Recent excavations, closely linked to palaeo-environmental studies, now offer a better representation of the development and living conditions of this urbanised area. Thanks to these studies and a regression analysis of the landscape, the site, which is now 15 km from the coast and around 750 m from the bed of the present-day Canche, appears to have been reconnected to the sea.

In addition, this analysis of the landscape, coupled with a historical study, lays the foundations for consideration of a wider occupation on the scale of the lower valley, where the roles and relationships between secular and ecclesiastical powers remain to be defined.

In addition, the position of the portus, on the borders of Merovingian and Carolingian Neustria, at the meeting point of the maritime and terrestrial, insular and continental, Scandinavian and southern worlds, is of strategic importance, particularly in economic terms. These exchanges, as evidenced by its artefacts, probably dictated its rapid and organised development.

Keywords: Early Middle Age; Quentovic; Emporium; Waterscape Evolution; Paleoenvironment; Archaeology

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Double checking 'double Dutch'. The use of double hull planking in the early modern Netherlands reconsidered.

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In 1984, the remains of a late sixteenth-century merchantman were discovered off the coast of Texel, the Netherlands. Upon excavation (1987-1997), the hull remains confronted archaeologists with a relatively unknown feature: A double layer of oak hull planking. Initially, the feature was interpreted in association with the bottom-based approach of building carvel ships in the early modern Netherlands, a tradition known as 'Dutch flush'. Maritime archaeologist Thijs Maarleveld believed that, for a brief moment in time, Dutch carvel ships were built with two layers of hull planking in order to increase the size of the vessels, a feature he referred to as a 'double Dutch' solution. To support his hypothesis, he referred to similar observations on early seventeenth century Dutch East Indiamen. Later research by maritime archaeologist Wendy van Duivenvoorde, however, did demonstrate that, within the context of the Dutch East India Company, second layers of hull planking could also be added to existing vessels purchased by the Company. In addition, several younger examples of double planked hulls were found in the archaeological record over time. These findings challenge Maarleveld's hypothesis, and they supported the need for a thorough reassessment of this particular construction feature. The reassessment of the construction of Scheurrak SO1 was one of the objectives of the interdisciplinary research project 'Scheurrak SO1 in the maritime cultural landscape of the early modern Netherlands', which ran from 2020 to 2024 at Leiden University. The analysis of the old excavation data and its confrontation with contemporary historical sources, led to new questions and initiated another dive campaign on the site in 2023. The combination of these different datasets has led to new, surprising suggestions for the interpretation of the double oak hull planking. This paper will present these new findings and embed them within the specific context of the Scheurrak SO1 site.

Keywords: Shipbuilding; Sixteenth Century; Netherlands; Furring; Lengthening, Double Dutch; Dutch Flush

Presentation in session G3: Trying Not to Sink: Managing Water on Ships (Thierry Boyer)

Riverbank to Riverbank: The Construction of Ferries in Saskatchewan, Canada.

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Prior to the construction of bridges, the most common and safest method to cross the rivers in the Canadian prairies was to be ferried a crossed, due to the severe and dangerous currents within the rivers. These ferries were locally manufactured to no standard plan, with the knowledge that the ferries would have a limited useful life span before being discarded.

This poster describes the geographic region of there service, their construction methods, and the recreation of working drawings and a 3D model based upon a preserved ferry. Thus, providing an archaeological record of these important, but easily overlooked, watercraft in the Canadian Prairies.

Keywords: Ferry; 3D Model; Recreation; Canadian; River Craft; Boat

Poster presentation in session K3: Digital Reconstruction of Shipwrecks

Underwater Biocultural Landscapes of Deep Waters: New Interpretative Frameworks for the Management and Investigation of the San José Galleon (Cartagena de Indias, Colombia)

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Since the investigative origins of maritime and underwater archaeology, the intrinsic link between what is understood as cultural heritage and natural heritage has been demonstrated. In many archaeological approaches to contexts related to Underwater Cultural Heritage, the presence of fauna and flora has been observed, whose symbiotic relationship has historically played a fundamental role in the conservation of the organic and inorganic elements that constitute archaeological sites. Then, interdisciplinary approaches have been consolidated as the necessary means to fully understand submerged archaeological elements and the natural environments in which they are found. As a result, several theoretical, conceptual and interpretative frameworks have been created, which have sought to understand the past human phenomena associated with water from an integral perspective. It is not only a matter of understanding the materiality that acts as a witness to the past, but also of recognizing those species that have coexisted with this evidence for decades, centuries and millennia, playing a significant role in the transformation of the planet and the societies that inhabit it. Thus, arise concepts such as Maritime Cultural Landscapes, Underwater Landscapes, Maritoriums, Nautical Spaces, and other frameworks that provide different interpretations of the relationship between people and their environment and the elements that constitute it. Then, this paper seeks to present and discuss the interpretive framework of the Underwater Biocultural Landscape of Deep Waters, which has been applied to the management and study of the archaeological context of the San José Galleon, wrecked in 1708 in Cartagena de Indias (Colombian Caribbean). In recent years, the study of shipwrecks in the deep waters west of this city has sought to understand these events not as isolated phenomena, but as part of a much wider context. The ultimate goal of this initiative was therefore to lay the groundwork for directing the efforts of the country and the institutions that represent it towards the construction of a dossier that will contribute to the declaration of the San José Galleon and its complex and diverse underwater landscape, nourished by both cultural and natural components, as Biocultural Heritage.

Keywords: Biocultural Landscapes; Deep Waters; Underwater Cultural Heritage; Management; San José Galleon; Cartagena De Indias; Colombia

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

From Antikythera to the abyss, the long road of webbed-footed archaeologists

L'Hour Michel

Former director of the Drassm
Former member of the 2001 Convention' STAB
Member of the French "Académie de marine"

The discovery and study of the Antikythera and Madhia wrecks, followed by the analysis of the Lake Nemi wrecks, played a key role in revealing, more than a century ago, the extent to which wrecks, sunken cities and other remains could hold unprecedented insights into the history of our humanity. Archaeologists' fascination with this submerged past, however, had to wait until the invention of scuba diving in the 1950s to open the way to more thorough investigations and for underwater archaeology to truly emerge in the 1960s and 1970s. It was up to the first generation of webbed-footed archaeologists, who had no reference for their training, to initiate the first field surveys, to design and specify research issues, to improvise and develop excavation methods, to control looting, which quickly became endemic, to impose a code of ethics on everyone, and ultimately to invent and structure the "profession." Paving the way for ever more in-depth research, these same pioneers and then their epigones went on to innovate by borrowing technologies often inspired by offshore industrial practices. Submarines, robots and remotely operated vehicles have been mobilized, while photogrammetry and 3D modeling techniques were developed, that now offer precise mapping of sites, facilitate data collection at depth and today open the door to very deep-sea archaeology. The progress made over the last century has been immense; ambitions, it is true, are no less. The fact remains that discipline faces many threats today as it did yesterday. Looting and trafficking of artifacts, which feed the international black market, are leading to the loss of precious historical contexts. Industrial activities, coastal urbanization, and the exploitation of fisheries resources are also damaging the remains, while climate change is accelerating their degradation and the rise of water levels. Pollution, which acidifies the seabed, and the impact of unregulated tourism exacerbate these dangers.

Against this backdrop, the future of underwater archaeology lies in the ongoing adaptation of research methods and strengthened international cooperation, such as that which led to the birth of the 2001 UNESCO Convention on the Protection of the Underwater Cultural Heritage. Only the integration of technological innovations, the essential and crucial development of professional training, and the commitment of all concerned to sustainable management will allow us collectively to preserve this sunken past of our humanity for future generations. The purpose of this communication is to remind everyone of what we owe to those who came before us and to show how much remains to be done. We have certainly won some battles, but it would be a mistake to think that we have already won the war.

Keywords: Shipwreck, Underwater archaeology, Sustainable management, Offshore technologies, International cooperation, Professional training, UNESCO.

Keynote presentation

D’Anticythère aux abysses : la longue marche des archéologues aux pieds palmés

L’Hour Michel

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Ancien membre du STAB de la Convention UNESCO de 2001
Membre de l’Académie française de marine

La découverte et l’étude des épaves d'Anticythère et de Madhia puis l’analyse des épaves du lac Nemi ont joué un rôle-clé en révélant, voici plus d’un siècle, à quel point épaves, cités englouties et vestiges divers pouvaient receler de données inédites sur l’histoire de notre humanité. La fascination des archéologues pour ce passé englouti a dû attendre néanmoins l'invention du scaphandre autonome dans les années 1950 pour que s'ouvre la voie d’investigations plus approfondies et que puisse véritablement émerger dans les années 1960 à 1970 l’archéologie sous-marine. A la première génération d’archéologues aux pieds palmés qui ne disposaient pour se former d’aucun référent, il est revenu d’initier les premières enquêtes de terrain, de concevoir et préciser des problématiques de recherches, d’improviser et développer des méthodes de fouille, de maîtriser les pillages, devenus très vite endémiques, d’imposer à tous une déontologie, et *in fine* d’inventer et de professionnaliser le « métier ». Ouvrant la voie à des investigations sans cesse plus approfondies, ces mêmes pionniers puis leurs épigones ont ensuite innové en empruntant à des technologies souvent inspirées des pratiques industrielles de l’offshore. Sous-marins, robots et véhicules télécommandés ont été mobilisés cependant que se développaient des techniques de photogrammétrie et de modélisation 3D qui offrent désormais une cartographie précise des sites, facilitent la collecte de données en profondeur et ouvrent aujourd’hui la porte à l’archéologie des très grandes profondeurs. Au cours du siècle écoulé, les progrès accomplis ont été immenses ; les ambitions, il est vrai, ne le sont pas moins. Il demeure que la discipline doit faire face aujourd’hui comme hier à de nombreuses menaces. Les pillages et le trafic d'artefacts, qui alimentent le marché noir international, entraînent la perte de contextes historiques précieux. Les activités industrielles, l'urbanisation côtière et l'exploitation de la ressource halieutique endommagent également les vestiges, tandis que le changement climatique accélère leur dégradation et la montée des eaux. La pollution, qui acidifie les fonds, et l'impact du tourisme non régulé aggravent ces dangers. Dans ce contexte, l'avenir de l'archéologie sous-marine repose sur une adaptation continue des méthodes de recherche et une coopération internationale renforcée telle celle qui a permis en 2001 de voir éclore la Convention de l’UNESCO sur la protection du patrimoine culturel subaquatique. Seules l'intégration des innovations technologiques, l'évolution indispensable et cruciale des formations professionnelles et l'engagement de tous en faveur d'une gestion durable nous permettront collectivement de préserver pour les générations futures ce passé englouti de notre humanité. L’objet de cette communication est de rappeler à tous ce que nous devons à ceux qui nous ont précédés et de montrer combien il nous reste à faire. On a certes gagné des batailles, mais ce serait une faute de penser qu’on a déjà gagné la guerre.

Mots-clés: Épave, Archéologie sous-marine, Gestion durable, Technologies offshore, Coopération internationale, Formation professionnelle, UNESCO.

Keynote presentation

Main Findings of Underwater Archaeological Excavation of the Yuan Dynasty Shengbeiyu Shipwreck, Zhangzhou, Fujian, China

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This paper will present the main findings of the comprehensive underwater archaeological investigation of the Yuan Dynasty Shengbeiyu shipwreck. The Yuan Dynasty Shengbeiyu shipwreck is located in the waters off Shengbai Islet, east of the Gulei Port Economic Development Zone in Zhangzhou City, Fujian Province, China, on the western edge of the Taiwan Strait. It is approximately 82 kilometers north of Zhangzhou City and about 65 kilometers south of Nan'ao Island in Shantou, Guangdong Province. According to historical records, this sea area was an important maritime route for ancient Chinese north-south trade and is also known for being a site of frequent historic maritime disasters. The Archaeological Research Center of the National Cultural Heritage Administration of China, in collaboration with the Fujian Provincial Institute of Archaeology and the Zhangzhou Cultural Heritage Protection Center, conducted underwater archaeological excavations at the site. This excavation represents an important practice of refined underwater archaeology in low visibility conditions in recent years in China. Through the underwater archaeological excavation, a wooden shipwreck was cleared, revealing a damaged hull measuring approximately 16.95 meters in length and 4.5 meters in width, with 10 remaining cabins. Components of the hull, including the mast step and the keel, were discovered, along with over 17,000 pieces of Longquan porcelain, including bowls, plates, dishes, cups, basins, stem cups, and incense burners, all wrapped in bamboo strips and showing no signs of use. Additionally, artifacts related to navigation and life aboard the ship, such as copper coins, seals, ship lamps, sounding weights, and soy sauce jars, were found, along with the seeds and fruit pits of plants like apricots and pepper through screening and flotation. By analyzing the artifacts recovered and studying historical documents, it is preliminarily inferred that the shipwreck dates back to the late Yuan Dynasty (mid-14th century) and was a Chinese maritime trading vessel engaged in the trade of Longquan celadon from Wenzhou Port on the southeastern coast of China to Southeast Asia. It is one of the few examples in Chinese waters of a ship carrying porcelain from only one kiln.

Keywords: Yuan Dynasty; Shengbeiyu Shipwreck; Underwater Archaeology; Excavation; Fujian Province; China

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Investigating the Main Members of Shipwrecks in East Asia and Southeast Asia from the 7th to 13th Centuries

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Archaeologists obtain data on shipwrecks and artifacts through underwater archaeology, which provides insights into the populations associated with these shipwrecks. Based on data collection and the establishment of a database of 102 shipwreck sites in East Asian and Southeast Asian waters from the 7th to the 13th centuries, this research combines quantitative methods with traditional Chinese archaeological typology to explore ship ownership and the national or ethnic affiliations of the crew. This research is of significant importance for understanding the maritime and economic history of this period. While the nature of the cargoes carried by a shipwreck can indicate ownership, it is not an absolute criterion, as merchants from one country may transport cargoes from other countries on their return voyages or specialize in trading foreign goods. Personal belongings of the crew can provide relatively accurate insights into the nationality and ethnicity of the main crew members aboard the ship. This involves distinguishing between items retrieved from the water as either cargo or personal property. Generally, personal belongings are fewer in quantity, limited in variety, and often show signs of use, further confirming their nature as personal possessions. Cargo items are characterized by bulk retrieval and a lack of usage traces. This research conducts detailed analyses of major cases, including the Huaguang Jiao Ⅰ shipwreck in Chinese waters, and the Belitung, Cirebon, and Pulau Buaya shipwrecks in Southeast Asian waters. Additionally, it categorizes and compares artifacts from 102 shipwrecks, establishes indices, conducts statistical analysis using linear regression, and visualizes the data through GIS, box plots, bar charts, and line graphs. The research also introduces the established shipwrecks database and plans to supplement data on shipwrecks after the 13th century for further research.

Keywords: East Asia And Southeast Asia; Maritime Archaeology; Shipwrecks Database; Crew Members; Cargo And Personal Belongings; Medieval Maritime Trade

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Maritime Trade Routes of Tang and Song China (618–1279 AD) Ceramics in the Indian Ocean

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This research primarily explores the ceramic trade routes between Tang and Song China and the Indian Ocean coast and islands from 618 AD to 1279 AD. Chinese ceramics were mainly traded to East Africa and North Africa through two maritime routes in the Indian Ocean. The traditional China-Africa route involved passing through the Strait of Malacca, traversing the Indian subcontinent, various countries in West Asia and the Arabian Peninsula, and ultimately reaching Africa. This research found that in the 13th century, Muslim merchants or explorers opened a southern route, starting from Sri Lanka, venturing south into the Indian Ocean, passing through the Maldives, the British Indian Ocean Territory, and Mayotte, and eventually reaching the Swahili-speaking world in East Africa. The research uses the distribution and typological analysis of Ding kiln white porcelain, Yue kiln celadon, and Longquan kiln celadon to support this argument. The northern Indian Ocean is influenced by the southwest monsoon winds in summer, with ocean currents aligning with the direction from the Indian subcontinent through the British Indian Ocean Territory to East Africa. The migration of the Austronesian language family to Madagascar and human genetic studies also suggest the possibility of this route's establishment. This research combines quantitative methods with traditional archaeological approaches, utilizing existing ceramic databases supplemented with relevant materials. Currently, data from 560 archaeological sites with Tang and Song Chinese ceramics excavated in South Asia, West Asia, North Africa, and East Africa have been collected. Additionally, data from 51 sites where Chinese coins were excavated, as well as 102 shipwrecks in East Asia and Southeast Asia, were analyzed using GIS, statistical chart production, and other methods for a comprehensive exploration.

Keywords: Tang And Song China; Ceramic Archaeology; Trade Routes; Indian Ocean; Swahili-speaking World

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Methods, Techniques and Technologies Applied to the Study and Safeguarding of Underwater Cultural Heritage in Deep-Sea: The Case of the San José Galleon (Cartagena de Indias, Colombia)

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Since 2019, the Colombian State, on behalf of the Culture and Defense Sectors, has been strengthening its technical, methodological and technological capacities to guarantee the protection and promote the study of the Underwater Cultural Heritage located in deep-sea. Thanks to the training of qualified personnel, investments in working platforms and the development of local capacities, an interdisciplinary team has been formed to ensure the protection of one of the most important archaeological contexts in Colombia's maritime history: the San José Galleon. This ship, sunk in 1708 during the Battle of Barú, presented an analytical challenge due to its location and depth of more than 600 meters. A team of archaeologists, oceanographers, historians, hydrographers and experts in underwater robotics have therefore perfected the operations, working systems and local innovations available to carry out an accurate recording, documentation and analysis of the shipwreck and its associated material. In this sense, the goal of this paper is to present and discuss the methods, techniques and technologies that have been adapted, applied and optimized in the study of the San José Galleon, located in Cartagena de Indias (Colombian Caribbean). It will present the joint work carried out by the institutions responsible for the matter, such as the Ministry of Culture, Arts and Knowledge, the Colombian Navy, the Colombian Institute of Anthropology and History, and the Maritime Authority. They have worked together to combine the different sectoral perspectives and capacities necessary to promote an integral management of this context belonging to the Nation's Underwater Cultural Heritage. It is only through interdisciplinary and interinstitutional work that it will be possible to develop and apply the technical, methodological and technological means necessary to study these particular and vulnerable deep-sea archaeological contexts.

Keywords: Methods; Techniques; Technologies; Underwater Cultural Heritage; Deep-Sea; San José Galleon; Colombia

Poster presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

A common approach to enforcement for heritage crimes offshore in English waters.

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Enforcement of laws focused on the protection and conservation of in situ underwater heritage is complex, and costly due to the multiple challenges of operating in the marine environment. The sheer size of England's marine area, containing as it does a rich historical record of seafaring over millennia. The authors will present the outcome of a project to co-ordinate enforcement effort in this space among those agencies with a maritime presence. Locating heritage in the enforcement portfolios of seagoing agencies usually concerned with, for example, fisheries protection, maritime safety or border and customs responsibilities offers the scope for enhanced evidence gathering, interruption and interdiction, as well as offering a significant deterrent effect. The creation of a common enforcement manual (CEM) is a valuable step to assist with the protection of marine heritage, including inter-tidal, assets located in the English region. It was created pursuant to a recommendation of a Historic England-funded project on the enhancement of protection of underwater heritage assets. Several organisations involved in that research indicated that a CEM would be of assistance in framing their ability to contribute to protection in respect of heritage assets in the English region and so Historic England agreed to fund its creation. The CEM provides a means to close knowledge gaps among officers and volunteers through providing its availability in an operational onboard setting and offering a comprehensive and concise information resource. The CEM provides easy access to the substance of the regulatory framework in England and a bespoke operational protocol for observation, investigation, interdiction (if permissible) and communication with relevant organisations. It is available on-board, enabling access in sea areas where access to online heritage resources is not available. This paper examines the development of the concept and showcases the result, which the authors hope will enable improved inter-agency working to enhance the protection of underwater cultural heritage at a marginal cost so as to generate sustainable added value to government in an effort to protect a valuable and threatened national resource.

Keywords: Enforcement; Agencies; Historic England; Heritage Crime; Protocols

Presentation in session L3: Heritage Crime (Alison James, Martijn Manders, Paul Jeffery)

Interpreting riverbed stratification: Historical and archaeological evidence from the Oglio River

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Interpreting archaeological findings within riverbeds, particularly in rural and sparsely populated areas of the Po Valley, remains a complex and persistent challenge in Italian archaeology. As rapid economic and societal changes in the first half of the 20th century led to the decline of most economic activities and forms of labour related to rivers, much of the material culture associated with these activities has been abandoned or forgotten. Consequently, evidence from various periods, such as pole alignments crossing lower riverbeds and the remains of wooden boats and watercraft, often provides limited explicit chronological information unless subjected to radiocarbon analysis.

This paper focuses on the lower course of the Oglio River in northern Italy. Historically, the river was characterised by the presence of monastic properties and ports since the early medieval period and remained an important route for trading goods until the end of the 19th century. Archaeological investigations conducted during the drought of summer 2022 revealed a striking example of the complex stratification of activities over time, where radiocarbon analysis could only be applied to selected features. This section of the riverbed serves as a case study, focusing on the distinction between historical evidence, analysed through archival sources, maps, and historical photographs, and older archaeological remains that had already been identified in previous investigations. By identifying which remains belong to more recent historical periods and associating them with specific water-related activities, such as boat mills, fisheries, mooring structures, customs houses, and watermills, this study aims to provide a methodological framework to differentiate post-medieval archaeological evidence from older features. Additionally, it offers insights into the types of activities that have left traces in the middle and lower Po Valley riverbeds over the past five centuries.

Ultimately, this research aims to raise awareness of the multi-layered nature of human interactions with the river over time, as the failure to recognise and consider this stratification may lead to misinterpretations of archaeological findings.

Keywords: Post-medieval Archaeology; River Archaeology; Oglio River; Po Valley; River Activities

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Baltic Sea 3D Wrecksite Ontology

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The Maritime Archaeological Society of Finland (MAS) has observed measurable increase in the eradication of historic shipwrecks in the Baltic Sea. Many shipwrecks surveyed 30-50 years ago, have totally disappeared into bottom sediment and those previously intact have fallen apart. Hence MAS initiated the "Baltic Sea 3D Wrecksite Ontology" (BS3D) -program in 2017 for countering the loss of cultural heritage information.

The program aims at creating a three dimensional "digital twin" i.e. a virtual 3D model of the most endangered wrecksites, threatened by the global warming of the seas. MAS volunteers produce 20-30 "wrecksite twins" every year, totalling almost 200 sites by 2025. All twins i.e. 3D-models and the photogrammetric material they were made of, as well as radiocarbon analyses or other survey data are all publicly available from MAS research portal on Open Data and Open Science basis.

An equally important goal of the program is establishing a Baltic Sea wide and interlinked wrecksite ontology, which would enable quantitative research on shipwreck typologies of various historical periods and wrecksite locations. The program does not advocate yet another monolithic database, but instead a distributed model, in which the various local databases would be compatible with a common data model and share the same typologies, as well as methodologies for defining them.

MAS has developed an efficient volunteer sourcing process and an Internet based IT-platform to support inventorying the shipwrecks with ontology attributes. A decisive factor in the success of the BS3D program has been the positive interaction between MAS and the Finnish environment, heritage and naval authorities.

In 2024 the BS3D program was recognized to have international relevance and thus it become a UNESCO endorsed NGO program hosted by MAS.

The presentation concentrates around three themes: Why is inventories and ontologies are relevant at this time; how they are effectively done and what are the lessons learned while doing them.

Keywords: Inventory; Ontology; 3D; Modeling; Dating; Positioning; Photogrammetry

Poster presentation in session M1: Inventorying UCH: An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Two Hundred Wrecksites Modelled - Lessons Learned and Moore's Law

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Maritime archaeological Society of Finland (MAS) started systematically inventoring wrecksites with photogrammetry in 2017. Thereafter MAS volunteers have created 3D models of about 200 different wrecksites. Today. photogrammetry has more or less replaced all manual recording methods, but is it a silver bullet solution for everything? And if not, what are the key challenges and how long will it take before they are solved?

First, the presentation elaborates on the MAS "volunteer sourcing" process for photogrammetric 3D models of wrecksites and how it came to being - solving various obstacles along the way. What were the lessons learned and the key take aways should you establish something similar?

Secondly, we take a look at various maritime archaeological research questions or use cases and assess the role of the wrecksite's 3D model therein. What added value does the more detailled "hires" 3D model have in contrast to popular "lowres" Sketchfab models and alikes?

Finally, we look at today's key challenges in underwater photogrammetry and hope to provoke discussion on different solutions. MAS presents a developmen road map forecast based on its development track record. Yes, the effects and opportunieties of AI in photogrammetry will be discussed shortly as well.

Keywords: Photogrammetry; 3D Model; AI; Resolution; Research; Visualisation

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

Two medieval ships, their inventary and cargo

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In recent years, two remarkable medieval ships have been discovered in Tallinn. In the summer of 2015, a well-preserved wreck was discovered in the park area near the city centre. The 18 m long wreck dates back to the beginning of the 14th Century and its construction features are similar to cog-type ships known in Europe. With over 700 artefacts found aboard, the wreck is a real time capsule, giving information about the everyday life on board. The wreck is already on display at the Maritime Museum.

In the spring of 2022, another medieval wreck was found. Located right next to Tallinn's Old City Harbour, the ship is also extremely well-preserved. With the length of 24 m and the beam of 9 m, it is one of the biggest excavated medieval ships. After the excavation, the wreck was transported to the Maritime Museum and is currently undergoing conservation. During the excavation, numerous finds were gathered, like shoes, weapons, tools used aboard and a compass.

With some finds from both of the wrecks, it is not exactly clear whether they belong to the ship's inventary or to the cargo. The presentation gives a short overview about the finds from both of the vessels. The role of some of the artefacts – cargo or ship inventary and their provenance is also discussed.

Keywords: Medieval Ships; Cargo

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

Nic Flemming and Honor Frost: Harbour Hunters

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The Maritime Archaeology Archives held at the Hartley Library at the University of Southampton contain the personal papers of two of the Mediterranean's pioneers in underwater archaeology: Honor Frost and Nic Flemming. The archives contain a wealth of career-spanning information and insights into the well-known work of Frost and Flemming throughout the Mediterranean and beyond. With the support of the Honor Frost Foundation, this research was undertaken to better understand the early days of maritime archaeology in Greece and the Aegean, and to particularly focus on the search for Bronze Age Aegean harbours. Greece in the Bronze Age is often assumed to have been a natural place of maritime connectivity and nautical interaction, but very few harbours have ever been identified, and even fewer investigated to a satisfactory standard. Honor Frost was an early adopter of scuba technology and had a keen interest in the prehistoric harbours of Cyprus and the Levant; although she did not dedicate much time during her career to Greece and the Aegean, she visited frequently and kept up correspondence with many prominent Greek terrestrial and maritime archaeologists. She also kept detailed notes about her search for stone anchors along the Greek coasts and in museums. Nic Flemming similarly kept a detailed journal of his time in Greece, searching for evidence of local sea level change at archaeological sites. This often led him to sheltered bays and inlets with evidence for ancient activity, including the sunken harbour town of Pavlopetri in Laconia. This paper will outline both Frost and Flemming's contributions to the maritime archaeology of Greece and then continue the story into the future and suggest what might be the next steps for the study of prehistoric Aegean harbours.

Keywords: Honor Frost; Nic Flemming; Aegean; Harbours; Greece; Archives

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

They came for the salt. Reconstructing the effects of medieval peat extraction in the Halligen area of North Frisia (Germany)

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The "Halligen" of the North Frisian Wadden Sea (Germany) are unique in terms of coastal landscape and settlement ground: these small salt marsh islands are the last place where people today live on terps to resist the storm floods – without protection from dykes. Being part of UNESCO World Heritage ‘Wadden Sea’, coastal North Frisian has changeful past characterised by intense human-environment interactions which led to drastic changes in coastline, cultural landscape and ecosystem over the centuries.

Beneath the tidal flats and the Hallig salt marshes lie the remains of the Medieval cultural landscape and its economic activities. While most of the drowned cultural lands south of the Halligen were freshly reclaimed and cultivated marshes and coastal fenlands in the Middle Ages, protected by dikes, with field systems and large settlements of terp chains, the area of the modern Halligen of Hooge, Langeness and Gröde are a different case. As this was a clay-on-peat area, a specialized economy of salt-production was started there around the 12th century, exploiting the salty peat by removing the clay and extracting the peat, which significantly lowered the ground surface and turned large areas into wasteland.

We combined geoarchaeological, geophysical and archaeological approaches to investigate the tidal flats around Hallig Hooge for remains of this salt economy and the associated settlements. On the Hallig, we investigated and partly excavated a medieval salt production site.

Our results reveal a near-industrial scale of the salt-extraction, reaching over many square kilometres and devastating the largest portion of the previous coastal salt marshes. This was done in a systematic and planned manner with few salt marsh plots being spared, likely for settlement and agricultural purposes. The peat extraction had massive impact on the coastal vulnerability: We found the ground surface was likely lowered into the range of the mean high water at that time, significantly increasing the risk of storm surge-induced flooding. The exploited marshes were useless for further cultivation, prone to flooding and fostered drastic transformations of the local geomorphology and the establishment of tidal flats in the Late Middle Ages.

Keywords: Tidal Flat Archaeology; Geophysical Prospection; Middle Ages; Marshland Reclamation; Salt Production; Wadden Sea

Presentation in session D2: Coastal Marine Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

How long has THAT been there?! - The effects of historic shipwrecks on their surrounding environment and their implications

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Maritime archaeological investigations of historic shipwrecks naturally focus on the object itself: there may be questions about what a ship and its wrecking event mean to humans – where was it built? what materials and methods were used in its construction? what did it do during its career? who was on board at the time of wrecking? who owned, salvaged or bought the wreck ?; or who, decades or centuries later, rediscovered it. There may be questions about the effects that modern human activity, such as tourism and salvage, and the environment have on the very fabric of the wreck. The consequences of a wreck, however, extend far beyond that.

Work is currently being conducted on potentially polluting wrecks from more recent decades, particularly from the World Wars. The oil, fuel and other chemicals that have the potential to escape due to deterioration of their containers and pollute the environment pose a significant threat to the local biomes and human populations (where applicable) near the wreck site. But what happens after a much greater span of time, such as 150 years or more? Once these chemicals have escaped and dispersed, or been removed? Is there still a concern about these wrecks affecting their surrounding environment? What about vessels that have been intentionally stripped and scuttled?

The phenomenon of black reefs has been noted and studied at some sites of modern shipwreck dating from the 1970s onwards. 'Black reefs' is the term given to a shift in the ecosystem surrounding a wreck related to the presence of iron in an otherwise iron-poor environment. The term accurately describes the change that occurs, as the living organisms that come to dominate the new environment near the wreck are brown to black. This colouration contrasts with the unaffected parts of the reef. However, little work has been done on the effects a historic wreck may have on its surrounding environment over a longer time. This paper focuses on wreck sites of ships from around the 1870s or earlier – it acknowledges the effect of external factors ON the wrecks and explores the effect OF the wrecks on their surrounding environment over time.

Keywords: Shipwreck; Black Reefs; Maritime Archaeology; Ecology

Presentation in session O1: Preserving of UCH (Jordy Moies)

If no one knows, then nobody can care – the role of maritime cultural heritage education and outreach in sustainable development

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The role of cultural heritage in support of the UN Sustainable Development Goals may at first appear unclear. However, organisations such as ICOMOS have compiled extremely valuable and comprehensive documentation to address this very topic. In the pursuit of a more sustainable way forward, knowledge of the past is an essential and invaluable tool as current affairs and their impact on modern society can only be understood in the context of history and a sound understanding of the past can reduce the number of trial-and-error attempts at creating a better future for generations to come.

Education and outreach in cultural heritage is paramount in the effort to engage people and instill a pride of place and sense of ownership which can in turn lead to more invested and proactive communities. To that end, government departments, community groups and private businesses play a vital role. As an example, I AM Archaeology is currently developing hands-on living history workshops with a maritime heritage bent, specifically tailored to the Australian National and New South Wales school curriculums, that will provide students with a more immersive learning experience and a lasting impression of the importance of cultural heritage.

The relevant experience required to develop such workshops has been gained by developing and implementing an 'immersive experience' approach with living history and reenactment community groups, such as The Revolting Peasants – a group focusing on the everyday working person from the Viking Age to the Victorian Era, at public events. The visitors are invited by the living history practitioner – portraying perhaps a 13th century peasant in a maritime trade or 19th century colonial Australian boat builder – to view, interact and engage with historically accurate tangible (replica) objects and materials as they are guided through the significance and historical context of each. The presentations are based on research, experimental and experiential archaeology, allowing practitioners to explore the effects of societal and cultural change on people's lives and lifeways. This paper presents what is already in place and discusses the plans for future development of programs that highlight the importance of human relationship with the seas and waterways historically and the urgent need to protect them in the modern era.

Keywords: Sustainable Development; Maritime Archaeology; Education; Cultural Heritage; Living History

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

The Woods in Medieval and Modern Shipbuilding. Archaeobotanical Approach to Mediterranean Shipwrecks

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Between the 5th and the 18th Century, the relations between humans and the sea changed in almost every way, from which states ruled the coasts, to the volume of trade sailing the waves, and even the introduction of naval artillery. One of the most important was the way sailing vessels were built, but there is not any study to tell if that applies to which materials were selected to build them too. In the last decades, many shipwreck sites have been excavated, both on land and underwater, and most of them have undergone archaeobotanical studies for wood identification of the timbers used in their construction. Even so, there haven't been too many publications unifying and reviewing the studies of several wrecks outside the local or regional spatial scale.

With the aim to discern possible patterns in the woods used in shipbuilding, especially on the different needs each part of the naval architecture brings, this study has created a database of all the Medieval and Modern shipwrecks found in the Mediterranean Sea. Starting with over a hundred sites where the hull remains were found during archaeological excavation, over eighty of them have published at least some of the tree species present in their structures. These wreck sites span thirteen centuries, at least twelve confirmed vessel typologies between merchant and military ships and almost every corner of the Mediterranean from the Strait of Gibraltar to the Levant, with especially high concentrations of them near the coasts of France, Spain, Italy and Turkey. There have been seven gymnosperm genres identified (*Abies, Cedrus, Cupressus, Juniperus, Larix, Picea* and *Pinus*), with thirteen species pertaining to them, as well as twenty-one angiosperm genres (*Acer*, *Buxus*, *Carpinus, Castanea, Fagus, Fraxinus, Guaiacum, Juglans, Olea, Phillyrea, Pistacia, Platanus, Populus, Quercus, Rhamnus, Salix, Spartium, Tamarix, Ulmus, Viburnum* and *Ziziphus*), from which twenty-five species have been counted.

Keywords: Wood Identification; Shipbuilding; Medieval And Modern Archaeology; Wood Specialization; Shipwrecks

Poster presentation in session G5: Shipwreck Studies (Marnix Pieters)

The Wadden Sea…a World heritage site (but not for cultural heritage)

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When in 2009, the Wadden Sea was accepted as a World Heritage site, the Outstanding Universal Values were that of being a place of exceptional biodiversity. The preparation to come to this status had been complex and long, but finally it was there, a joint application by the Netherlands and Germany and eventually also Denmark.

Now, the underwater archaeological departments of the Dutch government have been researching in the Wadden Sea since the early 80s. The first discoveries and researches of well-preserved shipwrecks were even done in the 70s. The Western Wadden Sea turned out to be an exceptional rich cultural historical or archaeological treasure trove of information about our past. One could easily argue that it has Outstanding Universal Value for this as well Why had the nomination not been cultural – natural, and only natural? Had the archaeologists been sleeping? And why don't they try it now? In this paper I will give an overview of the issues that have been surrounding this nomination and the difficulties of the management of this world heritage site.

Keywords: World Heritage; Wadden Sea; Management; Underwater Cultural Heritage; Outstanding Universal Value; Conflicting Goals

Poster presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Running a programme to manage Dutch shipwrecks overseas. Balancing between values, ownership, policies and so much more.

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The Cultural Heritage Agency of the Netherlands is running a programme to manage Dutch shipwrecks overseas since 2012. Dutch ships got wrecked due to wars, accidents, and bad weather and have been found in many places around the globe, from England to Argentina and from Indonesia to the US. In that sense they mirror the maritime ambitions and activity of the nation in the past. Some of these wrecks were privately owned, abandoned, but still of great value for the understanding and telling the story of our past. How do we deal with them? Other shipwrecks are claimed of still being owned by the Dutch government. This is due to a sovereignty claim. These are mostly warships, admiralty ships, VOC ships and WIC ships. But how does that work? And isn't that a bit of a neo-colonialist way of dealing with heritage? The activities executed by the programme are divided between physical management, training and knowledge exchange. But what are other parameters in the process of making choices? And are they easy to make? How are choices made on what to do and what not? Who is actually paying for these activities and what have been the results so far? What do the coastal states think of these activities? Is this programme primary a cultural heritage one or does it go further than that? In this paper we will talk about the challenges and approaches, about the reasons why it was set up, what the results are and how we determine the value of a site in order to prioritize what we do.

Keywords: Maritime Programme; The Netherlands; Coastal State; Flag State; Sovereignty

Presentation in session O1: Preserving of UCH (Jordy Moies)

Objects and stories; different and changing perspectives of the Dutch 'Golden age'

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Cultural heritage is that what we as a society would like to protect, investigate, manage and pass over to next generations. Our societies however change. The place we live in now is not the same as that of the 19th century or even 10 years ago. This means that our view on the past changes and thus also the value we attach to it. The way we treat relics of the past has changed as well. What we thought was great and admirable not too long ago, may now be despised. In this paper we will look at the stories of the Dutch East India Company and the changing view different societies have on them, and what kind of effects this (can) have on possible maritime archaeological works. In the 19th Century when nations were built, heroes were being sought and found in the admirals of the 17th century, often referred to as the Dutch Golden Age. These men were literally placed on a pedestal and worshiped. This view has changed dramatically in the Netherlands and with it also the language that is being used to refer to the past and objects that are being used to educate and tell the stories. This, however, is not homogenous and while in the Netherlands there are discussions on how to refer to the past, abroad there are different views on the role of the VOC in societies as well. Due to the fact that this was an enormously large multinational, active in many different countries and in contact with even more peoples, the view on what the VOC means for them is varying. In this paper we will talk about the changing views through time and the effect it has on current maritime cultural heritage management.

Keywords: Cultural Heritage; Perception; Stories; Language; VOC; Significance

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Inventory and Management of Mauritius' Underwater Cultural Heritage using the Mauritius Ocean Observatory E-platform

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For over 40 years, meticulous compilation of the shipwreck information has been ongoing, providing vital information about approximately 1,400 shipwrecks in the maritime zones of the Republic of Mauritius, from location and vessel type to cargo and historical documentation. The initial leads for locating shipwrecks often originated from local oral histories and the knowledge of fishermen and divers, supplemented by thorough research of historical archives. This involved examining a wide range of primary sources, including historical newspapers, logbooks, parliamentary papers, and private documents.

This paper presents a GIS-based approach to mapping Mauritius' underwater cultural heritage (UCH) using invaluable data, with a focus on shipwrecks and their spatial distribution. The integration of historical information and archaeological data significantly enhances our understanding of Mauritius' maritime history. The geospatial information enables detailed analysis of shipwreck locations, allowing for identifying patterns and relationships that contribute to a deeper comprehension of past maritime activities. This mapping effort is crucial for interpreting Mauritius' UCH, providing a foundation for further research and public awareness initiatives.

Recognising the importance of this rich maritime heritage, the Department for Continental Shelf, Maritime Zones Administration & Exploration (CSMZAE) initiated the "Mauritius Underwater Cultural Heritage Project" (MUCH Project). This project aims to identify, preserve, protect and raise awareness of UCH within the maritime zones of the Republic of Mauritius. A crucial aspect of this initiative is the integration of UCH data into the Mauritius Ocean Observatory E-platform (E-platform), a web-GIS decision support platform intended for maritime spatial planning (MSP). This E-platform facilitates the storage, management, and sharing of various marine datasets, including archaeological reports, survey data, and spatial layers. The main purpose of the E-platform is to promote informed decision-making by overlaying UCH data with other layers such as regulatory boundaries, ocean uses and marine environment. This study showcases the effectiveness of GIS and integrated data platforms in tackling the challenges of inventorying, managing, and protecting UCH amid increasing environmental and anthropogenic pressures.

Keywords: Underwater Cultural Heritage; GIS, Maritime Spatial Planning; Mauritius; Shipwrecks; E-platform; Data Management.

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Twenty years lessons learned of Accessible Underwater Cultural Heritage Sites.

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This paper presents the lessons learned from the efforts in the past twenty years to create accessible Underwater Cultural Heritage (UCH) sites in the Mediterranean, from the viewpoint of our participation with key contributions in several bottom-up initiatives. These initiatives have involved different stakeholders including underwater archaeologists, universities and research institutions and competent public authorities (ministries, regions, municipalities), and were supported in the framework of several national or EU co-funded projects. The paper will discuss the challenges and some of the parameters to consider for the accessibility, promotion and protection of Underwater Cultural Heritage and the sustainable management of the sites.

Based on our experience, it takes a long time and effort to make a UCH site accessible, and therefore a bottom-up approach ensures the long-term support of stakeholders in establishing a site and maintaining its accessibility. The accessibility of UCH needs also to be inclusive for divers and non-divers. This can be achieved with the use of immersive VR technologies and mainly with the deployment of Knowledge Awareness Centers with physical and virtual exhibitions of the sites. In addition, innovative means of attraction such as serious games, 3D reconstruction, videos and AR leaflets can further enhance accessibility and raise awareness. Another finding is that the accessibility of UCH is linked to its protection and therefore requires reliable means of safeguarding. Monitoring the sites entails various means such as the installation of underwater cameras and frequent visits, the design of diving tours accompanied by certified guides/divemasters and with the presence of the management authorities at the departure and return point. Finally, the efforts need to consider different aspects of sustainability such as financial (both for the local communities with the creation of a weekly destination and the management authority) and environmental ones (with the continuous monitoring of the marine environment).

Concluding, while being on a continuous learning journey gathering experience, we consider there is plenty room for enhancing accessibility of Underwater Cultural Heritage and great potential for blue growth and sustainable development for local communities and the marine environment.

Keywords: Accessibility; UCH; Protection; Bottom-up; Tourism; Cameras; Sustainability
Presentation in session

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Changing Ends? International reflections on the Ocean half decade

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In my 5 years at Wessex Archaeology our focus in the Archaeological assessment of Marine Geophysical data for offshore renewables has moved decisively from domestic projects to a wide international portfolio. This has required a reactive adjustment to stakeholder expectations. These brief reflections focus on a number of relevant axes that we operate with to satisfy our varied stakeholder sets region by region. I hope these axes cast a light on the international operating environment.

One can view these high-level axes, inter alia, as being in balance or tension, even dynamic tension

- UN Convention; ratified, non-ratified compliant or not
- Balance of interest Maritime Archaeology vs buried palaeosurfaces
- Tangible vs intangible cultural Heritage
- First Nations stakeholders; attitudes, engagement and laws.
- Territorial waters vs exclusive economic zone; Federal vs State
- International vs local EIA standards
- Seabed usage, renewables and extractive usage

At a lower level, as a practicing consultancy, considerations are made of how the wider world, Impact Assessment community's attitudes and stakeholder requirements are changing and how this contributes to delivery against the above axes. This is impacted by the changes in industrial uses of the seafloor and its shallow geology, and also the methodologies for measuring and mitigating impacts. In fact its key to the role to apply the latest advancements to efficiently bear on heritage requirements.

- Commercial work direct to regulators, or developers or multidisciplinary consultancies.
- The transition zone, marine and terrestrial elements rarely
- Changing technology, digitisation, AI, autonomous operations

We have experienced a variety of needs across a wide international market. Perhaps most illustrative being multi-jurisdictional trans-national projects where neither the seabed nor engineering aspects change but heritage reporting does so abruptly at a boundary. However, we must recognise that there are valid cultural reasons where a one-size-fits-all approach to EIA or even just Heritage is not suitable; even with a single infrastructure project.

If the object of the exercise is alignment with the UN convention and the safeguarding of tangible and intangible cultural heritage. A balance in the continuum of co-operate, collaborate and co-exist must be struck for the wider heritage good.

Keywords: International; Intangible; Jurisdiction; EEZ; First Nation; Maritime Archaeology; Palaeolandscape

Presentation in session J3: Offshore Renewables and Maritime Archaeology (Mark James, Victoria Boothby)

: the Cais do Sodré ship, an ongoing project at the Portuguese National Centre for Nautical Archaeology (CNANS).

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Capturing data from maritime archaeological sites and artefacts has been a challenge since researchers began exploring underwater cultural heritage. A number of methods have been tried and tested since the first wreck excavations in the 1950s. Innovative methods have been systematically applied in these investigations. Firstly, the adaptation of terrestrial archaeological recording techniques and, more recently, the introduction of digital photogrammetry, scanning methods and CAD resources. The Portuguese National Centre of Nautical Archaeology (CNANS) has several ship timbers in storage that have been discovered in Portugal since the 1990s, namely the Corpo Santo, Cais do Sodré, Ria de Aveiro A and Arade 1 ships. In different degrees of preservation, they have been studied by various researchers using different methodologies. In recent years, our team has been revisiting legacy data on those sites and re-capturing the timbers in high resolution 3D. This presentation will explore the methodological approach, adopted namely to the recording data from the excavation of the Cais do Sodré ship in the 1990s. Existing data was reanalysed and discussed, and each timber was digitally recorded in 3D, with the aim of collecting data on the construction of the ship, the formation of the site, and the effects of laboratory storage over time. This made it possible to digitally reconstruct the site, the ship in its original form and physically by 3D printing each timber for further analysis, such as reconstructing the original profile and testing for buoyancy, cargo and swell limitations. Taking this opportunity to revisit this heritage, complementary studies were undertaken by our team, aimed at improving the study of each timber as fragments of a past forest, and to identify possible forestry practices employed in the selection of trees to build the Cais do Sodré ship. The group of data was then collected and analysed by a multidisciplinary and interdisciplinary team, involving maritime archaeologists, conservator-restorers, and the contribution of students, and volunteers, to reconstruct this ship since the selection of trees, through the architecture, its use, the formation of the site, and the excavation that took place after its find.

Keywords: 3D Digital Reconstructions; Digitisers; Legacy Data; Photogrammetry; 3D Printing; Shipbuilding; Forest Resources

Presentation in session K3: Digital Reconstruction of Shipwrecks (Hendrik Lettany)

Intertidal archaeology in the Basque Country: updating the knowledge

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For the last years, we have been surveying and recording elements of archaeological cultural heritage along the estuaries of the Bizkaia province, in the Basque Country. Such projects have increased our knowledge on the different elements regarding archaeological types and periods of such heritage. They show how the society build, used and discarded such elements in relation to the different social, economical and political inputs and outcomes.

We are currently surveying the estuaries of the Gipuzkoa province, also part of the Basque Country. Initial results are promising: new wrecks have been allocated and infrastructure regarding the creation of polders are almost everywhere.

Our purpose is to be able to compare whether both provinces respond to the same necessities regarding the use of the intertidal zones, for instance by building up jetties or similar structures for mooring, fishing by building fish weirs, reclaiming land, or abandoning wrecks once their lifetime and use have ended. Such wrecks will provide a useful reservoir to understand better their shipbuilding method for which Basque shipbuilders have been so famous from the Middle Ages. In some wrecks recorded in the Bizkaia province, we have identified features which, we think, related to an evolution of the dove tail join which was recorded in the San Juan wreck (sunk in Newfoundland in 1565).

We hope that the initial survey of the different archaeological elements would allow us to select those which could enhance our knowledge on the different features, either regarding the wrecks, fish weirs or any other element so we can compare with the results for Bizkaia, forming a sound knowledge on the intertidal archaeology in the Basque Country.

Keywords: Intertidal Archaeology; Basque Country; Bizkaia; Gipuzkoa; Estuary; Survey; Cultural Heritage

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

The use of underwater vehicles in archaeological research: current status and methodological perspectives in Spain

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The increase in deep sea works in Spain over the last 30 years has led to an increase in archaeological finds at great depths and the need to catalog this heritage, work carried out by vehicle pilots supervised by archaeologists. At this point, the use of these autonomous and manned underwater systems in Spain is still in an initial phase, still lacking regulations governing their use and pilot training.

Along with this, the advance of new data acquisition technologies by means of underwater vehicles has been one of the main methodological revolutions for research in underwater archaeology. The use of these technologies not only allows researchers to reach sport diving and technical diving, entering and exploring the impossible limits for diving such as the abyssal depths at thousands of meters, but also in support tasks for divers below 100 meters. In addition, the appearance of new vehicles with simple designs and easy handling has reduced the cost of the devices, along with the increase in the number of vehicles available for research.

The intention of this work is to review the main archaeological interventions in which underwater vehicles have been used, proposing a state of the art of this methodology within the Spanish regional scope. Within this work we intend to analyze the pilot interventions, which give a good example of the future and possibilities of the discipline. In addition, we want to raise the debate on whether archaeologists have the necessary knowledge for the application of this technology, and whether it is necessary to train specialists in underwater archaeology to play the role of pilots in deep water interventions (as it happens today with drones). The development of a working methodology with this type of vehicles, preserving the archaeological research method, would be a real advance in the protection of underwater cultural heritage.

Keywords: Underwater Vehicles; Robotics; Deep-Sea Archeology; Thecniques; Methodology; Underwater Cultural Heritage Spain

Poster presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

Coast-R Network+ and the Resilience Coastal Communities and Seas Programme

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The Resilient UK Coastal Communities and Seas (ReCCS) programme is a £14.8M UKRI/DEFRA investment consisting of the Coast-R Network Plus (led by the University of Hull) and four research projects situated around the UK. Coast-R's role is to draw the programme together, championing the outcomes, benefits and opportunities, assisting with finding commonalities across projects and looking at specific cross-programme challenges such as stakeholder engagement.

Coast-R will build an inclusive and collaborative community of practice working to develop and grow knowledge, action and resilience for UK coastal communities and seas. Our poster showcases the opportunities and activities that we will be undertaking over the next four years with our partner universities, demonstrating how our objectives and cross-cutting themes will help us to:

- Champion and coordinate research and knowledge exchange across and beyond the ReCCS Programme.
- Develop and support transdisciplinary research capacity around coastal and marine resilience, through the Flexible Fund.
- Scale and embed effective place-based interventions into policy, practice and knowledge mobilisation.

We will also highlight opportunities for engaging with the network+ activities, including our flexible fund opportunities, and our ongoing programme of online workshops and webinars which are open to all members of the network+ - there will also be an opportunity to sign-up to the network if Coastal Futures delegates have not already done so.

More information about the ReCCS projects can be found here.

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Keywords: coastal landscapes; resilience; communities; capacity building

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

WWII Underwater Archaeology and Ethics

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Underwater archaeology, a niche subdiscipline of archaeology, developed in the 1960s and 1970s, but it would take at least 20 more years before archaeologists began investigating underwater cultural heritage related to WWII. A recent study outlines a literature review and analysis of sites, research topics, and publication demographics by decade of the micro-niche subdiscipline focused on WWII sites underwater (McKinnon 2024). What this study revealed is that over 35 years, the field of study developed from a focus on the establishment of a site type and its management, to studies of site formation and conservation, to research dedicated to public and community engagement, to decolonizing environmental risk assessments in post-colonial contexts, and even redemptive work exploring conflict in conjunction with modern post-colonial issues and concerns. Today there exists a vibrant field of study that spans the globe incorporating researchers from nearly every continent and body of water and integrating interdisciplinary collaborations. All the while during this progress, what largely has been missing is an in-depth, critical review of the ethics of underwater water archaeology of WWII sites. This stands in contrast to the field of archaeology and even more specifically our dry colleagues that work on conflict and modern sites' engagement with the subject of ethics. With the exception of the treasure hunting ethical debate and discussion, there is a dearth of critical studies focused specifically on ethics in the subdiscipline of underwater archaeology, let alone in the subfield of WWII underwater archaeology. Having participated in the conflict archaeology realm for close two decades, both on land and underwater, there are some ethical issues that I have grappled with over time, and which most certainly require examination to "move beyond the well-meaning platitudes of a redemptive ethics towards a more critical, transgressive model" (Moshenska 2010). This paper outlines the history of the study of WWII World War submerged sites and discusses some of these ethical topics .

Keywords: WWII; Ethics

Presentation in session Q2: Unity in Diversity (Kalle Virtanen)

Reimagining the National Marine Heritage Record for England

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The National Marine Heritage Record was established in the late 1990s to provide an inventory of archaeological remains on the seabed around England. The database currently holds over 45,000 records relating to the marine historic environment including 6,000 known wreck sites, and a further 31,000 wrecks known only from documentary records. Historic aircraft crash sites, isolated find spots, and details of fishermen's fasteners make up the remainder of the dataset.

High quality and accurate marine historic environment records are essential to ensure the early identification of heritage assets and associated features so that they can be protected appropriately. The need for a dependable and up to date marine record is demonstrated by the unprecedented scale of change to the seabed currently taking place. This paper will present an overview of the policies behind the National Marine Heritage Record and detail the thinking surrounding the semantic modelling.

The new National Marine Heritage Record will be delivered using the free open-source Arches Software platform. The new system, 'Mariner', will allow a shift in focus from the previous model where the vessel and the wreck were perceived as a single entity to one where the vessel and its physical remains are separate but linked entities allowing for a more accurate representation of our understanding of the seabed resource. The development of dedicated marine resource models will also allow for diverse datasets to be brought together in an integrated way. The system will enable us to fully capture the results of commercial archaeology in advance of development, research projects undertaken by divers and avocational archaeologists, as well as thematic research projects undertaken by heritage agencies and academic partners.

The development of 'Mariner' using Arches will allow the sharing of models and ideas with other partner organizations already using the software, or looking to move to it. It is hoped that 'Mariner' could become the model for systems focusing on the marine historic environment whether relating to wreck sites, coastal peat deposits, submerged landscapes or seascape characterization.

Keywords: Inventory; Shipwrecks; Database; Models; Records; Arches

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

Las cuatro etapas de la historia de la balsa de cuero de lobo marino: un caso de Los Andes del Sur

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Las balsas de cuero de lobo marino tienen una historia que sobrepasa los 1.200 años, rango temporal en el que ha tenido una serie de reconfiguraciones contextuales y funcionales, que pueden diferenciarse en cuatro momentos principales. Un primer momento ligado a la pesca y caza marina, seguido de un segundo caracterizado por su integración dentro del engranaje portuario del siglo XIX, en donde este medio de navegación no tuvo cambios en su cuerpo material, tecnología ni en su diseño. Desde fines del siglo XIX la balsa se convierte en un emblema de una cultura y pueblo en extinción, lo que generó una demanda de este objeto por parte de museos internacionales. En este nuevo contexto la embarcación deja de ser utilizada para lo que fue originalmente creada, para volverse un símbolo de una tradición en desaparición. Luego de casi mil años de continuidad material y tecnológica, llega el momento de su ocaso, circunstancia en donde se transforma para convertirse en un objeto colectable y de museo, una embarcación que ya no se usa para navegar sino para significar, mostrar y rememorar. La evidencia muestra que su demanda por coleccionistas y museos se manifiesta primero a escala internacional y luego a nivel nacional. Finalmente, en la escena local y regional, la balsa toma un nuevo protagonismo en el proceso de reivindicación étnica contemporánea de la cultura changa, como consecuencia de paso triunfal por los museos en las décadas previas. Esta ponencia propone un repaso de las cuatro etapas de esta embarcación, a partir tanto de evidencias directas como indirectas, en distintos soportes y materialidades, con tal de desentrañar sus transformaciones producto de su inserción en estos nuevos contextos sociohistóricos, incluso ya lejos de la pesca, la caza y la navegación en el mar. El propósito final de esta exposición es reflexionar cómo cambian los objetos desde su realidad indígena original hasta el momento de convertirse en bienes colectables.

Keywords: Norte De Chile; Atacama; Navegación; Tecnología Marina

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

Adaptation of riparian communities to the hydrogeomorphological dynamics of the Loire River during the Little Ice Age (14th-18th c.) : insights from municipal accounts

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The Loire River is the longuest in France. Numerous studies have been carried out on the river since the mid-19th c., but mainly on its downstream section (downstream from the Bec d'Allier confluence). This is also the region where the *levées* – long, continuous, and unsinkable dikes enclosing the river – have been in place since the medieval period. However, upstream of the Bec d'Allier, geohistorical, archaeological and geographical studies are far less common, and the presence of *levées* is much more sporadic. In this context, this study aims to explore the interactions between Loire riparian communities and the fluvial system in the Nivernais and Bourbonnais regions. More specifically, it seeks to understand how, in the absence of unsinkable structures, communities along the Loire have coped with the river's dynamics over the last millennium, and in particular during the Little Ice Age (LIA).

This study is based on the analysis of textual archives, particularly the communal accounts of the Nevers and Decize cities. Thanks to the County of Nevers granting them communal autonomy, these towns set up an accounting system since the end of the 14th c. These accounts are well preserved, since 1389 at Nevers and since 1404 at Decize. These records contain valuables informations about the Loire's floods and migrations. They have already enabled us to compile an unprecedented inventory of the Loire River floods and to identify periods of high hydrological activity during the LIA period (Mesmin et al., 2024). Furthermore, they provide insight into how local communities have responded to the hydrological activity intensification during the LIA period. While these communities developed strategies to cope with the Loire River floods, mitigating the river's lateral migration proved far more challenging. One way of limiting the river's migration and erosion was the construction of *battis* – submersible dykes built in the riverbed – to prevent the Loire from shifting away from the cities' bridges and ports. However, we will see that the development trajectories of the two sites diverged, primarily due to geomorphological and financial constraints.

Keywords: Loire River; Little Ice Age; Flood; Documentary Archive; Communal Account; Hydrogeomorphological Activity

Presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

Tracing Lost Landscapes: Integrating Geoscience and Archaeology to Investigate Submerged Upper Palaeolithic Landscapes.

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Geoscience and marine archaeological tools are essential for the exploration and reconstructions of submerged paleoenvironmental landscapes, as together they provide a comprehensive understanding of past environments. Bridging these disciplines offers an opportunity to connect cultural heritage materials with the surrounding natural environment, shedding light on the impacts of the last Ice Age and the subsequent interglacial period on prehistoric communities. From the Upper Palaeolithic onward, the European Atlantic coastline has endured distinct climatic and oceanographic shifts. The significant warming at the end of the last Ice Age led to weather instability, melting of the ice sheets, flooding rivers, and the formation of large estuaries that discharged into the seas contributing to sea level rise. These consequences reshaped the littoral zone and influenced the movement and settlement patterns of Palaeolithic groups.

The research employs a transdisciplinary approach to investigate submerged Upper Palaeolithic landscapes. The aim is to use a spectrum of methodologies, that integrate geophysical and archaeological knowledge. Predictive modelling will illuminate areas of high probability for submerged sites, followed by detailed analyses of seabed acoustic data, marine sediment core samples, and terrestrial satellite imagery. The study seeks to uncover patterns within the palaeogeomorphology, prehistoric human adaptation and their preferred settlements along Atlantic Europe. Additionally, the research incorporates coastal and oceanographic dynamics to assess sea level fluctuations, shoreline erosion, and sedimentation processes.

The findings will contribute to heritage preservation in the context of global climate change by offering a window into the past, retracing the steps of Palaeolithic people and deepening the understanding of their interactions with evolving landscapes. By locating submerged sites, this research will enhance our knowledge of how Palaeolithic communities adapted to dynamic coastal environments.

Keywords: Submerged Landscapes; Upper Palaeolithic; Climate Change; Sea Level Rise; Predictive Modelling; Core Sampling; Geophysics.

Presentation in session D2: Coastal Marine Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Traces of an Ancient Chain Pump on a 15th century Venetian shipwreck at the island of Vis, Croatia, a preliminary report

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The Department for Underwater Archaeology of the Croatian Conservation institute in 2013 started an investigation of a newly reported shipwreck Labotovo cove near Komiža on the island of Vis. Various pottery, glass, and metal objects can be dated to the middle of the 15th century, and suggested its Venetian origin. The vessel was equipped with as many as fourteen anchors, and at least three artillery pieces. The presence of three bronze bearings which appear to be parts of a chain *paternoster* pump stand out within the shipwreck. The upper assembly contained two identical bearings with flanges, and remnants of a wooden wheel. One identical bearing, and a small part of calcified wheel can be observed on the lower assembly. All three bearings have flanges with holes for fastening.

Evidence of chain pumps was found on more than two dozen shipwrecks from Roman, and on one from the early medieval period. Although much larger, Labotovo bearings can be compared to very similar or almost identical items found on Roman period wrecks *Cap del Vol*, *Tradelière*, *Chrètienne H*, *Los Ullastres*, *Nemi 1* and especially *Grand Rouveau*.

Thus far the earliest archaeological evidence of chain pump outside Antiquity is from a Portuguese naval vessel at the end of 17th century. Similarity of Labotovo bearings and other elements with their ancient predecessors suggest that this technology did not vanish from Europe during Middle Ages as some suggested, but could imply continuity in production of these kind of water lifting devices.

Keywords: Shipwreck; Chain Pump; Bearing; Glass; Venetian Pottery

Presentation in session G3: Trying Not to Sink: Managing Water on Ships (Thierry Boyer)

Intertidal contexts and Underwater Cultural Heritage: Case study in El Cóndor, Río Negro Province, Argentina.

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A correct management of Underwater cultural heritage should be based on a comprehensive understanding of material evidence, its socio-historical and locational contexts, as well as the dynamics that affect it, both natural and cultural. This becomes even more relevant when dealing with intertidal environments, where the factors involved present more complex dynamics, as both land and sea variables are combined.

In these contexts, marine geophysical studies are highly useful, as they provide access to a diverse range of information, such as the geological characteristics of the seabed, which are important for understanding the site formation dynamics of the area. They also enable the detection of areas with potential archaeological value, which should be verified through underwater surveys. These geophysical studies must be complemented by research on marine dynamics, such as currents, waves, sediment transport, coastal morphological characteristics, and the occurrence of extraordinary events. All of this data has its own characteristics and requires diverse processing, making the proper management of these essential. In this scenario, Geographic Information Systems (GIS) play a key role, allowing the integration and cross-referencing of this various types of information.

In the locality of El Cóndor, Río Negro (Argentina), a survey and inventory of Underwater cultural heritage was conducted in 2022 to assess its potential. Both intertidal land surveys and interviews with local residents revealed the existence of a diverse Maritime-historical cultural heritage (MHCH). Furthermore, it provided access to preliminary information related to site formation processes, identifying both natural and cultural factors. This work presents a historical-archaeological research proposal for the MHCH of El Cóndor, aimed at producing systematic knowledge about it, which will serve as the basis for its management, protection, and enhancement. The proposal places particular emphasis on the study of the environmental context, highlighting the geophysical and archaeological survey work and the integration of their results into Geographic Information Systems.

Keywords: Argentina; Maritime-historical Cultural Heritage; Geophysics Surveys; Intertidal Archaeology; GIS; Heritage Management

Poster presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Waterfront Archaeology in Antwerp. A Long-term Urban Development Process and Opportunities for Valorization in Public Domain

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The archaeological soil of Antwerp's Scheldt Quays is extremely valuable and covers more than 2000 years of city history. Centrally located is the “Burcht” zone, a protected archaeological monument of very high archaeological value. The city developed around this early settlement with its ‘Wharf’, the oldest mooring place. Over the centuries, Antwerp's waterfront expanded into an imposing façade of city walls, towers, canals, water gates and moorings with port infrastructure.

The city in cooperation with the Flemish Waterway Agency is currently implementing the Masterplan of the 7 km long Scheldt Quays, which is being designed to stabilize the current quay wall, to raise the embankments and to create qualitative public domain tailored to contemporary needs.

The city's archaeology department carries out planned and proactive archaeological research on the underground maritime heritage and created advisory maps to identify heritage values and the possibilities of unlocking maritime heritage structures.

The large-scale straightening of the Scheldt quays at the end of the 19th century cut the city off from the stream and meant a stripping of the medieval and 16th-19th century waterfront. The long-term vision for the valorization of the harbor relics is subject of this contribution and explained through recent excavation projects. Indeed, the integration of the archaeological relics of the canals, the old quays, towers and city walls can enhance the appeal of new developments and provide an additional asset for tourism. The implementation of the Scheldt Quays Master Plan is therefore a historic opportunity to give back the forgotten waterfront to the city.

Keywords: Waterfront; Archaeology; Mediaeval; Port Infrastructure; Integration; Urban Development; Antwerp

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Gallo-Roman bank revetments along the Senne river in Brussels (Belgium)

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During an emergency excavation at the Tour & Taxis site in Brussels in the summer of 2015, carried out by the Department of Archaeological Heritage of the Brussels Regional Public Service, the presence of a Gallo-Roman bank occupation was discovered.

The emergency investigation has provided numerous new data, including in connection with the landscape development of the site. The geoarchaeological findings show that the site was situated in an ancient meander of the Senne river. After the last glacial period, the very wide river developed into a much narrower but still navigable waterway in the Gallo-Roman period. The oldest traces of human presence in the vicinity of the site appear to date back to the Mesolithic and Late Neolithic periods and include a few lithic tools and a polished axe. During the Gallo-Roman period, the immediate vicinity of the site was inhabited. The discovery of a well near a Roman villa in 1921 in Molenbeek, barely 500 m from the current site, can probably be linked to this. The western bank of the Senne meander was reinforced during this period to prevent erosion. For this purpose, a series of poles were driven into the ground, between which planks were worked. In some places, remains of wattlework or adjoining poles were also found. Between the bank and the revetment, quite a lot of roof tiles, many of which were intact, and other building materials were dumped. The fact that the area was probably also used as a dumping ground for household waste can be seen from the numerous pottery shards, mainly of local or regional production, but also from different production centres in Gaul and the Rhine- and Mosel valley. Several metal objects illustrate different aspects of daily life. The finds date mainly between the 1st and 3rd d century AD. The presence of a few human skeletons with weapons and a comb in the previously mentioned well and a piece of a Merovingian chain mail discovered during the excavation indicate that the site was also inhabited in the 5th-6th centuries.

Keywords: Senne River; Gallo-Roman Archaeology; Brussels; Bank Revetments

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Environmental risk mapping and 3D monitoring: cost-effective strategies for underwater heritage protection

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Managing underwater archaeological sites in dynamic environments requires tools that help us understand not just where degradation happens, but why, and how we can monitor it efficiently. This research combines GIS-based spatial analysis with targeted fieldwork to support more informed and cost-effective site assessments. A first phase consists of developing a regional GIS model that brings together environmental data—like currents, sediment types, and seabed mobility—to identify areas where natural processes are likely impacting wreck sites. This model helps prioritize where field verification is needed. The second phase applies 3D documentation techniques, like high-resolution bathymetric data and photogrammetry and analysis by difference modeling, to measure physical changes on selected shipwrecks over time, alongside sampling and observations of local conditions. The goal is to compare what the model predicts with what we actually see on site, and from there, refine a practical method to assess site stability and preservation risk. Since different environmental conditions can lead to vastly different states of preservation, understanding why a site is deteriorating is crucial for anticipating long-term changes and guiding conservation efforts. Underpinning this work is the broader need to make site monitoring more manageable: to focus resources where they're most needed, using accessible data and repeatable techniques. By connecting environmental mapping with on-site condition assessment, this research aims to build a toolset that supports better longterm protection strategies for underwater heritage, in line with the framework of the 2001 UNESCO Convention.

Keywords

Poster presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

UN Decade of NGO Citizen Science

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In December 2018, the Non-Government Organisations (NGOs) accredited to the UNESCO 2001 Convention on the protection of underwater cultural heritage (UCH) convened in the Paris to chart a path to utilise their combined expertise in a way that would support the 2001 Convention. To that end, a digital hub was established to provide a common portal through which members of the community could link, share information and show the combined impacts of the group. In 2020, the UN Decade of Ocean Science began and the NGO group identified synergies within all seven outcomes to which they could contribute (https://www.unesco.org/en/decades/ocean-decade). While, the seventh outcome, being 'an inspiring and engaging ocean' is naturally served by our interrogation of the UCH to provide unifying maritime narratives it was also evident that the UCH acted as a resource on the seabed whose loss could be dated and subsequently studied to understand past and present change. Where sites were repeatedly monitored, information could be gathered to inform variations in pollution and on the condition of the associated benthic communities, both of which would inform on the health of a site. With the proliferation of cameras and videos providing images that could be processed to create 3D models, this data is now becoming relatively easy to acquire and could be repeated to record change. Indeed, such datasets are being collected by many organisations around the globe including the NGOs and affiliated organisations. This paper will outline how the portal established following the 2018 meeting is now being enhanced to form a link between these projects, expanding the NGO network into organisations with a desire to gather baseline information on the state of our heritage and the health of our oceans as part of the NGO led, UN Decade Action - Survey of the Maritime and Underwater Heritage (SoMUCH) Below the Waves. Here, citizen science will be key to the gathering of data, which can then be used for more detailed studies and for advocacy in support of the 2001 Convention and the UN Decade of Ocean Science.

Keywords: NGOs; 2001 Convention; UN Decade; Citizen Science

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

Protecting coastal cities: using the UCH to decipher long term patterns of change

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Sea-level fluctuations have had an impact on human activity throughout the Holocene. As the sea level has risen people have had to move and adapt, leaving tools, structures and settlements within their inundated landscapes that can become sealed within anaerobic sediment. These artefacts are often exquisitely preserved cultural assets that tell us about the societies that made them, but they are also a datable resource within environmental deposits that can be analysed scientifically to inform us about the rate and pace of sea-level change relative to the land. These climatically driven events make widescale changes that form a foundation for ongoing change, which can manifest more discernibly into localised impacts. When the historical, archaeological and palaeo-environmental evidence in combined with maps, charts and artistic representations, the relationship between natural and anthropological coastal modifications can be interpreted. Where this process is understood, long term patterns of change can be identified. Where such patterns are known to be ongoing, these coastal realignment trends can help inform planning policies for cities that are under the influence of rising sea levels and increased storminess. More directly, the exposure of prehistoric material for the first time since it's deposition, can provide direct evidence of current coastal change, whereby adding value beyond their cultural significance. The EU SARCC project has been quantifying historical and archaeological material to understand long term patterns of climate change while developing nature based strategies to protect urban centres. This paper will look at the significant historical and archaeological evidence that has been gathered and analysed and incorporated into planning guidance notes to provide insights into coastal change.

Keywords: Sea Level Fluctuations; Archaeology; Coastal Change; UCH

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

Indigenous People, Traditional Ecological Knowledge, and Climate Change: The Iconic Underwater Cultural Heritage of Stone Tidal Weirs

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Stone tidal weirs are iconic archaeological features of the maritime cultural landscape. Found in nearly every ecological environment from the tropics to the Arctic, they are monuments to the way that coastal communities in the past adapted, utilised, and attempted to cope with their ocean environments. The utility of tidal weirs as a form of mass capture tool for gathering large amounts of protein-rich foodstuffs made them an important resource for generations of communities. This paper will investigate the archaeology of stone fish weirs and illuminate the wealth of information that can be found in traditional ecological knowledge (TEK). Through the prism of archaeological investigation and the associated Intangible Cultural heritage, it will contextualise how their construction was symbiotically linked to the natural environment. The paper will highlight the importance and value of the cultural heritage of fish weir traditions, and reflect on how this heritage is threatened by rising sea levels and the modern overdevelopment of coastal zones today.

Keywords: Fish weirs, Indigenous communities, Climate change, traditional ecological knowledge (TEK)

Presentation in session F2: Fish Weirs (Paul Montgomery, Magdalena Nowakowska)

The National Registry of Underwater Cultural Heritage in Colombia: inter-institutional perspectives and challenges

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Underwater cultural heritage (UCH) inventories are a key tool for different government agencies in the management, study and protection of archaeological sites. These inventories make it possible to identify, protect and establish short, medium and long-term management measures. Colombian legislation recognizes the need for the creation of a National Register of Underwater Cultural Heritage by the Colombian Institute of Anthropology and History (ICANH) and the General Maritime Directorate (DIMAR). For this reason, since 2019, through the UCH office and the Center for Oceanographic and Hydrographic Research (CIOH) of DIMAR began with the creation of a specialized methodology for the identification, documentation and management of these submerged archaeological sites.

For this project, an interdisciplinary team composed of archaeologists, oceanographers, biologists, hydrographers, photographers and divers collaborated. This team worked on the development of an applied methodological proposal to identify the existence of archaeological evidence of underwater sites. As a pilot plan, it was implemented in the Bay of Cartagena de Indias and the islands of Providencia and Santa Catalina through an exhaustive analysis and interpretation of primary and secondary sources. These allowed us to establish areas of archaeological potential that were prospected with remote sensors (SSS, magnetometry, bathymetric data). Each anomaly was later corroborated by archaeological diving. Thus, a great diversity of submerged archaeological sites were identified, such as docks, ports, wrecks, shipwrecks, remains of fortifications and other significant elements.

Through this methodology it was possible to define with greater certainty the location of the submerged archaeological sites in the study area, allowing the creation of a spatial data infrastructure. More recently, thanks to the inter-institutional collaboration between DIMAR and ICANH, progress has been made in the consolidation of a geographic information system for UCH and the need for the creation of a protocol for its management and monitoring in Colombia. This conference presents the results of the methodological proposal, the lessons learned and the challenges faced in the creation of this data infrastructure, as well as the urgent need to integrate these cultural resources in maritime spatial planning.

Keywords: Inventory; Underwater Cultural Heritage; Interdisciplinarity; Archaeological Methodology; Spatial Data Infrastructure; Colombia

Poster presentation in session M1: Inventorying UCH: An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

“Tell him to get working! He’s not a bloody archaeologist!” Making the case for including treasure hunters in the history of maritime archaeology

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Archaeologists and treasure hunters will likely never see eye to eye. Our approaches to underwater cultural heritage are fundamentally incompatible, yet there is no denying the incredible impact treasure hunters have had on our field. For many people, the exploration of shipwrecks is often associated with the romanticized notion of adventurers seeking treasure, rather than scientific study of history and preservation of cultural heritage. The salvage and subsequent sale of *Geldermalsen* galvanized the art market and launched two decades of intense treasure hunting in Southeast Asia, but also prompted legislative change, incited international cooperation, and increased capacity building in the region. It would be irresponsible to ignore the impact of treasure hunters on both the public imagination and the field as a whole.

This paper proposes to analyse published accounts by and from treasure hunters as underutilized resources to explore treasure hunting and its relationship with underwater cultural heritage. For example, *Dragon Sea: A True Tale of Treasure, Archaeology, and Greed off the Coast of Vietnam,* recounts the salvage of the Hoi An Hoard. New to the field, young diver Troy Raven was awed by the shipwreck and its cargo; he told fellow diver Frank Pope: “I came upon these little statuettes that were really beautiful. I was trying to be real careful, picking them up real gentle and putting them in the basket.” Hatcher, watching everything from a monitor on deck, was furious with Raven’s slow pace: “What’s that cunt doing? Tell him to get working! He’s not a bloody archeologist!”

Collaborating with treasure hunters, gathering and documenting their histories may have the potential to enrich maritime archaeological research by providing a holistic approach of past maritime cultures and activities. Moreover, treasure hunting narratives can provide important insight into public perceptions of maritime archaeology. The benefit to both fields by combining scientific methods, with practical knowledge can ultimately contribute to the preservation and interpretation of underwater cultural heritage.

Keywords: Treasure Hunting; Public Engagement; Archaeology In The Media; Popular Culture; History Of Maritime Archaeology

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

From Tree to Boat: The Construction and Use of Grzybowo-Type Dugouts in Poland

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Dugout boats, made from a single tree trunk, are among the oldest known watercraft used by humans. Many examples have been found in Poland, providing valuable information about past societies and their use of rivers and lakes. A unique type of these boats, known as Grzybowo-type dugouts, has specific construction features, including a flat bottom, internal partitions, and advanced woodworking techniques. These characteristics suggest they were built for stability and durability, making them suitable for various water environments. By analyzing the construction of Grzybowo-type logboats, we can better understand their function and importance. These boats were likely used for transportation, fishing, and daily activities connected to life near water. Their design indicates that early boat builders had a strong understanding of boat-building methods and effective use of available wood resources. Grzybowo-type dugouts have been dated to the early Middle Ages. These logboats were a characteristic means of transport for the culture of early Middle Ages Slavics. Twelve dugout boats of this type have been found in Poland. The repeated discovery of similar vessels suggests that they played a crucial role in local economies and water-based trade. The presentation will discuss major archaeological discoveries of Grzybowo-type dugouts, focusing on their construction details, historical significance, and methods of use on the water. It will also highlight the challenges of studying and preserving these boats, especially since many are found underwater. Understanding these vessels helps us appreciate their role in early water transportation and their importance as part of Poland's underwater cultural heritage. Studying these boats provides insights into Middle Ages craftsmanship, and reveals how communities adapted to and interacted with aquatic landscapes throughout history.

Keywords: Underwater Archaeology; Dugout Boat; Lake; Boatbuilding; Underwater Heritage; Poland; Logboat

Presentation in session G5: Shipwreck Studies (Marnix Pieters)

Estrans et ports reliques : des paléoports atrophiés dans l'ouest de la France (De l'Antiquité romaine à aujourd'hui)

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Parmi l'ensemble des paléoports conservés et accessibles, les ports reliques figurent parmi les sites d'estran dont la détérioration apparaît la plus manifeste. Contrairement aux ports fossiles, très souvent en sommeil et masqués par les alluvions, les ports reliques, qui par définition apparaissent encore plus ou moins connectés à leur plan d'eau, sont en première ligne d'une érosion littorale ou fluvio-maritime accrue. Au sein du triptyque portuaire, l'espace intermédiaire de (dé)chargement, qui est compris entre l'espace navigable et l'espace de stockage et de redistribution, offre ainsi un point de fragilité indéniable en étant localisé à l'interface, dans cette zone intertidale et de ballotement permanent. Aujourd'hui, force est de constater que bon nombre des sites portuaires, qu'ils soient anciens et soumis à l'examen archéologique, ou récents et soumis à l'examen ethnoarchéologique, sont progressivement dépouillés de leur substance et de leurs éventuels équipements, ce qui n'est pas sans brouiller la lecture d'ensemble. Pour illustrer ces paléoports atrophiés, quelques sites à valeur d'exemples seront ici présentés, tant au niveau de leur érosion et des risques qui pèsent sur ces biens culturels et patrimoniaux, qu'au niveau des solutions apportées pour les approcher, améliorer leur lisibilité et leur enregistrement.

Keywords: Estran; Paléoport; Port Relique; Triptyque Portuaire; Enregistrement; Sauvegarde

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Geoarchaeology of Leuke Akte Roman Harbour and submerged columns remains by technology technic for heritage protected methods in Ras El Hekma area, NW coast of Egypt

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Ras El Hekma area located in the Mediterranean sea, this area seems as triangle head land extending into the Mediterranean sea for about 15 km ,It lies West of Alexandria City for about 220 km, and some 70 km East Marsa Matruh city.
Some historical writers like Fourtau, 1914 and Ball, 1942 show that Leuke Akte harbour was situated in the eastern of Ras El Hekma area.

This place was mentioned by that name by Scylax, Strabo, Ptolemy, and in the Book of Stadiums. As for the portolan from the beginning of the twelfth century, they mention it by the names: Rase El Kanayis, or the red head according to Keith. As for Piri Reis, or “the Reis on (the Turkish)” he calls it the head of the churches and advises ships to use it to protect themselves from the winds coming from the land. The name Leuca means “act.” White Land or White Coast or White Head (AbdelMaguid, 2001, pp.480).

The underwater archaeological survey in this bay resulted in the discovery of a group of amphorae and metal and stone anchors extending Chronologically, from the first century BC to the seventh century AD, indicating the intensity of navigational activity in the region (AbdelMaguid, 2001, pp.481).

The objective:

This study aims to define geomorphological characteristics and geoarchaeological evidence of the Leuke Akte ancient harbor, and to study effect of Holocene sea level change on the study area .

Methodology:

This study depends on detailed geo-archaelogical and geo-morphological surveying and mapping, coring of sediment samples, interpretation of multi-dates RS images, as well as GIS techniques. Some geomorphological and geoarchaeological indicator have been measured in the ancient harbours site in the eastern side of Ras El Hekma area. Some emerged notches and platforms, In addition to marine terraces and caves indicated to sea level change.

Some basalt blocks accumulated by stormy waves on the beach indicated to the submerged harbor platform for Leuke Akte harbor in those places and which it wanted on depth about 4 m under water and it refers to sea level change.

Keywords: Geoarchaeology; Palaeoenvironmental; Palaeo-Sediments; Landslide And Tectonic Movments; Roman Anchor; Greek & Roman Harbour; Holocene Sea Level Change

Presentation in session Q2: Unity in Diversity (Kalle Virtanen)

The Breakthrough: Marine Biodiversity Surveys on Historical Shipwreck Sites

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The integration of marine biodiversity research with historical shipwreck documentation has long been a challenge due to the divide between cultural heritage and environmental conservation sectors. This issue persists globally, with Sri Lanka being no exception. Shipwrecks are recognized as biodiversity hotspots, yet the challenge has been obtaining cross-disciplinary cooperation. Initially, cultural heritage and environmental authorities in Sri Lanka worked in isolation, with limited collaboration. For over 15 years, the Maritime Archaeology Unit (MAU) of the Central Cultural Fund (CCF), in collaboration with the Institute of Archaeology and Heritage Studies (IAHS) and the Netherlands' Cultural Heritage Agency (RCE), has worked toward bridging this gap through the development of the National Shipwreck Database of Sri Lanka (NSDSL). By persistently engaging stakeholders and demonstrating the value of shipwreck conservation for both heritage preservation and marine ecology, MAU-CCF fostered increased institutional support.

The NSDSL stands as a pioneering global initiative, being the first open-source Geographic Information System (GIS)-based database to systematically integrate archaeological shipwreck data with biodiversity research. This effort was further strengthened when the United Nations Development Programme (UNDP) provided funding for biodiversity surveys on five shipwreck sites, enabling the systematic collection and upload of marine ecological data. As a result, the database now includes records for 114 shipwrecks, six submerged aircraft, and a range of multimedia data, including 3D models, GIS mapping, and ecological analyses.

This breakthrough has led to new approaches in shipwreck conservation, including community involvement in biodiversity monitoring, knowledge exchange programs, and increased public awareness of underwater heritage. Additionally, NSDSL serves as a valuable tool for both scientific research and dive tourism, promoting sustainable practices and economic benefits for local communities. The database's accessibility ensures that researchers, policymakers, and the public can contribute to and utilize its information, fostering long-term protection of Sri Lanka's underwater cultural and natural heritage. The paper aim to address the ongoing struggle to safeguard the cultural and natural heritage values of the shipwrecks and to showcase the new developments related to the NSDSL.

Keywords: Shipwrecks; Shipwreck Biodiversity Data; Dive Tourism; GIS; Community Angagement

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

Godawaya: The Cargo of the Indian Ocean Vessel (2nd Century BCE)

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Sri Lanka's maritime interactions with the Indian Ocean world date back to the 5th century BCE, facilitated by the island's central location along key trade routes (Bohingamuwa 2017). While material and textual evidence from sites such as Mantai, Kantharodai, and Kirinda illustrate these connections, direct maritime archaeological evidence has remained elusive. The discovery of the Godawaya shipwreck, dated to the 2nd century BCE and located six kilometers offshore in southern Sri Lanka, provides the oldest known shipwreck in the Asia-Pacific region, offering an unparalleled opportunity to examine early seafaring, trade, and cargo transport. Historical records and inscriptions found near Godawaya Temple further support the site's importance as a port. A 1st-century CE inscription references customs duties collected from the port of Godapavatha, confirming its role as a trading hub. The presence of imported ceramics from India, China, and the Middle East (Schenk 2001; Lankton 2020) further attests to Godawaya's integration into extensive trade networks.

This paper presents recent findings from the Godawaya shipwreck, revealing crucial insights into its cargo and trade networks. Excavations conducted by the Maritime Archaeology Unit of Sri Lanka, with support from the US Ambassadors Fund, identified key elements of the ship's cargo, including iron and copper ingots, grinding stones, and thousands of pottery fragments. Additional finds, such as beads, glazed ingots, and metal objects, suggest diverse cultural connections and a broader trade network spanning South Asia and beyond. The vessel's wooden structure, remarkably preserved despite its age, underscores its significance as one of the earliest known trade ships navigating the Indian Ocean.

The findings from Godawaya shed light on the nature of cargo transported across the Indian Ocean, shipbuilding technology, and cultural exchanges between maritime communities. The shipwreck provides a crucial missing link in understanding ancient seafaring traditions, offering new perspectives on commerce, material culture, and technological advancements in early transoceanic trade. The site continues to be a rich source of information about ancient maritime trade and the cultural exchange that took place in the region.

Keywords: Godawaya; Indian Ocean Trade; Shipwreck; Silk Road; Cargo

Poster presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Taphonomic and paleoenvironmental evolution of the Île des Bois Neolithic site (Saint-Simon, Charente, France): geoarchaeological analysis and preservation issues

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The Charente River, low-energy and low mobile river, has preserved a rich underwater cultural heritage that bears witness to the interactions between past societies and their environment. However, this heritage remains largely unknown and is now increasingly threatened by the rapid transformation of the river channel bottom, its banks, the alluvial plain and adjacent wetlands. These changes are linked to human pressures and environmental changes, particularly the increase in hydrological extremes. The increase frequency in droughts and severe low-water periods, alternating with repeated floods, are exacerbating this vulnerability. The underwater Neolithic site of Île des Bois in Saint-Simon (Charente, Nouvelle-Aquitaine, France), discovered nearly thirty years ago, exemplifies all these challenges. This site, which sheds light on poorly-known periods of the Charente River's history, requires a reassessment to determine its state of preservation and the threats it faces. This paper presents an initial assessment of the site's health, based on a geoarchaeological and geomorphological approach. By combining analysis of the geomorphological context, a topo-bathymetric study, exploration of geophysical data and underwater inspection, this work aims to identify the vulnerability factors affecting of the remains, assess the risks they face and understand the processes of site formation and transformation. As part of a broader doctoral research project into the taphonomic and paleoenvironmental evolution of submerged river heritage, this study will enhance our understanding of the human occupation along the Charente River and its catchment. It will also provide concrete elements for the implementation of protective measures and the promotion this endangered heritage.

Keywords: Geoarchaeology; River Archaeology; Environmental Crisis; Hydrological Extremes; Anthropogenic Pressures; Charente River; Neolithic Period

Presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

A New Reconstruction of the Zambratija wreck (Late Bronze Age; Croatia, Istria)

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The Zambratija wreck, dated to the end of the Bronze Age (last quarter of the 12th and last quarter of the 10th century BC), is thus far the oldest fully sewn boat discovered in the Mediterranean and can be considered the archetype of the Adriatic sewn boat traditions. Discovered in 2008, it was partially excavated in 2011, followed by a second campaign in 2013, which resulted in a complete photogrammetric survey of the hull. Based on this data, an initial digital reconstruction of the hull's shape was produced (Koncani Uhač et al. 2019).

Given its historical and heritage significance, the Archaeological Museum of Istria decided to recover the wreck in 2023, with conservation treatment planned in the coming years. Ultimately, the Zambratija wreck will be displayed in a future new museum in Pula (Boetto et al. forthcoming).

The recovery provided an opportunity for further study and documentation of each preserved structural element using high-resolution 3D scans (Artec Leo). By integrating both previous and newly acquired 3D data, this research proposes a revised reconstruction of the hull shape. Additionally, the study includes the construction of a 1:5 scaled physical model, incorporating 3D-printed components derived from the scanned wreck data.

This presentation details the reconstruction process of the Zambratija wreck's hull shape, highlighting the benefits of 3D technology in understanding ancient shipbuilding techniques.

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Keywords Nautical Archaeology; 3D Modelling; Reconstruction; Wreck; Zambratija; Adriatic; Croatia.

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

Shedding light on Honor Frost and the Lighthouse of Alexandria, 1968-1995

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In the autumn of 1968 Honor Frost tasked by UNESCO to survey the reported archaeological site of the Pharos of Alexandria located in the harbour in Alexandria, Egypt first discovered by underwater dive Kamel Abil-Saadat. Over a series of five dives the potential of this site was revealed and the stage seemed set for a dramatic project to uncover one of the eight wonders of the ancient world. Sadly, Honor Frost would not return until 1995 when building works forced the excavation of the site by the Centre d'Etudes Alexandrines.

While the story of the site from 1995 is well known and documented, Jean-Yves Empereur and Isabelle Hairy (the subsequent archaeologist on the site) noted in "Honor Frost and the Pharos: the lighthouse of Alexandria" in *In the Footsteps of Honor Frost* that very little is understood of the original 1968 UNESCO project and the specific roles people played in the project. The contributions of Saadat and Honor Frost's co-director, Wladimir Nesteroff, as well as others are not entirely understood. There is also very little known about the work Honor Frost and others put into the attempts to revisit the site between 1968-1995. What halted what could have been one of the most exciting maritime archaeology projects in Egypt for 28 years? With the cataloguing of Honor Frost's archives, her project notebooks, correspondences, site plans, and more can shed light on the highs and the lows of the Pharos site during these early years. They present a unique opportunity to reshape the narrative to include not only the official publications on the site, but the background which shapes the site to this day.

The Pharos Archive Project aims to not only fill in the gaps in this story and highlight the important work done during the 1968 mission, but also to make the information accessible to the public through digital storytelling.

Keywords: Honor Frost; Archives; Egypt; Lighthouse; UNESCO

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

Affiliated Volunteers - Monitoring and Protecting Our Underwater Cultural Heritage

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The Historic England, is the public body that champions and protects England's historic places. The National Heritage Act 2002 gave Historic England responsibility for England's underwater cultural heritage, including managing and monitoring the country's nationally important wreck sites, the administration of a licensing system that enables public access to protected wreck sites, on behalf of the Department for Digital, Culture, Media & Sport and assessing new candidates for designation.

There are some 37,000 known wrecks and recorded loses around our coast and of these only 141 have some form of recognised protection; Historic England is responsible for managing and monitoring 93 of these protected sites. The scale of this task is such that the organisation does not have the resources to carry out their duties alone and relies on the passion and enthusiasm of over 200 affiliated volunteers, the largest single group within Historic England, to be custodians of these wreck sites. The majority of the volunteers are avocational archaeologists, many have embarked on maritime archaeology training programmes to gain the skills that enable them to more effectively manage their sites. They have formed their own association to facilitate communication between the members and share best practice. Several volunteer teams have the support of a nominated archaeologist, as a requirement of their licence, to assist and advise them. The activities undertaken by these volunteers range from visual monitoring, taking recreational divers to visit the sites, survey to more intrusive investigations.

Two case studies will be used to illustrate the nature of the work that is being undertaken by the volunteers on sites designated under the Protection of Wrecks Act 1973; the challenges that they face with regard to funding, succession planning, archiving and publication. A third case study will focus on a proposal that seeks to engage with the wider diving community to become champions for the sites protected under the Ancient Monuments and Archaeological Areas Act 1979.

Keywords: Wreck; Protected, Legacy, Volunteer, Succession, Funding, Champion

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

Tempering Passion with Calm Reflexion

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The 'UNESCO Convention on Underwater Cultural Heritage 2001', aims to ensure and strengthen the protection of underwater cultural heritage. It is based on the acknowledgement that it is an integral part of our shared history, it is attracting more public interest and appreciation, it should be protected and preserved and that through research, sharing of information and education, this valuable resource is more likely to be protected and preserved. The responsibility for ensuring that such protections are in place rests with all states.

Historic England, is the public body that champions and protects England's historic places. The National Heritage Act 2002 gave Historic England responsibility for England's underwater cultural heritage, including managing and monitoring the country's nationally important wreck sites, the administration of a licensing system that enables public access to protected wreck sites, on behalf of the Department for Digital, Culture, Media & Sport, assessing new candidates for designation, assessing project designs in relation to archaeological interventions, overseeing project implementation and certifying completed work.

The United Kingdom is not a signatory to the convention but has adopted the rules in the Annex as being best practice. Historic England has produced guidance on the management of research projects in the historic environment that form a template for project designs and reflects the general principles of the Annex.

Historic England, manages a group of some 200 volunteers who actively work on England's most important maritime sites. This paper will consider some of the challenges that arise when dealing with passionate and enthusiastic volunteers in respect of aims and objectives set out in project designs, managing the expectations of those individuals and the negative impacts of legitimate activities on underwater cultural heritage, whilst remaining faithful to the 2001 Convention and the annex.

Keywords: Convention; Annex; Volunteers; Expectations

Poster presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

Cultural Smugglers of the Stage: Traveling Performers and Theatrical Exchange in East and Southeast Asia's Maritime Networks (16th-19th Century)

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As the great maritime corridors of early modern Asia came alive with the movement of merchants, envoys, and settlers, another, more elusive kind of traveller moved among them: itinerant performers, whose voices, instruments, and puppets wove a different kind of cultural exchange. Between the 16th and 19th centuries, as regional and global trade intensified under Ming and Qing China, the Nguyễn lords of Vietnam, and European colonial powers, performers travelled abroad merchant vessel along coastal trade routes, carrying scripts, musical traditions, and theatrical techniques across East and Southeastern Asia. These performers, operating outside the structures of state diplomacy, functioned as cultural smugglers, adapting their art to the diverse, multilingual audiences of Guangzhou, Hội An, Malacca, Batavia, and Penang.

This study traces the informal networks of theatrical exchange that flourished in these cities. Cantonese opera troupes in Vietnam adjusted their vocal styles and instrumentation to local tastes. Vietnamese water puppeteers, whose craft originated in Red River Delta rice fields, adapted performances for urban markets, incorporating Khmer and Cham motifs. Sino-Javanese Wayang Potehi puppeteers reinterpreted Hokkien narratives for Malay and Javanese audiences. These evolving forms reveal not a simple diffusion of theatre but a constant improvisation, adaptation, and hybridisation shaped by maritime mobility.

Yet, theatrical exchange was not always apolitical. As British and French colonial authorities imposed censorship, itinerant performers used historical allegories and shifting performance space to evade scrutiny. In Malaya and Indochina, theatrical troupes embedded covert political critiques into classical narratives, using performance as both entertainment and resistance. Elsewhere, performance adjusted to religious constraints on figurative representations, ensuring their survival across shifting cultural landscapes.

Drawing upon archival performance records, travelogues, and maritime trade documentation, this study reframes performance as a migratory practice shaped by maritime exchange. It argues that itinerant performers—often overlooked in maritime studies, played a central role in shaping the intangible cultural heritage of early modern Asia. By moving beyond land-based perspective, this research highlights performance as a fluid, adaptive force embedded within maritime history, challenging how we define cultural heritage in seaborne worlds.

Keywords: Maritime Cultural Exchange; Itinerant Performers; Early Modern Asia; Port Cities; Theatre Adaptation; Intangible Heritage; Colonial Encounters

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Creating Maritime Convergence Knowledge with Community Participation: the Maritime Cultural Heritage in Seto Inland Sea, Japan

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Maritime cultural heritage (MCH) such as shipwrecks, artefacts, and coastal landscapes, are altogether a significant source of information for harnessing knowledge associated with human interactions with the sea. In Japan, maritime archaeologists and research institutes particularly the Asian Research Institute of Underwater Archaeology (ARIUA) have made considerable progress in MCH research. However, this is often not sufficiently communicated to or understood by citizens and students in Japan and its nearby countries.

Our on-going project: *'Citizen Participatory Marine Cultural Heritage Convergence Knowledge Creation Methodology Project (FY 2023-2028)',* first project of this kind funded by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), aims to establish the method of creating marine cultural heritage convergence knowledge through citizen's participation. The project consists of two phases: the first phase involves a case study group of local citizens around *Seto Inland Sea* and considers MCH and its benefits to the case study group with the aim to developing a model involving citizen participatory methods for the purpose of creating marine cultural heritage convergence knowledge. The second phase will be rolled out at a national scale and test a selective set of methods and model developed during the first phase around *Seto* Inland Sea in different parts of Japan. This latter phase examines the effectiveness of how citizen participatory methods could motivate Japanese citizens including the public, local communities, and classroom students to learn more about MCH and related maritime histories of Japan.

Japan is surrounded entirely by the sea holding rich maritime cultural heritage, however many sites and stories relating to its MCH remain largely unknown to both its local citizens and international community. To date, only six shipwreck sites are legally protected under 'Cultural Heritage Protection Act' in Japan. My presentation focuses on the first phase of the project (2023-2025) and introduces the methodology derived from community involvement, research, surveys, and discussions over MCH around the *Seto* Inland Sea as one sea. It further aims to analyze local interests and benefits linked to MCH around the *Seto* Inland Sea and contribute to developing a model on marine cultural heritage convergence knowledge in Japan.

Keywords: Maritime Cultural Heritage; Citizen Science; Community Involvement; Convergence Knowledge; Japan

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

From Seabed to Showcase: Integrating 3D Technology in Maritime Discovery, Research, and Engagement

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The application of 3D recording and modelling has revolutionised maritime archaeology, providing a comprehensive digital workflow that can enhance every stage of a project from initial survey to public engagement. This paper explores how 3D technologies can be employed throughout the archaeological process: it begins with the rapid and accurate recording of sites and artefacts – invaluable characteristics when surveying in difficult or underwater environments. The 3D data produced can be a key tool for research and analysis and serve as a foundation for interpreting the site and planning further investigations.

As a rapidly developing field, non-academics – volunteers and students, in particular – can derive great benefit from being invited to take part in this process by learning new skills including photography, photogrammetry, and data management.

Those same 3D models can then be employed to facilitate interactive public outreach and allow virtual exploration of maritime heritage through online platforms, augmented reality and virtual reality. When they are combined with other media, they can contribute to rich and engaging narratives that make maritime heritage more accessible, both physically, academically, and socially, to wider audiences than the information might otherwise reach.

Beyond their immediate use, these digital archives serve a crucial role in the long-term preservation of submerged cultural heritage, ensuring that detailed site records remain available for future study and reassessment.

This paper demonstrates, though case studies from the Maritime Archaeology Trust, practical applications of 3D data in maritime archaeology, and discusses the challenges and opportunities integrating it into a standard project workflow can present. Case studies include work from the Mesolithic submerged landscape of Bouldnor Cliff, the Chesil Beach wreck sites, the SS *Gallia*, the Unpath'd Waters project's Needles Voyager, and the recent Fathoming the Future project.

Keywords: 3D Modelling; Public Engagement; Workflow; Interactive; Visualisation; Education

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

Marine Cultural Heritage and Ocean Literacy: The (mental) path towards behavioural change

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Marine Cultural Heritage and Ocean Literacy: The Path Towards Behavioural Change

As Ocean Literacy (OL) gains global recognition and Marine Cultural Heritage (MCH) research evolves, their intersection presents new opportunities for fostering sustainable human relationships with the sea. OL is defined as "*an understanding of the ocean's influence on us and our influence on the ocean*" and is based on 7 key principles, among which no. 6 which states that "*the ocean and humans are inextricably interconnected*" (UNESCO-IOC, 2018). Moving beyond knowledge, OL spans various dimensions such as communication, awareness, activism, behaviour... Its growing body of research demonstrates the importance of integrating humanities and social sciences to strengthen emotional connections to the ocean while calling for further exploration of behavioural and attitudinal dimensions, along with advancing evaluation methods.

Meanwhile, MCH research is increasingly adopting multidisciplinary approaches, bridging the natural and cultural heritage divide by addressing themes such as biocultural heritage, but also by integrating pressing issues such as climate change and coastal management. MCH studies emphasize the need for a holistic approach to heritage management and protection, as well as an enhanced public education and awareness.

Building on this, the presentation examines how MCH can be embedded within OL initiatives to address these gaps, and to promote sustainable behavioural change toward marine natural and cultural heritage.

Drawing on interdisciplinary literature from heritage studies, environmental psychology, and education, it explores how MCH narratives shape perceptions, identity, and ultimately ocean stewardship. By analyzing existing OL and MCH frameworks alongside international case studies, this research suggests effective pathways for integrating MCH into OL to foster public engagement and policy impact.

Keywords: Ocean Literacy; Marine Cultural Heritage; Mediterranean; Education; Behaviour Change

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Naval graffiti from the temple of Apollo/church of Saint Peter in Alba Fucens (Abruzzi, Italy)

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Alba Fucens was a Roman colony with Latin rights that was built at the end of the 4th century BCE. Located at the foot of the Velino Mountain in the Abruzzi region (central Italy), Alba was at a short distance from the Fucino Lake, at the time the third biggest lake in Italy. Settled within the territory of the Equii, the city constituted a tangible sign of the recent Roman conquest by spreading over three hills and by being reachable through a branch road of the via Tiburtina Valeria. On the south-western hill's top stood the temple of Apollo that was converted into a church around the 6th century CE. On the building's North and South perimeter walls are visible a large number of graffiti in the form of both figurative drawings and textual inscriptions. Interestingly, along the northern wall there is a high number of graffiti depicting ships, the dating of which remains uncertain. In fact, with the sole exception of a graffito with a warship - nicely outlined and accompanied by the inscription "*navis tetreris longa*" and dated to the end of the 1st-beginning of the 2nd century CE on palaeographic basis - the remaining graffiti are roughly made and without accompanying texts.

The aim of this paper is to offer a complete overview of all the naval graffiti in the temple of Apollo/church of Saint Peter, never presented before, and to propose some scenarios as to their creation, dating, and interpretation.

Keywords: Naval Iconography; Naval Graffiti; Warship Graffiti; Figurative Graffiti; Alba Fucens

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Contrecoeur Unidentified Submerged Structure: Something's Fishy?

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As part of the expansion work around the Port of Montreal, specifically the development in the vicinity of Contrecoeur terminal, environmental surveys were conducted prior to the implementation of compensation measures for the restoration of the feeding habitat of the endangered copper redhorse fish, in the St. Lawrence river between Verchères and Contrecoeur, Québec, Canada. The Montreal Port Authority commissioned the professional services of IRHMAS to carry out underwater archaeological studies in the intervention area of the St. Lawrence River near Prunes Island and Bœufs Island. The objectives were to confirm the presence or absence of archaeological remains in the areas under study, and also to explore the feasibility of pluridisciplinary projects combining environmental and archaeological objectives through the shared use of instruments, and the optimization of diving operations. An initial remote sensing campaign using multibeam echosounder was conducted in the spring and summer of 2024 for environmental characterization. The team had an archaeologist which allowed to verify the presence or absence of submerged archaeological remains and, if applicable, to identify, document, and provide recommendations on the risks of disturbance related to upcoming development work. No remains were identified in the Prunes Island area, but a target was discovered near Bœufs Island. It appeared that a second shipwreck might have been uncovered as part of this preventive archaeology project. Another archaeological intervention took place in the fall using a side-scan sonar for very high-resolution recording, as well as a GoPro mounted on a pole for preliminary imaging, given the shallow depth of the target, revealing an ovoid shaped structure, but not the usual shipwreck remains. The images revealed only stones and aquatic plants, increasing the mystery surrounding this discovery. Finally, a visual survey through surface-supplied diving was planned and carried out in early November to identify the remains, and assess their archaeological significance while also collecting environmental data, ultimately leading to the identification of this unknown anthropogenic structure.

Keywords: Fishweir; Preventive Archaeology; Quebec; Stones; Indigenous; St. Lawrence River

Presentation in session F2: Fish Weirs (Paul Montgomery, Magdalena Nowakowska)

Or The Importance of Being Scuttled: The Strange Case of Contrecoeur Shipwreck

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Underwater archaeological surveys were carried out by IRHMAS as part of the environmental studies prior to Port of Montreal (APM) expansion project - Contrecœur Terminal. The intervention area is located on the south shore of the St. Lawrence River near the municipality of Contrecœur, in Montérégie, Québec, Canada. During the remote sensing survey in 2020, an anthropogenic target was identified, and confirmed to be a heritage shipwreck through a visual inventory conducted via SCUBA diving, dating back to the late 19th or early 20th century. Given that river conditions did not allow for the recording to be completed, and the nature of upcoming dredging work in the area was expected to result in the eventual destruction of the site (now designated as Borden code BkFh-12), a salvage operation was executed with surface supply diving, leading to the removal of the wreck from the riverbed. During this intervention in December 2022, its state of preservation proved to be quite remarkable. Considering its unique nature and historical significance, it was decided to temporarily store the wreck at the APM site, and eventually undertake a re-immersion campaign at Flintkote Quarry, Thetford Mines in November 2023. In the spirit of promoting and raising awareness about the importance of underwater cultural heritage, a commemorative plaque was also installed near the wreck. The site will henceforth be accessible to recreational divers and available for future underwater archaeological research. Salvaging a complete shipwreck had never been done before in Quebec, and re-immersing it to ensure its long-term preservation and create an accessible diving site is an innovative first for Canada in the protection and promotion of underwater cultural resources.

Keywords: Shipwreck; Conservation; Canada; Preventive Archaeology; Sonar, Surface Supply

Presentation in session G1: Analysis of Caulking and Luting Materials (Kristof Haneca, Koen Deforce)

Turin and its waters. Historical-topographical reflections in the light of recent archaeological discoveries

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The location of the city of Turin-Augusta Taurinorum (Piedmont, Italy) at the confluence of the rivers Po and Dora, which flank the city on the eastern and northern sides, seems to derive from a specific choice made when defining the area of its location. The relationship with the watercourses played an important role in the spatial organisation and destination of the urban areas, but also in the relationship of the city core with the surrounding territory and in its wide-ranging trade relations. The two watercourses were also certainly used for inland navigation: in the surrounding area for trade on the Dora and more widely for the Po, which according to Pliny was navigable from Turin and guaranteed a connection with the Adriatic coast, as demonstrated by amphora materials. As in other cases, the rivers had a defensive function and a functional significance linked to the exploitation of water as a driving force in the field of production or for both cultivation and manufacturing activities, but in the case of Turin the position of the rivers - at least that of the Dora - seems to have played a significant role in the definition of the city's pomerium, which must therefore have extended beyond the city walls, at least along the northern side. Here, in fact, there are numerous archaeological finds that reveal the presence of facilities probably for commercial and productive purposes, which still characterise the market vocation of the Porta Palazzo area. River defence works, canals and other water derivation works, some of which have been identified during recent archaeological investigations (Figures 1 and 2), have certainly also characterised the relationship between the city and its territory since the Roman age, defined by a dense network of canals serving the farmsteads up to the age of industrialisation. The contribution aims to illustrate, by interpolating archaeological data with geomorphological, cartographic and archival ones, the close interconnection that was generated diachronically between the city, its waters and its territory, illustrating the infrastructural network that characterised it.

Keywords: Inland Waters; Topography; Canal; Water Derivation; River

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Low cost high resolution multibeam recordings of historical ship wrecks

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A multibeam echo sounder is an excellent instrument for mapping historical shipwrecks, especially in water with poor visibility. In recent years, the systems have continued to improve with better resolution and density. However, the use of a multibeam system is often expensive because of the survey vessels involved. Ten years ago, a project was started in the Netherlands with the help of commercial vessels to carry out surveys with multibeam echosounders. Commercial survey companies operate throughout the country, often sailing near sites of historical interest like shipwrecks. By providing a list of historical locations and a modest fee, it has proven possible to collect useful recordings at low cost. In this way, high-resolution images have been collected from more than 250 historical locations. The recordings are used for a visualization and first impressions of the shipwrecks which produces sometimes surprising results. This information is an important component in the monitoring and ultimately the protection of the large quantities of the underwater cultural heritage. Some examples will be presented in this paper.

Keywords: Multibeam Echo Sounding; Ship Wrecks; Monitoring; Visualization

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Environmental impact assessment of war shipwrecks: a contribution to source apportionment of marine-based pollutants

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Since more than two decades, there has been growing concerns about the risks caused by world wars relics to marine environment. Started in October 2023, the CONTEPAV project endorsed by the Research Group on Ocean & Seas of the CNRS (GdR OMER), the Seine-Normandie Water Agency and in collaboration with IFREMER, proposed an innovative approach to tackle the environmental impact of war shipwrecks.

The project methodology is based on different marine environment chemical monitoring techniques applied to a series of WWII shipwrecks in the English Channel. Shipwrecks selected for the study are thought to be representative enough of the overall set of WWII shipwrecks lying in the English Channel, North Sea, and to some extend around Great Britain (e.g. minesweepers and destroyers).

Several environmental compartments have been sampled through passive samplers deployment (DGT, POCIS, SPMD), mussel caging, surface sediment collection and core sampling. The aim is to gather tangible data to assess the ongoing potential of contamination and to highlight spatio-temporal variations of chemical concentrations within the studied sites. Targeted chemicals in the present study are PAHs, PCBs, trace elements and heavy metals, and explosive compounds (TNT and its metabolites in seawater).

The preliminary results of sediment analysis already show a clear impact of shipwrecks on metal concentrations. Analysis of spatial distribution tend to confirm that shipwrecks could be the source of some elements. Several metals display concentrations that exceed toxicity thresholds (ERL values, OPSAR BACs). The Pollution Load Index (PLI) show metal pollution for nearly half of the samples (case of the *HMS MAGIC* shipwreck). Enrichment factors (EF) show 6% of very high to extremely high metal enrichment in sediment.

At IKUWA8, results from the CONTEPAV 2024 campaign on the *HMS Magic* (a British minesweeper) and the *Greif* (a nazi destroyer) shipwrecks in the Seine Bay will be presented.

Keywords: Pollution; Warship; English Channel; Chemicals; Metals; Sediment

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Balancing Growth and Conservation: Advancing the Implementation of the 2001 UNESCO Convention in the Kingdom of Saudi Arabia

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The Kingdom of Saudi Arabia has made significant strides in implementing the 2001 UNESCO Convention on the Protection of Underwater Cultural Heritage (UCH), en route to positioning itself as a regional leader in the safeguarding of UCH. Recognizing the importance of conserving UCH while advancing national development, the Kingdom has undertaken a proactive approach that integrates regulatory reforms, research, international collaboration, and institutional capacity-building into its broader Vision 2030 framework.

Since the recent establishment of a team dedicated to implementing UNESCO's heritage conventions and a specialized Underwater Cultural Heritage Department dedicated to advancing research and fieldwork, the Kingdom has focused on enhancing UCH governance and management strategies. One of the key steps is the development of a National Reporting Framework, providing a structured mechanism for improved documentation, monitoring, protection and conservation under the 2001 UNESCO Convention.

Global partnerships have reinforced the Kingdom of Saudi Arabia's position in global UCH discussions, with joint Saudi-international research missions actively exploring and documenting underwater sites. These collaborations have not only contributed to scientific advancements but have also resulted in enhanced capacity-building for Saudi divers and archaeologists.

The Kingdom of Saudi Arabia's expanding coastal and maritime industries, including large-scale infrastructure projects and a growing marine tourism sector, present an opportunity to showcase how economic growth and cultural heritage conservation can be successfully balanced. The Kingdom aims to integrate UCH protection into national and regional development efforts through comprehensive planning, inter-agency cooperation, and sustainable tourism policies, setting a benchmark for responsible heritage management.

By strengthening legal frameworks, fostering international partnerships, and driving research and conservation initiatives, the Kingdom of Saudi Arabia is leading by example in implementing the 2001 Convention. Its commitment to protecting underwater cultural heritage demonstrates how national strategies can effectively align with global best practices, ensuring that economic development and heritage safeguarding go hand in hand.

Keywords: Underwater Cultural Heritage; 2001 UNESCO Convention; Sustainable Development; Vision 2030; Heritage Conservation; International Cooperation

Presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

Balancing Stakeholders: Rethinking the Management of Underwater Cultural Heritage

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The management of maritime cultural heritage presents unique challenges, particularly in terms of balancing the roles of various stakeholders. Local communities play a major role in safeguarding and promoting this heritage, however the centralised structure of the Greek Ministry of Culture could potentially limit their active involvement. This research examines whether all stakeholders are treated as equal participants in decision-making processes. It also investigates whether they can be equal, given the structural, legal and cultural barriers that exist.

Focusing on Southeastern Laconia as a case study, this research explores how maritime cultural monuments are managed in a region with rich maritime history and archaeological significance. The legal frameworks of the UNESCO Convention on the Protection of Underwater Cultural Heritage and the Faro Convention on the Value of Cultural Heritage for Society, provide critical reference points. Both emphasise community engagement and shared responsibility, but their implementation within national frameworks often remains ambiguous.

The study outlines key challenges, such as the need for stronger collaboration between local communities and central authorities, opportunities to improve stakeholder awareness and the need to address administrative complexities. At the same time, it seeks opportunities for a more holistic approach, such as building partnerships, enhancing public awareness and embracing the unique identity and social memory of local communities.

Taking all this into account, this research aims to propose a sustainable and comprehensive management model for maritime cultural heritage, considering issues related to equity, legislative frameworks and community empowerment. Southeastern Laconia, with its vital local culture and historical significance, provides an interesting context to explore in which ways the relationship between maritime cultural heritage and society can be strengthened.

Keywords: Maritime Cultural Heritage Management; Community Involvement; Stakeholder Collaboration; Social Dimension Of Identity; Legal Frameworks; Southeastern Laconia

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Boat-hooks in the medieval Netherlands: typology, characteristics and their significance in the maritime archaeological record

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Humans practised seafaring since prehistory. For their efforts, maritime communities invented and utilized different kinds of tools and equipment that would assist them on the waters or the shore. As seagoing vessels evolved alongside the technological advancements of each era, so did the quantity and quality of the means and equipment that assisted these endeavors.

Maritime equipment development was prominent especially between the late Roman and the medieval era in Europe. In various academic works in the field of archaeology, we often encounter a type of portable equipment which was predominantly present in western and northern Europe's fluvial and coastal routes, the pole equipment.

Maritime pole equipment, mainly quant poles and boat-hooks, were wooden pole equipment with iron or steel often attached to their one end. The most diverse ones in their use were the boat-hooks. They were used for various activities on board of vessels and in timber rafting.

From managing cargo and mooring vessels during turbulent weather conditions to usages in life saving efforts and fishing, this equipment was ever present on boats and ships. We also encounter them as symbols of cultural significance for maritime communities, mainly sailors and fishermen. However, with the exception of few academic works and despite their existence in the archaeological record, they often are overlooked. This happens mainly due to their ambiguous chronological context, as they are often found on riverbeds in large numbers, while their simplicity of design and usage doesn't draw significant research interest.

This presentation will assess boat-hooks mainly originating from Dutch museum collections, and data from artefacts originating in western Europe, with a chronological focus between the early and late medieval eras. By combining archaeological, ethnological and historical methods and theories, and by using a comparative approach to assess the artefacts, the aim of this presentation will be to provide insights regarding the means of production, technical characteristics, usage contexts, development and the cultural importance of simple, yet vital, maritime equipment, in western European maritime communities and riverscapes.

Keywords: Maritime Material Culture; Maritime Pole Equipment; Boat-Hooks; Riverscapes; Medieval Netherlands

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

The Charlestown Shipwreck Collection, the experience of taking on a large private collection of shipwreck material

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The Charlestown Shipwreck Centre will be familiar to many people in maritime archaeology. Started by Richard Larn in 1976 the collection was the largest collection of shipwreck material in the United Kingdom and contained some of the oldest shipwreck material in the UK as well as material from 22% of English Protected Wrecks. In some cases, it was the only publicly accessible collection where material from some of the UKs earliest maritime excavations could been seen

It was a population tourist attraction but in 2024, 49 years after it opened, the current owners took the decision to close the centre and dispose of the collection via auction. This sale was met with concern by both the archaeological and museum communities in the UK but unfortunately no public funds were made available to save the collection from sale.

In the absence of public funds MAST stepped into to purchase the archaeological significance section of the collection and for £410,000 became the proud owner of over 5,000 objects that range in date from the late 15th century to the second world war, with a few earlier individual earlier items. The purchase took those objects out of private and into charitable ownership where they are now safe from being dispersed through sale.

This paper will examine the inherent problems of using private collections as a way of curating maritime archaeological archives and the problems and positives of taking such a collection out of private and into charitable ownership.

Keywords: Shipwreck; Collections; Museums; Archive; Conservation

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Australian Warship Wrecks in Timor-Leste

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Between late 1941 and early 1943, Australian commandos fought a protracted guerilla war aimed at repelling and disrupting the Japanese invasion of the island of Timor, in modern-day Southeast Asia. In recent years, the material remains of this fighting – including tunnels, pillboxes and prisons – have been comprehensively mapped across the island. But limited attention has been given to the submerged legacy of World War II, reflecting a lack of scholarly engagement with Timor's underwater cultural heritage more generally. This paper draws attention to the maritime aspects of World War II in Timor-Leste (East Timor), focusing on HMA ships *Voyager* and *Armidale*, which, due to their vastly different circumstances, present distinct insights into the management of Australia's wartime heritage in foreign waters. HMAS *Voyager*, for example, ran aground on Timor's south coast in September 1942, but efforts to re-locate, survey and neutralise the wreck were not conducted until 1999-2000 when Australian forces returned to Timor-Leste to lead the International Peacekeeping Force. HMAS *Armidale*, meanwhile, was wrecked in the Timor Sea in December 1942; just one third of those on board survived, and the wreck has never been located. Framing these two wrecks within both their historical and contemporary context, this paper offers reflections on why Australian warship wrecks in Timor-Leste have long been neglected, the opportunities and challenges for both states in taking a more proactive approach to locating and monitoring these sites, and the essential role of communities in doing so.

Keywords: World War II; Shipwrecks; Australia; East Timor; Maritime Heritage

Poster presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Potential harbour facilities along the Bulgarian coast

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The paper presents the research methodology of an interdisciplinary project („The "land-sea" interaction along the Western Black Sea: geoarchaeological and historical-geographical study“, funded by the National Science Fund of the Ministry of Education and Sciences of the Republic of Bulgaria (Grant Agreement no КП-06-Н-70/4) as well as the first positive results dedicated to the study of the land-sea interaction along the Western Black Sea coast.

The research area covers the whole Bulgarian Black Sea coast. The coastline is characterized by a great topographic and natural diversity, which provides favorable conditions for coastal navigation and port activities since ancient times. During last underwater archaeological surveys in last five years have been found several archaeological sites which could be a part of harbour infrastructures.

Multidisciplinary investigation of ancient archaeological sites is a key research field for systematic investigation. The research used a number of methods characteristics of the Earth sciences as well as the humanities. In the case study areas have carried out geophysical (side scan sonars, Remotely Piloted Aircraft Systems), geological and video surveys (remotely operated vehicles, SCUBA diving) for identification of underwater sites (rocky banks, underwater archeological sites). The survey emphasizes on the analysis of the paleogeographic environment linked to sea-level changes in areas of pre-selected archaeological sites. By using orthophotography, 3D shooting and geoarchaeological data concerning archaeological landscapes, the present investigation therefore complements the existing information in the written sources.

The article discusses the objectives and the advantages of the geoarchaeological methods and the GIS application in integrating geological, palaeogeographic, historical, and archaeological data. With the advancement of high-tech marine technology and the ever-closer cooperation of modern underwater archeology with the natural sciences, other port basins will be registered, which cannot be found on the modern map today.

Keywords: Black Sea; Coastal Landscape; Underwater Archaeology; Digital Technologies

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

World Heritage Below the Waves: Statistics on Underwater Cultural Heritage Sites

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This presentation explores the often-overlooked presence of underwater cultural heritage within the UNESCO World Heritage List, established in 1972 to recognize sites of exceptional cultural, natural, and mixed significance worldwide. Although the list includes numerous sites with underwater cultural heritage elements, these are not explicitly categorized or acknowledged as underwater heritage.

The presentation will focus on two main points. First, a detailed analysis of all listed sites through 2024 reveals that over one-third incorporate underwater cultural heritage elements. Notably, around 29% of all World Heritage Sites are, or have the potential to become, underwater cultural heritage due to threats such as rising sea levels, climate change, and natural disasters. This statistic underscores the pressing need to safeguard these vulnerable sites in alignment with underwater cultural heritage standards.

Second, the presentation will emphasize the importance of formal recognition for underwater cultural heritage, as many of these sites possess “Outstanding Universal Value.” Recognizing these submerged assets formally can support risk management and conservation efforts by providing insights into the unique challenges they face.

Beyond the physical remnants, preserving underwater heritage includes safeguarding intangible aspects, such as the rich stories, traditions, and identities tied to these sites. The cultural significance of underwater heritage is deeply interconnected with its physical existence. Thus, protecting these sites is essential not only for historical continuity but also for honoring the heritage of communities linked to them. This presentation advocates for a greater appreciation and enhanced protection of underwater cultural heritage as a crucial component of global heritage management, particularly within World Heritage Sites.

Keywords: Underwater Cultural Heritage; World Heritage; Climate Change; Stadidistics; Intangible Heritage

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Shipbuilding in Pisa through the centuries. A new reading in the light of archaeological sources.

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Pisa is a city that, although never directly facing the sea, has played a leading role in the landscape of navigation, maritime trade and shipbuilding since Roman times. Evidence of this past of its are two major poles of considerable historical and archaeological importance, the site of San Rossore, from which comes one of the most important finds of naval archaeology in recent years, and the area of republican and Medicean arsenals. Despite this, attention on Pisan maritime and naval archaeology has always been low, to the advantage of other archaeological issues, partly due to the lack of comprehensive publications related to this specialized topic. Regarding the Roman period, we don't have certain information about the forms of organization of public and private construction sites, but we do have important literary sources and some archaeological findings, on which it is possible to reflect. On the other hand, regarding the medieval and Renaissance periods we have both archaeological data and the buildings where public construction took place, the republican and Medicean arsenals, as well as numerous iconographic and documentary data. To date, the most important and comprehensive studies have been documentary and iconographic, but the least treated aspects have been precisely the archaeological ones. The present contribution therefore aims to reconstruct the picture of Pisan shipbuilding starting from the analysis of old and more recent archaeological data, considering both direct findings (shipyard inside the Medicean arsenals, traces of making inside the republican arsenals, materials indicating shipbuilding activity from San Rossore), as well as indirect ones (the numerous Roman and early medieval vessels found in San Rossore), in order to reread them together with archival and iconographic data and provide a new, more complete and organic interpretation.

Keywords: River Archaeology; Maritime Culture; Shipwreck; Shipyards; Shipbuilding; Tyrrhenian Sea

Poster presentation in session D4: The Double Narrative of Man and Water - Approaches and Perspectives (Martina Seifert, Andreas Külzer, Aylin Güngör)

The 'Boat of Ostend' Belgium, Revisited

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In 1952, during construction works, impressive wooden remains were found at a depth of 8 m below the surface along the Torhoutsesteenweg next to the centre of the town of Ostend. Witnesses described the remains as clinker-built, tentatively interpreted as ship remains dating to the Roman period or even to pre-Roman times. Unfortunately the remains were lost before maritime experts got a chance to have a closer look. Since then the findspot is widely known and 'The boat of Ostend' became a kind of an urban legend.
Unexpectedly, in 2022 an opportunity arose for additional research on 'The Boat of Ostend' findspot, thanks to the demolition of the building constructed in 1952. With a mechanical auger, cores were extracted, pinpointed at the location of the presumed location of the shipremains, based on the initial witness reports. Many of the extracted cores included bulky fragments of wood, confirming the presence of a large wooden construction in the subsoil. Importantly, these wooden remains were located at a depth mentioned in the original reports. Three of the wooden fragments were radiocarbon dated and provided a date in the late 15th or early 16th century. Dendrochronological analysis of the recuperated wooden fragments provided a *terminus post quem* for the felling date in 1528 for the archaeological site still buried below several meters of tidal deposits, while provenance analysis indicated the timbers originated from northwestern Germany and the area close to the border with the Netherlands.
If the wooden remains belong to a shipwreck, what seems very plausible, it must be dated from the second quarter of the 16th century onwards and probably arrived afloat via the Catharina gully, a former tidal inlet, at its final resting place.
Unfortunately no archaeological excavation could be organized but further geological and archaeological research will hopefully reveal more information. The mystery is thus for the moment only partly unraveled.

Key words: mechanical augering; dendrochronology; quaternary geology, 16th century

Poster presentation for session E2: River and Inland Water Archaeology. Exploring submerged and water-course linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

In-situ underwater conservation of WWII Stuka aircraft wreck

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During October and November of 2024, the ICUA Zadar team of conservators and archaeologists successfully conducted a pilot project to test *in-situ* underwater protection for the wreck of the Junkers Ju 87 aircraft, known as Stuka. This dive bomber aircraft crashed near the island of Žirje in the Adriatic Sea during World War II.

Previously, it was believed there was no effective way to preserve underwater aircraft wrecks and that their complete deterioration and destruction would occur within the period of approximately ten to fifteen years due to material corrosion. In May 2024, the ICUA Zadar gathered a team of experts who conducted corrosion measurements on the Stuka wreck to perform a conservation analysis. The results showed that the cathodic protection could be achieved using sacrificial anodes.

In October, the ICUA Zadar team installed two test anodes to assess their effectiveness. Subsequent measurements indicated that the connection of the anodes effectively passivated the wreck, halting further deterioration. This achievement showed that it is possible to permanently protect an aircraft wreck under the sea, making the Stuka the first wreck of its kind where the deterioration process was successfully stopped.

The trial installation of smaller anodes on the Stuka wreck will continue to provide protection in the coming months. In 2025, a comprehensive project will be implemented to protect the Stuka for the next fifteen years using this economically viable method.

Keywords: Underwater Conservation; Aircraft Wreck; Cathodic Protection

Presentation in session O1: Preserving of UCH (Jordy Moies)

SUBNORDICA - Beyond submerged landscapes

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In recent decades, great advances have been made to map the now submerged landscapes of NW Europe. However, there is still a lack of actual prehistoric archaeological sites, and finds are usually recovered by chance and are out of context. In the collaborative SUBNORDICA synergy project, researchers from across Europe are joining forces to develop new methods to investigate the submerged landscapes and to find traces of human settlement in the southern North Sea, using knowledge gathered from the Baltic Sea. More specifically, the project will assess the impact of postglacial sea-level rise in NW Europe on the, now submerged, landscape and its inhabitants. Three main questions are addressed: (1) What changes were brought about by rising sea level and climate change to the topography and environment of the submerged landscape? (2) How was the distribution of archaeological settlements and cultural activity impacted by this? (3) Can we find and recover these sites to investigate the impact on humans and their subsequent response? Combining information from four regions in the southern North Sea and the southern Baltic, artificial intelligence will be used to develop machine-learning routines to (a) integrate existing and newly acquired geophysical and geological data to map key areas of the changing landscape, and (b) combine this information with data from known underwater archaeological sites from the Baltic Sea to identify new targets of archaeological potential. Investigating these targets will use high-resolution geophysical methods, sediment coring and archaeological excavation, and geochronological, palaeoenvironmental, sedimentological and biological analyses of recovered deposits. The project aims to write a new chapter in human prehistory by providing a world-leading model for the investigation of submerged landscapes. In addition, it will offer improved policy guidance for underwater cultural heritage management at a time when seabed developments are making these areas increasingly difficult to access for research.

Keywords: Submerged Landscapes; Southern North Sea; Baltic Sea; Sea-level Rise; Prehistory

Poster presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

Conservation and exhibition strategies for a late medieval shipwreck: Insights from the Doel Cog.

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In 2000, during construction works at the Deurganck dock in Doel, located near Antwerp, Belgium, archaeologists unearthed a significant wooden structure: a twenty-meter-long vessel that was identified as a late medieval cog. This discovery was made beneath seven meters of sediment and has been recognized since as an invaluable find for understanding maritime history.

In 2010 the Flanders Heritage Agency started a multi-disciplinary research project on the ship's remains. As part of this project, a condition assessment was carried out using pilodyn measurements and core sampling to analyze 63 planks and timbers from various sections of the ship. Based on the results of this assessment a conservation plan was developed and is currently being implemented. This plan includes the desalination of the wood using DTPA (Diethylene Triamine Pentaacetic Acid) and its following impregnation with PEG 2000 (Polyethylene Glycol), to stabilize and preserve the wooden material. The results of the DTPA treatment have been documented and ongoing progress with the PEG 2000 impregnation is being closely monitored.

Simultaneously, research is being done to look into the possibilities for exhibiting the ship. Various options and locations in terms of feasibility, financial considerations, and timing are being evaluated. The goal is to categorize the most suitable approach for showcasing this archaeological find while ensuring its long-term preservation. In addition, the development of the technical reconstruction and supporting structure for the ship is under investigation. Given the complexity of this case, the research has been divided into smaller, more manageable questions to address specific technical challenges separately.

In this poster we shall discuss the results of these studies, highlighting the preservation steps and outlining the actions to be undertaken in the upcoming years.

Keywords: Doel Cog; Conservation and Exhibition Strategies; Deurganck Dock; long term conservation

Poster presentation in session G5: Shipwreck Studies (Marnix Pieters)

Forgotten Harbour - the medieval harbour of Puck (Poland) in the context of the early medieval Baltic zone

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The underwater archaeological site in the Bay of Puck near the mouth of the Płutnica River was discovered in 1977. From then until 2019, archaeological research has been carried out there. The paper summarises the research results and shows the early medieval Baltic harbour reconstruction.

As many as five phases of harbour functioning can be distinguished. Phase 0 is the period referred to as pre-harbour. It began in the Bronze Age and ended around the 8th century. Phase I is the first period of the harbour's operation, dating back to the 9th–10th centuries. During this period, there are traces of contact between the southern Baltic coast and Scandinavia. Phase II of the functioning of the harbour in Puck took place in the second half of the 12th century. The harbour of this phase was probably built on a raw root after Bolesław Krzywousty, Duke of Poland, annexed Pomerania. Unfortunately, the structures of this phase have been significantly damaged by the construction of the fairway. Phase III of the harbour dates from the end of the 13th century to the mid-14th century. During the period, the size of harbour structures was significantly reduced and was concentrated closer to the mouth of the Płutnica River. The buildings of this phase are probably the remains of a fishing station. The end of the 14th century saw the development of the city of Puck in its current location and, thus – the probable relocation of the main harbour to a new place and the abandonment of the buildings at the mouth of the Płutnica.

With its size and harbour structures, this little-known archaeological site could have rivalled the largest Baltic emporiums in the early Middle Ages. The results of the site's research will increase knowledge of trade, transport and coastal societies in the Baltic in the early Middle Ages.

Keywords: Early Medieval; Poland; Harbour; Baltic; Trade; Harbout Constructions

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Submerged Ancient Fortification Walls of Mesambria: Key Indicators of Black Sea Sea-Level Rise

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Nessebar, ancient Mesambria, is a UNESCO World Heritage Town. It is located on a small peninsula on the southern part of the Western Black Sea coast in Bulgaria. Long-term underwater archaeological surveys (1960–1984 by Liuba Ognenova, and from 2014 to the present by the Bulgarian Centre for Underwater Archaeology) have revealed that approximately one-third of the ancient town's territory is submerged. The Greek apoikia was founded at the end of the 6th century BC by Dorian settlers. Strabo and Stephanus of Byzantium note that "bria" derives from the Thracian word for "town," which some researchers interpret as evidence of the fortified settlement's Thracian origins. This assumption led the pioneers of the underwater exploration of Nessebar to associate some of the submerged fortification walls with the Thracians, dating them to the Late Bronze Age. Other walls have been dated to the Late Classical and Hellenistic periods, while later walls are attributed to the Early Byzantine era.

Recent discoveries of wooden beams in several of the submerged fortification walls of Messambria provided radiocarbon (14C) dates contributing valuable insights into sea level fluctuations, coastal changes, local tectonic activity, and human adaptation to these processes over the millennia (from the 5th century BC to the 5th century AD). These walls are found at varying depths: the earlier (Classical and Hellenistic) fortifications are between 5.5 m and 2.5 m deep, while those from the Late Antiquity period are submerged to a depth of 2.2 m. An initial attempt was made to reconstruct the coastal changes and the migration of the fortification system over the centuries. A high-resolution digital terrain model (DEM) and GIS database were produced, which have been used for spatial analyses. The findings at Nessebar can be correlated with the recent discoveries at other nearby underwater sites, such as Sozopol (ancient Apollonia Pontica) and Akra.

Keywords: Submerged Fortifications; Coastal Changes; Sea Level Rise; Mesambria; Black Sea; UNESCO World Heritage

Presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Innovative Blue Culture Technologies for the Protection, Monitoring, and Virtual Exploration of Underwater Cultural Heritage

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The BCThubs project implements Blue Culture Technologies (BCT) which seeks to protect underwater cultural heritage (UCH) in the face of challenges like global warming, pollution, and vandalism, while also promoting sustainable Blue Growth. The project has implemented a number of research and innovation (R&I) approaches to achieve these aims.

Underwater 3D modelling is enhanced through a robotic platform that integrates optical, acoustic, and navigational sensors with AI-powered data fusion capabilities. It can mount to hybrid ROVs for 3D reconstructions in real time down to 1000 meters. Also, high-resolution electro-resistivity (HRER) improves object detection, such as buried shipwrecks, during geomorphological surveys. There is also a shallow water sediment vibro-coring tool for use in scientific and commercial seabed sampling.

The project advances digital heritage solutions as well by providing cloud-based VR experiences of UCH sites featuring photogrammetry data of 3D marine ecosystems and narrative story-telling. Underwater Augmented Reality features used with acoustic localization creates Augmented Diving which enhances site exploration for divers in real-time.

Also, the monitoring of UCH through streaming video, SfM-based (Structure from motion) 3D reconstructions videos, and AI algorithms for site degradation detection is facilitated through advanced UCH modelling which employs 4D modelling and AI analysis. Finally, a surface buoy captures biometric data sent in real time through heart rate sensors coupled to a web portal which increases safety through real time physiological monitoring for divers.

The integration of the new technologies improves greatly the UCH conservation, access, and research as well as the control of sustainable management of underwater heritage sites.

Keywords: Underwater Cultural Heritage; Innovation Technologies; Blue Culture; Blue Economy; Advanced Sustainable Management

Poster presentation in session O1: Preservation of UCH (Jordy Moies)

Small rivers through the ages: an analysis of underwater archaeological structures and fishing history in the river žeimena, Lithuania

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The underwater archaeological research in the Lithuanian inland waters has been carried out for a few decades, with a primal focus on the lakes and a small section of the major rivers. Although these surveys uncovered many underwater archaeological sites, the potential of more minor and narrow rivers were recognised in 2013, when amateur divers discovered unique prehistoric fishing sites and sparse archaeological finds with a wide chronology from Mesolithic to early modern times in north-eastern Lithuania, the Žeimena River. In 2019 and 2021, underwater surveys of individual sections and small-scale excavations were carried out on the riverbed and dry land.

In 2024, a systematic underwater survey of the entire 80 km length of the Žeimena River began as part of an ongoing scientific project with the focus on the fish weirs, their locations, forms and specifics of fishing practices in the inland waters.

In Lithuania it is the first attempt to carry out a systematic underwater survey of an entire river basin, recognising the importance of capturing the specific moment of recording uncovered fragile organic artefacts and wooden structures in a constantly changing underwater riverbed landscape. A thorough interdisciplinary archaeological analysis of an entire water body (river) sheds light on choices, highlighting its central role in shaping human-environment interactions and adaptations by past communities and the predictable long-term use of specific sections of it for fishing and other activities.

The presentation will show the results of the ongoing underwater survey and analysis of potential archaeological sites and discuss the challenges of identifying underwater wooden structures. In addition to the methods used, the limitations of non-destructive survey technologies due to specific conditions will be presented. Further, possible directions for future research methods and collaborations aimed at identifying best practices for the conservation of this important cultural heritage will be discussed.

Keywords: Rivers; Underwater Survey; Fish Weirs; Wooden Structures; Methods; Identification; Fishing History

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Protection of inland national heritage through modern documentation techniques of underwater archeological sites.

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Underwater archaeology is primarily associated with shipwrecks and ports in seas and oceans, while the research potential of inland water bodies is often overlooked. Investigations in rivers and lakes face numerous technical and logistical challenges, such as limited visibility, cold water, thick sediment layers, and difficulties in using modern methods like side-scan sonars or GPS systems. For several years, the author has been developing search techniques adapted to inland waters. As part of a 2019 project on the Vistula River, a high-resolution side-scan sonar was used to survey over 10 km of the river, leading to the discovery of several shipwrecks and remnants of bridges. Similarly, research on Lakes Białe Augustowskie, Niegocin, and Kisajno has identified multiple wrecks, demonstrating the significant archaeological potential of these areas. Documenting underwater sites in challenging conditions requires advanced methods. Author has developed an SFM photogrammetry system using two calibrated GoPro cameras in a stereoscopic setup. This technique enables the creation of high-quality 3D models even in extremely low visibility conditions. It has been successfully applied in documenting a West Baltic Barrow Culture settlement in Lake Boczne and a dugout in Lake Lubanowo, allowing for precise object reconstruction and condition monitoring. Research has proven that inland waters conceal numerous valuable artefacts, and modern documentation methods allow for their effective protection and popularisation, for example, through virtual museums. The development of these technologies enables further research and analysis of objects without the need for their extraction.

Keywords: Underwater Archaeology; Inland Waters; Side-scan Sonar; Photogrammetry; 3D Documentation; Shipwrecks; Artifact Preservation

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

The island of rulers - results of underwater archaeological research of the island of Ostrów Lednicki (Poland)

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Lake Lednica is located in central-western Poland. Archaeological traces of settlement have been found on Ostrów Lednicki and Ledniczka islands. In the tenth century, Mieszko I, the first historical ruler of Poland, completely and comprehensively rebuilt the settlement layouts in Ostrów Lednicki. This centre became one of the most important in a network of fortified settlements, securing the development of the early Piast state. The settlement immediately adjacent to the fortress was extended, two sturdy bridge crossings were erected, and on either shore of the lake, open settlements were developed that constituted the economic base of the centre located on the island. Furthermore, smelting, blacksmith, horn-working and goldsmith workshops were determined to have existed. The most important building on the island was a stone palace, which served residential and religious functions. Such buildings were built in several centres of the developing state of the early Piasts and were an expression of developing contacts with Western and Southern Europe.

From the 1980s to now, underwater archaeological research has been carried out in Lednickie Lake. It is the longest continuous archaeological project in Poland, lasting over 40 years. During these years, numerous structures and artefacts have been found in the lake. Three medieval bridges were discovered in the lake. Two linked to the island's palace construction date back to the middle of the 10th century, while the third was built in the early 10th century. In addition, eight medieval log boats were discovered in the lake. Early medieval militaria are regularly found during explorations around the island of Ostrów Lednicki. Currently, the collection includes eight swords, a helmet, dozens of spearheads and more than a hundred axes. In recent years, research has been conducted near the palace, where traces of a construction disaster have been uncovered. All these traces are evidence of the early medieval community's planned management of the lake landscape.

The paper will focus on the significant discoveries of the last 40 years of research and how the early medieval interacted with the aquatic environment.

Keywords: Early Medieval; Poland; Island; Bridge; Military; Lake

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Analytical frameworks for the study of the dispersion and distribution in deep waters of artifacts from the San José Galleon shipwreck (Cartagena de Indias, Colombia)

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The study of material dispersion in shipwreck contexts provides valuable information on both the distribution of archaeological remains on the seabed and broader processes, such as the sinking dynamics and post-depositional phenomena affecting the wreck. Identifying spatial patterns and relationships among materials contributes to defining site boundaries, estimating the displacement of objects, and ultimately interpreting site formation from a holistic perspective.

This presentation explores the dispersion of archaeological remains from the Galleon San José shipwreck, located in Cartagena de Indias (Colombia), to assess its relationship with the sinking event and the subsequent depositional processes. Two key questions guide the analysis: How are materials distributed on the seabed, and what is their spatial extent? What connections can be established between object dispersion and the mechanics of the sinking? To address these questions, a multidisciplinary approach combining spatial statistical analysis with historical research was adopted.

The methodology includes the study of the debris field to delineate the area of material dispersion and analyze how objects behaved upon reaching the seabed. Spatial statistical techniques such as Kernel Density Analysis, Point Pattern Analysis (Nearest Neighbor Analysis and Ripley's K Function), and Directional Distribution Analysis were applied to identify significant patterns. Additionally, historical primary sources were examined, offering two contrasting narratives about the sinking: an English one that suggests an explosion and a Spanish one denying it.

The results indicate that the distribution and concentration of archaeological remains on the seabed align more consistent with a non-explosive sinking. While an explosion cannot be entirely ruled out, the observed dispersion patterns suggest a less catastrophic process. The concentration of materials within a defined core area, as revealed by density analysis, supports the hypothesis of a gradual deposition rather than a violent dispersal caused by an explosion. Furthermore, directional distribution analysis highlights how environmental factors, such as underwater currents, may have influenced the movement of materials post-sinking.

Keywords: Dispersion; Distribution; Depositional Processes; Galleon San José; Cartagena De Indias; Statistical Models; Sinking Event.

Poster presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

Maritime Commercial Networks in the Eastern Mediterranean from the 2nd Century BC to the 7th Century AD: Amphorae, Sailing Speed, Geopolitics, and Culture

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The eastern Mediterranean in the Hellenistic to Early Islamic Periods was comprised of numerous maritime commercial circuits interacting on a variety of scales. This is reflected in the archaeological record, particularly in the distribution of amphorae at port cities. These ceramic vessels carried agricultural products and serve as effective economic indices that attest to changes in the ebb and flow of commerce over time. In this way, they represent the manifestation of socioeconomic exchange and cultural interaction between people, an important tool when contextualized within the complex geopolitical macro-history of the region.

This paper utilizes three lines of data with which to examine prominent maritime commercial networks throughout the eastern Mediterranean between the 2nd century BC and the 7th century AD. The first is amphora frequencies across several key commercial port sites in the eastern Mediterranean and North Africa. Through statistical analysis, it is possible to identify possible correlation across imports from specific sources to shed light on prominent routes. This is complemented with assemblages from selected shipwrecks in the region. The second involves geocomputation to model sailing time in order to identify the most efficient routes and, essentially, cost rasters faced by merchants. Finally, these models are interpreted within the framework of various historical and sociocultural events that might have catalyzed shifts in maritime commerce. This allows for an inductive comparison of diachronically robust networks, specifically sailing routes suggested by wind patterns, to those which may be influenced by nuanced social preferences, economic policy, or geopolitical change.

Keywords: Economic history; network analysis; Byzantine trade; ancient ports; Roman amphora; maritime archaeology

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Islands and Water: Rethinking the concept of water in Popular imaginary and Representations in Climate Change Era. Case of the Indian Ocean Islands.

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Madagascar, the Comoros archipelago, La Réunion, Mauritius, and the Seychelles are the Indian Ocean islands closest to the African mainland. These islands share some geographical and historical similarities, they have a common economic and socio-cultural element: water. Water is omnipresent in island cultures. In Madagascar, water shapes beliefs and popular perceptions, it possesses a mystical power, the spirit of fresh water. In Mayotte, water plays a central role, mainly in purification rituals. In the Comoros archipelago, water has a mystical owner called Mwana Mrani, the child of the river or the sacred eel. Water is a vital part of the islanders' economic, social, and cultural heritage. However, Indian Ocean islands are particularly vulnerable due to climate change negative effects, including cyclones leading, chronic flooding, drought, engendering lower river flows and challenges related to access to water. This paper aims to reassess the popular beliefs and representation about water to a deep understanding of community's attachment to this essential element of nature. Subsequently, solutions will be proposed to reconnecting the population with water values by translating this into public policy for an effective adaptation model. To achieve this goal, documentary research, field observations, and interviews were carried out. Ethnographic and historic documents, ales and legend have been exploited the most. Collected data, essentially qualitative, enabling to demonstrate dynamism and changes in popular imaginary and perceptions of water. It was considered as a sacred element and becoming increasingly scare and devastating. It's time to reconnect with the original perceptions and value of water.

Keywords: Climate Change; Water; Indian Ocean Islands; Public Policy; Popular Imaginary; Values.

Poster presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

Empowering sustainable tourism growth of rural and remote areas leveraging cultural heritage in multidimensional tourism modelling.

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Rural and remote areas, while rich in natural and cultural beauties, often demonstrate an untaped potential for tourism growth. They usually face socio-economic challenges such as unemployment, limited touristic offerings and infrastructures, limited digitalisation and lack of diversified economic activities to support the resiliency of their communities. A pivotal catalyst for these challenges is the sustainable tourism growth, balancing the needs and expectations of the local society, with the regional strengths and the bouquet of tourism offerings.

Motivated from the above considerations, the TOURAL project analyses complementary tourism verticals as drivers for smart and sustainable regional growth, promoting multi-destination and multidimensional tourism offerings, empowered by macro-regional tourism cooperation and integrated local value chains.

The multidimensional model targets complementary but corroborating tourism verticals (underwater cultural & nature heritage, cultural & creative, cultural science, and silver tourism), to support sustainable tourism development of the regions, while balancing the growth of their urban clusters (more popular & touristic) with the growth potential of their remote & rural areas.

The key in the design of the smart multidimensional model is the use of bottom-up co-creation methods, addressing community needs and managing potential conflicts. This participatory approach will promote the co-design of policy pathways, the development of new business models to support tourism products, and the small-scale tourism service implementations and co-validation. The regional deployment of the model will foster joint planning, business development with integrated value chains, and cross-border cooperation within the Adriatic-Ionian and Black Sea basins to enable the offering of multi-destination tourism products.

Finally, the model gives special consideration to regional tourism value-chains, designing a one-stop-shop for financing opportunities and mentoring on business planning.

Acknowledgement: This work is supported by the TOURAL project “Multidimensional model of tourism verticals driving the sustainable balanced growth among rural & remote grids and urban clusters of rural regions, fostering macro-regional cooperation” (Grant Agreement 101132489) funded by the European Union through the Horizon Europe Program.

Keywords: Sustainable Tourism Growth; Rural And Remote Areas; Cultural Heritage; Macro-regional Cooperation; Co-work With Stakeholders

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

Underwater Archaeology in the Canton of Bern (Switzerland)

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The Archaeological Service of the Canton of Bern (ADB) is responsible for all archaeological heritage sites in the Canton of Bern (Switzerland). In this context, the ADB has been conducting underwater archaeological investigations more or less continuously for almost 40 years. Since the beginning, the focus has been on the 30 prehistoric shore settlement sites, the so-called pile dwellings, along the shores of Lake Biel.

The first systematic inventory of shore settlement sites in the 1980s revealed that some sites, known since the 19th century, are exposed to severe and ongoing erosion in shallow water areas. This erosion was triggered by the Jura water corrections in the second half of the 19th century, a large-scale hydrological intervention that fundamentally altered the water management of the region. Extensive drainage and canal works were carried out to prevent flooding and reclaim agricultural land, lowering the water level of Lakes Neuchâtel, Murten, and Biel by up to 2.5 m. These interventions in the hydrology had a lasting impact on the archaeological heritage in the shallow water areas of the lakes, accelerating erosion processes.

In response to this threat, the ADB has been conducting continuous underwater rescue excavations in the most severely affected areas since 1988. Through this long-term excavation activity, approximately 50'000 m^2 of lakebed has been documented to date, and 50'000 wooden piles, the foundations of settlement structures, have been recorded and analyzed. In the waterlogged settlement layers, not only objects made of ceramics, stone, metal, and bone are preserved, but also organic remains from everyday life in prehistoric times. In combination with dendrochronological dating of the construction timber, these sites provide an exceptionally detailed insight into settlement history, economic practices, and other cultural aspects, with a chronological resolution that is unparalleled for prehistoric periods. This unique research dataset is continuously analyzed and published in collaboration with researchers from various institutions.

With this presentation, we provide an insight into past and ongoing underwater archaeological investigations in the Canton of Bern.

Keywords: Underwater Archaeology; Prehistoric Archaeology; Pile Dwellings; Lakeshore Settlements; Dendrochronology; Rescue Excavations; Erosion

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Between Rituals and Looting: Underwater Archaeology in the Lacustrine Landscape of the Altiplano Cundiboyacense, Colombia

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The diverse socio-cultural processes that have developed over the centuries in Colombian territory have revealed the structural relationships that have been established between the different societies and the environments that surround them. Within this diversity of elements with which they interacted, it was the different bodies of water that led them to maintain a continuous adaptation and appropriation of these changing landscapes. In this sense, an archaeology of understanding these lake landscapes involves the development and application of complex interpretive frameworks that contribute to understanding the diverse relationships that were built between these communities and these environments that were so relevant in local trajectories.

In this case, we are trying to understand the relationship between the communities settled in the *Altiplano Cundiboyacense*, located in the eastern mountain range of the Colombian Andes, and the bodies of water associated with lakes and lagoons. In the pre-Hispanic period, the entire area was occupied by the *Muiscas*, who strategically placed their sacred places, such as shrines and sanctuaries, near lakes and lagoons, since in their worldview these were places where water, considered sacred and vital, was the very origin of life. Among these altars or places of worship that were important to the *Muiscas*, the lagoons of *Iguaque, Fúquene, Tota, Guatavita, Siecha* and many others stand out.

However, in the colonial and subsequent periods, places such as the *Laguna de Guatavita* or the *Laguna de Siecha* were influenced by the famous legend of *El Dorado*, according to which a chieftain submerged himself covered in gold dust and threw valuable offerings. This event attracted the attention of the Spanish conquistadors and, throughout its history, encouraged attempts to drain the lagoons in order to extract their artefacts.

The aim is to present an interdisciplinary approach to the archaeological and historical characterisation of lake landscapes, allowing us to understand, from the perspective of underwater archaeology, the historical processes that have included the rituality of lakes and lagoons and the processes of draining and plundering to which they have been exposed from the Colonial period to the present day.

Keywords: Underwater Archaeology; Rituality; Lake Landscape; Altiplano Cundiboyacense; Colombia.

Presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Integrating Marine Cultural Heritage in East African World Heritage Sites: Bridging Gaps for Sustainable Conservation

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Marine Cultural Heritage (MCH) plays a crucial role in the historical and contemporary identities of coastal communities in East Africa. However, despite its importance, MCH remains underrepresented in World Heritage nominations, management plans, and conservation strategies. The exclusion of maritime narratives from Outstanding Universal Values (OUVs) of designated sites leads to critical gaps in understanding and managing these landscapes holistically. This paper examines the integration of MCH within East African World Heritage coastal towns, with a focus on sites such as the Island of Mozambique, Lamu Old Town, Zanzibar's Stone Town, and Kilwa Kisiwani.

The research builds on the findings of the *Rising from the Depths Network*, which investigated MCH's role in sustainable development across Kenya, Tanzania, Mozambique, and Madagascar. It explores challenges such as governance gaps, limited capacity in maritime archaeology, and the disconnect between natural and cultural heritage policies. It also highlights the need for inclusive, community-driven conservation approaches that acknowledge traditional maritime knowledge and its contributions to heritage sustainability.

This presentation explores the synergies between international legal frameworks—such as the 2001 UNESCO Convention on the Protection of Underwater Cultural Heritage and the World Heritage Convention—to advocate for a more integrated management model. It also presents case studies that illustrate how coastal communities in East Africa interact with MCH to sustain local livelihoods and cultural traditions. The presentation will focus on practical strategies for incorporating MCH into World Heritage conservation, addressing policy recommendations, community participation mechanisms, and the expansion of World Heritage buffer zones to include submerged sites with the particular examples of the East African coast. Placing MCH at the core of World Heritage strategies will help reinforce the role of marine landscapes in ensuring the cultural and environmental sustainability of East Africa's coastal heritage sites.

Keywords: Marine Cultural Heritage; World Heritage; East Africa; Underwater Cultural Heritage; UNESCO; Coastal Conservation; Sustainable Development

Post presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Enhancing Ocean Sustainability through the UNESCO 2001 Convention: Unlocking the Potential of Underwater Cultural Heritage

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The UNESCO 2001 Convention on the Protection of the Underwater Cultural Heritage (UCH) provides a crucial framework for preserving submerged cultural assets such as shipwrecks, sunken cities, and prehistoric sites. The Convention not only safeguards historical artifacts but also strengthens the link between UCH and sustainable development. The Ocean Decade Heritage Network (ODHN) underscores the importance of integrating UCH into sustainable ocean practices and highlights its relevance within the SDGs of the 2030 Agenda through the United Nation's Decade of Ocean Science for Sustainable Development (2021-2030).

This presentation will explore how the 2001 Convention supports UCH in ocean sustainability. It will demonstrate the role of underwater cultural heritage in expanding knowledge of ocean ecosystems and human history and how the Convention is essential for this. The discussion will address opportunities for interdisciplinary collaboration, methods for promoting sustainable practices, and strategies that strengthen the resilience of coastal communities. The 2001 Convention serves as a foundation for ensuring that UCH, as well as its associated intangible expressions and values, remains an essential component of ocean sustainability. This presentation will advocate for a holistic approach to ocean stewardship that values both cultural and natural dimensions, reinforcing the importance of preserving heritage hidden beneath the waves. It will underline the role of the UNESCO 2001 Convention for the UN Ocean Decade and beyond.

Keywords: Underwater Cultural Heritage; UNESCO 2001 Convention; Ocean Decade; Sustainable Development; Ocean Literacy

Presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

The Maritime Observatory: Satellite-Derived Intelligence in Shipwreck Monitoring and Protection

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The remains of 20th Century military vessels and aircraft are now widely recognised as important cultural and historic sites, but their protection in-situ has traditionally been limited. Submerged and out of sight, wrecks are increasingly targets for unauthorised commercial salvors and souvenir hunters. Recent high profile incidents such as the looting of the battleship HMS Prince of Wales off the Malaysian coast, which triggered the release of a 10km oil slick, also highlight the risks that unauthorised activity on hazardous wrecks may pose to the environment from leaking fuel and degrading munitions.

The Maritime Observatory is a unique interdisciplinary partnership between two charitable organizations: the Maritime Archaeology Sea Trust, and OceanMind. Using technology developed for monitoring IUU (Illegal, Unauthorised, Unreported) fishing in remote areas, the Observatory enlists satellite surveillance combined with artificial intelligence to detect and deter unauthorised activity on wrecks and monitor sites at risk due to their pollution potential.

Using recent case studies of projects from the Mediterranean, Europe and South East Asia we will examine the range of threats facing submerged historic sites, discuss the technology and methodology behind remote shipwreck monitoring, and analyse the impact of satellite technology on the preservation of underwater heritage. Finally we will advocate the integration of remote shipwreck monitoring into wider marine protected areas and broader marine site management frameworks.

Keywords: Heritage Crime; Salvage; Shipwreck Monitoring; Remote Sensing; Satellites; Potentially Polluting Wrecks; War Graves

Presentation in session L3: Heritage Crime (Alison James, Martijn Manders, Paul Jeffery)

Transformations of archaeological contexts in deep waters in Cartagena de Indias (Colombia): an archaeological and conservation approach to its management

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One of the objectives of the San José Galleon Shipwreck research project for 2024, located at a depth of 600 meters, was to understand the natural and anthropogenic factors influencing site formation and material degradation processes from an interdisciplinary perspective. The site has been declared a Protected Archaeological Area, a management tool defined by Colombian legislation, which delimits and characterizes the site for its study, management, and preservation. Developing a project of this magnitude involves theoretical, methodological, and disciplinary challenges that necessitate a conceptualization exercise from archaeological, conservation, site security, heritage values, risk assessment, and heritage management perspectives. As preliminary results, some points of convergence and divergence were identified between the approaches, methodologies, and scales of analysis across the disciplines. Regarding the transformations inherent to the site, a dialogue was established between archaeology and conservation disciplines. To this end, the similarities and nuances between the theoretical perspectives of site-formation processes and the study of the deterioration of archaeological materials were identified. Additionally, discussion sessions were held with the biology and oceanography teams, integrating their disciplinary knowledge into the analysis of archaeological materials. This work was consolidated through an analysis matrix that allowed for the demonstration of the interaction between environmental factors and material culture. A transdisciplinary exercise in conceptualizing the problem was carried out through a visual representation. This includes the role of environmental factors in the transformation of the archaeological site and its interaction with material culture, as well as the mechanisms of transformation and indicators of deterioration. This is an ongoing exercise that will enrich the research, knowledge, and management of this significant deep-submerged archaeological site. This paper aims to open a space for transdisciplinary dialogue to achieve a comprehensive characterization of the transformations of such sites, focusing on the research, management, and preservation of underwater cultural heritage.

Keywords: Deepwater Archaeology; UCH Conservation; UCH Management; Risk Assessment; Shipwreck; Galeón San José.

Presentation in session O1: Preserving of UCH (Jordy Moies)

Offshore archaeology: from unknown anomalies to 3D models

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In the UK, the Marine Policy Statement (2009) states that heritage assets should be conserved through marine planning in a manner appropriate and proportionate to their significance. Marine archaeology is therefore a part of the Environmental Impact Assessment (EIA) document produced ahead of any offshore consent application and the works presented will reflect the process that needs to be followed.

This paper will present a case study of a proposed Offshore Windfarm in the North Sea, demonstrating the techniques and methods applied within development led marine archaeology in England, UK.

It will present the lifecycle of archaeological targets, specifically anchors, from their status as unknown anomalies through to being recorded as 3D models. These anomalies were located on the seafloor and identified as a result of increased geophysical surveys ahead of and during the offshore development.

Geophysical and hydrographic surveys were undertaken between 2010-2017 and 2022, across the proposed project area, collecting Side Scan Sonar, Magnetometer and Bathymetric data. As the Project Retained Archaeologists, Maritime Archaeology analysed the data in order to identify seabed anomalies of potential archaeological interest to be investigated.

In 2024, an archaeologist was present on-board the offshore vessel during the Unexploded Ordnance (UXO) campaign. As a result of the application of mitigation and curatorial engagement and requirements, twenty-two anchors, amongst other archaeological features, were identified and thirteen relocated to designated areas on the seabed following consultation with Historic England.

This paper will focus on these anchors, how they were assessed on the seafloor with the work class Remotely Operated Underwater Vehicle (ROV), stropped and lifted to the deck, where the on-board archaeologist recorded it thoroughly through measurements and photographs. Photographs were taken of both sides of the anchor to produce 3D models as a means of preservation by record and to aid in the understanding our underwater cultural heritage on a localised scale.

Discussions will be welcomed on the lessons learned during this process, best practises used in the industry, and how the dissemination and data sharing of resources can be improved.

Keywords: Offshore; Archaeology; Anchors; Modeling

Presentation in session J3: Offshore Renewables and Maritime Archaeology (Mark James, Victoria Boothby)

Inventorying Intangible Maritime Heritage: A U.S. Perspective

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U.S. Federal heritage mandates require consideration of both tangible and intangible elements. Under U.S. Federal law, the definition of a 'site' includes historic structures, archaeological remains, and areas of cultural significance. While remote sensing and diver or vehicle survey are often used to delineate maritime sites, these approaches fall short in identifying sites of intangible cultural significance. Participatory geographic information systems (PGIS) and ethnographic survey are two methodologies with the potential to enhance the identification and evaluation of intangible maritime heritage. Drawing on a collaborative project between East Carolina University and the U.S. Bureau of Ocean Energy Management, this presentation discusses a transdisciplinary approach to inventorying intangible maritime heritage sites. Given the involvement of local communities with the research, the chosen methodologies are framed within broader perspectives on reciprocal relationships, knowledge sovereignty, and ethical data capture.

Keywords: Intangible Maritime Heritage; Transdisciplinary; Inventorying; Community Collaboration

Presentation in session M1: Inventorying UCH - An Old Challenge (Anais Dimeglio, Alison Faynot, Sybil Thiebaud)

HMS Hampshire: A Century on the Seabed.

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HMS Hampshire was a British Devonshire class armoured cruiser that was launched in 1903. The ship saw action at the Battle of Jutland in 1916 before returning to the Royal Navy Base at Orkney, Northern Scotland. On June 5th 1916 the ship left Scapa Flow on a secret mission to Archangel in Northern Russia. On board were the British Secretary of State for War - Lord Kitchener and his senior staff. Passing Marwick Head off North West Orkney, the ship struck a mine laid by U75 in the early hours of May 29th 1916. HMS Hampshire sank within 15 minutes with a loss of 737 crew including Kitchener. There were only 12 survivors. In 2002 the wreck was designated as a controlled site under the Protection of Military Remains Act (1986).

On the 100th Anniversary of the sinking in 2016, a licence was granted to Rod Macdonald by the UK Secretary of State for Defence to conduct an underwater survey of the site using photography and 3D imaging techniques. This was the first officially sanctioned survey of the wreck. The results of the survey were limited by deteriorating weather conditions on site, limiting the survey to four days with good visibility.

In 2023 A second licence was granted to the survey team, led by Emily Turton and Ben Wade, to return to the wreck, resulting in a full 3D visualisation and photographic record of the 144m long wreck on the seabed at a depth of 63 metres. The international survey team consisted of academics, technical diving volunteers and professional videographers and photographers.

Using the results from the 2023 survey, this paper describes the challenges encountered and methods used to produce the 3D visualisation that reveals the condition of this important historic shipwreck.

Keywords: Shipwreck; 3d Imaging; Photogrammetry; Modelling; WWI

Presentation in session K3: Digital Reconstruction of Shipwrecks (Hendrik Lettany)

UK Ministry of Defence Wrecks Management Program: Managing Potentially Polluting Wrecks (PPW) around the world

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The UK MOD is responsible for the management of the risk of oil and chemical pollution emanating from an inventory of over 5,700 Potentially Polluting Wrecks (PPW) worldwide. These are largely legacies of WWI and WWII, carrying oil and ammunition when they sank. This risk is managed on behalf of the Royal Navy, by the Wrecks Management Team of Salvage and Marine Operations (SALMO).

Some wrecks are already leaking, and others are at increasingly greater risk of leaking as they corrode. Release of oil is a well-documented risk, which can have widespread impacts, from environmental damage, to impacting local populations and infrastructure. The SALMO Wrecks Team's overall aim is to reduce the risk of pollution emanating from the Royal Navy's inventory of PPW. Determining which wrecks should be prioritised for assessment and remediation is therefore of paramount importance.

The UK MOD SALMO Wrecks team manage the Royal Navy's inventory of PPW through the Wreck Management Program. This program encompasses a comprehensive method of wreck assessment from Historical Desk-Based Assessments (H-DBA), to survey, Environmental Desk-Based Assessments (E-DBA) and oil spill models. The information gathered during these stages can then lead to remediation if appropriate.

The presentation will explore SALMO's efforts and how the growing risks posed by PPWs, a consequence of their accelerating rate of decay, is leading to an explosion of work on wrecks that might otherwise have received little archaeological attention. It will discuss the setting of new standards and procedures for such work and the growing efforts of a global community of stakeholders to address the challenges posed by the polluting wreck inventory.

Keywords: Wrecks Environmental Protection Pollution Oil Chemicals Management

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Tourism's contribution to the dugout boat heritage in Soomaa National Park

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Tourism has emerged as a double-edged sword in the realm of cultural heritage preservation. On one hand, it provides opportunities for safeguarding traditional practices; on the other, it introduces risks such as commodification, distortion, and over-commercialization of cultural expressions.

The building and use of expanded logboats in Soomaa were added to UNESCO's List of Intangible Cultural Heritage in Need of Urgent Safeguarding in December 2021. Although dugout boats are built in many places around the world, the Soomaa region in Estonia has the only living tradition of expanded logboats within the European Union. Until the 1950s, they were used for daily transport and fishing. However, with the advent of cheaper boat types and modern road networks, logboats are no longer essential for everyday life. Nevertheless, they remain important for the identity of the local community and for tourism in the Soomaa region.

The Estonian government placed the natural and cultural heritage of the Soomaa region under protection by establishing Soomaa National Park in 1993. Since dugout boatbuilding is an essential part of local heritage, safeguarding this tradition has been one of the park's established objectives. Logboat-building courses were held over five years (1996–2000), with old local boatbuilders serving as instructors. Despite their continued cultural significance, logboats are now threatened by factors such as a lack of knowledge transfer between masters and apprentices, weak demand for logboat use, limited availability of raw materials, and a declining population in the Soomaa region.

If managed sustainably and respectfully, tourism development can support the living heritage in several ways. This paper will discuss the lessons learned about tourism's role in safeguarding boatbuilding, as well as the contribution of dugout boat heritage to the sustainable development of tourism in Soomaa national park.

Keywords: Sustainable Tourism; Dugout Canoes; Expanded Logboats; Intangible Cultural Heritage; Traditional Ecological Knowledge

Presentation in session A3: Sustainable Tourism (José Bettencourt, Patricia Carvalho, Kalliopi Baika)

The Lübeck Ship find. A unique vessel type from the 17th century?

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In 2020, a historic shipwreck from the middle of the 17th century was discovered in the Trave river close to Lübeck. As it was in acute danger, the wreck, which was exceptionally well preserved by the standards of the southern Baltic coast, was salvaged. During the salvage operation in 2023, over 500 ship timbers, almost 160 barrels filled with quicklime and around 150 artefacts were recorded. Besides the bottom of the ship, also several parts of the ship's side and deck as well as rudder and three anchors were found.

The carvel-planked ship had a round stern and several masts. It was originally around 21–24 metres long and 5.5–6 metres wide. Initial research indicates that the ship was built in the early 1640s in Lübeck by applying the Dutch-flush construction method. Unlike contemporaneous vessels, however, the Lübeck ship has a v-shaped keel. This makes it not only the first historical wreck from Lübeck, but also a unique find among the early modern ships in Northern Europe. Historical sources indicate that the construction type could be a local answer to the Dutch vessels dominating the Baltic Sea during that period.

Cargo and origin of the construction timbers point towards intense contacts with the Scandinavian countries. The ship was built using oak from Northern Germany and Southern Sweden as well as conifer from Gotland, the Åland Islands and Denmark. The quicklime is likely to stem from one of the Baltic Sea islands. In the second half of the 1650ies a devastating fire broke out on board, which caused the ship to sink, shortly before it reached its destination.

Keywords: Shipbuilding; Wreck; Lübeck; Baltic Sea; Early Modern Period; Carvel

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

The Coffee Wrecks: *Coffea arabica* from 18th- to 19th-century shipwrecks and what modern genomics approaches on conserved DNA can reveal about the progress of plant breeding and maritime history

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After centuries on the seabed, certain shipwrecks have become repositories of plant material. These reservoirs are often overlooked, but they can help us to understand maritime history and address modern agricultural challenges. Preserved plant genomes can reveal lost diversity, resistance traits, and other important characteristics of crops. The cargo of a shipwreck offers unique opportunity to investigate maritime history and crop domestication.

The study focuses on *Coffea arabica* samples recovered from shipwrecks as a case study. The samples are sequenced and through genetic analyses, we will shed light on 18th- and 19th-century coffee culture.

The genetic analysis investigates the evolutionary history of modern *C. arabica* cultivation by comparing the wreck samples to contemporary cultivars. The question is what was lost in the cultivation process due to genomic erosion and how deleterious alleles accumulated to the modern cultivars during this process?

Keywords: Genetics; Coffee; Wrecks ; Merchant Routes; Maritime Archeology; NGO

Poster presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

MAS contribution to international UCH NGO co-operation

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The presentation quickly outlines a legal and other societal aspects of MAS operational context in Finland and globally. It also briefly introduces MAS, its history and strategies for the future.

Main part of the presentation describes such MAS initiatives like the "Baltic Sea 3D Wrecksite Ontology" and operations like annual research expeditions and a field work camp or a field school which could contribute to the international co-operation of NGO's working in the field of underwater cultural heritage.

We also present a summary of the discussions with UNESCO 2001 Convention for the Protection of Underwater Cultural Heritage NGO committee and their role in coordinating such co-operation.

The presentation is merely a MAS introduction (in contrast to a lecture) to the topic and questions & discussion is encouraged by several questions for the audience.

Keywords: NGO; International; Co-operation; UNESCO

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

Navigating Encounters: Indigenous Watercraft and European Shipwrecks on the 18th-Century Uruguayan Coast

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Uruguay was not an independent country until 1825, but its territory has been inhabited for at least 14,000 years. During colonial times, indigenous communities populated the land, interacting with Europeans who arrived and some of whom settled in the area. This paper examines two shipwreck cases. The first is a French vessel wrecked along the Rio de la Plata coast, from the Guaraní perspective, as described by a Jesuit father. The second involves a Spanish shipwreck in the Atlantic coast, based on the survivors' accounts and their interactions with native peoples.

Jesuit missions (1609-1767) were established in the northern region along the Uruguay River, while the Jesuits also used the southern territory as a vast cattle ranch. They documented various aspects of Guaraní life, as well as their interactions with other indigenous groups and Europeans. A 1708 document written by Jesuit Father Salvador de Rojas describes a group of Guaraní cattle drivers who, upon hearing of a shipwreck, abandoned their cattle and constructed rafts and boats to salvage goods from the wreckage, which they brought back to the mission.

The second case concerns the 1753 shipwreck of the Spanish vessel *Nuestra Señora del Rosario* off the Atlantic coast. Everyone survived and many were later called to testify by the governor of Montevideo. Testimonies reveal that the crew did not approach the coast the night before the wreck because they observed "fires" from native peoples. The survivors built barracks to store salvaged goods and maintained a guard at all times, fearing possible encounters with indigenous groups.

The discussion will explore the complex dynamics of the period, emphasizing the relationships between local indigenous peoples and Europeans, particularly through the lens of shipwrecks along the vast coastal regions of colonial Uruguay.

Keywords: Cultural Interactions; Indigenous Navigation; Shipwrecks; Survivor Testimonies; Atlantic Coast; Rio De La Plata; Uruguay

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

Underwater cultural heritage in Uruguay: Tracing the Maritime History and Cultural Significance of Artifacts in Coastal Protected Areas

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Underwater cultural heritage in Uruguay, South America, is both rich and diverse, with hundreds of shipwrecks scattered along its 600-plus kilometers of coastline, which borders the Atlantic Ocean and the Rio de la Plata. This presentation highlights the first set of data collected on shipwrecks within two Protected Areas in Rocha Department: Cabo Polonio National Park and the Laguna de Rocha Protected Landscape. Historical records reveal at least 80 shipwrecks in the Cabo Polonio area and approximately 50 in the Laguna de Rocha region, spanning from the early contact period through to the end of the 20th century. These shipwrecks have had a profound impact on the region, with survivors settling nearby, coastal locations and beaches named after the ships, and numerous local stories that link these maritime accidents to present-day communities. As a result, many locals have collected and preserved small collections of artifacts from these wrecks. This research explores the local underwater cultural heritage as a vital element of maritime culture, examining the history of these shipwrecks through both documentary evidence and material remains. The presentation will highlight select items from these collections, tracing their origins in maritime trade and following their journey from the depths of the sea to their repurposing in the local cultural context, where they acquire new meanings. Local communities place significant value on the history of these shipwrecks and the artifacts associated with them. The processes of patrimonialization are complex, intertwining with the everyday use of objects that become symbols deeply embedded in local histories and the unique relationship between coastal inhabitants and shipwrecks. Furthermore, the way these artifacts are perceived continues to shape the collective memory and practices of the community. Given that these shipwrecks are located within Protected Areas, it is crucial to implement specific management guidelines to ensure their long-term protection, preservation, and integration into the cultural heritage of Uruguay's coastal communities.

Keywords: Shipwrecks; Underwater Cultural Heritage; Artifacts Collections; Maritime Trade; Protected Areas

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

PS Comet, Craignish Point, Argyll: a forerunner of the Clydeside shipbuilding industry

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The general location of PS *Comet* has been known since it was lost in 1820. However, it was only correctly positioned in 2020 by research undertaken by Tony Dalton and later located by John Beaton and members of the Dalriada Diving Club. The wreck had been largely unexamined by recreational divers due to the strong tidal currents and thick kelp at the site.

PS *Comet* was Europe's first commercial steamship, launched in 1812 and wrecked in 1820. On its final voyage from Fort William to Glasgow it ran aground at Craignish Point on the north side of the Dorus Mor. It was said to have split in two, with the after-part drifting towards the Gulf of Corryvreckan and its fore part remaining aground for some time, allowing some salvage work to be done, before slipping into deeper water itself.

As a wreck of international significance and representing an important place in the history of steam-powered navigation, the PS *Comet* has been designated as a scheduled monument by Historic Environment Scotland.

This scientific poster will summarise the underwater survey of the remains, the characteristics of the surviving visible elements, and the insights these provide about early steamships and the vessel's operational use along the west coast of Scotland. Furthermore, it will highlight the range of data sources assessed to characterise the site's significance for designation.

Keywords: Underwater Archaeology; Inland Waterways; 3D Photogrammetry; 3D Representation; Scottish Maritime History; Shipbuilding; Management Of UCH; Community Engagement

Poster presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

The term portus in Dressel 20 amphorae

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In Hispania, and particularly in Baetica, the most Romanized region of the Iberian Peninsula, significant commercial interests rapidly developed due to the area's abundant natural resources. These interests expanded considerably following the complete pacification of the region and the economic liberalization that ensued with the establishment of the imperial regime under Augustus.

During the Roman Empire, the olive oil trade was one of the principal economic activities in Baetica. This commodity was predominantly stored in a standardized type of amphora known as Dressel 20, which was produced in the region between approximately 30 and 270 AD.

However, the overland transportation of goods from Baetica, even through the extensive road network established under the first emperor, was both slow and costly. This inefficiency stemmed from the suboptimal use of animal traction: the Romans employed inadequate harnessing systems and did not properly shoe their draft animals.

In contrast, maritime and fluvial transport offered a faster, higher-capacity, and, in the case of amphorae, even safer alternative. The ceramic composition of these containers, combined with the cushioning effect of waterborne transport, significantly reduced the risk of breakage. Most importantly, these modes of transport were considerably more cost-effective. For this reason, cities located along major waterways, the coast, or principal roads leading to these routes consistently sought to establish connections with these key transport arteries.

These amphorae frequently bear a sigillum composed of a series of letters, some of which remain indecipherable. In numerous cases, these seals include the term portus, providing evidence of their riverine and maritime transport. However, the precise meaning of the term portus as it appears on the seals of Dressel 20 amphorae remains uncertain. Various hypotheses have been proposed by different scholars, yet no definitive conclusion has been reached.

This study aims to systematically catalog all known seals bearing the term portus found in Baetica and to attribute them to their respective production sites. By establishing these geographical associations, we intend to propose a new hypothesis regarding the possible significance of this designation.

Keywords: Dressel 20; Portus; Fluvial Transport; Amphoric Epigraphy; Olive Oil Trade

Poster presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Traditional Wayúu navigation in the Colombian Guajira and the wider Caribbean

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Throughout history, navigation has been one of humanity's most important practices, as it has allowed coastal, island, lake and river communities to connect, mobilise, inhabit and exchange goods and knowledge with other communities around the world.

In the case of the Americas, and more specifically in Colombia, in the peninsula of *La Guajira*, the *Apalaanchi* (those who live on the coast) of the *Wayúu* Indians have historically had a direct relationship with the sea and the different bodies of water. These bodies of water are seen not only as a means of obtaining their resources, but also as an extended territory through which they mediate their relations with other spaces and communities in the region and the Caribbean.

Thus, navigation requires a specific set of skills, transmitted orally and through practice, in which they learn not only about the boats (*anua* (dugout canoe) and *chalanas* (skeleton based)) and the tools of navigation (lever, oar, *canalete* (small rudder to give direction), sail, *tokotoko* (central engine) and outboard engine), but also the recognition of a wide variety of environmental conditions that are crucial for navigating in the different bodies of water.

Over the centuries, the *Apaalanchi* have learnt to recognise the environment in which they live perfectly, which has allowed them to sharpen their senses to such an extent that they are able to recognise details in this liquid territory that are not perceptible to us *Alijuna* (who are not *Wayúu*), such as the recognition of eight types of wind, the recognition of those stars that remain immobile in the firmament and are a fundamental reference when navigating at night, or the recognition of the bathymetry by the colour of the water.

In this way, the direct relationship between objects and traditional knowledge and the aquatic environment in which they evolve and relate to each other becomes clear. This allows us to understand the role that boats, and with them navigation, have played for the *Wayúu* people, as it has been a determining factor in consolidating, connecting and relating to their territory, their people and the other communities of the Caribbean.

Keywords: Wayúu; Indigenous Navigation; Traditional Navigation; Ethnoarchaeology; Cultural Maritime Landscape; La Guajira; Colombia

Presentation in session H3: Early Watercraft, Traditional Navigation Practices, and Indigenous Maritime Landscapes in the Americas (Elena Saccone, Christophe Delaere, Mirtha Alfonso Monges)

New Approach of Underwater Archaeology in Japan

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The “Minato (small harbor) Project,” funded by a Grants-in-Aid for Scientific Research, has ambitious goals. The pure scientific/archaeological goal is to identify and document ancient and historic harbor structures, including coastal embankments, wharves, and smaller features such as mooring stones in hopes to provide insights into local coastal adaptation strategies. Beside the academic goal, the project also strives to bring semi-submerged archaeology to the foreground, promote sustainable development practices that consider the historical significance of Japan's coastlines, and to consider the best use of such heritage for the community.

This project aims to develop a set of field techniques specifically tailored for identifying and recording “semi-submerged” remains. These methods are necessary because existing recording techniques for underwater and dry archaeological sites may not always be suitable for the dynamic coastal setting. For years, underwater archaeology primarily focused on shipwreck sites, while land archaeology concentrated on dry areas, leaving the intertidal zones as understudied "blank spots." This lack of attention has led to irreversible losses. With some prefectures having less than a quarter of their natural coastline remaining, it has become an urgent matter to raise awareness towards the intertidal/coastal archaeological sites before further development takes place.

This project builds upon the success of the Tango Archaeology Project 2022, which was initiated by a high school student from Tango Peninsula, Kyoto Prefecture. She posted a call on SNS for help in finding an underwater site – she believed that the discovery could help revitalize the local community. I joined her call in developing this grassroots effort, which led to the identification of over thirty mooring stones in front of the remote Asahi harbor fishing village in Tango, indicating its historical significance as a thriving port. The people and the community -who probably never thought of joining an archaeological project – are still involved in various capacities for the current Minato Project.

The Minato Project seeks to contribute to our understanding of Japan's maritime history, to provide valuable tools and insights for heritage professionals and policymakers to better manage archaeological resources, and to generate pride for the local communities through a fresh look at local history.

Keywords: Japan; Coastline; Heritage Management; Community; Harbor; Student

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Examining gender-based equality of opportunity within maritime archaeology: using case studies from England and international publications to reflect on global challenges

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Faced with the statistic that in 2021 only 3% of principal licence holders for UK Protected Historic Wrecks in England were women, a project was developed, which attracted funding from Historic England, to examine gender-based engagement with Protected Wrecks (PW). This sought to understand issues and barriers faced by women despite there being a comparatively developed maritime archaeological discipline within the UK, with employment practice supported by legislation which embeds gender equality and an active and engaged avocational community.

Quantitative research related to PWs and initial work to place this within the wider UK discipline revealed: PW teams were consistently at least 80% male; in the wider profession of maritime archaeology (largely commercial and charity sector) there were 56% women and 44% men; University teaching staff were 65% male; membership-based organisations were 63% male; and at Trustee, Board and Patron level in organisations the split was 70% male: 30% female. Within more public facing outputs, those speaking at maritime archaeological conferences were 80% male, and surprisingly this percentage split was also found within maritime archaeological publication. Through survey and interviews a range of key barriers to involvement in PWs were revealed, which raised questions about the situation across the full maritime archaeological profession prompting the formulation of more in-depth research.

A greater understanding of the contemporary discipline and the issues and barriers faced is required to develop and affect positive change through targeted actions. Achieving gender equality requires a multifaceted approach, from addressing historical biases in research and interpretation to promoting equitable practices in education, fieldwork, research, practice and professional recognition.

This paper will examine how we can gain a better understanding of the involvement (or lack of involvement) of women in maritime archaeology. It will consider how this situation is influencing long-term equality of opportunity, the creation of maritime archaeological knowledge and the setting of research, management and protection priorities.

Keywords: Understanding Discipline; Equal Opportunity; Women; Gender Bias

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

From the open sea to the foreshore: preventive archaeology of large-scale linear projects (France)

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Preventive archaeology in offshore context has seen significant growth in France since the early 2010s. The increase in the number of operations has led Drassm and Inrap archaeologists to adapt to a variety of contexts, from the open sea to the foreshore, from the Mediterranean coast to the North Sea, via the Atlantic and the English Channel. Operations carried out on large-scale linear projects (power cables, telecommunications cables, pipelines, etc.), over 50 field operations since 2010, combine large-scale geophysical surveys, robotic interventions in deep waters, human diving surveys and mechanised diagnosis on beaches.

Drassm and Inrap are involved in archaeological diagnosis or evaluation, two distinct administrative formats under French legislation, but beyond the subtleties of the legislative framework, the objectives and constraints are common, and the methods are developed jointly.

The intervention protocol for these large-scale projects, drawn up in 2014 in the context of the first French offshore windfarms, is based on the principle of two main stages: an analysis of geophysical data and an in-situ survey of potentially anthropogenic targets. This protocol has since been amended over the courses of the experience gained by the various teams, but certain limits inherent in the means of detecting and exploring the seabed still need to be overcome : detection of buried remains, poorly preserved remains or human occupation sites that are difficult to read, etc. In view of the future development of linear developments at sea (wind farms, cables, etc.), this question remains crucial for the scientific and heritage objectives of preventive archaeology to be fully met.

Keywords: Preventive Archaeology; Offshore; Geophysical Detection; Robotic Surveys; Detection Methods

Poster presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Heritage of War: The Biological Effects of Munitions from Sunken Warship Wrecks on Marine Organisms in the North Sea

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The North Sea is home to numerous sunken warships from the two World Wars, many of which still contain unexploded munitions. Over time, corrosion of these munitions has led to the release of toxic substances, particularly 2,4,6-trinitrotoluene (TNT), into the marine environment. While the accumulation of TNT and its derivates in marine organisms has been previously documented, its biological effects remain insufficiently understood.

To investigate the impact of these contaminants on marine life, field studies were conducted at selected wreck sites (SMS Ariadne, SMS Mainz, UC30, KW58) in the North Sea. Two key indicator species were examined: the common dab (*Limanda limanda*), a non-migratory flatfish, and the blue mussel (*Mytilus edulis*), a sessile filter feeder. Fish were caught near the wrecks and analyzed for physiological and biochemical changes. At the same time, mussels were deployed in cages at different locations on the wrecks for several weeks and subsequently examined for biomarker responses.

The results indicate significant biological effects in both observed species. Dab collected near wrecks exhibited malfunctions in enzymes involved in defense mechanisms, cell organelle impairments while simultaneously showing increased liver alterations and metabolic disturbances, correlating with TNT concentrations in the surrounding water, sediments and tissues of the investigated specimen. Similarly, mussels exposed to wreck-associated TNT contamination also showed malfunctions of enzymes related to the oxidative stress defense system and displayed metabolic disturbances by accumulating metabolic transformation products in digestive tissues as well. These findings suggest that residual munitions and ammunition remnants from other discharges in the vicinity of historical warships pose a threat to marine organisms, highlighting the need for further environmental monitoring and risk assessment of submerged wartime wrecks.

Keywords: Warship Wrecks; TNT Contamination; Biological Effects; North Sea; Limanda Limanda; Mytilus Edulis; Environmental Risk Assessment

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Towards a better integration of Europe's Mesolithic coastal heritage – transdisciplinary and transsectoral approaches in the HORIZON MSCA Doctoral network ArCHe

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This contribution presents the interdisciplinary and transsectoral approach to archaeological heritage of Mesolithic hunter-fisher-gatherer populations (c. 12.000-2.000 calBC) in diverse European maritime landscapes as applied in the HORIZON MSCA Doctoral Network ArCHe "Archaeological Coastal Heritage: Past, present and future of a hidden prehistoric legacy" (www.arche.uio.no). ArCHe trains ten Doctoral Candidates based at six beneficiaries in five European countries in the fields of archaeology, social anthropology, heritage studies, bioarchaeology, geology, oceanography, coastal engineering/preservation. The Mesolithic coastal heritage across Europe is – according to its non-monumental nature – fractured, highly vulnerable and often merely visible and tends to be under-communicated to the public. The different maritime regions (SE-Norway, W-Latvia, W-France, N-Spain) compared in the project are exposed to region-specific challenges – connected to characteristic and geologies of the coastal landscapes and are thus to different degrees endangered by climate change and infrastructure development which threaten the Mesolithic legacy embedded in them.

ArCHe's goal is to increase the scientific and public value of this legacy by investigating topics such as the Mesolithic use of the coast, today's management of the respective coastal areas and sites in terms of engineering and heritage management. It further develops better practices for better modes of communicating these sites and for integrating them into public awareness. The comparison of diverse maritime landscapes stands central, creating synergies between the projects which reach across boundaries of disciplines, regions and sectors. Applied practices in dealing with this maritime heritage in diverse settings are an important part of the training; the project includes non-academic partners encompassing cultural and natural heritage management organisations, an NGO dealing with underwater archaeological heritage and museums. Communicating the projects to diverse academic and non-academic stakeholders to school children, coastal communities and interested lay audiences is an integral part of the project.

Keywords: Mesolithic; Coastal Landscapes; Interdisciplinarity; Applied Practices; Regional Comparison; Preservation; Integration

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Lost ships and lasting impacts: Managing shipwreck pollution through archival, archaeological and environmental science

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More than 8,500 shipwrecks from the two world wars rest on the seafloor of the world's oceans and seas. At the time of sinking, many of these vessels were armed and loaded with ammunition. Decades later, recreational divers are not only witnessing the disintegration of these historical wrecks but are also encountering corroding munitions. Advanced corrosion of underwater munitions can cause toxic military explosives, such as 2,4,6-trinitrotoluene (TNT), to be in direct contact with the marine environment. Based on eyewitness reports from recreational divers and historical documents, a wartime wreck in front of the Belgian coast was selected as case study to assess the environmental impact of shipwrecks. Measurements of explosives in water and sediments indicate potential harmful effects on the local environment, such as uptake by fish and other organisms. Together with little knowledge about the consequences for human seafood consumption, the results are causing concern for policy makers. Further investigations in different historical archives and databases (e.g. Militärarchiv Freiburg, Germany), along with repeated dives on the wreck, helped us to determine the types and exact amount of ammunition on site to target further investigations. Additionally, new insights were gained about the history of the vessel and its crew. Being only a small fishing boat used by the Kriegsmarine, not a lot of information was available when we started our investigations. Ultimately, combining archaeological and environmental research results gave sufficient reasons to take actions against pollution, and provided policy makers with the knowledge required to plan and implement cleanup operations. The assessed wreck site, serving as an example for hundreds of thousands worldwide, highlights the importance of a strong link between environmental and archaeological approaches in finding solutions for policy makers to manage potentially polluting shipwrecks.

Keywords: Marine Pollution; Environmental Monitoring; Interdisciplinary Research

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Citizen Science in the Sunshine: The Florida Public Archaeology Network's Programs to Engage Communities with their Maritime Heritage

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The Florida Public Archaeology Network (FPAN) is a state-wide program based at the University of West Florida in Pensacola, Florida. FPAN's mission is to help stem the deterioration of the state's buried and submerged past through engaging the public in archaeology and heritage preservation. Since Florida has the longest coastline of any state in the continental U.S., maritime and coastal heritage resources are a major element of FPAN's focus, and are among the most threatened sites due to climate change, storm surge and effects of severe weather such as hurricanes, shoreline erosion, vandalism and looting, and even commercial salvage allowed under state law. Toward this end, FPAN has developed several programs that rely on citizen scientists, including Floridians and the state's many visitors, both diving and land-based, to help monitor and protect our state's maritime and submerged cultural sites. This presentation describes these programs, including their focus, purpose, training elements, promotion, administration, and challenges inherent in working with the public, as well as the successes and shortcomings we've encountered.

Keywords: Maritime Heritage; Citizen Science; Public Outreach; Community Engagement; Florida; United States

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

Admiralty Fuel Oil 1900-1945: Research and Risk

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This paper presents the results of archival research into the fuel oil used and transported by the UK Admiralty between 1900 and 1945, encompassing both the First and Second World Wars. It was carried out as part of a wider programme of work for the UK MoD and was intended to provide information useful for the understanding of fuel oil that could still be onboard wrecks that the United Kingdom Government may have responsibilities for.

The work addressed a data gap relevant to the understanding of pollution hazards from the many historic shipwrecks of the first half of the 20th century. During this period, the Royal Navy operated from bases across the globe. Fuel oil for its ships and other vessels under Admiralty control was therefore obtained from different oil producing regions. Despite attempts to obtain oil that met an evolving standard, the characteristics of the fuel oil supplied varied significantly. The study has sought to identify variations in the specific gravity, viscosity, pour point and asphaltene content of the different fuel oils available to the Admiralty over time. Bunkering records that identify what fuel oil was onboard individual vessels do not generally appear to exist. However, by studying purchasing, distribution, bunkering and fuel oil mixing practices, the study has produced a desk-based methodology for predicting what fuel oil is likely to have been carried at the time of loss. Desk-based case study testing has shown that whilst data gaps and uncertainty remain, the knowledge base has been improved and a workable methodology exists.

Keywords: Wrecks; Admiralty; Fuel; Regions; Characteristics; Predicting; Methodology

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Different conditions, common goals: Challenges in monitoring and management of the transnational and serial UNESCO World Heritage property “Prehistoric Pile Dwellings around the Alps”

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In 2011, the serial and transnational World Heritage Property “Prehistoric Pile Dwellings around the Alps” was inscribed in the UNESCO World Heritage List. The property comprises a selection of 111 of the more than 1000 known archaeological pile dwelling sites in six countries around the Alps (CH, AT, DE, IT, FR, SI). Pile dwellings are remains of prehistoric settlements from the period between 5000 and 500 BC. They are located under water, on lake shores, along rivers or in wetlands and offer exceptional preservation conditions especially for organic materials.

To manage this serial and transnational property the International Coordination Group UNESCO Palafittes (ICG) was created. It is made up of representatives of the six countries and 27 regions jointly responsible for the management of the sites. Its tasks are defined in the common Management Plan of the property. At national level the representatives in the ICG are integrated into different structures, depending on the administrative form of the country. In recent years there has been increasing interest and need within the ICG for closer exchange at international level between the governing bodies of the countries concerned and the responsible departments, to find a common way to monitor and manage the 111 sites, for the preservation of which the countries share responsibility.

For this reason, the ICG has set up a working group specifically dedicated to monitoring underwater sites. The aim of the working group "Monitoring Underwater Heritage (MUH)” is to develop common criteria to record and compare the current conditions of the underwater sites inscribed as UNESCO World Heritage, as well as to define a minimum standard for regular monitoring of these sites. The survey and the definition of the common standards are based on the needs of the sites, but also orientated on the requirements of UNESCO, in particular the Periodic Report.

In the lecture we would like to present the work of the MUH group and discuss in detail problems and solutions in the process of an international monitoring strategy for the underwater sites of the UNESCO World Heritage property.

Keywords: Cultural Heritage Management; Underwater Cultural Heritage; UNESCO; Underwater Monitoring; Prehistoric Pile Dwellings; Common Standards; Strategy Paper

Presentation in session L1: UCH Management in World Heritage Sites (Arturo Rey da Silva, Jonathan Sharfman, Elena Pérez-Àlvaro)

Du site archéologique aux Territoires de l'eau : héritages, passages, nouveaux concepts

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Cette communication propose d'offrir une lecture et une réflexion sur 20ans d'archéologie en rivière sur le territoire français.

Comment est-on passé du site archéologique en milieu fluvial au concept d'anthroposystème fluvial puis à celui de Territoires de l'eau?

Nous tenterons de discerner, au travers d'une chronologie précise évoquant les héritages intellectuels, la mise en place d'une archéologie des rivières et des fleuves, tant sur le plan administratif (ministère de la Culture) que sur le plan scientifique (universités et équipes de recherche). Cette première partie permettra de dessiner les contours de cette discipline au sein de l'organisation de la direction de l'archéologie, mais également au sein du monde universitaire et de la recherche.

En reprenant Colloques, programmes collectifs de recherches, axes ministériels, approches sociétales et enseignements universitaires, nous tenterons de montrer le lent cheminement de la recherche vers une archéologie plus inclusive, plus vertueuse, intégrant des concepts écologiques pertinents.

Dans une seconde partie, à partir d'exemples de sites archéologiques en eau (rivières, fleuves, zones humides), nous approcherons non pas tant les méthodes déployées que les réflexions en cours sur une archéologie des Territoires de l'eau. Nous étudierons sa place dans l'historiographie en France, son inscription possible dans les débats contemporains (changement climatique, perte de biodiversité, …) et témoignerons des nouvelles approches hybrides qui se font jour en France et en Loire en particulier (patrimoine culturel immatériel, Savoirs nautiques, Vers un Parlement de Loire).

Keywords: archéologie des rivières; France; savoirs nautiques; une archéologie des territoires de l'eau

Keynote presentation

Maritime Trade Links Between India and China: Insights from Chinese Porcelain Discoveries in India

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Chinese porcelain, distinguished by its refined craftsmanship and characteristic white hue, was a highly valued commodity imported into India from China. As a luxury item, it was transported in significant quantities via both the Silk Road and the maritime Spice Route. Literary accounts from Indian, Chinese, Arab, and European sources extensively document the trade of this prestigious ceramic.

India served as a major market for Chinese porcelain, as evidenced by archaeological discoveries across the Indian subcontinent. The earliest documented find was at Brahminabad in Sind (now in Pakistan) in 1854 CE. Since then, Chinese porcelain has been reported from over a hundred archaeological sites across 21 Indian states and Union Territories, ranging from peninsular India to Delhi in the north and from Gujarat's coastal settlements to remote sites in the Northeast. Notably, approximately 50% of these sites are located along India's coastline, underscoring the significant role of maritime trade in porcelain distribution.

The prolific presence of Chinese porcelain on both the East and West Coasts - particularly in Odisha, Andhra Pradesh, Tamil Nadu, Maharashtra, and Gujarat, attests to its widespread demand and use in India. However, despite its archaeological significance, the study of Chinese porcelain in India remains largely neglected.

This paper focuses on the maritime trade routes linking India and China, exploring the evidence provided by Chinese porcelain discoveries from various coastal archaeological sites in India. Through these findings, the paper aims to offer new perspectives on the historical trade relationships and cultural exchanges between the two nations.

Keywords: China; Chinese Porcelain; India; Maritime Trade; Archaeology

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Six ships from the 18th century in the Portuguese nautical iconography

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In order to characterise the ships and their evolution within a conceptual, technological and architectural signature, researchers are giving greater attention to material culture, but also to any other aspect that would contribute to a better understanding of these machines. Generally speaking, the remains of ships do not provide precise information about the rigging, the steering gear and most of the upper parts, which have already disappeared. Therefore, the information contained in contemporary documentation, such as iconography, must be thoroughly analysed in order to carry out comparative studies between the remaining parts of ships and the representations.

Iconography is particularly challenging because of the need to carry out a critical analysis of the authorship of the depiction, the motivation, and how much information the author had about the ships. In addition, the originality of the iconography under study is another concern, as it could have evolved since the original depiction, rather through adaptations, repairs or even reuse.

Having mentioned the above questions, our presentation aims to present and discuss a representation of six ships found on the ceiling of a manor house in southern Portugal, kilometres from the sea. The quality of the depiction of each ship contrasts with the rest of the illustration, as it shows a high level of detail of each ship, as opposed to the almost naïve style of the rest of the scenario. They form part of the roof's interior panelling, which is made up of polychrome wooden panels filled with vegetal, fantastic, zoomorphic and architectural motifs that probably have a narrative, a story that the author or authors wished to perpetuate.

To achieve the best possible results, this multidisciplinary and interdisciplinary research involved an innovative and non-intrusive approach and advanced technology to collect data. The pigment, the support material and the multiple layers were analysed in depth to reconstruct the ships, the environment and the production of these representations.

Keywords: Maritime Archaeology; Iconography; Technology; Heritage; Methodology, 3D Reconstructions; Material Analysis

Presentation in session G6: Ship Iconography from Prehistory to Modern Times (Zaraza Friedman)

Tacking OD2: Charting a new course into the past. An archaeological study of the 19th-Century shipwreck OD2 from Flevoland

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The 19th-century shipwreck OD2 from Flevoland, the Netherlands, provides a rich source of information for understanding the spatial layout, ship inventory, and historical context of the vessel. This study focuses on the trade network, the social status, and the daily life of the crew members. As with many wrecks from the former Zuiderzee area, no excavation report or in depth analysis exists for OD2, leaving this ship, like many others in the region, largely enigmatic. The wreck offers a valuable opportunity to gain deeper insight into the maritime history of 19th-century Dutch inland shipping, particularly vessels transporting bulk goods. OD2 was discovered in 1971 during agricultural work in Eastern Flevoland. The vessel was loaded with coking coal and yielded numerous other finds. Although the section above deck was largely missing and had been damaged by, among other things, agricultural activities, the lower part of the ship remained mostly intact. The ship's inventory was analyzed both functionally and materially, and based on the find locations, a spatial reconstruction of the lower part of the vessel was created. The inventory was then compared with four other 19thcentury inland vessels from the former Zuiderzee to identify gaps and peculiarities and to develop a broader understanding of bulk cargo transport in the 19th century. Analysis suggests that five people likely lived permanently on board, including at least a man, a woman, and a child. This is supported by spatial analysis, which revealed separate sleeping areas in the fore and aft sections. The coking coal was probably sourced from Germany (Aachen region) and transported via inland waterways. Unique finds, such as dominoes and a Bible, indicate leisure and religious practice on board. A mark on a small bowl suggests that the ship sank after 1865. This remains hypothetical, as the wreck does not form a fully closed context, many artifacts cannot be considered in situ, and not all finds can be confidently attributed to the original, functionally contemporaneous inventory of OD2. The comparison shows that OD2 exhibits certain gaps, including the absence of navigational instruments and rope. Vessels that sank after 1850 generally possessed larger and more varied inventories. A recurring pattern is the presence of permanent habitation on board, often including a woman and child. Although the limited comparative base and the non-representative nature of the available inventories render the findings provisional and hypothetical, they provide valuable insights into the variation of ship inventories and the social dynamics on board 19th-century inland vessels. The analysis of OD2 itself offers new perspectives on the crew members' living conditions, the spatial arrangement, and the historical context of the ship. Together, these findings contribute to a more nuanced understanding of the maritime archaeology of inland vessels transporting bulk goods in this period.

Keywords: Zuiderzee shipwrecks; 19th-century cargo vessel; Ship's inventories; Spatial reconstruction: Maritime historical context.

Poster presentation for session G5: Shipwreck Studies (Marnix Pieters)

Underwater Cultural Heritage and Global Justice: Ethical and Political Challenges of Universalizing the 2001 Convention

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The 2001 Convention on the Protection of the Underwater Cultural Heritage aims to safeguard humanity's submerged remains as a common good. However, its adoption remains uneven, revealing tensions between national sovereignty, global governance, and heritage justice. This paper offers an ethical and philosophical analysis of the challenges related to the universalization of the Convention, highlighting the political and moral dilemmas it raises.

First, the study examines the reluctance of certain states to ratify the Convention, questioning the conflict between national interests and collective responsibility. Is the protection of underwater heritage a matter of global public good, or is it subject to the strategic interests of maritime powers? Next, the discussion focuses on intergenerational justice: preserving this heritage ensures future generations' access to their past, but what mechanisms should be implemented to guarantee fair and sustainable management?

Finally, this analysis explores the ethics of the exploitation and valorization of underwater heritage. Between preservation, tourism, scientific research, and threats such as looting or industrial seabed exploitation, how can protection be reconciled with sustainable development? Should the universalization of the Convention be accompanied by a strengthened ethical framework to prevent the reproduction of heritage inequalities between wealthy nations and countries with limited conservation capacities?

By drawing on applied ethics and political philosophy, this paper provides insights into the conditions for a fairer and more inclusive governance of underwater cultural heritage, ensuring that its protection is not just a legal issue but also a matter of moral responsibility and international solidarity.

Keywords: Underwater Cultural Heritage; Heritage Justice; Applied Ethics; Sovereignty; Global Governance; Intergenerational Justice; Sustainable Development

Presentation in session P1: Make the 2001 Convention Universal to Address Current Challenges and Emergency Situations (Edouard Planche, Faisal Alanbar, Alison Faynot)

Archaeology of a pirate lair on Sainte-Marie Island, Madagascar

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Ambodifotatra Bay on Sainte-Marie Island in northeastern Madagascar is a unique maritime zone. This mouth protects several strategic inland waterways, some of which supply sources of drinking water, as well as mangrove swamps, and is closed at the entrance by the Isle aux Cayes (Islet Madame). This exceptional ecosystem was chosen by pirates at the end of the 17th century as their hideout. They stayed for 40 years, setting up their contraband trading post. Since 2022, archaeological research has been carried out in Ambodifotatra Bay, revealing the remains of the pirates' installations: careening area, water irrigation, construction of a camp, excavation of a shipwreck scuttled by the pirates.

Several areas have been archaeologically surveyed, yielding data of interest for understanding and organizing this hidden trading post. Islet Madame, at the entrance to the bay, has yielded numerous hut post holes and a very large quantity of Chinese porcelain fragments from the early 18th century. Further excavation is required to better understand the function of these buildings. At the same time, the underwater excavation of a complete shipwreck sunk around 1720 is underway. This is a unique case of a ship entirely made of teak in the European tradition, which has yielded a lot of Chinese porcelain, Islamic water vases and many other objects from the daily life of pirates. The aim is to try and identify this ship during the next archaeological mission.

Keywords: Madagascar; Sainte-Marie; Ambodifotatra Bay; Pirates; Shipwreck

Presentation in session G5: Shipwreck Studies (Marnix Pieters)

A storied ocean: Maritime collections and their interpretation at the Western Australian Museum

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Museum curators are like object cartographers, limited by space and the aspect of a story they have chosen to tell. As with the paradox of cartography, where it is impossible to include every feature on one map, the development of an exhibition narrative is also a reductive process. It is equally impracticable to include every object and interpretation in one exhibition and as such, curatorial practices contribute to and create explicit interpretations that are further disseminated through public display.

Yet by collectively performing this knowledge they create, museums today offer far more than a didactic and one-sided interpretation of the objects they choose to display. Curators recognise that objects are understood through the stories they generate and what they mean to the people who engage with them. Storytelling can also be a method of deconstructing current epistemic values and querying established hierarchies that privilege certain people, objects and histories above others.

This paper details a process of creating narratives for maritime collections at the Western Australian Museum using historically marginalised voices, including that of a survivor from the wrecked Dutch East Indiaman, *Batavia* (1629). Speculative and creative methodologies challenge traditional practices of object interpretation, seeking to create a cosmopolitical space and an interpretative structure that acknowledges the relationship between ourselves and others, including non-human entities. This practice attempts not only to capture new stories about the Indian Ocean but to respond to the challenge of how to represent others when the very concept of otherness is, in part, a construction of museology's own practices. Like cartography, museum curation has traditionally been the organisation of knowledge within Eurocentric boundaries. This approach uses archaeological, ethnographic, historical and ficto-critical methods to create object, human and animal biographies. The expectation is that from these complementary data, rich and diverse stories may emerge, thus demonstrating that museums, in their attempt to reflect history, also have the power to reimagine it.

Keywords: Indian Ocean; VOC; Museum; Maritime Archaeology; Shipwreck; Exhibition Methodologies

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Macrobotanical mixtures from river deposits in Brussels: from a rural Gallo-Roman site to the urbanisation of a medieval city

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In the last decade, macrobotanical remains from meters-thick infills of riverbeds excavated at two archaeological sites in Brussels were extensively studied. To the north of the city centre, at the site of Tour & Taxis, the remains of a meandering river arm was brought to light. Archaeological finds indicate human occupation during the Gallo-Roman period, while in the early medieval period anthropogenic activities declined and the river arm gradually disappeared from the landscape. The second site is situated within the ancient city centre of Brussels, in the area of the medieval harbour on the Senne, where several phases of the medieval river were uncovered. The oldest layers document on the towns' earliest developments while the most recent deposits shed light on the late medieval city and its urbanisation.

The results of the macrobotanical analyses of these two similar contexts from a rural and an urban site illustrate the potential and challenges of archaeobotanical studies of fluvial deposits and highlight the importance of an integrated taphonomical approach. The exceptional diversity of the plant material and its excellent waterlogged preservation offer unique insights into various aspects of daily life through time. Plant remains from both sites consist of a mixture of naturally accumulated material and remains from anthropogenic deposits, including animal dung, human excrements, fuel, domestic and artisanal waste. Due to the diverse origins of the botanical material that ended up in the water, the assemblages not only provide information on the local vegetation history but also on agriculture, food economy, trade, ornamental plants and waste management. In addition, numerous remains from the urban Senne deposits give material evidence for textile working and dyeing with plants along the riverbanks for more than three centuries.

Keywords: Archaeobotany; Vegetation; Food Economy; Textile Working; Urbanisation; Taphonomy; River Deposits

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Investigating Abu Dhabi's Underwater Archaeological Sites

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The Arabian Gulf has significant potential for underwater archaeological sites, as it has been the site of sustained maritime activity for several millennia. The fishing and pearling economies of the Gulf's littoral societies were an essential part of its economic fabric of its shores from at least the Neolithic period, and there are historical accounts of hundreds of pearling vessels spending four to five months of the year on the pearl banks in search of pearls. Terrestrial archaeological evidence also demonstrates that long-distance seaborne trade connected the region with shores beyond its borders from the Bronze Age until the present. Finally, the rapid rise of sea levels during the late stage Flandrian Transgression strongly suggests that submerged Palaeolithic landscapes exist beneath its waters. However, to date, underwater archaeology in the region has been remarkably underdeveloped, especially when compared to other parts of the world and the considerable amount of work that has been conducted in the realm of terrestrial archaeology. Most maritime studies in the Gulf have focused on boat documentation or linguistics, rather than on the material cultural remains beneath the sea. The few archaeological forays below the surface have been of a relatively short duration, and focused on relatively limited areas. As a result, to date, no historic shipwreck or pearl bank has been excavated and published to an academic standard in the Gulf. The Emirate of Abu Dhabi has recently established a permanent maritime archaeology unit under the direction of the Department of Culture and Tourism to address this issue. The huge potential for underwater archaeological sites is particularly significant for the Emirate, with over 37,000 square kms of marine area under its authority. The unit is currently working in collaboration with other stakeholders to develop a multi-platform marine geophysics mapping regime in order to identify potential sites of interest. In particular, it plans to explore innovative remote sensing techniques for the survey and excavation of pearl beds, which to date have been previously little studied from an archaeological perspective. This paper will discuss the unit's initial efforts to investigate and preserve Abu Dhabi's environmentally specific underwater cultural sites

Keywords: Pearl beds, Arabian Peninsula, marine geophysics, submerged landscapes

Presentation in session H1: maritime archaeology of the Arab world (Lucy Semaan, Crystal El Safadi, Lucy Blue)

Offshore development as a catalyst for submerged palaeolandscape research.

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Wessex Archaeology has been involved in submerged palaeolandscapes research for over 25 years, primarily around the UK but also in Europe, the USA, and Australia. During this time, we have been at the forefront of developing both research methodologies and mitigation strategies to maximise information collection within the constraints of the consenting processes. Our work with offshore industry has aided the evolution of iterative processes that mesh with the required engineering and design driven data collection process for industries including offshore wind farms, aggregate dredging, oil and gas, and associated offshore infrastructure.

This paper presents results of work from a variety of projects where palaeolandscapes were identified and researched within the context of offshore development, including some that contained significant archaeological remains. It addresses the variety of approaches to data analysis and seabed modelling, the kinds of information collected and assessed as part of the mitigation and consenting process, and the research outcomes from such work. We will also discuss the unique challenges of working on the Australian continental shelf. Here scientists and policy makers face the challenges of wildly differing world views, specifically the consideration of cultural heritage that cannot be defined within GIS polygons. Working with First Nations as project partners, however, offers unique opportunities to embed traditional knowledge about their submerged ancestral lands within the research that we do, enriching our research and understanding of the cultural values of these submerged palaeolandscapes.

Keywords: Offshore Development; Palaeolandscapes

Presentation in session D3: Submerged Prehistoric Landscapes in the Face of Development (Simon Fitch, Robyn Pelling, Ruth Plets)

A necessary sacrifice to protect the hull: Early Approaches to the Use of Sacrificial Sheathing by European Powers between the 16th and 18th Centuries.

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The protection of ship hulls has been a concern for shipbuilders and sailors since antiquity, a concern reflected in the wide array of coating systems developed to this day. In the second half of the 15th century, a new form of sheathing, this time made of wood, was introduced: sacrificial sheathing.

This type of hull sheathing was employed to protect vessels from the effects of marine borers. The system consisted of wooden planks, typically pine, attached to the outer hull beneath the waterline. These planks were laid over a thin layer of resinous material, which had been previously applied to the hull surface. The substance was composed of various elements, such as oils, tar, sulfur, and even animal hair. Finally, the sheathing planks were fixed using metal fasteners.

The development of sacrificial sheathing is attributed to the englishman Sir John Hawkins, and it was used with varying frequency until the 19th century. While this topic has predominantly been studied at a regional and national level, particularly in Great Britain and the Netherlands, its use by various maritime powers during this period has not yet been explored from a global perspective

This presentation will disccuss the results derived from a preliminary study of the technical characteristics of sacrificial sheathing, based on the material remains of wrecks identified as ships of English, Dutch, Portuguese, and Spanish origin.

Through this research, we have identified a period of experimentation with different materials in the 17th century, followed by a process of standardisation that began in the 18th century. Moreover, on ships of different flags, we observed certain morphological features that, rather than differing, share many similarities. This provides compelling evidence of the widespread use of this sheathing technique across Europe.

Keywords: Wooden Sheathing; Hull Protection; Marine Borers; Modern Europe; Shipbuilding

Presentation in session G1: Analysis of Caulking and Luting Materials (Kristof Haneca, Koen Deforce)

The Gislinge Boat Open Source Project: from boat-find to communities of maritime craftwork

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In 1993, the remains of a 7.7m long clinker-built boat were found during drainage works near the village of Gislinge, Denmark. Dated to ca. 1125 CE, the Gislinge Boat was reconstructed in full-scale at the Viking Ship Museum for the first time in 1995. Two decades later, a new project was developed at the Museum, exploring how open source approaches could be applied to maritime experimental archaeology and boatbuilding, with the aim of promoting and increasing engagement with maritime heritage and craft practice.

The working drawings for the Gislinge Boat were made available for free download via the project website. A programme of digital dissemination communicated all aspects of the building process, documenting and communicating the boatbuilders work on the reconstruction in real time whilst also providing an informal 'how-to guide' to building the boat for those who had downloaded the drawings. The project gained a large following online and slowly but surely, new Gislinge Boat reconstructions began to appear around the globe.

Several years have passed since the project was formally concluded at the Museum boatyard but it continues to have a life of its own online, thanks to the digital community social media provides.

Presenting a summary of the project and selected case-studies of boats that have been built as far afield as England, Estonia and the US, this paper will examine the potential maritime cultural heritage has to reach out to, and engage with, a much wider community than the 'traditional' museum-going public. The lasting impact the project has had on the Viking Ship Museum's dissemination practice, and the extent to which it continues to influence our approaches to the documentation and communication of maritime heritage will also be explored, allowing an opportunity to reflect on the often-overlooked social dimensions of museum outreach and practice.

Keywords: Gislinge Boat; Experimental Archaeology; Maritime Heritage; Maritime Craftwork; Public Engagement; Co-creation

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Post medieval shipwreck on Southern reef near Silba island

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Sea around Silba's three reefs is an archaeologically rich area – the seabed shows traces of at least five shipwrecks – four roman and a single post medieval one – with Southern reef being host to a Roman 1st century wreck and post medieval one, spaced some 200 meters apart.

Post medieval shipwreck on Southern reef near Silba island lies on the depth of 32 to 36 meters, and has been surveyed first time in 2005. During a short campaign in 2009 anchors and canons were partially uncovered and ceramic finds have been excavated. The campaign established the site's great potential but was never properly excavated due to financial constraints. 2019 marked the return to the site with an idea to continue excavating an area of the site which yielded ceramic finds and make a contemporary photogrammetric documentation which resulted in a 3D model and an orthographic mosaic of the site. A part of the site was excavated with the grid placed near the anchors which again showed a lot of pottery finds.

All ceramic finds from the first excavating campaign (2009) point to Ligurian workshops of the second half of the 17th century. One pitcher and one conical bowl could be connected to a workshop in Venetian area. Second short campaign (2019) yielded similar finds, with an interesting find of a possible glass lamp, a stone mortar and an amphora with a round bottom.

The site also shows two groups of cannons and a group of 3 anchors. Unfortunately no wooden remains have been uncovered yet, probably due to a large sediment layer covering the site – first ceramic finds near the anchors showed up after dredging ca. 70 cm of coarse sand. The ships' remains will be the aim of next excavation campaign in 2026.

Keywords: Postmedieval; Shipwreck; Pottery; Cannons; Anchors

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

The Origins and Development of Underwater Archaeology at Nicolaus Copernicus University in Toruń (Poland)–50 years of a tradition that continues to this day.

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The archives help today's academics recreate the beginnings of underwater archaeology at Nicolaus Copernicus University in Toruń, which began in the 1970s. Its beginnings are associated with the activities of two young archaeologists: Andrzej Kola and Gerard Wilke. Their commitment and passion for exploring underwater sites were the foundation for developing this field at Nicolaus Copernicus University. They were the first to obtain scuba diving licenses, which enabled numerous search operations and research of archaeological sites located underwater. Over time, they created a team of underwater archaeology enthusiasts joined by students of Nicolaus Copernicus University. 50 years ago, in 1975, the first Academic Underwater Tourism Club "Trepang" was established at Nicolaus Copernicus University, the tradition of which continues to this day as the Academic Underwater Research Group. Student associations known as "clubs" were a space for developing research passions among students and young people in the 1970s and 1980s. This was when the communist system operated in Poland after World War II, which resulted in significant shortages of goods and limited access to foreign products, making the development of science much slower than in Western countries. At the same time, the technical background was formed to conduct research and many projects in the field of underwater archaeology were initiated in the world. The most important activities include work on wrecks in the Baltic Sea, the Black Sea, the Aegean Sea, and Thailand. In the early 1980s, the first interdisciplinary university classes in underwater archaeology in Poland were initiated in Toruń. The Department of Underwater Archaeology began its activity under the direction of Gerard Wilke, and later Andrzej Kola. The Department initiated and continues to conduct underwater research on Ostrów Lednicki Island - an archaeological site associated with the beginnings of the Polish State. Written notes, research journals, documents, and archival photographs allow for the reconstruction of the methodology, exploration, and initiatives of the first archaeologists from Nicolaus Copernicus University. Also valuable are the memories of senior professors who witnessed and participated in the development and transformation of the discipline of underwater archaeology at the Nicolaus Copernicus University in Toruń.

Keywords: Archives; Underwater Archaeology; Tradition; Heritage; Poland

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

Tracing trade systems – shipwreck connectivity in the Finnish archipelago

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The northern Baltic Sea is known for its many historical shipwrecks. In Finnish waters and in the Gulf of Finland, the oldest known shipwrecks of trade ships date to the 13th century, when sailing traffic is known to have increased in the Baltic Sea. The reasons behind this increase are known from historical sources and relate to the political and mercantile interests of the European nations directed towards the north, but there is also much to be learned from the archaeological remains. Shipwrecks offer a multivariate view to the past, which may be accessed in many ways. When dealing with fractured and incomplete data, information may be gleaned by using network methods and GIS-analysis as frameworks. The research questions of connection and interaction of the Finnish archipelago are discussed in this presentation by the case studies of two shipwrecks of trade ships. The Egelskär shipwreck is dated to the end of the 13th century, and the Gråharuna shipwreck to the second half of the 16th century. They represent both ends of the medieval period in Finland, and function as looking glasses to the development of trade systems of that time in the northern Baltic Sea. What can be deduced from the mode of trade in the northern Baltic based on the example from these two shipwrecks? Is there a development in trade that is visible in the shipwrecks and the materials on board? Based on limited source material, overarching generalizations on trade systems in the northern Baltic should not be made, but an attempt to place these two shipwrecks into a larger framework will reveal information also on the regional trading systems.

Keywords: Middle Ages; Early Modern Period; Shipwrecks; Trade; Interaction; Connectivity

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

The Maritime Archaeology Research Exchange (M.A.R.E.) Project -Bringing Students to the Table

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The Maritime Archaeology Research Exchange (M.A.R.E.) Project is a student-led initiative established by early-career researchers to promote the field of maritime archaeology. Originally conceived following a successful conference hosted by University of Hamburg students in 2020, M.A.R.E. has grown significantly and is now an international organization dedicated to platforming emerging researchers.

In 2019, a group of University of Hamburg students envisioned a conference dedicated to early-career researchers in maritime archaeology. Due to the COVID-19 pandemic, the inaugural conference in November 2020 transitioned to a virtual format. Despite the challenges posed by the global pandemic, the new format achieved remarkable success. Emboldened by this achievement, the founders transformed M.A.R.E. into a monthly online lecture series beginning in January 2021. Since then, the organization has consistently provided a platform for scholars to present their research and has to-date hosted over 35 lectures.

The researchers that have presented with M.A.R.E. study a diverse range of topics within maritime archaeology including methodological innovations, technological advancements, and the study of ancient landscapes, harbors, and shipwrecks from the Bronze Age to the modern day. The audience is comprised of both academic professionals and enthusiasts passionate about cultural heritage. To further community engagement, M.A.R.E. introduced a monthly newsletter in 2023, that offers updates on recent publications, job opportunities, and upcoming conferences. So far, we have over 600 registrations for this newsletter.

In 2025, M.A.R.E. expanded its outreach by launching the M.A.R.E. Podcast. The Podcast explores current research trends and future directions in maritime archaeology with early-career researchers from around Europe. Through these initiatives, M.A.R.E. not only promotes the next generation of maritime archaeologists by fostering a robust professional network but also enhances public appreciation of cultural heritage through accessible dissemination.

In our presentation, we aim to showcase how we organize and manage the project, the challenges we have faced, and the valuable lessons we have learned along the way. We will also share our vision for the future, including new ideas for expanding the network and further supporting early-career scholars in maritime archaeology.

Keywords: Early-Career; Outreach; Online Lecture; Student Participation; Podcast; Network; International Cooperation

Presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

Listening to our Past: Recording the History of Maritime Archaeology

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This paper will present the results of the Listening to Our Past: Recording the History of Maritime Archaeology project. Whilst maritime archaeology has deep roots, it is still a relatively young discipline, with the majority of the pioneering excavations carried out in the last 50-60 years. As many of the individuals who contributed to the development of the field are still active, we have a unique opportunity to build a historically informed understanding of the development of maritime archaeology as a discipline, as a practice and as a profession. Oral histories are key to this, as narratives from pioneering individuals who have contributed to the field, can provide insights through personal experiences and memories.

The project has been ongoing since 2022, with a number of individuals from around the world having been interviewed to date. The research potential of these interviews has also been recognised, and the project has developed a database of the audio recordings and transcripts. The database also includes photographs provided by the interviewees showing scenes of day-to-day fieldwork, providing a more personal insight into their involvement with the discipline and its history. The data will then be accessible and searchable through an open access online portal, allowing researchers to explore the interviews and enabling the creative use of this material to tell new stories and better understand the history of the discipline. Alongside this, the database has been developed to include oral histories from other similar initiatives, and to signpost to other projects, websites and archives relevant to the history of maritime archaeology.

Keywords: Oral History; Maritime Archaeology; Pioneers; Interviews; Database

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

Combining archaeological and salvage expertise to better understand Potentially Polluting Wrecks, their heritage significance and research opportunities.

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Commissioned by the UK Ministry of Defense, Maritime Archaeology and ABL are undertaking Historic Desk-Based Assessments (H-DBAs) of over 450 potentially polluting wrecks (PPWs). These reports are based on archival information, and provide details on what a ship was, what it was carrying at the time of loss, how it was lost, and if possible, what has happened to the wreck since the time of loss.

The physical character of the vessel is assessed by looking at ships plans, local and national archives are used to find accounts of the sinking and information on what it was carrying; with a particular focus on potentially polluting cargo, oil and ammunition. Hydrographic reports, diver accounts and seabed surveys are also assessed to understand the current condition of the wreck. By gathering the historical information, the team are able to assess the probable status of the wreck and its contents and can provide sufficient information to the MoD for them to make a risk assessment and plan next steps.

This research has also allowed us to highlight the heritage significance of these vessels. Although many PPWs are military losses from the First and Second World Wars, there are also a wide range of ship types within this collection that have varied technological characteristics and use-life biographies.

Considerations of the cultural heritage significance of these sites is not often fully elaborated within the PP assessment process, which understandably focuses on the immediacy of environmental threats. However, research, survey and assessment of these 19th and 20th century wrecks provides opportunities to contribute to archaeological and historical narratives and research frameworks.

This talk will draw on examples from the H-DBA process in addition to sites investigated as part of the research focused Forgotten Wrecks of the First World War project. It will include case studies highlighting the variety of ship types included, as well as the wealth of information that can be obtained from archival sources, giving us a better understanding both of the associated cultural heritage of sites and the potential for polluting.

Keywords: Potentially Polluting Wrecks; Archival Research; Salvage Expertise; Heritage Significance; WWI; WWII

Presentation in session J2: Maritime Heritage in the Service of Environmental Action (Katerina Velentza, Achilleas Iasonos)

Those Flowering Waters: Reconstructing a Millennium of Human-River entanglements in Central Nicaragua through multi-proxy palynological analysis, archaeological excavations and local knowledge

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Water is a key element in the interplay between humans, their relationships with each other, and their environments. While archaeological research can shed light on human-river entanglements through time, a deep understanding of this complex relationship requires the active participation of local communities in the research process.

Central Nicaragua is highly susceptible to hydroclimatic variations, which affect the subsistence economies of local populations. To what extent did hydroclimatic changes impact prehispanic adaptation strategies in the Mayales River Valley (MRV)?

This presentation will showcase the final results of the Interdisciplinary Archaeological Project Finca Santa Matilda (PRISMA), which integrates the geoarchaeological analysis of the Roberto Amador site (RA), dating to AD 900–1250, with a multi-proxy palynological analysis of a 900-year core from El Tigre-Asososca Lake (León). Additionally, the interpretation of data has been enriched by the essential contributions of local communities in the MRV.

Prehispanic human responses to inundations at RA are evidenced by the strategic use of the site's landscape and the differentiated use of alluvial terraces. The inundation that affected the site around AD 1250 likely led to its eventual abandonment, revealing how human communities in the MRV employed adaptive settlement strategies to relocate in response to major fluvial changes. By comparing the archaeological data from RA with the paleoclimatic record produced by the authors, it is possible to correlate this inundation with regional hydroclimatic developments.

Further integration with local knowledge highlights that human communities in the MRV maintained a constant and dynamic relationship with the valley's fluvial environment, revealing how rivers are active forces that intimately shape human societies.

Keywords: Nicaragua; Palynology; Local Knowledge; Rivers; Climatic Change; Hydroclimatic

Presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

German X torpedoboots flotilla - a threat emerging from the depths of sea and history

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In 9th November 1916 the Germans decided to go out from Libau to hunt for Imperial Russia's ships in the Baltic Sea. The squadron consisted of three cruisers and VIII and X torpedoboat flotille ships. Those brand new and most advanced 80-meter long destroyers (in German torpedoboot) were considered as the pride of Imperial German Navy. The eleven ships of X torpedoboots flotilla was sent to bomb Paldiski port and any Russian ships anchored there. Due to a series of bad decisions and even worse luck, seven of those destroyers ran into mines and sank during one night. The whole operation was such an embarrassment that the Germans decided to not speak about it. So the ships were forgotten for almost 100 years. Now, however, all seven of them have been found. Each of those ships could take on board up to 220 tons of fuel oil. Currently it is not yet clear, how much fuel could still be on board the wrecks but considering that the wrecks have been under water 108 years it's likely that they will start polluting some time soon. This presentation will summarise the results of a HDBA and some fieldwork on the wrecks.

Keywords: WWI; Baltic Sea; Pollution; German Navy; Wrecks; Oil

Presentation in session J1: Toxic Legacies (Matthew Skelhorn, Stuart Leather, Matt Carter)

Navigation et mobilité des rivières dans le haut bassin de la Loire : les confluences de l'Allier et de la Dore

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Dans le haut bassin de la Loire, la confluence de la Dore avec l'Allier a varié sur une longueur de 20 km au sud de Vichy. La navigation importante de l'Allier - affluent principal de la Loire et son pendant économique plus important que la Loire amont, en raison de la richesse de la Limagne auvergnate et bourbonnaise - a nécessité des aménagements importants pour sa navigation.

Plusieurs ports ont été installés, en particulier au débouché de la vallée de la Dore dans l'Allier. Quatre « ports de Ris », des XVII et XVIIIe siècle ont ainsi été relevés à quelques centaines de mètres les uns des autres, montrant la variabilité importante du cours des deux rivières. Les archives montrent ainsi que l'Allier a coulé à Puy-Guillaume (arrosé aujourd'hui par la Dore), au moins à deux reprises au XVII-XVIIe et fin XVIIe-début XVIIIe.

Cette grande mobilité nécessite également un important travail de « balisement », qui consiste à rendre le lit navigable en enlevant ou signalant les obstacles et en construisant des duits pour créer des chenaux de navigation. Cette zone de confluence était enfin soumise à plusieurs péages fluviaux que la C*ommunauté des Marchands fréquentant la Loire et fleuves descendant en icelle* va combattre et réussir progressivement à faire disparaître du XIVe au XVIIIe siècle.

La variation de la confluence de l'Allier et de la Dore, débouché du commerce du Livradois et de tout l'est de l'Auvergne, a obligé à déplacer constamment les ports de liaison de cette région avec le bassin ligérien. La persistance de l'action humaine, pour retisser le lien batelier que la rivière détruisait régulièrement est exemplaire sur les cinq siècles documentés. Elle témoigne de régions centrales commercialement très ouvertes sur l'extérieur, avec une centralisation sur des places d'échange important amont/aval, comme la ville de Thiers et montre l'importance de ces relations avec l'ensemble du bassin de la Loire.

Keywords: Navigation; Ports; Duits; Péages; Mobilité Fluviale

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Recent efforts to bridge the gap between underwater archaeology and public engagement in Taiwan

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Taiwan, an island situated at the crossroads of critical maritime trade routes in East Asia, has a profound underwater heritage that reflects thousands of years of human endeavor, trade, war, and migration. Taiwan's Legislative Yuan enacted the Underwater Cultural Heritage Preservation Act in November 2015, creating a comprehensive legislative framework for the protection of submerged cultural heritage. This legislation is consistent with the UNESCO Convention on the Protection of Underwater Cultural Heritage, and represents Taiwan's commitment to safeguard its underwater cultural heritage. Since that time, Taiwanese underwater archaeology has grown significantly. The systematic documentation and recovery of information from many shipwrecks, submerged artifacts, and ancient landscapes have played a significant role in the growth. In addition, major efforts to bridge the gap between underwater archaeology and public engagement have also been undertaken. The Bureau of Cultural Heritage of the Ministry of Culture, which is the primary competent authority for cultural heritage, has been at the forefront of these efforts. National Tsing Hua University's Research Center for Underwater Archaeology and Heritage (RCUAH) has also played an important role in developing underwater archaeological research and incorporating underwater archaeology into Taiwan's cultural heritage education, preservation, and promotion initiatives. Underwater archaeology is likely to become a focus of public attention as a result of these collaborative initiatives, helping to augment Taiwanese awareness of the significance of submerged cultural heritage. This presentation is an attempt to provide an overview of Taiwan's efforts to bridge the gap between underwater archaeology and public engagement during the previous decade.

Keywords: Taiwan; Underwater Archaeology: Underwater Heritage; Public Engagement; Awareness

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

Balancing marine development and underwater cultural heritage preservation in Taiwan

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The rapid expansion of marine development presents a critical challenge in balancing economic growth, environmental sustainability, and the preservation of underwater cultural heritage. As global maritime and coastal activities increase, the protection of submerged cultural assets—such as shipwrecks, historic ports, and ancient relics—has become more urgent. Taiwan, with its extensive coastline and growing offshore industries, has recognized this need through legal frameworks, including the Underwater Cultural Heritage Preservation Act.

Article 9 of this Act mandates that government agencies and public enterprises assess the presence of underwater cultural heritage before approving or implementing any development projects. Additionally, the Regulations on the Investigation and Handling of Underwater Cultural Heritage Before Development outline procedures for conducting these assessments, ensuring that heritage preservation is integrated into marine planning and policy.

In recent years, Taiwan has promoted offshore wind power, port expansions, and other large-scale marine development projects. As a result, there has been a dramatic increase in underwater cultural heritage surveys, offering new opportunities for archaeological discovery and preservation. However, several challenges remain in the practical implementation of these regulations. Issues such as insufficient expertise, funding constraints, and conflicts between economic interests and heritage conservation continue to complicate efforts. Furthermore, the lack of standardized methodologies for underwater heritage investigations further complicates efforts to ensure effective protection.

This presentation will begin with an overview of Taiwan's major marine development projects, followed by an examination of the policies and measures enacted to safeguard underwater cultural heritage. Finally, it will discuss our recent Project for Monitoring Underwater Cultural Heritage during the No. 1 Wharf Dredging Work at Magong Port in Penghu, Taiwan. This case study will highlight ongoing challenges and propose potential methodological solutions for better integrating cultural heritage preservation into marine development planning

Keywords: Underwater Cultural Heritage Preservation Act; Marine Planning And Policy

Presentation in session N1: Scientific Contribution of Archaeology in the Context of Territorial Planning in the Maritime Sector - Results, Methods and News (Nicolas Bigourdan, Antony Firth, Frédéric Leroy)

Managing Iceland's Maritime Cultural Heritage: A Collaborative Plan for the Future

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This paper examines the role of community engagement as a management strategy for Iceland's maritime archaeological sites. Managing underwater heritage presents global challenges, and involving local communities, particularly sports divers, has shown potential worldwide. Initial training sessions and surveys indicated strong interest in participation, yet issues related to communication and professional skepticism toward public involvement underscored the need for a stronger foundational infrastructure and a more inclusive archaeological approach. As a result, the research focus shifted from direct community engagement to addressing professional perspectives, incorporating interviews, surveys, workshops, and educational initiatives. Conducted over three years as part of a doctoral study, this research aims to develop management recommendations that promote collaboration. This paper presents the key findings and outlines a proposed strategy for the sustainable management of Iceland's maritime cultural heritage.

Keywords: Maritime Heritage Management; Community Archaeology; Underwater Conservation

Presentation in session B1: Integrating the Public into UCH (Andrew Viduka)

In the middle of the Danube - river archaeology in the changing environment of Danube islands

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The study of the multi-level interaction between rivers, river landscapes and the communities living along them is an important field of archaeology and environmental archaeology. Among the climate change challenges of our time, changes in the river ecosystems are of particular importance. We plan to present the example of a geographically well-defined area of one of the largest islands in the Danube (the Csepel Island and the small island around it) as a sample area, through the ages. River islands are distinct environments with clear boundaries, unique microclimates and various morphological features beneficial for activities such as ferries, fisheries, and mills. Despite their importance, the historical changes in the river environment and the diverse uses of island landscapes have not been extensively studied from an environmental historical-archaeological perspective, either in Hungary or in the broader scientific community. Along Csepel Island, before the river regulations of the 19th century, several small islands had vanished. Its large size and diverse wetland environment have allowed for a significant population to settle, and for multiple land uses to coexist and succeed each other. We hypothesise that in the Sigetzug, in addition to the major ports of the Danube continental artery, trade-related central sites were established at the crossing points of the east-west livestock trade (cattle, horses). Besides the anchorages, an important factor in this was the possibility of housing a considerable number of animals at one time in the protected pastures in the interior of the large island. Fishing, especially the migratory Viza (giant sturgeon) fishery, could provide a seasonal surplus of good quality food, which could also feed the participants in fairs and festivals. The presentation includes archaeological topography, underwater sites (wrecks, buildings, wooden construction) and settlement changes (the displacement of entire villages) due to floods during the Little Ice Age. We will pay attention to the risks exposed by recent climatic events, the serious droughts (extreme low water level) to underwater heritage. Periods considered extend from EBA to 18th c. A.D.

Keywords: River Archaeology; Danube; Islandology; Environmental Changes; River Environment; Multidisciplinarity

Presentation in session E1: River versus Climate Change (Marion Foucher, Attila Tóth, Annie Dumont)

Ship or Scrap? Wreck archaeology in the depths of Lake Constance

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Lake Constance, the third largest lake in Central Europe, serves as a significant transport corridor. The discovery of a dugout canoe in the Seerhein near Constance in 2018 confirms the use of watercraft on the lake from the Late Neolithic onward. The lakebed, reaching depths of 251 meters, is home to numerous wrecks of ships and aircraft from various epochs. The first findings emerged in the early 20th century, and with the establishment of the Hemmenhofen office in the 1980s, the Landesamt für Denkmalpflege (State Office for Cultural Heritage Baden-Württemberg; LAD) began documenting wrecks through diving archaeology. Despite ongoing research, the total number of wrecks in Lake Constance remains unknown, and their condition is only well-documented in a few cases, particularly in deeper areas.

In late 2022, the LAD initiated the project "Wrecks and the Depth of Lake Constance," aimed at recording, inventorying, and documenting wrecks across all depths. This involves systematically analyzing current bathymetric and sonar data to identify wrecks of ships and aircraft. The project's goal is to compile a comprehensive inventory and assess the condition and monument value of each object. Both known and newly discovered wrecks will be examined to identify potential hazards and preserve their informational value for the future.

Over the past two years, various anomalies have been discovered on the seabed and investigated using ROVs, divers and sidescan sonar, which is considered fundamental research. While not all anomalies revealed archaeologically significant wrecks, many modern boats and types of debris, such as construction waste and fishing nets, were found. These discoveries have led to ongoing refinements in methodology. Nevertheless, each anomaly continues to present a surprise regarding what lies beneath the lakebed.

This presentation will focus on the methodological approach in the 'Wrecks in the Depths of Lake Constance' project. It highlights techniques adapted from deep-sea archaeology, as well as modern survey methods such as sidescan sonar and the use of ROVs. Additionally, it discusses the insights we have gained from this project so far.

Keywords: Lake Constance; Deep-Sea Archaeology; Wreck Archaeology; Survey; Techniques; Inventorisation; ROV’s

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

A new 3D reconstruction of the middle bronze age boat from Mitrou, Greece

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In 2007, the remains of a small boat were discovered within the prehistoric settlement of Mitrou, located on the south coast of the North Euboean Gulf in Central Greece. Mitrou was the focus of systematic excavations in 2004-2008 by a joint team of the Greek Archaeological Service and the University of Tennessee, under the co-direction of the author.

The boat had been preserved as a boat stain, that is, its disintegrated wood had left a black stain in the ground in the shape of the hull's bottom. Roughly half the hull was excavated, the rest remaining *in situ*. The boat was dated stratigraphically to an early stage of the Middle Helladic II Early phase, ca. 1900 BCE. This is only the fourth small boat discovered at a prehistoric site in Greece, and the first one dating to the Bronze Age. It is also the earliest "seagoing" vessel found in the Aegean, even though its small dimensions would have limited its action radius to the sheltered waters of the Euboean Gulf area. In spite of its small size, the Mitrou boat is highly significant for our understanding of Bronze Age boatbuilding in the Aegean.

I have argued that the Mitrou boat was an expanded logboat and that the Bronze Age Aegean had a tradition of expanded logboats (Van de Moortel 2012). This argument is supported by the characteristics of boats depicted in the famous miniature ship fresco of Akrotiri, on Thera, as well as in some Minoan ship images. At that time of that publication, only the shape of the bottom and the midship section were known, and no attempt was made to reconstruct the hull in 3D.

In recent years, a more detailed study of the excavation records and the stratigraphy has revealed that the hull shape was preserved to a greater height than previously thought. This has made it possible to create a 3D reconstruction of the boat. In this presentation, the new reconstruction will be presented as well as previously unpublished evidence supporting the interpretation of the Mitrou boat as an expanded logboat.

Keywords: Modelling; Expanded Logboat; Boat Stain; Bronze Age Aegean Shipbuilding; Ship Wood Compression

Presentation in session K1: 3D Modelling (Johan Opdebeeck, Rob van Haarlem)

A low cost tool for mapping the drowned prehistoric landscapes

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Magnetometers are used both onshore and offshore to detect metal residues and unexploded explosives. The raw recordings are filtered, with large deviations indicating the presence of this type of residue. Small deviations are treated as background noise and normally filtered out. Several studies over the past 10 years have shown that background noise can be used to map geological structures in the subsurface, such as filled up prehistoric channels. This is possible by measuring small differences in ferromagnetic minerals in the different sediments. These types of studies have been successfully carried out in both the North Sea and the IJsselmeer area which will be presented in this paper. This technique offers a good methodology to map drowned prehistoric landscape and examine large area's of the sea floor at a rather low cost.

Keywords: Magnetometry; Prehistoric Landscape; Channels; North Sea; Sub Surface Geology

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

Early Historic Books from Australian Waters: Literary Fragments from the VOC Shipwrecks Batavia (1629), Vergulde Draak (1656), Zuiddorp (1712), and Zeewijk (1727)

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Among the many artifacts recovered from the wreck sites of Dutch East India Company (*Verenigde Oostindische Compagnie*, VOC) ships along the Western Australian coast, a handful of book remains offer a rare glimpse into the intellectual and material culture of VOC voyages. Though often overlooked, these remnants—fragments of wooden book covers, brass clasps, and catch plates—serve as tangible links to the reading habits, administrative practices, and personal belongings of those aboard.

Books recovered from *Batavia*, *Vergulde Draak*, *Zuiddorp*, and *Zeewijk* have not survived in their entirety, with most reduced to their durable brass fittings. The consistency in their construction across a century of VOC operations—from the 1620s to the early 18th century—however suggests a remarkable continuity in post-medieval bookbinding techniques. The presence of these remains in both shipwrecks and survivor campsites highlights the essential role of books in the daily lives of VOC officers, crew members, and passengers.

This paper presents a detailed study of these book remains, comparing them with similar finds from other Dutch shipwrecks worldwide. By examining the materiality of these books—their bindings, locking mechanisms, and structural features—this research contributes to a broader understanding of maritime literacy, VOC administration, and the enduring exchange of knowledge across global networks.

Keywords: Dutch East India Company (VOC); Historic Bookbinding; Shipwreck Artifacts; Material Culture; Literacy

Presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

The submerged stone structure Blinkerwall – evidence of a drive lane for the late Glacial/early Holocene mass hunting of reindeer herds in Northern Europe?

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Since the mid-1970s, prehistoric researchers have come to the conclusion that the famous sites of Late Ice Age hunting communities in the Stellmoor tunnel valley north-east of Hamburg must have been the result of targeted mass hunts of migrating reindeer herds. However, due to the heavy anthropogenic impact on the northern European landscape during the Holocene, it has always been unclear what auxiliary structures were built by the communities of the time to guide the reindeer herds to the respective 'kill sites'.

There is now evidence from all over the world of prehistoric hunting structures, particularly in climates with open landscapes, which were mainly used for mass hunting of herds of ungulates (antelope, gazelles, wild horses, bison or reindeer). In order to better understand the function of the newly discovered megastructures in the Baltic Sea, comparable features from prehistoric and sub-recent times must be evaluated and comparatively analysed. A review of existing structures is a prerequisite for a robust scientific interpretation of the Blinkerwall and comparable structures which might exist elsewhere in the western Baltic Sea.

This paper will present first comparative examples and explain why we currently consider a prehistoric "drive lane" to be the most likely explanatory model for the anthropogenic megastructures on the Baltic Sea floor.

Keywords: Submerged Stone Age; Hunter-Gatherer; Megastructures; Early Holocene; Human Landscape; Baltic Sea

Presentation in session D5: Prehistoric Human Landscapes are Hidden (Harald Lübke, Marcel Bradtmöller)

The San José Galleon: Circulation, Trade, and Cultural Exchange in the Early Modern Period

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The recent discovery of the San José Galleon by the Colombian state represents a unique opportunity for the study of early modernity, the exchange between the Americas, Europe, and Asia, and the early stages of globalisation. This vessel, which led the *Flota de Tierra Firme* between 1706 and 1708, sank during a context marked by maritime blockades and risks derived from the War of the Spanish Succession. Its archaeological remains are exceptional not only because of the scarcity of similar sites in the Caribbean and the remarkable preservation of the wreck, but also because of their relevance in a period of economic and political transformation.

Written records of the first voyage of the San José Galleon in 1706 provide relevant information on the materials, people, ideas and orders that circulated between Europe and America. From these documents, it is possible to analyse the role of certain cargo objects as boundary objects, elements that facilitated interaction between different communities and knowledge. Furthermore, the analysis of the hierarchical structure within the galleon reflects broader social dynamics, replicating the power relations of modern society.

In addition, preliminary analyses of material culture from the archaeological context of the San José Galleon shipwreck offer valuable insights into the ship's role in the trade and circulation of goods. The cargo, which was onboard at the time of the sinking, included items that had been stored for years on Tierra Firme and in Peru, as well as objects that may have originated in Canton, China, brought via a trans-Pacific route that connected South America with Asia. Among the most significant finds were cobs, botijas, syringes, Chinese cups, case bottles, and also possibly objects of American origin, all of which highlight the diversity of products and their transcontinental origin.

The contrast between the documentary sources of 1706 and the archaeological record of 1708 provides an exceptional case for the study of the mobilisation, circulation and adaptation of techniques and objects, not only in the naval sphere, but also in agriculture, construction and eating/drinking *habitus*. Thus, the Galleon San José becomes a key case study to enter into the discussion of the processes of interconnection and cultural adaptation that gave rise to transimperial identities and phenomena of glocalisation in the Caribbean during the early modern period.

Keywords: Shipwreck; San José Galleon; Early Globalisation; Maritime Archaeology; Material Culture

Presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Across the river: Uncovering the maritime cultural landscape of crossing the river Humber

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The Humber estuary, between Yorkshire and Lincolnshire, has been a significant maritime locale since prehistory, providing a link between Britain and northern Europe through the North Sea. From the Bronze Age Ferriby boats (Chapman and Chapman 2005; Coates 2005; Van de Noort et al. 2014), considered as Europe's 'oldest watercraft', to the riverside site of Roman Petuaria (see Petuaria ReVisited project), and from the Vikings' maritime presence in Yorkshire, and the Medieval trade with the Hanseatic League, to Hull's prolific post-medieval maritime industry, the long and wide estuary of the river Humber has determined the cultural, economic and social aspects of people's lives in the region.

Throughout history the river Humber has been seen as both a connecting and a separating entity by the locals living at Yorkshire (north) and Lincolnshire (south), parts of which were integrated between 1974 and 1996 under the county of Humberside. Crossing that river (by ferry from the early 14th Century or since the 1980s over the Humber Bridge), has been a very important experience of living in the Humber region. In this paper we are using Westerdahl's (1992) concept of 'maritime cultural landscape' to explore cultural understandings of crossing the river Humber during the post-medieval period. Our team has been investigating standing, but frequently ignored material remains (such as ferry quays, dock buildings, and surviving ferry boats), documents from local and national historical archives, oral histories and personal experiences of crossing the river Humber. Our research and analysis reveal significant insights on life by a large estuary setting at the interface between land and sea, and its influence on people's understanding of the landscape.

Keywords: Maritime Cultural Landscape; River Archaeology; Intertidal Archaeology

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

RETS : Revealing the Senne. A hidden Landmark in the historical center of Brussels. Preliminary Results.

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Throughout history, the Senne river has always been an important landmark for Brussels, shaping the city's landscape and serving as a crucial resource for food, water supply, waste disposal, navigation, and industry. Infrastructures such as mills, breweries, fortifications and fishponds could be found along its banks. Over time, both natural and human interventions have dramatically altered its course and tributaries. Today, many questions remain unanswered concerning the evolution of the Senneriver valley, and the general human-environment interactions across history. Recent (geo)archaeological research conducted under the auspices of urban.brussels, the Brussels Regional Administration in charge of the archaeological heritage, has shown the tremendous archaeological potential of the river valley to reach a renewed understanding of the development of the Senne and its branches. Striking examples are the discovery of an unknown old meander on the site of Tour & Taxis in 2015 that permitted to reconstruct the site and its environment in Gallo-Roman times (De Cupere et al. 2017) and the excavation of the late medieval harbour at the Parking 58 site (Ghesquière et al. 2024). This interdisciplinary project integrates historical, (geo)archaeological, geological, and environmental data to model the Senne's evolution from the start of the Holocene until the 19th century. Through GIS and Rockworks analysis, ancient river traces can be identified and distinguished, while a p-OSL analysis of geological cores offers chronological insights into sediment deposition. The resulting 2D-maps and 3D-models showing the evolution of the river will serve as valuable decision-making tools for assessing the likelihood of river-related archaeological sites, contributing to a deeper understanding of the dynamic relationship between Brussels and its river through time.

De Cupere, B., Devos, Y., Marinova, E., Speleers, L., Nicosia, C., Modrie, S., Van Bellingen, S., 2017. De opgravingen van Thurn en Taxis: een inkijk op het Romeinse landschap en de voedseleconomie (Brussel). Signa, 6 : 23-26.

Ghesquière, V., Timmermans, J., Meganck, M., Van Bellingen, S., De Cupere, B., Speleers, L., Van Schepdael, N., Van de Vijver, K., Weitz, A., Deforce, K., Devos, Y., 2024. Fouilles archéologiques sur le site de l'ancien Parking 58 – Bruxelles. Premiers résultats, Urban Research, Brussels.

Keywords: Brussels; River Evolution; Human-Environment Interactions; Holocene; River Reconstruction

Presentation in session E2: River and Inland Water Archaeology: Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Cogs (?) in context. A further interpretation of the 14th century Doel 1 & 2 ships (Belgium).

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The Doel ships, excavated in 2000 and 2002, were studied in detail about a decade ago. Since then, new research on similar vessels has provided fresh perspectives, allowing for updated interpretations of their construction, timber selection, and operational context. This paper will take a deeper look into the shipbuilding techniques and logistics of both vessels, their final phase in Doel, and their place within the ongoing discussion surrounding cog/Bremen-type ships.

A thorough reassessment of the original data has been conducted to better understand possible wood management practices, timber growth patterns, and tree selection for shipbuilding. Additionally, the reconstruction and estimated loading capacities of these ships will be analysed in comparison with similar vessels, using insights gained from a reconstructed model. By examining these aspects, the study aims to provide a clearer picture of the life of these both vessels from tree to boat and the reuse of its timber.

Evidence of disassembly was previously identified, but recent studies confirm that timber reuse was widespread in the Low Countries, particularly in shipbuilding and repair practices. By integrating both archaeological and historical sources, this paper will further explore this phenomenon, particularly in relation to the find location at Doel. Comparisons will be drawn with other sites in the late medieval Scheldt and Zwin basins, providing a broader context for ship reuse and deconstruction practices. These insights contribute to a more comprehensive understanding of shipbuilding economies and resource management in the region.

Ultimately, this research aims to shed new light on the maritime activities of Flanders in the 14th century and the connection to northern Europe and the Baltic. By re-examining these ships within the latest scholarly framework, we develop a more comprehensive understanding of their role in medieval trade, as well as their logistics from the ship's construction to its final stage of use.

Keywords: Cogs; Medieval; Ships; Timber; Flanders

Presentation in session G4: Archaeology and History of Medieval and Early Modern Cargo Ships in Baltic Sea (Riikka Tevali, Patrik Höglund, Priit Lätti)

TESTEREP: Reconstructing 5000 Years of Belgian Coastal Evolution by Studying a Lost Island

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The TESTEREP project investigates the long-term evolution of the Belgian coastal landscape over the past 5000 years by integrating onshore and offshore data into a comprehensive transdisciplinary framework. The main aim is to understand the impact of both natural forces and human interventions in shaping the landscape and in determining the vulnerability of the coast for erosion and flooding. The project does this by reconstructing the paleogeography of the former Testerep island, which was once centrally located in the Belgian coast, stretching from Westende to Oostende. The large Testerep tidal gully separated it from the mainland since the Roman period. During the Middle Ages this gully silted up and was eventually embanked, dammed and turned into polders. At the same time, a large part of the seaward side of the island, including the medieval town of Oostende, disappeared under the waves over the centuries.

To capture the evolving landscape setup and shifting coastline, a GIS-database of both natural and manmade landscape features was established. It built on the legacy of previous work and was enhanced with new on- and offshore data, collected using geophysical surveys, coring, metal detecting, excavations and sampling for radiocarbon and OSL dating. These integrated datasets were turned into paleogeographic maps and digital terrain models for different time slices, which in turn served as input for advanced morphological and hydrodynamic models. These simulate water movement, waves and sediment transport over centuries, and were used to test hypotheses about the creation and demise of Testerep, by assessing the relative impacts of natural coastal dynamics and human landscape modifications, offering new insights into the mechanisms driving coastal change.

The project also includes a significant outreach component, using theatre, film, and exhibitions with innovative virtual landscape reconstructions to pass on its multidisciplinary knowledge to stakeholders from policy, industry and the general public. This way, the project aims to raise public awareness about coastal dynamics and current threats and to inspire sustainable coastal management strategies for the future, by taking inspiration from the past.

Keywords: Coastal Landscape Evolution; Landscape Archaeology; Marine Geology; Hydrodynamic Modeling; Public Outreach

Poster presentation in session D2: Coastal Maritime Landscapes (Soetkin Vervust, Ruth Plets, Bente Sven Majchczack)

Coastal engineering: The discovery of a Roman terp along the Heistlaan in Ramskapelle (Knokke-Heist)

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Archaeological research in the coastal plain of Flanders has long faced challenges due to dynamic landscape evolution and sedimentary complexity. Between 2011 and 2015 investigations along the A11 highway connection between Bruges, Knokke-Heist and Damme provided new insights into Roman-period occupation strategies. Among the significant findings is a 2nd-3rd century AD artificial dwelling mound or *terp* at Heistlaan, Ramskapelle.

Geoarchaeological and sedimentological analyses, combined with micromorphological studies, confirm the site's anthropogenic origin. The mound, measuring approximately 367 m² and standing 91 cm high, was carefully constructed using displaced sediments, strategically selected for stability and drainage. The discovery of structures, including sod houses with sunken floors, alongside a substantial assemblage of Roman pottery, animal remains, glass and metal artifacts, suggests a settlement of considerable socio-economic status.

This site provides a crucial piece of evidence for Roman land-use strategies in intertidal environments. It supports the hypothesis that habitation in the coastal plain was not merely transient but involved significant investment in infrastructure to counter environmental challenges. Furthermore, the findings contribute to a broader reevaluation of Roman occupation models in the Civitas Menapiorum.

By integrating traditional archaeological methods (coring and trenching) with geophysical prospection, soil analysis and micromorphological sampling, this study highlights the potential of multidisciplinary approaches in unraveling complex intertidal archaeological contexts. The *terp* along the Heistlaan in Ramskapelle represents a key example of Roman ingenuity in coastal adaptation, comparable to sites in Zeeland and Ostend.

These results reinforce the need for tailored research strategies when investigating intertidal cultural heritage. The discovery at Heistlaan underscores the importance of geoarchaeology in shaping our understanding of human-environment interactions in the North Sea region during antiquity.

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Keywords: Roman Archaeology; Coastal Plain Of Flanders; Terp; Geoarchaeology; Intertidal Adaptation; Micromorphology

Presentation in session Q2: Unity in Diversity (Kalle Virtanen)

"Keep the *Dauphine* afloat!" Pump parts and water management tools recovered from the wreck of a French privateer frigate sunk on the Natière rocks off St. Malo (France, 1704)

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The Natière 1 shipwreck, identified as the Norman privateer frigate *Dauphine*, was built in 1703 at Le Havre de Grâce royal dockyard and lost in 1704 at the entrance to St. Malo. This site was the subject of a major underwater excavation project carried out between 1999 and 2008 by the Department of Subaquatic and Underwater Archaeological Researches (Drassm, French Ministry of Culture) and the Adramar (Association for the Development and Research of Maritime Archaeology).

More than fifty items of wood, leather, fiber, iron and lead relating to bilge pumps and the water management were discovered at the forepart of the wreck, many of them in a very good state of preservation. This paper will consider successively pumps and pump utensils, tools, scrapers and brushes used to maintain the hull, and evidences of "all-in-one" kits ready to mend weakened areas in a hurry. All these artefacts will be presented in the context of their archaeological discovery and their use, accordingly to the main functional families identified onboard but also with reference to the various historical sources available for the period, in order to associate these items with the historical term attested by the archives, or even the existing iconographic representations that can be attached to these elements.

The aim of this paper is also to highlight some of the recognition keys that enable archaeologists excavating a wreck to get a better grasp of those items of shipboard equipment and material culture that are indispensable to the ship's survival, as well as to recognize their contribution to deducing the spatial layout of the remains (particularly with regard to bilge pumps) and to avoid any identification traps.

Keywords: Shipwreck; Bilge Pump; Upper Pump Box; Lower Pump Box; Pump Lever; Caulking & Mending Tools

Presentation in session G3: Trying Not to Sink: Managing Water on Ships (Thierry Boyer)

Including the public in managing and protecting underwater cultural heritage: the GIRT Scientific Divers citizen science programme

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GIRT Scientific Divers Pty Ltd

Most, if not all, heritage management agencies responsible for the protection of underwater cultural heritage collect insufficient site condition data yearly from sitesin their jurisdictions to make informed science-based management decisions. Gathering Information via Recreational and Technical (GIRT) Scientific Divers formally commenced in January 2019 in Dunedin, New Zealand after a pilot project phase in South Australia. GIRT was developed to give the diving public an ethically appropriate opportunity to participate in underwater archaeology and to ideally give heritage management agencies more real time robust site condition data, from a wider range of sites, at various depths, in more geographical distributed locations, than achievable by the limited number of people employed to manage underwater cultural heritage. While GIRT as a citizen science programme is in the early stages of its development, GIRT has already demonstrated that open circuit and closed-circuit divers are interested to dive with a purpose and participate in GIRT. Currently, 51 sites have been adopted across Australia and New Zealand with more limited uptake in other countries. Data collected by members has contributed to a more informed understanding of the condition of sitesin both countries and GIRT has been shown to be a pathway into underwater archaeology for individuals with an interest in marine biology. This presentation showcases GIRT's contributions and achievements to date.

Keywords GIRT Scientific Diver, citizen science, underwater cultural heritage management, condition monitoring, conservation

Presentation in session B1: Integrating the public into UCH (Andy Viduka)

Monitoring intertidal heritage with inSAR – The VESTIGIUM project

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The VESTIGIUM project is a multidisciplinary initiative focused on the study, documentation, and conservation of intertidal heritage along the Cádiz coastline (Spain). The project integrates a variety of techniques, including LiDAR, geophysics, radiocarbon dating, biological and sedimentary analysis, and InSAR, to assess the condition and risks affecting cultural and paleobiological remains in intertidal environments.

Among its diverse methodologies, Interferometric Synthetic Aperture Radar (InSAR) has been explored as a non-invasive tool to monitor medieval watchtowers, coastal castles, and 20th-century military structures (bunkers and fortifications), which are particularly vulnerable due to their location in dynamic coastal and marshland environments. Using data from the European Ground Motion Service (EGMS) and Sentinel-1 imagery, we analyze long-term deformation trends, assessing differential ground movement and its impact on structural stability. These findings are compared with historical records, geotechnical assessments, and field observations to enhance the understanding of site evolution.

This paper presents the methodological approach and preliminary results of InSAR-based monitoring within VESTIGIUM, discussing its integration with other techniques to support the preventive conservation of intertidal heritage. The study highlights the potential of InSAR for long-term monitoring in coastal areas, contributing to heritage management strategies in response to environmental and anthropogenic pressures.

Keywords: InSAR; Intertidal Heritage; Coastal Fortifications; Ground Deformation; Remote Sensing; Preventive Conservation; Cádiz

Poster presentation in session O1: Preservation of UCH (Jordy Moies)

The RUSH project: a tool to improve strategies for underwater cultural heritage in the context of the Cultural Heritage Framework Programme (CHFP).

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Underwater cultural heritage (UCH) is a complex field that requires the integration of various technologies and research methodologies. Such interdisciplinary approach is essential for documenting underwater sites and enhancing their accessibility. Additionally, cultural heritage is an important component of marine ecosystems, demanding for a comprehensive understanding of both cultural and natural factors, as well as the interactions and influences they have on each other. This calls for an interdisciplinary approach that emphasizes information sharing and knowledge transfer, thereby improving the operational and sustainable use of underwater cultural heritage.

The RUSH project uses a remote sensing approach to improve our ability to develop strategies for the conservation, management and communication of underwater cultural sites and their associated benthic communities. This action implies the use of technologies aimed at building a comprehensive overview of the seabed environment and its cultural features. The aim is to provide tools to document sites, assess their condition and prioritize conservation efforts, while ensuring that the cultural heritage remains in situ for future study and use.

A case study is presented in the Marine Protected Area of the Baia Archaeological Park (Naples, south Italy). This area was utilized as a test site to demonstrate the capabilities of ultra-high resolution acoustic remote sensing investigations for the 3D reconstruction of underwater artifacts, considering both the biotic and abiotic components of the seabed. The first results include multiresolution models for interactive online visualization of spatial data within a Web3D/WebXR framework, specifically the ATON platform of the CNR-ISPC. The next steps involve the identification of collaborative actions aimed at forming a multi-competence team to enhance public engagement and the acquisition of knowledge about Underwater Cultural Heritage.

Keywords: Underwater Cultural Heritage; Ocean Decade; UHR Acoustic Remote Sensing; Baia Archaeological Park; Habitat Mapping; Web3D Application; Ocean Literacy

Presentation in session C1: UCH in the UN Ocean Decade (Georgia Holly, Kiki Kuijjer, Arturo Rey da Silva)

Central Eurasia and the discovery of the stock-anchor

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The bulk of prehistoric anchorological research has focused on the Mediterranean, naturally encompassing the literate centres, while the anchor-stone traditions (primarily one and three-holed) resulted in exceptional preservation allowing for a robust corpus of material. However, this has resulted in a yet unexplained conceptional disconformity where a single design, the stock-anchor, seems to appear in the 7th century BC and practically erases the millennia-old traditions, seemingly without any evidence of transitional development. For this reason, the author has focused on studying regions and their traditions beyond the Mediterranean, for as relatively limited the evidence may be, expanding also into the ethnographic sphere. This poster will propose that the early stock-anchor parallels closest with the evidence from central Eurasia, whose tradition regularly has numerous hooked branches lashed upon or around an elongated ballast stone. It will be illustrated that the discovery of the stock-anchor could particularly and readily be explained as being influenced from north-of-the-Mediterranean, feasibly Black Sea, shores from where the Greeks could have adopted it to be spread Mediterranean-wide (and beyond).

Keywords: Anchors, Prehistoric Aegean, Ingenuity, Central Eurasia, Anchoring

Poster presentation in session D4: The Double Narrative of Man and Water - Approaches and Perspectives (Martina Seifert, Andreas Külzer, Aylin Güngör)

Patterns of anchor-stone traditions in the prehistoric Red Sea and Mediterranean

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Perhaps the most abundant extant evidence for prehistoric navigation and maritime culture are anchor-stones. In the Red Sea and Mediterranean these are primarily in the form of single pierced stones ('stone anchors') and stone-frames of 2-staked anchors (with three total holes - often termed 'composite stone anchors'). In 2019 (L. Blue ed., "In the footsteps …") the author summarized foundational conspicuous details of these objects. Continuation of this investigation has elucidated several nuanced patterns of design, and enlarged the geographical scope, demanding update.

This discussion will expand upon of the apparent Late Bronze dichotomy of stone anchors (one-hole) in the Levant, and staked (stone-framed) anchors in Cyprus and the Aegean proposed in 2019. Within this context it will be demonstrated that Cypriot anchor tradition indicates that the island's sailors played an exceptional role integrating the Levant, Egypt and Greece, and westward, in the Late Bronze Age. Regarding the Mycenaean Aegean itself, long an anomalous lacuna in the anchorology record, it will be illustrated to have at least included widespread stone-frame staked-anchor tradition thanks to recent publication of careful Balkan peninsula and Aegean islands surveys. This tradition morphs into a unique Iron Age form which might be identified as Homer's 'eunai', as the foundations of Magna Graecia materialized. Meanwhile, the Phoenicians remained faithful to the mainland Levantine stone anchor (one-hole) tradition, even as they explored Atlantic shores. Finally, it will be demonstrated that the discovery in the 7th-century BC of the stock-anchor (wood-framed) rapidly brings an end to the anchor-stone as the primary sea-going tradition.

Keywords: Anchors, Prehistory, Near East, Tradition, Interaction

Presentation in session D4: The Double Narrative of Man and Water - Approaches and Perspectives (Martina Seifert, Andreas Külzer, Aylin Güngör)

Once upon a time in a sailing ship - Ballast stones and intimate maritime engagements

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A stone, the size of a plum, black like licorice. It looks like a mundane stone, and yet it isn't. It is flint, which doesn't naturally exist in its current whereabouts. The stone is a mnemonic of the sailing ship heydays of Oulu, a city in Northern Finland by the Gulf of Bothnia, a thriving tar exportation centre from 17th to 19th centuries. The flint stones arrived at Oulu as the ballast of sailing ships. As ballast soil was usually reused, the unknown journeys and biographies of the stones have a scent of an adventure.

The city of Oulu was planning to remove the ballast-pregnant old harbour soil in the autumn of 2024. I organized a pop-up event, 'Save the ballast'. While collecting the flints in a frenzy, the event participants gained knowledge of the ballast stones, of their remarkable and essential roles in local and global seafaring. The participants enjoyed the sensorial maritime heritage opportunity and an immersive, playful and subjective experience of the maritime landscape adding to the appreciation of local maritime history. The participants were asked to report how the object biographies of the stones continued, now that they were once again dislocated. The result was a fascinating mixture of intimacy and diffuse ideas: poetry, a nursery mobile, a trial to produce a biblical circumcision knife, and a therapeutic use of a stone as a stabilizer by a traumatherapist.

I have also used ballast stones with people experiencing homelessness and in a workshop combining maritime heritage and bibliotherapy. These experiments show that even small stones can make maritime heritage tangible, meaningful and accessible for the public, adding inclusion, heritage based well-being, and equality to cultural heritage stewardship. Heritage encounters at best are all about individual perceptions and co-creation of values. A dynamic interaction between the observer and heritage, diffused through knowledge, personal biographies and strong emotions.

(If accepted, I would like to propose a stone adoption program to my IKUWA8 presentation with reports on the afterlives of the ballast stones, a modern maritime network; maybe this could work as a seed for a joint-article or a joint "rendez-vous" -session in IKUWA10?)

Keywords: Creativity; Public Archaeology; Immersive Heritage Engagement; Maritime Heritage Well-being Affordances; Participation; Marginalized Stakeholders; Networks

Poster presentation in session A1: Bringing the UCH to Life (Alison James, Peta Knott, Mark Beattie-Edwards)

The search for the maritime blockade of Amsterdam 1573

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At the start of the Eighty Years' War, Amsterdam was part of the Spanish crown. To hinder the shipping connection of this city with the Zuiderzee, the rebels sank ships several times in the IJ, the waterway on which the city is located, in 1572 and 1573. In April 1573, even the remains of a church and complete gravestones were used for this purpose, historical sources tell us. The Spanish admiral and stadtholder Bossu nevertheless managed to pass the blockade with his fleet on September 13 of the same year, which was the run-up to the Battle of the Zuiderzee. On October 11, the rebels won this naval battle, during which Bossu was captured and his ship 'De Inquisitie' was captured.

From 2022, archaeologists of the Cultural Heritage Agency of the Netherlands investigate the location of the blockade. The starting points of the field research are firstly that it should be possible to locate the narrowest part of the IJ, even though the current topography has completely changed. Secondly, it seemed unlikely that all the wrecks of the approximately 600 meter long blockade would be gone. We know that in 1578, after Amsterdam joined the Revolt, wrecks were recovered from the IJ and that a deep shipping channel was constructed in the twentieth century. But perhaps the wrecks could be present in the undisturbed parts of the riverbed…

Keywords: Historical Maritime Archaeology; Survey; Blockade

Presentation in session E2: River and Inland Water Archaeology - Exploring submerged and Watercourse-Linked Cultural Heritage (Cécile Ansieau, Ann Degraeve, Christophe Delaere)

Lost Plot in Porcelain: Biography of a Shipwrecked Bowl

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This study examines a large transitional Ming-Qing Chinese blue-and-white Jingdezhen porcelain Kraak bowl recovered from the 17th-century Chinese shipwreck in Indonesian waters, colloquially known as the Hatcher Wreck (1643-46 CE). Commercially salvaged and commodified, the bowl was first auctioned at Christie's Amsterdam in 1984 CE and now forms part of the Hong Kong Maritime Museum collection.

The study adopts a critical interpretivist paradigm and a pragmatic research philosophy that draws on the foundational theoretical frameworks of the social life of things, object biography, object agency, and postcolonial theories. Interdisciplinary provenance and action research strategies utilising a complex mixed-methodology that combined archival research, material culture analysis, comparative iconographic evaluation, ethnographic inquiry, archaeological survey and investigation were used to determine the orphaned artefact's true provenance, significance, shifting identity and symbolic material meanings.

The results revealed that the bowl's design is not a generic waterscape. Instead, the novel iconography suggests a politically significant commission linked to the 1644 CE assassination attempt on the Dutch Governor-General in Batavia, then a Dutch East India Company (VOC)Trading Post in present-day Jakarta, Indonesia. Batavia is depicted as a 'third space' in which violent oppositional resistance to Dutch colonialism was employed to dismantle colonial power structures. This cathartic process is captured as a lost plot in culturally hybrid porcelain, deviating from conventional narratives in Chinese export ware."

Hence, the bowl functioned as a visual record of political tensions and a primary source of information about the assassination attempt rather than merely as a commercial or utilitarian household object. The bowl's disrupted biography underscores the dynamic interplay between materiality and historical narrative. The analysis highlights how objects can function as non-human agents that mediate socio-political contexts and cultural memory. The fragmented provenance challenged traditional object biography approaches, raising questions about the ethics of studying treasure-hunted shipwreck porcelain and the impact of commercial exploitation on our ability to piece together the past. Ultimately, this analysis significantly reconstructs a lost political narrative and redefines the methodological potentials of object biography in understanding colonial history.

Keywords: Maritime Collections; Kraak Porcelain; Object Biography; Postcolonialism; Batavia; Indonesia

Poster presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

Establishing the Asian Underwater Cultural Heritage Association (AUCHA): A Participatory Approach

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The Asian Underwater Cultural Heritage Association (AUCHA) is a newly established organisation that addresses pressing regional challenges and advocates for enhanced underwater cultural heritage (UCH) management in Asia. Grounded in emergent dialectical pluralism, framed by pragmatic inter-contextual relativism, and underpinned by a triangulation of institutional entrepreneurship, transnational advocacy networks, and postcolonial theories, this paper examines AUCHA's establishment. It describes the key drivers and illustrates how regionally driven stakeholder engagement and bottom-up participatory processes can reshape regional advocacy, collaboration, and governance structures to amplify the voices of Asian communities, redefine UCH governance frameworks in response to the region's unique challenges, and address the limitations of existing frameworks, such as the 2001 UNESCO Convention.

With a growing membership drawn from nearly 30 Asian nations, AUCHA's community-based participatory mixed-methods action research approach to co-creation has proven to enhance legitimacy and resource mobilisation, foster innovative decision-making, and ensure that marginalised voices, including those of local and Indigenous communities, are integrated into UCH advocacy and governance strategies. AUCHA's establishment, therefore, represents a paradigm shift in regional cooperation. It offers transferable insights for sustainable UCH preservation while highlighting the critical importance of context-based, culturally sensitive, and inclusive processes that resonate with Asia's regional diversity.

By centring Asia's unique historical, social, and cultural contexts, and decentering those from outside the region, AUCHA demonstrates how locally driven, community-based inclusive methodologies can effectively address regional challenges in underwater archaeology and heritage

conservation, thereby paving the way for future collaborative endeavours across the region safeguarding Asia's rich underwater heritage for future generations.

Keywords: Asian Underwater Cultural Heritage Association (AUCHA); Underwater Cultural Heritage (UCH); Asian Approaches; Community-Based Participatory Approaches; Advocacy; Asia

Presentation in session B2: Maritime Heritage Societies (Markku Luoto, Peta Knott)

Maritime Cultural Exchange: Shaping Global Identities

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Maritime cultural exchange has long underpinned global interconnections, yet its multifaceted nature is frequently reduced to economic trade. This paper reconceptualises maritime cultural exchange, exploring how the reciprocal transfer of people, goods, information, ideas, beliefs, technologies, and traditions reconfigures identities and social practices beyond direct shipborne interactions. The paper unravels the complex networks through which cultural values and social practices traverse the ocean and presents a theoretical framework to illuminate how long-term global connectivity and cultural hybridity have shaped identities and worldviews.

The theoretical framework is operationalised using an interdisciplinary, mixed-methods approach integrating archaeological evidence, literary reviews, art historical analysis, and material culture studies. By challenging the traditional conflation of trade with cultural exchange, the study emphasises how materialities actively mediate the diffusion and reconfiguration of cultural identities. The paper examines direct maritime and indirect terrestrial routes to illuminate the complex interplay between commerce, culture, and technology that has driven global cultural convergence.

Based on case studies ranging from naval construction to material culture circulation, the paper demonstrates that maritime cultural exchange is a robust mechanism driving global cultural transformation, reshaping economic relations and broader cultural landscapes. The results reveal that maritime exchange has transformed economic relations and the broader cultural landscape of dominant powers and seafaring communities while permeating inland societies and those in peripheral regions. This reconceptualisation enriches theoretical debates whilst providing fresh empirical insights into the mechanisms that have shaped and continue to influence cultural interconnectivity on a global scale and sets the stage for further exploration into the transformative impact of maritime networks at the forthcoming conference.

Keywords: Maritime Cultural Exchange; Materiality; Archaeology; Material Culture Studies; Globalisation

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)

Medieval and post-medieval intertidal shipwrecks in northern Norway: gauging the benefits and challenges of a liminal context

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This paper examines three archaeologically documented shipwrecks from northern Norway that illustrate some of the complexities of intertidal depositional contexts. Two of the wrecks are located on small offshore island c.17 km apart and 28-38 km from the mainland in Helgeland, Nordland. The Husøy wreck was a >20 m cargo ship built in western Norway and abandoned in the mid-15th century. Partial excavation in 1958-59 represents the earliest semi-underwater wreck excavation in Norway and was restricted to low tide. The wreck was destroyed by dredging in 1984. The second wreck was discovered by a mechanical excavator on the island of Lovund in 1976. It was excavated in 2017 as a research project financed a local interest group and is on display in a custom-made museum that opened in 2024. It is an open 12.2 m cargo vessel built of oak from south Norway around 1460. Both medieval wrecks are interpreted as vessels used for transport of stockfish to Bergen and owned by local fishing communities. The third wreck is located at a river mouth near Fauske in Nordland with frames partially exposed at low tide. The hull interior was uncovered and documented with 3D photogrammetry as a research project in 2022. The wreck is a large *jekt* cargo vessel (c. 20 m) used for stockfish transport to Bergen and was built of local pine around 1750. The ship had multiple repairs and remained in use for nearly a century before being abandoned. This is the only existing example of a *jekt* built in Nordland. All of the wrecks discussed in this presentation highlight issues encountered in intertidal locations. Dredging of the Husøy wreck should never have occurred but was needed for increased depth at a small boat harbour. The shallow location of the Lovund boat made it possible to drain the water and enable “dry” excavation. The jekt at Mjønes is in an excellent state of preservation due to a continuous flow of fresh water from the river but would be challenging to excavate. The implications of these pros and cons for maritime archaeology are evaluated and discussed.

Keywords: Northern Norway; Intertidal Shipwrecks; Medieval Period; Cargo Vessels; Stockfish Trade

Presentation in session F1: Intertidal Cultural Heritage (Jan Trachet, Jeroen Verhegge, Wim De Clercq)

Understanding the role of oral histories in Maritime Archaeology in South Africa

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Maritime Archaeology in South Africa is a young discipline which faces immense challenges in relation to public awareness, capacity and investment. While bona fide archaeological projects have been few and far between, the advent of SCUBA and the lack of legislative controls in the 1960s resulted in an explosion of salvaging operations around the South African coastline. In a thirty-year period from the late 1960s to the late 1990s a large number of wrecks with rich cargoes were found and salvaged with the artefacts sold for profit. Due to the relatively new understanding of underwater heritage, the legislation was sparce and the heritage authorities often relied on the good grace of the salvors to share the results of their operations. This lack of comprehensive oversight at the time meant that much of this activity went unrecorded, leaving important historical knowledge lost or scattered.

In 2015 the South African Heritage Resources Agency (SAHRA) and the Rijksdienst voor het Cultureel Erfgoed (RCE) of the Netherlands embarked on a joint project titled "Modern Oral History: Dutch Wrecks in South African Waters". The aim was to gather oral and archival information about the history of modern salvage – much of which existed only in the memories of divers and in their personal notes, sketches, and photos – before it was lost forever.

As well as interviewing the divers conducting the work and the archaeologists who came along later, the project relied on archival research undertaken in the Netherlands, an investigation into museum collections and a review of the legacy data held by SAHRA in Cape Town.

This talk will give an overview of the project including the challenges experienced by SAHRA, often due to the historically strained relationship between the heritage authorities and the salvors, which, as is the case in many parts of the world, can be complicated and often adversarial. The conclusion will focus on the overarching results of the project, the positive experiences of those involved and possibilities for the future.

Keywords: Archives; Oral Histories; Legacy Data

Presentation in session A2: History of Maritime Archaeology (Lauren Tidbury, Anna Demetriou, Julie Satchell)

New Achievements of China's Inland Underwater Archaeology--A Case Study of Shicheng City, Zhejiang Province

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In 1959, to build Xin'anjiang River Hydropower Station, the first independently designed and constructed by China, the upper reaches of the Xin'anjiang River were dammed to store water, forming an artificial lake. According to statistics, various relics submerged underwater included cities, important towns, markets, villages, farms, mountains, forests, houses, communication facilities, water conservancy facilities and buildings, etc. The two main ancient cities in the inundation area were: the old town of Chun'an County, also known as Hecheng City; and the old town of Sui'an County, also known as Shicheng City, or 'Lion City'. Before the Xin'anjiang River Reservoir was built, the local authorities had requested that the houses in the two old towns be demolished, destroyed and disinfected. Hecheng City was largely destroyed, but Shicheng City was basically preserved intact. In 2023, we investigated the inundated, yet relatively intact, Shicheng City. Shicheng City was built in the early Tang Dynasty (618-907 CE) and continued to be used until the construction of the Xin'anjiang River Reservoir in 1959. A large number of ancient buildings from the Ming (1368-1644 CE) and Qing Dynasties (1644-1911 CE) were retained in the city. This underwater archaeological investigation used various technical methods to explore the city distribution range, urban layout, preservation status, burial environment and other basic data of the submerged Shicheng Ruins. The archaeology team also investigated some representative local memorial archways in the nearby towns, which resembled those submerged ones to a large extent. They are precious comparative buildings from on land. They are good control group when using the side-scan sonar to identify underwater memorial archway structures. Our underwater archaeological survey of Shicheng City revealed a rich archaeological archive from the Tang to Qing dynasties, and provided new fresh insights into ancient urban evolution. The result underscores the potential of artificially inundated environments, and validates the integration of underwater and terrestrial survey techniques.

Keywords: Artificial Lake; Inland Underwater Archaeology; Shicheng City; Urban Layout; Physical Detection

Presentation in session H2: Asian Underwater Archaeology (Sarah Ward, Rasika Muthucumarana)

Exploring the Depths on a Budget: Photogrammetry with Low-Cost ROVs

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Over the past decade, maritime archaeology has seen two major technological advancements: photogrammetry and remotely operated vehicles (ROVs). Photogrammetry enables maritime archaeologists to document sites quickly, accurately, and in high resolution, creating detailed 3D models that facilitate further analysis. Meanwhile, ROVs provide access to deeper underwater sites beyond the physical limitations of divers, expanding the scope of archaeological research.

The authors employ off-the-shelf, low-cost ROVs—commonly known as underwater drones—to conduct photogrammetric documentation of submerged archaeological sites at depths exceeding 40 meters. These ROVs allow researchers to systematically capture images and videos, which are then processed to reconstruct site features digitally. The extracted scientific data contribute to academic research, public dissemination, and the effective management and preservation of underwater cultural heritage.

This paper presents several case studies demonstrating the advantages and challenges of using low-cost ROVs and photogrammetry in maritime archaeology. It also explores methodologies for optimizing data collection, processing, and interpretation in deepwater environments.

Keywords: Photogrammetry; ROVs; Underwater Drones; Deep Sea; SfM

Presentation in session K2: Deep Sea Archaeology (Carlos del Cairo Hurtado, Ana Catarina García, Jung Young-Hwa, Carlos Reina Martínez)

The Marine Historic Environment Record Service: Integrating Heritage Data for Policy, Planning, and Public Engagement

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The UK's marine sector is undergoing rapid transformation. Offshore wind capacity is set to grow from under 10GW today to 65GW by 2035, alongside shipping, fishing, marine aggregates, undersea cables, carbon storage, and conservation, all competing for limited seabed space. At the same time climate change is accelerating risks to marine and coastal heritage. Without reliable data to inform planning, listings, and policy decision making, marine heritage risks being overlooked. As the marine landscape changes, Historic England's Marine Historic Environment Record Service (MHERS) plays an important role in managing this change. In curating England's National Marine Heritage Record (NMHR), we provide critical data on shipwrecks, submerged landscapes, isolated finds, and coastal heritage sites across England's Exclusive Economic Zone (EEZ). However, managing marine heritage at a national scale presents ongoing challenges regarding governance, data quality, and accessibility. Defining landward boundaries remains complex, terrestrial data integration requires validation and improvement, and public access must be balanced with confidentiality for sensitive sites. To address these challenges, we collaborate with our colleagues from Marine Planning, Policy and Listings to ensure that heritage data can inform offshore developments, seabed resource management, and protection of sites, balancing economic growth with historic preservation, contributing to HE's Net Zero strategy and England's Blue Economy. To improve data quality and accessibility we are implementing Mariner, a new Arches database, to restructure and enhance the NMHR, resolving inconsistent record formats, hierarchical data limitations, and the challenge of linking differing record types. We are integrating coastal erosion data, seabed instability assessments, and climate risk mapping into the NMHR, enabling early identification of heritage risks from environmental change. Furthermore, we are widening marine heritage's accessibility by facilitating public and professional access to the NMHR via Heritage Gateway and supporting the public with genealogy enquiries. Looking ahead, we are refining our governance framework, strengthening integration with marine planning, and expanding stakeholder engagement. Future efforts will focus on improving data validation, public access, volunteer engagement, and interoperability with partner datasets, ensuring the NMHR serves as the first port of call for policymakers, commercial developers, researchers, and the public seeking English marine heritage information.

Keywords: Marine heritage management; Marine planning and policy; Marine development; Stakeholder engagement; Data governance; Heritage data management; Climate change

Poster presentation in session L2: Underwater and Maritime Heritage Management (Pedro Barros, Cristóvão Fonseca, Gonçalo C. lopes)

Vessels in Transit: The Changing Lives of Traditional Boats Across Museums, Archives, and Digital Worlds

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Small wooden boat collections represent a rich but fragile part of maritime heritage, reflecting diverse cultural, technological, and environmental adaptations. However, these collections are often at risk due to financial instability, legal uncertainties, and institutional limitations. This paper examines the case of the International Small Craft Association (ISCA) collection—once the world's largest assemblage of traditional small craft—and uses it as a springboard to discuss broader challenges in managing dispersed maritime heritage. Originally amassed in the UK with over 270 boats from around the world, the ISCA collection was ultimately scattered across multiple countries due to a lack of long-term institutional support. Its fate underscores how unique artifacts and their associated knowledge can be lost when collections become fragmented, poorly documented, or inaccessible to researchers and descendant communities.

By incorporating case studies from ISCA alongside comparative examples of similar small boat collections worldwide, this paper highlights common issues, including physical dispersion, digitisation needs, audience engagement, and legal governance. These challenges are examined through an object biography approach, tracing the shifting meanings of traditional boats as they transition from working vessels to museum exhibits, digital reconstructions, and sites of community memory.

This paper also considers the role of digital interventions—including 3D modelling, interactive archives, and participatory storytelling—in restoring lost contexts and enhancing engagement. However, these innovations raise critical legal and ethical questions surrounding ownership, custodianship, and intellectual property in maritime heritage.

Ultimately, this paper not only raises pressing questions about preserving mobile heritage in the digital age, but also proposes collaborative solutions for reconnecting, protecting, and reinterpreting small craft collections for future generations.

Keywords: Dispersed Maritime Collections; Object Biographies; Small Watercraft; Digitisation And Access; Museum Interpretation; Cultural And Legal Governance; Audience Engagement

Poster presentation in session A4: Maritime Collections (Corioli Souter, Martijn Manders)

The wooden ship construction under the cliffs of the fortress on island Pag in Croatia

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The remains of the former fortress called Fortica are near the bridge of island of Pag. The fortress was built in the 17th century to control and guard traffic and to ensure the safety of navigation of ships. It is located on an important maritime route and controlled the passage between island of Pag and the mainland, and passage to Velebit channel for various merchant ships that sailed from the northern Adriatic to Dalmatia and vice versa, and were exposed to various attacks. A crew of soldiers was usually stationed in it to prevent illegal trade, which was not so rare at the time. The fortress defended the wealth of the region itself and important places for trade, such as the Pag salt works, a wealth that many people clashed over.

Under the cliffs of the fortress, during a training diving exercise, police diving officer noticed and reported the remains of a wooden structure located at a depth of 17 m. An underwater archaeological survey was conducted at the end of 2023. The aim of the survey was to document the remains wooden structure at a depth of 17 m. During the excavation, it was determined that the wooden remains belong to the shipwreck. No movable finds were excavated on the site at that moment, nor was the limit of the ship's structure found. The excavation will continue in 2025 year to define the limits of the wreck and recover any datable material, as well as the research into the historical sources about the area.

Keywords: Ship Construction; Shipwreck; Fortress; Island Pag; Maritime Route

Poster presentation in session I1: From Local to Global (Sarah Ward, Tânia Manuel Casimiro)