ASSEMBLE

ASSOCIATION OF EUROPEAN MARINE BIOLOGICAL LABORATORIES EXPANDED

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PROJECT NEWS

www.assembleplus.eu

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This newsletter has been developed to inform and update **ASSEMBLE Plus** partners on project activity. This is the fourth of five editions. External news items will be shared on the website, www.assembleplus.eu.

If you have an event report, news items or article that you would like to see appear on the website or in the next issue, please contact Georgia Bayliss-Brown (georgia@aquatt.ie).

News: The Transnational Access programme

by Davide di Cioccio (EMBRC, France)

The ASSEMBLE Plus Transnational Access (TA) programme supports research projects in marine biology and ecology. Researchers who have applied to the TA programme are getting access to facilities and services for research in marine biology at more than 30 partner institutes. The objective of the TA programme is to enable researchers to carry out their own research projects, offering them free access to platforms and marine biological resources not available in their own institutes, while also gaining the opportunity to establish new scientific collaborations.

Launched in February 2018, the TA programme is continuing to give access to successful applicants of the past eight calls. Looking at the spread of the calls and the applications submitted, the TA programme can be considered a great success: overall 600 applications have been submitted, with access granted to more than 500 groups of European and international researchers from 46 different countries.

During 2020, international travel restrictions and the temporary closure of most of the marine stations due to the COVID-19 pandemic have negatively impacted the TA programme: more than 70% of projects have been postponed for access in later periods, in particular those requiring organisms found in the field in a very specific seasonal window. While on-site access to marine stations has not always been possible during 2020, the TA programme has continued to offer use of facilities through remote access: this service allowed users to receive the strains and processed samples required to perform their experiments at their home institutes.

The results from the TA projects and the overall experience of the TA users are available at: http://www.assembleplus.eu/access/success-stories. If you are interested in learning more about the TA programme, please visit http://www.assembleplus.eu/access/transnational-access or get in touch with David di Cioccio, the ASSEMBLE Plus Access Officer at assembleplus_ta@embrc.eu.

News: An update on Data Management

by Katrina Exter (VLiZ, Belgium)

Much of the current work being done in Work Package NA2 is concentrated on management of the data relating to the Autonomous Reef Monitoring Structures (ARMS) and Ocean Sampling Day (OSD) activities of Work Package JRA1.

The ARMS project itself has been described in a recent publication and some of the 2018 ARMS data that have been published and made open-access are described in this publication. ARMS data were also described as a use-case for including genomics and imaging data in the Darwin Core Archive (DwC-A) format in an online meeting of the Biodiversity Information Standards (TDWG) in 2020). Work is ongoing in describing, in the DwC-A standard, the complex Genomics Observatory data that is ARMS. Work on the semantic annotation of the ASSEMBLE Plus global observation (GO) data is also ongoing.

FAIRification of some of the data of the ASSEMBLE Plus collection in VLiZ's Integrated Marine Information System has been discussed with EurOBIS and OBIS and will be done via these partners. Templates for creating interoperable CSV files for scientific data have been created for some of the JRAs, and this process is expected to continue as more data are received.

If you are interested in learning more about the data management within ASSEMBLE Plus, please visit http://www.assembleplus.eu/results/fairdatamanagement or get in touch with Katrina Exter at katrina.exter@vliz.be.

Conference: ASSEMBLE Plus 2021
18th - 19th January 2021, Online *by Adelino Canario (CCMAR, Portugal)*

The ASSEMBLE Plus 2021 Conference, "Marine biological research at the frontier", was organised by the Algarve Centre of Marine Sciences (CCMAR), on behalf of the ASSEMBLE Plus project which is coordinated by the European Marine Biological Resource Centre (EMBRC). The conference took place online over a period of two weeks between the 18th and 29th January 2021.

ASSEMBLE Plus' main objective is to provide the scientific community (from academia and industry) with access to the resources, facilities, and instruments available at marine biological stations. With this purpose in mind, the conference had several aims:

1. To present the offerings and services available from ASSEMBLE Plus partners to potential users.
2. To showcase the projects and scientific achievements of hosted ASSEMBLE Plus users.
3. To collect feedback from stakeholders on improving the services offered and extending its reach to the scientific community, especially with industry partners.
4. To promote the project and the services offered by its partners.

The conference was widely promoted amongst the scientific community via social media and press releases, leading to high levels of attendance (570 registered participants). Most attendees (95%) came from academia within Europe (85%), and participation at individual sessions ranged from 30 to 80 people per session.

ASSEMBLE Plus and CCMAR would like to thank all of the speakers and participants for their valuable contribution to the sessions. CCMAR and ASSEMBLE Plus' other partners are currently preparing follow-up activities with stakeholders to hone in on the wealth of information and experience shared throughout the conference.

Feedback received will inform the design of the next ASSEMBLE Plus Conference, which is due to take place in the second half of 2022. The programme from this conference can be found here and videos from the sessions are available on EMBRC's YouTube channel. If you are interested in providing further feedback or suggestions for the next ASSEMBLE Plus conference, please get in touch with Adelino Canario at acanario@ccmar.pt.

Brokerage Event: New Standardisation of Cryopreservation Protocols for Marine Organisms
28th January 2021, Online *by Estefania Paredes (University of Vigo, Spain)*

As part of the ASSEMBLE Plus online conference, a brokerage event was organised to provide a platform for researchers, companies and equipment providers to meet and discuss cryopreservation of marine organisms, and to present on new tools and resources available and exchange ideas. A major driver to host the brokerage event was the release of the ASSEMBLE Plus' repository of methodologies for the cryogenic preservation of marine organisms. Launched in July 2020, the Cryomar Protocol Toolbox represents a collaborative effort from researchers across Europe from several marine biological stations.

The toolbox provides a standardised methodology for cryopreservation, including obtaining gametes, and quality control prior and to after cryopreservation. Species covered include:

- Marine invertebrates: Mediterranean mussel, Portuguese oyster, Sea urchin and Sea cucumber
- Macroalgae: Red seaweed
- Microalgae
- Fish: Zebrafish, Senegalese sole and Thicklip grey mullet
- Microbial consortia

The full press release and list of species covered can be found at: http://www.assembleplus.eu/CryomarProtocolToolbox. The toolbox was presented by Estefania Paredes. Nils Tolke (Planktonic AS) and Juan Asturiano (Universitat Poltécnica de Valéncia) also spoke about their activities relating to cryopreservation. The level of participation and engagement during the event was much higher than expected (128 registrants) and it is hoped that many collaborations will be generated as a result.

The full video can be viewed at here. If you are interested in finding out more about ASSEMBLE Plus' cryopreservation research, please get in touch with Estefania Paredes at eparedes@uvigo.es.

Sea urchin, Sphaerechinus granularis

Workshop: A business model for an ecosystem of mature European marine biological stations
15th December 2020, Online *by Ibon Cancio (UPV/EHU, Spain)*

Through the work in Work Package 6: 'Long-term sustainability of marine biological stations', ASSEMBLE Plus is developing business model(s) that will be beneficial for the individual institutions and research infrastructures that form the project partnership. The main aim is to foster the creation of an ecosystem of mature marine biological stations in Europe supported by a framework to secure funding for their long-term sustainability. Following a SWOT analysis of their respective mission statements and strategic plans conducted in 2018, an online survey on their business models was carried out during autumn 2020. The analysis of this survey should allow ASSEMBLE Plus to obtain a full picture of the modus operandi and the medium- to long-term prospects of today's marine biological stations.

For the survey and its analysis, ERAMARIS, was incorporated as a partner on the project during 2020. ERAMARIS is a start-up company that offers business development services to research institutes and small to medium-sized enterprises (SMEs) with a focus within the marine and life sciences domain. Its Director, Ilaria Nardello, supervised the survey and the workshop that took place online on 15th November 2020.

The objectives of the workshop were to discuss and allow inter-comparison among the different organisational and strategic development models in existence within the surveyed marine biological stations. The survey had been completed by the European Marine Biological Resource Centre (EMBRC) and 22 marine biological stations. Twenty-five people representing 17 marine biological stations and EMBRC-ERIC headquarters participated in the workshop.

The initial findings from the survey were presented and discussed:

- 100% of the respondents declared that their institutions were not-for-profit.
- Respondents declared that service provision more than doubled over time since establishment, while innovation-related activities increased six-fold.

All of these observations and additional commentary from the workshop provide interesting take-home messages that will inform the future framework for a European research infrastructure.

Data analysis is ongoing and, with the results obtained, a realistic business model for the future of the key European marine biological stations will be shaped with a common set of tested performance indicators. This will allow monitoring of the performance of participating research infrastructure and a prompt adjustment of their business strategy when/if required.

The final outcome of the study will be presented at an online event that will take place in May to June 2021. The delivery of the "Business Model for an ecosystem of mature European Marine Biological Stations" (DNA4.2) is planned for September 2021.

If you are interested in finding out more about developing a business model for marine biological stations, please get in touch with Ibon Cancio at ibon.cancio@ehu.eus.

Attendees of the business model workshop

Article: Autonomous Reef Monitoring Structures and the invisible invaders of the Mediterranean

by Georgios Kotoulas HCMR, Greece), Christina Pavloudi (HCMR, Greece) and Matthias Obst (University of Gothenburg, Sweden)

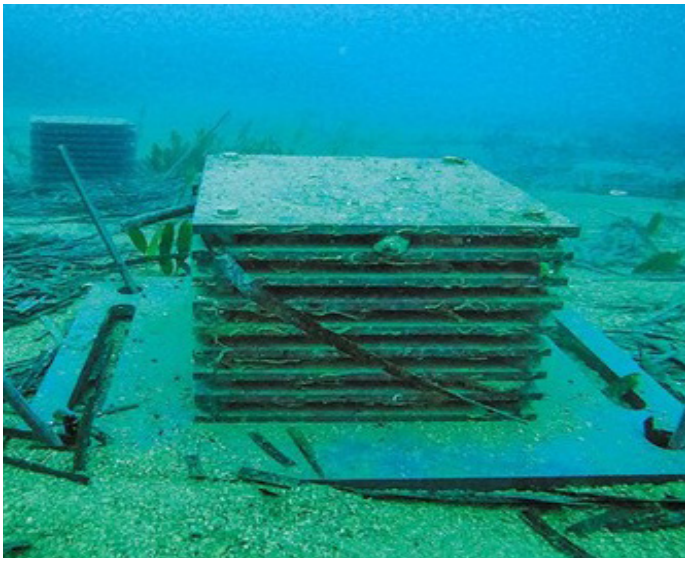
When talking about "foreign" species in the Greek seas, most will think of the puffy Lagocephalus or the spiny Lionfish. But there is also an unseen world of "alien species" lurking in coastal water; many creatures from all over the world who travel mostly by clinging to ships can end up finding their new home in the Mediterranean. The Hellenic Centre for Marine Research (HCMR), based in Crete, contributes to international scientific research in this area by building structures that function as "invertebrate hotels", recording the residents and analysing their DNA.

Dr Georgios Kotoulas, a geneticist at HCMR, is responsible for this research. "As part of the project, constructions of PVC plates were created, which essentially mimic the complex structure of the sea floor and allow the settlement and development of many different marine organisms: plants, animals and microbes," he explains.

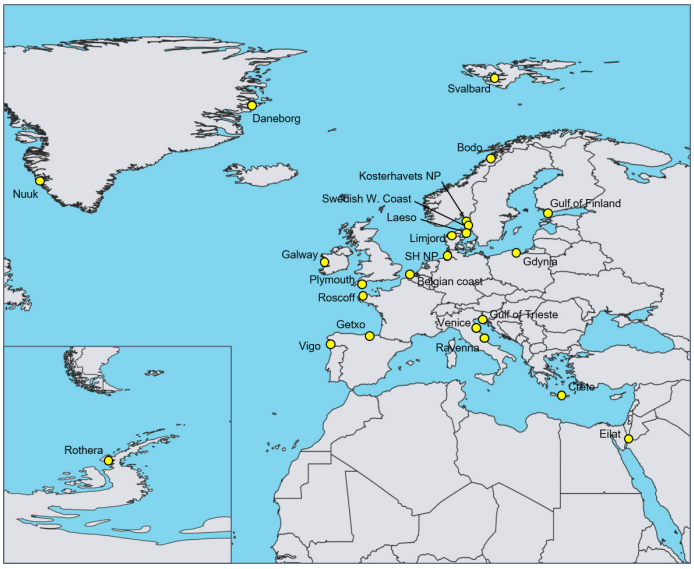
"These structures function as hotels for marine species, as they are colonized immediately after their placement. In Greece, we deployed such constructions in two places: the port of Heraklion, which is a point of entry of ships in our sea, and in front of the premises of HCMR, in Gournes".

"Underwater hotels" remain at the bottom for different periods – for at least three months. Then they are hauled and transported to the laboratory. In the last three years, almost all samples from all the countries participating in the programme have been shipped to HCMR.

"The plates are unscrewed one by one and photographed," explains Christina Pavloudi, an associate researcher at HCMR. "The animals are then removed from the plates and the samples are analysed by molecular methods. We export the genetic material and multiply specific genes in order to distinguish and associate the different species".



ARMS on location



ARMS sites

The results of these surveys are impressive. One of the "underwater hotels" in Crete identified 15 alien species – some are well-known, such as the pearly oyster (*Pinctada imbricata*) while others were observed for the first time in Greece, such as the nudibranch snail, *Anteaeolidiella lurana*. "The data we get from this research reveal to us how the ecosystems of the Eastern Mediterranean are changing from human activity and climate change," says Dr Kotoulas. "At the same time, they help us not only to expand the mapping of alien species, but also to understand how ecosystems work. A very important part of this programme is that research is carried out using the same methods in all countries, and the data will be made public, so that they can be used by other experts and contribute to scientific knowledge".

This work is continuing into 2021. Deployment has begun and preliminary data are being collected, showing that ARMS are able to detect alien species as well as being used for continental-scale phylogeographic studies, to reveal connectivity among benthic habitats along the European coast. This is only the start of the planned activity for ARMS.

The ARMS Marine Biodiversity Observation Network (MBON), now part of the global network (GEOBON), is constantly growing. In March 2021, the Università di Bologna in Italy joined, meaning that three new ARMS units will be placed off the coast of Venice. Furthermore, MBON has submitted a programme proposal to the first call of actions by the UN Decade for Ocean Science for Sustainable Development. To find out more about the programme proposal, please visit: https://marinebon.org/assets/Marine_Life_2030_UN_Ocean_Decade_request_for_endorsement_20210115.pdf. If you are interested in learning more about ARMS MBON, please visit http://www.assembleplus.eu/research/ARMS-MBON or get in touch with Georgios Kotoulas at kotoulas@hcmr.gr.

Success Story: Genetic diversity of Irish kelp (*Laminaria hyperborea*) from a European view

Kate Schoenrock-Rossiter (NUI Galway, Ireland)

In 2019, I applied to the ASSEMBLE Plus Transnational Access program to do collaborative work in the Serrao lab at CCMAR. The lab at CCMAR works extensively in population genetics of marine algae and has in-house facilities for everything from DNA extraction to sequencing.

Our aim for the visit was to create a calibration metric for microsatellite data generated for a cold-water kelp, *Laminaria hyperborea*, across research laboratories and sequencing platforms in the EU. This calibration will allow data to be compared across labs, including past and future studies, allowing broad analysis of patterns in genetic structure of this foundation species, and potentially others if the same methods were to be used in future calibrations. During my two weeks at CCMAR, we were able to achieve data collection for this work and expand the project to Station Biologique de Roscoff.
Our work was recently published in the *European Journal of Phycology*, in spring 2020 and three labs from CCMAR, SBR and NUI Galway/University of Alabama at Birmingham continue to hone this calibration and work together to generate EU wide data sets, a key output of this transnational access.

Success Story: North Adriatic phytoplankton assemblages

Ivano Vascotto (National Institute of Biology, Slovenia)

I applied to ASSEMBLE Plus to fill the knowledge gap I had about the phytoplankton ecology of the other side of the Northern Adriatic Sea. In general, in an analysis of time series, it is important to have contact with the data provider so that any errors or issues can be easily spotted and resolved. This is particularly true with phytoplankton data since the variability in identification levels is great among researchers. In our specific case, to visit ISMAR in Venice had even more advantages. The data we had access to at ISMAR included bio volumes and not just counts, so it has been possible to test methods of analysis with a different type of data.

During the one-month visit, I had the chance to observe all the limits of my analysis protocol, which I modified once back from Venice. Personally, this experience was excellent and I recommend ASSEMBLE Plus to everyone in the marine community.

Success Story: Effects of ultraviolet radiation and high temperature on physiological parameters of *Microcystis* spp.

Florencia de la Rosa (CONICET, Argentina)

I applied to ASSEMBLE Plus because I wanted to be trained in fatty acid profiling under the supervision of Prof. Marleen De Troch at UGENT. My PhD research focusses on studying the effects of climate change, increased temperature and solar ultraviolet radiation, on Microcystis aeruginosa (cyanobacteria).

Thanks to ASSEMBLE Plus, I established a good protocol for extraction, identification, and quantification of fatty acids composition. The information acquired is essential for my PhD research, due to its contribution to the identification of a differential sensitivity of polyunsaturated fatty acids to climate change factors. Additionally, their response will have an impact on the invertebrates grazing on them and the overall flow of energy in the ecosystem.

I would especially like to thank all of the researchers and staff at Ghent University for making my ASSEMBLE Plus experience so memorable. Also, I would love to make further exchanges in the future.

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ABOUT THE PROJECT

THE CHALLENGE

Researchers from academia and the private sector need high-quality access to sophisticated marine biological research infrastructures to conduct their research for the advancement of knowledge and technology, to inform policy and to contribute to blue growth.

PROJECT OBJECTIVE

Building on the success of its predecessor ASSEMBLE (2009-2014), the EU-funded ASSEMBLE Plus brings together key marine biological research institutes across Europe and overseas to ensure their optimal use and joint development. In particular, ASSEMBLE Plus provides expenses-paid Transnational Access to the ecosystems, marine organisms, and facilities available at its partner institutes.

AT A GLANCE

PROGRAMME: Horizon 2020 (INFRAIA-01-2016-2017)

TYPE OF ACTION: Research and Innovation Action

DURATION: Oct 2017 – Sept 2021 (48 months) + 6 month extension requested

CONSORTIUM: 26 partners from 16 countries

COORDINATOR: Sorbonne Université (SU), France

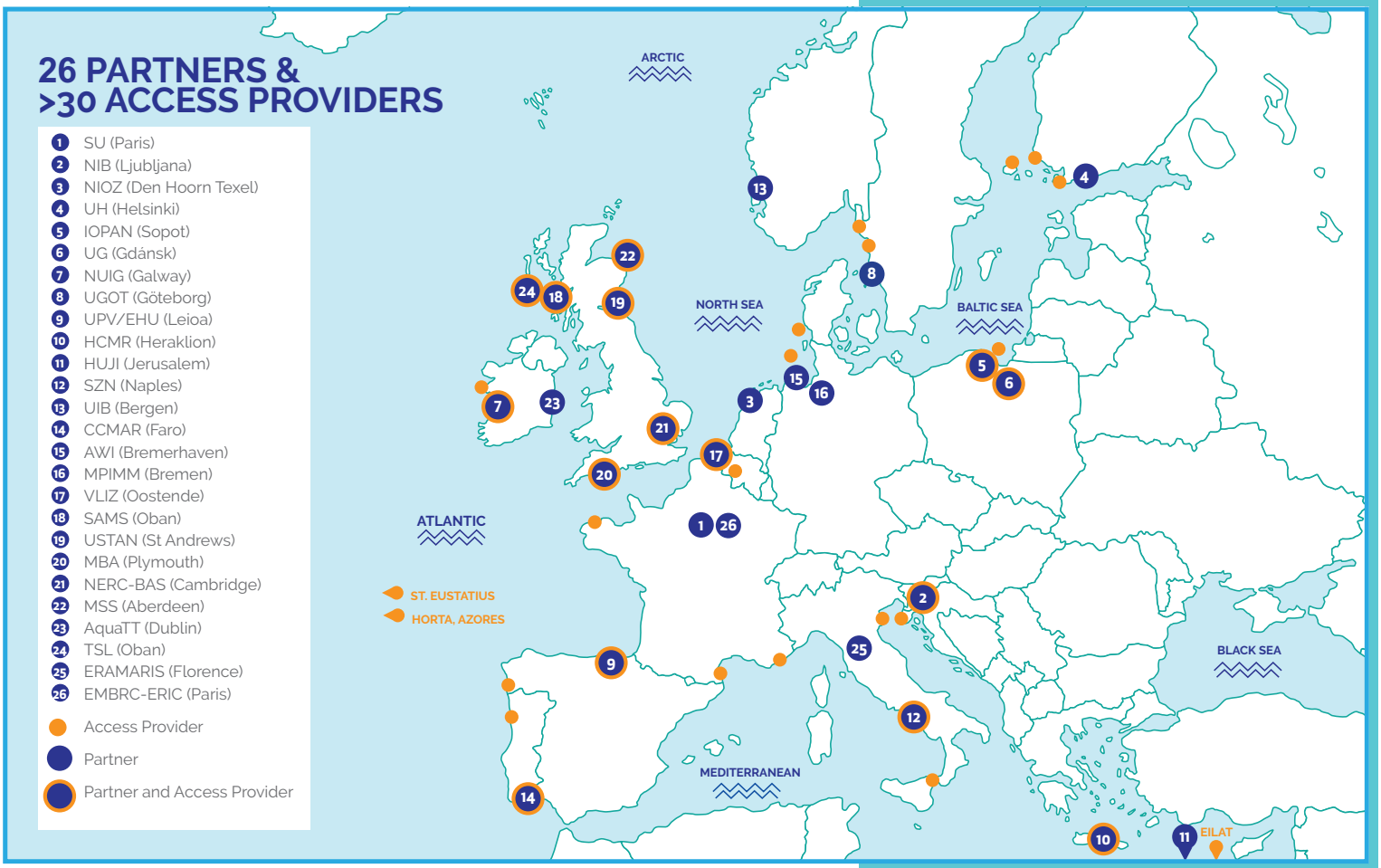
26 PARTNERS & >30 ACCESS PROVIDERS

1. SU (Paris)
2. NIB (Ljubljana)
3. NIOZ (Den Hoorn Texel)
4. UH (Helsinki)
5. IOPAN (Sopot)
6. UG (Gdańsk)
7. NUIG (Galway)
8. UGOT (Göteborg)
9. UPV/EHU (Leioa)
10. HCMR (Heraklion)
11. HUJI (Jerusalem)
12. SZN (Naples)
13. UIB (Bergen)
14. CCMAR (Faro)
15. AWI (Bremerhaven)
16. MPIMM (Bremen)
17. VLIZ (Oostende)
18. SAMS (Oban)
19. USTAN (St Andrews)
20. MBA (Plymouth)
21. NERC-BAS (Cambridge)
22. MSS (Aberdeen)
23. AquaTT (Dublin)
24. TSL (Oban)
25. ERAMARIS (Florence)
26. EMBRC-ERIC (Paris)

Access Provider

Partner

Partner and Access Provider



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