Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and connected seas (ICG/NEAMTWS)

Eleventh Session

Nicosia, Cyprus
12–14 November 2014

UNESCO

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ICG/NEAMTWS-XI/3
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[1]The Executive Summary is available in English, French, Spanish and Russian.

TABLE OF CONTENTS

page

ANNEXES

Executive summary

The Eleventh Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS) was hosted by Cyprus in Nicosia, from 12 to 14 November 2014 at the University of Cyprus.

The ICG/NEAMTWS was established by the Assembly of the Intergovernmental Oceanographic Commission (IOC) at its Twenty-third session in 2005 by Resolution XXIII-14 with the mandate to coordinate the establishment of a tsunami early warning system for the North-Eastern Atlantic, the Mediterranean and Connected Seas.

The **ICG welcomed** the continuation of the interim operational phase of the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS), through the Candidate Tsunami Service Providers (CTSPs) of France, Greece, and Turkey, and the commencement of the activities as CTSP by Italy.

The **ICG recommended** that the above mentioned CTSPs should apply for the Accreditation following the procedures approved at the Ninth session of the ICG/NEAMTWS.

The **ICG noted** the positive results of the tsunami exercise NEAMWave 14 that successfully tested the readiness of the system and of the Member States. The Exercise was marked by a significant increase of the participation of Civil Protection Authorities (CPAs).

The **ICG decided** to continue conducting Communication Test Exercises by CTSPs on a quarterly and rotational basis based on a scenario event to be disseminated to all Member States TWFPs.

The **ICG while confirming** the continuation of the Working Groups, as follows: Working Group 1 on Hazard Assessment and Modelling; Working Group 2 on Seismic and Geophysical Measurements; Working Group 3 on Sea Level Data Collection and Exchange, including Offshore Tsunami Detection and Instruments; and Working Group 4 on Public Awareness, Preparedness and Mitigation, **decided** to give the mandate to the Steering Committee to consider a potential reorganization of the structure of Working Groups and Task Teams.

The **ICG confirmed** the continuation of the Task Team on Communication Test and of the Task Team on Tsunami Exercises, and established a Task Team on Operations for the next intersessional period.

The **ICG confirmed** the continuation of the Steering Committee composed by the Officers and the Co-Chairs of the Working Groups and the Task Teams, and representatives of CTSPs.

The **ICG acknowledged** the importance of Tsunami Information Centre for the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTIC, neamtic.ioc-unesco.org) and **recommended** to increase education and awareness raising activities in the region of the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAM), also through the implementation of National and Local Tsunami Preparedness and Response Programs.

The Eleventh Session of ICG/NEAMTWS was attended by 50 participants from 16 Member States, and 2 observer organizations. The need for a stronger cooperation with the

ICG/CARIBE-EWS was reiterated and reinforced by the presence of the Chair of the ICG/CARIBE-EWS. The percentage of women attending the ICG/NEAMTWS-XI was 22%.

Résumé exécutif

La 11e session du Groupe intergouvernemental de coordination du Système d'alerte rapide aux tsunamis et de mitigation dans l'Atlantique du Nord-Est, la Méditerranée et les mers adjacentes (GIC/NEAMTWS) a été accueillie par Chypre à Nicosie, du 12 au 14 novembre 2014, à l'Université de Chypre.

Le GIC/NEAMTWS a été créé par l'Assemblée de la Commission océanographique intergouvernementale (COI) à sa 23e session en 2005 en vertu de la résolution XXIII-14, avec pour mandat de coordonner la mise en place d'un système d'alerte rapide aux tsunamis dans l'Atlantique du Nord-Est, la Méditerranée et les mers adjacentes.

Le **GIC s'est félicité** de la poursuite de la phase opérationnelle provisoire du Système d'alerte rapide aux tsunamis et de mitigation dans l'Atlantique du Nord-Est, la Méditerranée et les mers adjacentes (NEAMTWS), par le biais des centres candidats aux fonctions de prestataires de services d'alerte aux tsunamis de la France, de la Grèce et de la Turquie, et du lancement de ses activités de centre candidat par l'Italie.

Le **GIC a recommandé** que les centres candidats susmentionnés sollicitent leur accréditation selon les procédures approuvées à la 9e session du GIC/NEAMTWS.

Le **GIC a pris note** des résultats positifs de l'exercice relatif aux tsunamis NEAMWave 14, qui a testé avec succès l'état de préparation du système et des États membres. Cet exercice a été marqué par une participation en forte hausse des autorités de protection civile.

Le **GIC a décidé** de poursuivre les tests des moyens de communication par les centres candidats chaque trimestre, à tour de rôle, à partir d'un scénario d'événement à diffuser à tous les TWFP des États membres.

Le **GIC**, tout en confirmant le maintien des groupes de travail, comme suit : Groupe de travail 1 – Évaluation et modélisation des aléas ; Groupe de travail 2 – Mesures sismiques et géophysiques ; Groupe de travail 3 – Collecte et échange de données relatives au niveau de la mer, y compris les instruments de détection en mer des tsunamis ; Groupe de travail 4 – Sensibilisation de la population, préparation et mitigation, **a décidé** de charger le Comité directeur d'envisager la possibilité d'une réorganisation de la structure des groupes de travail et équipes spéciales.

Le **GIC a confirmé** le maintien de l'Équipe spéciale sur le test des moyens de communication et de l'Équipe spéciale sur les exercices d'alerte aux tsunamis, et a mis en place une Équipe spéciale sur les opérations pour la prochaine période intersessions.

Le **GIC a confirmé** le maintien d'un Comité directeur composé du Bureau et des coprésidents des groupes de travail et des équipes spéciales, ainsi que de représentants des centres candidats.

Le **GIC a pris acte** de l'importance du Centre d'information sur les tsunamis pour l'Atlantique du Nord-Est, la Méditerranée et les mers adjacentes (NEAMTIC, neamtic.ioc-unesco.org) et **a recommandé** de développer les activités d'éducation et de sensibilisation dans la région de l'Atlantique du Nord-Est, de la Méditerranée et des mers adjacentes (NEAM), également

par la mise en œuvre de programmes nationaux et locaux de préparation et de réponse aux tsunamis.

Cinquante personnes de 16 États membres et deux organisations observatrices ont pris part à la 11e session du GIC/NEAMTWS. La nécessité d'un renforcement de la coopération avec le GIC/CARIBE-EWS a été réitérée et appuyée par la présence de la Présidente du GIC/CARIBE-EWS. Le pourcentage de femmes présentes à la GIC/NEAMTWS-XI s'élevait à 22 %.

Resumen dispositivo

La undécima reunión del Grupo Intergubernamental de Coordinación del Sistema de Alerta Temprana contra los Tsunamis y Atenuación de sus Efectos en el Atlántico Nororiental y el Mediterráneo y Mares Adyacentes (ICG/NEAMTWS) se celebró en Nicosia (Chipre) del 12 al 14 de noviembre de 2014 en la Universidad de Chipre.

El ICG/NEAMTWS fue creado por la Asamblea de la Comisión Oceanográfica Intergubernamental (COI) en su 23ª reunión (2005), mediante la Resolución XXIII-14, con el mandato de coordinar el establecimiento de un sistema de alerta temprana contra los tsunamis para el Atlántico nororiental, el Mediterráneo y los mares adyacentes.

EL **ICG acogió con agrado** la continuación de la fase operacional provisional del Sistema de Alerta Temprana contra los Tsunamis y Atenuación de sus Efectos en el Atlántico Nororiental y el Mediterráneo y Mares Adyacentes (NEAMTWS), mediante los candidatos a Proveedores de Avisos sobre Tsunamis de Francia, Grecia y Turquía y la puesta en marcha de las actividades de Italia como candidata a Proveedora de Avisos sobre Tsunamis.

El **ICG recomendó** que los candidatos a Proveedores de Avisos sobre Tsunamis antes mencionados solicitaran una acreditación con arreglo a los procedimientos aprobados en la novena reunión del ICG/NEAMTWS.

El **ICG tomó nota** de los resultados positivos del ejercicio de respuesta en caso de tsunami, NEAMWave 14, que puso a prueba con resultados satisfactorios la capacidad de respuesta del sistema y de los Estados Miembros. El ejercicio se caracterizó por un considerable aumento de la participación de las autoridades de protección civil.

El **ICG decidió** que los candidatos a Proveedores de Avisos sobre Tsunamis siguieran llevando a cabo ejercicios de prueba de comunicación con frecuencia trimestral realizados de forma rotativa por los candidatos a Proveedores de Avisos sobre Tsunamis sobre la base de un evento hipotético, que serán difundidos a todos los Puntos focales de alerta contra los tsunamis (TWFP) de los Estados Miembros.

EL **ICG al tiempo que confirmó** que proseguirían su labor los grupos de trabajo siguientes: Grupo de Trabajo 1: Evaluación de peligros y modelos; Grupo de Trabajo 2: Mediciones sísmicas y geofísicas; Grupo de Trabajo 3: Acopio e intercambio de datos sobre el nivel del mar, comprendidos la detección en alta mar de los tsunamis y los instrumentos correspondientes; y Grupo de Trabajo 4: Sensibilización del público, preparación y atenuación de los efectos, **decidió** encomendar al Comité de Dirección el mandato de examinar una posible reorganización de la estructura de los grupos y equipos de trabajo.

EL **ICG confirmó** que proseguirían su labor el Equipo de Trabajo sobre Pruebas de Comunicación y el Equipo de Trabajo sobre Simulaciones de Tsunamis y creó un Equipo de Trabajo sobre Operaciones para el próximo periodo entre reuniones.

EL **ICG confirmó** la continuación de la labor del Comité de Dirección integrado por los miembros de la Mesa y los copresidentes de los grupos de trabajo y los equipos de trabajo, así como por representantes de los candidatos a Proveedores de Avisos sobre Tsunamis.

El **ICG reconoció** la importancia de los centros de información sobre tsunamis en el Atlántico Nororiental y el Mediterráneo y mares adyacentes (NEAMTIC, neamtic.ioc-unesco.org) y recomendó que se intensificaran las actividades de formación y sensibilización en la región del Atlántico Nororiental y el Mediterráneo y mares adyacentes (NEAM) también mediante la ejecución de programas nacionales y locales de preparación para los tsunamis y respuesta a los mismos.

Asistieron a la undécima reunión del ICG/NEAMTWS 50 participantes de 16 estados Miembros y dos organizaciones observadoras. Se reiteró la necesidad de fortalecer la cooperación con el Grupo Intergubernamental de Coordinación del Sistema de Alerta contra los Tsunamis y otras Amenazas Costeras en el Caribe y Regiones Adyacentes (ICG/CARIBE-EWS), lo cual se vio apoyado por la presencia de su Presidente. Las mujeres que asistieron a la undécima reunión del ICG/NEAMTWS representaron un 22% de la concurrencia.

Краткий Рабочий Доклад

Одиннадцатая сессия Межправительственной координационной группы по Системе раннего предупреждения о цунами и смягчения их последствий в Северо-Восточной Атлантике, Средиземном и прилегающих морях (МКГ/СПЦСВАСМ) проходила по приглашению Кипра с 12 по 14 ноября 2014 г. в Никозии в университете Кипра.

МКГ/СПЦСВАСМ была создана по решению Ассамблеи Межправительственной океанографической комиссии (МОК) на ее двадцать третьей сессии в 2005 г. в соответствии с резолюцией XXIII-14 в целях координации создания системы раннего предупреждения о цунами в Северо-Восточной Атлантике, Средиземном и прилегающих морях.

МГК приветствовала продление промежуточной фазы функционирования системы раннего предупреждения о цунами и смягчения их последствий в Северо-Восточной Атлантике, Средиземном и прилегающих морях (СПЦСВАСМ) силами потенциальных провайдеров данных слежения за цунами (КПСЦ) Франции, Греции и Турции и начало мероприятий КПСЦ Италией.

МКГ рекомендовала вышеупомянутым КПСЦ подать заявки на аккредитацию в соответствии с процедурами, утвержденными на девятой сессии МКГ/СПЦСВАСМ.

МКГ отметила позитивные итоги учений «СВАСМ/Волна-14», в ходе которых была проведена успешная проверка готовности системы оповещения и государств-членов. В ходе учений отмечалось значительное увеличение участия органов гражданской обороны (ОГО).

МКГ постановила продолжить проводить силами КПСЦ проверку системы оповещения ежеквартально и на ротационной основе в соответствии со сценарными условиями, которые будут разосланы всем государствам-членам.

Подтвердив продолжение работы следующих рабочих групп: рабочая группа 1 – оценка и моделирование опасных явлений; рабочая группа 2 – сейсмические и геофизические измерения; рабочая группа 3 – сбор и обмен данными об уровне моря, включая обнаружение цунами в открытом море и соответствующие инструменты; рабочая группа 4 – информирование общественности, обеспечение готовности и смягчение последствий, **МКГ постановила** поручить Руководящему комитету рассмотреть вопросы потенциальной реорганизации структуры рабочих и целевых групп.

МКГ подтвердила продолжение работы целевой группы по проверке системы оповещения и целевой группы по проведению связанных с цунами учений и учредила целевую группу по операциям на следующий межсессионный период.

МКГ подтвердила продолжение работы Руководящего комитета в составе должностных лиц и сопредседателей рабочих и целевых групп, а также представителей КПСЦ.

МКГ подтвердила важность деятельности центра информации о цунами для региона Северо-Восточной Атлантики, Средиземного и прилегающих морей (НЕАМТИК, http://neamtic.ioc-unesco.org), а также рекомендовала расширять мероприятия в области просвещения и повышения уровня осведомленности в регионе Северо-Восточной Атлантики, Средиземного и прилегающих морей (НЕАМ), в том числе посредством осуществления национальных и местных программ готовности к цунами и реагирования на них.

В одиннадцатой сессии МКГ/СПЦСВАСМ приняли участие 50 представителей из 16 государств-членов и две организации-наблюдателя. На сессии вновь была озвучена необходимость укрепления сотрудничества с МКГ/КАРИБ-СРП, актуальность которого подчеркивалась присутствием на заседании председателя МКГ/КАРИБ-СРП. Женщины составили 22% от числа участников МКГ/СПЦСВАСМ-XI.

1. OPENING OF THE SESSION

1 The Eleventh session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS-XI) was opened on 12 Wednesday November 2014 at 10:00 by Mr Ahmet Yalciner, Chairperson of ICG/NEAMTWS, who welcomed the participants to the meeting.

2 Mr Pavlos Paraskeva, Secretary General of the Cyprus National Commission for UNESCO, addressed his welcoming remarks to the participants. He explained that the present meeting was an opportunity to exchange views and reflect on measures to improve the research methods in the field of tsunami early warning and mitigation system, assess risks, issue warnings and raise awareness among the populations concerned.

3 He indicated that the participation in networks such as the Intergovernmental Coordination Group for Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas is of paramount importance for national security and disaster preparedness. He concluded by highlighting that improving capabilities for tsunami risk assessment, implementing early warning systems and enhancing preparedness of communities at risk is among the main objectives of the Intergovernmental Oceanographic Commission (IOC) and the United Nations Educational, Scientific and Cultural Organization (UNESCO).

4 Mr Andreas Frantzis, Civil Defence Commissioner of Cyprus, expressed the great interest of the civil protection authorities (CPAs) for the development of Tsunami Early Warning Systems (TEWS) being them the main end-user of such a system.

5 He reported on earthquakes and subsequent tsunami risk in Cyprus. He also mentioned the increased vulnerability of the Cyprus coastal area due to coastal development and the plans for the construction of critical infrastructures in these areas. Finally, he described the three most important elements for tsunami prevention and preparedness: reinforcing scientific research in the field of tsunami science, providing incentives towards preparedness by the government, and promoting education and awareness raising activities in order to create an environment of cooperation among all concerned stakeholders.

6 Mr Frantzis closed his speech by mentioning the importance of the reinforcement of cooperation between civil protection authorities and the scientific community.

7 Ms Eleni Morrisseau, Director of the Department of the Geological Survey of Cyprus, reported on the evidence of tsunamis that have hit Cyprus. She explained that this evidence comes from historical documents, but also from indisputable geological data. She explained that the Geological Survey has been carried out geomorphological and sedimentological studies in Cyprus.

8 She proposed a more bottom-up approach in tsunami simulation, which should be based on modelling but also on observed field evidence, at least for the maximum height of run-up.

9 Ms Morrisseau reinforced the idea that, although tsunamis are not high frequency events, they can cause extensive loss of lives and properties especially in a country like Cyprus where the majority of the population and the assets are located on the coast. For this reason, she stressed the importance of continuing promoting tsunami research and supporting the development of tsunami early warning systems.

10 Mr Thorkild Aarup, head of the UNESCO/IOC Tsunami Unit (TSU), reported on the steady progress of the NEAMTWS. The Exercise NEAMWave 14, (IOC/2014/TS/114VOL.1) held from 28 to 30 October 2014, increased the engagement of civil protection authorities and added a National Tsunami Warning Centre (NTWC) from Italy, the Istituto Nazionale di Geofisica e Vulcanologia (INGV), that is now providing tsunami service to the other Member States.

11 He also acknowledged the extrabudgetary support for NEAMWave14 received from the Directorate General for the Humanitarian Aid and Civil Protection department of the European Commission (EC DG-ECHO). He also mentioned the seriousness of the UNESCO budget, and the probable budgetary cuts. He appealed for Member States support to underpin NEAMTWS. He closed his speech thanking the University of Cyprus for hosting the session.

2. ORGANIZATION OF THE SESSION

2.1. ADOPTION OF THE AGENDA

12 The Chairperson of the ICG/NEAMTWS introduced the provisional agenda prepared by the Secretariat in coordination with the Officers.

13 The Session adopted the Provisional Agenda, included in ANNEX I.

2.2. DESIGNATION OF THE RAPPORTEUR

14 According to IOC Rule of Procedure 25.4 (IOC/INF/1166), the meeting considered the designation of a Rapporteur. Mr Zacharias Kountouriotis was designated by the Cyprus Delegation as rapporteur and was approved by acclamation.

2.3. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

15 The Chairperson reviewed the timetable for the meeting and it was adopted. The Chairperson also introduced the documentation for the meeting (ANNEX V).

2.4. ESTABLISHMENT OF SESSIONAL COMMITTEES AND WORKING/DRAFTING GROUPS

16 The ICG discussed the formation of sessional committees and Working Groups in order to ease the work in Plenary, as well as to facilitate and promote the exchange of information.

17 The Vice-Chairperson, Mr Trevor Guymer, reported about two activities to be considered for the establishment of sessional committees:

- Revision of the guiding documents

  The existing NEAMTWS guiding documents are out of date and there are also some inconsistencies between some of them. Considering that the documentation should reflect the existing architecture of the system, it is proposed to revise them. It is proposed that the Vice-Chairperson will coordinate the inter-sessional revision group of the documents, and that a high level document summarizing NEAMTWS structure and activities, which could be sent to policy and decision-makers of the region to present the system, will be developed. This document will be linked to the Implementation Plan, and the Operations Users Guide.

- Multi-hazard approach of NEAMTWS

  A questionnaire was sent to NEAMTWS Tsunami National Contacts (TNCs) to take stock of existing activities and interest on multi-hazard approach. A number of answers were sent to the IOC Secretariat prior to the ICG/NEAMTWS-XI, and it was possible to verify that such interest exists for the majority of the Member States. The Vice-Chairperson, together with the NEAMTWS Technical Secretary, will summarize the replies already received, and will ask for additional contribution and comments from other Member States.

18 Member States appreciated this initiative. However, it was asked to better clarify its aim, and to focus on hazards that are included in the mandate of IOC, i.e. sea-level related hazards. It was also highlighted that the most important issue for the countries is to link with other institutions that are in charge of managing detection networks that might be useful and relevant for the tsunami early warning systems, e.g. meteorological offices.

19 The Chairperson proposed that following the discussion had during the Steering Committee and in addition to the already existing Working Groups and the ad hoc Task Teams, it should be created one sessional Drafting Group on documents, and one on decisions and recommendations.

3. REPORT ON ICG/NEAMTWS INTERSESSIONAL ACTIVITIES

3.1. REPORT BY THE CHAIRPERSON

20 Mr Ahmet Yalciner, Chairperson of the ICG/NEAMTWS, reported about the activities undertaken since last session of the ICG/NEAMTWS. He recalled the governance structure of the ICG/NEAMTWS, including Working Groups and Task Teams.

21 He reported that he represented NEAMTWS at the Seventh meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-VII/3) held in Paris, France, on 12 and 13 February 2014. He noted that he chaired the ICG/NEAMTWS Steering Committee meeting held in Paris, France, on 21 March 2014 and participated in the meetings of the Task Team on Communication Test and on Tsunami Exercise held in Paris, France, on 20 March 2014. He added that he also took part in the regional workshop on Improving Tsunami Warning and Emergency Response in the North-Eastern Atlantic, Mediterranean and connected seas (IOC/2014/WR/266) organized by IOC, UNESCO and ISESCO (Islamic Educational, Scientific and Cultural Organization) in Rabat, Morocco, on 23 and 24 September 2014 for Maghreb countries.

22 He highlighted the success of this workshop which should be considered a very good example of capacity development activities to be undertaken in other regions and countries of NEAMTWS. He also summarized the issues that emerged from the Steering Committee meeting one day prior to the ICG/NEAMTWS-XI, in particular, the question of interoperability among the NEAMTWS Candidate Tsunami Service Providers (CTSPs), the multi-hazard approach, the accreditation procedure, capacity building, full involvement of all Member States, and the Tenth Anniversary of the establishment of NEAMTWS.

23 Finally, he acknowledged the support of the two Vice-Chairs, Mr Pierluigi Soddu and Mr Trevor Guymer, and of the IOC Secretariat.

24 Mr Fernando Carrilho informed the Assembly that Portugal will not be in the position of starting its operational activity during 2014.

3.2. REPORT BY THE IOC SECRETARIAT

25 The Secretariat reported on the activities conducted during 2014 to support the ICG/NEAMTWS. In addition to the organization of the meetings of the Task Teams on Communication Test, on Tsunami Exercises and of the Steering Committee, the Secretariat worked in close collaboration with the Task Team on Tsunami Exercises Co-Chairpersons to coordinate the organization of the second tsunami Exercise NEAMWave14.

26 The Secretariat negotiated with Directorate General for Humanitarian Aid and Civil Protection of the European Commission (DG-ECHO), a direct grant to support the organization of the Exercise NEAMWave14. Moreover, one workshop for the civil protection authorities was organized jointly with the European Commission Directorate General for Humanitarian Aid and Civil Protection (DG ECHO) (Brussels, 10 June 2014).

27 A regional workshop for the Maghreb countries representatives of governmental, scientific and emergency management institutions was organized in Rabat, Morocco, on 23 and 24 September 2014. The aim was to present the recent developments of the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS) and to prepare for Exercise NEAMWave 14.

28 The workshop was organized by the Intergovernmental Oceanographic Commission (IOC) of UNESCO together with the Islamic Educational, Scientific and Cultural Organization (ISESCO), the UNESCO for the Maghreb based in Rabat, and the Centre National pour la Recherche Scientifique et Technique (CNRST) of Morocco. A summary report including recommendations was prepared by the IOC Secretariat (IOC/2014/WR/266).

29 Moreover, the Secretariat participated in a technical workshop organized by the Spanish Civil Protection School (Madrid, Spain, 29 September 2014), and in the European Union Civil Protection Committee meeting (Brussels, 20 June 2014).

30 In order to promote better integration of the Eastern Atlantic sea level networks for tsunami warning, the Secretariat participated in the 13th Conference of the Eastern Atlantic Hydrographic Commission (EAtHC) held in Casablanca, Morocco, from 16 to 18 September 2014. Thanks to the leadership of the French Naval Hydrographic and Oceanographic Service (SHOM), the International Hydrographic Organization (IHO) amended resolution 1/2005 (IHO Response to Disasters) as follows:

> *'It is also very important for Coastal States to collect relevant coastal and bathymetric data in their areas of responsibility and to make this available to the appropriate organizations to support the establishment and improvement of tsunami early warning systems, protection of coastal areas and relevant simulation studies. Coastal States must also cooperate to set up sea-level and tide gauges networks, procedure and systems for the exchange and transmission, in near real time (1 to 5 min), of sea-level data, properly sampled (~ 1 min rather than 15 min or 1 h), likely to provide early warnings of tsunamis and storm surges. Any necessary regional cooperation for the collection of data shallow and deep-water bathymetry can be coordinated through the IHB in liaison with the relevant Regional Hydrographic Commission, IHO Member States, other Coastal States and relevant International Organizations as appropriate such as the IOC (www.ioc-tsunami.org)'.*

31 The Secretariat established contacts with the UNESCO sector in charge of the Support to countries in post-conflict and post-disaster situations: UNESCO Intersectoral Platform in order to promote collaboration between NEAMTWS and the Reducing Earthquake Losses in the Extended Mediterranean Region (RELEMR) programme. It will be possible to organize a special session on Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS) at the

RELEMR meeting to be held in 2016. Although the dates and the venue of the RELEMR 2016 meeting are still to be decided, a concept note with a proposal for the special session should be prepared in collaboration with Co-Chairpersons of Working Group 2 on Seismic and Geophysical Measurements and submitted to the RELEMR Coordination Group.

32 The Secretariat has also established contact with the Co-Chairpersons of the Mediterranean Oceanography Network for the Global Ocean Observing System (MONGOOS) to strengthen the collaboration in particular for the activities coordinated by Working Group 3 on Sea Level Data Collection and Exchange, Including Offshore Tsunami Detection and Instruments.

3.3. REPORT BY WORKING GROUP ON TSUNAMIS AND OTHER HAZARDS RELATED TO SEA-LEVEL WARNING AND MITIGATION SYSTEMS (TOWS-WG)

33 Mr Thorkild Aarup, Head of the Tsunami Unit, on behalf of the Vice-Chairperson of the IOC in charge of Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) Prof Yutaka Michida, reported on the results of the TOWS Task Teams on Tsunami Watch Operations (IOC/TOWS-WG-VII/3 Annex V) and on Disaster Management and Preparedness (of IOC/TOWS-WG-VII/3 Annex IV) meetings held in Paris, France, on 10 and 11 February 2014, and of the Seventh meeting of Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-VII) held in Paris, France, on 12 and 13 February 2014.

34 The recommendations by the TOWS-WG-VII (IOC/TOWS-WG-VII/3 Annex II) included the following:

- Accept the recommendations from the Task Team on Disaster Management and Preparedness and requested the Task Team to implement them, in particular:
    - Publish a Standard Operating Manual;
    - Initiate development of a document containing (i) reference list of tsunami evacuation mapping material, and (ii) a template for comprehensive mapping guidelines;
    - Promote education and awareness strategies as well as accredited community preparedness programmes as exampled in the CARIBE-EWS;
    - Contribute to the development of tsunami guidance for tourism industry;
    - Finalize and publish the Post-Event Performance Survey;
    - Underline the role of Tsunami Information Centres (TICs) have in the management of post event performance surveys, and request that ICGs provide for appropriate resourcing and mandate of their TICs to be able to perform this function.

- Accept the recommendations from the Task Team on Tsunami Watch Operations in particular:
    - The maps describing (i) 'Existing services of the global tsunami warning system as of Date' and detailing coverage and service provision; and (ii) Earthquake source zone monitoring areas for each of the warning systems.
    - Define a generic naming convention for ICG tsunami service providers as follows:
        — CARIBE-EWS Tsunami Service Provider (CARIBE-EWS-TSP)

- IOTWS Tsunami Service Provider (IOTWS-TSP)
- NEAMTWS Tsunami Service Provider (NEAMTWS-TSP)
- PTWS Tsunami Service Provider (PTWS-TSP)

  - Define the procedures and guidelines for ICG-TSPs issuing and disseminating tsunami bulletins for earthquakes outside their respective ICG coverage.
  - That the Chair of TOWS-WG will communicate with and request the Executive Secretary of IOC (i) to contact UN-OCHA and WMO to express concern of the Group about the confusion that the GDACS tsunami alert products creates vis-à-vis with the products issued by the ICG-TSPs, and (ii) to seek clarification about the scope, methodology, purpose and intended users of the GDACS service.
  - That Rick Bailey (Chair ICG/IOTWS) and Srinivas Kumar (Chair of Task Team Tsunami Watch Operations) develop a Global Tsunami Services Definition document be developed based on agreed concepts and guidelines as informed by the Task Team report to TOWS-WG-IV, and report on the development to the TOWS-WG-VIII.
  - That ICG-TSPs adapt their bulletins to clearly define water levels, tsunami arrival times and the method/terminology in order to avoid confusion and achieve more harmonized products.

- Accept the recommendations and proposed approach by Task Team on Hazard Assessment Related to Highest Potential Tsunami Source Areas and requested the Task Team in collaboration with the IOC Secretariat to continue the planning and preparations for the envisioned workshop “Assessing Earthquake triggered Tsunami Potential”. The Group noted the importance of the scientific outcome from the workshop and that it could provide valuable input to the work of the two other Task Teams.

- Request the Chair of the Inter-ICG Task Team on Tsunami Watch Operations to communicate with the Executive Secretary of IOC and request her to inform IMO, IHO, WMO on what tsunami products are available and seek feedback on requirements and better ways of disseminating tsunami threat information to maritime community.

- Continue the work for the development of on an ‘Outreach and Communications Plan for the IOC Tsunami Programme’ and to finalize it as a working document by 1 May 2014 (Chairs of ICG, and TIC representatives and chaired by ICG/IOTWS Chair).

- Acknowledge the need for harmonization of terminology across the ICGs. For definitions of National Tsunami Warning Centre (NTWC) and Tsunami Warning Focal Point (TWFP)

- To update definitions for TWFP and NTWC to read as follows:

  - National Tsunami Warning Centre (NTWC): A centre officially designated by the government to monitor and issue tsunami warnings and other related statements within their country according to established National Standard Operation Procedures.
  - Tsunami Warning Focal Point (TWFP). A 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG

Tsunami Service Provider according to established National Standard Operation Procedures. The TWFP may or not be the NTWC.

- Note the need for advocacy of the tsunami hazard in the context of Disaster Risk Reduction in the build-up to the third UNISDR World Conference of Disaster Risk Reduction (14-18 March 2015, Sendai, Japan) and that the IOC should call upon the IOC and UNESCO's collective capacity and structures in this regard.

- Note as well that a number of events will take place over the next 18 months and encouraged high level visibility of the IOC tsunami program, for example:
  - The ten year commemoration of the 2004 Indian Ocean tsunami.
  - The fifty year anniversary for the establishment of the PTWS.
  - The ten year anniversary for the establishment of ICG/CARIBE-EWS, ICG/IOTWS, and ICG/NEAMTWS.
  - The launch of the Oman National Multi Hazard Early Warning System and associated high level scientific conference (Muscat, Oman, December 2014)
  - Third UN International Conference on Small Island Developing States (1–4 September 2014, Apia, Samoa)

- Note that the tourist industry plays a large role in the economy of many countries, and effort should be made by the ICGs and TICs to engage with regional tourist organisations.

- Recognize that the current financial situation strongly limits the implementation of the tasks of the Group, ICGs and Inter-ICG Task Teams and strongly urge the Member States to increase their extra-budgetary contributions to the IOC to provide the needed resources for the priorities identified by TOWS-WG and ICGs.

- Endorse the Post-Tsunami Field Survey Guide (2nd edition) and recommended that it be published.

- Nominate Rick Bailey to be TOWS WG contact point for the JCOMM ETWCH and requested the secretariat to inform the JCOMM co-presidents.

- Request the Secretariat to continue to report on the performance and membership of the IOC Tsunami mail list server, and requested that the legal disclaimer be revised so it does not include wording on "warnings".

35 The IOC Executive Council at its 47th session adopted the recommendations by TOWS-WG-VII through Decision EC-XLVII/Dec.3.2.1 on Global Coordination of Early Warning and Mitigation Systems for Tsunamis and Other Sea-Level Related Hazards.

36 With reference to the recommendation of TOWS-WG to change and harmonize the definitions of the structural elements of the four ICGs, and its subsequent approval by the IOC Executive Council, UK asked for a better clarification on the relationship between TOWS-WG and the different ICGs and asked to give Member States from ICG/NEAMTWS the opportunity to review the decision of the TOWS-WG before they are discussed by the IOC Governing Bodies.

3.4. REPORT BY WORKING GROUPS AND TASK TEAMS

37 The Chairman invited the Chairpersons of the Working Groups to comment on progress achieved during the intersessional period with respect to the recommendations

adopted at the Tenth Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and connected seas (ICG/NEAMTWS-X/3s) and the tasks assigned to them in the Implementation Plan. The reports on the intersessional activities of the Working Groups are included in ANNEX IV.

3.4.1. Working Group 1 on Hazard Assessment and Modelling

38 Mr Jörn Behrens presented the report of Working Group 1 (WG1) on Hazard Assessment and Modelling. He described the activities undertaken to support the organization of Exercise NEAMWave 14 (IOC/2014/TS/114VOL.1), and in particular the production of the updated scenario guidelines.

39 Moreover, WG1 collaborated actively with the European Commission (EC) funded project, ASTARTE (Assessment, STrategy And Risk Reduction for Tsunamis in Europe), for what regards tsunami modelling research.

40 He explained that some activities are still pending and in particular the provision of data for benchmarking (seismic parameters, topo-bathymetry, sea-level data, run-up) of the 1956 Amorgos event, and the revision of the decision-matrix. He proposed that this last issue should be dealt by the Steering Committee.

3.4.2. Working Group 2 on Seismic and Geophysical Measurements

41 Mr Gerassimo Chouliars, Co-Chairperson of the WG2, presented the current state of the seismic and GPS networks, and the seismic methods for Candidates Tsunami Service Providers (CTSPs), and National Tsunami Warning Centres (NTWCs) inventory coordinated by Working Group 2 (WG2).

42 He also presented a proposal made by the Co-Chaipersons of WG2 regarding a message identifier for the tsunami alert message sent by the CTSPs. According to the Interim Operational Users Guide for the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and Connected Seas (IOpUG/NEAMTWS-1.1g), message identifiers should be developed by the Task Team on Communication Test. The proposal made by WG2 considers that labelling individual messages could be of great values to message recipients, and that these labels should be linked to the thread of the message issued by each Candidate Tsunami Watch Provider. From the message recipient's perspective the two most relevant advantages of providing such an identifier are:

- The possibility of univocally and automatically recognizing the duplicates of one single original message, which are always received due to the redundancy of the transmission channels;
- The possibility of easily associate messages as subsequent updates (e.g. ongoing, end or cancellation) to previous issued messages by the same TWP (or TSP).

43 He also reported on joint WG2 and ASTARTE project meetings on operational detection and communication infrastructure and early warning and forecast. He highlighted that WG2 Co-Chairpersons participated in the European Plate Observing System (EPOS) PP Final Meeting: Towards EPOS Implementation Phase and Beyond held in Rome, Italy, from 22 to 24 October 2014. Mr Chouliars indicated that EPOS is the integrated solid Earth Sciences research infrastructure approved by the European Strategy Forum on Research Infrastructures (ESFRI).

3.4.3. Working Group 3 on Sea Level Data Collection and Exchange, Including Offshore Tsunami Detection and Instruments

44 Ms Begoña Pérez, Co-Chairperson of Working Group 3 (WG3), reviewed the progress achieved during the intersessional period based on the recommendations provided at the Tenth session of the ICG/NEAMTWS.

45 She reported on the inventory of tide gauge stations available for tsunami warning purpose in each NEAMTWS Member State. Ms Pérez explained that up to 12 countries provided information: Cyprus, France, Germany, Greece, Israel, Italy, Malta, Monaco, Romania, Russia, Spain and Turkey. She also explained that a map and a database reporting the information provided by Member States were developed. The database contains the following fields: status, number and type of sensors, approx. sea level rise limit, measurement description, transmission and latency, GTS, satellite platform, WMO header, contribution to IOC SLSMF and different TWS's, automatic qc, availability of verified data, web links.

46 Ms Pérez reported that a first draft of the guidelines for sea-level data transmission through Global Telecommunication System (GTS) was prepared by SHOM.

47 She highlighted that Co-Chairs of WG3 participated in a number of events such the two-day Copernicus User Awareness & Training Event held in Lisbon, Portugal, on 13 and 14 February 2014; the International Conference on Mathematical Modelling for Tsunami Early Warning Systems (TsuMaMos) held in Málaga, Spain, on 9 and 10 April 2014; and the Technical Workshop organized by the Spanish Civil Protection School in Madrid, Spain, on 29 and 30 September 2014.

48 Finally, Co-Chairperson of WG3 informed about a new publication released by the Science and Society Committee of the Joint Task Force (JTF) of the International Telecommunication Union (ITU), the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO/IOC), and the World Meteorological Organization (WMO) (ITU/UNESCO-IOC/WMO) on Green Cables: *The scientific and societal case for the integration of environmental sensors into new submarine telecommunication cables* (available at: http://www.itu.int/en/ITU-T/climatechange/task-force-sc/Pages/default.aspx)

3.4.4. Working Group 4 on Public Awareness, Preparedness and Mitigation

49 Mr Stefano Tinti, Co-Chairperson of Working Group 4 (WG4), presented the report of WG4.

50 He indicated that the main issue to be dealt with in the context of WG4 is related to the understanding of the tsunami alert messages by the Civil Protection Authority and by the population. He explained that some Member States highlighted the confusion that can be generated by the level of alert used in the NEAMTWS which is different from other regions.

51 He concluded that a standardization of the level of alerts would be beneficial for the entire community.

3.4.5. Report by the Task Team on Communication Test

52 Mr Fernando Carrilho, Co-Chairperson of the Task Team on Communication Test (TT-CT), provided a combined report on the intersessional activities undertaken by the Task Team and on the Workshop on Communication of Tsunami Messages held in Nicosia, Cyprus, 10 November 2014.

53 Mr Carrilho explained that during the Tenth session of the ICG/NEAMTWS it was decided to conduct quarterly communication test based on scenario. However, during the first TT-CT meeting held in Paris, France, on 20 March 2014, it was decided to conduct an enlarged communication test with a text message only.

54 He reported that the Enlarged Communication Test Exercise (ECTE) was conducted on 30 June 2014 by the Instituto Português do Mar e Atmosfera (IPMA). He noted that 10 Member States and 11 institutions participated in the ECTE. He also noted that some preliminary results were reported, in particular the fax was not effective as needed as rapid warning communication tool, GTS was more effective although a delay of seven minutes in the issuing date was noticed, email worked well, and sms proved to be a fast communication method although some improvements have to be considered.

55 Mr Carrilho indicated that in addition to the ECTE, the monthly communication test by CTWPs was regularly carried out. SMS and Red-phone message dissemination facilities have been explored and described in the annexes of the ECTE manual (IOC/2014/TS/116).

56 He highlighted that the aim of the workshop on Communication of Tsunami Messages was to assess the effectiveness of the different communication methods currently used in NEAMTWS by the CTWPs. Mr Carrilho summarized the workshop outcomes as follows:

- To propose SMS as a standard communication method within NEAMTWS;
- To recommend Tsunami Watch Recipients (TWRs) to implement access to GTS messages;
- To propose including a new type of message, “Cancellation message”, to disregard possible previous wrong messages – to be used just in case of no real event situations;
- To insist with the TWRs that it is necessary to respond to the test messages that are send monthly.

57 Mr Carrilho informed that the discussion focused on the still limited participation of Member States in the ECTE. He stated that this is probably due to the registration procedures.

58 Turkey proposed to not include the registration for the next ECTE which will be conducted by CENALT in spring 2015. UK seconded this proposal.

59 Mr Carrilho concluded that next ECTE will be scenario based and therefore the CTE manual should be updated.

3.4.6. Report by the Task Team on Tsunami Exercises

60 Ms Emilie Crochet, Co-Chairperson of the Task Team on Tsunami Exercises (TT-TE), provided a report on the activities undertaken to coordinate the organization of the Exercise NEAMWave 14.

61 She explained that one of the main objectives of NEAMWave 14 was the better involvement of Civil Protection Authorities (CPAs), for this reason, it was decided to have two representatives of CPA as Co-Chairs of the Task Team.

62 Ms Crochet noted that linkages were also established with the Euromed programme for the prevention, preparedness and response to natural and man-made disasters (PPRD) South II in order to reach CPA from the Southern Mediterranean countries.

63 Ms Crochet informed that a summary report from NEAMWave 14 Manual, the registration form, and the evaluation questionnaire were translated into French. She also informed that it was decided to create a help desk, located at the NEAMTWS Secretariat, with a dedicated email address (neamwave14.helpdesk@unesco.org) in order to be able to answer questions during the exercise itself.

64 The Co-Chairperson explained that the exercise concept paper and the scenario guidelines were sent with the IOC Circular Letter 2522 (CL-2522) announcing NEAMWave 14, and that the exercise manual was sent in attachment to the Second announcement of the exercise with the CL-2528.

65 She reported that taking into account that the Third phase of the exercise, Phase C, was involving the request of international assistance through the European Commission Emergency Response Coordination Centre (ERCC), an email was sent to all the registered participants explaining the ERCC Standard Operating Procedure. Moreover, she indicated that several preparatory meetings, already mentioned by the previous speakers, were organized in Brussels, Belgium, and Rabat, Morocco.

3.5. REPORTS BY OTHER ICGs

66 Ms Christa von Hillebrandt-Andrade, Chairperson of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS), reported about the activity undertaken in the Caribbean countries since the last ICG/NEAMTWS session.

67 She noted that tsunami alerts are currently provided by the National Oceanic and Atmospheric Administration (NOAA) US National Tsunami Warning Center (US NTWC, renamed from WCATWC) for Puerto Rico and the Virgin Islands and for the rest of the CARIBE-EWS by the NOAA's Pacific Tsunami Warning Center (PTWC).

68 She explained that the Eighth session of the ICG/CARIBE-EWS (ICG/CARIBE-EWS-VIII/3) held in Port of Spain, Trinidad and Tobago, from 29 May to 1 April 2013 established the Tsunami Recognition Task Team on Preparedness, Readiness and Resilience under the aegis of Working Group 4 to re-evaluate the tsunami service model for the Caribbean and adjacent regions, within the framework of the UNESCO/IOC.

69 Ms von Hillebrandt-Andrade confirmed that the NOAA Caribbean Tsunami Warning Program (CTWP) will continue supporting improved Sensing, Training and Decision Support capabilities, and the government of Japan will support Nicaragua to establish a Regional Tsunami Warning Centre.

70 She informed about the status of the detection networks which are available for the CARIBE-EWS and she recalled that 87% percent of the seismic stations, and 65 percent of the sea level monitoring stations of what foreseen by the Implementation Plan 2013–2017 for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (IOC/2013/TS/78 REV) are functioning. She indicated that UNAVCO consortium has installed 65 new GPS stations and refurbished 20. She noted that there are still some gaps to be filled in Central America.

71 In order to be able to better serve Civil Protection Authorities during next year, Ms von Hillebrandt-Andrade explained that tsunami alert will be based on wave heights forecast using the PTWS (Pacific Tsunami Warning and Mitigation System) new products. She also explained that 96% of CARIBE-EWS nations and territories have designated Tsunami National Contacts (TNCs) and Tsunami Warning Focal Points (TWFPs), and NTWC were established in Colombia and Mexico. She indicated that the ICG/CARIBE-EWS is updating

the TWFP contact details following the new definitions adopted by the 47th session of the IOC Executive Council held in Paris, France, from 1 to 4 July 2014 (IOC/EC-XLVII/3).

72 The Chair recalled that the Caribbean Tsunami Information Centre (CTIC) was launched in 2014 and is hosted by Barbados. Furthermore, she reported that Tsunami Ready program is regularly undertaken in the Caribbean countries, and currently there are 48 TsunamiReady™ communities in the Caribbean (up from 32 in 2013), including second IOC-NWS recognition of British Virgin Islands. She noted that additionally activities related to risk assessment are undertaken, and that around 10 Member States and Territories have done tsunami modelling and 5 Member States and Territories have evacuation maps.

73 Ms von Hillebrandt-Andrade indicated that the Exercise Caribe Wave/Lantex 14 was organized on 26 March 2014 (IOC/2013/TS/109VOL.1) with 200.000 participants registered online. She emphasized the excellent collaboration with Portugal and France considering that the source for the scenario was based on the Lisbon 1755 event.

74 To conclude, Ms von Hillebrandt-Andrade highlighted potential areas of collaboration between the CARIBE-EWS and NEAMTWS: organize a joint tsunami exercise, ways to improve access to alert messages of the NEAM region for the emergency managers of the CARIBE region, and finally the collaboration between the Tsunami Information Centres (TICs). The discussion focused on how to learn from the experience gained by the CARIBE-EWS in involving the majority of Member States in its activities, and Turkey proposed that a pilot TsunamiReady Program could be implemented in one of the NEAMTWS countries.

3.6. REPORTS BY OTHER INTERGOVERNMENTAL ORGANIZATIONS

75 Mr Alessandro Annunziato, from the Joint Research Centre of the European Commission (EC/JRC), provided an overview of the main activities related to tsunamis performed at JRC over the year.

76 Mr Annunziato reported that the first phase of the Global Tsunami Informal Monitoring System (GTIMS) was concluded successfully in June 2014 and all the participants recognized the value of the method as good training for the operators (analysis and reporting of all the worldwide events of magnitude larger than Mw 7.0). He also reported that a second phase is in preparation and should be launched in the first half of 2015.

77 He explained that an important experiment on tsunami alerting has been performed in October in Setubal, Portugal. He reported that it consisted in simulating the sea level rise corresponding to a tsunami in the Gulf of Cadiz, Spain, at the location of a tide gauge. Mr Annunziato noted that the real time analysis of the sea level, with the identification of anomalous abrupt change respect to the normal tide, provides a trigger for the activation of the Tsunami Alerting Device (TAD) that is installed 3.5 km far inside the Setubal channel. He indicated that the experiment was successful and the alert was triggered within 30 seconds. He further explained that people around the location of the TAD called the local firefighters to understand if the alert was real or not revealing that people, if adequately instructed (see NEAMTIC activities), can properly react to alerts.

78 To conclude, he reported that the last activity was the development of a new tide gauge type characterized by a low development cost and minimum installation requirements. He explained that this new device, called Inexpensive Device for Sea Level Measurements (IDSL), has a cost of less than 1K€; and the JRC is currently testing it in Imperia, Liguria, to have a comparison with another device installed by the Italian authorities. Furthermore, he noted that once the testing phase of the prototype will be completed, JRC will construct 20 devices that will be offered to the NEAMTWS community for installation in locations of interest. He indicated that the requests for interest in the testing should be done through the

IOC Secretariat, and the organizations interested in the installation should take care of identifying the locations and related permissions and should provide the necessary SIM card for the data transmission.

4. IMPLEMENTATION

4.1. STATUS FOR ESTABLISHMENT OF NATIONAL TSUNAMI WARNING CENTRES AND TSUNAMI SERVICES PROVIDERS

79 Member States reported on the status of the establishment of the Candidate Tsunami Service Providers (CTSPs) and their National Tsunami Warning Centres (NTWCs).

4.1.1. France

80 Mr François Schindelé started his presentation explaining that the CENtre d'Alerte aux Tsunamis (CENALT) monitored continuously the seismic and tsunami activity of the North-Eastern and Atlantic (NEAM) region during 2014.

81 He indicated that CENALT detected and have disseminated messages for 5 seismic events with magnitude greater than the threshold (5.5 to 5.7), 4 of them located in the North-Eastern Atlantic and one in the Western Mediterranean.

82 He also explained that CENALT have conducted monthly communication tests and have participated to the Exercise NEAMwave 14 sending alert messages on 28 October 2014 of a magnitude 6.5 earthquake scenario occurring in the Ligurian Sea.

83 In closing, he reported that CENALT received and processed more than 30 new sea level components at the end of 2014 thanks to the new tide gages data made available by Italy and Spain on the IOC sea level web page. He underlined that these data are crucial to detect rapidly a potential tsunami in Western Mediterranean sea and North-Eastern Atlantic.

4.1.2. Germany

84 Ms Anna Von Gyldenfeldt reported that for many decades, Germany has been operating a Sea Level Forecasting and Storm Surge Warning Service based at the Federal Maritime and Hydrographic Agency (BSH).

85 She explained that as for the technical and operational procedures – sea level monitoring, data analysis, warning level decision and warning dissemination – the storm surge warning processes show clear parallels to the needs of a tsunami warning service. She also added that model simulations indicate that in case of a tsunami entering the North Sea, expected maximum wave heights shall be comparable to experienced storm surge heights. Thus, it seemed most appropriate to integrate the National Tsunami Warning Centre into the already existing system.

86 Ms Von Gyldenfeldt pointed out that a decision matrix was developed, distinguishing between four cases with different warning levels, and to inform the public about the new warning features, a user workshop was held in 2013 and co-operations with the German Civil Protection Authorities and the Foreign Office were established.

4.1.3. Greece

87 Mr Melis reported that in its 2014 status, the National Observatory of Athens (NOA-IG) officially appointed as the Hellenic National Tsunami Warning Center (HL-NTWC),

Greece, acted as one of the candidate centres providing tsunami watch services in the region covered by the NEAMTWS.

88 He explained that the HL-NTWC operates on a 24/7 basis for continuous seismic and tsunami monitoring supported by the National Seismic Network and other, constantly expanding, instrumental tide-gauge and accelerometric networks operated by the Institute of Geodynamics (IG) of the National Observatory of Athens (NOA). He also explained that tsunami messages are issued and disseminated to the national civil protection as well as to other NEAMTWS centres as soon as a strong earthquake occurs according to the Decision Matrix adopted by Recommendation 1 of ICG/NEAMTWS-VII and to the Tsunami Analysis Tool (TAT) provided by the EC/JRC

89 Mr Melis noted that the HL-NTWC developed a programme of training for its staff in close collaboration with EC/JRC, while participated actively in the monthly communication tests as well as at the fourth Communication Test Exercise in the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS-CTE4) held the 30 June 2014, and at the Exercise NEAMWave 14 where elaborated one of the tsunami scenarios used. He highlighted that the HL-NTWC participated as a main partner in several EU and other research projects (e.g. ASTARTE) as well as in educational projects coordinated by NEAMTIC.

4.1.4. Israel

90 Mr Salamon presented the recommendations of the Scientific Committee appointed by the Head of the Earth and Marine Science Research Administration, according to the State of Israel Governmental decision No. 4738, to formulate a framework for a tsunami early warning system (“Mayim Adirim”) along the Mediterranean coast of Israel. He explained that the Committee Members were representatives of all the relevant governmental research institutes, academia, Ministry of Defence (MOD) and Home Front Command (HFC).

91 He summarized the report of the Committee which focused first on evaluating the tsunami hazard to Israel, emphasizing the role of both earthquakes and near-shore submarine landslides on tsunami generation in the region, the probability of occurrence and the potential damage from tsunamis, and consequently recommended on the required policy, warning principles and frame of preparedness.

92 Furthermore, he explained that the main body of the Committee report provides specific guidelines and detailed suggestions for the policy makers for the establishment of efficient ‘end-to-end’ tsunami early warning procedures in order to improve public awareness and preparedness against tsunamis and extreme inundation events. He highlighted that among the main suggestions are the formation of two new centres, one 'scientific' (“Nachshol Nitzpeh”) and other 'operational' (“Migdalor”) that are responsible for monitoring and handling real tsunami events, both functioning 24/7.

93 He explained that the scientific centre (consisting of seismologists, oceanographers and geologists) is based on real-time scientific data obtained from 'in-state' monitoring systems as well as on 'out-of-state' early warning messages received from the Tsunami Services Providers (TSPs) that operate within the framework of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS). He added that the ‘scientific’ centre will inform the 'operational’ centre in real time as to the probability of tsunami occurrence and issue the proper alert messages.

94 With regard to the operational centre (consisting of MOD and HFC representatives), Mr Salamon informed that it will in turn decide whether or not to issue a tsunami warning

message to the proper civil protection authorities and the public. He emphasized that is of the utmost importance to decide on a common language and terminology of the exchanged messages between the two centres and the Tsunami Services Providers.

95 He also explained that the scientific centre should be implemented immediately at the Seismology Division of the Geophysical Institute of Israel (GII), and so is the operational centre under the responsibility of the National Emergency Management Authority (NEMA) of the MOD.

96 To finish, he stated that the report is concluded by suggesting the ways of how to increase Israeli public awareness to the possible risk of tsunamis and at the same time promote safe behaviour through education and training.

4.1.5. Italy

97 Mr Michelini reported that during 2014, Italy has been putting in place its National Tsunami Warning Centre (NTWC), which is made by three components: Istituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA), Dipartimento della Protezione Civile (DPC), e Istituto Nazionale di Geofisica e Vulcanologia (INGV). He explained that ISPRA is responsible for maintaining the Italian sea level network and for providing sea level data to INGV, INGV is responsible for running the seismic network, acquiring data from other networks, and has a 24/7 shifting to analyse earthquakes and sea-level data, and to provide tsunami warning to DPC, and DPC is responsible for warning dissemination on the Italian territory.

98 He explained that the operational component of the NTWC at INGV is called CAT (Centro di Allerta Tsunami) and that it has begun to act as a CTSP for the Mediterranean region from 1 October 2014 with a competence zone for earthquakes occurring in the Western, Central, and Eastern Mediterranean, and in the Aegean and Marmara Seas. He also explained that CAT performs nowadays monthly communication tests on the first Friday of each complete first week of the month.

99 He also mentioned that with the purpose of continuing training people on the duty shift, M>=5.5 events are analysed globally although warnings are issued to the designated external recipients only for events occurring within the zone of competence of CAT.

100 Mr Michelini indicated that although at the moment the tsunami warning procedures rely on the NEAMTWS Decision Matrix, a database of 50,000 tsunami Green's functions, capable to represent any possible earthquake-induced tsunami, has been prepared using the HySEA Malaga University GPU-based tsunami code. He noted that after a test phase, this new approach will be implemented in CAT operations and will replace the Decision Matrix approach.

101 He indicated that, due to the pre-existing seismic monitoring, CAT/INGV is already exchanging seismic data with other seismic centres that begun NEAM CTSP and with CENALT. He also noted that agreements and testing are ongoing for improving seismic data and parameters exchange, and sea level data exchange with CENALT, NOA and KOERI (Kandilli Observatory and Earthquake Research Institute). He added that it is likely that the same will happen with IPMA (Instituto Português do Mar e da Atmosfera) in the next future.

102 He highlighted that awareness-raising initiatives are being conducted on the national territory, first contacts with media have been established, and the activities of the CAT will be further disseminated through 2015.

4.1.6. Portugal

103 Mr Carrilho reported that the three main components of the Portuguese NTWC, based at IPMA (Instituto Português do Mar e da Atmosfera), are the seismic network, the tsunami detection/analysis, and the issuing of message to the civil authorities. He also reported that IPMA runs the national seismic network and will operate the Tsunami Warning Centre (TWC).

104 He explained that currently the Portuguese seismic network is collecting data from 59 broadband stations, 27 SP stations, and 33 accelerometers (most of them co-located with the seismic sensors) through which the hypocentre of an earthquake can be determined in less than 5 minutes. He noted that Seiscomp3 is likely to become the primary system to be used in the seismic detection enabling fast determinations of moment magnitude in case of larger events.

105 Mr Carrilho indicated that the tide gauge network includes 17 stations transmitting in real-time/near-real time, where most of the data is accessed by Internet and a small part through the GTS system. Both datasets are converted to miniseed format and managed through the same Seiscomp platform used for seismic data. He highlighted that during the next months it is expected to increase the number of online tide-gauges by adding 10 stations belonging to the French network, located in the Atlantic coasts.

106 Furthermore, he reported that in respect of tsunami modelling and in the framework of a cooperation with JRC, a database of more than 6,000 scenarios was developed and installed at IPMA. It covers the region from Azores to Gibraltar and magnitudes from 6.5 to 8.75. He explained that this set of scenarios enabled IPMA to estimate wave arrival times and wave heights near the coast. It was also installed a Tsunami Analysis Tool (TAT, developed by JRC) to analyse tsunamis and assist in the issue messages according to the expected severity of the tsunami.

107 Regarding on duty service, he emphasized that with the creation of IPMA it will be possible to operate the tsunami watch system by combining the existing seismic and the weather forecast on duty services, something depending on the internal reorganization of the operational on-duty systems.

108 Mr Carrilho indicated that considering the regional level, IPMA has integrated seismic and sea-level data on a common analysis platform, and developed a new tool to generate bulletin messages according to the decision matrix for the North-Eastern Atlantic approved by the ICG/NEAMTWS. He also indicated that a new platform to disseminate messages by fax, email, sms and GTS was developed.

109 He recalled that as a Candidate Tsunami Service Provider, IPMA took part on the exercise NEAMWave 14 as message provider having prepared a scenario for the North-Eastern Atlantic region, and as soon as IPMA is ready to start operations as National Tsunami Warning Centre (NTWC), it will offer tsunami services for the NE Atlantic region.

4.1.7. Turkey

110 Mr Necmioglu reported that the Turkish Candidate Tsunami Service Provider (CTSP-TR), KOERI, is operational since 1 July 2012 and continues to operate 129 BB and 86 strong motion and 6 short period sensors. The regional coverage includes 77 stations from GFZ and additional 16 stations through bilateral agreements. He noted that during 2014, Romania and Russian Federation have subscribed to its services thanks to Exercise NEAMWave 14, reaching a total of 11 NEAMTWS Member States as subscribers.

111 He explained that CTSP-TR continued to issue messages according to the NEAMTWS Decision Matrix and issued a Watch message for the 24 May 2014 Northern Aegean Event. He also explained that no further progress could have been made in 2014 in the integration of the existing national-tide gauge stations due to the updated plans of the General Command of Mapping in charge of the operation of the national tide-gauge network. However, collaborative activities with EC/JRC continued where a comprehensive tsunami scenario database for the Eastern Mediterranean, Aegean and Black Seas has been produced.

112 He indicated that CTSP-TR also participated in EC/JRCs Global Tsunami Informal Monitoring Service Project (GTIMS) and analysed 16 tsunamigenic events around the globe. He also indicated that CTSP-TR continued to participate in the Communication Test Exercises (CTEs) and in the Regional Communication Test Exercises (RegCTEs), and acted as the Message Provider for the Black Sea Scenario in the Exercise NEAMWave 14, where Black Sea was covered fort the first time in a NEAMTWS Tsunami Exercise.

113 He recalled that the new operational centre has been built and full integration is expected in the first half of 2015. He explained that data preparation activities for the inundation maps at TFPs continued, and CTSP-TR also continued to improve its TWS through its involvement of European Commission (EC) funded FP7 Projects: ASTARTE and MARSite.

114 He explained that during the Eleventh session of the ICG/NEAMTWS, CTSP-TR presented a detailed NEAMTWS Performance Monitoring Framework with Key Performance Indicators (KPIs) and is committed to provide its full support to the newly established Task Team on Operations to fulfil its mandate within the intersessional period. In addition, he noted that CTSP-TR strongly welcomed the declaration of Italy for its intention to apply for accreditation in 2015 and is ready to support Italy by all possible means in this endeavour. CTSP-TR also aims for accreditation to 2015 subject to the full operational status of the newly built operational centre and finalization of its new legal status.

115 He explained that a discussion was opened among Member States on the accreditation procedure. Although it would be desirable to implement the accreditation in 2015 considering also the 10th Anniversary of the establishment of the ICG/NEAMTWS, it might be difficult to be able to implement the accreditation for all the four CTSPs. Mr xxxxx highlighted that it was agreed that it is very important to inform the general public, and the concerned stakeholders about the existence of the CTSPs and about the service they provide, and that this should be a priority for next year.

116 He also explained that another discussion took place around the relationship between the NTWC, the CTSPs, and the Civil Protection Authorities and it was agreed that a specific workshop should be organized in order to promote an open dialogue between the different communities.

4.2. TSUNAMI INFORMATION CENTRE FOR THE NORTH-EASTERN ATLANTIC, THE MEDITERRANEAN AND CONNECTED SEAS (NEAMTIC) AND NEAMTWS INTRANET

117 The Secretariat reported on the activities conducted during 2014 in the context of the Tsunami Information Centre (TIC) for the NEAM region. A coordination meeting for the TICs of all the regions was organized the 14 February 2014 in Paris, France, and it was decided to use the layout of the Indian Ocean Tsunami Information Centre (IOTIC) website as common standard.

118 The Secretariat presented the main features of the IOTIC website, and the plan for their implementation for NEAMTIC website. Moreover, following a number of requests from the Member States, the Secretariat developed an intranet in the context of the UNESTEAMS structure made available by the Division of Knowledge Management & Information Systems of UNESCO.

4.3. EVALUATION OF EXERCISE NEAMWAVE14

119 Ms Marzia Santini, Co-Chairperson of the Task Team on Tsunami Exercises, presented the preliminary results of the Exercise NEAMWave 14. Recalling the decided structure of the exercise in Phases A, B, and C, she informed about the participation of Member States. In order to take into account some of the recommendations made after Exercise NEAMWave 12 (IOC/2012/TS/103 VOL.1 + VOL.2), she noted that the Exercise Manual was distributed well in advance, and additional sections on the implementation of Phase B, and on Phase C were added.

120 She explained that the exercise was marked by a strong participation of the Civil Protection Authorities (14 CPAs performing a total of 17 Phases B, out of a total of 20 countries participating to the exercise), and Phase B was implemented as orientation workshops, drill exercises, tabletop exercises, and functional exercises. She indicated that all Member States with a CTSP (Greece, France, Italy, Turkey and Portugal) performed Phase B.

121 Ms Santini informed that for the first time, countries bordering the Black Sea, like Romania and Russia, participated in the exercise, with a dedicated scenario. She also informed that this exercise was the occasion to test for the first time the mainstreaming of the Standard Operating Procedures (SOPs) of the Emergency Response and Coordination Centre (ERCC) of the European Commission (EU) into the NEAMTWS system for providing international assistance through the Union Civil Protection Mechanism (CPM) in case of major disasters.

122 She noted that during the exercise some communication issues were identified providing the opportunity to learn some lessons regarding, for example, the use of some communication technologies and interoperability issues among CTSPs, andit was concluded that there is still room for improvement in internal coordination (among IOC Secretariat, TT members and CTSPs; e.g. TNC databases or consideration of the information of the application forms).

123 Ms Olimpia Imperiali, from the European Commission Directorate General for Humanitarian Aid and Civil Protection (DG ECHO), made a presentation on the activities of DG ECHO and of its Emergency Response Coordination Centre (ERCC).

124 Ms Imperiali also highlighted the usefulness of the ERCC by taking part in NEAMWave 14 and in particular because NEAMWave 14 offered an excellent opportunity for the non-European countries to test the CPM of the European Union and understand its functioning.

125 Mr Pierluigi Soddu presented the activities undertaken in Italy and he reported that a number of preparatory activities and training events were organized with the regional departments, in particular those affected by the Eastern Mediterranean scenario.

126 Mr Soddu explained that the Exercise NEAMWave 14 was the occasion to test the decision-making chain, and also the procedure to send the message that arrives from the TSP to the headquarters of the Civil Protection and then to the regional and local

departments. He noted that some 100 institutions participated in the exercise using different communication methods.

127 Ms Elena Tel, Instituto Español de Oceanografía (IEO), presented the activities undertaken in Spain. She reported that Spain is currently developing a legal framework to set-up a National Tsunami Warning Centre.

128 Ms Tel informed that the CPA was in charge of the preparation of the exercise and a first meeting was organized in July 2014 with CPA representatives, and then a two-days workshop on a national level in September 2014. She also informed that the objectives of the exercise were presented to all concerned stakeholders.

129 She explained that during the exercise some communication issues between the national level of the CPA and the regional level, but measures are already under preparation to solve these issues.

130 Ms Anna von Gyldenfeldt, Federal Maritime and Hydrographic Agency, presented the activities undertaken in Germany. She reported that Germany participated in all the phases of Exercise NEAMWave 14 having the occasion to test the procedures developed for tsunami risk in Germany.

131 She explained that four cases have been identified: if the earthquake is below threshold and therefore there is not tsunami being generated the event is noted but no action is taken; if the earthquake is above threshold, but no tsunami is being generated, the event is noted and an email with information to the German Joint Information and Situation Centre (GMLZ) at Federal Office of Civil Protection and Disaster Assistance (BBK) is sent. In case of a tsunami event, where the German coast might not be affected but German citizens abroad might be, as in the case of the NEAMWave 14 Scenario of North-eastern Atlantic, an email with information to the GMLZ/BBK and the Foreign Office's Crisis Response Centre is sent; if the German coast is affected an information exchange with GMLZ/BBK and Response Centre starts and the warnings are issued.

132 She noted that warnings are disseminated according to the same existing structure for storm surges. Tsunami warnings are disseminated via radio broadcast, internet and telephone/fax service (FACT24) to subscribers which are, for example, the local communities, local firefighters, civil protection, the German Federal Agency for Technical Relief (THW), power plants, dike wardens, harbour authorities.

133 Mr Melis, NOA, informed about the activities undertaken in Greece. He reported that NOA acted as Message Provider for the Eastern Mediterranean scenario during Exercise NEAMWave 14. He summarized that the messages were sent through GTS, email, fax and sms. Emails were sent to 56 external and 6 internal recipients, fax message to 41 external and 1 internal recipients, and sms messages to 28 external and 4 internal recipients.

134 He explained that the Greek CPA participated in NEAMwave 14 and produced coastal impact maps from the message sent by NOA. He also explained that some preparatory meetings and trainings were undertaken with the CPA in collaboration with the Italian CPA as well.

135 Finally, Mr Melis described some of the main issues encountered in NEAMWave14: contact list, graphical products in the messages as results of numerical modelling and not of the decision matrix, and finally sms use could be improved.

136 Mr Fernando Carrilho, on behalf of the Portuguese Civil Protection Authorities (ANPC), presented the activities undertaken in Portugal. He explained that the main

objectives for ANPC were to test internal operation procedures for Phase A and C, and to test the perception of tsunami warning message by the local level (municipalities and fire brigades) as well as the reaction time, i.e. elapsed time from IPMA to local level. He summarized that in the case of Phase A and C the objectives were accomplished, while in the case of phase B a numbers of issues were identified. The customized message from IPMA was sent to ANCP which forwarded the message to the Maritime Authority (DGAM), 10 District Command for Relief Operations (CDOS), 54 municipalities, and 113 fire brigades.

137 Mr Carrilho reported that the two main issues are that the warning systems actually in place are not suitable in case of tsunami (too much time consumed in the process), and there is a need for a review of operational/technical procedures on early warning, in particular local maps with potential damage should be developed, damage in critical infrastructures should be considered, and evacuation maps and shelters points defined.

138 He concluded that in general NEAMWave 14 was an excellent opportunity to promote tsunami risk awareness at local level, the involvement from local level exceeds initial expectations, and good comments and proposals from regional and local levels were reported and will have to be considered in the future.

139 Mr Öcal Necmioglu, on behalf of the Prime Ministry Disaster and Emergency Management Authority of Turkey (AFAD), presented the activities undertaken in Turkey. He reported that KOERI acted as Message Provider for Exercise NEAMWave 14 and he explained that for the first time it was developed a scenario for the Black Sea in order to involve institutions from Black Sea countries.

140 Mr Necmioglu noted that, on a national level, messages with enhanced products were disseminated to AFAD (Turkish CPA) according to the Master Schedule of Events List (MSEL). He also noted that in the case of Turkey some issues related to contacts details emerged, and he highlighted that a revision of the registration procedure should be considered.

141 He explained that during Exercise NEAMwave 14, Turkey also tested TRIDEC products, the TRIDEC cloud. He informed that the cloud-based and web-based prototype could open up new prospects for Tsunami Early Warning and Mitigation Systems, in particular, the combination of several complementary cloud-based services merged into one platform can be used for web-mapping of hazard specific geospatial data in order to handle, share, and communicate threat specific information and collaborate in a distributed environment.

142 Mr Necmioglu noted that AFAD performed NEAMWave14 with the participation of 2 provincial units (Bartin and Zonguldak) and one Search and Rescue Unit (SAR) located in Sakarya Province as a tabletop exercise. He informed that Mr Yalciner also participated as observer to the exercise in Ankara.

143 He reported that AFAD organized 2 preparatory meetings in Ankara with the participation of all national and local level experts. He explained that at local level, Provincial Units of Zonguldak and Bartin also organized 2 events for the preparation of NEAMWave 14 and during local meetings, public awareness programmes both in Bartin and Zonguldak on tsunami hazard were also carried out. He indicated that in total, at national and local level, approximately 100 people from AFAD Headquarters (HQ) and Bartın, Zonguldak and Sakarya (SAR) provinces (including government units, private sector, NGOs, universities) attended to the tabletop exercise actively.

144 He explained that before the exercise, a real emergency (coalmine accident) happened in Karaman, Turkey and so AFAD HQ and Zonguldak (AFAD) Provincial units

were occupied simultaneously with the coalmine accident emergency and with the exercise activities. He noted that although Turkey had the right to cancel the exercise, AFAD HQ decided to continue to perform both real emergency response and tabletop exercise. Mr Necmioglu highlighted that before and during the exercise there was excellent collaboration, cooperation and communication among the institutes, mainly KOERI, Provincial AFAD Units, provincial exercise participants.

145 Mr Trevor Guymer, on behalf of the Emergency Management of the Cornwall Council, presented the activities undertaken by United Kingdom. He reported that it was the first time for UK to participate in a tsunami exercise for phase B and it was decided to implement a regional tabletop exercise. He explained that the main objective of the exercise was to test a cascading communication from the regional level of the Cornwall Council to the governmental level using a well-established mechanism which is the one in place in the case of floods.

146 He noted that a briefing on tsunami risk was given by the UK Tsunami National Contact which was found very useful. Mr Guymer explained that messages were received from the TNC and not from IPMA so there was an issue related to contacts to be used for the exercise which differ from the official TWFP and TNC contacts for UK. This raises the issue of the subscription procedure.

147 He informed that the participation in NEAMWave 14 was very important for UK because it raised issue related to how to manage tsunami risk on a national level, and it was also the occasion to sensitize the emergency management authorities on tsunami risk and on the need to define emergency management procedures.

4.4. TSUNAMI ALERT MESSAGES AND NEW PRODUCTS FROM OTHER ICGs

148 On behalf of NOAA National Weather Service (NWS), Ms Christa von Hillebrandt-Andrade, Chairperson of the ICG-CARIBE EWS, reported about the new products in use in the Pacific Tsunami Warning System (PTWS).

149 She explained that as of the 1 of October 2014 there was a big change in the services provided by the PTWS. The previous PTWS products were public and included only text, including the list of the areas in warning or in watch status, the forecasted tsunami arrival times, and information on the observed wave heights. There were some limitations expressed both by scientists and emergency response managers. The approach was extremely conservative based primarily on limited historical data, and therefore resulted in significant over-warning. Areas were put in warning or watch based on earthquake magnitude, estimated time left to tsunami impact or distance from earthquake epicentre. The approach was suitable for timely alert for regional and basin-wide tsunamis but not for local tsunamis. There was no information on forecast levels of wave impact. PTWC warning advice caused confusion with country's authoritative warning, and the product was only text product. The new paradigm change is that the threat will be based on wave forecast models and not on pre-determined magnitude threshold. Forecasts will be constrained by earthquake mechanism and sea level readings on tide gauges. Public text messages continue with summary information, and finally there is a suite of graphical products that are available only to the Tsunami Warning Focal Point. These are:

- Coastal Tsunami Amplitude Forecast Polygon Map – Overview,
- Deep-Ocean Tsunami Amplitude Forecast Map – Pacific-wide,
- Coastal Tsunami Amplitude Forecast Map – Pacific wide and Regional, with Tsunami Travel Times,
- Coastal Tsunami Amplitude Forecast KMZ– input to Google Earth,

- Table of Forecast Statistics for Regional Polygons.

150 Ms von Hillebrandt-Andrade informed that there is no longer warning or watch alert levels disseminated to the countries of the PTWS, instead there are four categories of forecast maximum coastal tsunami wave amplitudes.

- < 0.3m (no Threat),
- 0.3 to ≤ 1m,
- 1 to ≤ 3m,
- >3m,
- Other: Forecast not yet computed.

151 She explained that countries now decide and issue their own alert levels to their populations, and so they have to have new SOP. The new products will be tested during the next Exercise Pacific Wave 15 (PACWave 15) from 2 to 6 February 2015.

152 Ms von Hillebrandt-Andrade informed that the CARIBE-EWS has also recommended that these enhanced products be introduced in the Caribbean and the final decision and timeline will be established at next session of the ICG-CARIBE-EWS (ICG/CARIBE-EWS-X) that will be held from 19 to 21 May 2015 in Philipsburg, Sint Maarten.

153 The presentation given was appreciated by Member States and it was proposed to start a discussion on how these products could be implemented in NEAMTWS as well. It was highlighted that particular attention should be given to the analysis of the new method limitations and its positive aspects.

154 Mr Pierluigi Soddu, on behalf of the representatives of CPAs from other Member States, made a presentation on the common open issues related to tsunami risk management from a CPAs' perspective.

155 He explained that in the NEAM region the time to alert the population is very short. Therefore there is a need to adapt the usual steps for alerting/activating the emergency management system (i.e. the operational/technical procedures). The precondition for this change is the modification of the legal framework which assigns roles and responsibilities, and a consequent capacity development for the personnel working in the emergency rooms.

156 Following the presentation of the new products available in the PTWS, he ensured that there would be a need to have information about the expected wave heights at the identified forecast points. Moreover, a systematic risk assessment for the NEAM region would help the local authorities to develop emergency management plans, and evacuation maps. He highlighted that cooperation with national scientific counterparts is needed to agree on national projects to fill these gaps. Finally, he explained that it is very important to develop education and information campaign with the public to inform them about the characteristics of the tsunami risk and to make them more prepared in case of an event as well as to consider the possibility of false alerts.

157 Mr Soddu presented a proposal already shown during the Steering Committee meeting of the ICG/NEAMTWS which is to reorganize the structure of the Working Groups and Task Teams of NEAMTWS in order to respond to the needs of the two main groups active in the system, the CTSPs and the CPA. A dedicated Working Group for the CPA would facilitate a more proactive participation. This Working Group would provide a forum in which common criticalities could be discussed and somehow addressed from an institutional and operational point of view.

158 The proposal of Mr Soddu was appreciated by Member States that acknowledged the need to adapt the system structure and governance to the new situation but concluded that more time is needed to evaluate pros and cons of the proposal. It was decided that a written proposal should be prepared by the Mr Soddu as Vice-Chair be discussed at the next Steering Committee meeting. The proposal will be then discussed and eventually approved at the next session of the ICG/NEAMTWS.

5. PROGRAMME FOR 2014–2015

159 The Secretariat and the Chairperson emphasised the need to define a visibility strategy for next year which will mark the Tenth Anniversary of the establishment of the ICG/NEAMTWS. A very important opportunity will be the final conference of the Exercise NEAMWave 14 where the results will be presented as well as proposals for next steps in the implementation of the operational part of the system.

6. DATE AND PLACE FOR ICG/NEAMTWS-XII

160 The Secretariat informed that no offer to host the next session of the ICG was received so far.

161 The Secretariat and the officers will verify different options in the upcoming weeks.

7. ANY OTHER BUSINESS

162 No other business was required to be considered by the session.

8. ADOPTION OF DECISIONS AND RECOMMENDATIONS

163 The meeting discussed the draft decisions and recommendations from the plenary and the Working Groups prepared by the Secretariat. The adopted version is included in ANNEX II.

9. CLOSE OF THE SESSION

164 The meeting closed on Friday 14 November 2014, at 14:00.

ANNEX I

AGENDA

1 OPENING

2 ORGANIZATION OF THE SESSION

2.1 ADOPTION OF THE AGENDA

2.2 DESIGNATION OF THE RAPPORTEUR

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

2.4 ESTABLISHMENT OF SESSIONAL COMMITTEES AND WORKING GROUPS

3 REPORTS ON ICG/NEAMTWS INTERSESSIONAL ACTIVITIES

3.1 REPORT BY THE CHAIRPERSON

3.2 REPORT BY IOC SECRETARIAT

3.3 REPORT BY TOWS-WG

3.4 REPORT BY THE WORKING GROUPS AND TASK TEAMS

3.5 REPORT BY OTHER ICGS

3.6 REPORTS BY OTHER INTERGOVERNMENTAL ORGANIZATIONS

4 IMPLEMENTATION

4.1 STATUS FOR ESTABLISHMENT OF NATIONAL TSUNAMI WARNING CENTERS AND TSUNAMI WATCH PROVIDERS

4.2 TSUNAMI INFORMATION CENTRE (NEAMTIC) AND NEAMTWS INTRANET

4.3 EVALUATION OF NEAMWAVE14

4.4 TSUNAMI ALERT MESSAGES AND NEW PRODUCTS FROM OTHER ICGS

5 PROGRAMME FOR 2014-2015

5.1 ACTIVITIES SCHEDULED FOR 2014-2015

5.2 ESTABLISHMENT OF INTERSESSIONAL WORKING GROUPS AND TASK TEAMS

6 DATE AND PLACE FOR ICG/NEAMTWS-XII

7 ANY OTHER BUSINESS

8 ADOPTION OF DECISIONS AND RECOMMENDATIONS

9 CLOSING

ANNEX II

DECISIONS AND RECOMMENDATIONS

Decision ICG/NEAMTWS-XI.I

The Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS),

Having met for its 11th Session in Nicosia, Cyprus, 12–14 November 2014,

Having reviewed the progress made in the implementation of the NEAMTWS,

Noting furthermore the positive results of the extended communication tests since the Tenth Session and of the second tsunami exercise for the region, NEAMWave14, and the significant increase of the participation of Civil Protection Authorities

Welcoming the continuation of the interim operational phase of NEAMTWS, through the activities of candidate Tsunami Service Providers (CTSPs) in France, Greece and Turkey,

Welcoming the commencement of the activities of candidate Tsunami Service Provider by Italy

Urges those Member States, who have not yet subscribed through the IOC to the services of the CTSPs to do so as soon as possible,

Requests the Executive Secretary to contact Member States

- who have not nominated or verified both TWFPs and TNCs,
- who have not provided tsunami forecast points,

and **reminds** them to urgently do so;

Takes note of Decision EC-XLVII/Dec.3.2.1 approved by the IOC Executive Council at its 47th Session;

Requests the Co-Chairs of the Working Groups and of the Task Teams to prepare, in consultation with the Members of their respective Working Groups or Task Team, a plan of action for the intersessional period, and submit it to the IOC Secretariat no later than the end of January 2015;

Decides:

(i) To continue the Task Team on Communication Test with Terms of Reference as outlined in Annex 1,

(ii) To continue the activities of the Task Team on Tsunami Exercises with Terms of Reference as outlined in Annex 2,

(iii) To establish a new Task Team on Operations with Terms of Reference as outlined in Annex 3,

(iv) To continue the activities of the Steering Committee during the intersessional period with the Terms of Reference in Annex 4 hereafter,

(v) To continue conducting quarterly non-dummy Extended Communication Test

Exercises based on a scenario event,

(vi) To continue the regular dummy Communication Test Exercises conducted every month between CTSPs and their subscribers,

(vii) To revise the NEAMTWS documentation, including the generation of a new high level, overview document to be approved by the ICG/NEAMTWS at its Twelve session;

Recommends:

(i) To increase the participation of Member States, including by the use of workshops,

(ii) By recalling the procedures approved at the ICG/NEAMTWS-IX, the CTSPs to apply for Accreditation, and in the interim to continue operating in accordance with those procedures,

(iii) To review the way in which contact lists are used within the communication tests and tsunami exercises,

(iv) To make available the reports of TOWS meetings to the TNCs and to the ICG NEAMTWS Working Groups and Task Teams for review,

(v) To increase the accessibility of documentation through the use of the collaborative workspace made available by the IOC Secretariat,

(vi) To improve the efficiency of Working Groups during the intersessional period ensuring that key documents are made available via the IOC Secretariat at least one month before next ICG;

Acknowledges the importance of NEAMTIC and **invites** it to continue its work;

Thanks the Task Team on Tsunami Exercise and the IOC Secretariat for the successful coordination of the Exercise NEAMWave14;

Acknowledges the assistance provided by the Directorate-General of the European Commission's Humanitarian Aid Office (DG-ECHO) for the undertaking of NEAMWave14 and the continued support of the EC and Joint Research Centre (JRC) in capacity development, including infrastructure and research and new sea level measurements;

Agrees to exchange information with ICG/CARIBE-EWS as appropriate and to invite its Chair to participate in the Task Team for Tsunami Exercises;

Thanks Cyprus for hosting the Eleventh Session of ICG/NEAMTWS.

Annex 1 to Decision ICG/NEAMTWS-XI.I

Terms of Reference of the ICG/NEAMTWS Task Team on the Communication Test Exercises

Mandate

The Task Team will:

1. Update procedures for testing the communication of tsunami alert messages between CTSPs and TWFPs, including a review of latency and availability.
2. Contribute to reviewing and proposing amendments to the relevant parts of the Interim Operational Users Guide in the light of experience with the tests.

3. Plan, conduct, evaluate and validate quarterly CTEs organized by CTSPs on rotational basis.

4. Report progress to ICG/NEAMTWS-XII.

Modus operandi

The Task Team will mainly work by correspondence, but hold a meeting in March or April 2015, and if required, another one in preparation for the next ICG meeting.

Membership

The ICG officers

— Chairs or Co-Chairs of existing NEAMTWS Task Teams and Working Groups,

— Representatives of candidate TSPs ,

— Experts designated by Member States having interest in participating in the system (NTWCs, TWFPs, TNCs, Civil Protection authorities),

— Representatives of relevant organizations working in the NEAMTWS region.

Annex 2 to Decision ICG/NEAMTWS-XI.I

Terms of Reference of the ICG/NEAMTWS Task Team on Tsunami Exercises

Mandate

The Task Team will:

1. Evaluate NEAMWave14, in particular by providing information on Civil Protection Authorities feedbacks and needs with reference to tsunami alert message content together with the Exercise Team*,

2. Organize in coordination with the IOC Secretariat a workshop on NEAMWave14 results and outcomes,

3. Report progress to ICG/NEAMTWS-XII.

Modus operandi

The Task Team will mainly work by correspondence, but hold a meeting in March or April 2015, and if required, another one in preparation for the next ICG meeting.

Membership

The ICG officers:

— Chairs or Co-Chairs of existing NEAMTWS Task Teams and Working Groups,

— Representatives of candidate TSPs,

— Experts designated by Member States having interest in participating in the system (NTWCs, TWFPs, TNCs, Civil Protection authorities),

— Representatives of relevant organizations working in the NEAM region,

— Representative of ICG/CARIBE-EWS.

*Exercise Team: Current and previous Co-Chairs of TT-CTE, WG1 (Hazard Assessment and Modelling), WG4 (Public Awareness, Preparedness and Mitigation), Chairperson of NEAMTWS, and members of the IOC Secretariat.

Annex 3 to Decision ICG/NEAMTWS-XI.I

Terms of Reference of the ICG/NEAMTWS Task Team on Operation

Mandate

The Task Team will:

1. Coordinate the development and operational implementation of warning centres/systems through:
   (i) Developing a NEAMTWS Performance Monitoring Framework based on the functions-requirements defined in the approved accreditation procedure and performance indicators developed for CTEs; advice on the modalities of operation, interoperability, methods and standards for the development and issuance of warnings, such as methods and reporting of magnitudes, and requirements in terms of coordination and operation of NEAMTWS.
2. Foster and propose a technical solution for real-time data exchange among CTSPs,
3. Advice on arrangements for redundancy and back-up arrangements,
4. Support the update of the NEAMTWS Operation documents, as the Operational Users Guide (OUG),
5. Report progress to ICG/NEAMTWS-XII.

Modus operandi

The Task Team will mainly work by correspondence and will hold one meeting in the first half of 2015, and if required, another one in preparation for the next ICG meeting.

Membership

— The ICG officers,

— All CTSP Representatives,

— NTWC, TWFP and CPA Representatives,

— Chairs or co-chairs of existing NEAMTWS Task Teams and Working Groups.

Co-chairs of the Task Team will be appointed by the ICG NEAMTWS Officers and will be reappointed on a rotational basis every year.

Annex 4 to Decision ICG/NEAMTWS-XI.I

Terms of Reference of the ICG/NEAMTWS Steering Committee

Mandate

The Steering Committee shall coordinate and integrate the work of ICG/NEAMTWS in the intersessional periods, as implemented through the various Working Groups and Task Teams, including but not limited to:

- Monitor performance and interoperability of the NEAMTWS and report to ICG/NEAMTWS.
- Implement decisions and recommendations of the ICG and provide strategic advice on the implementation of the NEAMTWS.
- Identify relevant funding sources taking account of the resource implications of approved activities.
- Facilitate implementation at the level of the ICG of relevant resolutions, decisions and recommendations of the IOC Governing Bodies.
- Evaluate the feasibility of implementation of the recommendations of the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG) in NEAMTWS.
- Develop and maintain the NEAMTWS Implementation Plan, Interim Operations Users Guide, and replace the Development Plan by a new overview document.
- Examine continuing compliance of Tsunami Service Providers (TSPs) with the adopted operational and organizational function and requirements.
- Implement the procedures as adopted and the Terms of References (ToRs) for the accreditation of Candidate Tsunami Service Providers (CTSPs).
- Nominate accreditation teams, foster the accreditation process during the coming year and assist in seeking funds for the visits.
- Continue the tasks initiated by the ICG/NEAMTWS Task Team on the Multi-hazard Approach to Coastal Inundation that is, identifying relevant national and international activities and the scope for linkage with NEAMTWS.
- Liaise with the Steering Committees or equivalent structures of other ICGs.
- Consider the potential re-organization of Working Groups and Task Teams structure.
- Promote increased awareness of NEAMTWS especially by taking advantage of its Tenth anniversary.

Modus operandi

The Steering Committee will mainly work by correspondence, but hold a coordination meeting prior to each ICG session. Other meetings will be held as needed.

Membership

— The ICG/NEAMTWS Officers (Chair and two Vice-Chairs),

— The Co-Chairs of ICG/NEAMTWS Working Groups and Task Teams,

— Representatives of all TSPs/CTSPs.

Annex 5 to Decision ICG/NEAMTWS-XI.I

Conclusions and Recommendations of Working Group 1 on Hazard Assessment and Modelling

The WG1 recommends developing a format (e.g. report or workshop) to address the following issues:

(i) Clarify and communicate the interpretation and usage of modelling results in operational tsunami warning in the following regards:

- How to use modelling results in the presence of the decision matrix approach?
- How to interpret and standardize coastal wave height information in new colour coded hazard map products, where colours are derived from non-obvious modelling methods?
- How to interpret forecasting data at forecast points and how to use forecast points for evaluation in hazard assessment?
- How to compare and interpret different TSPs' modelling results?

(ii) Prepare corresponding documentation for the ICG/NEAMTWS-XII.

The WG1 recommends adopting a free data policy for model data base data as it is in place for the sensor data considering the value of these data for hazard related assessments (basin definition, uncertainty quantification, sensor location optimization, influence determination).

Annex 6 to Decision ICG/NEAMTWS-XI.I

Conclusions and Recommendations of Working Group 2 on Seismic and Geophysical Measurements

The WG2 re-iterates the request for completing the inventory of seismic and geophysical infrastructures available, and to provide clarity on what is available and open or subject to bilateral agreements. The WG2 re-iterates that Member States (particularly if ORFEUS members) should comply with Open Data Policy.

The WG2 recommends:

(i) The new Task Team Operations to foster and propose a technical solution for real-time parametric data exchange among CTSPs; to review magnitude assessment methods, and magnitude reporting in the messages; to focus on the optimal layout of the seismic network

(ii) That the agreement with the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) should be reviewed to emphasize the need for CTSPs to have an easy and effective access to data, with particular regard to metadata.

(iii) That the IOC Secretariat: supports Member States to establish and foster data exchange with North African countries; and establish formal Cooperation with the RELEMR initiative

(iv) The CTSPs to implement the new Message IDentifier (MID). This requirement should be included in the accreditation procedures. The technical description of MID

provided and discussed by Steering Committee in the inter sessional period should be included as an Annex in the Operational Users Guide

(v) To consider in the potential re-organization of Working Groups and Task Teams structure the possibility of including a Scientific Advisory Board.

Annex 7 to Decision ICG/NEAMTWS-XI.I

Conclusions and Recommendations of Working Group 3 on Sea Level Data Collection and Exchange, including Offshore Tsunami Detection and Instruments

The WG3 recommends:

(i) That all sea level data should be made available to the CTSP's and NTWC's using bilateral agreements, between NTWC's whenever possible.

(ii) To increase the number of sea level stations available, particularly in the North of Africa, and reduce sampling and latency to 1 minute or less as far as possible.

(iii) To increase the number of stations uploading sea level data to the GTS in Europe to facilitate access by other ICGs.

(iv) To make available an updated inventory of metadata of sea level and offshore sensors in the NEAM region for the ICG's and NTWC's on the NEAMTIC webpage

(v) That the new NEAMTWS documentation should include a detailed review of the real capabilities and limitations of the existing tsunami detection network and plans for future improvements

(vi) That the link between the tsunami warning systems and the operational oceanography regional alliances in Europe (e.g. Mongoos) should be further explored, to guarantee the sustainability of the marine network and to fulfil the multi-hazard requirements

WG3 appreciates the offer of JRC to provide new real time sea-level stations to Member States in need of such stations, and looks ahead for tighter cooperation with JRC in providing real time sea-level data for the NEAMTWS.

ANNEX III

OPENNING ADRESSES

Dr Pavlos Paraskevas
Secretary General of the Cyprus National Commission for UNESCO

Ladies and Gentlemen,

It is a great pleasure and privilege for me to welcome you to Cyprus, on behalf of the Cyprus National Commission for UNESCO, for the 11th meeting of experts of this Intergovernmental Coordination Group. We believe that joint efforts and close collaboration between our countries are fundamental for the development of a framework for a Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas.

The Intergovernmental Oceanographic Commission of UNESCO, for more than 50 years, contributes to the strategic objectives of leveraging scientific knowledge for the benefit of the environment and the management of natural resources. The present meeting is an opportunity to exchange views and reflect on measures to improve the research methods in the field of Tsunami Early Warning and Mitigation System, to assess risks, issue warnings and raise awareness among the populations concerned.

The Oceanography Center, as the scientific focal point in our country for issues related to marine research, fosters multilateral cooperation and facilitates exchange of data, good practices and capacity building, thus providing the tools for improvement and attainment of better results. Moreover, the existence of specialized observing and forecasting centers is also of vital importance for the area and the world for the prevention of natural disasters like tsunamis. The participation in networks such as the Intergovernmental Coordination Group for Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas is paramount importance for national security and disaster preparedness. Improving capabilities for tsunami risk assessment, implementing early warning systems and enhancing preparedness of communities at risk is among the main objectives of UNESCO in this field.

Please allow me to conclude by expressing a warm “thank you” / «ευχαριστώ» to the Oceanography Center for the organisation of this meeting, to the University of Cyprus and to all of you who accepted the invitation and are present here today. I hope that this meeting will provide the opportunity for a fruitful exchange of views and will form the basis for future collaboration between our countries, to avoid loss of human lives due to natural disasters, such as tsunamis, and ensure a safer world.

Mr Andreas Frantzis
Civil Defence Commissioner of Cyprus

It is with great pleasure that I address this very important meeting today that is dealing with the development of an early warning system for tsunamis.

Under my capacity as the Cyprus Civil Defence Commissioner, I have the overall responsibility for civil protection and my organization as an end user of such a system, is highly interested in supporting and encouraging your efforts towards the development of an early warning system for tsunamis.

Throughout its long history, Cyprus has suffered great destructions from earthquakes and nearly all of its historical towns have being heavily damaged from seismic activity.

Throughout the last century, the monitoring of data of seismic activity and its consequences, confirm these past historical references. This data provides a serious reminder and warning to our society, of the islands vulnerability to such a physical phenomenon. At the same time recent complex emergencies and low probability but of high impact disasters like the disaster of Fukushima, provide us with a warning that we have to prepare ourselves not only against traditional threats but also against new ones that arise from the rapid evolution of our societies and the increased industrialization as well as urbanization.

All these challenges before us, have brought up the need for enforcing seismic codes and other parallel measures and thus to ensure that development does not produce serious dangers to our infrastructure.

As any other country, that is prone to earthquakes and other natural or manmade disasters, we highly depend on contingency planning, we discuss and cooperate with all of our partners and stakeholders and we regularly exercise our plans so they can be effectively and timely activated.

Other measures we take include the acquisition and storage of relief items in the case of a disaster, the update of our training programs and last but not least the enhancement of our regional, European and international cooperation.

One significant step we have taken in 2000 was the acquisition of a modern electronic siren system that has the facility to warn the population in case of a disaster or other destructive incident. The system accumulates energy from solar panels and is activated by a wireless radio system. This feature has added value because the system it can work after a major disaster, which may affect the electricity supply and the communication networks.

In the case of an earthquake of a big magnitude the big challenge for us is the absence of an early warning system for tsunamis. It is a challenge with regards to the warning of our population through our PWS but also the timing and the mechanism who have to decide about this very crucial issue and release a warning. For this purpose we have put in place a certain procedure jointly with the Geological Survey Department of the Ministry of Agriculture and Natural Resources of the Republic.

Another issue of high concern for us is that a large number of critical infrastructures of the Republic, such as petroleum and gas storage facilities are situated in coastal areas. Furthermore the prospect of the creation of an Energy Centre in the south coast of Cyprus where the government will make an enormous investment in terms of value and strategic importance for the further development and prosperity of the island, has forced us to suggest to the competent authorities that are responsible for this establishment, to consider the development and implementation of additional measures to protect these installations from a potential tsunami. The authorities in question replied that the risk assessments which have already been carried out include the risk resulting from a potential tsunami.

Dear all at this stage I would like to emphasize three issues of great importance that I believe are the key elements for the effective prevention, preparedness and response in the case of a tsunami.

Reinforcing scientific research in this particular field is first and foremost very important in enhancing prevention.

Second, is that I consider that governments should think of ways on how to provide incentives to the public and private sector towards prevention and preparedness.

Last but not least, we have to invest in education and in the creation of awareness and culture amongst the population with an emphasis on transparency, in such a way as to not breach public trust but on the contrary, create an environment of cooperation that promotes group thinking and accountability between all stakeholders.

Finally I would like to stress the need for a closer cooperation of Civil Protection Services as well as other disaster management authorities with the scientific society.

I wish you all success in your endeavor, a pleasant stay in Cyprus and a safe return back home. Thank you very much for being with us.

Dr Eleni Morrisseau
Director, Cyprus Geological Survey Department

Distinguished delegates,

Dear participants,

The Eastern Mediterranean area is one of the world's most intense seismic zones where large destructive earthquakes occur with frequency. Seismologists of the national digital seismological center at the Cyprus Geological Survey record about 600 earthquakes per year, both onshore and offshore. The Cyprus region has a documented history of destructive tsunamis. Numerous accounts have been made by historians and later catalogued by geographers, geologists and modern seismologists. The earliest date of tsunami occurrence in the Cyprus region was recorded on a clay tablet during the second millennium BC.

In 1294, Ogerius Panis and Marchisius Scriba wrote about a tsunami that occurred in May 1222 AD:

"...at Cyprus, the sea was lifted up by the shock and rushed inland; the sea in places opened up in huge masses of water big as mountains and surged inland, razing buildings to the ground and filling villages with fish... Baffa (Pafos), they say, suffered most...the harbor dried up and then the town was submerged by the sea...the town and its castle were completely ruined and its inhabitants wiped out."

Evidence for tsunamis comes not only from historical accounts but also from indisputable geological data. Tsunamis that hit the coast make significant morphological impact. In the last 10 years, important geomorphological tsunami features and sediments have been studied in Cyprus, always in collaboration with the Cyprus Geological Survey. Large rock blocks (20 to 50 ton) lifted by tsunamis and deposited on higher ground have been recorded on Cape Kormakitis, the coast of Gialousa, Cape Greco, Agia Napa, Pafos Airport, Kissonerga coast, Lara Bay and the Akamas peninsula.

What we geologists propose, is that we revisit the subject of tsunami risk with a new bottoms-up approach. Until recently, tsunami hazard analysis was based almost exclusively on catalogues which list historical references of the last 2500-3000 years and recent instrumental records. Recent events in the Indian Ocean and Japan have taught us that the return period of a very destructive tsunami can be much larger than 3000 years which is usually the limit of historical accounts. Tsunami simulation should be based on modeling but also observed field evidence, at least for the maximum height of run-up.

The coastal zone of Cyprus is the home of significant archaeological sites, hotels with thousands of local and foreign visitors year-round, marinas, ports, 2 airports, sea bottom anchored cables, military bases, power stations and plans for oil and gas installations. Above

all it is the zone that hosts 9 of the 10 largest urban centers of Cyprus and the majority of its population. The occurrence of a large tsunami can bring the country to a complete stand-still and for this reason I consider tsunami studies and an early warning system very important. I anticipate that you will have a very interesting and fruitful workshop.

Mr Thorkild Aarup
Head Tsunami Unit, UNESCO/IOC, Paris, France

Thank you Dr Paraskeva from the Cyprus National Commission for UNESCO, Mr Andreas Frantzis for your particular perspective as Civil Defense Commissioner of Cyprus and Ms Elena Moyson from the Geological Survey.

On behalf of Wendy Watson Wright, Executive Secretary of IOC I would like to welcome you and thank you for coming and contributing with your expertise to the work of this group.

Since the last meeting we have seen steady progress:

NEAMWave14 was carried out from 28-30 October 2014. There are many highlights from this exercise and those will be discussed in greater detail later.

There has been increased engagement with the civil protection institutions

There are now four candidate tsunami watch providers in Mediterranean with INGV announcing as of 1st October that it is available to provide alerts to member states that are interested.

I also want to acknowledge the extrabudgetary support European Commission's Humanitarian Aid and Civil Protection department (ECHO) has provided to IOC towards the coordination work of the NEAMWave 14; we are very grateful for that.

Budget situation

The budget situation is still very critical. UNESCO has now started the second biennium after the crisis began in October 2011. Following the admission of Palestine as a full member of UNESCO, US and Israel stopped paying their assessed contributions to the UNESCO Regular Programme.

In this context and also in line with the IOC Executive Council I therefore appeal for the help and support of member states.

In closing I would like to thank the University of Cyprus for hosting this meeting in this very nice setting. I would in particular like to thank Prof Georgious Georgiou, Prof George Zotiattis, Tommy Eleftheriou, and Constantina Mageirou for all the preparations and help you have provided towards the meeting.

I look forward to a very interesting and productive meeting.

ANNEX IV

REPORTS ON THE INTERSESSIONAL ACTIVITIES OF THE WORKING GROUPS AND TASK TEAMS

WORKING GROUP 1
HAZARD ASSESSMENT AND MODELLING

(Prepared by Jörn Behrens, University of Hamburg, Germany,
and Mauricio González, University of Cantabria, Spain)

Members of Working Group 1 have been involved in diverse activities related to NEAMWave 14 and continue to be involved in setting up the operational Regional and National Tsunami Warning Centres. Additionally, a lot of NEAMTWS related modelling activities are carried out currently in the context of the EU FP7 Project ASTARTE (www.astarte---project.eu). Therefore, the amount of direct ICG/NEAMTWS related work has again been limited and no intersessional meeting was scheduled.

We list the direct ICG/NEAMTWS related activities in the following.

- A revision of the manual for NEAMWave 14 was necessary in order to adapt scenario definitions to the added requirements to involve national and local disaster management units. This task has been actively supported by the WG1 Chairpersons and members of the WG.
- Members of the Working Group have been involved in generation of the test scenarios for NEAMWave14.
- Members of the working group are involved in the EU FP7 ASTARTE and work packages in that project have been coordinated with the tasks of WG1. As an example, a report on uncertainty quantification in all aspects of tsunami hazard assessment and mitigation is being prepared, which will serve as a basis for future recommendations on uncertainty treatment by the ICG.

Several work items on the WG1 Implementation Plan are unfortunately still pending. It will be the foremost obligation of the sessional meeting of WG1 to find solutions to complete or work around those pending work items.

Attached to this document is the current Work Plan for WG1, which will be revised during the NEAMTWS-X sessional meeting. It will also be the task of the Working Group to review the Work Plan considering currently running research projects and their envisioned results.

Task/Action	Timeline	Responsibility	Required Budget	Status[1]
Provision of data for benchmarking (seismic parameters, topo-bathymetry, sea level data, run-up...) of the Greece 1956	NEAMTWS-X 2013	Greece		O
Recommendation on Basin definition	1Q 2014	Spain, WG1, NEARTOWAR		O
Revision of Decision Matrix based on the findings of	NEAMTWS-X	WG1, Greece, WG4,		O
Position of deep water gauges (derive recommendations)	Report by NEAMTWS-X	WG1, WG3, ASTART		O
Unified document on Tsunami Sources and Hazard (Follow-up of Tsunami Sources and Hazard assessment)	NEAMTWS-XI	ASTARTE		N

Table IV–1. Work Plan for Working Group 1

[1] Notes: – Status: C – Completed, O – Ongoing, N – New

WORKING GROUP 2
SEISMIC AND GEOPHYSICAL MEASUREMENTS

(Prepared by Gerasimos Chouliaras, National Observatory of Athens, Greece, and Stefano Lorito, National Institute for Geophysics and Volcanology, Italy)

WG2 inventory:

- Seismic/GPS real-time infrastructures +
- Seismic methods of CTWPs, NTWC, and other Member States centres

Participation to meetings in Paris:

- Task Team Meeting on Tsunami exercise (9 April 2014)
- Steering Committee Meeting(10 April 2014)

Proposal of a Message Identifier (MID) for NEAM tsunami messages

Participation to ASTARTE:

- Joint meeting of WP6 on Operational detection and communication infrastructure and WP7 on Early Warning And Forecast (Istanbul, Turkey, 20–21 January 2014)
- Contribution to other WP6-7 research activities (e.g., on fast moment tensor, real-time GPS analysis) and to ASTARTE deliverables (D6.12 Database of the existing

Tsunami Early Warning relevant infrastructure in the NEAM Region [e.g., with NEAMTWS seismic/GPS inventory])

- First ASTARTE meeting (16–18 October 2014, Siracusa, Italy)

Participation to EPOS PP:

EPOS PP Final Meeting: Towards EPOS Implementation Phase and Beyond (22–24 October 2014, Rome, Italy).

WORKING GROUP 3
SEA LEVEL DATA COLLECTION AND EXCHANGE, INCLUDING OFFSHORE TSUNAMI DETECTION INSTRUMENTS

(Prepared by Begoña Pérez, Puertos del Estado, Spain, and Dov S. Rosen, Sea Shore Rosen Engineering Consultants and advisor to the National Management Authority, Israel)

WG3 list of actions from the NEAMTWS-X meeting in Rome (November 2013).

Member States/national tide gauge operators will be contacted to:

- Fulfil new table of stations with detailed information related to all the stations available for tsunami warning purposes in their country
- Prepare a map of their national network (only tsunami related stations)

Concerning this action, national tide gauge operators were contacted in March 2014 by the IOC, on behalf of WG3, that prepared an excel template with the basic information or metadata required from the tide gauge stations concerning tsunami interests.

Up to 12 countries provided the information required for the table: Russia, Turkey, France, Monaco, Spain, Italy, Israel, Romania, Cyprus, Greece, Germany and Malta. None of them provided a map, but the stations have been compiled in Figure IV–1.

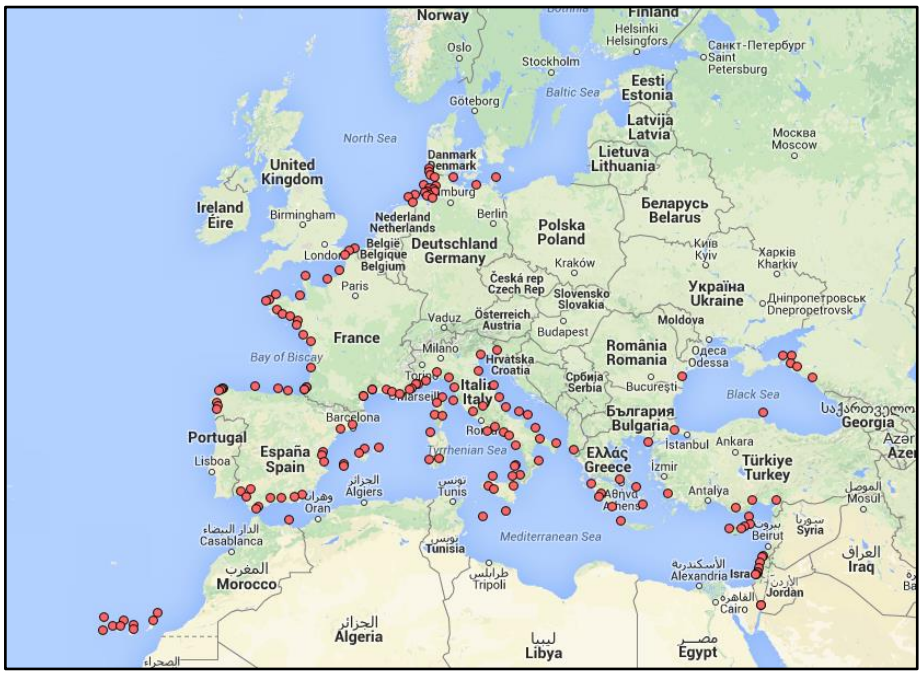

Figure IV–1. Stations from countries that provided metadata information relative to tsunami warning after IOC WG3 March 2014 request.

Once again, as well as from most of the countries in Northern Europe (except Germany), no information was received from any country in the North of Africa. Particularly important is to include the stations from Portugal, for example:

- Update the Implementation Plan according to previous information.
- Prepare a brief report on basic steps for uploading sea level data to the GTS, to be provided to all national institutions (France and Spain)

A preliminary guide was prepared by France based on their experience, and it is now being reviewed and discussed within WG3. A preliminary version is provided with this document.

- Communication with ASTARTE for review of the objectives for improvement of the marine network of NEAMTWS

No update concerning this action.

- Review problems for tsunami detection by tide gauges in stilling wells, open air radars (waves effects) etc.

No update concerning this action. It is expected that a detailed analysis of the metadata provided by the different countries will allow an interesting review about existing deficiencies: the most obvious ones that should be discussed within WG3 are: the need of redundancy of sensors and communications, at least at the areas with higher risk of tsunami (Gulf of Cádiz and Mediterranean). The allocation of additional pressure sensors would prevent total destruction during an event and the recording of data in case of a very large tsunami. At this moment, from the already available information in the sea level sensors inventory, it seems most of the tide gauges would only measure relatively small tsunamis.

<u>WG3 activities intersessional period 2013–2014:</u>

After reception of invitation as co-chair of WG3 of NEAMTWS, attendance to Copernicus User Awareness & Training Event in Lisbon, 13-14th February 2014. Continuation of GMES, Copernicus operational phase started in 2014 (until 2020). Of interest for NEAMTWS, the presentation of the data portal GIO EMS Services: http://emergency.copernicus.eu/mapping, with the role of providing administrations and authorized users high resolution maps obtained from airplanes and satellites, in order to help on the management of emergencies and natural disasters. Concerning tsunami warning, Copernicus could provide useful information for Civil Protection and the National Tsunami Warning Systems in the region. First maps would be available up to 3 hours after the disaster. Nothing available in Copernicus that could help on the component of tsunami detection by now.

<u>Other issues:</u>

- Portugal has informed of their plans to establish a GPS buoy in the coast of Portugal. Arrangements have been made between NOAA and IPMA (Portugal) to re-locate one DART buoy close to San Vicente cape (South West Portugal). This buoy would be of particular interest to NEAMTWS due to the high risk of a tsunami in this region (Portugal, Morocco and South Spanish Atlantic coast).

- Publication of the report: “The scientific and societal case for the integration of environmental sensors into new submarine telecommunications cables”, by the Science and Society Committee of the ITU/UNESCO-IOC/WMO Joint Task Force on Green Cables (JTF), under the leadership of Rhet Butler (Chair), in 2014. The publication is provided with this document.

SUMMARY REPORT OF THE FIRST MEETING OF THE TASK TEAM ON COMMUNICATION TESTS

Paris, 2 April 2014
English only

1. OPENING

The Co-Chairs, Nikolaos Melis (NOA-Greece) and Fernando Carrilho (IMPA-Portugal) opened the meeting on Thursday 20 March at 09.30 a.m.

2. APPROVAL OF AGENDA

The TT approved the provisional agenda.

3. REVIEW OF TT-CT ACTION PLAN FOR 2014

The Action Plan of TT-CTTE, submitted to the IOC Secretariat as requested in Decisions and Recommendations of NEAMTWS-X, was introduced to the TT-CT members.

The discussion focused on the organization of the next communication tests, taking into account the decision of the last ICG-NEAMTWS to conduct quarterly non-dummy Communication Test Exercises based on a scenario event.

From the Co-Chairs it was proposed to introduce the scenario but only addressed to those Member States that have subscribed to services of the Candidate Tsunami Watch Providers (CTWPs).

However, it was noticed that previously delegates from Civil Protection Authorities (CPAs) have raised the problem that too many messages could create confusion in the emergency rooms. Moreover, it was noticed that if a scenario is included in the communication test the media should be involved as well. The issue of involving those Member States that are not actively participating in NEAMTWS was also raised by several participants.

As an action to raise other Member States awareness, and also to ask to member states to verify the information on TNCs and TWFPs sent to the Secretariat, it was decided that a letter will be prepared and sent with the signature of the Chair, and of the IOC Executive Secretary to highlight that NEAMTWS is in its interim operational phase, and that it is important to consider that TWFPs contacts should be those related to the institutions that will be in charge of receiving the alert messages and distributed nationally to the competent institutions.

It was also proposed to organize a workshop back to back with the next ICG in Cyprus focused on the operational component of NEAMTWS.

The Secretariat and the Chair will contact the host in Cyprus to verify the possibility of having such a workshop on 11 November 2014.

For what regards the enlarged communication test, it was finally decided to continue as in the past but to do it more frequently (quarterly), leaving the use of more realistic messages, based on scenarios, for next year.

Portugal will start in June, then France in September.

4. CTWPs REPORTING ON REGULAR CTEs

France

CENALT performs a CTE with other CTWPs and TWFP on every Wednesday of the every first full week of each month. A similar exercise is being conducted the same day with the Interministerial Operational center (COGIC).

CENALT monitors the delay of reception of the messages. It should be emphasized that since October 2013, the message is receive in less than 2 minutes.

Greece

NOA-HLNTWC performs a regular communication test on Thursday of the first full week of every month. It disseminates the communication test message to 16 agencies of 12 member states, plus to 3 international bodies (IOC secretariat, ECHO-MIC & JRC).

The latency for all methods varies from one to four minutes in general, with only very few and occasional exceptions. However with the monthly communication tests a series of issues have been revealed:

1. More active response by the TWFP subscribers is needed.
2. Not all recipients report UTC time, but they also report local time. Sometimes seconds are not included in the replies.
3. Some recipients confuse the GTS message received by e-mail via their GTS provider and the original e-mail message.
4. GTS might cause problems, since it is an external service and cannot be fully monitored locally.

Turkey

KOERI performs a CTE with other CTWPs on every Tuesday of the every first full week of each month. A similar exercise is being conducted on every Monday of the every first full week of each month with the CPA of Turkey (Disaster and Emergency Management Presidency). It was noticed that the online questionnaire set up by KOERI to analyse the results of the communication test is a good tool, and it was proposed to set up a similar common system for all the CTWPs on NEAMTIC website.

The Secretariat will be in charge of assessing the feasibility of such a system.

5. INFORMATION ON NEW TECHNOLOGY

The discussion was mainly focused on the use of SMS especially taking into account the experience gained through the CTE3.

Considering that in SMS there is a limitation in the length of the text, the discussion was around the use of SMS as an alternative way of sending alerts.

It was also suggested that SMS could be used to inform about an event and to direct the relevant people to the emergency room.

It was also proposed to reflect on the 'red phone' proposal made by Alessandro Annunziato from the Joint Research Centre at the ICG/NEAMTWS X.

It was suggested that new technologies should further investigated, and that application on how to use mobile phones to alert the population as well should be analysed and assessed.

6. PROPOSAL FOR REVISION/UPDATING OF CTE DOCUMENTS

A new section on the use of SMS, and also on the JRC red phone proposal should be included in the CTE manual as well as on the non-dummy Communication Test Exercises based on a scenario event.

7. FINALIZE 2014 ACTIONS, REQUEST FOR CTWPs, SCHEDULED TELECONFERECING

The decided 2014 actions include:

1. The preparation of a letter to Member States requesting a revision of TNCs and especially TWFPs contact details, the details for SMS should be included in a revised TWFPs form
2. The organization of a workshop back to back with the ICG-NEAMTWS XI in Cyprus on 11 November 2014
3. CTE should be undertaken as in the past without scenario but should be undertaken more frequently as decided in the ICG/NEAMTWS-X
4. Italy will start its activity as CTWP in October and will therefore start also its monthly communication test with the choice of doing their monthly communication test on Mondays

8. AOB

No AOB was proposed

9. CLOSURE

The Co-Chairs closed the meeting at 12.30

Annexes (Not included):

- Annex I:Agenda
- Annex II: List of participants

SUMMARY REPORT OF THE FIRST MEETING OF THE TASK TEAM ON TSUNAMI EXERCISES

Paris, 2 April 2014
English only

1. OPENING

The Co-Chairs, Marzia Santini (DPC-Italy) and Emilie Crochet (COGIC-France) opened the meeting on Thursday 20 March at 14.30 pm.

2. APPROVAL OF AGENDA

The TT approved the provisional agenda.

3. REVIEW OF TT-CT ACTION PLAN FOR 2014

The Action Plan of TT-TE, submitted to the IOC Secretariat as requested in Decisions and Recommendations of NEAMTWS-X, was introduced to the TT-TE members.

The co-chairs presented the activities foreseen for the preparation and the conduct of the next exercise NEAMWave14.

The detailed action plan is reported as annex to this report.

The exercise will take place in October 2014, and will last for 2 days.

A concept paper will be prepared by the Co-Chairs and distributed with the first announcement of the exercise.

It was highlighted that it will important this year with the occasion of the 10th anniversary of the South-East Asia tsunami to think carefully at the involvement of the public and of the media.

The Secretariat informed that at the last TOWS meeting, held in February 2014 in Paris, a decision was taken to create a team made of the Chairs of the 4 tsunami early warning and mitigations systems (Pacific Ocean, Indian Ocean, Caribbean and NEAM) and of the heads of the 4 Tsunami Information Centres (TICs) to define a common communication strategy, and to focus on the 10th anniversary. The Member States will be informed about the results.

The ICG/NEAMTWS Chair, Ahmet Yalciner, informed the participants that he considers working on awareness raising and better involvement of NEAMTWS Member States an important component of his duties, and that he commits in defying a specific strategy for that together with the vice-chairs, Pierluigi Soddu and Trevor Guymer.

4. PRESENTATION ON NEAMWAVE 12 RESULTS

Mr Öcal Necmioğlu, former co-chair of the Task Team Communication Test and Tsunami Exercise, presented the main results and lessons learnt of NEAMWave 12.

In particular it was highlighted that in NEAMWave 12 the participation of the Civil Protection Authorities was lower than expected and that for the future the Member States of the Candidate Tsunami Watch Providers (CTWP) member states should be more actively involved in searching this link.

It was requested by the participants of NEAMWave 12 to provide guidance on the exercise in a more structured manner, and to have somebody of the exercise team that can be contacted during the exercise.

We should also think about defying the Standard Operating Procedures (SOP).

It was also noticed that some level of confusion was generated and this was maybe due to the fact that the documents were prepared by non-native speakers. It could be advisable to have a native speaker reviewing the documents before sharing them with the exercise participants.

5. NEAMWAVE 14

5.1 PRESENTATION OF THE EXERCISE AND INTERACTION WITH THE ERCC

The co-chairs presented the concepts and the component of NEAMWave 14. The title given to the exercise is “NEAMWave 14: from early warning toward early action”.

NEAMWave 14 will be made of three phases, a phase A and B as in NEAMWave12 and an additional phase, named phase C, with the involvement of the European Response Coordination Centre (ERCC).

This phase will involve the simulation of a request of international assistance from an ICG/NEAMTWS member state, and of the coordination through the ERCC of this assistance provided by the European Union member states that are part of the Civil Protection Mechanism (MIC).

The issue of the involvement in this phase of the non EU member states was raised. It was clarified that the non EU member states can request assistance but it is to EU member states to provide this assistance. It has been suggested and agreed to call this phase “Phase C: early response”.

It is important to highlight that this phase will be an opportunity to involve the Civil Protection Authorities from Europe because a number of preparatory and information activities will be undertaken in the context of NEAMWave 14.

The Secretariat informed that at also targeted activities for North-African member states will be undertaken. UNESCO funds have been decentralised to the UNESCO Rabat office, and will be used to organize a NEAMWave14 preparatory workshop in Rabat involving Morocco, Algeria, Tunisia and Mauritania.

5.2 POSSIBLE SCENARIOS

At the ICG/NEAMTWS-X it was decided to conduct NEAMWave 14 based on scenario events in Black Sea, Mediterranean and North-East Atlantic.

Portugal will be in charge of developing the scenario for the North-East Atlantic. If the choice is to prepare a worst-case scenario the 1755 Lisbon scenario should be used also for NEAMWave 14. Another option could be to develop a scenario of a big earthquake generating a less impacting tsunami.

France could develop a scenario for the Ligurian Sea, impacting areas with beaches and harbours. The aim would be to simulate a tsunami with a limited inundation but with high impacts.

Greece could develop a scenario based on the Crete event of 365. This scenario would have major effect in all the Eastern Mediterranean and in the Adriatic, impacting also the Balkan countries. This scenario could be the one chosen for the phase C in which the ERCC will be involved due the high level of countries potentially impacted.

Turkey will be in charge of developing a scenario for the Black Sea.

6. PROPOSAL FOR REVISION / UPDATING OF EXERCISE REFERENCE DOCUMENTS

The documents to be updated are the scenario guidelines, and the exercise manual

7. IMPLEMENTATION PLAN

The information on the decided actions is reported in the Annex II of this report

8. AOB

No AOB was proposed

9. CLOSURE

The meeting was closed at 6:30 pm

Annexes (Not included):

Annex I Task Team Tsunami Exercises Action Plan

Annex II list of participants

ANNEX V

LIST OF DOCUMENTS

WORKING DOCUMENTS

Agenda item	Reference code	Document title
2.1	ICG/NEAMTWS-XI/1	Agenda
2.3	ICG/NEAMTWS-XI/1 Add. prov.	Provisional Timetable ICG/NEAMTWS-XI
3.2	ICG/NEAMTWS-XI/6	Report by the ICG/NEAMTWS Secretariat
3.4	ICG/NEAMTWS-XI/7	Report on Intersessional Activities of Working Group 1
3.4	ICG/NEAMTWS-XI/8	Intersessional activities of Working Group 2
4.3	ICG/NEAMTWS-XI/Annex II	Application Form to participate in NEAMWave14
4.3	ICG/NEAMTWS-XI/10	Scenario proposal by IPMA-NEAMWave14
4.3	ICG/NEAMTWS-XI/11	Scenario proposal by NOA - NEAMWave 14
4.3	ICG/NEAMTWS-XI/12	Scenario proposal by KOERI – NEAMWave 14
4.3	ICG/NEAMTWS-XI/13	TRIDEC Cloud tested with exercise runs in the fringe of NEAMWave14
4.3	ICG/NEAMTWS-XI/9	Scenario proposal by CENALT-NEAMWave14
4.3	IOC/2014/WR/266	IOC-UNESCO-ISESCO Workshop on Improving Tsunami Warning and Emergency Response in the North-Eastern Atlantic, Mediterranean and Connected Seas: Summary Recommendations, Rabat, Morocco, 23–24 September 2014

BACKGROUND DOCUMENTS

Code	Document title
IOC/2013/TS/105 REV.3	User's guide for the Pacific Tsunami Warning Center: enhanced products for the Pacific Tsunami Warning System
ICG/NEAMTWS-TT-CTE/1	Agenda Workshop for Task Team Communication Test
IOC/2014/TS/114Vol.1	Exercise NEAMWAVE 14. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region, 28–30 October 2014, Volume I: Manual
IOC/2014/TS/116 Vol.1 and Vol.2	Third Enlarged Communication Test Exercise (CTE3),Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas. 1st October 2013. Volume 1 and Volume 2: Exercise Manual and Evaluation Report
IOC/BRO/2014/6	Exercise NEAMWAVE 14 Flyer. A Tsunami Warning and Communication Exercise for the North-Eastern Atlantic, the Mediterranean, and Connected Seas Region.
IOC/TOWS-WG-VII/3	Seventh meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), Paris, France, 12–13 February 2014

ANNEX VI

LIST OF PARTICIPANTS

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ANNEX VII

LIST OF ACRONYMS

AFAD	Prime Ministry Disaster and Emergency Management Authority of Turkey
ANPC	Portuguese Civil Protection Authorities
ASTARTE	Assessment, Strategy And Risk Reduction for Tsunamis in Europe
BBK	Federal Office of Civil Protection and Disaster Assistance
BSH	Federal Maritime and Hydrographic Agency
CAT	Centro di Allerta Tsunami
CDOS	District Command for Relief Operations
CENALT	CENtre d'Alerte aux Tsunamis
CL	Circular Letter
CNRST	Centre National pour la Recherche Scientifique et Technique of Morocco.
CPA	Civil Protection Authority
CPM	Union Civil Protection Mechanism
CTBTO	Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization
CTE	Communication Test Exercise
CTIC	Caribbean Tsunami Information Centre
CTSP	Candidate Tsunami Service Provider
CTSP-TR	Turkish Candidate Tsunami Service Provider
CTWP	Caribbean Tsunami Warning Program (CTWP
DGAM	Maritime Authority (DGAM) of Portugal
DG-ECHO	Directorate-General of the European Commission's Humanitarian Aid Office
DPC	Dipartimento della Protezione Civile
EAtHC	Eastern Atlantic Hydrographic Commission
EC	Executive Council
EC DG-ECHO	Directorate General for the Humanitarian Aid and Civil Protection department of the European Commission
ECTE	Enlarged Communication Test Exercise
EPOS	European Plate Observing System
ERCC	Emergency Response Coordination Centre
ESFRI	European Strategy Forum on Research Infrastructures
GII	Geophysical Institute of Israel
GMLZ	German Joint Information and Situation Centre
GTIMS	Global Tsunami Informal Monitoring System
GTS	Global Telecommunication System
HFC	Home Front Command of Israel
ICG	Intergovernmental Coordination Group
ICG/CARIBE-EWS	Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System

ICG/NEAMTWS	Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
IDSL	Inexpensive Device for Sea Level Measurements
IEO	Instituto Español de Oceanografía
IG	Institute of Geodynamics
IHO	International Hydrographic Organization
INGV	Istituto Nazionale di Geofisica e Vulcanologia
IOC	Intergovernmental Oceanographic Commission
IOC/TOWS-WG	Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems
IOpUG/NEAMTWS	Interim Operational Users Guide for the Tsunami Early Warning and Mitigation System in the North-eastern Atlantic, the Mediterranean and Connected Seas
IOTIC	Indian Ocean Tsunami Information Centre
IPMA	Instituto Português do Mar e Atmosfera
ISESCO	Islamic Educational, Scientific and Cultural Organization
ISPRA	Istituto Superiore per la Protezione e la Ricerca Ambientale
ITU	International Telecommunication Union
JCOMM	Joint Technical Commission for Oceanography and Marine Meteorology
JRC	Joint Research Centre
JTF	Joint Task Force
KOERI	Kandilli Observatory and Earthquake Research Institute
KPI	Key Performance Indicators
MID	Message Identifier
MOD	Ministry of Defence of Israel
MONGOOS	Mediterranean Oceanography Network for the Global Ocean Observing System
MSEL	Master Schedule of Events List
NEAM	North-Eastern Atlantic, the Mediterranean and Connected Seas
NEAMTIC	Tsunami Information Centre for the North-Eastern Atlantic, the Mediterranean and Connected Seas
NEAMTWS	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
NEMA	National Emergency Management Authority of Israel
NOA	National Observatory of Athens
NOAA	National Oceanic and Atmospheric Administration
NTWC	National Tsunami Warning Centre
NWS	National Weather Service
OUG	Operational Users Guide
PPRD	Euromed programme for the prevention, preparedness and response to natural and man-made disasters
PTWC	Pacific Tsunami Warning Center
PTWS	Pacific Tsunami Warning System
RegCTEs	Regional Communication Test Exercises

RELEMR	Reducing Earthquake Losses in the Extended Mediterranean Region (RELEMR) programme
SAR	Search and Rescue Unit
SHOM	French Naval Hydrographic and Oceanographic Service
SLSMF	Sea Level Station Monitoring Facility
TAT	Tsunami Analysis Tool
TEWS	Tsunami Early Warning Systems
THW	German Federal Agency for Technical Relief
TIC	Tsunami Information Centres
TNC	Tsunami National Contact
ToR	Terms of Reference
TOWS-WG	Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems
TSU	Tsunami Unit
TsuMaMos	International Conference on Mathematical Modelling for Tsunami Early Warning Systems
TT	Task Team
TT-CT	Task Team on Communication Test
TWFP	Tsunami Warning Focal Point
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations Office for Disaster Risk Reduction
US NTWC	US National Tsunami Warning Center
WG	Working Group
WMO	World Meteorological Organization

In this Series *Languages*

Reports of Governing and Major Subsidiary Bodies, which was initiated at the beginning of 1984, the reports of the following meetings have already been issued:

1.	Eleventh Session of the Working Committee on international Oceanographic Data Exchange	E, F, S, R
2.	Seventeenth Session of the Executive Council	E , F, S, R,Ar
3.	Fourth Session of the Working Committee for Training, Education and Mutual Assistance	E, F, S, R
4.	Fifth Session of the Working Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S, R
5.	First Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions	E, F, S
6.	Third Session of the *ad hoc* Task team to Study the Implications, for the Commission, of the UN Convention on the Law of the Sea and the New Ocean Regime	E, F, S, R
7.	First Session of the Programme Group on Ocean Processes and Climate	E, F, S, R
8.	Eighteenth Session of the Executive Council	E, F, S, R, Ar
9.	Thirteenth Session of the Assembly	E, F, S, R, Ar
10.	Tenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific	
11.	Nineteenth Session of the Executive Council, Paris, 1986	E, F, S, R, Ar
12.	Sixth Session of the IOC Scientific Committee for the Global Investigation of Pollution in the Marine Environment	E, F, S
13.	Twelfth Session of the IOC Working Committee on International Oceanographic Data Exchange	E, F, S, R
14.	Second Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, Havana, 1986	E, F, S
15.	First Session of the IOC Regional Committee for the Central Eastern Atlantic, Praia, 1987	E, F, S
16.	Second Session of the IOC Programme Group on Ocean Processes and Climate	E, F, S
17.	Twentieth Session of the Executive Council, Paris, 1987	E, F, S, R, Ar
18.	Fourteenth Session of the Assembly, Paris, 1987	E, F, S, R, Ar
19.	Fifth Session of the IOC Regional Committee for the Southern Ocean	E, F, S, R
20.	Eleventh Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Beijing, 1987	E, F, S, R
21.	Second Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Arusha, 1987	E, F
22.	Fourth Session of the IOC Regional Committee for the Western Pacific, Bangkok, 1987	E only
23.	Twenty-first Session of the Executive Council, Paris, 1988	E, F, S, R
24.	Twenty-second Session of the Executive Council, Paris, 1989	E, F, S, R
25.	Fifteenth Session of the Assembly, Paris, 1989	E, F, S, R
26.	Third Session of the IOC Committee on Ocean Processes and Climate, Paris, 1989	E, F, S, R
27.	Twelfth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Novosibirski, 1989	E, F, S, R
28.	Third Session of the Sub-Commission for the Caribbean and Adjacent Regions, Caracas, 1989	E, S
29.	First Session of the IOC Sub-Commission for the Western Pacific, Hangzhou, 1990	E only
30.	Fifth Session of the IOC Regional Committee for the Western Pacific, Hangzhou, 1990	E only
31.	Twenty-third Session of the Executive Council, Paris, 1990	E, F, S, R
32.	Thirteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, New York, 1990	E only
33.	Seventh Session of the IOC Committee for the Global Investigation of Pollution in the Marine Environment, Paris, 1991	E, F, S, R
34.	Fifth Session of the IOC Committee for Training, Education and Mutual Assistance in Marine Sciences, Paris, 1991	E, F, S, R
35.	Fourth Session of the IOC Committee on Ocean Processes and Climate, Paris, 1991	E, F, S, R
36.	Twenty-fourth Session of the Executive Council, Paris, 1991	E, F, S, R
37.	Sixteenth Session of the Assembly, Paris, 1991	E, F, S, R, Ar
38.	Thirteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Baja California, 1991	E, F, S, R
39.	Second Session of the IOC-WMO Intergovernmental WOCE Panel, Paris, 1992	E only
40.	Twenty-fifth Session of the Executive Council, Paris, 1992	E, F, S, R
41.	Fifth Session of the IOC Committee on Ocean Processes and Climate, Paris, 1992	E, F, S, R
42.	Second Session of the IOC Regional Committee for the Central Eastern Atlantic, Lagos, 1990	E, F
43.	First Session of the Joint IOC-UNEP Intergovernmental Panel for the Global Investigation of Pollution in the Marine Environment, Paris, 1992	E, F, S, R
44.	First Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1992	E, F, S
45.	Fourteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Paris, 1992	E, F, S, R
46.	Third Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Vascoas, 1992	E, F
47.	Second Session of the IOC Sub-Commission for the Western Pacific, Bangkok, 1993	E only
48.	Fourth Session of the IOC Sub-Cornmission for the Caribbean and Adjacent Regions, Veracruz, 1992	E, S
49.	Third Session of the IOC Regional Committee for the Central Eastern Atlantic, Dakar, 1993	E, F
50.	First Session of the IOC Committee for the Global Ocean Observing System, Paris, 1993	E, F, S, R
51.	Twenty-sixth Session of the Executive Council, Paris, 1993	E, F, S, R
52.	Seventeenth Session of the Assembly, Paris, 1993	E, F, S, R
53.	Fourteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Tokyo, 1993	E, F, S, R
54.	Second Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1993	E, F, S
55.	Twenty-seventh Session of the Executive Council, Paris, 1994	E, F, S, R
56.	First Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Melbourne, 1994	E, F, S, R
57.	Eighth Session of the IOC-UNEP-IMO Committee for the Global Investigation of Pollution in the Marine Environment, San José, Costa Rica, 1994	E, F, S
58.	Twenty-eighth Session of the Executive Council, Paris, 1995	E, F, S, R
59.	Eighteenth Session of the Assembly, Paris, 1995	E, F, S, R
60.	Second Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1995	E, F, S, R

61.	Third Session of the IOC-WMO Intergovernmental WOCE Panel, Paris, 1995	E only
62.	Fifteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Papetee, 1995	E, F, S, R
63.	Third Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms, Paris, 1995	E, F, S
64.	Fifteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange	E, F, S, R
65.	Second Planning Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1995	E only
66.	Third Session of the IOC Sub-Commission for the Western Pacific, Tokyo, 1996	E only
67.	Fifth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, Christ Church, 1995	E, S
68.	Intergovernmental Meeting on the IOC Black Sea Regional Programme in Marine Sciences and Services	E, R
69.	Fourth Session of the IOC Regional Committee for the Central Eastern Atlantic, Las Palmas, 1995	E, F, S
70.	Twenty-ninth Session of the Executive Council, Paris, 1996	E, F, S, R
71.	Sixth Session for the IOC Regional Committee for the Southern Ocean and the First Southern Ocean Forum, Bremerhaven, 1996	E, F, S,
72.	IOC Black Sea Regional Committee, First Session, Varna, 1996	E, R
73.	IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Fourth Session, Mombasa, 1997	E, F
74.	Nineteenth Session of the Assembly, Paris, 1997	E, F, S, R
75.	Third Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1997	E, F, S, R
76.	Thirtieth Session of the Executive Council, Paris, 1997	E, F, S, R
77.	Second Session of the IOC Regional Committee for the Central Indian Ocean, Goa, 1996	E only
78.	Sixteenth Session of the International Co-ordination Group for the Tsunami Warning System in the Pacific, Lima, 1997	E, F, S, R
79.	Thirty-first Session of the Executive Council, Paris, 1998	E, F, S, R
80.	Thirty-second Session of the Executive Council, Paris, 1999	E, F, S, R
81.	Second Session of the IOC Black Sea Regional Committee, Istanbul, 1999	E only
82.	Twentieth Session of the Assembly, Paris, 1999	E, F, S, R
83.	Fourth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 1999	E, F, S, R
84.	Seventeenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Seoul, 1999	E, F, S, R
85.	Fourth Session of the IOC Sub-Commission for the Western Pacific, Seoul, 1999	E only
86.	Thirty-third Session of the Executive Council, Paris, 2000	E, F, S, R
87.	Thirty-fourth Session of the Executive Council, Paris, 2001	E, F, S, R
88.	Extraordinary Session of the Executive Council, Paris, 2001	E, F, S, R
89.	Sixth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions, San José, 1999	E only
90.	Twenty-first Session of the Assembly, Paris, 2001	E, F, S, R
91.	Thirty-fifth Session of the Executive Council, Paris, 2002	E, F, S, R
92.	Sixteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Lisbon, 2000	E, F, S, R
93.	Eighteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Cartagena, 2001	E, F, S, R
94.	Fifth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2001	E, F, S, R
95.	Seventh Session of the IOC Sub-commission for the Caribbean and Adjacent Regions (IOCARIBE), Mexico, 2002	E, S
96.	Fifth Session of the IOC Sub-Commission for the Western Pacific, Australia, 2002	E only
97.	Thirty-sixth Session of the Executive Council, Paris, 2003	E, F, S, R
98.	Twenty-second Session of the Assembly, Paris, 2003	E, F, S, R
99.	Fifth Session of the IOC Regional Committee for the Co-operative Investigation in the North and Central Western Indian Ocean, Kenya, 2002 (* Executive Summary available separately in E, F, S & R)	E*
100.	Sixth Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, St. Petersburg (USA), 2002 (* Executive Summary available separately in E, F, S & R)	E*
101.	Seventeenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Paris, 2003 (* Executive Summary available separately in E, F, S & R)	E*
102.	Sixth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2003 (* Executive Summary available separately in E, F, S & R)	E*
103.	Nineteenth Session of the International Coordination Group for the Tsunami Warning System in the Pacific, Wellington, New Zealand, 2003 (* Executive Summary available separately in E, F, S & R)	E*
104.	Third Session of the IOC Regional Committee for the Central Indian Ocean, Tehran, Islamic Republic of Iran, 21-23 February 2000	E only
105.	Thirty-seventh Session of the Executive Council, Paris, 2004	E, F, S, R
106.	Seventh Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, 2005 (* Executive Summary available separately in E, F, S & R); and Extraordinary Session, Paris, 20 June 2005	E*
107.	First Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Perth, Australia, 3–5 August 2005	E only
108.	Twentieth Session of the Intergovernmental Coordination Group for the Tsunami Warning System in the Pacific, Viña del Mar, Chile, 3–7 October 2005 (* Executive Summary available separately in E, F, S & R)	E*
109.	Twenty-Third Session of the Assembly, Paris, 21–30 June 2005	E, F, S, R
110.	First Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), Rome, Italy, 21–22 November 2005	E only
111.	Eighth Session of the IOC Sub-commission for the Caribbean and Adjacent Regions (IOCARIBE), Recife, Brazil, 14–17 April 2004 (* Executive Summary available separately in E, F, S & R)	E*
112.	First Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions (ICG/CARIBE-EWS), Bridgetown, Barbados, 10–12 January 2006	E only
113.	Ninth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Cartagena de Indias, Colombia, 19–22 April 2006 (* Executive Summary available separately in E, F, S & R)	E S*

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114.	Second Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Hyderabad, India, 14–16 December 2005	E only
115.	Second Session of the WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology, Halifax, Canada, 19–27 September 2005 (Abridged final report with resolutions and recommendations)	E, F, R, S
116.	Sixth Session of the IOC Regional Committee for the Western Indian Ocean (IOCWIO), Maputo, Mozambique, 2–4 November 2005 (* Executive Summary available separately in E, F, S & R)	E*
117.	Fourth Session of the IOC Regional Committee for the Central Indian Ocean, Colombo, Sri Lanka 8–10 December 2005 (* Executive Summary available separately in E, F, S & R)	E*
118.	Thirty-eighth Session of the Executive Council, Paris, 20 June 2005 (Electronic copy only)	E, F, R, S
119.	Thirty-ninth Session of the Executive Council, Paris, 21–28 June 2006	E, F, R, S
120.	Third Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), Bali, Indonesia, 31 July–2 August 2006 (*Executive Summary available separately in E,F,S & R)	E*
121.	Second Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), Nice, France, 22–24 May 2006	E only
122.	Seventh Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, Paris, France, 16–18 March 2005 (* Executive Summary available separately in E, F, S & R)	E*
123.	Fourth Session of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS-IV), Mombasa, Kenya, 30 February-2 March 2007 (* Executive Summary available separately in E, F, S & R)	E*
124.	Nineteenth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Trieste, Italy, 12–16 March 2007 (* Executive Summary available separately in E, F, S & R)	E*
125.	Third Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, Bonn, Germany, 7–9 February 2007 (* Executive Summary available separately in E, F, S & R)	E*
126.	Second Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Cumaná, Venezuela, 15–19 January 2007 (* Executive Summary available separately in E, F, S & R)	E*
127.	Twenty-first Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System, Melbourne, Australia, 3–5 May 2006 (* Executive Summary available separately in E, F, S & R)	E*
128.	Twenty-fourth Session of the Assembly, Paris, 19–28 June 2007	E, F, S, R
129.	Fourth Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, Lisbon, Portugal, 21–23 November 2007 (* Executive Summary available separately in E, F, S & R)	E*
130.	Twenty-second Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System, Guayaquil, Ecuador, 17–21 September 2007 (* Executive Summary available in E, F, S & R included)	E*
131.	Forty-first Session of the Executive Council, Paris, 24 June–1 July 2008	E, F, R, S
132.	Third Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Panama City, Panama, 12–14 March 2008 (* Executive Summary available separately in E, F, S & R)	E*
133.	Eighth Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, Paris, France, 17–20 April 2007 (* Executive Summary available separately in E, F, S & R)	E*
134.	Twenty-third Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System, Apia, Samoa, 16–18 February 2009 (*Executive Summary available separately in E, F, S & R)	E*
135.	Twentieth Session of the IOC Committee on International Oceanographic Data and Information Exchange, Beijing, China, 4–8 May 2009 (*Executive Summary available separately in E, F, S & R)	E*
136.	Tenth Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Puerto La Cruz, Bolivarian Republic of Venezuela, 22–25 October 2008 (*Executive Summary available separately in E, F, S & R)	E, S*
137.	Seventh Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-VII), Sabah, Malaysia, 26–29 May 2008 (*Executive Summary available separately in E, F, S & R)	E*
138.	Ninth Session of the IOC-WMO-UNEP Committee for the Global Ocean Observing System, Paris, France, 10–12 June 2009 (* Executive Summary available separately in E, F, S & R);	E*
139.	Fifth Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, Athens, Greece, 3–5 November 2008 (* Executive Summary available separately in E, F, S & R)	E*
140.	Fourth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Fort-de-France, Martinique, France, 2–4 June 2009 (* Executive Summary available separately in E, F, S & R)	E*
141.	Twenty-fifth Session of the Assembly, Paris, 16–25 June 2009	E, F, R, S
142.	Third Session of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology, Marrakesh, Morocco, 4–11 November 2009	E, F, R, S
143.	Ninth Session of the IOC Intergovernmental Panel on Harmful Algal Blooms, Paris, France, 22–24 April 2009 (* Executive Summary available separately in E, F, S & R)	E*
144.	Fifth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Managua, Nicaragua, 15–17 March 2010 (* Executive Summary available in E, F, S & R)	E*
145.	Sixth Session of the IOC Regional Committee for the Central and Eastern Atlantic Ocean, Accra, Ghana, 28–30 March 2010 (* Executive Summary available in E, F, S & R)	E*
146.	Forty-second Session of the Executive Council; Paris, 15, 19 & 20 June 2009	E, F, R, S
147.	Forty-third Session of the Executive Council; Paris, 8–16 June 2010	E, F, R, S
148.	Sixth Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, Istanbul, Turkey, 11–13 November 2009 (* Executive Summary available separately in Ar, E, F, S & R)	E*
149.	Seventh Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, Paris, France, 23–25 November 2010 (* Executive Summary available separately in Ar, E, F, S & R)	E*
150.	Sixth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Santo Domingo, Dominican Republic, 26–29 April 2011 (* Executive Summary available in E, F, S & R)	E*

151.	Twenty-fourth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System, Beijing, China, 24–27 May 2011 (*Executive Summary in E, F, S & R included)	E*
152.	Twenty-first Session of the IOC Committee on International Oceanographic Data and Information Exchange, Liège, Belgium, 23–26 March 2011 (*Executive Summary available separately in E, F, S & R)	E*
153.	Eighth Session of the IOC Sub-Commission for the Western Pacific (WESTPAC-VIII), Bali, Indonesia, 10–13 May 2010 (*Executive Summary available separately in E, F, S & R)	E*
154.	Tenth IOC Intergovernmental Panel on Harmful Algal Blooms, Paris, France, 12–14 April 2011 (* Executive Summary available separately in E, F, S & R)	E*
155.	Forty-fifth Session of the Executive Council, Paris, 26–28 June 2012 (* Decisions available in E, F, S & R)	E*
156.	Seventh Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, Willemstad, Curacao, 2–4 April 2012 (*Executive Summary available in E, F, S & R)	E*
157.	Eleventh Session of the IOC Sub-Commission for the Caribbean and Adjacent Regions (IOCARIBE), Miami, USA, 17–20 May 2011 (*Executive Summary available separately in E & S)	E, S*
158.	Eight Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-VIII), Trinidad & Tobago, 29 April–1 May 2013 (*Executive Summary available in E, F, S & R)	E*
159.	Twenty-seventh Session of the Assembly, Paris, 26 June–5 July 2013 and Forty-sixth Session of the Executive Council, Paris, 25 June 2013	E, F, R, S
160.	Twenty-fifth Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), Vladivostok, Russian Federation, 9–11 September 2013 (*Executive Summary in E, F & R)	E*
161.	Ninth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions, US Virgin Islands, 13-15 May 2014 (*Executive Summary available in E, F, S & R)	E*
162.	Forty-seventh Session of the Executive Council, Paris, 1–4 July 2014 (* Decisions available in E, F, S & R)	E*
163.	Ninth Session of the IOC Sub-Commission of the Western Pacific (WESTPAC-IX), Busan, Republic of Korea, 9–12 May 2012	E
164.	Eleventh Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North Eastern Atlantic, the Mediterranean and Connected Seas, 12–14 November 2014, Nicosia, Cyprus (*Executive Summary available in E, F, S & R)	E*