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)

Twelfth Session

Dublin, Ireland
16–18 November 2015

UNESCO

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ICG/NEAMTWS-XII/3
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[1]The Executive Summary is available in English, French, Spanish and Russian. An Executive Summary of the report is available as a separate document in English (ICG/NEAMTWS-XI/3S)

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Executive summary

The Twelfth 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 Ireland in Dublin, from 16 to 18 November 2015.

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, Turkey, and Italy and the intention of Portugal to start operations as a CTSP in 2016.

The **ICG further welcomed** the progress achieved by the CTSPs and the application by National Observatory of Athens (Greece) for accreditation and the intention expressed by France, Italy and Turkey to also apply for accreditation in the next intersessional period. The ICG **adopted** the document 'Procedures for the Accreditation of TSP, as included in Annex 6.

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.

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 establish a new Task Team on Architecture for ICG/NEAMTWS Governance and reorganisation review.

The **ICG confirmed** the continuation of regular Communication Test Exercises for the next intersessional period and quarterly Extended Communication Test Exercises based on a scenario event involving Member State Civil Protection Agencies.

Decides to organise and conduct a further tsunami exercise in 2017 (NEAMWave17).

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.

Recommends:

I. To increase the participation of Member States in the ICG activities,
II. That each CTSP provide threat level information based on their best practices, including (possibly different) decision matrices, scenario databases or other methods, these methodologies needing to be documented in the NEAMTWS Operational Users Guide),
III. That all sea level data should be made available to the CTSPs and NTWCs using bilateral agreements, between NTWCs whenever possible,
IV. That all tide gauge stations should transition to operational, real time status,
V. To increase the number of seismic and sea level stations available in the North of Africa, and for sea level to reduce sampling and latency to 1 minute or less as far as possible,
VI. That Member States should urge the active involvement of their national Civil Protection Authorities (CPAs) in the routine activities of the ICG, with the aim of making the ICG products more suitable for meeting the needs and expectations of those CPAs,

VII. That NTWCs, in consultation with their CPAs, evaluate the need to provide enhanced products in the NTWC messages, such as maps, and to present and make proposals for discussion and adoption at the next ICG;

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** Member States to contribute funding and secondments to its maintenance and development.

The Twelfth Session of ICG/NEAMTWS was attended by 46 participants from 16 Member States, and one observer organization. The need for a stronger cooperation with the ICG/CARIBE-EWS was reiterated.

Résumé exécutif

La 12e 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 l'Irlande à Dublin, du 16 au 18 novembre 2015.

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 (CTSP) de la France, de la Grèce, de la Turquie et de l'Italie, et de l'intention du Portugal de démarrer des activités en tant que CTSP en 2016.

Le **GIC s'est en outre félicité** des progrès accomplis par les CTSP et de la demande d'accréditation de l'Observatoire national d'Athènes (Grèce), ainsi que de l'intention exprimée par la France, l'Italie et la Turquie de demander l'accréditation au cours de la prochaine période intersession. Le GIC **a adopté** le document « Procédures pour l'accréditation des TSP », tel qu'il figure à l'annexe VI du rapport.

Le **GIC a pris note** des résultats favorables des tests de communication à grande échelle menés depuis la 10e session et du deuxième exercice d'alerte aux tsunamis réalisé dans la région, NEAMWave14, ainsi que de l'augmentation significative de la participation des autorités de la protection civile.

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 créer une nouvelle Équipe spéciale sur l'architecture de la gouvernance du GIC/NEAMTWS et l'examen de sa réorganisation.

Le **GIC a confirmé** la poursuite des exercices réguliers visant à tester la communication pour la prochaine période d'intersession ainsi que des exercices de test de communication trimestriels à grande échelle à partir d'un scénario d'événement impliquant les organismes de protection civile des États membres.

Le **GIC a décidé** d'organiser et de diriger un autre exercice d'alerte aux tsunamis en 2017 (NEAMWave17).

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 recommandé :**

I. que les États membres participent davantage à ses activités ;

II. que chaque CTSP fournisse des informations sur le niveau de menace fondées sur leurs meilleures pratiques, notamment des matrices de décision (éventuellement différentes), des bases de données sur les scénarios ou d'autres méthodes, ces dernières devant être documentées dans le Guide opérationnel des utilisateurs du NEAMTWS ;

III. que toutes les données sur le niveau de la mer soient mises à la disposition des CTSP et des centres nationaux d'alerte aux tsunamis (NTWC) au moyen d'accords bilatéraux passés entre les NTWC, dans toute la mesure possible ;

IV. que toutes les stations marégraphiques adoptent un statut opérationnel en temps réel ;

V. d'accroître le nombre de stations sismiques et marégraphiques disponibles en Afrique du Nord, et en ce qui concerne le niveau de la mer, de réduire l'échantillonnage et la latence à 1 minute ou moins, autant que possible ;

VI. que les États membres encouragent leurs autorités nationales de protection civile à participer activement à ses activités courantes, afin que ses produits répondent mieux aux besoins et aux attentes de ces autorités ;

(vii) que les NTWC, en consultation avec leurs autorités de protection civile, évaluent la nécessité de fournir des produits améliorés dans leurs messages, tels que des cartes, et de formuler et présenter des propositions pour examen et adoption à sa prochaine session.

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** aux États membres de contribuer à sa maintenance et à son développement par des financements et des détachements.

46 personnes de 16 États membres et une organisation observatrice ont pris part à la 12e session du GIC/NEAMTWS. La nécessité d'un renforcement de la coopération avec le GIC du Système d'alerte aux tsunamis et autres risques côtiers dans la mer des Caraïbes et les régions adjacentes (GIC/CARIBE-EWS) a été réaffirmée.

Resumen dispositivo

La 12ª 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 Dublín (Irlanda) del 16 al 18 de noviembre de 2015.

El ICG acogió con agrado la continuación de la fase operacional provisional del NEAMTWS, mediante los candidatos a Proveedores de Avisos sobre Tsunamis de Francia, Grecia, Italia y Turquía, así como la intención de Portugal de comenzar a actuar como candidato a Proveedor de Avisos sobre Tsunamis en 2016.

El ICG acogió también con agrado los avances logrados por los candidatos a Proveedores de Avisos sobre Tsunamis, así como la solicitud de acreditación del Observatorio Nacional de Atenas (Grecia) y la intención expresada por Francia, Italia y Turquía de solicitar también la acreditación en el próximo periodo entre reuniones. **El ICG aprobó** el documento en el que se especifican los procedimientos de acreditación de los Proveedores de Avisos sobre Tsunamis, que se incluye en el anexo VI del informe.

El ICG tomó nota de los positivos resultados de las pruebas ampliadas de verificación de las comunicaciones desde su décima reunión y del segundo ejercicio de simulación de tsunamis realizado en la región, NEAMWave14, así como del considerable aumento de la participación de las autoridades de protección civil.

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** crear un nuevo equipo de trabajo sobre arquitectura para el examen de la gobernanza y reorganización del ICG/NEAMTWS.

El ICG confirmó la continuación de las pruebas periódicas de verificación de las comunicaciones durante el próximo periodo entre reuniones y la continuación de las pruebas trimestrales ampliadas de verificación de las comunicaciones sobre la base de eventos hipotéticos con la participación de los organismos de protección civil de los Estados Miembros.

El ICG decidió organizar y llevar a cabo un nuevo ejercicio de simulación de tsunamis en 2017 (NEAMWave17).

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 recomendó que:

i) aumentara la participación de los Estados Miembros en las actividades del ICG;

ii) cada candidato a Proveedor de Avisos sobre Tsunamis ofreciera información sobre el nivel de amenaza basándose en sus mejores prácticas, en particular matrices de decisión (posiblemente diferentes), bases de datos sobre hipótesis u otros métodos, ya que estas metodologías debían documentarse en la guía operacional para usuarios del NEAMTWS;

iii) todos los datos sobre el nivel del mar se pusieran a disposición de los candidatos a Proveedores de Avisos sobre Tsunamis y de los centros nacionales de alerta contra los tsunamis (NTWC) mediante acuerdos bilaterales, a ser posible, entre distintos NTWC;

iv) todas las estaciones de mareómetros pasaran gradualmente a estar operativas en tiempo real;

v) aumentara el número de las estaciones sismológicas y de medición del nivel del mar disponibles en el Norte de África y, en lo que respecta al nivel del mar, que se redujeran el muestreo y la latencia a un minuto o menos, en la medida de lo posible;

vi) los Estados Miembros instaran a sus autoridades de protección civil a participar activamente en las actividades rutinarias del ICG, con el objetivo de conseguir que los productos del ICG fueran más adecuados para satisfacer las necesidades y expectativas de dichas autoridades;

vii) los NTWC, en consulta con sus autoridades de protección civil, evaluaran la necesidad de ofrecer productos mejorados en sus mensajes, por ejemplo mapas, y de formular y presentar propuestas para que se examinaran y aprobaran en la próxima reunión del ICG.

El ICG reconoció la importancia del Centro de Información sobre Tsunamis en el Atlántico Nororiental y el Mediterráneo y mares adyacentes (NEAMTIC: neamtic.ioc-unesco.org) y **recomendó** a los Estados Miembros que contribuyeran con recursos y adscripciones a su mantenimiento y desarrollo.

Asistieron a la 12ª reunión del ICG/NEAMTWS 46 participantes de 16 Estados Miembros y una organización observadora. Se reiteró que era necesario 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).

Краткий Рабочий Доклад

Двенадцатая 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 Ирландии в Дублине с 16 по 18 ноября 2015 г.

МКГ 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 (ППДСЦ) Франции, Греции, Турции и Италии и намерение Португалии начать работу в качестве ППДСЦ в 2016 г.

МКГ также приветствовала достигнутый ППДСЦ прогресс и заявку на аккредитацию, представленную Национальной обсерваторией Афин (Греция), равно как и намерение Франции, Италии и Турции также подать заявку на аккредитацию в следующий межсессионный период. МКГ **одобрила** документ «Процедуры аккредитации ПДСЦ», содержащийся в Приложении VI к докладу.

Кроме того, **МКГ отметила** положительные результаты расширенных проверок систем оповещения, проведенных после десятой сессии, и вторых в этом регионе учений «СВАСМ/ Волна-14», а также значительное расширение участия в этой деятельности органов гражданской обороны.

Подтвердив продление 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** создать новую целевую группу по структурам управления и обзору реорганизации МКГ/СПЦСВАСМ.

МКГ подтвердила продолжение проведения регулярных проверок систем оповещения в следующем межсессионном периоде и ежеквартальных расширенных проверок систем оповещения на основе предлагаемого сценария с участием органов гражданской обороны одного из государств-членов.

МКГ постановила организовать и провести очередные учения по предупреждению цунами в 2017 г. (СВАСМ/Волна-17).

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

МКГ рекомендовала:

I. расширять участие государств-членов в мероприятиях МКГ;

II. каждому ППДСЦ представлять информацию об уровнях угрозы на основе используемых ими передовых методов, включая матрицы принятия решений (возможно, различные), базы данных по сценариям цунами или другие методы, поскольку описание этих методологий необходимо внести в Оперативное руководство по СПЦСВАСМ для пользователей;

III. обеспечивать ППДСЦ и Национальные центры предупреждения о цунами (НЦПЦ) всеми данными об уровне моря, используя по мере возможности механизм двусторонних соглашений между НЦПЦ;

IV. перевести все мареографы в работу в режиме реального времени;

V. увеличить число действующих станций измерения сейсмической активности и уровня моря в Северной Африке, а также сократить по мере возможности время проведения измерений уровня моря и латентность до одной минуты и менее;

VI. государствам-членам настоятельно призвать свои органы гражданской обороны (ОГО) к активному участию в повседневной деятельности МКГ в целях обеспечения более полного соответствия продуктов МКГ потребностям и ожиданиям этих ОГО;

VII. НЦПЦ в консультации с соответствующими ОГО провести оценку целесообразности включения в сообщения НЦПЦ таких усовершенствованных продуктов, как карты, а также разработать и представить предложения для обсуждения и утверждения на следующем заседании МКГ.

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** государствам-членам предоставить финансирование и прикомандировать в центр сотрудников в целях укрепления его текущей деятельности и развития.

В двенадцатой сессии МКГ/СПЦСВАСМ приняли участие 46 представителей из 16 государств-членов и одна организация-наблюдатель. На сессии вновь подчеркивалась необходимость укрепления сотрудничества с МКГ по системе раннего предупреждения о цунами и опасности других бедствий в прибрежных районах Карибского моря и прилегающих регионов (МКГ/КАРИБ-СРП).

1. OPENING OF SESSION

1 The Twelfth 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-XII) was opened on Monday 16 November 2015 at 10:00 by Mr Ahmet Yalciner, Chair of ICG/NEAMTWS, who welcomed the participants to the meeting.

2 Following the Chair opening remarks, Mr Koen Verbruggen, Director of the Geological Survey of Ireland introduced Mr Alex White, Minister for Communications, Energy and Natural Resources from the Ireland.

3 In his welcoming remarks, Mr White highlighted that the recent earthquake of magnitude 6.6 in the north Atlantic on 13th February 2015 is a reminder to be vigilant. He mentioned that Ireland's coast is vulnerable to tsunamis generated by undersea landslides as well as distant earthquake generated tsunamis. He remarked that traditionally coastal flooding is an important issue for Ireland and he highlighted that there is a strong case for tsunami preparedness. There is now an opportunity to better implement town planning, preparedness and response to such coastal hazards. He acknowledged that more work is needed to increase tsunami preparedness in Ireland. In closing, he thanked partners for their support and he wished participants a successful and productive meeting. The full speech is available in Annex III.

4 Mr Vladimir Ryabinin, Executive Secretary of IOC provided opening words via a recorded video message. Mr Ryabinin remarked how that he had been impressed to learn how enthusiastic and energetic the tsunami community is in terms of doing a very important job protecting millions of people on the coasts of the world ocean. NEAMTWS is one of the three "youngest" components of the IOC network of regional Tsunami Warning Systems. He highlighted the steady development there has been in NEAMTWS and that today there are four National Tsunami Warning Centers in France, Greece, Italy and Turkey. He expressed his hopes that the NEAM system will successfully continue its development.

5 The growth in population of coastal areas generally implies for increasing exposure to marine and coastal hazards. The future of Disaster Risk Reduction activities depends on the increasingly important role of Multi-Hazard Early Warning Systems and the need to re-engage work with governments to make sure that these systems are sustained into the future. In that respect he also highlighted the need to further strengthen the educational and awareness component through work with civil protection and local communities.

6 Finally, he also introduced Dr. Denis Chang Seng as the new Technical Secretary for ICG/NEAMTWS. It is the first time since the start of ICG/NEAMTWS that IOC now has a UNESCO regular programme funded post to support ICG/NEAMTWS task and activities. He emphasized that this is a special achievement, in light of the financially challenging times IOC-UNESCO has gone through since 2011. The full speech is available in Annex IV

7 In line with the one-minute silence held due to the victims in Paris (13 November 2015), the ICG/NEAMTWS observed a one-minute silence at 11.00 am Dublin time"

2. ORGANIZATION OF THE SESSION

2.1. ADOPTION OF THE AGENDA

8 The Chairman of the ICG/NEAMTWS introduced the provisional Agenda. Two agenda items were revised. Agenda item 3.7 was revised from Revision of Accreditation Procedures to Revision and Adoption of the Accreditation Procedures. Agenda item 4 (Discussion on

proposal for ICG/NEAMTWS governance and reorganisation) and 5 (Implementation) were interchanged. The Group adopted the Provisional Agenda with change, as included in Annex I.

2.2. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

9 The ICG reviewed and adopted the timetable for the meeting.

2.3. ESTABLISHMENT OF SESSIONAL COMMITTEES AND WORKING/DRAFTING GROUPS

10 The ICG discussed the formation of sessional committees and working groups. The Chairman agreed to further discuss on the establishment of a new Task Team on Architecture. This followed from a recommendation of the Steering Committee of ICG/NEAMTWS regarding a proposal for ICG/NEAMTWS governance and reorganisation. Four sessional Working Groups and four Task Teams were established (Annex I) in accordance to the agreed meeting timetable.

3. REPORT ON ICG/NEAMTWS INTERSESSIONAL ACTIVITIES

3.1. REPORT BY THE CHAIRPERSON

11 Mr Ahmet Yalciner, Chair of the ICG/NEAMTWS, reported on the activities undertaken since the last session of the ICG/NEAMTWS. He informed the session regarding the governance structure and mandate of the ICG/NEAMTWS, as well as the four Working Groups and the three Task Teams. He mentioned that since 2005 there has been eleven ICG/NEAMTWS sessions. In the last ICG/NEAMTWS meeting, a Task Team on Operations was established. The eleventh session also adopted the name Candidate Tsunami Service Providers (CTSPs) to replace Candidate Tsunami Warning Centers CTWCs.There are currently four operational CTSPs. In 2016 Portugal is expected to announce its CTSP.

12 The Chair summarised the strategy and activities implemented since the last session which encompassed raising awareness and capacity building; the preparation of information to commemorate the 10th anniversary of NEAMTWS; collaboration with national authorities, particularly the Civil Protection Authorities (CPAs) about interoperability; accreditation procedures for CTSPs; updating guiding documents and the ongoing effort about multi-hazard approach. He mentioned that communication test exercises had been successfully performed at different times. He mentioned that the NEAMWave 14 exercise meeting was officially closed at the meeting in Paris on 23rd June 2015. He thanked Emilie Crochet, Marzia Santini and Francesca Santoro for their excellent work and leadership in regards to the NEAMWave 14 exercise. Mr. François Schindele represented ICG/NEAMTWS in the TOWS-VIII meeting in Morioca, Japan (12-13 March 2015). He pointed out that the Task Team meeting on Operation was held in Rome (hosted by INGV) and the Working Group 3 and Steering Committee (SC) meet on 20 October 2015.

13 The Chair invited Mr. Trevor Guymer to briefly report on the progress on a few issues (not listed in the agenda but addressed through the SC) on (i) Multi-Hazard Approach (MHA) in NEAMTWS, (ii) the 10th anniversary of NEAMTWS, and (iii) the generation of a high level overview document to be approved by the ICG/NEAMTWS twelfth Session.

14 Mr Trevor Guymer reported that fourteen responses had been received to the questionnaire about MHA in the NEAMTWS region. One issue that stands out is the fact that several Member States have or plan to have a standalone Tsunami Warning Center (TWC). Two member states (Ireland and U.K) plan to have TWC as part of the wider systems. Several reasons were given, including the perception of the much lower likelihood of tsunami occurrence, and that resources cannot justify to have a standalone system. Some national emergency services also indicated that there is a need to simplify the systems. Member States also raised the issue about their interest to not only deal with their own coastline, but wished to receive tsunami information for alerting tourist in other countries. He highlighted that both U.K. and Ireland have flagged the need to include tsunami on the national risk register in order to generate more resources to attend to them. The next steps include focusing on the response component, linking and engaging closely with CPAs. He highlighted that there is a need to adapt existing approach to new requirements. He suggested to create a link with the proposed establishment of a new Task Team on Architecture.

15 Mr. Guymer remarked that there is a need to build meaningful links with the JCOMM team on waves and coastal hazards since there are common issues of interest, including sea level and coastal flooding. He proposed to produce a draft MHA strategy for ICG/NEAMTWS.

16 Mr Guymer recalled that at the SC (30-31 March 2015) in Paris, members agreed to produce a publication for policy makers and the wider public to mark the ten -year anniversary of ICG / NEAMTWS. The aim was to attract attention, and raise the profile of NEAMTWS. The lead authors selected were from the SC, including the technical secretary, Francesca Santoro.

17 A draft document was prepared in September 2015 and there had been considerable interest to contribute material. A first reading of the draft document indicates that it is long and too detailed for a more general audience. Mr Guymer proposed to split the publication in two. One would be an IOC/UNESCO summary publication targeting decision and policy makers, while the other will be a full document detailing what has been achieved by ICG/NEAMTWS. He also asked for clarification regarding responsibilities, publication time line, and confirmation of funding arrangement for the publication.

18 According to Mr Guymer, one of the decisions and recommendations of the eleventh ICG / NEAMTWS was to revise the NEAMTWS documentation, including the generation of a high level overview document to be approved by the twelfth ICG/NEAMTWS session. A brief document was prepared and modified at the SC meeting (30-31 March 2015). The intension was to bring the document forward to the twelfth ICG/NEAMTWS session. However, due the new development regarding the proposal for a possible reorganisation of ICG/NEAMTWS governance; it was decided to defer the matter.

19 Member States, agreed to explore with MHA for sustainability and greater participation of CPAs in ICG/NEAMTWS. Additionally, participants endorsed the proposed two-level document to mark the 10th anniversary of ICG/NEAMTWS.

3.2. REPORT BY THE IOC SECRETARIAT

20 Mr Thorkild Aarup reported on the activities conducted during 2015 to support the ICG/NEAMTWS. Mr. Aarup highlighted that the activities of the Secretariat were mainly focused on coordination activities. The bulk of the work included NEAMWave14 analysis activities, establishment of the new NEAMTIC website, development of a Facts Sheet, organisation of the Steering Committee meetings and the final NEAMWave 14 meeting (23 June 2015, Paris).

21 Presentations on NEAMTWS were provided to the NATO Science for Peace programme. A presentation was also provided to the Mediterranean Operational Network for the Global Ocean Observing System (MONGOOS) to explore potential observation and network sharing collaboration.

22 Preliminary discussions with the UNESCO Science program “Reduction of Earthquake Losses in the Extended Mediterranean Region (RELEMR)” were held to explore having a joint session or back-to-back NEAMTWS meeting with a future RELEMR workshop.

23 The secretariat has also coordinated the NEAM ten-year anniversary publication and he confirmed that IOC will support the publication this anniversary summary for policy makers.

3.3. REPORT BY TOWS-WG

24 Mr Thorkild Aarup presented a recent report on TOWS on behalf of Mr Yutaka Michida and Mr Alexander Postnov (former and present chair of TOWS-WG). The report highlighted a few activities:

- Representatives from the four ICGs and IOC Executive Secretariat participated in the UN 3rd International Conference on Disaster Risk Reduction in Sendai, Japan 14-18 March 2015. The conference adopted the Sendai Framework for Disaster Risk Reduction 2015-2030 (http://www.unisdr.org/we/coordinate/sendai-framework)

- The tsunami programme has continued last year with a fair amount of governance and technical working groups under the four ICGs as well as awareness raising, information sessions, training courses and the coordination of four tsunami exercises.
- The 50-year anniversary of the PTWS was commemorated with a special symposium(http://itic.ioc-unesco.org/index.php?option=com_content&view=category&id=2153&Itemid=2596 ; an anniversary book and video was also published)
- Fact Sheets have been produced for the four Tsunami Warning Systems (see http://www.ioc-tsunami.org/index.php?limitstart=5&lang=en

25 Mr Aarup reminded the ICG about the tsunami programme structure which consist of four ICGs, each of them reporting directly to the IOC governing bodies (the Assembly and Executive Council). The TOWS-WG is a cross-cutting group that looks at inter-ICG issues in order to harmonize systems. Mr Aarup explained that some ICGs have new Chairs for example in the Pacific while others will have elections at NEAMTWS-XII and CARIBE-EWS XI (NEAM and Caribbean).

The TOWS Working Group has three Task Teams:

1. Disaster Management and Preparedness
2. Tsunami Watch and Operations
3. Hazard Assessment related to highest potential tsunami source areas

26 Each of the Task Teams make recommendations to the TOWS Working Group and subsequently the TOWS report and its recommendations are communicated to the IOC Assembly or Executive Council.

27 In regards to the TOWS-VIII (12-13 March 2015, Morioka, Japan), the Task Team on Disaster Management and Preparedness recommendations included:

- Finalise the standard Operating Procedure Manual
- Finalise the PTWS and International Centre pilot training programme for tsunami evacuation, mapping and planning
- Encourage ICGs to adopt performance based recommendations programme on tsunami preparedness. There is a suggestion to look at the Caribbean TWC programme
- Finalise portal guidelines and conduct a survey on material on tsunami hazards in Business Contingency Planning.

25. The Task Team on Tsunami Watch and Operations made recommendations for revisions on the tsunami glossary including tsunami threat levels, standard procedures for reporting water levels as well as key performance indicators.

26. The Task Team on Hazard Assessment related to highest potential tsunami source areas will provide guidance to the four ICGs on how to calculate seismic hazard risk. The Task Team met back to back with the 26th General Assembly of the International Union of Geodesy and Geophysics (IUGG) held from June 22 to July 2, 2015 in Prague, the Czech Republic and is expected to report progress to the TOWS-IX meeting.

27. Mr Aarup highlighted that there was an extended discussion at the TOWS-VIII meeting on development of tsunami advisory for shipping. The Group decided to invite IMO to the TOWS-IX (25-26 February 2016, Paris) meeting and start a formal process to discuss how tsunami advisories may be provided for shipping community.

28. In regards to the reporting by the four ICGs to the 28th IOC Assembly (18-25 June 2015, Paris), and in regards to NEAMTWS in particular, the Assembly welcomed the progress achieved by the four NEAMTWS CTSPs as well as the development of NTWCs in NEAM region.

29. The 28th Assembly further decided that in the future all Intergovernmental Coordination Groups for Tsunami Early Warning and Mitigation should include in their reports to the IOC Governing Bodies a section with their performance against targets of the Sendai Framework for Disaster Risk Reduction 2015–2030.

30. Finally, the Assembly decided to continue TOWS-WG and its three Task Teams for another intersessional period.

3.4. REPORT BY OTHER ICGs

31. The Chairman informed that reports from other ICGs are available for viewing and reference at the IOC website and or the ICG/NEAMTWS XII Session site.

3.5. REPORTS BY OTHER INTERNATIONAL ORGANISATIONS

32. Mr Alessandro Annunziato from the Joint Research Center (JRC) / European Commission discussed four key issues: 1) the Global Tsunami Informal Monitoring System; 2) the Sea Level Installation project, 3) the Decision Support Systems Workshop; 4) the Information on Disaster Risk Management Knowledge Centre, the ERCC Pilot Project, as well as EU/JRC investment in NEAMTWS.

33. He highlighted that the second phase of the Global Tsunami Informal Monitoring System started between mid-August and beginning of September. It includes KOERI, NOA and NIEP (Operational Mode), IPMA and CNRST (Training Mode). They have analyzed three events in GTIMS-2. This includes the 8.3 magnitude earthquake on 16 September 2015 and the 3-4 m tsunami wave generated in Chile, the 7.2 magnitude earthquake on the 20 October, but no tsunami generated in Vanuatu and the 7.0 moment magnitude earthquake on the 13 November 2015 with a small tsunami in Japan.

34. He informed participants about the status of the project to install twenty new Inexpensive Device for Sea Level (IDSL) Measurements in the NEAMTWS region funded by DG-ECHO/JRC. Installations are progressing according to plans. He mentioned that the quality of the data, when working, is extremely high with almost zero latency. Based on the experience of the first five installations, JRC has prepared an IDSL Installation Guide with the aim of giving the installation teams adequate information when installing new devices.

35. JRC also has organized a Tsunami Decision Support Systems Workshop with the attendance of sixteen participants from 2-3 July 2015 at the Joint Research Centre, ISPRA. The workshop consisted of presentations and live demonstrations with on-the-spot analyses and operational tools.

36. He also discussed the development of European-level disaster science partnerships based on existing networks of scientific centers and the ERCC Multi-Hazard 2.5 million Euro pilot projects. The project aims to create a Scientific Partnership to support ERCC in the Early Warning Analysis and Monitoring. One consortium has submitted a project proposal.

3.6. REPORTS BY THE NEAMTWS WORKING GROUPS AND TASK TEAMS

38. The Chair invited the chairpersons of the Working Groups to report on progress achieved during the intersessional period with respect to the recommendations adopted at the earlier Session of the ICG/NEAMTWS 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.

Working Group 1 on Hazard Assessment and Modelling

39. Mr Jörn Behrens presented the WG1 report. He explained that members of Working Group 1 have focused their activities on modelling and research in the framework of the EU FP-7 Project ASTARTE (Assessment, STrategy And Risk Reduction for Tsunamis in Europe). The amount of direct ICG/NEAMTWS related work has been limited. There was no meeting scheduled for this intersessional period.

40. He presented the list of ICG/NEAMTWS related activities that follow the work plan adopted at the sessional working group meeting at ICG/NEAMTWS-XI in Nicosia, Cyprus. This includes the: 1) work conducted on the definition of basins in the Mediterranean, utilizing a tsunami scenario database that has been compiled by Dr. Andrey Babeyko (GFZ Potsdam, Germany) in the ASTARTE project; 2) a compilation on tsunami sources in the Mediterranean compiled in the context of the ASTARTE project; 3) discussions on an open data policy for modelling results (in particular the tsunami scenario databases) that have taken place. However, he pointed out that a formal agreement or text proposal for adoption by the ICG plenary has not yet been formulated.

41. He pointed out that several work items on the WG1 implementation plan are still pending. He suggested that the sessional meeting of WG1 seek solutions to complete those pending work items. One of the items to address include producing a guideline for CPAs on how to interpret modelling results and forecast accuracy.

Working Group 2 on Seismic and Geophysical Measurements

42. Mr Stefano Lorito reported that their work was absorbed within the Task Team on Operations and activities with CTSPs. There was no intersessional meeting organized, however their effort was streamlined in different meetings of the Steering Committee and Task Team Operations.

43. He explained that the combination of seismic observations and continuous GNSS/GPS observations make it possible to record very fast crust displacement. He illustrated this with some examples of the measured static displacement where the GPS did not saturate, but is much less sensitive than actual seismic sensors. From GPS measurements it possible to obtain real-time earthquake magnitudes and focal mechanisms.

44. Within the ASTARTE FP7 project and its Work Package 6.2, INGV and NOA are jointly improving the GPS network around the Ionian Sea (WP6.2). He reported that GFZ has contributed to real-time GPS data processing and a joint report is being prepared. He remarked that in NEAM region real-time continuous GPS network already exist (INGV, NOA). He stressed that other existing continuous GPS networks could be potentially of interest to the real-time earthquake applications. New stations will be established in Greece. Modeling is being employed to investigate where it would be useful to install new continuous real-time GPS stations.

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

45. Ms Begoña Pérez introduced the recommendations of WG 3 for the period 2012-2014 and the list of actions undertaken to this end. These mainly include:

1. Completion of a NEAMTWS Sea level station inventory in December 2014
2. Definition and distribution to the MS of an excel table for offshore instrumentation inventory
3. Yearly updates of inventories (MS)
4. Organization of a meeting between WG3 and the ASTARTE project in order to report on the status and limitations of the existing sea level network, incorporate recommendations for improvement of the network based on modelling criteria and ASTARTE achievements and include this information in the new documentation of NEAMTWS
5. Use of new NEAMTWS workspace and forum for marine network issues
6. Study the preparation of a proposal (H2020) for adding pressure sensors to existing buoys in NEAM region (strategic locations)
7. JRC sensors for filling gaps or providing redundant information at strategic locations. WG 3 requires information on costs, conditions, role of JRC in installation and maintenance.

46. Ms Pérez mentioned that Dov Rosen as Co-Chair attended the Steering Committee meeting in Paris and Rome on the 30-31 March 2015 and 20 October 2015.

47. She gave an overview of the tide gauge inventory and distribution in NEAM region as part of the IOC/SLSMF. Tide gauges have increased from 15 in 2007 to 185 in 2015 and that 112 (61%) of them are sampling at less than 1 minute.

48. The other activities of WG 3 include strengthening collaboration with MONGOOS. She pointed out that EuroGOOS has established in 2015 the EuroGOOS Task Team on Tide Gauges. She added that collaboration with the Task Team on Tide Gauges is one of their objectives. The basic approach is to have multi-hazard sea level stations. She urged that there is a need to get involved with the oceanographic and meteorological communities.

49. She mentioned Portugal's effort concerning offshore detection of tsunami using GPS buoy near the coast of Portugal as well as an agreement with NOAA regarding the relocation of a DART buoy close to San Vicente Cape.

50. Mr Dov Rosen added that in a meeting in March in Paris, he presented an approach on Early Warning using high frequency radar. He also mentioned that Israel had purchased two high frequency radars, but they are not set for tsunami detection. They will try and upgrade the system to include tsunami warning.

Working Group 4 on Public Awareness, Preparedness and Mitigation

50. No report was provided by WG 4.

Task Team on Communication Exercises

51. Mr Fernando Carrilho briefly outlined the key activities carried out which include communication test performed by all four CTSPs. There were no specific problems reported. The Extended Communication test exercise number five was performed by the message providers on 26 March 2015. Test exercise number six was performed by NOA as a message provider. He reported that the Extended Communication test exercise number seven was not carried out. He highlighted that all the communication tests were not based on scenario based event. This is in line with what was discussed at the intersessional meeting in Paris. He pointed out that not all CTSPs have used the new technology proposed which includes the use of SMS in communication test messaging.

Task Team on Tsunami Exercise

52. The Chair Mr Yalciner reported that tsunami exercise activities have been an integral part of NEAMWave14 and that there was a final closing meeting organised on Tsunami Exercise in Paris. He proposed that if there were no specific input on Tsunami Exercise, the matter will be further discussed in agenda 5.3 on the evaluation of NEAMWave14.

Task Team on Operation

53. Mr François Schindelé and Mr. Alberto Michelini presented the intersessional work of Task Team on Operation.

54. The Task Team on Operation has continued to examine and compare the system architecture from other regions. The Task Team recognises the reduced presence of CPAs in ICG/NEAMTWS. However, Mr Schindelé remarked that similar situation had existed in the Pacific before 2004. The situation only changed after 2004 Indian Ocean tsunami.

55. There is still a need to recognise the practical situations of information inconsistencies of operating different CTSPs as was experienced in the 16 April 2015 earthquake in Greece and subsequent Tsunami alerts.

3.7 REVISION AND ADOPTION TO THE ACCREDITATION PROCEDURES

56. ICG/NEAMTWS-IX decided (11-13 September 2012) in Southampton, UK that there should be an accreditation process/evaluation before a CTSP would be accepted as a TSP. No accreditation has so far been requested by any CTSPs. There have been few developments since ICG/NEAMTWS-IX, which have merited an update of the accreditation procedure: http://www.ioc-tsunami.org/index.php?option=com_oe&task=viewDocumentRecord&docID=9689&lang=en

57. The Chair presented a revised version of the document of the accreditation procedures for CTSPs. He invited comments and input to further improve the document. The main technical revisions include the following:

- Change from Service Watch Providers to Service Functions. Example: - Candidate Tsunami Warning Providers (CTWPs) to Candidate Tsunami Service Providers (CTSPs)

- Change evaluation visit to simply an evaluation. The evaluation is based on a video-conference and test of the CTSP via scenario earthquakes. An evaluation visit is foreseen or necessary in the case if accreditation levels are not met.

58. For the accreditation team, it was finally agreed that at least three experts will be drawn from nominations from the Member States with significant experience in tsunami monitoring.

59. Key discussions focused on the neutrality and impartiality of members of the accreditation team, however no clear position was adopted. The ICG/NEAMTWS agreed that the accreditation team report is submitted to the SC for approval by majority voting in a meeting or by e-mail or by video-conferencing.

60. The ICG/NEAMTWS decided to adopt the revised procedures as outlined in Annex 6 to Decision ICG/NEAMTWS-XII.

4. IMPLEMENTATION

4.1. STATUS FOR ESTABLISHMENTOF NATIONAL TSUNAMI WARNING CENTRES AND TSUNAMI SERVICE PROVIDERS

France

61. Mr François Schindelé provided an update of the French Tsunami Warning Center CENALT. CENALT is hosted by CEA (Commissariat à l'énergie atomique et aux énergies alternatives). The CENALT national mandate is to warn French civil security authorities within 15 minutes of a potentially tsunamigenic event occurring in the North Eastern Atlantic Ocean and Western Mediterranean Sea, transmitting pertinent parameters of the event. CENALT international objectives is to advice NEAM CTSPs, National Warning Centers and Tsunami Warning Focal Points within 15 minutes. The tsunami alert system has been in operation since July 2012.

62. CENALT has a secured operational seismic and tide gauge data network transmission system mainly through a dedicated private telecommunication network for data transmission and message dissemination. Notably, the communication system can send messages to Meteo France and the Global Telecommunication System and the COGIC (Centre opérationnel de gestion interministérielle des crises) (Center of Civil Protection Agencies). It is a robust telecommunication system, which has been used in the last three and half years.

63. CENALT has participated in international tests and exercises, self-evaluation of the system and procedures by conducting crisis exercises since July 2012. Regular calculation of forecast arrival times are computed by the center. CENALT carries out daily evaluation of the network detection capacities.

64. CENALT has detected, monitored and processed more than 1250 seismic events in the NEAM region and 9200 events globally. CENALT has issued 12 tsunami messages in the NEAM region. Mr. Schindele pointed out that 12 countries and 15 institutions subscribed to CENALT to receive message by Mail, Fax and or GTS. The first tsunami message/information is generally received in less than 2 minutes.

65. He elaborated on the seismic event on North Atlantic ridge 13 February 2015 - 7.0 magnitude earthquake. This event is the largest detected and processed by CENALT since the start of the operation. CENALT intentionally did not issue tsunami advisories because of the type of strike slip mechanism (that exceptionally generated a very small tsunami) and due to the fact that there was no coastline at less than 1000km from the epicenter. In the Atlantic Ocean, several seismic zones are located at more than 1000 km from any shoreline. In relation to the NEAMTWS Decision Matrix, he argued that in case of an earthquake between 7.1-7.5

magnitude in the Atlantic ridge, all countries should be provided with a message at “information level”. In the case of a 7.6-7.8 magnitude earthquake, all countries should be provided a message at “advisory level”. In this context, CENALT is proposing a new Atlantic Decision Matrix and alert procedure for strike-slip mechanism and when earthquake is more than 1000km from any coastline.

Germany

66. Dr Anna von Gyldenfeldt from the German Federal Maritime and Hydrographic Agency (NTWC) outlined Germany’s National Tsunami Warning Center strategy. The NTWC is integrated in the existing Sea Level Forecasting and Storm Surge Warning Centre.

67. The Sea Level Forecasting Service issues four forecast per day for sixteen stations on the German North Sea coast whilst the Storm Surge Service issues reliable twelve-hour lead-time forecast for any storm surge event. The service is running on a 24/7 basis in collaboration with the German Weather Service.

68. There is a four colour coding system (blue, green, orange and red) in accordance with the internal tsunami SOPs and instructions. In case of a tsunami (red coding), warnings are issued based on the dissemination structure for storm surges. Tsunami warmings are issued via radio broadcast, internet and telephone/fax service to more than 300 subscribers. Examples of subscribers include communities, local firefighters, civil protection, power plants, dike wardens, harbour authorities and individuals.

69. Dr Gyldenfeldt mentioned that communication tests are carried out with KOERI, NOA and CENALT. She highlighted that six tsunami messages were received in 2015, of which five were treated as case “green-earthquake” above threshold but with no tsunami generated and one as orange colour coded with a tsunami generated but no German coast was affected.

Greece

70. Dr Gerassimos Papadopoulos from the National Observatory of Athens gave an overview of the Hellenic National Tsunami Warning Center (HL-NTWC) which also serves as a CTSP for the NEAMTWS region. His presentation focused on research, performance and infrastructure, tsunami operations and services as well as exercise and training.

71. The HL-NTWC participates in several European funded research projects including the ASTARTE project as well as other national projects which contributes to the operations of the center.

72. Dr Papadopoulos mentioned that that HL-NTEC operates 20 continuous GPS stations, 140 accelerometric devices and 155 seismic stations, both located in Greece and neighbouring countries that belong to collaborative partners such as KOERI and GEOFON. Between 2013 and 2014 5 tide gauges with microwave sensors have been installed, all transmitting to HL-NTWC in real time. Three additional tide gauge stations were installed in 2013 in partnership with JRC and are transmitting near real time data to HL-NTWC and JRC. He highlighted that HL-NTWC has been operational since August 2012. They have operational capacities in earthquake monitoring and detection, tsunami monitoring and analysis, alert message dissemination, earthquake and sea level analysis and technical monitoring of the operated networks. There are 17 agencies from 12 Member States as well as 3 International bodies that subscribe to and receiving information from the center.

73. He underlined that under the framework of cooperation with JRC, a Tsunami Analysis Tool is used as a dedicated Decision Support Tool of the tsunami events. Trials and tests are also carried out with respect to other available tools regarding Tsunami Warning, like the

TRIDEC by GEOFON. They have also investigated inverted travel times from forecast point to sources under the IH Cantabria -EU DG NEARTOWARN project.

74. For message dissemination an in house system has been developed for sending three types of messages simultaneously (e-mail, fax and GTS). He highlighted that the new technology was used in the last exercise (NEAMWave14). The center has issued a total of 13 bulletins of which 12 were information bulletins and one was a tsunami watch bulletin.

75. NOA-HLNTWC has participated in the NEAMWave12 and NEAMWave14 exercise and the various communication tests.

76. The center has also translated educational material into Greek to better educate communities about tsunami threats. The centre is also co-authoring the 10th Anniversary report document. He informed the meeting that NOA-HLNTWC also participated in the Tsunami Decision Support Systems Workshop that was held in the European Management Laboratory (ECML) of the JRC in Ispra, Italy in July 2015.

77. He noted that HL-NTEC participates in the Global Tsunami Informal Monitoring System (GTIMS) coordinated by JRC with the aim of issuing pseudo-messages and Tsunami Analysis Reports for tsunami generated worldwide caused by earthquakes of magnitude equal and greater than 7.0 for a period of 1 year.

Israel

78. Mr Amir Yahav from the National Emergency Management Authority presented the status of tsunami preparedness in Israel. He outlined the goals at the national level which includes establishing (i) the necessary analysis to determine safe zones and escape routes; and the integrated procedures of all government entities and the population before, during and after tsunami and (iii) how to alert the coastal population from a tsunami.

79. He described Israel's current tsunami procedures which entails receiving direct messages from the candidate Tsunami Service Providers through email and fax and indirectly via GTS to the Met Office, then via email and phone alert to the Seismology Division of the Geophysical Institute and to the Chair of the National Steering Committee for Earthquake Preparedness. The information is processed at the Seismology Division of the Geophysical Institute and reviewed by the Chair of the National Steering Committee for Earthquake Preparedness.

80. Key achievements to date include putting tsunami on Israel's national list of risks, the development of a national emergency plan for tsunami response, improved connection with the relevant CTSPs, operationalizing the Seismology Center / National Tsunami Warning Center, the formation of national decision makers' team for alerting the country to tsunami, the identification of safe zones and escape routes, organization of the national tsunami preparedness orientation day, as well as the ongoing public awareness and guidance via media campaign.

81. Mr Yahav emphasized that future effort needs to focus on placing tsunami signs along the coast. A tsunami exercise is planned for 26th November 2015. The tsunami exercise aims to improve preparedness for tsunami in coastal areas. The emphasis is on saving lives and minimizing damages to critical infrastructures. The scenario will give a lead time of about 45-60 minutes from a tsunami alert with an inland flooding of up to ten meters. The exercise will be end-to-end, involving first responders and local authorities.

82. Finally, he thanked the CTSPs (INGV, KOERI, and NOA,) for the kind agreement to assist Israel with their tsunami exercise.

Italy

83. Mr Alberto Michelini explained that Italy's (IT) area of tsunami coverage and monitoring is complex and challenging because it is located in the middle of the Mediterranean. IT-CTSP started its pre-operations in January 2014. Applying for accreditation of the IT-CTSP is under consideration.

84. The center receives seismic data from GFZ, NOA, CENALT and IRIS consisting of about 400 stations worldwide. They receive sea level data from the Italian Sea Level Network, IOC, CENALT, KOERI and JRC under bilateral agreements. He mentioned that new bilateral agreements would further facilitate data exchange between organizations/countries. ISPRA has been sending real time sea level measurements recorded by its National Mareographic Network to IT-CTSP since August 2013.

85. In 2008, INGV developed a software for seismic detection (named "arly-est"). The center has also developed another software named "JET" (Java Estimate Tsunami interface). JET gathers all information provided by the arly-est software and combines the dissemination of alerts with information received from the tidal gauges.

86. INGV is working to integrate real time GPS networks on both sides of the Ionian Sea to better measure the actual displacement in the case of an earthquake.

87. He highlighted that the IT-CTSP now uses a new standard Decision Matrix since July 1, 2015, similar to KOERI for deciding on tsunami alert levels. He asserted that the NEAMTWS Decision Matrix is too conservative for decision-making. Seemingly, alert levels are largely overestimated.

88. A pre-calculated tsunami database is currently under implementation. Mr. Michelini stressed that in the near future, a scenario database at IT-CTSP will be based on Probability Density Functions curves at each site as a function of uncertainty on earthquake parameters, and tsunami modeling. The aim is to establish with the CPA the percentile at which issue the alert. IT-CTSP endeavors to define a protocol in order to convert probability into appropriate decisions and actions. IT-CTSP has a list of NEAM official (provided by the Member States) and non-official forecast points (adopted by INGV).

89. The seismic / alert center operation is an integration between the Seismic Surveillance and Tsunami Alert Services. The operational system consists of two seismologists, one technician/engineer and one tsunami expert working on a 24/7 basis. Three additional persons are on call in case of emergency. He pointed out that a first alert can be issued to the National Civil Protection Agency in less than 14 minutes based on the Decision Matrix.

90. IT-CTSP conducts training on tsunamis and standard operating procedures; global monitoring, and communication test. Staff are trained using real case events for example in the case of the 7.1 magnitude earthquake off the coast of Central America in 2014. A national communication campaign "I don't take risks" was carried out between 2013 and 2014 involving twenty-eight coastal municipalities in the province of Salerno, Italy.

91. Mr Pierluigi Sodu provided supplementary information on the evolution of national tsunami activities and the preparations for NEAMWave 14.

Portugal

92. Mr Fernando Carrilho pointed out that the Portuguese NTWC consists of the seismic network, the tsunami detection/analysis and the dissemination and communication of tsunami message to the civil authorities.

93. The IPMA is mandated to operate the NTWC and runs the national seismic network. The Portuguese seismic network consist of 55 broadband stations, 2 S-P stations, and 49 accelerometers. The Portuguese NTWC can detect the hypocenter of an earthquake in less than 5 minutes using the Seiscomp3. The center receives data from 25 tide gauge stations transmitting in real-time/near-real time. He said that a database of more than 6000 scenarios was developed and installed at IPMA in collaboration with the JRC.

94. Mr Carrilho informed the session that 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 NE Atlantic. In addition, the IMPA has developed a new platform to disseminate messages by fax, email, sms and GTS. He remarked that IPMA took part in the WESTSUNAMI exercise as a message provider, given that IPMA had prepared a scenario for the NE Atlantic region.

95. He stressed that with the creation of IPMA it will be possible to operate the tsunami watch system within the existing seismic and the weather forecast services. However, he underlined that there is a need for internal reorganization of operational duties. Mr. Carrilho highlighted that IMPA expects to start tsunami operations at national level in May 2016 and tsunami services for the NE Atlantic region after September 2016.

96. Ms Carina Coelho, on behalf of the Portuguese CPAs gave a presentation on a tsunami exercise named “TSUNAMI’15”. A video of the exercise was presented. The exercise was carried out at two levels including the National Command of Relief Operations and the District Command Operations of Faro. A total of 15 participants were involved in the District Command Operations of Faro. She highlighted that for Portugal travel times for tsunamis are relatively short and as such there is a need to implement an effective warning system for all the coast.

Turkey

97. Mr. Öcal Necmioglu presented the current status of the NTWC hosted at KOERI, Turkey. He highlighted that the CTSP has been operational since 1 July 2012 and is under continuous testing due to this operational status. He reported that there are eleven subscribers. He described the daily operational set up the CTSP as well as the Decision Support System currently in use based on the KOERI Decision Matrix.

98. He provided an update on the seismic monitoring stations. Real Time Seismic Data is received from CTBO following an agreement signed with CTBTO on 3 March 2011. In the case of sea level monitoring, he pointed out that currently there are 19 stations and that 7 tide gauge stations are transmitting data via satellite to KOERI. He remarked that the integration of the whole network to NTWC is on-hold due to procedural issues and plans to upgrade whole network with radar type tide-gauges.

99. He mentioned the ongoing collaboration with JRC regarding ISDL installations. He stressed that there is a strong need to improve the NEAMTWS by deploying sea-bottom and/or offshore observation systems. The Center has been producing tsunami analysis reports for Potential tsunamigenic earthquakes with magnitude of greater than 7.0 magnitude for one year. He remarked that the reports are useful because it helps to train staff to deal with real events. The informal report has been produced by KOERI within the framework of the contractual agreement between EC-JRC and KOERI.

100. He outlined KOERI’s involvement and role in the ASTARTE project. There is ongoing collaboration with NEAMTWS partners. KOERI is involved in WP 6 and WP 7 on Operational Detection and Communication Infrastructure and Early Warning and Forecast

101. He reported that regular communication test exercises are practiced with the National CPA, however currently there is no ICG/NEAMTWS mechanism established for the evaluation of these regular CTEs. KOERI CTSP carry out daily tests. An evaluation is carried out regularly by duty officers. KOERI has prepared a draft Operational Manual.

102. Mr Necmioglu suggested that in order to increase the level of CPA participation in ICG/NEAMTWS Tsunami Exercises, the next NEAMWave exercise needs to consider earthquake and tsunami impact scenarios that will address both the near-field and multi-hazard aspect of the disaster. He stressed that the NEAMWave 14 Phase C was an important tool in order to test the international assistance capacity and capability of countries. He suggested that this issue must be developed and better organized for the forthcoming exercises. KOERI is also investigating the hydrodynamic parameters and preparing data for the development of tsunami inundation maps.

103. He pointed out that NEAMTWS Performance Monitoring is important. It is also linked with the ICG Performance Reporting against targets of the Sendai Framework for Disaster Risk Reduction 2015-2030. He showed an example of NEAMTWS Performance Framework prepared in March 2015. In addition, he went on to discuss the interoperability issues of KOERI and that they have prepared an event report.

104. In relation to NEAMTWS strategic road map, he underlined that KOERI's contribution to the high-level document includes seven phases which involves an implementation plan, development plan, testing, validation, accreditation, performance monitoring, and sustainability issues.

105. Regarding matters pertaining to Real-time Data Exchange, he highlighted that an official request has been made to INGV and NOA in early 2015 to establish a bilateral agreement concerning real time seismic (NOA) and sea-level (INGV and NOA) data. It is to their understanding that such a bilateral agreement is not realistic for the sea-level data exchange. In this context, he proposed JRC to act as "NEAMTWS Sea-level Data Hub" where all sea-level data received by the CTSPs would be made available to this hub in (near) real-time.

106. Other issues discussed include problems with end users, particularly several Civil Protection Authorities who are struggling with the ongoing humanitarian refugee crisis in the region.

107. Concerning the proposal about ICG/NEAMTWS governance and reorganization, it is of his view that the proposal will be difficult to implement during the accreditation period. He suggested it would be prudent to first analyze for the existing governance structure what is missing and why? Finally, he highlighted that KOERI is ready to apply for accreditation.

4.2. TSUNAMI INFORMATION CENTER (NEAMTIC)

108. The Chair reported that the NEAMTIC website is functional and information is available for Member States at the following website: http://neamtic.ioc-unesco.org/

109. Member States raised a question regarding what is the future intention for the NEMATIC website particularly in regards to maintenance and further development.

110. Mr Thorkild Aarup from IOC clarified that the NEAMTIC website was established following a decision of the ICG and initial funding to develop the NEAMTIC was supported through a grant from the European Union. At the moment there are no dedicated funds for the NEAMTIC work. He stressed that NEAMTIC is an important element and it works in tandem with NEAMTWS and he highlighted the need for support to NEAMTIC activities.

111. Another question raised was whether there is any professional communicator, public relation officer or teacher involved in the development of the NEAMTIC website. Further issues discussed were who the website was targeting. It was argued that if NEMATIC was designed for education in schools and the public in general, the current information is not relevant and are far too detailed and or scientific. The Technical Secretary for NEAMTWS will review and update as appropriate

4.3. EVALUATION OF NEAMWAVE14 AND DISCUSSION ON NEAMWAVE16 (5.3)

112. Ms. Emilie Crochet as co-chair of the Task Team on tsunami exercise provided an evaluation of the NEAMWave14 exercise carried out from 28 to 30 October 2014. She first gave an overview of the objectives of the NEAMWave14 exercise which included validating and evaluating the CTSPs dissemination process, procedures to receive messages, assessing the decision process concerning public warnings and their awareness as well as identifying best practices and possible improvements in the entire process. She highlighted that the evaluation was structured in three phases.

113. For phase-A of the exercise, there were 4 scenarios conducted. A total of 19 countries participated. For the Eastern Mediterranean scenario there were 12 subscriptions while for the Western Mediterranean scenario there were 7 subscriptions. In the case of the North East Atlantic scenario, there were 6 subscriptions while the Black Sea scenario had 7 subscriptions. The results for the phase-A evaluation suggest that CTSPs found the exercise very useful and it would be useful to develop recommendations to be applied for the operational CTSPs activities. She highlighted that the Task Team received less feedback than originally expected. In this context, there is a need to improve the subscription process and collaboration between CTSPs. It was underscored that direct phone contact is recommended in case the NTWC needs urgent clarification. She highlighted that the tsunami alert message is considered too complicated and not fit for use by the CPAs.

114. For phase-B of the exercise, 16 countries participated. There were 3 subscriptions from the Black Sea, 3 subscriptions from the Western Mediterranean, 4 subscriptions from the North-east Atlantic and 8 subscriptions from Eastern Mediterranean. Italy, Spain and Turkey subscribed for phase B. Cyprus and Malta conducted the Emergency Management Scenario. A table top exercise was ere organized in Spain, Turkey and UK. Cyprus and Portugal organized a drill. France and Italy performed functional exercises while in Ireland and Spain orientation seminars was organized.

115. She remarked that 8 of 9 countries made some preparations for the exercise before participating to NEAMWave14. There were training and meetings organized in Italy, Malta, Spain, Turkey and France. Communication test practice was carried out in Italy and Spain.

116. Ms. Crochet highlighted that the original messages sent by the NTWCs were easily understood by almost all the users. She noted that, in 3 countries (France, Portugal and Turkey) the messages were customized by the NTWC in order to facilitate the interpretation by the national CPA/EMO. Moreover, the exercise was considered useful by the participating countries to assess the dissemination of warning messages to the agencies in charge of the emergency response.

117. Cyprus, France, Italy, Portugal and the UK have defined levels of alert. She pointed out that there is a lack of evaluation plans at local level. However, those concerned are working to address the matter. Currently, only Italy has established evacuation plans at local level in some test areas while evacuation plans are still under development in France, Spain and Turkey

118. For the phase-C of the exercise, there were 11 subscriptions with a total of 7 participating countries for the Eastern Mediterranean scenario. However, it is important to inform respective countries about the mechanisms if they don't belong to it yet. The format message from the CTSP need to be further simplified for the users.

119. Ms Crochet concluded that the NEAMWave14 exercise was very successful although there is a need to clarify some issues for the next exercise, in particular the subscription mechanism. She remarked that SMS was very useful in the exercise. The NEAMWave14 exercise has encouraged CTPs to participate in tsunami activities. She asserted that the possibility of further simplifying the message distributed by CSTPs could further improve information flow to the users. The exercise (Phase- C) represents an important tool to test the international assistance capacity and capability of countries. She stressed that this issue must be developed and better organized for the forthcoming tsunami exercises. Finally, she pointed out that NEAMWave 12 recommendation is still valid regarding the use of graphic information, such as maps.

120. Mr Pierluigi Soddu suggested the need to involve other sectors and important infrastructures for example airports in the next NEAMWave exercise.

Next TsunamiWave Exercise

121. Ms Emilie Crochet the co-chair of Task Team Exercise reported that Ms Marzia Santini, the other co-chair is unavailable until March 2016. She would be happy to take the responsibility as vice-chair of the Task Team Exercise, but not as co-chair.

122. Mr Gerassimos Papadopoulos stated that it is important to learn from the tsunami wave experience. He pointed out the need to further improve NEAMTWS in the next exercise. He suggested the need to generate new ideas that would encourage more interactions between different organisations and stakeholders.

123. Mr François Schindele outlined several important issues to take into account for the next NEAMWave exercise. This includes planning for quarterly scenario exercise, accreditation of CTSPs particularly in the first semester of 2016 and activities linked with the proposed new Task Team on NEAMTWS Architecture. He proposed that the Steering Committee needs to take note of all the experiences, feed-back and progress implemented in 2016 and decide what will be implemented in the next NEAMWave exercise. With this in mind he proposed that the next NEAMWave exercise to take place in 2017. CPAs need to take the opportunity to organize at least one national exercise in 2016. France will organize at least one national exercise in collaboration with other countries.

124. Mr Öcal Necmioglu re-emphasized the need to consider earthquake and tsunami impact scenario that will address both the near-field and multi-hazard aspect of the disaster in the next NEAMTWS exercise. He stressed that this will increase the interest of participation by CPAs. He also mentioned the need to plan the exercise on different days rather than on consecutive days. Öcal endorsed France proposal to plan for the next NEAMTWS Wave exercise in 2017. He remarked that organizing a NEAMWave exercise involves substantial work and that presently there is no supporting co-chair for the tsunami wave exercise. In his view, ICG / NEAMTWS needs to plan the next wave exercise in 2017. In addition, he recommended that ICG / NEAMTWS only have three-communication exercise test for the year 2016.

125. Mr Fernando Carrilho welcomed the proposal to postpone the next NEAMWave exercise to 2017. He stressed the need to extend the communication exercise and involve more CPAs in the next Tsunami wave exercise. The rescheduling of the NEAMWave exercise will give local authorities more time to prepare.

126. The Chair remarked that even if ICG / NEAMTWS agrees to postpone NEAMWave exercise to 2017, it is important to plan for some activities in 2016. He highlighted that ICG / NEAMTWS should not have gaps or suspension in such an important exercise in 2016. On the other hand, he recognised that is important not to only repeat the exercise, but to gain experience from the next NEAMWave exercise. He stressed that the wave exercise is an important tool to practice for real events. The chair underscored the need to have the involvement of the CPAs and to show improvements in the NEAMTWS that relates to the citizens of Member States.

5. DISCUSSION ON PROPOSAL FOR ICG GOVERNANCE AND REORGANISATION

127. Mr Pierluigi Soddu presented an updated proposal for ICG/ NEAMTWS governance and reorganization. It should be noted that Mr Soddu presented an earlier proposal to the eleventh ICG/NEAMTWS session in Nicosia, Cyprus (12-14 November 2014). The proposal was appreciated by Member States that acknowledged the need to adapt the system structure and governance but concluded that more time is needed to evaluate pros and cons of the proposal. The 11th session of ICG/NEAMTWS decided that a written proposal should be prepared by the Mr Soddu to be discussed at the Steering Committee meeting in Paris (30-31 March 2015). The proposal would then be discussed and eventually approved at the twelfth ICG/NEAMTWS session.

128. The updated document described a proposal to reorganize the ICG / NEAMTWS Governance with a view to respond more effectively to the interim-operational phase of the system. He argued that in the resolution establishing the ICG and the subsequent "Implementation Plan" of 2007, an organizational structure was identified that reflected, rightly at the time, an organization which was mainly oriented to the scientific component of the programme. To address specific technical issues (terms of reference) the ICG/NEAMTWS was structured with a Steering Committee, four working groups and three task teams. He stressed that the present organization is scientifically oriented and has remained unchanged for a few years. In his view, the only exception to this approach is represented by the Task Teams that have a well-identified dynamism because of their functions. He underlined that the NEAMTWS Implementation Plan ver. 3.4 (2009) also states that the implementation plan is a dynamic document.

129. In the current NEAMTWS Implementation Plan, the Civil Protection Authorities do not have an active role. Currently CPAs are considered only as an end-user. He remarked that NEAMTWS has been in its interim-operational phase since 2012, with four National Tsunami Warning Centres (NTWCs) which are acting as Candidate Tsunami Service Providers (CTSPs). He highlighted that new issues and challenges have emerged from the perspectives of both the CTSPs and the CPAs in this new phase of NEAMTWS. He argued that since tsunami alert messages have been communicated, two new actor groups have emerged; those who provide services and those who use them. He stressed that the two communities need to interact and operate in synergy in order to achieve an integrated early tsunami warning system.

130. The providers and the users have become major players in the tsunami warning system. It is necessary to respond to these new needs and requirements by changing the organizational structure of the ICG / NEAMTWS, making it more responsive to the needs of the CPAs and stakeholders, including the European Commission and other UN agencies involved in the emergency and response management.

131. The organizational model proposed consist of more operational levels and are interconnected:

1. Management Level: Chair, two Vice-chairs and the Secretariat;
2. Level of Synthesis, Evaluation or Coordination: Steering Committee;
3. Strategic Level: Operation represented by Working Groups;
4. Functional Level: Operation represented by the Task Teams.

132. He then elaborated on the tasks and organization of the various elements chair two vice chairs, the Secretariat, the Steering Committee, the Working Groups, the Task Teams as well as the membership, and coordination of the proposed new structure and organization.

133. An Interconnection Matrix was presented to describe the relationships between the three WGs and highlights on how they can be articulated and integrated. He presented the proposal for new organization scheme (see below) and the timing of implementation and the reorganization of ICG NEAMTWS.

- One Chair
- Two Vice Chair
- Secretariat
- Steering Committee
- 3 Working Group
- Task Teams

134. Mr Soddu proposed to submit an assessment report based on the session discussions on reorganization and governance of ICG/NEAMTWS in September 2016.

135. In response to the proposal on ICG / NEAMTWS governance and reorganisation, Mr. Sergui Dov Rosen indicated that September 2016 would be too late to submit the report. He suggested the need to dedicate more time for the review process in case there are opposing ideas. Moreover, he argued that the time schedule presented for the reporting is very tight. However, they should allow for a two-year period for reporting in case there are unforeseen situations. He is of the opinion that the Task Team on Architecture should not force themselves to have the report by next year. In his view, the timetable should be flexible allowing the Task Team the possibility to bring the report / proposal to the ICG Session in 2017.

136. Gerassimos Papadopoulos suggested that it would be very important to submit the report earlier than in September 2016. He suggested that June 2016 would be convenient because of mid-year holiday season. He proposed to have a simple organization structure in order to engage fully with the Member States. He emphasized such simple structure should aim to achieve and maintain progress of the next phase of NEAMTWS

137. Anna Von Gyldenfeldt pointed out that there is a need to have better communication between TSPs and CPAs. She also mentioned that the link between Task Teams and Working Groups should remain more open.

138. Öcal Necmioglu suggested that ICG NEAMTWS effort should focus on identifying what is working, what is not functional, what could be the means to improve the existing system. He argued that his suggestion is not opposing the proposal for ICG/ NEAMTWS governance and reorganization but in fact it will better inform ICG / NEMTWS how realistic the proposed reorganization is, and whether it is implementable and sustainable. ICG / NEATWS needs to be open and adopt a system of self-criticism. He proposed an informal approach to address the matter of governance and reorganization of ICG NEAMTWS.

139. Following the debate, the Chair concluded that a Task team on Architecture should be established and a sessional committee should develop the respective ToRs.

6. PROGRAMME FOR 2016

140. The Secretariat and the Chair highlighted that ICG / NEAMTWS reorganisation and governance, accreditation of CTSPs, national communication test and exercises, and the preparations for NEAMWave17 would be the bulk of the activities for the intersessional period of 2016.

7. ELECTION OF OFFICERS

141. The Election of Officers of the ICG/NEAMTWS was announced with the Invitation Letter, providing the required forms. Open for nominations were the positions of one chair and two vice-chairs. The deadline for nominations was 17 November 2015, at 12.00 Local Time.

142. Before the deadline, nominations had been received by the Secretariat for all open Officers positions. Each nomination was duly dated, timed and signed by the Secretariat.

143. The ICG/NEAMTWS established a Nominations Committee, composed of Dr Brian McConnell (Ireland) (Chair), Mr Kenneth Lundmark (Sweden) and Dr Michel Boisson, (Monaco).

144. The Nominations Committee met on November 17, 2015 at 14:00. It duly scrutinized the nomination forms. The nomination papers were considered complete, correct and in the required form and format.

145. For the position of Chair one nomination had been received:
Ahmet Cevdet Yalciner, Turkey
Seconded by Portugal and United Kingdom

146. Mr Yalciner was declared elected by acclamation.

147. For the position of Vice Chairs two nominations had been received:
Anna von Gyldenfeldt, Germany (Seconded by France and United Kingdom
and
Stefano Lorito, Italy (Seconded by Turkey and Portugal)

148. Ms Anna von Gyldenfeldt and Mr Stefano Lorito were declared elected by acclamation.

8. DATE AND PLACE FOR ICG/NEAMTWS-XIII

149. The Secretariat informed the meeting that the Government of Romania through its National Institute for Earth Physics has offered to host the thirteenth session of ICG/NEAMTWS in Bucharest from 26-28 September 2016.

9. ANY OTHER BUSINESS

150. No other business was raised to be considered by the session.

10. ADOPTION OF DECISIONS AND RECOMMENDATIONS

151. 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.

11. CLOSING

152. The meeting closed on Wednesday 18 November 2015, at 16:00.

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 OTHER ICGS

3.5 REPORTS BY OTHER INTERGOVERNMENTAL ORGANIZATIONS

3.6 REPORT BY THE NEAMTWS WORKING GROUPS AND TASK TEAMS

3.7 REVISION AND ADOPTION OF THE ACCREDITATION PROCEDURES

4 IMPLEMENTATION

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

4.2 TSUNAMI INFORMATION CENTER (NEAMTIC)

4.3 EVALUATION OF NEAMWAVE14 AND DISCUSSION ON NEAMWAVE16

5 DISCUSSION ON PROPOSAL FOR ICG/NEAMTWS GOVERNANCE AND REORGANIZATIONGOVERNANCE REARRANGEMENT

6 PROGRAMME FOR 2016

6.1 ACTIVITIES SCHEDULED FOR 2016, INCLUDING NEAMWAVE16

6.2 ESTABLISHMENT OF INTERSESSIONAL WORKING GROUPS AND TASK TEAMS

7 ELECTIONS OF OFFICERS

8 DATE AND PLACE FOR ICG/NEAMTWS-XIII

9 ANY OTHER BUSINESS

10 ADOPTION OF DECISIONS AND RECOMMENDATIONS

11 CLOSING

ANNEX II

DECISIONS AND RECOMMENDATIONS

Decisions ICG/NEAMTW-XII

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 12th Session in Dublin, Ireland, 16–18 November 2015,

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, Italy and Turkey,

Noting the intention of Portugal to start operations as a CTSP during 2016,

Welcoming the application by National Observatory of Athens (Greece) for accreditation and the intention expressed by France, Italy and Turkey to also apply for accreditation in the next intersessional period,

Recognising the progress achieved by the candidate Tsunami Service Providers,

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 Tsunami Warning Focal Points (TWFPs) and Tsunami National Contact (TNCs),
- who have not provided tsunami forecast points, and remind them to urgently do so;

Takes note of the Decision IOC-XXVIII, Dec.8.2 approved by the 28th Session of IOC Assembly;

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 2016;

Decides:

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

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

(iii) To continue the activities of the Task Team on Operations with Terms of Reference as outlined in Annex 3,

(iv) To establish a new Task Team on Architecture with Terms of Reference as outlined in Annex 4,

(v) To continue the activities of the Steering Committee during the intersessional period with the Terms of Reference in Annex 5 hereafter,

(vi) To start conducting quarterly Extended Communication Test Exercises based on a scenario event and encourages Member State CPAs to be involved,

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

(viii) To defer revision of NEAMTWS documentation pending the outcome of the work by the new TT on Architecture,

(ix) To adopt the document 'Procedures for the Accreditation of TSP', as included in Annex 6,

(x) To organise and conduct a further tsunami exercise in 2017 (NEAMWave17),

(xi) That it would appreciate the involvement of EC-JRC as an additional exchange mechanism for sea level data within the NEAMTWS CTSPs, the details to be elaborated in consultation with data providers;

Recommends:

(i) To increase the participation of Member States in the ICG activities, including by the use of workshops and ensuring that key documents are made available via the IOC Secretariat at least one month before next ICG,

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

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

Further recommends:

(i) That each CTSP provide threat level information based on their best practices, including (possibly different) decision matrices, scenario databases or other methods, these methodologies needing to be documented in the NEAMTWS Operational Users Guide),

(ii) That all sea level data should be made available to the CTSPs and NTWCs using bilateral agreements, between NTWCs whenever possible,

(iii) That all tide gauge stations should transition to operational, real time status,

(iv) To increase the number of seismic and sea level stations available in the North of

Africa, and for sea level to reduce sampling and latency to 1 minute or less as far as possible,

(v) That Member States should urge the active involvement of their national Civil Protection Authorities (CPAs) in the routine activities of the ICG, with the aim of making the ICG products more suitable for meeting the needs and expectations of those CPAs,

(vi) That NTWCs, in consultation with their CPAs, evaluate the need to provide enhanced products in the NTWC messages, such as maps, and to present and make proposals for discussion and adoption at the next ICG;

Accepts:

Additional recommendations of Working Groups and Task Teams as outlined in Annex 7;

Acknowledges the importance of the NEAM Tsunami Information Center (NEAMTIC) and invites Member States through funding and secondments to contribute to its ongoing work, in particular to developing and maintaining the NEAMTIC website;

Notes the successful completion of NEAMWave14, including the final workshop conducted in the fringes of the 28th IOC Assembly;

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

Thanks Ireland for hosting the Twelfth Session of ICG/NEAMTWS.

Annex 1 to Decision ICG/NEAMTWS-XII

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. Encourage the use of new communication technologies.

3. Revise and update the supporting documents for future Communication Test Exercises (CTEs) and Extended Communication Test Exercises (ECTEs) (including preparation of a draft Annex on scenario type communication test messages – and a further clarification on SMS messaging).

4. Plan, conduct, evaluate and validate quarterly ECTEs, based on scenario events, organized by CTSPs on rotational basis.

5. Contribute to reviewing and proposing amendments to the relevant parts of the Interim Operational Users Guide in the light of experience with the tests.

6. Assist IOC Secretariat to increase awareness of TFPs on the operational part, looking for their operational involvement in NEAMTWS.

7. Report progress to ICG/NEAMTWS-XIII.

Modus operandi

The Task Team will mainly work by correspondence, but hold a meeting in March /April 2016, 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.

Co-chairs of the Task Team will be appointed by the ICG /NEAMTWS Officers.

Annex 2 to Decision ICG/NEAMTWS-XII

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

Mandate

The Task Team will:

1. Develop plans for NEAMWave17, taking into account lessons learnt through the evaluation of previous tsunami exercises, including feedback from Civil Protection Authorities, and needs with reference to tsunami alert message content.

2. Report progress to ICG/NEAMTWS-XIII.

Modus operandi

The Task Team will mainly work by correspondence 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.

Co-chairs of the Task Team will be appointed by the ICG /NEAMTWS Officers.

Annex 3 to Decision ICG/NEAMTWS-XII

Terms of Reference for Task Team on Operations (No change from ICG/NEAMTWS XI**)**

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-XII

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

10 years after its initiation in 2005 and 3 years after Candidate Tsunami Service Providers began operations the ICG has decided it is timely to review its structure to ensure that it remains fit for purpose. The Task Team on Architecture has been set up to address this issue.

Mandate

The Task Team will:

1. Assess the need to reorganise the governance and structure of ICG/NEAMTWS taking account of:
    - Achievements to date in the implementation of NEAMTWS
    - Lessons learnt since 2012 through the operation of the CTSPs
    - Experience gained by other ICGs
    - The need to ensure better identification of the requirements of end users
    - The need to increase participation by civil protection agencies
    - The issues highlighted in the reorganisation proposal presented to ICG/NEAMTWX-XII and other problems that have been identified with the present system;

2. Prepare a report on the above and, if appropriate, make recommendations for a new structure;

3. Make the report available to the other ICGs for comment;

4. Report progress to the Steering Committee and to ICG/NEAMTWS-XIII.

Modus operandi

The Task Team will work by correspondence and produce a first draft report in March 2016 for consideration by the Steering Committee. Following comments by the Steering Committee, a final report will be made available to ICG members in June 2016 for approval at ICG/NEAMTWS-XIII.

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.

Annex 5 to Decision ICG/NEAMTWS-XII

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 6 to Decision ICG/NEAMTWS-XII

Procedures for the Accreditation of TSP

(As agreed at the ICG/NEAMTWS -XII, 16-18 Nov 2015, Dublin Ireland)

TABLE OF CONTENT

1 Requirements and functions of accreditation

1.1 Requirements and functions of references

The procedures are based on the operational and organizational functions and requirements of Tsunami Service provider (TSP) adopted by the ICG VIII in November 2011 (Appendix I) and subsequently reformatted (Appendix II). Appendix III gives the more detailed descriptions of the functions and requirements as adopted at ICG IX in September 2012. Further modifications regarding alternative methods for event assessment have been made to comply with the recommendations of ICG XII (November 2015).

The main role of the TSP, is to provide, in a timely fashion, the messages defined by the ICG as described in the Operational User's Guide to TSRs, in particular the National tsunami warning centers (NTWCs) in each member state of the NEAM region who requests to receive the services of the CTSP or TSP.

The number of requirements is 12

The number of functions is 12

1.2 Evaluation

For each function and requirement, quantitative and/or Qualitative parameters/actions are defined.
For the accreditation evaluation, 3 levels of capability are defined for each requirement and function:
A : fully met; B : substantially met; C not met
Several requirements and functions are considered essential and shall be on the highest level A (in bold in the lists of Appendix II):

- **9 essential requirements**
- **8 essential functions**

For the 7 other functions or requirements that are not essential, at least 4 shall be at level A or B.

2.0 Accreditation procedures

2.1 Documentation

The Candidate TSP will receive a document with

- the list of requirements/functions ,

- for each function/requirement :
    - the parameters checked
    - and the thresholds for the 3 levels

The candidate must fill the document and return it to the Accreditation team.
When the accreditation team considers that the candidate TSP is ready, an evaluation is organized by the accreditation team with the contribution of the TNC of the country involved who is responsible for the organization of the evaluation.

1.3 ICG/NEAMTWS Accreditation Team list

For the accreditation, at least three experts will be drawn from countries with significant experience in tsunami monitoring. In particular but not exclusively:
- one expert of NEAM Member States with a Candidate TSP or TSP
- one expert of another NEAM Member state
- plus one expert

Each Candidate TSP will be evaluated by a team of at least 3 experts (which cannot include representatives from the TNC or TWFP of the visited Candidate TSP). The ICG Steering Committee will nominate the team

The duration of the accreditation evaluation should be at least two full working days in order to check all relevant functions and requirements of the Candidate TSP. The evaluation will be based on a video-conference and test of the CTSP operation will be performed via scenario earthquakes.

1.4 Candidate TSP team

The team of the evaluated country should consist of representatives from at least 3 of the following institutions:
- Tsunami National Contact (TNC)
- Tsunami Warning Focal Point (TWFP)
- Head of NTWC
- Governmental representative

Candidate TSP can bring as many participants as deemed necessary to answer the questions of the accreditation team.

1.5 [Example of] accreditation planning

1. When the Candidate TSP is considered ready for accreditation, its Tsunami National Contact (TNC) sends a letter to the IOC for initiating the accreditation process
2. The IOC sends a response letter to the TNC with the documentation, including the related appendices and the document to fill in timely manner
3. The Candidate TSP fills the document
4. The TNC returns the document to the Accreditation Team (AT) and IOC
5. Within two months, the AT analyses the document and reports in writing to the Steering committee and IOC about their draft conclusions
    a. If the Candidate TSP does not fulfill the functions and requirements as recommended in the accreditation document, a list of improvements is proposed to the candidate TSP

   b. If the candidate TSP seems to fulfill the functions and requirements, an evaluation of the AT is organized by IOC and the TNC, in a timely manner
      i. During the evaluation, all parameters and documentation are checked by the AT
6. According to the report of AT, if the accreditation criteria decided by the ICG are met, the Officers approve and the Candidate TSP is considered as TSP and notified by the IOC and the ICG is informed accordingly
7. If the accreditation criteria are not met, the extensive list of requested improvements is provided to the TNC and Candidate TSP. Within one month, the TNC will inform the IOC and AT when the improvements are implemented. A second evaluation of the Accreditation Team will be organized if necessary. If accreditation levels are not met after the second evaluation, the AT could conclude that a visit is necessary. In that case, the AT should send a note to the Officers explaining the necessary improvements for accreditation and justify the purposes and the necessity of the visit at the center. The Officers analyses the note and decide in relation with the AT if a visit is necessary and what will be the list of issues that would be discussed during the visit. IOC will send a letter to the CTSP and TNC explaining the purpose of the visit. After three evaluation phases, if the accreditation levels are still not met, no new evaluation would be organized before the next ICG session.

1.6 Accreditation validity

No re-accreditation would be necessary as long as the Tsunami Service Provider presents several activities during each ICG session: monitoring and alerting the TWFP for majority of the events occurred in the NEAM; participation to communication tests and exercises; active participation to the ICG operational activities, including relevant task teams and working group activities.

In case of failure or lack of the TSP functions or requirements, a re-accreditation could be requested at any time by the Steering Committee. The main issue is that the TSP shall provide explanation to the Steering Committee of the failure and expose the modifications and improvements made.

The TSP is requested to inform IOC via official channels in case it decides not to continue, or is not in a position to provide its services, or interrupts its services for a duration of longer than 1 year, for one reason or another. By doing so, the TSPs accreditation will be declared as invalid, and will remain so until the CTSP informs the IOC in the future on the availability of its services again. In such case, the CTSP will be subject to re-accreditation.

1.7 New requirements/new functions

When the ICG adopts new requirements or new functions, the timing of its implementation shall be considered for each of the TSP, depending on the complexity of the new requirement/function. The ICG must propose relevant criteria for accreditation of this new requirement/function.

1.8 Candidate tsunami service provider (CTSP) and tsunami service providers (TSP) activities

Until the process of accreditation is completed, each Candidate TSP provides the alert messages to the TWFP of the member states that have subscribed to its services. Candidate

TSPs and TSP are encouraged to organize Communication tests and to participate to in International tsunami exercises. Candidate TSPs and TSP are encouraged to perform or support research to improve the service performance.

2.8 Liability

Upon acceptance as a NEAMTWS Tsunami Service Provider (TSP), the management of all new TSPs will be asked to sign a legal disclaimer removing IOC/UNESCO from any legal or financial responsibilities for the TSP or associated activities within it.

Accreditation of CTSP does not cover liability of AT, and CTSP/TSP.

Appendix I
Operational and Organizational Functions and Requirements for Tsunami Service Providers (TSPs)

Adopted by ICG/NEAMTWS VIII and modified according to ICG/NEAMTW XII recommendations

Watch Function

- Reception and interpretation of real-time seismic and sea-level measurements
- Determination of seismic parameters
- Forecasting of tsunami arrival times and level of alert at forecasting points specified by Member States
- Exchange seismic and sea level parameters and information with other TSPs and NTWCs
- Disseminate watch and cancellation messages based on the alert-level decision matrix (or best practices including numerical simulations and other methods) to NTWCs and the TWFPs
- Monitoring of tsunami propagation and disseminate updated information in priority tsunami amplitude measurements
- Function as a NTWC

Function above and beyond watch time

- Monthly internal tests of the watch system
- Actively participate in communication and tsunami exercises
- Contribute to training courses in coordination with IOC
- Participate actively in, and report to, the ICG and working groups and task teams

Requirements

- Seismic as well as tsunami/oceanographic expertise
- Direct access to a local database of tsunami and large earthquakes
- Real-time transmission systems for reception of data
- Real-time alert reception and transmission systems including GTS, internet, fax
- Operational manual describing procedures and documentation for TSRs
- Backup and redundant system
- 24/7 watch staff
- Tsunami modelling capacity for travel time computation

APPENDIX II

Detailed TSP Functions and requirements

Adopted at ICG/NEAMTWS IX and modified according to ICG/NEAMTW XII recommendations

I Watch Functions

WF1 Disseminate watch and cancellation messages based on the alert-level decision matrix (or alternatively their own best practice) to all NTWCs and the TWFPs, and all eligible subscribers with no restriction. These best practices include scenario databases or other methods, these methodologies needing to be documented in the interim NEAMTWS Operational Users Guide.

WF2 Reception and interpretation of real-time seismic measurements

WF3 Determination of seismic parameters

WF4 Exchange seismic parameters and information with other CTSPs, TSPs and NTWCs

WF5 Reception and interpretation of real-time sea-level measurements

WF6 Forecasting of tsunami arrival times and level of alert at each forecasting point specified by Member States

WF7 Exchange sea level data and information with other CTSPs, TSPs and NTWCs

WF8 Monitoring of tsunami propagation and disseminate updated information in priority tsunami amplitude measurements to all NTWCs and the TWFPs, and all eligible subscribers with no restriction

II Above and beyond watch time Functions

AF1 Monthly internal tests of the watch system

AF2 Actively participate in communication and tsunami exercises

AF3 Contribute to training courses in coordination with IOC

AF4 Participate actively in, and report to, the ICG and working groups and task teams

III Requirements

R1 Nominated and act as NTWC

R2 Real-time alert reception and transmission systems including GTS, Internet, fax

R3 Redundancy

R4 24/7 watch staff

R5 Operational manual describing procedures and documentation to TSPs

R6 Seismic expertise

R7 Direct access to large earthquakes data base

R8 Real-time transmission systems for reception of seismic data

R9 Tsunami and sea level expertise

R10 Direct access to a tsunami data base

R11 Real-time transmission systems for reception of sea level data

R12 Tsunami modelling capacity for tsunami travel time computation

APPENDIX III
Detailed TSP Functions and Requirements Criteria
Adopted at ICG/NEAMTWS IX and modified according to ICG/NEAMTW XII recommendations

I. Watch Functions

WF1 Disseminate watch and cancellation messages based on the alert-level decision matrix (or other best practices) to NTWCs and the TWFPs

The content and type of messages must be in agreement with the decision matrix criteria or other best practice as specified in the interim Operational Users Guide (iOUG). A set of different earthquake parameters (e.g. magnitude, depth, location) must be defined and the CTWP should provide the correct message type (information, advisory, watch, cancellation, end of, exercise, communication test). The list, name and coordinates of forecast points must be the same list as the IOC provided.

WF1.1 Content of messages

The content of messages must conform to the one of the various message types defined in the iOUG and the sequence of iOUG messages must be respected. Though some flexibility is allowed in the text with respect to the iOUG message format, 100 % of the prescribed parameters must be contained in the message.

The generation and content of messages have to be established in the provider's Standard Operation Procedures (SOP).

List of recipients and of the corresponding communication links must be provided and certified (a Communication Plan is recommended).

The SOP should contain: the rules for upgrading, downgrading and cancellation of the tsunami messages; procedures (if any) for the case when the event magnitude is within 0.1 of the Decision Matrix thresholds; procedures (if any) for the case when there are conflicting reports on magnitude values.

WF1.2 Verification of the messages before the transmission

In case the message is generated automatically it must be checked by the operator before

Distribution. Criteria for sending out the cancellation and end-of-messages in case of tsunami and in case of no tsunami should be defined in the SOP.

WF1.3 Transmission of messages during real events

Procedures to measure the latency of message transmission to TWFP should be defined for each mode of transmission. The latency of transmission of the first messages of the sequence is the most important. Statistics of the latency should be presented. The implementation of an automatic transmission procedure to all the foreseen recipients is strongly recommended in order to reduce latency to the level suggested by the established SOP. For the case in which a tsunami has been generated, criteria for sending an end-of-tsunami watch or advisory message should be defined in the SOP. For the case in which a tsunami has not been generated, criteria for sending a tsunami watch or advisory cancellation should also be defined in the SOP.

WF1.4 Updating the TNC/TWFP/NTWC contact list

The SOP should define when the TNC/TWFP/NTWX contact lists are to be updated. Responsibility for the updates lies with the CTSPs. The CTSP updates the contact list in conjunction with IOC Secretariat.

WF2 Reception and interpretation of real-time seismic measurements

It is necessary that the CTSP has proven to employ a standardized method of receiving and analyzing seismic signals in the framework of a robust and redundant real-time seismological network communication system along with its ability of rapidly determining and interpreting earthquake parametric data on a 24/7 basis. The protocols adopted for such an activity must be described in the SOP. The overall maintenance and the capacity of intervention and rapid recovery in case of malfunctioning of any of the elements of the seismic network should be well established and a list of the 24/7 dedicated personnel and a **list of seismic stations and their general specifications** must be provided. The detectability of the seismic network must allow for the determination of the parametric data of tsunamigenic earthquakes in the region attributed by NEAMTWS to the CTSP.

WF3 Determination of seismic parameters

The candidate CTSP has to demonstrate the ability and reliability of the employed hardware and software for providing rapidly real-time parametric data on a 24/7 basis including the typical delay (will be defined by the experts) and the associated accuracy (will be defined by the experts) for each of them. It is compulsory to specify which parameters are determined automatically and which are revised by a geophysicist / seismologist. Of primary importance is the rapid determination of earthquake origin time, magnitude, epicentral coordinates and depth. Non-standard results from other analytical procedures (e.g. source parameters, focal mechanism, duration of high-frequency p-waves, or any other tsunamigenic discriminants), if any, should be appropriately and distinctively documented at the earliest convenience.

WF4 Exchange seismic parameters and information with other TSPs and NTWCs

The communication tools and communication interval with other TSPs and NTWCs.

The employed communication tools must allow for the near real-time communication and **parametric** data exchange with other **CTSPs/TSPs** and NTWCs with a minimum time interval shorter than the tsunami arrival time. **For improvement of earthquake location it is recommended to implement a real time waveform data exchange through bi-lateral agreements among CTSPs/TSPs and NTWCs**.

WF5 Reception and interpretation of real-time sea-level measurements

It is necessary that the candidate TSP uses a fit-for purpose method of receiving and analyzing sea level data in the framework of a robust and, if possible, a redundant real-time sea level station network communication system along with its ability of rapidly determining and interpreting sea level data on a 24/7 basis. The protocols adopted for such an activity must be described in the SOP. A strategy and capability to cope with failure of individual stations and the whole network needs to be demonstrated and documented. A complete list of the personnel in the operational team, and their functions, must be provided together with a contingency plan (in case of non 24/7 service). The CTSP is responsible for selecting those sea level stations that allow it both to confirm that a tsunami has been generated and to monitor its subsequent history or cancel the tsunami alerts.

WF6 Forecasting of tsunami arrival times and level of alert at each forecast point specified by Member States

WF6.1 List of forecast points

It is necessary that the candidate TSP has available the list of forecast points as provided by Member States and following guidance from ICG (see separate document).

WF6.2 Computational tools for deriving tsunami parameters at forecast points

The candidate TSP needs to provide estimated tsunami arrival times in a timely manner, using suitable computational tools and bathymetric data. Optionally other tsunami parameters such as wave heights at each forecast point could also be provided. These tools need to be state of the art and fit for the purpose of operational tsunami forecasts (e.g. need to be validated by appropriate and accepted validation procedures, documented in technical reports or in the scientific literature). A documented method for deriving alert levels at forecast points needs to be in place based on the relevant ICG decision matrix (or best practices). It must be made clear which parameters will be reviewed by a trained operator.

WF7 Exchange sea level data and information with other CTSPs, TSPs and NTWCs

WF7.1 List of the sea level stations

The CTSP or TSP must have an updated and detailed list of the real time sea level stations that are used for its tsunami watch operations, including their characteristics and respective status.

WF7.2 Open access of real time sea level data to other CTSPs, TSPs and NTWCs

Each CTSP or TSP, if requested, should provide fast access to the other centres of the real time sea level data they receive from the list of stations above. They should also exchange the information about tsunami characteristics (arrival time and wave height) obtained from the sea level measurements with the other TSPs and NTWCs. The CTSPs, TSPs and NTWCs will not

distribute these sea level data to any third parties apart from sharing these data between them, unless other agreements with the data providers are in place.

WF8 Monitoring of tsunami propagation and dissemination of updated information with tsunami wave height measurements

The monitoring tools, procedures, and update intervals.

The candidate TSP needs to maintain a monitoring tool for continuously receiving data updates for sea level stations. Additionally, procedures to derive tsunami wave height from sea-level measurements need to be in place, applied and documented. Furthermore, procedures need to be in place by which updated information is disseminated as rapidly as possible to TWFPs and exchanged with other TSPs.

II. Above and beyond watch time Functions

AF1 Monthly internal tests of the watch system

List of the tests of the watch system, that should include all the 8 WFs required for the TSP:
Describe the way of each [Specify how the test of each] individual function is conducted, frequency, the number of involved people, evaluation and reporting. Describe further possible actions in case of malfunctions. Provide a summary report of the conducted tests (documentation is expected to be written in the working language of the TSP for internal use, but a summary in one of the IOC languages should be also made available for evaluation purposes).

Specify the training schedule for the personnel (if any).

AF2 Actively participate in communication and tsunami exercises

List of the participation to CTE and NEAMWave; involvement in the process.

AF3 Contribute to training courses in coordination with IOC
Specify the involvement (personnel, material, facilities, or organizational and/or financial support provided) in the training courses.
CV and expertise of the people suggested contributing in the future courses and the technical/science areas concerned.

AF4 Participate actively in, and report to, the ICG and working groups and task teams
Number and dates of participation: ICG, WG, Task teams

III. REQUIREMENTS

R1 Nominated and act as NTWC

Letter of nomination of the government.
Mandate of the NTWC.
Official letter of starting of operational activities.
Describe the rules and procedures (preferably as SOP) that the CTSP, acting as NTWC, has to link with the national CPA or EMO.

R2 Real-time alert reception and transmission systems including GTS, Internet, fax

Demonstrate the transmission mode in place: GTS, Internet, fax
Hardware and Software that disseminate the messages.

Describe how the messages are sent by GTS, what are the software and hardware in place – and the connection and MoU with National Met Service.
Hardware and software in place to receive the alert messages. Provide the SOP established (if any).
R3 Redundancy
Number of processing systems and hardware (at least 2).
Backup power supply.
Redundancy for transmission and reception of messages and relevant data (if any).
Provide the SOP in case of power failure, in case of communication failure.
The redundant component must be tested regularly and provide all the functions (see AF1).

R4 24/7 watch staff

Number and expertise of people in 24/7 staff.
Calendar of the staff.
Service organization and SOP in place in case of a tsunami event.
SOP to replace operators.

R5 Operational manual describing procedures and documentation to TSPs

List of procedures, manual and documentation available for internal staff, and for staff training.

R6 Seismic expertise

The list of the CTSP staff and their experience level on earthquake/real time seismology and related issues must be exhibited by documented experience in the service of a 24/7 seismological network. Documented experience in real time detection seismology is mandatory.

R7 Direct access to large earthquake data base

The capacity and performance of real time access to the CTSPs/TSPs earthquake parametric (waveform and other) database must be fluent with no restrictions.The available databases and their formats should be provided along with relevant documentation concerning the related analysis tools with other TSPs tools.

R8 Real-time transmission systems for reception of seismic data

It is **mandatory** that the candidate CTSP demonstrates intra-site communication and the ability to efficiently transmit and receive real-time seismic signals in the framework of a 24/7 seismological network through a robust, dedicated and redundant communication systems.

R9 Tsunami and sea-level expertise

The list of the TSP staff and their related expertise in the monitoring and the rapid analysis of sea-level data.

The experience level of each individual staff in the list in real time sea-level monitoring and related issues must be demonstrated. Documented experience in providing an operational sea level service is mandatory.

R10 Direct access to a tsunami data base
The capacity and performance of real time access to the CTSPs/TSPs tsunami parametric (waveform and other) database must be fluent with no restrictions.

The available databases and their formats should be provided along with relevant documentation concerning the related analysis tools with other TSPs tools.

R11 Real-time transmission systems for reception of sea level data

It is **mandatory** that the candidate CTSP demonstrates intra-site communication and the ability to efficiently transmit and receive real-time sea level signals in the framework of a 24/7 network through a robust, dedicated and redundant communication systems.

R12 Tsunami modelling capacity for tsunami travel time computation

The capacity to generate (near) real time computation of tsunami travel times.
Computational tools must be available and the ability to compute and display the results be demonstrated and documented. The tools need to conform to accepted scientific standards and need to be validated with appropriate procedures. Staff with the necessary expertise to use these tools must be available on a 24/7 basis.

Appendix IV

Acronyms

AT	Accreditation Team
CTSP	Candidate Tsunami Service Provider
ICG	Intergovernmental Coordination Group
IOC	Intergovernmental Oceanographic Commission of UNESCO
iOUG	interim Operational Users Guide
NEAMTWS	The North Eastern Atlantic, Mediterranean and connected sea Tsunami Early Warning and Mitigation System
NTWC	National Tsunami Warning Center
SOP	Standard Operation Procedures
TNC	Tsunami National Contact
TWFP	Tsunami Warning Focal Point
TSP	Tsunami Service Provider
TSR	Tsunami Service Recipient

Annex 7 to Decision ICG/NEAMTWS-XII

Additional recommendations of Working Groups and Task Teams

WG2 recommends:

(i) that CTSPs and other institutions continue to work toward implementation of real-time GPS networks and their use for warning operations.

(ii) that CTSPs and other institutions continue to work toward exploring capability of real time strong motion networks and their implementation for use in warning operations, and particularly for moment tensor estimation.

WG3 recommends:

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

(ii) To further update the inventory of metadata of sea level and offshore sensors in the NEAM region for the ICG's and NTWC's on the NEAMTIC webpage.

(iii) That the link among the CTSPs and the operational oceanography regional alliances in Europe (e.g. EuroGOOS, MONGOOS, and in particular the EuroGOOS Tide Gauges Task Team) should be maintained and strengthened, to guarantee the sustainability of the marine network and to fulfil the multi-hazard requirements.

(iv) That Member States explore the offer by 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.

The Task Team on Operations recommends: that very close collaboration with all 4 WGs is needed to explore and propose innovative solutions for adoption by the ICG.

ANNEX III

OPENNING ADRESSES

Mr Alex White
Minister for Communications, Energy and Natural Resources, Dublin, Ireland

Prof Yalciner,

Delegates and observers,

I am pleased to welcome you to Dublin for this important meeting, the 12th Intergovernmental Coordination Group of the Tsunami Early Warning and Mitigation System for the North-eastern Atlantic, the Mediterranean and Connected Seas.

My Department is the Lead Government Department for tsunami in Ireland's emergency management process, and the Geological Survey of Ireland is working with national partners to develop a tsunami warning system for Ireland within the context of your international system for the northeast Atlantic and Mediterranean. We value the seismic and sea level data, and the expertise your project brings, and I welcome the tsunami watch and messaging services provided by the French Centre National d'alerte aux tsunamis. The message of 13th February this year notifying a magnitude 6.6 earthquake in the north Atlantic reminds us that we must be vigilant.

The simulation exercise you conducted in late-2014 was particularly useful in focussing discussions with the emergency management authorities here, under the co-ordination of the Office of Emergency Planning, and I'm pleased to note that another such exercise is planned for 2016 and will be discussed at this meeting. We will use that opportunity to increase our engagement with your warning system and to further development Ireland's tsunami emergency response planning.

Some people have expressed surprise to me that Ireland would host such a meeting, as we are generally acknowledged as a very quiet and safe country regarding most geological risks. However historical records and geological evidence indicate that, while tsunamis are unlikely events around Ireland, the Irish coast is vulnerable to tsunamis from submarine landslides and distant earthquakes. The effects would be similar to the level of coastal flooding seen during storm surges, but with a much shorter time to react, and so an effective detection and warning system needs to be in place. We are aware of the nature of the tsunami hazard to Ireland but have more work to do in assessing our vulnerability to it. In that regard, I welcome the workshop arranged by GSI and Prof. Dias of the UCD Earth Institute that will take place on Thursday in the National Emergency Coordination Centre. The coastal flood mapping of the Office of Public Works is particularly relevant and helpful in that process, along with the seabed mapping funded by my department, and carried out by the GSI and Marine Institute INFOMAR project.

I am happy to acknowledge the other national partners involved in developing an Irish tsunami warning system, including the Geophysics section of the Dublin Institute for Advanced Studies, and MetEireann, the national meteorological office. I know that representatives of these bodies will be joining the various sessional working groups over the next three days.

In closing I would like to wish you a successful meeting, I thank the International Oceanographic Commission of UNESCO and the staff of GSI for arranging it, and I hope that in addition to a productive meeting, you will also take time to enjoy your stay in Dublin

Mr Vladmir Ryabinin
Executive Secretary, IOC

Honorable Minister Mr Alex White,

Minister for Communications, Energy and Natural Resources,

Dear colleagues and friends,

Since the beginning of March this year I have been serving as Executive Secretary of the Intergovernmental Oceanographic Commission of UNESCO. I have learnt much in these almost nine months, and one of the most impressive revelations for me has been to learn how enthusiastic and energetic the tsunami community is! You do a very important job protecting millions of people on the coasts of the world ocean and it is gratifying to see that you are energetic, devoted, and highly professional. It is the combination of expertise and energy that moves this world forward!

I really wanted to come to Dublin and work with you, but right now we are in session of the UNESCO General Conference, which determines the program and budget of UNESCO and IOC. A lot depend on our performance these days on the stage of UNESCO.

The North-eastern Atlantic, Mediterranean and connected seas Tsunami Warning and Mitigation System is one of the three “youngest” components of the IOC network of regional Tsunami Warning Systems. As you probably know, IOC tried to establish this system before 2004, but without success. It was the devastating Sumatra tsunami in 2004 that set in motion the development of the International System in the NEAM region, as it was the case also for the Indian Ocean and the Caribbean. It is very unfortunate that such needed systems obtain strong incentives and resources for their establishment only after tragic tsunami events. With the establishment of the NEAM system I hope that we collectively are contributing to break this very sad rule.

In the NEAM region there has been a long and steady development of the Tsunami Warning System. Today there are four National Tsunami Warning Centers in France, Greece, Italy and Turkey. They act as candidate Regional Tsunami Service Providers and issue tsunami alerts to member states that wish to subscribe.

For the future, IOC hopes that the NEAM system will successfully continue its development. For the present there are important topics on the agenda concerning future governance and accreditation of Tsunami Service Providers.

Equally important is a strong educational and awareness creation component - through work with civil protection and local communities. In this respect it is encouraging to note that NEAMWave14 did mobilize more civil protection Agencies than during the first exercise – NEAMWave 12.

Ladies and Gentlemen,

What is the future of disaster risk reduction activities, seen from the international perspective, particularly as the world is considering the post-2015 development agenda? We are aware that people continue to migrate to coastal zones, and the exposure of people and assets to marine and ocean hazards is constantly increasing in time. At the 3rd United Nations World Conference on Disaster Risk Reduction, hosted by the Government of Japan in Sendai in March this year, countries from all around the world underscored the increasingly important role of Multi-Hazard Early Warning Systems. This change in paradigm is perhaps an open

door for tsunami people to re-engage work with governments and to make sure that this system is sustained into the future. In my view, it is important that the current trends in the domain of disaster risk reduction are taken into account in planning of the further development of tsunami warning systems.

Before closing I would also like to introduce to you Dr Denis Chang Seng, who joined IOC on 1st November 2015. Denis is the new Technical Secretary for ICG/NEAMTWS.

Denis post is shared 50-50 between the Tsunami Unit and the Ocean Observations and Services Sections. As Programme Specialist, he will serve as Technical Secretary of ICG/NEAMTWS, and will support expert teams under the Joint IOC-WMO Technical Commission for Oceanography and Marine Meteorology (JCOMM) Services and Forecast Systems Programme Area.

Denis is educated in meteorology, oceanography and in disaster risk preparedness, with a focus on tsunami early warning. Most recently, he was a Natural Science Programme Specialist at the UNESCO Apia Office for the Pacific States (2012-2015). Previously, he worked as a research associate with the United Nations University for Environment and Human Security (UNU-EHS) at the UN Campus, in Bonn, Germany (2007-2012). Here he has also worked in support of and contributed to German Indonesian Tsunami Early Warning System Project (GITEWS).

In the Seychelles, he was a national expert and a lead consultant with UNDP working in the areas of Climate Change and Disaster Risk Management. Denis worked for several years as a senior meteorologist at the National Meteorological Services in the Seychelles, prior to assuming the position of Acting Director. His responsibilities there included ocean wave and sea level monitoring and forecasting. Denis completed his doctoral degree in Natural Sciences from the department of Geography, Mathematics and Natural Science at Bonn University, Germany in July 2010.

In welcoming Denis I would like to mention that this is the first time since the start of ICG/NEAMTWS that IOC now has a UNESCO regular programme funded post in support of this task. I may add that this is a special achievement in the financially challenging times we have gone through since 2011.

But it also underlines the priority the Intergovernmental Oceanographic Commission of UNESCO attains to the Tsunami programme. IOC stands ready to continue the support and provide for effective intergovernmental coordination of tsunami warning systems around the world.

I wish you all a very successful meeting, and hope that its outcomes will be very positive and fruitful.

ANNEX IV

REPORTS ON THE INTERSESSIONAL ACTIVITIES OF THE WORKING AND TASK TEAMS

WORKING GROUP 1
HAZARD ASSESSMENT AND MODELLING

(Prepared by Joern Behrens, University of Hamburg,Germany)

Members of Working Group 1 have focused their activities to modelling and research in the framework of EU FP-7 Project ASTARTE (www.astarte-project.eu). Therefore, the amount of direct ICG/NEAMTWS related work has been limited and no intersessional meeting was scheduled. We list the direct ICG/NEAMTWS related activities that follow the work plan adopted at the sessional working group meeting at ICG/NEAMTWS-XI in Nicosia, Cyprus, in the following:

1. Work on the definition of basins in the Mediterranean has been conducted, utilizing a tsunami scenario database that has been compiled by Dr. Andrey Babeyko (GFZ Potsdam, Germany) in the ASTARTE project.

2. A document on sources in the Mediterranean has also been compiled in thecontext of ASTARTE and will be available to the NEAMTWS public in the near future.

3. Several talks on an open data policy for modelling results (in particular the tsunami scenario databases) have taken place. However, a formal agreement or text proposal for adoption by the ICG plenary has not yet been formulated. Several work items on the WG1 implementation plan are still pending. It will be the foremost obligation of the sessional meeting of WG1 to find solutions to complete those pending work items.

Table 1 shows the current work plan for WG1, which will be revised during the NEAMTWS-XII 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[2]
Provision of data for benchmarking (seismic parameters, topo-bathymetry, sea level data, run-up) of the Greece 1956 event	NEAMTWS X 2013	Greece		O
Recommendation on Basin definition	1Q 2014	Spain, WG1, NEARTOWARN		O
Position of deep water gauges (derive recommendations)	Report by NEAMTWS X	WG1, WG3, ASTARTE		O
Unified document on Tsunami Sources and Hazard (Follow up of Tsunami Sources and Hazard assessment)	NEAMTWS XI	ASTARTE		N
Documentation on interpretation of modeling results in operational procedures	NEAMTWS XII	WG1, Outside Experts		N
Adopt free data policy for model data base data	NEAMTWS XII	WG1, NEAMTWS		N

Table 1: Work plan for WG1

WORKING GROUP 2
SEISMIC AND GEOPHYSICAL MEASUREMENTS

(Prepared by Stefano Lorito, National Institute for Geophysics and Volcanology, Italy)

GPS Application

- GPS data can be used is to obtain reliable real-time Mw and focal mechanisms

Activities within ASTARTE FP7

- INGV and NOA are jointly improving GPS network around the Ionian Sea (WP6.2)
- GFZ contributed regarding real-time GPS data processing
- A joint report (NOA/GFZ/INGV) is being prepared

In this region:

- Real-time continuous GPS networks exists (INGV, NOA)
- Other existing continuous GPS networks could be potentially interested to the real-time applications
- Forward modeling is in progress to investigate:

2

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

  - the present resolution of the existing networks
  - where it could be useful to install new continuous real-time GPS stations

- Preliminary tests of real-time positioning

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

(Prepared by Co-chairs: Begoña Pérez, Pueertos del Estado, Spain) and Sergiu Dov Rosen, Sea shore Engineering Consultants and Advisor to the National Management Authority, Israel)

Recommendations 2013-2014:

1. As a priority, all sea level data should be made available to the CTWP's and NTWC's using bilateral agreements, between NTWC's whenever possible.

2. 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.

3. Increase the number of stations uploading sea level data to the GTS in Europe to facilitate access by other ICGs.

4. An updated inventory of metadata of sea level and offshore sensors in the NEAM region should be available for the ICG's and NTWC's on the NEAMTIC

5. NEAMTWS documentation should include a detailed review of the real capabilities and limitations of the existing tsunami detection network and plans for future improvements

6. The link between the TWS's 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

7. Strengthen cooperation with JRC in providing real time sea-level data for the NEAMTWS.

8. Coordinate with ASTARTE the location of additional sea level and other instruments for tsunami generation validation, by holding a joint meeting

List of Actions

1. Sea level inventory: MS input to finish the first version by December 2014

2. Define and distribute to the MS an excel table for offshore instrumentation inventory

3. Yearly updates (previous to each NEAMTWS session) of inventories (MS)

4. Organization of a meeting WG3-ASTARTE in order to:

    - Report on the status and limitations of the existing sea level network
    - Incorporate recommendations for improvement of the network based on modelling criteria and ASTARTE achievements
    - Include this information in the new documentation of NEAMTWS
    - Use of new NEAMTWS workspace: forum for marine network issues

5. Study the preparation of a proposal (H2020) for adding pressure sensors to existing buoys in NEAM region (strategic locations)

6. JRC sensors for filling gaps or providing redundant information at strategic locations. Require JRC information on costs, conditions, role of JRC (installation, maintenance?)

Meetings

- Sergiu Dov Rosen attended the SC meeting in Paris (March 2015) and the WG3 meeting and SC meeting in Rome (20 October 2015): Rosen

Tide gauges inventory in the NEAM region

- Steady increase in tide gauge in the region since 2006 from 15 in 2005 to 185 in 2015

Related activities

- Collaboration with MONGOOS strengthened during last year

- EuroGOOS has established in 2015 the EuroGOOS Task Team on Tide Gauges: tsunami warning is one of the applications considered by the task team: collaboration with NEAMTWS is therefore one of its objectives

The approach is based on multi-hazard approach of sea level stations: tsunami, storm surge, climate change. This requires the involvement from Oceanographic and Meteorological communities.

Later updates concerning offshore detection

- Portugal: Establishment of a GPS buoy in the coast of Portugal
- Agreement with NOAA for the re-location of a DART buoy close to San Vicente Cape

- Spain and Portugal: preparing a proposal for adding tsunami detection software to existing HF radars in the Gulf of Cadiz and Galicia. Study addition of a bottom pressure sensor to Puertos del Estado buoy in the Gulf of Cádiz

ANNEX V

LIST OF DOCUMENTS

Working Documents

Agenda Item	Reference Code	Document Title and Link
		ICG NEAMTWS XII Time Table
3.1		Report ICG NEAMTWS Chair
3.3	IOC/TOWS-WG-VIII/3	Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG) 8th Meeting, Morioka, Japan,12–13 March 2015n
3.5		Joint Research Center Activities on Tsunami
3.6		NEAMwave14 Exercise
3.6		Report on Intersessional Activities of Working Group 3
3.6		Report on Intersessional Activities Working Group 2
3.6		Report on Intersessional Activities of Working Group 1
4		Proposal for ICG /NEAMTWS reorganization v5
5.1		Status CTSP Greece Part 1 Status CTSP Greece Part 2
5.1		Status NTWC Portuguese
5.1		Status CTSP CENALT France

5.1		Status Tsunami Preparedness in Israel
5.1		Status of CTSP in Italy
5.1		Status National Tsunami Warning Center Germany
5.1		Status of TWS KOERI Turkey
5.3	IOC/BRO/2015/7	Summary of Results-Tsunami Exercise NEAMWave 14: From Early Warning to Early Response
5.3		NEAMWave14 Exercise
7		Technical Arrangements for the Elections of the Officers of the ICG/NEAMTWS

Background Documents

Agenda Item	Reference Code	Document Title and Link
		Results of Multi-Hazard Approach Questionnaire
		NEAMTWS 10th Anniversary document
		Multi-Hazard Approach: Status
3.4	ICG/CARIBE-EWS-X/3	ICG/CARIBE-EWS, 10th Session, Philipsburg, Saint Martin 19–21 May 2015
3.4	IOC/ICG/PTWS-XXVI/3	ICG/PTWS, 26th Session, Honolulu, USA 22-24th April 2015

ANNEX VI

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ANNEX VII

LIST OF ACRONYMS

CPA	Civil Protection Authority
CTBTO	Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization
CTE	Communication Test Exercise
CTSP	Candidate Tsunami Service Provider
DG-ECHO	Directorate-General of the European Commission's Humanitarian Aid Office
EC	Executive Council
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/NEAMTWS	Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
IOC	Intergovernmental Oceanographic Commission of UNESCO
JRC	Joint Research Centre
MID	Message Identifier
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 (NEAMTWS
NTWC	National Tsunami Warning Centre
OUG	Operational Users Guide
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
TT	Task Team
TWFP	Tsunami Warning Focal Point
UNESCO	United Nations Educational, Scientific and Cultural Organization
WG	Working Group

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*
165.	Twenty-sixth Session of the Intergovernmental Coordination Group for the for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXVI), Hawaii, USA, 22–24 April 2015 (*Executive Summary available in E, F, S & R)	E*
166.	Tenth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS), Philipsburg, Sint Maarten, Kingdom of the Netherlands, 19–21 May 2015 (*Executive Summary available in E, F, S & R)	E*
167.	Tenth Session of the IOC Sub-Commission of the Western Pacific (WESTPAC-X), Phuket, Thailand, 12–15 May 2015	E
168.	Twenty-eighth Session of the Assembly, Paris, 18–25 June 2015	
169.	Twelfth 12th 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-XII), Dublin, Ireland, 16-18 November 2015 (*Executive Summary available in E, F, S & R)	E*