Intergovernmental Oceanographic Commission
Reports of Governing and Major Subsidiary Bodies

Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS)

Ninth Session

St. Thomas, United States of America
13–15 May 2014

UNESCO

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Paris, 20 May 2014
English only[1]

[1]The Executive Summary is available in English, French, Spanish and Russian.

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Executive summary

The Ninth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS-IX) was held in St Thomas, US Virgin Islands, from 13 to 15 May 2014, hosted by the Virgin Islands Territorial Emergency Management Agency (VITEMA). The meeting was attended by 56 participants from 15 Caribbean countries and territories and 5 organizations: Caribbean Tsunami Information Center (CTIC), Science Applications International Corporation (SACI), Puerto Rico Seismic Network (PRSN), UNAVCO, Inc., and the University of the West Indies Seismic Research Centre (SRC);

The ICG recognised as achievements in 2013-2014 the launching of the Caribbean Tsunami Information Center (CTIC), established in Barbados; the successful Exercise Caribe Wave/Lantex 14 held on 26 March 2014, with 47 of the 48 MS and territories participating and almost 200,000 people signing up for, more than four times the participation from 2013;

The ICG further recognised the increased number of communities receiving the TsunamiReady recognition in the region, including two territory wide recognitions, one of them in the framework of the NWS NOAA-UNESCO/IOC TsunamiReady pilot project;

The ICG endorsed the continuation of the work of the Task Team on Performance Based Tsunami Recognition Programme;

The ICG recommended continued implementation of the NWS NOAA-UNESCO/IOC TsunamiReady pilot project to support the development and validation of the CARIBE-EWS Performance Based Tsunami Community Recognition Programme.

The ICG acknowledged the offer of the Puerto Rico Seismic Network (PRSN) to organize and host in collaboration with the Caribbean Tsunami Warning Programme (CTWP) the next "Caribbean Training Course for Operators of Sea Level Stations" and connected Working Group 1 meeting on sea-level matters;

The ICG acknowledged the designation of several regional GPS data centres in support of CoCoNet project and agreed with the CoCoNet offer to install two permanent GPS on existing tide gauges and its selection of site choices for two new tide gauges (Yucatan and Jamaica);

The ICG decided to create a Task Team to describe tsunami services as part of the Caribbean Tsunami Warning System, including the current capabilities, required information, products, and services **and instructed it** to propose a system model to serve as a guideline towards a fully functional Caribbean Tsunami Warning System;

The ICG recommended that a joint Exercise Caribe Wave/Lantex 15 takes place on 25 March 2015, with two hypothetical scenarios: An earthquake located offshore eastern Panama, and a submarine landslide off the East coast of the United States of America;

The ICG recommended continuing the development of PTWC's enhanced products for the CARIBE-EWS for full implementation at a future date and **requested** PTWC to issue experimentally the proposed enhanced products by email or by other secure means only to designated TWFPs in parallel with the existing products beginning in the first quarter of 2015;

The ICG approved new Terms of Reference for Working Group 3 on Tsunami Services and **defined** that it will focus on the warning guidance, dissemination and communication of tsunami products;

The ICG accepted the offer from Sint Maarten to host the Tenth Session of ICG/CARIBE-EWS in 2015 and **noted** the offer of Colombia to host the Eleventh Session in 2016.

Résumé exécutif

La neuvième session du Groupe intergouvernemental de coordination du Système d'alerte aux tsunamis et autres risques côtiers dans la mer des Caraïbes et les régions adjacentes (GIC/CARIBE-EWS-IX), organisée par la *Virgin Islands Territorial Emergency Management Agency* (VITEMA, Agence territoriale de gestion des situations d'urgence des îles Vierges), s'est tenue à Saint-Thomas (Îles Vierges américaines), du 13 au 15 mai 2014. Elle a réuni 56 participants de 15 pays et territoires des Caraïbes ainsi que 5 organisations : le Centre d'information sur les tsunamis dans les Caraïbes (CTIC), la Science Applications International Corporation (SAIC), le Réseau sismique de Porto Rico (PRSN), l'UNAVCO, et le Centre de recherches sismiques (SRC) de l'Université des Indes occidentales.

Le GIC a salué, entre autres réalisations de 2013-2014, le lancement du Centre d'information sur les tsunamis dans les Caraïbes (CTIC), créé à la Barbade ; ainsi que la réussite de l'exercice Caribe Wave/Lantex 2014, effectué le 26 mars 2014, avec la participation de 47 des 48 États membres et territoires et l'inscription de près de 200 000 personnes, soit une participation plus de quatre fois supérieure à celle de 2013 ;

Le GIC a également salué l'augmentation du nombre de communautés auxquelles la reconnaissance TsunamiReady a été accordée dans la région, y compris deux reconnaissances à l'échelle d'un territoire, dont une dans le cadre du projet pilote TsunamiReady mené par le NWS/NOAA et la COI/UNESCO ;

Le GIC a approuvé la poursuite des travaux de l'équipe spéciale chargée du programme de reconnaissance des tsunamis fondée sur la performance ;

Le GIC a recommandé de poursuivre la mise en œuvre du projet pilote TsunamiReady mené par le NWS/NOAA et la COI/UNESCO ;

Le GIC a pris acte de l'offre du Réseau sismique de Porto Rico (PRSN) d'organiser et d'accueillir, en collaboration avec le Programme d'alerte aux tsunamis dans les Caraïbes (CTWP), le prochain stage de formation des opérateurs de stations d'observation du niveau de la mer aux Caraïbes ainsi que la réunion connexe du groupe de travail 1 sur les questions relatives au niveau de la mer ;

Le GIC a salué la désignation de plusieurs centres régionaux de données GPS à l'appui du projet CoCoNet, et **a approuvé** la proposition du projet CoCoNet d'installer deux GPS permanents sur les marégraphes existants ainsi que sa sélection de sites pour la mise en place de deux nouveaux marégraphes (Yucatan et Jamaïque) ;

Le GIC a décidé de créer une équipe spéciale chargée de décrire les services relatifs aux tsunamis dans le cadre du Système d'alerte aux tsunamis dans les Caraïbes, y compris les capacités actuelles, les informations requises, les produits et les services, **et lui a donné pour instruction** de proposer un modèle de système qui permette d'orienter le Système d'alerte aux tsunamis dans les Caraïbes afin qu'il soit pleinement fonctionnel ;

Le GIC a recommandé que l'exercice conjoint Caribe Wave/Lantex 15 ait lieu le 25 mars 2015, suivant deux scénarios hypothétiques : un séisme situé au large du Panama oriental, et un glissement de terrain sous-marin au large de la côte Est des États-Unis ;

Le GIC a recommandé de poursuivre l'élaboration de produits améliorés du PTWC destinés au CARIBE-EWS en vue d'une pleine application à une date ultérieure, et **a prié** le PTWC de diffuser à titre expérimental, par courrier électronique ou autre moyen sécurisé, les produits améliorés proposés à l'intention exclusive des TWFP désignés, parallèlement aux produits existants, à partir du premier trimestre de 2015 ;

Le GIC a approuvé le nouveau mandat du groupe de travail 3 sur les services liés aux tsunamis, et **a indiqué** que celui-ci concentrerait ses efforts sur le conseil en matière d'alerte ainsi que sur la diffusion et la communication de produits relatifs aux tsunamis ;

Le GIC a accepté la proposition de Sint Maarten d'accueillir la 10e session du GIC/CARIBE-EWS en 2015, et **a pris note** de la proposition de la Colombie d'accueillir la 11e session en 2016.

Resumen dispositivo

La novena reunión del Grupo Intergubernamental de Coordinación (ICG) del Sistema de Alerta contra los Tsunamis y otras Amenazas Costeras en el Caribe y Regiones Adyacentes (ICG/CARIBE-EWS-IX), cuyo anfitrión fue la entidad denominada Virgin Islands Territorial Emergency Management Agency (VITEMA), se celebró en Saint Thomas (Islas Vírgenes de los Estados Unidos) del 13 al 15 de mayo de 2014. Asistieron a la reunión 56 participantes de 15 países y territorios del Caribe y 5 organizaciones: el Centro de Información sobre los Tsunamis en el Caribe (CTIC), Science Applications International Corporation (SACI), la Red Sísmica de Puerto Rico (PRSN), UNAVCO, Inc., y el Centro de investigaciones sísmicas de la Universidad de las Indias Occidentales.

El ICG reconoció como logros conseguidos en 2013-2014 la puesta en marcha del Centro de Información sobre los Tsunamis en el Caribe (CTIC), con sede en Barbados, así como la realización con éxito del ejercicio regional de alerta contra tsunamis (CARIBE WAVE/LANTEX 14) el 26 de marzo de 2014, con la participación de 47 de los 48 Estados Miembros y territorios y casi 200.000 personas inscritas, multiplicando más de cuatro veces la participación de 2013.

El ICG reconoció asimismo el creciente número de comunidades que reciben el reconocimiento “Tsunami Ready” (“Preparados para el tsunami”) en la región, comprendidos dos reconocimientos de territorios, uno de ellos en el marco del proyecto piloto "TsunamiReady" del Servicio Meteorológico Nacional (NWS) de la Administración Nacional Oceánica y Atmosférica de los Estados Unidos de América (NOAA) y la COI de la UNESCO.

El ICG respaldó la continuación de la labor del Equipo de Trabajo sobre el programa de reconocimiento de tsunamis basado en el desempeño.

El ICG recomendó seguir ejecutando el proyecto piloto "TsunamiReady" del NWS de la NOAA y la COI de la UNESCO, a fin de apoyar el desarrollo y la validación del programa comunitario del CARIBE-EWS de reconocimiento de tsunamis basado en el desempeño.

El ICG agradeció el ofrecimiento de la Red Sísmica de Puerto Rico (PRSN) de organizar y acoger, en colaboración con el Programa de Alerta contra los Tsunamis en el Caribe (CTWP), el próximo "curso caribeño de formación para operadores de estaciones de medición del nivel del mar" y la reunión conexa del Grupo de Trabajo 1 sobre asuntos relativos al nivel del mar.

El ICG reconoció la designación de varios centros regionales de datos GPS en apoyo al proyecto COCONet y aceptó el ofrecimiento de COCONet de instalar dos GPS permanentes en mareómetros existentes, así como su selección de emplazamientos para dos nuevos mareómetros (Yucatán y Jamaica).

El ICG decidió crear un equipo de trabajo encargado de exponer los servicios relativos a tsunamis como parte del Sistema de Alerta contra los Tsunamis en el Caribe, indicando las capacidades actuales, la información que se requiere, los productos y los servicios, y le **encargó** que propusiera un modelo de sistema que sirviera de orientación con miras a un Sistema de Alerta contra los Tsunamis en el Caribe plenamente operativo.

El ICG recomendó que se llevara a cabo el 25 de marzo de 2015 un ejercicio conjunto de alerta contra tsunamis (CARIBE WAVE/LANTEX 15), con dos situaciones hipotéticas: un terremoto situado en alta mar frente a las costas orientales de Panamá y un desprendimiento de tierras submarinas frente al litoral oriental de los Estados Unidos de América.

El ICG recomendó que se siguieran elaborando productos mejorados del PTWC para el CARIBE-EWS con miras a su plena aplicación en una fecha futura y **pidió** al PTWC que transmitiera experimentalmente los productos mejorados propuestos por correo electrónico o por otros medios seguros únicamente a los TWFP designados, junto con los productos existentes, a partir del primer trimestre de 2015.

El ICG aprobó el nuevo mandato del Grupo de Trabajo 3 sobre servicios relativos a los tsunamis y **decidió** que éste se centraría en la orientación para las alertas, la difusión y comunicación de productos relativos a los tsunamis.

El ICG aceptó el ofrecimiento de San Martín de acoger la 10ª reunión del ICG/CARIBE-EWS en 2015 y **tomó nota** del ofrecimiento de Colombia de acoger la 11ª reunión en 2016.

Рабочее резюме

Девятая сессия Межправительственной координационной группы по Системе предупреждения о цунами и опасности других бедствий в прибрежных районах Карибского бассейна и прилегающих регионов (МКГ/КАРИБ-СРП-IX) проходила на о. Сент-Томас, Виргинские острова Соединенных Штатов, с 13 по 15 мая 2014 г. по приглашению территориального агентства по чрезвычайным ситуациям Виргинских островов (ВИТЕМА). На совещании присутствовало 56 участников из 15 стран и территорий Карибского бассейна, а также представители следующих пяти организаций: Карибский центр информации о цунами (КЦИЦ), Международная корпорация по практическому применению научных знаний (МКПН), Сейсмическая сеть Пуэрто-Рико (ССПР), «Консорциум UNAVCO» и Центр сейсмических исследований Вест-Индского университета (ЦСИ).

МКГ признала в качестве достижений 2013-2014 гг. открытие в Барбадосе Карибского центра информации о цунами (КЦИЦ) и успешное проведение 26 марта 2014 г. совместных учений «Карибская волна/ЛАНТЕКС», участие в которых приняли 47 из 48 государств-членов и территорий региона, а также почти 200 тыс. человек, что более чем в четыре раза превышает показатели участия в 2013 г.

МКГ приветствовала увеличение числа местных сообществ в регионе, признанных подготовленными к цунами, включая две территории целиком, одна из которых приняла участие в совместном пилотном проекте НВС НОАА-ЮНЕСКО/МОК «TsunamiReady» («К цунами готов»).

МКГ одобрила продолжение работы Целевой группы по Программе сертификации готовности к цунами на основе показателей эффективности.

МКГ рекомендовала продолжить осуществление пилотного проекта НВС НОАА-ЮНЕСКО/МОК «TsunamiReady» в целях содействия развитию и признанию Программы сертификации готовности к цунами на основе показателей эффективности КАРИБ-СРП.

МКГ подтвердила получение от Сейсмической сети Пуэрто-Рико (ССПР) предложения организовать и принять у себя совместно с Карибским центром информации о цунами (КЦИЦ) следующий «Учебный курс для операторов станций измерения уровня моря в Карибском бассейне» и **информировала** об этом участников совещания Рабочей группы I по вопросам, связанным с уровнем моря.

МКГ подтвердила, что определила несколько региональных центров данных GPS для оказания содействия в рамках проекта КОКОНет, и **согласилась** с предложением КОКОНет установить два постоянных GPS-передатчика на уже функционирующие мареографы, а также с предложенными вариантами размещения двух новых мареографов (Юкатан и Ямайка).

МКГ постановила сформировать целевую группу для подготовки документа о связанных с цунами услугах как части Системы предупреждения о цунами в Карибском бассейне, включая описание существующих возможностей, необходимой информации, продуктов и услуг, а также поручить этой группе представить предложения в отношении типовой модели системы, которая служила бы ориентиром для создания полнофункциональной Системы предупреждения о цунами в Карибском бассейне.

МКГ рекомендовала провести совместные учения «Карибская волна/ЛАНТЕКС-15» 25 марта 2015 г. с использованием двух гипотетических сценариев: подводное

землетрясение к востоку от Панамы и подводный оползень у восточного побережья Соединенных Штатов Америки.

МКГ рекомендовала продолжить разработку Центром предупреждения о цунами в Тихом океане (ЦПЦТО) усовершенствованных продуктов для КАРИБ-СРП в целях полного внедрения в перспективе, а также **просила** ЦПЦТО начать на экспериментальной основе в первом квартале 2015 г. выпуск предлагаемых усовершенствованных продуктов путем рассылки их по электронной почте или иным надежным способом исключительно установленному кругу координаторов по предупреждению о цунами (КПЦ) одновременно с существующими продуктами.

МКГ утвердила новый Круг ведения Рабочей группы III (Услуги по цунами) и **определила**, что группа сосредоточит свое внимание на работе над руководством по предупреждению о цунами, а также на распространении и коммуникационном обеспечении продуктов по цунами.

МКГ согласилась с предложением Синт-Маартена принять у себя десятую сессию МКГ/КАРИБ-СРП в 2015 г. и **приняла к сведению** предложение Колумбии стать организатором одиннадцатой сессии МКГ/КАРИБ-СРП в 2016 г

1. WELCOME AND OPENING OF SESSION

1 The Ninth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS-IX) was held in Saint Thomas, US Virgin Islands, from 13 to 15 May 2014, hosted by the Virgin Islands Territorial Emergency Management Agency (VITEMA).

2 The Session was opened on Tuesday, 13 May 2014 under the Chairmanship of Ms Christa von Hillebrandt-Andrade (USA), Chair of the ICG/CARIBE-EWS.

3 Mr Bernardo Aliaga, Technical Secretary of the ICG/CARIBE-EWS and representative of the Intergovernmental Oceanographic Commission (IOC), briefly addressed the meeting on behalf of Ms Wendy Watson-Wright, Assistant Director General of UNESCO and Executive Secretary of IOC. He recalled that the main objective of a tsunami warning system is to identify and mitigate the hazards posed by tsunamis, targeting integrated end-to-end warning systems including hazard detection and forecasting; threat evaluation and alert dissemination; and community preparedness and response. He highlighted how important are Standard Operating Procedures (SOPs) at National Tsunami Warning Centres (NTWCs) and at Disaster Management Organizations for a successful system. He expressed the appreciation of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and its IOC to the Government of the US Virgin Islands for hosting the meeting.

4 Ms Christa von Hillebrandt-Andrade, Chair of the ICG/CARIBE-EWS, specially recognized the work of the Director of VITEMA, BG Elton Lewis, and his team, towards the successful organization of this Ninth Session. She recalled that almost 20 years ago, the US Virgin Island scientist, Roy Watlington, hosted in St. John the first gathering of Caribbean scientists to discuss the tsunami threat and planted the seed for what has become the ICG/CARIBE-EWS.

5 She indicated that since previous session held in Port of Spain, Trinidad and Tobago, from 29 April to 1 May 2013 (ICG/CARIBE-EWS-VIII), the Group has definitely continued to work with passion and diligence in the region to advance a Tsunami and Other Coastal Hazards Warning System.

6 She highlighted the following achievements in 2013–2014: The launching of the Caribbean Tsunami Information Center (CTIC), established in Barbados with the hiring of its interim director, Ms Alison Brome; and the successful of *Exercise Caribe Wave/Lantex 14* (IOC/2013/TS/109VOL.1) held on March 26 2014 with 47 of the 48 Member States (MS) and territories participating and almost 200,000 people signed up for, more than four times the amount from 2013. Also, since last year there are 20 more TsunamiReady communities in Puerto Rico and the US and British Virgin Islands, including two territory wide recognitions. In the area of observing systems, she indicated that over 100 seismic stations and 60 sea-level stations from around the region are contributing their data so the tsunami warning centres can provide the fastest and most reliable tsunami services. In addition, a Caribbean wide GPS network which holds promises for enhanced tsunami warning systems is almost fully implemented. In the area of preparedness and response, there are now over 50 evacuation maps in the region, however most countries do not have tsunami hazard maps, nor do they have evacuation maps. She concluded by calling the representatives of Member States to make progress on how can we best protect our residents, visitors and economies from these infrequent but deadly waves that will one day strike again our shores.

7 The opening ceremony included delivery of certificates containing formal recognition as TsunamiReady Jurisdictions to the US Virgin Islands and British Virgin Islands (UK). Mr Michael Angove, Manager of the Tsunami Programme of the National Weather Service (NWS) of the United States of America, provided background information on the US

TsunamiReady programme and its implementation in the US Virgin Islands, and as well as on the US support of extending the programme internationally as a Pilot Project with IOC. Following his introduction, certificates were delivered to Ms Sharlene DaBreo, Director of the Department of Disaster Management (DDM) of British Virgin Islands, and to the Governor of US Virgin Islands, Hon. P. de Jongh.

8 Ms Christa von Hillebrandt-Andrade presented to Professor Watlington, University of West Indies (UWI), a Tsunami Champion certificate.

9 Governor John P. de Jongh, United States Virgin Islands, accepted the recognition and provided remarks on the relevance of the work of the Intergovernmental Coordination Group (ICG). He especially recognized the British Virgin Islands for their award for TsunamiReady and also to his team, Virgin Islands Emergency Management Agency (VITEMA), for having followed the lead of Anguilla and Puerto Rico in making sure that everything possible is done to protect the communities. He expressed that one of the most interesting things about living on an island is that you are lulled by the beauty of the seas and hills, impassioned by the attitudes of people, by the tourists that come to visit, and just by the serenity of the area. But deep within all of that are risks and are hazards that each of us, as policymakers, recognize we have to deal with every day. He highlighted that the 15 countries meeting in St Thomas clearly understand this ever present danger. They also recognize that all present have a responsibility, whether as elected officials or whether as appointed officials, to be ready and prepared for what will come in the direst of times, and when people are least anticipating disaster.

10 Gov. de Jongh wished the Delegates the very best for the conference, thanked them for coming to St. Thomas, US Virgin Islands, and declared the Session open.

11 The addresses of Ms Christa von Hillebrandt-Andrade and Governor John P. de Jongh are included in full under ANNEX III.

2. ORGANIZATION OF THE SESSION

2.1. ADOPTION OF AGENDA

12 The Chairperson informed the Plenary that the agenda was prepared by the Secretariat and the Chair taking into account the Recommendations and instructions given at ICG/CARIBE EWS-VIII, as well as the relevant parts of the IOC Rules of Procedures.

13 The agenda was approved as presented.

2.2. DESIGNATION OF THE RAPPORTEUR

14 The Chairperson requested Delegates to propose candidates for rapporteur of the meeting. As customary, the meeting was requested to choose one rapporteur for each of the three languages of the meeting.

15 The Chair informed the Session that, as per established practices for subsidiary bodies, only the Decisions and Recommendations receive line by line approval of the report.

16 Mr Stephen Hall (UK) volunteered for English, France proposed Mr Gregory Jabol for French, and Venezuela proposed Ms Gloria Romero for Spanish.

17 The **ICG approved** the proposals and **thanked** UK, France and Venezuela for providing rapporteurs.

2.3. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

18 The Chairperson noted that interpretation was available in English, French, and Spanish. She informed the Plenary that, in order to facilitate the proceedings of the meeting, a timetable had been prepared by the Secretariat in coordination with the Chair and the local organizing committee. At this point, she offered the floor to the local host to provide logistic details about the welcome dinner, lunch, and the logistics for working groups, Plenary and Secretariat. BG (Ret) Elton Lewis, on behalf of the host organizing committee, provided detailed logistic information.

19 Ms Hillebrandt requested the Secretariat to introduce the documentation for the meeting. On behalf of the Secretariat, Mr Aliaga explained that due to financial constraints the documentation is available only in English and posted to the meeting website. Only the provisional agenda, provisional timetable, provisional list of participants had been printed. Mr Aliaga asked Delegates to check the participant's provisional list and confirm details to the Secretariat.

20 In order to smooth the work of the Session and facilitate the generation of recommendations and agreements, the Plenary **decided** to set up the following intrasessionnal Working Groups and Committees to address some of the major issues addressed at the meeting:

- Enhanced PTWC Products and Monitoring and Detection Systems, Co-Chairs: Dr Chip McCreery (USA) and Mr Jean Marie Saurel (France)
- CTIC (Work Plan 2014-2016) and Tsunami Recognition Programme, Co-Chairs: Mr Kerry Hinds (Barbados) and Ms Alison Brome (CTIC Director a.i.)
- Caribe Wave/Lantex 15, Co-Chairs: Dr Victor Huerfano (PRSN) and Ms Christa von Hillebrandt-Andrade (CTWP)
- Recommendations Committee, Chair Ms Jennifer Lewis (USA)
- Elections Committee, Chair Mr Pedzi Gregori (Curacao).

21 The Chair requested Working Groups to produce a recommendation for approval by the ICG or re-draft the ones presented by the intersessional Working Groups, as needed.

22 Ms Hillebrandt suggested that while in plenary the time used to reporting be reduced as much as possible to concentrate on the exchange of views and decisions on policy matters. The Plenary **decided** that national reports be delivered without PowerPoint presentations, and instead be provided to the Secretariat for posting to the meeting website.

23 The timetable **was approved** as is.

3. REPORT ON INTERSESSIONAL ACTIVITIES

3.1. REPORT OF THE EXECUTIVE SECRETARY OF IOC

24 The Technical Secretary for ICG/CARIBE EWS, Mr Bernardo Aliaga, presented the report of the Executive Secretary of IOC, indicating that since the last session of ICG/CARIBE-EWS we have continued to see steady progress for the tsunami programme despite the strained financial situation. Tsunami warning exercises have been carried out in the Caribbean Sea and in the Pacific Ocean. Portugal and Italy have announced that their

national tsunami warning centres will be operational in early 2014, and they will be ready to act as candidate Tsunami Watch Providers (TWPs) for the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAM) region. New tsunami warning products will be available in the Pacific in 2014, scheduled to officially commence on 1 October 2014, and South China Sea Tsunami Advisory Center (SCSTAC) continues to advance as part of the Pacific Tsunami Warning and Mitigation System (PTWS).

25 Mr Aliaga reported that funding of the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) at the level of 600,000 USD was committed to tsunami hazard assessment in the Indian Ocean and to collecting eyewitness accounts and other information about the 1945 tsunami in the NW Indian Ocean (Makran area). Australia renewed it support for two years to the Indian Ocean Tsunami Warning and Mitigation System (IOTWS) Secretariat; the European Commission Directorate General Humanitarian Aid Office (EU DG ECHO) will support the coordination of Exercise NEAMWAVE 14; and the Jakarta UNESCO Office through the Indian Ocean Tsunami Information Centre (IOTIC) has recently managed to attract some support from the Indonesian and Malaysian Funds in Trust.

26 With respect to the Caribbean, Mr Aliaga recalled the steady growth of the number of operational sea-level stations, with six stations recently installed through funds by the IOC. As well as previously reported, the Tsunami Unit (TSU) managed to get a special contribution of 130,000 USD from the UNESCO Emergency Fund towards the establishment of the Caribbean Tsunami Information Centre (CTIC). Through extrabudgetary projects and partnerships, the Unit has also maintained activities related toward awareness and preparedness, among others with EU DG ECHO support towards tsunami preparedness in Haiti and Dominican Republic.

27 He reported that the EU DG ECHO funded projects in Dominican Republic and Haiti will improve the scientific knowledge on the effects of the 1946 tsunami event in the North of the Hispaniola Island, and will provide a solid base to evaluate tsunami inundation in Northern Hispaniola. It has already provided a detailed technical report on earthquake and tsunami scenarios for Northern Hispaniola with the assistance of knowledgeable experts. It is also providing school manuals approved by the Ministry of Education in Dominican Republic (MINERD).

28 Regarding the Tsunami Programme, he indicated that UNESCO and its IOC has managed to keep a fair level of coordination, extrabudgetary funding, training activities, and publications flowing, despite the financial shortages. While all the activities sound like things are just going well, the past two years the situation has been very challenging to manage. The Unit has lost a number of staff over the last two years and, at the present time, it has many temporary staff and is critically dependent on extrabudgetary funds.

29 For the short-term future, Mr Aliaga pointed to several high level and/or high visibility events that may require the coordinated presence of the CARIBE-EWS Member States, including the 10 year commemoration of the Indian Ocean tsunami, the 50th Anniversary of the Pacific Tsunami Warning System in 2015, and the 3rd UNISDR World Conference on Disaster Risk Reduction (Sendai, Japan, 14−18 March 2015).

30 Haiti thanked the report of the Executive Secretary and inquired about the paleotsunami and inundation studies to be completed in Haiti and Dominican Republic. Mr Aliaga replied that the tsunami inundation study is on track and assigned to one of the four bidder companies. With respect to the paleotsunami study, he indicated that despite two calls for proposals no candidates had been retained and the study might be cancelled.

31 The Chairperson asked to extend to the Executive Secretary the recognition of the Member States for the support of UNESCO/IOC to the ICG/CARIBE-EWS, and especially necessary for securing funding for the Caribbean Tsunami Information Center.

32 The **ICG noted** the report of the Executive Secretary.

3.2. CHAIRMAN'S REPORT

33 The Chairperson of ICG/CARIBE EWS, Ms Christa von Hillebrandt-Andrade, reported that the intersessional 2013−2014 period was extremely busy as the ICG continue to strengthen and promote the Tsunamis and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions. Between the two sessions she sought to provide guidance and support to all focus areas of the CARIBE-EWS: Monitoring and Detection, Tsunami Hazard, Communications and Preparedness, Readiness and Resilience in coordination with Secretariat, CTIC, Officers and Member States. She represented the ICG at several intergovernmental, international and national meetings and activities, like the 27th Session of the IOC Assembly held from 26 June to 5 July 2013 in Paris, France (IOC-XXVII); the Tenth Session of ICG/NEAMTWS (ICG/NEAMTWS-X) held from 19 to 21 November 2013 in Rome, Italy; the CTIC activities, including its launch in Barbados; and UNESCO IOC/TOWS-WG-VII. She also participated as a trainer at workshops, many focusing on Standard Operations Procedures (SOPs). She was invited to write a perspective on the Caribbean Tsunami Warning System which was published under the title *Minimizing Caribbean Tsunami Risk* in Science on 30 August 30 2013. She appreciated the opportunity she had to visit several Member States and Territories to see first-hand their operations and especially recognized the support and hospitality of the governments of US Virgin Islands, Dominican Republic, Colombia, Barbados, Mexico, British Virgin Islands and IOC Tsunami Unit in Paris, France, for the corresponding invitations. She highlighted the commitment of the colleagues and institutions in the strengthening of the tsunami warning system. As part of the preparation and follow-up to Caribe Wave/Lantex 14, she had the opportunity to also speak with many of the Tsunami Warning Focal Points (TWFPs) and Tsunami National Contacts (TNCs) and appreciated these exchanges.

34 Ms Hillebrandt indicated that compared to other ICGs the ICG/CARIBE-EWS has the highest percentage of Member States with designated Tsunami National Contacts and Tsunami Warning Focal Points (45/48 for a 94%). Nevertheless, there are still 2 Member States and 1 Territory which are still in the process of making these designations. During her visit to Paris to assist to the Seventh meeting of Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-VII), Ms Hillebrandt visited the Delegations of Brazil, Cuba and UK at UNESCO Headquarters to encourage them to make the corresponding designations and followed up through emails and phone calls. Two of the three countries did participate at the Exercise Caribe Wave/Lantex 14 (IOC/2013/TS/109VOL.1), which is good progress.

35 The Chairperson reported that regular contact was maintained with the Officers, the Secretariat, CTIC, Working Groups and Task Teams through meetings, conference calls, webinars and email correspondence. She expressed her thanks for its continual support of the Puerto Rico Seismic Network (PRSN), Puerto Rico Emergency Management Agency (PREMA) and the Technical Secretary in Paris. She also recognized the key support of National Oceanic and Atmospheric Administration (NOAA) and the TsunamiReady Program developed by the National Weather Service (NWS) of United States of America for the approval of time, effort, and funding to carry out her duties as Chair.

36 The **ICG noted** the report of the Chairperson.

3.3. ICG/CARIBE-EWS SECRETARIAT REPORT

37 The Technical Secretary for ICG/CARIBE-EWS, Mr Bernardo Aliaga, presented the report of the Secretariat. He focused on the status of nominations of Tsunami Warning Focal Points (TWFPs) and Tsunami National Contacts (TNCs). The full list of TWFPs and TNCs for the ICG was distributed to the Delegates and comments and corrections were collected by the Secretariat during the Session.

38 The **ICG noted** the report of the ICG/CARIBE-EWS Secretariat.

3.4. REPORT OF THE CARIBBEAN TSUNAMI INFORMATION CENTER (CTIC)

39 The Interim Director of CTIC, Ms Alison Brome, introduced this item. She noted that CTIC was formally established on 2 September 2013 at the Department of Emergency Management (DEM) of Barbados as a partnership initiative between the Government of Barbados and UNESCO/IOC. This process was supported by the Enhancing Resilience to Reduce Vulnerability in the Caribbean (ERC) Project, funded by the Government of Italy and implemented by United Nations Development Programme (UNDP) sub-regional office for Barbados and the Organization of Eastern Caribbean States (OECS). Ms Brome further noted that the partnership was formalised through a Memorandum of Understanding (MOU) and Implementing Partners Agreements (IPAs) between the parties.

40 CTIC expenditure over the period May 2013–April 2014 sourced by UNDP and UNESCO/IOC was 324,645.13 USD. Key CTIC-related results achieved during this period include the convening of 3 workshops on the development of Standard Operating Procedures (SOPs), the meetings of the Exercise Caribe Wave/Lantex 14 and Tsunami Recognition Programme Task Teams, CTIC Launch Ceremony, CTIC Board Meeting and supporting Exercise Caribe Wave/Lantex 2014. Other critical achievements included the finalisation, printing and distribution of the tsunami brochure and flyer *Understanding tsunamis: a guide for the Caribbean and Adjacent Regions (IOC/BRO/2012/6)*, and the document *Tsunami Public Awareness and Education Strategy for the Caribbean and Adjacent Regions* (IOC/2013/TS/107 REV.), the development of the draft CTIC Business, Sustainability Plan 2014–2019 (ICG/CARIBE-EWS-IX/8), and the partnering with UNDP and the Caribbean Disaster Emergency Management Agency (CDEMA) in the implementation of supporting initiatives.

41 Key considerations and challenges reported by CTIC were: limited human resource capacity and resource mobilisation. With respect to human resources, Ms Brome noted that the dedicated staff available to CTIC is only the Interim Director and this has resulted in the revision of the CTIC work plan and a concentration by the Interim Director on the execution of activities and associated logistical tasks with limited emphasis on reporting, resource mobilisation, and partnership building, which has implications for the management and sustainability of the CTIC. On resource mobilisation, she noted that limited resources are available to execute the activities of the CTIC beyond September 2014.

42 Contingencies identified by the Interim Director to address the human resource constraints included the pursuit of interns and continued lobbying of ICG/CARIBE-EWS Member States for the provision of in-kind assistance to support the work of the CTIC though secondments and other mechanisms. In relation to the resource mobilisation challenges, the CTIC will continue the preparation and submission of concept and project proposals to donor agencies, pursuit of formal partnership agreements with key regional technical agencies including in order to maximise and harmonise financial resources, and continued lobbying of ICG/CARIBE-EWS Member States to make annual financial contributions to the IOC Special

Account, support specific CTIC activities, and identify potential sources of funding within the donor community.

43 The **ICG noted** the report of CTIC.

44 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.1

3.5. REPORTS FROM UN AND NON UN ORGANIZATIONS

45 Dr Victor Huerfano, Director (a.i.) of the Puerto Rico Seismic Network (PRSN), provided a brief introduction to the activities of PRSN in support of the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions, including through instrumentation and observing networks as well as hosting of meetings and trainings.

46 After his intervention, the Delegation of Venezuela highlighted the positive work performed by PRSN and confirmed continued cooperation with FUNVISIS (Fundación Venezolana de Investigaciones Sismológicas). It also highlighted that social media is a useful tool that can be put to the service of preparedness and awareness. The British Virgin Islands (UK) also thanked PRSN for their support and expressed appreciation of the help provided.

47 Dr Frédéric Dondin, on behalf of the Seismic Research Center (SRC) indicated that its activity regarding the study of tsunami as a hazard for the Caribbean region focus on 3 axes: an Education and Outreach Programme (E&O), a monitoring contribution using its established seismic network, and a research programme based on the evaluation of tsunami hazards for the Lesser Antilles islands for specific scenarios.

48 The E&O 2013 and 2014 activity related to the topic of tsunami at SRC has been focusing on the Tsunami Smart Programme, a tsunami public awareness activity aiming school communities. The SRC's E&O team (Ms Stacey Edwards and Mr Clevon Ash) ran the programme in Barbados via workshop activity for both primary schools teachers and students. Both groups knowledge on tsunami were tested at the end of each workshop. The Tsunami Smart Programme was performed with the help of the Department of Emergency Management (DEM) as training for the Exercise Caribe Wave/Lantex 14. Along with the Tsunami Smart Programme, Dr Joan Latchman, seismologist, did a public seminar on earthquake tsunamis, and the Coastal Zone Management Unit of Barbados (CZMU) hosted a lecture seminar on submarine landslide-generated tsunami at current Kick 'em Jenny volcano: analysis of scenarios and impact on Barbados island. Meetings with the CTIC Director and interviews with the local media were organized as well. The next Tsunami Smart Programme is scheduled in July 2014 in Saint Kitts.

49 The monitoring activity of earthquakes and their potential tsunami effect continue to be improved by SRC constant enhancement of its seismic network. As from 2013, SRC's seismic network includes two full ranges stations (broadband seismometers, cGPS[continuous Global Positioning System], and strong motion accelerometers) installed in Antigua and Carriacou (Grenadines). These instruments were funded by INTERREG IV programme. Additional instruments such as an extra broadband seismometer (Trinidad) funded by the University of the West Indies (UWI), intermediate period seismometers & strong motion accelerometers (Nevis, St. Lucia, Trinidad - funded by the Caribbean Catastrophe Risk Insurance Facility [CCRIF] and/or UWI) have been installed in St Kitts and Grenada (CCRF funded instrument) and also in Trinidad. In addition 4 extra strong motion accelerometers have been installed in Trinidad but experience some issues in term of data transfer due to internet issues.

50 The research activity of the SRC is currently lead by Dr Frederic Dondin, a research fellow in physical volcanology. Dr Dondin aims to assess the potential tsunami hazards related to potential unstable sector(s) of the current Kick'em Jenny submarine volcano (Grenada). The study was able to provide first order models of sliding surface based on a relative slope stability analysis following the method presented by Borselli et al. 2011. Such models were used to estimate the volume of potential instability. Numerical simulations of the tsunami source were performed using the St. Venant equation-based model VolcFlow (Kelfoun et al. 2010). These source models were used as inputs for FUNWAVE 2-TVD (Boussinesq equation-based model; Shi et al. 2012) model in order to assess the tsunamigenic hazards off the coast of Barbados and Trinidad. Only 1st order models were generated due to the lack of high resolution shallow bathymetric data for these islands. No risk assessment could be achieved for the coastal areas of these islands.

51 The Chair Ms Hillebrandt highlighted two issues: the first being the absence of funding available for hazard assessment, and the second the lack of bathymetric information with adequate resolution for tsunami modelling.

52 France thanked SRC for their continued cooperation on seismic monitoring. PRSN reported that sea-level stations in Trinidad & Tobago are now transmitting every 10 minutes (previously every hour).

53 France indicated that inaccurate information about tsunami threat affects the awareness raising and public education efforts. Haiti also suggested that something should be done to counter misleading information.

54 Dr Karl Feaux on behalf of the UNAVCO Inc.provided an update on the status of UNAVCO-managed community networks in the Caribbean region and Mexico. The Continuously Operating Caribbean GPS Observational Network (CoCoNET) is scheduled for completion in FY2015. When completed, the network will produce high-quality, low-latency data and data products from 80 new and refurbished continuously operating GPS/meteorological stations, (cGPS-MET) in the Caribbean region, as well as, bring data into the CoCoNET data archive from over 60 existing GPS stations in the region. To date, 52 new and refurbished cGPS-MET stations have been installed as part of CoCoNET. In the next few weeks, UNAVCO will work with colleagues at the Grupo de Óptica Atmosférica (GOAC) de Camagüey to install a cGPS-MET station in Camagüey, Cuba.

55 UNAVCO will also install two new tide gauge stations as part of the COCONet project.The tide gauge stations will consist of a radar level recorder, pressure sensor, GPS instruments (one on the pier and one within 5 kilometres of the pier), and a meteorological instrument. UNAVCO has worked with colleagues at NOAA, the University of Hawaii, the Puerto Rico Seismic Network, and other Caribbean tide gauge network operators to find the best targets for collocation to augment the current network. Currently, Puerto Morelos, Mexico and Port Royal, Jamaica, are two proposed locations for deployment of the tide gauge instruments.

56 The CoCoNET project seeks applicants for a second round of graduate research fellowships starting in August or September 2014. The CoCoNET Graduate Fellowships will provide individual awards between $5,000 and $10,000 per year for a maximum of 2 years to support solid Earth or atmospheric science graduate research projects conducted at a U.S. institution of higher education. The research projects must be within the CoCoNET footprint or directly use data from the CoCoNET GPS stations and/or meteorological sensors. For information about how to apply for this fellowship, go to:
http://coconet.unavco.org/science/coconetfellowship.html.

57 The Trans-boundary, Land and Atmosphere Long-term Observational and Collaborative network (TLALOCNet) is a combined atmospheric and tectonic cGPS-MET network in Mexico, funded by the National Science Foundation (NSF) and the Universidad Nacional Autónoma de México (UNAM) for interrogation of climate, atmospheric processes, the earthquake cycle, and tectonic processes of Mexico and environs. TLALOCNet will span all of Mexico and link existing GPS infrastructure in North America and the Caribbean. The TLALOCNet siting plans calls for 6 new cGPS-MET stations and 18 upgrades to existing stations in Mexico, with an additional contribution of 13 new stations from UNAM.

58 CoCoNET and TLALOCNet will serve atmospheric objectives by providing more precise estimates of tropospheric water vapour, which will enable a better understanding of airborne moisture processes. Data and data products from both CoCoNET and TLALOCNet will be freely available to researchers, educators, students, and the private sector.

59 Barbados asked about the cost of the CoCoNET stations compared to automated Met stations. Mr Feaux indicated the cost of each station is around US$100,000. Barbados also inquired if they have had vandalism in their stations. Mr Feaux indicated that yes, they have had some vandalised stations.

3.6. STATUS OF OTHER ICGS

60 Mr Bernardo Aliaga reported on the status of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), and the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS).

61 With respect to the ICG/IOTWS, he focused its report on the Key Performance Indicators (KPI) developed by the ICG/IOTWS. He recalled that the IOTWS is a “system-of-systems” with operational robustness achieved through multiple Regional Tsunami Service Providers (RTSPs), which communicate with the National Tsunami Warning Centres (NTWCs) of Indian Ocean countries. Each RTSP covers the entire area of responsibility of the IOTWS. Under agreement through the ICG/IOTWS, there must be at least two RTSPs covering all parts of the Indian Ocean to ensure redundancy and robust operations in the advent of a tsunami. The system-of-systems approach requires all seismic, sea-level, and RTSP tsunami threat information to be interoperable, i.e. RTSPs use common and agreed formats for data and information exchange, address common service requirements, follow agreed, high-level Standard Operating Procedures (SOPs), and share information on procedures and processes. The ICG/IOTWS has identified the capabilities and process required for an operational centre to be recognised as an RTSP of the IOTWS.

62 The product suite and operational processes of the RTSPs are complex, but it is essential that the client NTWCs and the ICG/IOTWS are able to readily assess the performance of individual centres. RTSPs have agreed to transparent reporting of their performance against a comprehensive range of Key Performance Indicators (KPIs). The following KPIs have defined quantitative targets: Elapsed time from EQ to initial EQ information issuance, probability of detection of IO (Indian Ocean) earthquakes with Mw>=6.5, accuracy of EQ hypocentre location, accuracy of EQ hypocentre depth, accuracy of initial earthquake magnitude, elapsed time from EQ to issuance of first bulletin containing tsunami threat info, accuracy of the tsunami forecast amplitude/height, probability of detection of tsunami above threat threshold, accuracy of time arrival of tsunami (0.02 m amplitude), accuracy of time of arrival of 1st significant wave (0.1 m), accuracy of threat threshold exceedance, percent of IO countries issued a timely product as defined above, elapsed time from any product issuance to potential receipt by TWFPs, percent of time RTSP is operating and able to issue products, percent of regular communication tests participated in.

63 Mr Aliaga focused his report on the ICG/PTWS on the New Enhanced Products. He recalled that for 2012 and 2013 a key focus of the ICG/PTWS has been the introduction of the Pacific Tsunami Warning Centre (PTWC) enhanced products for tsunami threat assessment based on tsunami forecast models and pre-defined coastal zones. Following Exercise Pacific Wave 11 (PacWave'11) held on 9 and 10 November 2011 (IOC/2011/TS/97VOL.1; IOC/2011/TS/97VOL.2.), ICG/PTWS PacWave 11 and Enhanced Tsunami Products Task Team Meetings took place from 21 to 23 May 2012 in Honolulu, United States in order to review the text and graphical threat products developed by PTWC, and recommend that PTWS Steering Committee endorse them for use during Exercise PacWave 13 (IOC/2013/TS/106 Vol.1 + Vol.2), and for issuance by PTWC on an experimental basis from early 2013. The Enhanced Products were further refined during a large number of training and consultation meetings throughout the Pacific region and were the prime focus of PacWave 13 held from 1 to 14 May 2013. They were ratified for implementation by the ICG/PTWS at its Twenty-fifth Session held in Vladivostok, Russian Federation, from 9 to 11 September 2013 (IOC/ICG/PTWS-XXV/3 REV.), and are scheduled for full implementation as from 1st October 2014.

64 Chair Hillebrandt reported on the status 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) and on the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (TOWS-WG). She focused on the coordination with ICG/NEAMTWS for the Exercise Caribe Wave/Lantex 14 (IOC/2013/TS/109VOL.1) and on the new definition of Tsunami Warning Focal Point (TWFP) and National Tsunami Warning Centre (NTWC) by TOWS-WG.

65 With respect to ICG/NEAMTWS, she reported that, in her role of Chair of the ICG, she attended the Tenth Session of the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS-X) hosted by Italy in Rome, from 19 to 21 November 2013 at the Italian Department for Civil Protection. She presented a report on behalf of the ICG and participated at discussions on the possibility of joint exercises including the actual participation of Portugal at the Caribe Wave/Lantex 14 through issuance of bulletins.

66 With respect to TOWS-WG, she indicated that in its capacity of member she participated at the Seventh Meeting of the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-VII) that met in Paris at UNESCO Headquarters, on 12 and 13 February 2014, including meetings of Inter-ICG Task Team on Tsunami Watch Operations and Inter-ICG Task Team on Disaster Management & Preparedness both held on 10 and 11 February 2014. From these meetings, there were several relevant matters discussed and presented, the maps depicting the ICG Service Areas and the Earthquake Source Zone Maps and the other, which very relevant from an operational point of view and that is the discussion about refined definitions of TWFPs and NTWCs. IOC/TOWSWG-VIII decided the following new definitions, subject to the approval of the IOC:

- Tsunami Warning Focal Point (TWFP): A 24 x 7 point of contact (office, operational unit or position, not a person) officially designated by the NTWC or the government to receive and disseminate tsunami information from an ICG Tsunami Service Provider according to established National Standard Operation Procedures. The TWFP may or not be the NTWC.

- National Tsunami Warning Centre (NTWC): A centre officially designated by the government to monitor and issue tsunami warnings and other related statements within their country according to established National Standard Operation Procedures.

3.7. NATIONAL PROGRESS REPORTS

67 British Virgin Islands (UK) indicated that in the intersessional period their tide gauge was repaired in collaboration with PRSN and the station is fully connected to IOC Sea Level Station Monitoring Facility. A new Seismic Station and weather station were also installed, in collaboration with UNAVCO. Revised protocols were finalized and approved. It also reported that the Royal Virgin Islands Police Force (RVIPF) has been enabled to remotely activate key systems of the Department of Disaster Management (DDM). DDM also created new social media channels (Facebook and Youtube) and significantly achieved the recognition of being a TsunamiReady community under the pilot project US NOAA NWS–UNESCO/IOC.

68 Colombia reported that its National Tsunami Warning System comprises the Geological Survey of Colombia (SGC) and the Seismological Observatory for the Southwest (TWFP). Once the respective Decree is approved, TWFP becomes the responsibility of the General Directorate of Maritime and Port Affairs (DIMAR). This system is also comprised of the National Unit for Disaster Risk Management (UNGRD). All these institutions work together in a coordinated manner towards a continuous improvement of the national system. The SGC had made advances installing six broadband stations (including one in the island of Providence), other five are in the process; in addition has the support of the GEORED GPS Field Stations.

69 UNGRD assisted 41 coastal municipalities of Colombia in the elaboration of Standard Operating Procedures and evacuation plans.

70 During 2013, DIMAR has installed 11 meteorological and tide stations through the national Caribbean coast and in insular areas where the data transfer rate is 2 minutes. It has also implemented the Tsunami National Centre with its headquarters in the City of Bogotá D.C. and it has established two backup centres: one in Tumaco for the Pacific coast, and other in Cartagena for the Caribbean coast. Those backup centres will send alerts in case of the TNC goes offline. The “EVIDA” (Evaluation, Visualization and Dissemination of Alerts) software was also developed in order to optimize time when sending warning bulletins.

71 Curaçao reported the installation of one seismic station in December 2013. This station is in the Meteorological Department Curacao (MDC) national network with network code WC, and has station name HATO. The station was installed at the main building of the Met Office and will contribute data through IRIS (Incorporated Research Institutions for Seismology), ORFEUS (Observatories and Research Facilities for European Seismology) to interested countries. The data can be accessed through the seedlink protocol. Furthermore, Curaçao reported on the upcoming installation of two sea-level stations with GOES (Geostationary Operational Environmental Satellite), capabilities that are to be installed in the second quarter of 2014. With respect to hazard assessment, a project is ongoing to build an application for modeling as well as a decision making tool to support the warning efforts for the island. On the communications front, MDC has been working on a direct link between the office and the general public.

72 Dominican Republic reported significant progress under DIPECHO (European Commission Humanitarian Aid Department's Disaster Preparedness Programme) project “National institutions prepared and communities resilient to earthquakes and tsunamis in urban environments in the province of Puerto Plata”, with the support of UNDP and UNESCO, towards tsunami preparedness in Puerto Plata, in the North of Dominican Republic. Specifically:

- An evacuation drill with media coverage was held in a school in the frame of the Exercise Caribe Wave/Lantex 14.

- The national manual on interinstitutional procedures in case of tsunami was updated and new educational manuals about tsunamis were designed in collaboration with the Ministry of Education.
- With the support of the Global Foundation for Democracy and Development (GFDD), a workshop was conducted in July 2013 aiming the tourism and security sector in Santo Domingo, and a second workshop aiming these sectors is planned for July 2014.

73 Dominican Republic also reported that with the support of the NGO Plan International, ONAMET (Oficina Nacional de Meteorología de República Dominicana) is also working on tsunami preparedness for three communities in the Azua province.

74 Netherlands reported that in 2006 three seismometers were installed, one in the islands of Saba, St. Eustace and St. Maarten. Recently (2013), the instrumentation on Saba and St. Eustace was extended with 3 more seismometers on each island. These instruments are used for volcano monitoring, but can also contribute to the tsunami warning system in the Caribbean (redundancy). In 2014, at least two continuous GPS stations are planned on the islands. Data is-and will be available in real-time for interested networks in the region. Within the EU project NERA (Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation), software packages have been developed and are in the process of being implemented at the KNMI (Koninklijk Nederlands Meteorologisch Instituut), which can be used for tsunami monitoring. Procedures for informing the national crisis centre in case of an emergency have been documented and discussed and will be further developed.

75 As part of the EU/UNDP Regional Risk Reduction Initiative (R3I) project, Sint Maarten's near shore bathymetry has been mapped through the intervention of UNESCO–IHE (Institute for Water Education). Currently work is being done on the modelling for tsunami, storm surge, and other similar sea based events. Once the modelling is completed, Sint Maarten will have a clearer indication of the threats for the coastal areas. Safe zones will be identified, as well as evacuation routes.

76 Sint Maarten is working on expanding its National Warning System, Common Alerting Protocol (CAP) based, which will enable the authorities to alert the population for emergencies, including tsunami. Once the modelling, safe zone determination and evacuation routes have been completed, a public awareness campaign will be initiated. Sint Maarten indicated that there is interest in the TsunamiReady program. It also reported that due to a sign-up error participation in Caribe Wave/Lantex 14 did not go ahead as planned.

77 The Government of Barbados through the Technical Standing Committee on Coastal Hazards (TSCCH) remains committed to expanding the National Tsunami Preparedness Programme. Over the past year, the committee has embarked on a multifaceted approach to achieving this objective with finalisation of the National Tsunami Warning Protocols and Standard Operating Procedures, the testing and validation of these Standard Operating Procedures during the national level Communication Exercise Caribe Wave/Lantex 14, the adaptation of the *Tsunami Public Awareness and Education Strategy for the Caribbean and Adjacent Region* (IOC/2013/TS/107 REV) resulting in the articulation of the Barbados Coastal Hazards Public Awareness and Education Strategic Plan 2013–2017, which formed the basis of an intensive 2013–2014 public awareness campaign aimed at sensitizing citizens to the earthquake and tsunami hazards as well as continued stakeholder advocacy as a means of building national level programmatic support for this initiative.

78 France reported that during the intersessional 2013–2014 period, progress continued to be made in the instrumentation and risk assessment as in previous years. France highlighted that its most important efforts were focused on alert dissemination, SOP drafting, and public awareness raising activities, and, in particular, on the creation of a working group

involving local assemblies and other relevant stakeholders (medias, communities, associations, etc.).

79 Concerning the instrumentation, one new seismic station in the North of Martinique and a new sea-level station in le Robert (Martinique) funded by the European programme INTERREG CARAÏBES have been installed. Data quality controls have been completed for Deshaies (Guadeloupe) and le Prêcheur (Martinique) sea-level stations. Data of these three sea-level stations are now transmitted to IOC sea-level facility and warning centres through the GTS communication system. Currently, 14 French seismic stations operated by two networks (West Indies IPGP and Geoscope), and 7 sea-level stations are contributing to the CARIBE-EWS.

80 A workshop for the regional network operators has been organized in Martinique, French West Indies, in October 2013. Topics and lectures covered data quality assessment and real-time data exchange. After the workshop, a Working Group 1 meeting regarding the seismic network was conducted.

81 In addition, GIS (Geographic Information System) layers containing the historical tsunami database and tide gauges were installed in Martinique; tsunami models and inundation maps, funded by the European programme INTERREG CARAÏBES, are in progress and should be made available by the end of 2014; parts of the SOPs have been written; evacuation maps and signage have been tested in 3 pilot communities of Martinique; and a public conference on tsunami took place in November during the official week of earthquake awareness.

82 To conclude, France stated that, from their point of view, Exercise Caribe Wave/Lantex 14 was a success because of the scenario of a remote tsunami enabled for the first time private stakeholders like the network providers (electricity, telephone, water) and public road network operators, as well as observers from the communities to be involved.

83 United States expressed their gratitude to the US Virgin Islands for hosting this Ninth Session of ICG/CARIBE-EWS. It is noteworthy to mention the hard work accomplished to put this meeting together while working so diligently to secure the TsunamiReady certification for the USVI.

84 NOAA would like to notify the ICG that the West Coast and Alaska Tsunami Warning Center (WCATWC) was renamed the US National Tsunami Warning Center (NTWC). This change reflects the primary mission areas of centres, with NTWC concentrating on the entire US Mainland and PTWC supporting US' Pacific Islands and US' international responsibilities. Pacific Tsunami Warning Center will continue to provide forecasting services for the ICG Members.

85 Sensing improvements in the Caribbean region have been noteworthy with over 125 new seismic and sea-level stations installed since 2004. Thanks to this international cooperative effort, the Caribbean region is now one of the most densely sensed areas of the world in terms of tsunami detection, and the US remains committed to supporting observing networks such as the Puerto Rico Seismic Network, and is currently working with the PRSN to host a sea-level observations workshop tentatively scheduled for the fall of 2014.

86 This year the US formally transitioned the Short-term Inundation Forecasting for Tsunami (SIFT) model into operations at our Tsunami Warning Centres. The SIFT model is very dependent on high-quality observational data to produce accurate coastal inundation forecasts for pre-determined locations along U.S. coasts including Puerto Rico and the U.S. Virgin Islands. Between the improvements to the sensing networks and the operational

implementation of SIFT, the US has significantly increased tsunami forecast and warning capability for its coasts in the Caribbean.

87 The US would also like to inform the ICG that enhanced informational products from PTWC continue to be developed and tested for implementation within the PTWS. Data from numerous Pacific-crossing tsunamis that have occurred in the past decade are being used to evaluate the characteristics of forecasts that are a part of those enhanced products. The results of this work will be used to help users better understand those forecasts and to improve the enhanced products where appropriate. Once we have fully fielded the enhanced informational products in the Pacific, we will be ready to begin experimental implementation in the Caribbean basin.

88 Finally, the US is encouraged by the significant increase in participation in the Exercise Caribe Wave/Lantex 14, with 47 Member States and territories represented, and almost 200,000 registered participants. Wide participation in this exercise is critical to preparing communities “in advance” for the tsunami threat.

3.8. INTERIM ADVISORY SERVICES REPORT (PTWC)

89 Dr Charles McCreery, PTWC Director, provided an overview of PTWC’s current status and activities that had occurred during the intersessional period. He noted that the seismic and sea-level sensing networks used by PTWC to perform its mission in the Caribbean region have continued to improve, and thanked the Member States for their contributions to these networks. He reviewed the eleven earthquakes that prompted PTWC to issue Tsunami Information Statements for the CARIBE-EWS over the past year and noted that this was an anomalously high number of event compared to past years.

90 He also reviewed criteria currently used by PTWC to trigger Information Statements and Tsunami Watches for the region. He summarized results of the scheduled monthly communication tests as well as two unscheduled tests. Following a poor response to the first unscheduled test, the language of the test message was altered to emphasize that a response was required from the TWFP agencies that were specifically named. The response rate following the second test was much higher. He showed a picture of the new NOAA facility in Hawaii where PTWC will be relocating later this year. PTWC will have a much larger space for its operations, as well as, a more modern and secure IT infrastructure. Lastly, he reported on a project that will provide the two US TWCs with common operational software and hardware, compatible with the IT of the rest of the US National Weather Service, and that the project will also create a joint website to support their domestic and international tsunami products and related tsunami information.

91 The **ICG noted** the report of PTWC

3.9. REPORT OF EXERCISE CARIBE WAVE/LANTEX 14

92 Ms Christa von Hillebrandt-Andrade (USA) presented the report on the Task Team on the Exercise Caribe Wave/Lantex 14 (IOC/2013/TS/109VOL.1). She reported that 31 Caribbean nations and 16 territories took part in the third regional Exercise Caribe Wave/Lantex 14 held on 26 March 2014. This represents a participation rate of 98% of Member States of the ICG, an increase from 75% in 2011 and 94% in 2013. The high level of participation reflects improved level of understanding of the tsunami threat and commitment of the countries to get ready. Given the transatlantic nature of the scenario, it also marked the first time for coordination between two tsunami warning systems, the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS) with the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (NEAMTWS).

93 According to the registrations, close to 200,000 people were signed up throughout the Caribbean and adjacent regions (150,000 more than in 2013). Participants included over 1,400 organizations and families (up from 481 in 2013, and 300 in 2011). During the exercise, the Pacific Tsunami Warning Center (PTWC), the US National Tsunami Warning Center (US NTWC) and the Puerto Rico Seismic Network (PRSN) sent out over 31,500 emails to 2,000 subscribers to the special Caribe Wave/Lantex 14 notification service. The Instituto Português do Mar e Atmosfera (IPMA) also made available the type of bulletins it would be issuing for the NEAMTWS for such an event.

94 All of the officially designated IOC/UNESCO CARIBE-EWS Tsunami Warming Focal Points/National Contacts participated in the exercise. In addition, other local tsunami warning focal points, international, state, territorial and local emergency management organizations, academic institutions, governmental agencies, businesses, health facilities, media and individuals and families also took part. Besides the emails, websites, social media and text messages, sirens and emergency alert radios were also used to disseminate information. Drills, table top exercises, seminars, meetings and video/web, among other activities, were also held as part of the Exercise Caribe Wave/Lantex 14.

95 Thru the exercise it was possible to:

- Validate the issuance of tsunami products from the PTWC and NTWC;
- Validate the receipt and dissemination of tsunami products by TWFP's;
- Continue with the exposure to proposed enhanced PTWC products, which include graphics;
- Validate the readiness of the CARIBE-EWS countries to respond to a distant tsunami.

96 The **ICG noted** the report of the Task team on Exercise Caribe Wave/Lantex 14.

4. WORKING GROUP PROGRESS REPORTS

4.1. WORKING GROUP 1 PROGRESS REPORT ON MONITORING AND DETECTION SYSTEMS, WARNING GUIDANCE

97 This agenda item was presented by Mr Jean Marie Saurel (France) Chairperson of Working Group 1 (WG1).

98 Working Group 1 noted significant networks improvements, including the seismic, sea-level and GPS side. Several seismic stations were installed or made available during the period, and the data contributing for research in IRIS increased too. The contributing sea-level stations number dramatically increased from 45 to 60 with new or upgrading stations. The CoCoNet project continued its development and added the installation of 2 sea-level stations in their plan. Three mirror or alternate regional GPS data centres have been designated.

99 Working Group 1 proposed a modified table for the seismic stations technical requirements. Those modifications introduce primary and secondary seismic stations requirements to improve the data availability of the overall network and to allow a more sustainable network for operators. Working Group 1 also produced sea-level capability maps to serve as a guideline for future stations site planning.

100 Finally, Working Group 1, with the help of the Caribbean Tsunami Warning Program (CTWP), continues the data availability tracking of the sea-level and seismic network to ensure the threshold detection levels are met, with monthly reports and coordination calls.

101 Venezuela inquired if both NTWC and PTWC use the same seismic stations for detecting tsunamis in the Caribbean. PTWC answered that yes, both should be using the same. Chair Hillebrandt-Andrade indicated that currently the CTWP statistics reflect the availability of data for NTWC, but soon the statistics for PTWC will also be included.

102 Venezuela inquired on the remaining stations (34%) that are not available through IRIS. WG1 Chair indicated that they are available directly to the seismic operators, via PRSN that serves as distribution centre. Data in some cases is sent in parallel to IRIS for archiving but otherwise is available directly to the warning centres. PRSN clarified that some data is available to PRSN but cannot be forwarded to regional centres due to restrictions of owner of stations.

103 Haiti indicated problems with pressure sensors in Cap Haitian and Jacmel. WG1 encouraged Haiti to participate at the training on sea level to be organised later this year. Haiti indicated that Jacmel station is not available in TideTool. WG1 Chair encouraged Haiti to contact PTWC to solve this problem.

104 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.2

4.2. WORKING GROUP 2 PROGRESS REPORT ON HAZARD ASSESSMENT

105 This agenda item was introduced by Mr Alberto López (PR,USA), Vice-Chair of Working Group 2 (WG2), who reported on three action items the WG2 has worked during the ICG intersession period, namely the update of the contact details of the members, provided feedback to *Post-tsunami survey field guide* (SC.98/WS/24), and about an informal meeting hosted in Mayaguez, Puerto Rico (USA).

106 Mr López summarised the results of the informal meeting hosted by the Working Group in Mayaguez, Puerto Rico, which discussed three main topics: (i) Tsunami sources for modelling, (ii) tsunami modelling workshop, and (iii) work/effort recognition. The first topic presented three approach levels for tsunami modelling; from basic and simple sources, to more elaborate sources based on research projects. The second item discussed modelling workshops and concluded on the need to organize a second workshop as follow-up to the Community Model Interface for Tsunami (ComMIT) Training workshop that was held from 24 to 28 October 2011 in Point a Pitre, Guadeloupe, France. The third topic addressed a concern of work and effort put forth by researchers not being recognized by their institutions.

107 Mr López presented 10 recommendations resulting from the meeting. Among these recommendations were included the need to compile both seismic event catalogues and homogeneous and easily-accessible bathymetric data from coastal regions, developing SOP's for evacuation routes and harbour hazards, develop useful Disaster Decision Tools and Visiting programmes, and urge UNESCO to provide agreements with academic institutions to recognize the work and effort of their researchers.

108 Chair indicated that in the preparative for Caribe Wave/Lantex 14 an online training on ComMIT was organized and it was seen that some of the participants became active users of it. She suggested to explore using this tool more frequently.

109 CTIC noted that in its Work Plan it has considered a workshop on Hazard Assessment that could be organized jointly with WG2.

110 PRSN asked if a Memorandum of Understanding (MoU) can be put in place by UNESCO with organizations like the University of Puerto Rico at Mayagüez, to recognise the work of scientists supporting ICG/CARIBE-EWS. The Secretariat responded that this is

doable and recommended to initiate negotiations towards a MoU of UNESCO and the University of Puerto Rico at Mayagüez.

111 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.3

4.3. WORKING GROUP 4 PROGRESS REPORT ON PREPAREDNESS, READINESS AND RESILIENCE

112 This agenda item was introduced by Ms Kerry Hinds (Barbados), Chairperson of Working Group 4. The Working Group 4 on Preparedness, Readiness and Resilience presented a status of its work from April 2013−April 2014. This status update included:

- A review of the Working Group's terms of reference and membership.
- Tasks of Working Group 4 coming out of ICG/CARIBE-EWS-VIII.
- Reflecting on a Year of Progress April 2013−April 2014
- Way forward: Recommendations of Working Group 4 to ICG/CARIBE-EWS-IX

113 The status update noted that the 27 Member, Working Group has benefitted tremendously from the inclusion of three new Members and the designation of two Vice-Chairs to support the Chair and wider membership in the advancement of the Working Group's work.

114 The ICG was reminded about the recommendations of Working Group 4 emanating from the Eighth Session of the ICG/CARIBE-EWS (ICG/CARIBE-EWS-VIII/3) and the status of the implementation of the recommendations.

115 During the year, it was noted that the Working Group made advancements in executing its' mandate and tasks participating in a number of capacity building initiatives aimed at individual Working Group member and the Member States. They also provided technical advice and support to the national public awareness programmes of many of the Member States and the various Task Teams of the ICG.

116 Finally, Working Group 4 tabled a number of recommendations to ICG/CARIBE-EWS-IX for the consideration of Member States.

117 France requested that if it was possible for a sessional meeting of Working Group 4 to take place because the communication of WG 4 has not been frequent and France's representatives would like to be more involved in the activities of the group. WG 4 Chair indicated that the list of members should be updated to make sure email communications among members are fluent. ICG Chair recommended to further explore intersessional virtual meetings to solve communications issues unless funding becomes available for in-person meetings.

118 Secretariat reminded the Plenary that policy discussion about a Performance Based Tsunami recognition Programme should take place at this session as part of the intrasessional Working Group on the CTIC (Work Plan 2014−2016) and Tsunami Recognition Programme.

119 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.1

4.4. TASK TEAM ON WARNING COMMUNICATION AND DISSEMINATION

120 This agenda item was introduced by Ms Gloria Romero (Venezuela) on behalf of Mr Antonio Aguilar (Venezuela), Chair of the Task Team. She indicated that the Task Team on Warning Communication and Dissemination worked exclusively by email and reached conclusions in terms of a new Tem of Reference (ToRs) for former Working Group 3, and a new organizational structure. She presented the details of the new Terms of Reference.

121 France requested that the Group renew its coordination with the World Meteorological Organization (WMO) regional bodies including the Hurricane Committee. Given the cross-sectional and common areas of the two regional entities, such as telecommunication networks, marine submersion and regional warning systems, it is recommended that an effective and efficient approximation is made between WMO/Committee of Hurricanes Region IV (North America, Central America and Caribbean basin) and the ICG/CARIBE EWS. A focal point of the Hurricane Committee could be invited to each ICG to benefit both groups of progress and reflections on common topics. The Secretariat proposed to invite a permanent member of the Hurricane Committee to the proposed revamped WG3.

122 Dr McCreery suggested distinguishing between the communications among the regional centres and the NTWC/TWFPs and the communications from the NTWC/TWFP to national stakeholders and the public. The Secretariat suggested that this is can be taken by nominating two Vice-Chairs to deal with the two separate aspects.

123 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.4

5. ESPECIAL INVITED LECTURES: COMMUNITY-BASED TSUNAMI WARNING SYSTEM

124 Under this agenda item, the Chairperson recalled Recommendation ICG/CARIBE-EWS-IV.4, which urges Member States to consider the recommendations of the “Best Practices on Tsunami and Coastal Hazards Community Preparedness and Readiness in Central America and the Caribbean” workshop that was held from 11 to 13 August 2008, Panama City, Panama. In this respect, representatives of US Virgin Islands and British Virgin Islands (UK) were invited to make a presentation with focus on the development of their community-based warning systems.

125 The Director of Disaster Management of British Virgin Islands (UK), Ms Sharleen DaBreo, highlighted the achievements made and the continued work they will be undertaking in the future. The main achievement was the TsunamiReady recognition which the department undertook with the Royal Virgin Islands Police Force. Other achievements were the completion of inundation maps, installation of tsunami signs, smart school certification for a number of schools, and the completion of remote access to a number of DDM alert mechanisms which can now be activated by RVIPF. Future steps for improvement especially for maintaining TsunamiReady include: Developing of Community scale Tsunami evacuation maps, complete LIDAR coverage for the rest of the BVI, more community evacuation signs to be installed and purchase of an EMWIN for the RVIPF just to name a few.

126 Mr Elton Lewis, Director of the US Virgin Islands (USVI) Territorial Emergency Management Agency (VITEMA), indicated that the US Virgin Islands are prone to earthquakes and tsunami from local sources as well as regional and distant tsunami sources. The last major tsunami impact was in in 1867 when a disastrous 7.5 magnitude earthquake generated a tsunami that impacted coastline communities in the US and British Virgin Islands. The seven metre high tsunami forced the USS Monongahela inland onto Frederiksted’s shoreline and killed 30 people. At that time, most of the population worked

inland on plantations. The tsunami also heavily damaged the Charlotte Amalie port at Saint Thomas.

127 Today, thousands reside, work in, attend school in or visit coastal areas that at-risk of tsunami inundation. The coastlines are lined with public facilities, residential communities, cruise ship ports, police and fire stations, schools, government offices, businesses, sewage treatment plant, and electricity and desalination plants with storage tanks.

128 He indicated that the dialogue on tsunami readiness in the Virgin Islands began with a small group of tsunami experts that met on the island of St. John in the 1990s to develop a Caribbean tsunami programme. For VITEMA, while they were aware that the Virgin Islands was at risk for tsunami, it was not until 2009, when Governor De Jongh reorganized the agency to more efficiently and effectively manage emergencies, that we began to look comprehensively at readiness for this type of event. VITEMA formed a Territorial Tsunami Preparedness Working Group (TTPWG) comprised of representatives of the public and private sectors, semi-autonomous agencies and non-government organizations, including representatives of the HOVENSA oil refinery, the American Red Cross, the Virgin Islands Water and Power Authority (WAPA), and the National Park Service (NPS).

129 The Territorial Tsunami Preparedness Working Group (TTPWG) developed a site selection decision matrix to select sites for a tsunami readiness pilot project based on population density, location and elevation of the site, proximity to safe areas and feasibility of achieving tsunami readiness. These coastlines sites were targeted for placement of the tsunami hazard zone and tsunami evacuation route signs and for installation of the outdoor warning sirens as part of the Tsunami Early Warning System. Between 2011 and 2014, VITEMA installed more than 100 signs along coastline areas throughout the Territory and installed 24 outdoor warning sirens: 10 on St. Croix, 12 on St. Thomas, and 2 on St. John. The solar-and-battery-powered sirens are omnidirectional and capable of transmitting both voice and tone alerts for a range of about 1.5 miles. Messages include tsunami, earthquake, flooding, hazard materials, curfew and hurricane warnings.

130 In 2009, the Virgin Islands Emergency Management Office (VI-Alert) was also launched a mass alert and notification system, which allows VITEMA to issue free instant life-safety alerts to registered users via text message, email, voicemail and fax. The VI-Alert system was developed through a unique partnership between the Government of the US Virgin Islands and the New York State Division of Homeland Security and Emergency Services (DHSES), which currently serves as the Administrator of the system and provides technical support.

131 VITEMA also enhanced its education and outreach efforts to include tsunami awareness courses for the general public, emergency service coordinators, first responders and the private sector businesses, particularly for the hospitality industry. In addition, in 2011, Governor John P. de Jongh Jr. approved and signed the US Virgin Islands Tsunami Incident Annex 2011 which serves the Territory's guide for both the public and private sector for response and recovery to a tsunami. The Annex has been incorporated with the US Virgin Islands Emergency Operations Plan.

132 All of efforts have in collaboration with a number of local and federal partners including: the National Tsunami Warning Centre, Puerto Rico Seismic Network, Caribbean Tsunami Warning Program, the Virgin Islands National Guard, National Disaster Preparedness Training Center (NDPTC) which is supported by US Department of Homeland Security−FEMA, USVI government departments, U.S. Coast Guard (USCG), the University of the Virgin Islands and Caribbean Coastal Observing System (UVI-CariCOOS).

133 A summary of the presentation of Mr Lewis is included in full under ANNEX IV.

6. POLICY MATTERS

6.1. ESTABLISHMENT OF A CARIBBEAN TSUNAMI WARNING CENTER

134 The Chairperson introduced this topic recalling for Member States that according to Recommendation ICG/CARIBE-EWS-II.3, the Group decided to establish a Caribbean Tsunami Warning Center (CTWC) to be located in the region.

135 She recalled that the United States of America stated at the Eighth Session of ICG/CARIBE-EWS that while it continues to support a phased approach toward the establishment of the Caribbean Tsunami Warning Center at the University of Puerto Rico at Mayagüez to serve the Caribbean and Western Atlantic basins, budget constraints had forced NOAA to consider alternative end states for the CTWP facility.

136 The Chair also recalled that during the same session the Bolivarian Republic of Venezuela informed that their schedule for the establishment of a National Tsunami Warning Centre was 3 years.

137 The Chairperson offered the floor to USA and Venezuela to report on progress made with regard to the two above tasks related to the establishment of a CTWC.

138 United States indicated that in 2009, the United States adopted a phased planning strategy regarding the possible development of a Caribbean Tsunami Warning Center. These phases were planning phases, not implementation phases. The results of each phase were sequenced to determine next steps, including decisions about whether or not to continue the planning process. The three planning phases were:

1. Enhance tsunami outreach and education capacity in the Caribbean;

2. Strengthen Caribbean Regional Tsunami monitoring systems; and

3. Establish a Regional Tsunami Warning Center at the University of Puerto Rico Mayagüez.

139 The United States, in collaboration with its national and international partners, has made significant advances in the first two phases of this strategy. Caribbean nations are now better positioned to respond to the tsunami threat due to sustained outreach and education efforts and significant investments in monitoring and observing. Over 150 new seismic and sea-level monitoring systems have been installed across the region, making the Caribbean basin one of the world's most densely sensed areas in terms of tsunami detection. Since it is availability of sensing data, and not physical location of a warning facility that drives forecast accuracy, NOAA has determined that the combination of existing U.S. Tsunami Warning Centres and the Caribbean basin's extensive monitoring systems can continue to effectively serve as the primary source of top-level tsunami forecast guidance for the region. Thus, the best use of resources to further advance capability in the region is through the continued enhancement of tsunami outreach and education capacity, in addition to observational systems. NOAA will therefore concentrate additional resources—as available—on staffing, regional sensing, outreach, education, training, and decision support services. This will be accomplished through the National Weather Service Caribbean Tsunami Warning Program, supported as required by the International Tsunami Information Center (ITIC), and in partnership with the University of Puerto Rico at Mayagüez and stakeholders.

140 The United States has determined this approach to be the most sustainable way to continue to deliver top-level tsunami detection, forecast, warning, mitigation, and decision support capabilities to the Caribbean.

141 Venezuela inquired if USA is confirming that the ICG can continue to support the establishment of a centre in the region and USA will support these efforts. USA answered that it will continue to provide the tsunami forecast services from PTWC as long as this is requested. However, in light of limited resources it has decided to focus on using them on the reinforcement of observing and preparedness capabilities.

142 Venezuela informed that it continues working to implement the Tsunami Warning Centre for Venezuela. It has approved funding for the preparation of studies (paleotsunami, detection, awareness) and supports that the region establish a Regional Centre that will enhance the ability of each of the Caribbean countries and adjacent regions to exchange data, experiences and knowledge to reduce the risk of tsunami and other coastal hazards

143 Venezuela also highlighted that new national centres joining the system like the Mexican Tsunami Warning Centre (CAT) continue to be established and this is encouraging.

144 Venezuela reported that satellite based remote sensing information is available from Venezuela to help producing tsunami inundation and evacuation maps. In order to do this, countries wishing to benefit from this device should send a formal request to the Government of Venezuela.

145 The Chair reminded that at the TOWS level some criteria have been established through its Task Team on Tsunami Watch Operations, and that the IOTWS does have a RTSP scheme, that is also the approach followed by NEAMTWS. She indicated that in light of the different models, perhaps this is an opportunity to revise the criteria established by Working Group 1 and adopted by the ICG/CARIBE-EWS-IV in 2009.

146 USA asked if Venezuela still thinks that a regional centre based in the region is required. Venezuela indicated that it is necessary to have a NTWC at each country, and that a CTWC based in the region is also needed.

147 France indicated it also considers that a CTWC based in the region is required, not only because of the specificities of the Caribbean but also because of the language and time-zone aspects.

148 Haiti expressed that it also considers that the region would be better served with a CTWC based in the region, with language capabilities and closer to the region.

149 Colombia inquired if Venezuela is considering that it could be a physical centre or a system. Venezuela clarified that each country must have a NTWC. The point is that it should make part of a system. The idea is that if countries develop their own NTWCs, they could have a rotated role among those centres that have the capabilities to deliver regional products. In a nutshell, the region not only will be a provider of data but also will use it to deliver tsunami information products. Colombia indicated that this could be achieved through a truly inter-operable system.

150 Secretariat indicated that inter-operability and data exchange are key to pave the way to a RTSP scheme and that every country should have a NTWC capable of interpreting tsunami products.

151 France indicated that the Caribbean does have several small islands that may not have the capabilities to establish a NTWC and suggested the establishment of a Task Team to discuss the tsunami services model for the Caribbean.

152 USA requested to the Chair and Secretariat if at the IOC level a model of regional centres providing warnings would be compatible with the current schemes in use by other regions. Chair reminded that the IOC has recognised that countries do have the sovereignty to issue warning and regional centres do provide tsunami information for the countries to decide on the basis of the information provided. Secretariat indicated that globally there is a transition from a regional warning/watches scheme to a model of tsunami products, leaving to Member States the responsibility of issuing warnings at national level.

153 The **ICG decided** to establish a Task Team to discuss the tsunami services model for the Caribbean.

154 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.5

6.2. FOURTH CARIBBEAN TSUNAMI EXERCISE (EXERCISE CARIBE WAVE/LANTEX 15)

155 The Chair recalled that at the Eighth 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) held in Port of Spain, Trinidad and Tobago, from 29 April to 1 May 2013, the ICG decided to conduct Caribe Wave exercises on an annual basis and therefore an exercise is to be scheduled for 2015.

156 The intrasessional Working Group on Caribe Wave 15 reported under this agenda item. The Group recommended that a joint Exercise Caribe Wave/Lantex 15 takes place on 25 March 2015, with two hypothetical scenarios: An earthquake located offshore eastern Panama and a submarine landslide off the East coast of US. The Group also recommended that PTWC includes its existing and proposed enhanced products as part of the exercise through email to CARIBE-EWS TWFPs, in addition to issuing the dummy messages through all official methods available

157 The **ICG adopted** Recommendation ICG/CARIBE-EWS-IX.6

6.3. PTWC NEW PRODUCTS FOR CARIBE-EWS

158 This agenda item was introduced by Dr McCreery, Director of PTWC. He provided a summary of the current status in the development of enhanced text and graphical products for the CARIBE-EWS. He noted that the CARIBE-EWS enhanced products are in parallel with the development by PTWC of similar products for the PTWS and are also guided in part by recommendations from the TOWS Inter-ICG Task Team on Tsunami Watch Operations.

159 He noted that the future implementation of the enhanced products will represent a significant paradigm change requiring Member States to independently determine alert levels, rather than having them come from the regional service provider. He then showed and described examples of each of the six types of enhanced products that are: 1) a text product containing a brief summary of the situation with expected arrival times and the forecast maximum amplitudes for each area, 2) a map showing the forecast maximum deep-ocean amplitudes, 3) a map showing the forecast coastal amplitudes, 4) a map showing the maximum forecast level of threat for each area as color-coded filled polygons, 5) a kmz file that can be used in conjunction with Google Earth to zoom into an area and view individual coastal forecast points, and 6) a table of forecast statistics for each area.

160 He pointed out that the U.S. Tsunami Program was in the process of conducting a study of the RIFT model upon which the enhanced products are based. Results of that study will be used to help Member States better understand the forecast provided in the products and potentially to revise the products. He also informed that additional maps may be produced to expand certain areas. Lastly, he noted that recommendations regarding the enhanced products would be forthcoming from the intra-sessional Task Team on this topic.

161 Haiti inquired if the text message will also include the maximum amplitude for the polygons. PTWC responded that yes, the text message will include that information.

162 The ICG adopted Recommendation ICG/CARIBE-EWS-IX.7

6.4. UPDATES TO THE ICG/CARIBE-EWS IMPLEMENTATION PLAN

163 The Chair recalled that the Eighth session of the ICG/CARIBE-EWS agreed to approve the Implementation Plan as amended by the intrasessional Working Group on the Implementation Plan.

164 **The Group decided** to instruct the Secretariat to update the Implementation Plan in coordination with the Officers and the Working Group Chairs.

7. PROGRAMME AND BUDGET FOR 2014–2015

165 This agenda item was introduced by the Technical Secretary, Mr Aliaga, who reported on the status of regular funding from UNESCO for the Tsunami Unit and in particular for the ICG/CARIBE-EWS. He indicated that out of a total $510 million USD approved regular budget for the entire UNESCO, the Tsunami Unit has been authorised a maximum of 254,400 USD for the biennium 2014–2015. From this amount, the ICG/CARIBE-EWS has been allocated a total of 60,000 USD, evenly distributed into three main areas of activity: Promote integrated and sustained monitoring and warning systems, Educating communities at risk with respect to ocean-related hazards prevention, and Contribute to develop Member States capacities for coastal hazard assessment. He provided details about the planning for the expenditure of these amounts that are mainly to support the ICG coordination work and to be used as seed money to attract extrabudgetary funding to implement the Work Plan of the ICG, with a clear focus on CTIC activities and Work Plan.

8. NEXT MEETING

8.1. CONFIRMATION OF DATE AND PLACE OF ICG/CARIBE-EWS-X

166 The Chairperson recalled that at Eighth Session Sint Maarten announced they will consider hosting the Ninth or Tenth Session. It was later decided to accept the offer of US Virgin Islands to host the Ninth Session and Sint Maarten decided to hold its offer and consider the hosting of the Tenth or Eleventh Session.

167 The representative of Sint Maarten indicated that in consultation with the Cabinet of Sint Maarten it has been decided to offer the hosting of the Tenth Session of the ICG/CARIBE-EWS.

168 **The ICG decided** to accept the offer of Sint Maarten to host the meeting in the week of 18 May 2015.

8.2. TARGET DATE FOR ICG/CARIBE-EWS-XI

169 The group was requested by the Chairperson to decide on a target date for the Eleventh Session of the ICG/CARIBE-EWS.

170 Colombia indicated its availability to host the Eleventh Session of ICG/CARIBE-EWS in Cartagena, Colombia.

171 The **ICG acknowledged** the offer of Colombia and decided to hold the Eleventh Session of the ICG/CARIBE-EWS in May 2016.

9. OFFICERS ELECTIONS

172 The Chairperson introduced this item recalling the role of the Chairman. She then asked the Chair of the Elections Committee to report on the deliberations of the Committee.

173 Ms Pedzi Girigori (Curacao), Chair of the Election Committee recalled that the election of Officers of the ICG/CARIBE-EWS was announced with the Invitation in IOC Circular Letter No. 2505 (CL-2505), providing the required forms. Open for nominations were the positions of one Chair and three Vice-Chairs. The deadline for nominations was set in the Circular Letter and confirmed in the adopted timetable as Tuesday, 13 May 2014, 18.00 Local Time. She reported that one nomination for the Chair was received. Three nominations were received for the existing three Vice-Chair positions by the Secretariat.

174 Each nomination was duly dated, timed and signed by the Secretariat. The details were checked for completeness.

175 The Elections Committee composed of Anguilla (UK) and Curacao, chaired by Ms Pedzi Girigori, Head of Delegation of Curacao, met on 14 May 2014 at 15:00. It duly scrutinized the nomination papers. All of them were considered complete, correct and in the required form and format. The Chairman countersigned each nomination form in the presence of the Committee. The meeting was closed at 15:15.

176 Ms Christa G. von Hillebrandt-Andrade (USA) was elected Chair by acclamation. Mr Milton Puentes (Colombia), Lt Denis Lopez (France), and Ms Aura Fernandez (Venezuela) were elected as Vice-Chairs.

177 Working Group officers were also elected. For Working Group 2: Mr Alberto Lopez, Puerto Rico (USA) as Chair and Mr Franck Audemar (Venezuela) as Vice-Chair. For Working Group 3: Antonio Aguilar from FUNVISIS, Venezuela as Chair, Mr Ernesto Morales from NWS (Puerto Rico, USA) as Vice-Chair for Technology and communications platform for alerts, and Mr Claudio Martinez from ONAMET (Dominican Republic) as Vice-Chair for Protocols for end to end communication and dissemination of warnings. Finally, for Working Group 4, Lt Patrick Tyburn (France) as Chair, Ms Susan Hodge (Anguilla, UK) as Vice-Chair for Resilience, and Ms Stacey Edwards from SRC (Trinidad & Tobago) as Vice-Chair for Public Awareness.

178 The following Task teams were discontinued and its work considered complete: Sea Level Network Capability, and Warning Communication and Dissemination.

179 A Task Team on Tsunami Services Model was formed, under the Chairmanship of Mr Miguel Palma (Venezuela), with the following membership: Dr Victor Huerfano (PRSN), Mr Jean Marie Saurel, (France), Mr Michel Angove (USA), Mr Lloyd Lynch (SRC), Mr Milton Puentes (Colombia), Ex Officio Chair ICG/CARIBE-EWS and Ex Officio IOC Secretariat.

10. ANY OTHER BUSINESS

180 France inquired if it will be possible to perform research post-seismic interventions for in order to monitor seismic effects within maritime areas.

181 The Group, under the suggestion of France, recognized the necessity for rapid marine survey (sensor deployment and data acquisition) after significant earthquake occurring offshore Member States, also recognizing that the area of interest in those cases might be spread over several countries or Economic Exclusive Zone (EEZ), also reminding that official authorization procedures can usually last more than 6 months.

182 The Group **requested** France to explore mechanisms that would facilitate these activities under the hospices of ICG/CARIBE-EWS.

183 Aruba inquired by email if that would be possible to develop some mechanism for tele-participation to ICG sessions. The Chair asked the Secretariat and Sint Maarten to explore the possibility of putting in place some mechanisms to enable tele-participation at the coming ICG/CARIBE-EWS-X session.

11. ADOPTION OF DECISIONS AND RECOMMENDATIONS

184 Based on the reports of the Working Groups and discussions at the Plenary Sessions, the ICG adopted seven Recommendations.

12. CLOSE OF THE SESSION

185 The Chair recognised the services of audio/translation and extended the recognition to BG Lewis and the Government of US Virgin Islands. The meeting closed at 17.45.

ANNEX I

AGENDA

1 WELCOME AND OPENING

1.1 REPRESENTATIVE OF THE INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION OF UNESCO

1.2 CHRISTA VON HILLEBRANDT, ICG/CARIBE-EWS CHAIR

1.3 WELCOME ADDRESS BY NATIONAL AUTHORITIES

2 ORGANIZATION OF THE SESSION

2.1 ADOPTION OF AGENDA

2.2 DESIGNATION OF THE RAPPORTEUR

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

3 REPORT ON INTERSESSIONAL ACTIVITIES

3.1 IOC EXECUTIVE SECRETARY'S REPORT

3.2 CHAIR'S REPORT

3.3 CARIBE EWS SECRETARIAT REPORT

3.4 REPORT OF THE CARIBEAN TSUNAMI INFORMATION CENTER (CTIC)

3.5 REPORTS FROM UN AND NON-UN ORGANISATIONS

3.6 STATUS OF OTHER ICGs

3.7 NATIONAL PROGRESS REPORTS

3.8 INTERIM ADVISORY SERVICES REPORT (PTWC)

3.9 REPORT OF CARIBE WAVE 2014

4 WORKING GROUP PROGRESS REPORTS

4.1 WORKING GROUP 1: MONITORING AND DETECTION SYSTEMS, WARNING GUIDANCE

4.2 WORKING GROUP 2: HAZARD ASSESSMENT

4.3 WORKING GROUP 4: PREPAREDNESS, READINESS AND RESILIENCE

4.4 TASK TEAM ON WARNING COMMUNICATION AND DISSEMINATION

5 SPECIAL INVITED LECTURES: COMMUNITY-BASED TSUNAMI WARNING SYSTEM

5.1 US VIRGIN ISLANDS TSUNAMI READY PROGRAM

5.2 BRITISH VRIGIN ISLANDS TSUNAMI READY PROGRAM

6 POLICY MATTERS

6.1 ESTABLISHMENT OF A CARIBBEAN TSUNAMI WARNING CENTER

6.2 EXERCISE CARIBE WAVE/LANTEX 15

6.3 PTWC NEW PRODUCTS FOR CARIBE EWS

6.4 UPDATES TO THE CARIBE-EWS IMPLEMENTATION PLAN

7 PROGRAMME AND BUDGET FOR 2014–2015 (UPDATE)

8 NEXT SESSIONS

8.1 CONFIRMATION OF DATE AND PLACE OF ICG/CARIBE EWS-X

8.2 TARGET DATE FOR ICG/CARIBE EWS-EWS XI

9 OFFICERS ELECTION

10 ANY OTHER BUSINESS

11 ADOPTION OF DECISIONS AND RECOMMENDATIONS

12 CLOSE OF THE SESSION

ANNEX II

ADOPTED RECOMMENDATIONS

Recommendation ICG/CARIBE-EWS-IX.1

Caribbean Tsunami Information Centre (CTIC) Work Plan and the Performance Based Tsunami Recognition Programme

The Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions;

Recognizing the strategic framework to ensure the sustainability of the Caribbean Tsunami Information Centre (CTIC), and the progress made in the establishment and implementation of programmes of the CTIC;

Noting the efforts of the Task Team on Performance Based Tsunami Recognition Programme in proposing a strategy and guidelines for the implementation of a CARIBE-EWS Performance Based Tsunami Community Recognition Programme;

Acknowledging the role of the Task Team on Performance Based Tsunami Recognition Programme in supporting the mandate of the CTIC;

Urges the Secretariat to continue to encourage the Member States to provide financial contributions to further facilitate CTIC's functions and operations through various means including memoranda of understanding, voluntary contributions to the IOC Special Account, and support for specific activities;

Further urges that consideration be given to the identification of agreed parameters such as population size and Gross Domestic Product (GDP) as a means of allocating financial contributions to the CTIC from individual Member States;

Recommends that the CTIC also includes financial support (overhead) to the operational budget within submissions of project proposals to donor agencies and pursues technical cooperation with regional and international organizations;

Recommends that the CTIC engages the private sector in partnership;

Requests Member States to provide technical in-kind contributions to advance the activities and operations of the CTIC through a range of mechanisms including secondments as well as the allocation of technical and administrative expertise on a part-time (virtual) basis;

Supports the recommendation of the CTIC Board that the organisation Work Plan utilizes the results-based management framework approach;

Further recommends that Member States identify priority areas for action within the Draft CTIC Work Plan noting the current budgetary constraints;

Recommends that the CTIC Annual Work Plan be aligned with the outcomes and schedule of the ICG/CARIBE-EWS meetings and Implementation Plan;

Endorses the continuation of the work of the Task Team on Performance Based Tsunami Recognition Programme;

Recommends continued implementation of the NWS NOAA-UNESCO/IOC TsunamiReady pilot project to support the development and validation of the CARIBE-EWS Performance Based Tsunami Community Recognition Programme.

Recommendation ICG/CARIBE-EWS-IX.2

Tsunami Monitoring and Detection Systems, Warning Guidance

The Intergovernmental Coordination Group for Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions;

Considering the report of Working Group 1 on Monitoring and Detection Systems, Warning Guidance, and **having reviewed** the status of the observational data availability in the Caribbean and adjacent regions;

Recognizing the difficulty for regional seismic network operators to maintain numerous stations at a high availability level and the past efforts that lead to match the expected requirements in several regions;

Encourages sea-level station operators with the support of their Member States to continue their effort in maintaining the sea-level stations (including their calibration and levelling) in order to avoid past situations where stations fell into disrepair;

Recommends each network operator of Member States to identify primary and back-up secondary seismic stations in order to meet the new seismic stations requirements;

Requests Caribbean Tsunami Warning Program to continue producing updated maps and monthly reports based on current CARIBE-EWS sea-level, core seismic stations, and available real-time seismic stations in the region;

Encourages the Tsunami Warning Centres to use accelerometer (strong motion sensor) data, either continuous or triggered, for large magnitude event characterization for forecasts;

Recommends the investigation of new monitoring techniques (including permanent Ocean Bottom Seismometers) close to the trenches and tsunamigenic sources to decrease detection time for the region;

Urges Member States to continue their efforts to fill gaps in the monitoring networks (seismic and sea-level) towards the completion of the T*sunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS): Implementation Plan 2013-2017* (IOC/2013/TS/78 REV.) based on recommended seismic and sea-level performance maps;

Continue to encourage the USA and the Bolivarian Republic of Venezuela in their effort to support, respectively, the phased implementation for the establishment of the Caribbean Tsunami Warning Centre, and the additional Regional Tsunami Warning Centre in support of the Caribbean Tsunami Warning System;

Acknowledges the designation of several regional GPS data centres in support of CoCoNet project;

Acknowledges the offer of the Puerto Rico Seismic Network (PRSN) to organize and host in collaboration with the CTWP the next Caribbean Training Course for Operators of Sea Level Stationsand connected Working Group 1 meeting on sea-level matters;

Agrees CoCoNet offer to install two permanent GPS on existing tide gauges and its selection of site choices for the two new tide gauges (Yucatan and Jamaica);

Encourages Cuba, Honduras, Trinidad and Tobago, and other Member States in their efforts to upgrade their existing sea-level network to the CARIBE-EWS sea-level requirements;

Requests Working Group 1 to review technical requirements of sea-level stations, including the requirement of a minimum tsunami detection time of 30 minutes within the Caribbean and adjacent regions.

Recommendation ICG/CARIBE-EWS-IX.3

Tsunami Hazard Assessment

The Intergovernmental Coordination Group for Tsunamis and Coastal Hazards Warning System for the Caribbean and Adjacent Regions;

Recalling the request to Working Group 2 to develop and maintain databases of tsunamigenic sources, existing tsunami inundation maps and tsunami modelling capabilities and present annually at the ICG/CARIBE-EWS;

Recognizing that ports and harbours are critical infrastructure;

Noting an interest in changing the passive approach provided by workshops into a more active approach provided by visits and virtual meetings, that have proven more successful in the Caribbean for seismic operations and monitoring groups;

Acknowledging that delegates from Member States need a second workshop on tsunami modelling for tsunami hazard assessment as a follow-up from a previously organized workshop in 2011;

Encourages Working Group 2 to develop an inventory of tsunami sources for the Caribbean region as outlined in the the *Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS): Implementation Plan 2013-2017* (IOC/2013/TS/78 REV.);

Encourages once again Member States to provide tsunami modellers the most up-to-date bathymetric data and near shore topography of coastal regions with a minimum resolution of 90 metres (3 seconds) or less for coastal bathymetry up to 100 metres;

Recommends that all bathymetric data be archived in a homogeneous format with quality control, with easy access to modellers in a location to be determined by Working Group 2;

Request Working Group 2 to develop an inventory of existing tsunami and other coastal hazards inundation and evacuation maps for the coasts of the Member States of CARIBE-EWS;

Recommends developing agreements between institutions or agencies and IOC for working group members with the objective of providing time and effort recognition to those who work for the ICG;

Encourages the establishment of an Expert Team of Tsunami Modellers that would be available for organizing virtual meetings and visits to Member States in association with workshops;

Recommends that Member States work with Working Group 2 **to compute** harbour current flows due to tsunamis in order to estimate potential damages and quantify safe depth limits for ships.

Recommendation ICG/CARIBE-EWS-IX.4

Tsunami Related Services

The Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions;

Recalling that at the Eighth 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) held in Port of Spain, Trinidad and Tobago, from 29 April to 1 May 2013, **decided** to establish a Task Team to develop new terms of reference for Working Group 3 to develop guidelines for receiving and distributing tsunami guidance information and end-to-end alerts;

Considering the report of the Task Team;

Recommends the restructuring of Working Group 3 with name Tsunami Related Services;

Further recommends that the purpose of Working Group 3 will be to examine current and develop capacities in each country of the region and advise the ICG about the definition and composition of tsunami early warnings and products, the methods, and best practices for effective procedures for end-to-end communication and dissemination of early warnings and tsunami products. The Working Group 3 will:

- Explore and document capabilities for dissemination of existing guidance and alerts in the countries of the region.
- Identify the difficulties and challenges existing in the region for effective end-to-end communication and dissemination of tsunami early warnings and products.
- Establish strategies for the development and implementation of methods and technologies to strengthen the media and dissemination of tsunami early warnings and products by Member States.
- Routinely test (and periodically evaluate) the mechanisms of communication and dissemination of warnings by Member States, in order to identify weaknesses and make recommendations to help strengthen these delivery systems.
- Create communication protocols and standardized information identifying guidelines for communication and dissemination of tsunami early warning and products in all countries, for approval by the ICG.

The structure of the Working Group 3 will be:

- 1 Chair of Working Group on Tsunami Related Services.
- 1 Vice-Chair focusing on the technology and communications platform for alerts.
- 1 Vice-Chair for protocols for end-to-end communication and dissemination of warnings.

Recommends that the membership shall include one representative from the tsunami warning centre responsible for guidance and alerts in the Caribbean, and one representative from WMO RA IV Hurricane Committee to facilitate coordination of the common issues such as building a regional EWS, preparing for coastal inundation, and using GTS and EMWIN.

Recommendation ICG/CARIBE-EWS-IX.5

Caribbean Tsunami Warning System and Tsunami Services

The Intergovernmental Coordinating Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions,

Recalling Recommendation ICG/CARIBE-EWS-IV.6, which approved the criteria for a Regional Tsunami Warning Centre as identified in the Working Group 1 report on technical, logistical, and administrative requirements of a Regional Tsunami Warning Centre for the CARIBE-EWS (ICG/CARIBE-EWS-IV/13);

Further recalling Recommendation ICG/CARIBE-EWS-II.3, which decided to establish a Caribbean Tsunami Warning Center to be located in the region;

Aware that gaps in the seismic and sea-level observing networks, impediments to data exchange and ineffective communication systems do compromise the effectiveness of regional tsunami services;

Decides on the establishment of a Task Team to describe tsunami services as part of the Caribbean Tsunami Warning System, including the current capabilities, required information, products, and services and **instructs** it to propose a system model to serve as a guideline toward a fully functional Caribbean Tsunami Warning System;

Further instructs the Task team to:

- **Construct** a capability baseline in the Caribbean region to determine existing gaps in terms of monitoring and detection networks (seismic, sea-level, GPS), oceanographic support (bathymetry, coastal DEM), and others necessary for the optimum tsunami services delivery in the Caribbean, in collaboration with Working Group 1 and Working Group 2.
- **Establish** a list of information, products, and services needed by Member States in the region to allow the assessment of tsunami and other coastal hazards risk, have the ability to make warning or alert decisions, and respond accordingly given specific nature of the Caribbean and adjacent regions in collaboration with Working Group 3.
- **Identify** and **establish** an appropriate Tsunami Warning System implementation model and propose a work plan for the achievement of the previously established criteria for the CARIBE-EWS.

Decides to invite representatives from ICG/NEAMTWS, ICG/PTWS, and ICG/IOTWS for their valuable experience and inputs of their ICG Tsunami Warning Systems.

Recommendation ICG/CARIBE-EWS-IX.6

Exercise Caribe Wave/Lantex 15

The Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions,

Recognising the success of the Exercise Caribe Wave/Lantex 14 in support of advancing the Caribbean Tsunami Warning System;

Furthermore recognising the implementation plan of the Pacific Tsunami Warning Center Enhanced Products indicated by the Member States;

Noting the decision of ICG/CARIBE-EWS-VIII to conduct Caribe Wave exercises on an annual basis leaving to each Member State to define its level of participation;

Recommends that a joint Exercise Caribe Wave/Lantex 15 takes place on 25 March 2015, with two hypothetical scenarios: An earthquake located offshore eastern Panama, and a submarine landslide off the East coast of the United States of America;

Further recommends PTWC to include its existing and proposed Enhanced Products as part of the exercise through email to the Tsunami Warning Focal Points (TWFPs) of the Caribe, in addition of the issuing the dummy messages through all official methods available;

Approves the goals and timeline of this exercise as presented at the Ninth Session of the ICG/CARIBE-EWS;

Extends the mandate of the Task Team Caribe Wave/Lantex 14 to assist in the preparation of the scenarios and participants handbooks for the Exercise Caribe Wave/Lantex 15, and **encourages** CTIC to take a progressively greater role in this activity;

Request PTWS to take into consideration the dates of Caribe Wave/Lantex 15 in the selection of the dates of Exercise Pacific Wave 15 (PacWave 15), thus facilitating the participation of the Member States that are members of PTWS and CARIBE-EWS;

Further request that the Secretariat of CARIBE-EWS to identify funds for the translation into Spanish and French of the final handbook corresponding to the Panama scenario.

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Financial implications: Translation expenses

Recommendation ICG/CARIBE-EWS-IX.7

Enhanced PTWC Products for the CARIBE-EWS

The Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions,

Taking into account input from the Intersessional Task Team and Intrasessional Working Group on PTWC Enhanced Products, and

Taking in consideration the recommendations made by TOWS Inter-ICG Task Team on Tsunami Watch Operations;

Recommends continuing the development of PTWC's enhanced products for the CARIBE-EWS for full implementation at a future date;

Agrees that PTWC enhanced text products distinguish, in an easy and immediately recognizable way, the difference between those based upon an earthquake located far from coasts covered by the CARIBE-EWS, and those based on a nearby earthquake that may require immediate action by one or more Member States;

Approves that the initial enhanced products issued by PTWC for an earthquake with a potential tsunami threat that is based only upon the preliminary earthquake location, depth, and magnitude does not include a forecast of tsunami amplitudes, but does include a map showing the epicentre location and tsunami travel time contours along with a general statement about areas within 3 hours travel time that may have a tsunami threat;

Urges that the enhanced products take into account results of the ongoing study by the U.S. Tsunami Program of RIFT model forecasts, on which the enhanced products are based, as compared with amplitudes of several Pacific-crossing tsunamis that have occurred during the last decade, to help Member States to better understand the characteristics of the RIFT forecasts and to improve the products and forecasts wherever possible;

Suggests that additional training focused exclusively on the interpretation of PTWC enhanced products and corresponding Standard Operating Procedures for Member States that would be using the products to appropriately convert the information to alert levels;

Further suggests that such training be conducted in English, French, and Spanish as necessary, and for individuals with tsunami operational responsibilities in CARIBE-EWS Member States;

Additionally recommends this training be conducted for 3 subsets of neighbouring CARIBE-EWS Member States, similar to the 3 groups organized for trainings during the 2013–2014 intersessional periods;

Requests PTWC update the *User's guide for the Pacific Tsunami Warning Center: Enhanced products for the CARIBE-EWS* to reflect changes and improvements and distribute it to Member States in the third quarter of 2014;

Further requests PTWC to issue experimentally the proposed enhanced products by email or by other secure means only to designated TWFPs in parallel with the existing products beginning in the first quarter of calendar year 2015;

Recommends that a decision regarding the timing for full implementation of the enhanced products not be made until at least Tenth Session of the ICG/CARIBE-EWS;

Proposes that an exercise based solely on the enhanced products be conducted and satisfactorily evaluated prior to full implementation of the enhance products; and

Lastly recommends that the Intersessional Task Team on PTWC Enhanced Products continue until the enhanced products are fully implemented.

ANNEX III

OPENING SPEECHES

Ms Christa von Hillebrandt-Andrade, Chair of ICG/CARIBE-EWS

Honourable John P. de Jongh, Jr., Governor of the USVI, distinguished heads and members of delegations, observers, members of the media, ladies and gentlemen.

It gives me a great pleasure to be among the first to welcome you to the Ninth 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). We are extremely thankful to the officials who have so diligently worked on all the arrangements for this meeting. I would especially like to recognize Director Lewis, and his team within and beyond the Virgin Islands Territorial Emergency Management Agency. Almost 20 years ago the USVI scientist Roy Watlington hosted in St. John the first gathering of Caribbean scientists to discuss the tsunami threat and planted the seed for what has become our CARIBE-EWS. We are so glad to see all the advances since then here in the US territory and the Caribbean; it is no longer “El Peligro Olvidado”, “The Forgotten Danger”.

Almost 10 years ago we all witnessed the immensely destructive nature of tsunamis as the waves washed over the coasts of so many Indian Ocean countries causing the loss of over 225,000 lives. In 2010 we witnessed with dismay how the earthquake in Haiti brought down too many buildings, killing too many people, causing too much grief. But then, then we have also seen in Chile and Japan, that big earthquakes do not have to kill so many people, and yes people will die from tsunamis, but much fewer if governments have plans and systems in place and people are educated and ready to respond.

Since we gathered last year in Trinidad and Tobago, we have definitely continued to work with passion and diligence in the region to advance our Tsunami and Other Coastal hazards warning system and this week we will recognize important milestones and also debate on how to continue to grow the System. I would just like to highlight a few of these:

- In September 2013, the Caribbean Tsunami Information Center was officially established in Barbados with the hiring of its interim director, Ms Alison Brome. Now it needs the support of Governments and Organizations so that it can execute its business plan, who and how can the CTIC be resourced?
- CARIBE-EWS also has appreciated and recognized the services provided by the US Pacific Tsunami Warning Center and the renamed US National Tsunami Warning Center, and this year the earth kept them busier than usual. But what will be the updates with regards to the establishment of a Tsunami Warning Center in the Region?
- On March 26, 47 of the 48 MS and territories participated and almost 200,000 people were signed up for Caribe Wave 2014, more than four times the amount from 2013. Just last week we had the most successful unannounced communications test, even better than the ones in the Pacific. Surely the 3 SOP workshops helped the MS be more involved. What will be the scenario(s) for Caribe Wave 2015? Who can provide the funding for more training, so necessary especially with the eventual rollout of the enhanced products?
- Since we met last year there are 20 more TsunamiReady communities in Puerto Rico and the US and British Virgin Islands, including two territory wide recognitions. For many years our Member States have recognized the virtues of Performance Based

Community Recognition Programs like TsunamiReady, are we going to be the first ICG to agree upon guidelines for regional recognition?

- Over 100 seismic stations and 60 sea level stations from around the region are contributing their data so the tsunami warning centers can provide the fastest and most reliable tsunami services. In addition, a Caribbean wide GPS network which holds promises for enhanced tsunami warning systems is almost fully implemented. But we still have some gaps. How can we sustain and complete our observational network?
- There are now over 50 evacuation maps in the region, but still most countries do not know how high the tsunami that can hit their shore can be, nor do they have evacuation maps. Are there opportunities to strengthen tsunami inundation and evacuation mapping efforts?

Indeed, we have come a long way since the first Caribbean tsunami gathering 1996 in St. John and the first CARIBE-EWS meeting ten years later in Barbados in 2006. Over the next three days, we need to establish priorities and make recommendations as we continue to move forward with a Tsunami Warning System that responds to the needs of our MS and Territories to protect lives and livelihoods, because that is what it all comes down to. How can we best protect our residents, visitors and economies from these infrequent, but deadly waves that will one day strike again our shores?

Once again, thank you to the people and government of the US Virgin Islands for providing the perfect setting for these discussions and all of you for being here.

St. Thomas, USVI

13 May 2014

John P. De Jongh Jr.
Governor of the Virgin Islands

Good morning. It's really a pleasure to be a very small part of a very important organization, particularly this organization holding this event on St. Thomas, US Virgin Islands. To the leadership team of VITEMA and the British Virgin Islands and the Secretary General, and to all of our partners, I welcome you to St. Thomas and I welcome you to what I hope will be a very fruitful discussion and guidance among fifty (50) scientists and emergency managers representing seventeen (17) countries, some of which I've been to and some of which are on my bucket list for the future. Clearly the discussion you will have today will have to do with loss of life, prevention, accurate forecasting and timely information to our communities.

I especially want to recognize the British Virgin Islands for their award today for Tsunami Ready and also to my team, Virgin Islands Emergency Management Agency, as we follow the lead of Anguilla and Puerto Rico in making sure that we do everything that's possible with respect to our communities. One of the most interesting things about living on an island is that you are lulled by the beauty of the seas and hills, impassioned by the attitudes of our people, by the tourists that come to visit, and just by the serenity of our area. But deep within all of that are risks and are hazards that each of us, as policymakers, recognize we have to deal with every day, and the seventeen (17) countries here today clearly understand that in and of itself. They recognize that we have a responsibility, whether we are elected officials or whether we are appointed officials, to be ready and prepared for what will come in the most dire of times and at times when we are most at ease. And the thing about emergency management that I came to appreciate in January 2007, when I came into office, is that our success in preparation is based on partnerships. It's based on relationships that exist not just within our jurisdiction; it's based on relationships at the federal level, at municipalities outside

of our distinct areas and based on being able to respond in times of need. To be able to call on FEMA and Alejandro (de La Campa) at times when we need them is tremendous and to be able to call on Christa (von Hillebrandt) for guidance is clearly to our benefit. To be able to talk to the British Virgin Islands about their experiences and what is necessary to go forward, and to be able to have the Department of Homeland Security and FEMA be a part of our decision-making, especially for us, is something that puts us at ease and (helps us) recognize we can mitigate what takes place.

Within the next two weeks, General Lewis will tell me that we have to have a conversation with the National Weather Service about the upcoming hurricane season. Two weeks later, we will have a another discussion with Department of Homeland Security and with FEMA about how they will respond and be prepared for any eventuality that could take place in the US Virgin Islands – how they will respond with resources – human resources and materials – to put our people at ease.

From 1989 to 1995, those two events of (Hurricanes) Hugo and Marilynn, clearly educated us on what could happen in a disaster or catastrophe. So the mindset now, for each of us, irrespective of what country we may be from or what we may be doing, it is not 'if' but it is 'when.' As of April 22 of this year, we have been designated as Tsunami Ready, clearly an indication of recognition that we were able to achieve what was started years ago on the island of St. John with Dr Watlington, but could not be achieved without having FEMA in Puerto Rico, without having Victor (Huerfano, PRSN), without having Christa (von Hillebrandt) to guide us through a process that allowed us to know how important it is — the investments we've made, but also the commitment we must make for the next three years and beyond. From the millions we put in with respect to our emergency management centres, to the upgrading of our radios, and making our first responders know exactly how they have to respond and making sure they have the tools, to the VI–Alert system that VITEMA handles, to our call centres and the trained staff that they have -to be able to have that, is all an indication, that that investment is what got us here today.

The coordination of VITEMA with our Police Department, with our National Guard with our Public Works Department, all has, I think, what is necessary for us to be able achieve the most important - which is safety of lives and mitigating loss of life for our community.

There is no doubt that the Caribbean Tsunami Warning Program is something we care about and something we support. I would dare say that VITEMA and our government, I presume the even the British Virgin Islands, we do hurricanes well. Our people know exactly what to do, where to go and how to respond. What we're now learning about, are tsunamis. We're learning that the activity of tsunamis from 1867 forward within our region have been tremendous. And we know with no uncertainty, whether your political beliefs are with global climate change or not, things are changing.

We live in a small community in the middle of ocean that requires us to be prepared. So as we continue to educate ourselves, look at science that is associated with it, I would hope that as time goes on, resources for the Caribbean Tsunami Warning System and the resources for education and personnel will be allocated, because from Colombia and Venezuela all the way up to the Dominican Republic including the Cayman Islands and the Bahamas, we are region that has a need and clearly are very much at risk.

I wish you the very best for your conference and again thank you for coming to St. Thomas, US Virgin Islands.

ANNEX IV

**PRESENTATION BY BG ELTON LEWIS,
CEM, DIRECTOR**

US Virgin Islands Territorial Emergency Management Agency

9th Session UNESCO/IOC/ICG/CARIBE-EWS
May 13-15, 2014, St. Thomas, US Virgin Islands

The United States Virgin Islands comprises four islands – St. Croix, St. Thomas, St. John and Water Island – with a population of approximately 106,000, down 2% from the year 2000. The Gross Domestic Product of the US Virgin Islands is estimated at $4.2 billion, with tourism being the main driver of the USVI economy. The USVI experiences an average of the 2.48 million air and cruise ship visitors annually, who contribute about $500 million to the local economy each year.

By merit of the locations, the US Virgin Islands are prone to earthquakes and tsunami from local sources as well as regional and distant tsunami sources. The last major tsunami impact was in in 1867. On November 18, 1867, a disastrous 7.5 magnitude earthquake generated a tsunami that impacted coastline communities in the US and British Virgin Islands. The seven (7)-meter high tsunami forced the U.S.S. Monongahela inland onto Frederiksted's shoreline and killed 30 people. At that time, most of the population worked inland on plantations. The tsunami also heavily damaged the Charlotte Amalie port at St. Thomas.

Today, thousands reside, work in, attend school in or visit coastal areas that at-risk of tsunami inundation. The coastlines are lined with public facilities, residential communities, cruise ship ports, police and fire stations, schools, government offices, businesses, sewage treatment plant and electricity and desalination plants with storage tanks.

The US Virgin Islands Territorial Emergency Management Agency (VITEMA) was created in 1985 to coordinate major emergency in the Territory and placed under the auspices of the Virgin Islands Army National Guard. In 2009, Governor John P. de Jongh Jr. overhauled the emergency management system and reorganized VITEMA to make it a stand-alone, Cabinet-level agency with the director reporting directly to the governor.

The dialogue on tsunami readiness in the Virgin Islands began with a small group of tsunami experts that met on the island of St. John in the 1990s to develop a Caribbean tsunami program.

For VITEMA, while we were aware that the Virgin Islands was at risk for tsunami, it was not until 2009, when Governor De Jongh reorganized the agency to more efficiently and effectively manage emergencies, that we began to look comprehensively at readiness for this type of event. VITEMA formed a Territorial Tsunami Preparedness Working Group (TTPWG) comprised of representatives of the public and private sectors, semi-autonomous agencies and non-government organizations, including representatives of the HOVENSA oil refinery, the American Red Cross, the Virgin Islands Water and Power Authority and the National Park Service.

The Territorial Tsunami Preparedness Working Group (TTPWG) developed a site selection decision matrix to select sites for a tsunami readiness pilot project based on population density, location and elevation of the site, proximity to safe areas and feasibility of achieving tsunami readiness. These coastlines sites were targeted for placement of the tsunami hazard zone and tsunami evacuation route signs and for installation of the outdoor warning sirens as part of the Tsunami Early Warning System.

Between 2011 and 2014, VITEMA installed more than 100 signs along coastline areas throughout the Territory and installed 24 outdoor warning sirens – 10 (ten) on St. Croix, 12 (twelve) on St. Thomas, and two (2) on St. John. The solar-and-battery-powered sirens are omni-directional and capable of transmitting both voice and tone alerts for a range of about 1.5 miles. Messages include tsunami, earthquake, flooding, hazard materials, curfew and hurricane warnings.

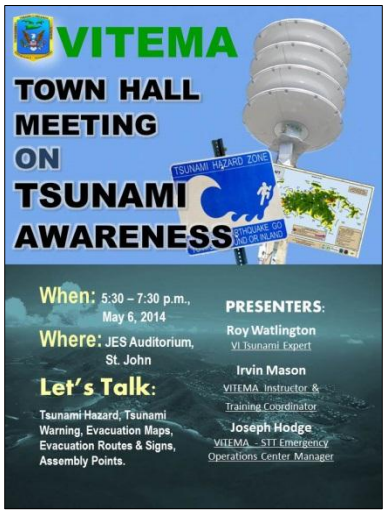
In 2009, we also launched ***VI-Alert***, a mass alert and notification system, which allows VITEMA to issue free instant life-safety alerts to registered users via text message, email, voicemail and fax. The VI-Alert system works as a portal for alerting agencies including the National Weather Service, the US Geological Survey, the National Tsunami Warning Centre, VITEMA, the VI Police Department, the VI Department of Health, the VI Water and Power Authority and the Office of the Governor. This design allows registered users to sign on to one mechanism for receiving all emergency alerts and notifications.

The VI-Alert system was developed through a unique partnership between the Government of the US Virgin Islands and the New York State Office of Homeland Security and Emergency Services, which currently serves as the Administrator of the system and provides technical support.

VITEMA also enhanced its education and outreach efforts to include a Tsunami Awareness courses for the general public, emergency service coordinators, first responders and the private sector businesses, particularly for the hospitality industry. We have also begun to hold Tsunami Awareness Town Hall Meetings. For the past three years, the USVI has also participated in the LANTEX. In May of this year, to continue our awareness campaign, VITEMA also sponsored a Tsunami Float in the parade which was seen by thousands of residents and visitors.

In addition, in 2011, Governor John P. de Jongh Jr. approved and signed the US Virgin Islands Tsunami Incident Annex which serves the Territory's guide for both the public and private sector for response and recovery to a tsunami. The Annex has been incorporated with the US Virgin Islands

Emergency Operations Plan.



In planning for response and recovery for catastrophic included surveying and identifying beach landing areas in the event sea and air ports were severely damaged or destroyed. The sort of planning is critical to ensuring commodities can be received and distributed. The survey also included identification of mass care sites to manage individuals that may be displaced in a tsunami event.

All of efforts have in collaboration with a number of local and federal partners including; the National Tsunami Warning Center, Puerto Rico Seismic Network, Caribbean Tsunami Warning Program, the Virgin Islands National Guard, National Disaster Preparedness Training Center (supported by US Department of Homeland Security-FEMA), USVI government departments, U.S. Coast Guard, University of the Virgin Islands and Caribbean Coastal Observing System.

Tsunami Awareness Course-AWR-217

ANNEX V

LIST OF DOCUMENTS

WORKING DOCUMENTS	
DOCUMENT CODE	DOCUMENT TITLE
ICG/CARIBE-EWS-IX/1 Prov	Provisional Agenda
ICG/CARIBE-EWS-IX/1 Prov Add	Provisional Timetable
ICG/CARIBE-EWS IX/2	Annotated Agenda
ICG/CARIBE-EWS IX/5	IOC Executive Secretary Report
ICG/CARIBE-EWS IX/6	ICG/CARIBE-EWS Chair Report
ICG/CARIBE-EWS-IX/7	Report of the Caribbean Tsunami Information Centre (CTIC): Achievements and Status 2013–2014
ICG/CARIBE-EWS-IX/8	CTIC Business, Sustainability Plan 2014–2019 (Draft)
ICG/CARIBE-EWS-IX/8p	CTIC Business, Sustainability Plan 2014–2019
ICG/CARIBE-EWS-IX/9	Draft CTIC Work Plan and Estimated Operational Expenses 2014–2016
ICG/CARIBE-EWS-IX/10	Report of the Caribbean Tsunami Information Centre (CTIC) 2013–2014
ICG/CARIBE-EWS-IX/11	COCONet and TLALOCNet: Multi-hazard GPS/Met observatories, enhancing geodetic infrastructure and the scientific community in Mexico and the Caribbean
ICG/CARIBE-EWS-IX/12	The 2013-2014 Seismic Research Centre (SRC) Tsunami-related activity.
ICG/PTWS-XXV/3	Twenty-fifth Session of the Intergovernmental Coordination Group for the Pacific Ocean Tsunami Warning and Mitigation System
IOC/TOWS-WG-VII/11	PTWS Report
IOC/TOWS-WG-VII/12	IOTWS Report
IOC/TOWS-WG-VII/8	Report from NEAMTWS
ICG/NEAMTWS-X/3s	Executive Summary of the NEAMTWS-X session
ICG/CARIBE-EWS-IX/13	Inter-Governmental Oceanographic Commission 2013 National Report Submitted by Saint Lucia for the period January – December 2013
ICG/CARIBE-EWS-IX/14	National Report Caribe 2013–14 France

WORKING DOCUMENTS	
DOCUMENT CODE	DOCUMENT TITLE
ICG/CARIBE-EWS-IX/15	National Report Caribe 2013-14 USA
ICG/CARIBE-EWS-IX/16	National Report Caribe 2013-14 Mexico
ICG/CARIBE-EWS-IX/17	National Report Caribe 2013-14 Dominican Republic
ICG/CARIBE-EWS-IX/18	National Report Caribe 2013-14 Barbados
ICG/CARIBE-EWS-IX/25	National Report Caribe 2013-14 British Virgin Islands
ICG/CARIBE-EWS-IX/26	Informe Nacional Caribe 2013-14 Colombia
PTWC Communications Plan	PTWC Communications Plan Communication Plan for the Interim Tsunami Advisory Information Service to the Caribbean Sea and Adjacent Regions (19 December 2007 version)
ICG/CARIBE-EWS-IX/27	PTWC Interim Advisory Services Report
ICG/CARIBE-EWS-IX/28	Caribe Wave/Lantex 14
IOC/2013/TS/109VOL.2 draft	Final report of Caribe Wave/Lantex 14, Volume 2. Draft
IOC/2013/TS/109VOL.2 draft	Final report of Caribe Wave/Lantex 14, Media Report. Draft
ICG/CARIBE-EWS-IX/19	Caribe Wave/Lantex 14 Webinar
ICG/CARIBE-EWS-IX/20.1	WG1 on Monitoring and Detection Systems, Warning Guidance
ICG/CARIBE-EWS-IX/20	WG 1 Report
ICG/CARIBE-EWS-IX/29	WG2 Report–May2014
ICG/CARIBE-EWS-IX/22	WG4 Report
ICG/CARIBE-EWS-IX/24	Report of Task Team on Performance Recognition Programme
ICG/CARIBE-EWS-IX/23	Task Team on Warning Communication and Dissemination
ICG/CARIBE-EWS-IX/30	Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the Caribe EWS (Draft)

INFORMATION DOCUMENTS	
DOCUMENT CODE	DOCUMENT TITLE
CL-2505	Invitation to the Ninth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-IX), St Thomas, United States Virgin Islands, 13-15 May 2014
IOC/2013/TS/78Rev.	Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS), Implementation Plan 2013–2017
ICG/CARIBE-EWS-IX/Inf.3	Election of Officers
ICG/CARIBE-EWS-IX/Inf.1	Logistical Information for Participants
ICG/CARIBE-EWS-IX/Inf.2	Hotel Reservation-Contact details
ICG/CARIBE-EWS-IX/Inf.4	Organizational Structure and Governance

ANNEX VI

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ANNEX VII

LIST OF ACRONYMS

CAP	Common Alerting Protocol
CARIBE-EWS	Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
CariCOOS	Caribbean Coastal Observing System
CAT	Mexican Tsunami Warning Centre
CCRIF	Caribbean Catastrophe Risk Insurance Facility
cGPS	continuously operating GPS
CoCoNET	Continuously Operating Caribbean GPS Observational Network
ComMIT	Community Model Interface for Tsunami
CTIC	Caribbean Tsunami Information Center
CTWP	Caribbean Tsunami Warning Programme
DDM	Department of Disaster Management
DEM	Department of Emergency Management of Barbados
DHSES	New York State Division of Homeland Security and Emergency Services
DIMAR	General Directorate of Maritime and Port Affairs
DIPECHO	European Commission Humanitarian Aid Department's Disaster Preparedness Programme
EEZ	Economic Exclusive Zone
ERC	Enhancing Resilience to Reduce Vulnerability in the Caribbean
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
EU DG ECHO	European Commission Directorate General Humanitarian Aid Office
GIS	Geographic Information System
GOAC	Grupo de Óptica Atmosférica de Camagüey
ICG/CARIBE-EWS	Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean

	Tsunami Warning and Mitigation System
ICG/NEAMTWS	Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
ICG/PTWS	Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System
IO	Indian Ocean
IOC	Intergovernmental Oceanographic Commission
IOTIC	Indian Ocean Tsunami Information Centre
IOTWS	Indian Ocean Tsunami Warning and Mitigation System
IPA	Implementing Partners Agreements
ITIC	International Tsunami Information Center
KNMI	Koninklijk Nederlands Meteorologisch Instituut
KPI	Key Performance Indicators
MINERD	Ministry of Education in Dominican Republic
MOU	Memorandum of Understanding
NDPTC	National Disaster Preparedness Training Center
NEAMTWS	Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas
NERA	Network of European Research Infrastructures for Earthquake Risk Assessment and Mitigation
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NSF	National Science Foundation
NTWC	National Tsunami Warning Centre
NWS	National Weather Service
OECS	Organization of Eastern Caribbean States
ONAMET	Oficina Nacional de Meteorología de República Dominicana
PRSN	Puerto Rico Seismic Network
PTWC	Pacific Tsunami Warning Centre

PTWS	Pacific Tsunami Warning and Mitigation System
RTSP	Regional Tsunami Service Providers
RVIPF	Royal Virgin Islands Police Force
SACI	Science Applications International Corporation
SCSTAC	South China Sea Tsunami Advisory Center
SGC	Geological Survey of Colombia
SIFT	Short-term Inundation Forecasting for Tsunami model
SOP	Standard Operating Procedure
SRC	Seismic Research Centre
TLALOCNet	Trans-boundary, Land and Atmosphere Long-term Observational and Collaborative network
TNC	Tsunami National Contact
TOWS-WG	Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems
TSU	Tsunami Unit
TWFP	Tsunami Warning Focal Point
UNAM	Universidad Nacional Autónoma de México
UNESCO	United Nations Educational, Scientific and Cultural Organization
IHE	Institute for Water Education
UNGRD	National Unit for Disaster Risk Management
US NTWC	US National Tsunami Warning Center
USCG	U.S. Coast Guard
USVI	US Virgin Islands
UVI-	University of the Virgin Islands
UVI-CariCOOS	University of the Virgin Islands and Caribbean Coastal Observing System
UWI	University of West Indies
VI-Alert	Virgin Islands Emergency Management Office
VITEMA	Virgin Islands Territorial Emergency Management Agency

WAPA	Virgin Islands Water and Power Authority
WCATWC	West Coast and Alaska Tsunami Warning Center
WMO	World Meteorological Organization

In this Series *Languages*

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

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

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

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

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

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