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 Sea and Adjacent Regions

Fourth Session

Fort-de-France, Martinique
2–4 June 2009

UNESCO

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IOC/ICG-CARIBE EWS-IV/3
Paris, October 2009
English only[1]

[1] An Executive Summary of this report, including the recommendations, is available in French, Spanish and Russian as a separate document (ICG-CARIBE EWS-IV/3s).

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EXECUTIVE SUMMARY

The Fourth Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-IV), was held in Fort-de-France, Martinique, 2–4 June, 2009. The meeting was attended by nearly 60 participants from 11 countries in the Caribbean Region and six regional organizations.

The ICG reviewed the progress made during the intersessional period, noted reports and recommendations from its Working Groups and received progress reports on training activities, as well as on the process of nominations of Tsunami Warning Focal Points (TWFP) and Tsunami National Contact (TNC): up to 2 June 2009, 23 Member States have now confirmed tsunami focal point information (both TNC and TWFP).

The ICG approved the criteria for a Regional Tsunami Warning Centre as defined in "Technical, Logistical, and Administrative Requirements of a Regional Tsunami Warning Centre for the CARIBE EWS", (Doc. ICG/CARIBE-EWS IV/13).

The ICG acknowledged with thanks the significant resources from the Government of France (Programme INTERREG III-B and INTERREG IV-B Espaces Caraibes) and the Government of Italy (via the United Nations Development Programme – Barbados and the Organization of Eastern Caribbean States) for activities on natural hazard vulnerability and risk reduction, including tsunami and coastal hazards.

The Group agreed to convene a hands-on-training workshop in 2010 in a Member State that has been affected by a tsunami and that has a community-based warning system in place.

The ICG decided to establish the Caribbean Tsunami Information Centre (CTIC) and endorsed the Barbados proposal to host the CTIC. **The ICG recommended** as well updating continuously the CARIBE-EWS Implementation Plan for the Establishment of the Tsunami and other Coastal Hazards Warning System for the Caribbean in order to better assess the implementation rate and performance measures (Ref. IOC-ICG/CARIBE EWS-III/13 and IOC Technical Series 78).

The ICG endorsed the list of criteria and standards for the sea level stations in the Caribbean as described in the IOC/JCOM/GLOSS/PRSN Caribbean Training Course for Operators of Sea Level Stations and defined in the section 3.1.3 of the Implementation Plan.

The ICG endorsed the new and expanded core network of sea level stations in the region as defined in the Implementation Plan.

The ICG decided to hold its Fifth Session (ICG/CARIBE EWS-V) in March 2010 and **recommended** to accept the offer from the Government of Nicaragua to host it. The ICG extended its deep appreciation to the Government of France and the "Conseil Général de la Martinique" for hosting the meeting.

Based on the reports of the Four Working groups and the discussions at the plenary sessions**, the ICG adopted** seven Recommendations: (i) Monitoring and Detection Systems, Warning Guidance; (ii) Hazard assessment; (iii) Warning, dissemination and communication; (iv) Preparedness, readiness and resilience; (v) Regional Tsunami Warning Centre; (vi) Caribbean Tsunami Information Centre (CTIC); (vii) CARIBE-EWS Budget for the Biennium (2020–2011).

RESUME EXECUTIF

La quatrième session du Groupe intergouvernemental de coordination du Système d'alerte aux tsunamis et aux autres risques côtiers dans la mer des Caraïbes et les régions adjacentes (ICG/CARIBE-EWS IV), s'est tenue à Fort-de-France (Martinique), du 2 au 4 juin 2009. Elle a réuni près de 60 participants de 11 pays de la région des Caraïbes et six organisations régionales.

Le GIC a passé en revue les progrès réalisés depuis sa dernière session, pris note des rapports et des recommandations de ses groupes de travail, et pris connaissance des rapports d'étape qui lui ont été présentés sur les activités de formation et sur la désignation des points focaux pour l'alerte aux tsunamis (TWFP) et des points de contact nationaux pour les tsunamis (TNC) : au 2 juin 2009, 23 États membres avaient confirmé les coordonnées de leurs points focaux pour les tsunamis (TNC et TWFP).

Le GIC a approuvé les critères définis pour un Centre régional d'alerte aux tsunamis dans le document intitulé « Technical, Logistical and Administrative Requirements of a Regional Tsunami Warning Centre for the CARIBE-EWS » (paramètres techniques, logistiques et administratifs d'un centre régional d'alerte aux tsunamis du CARIBE-EWS) (document ICG/CARIBE-EWS IV/13).

Le GIC a accepté avec reconnaissance les importantes ressources mises à disposition par le Gouvernement français (Programme INTERREG III-B et INTERREG IV-B Espaces Caraïbes) et le Gouvernement italien (par l'intermédiaire du Programme des Nations Unies pour le développement - Barbade et de l'Organisation des États des Caraïbes orientales) pour des activités concernant la vulnérabilité aux aléas naturels et la réduction des risques, y compris les tsunamis et autres risques côtiers.

Le Groupe a convenu d'organiser un atelier de formation pratique en 2010 dans un État membre ayant été touché par un tsunami et doté d'un système d'alerte reposant sur les communautés.

Le Groupe a décidé de créer le Centre d'information sur les tsunamis dans les Caraïbes (CITC) et souscrit à la proposition de la Barbade de l'accueillir. **Il a recommandé** également d'actualiser en permanence le Plan CARIBE-EWS de réalisation du Système d'alerte aux tsunamis et aux autres risques côtiers dans la mer des Caraïbes afin de mieux évaluer le taux d'exécution et les indicateurs de performance (réf. IOC-ICG/CARIBE EWS III/13).

Le GIC a approuvé la liste de critères et de normes applicables aux stations d'observation du niveau de la mer dans les Caraïbes énoncés dans le document IOC/JCOMM/GLOSS/PRSN sur le stage de formation des opérateurs de stations d'observation du niveau de la mer et définis à la section 3.1.3 du Plan de réalisation.

Le Groupe a approuvé le nouveau réseau central élargi de stations d'observation du niveau de la mer dans la région, tel que défini dans le Plan de Mise en Œuvre.

Il a décidé de tenir sa cinquième session (ICG/CARIBE EWS V) en mars 2010 et **recommandé** d'accepter l'offre du Gouvernement nicaraguayen de l'accueillir. Il a exprimé sa profonde reconnaissance au Gouvernement français et au Conseil général de la Martinique qui ont accueilli la réunion.

Se fondant sur les rapports des quatre groupes de travail et les débats des séances plénières, **le Groupe a adopté** sept recommandations : (i) Systèmes de surveillance et de détection, conseils en matière d'alertes ; (ii) Évaluation préalable des aléas ; (iii) Alerte, diffusion et

communication ; (iv) Préparation, disponibilité opérationnelle et résilience ; (v) Centre régional d'alerte aux tsunamis ; (vi) Centre d'information sur les tsunamis dans la mer des Caraïbes (CITC) ; (vii) Budget biennal du CARIBE-EWS (2010-2011).

RESUMEN DISPOSITIVO

La cuarta reunión del Grupo Intergubernamental de Coordinación del Sistema de Alerta contra los Tsunamis y otras Amenazas Costeras en el Caribe y Regiones Adyacentes (ICG/CARIBE EWS-IV), se celebró en Fort de France (Martinica, Francia), del 2 al 4 de junio de 2009. A la reunión asistieron unos 60 participantes de 11 países de la región del Caribe y de seis organizaciones regionales.

El ICG examinó los avances realizados durante el periodo entre sesiones, tomó nota de los informes y las recomendaciones de sus grupos de trabajo y recibió informes sobre las actividades de formación así como sobre el proceso de designación de puntos focales de alerta contra los tsunamis (TWFP) y contactos nacionales sobre tsunamis (TNC): hasta el 2 de junio de 2009, 23 Estados Miembros habían confirmado la información relativa a los puntos focales de alerta (TWFP y TNC).

El ICG aprobó los criterios para un Centro Regional de Alerta contra los Tsunamis, según se definieron en el documento "Technical, Logistical, and Administrative Requirements of a Regional Tsunami Warning Centre for the CARIBE EWS" [Requisitos técnicos, logísticos y administrativos de un Centro Regional de Alerta contra los Tsunamis para el Caribe y regiones adyacentes] (documento ICG/CARIBE-EWS IV/13).

El ICG agradeció los importantes recursos que aportaron el Gobierno de Francia (programas INTERREG III-B e INTERREG IV-B Espaces Caraïbes) y el Gobierno de Italia (por conducto del Programa de las Naciones Unidas para el Desarrollo – Barbados y la Organización de los Estados del Caribe Oriental) a las actividades relativas a la reducción de los riesgos y la vulnerabilidad en relación con los peligros naturales, comprendidos los tsunamis y otras amenazas costeras.

El Grupo acordó convocar un taller de formación práctica en 2010, en un Estado Miembro que haya sido afectado por un tsunami y que disponga de un sistema de alerta contra los tsunamis de base comunitaria.

El ICG decidió crear el Centro de Información sobre los Tsunamis en el Caribe (CTIC) y respaldó la propuesta de Barbados de acogerlo. **El ICG recomendó** además que se actualizara permanentemente el Plan de Implantación de CARIBE-EWS para el establecimiento del Sistema de Alerta contra los Tsunamis y otras Amenazas Costeras en el Caribe a fin de evaluar mejor el índice de ejecución y la medición del desempeño (véase el documento IOC-ICG/CARIBE EWS-III/13).

El ICG hizo suya la lista de criterios y normas para las estaciones de medición del nivel del mar en el Caribe, según se exponen en el documento IOC/JCOM/GLOSS/PRSN Caribbean Training Course for Operators of Sea Level Stations [Curso de formación para operadores de estaciones de medición del nivel del mar en el Caribe] y de conformidad con la definición al respecto que figura en la sección 3.1.3 del Plan de Implantación.

El ICG apoyó la nueva red básica ampliada de estaciones de medición del nivel del mar en la región, según se define en el Plan de Implementación.

El ICG decidió celebrar su quinta reunión (ICG/CARIBE EWS-V) en marzo de 2010 y **recomendó** que se aceptara el ofrecimiento del Gobierno de Nicaragua de acogerla. El ICG expresó su profundo agradecimiento al Gobierno de Francia y al *Conseil Général* de Martinica por haber acogido esta reunión.

A partir de los informes de los cuatro grupos de trabajo y los debates que tuvieron lugar en las sesiones plenarias, **el ICG aprobó** sendas recomendaciones sobre los siete puntos siguientes: i) Sistemas de vigilancia y detección, orientaciones sobre alertas; ii) Evaluación de peligros; iii) Alerta, difusión y comunicación; iv) Preparación, capacidad operacional y de recuperación; v) Centro de Alerta contra los Tsunamis en el Caribe; vi) Centro de Información sobre los Tsunamis en el Caribe (CTIC); vii) Presupuesto de CARIBE-EWS para el bienio 2010–2011.

РАБОЧЕЕ РЕЗЮМЕ

Четвертая сессия Межправительственной координационной группы по Системе предупреждения о цунами и опасности других бедствий в прибрежных районах Карибского бассейна и прилегающих регионов (МКГ/КАРИБ-СРП-IV) была проведена в Фор-де-Франс (Мартиника) 2-4 июня 2009 г. На совещании присутствовало около 60 участников из 11 стран Карибского региона и представители шести региональных организаций.

МКГ рассмотрела прогресс, достигнутый в межсессионный период, и приняла к сведению доклады и рекомендации своих рабочих групп, а также получила доклады о ходе проведения мероприятий по подготовке кадров и о процессе назначения координаторов по предупреждению о цунами (КПЦ) и национальных контактов по цунами (НКЦ): по состоянию на 2 июня 2009 г. информацию относительно координаторов по цунами подтвердили 23 государства-члена (как НКЦ, так и КПЦ).

МКГ утвердила критерии для регионального центра предупреждения о цунами, определенные в документе «Технические, логистические и административные требования, предъявляемые к Региональному центру предупреждения о цунами для КАРИБ-СРП (док. ICG/CARIBE-EWS IV/13).

МКГ с благодарностью отметила предоставление значительных средств правительством Франции (программа INTERREG III-B и INTERREG IV-B – Районы Карибского моря) и правительством Италии (через Программу развития Организации Объединенных Наций – Барбадос и Организация восточно-карибских государств) для мероприятий по уменьшению уязвимости перед опасными явлениями и рисков, связанных с такими явлениями, включая цунами и опасные прибрежные явления.

Группа достигла согласия в отношении созыва в 2010 г. учебно-практического семинара в одном из пострадавших от цунами государств-членов, где имеется система предупреждения, действующая на общинном уровне.

МКГ приняла решение о создании Карибского центра информации о цунами (КЦИЦ) и одобрила предложение Барбадоса разместить такой центр в этой стране. **МКГ рекомендовала** также постоянно обновлять План осуществления КАРИБ-СРП по созданию Системы предупреждения о цунами и опасности других бедствий в прибрежных районах Карибского бассейна и прилегающих регионов с целью лучшей оценки темпов реализации и показателей эффективности (см. IOC-ICG/CARIBE EWS-III/13).

МКГ одобрила список критериев и стандартов для станций измерения уровня моря в Карибском бассейне, изложенных в учебном курсе МОК/СКОММ/ГЛОСС/ССПР для операторов станций измерения уровня моря в Карибском бассейне и определенных в разделе 3.1.3 Плана осуществления.

МКГ одобрила новую расширенную основную сеть станций измерения уровня моря в этом регионе, определенную в Плане осуществления.

МКГ решила провести свою пятую сессию (МКГ/КАРИБ-СРП-V) в марте 2010 г. и **рекомендовала** принять предложение правительства Никарагуа провести ее в этой стране. МКГ выразила также глубокую признательность правительству Франции и *Генеральному совету Мартиники* за готовность принять это совещание.

На основе докладов четырех рабочих групп и обсуждений, состоявшихся в ходе пленарных заседаний, **МКГ приняла** семь рекомендаций по следующим вопросам: (i)

системы мониторинга и обнаружения, руководящие принципы оповещения; (ii) оценка опасности бедствий; (iii) оповещение, распространение информации и коммуникация; (iv) подготовленность, готовность и способность противостоять бедствиям; (v) Региональный центр предупреждения о цунами; (vi) Карибский центр информации о цунами; (vii) бюджет КАРИБ-СРП на двухлетний период (2020-2011 гг.).

1. WELCOME AND OPENING

1 The Fourth Session of the IOC Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-IV) was held at the Hotel La Batelière, Fort-de-France, Martinique, 2–4 June 2009.

2 The Session was opened on Tuesday 2 June 2009 by Dr Lorna Inniss (Barbados), Chairperson of the ICG/CARIBE-EWS.

3 Mr Peter Koltermann, Head of the Tsunami Unit of the Intergovernmental Oceanographic Commission of UNESCO welcomed all participating delegations, organizations, observers and personalities invited to the Opening Ceremony. He kindly thanked the Government of France on behalf of Dr Patricio Bernal, IOC Executive Secretary, who was unable to attend the Session, for hosting the ICG/CARIBE EWS-IV and for supporting activities related to disaster mitigation.

4 During his intervention, Mr Koltermann recalled the importance of this meeting as it marks an important milestone in the collective efforts to establish a global early warning system for tsunamis.

5 Mr Koltermann emphasized the remarkable progress made during the past four years following the Indian Ocean Tsunami of December 2004. The devastation brought by this unprecedented catastrophe remains vivid in all our minds. It tragically demonstrated how inadequately prepared we all were for such a disaster, and the urgent need for a global strategy to provide the whole world with protection against tsunamis.

6 He referred to the main three components of an early warning system with a comprehensive approach, based on three mutually dependent components: first, the assessment of tsunami hazards; second, the detection/warning system; and third, the adoption of preparedness measures. Pending the CARIBE-EWS becomes fully independent, the Pacific Tsunami Warning Center (PTWC) provides the essential cover for the Caribbean since February 2005. All countries are grateful to the USA for providing this interim service.

7 The achievements of the CARIBE-EWS, coordinated by the IOC are to be applauded. However, it is necessary to improve and extend those services. To be successful, and meet the underlining urgency we all have to work hard.

8 Mr Koltermann thanked the Conseil Général de la Martinique and the Government of France for hosting such a crucial meeting for the region. The CARIBE-EWS is close to coming off age. That still is a significant step, and needs all efforts and Member States' commitment. He wished all participants a successful and effective meeting. (The full intervention is available in Annex III.)

9 Dr Lorna Inniss, Chairperson of the ICG/CARIBE-EWS welcomed participants to the Fourth Session of the ICG and conveyed her gratitude to the Government of France for hosting the meeting.

10 She regretted the fact that representatives from Honduras were unable to attend the meeting, due to the recent earthquake experienced in that country. The loss of life and damage suffered is a grim reminder of the potential devastation and upheaval such phenomena leave in their wake. She indicated that delegates' thoughts are with the people of Honduras in this difficult period. However, the triggering of the Caribbean tsunami early warning system makes what delegates are doing here this week all the more critical. While we deplore the losses incurred with such events, we must emphasize the need to monitor the performance of our early warning system to permit improvements to the system in preparation for any future alerts.

11 Dr Inniss recognized that at the same time this meeting is happening, many or all of governments are also participating in difficult negotiations on a new climate change agreement. Indeed, some countries are fighting for their very survival, especially as we consider that many of the 2007 predictions of the Intergovernmental Panel on Climate Change, especially those related to sea level rise and natural hazards have already been exceeded. Some small economies and islands are already feeling the effects of these extreme environmental changes. Therefore, Dr Inniss was pleased to welcome representatives from some of the Small Island Developing States, who have tried to work with the ICG in spite of the constraints of their travel budgets.

12 In addition to the climate change issues being debated in Bonn, many of the governments are grappling with recent outcomes and future uncertainties of the global economic crisis at the domestic level. While these financial constraints are already impacting the ICG, it is clear that the potential economic impacts of coastal hazards are well enough understood, to ensure that this priority will not be removed from the international agenda for many years to come. This ICG forum presents a unique opportunity for the Caribbean and Adjacent Regions, to work together for the mitigation of losses in respect of tsunamis and other coastal hazards for our countries. Dr Inniss indicated that we cannot rest until we have a well-functioning and maintained, sustainable, global early warning system for our vulnerable populations.

13 She applauded the efforts made by France to identify clearly their commitment and concrete actions towards the attainment of this global system, as well as the Government's proposal to forge stronger linkages with the other Member States of the Caribbean region. Indeed, the French Senator Courteau's 2007 report on tsunami early warning systems worldwide highlighted several areas where improvement is needed. She welcomed the recent invitation by the French Senate to speak on the ICG/CARIBE-EWS and its requirements, at their upcoming public hearing by the end of June 2009. (The full intervention is available in Annex III.)

14 Mr Claude Lise, Senator et President of the "Conseil Général de la Martinique", addressed the ICG/CARIBE EWS-IV and gave a warm welcome to participating delegations, organizations as well as observers of the Session and expressed his gratitude on behalf of the Government of France and the Conseil Général de la Martinique for having the opportunity to host this Session. (The full intervention is available in Annex III.)

2. ORGANIZATION OF THE SESSION

2.1 ADOPTION OF AGENDA

15 The Chairman introduced this Agenda Item and informed the Plenary that the agenda was prepared by the Secretariat and the Officers taking into account the Recommendations and instructions given at ICG/CARIBE EWS-III, as well as the IOC Rules of Procedures.

16 She informed that no new items have been suggested by Member States in the statutory delay, which is up to 20 days before the opening of the meeting. She introduced the Provisional Agenda (Document ICG/CARIBE EWS-IV/1 Prov. Rev 3) to the meeting for comments from delegates.

17 **The ICG approved** the Agenda as presented in Annex I to the present report. The List of Participants is available in Annex V to this report.

2.2 DESIGNATION OF THE RAPPORTEUR

18 The Chairperson invited nominations for Rapporteurs for the present session to assist her and the Secretariat in the preparation of the Summary Report.

19 USA volunteered to provide an English language Rapporteur. Colombia volunteered for acting as Spanish language Rapporteur and France was proposed as Official Rapporteur for French language.

20 The Chairperson informed the Session that according to established practices for subsidiary bodies there is not a line by line approval of the report but only for Decisions and Recommendations.

21 **The ICG approved** the proposals and **thanked** Colombia, France and USA for providing the Rapporteurs.

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

22 The Chairperson noted that interpretation is available in French, English and Spanish. She informed the Plenary that in order to facilitate the proceedings of the meeting a Timetable (Doc. ICG/CARIBE EWS-IV/1 Prov. Add. Rev 3) has been prepared by the Secretariat in coordination with the Officers and the local organizing committee. The timetable includes a presentation prepared by the Conseil Général de la Martinique on its programmes for Natural Hazards Management on Wednesday afternoon. She then presented the Timetable for comments.

23 **The ICG approved** the Timetable.

24 In order to smooth the working in plenary, as well as to facilitate and promote the exchange of information, Delegates were requested by the Chairperson to decide on the establishment of Sessional Commissions.

25 **The ICG approved** the establishment of three Sessional Commissions as follows:

- Recommendations and Budget Commission: to certify that draft recommendations submitted by Member States are consistent in language and fulfil requirements established in the *IOC Manua*l (Document IOC/INF-785) and to produce a budget for the period 2010–2011. This commission reported under items 7 and 10 and was supported technically by the Head of the Tsunami Unit, Peter Koltermann.
- Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the Caribbean EWS: to examine document IOC-ICG/CARIBE EWS-IV/13 in light of the ICG's goal to establish the Regional Tsunami Warning Centre by 2010. This commission reported under item 5.1 and was supported by the Technical Secretary for IOCARIBE, Cesar Toro.
- Caribbean Tsunami Information Centre (CTIC): To examine technical and administrative options for establishing and launching CTIC and suggest the way forward. This commission was supported technically by the ICG/CARIBE WS Technical Secretary, Bernardo Aliaga.

3. REPORT ON INTERSESSIONAL ACTIVITIES

3.1 IOC EXECUTIVE SECRETARY'S REPORT

26 The Head of IOC Tsunami Unit, Mr eter Koltermann, presented the report of the Executive Secretary (Doc. ICG/CARIBE EWS-IV/5) on his behalf. He referred to the proposed

IOC Budget and Programme for 2010–011, the status of cooperation with CTBTO for seismic data provision to National Tsunami Warning Centres, the results of the Global Meeting of the Intergovernmental Coordination Groups for Tsunami Warning Systems (GLOBAL TWS) and the subsequent Second Meeting of the Working Group on Tsunamis and Other Ocean Hazards Warning and Mitigation Systems (TOWS), held in UNESCO Headquarters on 24–7 March 2009.

27 During his intervention, Mr Koltermann reported that the IOC Secretariat is developing a strategy for the tsunami programme. He emphasized that the CARIBE-EWS is owned and should be run from within the region.

28 Mr Koltermann reported a slight increase in the proposed budget for 2010–2011 that will be seen by the UNESCO General Conference in October 2009; it includes dedicated staff under Regular Programme budget reducing the load on the extrabudgetary funds. This should help the CARIBE-EWS, especially for its activities and the CTIC.

29 He also referred to a planned Memorandum of Cooperation with CTBTO for real time seismic data provision and reiterated the importance of sea level networks and technical standards for sea level gauges and networks.

30 Several Member States addressed the need to evaluate and assess countries' response to the Honduras earthquake occurred on 28 May 2009.

31 Saint Lucia requested some clarification on the role of the two focal point defined for the Tsunami Warning System. The Head of the Tsunami Unit, Mr Koltermann defined the roles for TNC and TWFP and emphasized that the TWFP (Tsunami Warning Focal Point) is the responsible institution or person that operates 24 hours a day, seven days a week (24/7) and is mandated to receive warnings from regional centres and to deliver warnings to the emergency authority. While the Tsunami National Contact (TNC) is a high level official responsible to make decisions and possibly be the ICG representative.

32 Barbados raised some questions regarding scientific issues and terminology. The IOC has published some reference literature, as well as the ISDR (ISDR glossary) to help with the harmonization of the terminology but more work needs to be done in this area.

3.2 ICG/CARIBE EWS CHAIRPERSON'S REPORT

33 Dr Lorna Inniss (Barbados) presented the report of the Chairperson (Doc. ICG/CARIBE EWS-IV/6) to the meeting. She mainly referred to her activities of representation and promotion of the ICG/CARIBE-EWS in several fora related with Disaster Risk Reduction in the Caribbean during the intersessional period. She also mentioned the important role of the officers and the chairpersons of Working Groups in keeping the ICG/CARIBE-EWS focused on the agreed activities during the intersessional period and congratulated Member States for activities carried out in the region.

34 Referring to the recent Honduras earthquake, Dr Inniss recalled that earthquakes have reminded the Group of our vulnerability and help to keep the issue as a priority.

35 Dr Inniss stated the ICG/CARIBE-EWS would like to reach 100% completion of National Contacts and Warning Focal Points from the Member States in the region.

36 During her statement, Dr Inniss emphasized the urgent need to integrate the Implementation Plan on National Development Strategies so Member States concerns are properly addressed. She stated that the establishment of IOC National Committees or Tsunami National Committees could help to accelerate this process.

37 She informed the meeting that new funding from UNDP and the Government of Italy is been made available to assist ICG for the establishment of the CTIC.

38 Barbados agreed that Member States should review more frequently the advancement of the Implementation Plan.

39 Regarding the Caribbean Tsunami Warning Centre, USA informed the meeting that a manager position has been opened for recruitment. Some concern was expressed on the proposed establishment date of the Centre by 2010, but the Delegate of USA assured the Group that USA will continue to provide interim tsunami warning services via PTWC for the region. PTWC monitors the Caribbean and the WC/ATWC monitors Puerto Rico and U.S. Virgin Islands. The two centres provide backup and thorough review of events in the region and deliver 24/7 dissemination of bulletins to the region.

40 Barbados congratulated USA with the decision of moving in the direction of establishing a Caribbean Tsunami Warning Centre. Barbados also stated they are more comfortable knowing that a centre is in the region.

3.3 ICG/CARIBE EWS SECRETARIAT REPORT

41 The Technical Secretary for ICG/CARIBE-EWS, Mr Bernardo Aliaga, introduced the report of the Secretariat. He referred to documents ICG/CARIBE EWS-IV/7 “ICG/CARIBE-EWS Secretariat's report” and ICG/CARIBE EWS-IV/8 “ICG/CARIBE EWS-III Recommendations Status Report”.

42 He presented a progress report on training activities as well as on the process of nominations of Tsunami Warning Focal Points (TWFP) and Tsunami National Contacts (TNC).

43 Mr Aliaga reported on the training activity organized by the Puerto Rico Seismic Network (PRSN) which hosted the IOC-GLOSS-PRSN Caribbean Training Course for Operators of Sea Level Stations, on 23–27June 2008 in Mayagüez, Puerto Rico. The purpose of the course was to provide the sea level station operators in the region lectures and hands on training on the science and operations of sea level stations for tsunami and other coastal hazards warning purposes. It also considered the proposed IOCARIBE-GOOS partnership that promotes development and sustainability of the Caribbean Sea level array and its integration into the Caribbean Tsunami and Other Coastal Hazards Warning System. The report of this activity includes reports of national and regional sea level initiatives, and a set of recommendations concerning sea level activities in the region. All Presentations and Final Report are available from:
http://www.ioc-unesco.org/index.php?option=com_oe&task=viewEventRecord&eventID=334

44 He then reported on the Workshop on “Best Practices on Tsunami and other Coastal Hazards Community Preparedness”, co-organised by the Secretariat for the Americas of the International Strategy for Disaster Risk Reduction (ISDR), USAID, UNESCO/IOC, and the Maritime Authority of Panama. The workshop addressed a series of fundamental questions on how to build and sustain community level, coastal early warning systems in Central America and the Caribbean. The meeting convoked community preparedness leaders/planners from across the region to share their experiences in developing community-based programmes for dealing with coastal hazards, including tsunamis. There were representatives from Caribbean countries such as Barbados, British Virgin Islands, Saint Vincent and the Grenadines, Saint Lucia, Trinidad & Tobago, USA, as well as from Colombia, Costa Rica, Nicaragua, and El Salvador.

45 With respect to the status of nominations of Tsunami Warning Focal Points, he reported that as of 2 June 2009, 23 Member States had complete confirmed tsunami focal point information (both TNC and TWFP).

46 The Chairperson opened the floor for comments in view of the report of the ICG/CARIBE-EWS to be submitted to the 25th Session of the IOC Assembly, Paris, 16–25 June 2009.

47 Bermuda (UK) stated from a technical perspective, Overseas Territories (OTs) of UK need to be copied on information sent to London. The Technical Secretary was requested to follow up this matter with OTs and liaise with UK's Foreign Affairs.

48 On the same issue, PTWC stated that there is some confusion with the UK Overseas Territories because there are many areas but focal points are not known, and they are not sure if the tsunami info is getting to the Member States.

49 Anguilla (UK) and Turks & Caicos (UK) informed they have been given the documents to provide that information to the ICG/CARIBE-EWS.

50 Saint Lucia stated that there is a perception that the focal points and national contacts are not well known/defined.

3.4 REPORTS FROM UN AND NON-UN ORGANIZATIONS

51 The Chairperson indicated that the ICG has been successful in developing a wide and inclusive partnership policy. Several UN and non-UN organizations have become Permanent Observers to the ICG. During this agenda item short oral presentations were made from invited observers for the benefit of the increased cooperation with the ICG, as follows:

52 Ms Allison Brome from the Caribbean Disaster Emergency Response Agency (CDERA), and Technical Coordinator of the project "Empowering Coastal Communities to Prepare for and Respond to Tsunamis and Coastal Hazards" summarised the objectives, expected outcomes and status of the of the project.

53 Barbados thanked USAID for supporting initiative and CDERA and Allison Brome for its work and oversight of the project. Barbados stated this is a flagship programme for the ICG because it meets specific needs of the States. Barbados indicated that this project could be a model for other regions and countries.

54 USA inquired how CDERA's experience with this project could be extended to other overseas territories. Ms Brome indicated that this work has already started with Dominica. Other potential countries would be investigated and communicated to the IOC Tsunami Unit.

55 Dr Richard Robertson, Director of the Seismic Research Center of the University of West Indies (SRC/UWI), reported on relevant activities of SRC/UWI. He recalled the ICG that SRC/UWI represents the English speaking Caribbean countries with monitoring, research, outreach and education as the main focus of their work. SRC/UWI is responsible for nine (9) Island States in the Eastern Caribbean.

56 He reported that the SRC/UWI has started the process of installing five (5) new seismograph sensors including a new station in Montserrat, all transmitting real time via satellite. He also indicated continuous development of a GPS sensors network with Saint Kitts and Nevis and St. Lucia stations accessed via internet. Also the Student Outreach Officer developed material for teachers to teach students about these particular natural hazards. Moreover, increased collaboration with the "Institut de Physique du Globe de Paris" (IPGP, France) to monitor volcanoes and earthquake in the region has been developed.

57 CDERA and France thanked Mr Robertson for his presentation.

58 France confirmed the cooperation among IPGP and SRC and commended the efforts of increased networking despite language barriers. France reported that it has installed two stations in Guadalupe and a VSAT reception hub for OVSG/IPGP and SRC/UWI data.

59 Dr Mark Guishard, Director Bermuda Weather Service, also representing WMO Regional Association IV Hurricane Committee, gave a presentation. He referred to communication technologies, EMWIN and the Third Border Initiative. He recalled that there were two EMWIN training workshops for Caribbean Islands in 2007 (one in Miami in March, one in Silver Spring in July). He stated that EMWIN receivers will need to be upgraded when the new GOES satellites will replace the current one. Concerning Data Acquisition & Dissemination he mentioned the use of satellite communication in support to meteorology with dual systems mostly used in the region in addition to other GTS communication systems.

60 The Hurricane Committee recommended that the proposed RA IV Working Group on Disaster Risk Reduction and service delivery (DRR-SD) includes representation of the ICG in its Terms of Reference.

61 He indicated that storm surge watch schemes need to be established. WMO and WMO-IOC/JCOMM are planning a workshop to enhance countries capabilities to forecast storm surges, the “TCP/JCOMM Workshop on Storm Surge and Wave Forecasting” for late 2009 or 2010. He stated that products for the Tropical Cyclone Storm Surge forecasting should become shortly operational.

62 He urged the ICG/CARIBE-EWS to submit recommendations to the Storm Surge team and indicated that an invitation will be sent from the Hurricane Committee to the ICG/CARIBE-EWS to attend the Hurricane Committee Meeting in Bermuda in March 2010.

63 Barbados stressed the importance of defining scientific requirements to carry out the responsibilities and the need to obtain orientations on how storm surges and tsunami modelling should be addressed.

64 Saint Lucia recalled the role of the meteorological services and the need to encourage them to a more active participation. They have expressed concern about timing of workshops and overlapping with other meetings and also during Hurricane Season. Saint Lucia stated also that the focus of their Met-office is aviation and they are being pulled into other areas, including tsunamis.

65 USA mentioned the good reasons why those two programmes, Tsunami and Hurricane, have been handed over to IOC and WMO responsibility. He indicated that tsunamis and hurricanes are different time scales processes.

66 USA stressed the need to keep the perspective of the high tsunami risk for the region and the critical objective for developing the proper response in the right time. They stressed the importance of the expertise for SRC including the information dissemination as one of the components.

67 USA stated they have different programmes but have some relationships. One is in WMO arena and one in ICG arena for good reason. Physically, one is wind driven wind storm waves, the other is seismic induced waves. One is short term and the other long term. It is important to remember tsunamis are short fused events; therefore EMWIN helps disseminate short fused and efficient warning dissemination. The Hurricane programme is more frequent. If we tie them too closely, we will find the tsunami programme will be overshadowed by more frequent events. We have much yet to do to make the region resilient to tsunamis. We need to become as effective as possible, which includes dissemination of products and processing warnings quickly to get proper response in an effective time period. We cannot overstate one at the expense of the other.

68 In response to the Delegates interventions, Dr Guishard, Director Bermuda Weather Service, stated that the Met services are 24x7 and already have framework for creating and disseminating warnings. There are more needs for Met services and other operator issuing warnings to engage in emergency manager community. We need to find out requirements for Emergency Management (EM) and get a framework in place for quick analysis and response and communication among met services and EM.

69 PRSN stated that geophysicist (seismic) and Met offices are separate in Puerto Rico and a Caribbean Tsunami Warning Centre (CTWC) would help with scientific and technical explanation. In the case of Puerto Rico, both services are 24x7.

70 Seismic Research Centre stated they do not expect Met services to have expertise to make judgment on tsunami relevant information; in their view Met services would transfer info from CTWC to technical experts in Tsunami Warning Centres and Seismic Centres.

71 Anguilla (UK) stated that some countries do not have Met centres so there is a clear need for a CTWC.

72 Summarising, the Chairperson stated that the ICG encourage training in-country (and joint training) and accept the invitation to the Hurricane Committee meeting recognizing there is a difference in mandate among the ICG and WMO. Both bodies need to elaborate on the benefits of the relationship.

3.4.1 CTBO Report on Availability and Access to IMS Data

73 In response to the tragedy of the Sumatra tsunami of 26 December 2004, the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO agreed to share efforts to facilitate the development and operation of Tsunami Warning Centres.

74 Subsequently according to the decision CTBTO/WGB-27/1, UNESCO has to approve the National Tsunami Warning Centres that have submitted requests to CTBTO to use seismic and other IMS data for purposes of producing tsunami warnings. Mr Lassina Zerbo, Director International Data Centre Division. reported on the arrangements for availability and access to IMS data.

75 With the purpose of benefiting of data transfer including in the Caribbean region a Memorandum of Cooperation with UNESCO is planned.

76 In the Caribbean, CTBTO started building capacity by providing free of charge training, equipment and software for Least Developed Countries (LDC).

77 USA reiterated on the importance of receiving data from CTBTO to close data gaps. He stressed that data needs to be available in a format that will facilitate data transfer.

78 PTWC suggested the Tsunami Unit to send a note of appreciation to CTBTO for sharing data.

3.5 STATUS OF OTHER ICGs

79 This agenda item was introduced by the Head of IOC Tsunami Unit, Mr Peter Koltermann. He summarized recent developments in the four Tsunami Warning Systems coordinated by the IOC Secretariat. He also addressed the results from the recent 2nd meeting of the TOWS Working Group.

80 The Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWS), at its 6th Session (Hyderabad, India, 7–9 April 2009. reviewed the progress made during the intersessional period. The six Working Groups, on: (1) seismic measurements, data collection and exchange; (2) sea-level data collection and exchange, including deep ocean tsunami detection instruments; (3) risk assessment; (4) modelling, forecasting and scenario development; (5) a system of interoperable advisory and warning centres; and (6) mitigation, preparedness and response, together with the Regional Tsunami Watch Provider (RTWP) Coordination Group and Indian Ocean Wave'09 Exercise Task Team, met in the intersessional period and provided the ICG with a summary of their activities and recommendations.

81 Based on these reports, the ICG decided to: (i) adopt the Guidelines on "Tsunami risk assessment and mitigation for the Indian Ocean: knowing your tsunami risk – and what to do about it" as submitted by Working Group 3; (ii) welcome the completion of the Indian Ocean Tsunami Hazard Map by Working Group 3; (iii) adopt revised Terms of Reference for the ICG/IOTWS Steering Group; (iv) establish a Task Team to review the Working Group Structure and Terms of Reference, noting the outcomes of the TOWS-2 meeting, and reporting to the Steering Group within six months; (v) invite the Working Group Chairs and Vice-Chairs to remain in place until the review of Working Group Structure and Terms of Reference is completed, submitted to and approved by the Seventh Session of the ICG/IOTWS; (vi) reconstitute the RTWP Coordination Group as the RTWP Task Team, reporting to Working Group 5.

82 The ICG elected Dr Jan Sopaheluwakan (Indonesia) as its Chairman and Dr Shailesh Nayak (India) and Mr Rick Bailey (Australia) as its Vice-Chairpersons for a term of 2 years commencing at the end of ICG/IOTWS-VI. The ICG/IOTWS decided to hold its Seventh Session in March or April 2010 in Indonesia.

83 The 23rd Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXIII) met in Apia, Samoa, 16–18 February 2009). In particular, the ICG adopted the PTWS Medium-term Strategy and a new PTWS Working Group structure and reviewed the progress on the PTWS Implementation Plan. The new Working Group structure comprises three Technical Working Groups (WG1 – Tsunami Risk Assessment and Reduction; WG 2 – Tsunami Detection, Warning and Dissemination; and WG 3 – Tsunami Awareness and Response, and four Regional Working Groups (WG 4 – Central American Pacific Coast; WG 5 – Southeast Pacific Region; WG 6 – Southwest Pacific Region; and WG 7 – South China Sea Region. The ICG also adopted revised Terms of Reference for the PTWS Steering Committee.

84 The 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 (ICG/NEAMTWS-V) met in Athens, Greece, 3–5 November 2008. It reviewed the progress made during the intersessional period (January–November 2008). The four Working Groups, on: (i) hazard assessment, risk and modelling; (ii) seismic and geophysical measurements; (iii) sea-level data collection and exchange, including offshore tsunami detection and instruments; and (iv) advisory, mitigation and public awareness, together with the Task Team on the NEAMTWS architecture, met in the intersessional period and reported to the ICG (ICG/NEAMTWS-V) on their activities.

85 Based on these WG reports, the ICG/NEAMTWS-V requested Member States to openly share and exchange all tsunami-relevant real-time observational data as appropriate and in accordance with the UNESCO/IOC Oceanographic Data Exchange Policy (IOC Resolution XXII-6). It further requested Member States to consider extra-budgetary contributions to IOC in support of NEAMTWS and to nominate National Tsunami Warning Focal Points (TWFP) and Tsunami National Contacts (TNC). It also decided to extend the duration and mandate of the Task Team on the NEAMTWS architecture. It also agreed on the revised Roles and

Requirements for the National Tsunami Watch Centres (NTWC) and the Regional Tsunami Watch Centres (RTWC), as detailed in the Task Team report. With respect to tsunami alert nomenclature, the ICG decided that the term “warning” will be used by the NTWCs only. The ICG decided that sea-level data from the NEAMTWS core network should be freely available to RTWCs and NTWCs once these are established. As an interim solution, these data can be provided to the IOC sea-level monitoring facility for real-time visualization and control of the operational status. The ICG/NEAMTWS decided to organize its 6th Session in November 2009 in Istanbul/Turkey.

86 Mr Koltermann also reported that following the announcements made at the 41st Session of the IOC Executive Council (Paris, 24 June–1 July 2008) and at the 5th Session of the ICG/NEAMTWS (Athens, 3–5 November 2008), the IOC Secretariat for ICG/NEAMTWS and Liaison Office with UN/ISDR was established on the Bonn UN Campus in January 2009, with initial financial contributions from Germany and UN-ISDR.

87 He then informed that the Second Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-II) was held in Paris at UNESCO Headquarters on 27 March 2009, under the co-chairmanship of Neville Smith (IOC Vice-chairman) and François Gérard (I-GOOS Chairman). The meeting reviewed progress with respect to actions and decisions taken by the Governing Bodies through Resolution XXIV-14 and Resolution EC-XLI.6, also in relation to the results of the Global Meeting of the Intergovernmental Coordination Groups for Tsunami Warning Systems (Paris, 24–27 March 2009). Highlights and recommendations from the meeting are the following:

- TOWS-WG-II report on the progress achieved by the ICG Chairpersons in working with the Member States and the TOWS-WG on the development of harmonized working group structures as a foundation for inter-operability, with a view to preparing recommendations for IOC principles, criteria and procedures for ocean-related hazards warning and mitigation systems
- Proposal to establish three inter-ICG Task Teams devoted respectively to sea level, preparedness, and tsunami watch operations, with a view to facilitate coordination of activities, development of common requirements and standards, and sharing of best practices
- Initial Draft Strategy and Plan for the Implementation of the Global Ocean-related Hazards Warning and Mitigation System Framework and of the TOWS-WG Recommendations, to be further elaborated based on the inputs from the ICGs
- Inclusion of requirements on the collection and exchange of real-time sea level data for tsunami warning purposes in the work programmes of JCOMM/GLOSS and JCOMM/DBCP, as well as the possible review the terms of reference of the GLOSS Group of Experts to reflect the operational requirements of the tsunami warning centres
- Need for ICGs to identify high-priority science issues that can benefit from contributions from IOC programmes and scientific and technical subsidiary bodies in the context of the Programme and Budget for 2010–2011
- Investigation with the CTBTO Secretariat to conclude an agreement about the provision of i.e. seismic data to TWCs and the coordination of related matters
- Investigation with other seismic networks of the possibilities for improved exchange and standardization of real-time seismic data and coordination of training programmes for global seismic monitoring for tsunami warning purposes
- Facilitation of the exchange, review and adoption of documents and guidelines related to risk assessment methodologies and other standards developed by the ICGs

- Development of a document with definitions and terminology on hazards, disasters, vulnerability and risks drawing on existing documents developed by bodies like UN/ISDR for use by the IOC Secretariat, its Subsidiary Bodies, and its programmes
- Assessment of the IOC Oceanographic Data Exchange Policy as it applies to tsunami warning systems and the monitoring of its implementation to ensure the open, free, and unrestricted sharing of tsunami-relevant observational data needed for timely and effective ocean-related hazard detection, analysis, and warning for coastal communities
- Possible revision of the terms of reference of GEBCO to promote and coordinate the development of high-resolution bathymetric data in coastal areas and digital elevation models.

3.6 NATIONAL PROGRESS REPORTS

88 Delegates made short presentations on main actions and status of their national tsunami and other coastal hazards warning systems. Anguilla (UK), Bermuda (UK), Barbados, Colombia, France, Nicaragua, USA and Saint Lucia presented National Reports.

89 Anguilla (UK) indicated that their TNC and TWFP are now officially nominated and described the Anguilla National Warning System (AWS) including its requirements, capabilities and policies. Its delegate described the different communication systems for warnings, based on the Common Alerting Protocol (CAP) model and briefly commented on future developments. She indicated that the message on the Honduras earthquake was received timely.

90 Bermuda reported on its participation in the Drill run by the West Coast and Alaska Tsunami Warning Center (WC/ATWC) for the Atlantic in 2 April 2009 (LANTEX09). He indicated that Bermuda does receive warnings through the Aeronautical Fixed Telecommunications Network (AFTN), Earth Alerts software (internet-based) and E-mail alert (internet-based). Bermuda indicated that no Tsunami model is available locally, or at least not that include local bathymetry. He emphasized that more need to be done in order to assess the threat from tsunamis, particularly through more accurate bathymetry data. He indicated that the recent Honduras earthquake highlighted shortcomings in the system including that messages are received from WCATWC as usual (not specifically referencing Bermuda) but no messages are received from PTWC. The Secretariat committed to check-up on the information transmitted to PTWC and correct it as needed to secure Bermuda receives the information from PTWC.

91 Colombia presented a report on the steps taken towards establishing their new Tsunami Warning System to be established in the near future. It reported that three (3) new tide gauges were installed and a second tsunami drill is planned to be executed in 2009 in Tumaco. The Seismologic Observatory of the South Occident (OSSO) has developed and published a study on Natural Hazards that impacted Venezuela, Colombia, Ecuador and Peru with the support of the European Commission. As well, Colombia hosted in May 2009 an international conference on tsunamis.

92 France reported that the Minister of Environment already decided to participate in the development of the four regional tsunami warning systems. In Martinique, one tide-gauge has been installed by the Conseil Général de la Martinique on the north-east part of the island, one tide-gauge is maintained by the SHOM in the harbour of Fort-de-France. None of these tide-gauges have real time transmission. Two tide-gauges with real time transmission will be installed in Guadeloupe during the fall of 2009. A tsunami awareness booklet was issued in French and Creole.

93 Nicaragua informed the meeting about a drill that took place on the Pacific coast, specifically in Masachapa. It served as a tool to assess gaps in the warning system. For

example, the system uses sirens equipment that lacks maintenance. Nicaragua reported that INETER is developing tsunami hazard maps. Referring to the recent Honduras earthquake, Nicaragua informed that they are providing advice and training to Honduras on seismic equipment and techniques.

94 Saint Lucia introduced its National Emergency Powers Act No. 5 of 1995 and the Disaster Management Act (30/2006) which empower the National Emergency Management Committee to, among other mandates, carry out a work programme to develop a master plan for the national implementation of a Tsunami and Coastal Hazard Warning System in collaboration and consistent with ICG/CARIBE-EWS efforts in that area. Saint Lucia indicated has a high priority to obtain inundation maps for tsunami.

95 USA presented the Puerto Rico component of the National Tsunami Hazard Program (NTHMP) and the Tsunami Ready Program, which is a set of basic criteria provided as a guideline to the communities so they can be prepared for a tsunami. As part of USA presentation the National Geophysics Data Center (NGDC) reported about the Hazards Data Web delivery, the Global Historic Tsunami Databases and the software for Tsunami Travel Time calculation and map display.

96 Answering the question concerning the free availability of this software, USA expressed their interest to explore necessary actions to make it freely available.

97 NGDC stated it bought software license to distribute it to Tsunami Focal Points. ITIC is in charge of distributing it. While the data is freely available, the travel time software has licensing though and they bought rights to develop it so they can give to ICG Member States. USA was given action to find out if they can make it freely available.

98 Complete presentation of National Reports available at http://www.ioc-unesco.org/index.php?option=com_oe&task=viewEventDocs&eventID=371.

3.7 INTERIM ADVISORY SERVICES REPORT (PTWC)

99 The Director of the NOAA Pacific Tsunami Warning Center (PTWC) Dr Charles McCreery presented the current status and outstanding issues of the Interim Operational Tsunami Warning Services provided to the CARIBE-EWS. He referred to issues dealing with the ICG/CARIBE EWS-II/11 “Communications Plan for the Interim Tsunami Advisory Information Service to the Caribbean Sea and Adjacent Regions”.

100 The Pacific Tsunami Warning Center (PTWC) Director gave his report on the intersessional activities of PTWC in its role as the Interim Advisory Services Provider for the CARIBE-EWS. He noted, in response to earlier ICG discussions, that PTWC products for the CARIBE-EWS are to be considered only as advice to governments of the region and not as an indication of an official state of alert. This is explicitly stated near the beginning of all PTWC text products. He also reviewed PTWC criteria for different levels of alert and remarked on key limitations to operational warnings that face all Tsunami Warning Centres and ICGs.

101 He noted that during the intersessional period, PTWC responded to over a 1000 earthquakes around the globe, issued a preliminary analysis for 863 of these, and issued official tsunami products for 49 earthquakes of which 6 were in the Caribbean or Atlantic. One of these was the magnitude 7.3 earthquake off the northwest coast of Honduras on 28 May 2009, that resulted in PTWC issuing a Local Tsunami Watch for nearby areas. He provided a timeline for the event showing that the initial watch message was disseminated 8 minutes after the event and cancellation about an hour later. Due to the lack of real time sea level data from the area, cancellation was only based on the passage of time as well as that the earthquake mechanism and magnitude were consistent with a very low probability of a destructive tsunami. PTWC

stated that the lack of real time sea level data remains an outstanding gap in the capabilities of the CARIBE-EWS.

102 Next, the PTWC Director gave preliminary results of a communications test conducted on 29 May 2009. In general, while it appears that all but one of the designated Tsunami Warning Focal Points (TWFP) received the test by one or more communication methods, positive confirmation of receipt by the TWFPs was only made for a small fraction of the designated methods. The Director emphasized the importance of getting a more comprehensive confirmation of communications, and reviewed the different means available for receiving bulletins —GTS, AFTN, EMWIN, Fax, Email, and RANET.

103 He then highlighted some recent or upcoming changes to U.S. TWC capabilities that include an IT modernization of both PTWC and WC/ATWC, a unified website for PTWC and WCATWC, and the recently completion of a dedicated high-speed communications network between PRSN, NEIC, PTWC and WC/ATWC. He also noted U.S. plans to install up to 10 new coastal sea level stations in the Caribbean that will significantly help TWCs to rapidly detect and evaluate Caribbean tsunamis such as the aforementioned Honduras event. Lastly, he noted that PTWC and WC/ATWC have now signed agreements with the CTBTO to receive seismic and hydro-acoustic data from their independent global network.

104 The PTWC Director then mentioned a number of tools available to Member States from the U.S. to help with their operational tsunami preparedness and response. These include the California Integrated Seismic Network real time earthquake display software, Tide Tool software for real time sea level monitoring and measurement, RANET for SMS tsunami alerts, and the Tsunami Bulletin Board for the electronic exchange of tsunami information between academic and government scientists and officials.

105 **The ICG thanked** the PTWC Director for his report and offered a number of comments in response. The USA noted the importance of communication tests and expressed concern, based on the report, that some Member States may not be receiving the messages. In particular, the USA was concerned about confirming the receipt of GTS messages as the primary method of dissemination and establishing an alternate means, such as EMWIN, in the absence of GTS capabilities. Bermuda noted that they have never received PTWC messages and recently communicated with PTWC regarding the issue. The Secretariat noted that Bermuda has not formally established a TWFP and reminded Member States that there is a formal process for establishing or changing the TWFP information through diplomatic channels to the IOC. The Secretariat also explained that such information, even if sent informally to the Secretariat, would be immediately forwarded to PTWC while waiting for the formal process to complete. The USA responded that even that process can be too slow if, for example, a TWFP needs to makes a change on a weekend or holiday. The PTWC Director noted that there have been discussions within the ICG/PTWS about establishing a more convenient electronic process for Member States to review and keep their TWFP information up to date. The Secretariat responded that this is up to Member States to decide on the appropriated mechanism.

106 USA Delegate stated that USA recognizes the importance of the interim services of PTWC to Caribbean and Member States and is concerned about GTS stated as primary communication mechanism while there are many Member States that do not have GTS. He indicated that there needs to be more communication tests, because the ICG needs to find out why the test messages did not get there.

107 With respect to the GTS communication mechanism, Mr Koltermann stated the ICG has discussed GTS *versus* other mechanisms. There is a need for WMO to ensure the GTS is available and working.

108 Bermuda stated they have submitted tsunami focal point information, but it is not indicated on the list of the Communications Test. It says “assumed received” but wonder if other Member States are listed incorrectly on the list?

109 The ICG Technical Secretary Mr Aliaga informed that there is a formal process for notification. Tsunami focal points information needs to be sent to the ICG Secretariat not to the PTWC, to follow the correct process. If information needs to be corrected or change, use the same process —send to the ICG Secretariat (who will then pass it on to PTWC).

110 Mr McCreery suggested a website where Member States could review their information and keep it up to date; a master data list. He thought the Secretariat was requested to do this website for other ICGs.

111 Saint Lucia stated they urge that that the process for updates be reviewed.

3.8 ITIC REPORT (TSUNAMI SIGNAGE)

112 Dr Laura Kong, ITIC Director, presented an information document on the signage adopted by the International Organization for Standardization (ISO) in 2008 ((Document IOC/CARIBE-EWS-IV/14). ISO 20712 on water safety signs and beach safety flags provides specifications (Annexes II-IV) and guidance (Annex V) on safety signs that provide information about aquatic hazards and the actions necessary to avoid these hazards. These include internationally agreed signage for a tsunami hazard zone, an evacuation area and an evacuation building. She also provided the example of New Zealand on the types of signage they have decided upon, as well as the community-based roll-out process for determining the appropriate hazard zone, response, and accompanying signage.

113 She emphasized the importance of education and awareness building to stakeholders and the public in order for the signage to become an effective and useful public safety tool.

114 The Chairperson invited to consider in coordination with their relevant national ISO partner organization to adopt the ISO signage in view of harmonising tsunami signage in use in the Caribbean with the ISO approved ones.

115 Responding to Anguilla (UK), Laura Kong indicated Member States can get the technical specifications for ISO signs from the ICG/CARIBE EWS-IV website or directly from ISO.

116 **The ICG agreed** to consider adopting the graphical symbols included in the ISO 20712 series on water safety and beach flag signs, to harmonize tsunami signage in the region.

4. WORKING GROUP PROGRESS REPORTS

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

117 This agenda item was presented by Mrs Christa von Hillebrandt-Andrade (USA), Chairperson of Working Group 1. She referred to document ICG/CARIBE EWS-IV/9 Working Group 1: Monitoring and Detection Systems, Warning Guidance. She provided a report on the Working Group activities during the intersessional period. The WG currently has 17 members. During the upcoming intersessional period it will seek to identify new members with expertise in sea level observations. The WG met in December in Guadeloupe and also maintained communication through electronic mail. In June 2008, an IOC/JCOMM/GLOSS/PRSN Caribbean Training Course for Operators of Sea Level Stations was held in Mayagüez, Puerto Rico. As part of this meeting a list of recommended sitting and operational requirements were approved. The Working Group 1 also prepared and submitted the “Technical, Logistical, and

Administrative Requirements of a Regional Tsunami Warning Centre for the CARIBE-EWS". Mrs von Hillebrandt-Andrade also represented the WG in the Global TWS Meeting in Paris, April 2009 and in the GLOSS Meeting, also held in Paris in May 2009.

118 The Working Group 1 presented a brief report on the status of seismic stations for CARIBE-EWS. To assess the performance of the 121 station core network of the CARIBE-EWS, Dr Dan McNamara of the United States Geological Survey (USGS) and member of WG1 conducted a Network Capability Modelling study. Results from the USGS Network Capability Modelling study indicate that the CARIBE-EWS minimum performance criteria can be achieved with the 121 station core seismic network. Of the 121 stations, there are 10 stations for which funding has yet to be identified. Efforts are also underway to engage the network operators of existing core stations but for which there is no real time data exchange.

119 According to Working Group 1 100 Sea Level stations, including 94 coastal gauges and 6 DART buoys have been identified as part of the CARIBE-EWS core sea level network. The coastal stations have been divided into high and medium priority stations. Of the 100 stations, only 18 coastal stations, all in the north-eastern Caribbean, Bahamas and Bermuda, and the 6 DART buoys are providing data within 15 minutes, the requirement for stations within the Caribbean due to the very rapid travel time of tsunamis to coastal areas. The CARIBE-EWS has been coordinating with regional and global seal level initiatives like the CARICOM Caribbean Center for Climate Change, which has upgraded 11 stations in the region and IOCARIBE-GOOS and GLOSS who have long standing projects in the region. The coordination with these efforts will support the multipurpose application of these sea level stations. The United States has also offered to install 11 sea level stations in the region.

120 Mrs von Hillebrandt-Andrade expressed that the lack of access to operating seismic stations in South America should be overcome to enhance the CARIBE-EWS capability by using the existing regional seismic network. The core network defined should contain a minimum of 121 stations in order to complain to standards.

121 Colombia reported that their seismic stations are now connected and providing seismic data to the regional network.

122 It was stressed by several delegates the need to continue working with CTBTO to enhance the region capacity for accessing seismic data.

123 Barbados commended the work of Working Group 1 and expressed concern about the sea level monitoring network. She indicated that the PTWC report on the Honduras earthquake clearly demonstrated the severe limitations in detection of a tsunami in the region. Barbados commented that a number of fragmented projects installing sea level gauges are ongoing and urged the representatives of Working Group 1 to make every effort to coordinate with these programmes.

124 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.1.

4.2 WORKING GROUP 2 PROGRESS REPORT: HAZARD ASSESSMENT

125 This agenda item was introduced by Israel Matos, ICG Vice-Chairman in absence of the other Officers of Working Group 2 that were unable to attend the meeting. He referred to document ICG/CARIBE EWS-IV/10 Working Group 2 Hazard Assessment.

126 In his report Mr Matos also reported on the status of implementation of actions agreed at the Working Group meeting in December 2008.

127 Mr Matos stated the need to consider the terms of reference and consider nomination of additional experts from Member States to Working Group 2.

128 Ms Von Hillebrandt informed that a workshop is to be held in Puerto Rico in December 2009, yet not noted in the actions from Working Group 3.

129 One of the recommendations of Working Group 2, which suggested only tsunami computer models that have passed certain benchmarks, as described in NOAA Technical Memorandum OAR PMEL-135, Standards, Criteria and Procedures for NOAA Evaluation of Tsunami Numerical Models (http://nctr.pmel.noaa.gov/ benchmark and the corresponding document for ICG/IOTWS) should be adopted for inundation modelling and forecasting, retained the attention of Delegates. In the discussion that ensued some Member States felt comfortable with adopting this benchmarking process. Mr Koltermann of the Tsunami Unit indicated that the quality control mechanism is appreciated, but standards are more necessary. He stated referring to a NOAA internal technical memorandum may be premature. Mr Koltermann emphasized on the need to consider providing alternatives for defining standards of modelling. USA stated that these recommendations came from international discussions with experts from different countries. The group agreed to elevate this matter to TOWS.

130 Under this agenda item, and following a recommendation of the ICG Officers and Working Group Meeting in December 2008, an invited presentation on the 1755 Lisbon Earthquake and the Portuguese Tsunami Warning System was delivered by Dr Ana Maria Baptista, Vice-Chairperson of ICG/NEAMTWS.

131 Main conclusions from her presentation were:

(i) that some controversy arises about the source of the 1755 earthquake. However, tsunami would occur briefly after the earthquake and the system need to be ready for any of the possible scenario. She indicated that Portugal intends to install three tsunameters off Portugal; and

(ii) while the backbone of a Portuguese TWS is in place more improvements and more technical staff are needed.

132 **The ICG recognized** the importance of developing methodologies that ensure benchmarking for tsunami computer models.

133 **The ICG encouraged** Member states to obtain bathymetric data from deep to shallow water, in support of modelling efforts, especially in the transition depths from 30 to 200 metres, as well as coastal topographic data.

134 **The ICG instructed** Working Group 2 to revisit the proposed recommendations in document ICG/CARIBE EWS-III.2 to identify priority areas that need ICG attention and report to ICG Officers no later than 30 September 2009 for subsequent submission by the secretariat to Member States for their comments and for consideration in ICG/CARIBE EWS-V.

135 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.2.

4.3 WORKING GROUP 3 PROGRESS REPORT: WARNING, DISSEMINATION AND COMMUNICATION

136 This agenda item was presented by Ms Elizabeth Klute (Anguilla, UK), Vice-chairperson of Working Group 3. She referred to document ICG/CARIBE EWS-IV/11 Working Group 3: Warning, Dissemination and Communication. Working Group 3 submitted the following recommendations to the ICG/CARIBE EWS-IV:

137 She referred to recurrent technological problems in some Member States with the World Meteorological Organization (WMO) Global Telecommunications System (GTS). She highlighted the fact that EMWIN is considered a backup system to GTS however some Caribbean countries do not have access to the GTS and to EMWIN.

138 Ms Klute reminded the Group that the implementation plan states that monthly communication tests will be carried out by the regional warning centre (interim). This has not happened to date.

139 Working Group 3 also discussed on the development of protocols for early warning and the discussion on the workshop on "Best Practices on Tsunami and Coastal Hazards Community Preparedness and Readiness in Central America and the Caribbean".

140 Under this agenda item, and following the recommendation of Working Group 3, Ms Klute offered a presentation on the Common Alerting Protocol (CAP) standard.

141 USA stated that EMWIN is mentioned as a backup, but it should be mentioned as equal to GTS. In many cases it is a primary system for Member States to get the latest information. He indicated that GTS is a two way system, but very expensive. EMWIN is less as expensive and just as effective.

142 With respect to the chairmanship of this WG, vacant by change of duties of its current Chairperson, during the officers meeting in December in Guadeloupe, it was decided that Mr Trevor Basden (Bahamas) current Vice-Chairman could assume the chairmanship and Ms Elizabeth Klute (UK, Anguilla) was proposed for Vice Chairpersonship. Barbados seconded by Saint Lucia supported the proposal.

143 **The ICG nominated** Mr Trevor Basden (Bahamas) as Chairman and Ms Elizabeth Klute (UK, Anguilla) as Vice Chairpersonship of Working Group 3.

144 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.3.

4.4 WORKING GROUP 4 PROGRESS REPORT: PREPAREDNESS, READINESS AND RESILIENCE

145 This agenda item was introduced by Ms Julie Leonard (USA), Chairperson of Working Group 4. Ms Leonard referred to document ICG/CARIBE EWS-IV/12 Working Group 4: Preparedness, Readiness and Resilience.

146 She reported that on 11–13 August 2008, ICG/CARIBE-EWS Working Group 4 held a meeting on "Best Practices on Tsunami and Coastal Hazards Community Preparedness and Readiness in Central America and the Caribbean", fulfilling a recommendation (III.4) made at the ICG/CARIBE-EWS-III session in Panama, March 2008.

147 The meeting was designed to explore and synthesize the essential elements for promoting community based preparedness, readiness and resilience with a focus on coastal communities and the multiple hazards they face. The 21 invited participants were leaders and/or planners of successful Central American and Caribbean experiences in the preparedness and readiness of coastal communities for reducing natural hazard risk. Regional and international organizations, as well as representatives of the academic sector, UN agencies and international NGOs also presented their experiences in supporting coastal community risk reduction activities. They were asked to address problem identification; methodology and strategy implementation; results achieved; and sustainability and transferability, as well as gender and media considerations.

148 The main results of the meeting, which will be circulated for Member State review by August 2009, include recommendations for capacity building and strengthening at the regional and national level, pointers for the development of standard operational procedures and concrete steps to move forward based on current initiatives and ongoing efforts (including educational aspects at community level as well as public-private liaisons and communications, as the main pillars for "Tsunami ready" communities). The principal recommendations, which support the development of a Caribbean wide tsunami and other coastal hazards early warning systems (CARIBE-EWS), are to:

- Identify communities vulnerable to tsunamis and other coastal hazards, and specific populations within these communities, such as physically handicapped, elderly, hospitalized, etc. Risk assessments should target these groups
- Develop educational and public awareness materials and campaigns that target vulnerable communities and take into account people with special needs. Warnings can only be effective if they reach the people who need to respond in a timely fashion and in a culturally understandable context
- Build bridges between the scientific and local communities to improve hazard mapping and evacuation planning as previously discussed
- Develop evacuation maps, and preparedness and mitigation plans in collaboration with vulnerable populations, to ensure the shared identification of problems and solutions
- Encourage and facilitate participation by non-governmental and private sector organizations in the development of national components of their early warning systems
- Utilize the services of the regional tsunami warning and information centres once established to support the above activities
- Convene a hands-on training workshop in 2010 in conjunction with WG-III in an area that has been affected by a tsunami and that has a community-based warning system in place, such as Masachapa, Nicaragua; Tumaco, Colombia; Mayaguez, Puerto Rico, (USA) and invite Member States to volunteer to host such a training/workshop
- Request that a representative of each of the above communities be invited to make a presentation at ICG-IV on the development of their community-based warning systems. Further recommend that Member States take advantage of this expertise and invite representatives of these systems to provide expert knowledge to their designated early warning and emergency authorities
- Follow the example of the Tsunamis in the Caribbean Symposium held in Venezuela in October 2008, promote the participation of the local communities in similar types of events.

149 Under this agenda item, and following the recommendation of Working Group 4 a presentation on TsunamiReady in Puerto Rico, USA, was made by Christa von Hillebrandt-Andrade, Director PRSN.

150 In response to interest expressed by Member States to use the TsunamiReady concept for the promotion and implementation of coastal hazard preparedness programmes, the United States of America notes that the term "TsunamiReady" is the trademarked name for a NOAA programme to recognize communities that have met certain standards for tsunami risk analysis and preparedness. Because the name is trademarked, NOAA technically is required to seek a licensing agreement with any other country that wishes to use it. NOAA is willing to work with the IOC and Caribbean Member States, however, to explore options for the use of "TsunamiReady". Current guidelines can be found at the following web-site: http://www.tsunamiready.noaa.gov/guidelines.htm.

151 Ms von Hillebrandt-Andrade from PRSN (US) reminded that TsunamiReady is not a certification but recognition to communities. Therefore is used by communities that meet the criteria.

152 Barbados congratulated the Chairperson and Working Group 4. Its Delegate indicated that Barbados is pleased to be part of the Working Group and see that the work has been accelerated and outcomes have been seen.

153 Responding to a request, the Tsunami Unit stated that technical experts can be nominated in writing to relevant Working Groups at any time by the Tsunami National Contacts.

154 Given the close collaboration represented in the achievement of objectives for Working Groups 3 and 4 Barbados strongly recommended a joint meeting of the two Working Groups possibly before ICG-V.

155 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.4.

5. POLICY MATTERS

5.1 ESTABLISHMENT OF A CARIBBEAN TSUNAMI WARNING CENTRE

156 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 Centre to be located in the region. Through Recommendation ICG/CARIBE EWS-II.12 ICG/CARIBE-EWS agreed to actively plan to take over the full responsibility for the system with a Caribbean Tsunami Warning Centre in the region by 2010.

157 She requested the Chairperson of Working Group 1 Mrs Christa von Hillebrandt-Andrade (USA) to present the “Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the CARIBE-EWS (document IOC/ICG/CARIBE-EWS-IV/13) in light of the ICG's goal to establish the Regional Tsunami Warning Centre by 2010.

158 A sessional Commission was immediately established and later during the session the Chairperson offered the floor to its Rapporteur to deliver the conclusions and recommendations of the sessional group.

159 The Chairman also requested comments and decisions from Member States on the next steps needed for the fulfilment of this recommendation, also considering the recommendations made by Working Group 1.

160 The United States introduced their phased approach to develop a Caribbean Tsunami Warning Centre, which establishes the following three planning phases, each with a discrete decision point that determines whether to proceed to the next phase:

1. Enhance tsunami outreach and education capacity in the Caribbean, in a manner complimentary with the efforts of CTIC.
2. Strengthen Caribbean Regional Tsunami monitoring.
3. Establish a Regional Tsunami Warning Centre at the University of Puerto Rico Mayaguez.

161 The results of each phase will determine next steps, including decisions about whether or not to continue the planning process. The U.S. will inform and consult with the ICG/CARIBE-EWS Member States as we go through this process.

162 In the first phase (FY 2009), the U.S. will hire a new Manager, Caribbean Tsunami Center, to be located at the University of Puerto Rico in Mayaguez (recruitment underway). In the second phase, the U.S. will identify requirements for improvements to seismic networks, sea level (coastal and deep-ocean) networks, communications infrastructure, and other elements of a tsunami detection system for the Caribbean. The requirements will help inform decisions about how the U.S. can enhance these networks. In the third phase, the U.S. may establish a tsunami warning centre co-located with the Puerto Rico Seismic Network at the University of Puerto Rico at Mayaguez.

163 France, Anguilla (UK) and Bermuda (UK) supported and thanked the US for its phased approach.

164 **The ICG acknowledged** with appreciation the United States deliberations to establish a Caribbean Tsunami Warning Centre in Puerto Rico, USA.

165 **The ICG urged** Member States to support the development of monitoring and observing capacity in accordance with the criteria identified in the "Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the CARIBE-EWS" in support of a Caribbean Tsunami Warning Centre.

166 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.5.

5.2 ESTABLISHMENT OF A CARIBBEAN TSUNAMI INFORMATION CENTRE (CTIC)

167 This agenda item was introduced by the Chairperson. She informed Delegates on recent funding developments enabling CTIC to be established soon and offered the floor to Mr Ian King (UNDP) to explain the background and status of funding for CTIC.

168 Mr Ian King (UNDP) introduced the Resilience Project and the Awareness Component and the support to the establishment of the CITIC.

169 Ms Julie Leonard, Chairperson of Working Group 4, reported on the recommendations of Working Group 4 (ICG/CARIBE EWS-IV/12) with respect to CTIC, most notably inviting the Government of France to collaborate with the CTIC through the proposed "Centre d'Information et de Ressources sur les Risques Naturels (Programme INTERREG III-B Espaces Caraibes)" and encouraging the governments of Barbados, France, Italy and Venezuela to maximize their cooperation/collaboration to share common services and information in all Caribbean languages towards the mitigation of tsunami and other coastal hazards.

170 Barbados indicated that the Minister of Home Affairs with responsibility for disaster management has agreed to the following:

- That Barbados should remain fully engaged in the process towards the establishment of the Caribbean Tsunami Warning Centre
- That Barbados should make a journal offer to the ICG to host the CTIC having successfully negotiated within UNDP for three years of funding
- The Barbados Delegation to the ICG is instructed to propose to the ICG that a strong commitment to the sustainability of the Centre be made by the participating Member States of the ICG
- Barbados would be in a position within two weeks to provide a definite position of its hosting of the CTIC.

171 France reported that on the initiative of the French government, two weeks ago in Barbados, the European Commission organized one high level technical meeting between the European Commission, CARIFORUM, European overseas countries and territories (OCTs) and

Outermost regions in the Caribbean area as well as the related member States of the European Union (United Kingdom, the Netherlands), on the establishment of a regional cooperation platform as a pilot project in the field of civil protection. The purpose of this event was to take stock of civil protection actions that are ongoing or planned in the region, to identify needs for increased coordination and possible additional measures, and to prepare the organization of the platform. This platform would take aim for three objectives/purposes: (i) prevention of crises; (ii) management of crises (response), and; (iii) management post crises.

172 This meeting allowed to improve awareness of crisis management tools and available financial instruments in the zone. It also allowed to stimulate membership and interest of OCTs. CDERA offered to manage the platform of collaboration after completion of six months feasibility study on the content of actions and priorities. The commission announced the launching of a feasibility study at the end of June 2009.

173 France emphasized this European initiative, which can unquestionably provide additional support for the different future actions undertaken within IOC in general and for the Caribbean and CTIC in particular.

174 France also expressed its wish to participate in and collaborate with the CTIC project. In particular France is willing to provide support for activities in and related to the French-speaking territories in the Caribbean. As well, France proposed to make a link between the IOC and the European Commission for the regional cooperation platform in the field of civil protection, in order to take into account the needs of the Caribbean area.

175 France stated that Regional Governments should be important partners for efforts related to CTIC. Provisional agreement has already been given by the Conseil Général de la Martinique and the “Conseil regional” de la Guadeloupe.

176 The Chairperson then offered the floor to the Chairman of the sessional commission established under agenda item 2.3. to deliver the conclusions and recommendations of the sessional group.

177 **The ICG noted** with appreciation that the UNDP has received €430,000 from the Government of Italy for the establishment of CTIC during the period 2009–2011, as well as that IOC has considered $30,000 for CTIC in its Regular Budget 2010–2011.

178 **The ICG requested** Member States and donors to consider reinforcing the CTIC through the mechanism of secondments.

179 **The ICG acknowledged** that Nicaragua and France have indicated a willingness to support the secondment of technical staff to the CTIC and to support the work of CTIC through the provision of technical services and data from existing equipment.

180 **The ICG decided** to establish the CTIC **and endorsed** the Barbados proposal to host the CTIC.

181 **The ICG approved** Recommendation ICG/CARIBE EWS-IV.6.

5.3 SECRETARIAT TO ICG/CARIBE EWS

182 The Chairman recalled that the Group, through Recommendation ICG/CARIBE EWS-II.9, instructed the IOC Executive Secretary to seek for ways and means to secure funds for the establishment of a permanent CARIBE-EWS technical secretariat; it further instructed the IOC Executive Secretary to open a special IOC “CARIBE-EWS” Subsidiary Special Account to allow Member States and organizations to provide funds for the establishment of a permanent CARIBE-EWS Technical Secretariat.

183 The Head of the Tsunami Unit informed the meeting on the existing arrangements for the servicing of the ICG/CARIBE-EWS, reporting that no new funding is yet available for establishing the Secretariat to the ICG/CARIBE-EWS in the region.

184 There was no decision associated to this agenda item.

5.4 ICG/CARIBE EWS COMMENTS TO THE TOWS-WG REPORT

185 The Chairman introduced this agenda item and informed the meeting that ICG Officers and Working Group Chairs attended the Global Meeting of the Intergovernmental Coordination Groups for Tsunami Warning Systems (Paris, 24–26 March 2009). Officers also attended the Second Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-II) (Paris, 27 March 2009). She then ask the Head of the Tsunami Unit, Peter Koltermann to introduce the highlights and recommendations from the Second TOWS-WG meeting, which are the following:

- TOWS WG-II report on the progress achieved by the ICG Chairpersons in working with the Member States and the TOWS-WG on the development of harmonized working group structures as a foundation for inter-operability, with a view to preparing recommendations for IOC principles, criteria and procedures for ocean-related hazards warning and mitigation systems
- Proposal to establish three inter-ICG Task Teams devoted respectively to sea level, preparedness, and tsunami watch operations, with a view to facilitate coordination of activities, development of common requirements and standards, and sharing of best practices
- Initial Draft Strategy and Plan for the Implementation of the Global Ocean-related Hazards Warning and Mitigation System Framework and of the TOWS-WG Recommendations, to be further elaborated based on the inputs from the ICGs
- Inclusion of requirements on the collection and exchange of real-time sea level data for tsunami warning purposes in the work programmes of JCOMM/GLOSS and JCOMM/DBCP, as well as the possible review of GLOSS terms of reference to reflect the operational requirements of the tsunami warning centres
- Need for ICGs to identify high-priority science issues that can benefit from contributions from IOC programmes and scientific and technical subsidiary bodies in the context of the Programme and Budget for 2010–2011 and developing a whole-of-IOC perspective
- Investigation with the CTBTO Secretariat to conclude an agreement about the provision of seismic data to TWCs and the coordination of related matters
- Investigation with CTBTO and other seismic networks of the possibilities for improved exchange and standardization of real-time seismic data and coordination of training programmes for global seismic monitoring for tsunami warning purposes
- Facilitation of the exchange, review and adoption of documents and guidelines related to risk assessment methodologies and other standards developed by the ICGs
- Development of a document with definitions and terminology on hazards, disasters, vulnerability and risks drawing on existing documents developed by bodies like UN/ISDR for use by the IOC Secretariat, its Subsidiary Bodies, and its programmes
- Assessment of the IOC Oceanographic Data Exchange Policy as it applies to tsunami warning systems and the monitoring of its implementation to ensure the open, free, and unrestricted sharing of tsunami-relevant observational data needed

for timely and effective ocean-related hazard detection, analysis, and warning for coastal communities

- Possible revision of the terms of reference of GEBCO to promote and coordinate the development of high-resolution bathymetric data in coastal areas and digital elevation models

186 There was no decision associated to this agenda item.

6. UPDATES TO THE CARIBE EWS IMPLEMENTATION PLAN

187 This agenda item was introduced by the ICG/CARIBE-EWS Technical Secretary. He referred to document ICG/CARIBE EWS-III/13, "CARIBE-EWS Implementation Plan" and to the amendments proposed by Working Group 1.

188 France provided a presentation on its plan to collect LiDAR bathymetry to 30 m around its coasts. They further reported that the survey data resolutions are 50 cm on land and 30-50 m at sea. Costs were charged per hour and dependent on the topography complexity. The Martinique LiDAR project cost is 2 million euros, with $0.2 million required for the land survey. They estimated that the cost to extend the survey from 30 to 200 m water depth would be 4 million euros.

189 Member States expressed interest in the value of such data as it was recognized to be a critical input for obtaining realistic inundation maps. Bermuda and Saint Lucia highlighted the importance of sharing with other countries the value of the new technologies for improving coastal inundation modelling. Nicaragua informed the group that it currently has a community-level project for the Pacific coast and would like to use the best data so as to give realistic results.

190 The Head of the Tsunami Unit noted that presently LiDAR surveys are carried out with different goals and costs, such as for chemical and biological characteristics, or to obtain bathymetry, but noted that these are not complementary. The focus of LiDAR has been for 0-30 m typically. He emphasized, however, that the tsunami is concerned with all depths.

191 The Group agreed that Working Group 2 should address this topic of depth requirements of high-resolution bathymetry for inundation modelling, especially since the costs of extending LiDAR surveys to a 200-m depth are very high.

192 The Chairperson thanked Nicaragua and other Member States for their comments, noting that the concern and need was common to all countries. She looked forward to the contributions of France in sharing their experience and in assisting other countries in the developing of good studies based on their experience. France is seeking the LiDAR project support from European 'INTERREG' Programme, indicating that other countries could take advantage of the same programme. France suggested a coordinated approach and offered to explore this funding opportunity on behalf of the ICG.

193 Bermuda emphasized that it would be desirable to have a regional project, rather than independently since there may be a fixed costs for the initial effort, but additional nearby surveys would be cost-effective.

194 The Technical Secretary for IOCARIBE noted that bathymetry is a main requirement for inundation studies. He reminded the group that the IOC has a long-time project for obtaining and improving the GEBCO-based maps. For the Caribbean, the IBCCA Chart is available and updated regularly. He reminded all countries that good bathymetry is a very large need to national planners concerned with future coastal development critical to sustaining their economies. He noted that over 50% of some Caribbean countries GNPs are dependent of

tourism. He emphasized that Tsunami National Contacts should team up with these stakeholders strongly in order to build a strong justification for obtaining the needed bathymetric data.

195 **The ICG recommended** updating continuously the CARIBE-EWS Implementation Plan for the establishment of the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions in order to better assess the implementation rate and performance measures.

7. PROGRAMME AND BUDGET FOR 2010–2011

196 The Chairman of the sessional commission established under agenda item 2.3 delivered the conclusions and recommendations of the sessional commission.

197 **The ICG requested** Member States to report to the Secretariat on the funding they make available to their own national TWS and to contribute to the operation of the CARIBE-EWS.

198 **The ICG approved** Recommendation ICG/CARIBE EWS-III.7.

8. NEXT SESSION

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

199 The Chairperson introduced this agenda item. She recalled that at ICG/CARIBE EWS-III, Cuba informed the Plenary that they will consider hosting the Fifth session subject to Government's approval. She reported that the Secretariat had not received a positive response. Member States were therefore requested to make offers to host the ICG/CARIBE EWS-V.

200 Nicaragua kindly offered to host the Fifth Session of the ICG/CARIBE EWS in 2010.

201 **The ICG acknowledged** this offer with appreciation.

8.2 TARGET DATE FOR ICG/CARIBE EWS-VI

202 **The ICG agreed** on March 2011 as a target date for the Sixth Session of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards for the Caribbean and Adjacent Regions.

9. ANY OTHER BUSINESS

203 No other business was proposed.

10. ADOPTION OF DECISIONS AND RECOMMENDATIONS

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

205 The text of adopted recommendations is given in Annex II.

11. CLOSURE

206 The ICG/CARIBE-EWS Chairperson thanked the Government of France and the "Conseil Général de la Martinique" for hosting the meeting. She also thanked the Local Organizing Committee for the excellent facilities provided for the organization of the meeting.

207 The Fourth Session of the IOC Intergovernmental Coordination Group for the Tsunami and other Coastal Hazads Warning System for the Caribbean Sea and Adjacent Regions was closed at 18.00 hrs at the Hotel Batelière, Fort-de-France, Martinique, on Friday, 5 June 2009.

ANNEX I

AGENDA

1. WELCOME AND OPENING

1.1. Dr Peter Koltermann, Head of the Tsunami Coordination Unit, UNESCO`s Intergovernmental Oceanographic Commission

1.2. Dr Lorna Inniss: Deputy Director, Coastal Zone Management unit

1.3. Mr Claude Lise, Senateur et President du Conseil Général de la Martinique

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. CHAIRMAN'S REPORT

3.3. CARIBE EWS SECRETARIAT REPORT

3.4. REPORTS FROM UN AND NON UN AGENCIES

3.4.1 CTBTO report on availability and access to IMS data

3.5. STATUS OF OTHER ICGS

3.6. NATIONAL PROGRESS REPORTS

3.7. INTERIM ADVISORY SERVICES REPORT (PTWC)

4. WORKING GROUP PROGRESS REPORTS

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

4.2. WORKING GROUP 2 PROGRESS REPORT: HAZARD ASSESSMENT

4.3. WORKING GROUP 3 PROGRESS REPORT: WARNING, DISSEMINATION AND COMMUNICATION

4.4. WORKING GROUP 4 PROGRESS REPORT: PREPAREDNESS, READINESS AND RESILIENCE

5. POLICY MATTERS

5.1. ESTABLISHMENT OF A CARIBBEAN TSUNAMI WARNING CENTER

5.2. ESTABLISHMENT OF A CARIBBEAN TSUNAMI INFORMATION CENTER (CTIC)

5.3. SECRETARIAT TO ICG/CARIBE EWS

5.4 ICG/CARIBE EWS COMMENTS TO THE WG TOWS REPORT

6. UPDATES TO THE CARIBE EWS IMPLEMENTATION PLAN

7. PROGRAMME AND BUDGET FOR 2010–2011

8. NEXT SESSION

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

8.2. TARGET DATE FOR ICG/CARIBE EWS-VI

9. OTHER BUSINESS

10. ADOPTION OF DECISIONS AND RECOMMENDATIONS

11. CLOSURE

ANNEX II

RECOMMENDATIONS

Recommendation ICG/CARIBE EWS IV.1

MONITORING AND DETECTION SYSTEMS, WARNING GUIDANCE

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

Noting the report of Working Group 1 Monitoring and Detection Systems, Warning Guidance,

Having considered the reports of the Regional Seismic Network Operators Workshop (Trinidad and Tobago, 2008), the IOC/JCOMM/GLOSS/PRSN Caribbean Training Course for Operators of Sea Level Stations (Puerto Rico, 2008),

Having reviewed the status of the seismic and sea level stations in the region,

Endorses the revised core network of seismic stations as defined in the section 3.1.2 of the CARIBE-EWS Implementation Plan (IOC Technical Series 78);

Recognizes and acknowledges the efforts of Member States and stakeholders in the continued improvement quality of the seismic data and the number of seismic stations contributing to the CARIBE-EWS;

Encourages that the continuous seismic data be sent to global data centres to facilitate research to improve the understanding of the seismic hazards;

Welcomes the Memorandum of Cooperation between the CTBTO and IOC to facilitate the access of primary and secondary data to the CARIBE-EWS;

Endorses the new and expanded core network of sea level stations as defined in the section 3.1.3 of CARIBE-EWS Implementation Plan (IOC Technical Series 78);

Recognizes that the existing network of sea level stations in the region does not meet the needs of the CARIBE EWS as defined in the core network;

Urges Member States and other stakeholders to provide funding to support the acquisition, installation, maintenance and operation of core seismic and sea level stations contributing data to meet the full needs of the CARIBE-EWS and strengthen the communication systems of the monitoring centres exchanging data with the warning centres to ensure data availability;

Acknowledges that the United States plans to install eleven (11) sea level stations in the region;

Acknowledges also NOAA NESDIS for providing a GOES channel for the near real time transmission of Caribbean Sea level data;

Endorses the list of criteria and standards for the sea level stations in the Caribbean as described in the IOC/JCOM/GLOSS/PRSN Caribbean Training Course for Operators of Sea Level Stations and defined in the section 3.1.3 of the CARIBE EWS Implementation Plan.

Financial Implications: None

Recommendation ICG/CARIBE EWS IV.2

HAZARD ASSESSMENT

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

Having considered the Report of Working Group 2 on Hazard Assessment (ICG/CARIBE-EWS IV/10),

Recalling document ICG/CARIBE-EWS-III/8 (Recommendations Status Report),

Acknowledging with appreciation the excellent work of the Norwegian Geotechnical Institute NGI, in support of the CARIBE EWS,

Noting that France has conducted and is planning several bathymetric mapping projects, and United States is conducting mapping activities,

Noting the benchmarks described in NOAA Technical Memorandum OAR PMEL-135, Standards, Criteria and Procedures for NOAA Evaluation of Tsunami Numerical Models (http://nctr.pmel.noaa.gov/ benchmark and the corresponding document for ICG/IOTWS) for inundation modelling and forecasting,

Recognizes the importance of developing methodologies that ensure compatibility of tsunami computer models for propagation and inundation modelling and forecasting;

Agrees that ICG/CARIBE-EWS propose to TOWS to establish a task team as soon as possible to develop appropriate modelling standards;

Supports the recommendation to evaluate shallow bathymetry obtained from satellite imagery;

Encourages Member States to obtain bathymetric data from deep to shallow water, in support of modelling efforts, especially in the transition depths from 30 to 200 metres, as well as coastal topographic data;

Instructs Working Group 2 to revisit recommendation ICG/CARIBE EWS-III.2 to identify priority areas that need ICG attention;

Further instructs Working Group 2 to report to ICG Officers no later than 30 September 2009 for subsequent submission by the secretariat to Member States for their comments and for consideration at ICG/CARIBE EWS-V.

Financial Implications: None

Recommendation ICG/CARIBE EWS IV.3

WARNING, DISSEMINATION AND COMMUNICATION

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

Recalling Recommendation ICG/CARIBE-EWS-III.3,

Recognizing the urgent need to establish protocols for warning, dissemination and communication for the Tsunami and other Coastal Hazard Warning System for the Caribbean Sea and Adjacent Regions,

Noting the adoption by WMO of the International Telecommunications Union (ITU) Common Alerting Protocol (CAP) standard,

Urges Member States to work with WMO to resolve any GTS programming problems, and to consider EMWIN as an alternate primary system to GTS, therefore embracing it as an official method for receiving tsunami alerts;

Further urges Member States to ensure the necessary close cooperation between national authorities such as National Meteorological and Hydrological Services NMHS and Tsunami Warning Centres to receive and transmit tsunami-related data and information, e.g. using the WMO's GTS;

Requests the Secretariat to translate into French and Spanish the adapted IOC Country Assessment Questionnaire and submit to non-CDERA Member States for complete inventory of their communications capabilities;

Urges Member States to work to standardize national protocols and operating procedures to reduce response time; and to inform about the development of response protocols based on the results of the CDERA Tsunami and Coastal Hazards Warning System Project;

Request Member States Tsunami Warning Focal Points to actively participate in the interim regional warning centre communication tests.

Financial implications: None

Recommendation ICG/CARIBE EWS IV.4

PREPAREDNESS, READINESS AND RESILIENCE

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

Recalling Recommendation ICG/CARIBE EWS-III.4,

Taking note of the Working Group 4 Progress Report, including the recommendations from the workshop on "Best Practices on Tsunami and Coastal Hazards Community Preparedness and Readiness in Central America and the Caribbean" held in Panama, in August of 2008,

Recognizing the significant resources from the Government of France (Programme INTERREG III-B and INTERREG IV-B Espaces Caraibes) and the Government of Italy (via the United Nations Development Programme - Barbados and the Organization of Eastern Caribbean States) for activities on natural hazard vulnerability and risk reduction, including tsunami and coastal hazards,

Urges Member States to consider the recommendations of the "Best Practices on Tsunami and Coastal Hazards Community Preparedness and Readiness" workshop;

Recommends that, following the example of the Tsunamis in the Caribbean Symposium held in Venezuela in October 2008, Member States consider promoting the participation of the local communities in similar types of events;

Decides to convene a hands-on training workshop in 2010 in a Member State that has been affected by a tsunami and that has a community-based warning system in place, and invite Member States to volunteer to host such a training workshop**.**

Financial Implications: None

Recommendation ICG/CARIBE EWS IV.5

REGIONAL TSUNAMI WARNING CENTRE

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

Recalling IOC Resolution EC-XLI.6, Recommendations ICG/CARIBE EWS-II.3, II.12 and III.1, and the CARIBE-EWS Implementation Plan (IOC Technical Series 78),

Acknowledges the interim services provided by the Pacific Tsunami Warning Center (PTWC) to Members States of Caribbean and Adjacent Regions;

Considering the technical, logistical, and administrative requirements of a Regional Tsunami Warning Centre for the CARIBE EWS developed by Working Group 1 on Monitoring and Detection Systems and Warning Guidance (Doc. ICG/CARIBE-EWS V/13),

Welcomes and **appreciates** the United States deliberations to establish a Caribbean Tsunami Warning Centre in Puerto Rico, USA;

Approves the criteria for a Regional Tsunami Warning Centre as identified in the Working Group 1 report on the "Technical, Logistical, and Administrative Requirements of a Regional Tsunami Warning Centre for the CARIBE EWS", (Doc. ICG/CARIBE-EWS IV/13);

Invites Member States to submit proposals for the establishment of a Caribbean Tsunami Warning Centre;

Urges Member States to support the development of monitoring and observing capacity in accordance with the criteria identified in the "Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the CARIBE EWS" in support of a Caribbean Tsunami Warning Centre.

Financial Implications: None

Recommendation ICG/CARIBE EWS IV.6

CARIBBEAN TSUNAMI INFORMATION CENTRE (CTIC)

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

Notes with appreciation the work of the Coastal Zone Management Unit, Barbados in providing interim CTIC services to the region with the help of ITIC;

Further notes with appreciation that the UNDP has received € 430,000 from the Government of Italy for the establishment of CTIC during the period 2009–2011, as well as that IOC has considered $ 30,000 for CTIC in its Regular Budget for 2010–2011;

Declares that the CTIC would provide services to the all ICG/CARIBE-EWS Members States reflecting the full multi-cultural and multi-lingual character of the region;

Recognizes that existing institutions within the region e.g. CRID, CDERA, CEPREDENAC are potential partners of the CTIC;

Takes note of the possibility of using the mechanism of temporary secondments to CTIC, which would facilitate contributions by Member States, language diversity and enhanced Member States' access to dedicated services, capacity building, and adoption of best practices;

Encourages Member States and donors to consider reinforcing the CTIC through the mechanism of secondments;

Acknowledges that Nicaragua and France have indicated a willingness to support the secondment of technical staff to the CTIC and to support the work of CTIC through the provision of technical services and data from existing equipment;

Further acknowledges that France has indicated its willingness to provide support for activities in, and related to, the French-speaking territories in the Caribbean;

Welcomes the offer by France to liaise between the ICG/CARIBE-EWS and the European Commission regarding regional cooperation in the field of civil protection, in order that the needs of the Caribbean zone are taken into account;

Acknowledges that the ITIC has offered to provide technical assistance, training, public awareness materials and other support as requested by the CTIC;

Notes the need for consideration of harmonization between the ITIC and the CTIC especially in relation to those countries having both Pacific and Caribbean coasts,

Requests that the budget of CTIC consider funding to secure continued cooperation and reinforcement of links among National Emergency Managers from all Member States within the Caribbean;

Recommends that Member States identify funding for CTIC activities within their annual regular budgets;

Decides to establish the CTIC and **endorses** the Barbados proposal to host the CTIC.

Instructs the Secretariat to initiate negotiations as soon as possible with UNDP and the Government of Barbados towards the definition of the administrative and logistic arrangements that will lead to establishing and launching CTIC in 2009.

Financial Implication: $ 30,000 from the Regular Programme Budget
€ 430,000 from UNDP/Italy

Recommendation ICG/CARIBE EWS-IV.7

CARIBE-EWS BUDGET FOR THE BIENNIUM (2010–2011)

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

Recognizing the establishment of a Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions,

Noting the need for sustained funding for building and maintaining the CARIBE-EWS,

Recalling the decisions and results of ICG/CARIBE EWS-II, Recommendation ICG/CARIBE EWS-II.10 and IOC Resolutions XXIII-13 and XXIV-13,

Emphasizing the need for enhancing the tsunami warning aspects in a multi-hazards approach in order to use other available systems and financial sources,

Acknowledging that Member States and other UN bodies and organizations are willing to assist in the establishment of a Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions,

Bearing in mind that almost all Member States have a communication system (GTS/EMWIN) at their National Meteorological and Hydrological Services that can be used as the backbone communication system for tsunami warnings,

Having considered the decision of the ICG/CARIBE EWS-II to establish a Regional Tsunami Warning Centre;

Considering also the forthcoming establishment of the CTIC;

Further considering the Recommendations of the ICG/CARIBE EWS-III in Panama City along with its Implementation Plan,

Recommends to update continuously the CARIBE-EWS Implementation Plan (IOC Technical Series 78) for the establishment of the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions in order to better assess the implementation rate and performance measures;

Invites Member States to indicate the funding they make available to their own national Tsunami Warning Systems and to contribute to the operation of the CARIBE-EWS;

Urges the IOC Secretariat to seek financial resources to implement the Tsunami and other Coastal Hazards Warning System for the Caribbean Sea and Adjacent Regions, noting that IOC has allocated $ 60,000 from the Regular Budget 2010–2011 to ICG/CARIBE-EWS to support activities of the interim Secretariat.

Financial Implication: in US$

CARIBE-EWS Programme and Budget Biennium 2010–2011

		Extra Budgetary		
	Regular Budget	**Not available**	**Available**	**Total**
Capacity Building	30,000	150,000	90,000	270,000
Comm. & Equipment	000		4.980,000	4,980,000
Data collection & Mapping			10,164,000	10,164,000
Administration	30,000			30,000
Operational Warning Services			280,000	280,000
Outreach Education	000		3,093,000	3,093.000
Permanent Secretariat	000	450,000		450,000
TOTAL	**60,000**	**600,000**	**18,607,000**	**19,267,000**

ANNEX III

SPEECHES

A. Opening Address
Dr Patricio Bernal, ADG/IOC and Executive Secretary of IOC,

2 June 2009[2]

M le Sénateur et Président du Conseil Général de la Martinique, M Lise
Mme Lorna Inniss, ICG/CARIBE EWS Chair.
M Israel Mateos, ICG/CARIBE-EWS vice-chair
M Jean-Paul Jouanelle, Représentant du comité d'organisation local
M Steve Tait, Chef de la Délégation de la France

Excellences, délégués des pays membres, chers collègues,

C'est avec grand plaisir que je vous souhaite la bienvenue en Martinique à l'occasion de la quatrième session de l'ICG/CARIBE-EWS. Je regrette sincèrement de ne pouvoir partager en personne avec vous les progrès importants que j'ai noté dans le développement rapide du CARIBE-EWS depuis notre dernière réunion à Panama City.

Ce congrès représente une étape importante dans nos efforts collectifs pour mettre en place un système global et rapide d'alerte aux tsunamis, vous êtes proches de la phase opérationnelle.

Aujourd'hui, nous devons donc commencer par célébrer les remarquables progrès que nous avons faits tous tout au long des 4 dernières années, depuis le tsunami de l'Océan Indien de décembre 2004.

La dévastation provoquée par cette catastrophe sans précédent reste très présente dans tous nos esprits. Elle a tragiquement démontré combien nous étions tous mal préparés pour un tel désastre, et le besoin urgent d'une stratégie globale pour fournir au monde entier une protection contre les tsunamis.

Le système du Pacifique et le plus ancien, établi cela fait plus de quatre décennies. Les trois nouveaux systèmes se sont construits à partir de l'expérience acquise dans le Pacifique. Ils ont tous adopté une approche complète basée sur 3 composants interdépendants : premièrement une évaluation du danger des tsunamis, deuxièmement l'élaboration d'un système de détection/alerte des tsunamis ; et troisièmement l'adoption de mesures de préparation. Jusqu'au moment où le CARIBE-EWS deviendra complètement indépendant, le PTWC fourni la couverture essentielle pour la Caraïbe, comme c'est le cas depuis février 2005. Nous sommes tous reconnaissants aux Etats Unis de fournir cette prestation par intérim.

All three components I mentioned are needed: to warn. Without preparing the response when confronted by an emergency is no help at all; and risk assessments are vital in helping countries to focus and prioritize their disaster preparedness strategies. However, while maintaining this comprehensive approach, the new systems follow a slightly different governance model from the Pacific system.

They are nationally owned end-to-end systems. Their smooth functioning requires the direct and sustained involvement of all Member States, who participate both independently and as part of a regional system. It also requires careful coordination and harmonization within and across all four systems, in order to ensure global coherence while enabling Member States to maintain

[2] Delivered by Mr P. Koltermann, Head of the Tsunami Unit

their regional autonomy and visibility. Global coverage can only be ensured by agreeing and following common standards and procedures and meeting common requirements. I note with great pleasure how France, as the only country being a full member of all four Tsunami Warning Systems, and in particular Martinique are strongly involved and committed to meet these challenges.

This is where the role of an intergovernmental body like IOC is so important. Your agenda and deliberations will also be guided by the Resolution 41.6 adopted at the 41st session of IOC's Executive Council last June. Resolution 41.6 affirms the need for common requirements for regional tsunami warning systems and for harmonizing regional ICG structures to create efficiency and facilitate the exchange of knowledge and information. It also recognizes that different ocean regions have certain characteristics that are unique and require specialized approaches.

The Director General of UNESCO, Mr. Matsuura highlighted at the Global Meeting of all ICGs in Paris in March 2009 the commitment of the Organization to the development of the Tsunami Warning Systems, and where it can contribute with UNESCO's assets: preserving your cultural heritage and assisting your aspirations to provide better services to your people.

The PTWS has helped to form the CARIBE-EWS, you have advanced the structure and philosophy of TWSs. As for the other systems a new approach to providing global coverage is well underway.

The achievements of the CARIBE-EWS, coordinated by the IOC are to be applauded. Applause is nice, but we all have to improve and extend those services. That is no mean task, and I see with great appreciation how the CARIBE-EWS is moving fast. To be successful, and meet the underlining urgency we all have to work hard, and for the Secretariat I can assure you the full and lasting support for your work.

Finally I want to thank the Conseil Général de la Martinique and the Government of France for the invitation to finally meet here, and the opportunity to convene a crucial meeting for this region. The CARIBE-EWS is close to coming off age. That still is a big step, and needs all efforts and member states' commitment. I wish you all a successful and effective meeting.

B. Opening Address
Dr Lorna Inniss, Chairperon of the ICG/CARIBE-EWS,

2 June 2009

Your Excellency, Mr Claude Lise, Sénateur et Président du Conseil général de la Martinique.
Mr Steve Taitt, Head of the Delegation of France to the ICG-IV.
Mr Jean Paul Jouanelle, Representative of the "Conseil général de la Martinique" and Master of Ceremonies,
Mr Peter Koltermann, Head of the Tsunami Unit of the Intergovernmental Oceanographic Commission of UNESCO
Heads of Delegation and other Delegates of the Member States of the ICG,
Observers to the ICG,
Representatives of UN organisations
Members of the Media,
Ladies and Gentlemen:

I have the distinct honour, as the current Chair of the Caribbean Intergovernmental Coordination Group, and on behalf of the two Vice Chairs, to welcome you to this fourth session here in Martinique. We appreciate the gracious hospitality of the Government of the Republic of France through the Local Organising Committee, facilitating our arrival at this beautiful location. Your Excellency, please convey our sincere gratitude to your Government for hosting this meeting. We have a challenging agenda this week, and the excellent organisation here will help us to achieve our goals.

We regret the fact that our colleagues from Honduras are unable to be with us, due to the recent earthquake experienced in that country. The loss of life and damage suffered is grim reminder of the potential devastation and upheaval such phenomena leave in their wake. Our thoughts are with them in this difficult period. However, the triggering of the Caribbean tsunami early warning system makes what we are doing here this week all the more critical. While we deplore the losses incurred with such events, we must emphasize the need to monitor the performance of our early warning system to permit improvements to the system in preparation for any future alerts.

While we are here, many or all of our Governments are also participating in difficult negotiations on a new climate change agreement. Indeed, some countries are fighting for their very survival, especially as we consider that many of the 2007 predictions of the Intergovernmental Panel on Climate Change, especially those related to sea level rise and natural hazards have already been exceeded. Some small economies and islands are already feeling the effects of these extreme environmental changes. I am therefore pleased to welcome representatives from some of our small island developing states, who have tried to work with the ICG in spite of the constraints of their travel budgets.

In addition to the climate change issues being debated in Bonn, many of our Governments are grappling with recent outcomes and future uncertainties of the global economic crisis at the domestic level. While these financial constraints are already impacting the ICG, it is clear that the potential economic impacts of coastal hazards are well enough understood, to ensure that this priority will not be removed from the international agenda for many years to come. This ICG forum presents a unique opportunity for us in the Caribbean and Adjacent Regions, to work together for the mitigation of losses in respect of tsunamis and other coastal hazards for our countries. We cannot rest until we have a well-functioning and maintained, sustainable, global early warning system for our vulnerable populations.

And it is in this context that we applaud the efforts of the Republic of France to identify clearly its commitment and concrete actions towards the attainment of this global system, as well as the Government's proposal to forge stronger linkages with the other Member States of the

Caribbean region. Indeed, Senateur Courteau's 2007 report on tsunami early warning systems worldwide highlighted several areas where improvement is needed. I therefore welcome the recent invitation by the French Senate to speak on the Caribbean early warning system and its requirements, at their upcoming public hearing later this month.

Today, we laud tall Member States for their contribution, in ways great and small, to the realization of our objective. We also recognize the significant contribution of the Government of the United States to the efforts of the ICG Working Groups. Every Member State is needed, and we would like to celebrate the collaboration of all our partners in the region.

On behalf of the Member States of the ICG, I would like to recognize the sterling work of the able staff of the Tsunami Unit at IOC/UNESCO in Paris. Without the hard work of the Secretariat on a daily basis, and I would specifically mention Peter Koltermann and Bernardo Aliaga among others, I cannot guarantee that we would be here today reflecting on the progress made during the last intersessional period.

Your Excellency, Distinguished Delegates, Ladies and Gentlemen: On behalf of the two Vice Chairs: Mr Israel Matos of the USA and Mr Gustavo Malave of Venezuela who is unable to be with us, I welcome you to the fourth session of ICG for the Caribbean and Adjacent Regions. THANK YOU.

C. Opening Address
M. Claude Lise, Sénateur et Président du Conseil général de la Martinique,

2 June 2009

Mesdames et Messieurs,

Je suis particulièrement heureux de vous accueillir en Martinique, terre française dans notre mer caraïbe.

Vous êtes réunis ici pour travailler ensemble à un système collectif de d'alerte et de défense contre les tsunamis qui à tout moment peuvent survenir et créer sur nos terres les dégâts humains, environnementaux et économiques que nous savons quand la force et l'imprévisibilité de l'aléa s'ajoutent à l'impréparation des populations.

Je veux avant toute chose vous présenter le Conseil Général de la Martinique, institution dont, j'en suis conscient, la plupart d'entre vous ignorent tout. Et je présume que vous devez vous interroger sur la raison pour laquelle c'est le Président de cette collectivité territoriale qui s'adresse à vous ce matin.

Dans le système institutionnel français, le Conseil Général est une très ancienne institution puisqu'elle a été créée sous cette dénomination en 1827. Aujourd'hui, la France compte 105 conseils généraux, y compris ceux d'outre-mer. Chacun d'entre eux est administré par une assemblée d'élus, les conseillers généraux. 45 conseillers généraux représentant autant de cantons sont élus chacun pour 6 ans pour administrer le Conseil Général de la Martinique.

En France, il existe bien d'autres types de collectivités territoriales dirigées elles aussi par des élus. Mais sur le territoire de la Martinique, si vous considérez le nombre d'agents y travaillant, 2200, le budget annuel de cette collectivité, environ 630 millions d'euros, et la part de ce budget consacré à la commande publique, le Conseil Général est, sans contestation possible, de loin la première autorité locale, la première collectivité territoriale de la Martinique.

Le Conseil Général est par ailleurs et c'est là sa première mission, la collectivité de la solidarité, celle qui protège les plus faibles, qu'il s'agisse des enfants, des personnes âgées, des handicapés ou encore des exclus. Celle qui, contre vents et marées, et c'est vraiment ici le cas

de le dire, maintient la cohésion sociale de notre peuple en luttant contre la précarité et l'exclusion sociale par une multitude d'actions très concrètes. Et c'est sans doute cette vocation, cette expérience et la conscience de nos responsabilités qui nous ont conduit au début des années 1990 à nous investir avec beaucoup de détermination dans un domaine qui, c'est vrai, ne relève pas de nos compétences légales, je veux parler de la prévention et de la gestion des risques naturels.

En effet, nous avons dû, sans qu'il ne s'agisse là d'une critique, prendre acte d'un manque d'intérêt et de moyens de l'Etat consacrés à la connaissance de base scientifique de notre environnement insulaire, tropical, distant et singulier. Collectivité de la solidarité et de la protection sociale, comme je viens de vous l'indiquer, nous avons voulu répondre à une nouvelle exigence sociale qui s'exprimait avec de plus en plus d'acuité, celle de la sécurité devant les aléas auxquels cette terre est exposée tout comme les autres pays de la Caraïbe.

C'est ainsi qu'en quelques années, grâce à l'action du Conseil Général, la Martinique a été dotée, de moyens particulièrement performants d'étude et de prévention des phénomènes naturels.

Je ne veux pas détailler ici, tous les systèmes et les équipements que nous avons mis en place qui font de cette île de la Martinique l'un des territoires les plus surveillés et étudiés du globe. Je sais que le programme élaboré par l'équipe de l'UNESCO conduite par Monsieur Bernardo ALIAGA avec le concours de l'Institut de Physique du Globe de Paris représentée en Martinique par Madame Valérie CLOUARD a prévu de consacrer l'après-midi de demain à une présentation des actions de prévention et de gestion des risques naturels qui aura lieu dans le cadre spectaculaire du Centre de Découverte des Sciences de la Terre, à Saint-Pierre, notre ancienne capitale. Celle là même où périrent les victimes de l'éruption de la Montagne Pelée. Je vous invite, à assister à cette présentation et à établir avec nos techniciens à cette occasion un dialogue dont, je peux vous l'assurer, ils sauront tirer les enseignements pour nos actions futures. Je crois que c'est à l'issue de cet échange que nous souhaitons particulièrement nourri que vous comprendrez pourquoi, les élus du Conseil Général ont voulu s'investir dans le financement de cette grande rencontre caribéenne, conscients qu'ils étaient de l'intérêt fondamental de vos travaux pour la protection de nos populations.

Je veux cependant pour terminer insister sur l'un des axes de cette politique de prévention et de gestion des risques naturels les plus susceptibles de vous intéresser. Il s'agit de la politique de coopération régionale que nous mettons en œuvre depuis quelques années.

En effet, le Conseil Général acteur de la mitigation des risques naturels a d'abord voulu protéger notre population, son patrimoine et son territoire. Mais au fur et à mesure que nous développions cette politique, nous avons reçu de plus en plus de visites de délégations étrangères venues s'informer de ce que nous faisions. De la Caraïbe, mais aussi d'ailleurs : Saint-luciens, Dominicais, Vénézuéliens, Trinidadiens, Jamaïcains, Cubains, Haïtiens, Chiliens, et aussi des européens (Grecs, Canariens, Açoriens, Madèrians, …) se sont succédé dans nos locaux où sont concentrés les équipements et les équipes qui protègent la Martinique. Et c'est à l'occasion de ces nombreuses visites et des échanges qu'elles nous permettaient avec nos frères de la Caraïbe que nous avons compris que bien des systèmes que nous avions ici développés pour prévoir et atténuer les effets des aléas auxquels notre pays est soumis pouvaient aussi être particulièrement utiles pour tous nos voisins. Et ceci pour une raison toute simple : nous étions menacés et souvent frappés par les mêmes catastrophes naturelles.

C'est la raison pour laquelle les élus ont pris la décision de partager notre savoir faire avec nos voisins, conscients par ailleurs que nous avions beaucoup à apprendre de la manière dont les autres pays de la Caraïbe avaient appréhendé certains aspects de cette politique pour lesquels nous sommes encore insuffisamment engagés. Je veux parler par exemple de la culture du risque ou de la nécessaire adaptation au changement climatique en cours dans notre région Caraïbe.

L'engagement dans ce domaine a été confirmé en juin 2007 lors de l'adoption à l'unanimité par notre assemblée plénière des orientations de l'Agenda 21 pour la Martinique pour la période 2007-2013.

L'un de ses 5 axes stratégiques s'annonce ainsi : « Renforcer l'ancrage du territoire dans son environnement régional et international » ; et pour atteindre ce but, il est notamment proposé de « Développer une coopération de gestion des crises majeures à l'échelle de la Caraïbe ».

C'est la politique que nous menons dans ce cadre politique qui vient d'être distinguée par le comité de sélection du programme européen de coopération régionale INTERREG, il y a tout juste 15 jours quand celui-ci a retenu pour le financer le projet du Conseil Général intitulé « Cluster Caraïbe des Risques Naturels et de la Mer ». Cela signifie que la pertinence et l'efficacité de notre politique de coopération dans ce domaine est reconnue par les régions de Guadeloupe, Guyane et Martinique, les collectivités de Saint-Martin et de Saint-Barthélemy, mais aussi, et ceci est évidemment très important de notre point de vue, par l'Association des Etats de La Caraïbe, le CARICOM CARIFORUM et l'Organisation de la Caraïbe de l'Ouest. En effet toutes ces institutions siègent au comité de sélection en présence aussi de l'Etat français et de la Commission Européenne.

Et c'est très exactement cette même politique de construction d'une gestion commune des crises majeures que pendant ces 3 jours vous allez mettre en œuvre à l'échelle de notre mer caraïbe s'agissant du risque de tsunami.

Vous comprenez maintenant, je le crois, pourquoi, nous sommes si intéressés aux réalisations qui sont les vôtres et aussi pourquoi c'est avec beaucoup de sincérité qu'au nom du Conseil Général de la Martinique, je vous souhaite plein succès dans vos travaux que nous suivrons avec beaucoup d'attention.

Je vous remercie de votre attention.

ANNEX IV

LIST OF DOCUMENTS

Working Documents

Doc. No.	Document title
ICG/CARIBE EWS-IV/1 Prov. Rev 1	Provisional Agenda (English only)
ICG/CARIBE EWS-IV/1 Prov.Add. Rev. 2	Provisional Timetable (English only)
ICG/CARIBE EWS-IV/2 Prov.	Provisional annotated agenda (English/Spanish)
ICG/CARIBE EWS-IV/3	Draft Summary Report (to be prepared during the session) (English/Spanish)
ICG/CARIBE EWS-IV/4	Provisional List of Documents (this document) (English only)
ICG/CARIBE EWS-IV/5	IOC Executive Secretary's Report (English only)
ICG/CARIBE EWS-IV/6	Chairman's Report (English)
ICG/CARIBE EWS-IV/7	ICG CARIBE EWS Secretariat's report (English/Spanish)
ICG/CARIBE EWS-IV/8	ICG CARIBE EWS-II Recommendations Status Report (English)
ICG/CARIBE EWS-IV/9	Working Group I: Monitoring and Detection Systems, Warning Guidance (English/Spanish)
ICG/CARIBE EWS-IV/10	Working Group II Hazard Assessment (English/Spanish)
ICG/CARIBE EWS-IV/11	Working Group III: Warning, Dissemination and Communication (English/Spanish)
ICG/CARIBE EWS-IV/12	Working Group IV: Preparedness, Readiness and Resilience (English/Spanish)
ICG/CARIBE EWS-IV/13	Working Group I: Technical, logistical and administrative requirements of a Regional Tsunami Warning Centre for the Caribe EWS
ICG/CARIBE EWS-IV/14	ITIC's Report of Tsunami signage
IOC/TOWS-WG-I/3	Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG), First Meeting, UNESCO Headquarters, Paris, France, 3–4 April 2008
IOC Technical Series 78	CARIBE EWS Implementation Plan (English only)
IOC Technical Series (*tbd*)	Communications Plan for the Interim Tsunami Advisory Information Service to the Caribbean Sea and Adjacent Regions (English only)

Information Documents

Doc. No.	Document title
--	Information for participants (venue, hotels, airport, bus) (see website)
ICG/CARIBE EWS-IV/Inf. 1	List of Caribbean National Contacts updated 18 February 2008 (not posted in the website)
	IOC Assembly Resolution XXIII-13 (English/Spanish)
ICG/CARIBE EWS-III/3	Summary Report of the Third Session of the Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS-III) (English with Executive Summaries in Spanish and French)
IOC/CL 2291	Letter of Invitation to ICG/CARIBE-EWS-IV (English/Spanish/French)
ICG/CARIBE EWS-II/12	A Caribbean Tsunami Information Centre: Roles and Functions for the Implementation of an Effective Tsunami and Coastal Hazards Warning and Mitigation System (English only)
IOC/INF-1202 rev.	National Report Format (Dec. 08) (English only)

ANNEX V

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ANNEX VI

LIST OF ACRONYMS

AFTN	Aeronautical Fixed Telecommunications Network
AWS	Anguilla National Warning System (UK)
CAP	Common Alerting Protocol
CARICOM	Caribbean Community
CDERA	Caribbean Disaster Emergency Response Agency
CEPREDENAC	Central American Coordination Center for Disaster Prevention
CRID	Regional Disaster Information Center (Latin America and the Caribbean)
CTBTO	Comprehensive Nuclear-Test-Ban Treaty Organization
CTIC	Caribbean Tsunami Information Centre
CTWC	Caribbean Tsunami Warning Centre
DBCP	Data Buoy Cooperation Panel (IOC-WMO)
DRR-SD	Disaster Risk Reduction and service delivery
EMWIN	Emergency Managers Weather Information Network (USA)
GLOSS	Global sea level Observing System (UNESCO/IOC)
GOES	Geostationary Operational Environmental Satellite (US/NOAA)
GOOS	Global Ocean Observing System (WMO-UNEP-IOC)
GTS	Global Telecommunication System
IBCCA	International Bathymetric Chart of the Caribbean Sea and the Gulf of Mexico
ICG	Intergovernmental Coordination Group
ICG/IOTWS	Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning & 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
IMS	IP Multimedia Subsystem
INETER	Instituto Nicaraguense de Estudios Territoriales
INTERREG	EU-funded programme
IOCARIBE	IOC Sub-Commission for the Caribbean and Adjacent Regions
IPGP	Institut de physique du Globe de Paris (France)
ISDR	International Strategy for Disaster Reduction (UN)
ISO	International Organization for Standardization
ITIC	International Tsunami Information Center

ITU	International Telecommunication Union
JCOMM	Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology
LDC	Least Developed Countries
LiDAR	**Li**ght **D**etection **A**nd **R**anging (optical remote sensing technology)
NEIC	National Earthquake Information Centre
NESDIS	National Environmental Satellite, Data and Information Service (USA)
NGDC	National Geophysical Data Centre (USA)
NOAA	National Oceanographic Atmospheric Administration (USA)
NTHMP	National Tsunami Hazard Mitigation Program (USA)
OCTs	overseas countries and territories
OVSG	Observatoire Volcanologique et Sismologique de Guadeloupe (France)
PRSN	Puerto Rico Seismic Network
PTWC	Pacific Tsunami Warning Center
RANET	Radio and Internet for the Communication of Hydro-meteorological Information for Rural Development (US/NOAA)
RTWC	Regional Tsunami Watch Centres
SHOM	French Naval Hydrographic and Oceanographic Service
SMS	Security Management System
SRC/UWI	Seismic Research Center of the University of West Indies
TCP	Tropical Cyclone Programme (WMO)
TNC	Tsunami National Contact
TOWS	Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems
TWFP	Tsunami Warning Focal Point
TWS	Tsunami Warning System
UN	United Nations
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific & Cultural Organization
USAID	United States Agency for International Development
USGS	United States Geological Survey
VSAT	Very Small Aperture Terminal
WC/ATWC	West Coast and Alaska Tsunami Warning Center (USA)
WGB	Working Group B (CTBTO)
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*