

## ANNEX II

### ADOPTED RECOMMENDATIONS

#### Recommendation ICG/PTWS-XXVIII.1

##### **ICG/PTWS Governance**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Recalling** IOC Resolution IV-6 that established the International Coordination Group for the Tsunami Warning System in the Pacific (ICG/ITSU) and IOC Resolution XXXIX-8 that renamed ITSU to be the Pacific Tsunami Warning and Mitigation System (PTWS) and to provide continuity through the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Reaffirming** that the Pacific Tsunami Warning and Mitigation System (PTWS) is a coordinated network of national systems and capacities, and is part of a global network of early-warning systems for all ocean-related hazards,

##### **Noting:**

- Recommendation ICG/PTWS-XXVI.3: The ICG decided to constitute, under the Steering Committee, a Task Team to look into performance monitoring measures for Tsunami Service Providers (TSPs), National Tsunami Warning Centres (NTWCs), and national warning systems starting from the PTWS Medium-term Strategy 2014–2021 ([IOC/2013/TS/108](#)) established goals,
- [Sendai Framework for Disaster Risk Reduction 2015–2030](#) was adopted by UN Member States on 18 March 2015 at the World Conference for Disaster Risk Reduction (WCDRR),
- IOC Executive Council Decision EC-XLIX/4.2 on IOC Contribution to the Sendai Framework for Disaster Risk Reduction 2015–2030,

**Having reviewed** the progress made in the implementation of the PTWS since the 27th Session of the ICG/PTWS,

**Having considered** the reports of:

- Working Group 1 on Understanding Tsunami Risk
- Working Group 2 on Tsunami Detection, Warning and Dissemination
- Working Group 3 on Disaster Risk Management and Preparedness
- Task Team on PacWave Exercises, on PacWave18
- WG2 Task Team on Seismic Data Sharing in the South West Pacific
- Task Team on Tsunami Evacuation Maps, Plans and Procedures (TEMPP) and Tsunami Ready
- Task Team on Future Goals and Performance Monitoring
- Regional Working Group on Tsunami Warning and Mitigation System in the Central American Pacific Coast
- Regional Working Group on Tsunami Warning and Mitigation System in the South East Pacific Region

- Pacific Island Countries and Territories Regional Working Group on Tsunami Warning and Mitigation System
- Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region
- Task Team of the Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region on Establishment of a South China Sea Tsunami Advisory Center
- Task Team of the Regional Working Group on Tsunami Warning and Mitigation System in the Central American Pacific Coast on Establishment of a Central America Tsunami Advisory Center
- 8<sup>th</sup> Meeting of the PTWS Steering Committee, Honolulu, Hawaii, USA, 7-8 June 2018
- 12<sup>th</sup> Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-XII), Paris, France, 21-22 February 2019
- North West Pacific Tsunami Advisory Center (NWPTAC)
- Pacific Tsunami Warning Center (PTWC)
- International Tsunami Information Center (ITIC)
- Chair's Report
- Secretariat Report
- Reports of the ICG/IOTWMS, ICG/CARIBE-EWS,
- Report on the Joint Task Force to Investigate the use of Submarine Telecommunication Cable for Ocean and Climate Monitoring and Disaster Warning (ITU, WMO, and IOC)

**Having further considered** the reports on:

- Future Working Group and Task Team Structure
- UN Decade of Ocean Science for Sustainable Development (2021–2030)
- World Data Services for Geophysics including tsunamis
- Secretariat of Pacific Community Report

**Recognizing** the emerging capabilities of Member States to develop probabilistic tsunami hazard assessments,

**Requests** Working Group 1 to provide guidance on how to transfer and translate maps generated by probabilistic tsunami hazard assessments into a language that can be easily interpreted by the at-risk general population.

**Noting** the instruction to Working Group 2 by ICG/PTWS-XXVII to urgently establish the minimum competency level for National Tsunami Warning Centre (NTWC) operations,

**Further noting** the report of Working Group 2 on process to define a framework for the minimum competency levels for NTWC operations, and the available draft document,

**Noting** the instruction to Working Group 2 by ICG/PTWS-XXVII to review the sensing network of the PTWS and develop an optimal (defined by functional, resourcing and capability requirements) multi-instrument design that integrates emerging techniques and sensor technologies,

**Further noting** the oral and written reports of Working Group 2 on process to define a framework for assessing the sensitivity of the PTWS sensing networks,

**Acknowledging** that the PTWS is effective in saving lives and reducing the impacts to communities in both near-field and distant-tsunami events through the three pillars of risk assessment and reduction, detection, warning and dissemination, and awareness and response;

**Requests** Member States to share any new forms of sea level data for tsunami warning purposes in accordance with the IOC Oceanographic Data Sharing Policy;

**Decides** to:

1. Continue WG1 Understanding Tsunami Risk with Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Co-Chairs are Dr Diego Arcas (USA, second term) and Ms Sarah-Jayne McCurrach (New Zealand, second term);
2. Continue WG2 Tsunami Detection, Warning and Dissemination with minor changes to the Terms of Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Chair is Ms Lara Bland (New Zealand) and Vice-Chair Dr Chip McCreery (USA, second term).
3. Continue WG2 Task Team on Seismic Data Sharing in the Southwest Pacific with Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. The Task Team will be co-chaired by Mr Rennie Vaiomounga (Tonga) and Ms Adrienne Moseley (Australia).
4. Establish a Working Group 2 Task Team on the minimum competency levels for National Tsunami Warning Centre (NTWC) operations staff with Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Co-Chairs are Ms Lara Bland (New Zealand) and Mr Ofa Fa'anunu (Tonga).
5. Establish a Working Group 2 Task Team on the Integrated PTWS sensor networks for tsunami detection and characterisation with Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Co-chairs are Dr Bill Fry (New Zealand) and Dr Tim Melbourne (United States).
6. Continue WG3 Disaster Risk Management and Preparedness with revised Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Chair is Mr David Coetzee (New Zealand), and Vice Chair is Dr Laura Kong (USA);
7. Continue Sub-Regional Working Groups and Task Teams with same Terms of Reference except where noted:
  - *Regional Working Group on Tsunami Warning and Mitigation System on the Central American Pacific Coast.* Chair Dr Silvia Chacon (Costa Rica) and Vice-Chair Ms Griselda Marroquin (El Salvador). The Terms of Reference for this group remains unchanged;
  - *Regional Working Group on Tsunami Warning and Mitigation System in the South East Pacific Region* with revised Terms of Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Chair is Ms Mary Rengifo (Colombia) and Vice-Chair is Lt Cdr. Carlos Zuniga (Chile).

- *Pacific Island Countries and Territories Working Group on Tsunami Warning and Mitigation System* with revised Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Chair is Mr. Jerome Aucan (France - New Caledonia) and Vice Chair is Mrs. Esline Garaebiti (Vanuatu).
  - Pacific Island Countries and Territories Working Group Task Team on Capacity Development with revised Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Co-Chairs are Mr Jerome Aucan (France-New Caledonia) and Mr Ofa Fa'anunu (Tonga).
  - *Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region*. Chair Mr. Chan Sai-Tick (China) and Vice-Chair to be elected; The Terms of Reference for this group remains unchanged;
  - Task Team of the Regional Working Group on Tsunami Warning and Mitigation in the South China Sea Region on Establishment of a South China Sea Tsunami Advisory Center with revised Terms of Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1. Elected Chair is Dr Yuan Ye (China) with Vice-Chair to be elected;
  - Task Team on Future Goals and Performance Monitoring. Elected Chair is Ms Sarah-Jayne McCurrach (New Zealand), and Vice-Chair is Ms Mary Rengifo (Colombia). The Terms of Reference for this Task Team remains unchanged;
8. Dissolve Task Team on Tsunami Evacuation Maps, Plans, and Procedures (TEMPP), and Tsunami Ready upon publication of the TEMPP guidelines noting that the Tsunami Ready component of the Task Team is now included in the Terms of Reference of WG 3.
  9. Continue the *PTWS Steering Committee* with same Terms-of-Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1;
  10. Dissolve Task Team on PacWave18 Exercises upon publication of the report;
  11. Establish a *Task Team on PacWave20 Exercise* with Terms of Reference as attached in Appendix 1 to Recommendation ICG/PTWS-XXVIII.1, Elected Co-chairs are Mr Emilio Talavera (Nicaragua), and Dr Laura Kong (ITIC, USA);

**Acknowledges** the contribution of the Government of France through the Pacific Fund for its continued support of the Oceania Regional Seismic Network (ORSNET) as well as other development partners e.g. the World Bank for their support of the tsunami warning and mitigation activities in the Pacific Island Countries and Territories (PICTs);

**Recommends** the IOC and WMO to take into consideration the tsunami warning and mitigation needs of the Small Island Developing States and Territories when negotiating the reform of the Joint IOC/WMO Commission on Marine Meteorology and the establishment of the WMO Country Support Initiative;

**Decides** that a standing agenda item be established for the workshop or meeting about recent science and developments for the tsunami warning system prior to the ICG/PTWS Sessions to leverage donor support to promote better opportunities to enable participation of those Members States such as Pacific Island Countries and Territories (PICTs);

**Expresses its gratitude** to the Government of Nicaragua and Instituto Nicaragüense de Estudios Territoriales (INETER) for kindly hosting the 28th Session of the ICG/PTWS in Montelimar, Nicaragua;

**Accepts with appreciation** the kind offer of Japan to host the 29th Session of the ICG/PTWS in 2021 in time and a location to be determined.

**Congratulates** Chair Dr Wilfried Strauch (Nicaragua) and Vice Chairs Mr. Ofa Fa'anunu (Tonga) and Mr. Yuji Nishimae (Japan) for being elected as the new leadership for the PTWS.

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Financial Implications: None

## Appendix 1 to Recommendation ICG/PTWS-XXVIII.1

### Terms of Reference

#### **Working Group 1: Understanding Tsunami Risk**

1. Develop and promote best practice tsunami risk reduction material, programmes, standards and tools for understanding tsunami risk, to support emergency management and early warning, including but not limited to:
  - hazard assessment and coastal inundation models and products
  - risk assessment methodology and risk forecasting
  - scenario assessments including maximum credible and most likely events to understand likely exposure, vulnerability and event frequency
  - forecast and threat models
  - evacuation and inundation modelling
  - use of new and improved data including Digital Elevation Modelling (DEM), GNSS and paleotsunami information
2. Work with International Union of Geodesy and Geophysics (IUGG) and other scientific bodies to ensure the translation of science information to support tsunami risk assessment and risk reduction. Develop recommendations for IUGG and other scientific bodies on science gaps in hazard assessment capability.
3. Better understand and develop best practice for assessing and reducing the risk of local source and non-seismic tsunami sources.
4. Develop projects in conjunction with subject matter experts and groups with specific interest to address gaps or areas for improvement in tsunami risk assessment and risk reduction.
5. Provide hazard specific support and advice to other ICG/PTWS working groups and working groups from other ocean basins, as well as other working groups to understand, coordinate and develop ways to address tsunami risk management.

The Group will be composed of members nominated by Member States, with two co-chairs, one from a science and one from a disaster risk management background, to be elected.

## Terms of Reference

### **Working Group 2: Tsunami Detection, Warning and Dissemination**

Liaise with other working group(s) and Task Team(s) within the ICG/PTWS and with working groups from the other ocean basins through the TOWS-WG to:

1. Develop, coordinate and enhance operational implementation of interoperable tsunami threat information products and services.
2. Undertake studies to determine warning requirements for seismic and sea level data.
3. Monitor and report on the performance of key observational, warning and communication system components.
4. Contribute to the conduct of regular exercises and communication tests of the PTWS.
5. Identify areas of priority for action following assessments, communications tests, exercises and real tsunami events.
6. Develop and maintain relevant documentation, such as the PTWS Users Guide.
7. Provide advice to the International Tsunami Information Centre (ITIC) on educational materials and for capacity building about the warning systems and services.
8. Help strengthen the capacity and capability of Member States.

The Working Group will be composed of members nominated by Member States, representatives for each ICG designated TSPs, ITIC, and invited observers, with a Chair and a Vice-Chair to be elected by the ICG.

## Terms of Reference

### **WG2 Task Team on Seismic Data Sharing in the South West Pacific**

1. Advocate seismic data sharing in the region.
2. Advise South West Pacific countries on data sharing protocols, techniques and technologies.
3. Work with South West Pacific Countries and donors to ensure a common data sharing policy.
4. Encourage South West Pacific Countries with existing or planned broadband seismograph stations to join the International Federation of Digital Seismograph Networks (FDSN), use the standards developed by the FDSN for data exchange and take advantage of the data archiving provided by the FDSN

Members are representatives of South Pacific Countries and territories (Australia, Fiji, France–French Polynesia, France-New Caledonia, New Zealand, Papua New Guinea, Samoa,

Solomon Islands, Tonga, Vanuatu), PTWC, NWPTAC, Japan, and United States. Co-chairs to be elected by the ICG.

#### Terms of Reference

### **WG2 Task Team: Minimum Competency Levels for National Tsunami Warning Centre (NTWC) Operations Staff**

This expert Task Team will establish and document the minimum competency levels for NTWC operations staff and develop a framework for the competencies and training requirements of the roles of a NTWC.

1. Establish the minimum competency levels required for NTWC operations staff.
2. Establish a framework for the required competencies required by the roles of a NTWC.
3. Establish what training is required to ensure NTWC staff meeting minimum competency levels.
4. Investigate and document what schemes are currently in existence and what guidelines and principles can be adapted for this purpose.

The Task Team will be composed of Wilfried Strauch (Nicaragua), Ofa Fa'anunu (Tonga), Yuelong Miao (Australia), Chip McCreery (USA), Lara Bland (New Zealand), Laura Kong (USA), and Ken Gledhill (New Zealand). Co-chairs to be elected by the ICG.

#### Terms of Reference

### **WG2 Task Team: Integrated PTWS Sensor Networks for Tsunami Detection and Characterisation**

This expert Task Team will establish and document a methodology to test the sensitivity of the PTWS sensing networks, integrating new and emerging techniques and technologies by:

1. Developing a methodology for gap and sensitivity analysis that combines multiple sensing technologies for tsunami detection and characterisation.
2. Integrating emerging techniques and sensor technologies (e.g. better use of tide gauges; GNSS technology and processing; sensors on telecom cables) with the existing sensing network to meet tsunami warning service requirements.
3. Where possible, include cost-benefit analysis of the potential technologies being considered.

The Task Team will be composed of Tim Melbourne (United States), Bruce Howe (United States), Lara Bland (New Zealand), Bill Fry (New Zealand), Mike Angove (USA), Diego Arcas (USA), Stuart Weinstein (USA), Ken Gledhill (New Zealand) and Grigory Steblov (Russian Federation), Co-chairs to be elected by the ICG.

## Terms of Reference

### **Working Group 3: Disaster Risk Management and Preparedness**

1. Facilitate in collaboration with TOWS Task Team on Disaster Management and Preparedness and organizations such as UNISDR, the exchange of experiences and information on risk reduction and preparedness actions, and matters related to disaster management;
2. Promote preparedness in coastal communities through education and awareness products and campaigns;
3. Facilitate SOP training across regions to strengthen emergency response capabilities of Member States and their Disaster Management Offices;
4. Facilitate the piloting of IOC-UNESCO Tsunami Ready, and report results from pilots to the ICG/PTWS and the TOWS-WG
5. Develop and promote best practice preparedness material, programs and assessment tools;
6. Develop and Promote tsunami risk reduction theory and practice;
7. Support the ITIC of the ICG.

The Group will be composed of members nominated by Member States, a representative of ITIC with a Chair and a Vice-Chair to be elected by the ICG.

## Terms of Reference

### **Regional Working Group on Tsunami Warning and Mitigation System on the Central American Pacific Coast**

1. To assist the Central American countries in the development, improvement and implementation of their National Tsunami Warning and Mitigation Systems, and the countries which are becoming new members of ICG/PTWS in their integration into the ICG/PTWS.
2. To request CEPREDENAC to support the development of CATAC in Nicaragua as interim Regional Tsunami Advisory Centre for all Central American countries.
3. To implement a regional communications and warning plan.
4. To facilitate Tsunami Hazard and Risk studies in the Central American Region.

The Group will be composed of members from Member States Nicaragua, El Salvador, Guatemala, Costa Rica, Honduras, Mexico and Panama, with a Chair and a Vice-Chair elected by the members of the Working Group and endorsed by the ICG.



## Terms of Reference

### **Regional Working Group on Tsunami Warning and Mitigation System in the South East Pacific Region**

1. To enhance regional capabilities in the South East Pacific Region for the Detection, Assessment, Warning and Dissemination of tsunami events, based on lessons learned and global trends, with the purpose of generating improvement opportunities for the National Tsunami Warning Centers (NTWC) following the Sendai framework priorities as a reference.
2. To facilitate cooperation in the establishment and upgrading of seismic and sea level stations and networks and communication systems in the region, and their interoperability in accordance with ICG/PTWS requirements, through the active participation of appropriate national delegates from Member States, in the Working Group 2: Tsunami Detection, Warning and Dissemination.
3. To improve the communication channels between the countries, according to the regional communications protocol established under Permanent Commission for the South Pacific (CPPS), through periodical tests using redundant systems.
4. To analyse the convenience of piloting Tsunami Ready program in the region.
5. To promote regional activities and join projects considering in-region capacity building and enhancing disaster preparedness for response as main efforts, according the priorities number 1 and 4 of the Sendai framework.
6. To facilitate capacity building and the sharing of sea level information among others, including the free and open exchange of data.
7. To improve the educational programs with regional criteria based on social, cultural and economic reality, through the active participation of appropriate national delegates from Member States, in the Working Group 3: Disaster Risk Management and Preparedness.
8. To develop synergies with universities and academic centres to promote and to facilitate the regional tsunami research in order to cope with regional needs.

The Group will be composed of representatives nominated by the Member States of Chile, Colombia, Ecuador and Peru, with a Chair and a Vice-Chair from each country rotating every two years, following an alphabetical order. In this context, the Vice-Chair will assume regional presidency for the coming period.

## Terms of Reference

### **Pacific Island Countries and Territories Working Group on Tsunami Warning and Mitigation**

1. To continually review and evaluate capabilities of and make recommendations for improvements to countries in the Pacific Islands and Territories (PICT) Region for providing end to-end tsunami warning and mitigation services.
2. To support the involvement and contribution of PICT countries in the activities of the ICG/PTWS.

3. To promote and facilitate the tsunami hazard and risk studies in the PICT region.
4. To facilitate cooperation in the establishment and upgrading of seismic and sea level stations and networks in the region, and the interoperability of these systems in accordance with ICG/PTWS requirements.
5. To facilitate training and capacity building in the end to end tsunami warning and mitigation system in the region.
6. To encourage the sharing of tsunami information, including but not limited to the free and open exchange of data.
7. To facilitate tsunami awareness in school curricula, and development and dissemination of public educational materials.
8. To work in cooperation with PTWS Working Group 1, 2 & 3, and relevant task teams especially on activities that strengthen country capacity in tsunami warning, risk mitigation & emergency response.

Members composed of representatives from Pacific Island Countries and Territories (PICTs), Council of Regional Organizations in the Pacific (CROP) Agencies and WMO. Chair and Vice Chair elected by the members of the Working Group and endorsed by the ICG.

#### Terms of Reference

#### **Pacific Island Countries and Territories Working Group Task Team on Capacity Development**

1. Continue the development of competency framework for National Tsunami Warning Centres personnel and pilot it in Australia, Vanuatu, Fiji, Samoa and Tonga and report progress and lessons learnt to ICG/PTWS WG 1, 2 and 3;
2. Continue to monitor and coordinate the Pilot Tsunami Ready Program and TEMPP in Samoa, Tonga, Fiji, Cook Islands, Solomon Islands and Vanuatu and review the Tsunami Ready Checklist for schools and communities in PICT;
3. Continue to develop the guideline for National Tsunami Warning Centres in responding to local tsunami and report to WG 1, 2 and 3; and
4. Develop an online survey of warning and mitigation capabilities in the Pacific Island Countries and Territories (Member countries and IOC).

The Task Team Members: Australia, New Caledonia (Co-Chair), Tonga (Co-Chair), Samoa, Vanuatu, New Zealand, Solomon Islands, Fiji, PNG, ITIC, SPREP, SPC, IOC, PTWC. Co-chairs to be elected by the ICG.

#### Terms of Reference

#### **Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region**

1. To evaluate capabilities of countries in the South China Sea Region for providing end-to-end tsunami warning and mitigation services.

2. To ascertain requirements from countries in the South China Sea Region for the tsunami warning and mitigation services.
3. To promote and facilitate tsunami hazard and risk studies in the region.
4. To facilitate cooperation in the establishment and upgrading of seismic and sea level stations and networks and communication systems in the region.
5. To facilitate improvement of the education programmes on tsunami mitigation in the region.
6. To facilitate capacity building and the sharing of tsunami information in the region, including the free and open exchange of data.

The Group will be composed of members nominated by Member States Brunei, Cambodia, China, Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam and invited experts with a Chair and Vice-Chair to be elected by the members of the Working Group and endorsed by the ICG.

#### Terms of Reference

##### **Regional Working Group on Tsunami Warning and Mitigation in the South China Sea Region Task Team on Establishment of a South China Sea Tsunami Advisory Center**

1. Evaluate and report on performance indicators for the SCSTAC.
2. Explore ways for facilitating the sharing and exchange of data, tsunami warning technologies and relevant information necessary for further enhancing tsunami warning advisory capability of the SCSTAC.
3. Consult with National Tsunami Warning Focal Points of the WG-SCS Member States for their latest requirements on Tsunami service/products.
4. Review and continue to improve the SOP and the contents of tsunami advisory products following the full operation of the SCSTAC.
5. Keep contact with PTWC and NWPTAC (JMA) for coordination, consistency, guidance and assistance.

Membership: Representatives of Member States of the ICG/PTWS WG-SCS (Brunei Darussalam, China, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam) and invited experts; representatives of PTWC and NWPTAC (JMA); with Chair and Vice-Chair to be elected by the ICG.

#### Terms of Reference

##### **Task Team on Future Goals and Performance Monitoring**

1. Finalise the ICG PTWS Framework for Goals and Performance Monitoring of Tsunami Warning & Mitigation Systems, to be harmonised with other ICGs, for use in the next two inter-sessional periods.

2. Use the outcomes from the 28th Meeting of the ICG/PTWS to establish a performance baseline and a list of activities and resources required to help meet the identified goals.
3. Develop a PTWS Status Report for reporting the status and performance of the PTWS at the next meeting of the ICG.
4. Utilise the new National Report template for Member States to collect the required information and determine performance metrics for the PTWS Status Report.

Members consisting of the Working Group Chairs, ITIC, PTWC, USA, and invited experts and observers as appropriate, reporting to the Steering Committee. Chair and Vice-Chair to be elected by the ICG.

#### Terms of Reference

##### **PTWS Steering Committee**

1. The Steering Committee shall act in an advisory capacity to the Chair of the ICG/PTWS during the inter-sessional period.
2. The Steering Committee shall coordinate and integrate the work of ICG/PTWS in the inter-sessional periods, as implemented through the various technical and regional working groups and task teams, including but not limited to:
  - Maintain the PTWS Medium Term Strategic Plan
  - Monitor, maintain and update the PTWS Implementation Plan
  - Develop a Strategy for funding PTWS activities
  - Monitor the performance of the PTWS.
3. The Steering Group will be composed of the ICG/PTWS Officers (Chair and two Vice-Chairs), Chairs of the Technical and Regional Working Groups, Directors of PTWC, NWPTAC and ITIC or their representatives, other members' representatives by invitation of the Chair.

#### Terms of Reference

##### **Task Team on PacWave20 Exercise**

1. Design and carry out a ninth Exercise Pacific Wave 2020 with the following characteristics:
  - An exercise shall be conducted with the aim to test PTWS tsunami service provider arrangements, and Country preparedness arrangements and operational procedures to respond and recover from a destructive tsunami.
  - An exercise shall be conducted with the following objectives
    - a) Test communications from the PTWS Tsunami Service Providers to Tsunami Warning Focal Points and National Tsunami Warning Centers of Member States.
    - b) Test national communication and cooperation, and readiness within the country.
    - c) Test regional communication and cooperation between Member States.

- d) Support the development of tsunami procedures and products by the Central America Tsunami Advisory Center (CATAC).

2. Exercise Pacific Wave 2020 (PacWave20) will:

- Take place in the months of September through to November 2020 to support International Disaster Risk Reduction Day (13 October) and World Tsunami Awareness Day (5 November).
  - Be conducted as a series of regional exercises organized through the PTWS Regional Working Groups where applicable, with support from the PTWS TSPs and ITIC, involving all PTWS countries as part of the regular biennial Pacific Wave exercise conducted since 2006.
  - Be conducted to include one live communications test from the PTWS TSPs to Member States on 5 November 2020.
  - Be conducted to include exercise activities over and above a table top exercise. Possible exercise variations include:
    - a) Consider conducting in real time during the daytime working hours with full staffing, or simulating minimal staff during night time or weekend hours
    - b) Consider testing country capability to carry out their warning and response responsibilities for the situation where one or more PTWS TSPs is not able to provide guidance in a timely manner.
    - c) Consider conducting the exercise down to the community level, including where possible including an extensive public awareness campaign.
    - d) Consider the Sendai Framework for Disaster Risk Reduction Global Sendai Framework for Disaster Risk Reduction seven global targets and four priorities for action, World Tsunami Awareness Day and/or the UN Decade of Ocean Science for Sustainable Development in designing the exercise.
  - The exercise shall be announced by the IOC to Member States at least 240 days in advance of the exercise date.
  - The exercise manual will
    - a) Include information on each regional exercise
    - b) Inform Member States on the availability of exercise products for their region, including instructions to Member States regarding the distribution dates,
    - c) Include instructions to Member States regarding their participation and the evaluation instrument be prepared with content and structure similar to what was prepared for previous Pacific-wide exercises, but considering lessons learned and any need to collect additional information.
    - d) Be distributed by the IOC to Member States at least 180 days in advance of the exercise date.
  - Participating Member States will be asked to complete and return the evaluation instrument no more than 21 days following the exercise.
3. Prepare the Summary Report for the exercise, compiling a list of recommendations and the list of actions from the findings for consideration by the ICG/PTWS-XXIX.
4. Members invited from the ICG/PTWS Member States and Regional Working Groups, SPC, PTWC, NWPTAC. SCSTAC and CATAC. Task Team co-chairs to be elected by the ICG.

## Recommendation ICG/PTWS-XXVIII.2

### **Tsunami Detection, Warning and Dissemination**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Noting** the gaps in response to recent unscheduled communications testing from the PTWC,

**Recommends** there is a need to have more unscheduled communication testing with additional mechanisms for collecting data about how they are received. It was also **noted** that test notifications would come with a notification in Spanish so all watch standers would understand it is a critical test message.

**Noting** the recent improvements to the United States Website [Tsunami.gov](https://www.tsunami.gov) which supports both national and international interests covered by the United States tsunami warning centers,

**Recommends** that United States provide PTWS Member States with a prototype of the website and solicit feedback about its content and use;

**Noting** that the tsunami source region for the PTWS TSPs has been specifically defined through the TOWS-WG process and agreed to by the IOC Assembly,

**Also noting** that by existing PTWS procedures, for earthquakes that occur outside of that region the PTWS TSPs are only to issue products when there is an expectation that tsunami waves exceeding 0.3 meters amplitude are expected within that TSP's coastal service area,

**Considering** that there are cases when large earthquakes occur just outside the boundary, such as for the 2018 Palu, Indonesia, earthquake and tsunami, when it would be useful for a TSP to issue an Information Statement indicating no tsunami threat to its service area,

**Further considering** the importance of not causing confusion when the TSP and/or NTWC responsible for that earthquake may be issuing a threat message or tsunami warning for coasts closer to the earthquake,

**Decides** the following:

- The ICG/PTWS **agrees** to retain its guidance that TSPs only issue threat messages for earthquakes outside the designated PTWS source area when tsunami amplitudes within that TSP's coastal service area are expected to exceed 0.3 meters; and
- The ICG/PTWS **agrees** to add guidance to allow TSPs to issue Tsunami Information Statements for large earthquakes that occur close to but outside of the defined PTWS source boundary when it is judged by the TSP that the event may cause concern within its service area either because of the large earthquake magnitude, because a tsunami threat or warning message has been issued closer to the earthquake, or because a tsunami has been observed;
- TSPs will include special language within such Tsunami Information Statements to make it especially clear that it is forecasting no tsunami threat only for the coasts within its service area, and the boundary of the service area in that general region will be clearly stated.

**Noting** that there are two Tsunami Service Providers (TSPs) operating for the PTWS and another two TSPs approaching commencement of their services,

**Considering** that some of the documentation regarding PTWS TSP services is now out-of-date and all was developed without an overall plan,

**Acknowledging** that all the individual TSP user's guides have similar categories of information regarding their services but organized in different ways,

**Decides** the following:

- The Operational Users Guide for the Pacific Tsunami Warning and Mitigation System (PTWS) ([IOC Technical Series No. 87](#)) that contained detailed information about PTWC, NWPTAC, and WC/ATWC services be revised to be a more general overview document of all TSP services;
- The existing and emerging TSPs create or revise their current individual TSP user guides (e.g., [IOC Technical Series No. 105](#) for PTWC, [IOC Technical Series No. 142](#) for NWPTAC, SCSTAC User's Guide to be published within the IOC Technical Series) with a similar structure and content;
- The structure and content of the individual TSP user's guides discussed and generally agreed upon by TSP representatives at ICG/PTWS-XXVIII will be finalized and agreed to by the TSPs and Working Group 2 no later than June 30, 2019;
- The new or revised TSP User's Guides will be submitted to Working Group 2 for its review and approval no later than June 30, 2020;
- The overview document indicated above will be created by ITIC and the IOC Secretariat in consultation with the TSPs and finalized before ICG/PTWS-XXIX;
- The IOC Secretariat will publish the guides and overview documents in accordance with their publication procedures.

**Recognizing** the current technical limitations of producing timely and accurate forecasts of local tsunami events,

**Noting** the instruction to Working Group 2 by ICG/PTWS-XXVII to develop guidelines and Standard Operating procedures (SOPs) to inform the "best practice" response to these local tsunami events;

**Further noting** the report of Working Group 2 on the development of a document of "best practice" response to these local tsunami events,

**Decides** the acceptance of the document "*Local-Source Tsunami Response Best Practice*" contained in [Annex IV](#) as a first version for the guidance of Member States, and

**Instructs** Working Group 2 to provide regular updates of the document, at least once every two years;

**Recognizing** the need to improve the speed and accuracy of source characterization in support of local source tsunamis, analysis of GNSS offset data holds promise for helping to directly depict seismic deformation and rapidly estimate the co-seismic sea floor deformations,

**Noting** that real-time sharing of GNSS data, in the form of satellite messages, receiver offsets and/or processed seismic solutions between Member States, TSPs, and NTWCs is necessary to support this capability,

**Recommends** Member States with GNSS data investigate the means of sharing this data in real time. In exchange for sharing data and/or analyzed results, Member States will receive the benefit of improved tsunami impact forecasts for their vulnerable coastlines, with the possibility of many lives saved, particularly in the near-field.

**Recognizing** the potential of SMART Cables to significantly improve tsunami warnings,

**Having endorsed** the continuing efforts of the ITU/WMO/UNESCO-IOC Joint Task Force (JTF) toward SMART cables implementation, and

**Reaffirming** the same recognition and endorsement made by the PTWS Steering Committee in its meeting in June 2018,

**Requests** the SMART cable expert team and the Regional Working Group on Tsunami Warning and Mitigation System in the South East Pacific Region to complete and expand on the report describing the need and benefits of SMART cables for earthquake and tsunami early warning, in addition to climate and ocean observation purposes, and **further requests** the expert team to report on progress made to the PTWS XXIX.

**Acknowledging** the availability of deep-water sea level data is fundamental for tsunami forecasting and validation **and noting** the lack of available metadata for these systems, such as accurate location information for the Bottom Pressure Recorder (BPR), can undermine their use as effective tsunami detection and forecast tools,

**Recommends the PTWS** should agree on a mechanism for all Member States who own and operate a DART or DART-like system to ensure that both, data and metadata of these systems is pro-actively shared by the owner States every time there is a new deployment, re-deployment, or simply on a regular basis to confirm no changes to their national array. Details of the parameters that should be included in the metadata should also be coordinated;

**Instructs** Working Group 2 to bring a draft recommendation for cataloguing and updating this critical DART siting information to the PTWS Steering Committee, for subsequent discussion and endorsement at the next session (PTWS XXIX).

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Financial implications: None

### Recommendation ICG/PTWS-XXVIII.3

#### **Disaster Risk Management and Preparedness**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Noting** that a meeting of the Working Group 3 was held from 4-5 June 2018,

**Noting** that the SOP Guidelines project was completed in 2017 in the form of [IOC Manuals & Guides 76](#) *Plans and Procedures for Tsunami Warning and Emergency Management*,

**Noting** that the document *Preparing for community tsunami evacuations: From Inundation to Evacuation Maps, Response Plans, and Exercises* (in preparation as IOC Manuals and Guides



82) will be published by July 2019, and that this concludes the work of the Task Team on Tsunami Evacuation Maps, Plans, and Procedures (TEMPP) and Tsunami Ready,

**Noting with appreciation** the work of the Task Team on TEMPP and Tsunami Ready under the leadership of Dr Laura Kong, ITIC Director,

**Noting** that the Task Team on TEMPP and Tsunami Ready will dissolve given that the TEMPP project is now completed,

**Agrees** that the remaining focus of the Task Team (Tsunami Ready) will be included in the Terms of Reference of Working Group 3.

**Noting** that for 2019 “The Sendai Seven Campaign – 7 Targets, 7 Years” of the [Sendai Framework for Disaster Risk Reduction 2015–2030](#) focuses on **Target 4**: *Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030*, and that in the 2020 it focuses on **Target 5**: *Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020*,

**Noting** that the International Tsunami Information Center (ITIC) has established dedicated web pages for:

- a) Maritime and Ports Guidance
- b) Structural design and vertical evacuation guidelines,

**Requests** Member States to send materials on the above subjects to the ITIC for sharing;

**Encourages** Member States to observe the World Tsunami Awareness Day (WTAD) in 2019 to address these themes with special emphasis on ports and harbors, and on vertical evacuation, and in 2020 on Tsunami Ready as a part of a national strategy.

**Noting** the participation of more than 35 experts from 12 countries and grand success of the first [ITIC Training on End-to-End Tsunami Early Warning Systems in Chile](#) hosted by the Hydrographic and Oceanographic Service of the Chilean Navy (SHOA), 1-10 August 2018, further noting that ITIC has held these trainings since 2001 for two weeks in Hawaii using Hawaii as a working example of an end-to-end tsunami warning and mitigation system,

**Recommends** to ITIC to seek opportunities to host these trainings in other countries with long-established end-to-end systems, which can share their best practices with Member States;

**Noting** the strong participation in the Tsunami Ready Workshop for Central American and other countries which was sponsored under the DIPECHO Project as a pre-ICG meeting organized by the IOC and ITIC, and

**Recognizing** its value for communicating information to build the capacities of countries,

**Noting** the difficulties the Pacific Island Countries and Territories (PICT) and other Members face in mobilising resources to participate in the ICG/PTWS regular sessions,

**Recommends** to organize a workshop or meeting about recent science developments for the tsunami warning and mitigation system prior to the ICG/PTWS-XXIX;

**Encourages** Member States to include in their national budgets costs for training or other support services.

**Appreciating** NOAA and ITIC for the further development of the Community Inundation Model (ComMIT) for hazard assessment within the Tsunami Evacuation Maps, Plans, and Procedures (TEMPP) project to support the recognition of Tsunami Ready communities,

**Appreciating** NOAA and ITIC for the additional development of the Tsunami Coastal Assessment Tool (TsuCAT) for situational awareness and use as exercise tool to assist Member States in conducting tsunami exercises using the PTWC Enhanced Products,

**Recommends** that the ComMIT tool is further developed and enhanced in order to support and automate the computation of tsunami simulations from a large number of potential scenarios (e.g., from IOC Scientific meeting of experts), and these to be included in the TsuCAT database of pre-computed scenarios;

**Requests** that NOAA and ITIC further develop TsuCAT to facilitate exercises by including tools that enable the creation of exercise MSEL (Master List of Events) that include additional injects to be able to conduct realistic tsunami exercises, and to provide training on the use of TsuCAT's features.

**Appreciating** the development by Working Group 3 of a draft standardized post-event survey (*After Action Evaluation Survey*) for countries to complete and capture lessons identified from events that do not trigger the established IOC post-event assessment survey thresholds,

**Requests** Member States to review and provide feedback to Working Group 3 to document *After Action Evaluation Survey* for finalization at the ICG/PTWS-XXIX in 2021.

**Noting** that at least thirteen Member States have undertaken or are in the process of undertaking or plan to undertake Tsunami Ready,

**Approves** the revised text of the Tsunami Ready Guidelines for the PTWS ([ANNEX V](#)), as reviewed by the intra-session Working Group.

**Noting** that Working Group 3 reported on a review of the current PTWS Working Groups and Task Teams structure against the structures of other ICGs,

**Also noting** that the current [PTWS Medium-Term Strategy](#) ends in 2021, and that the next Medium-Term Strategy will further inform the PTWS Working Groups and Task Teams structure,

**Agrees** that the Chair of Working Group 3 continues work with regards to the future PTWS structure, supported by the Chair and the Vice Chairs of the ICG/PTWS and the other Technical Working Group Chairs, with the following focus:

- 1) Develop a draft PTWS Medium-Term Strategy 2022-2029 for discussion by the PTWS Steering Committee in 2020, and approval by the ICG/PTWS-XXIX in 2021. The draft Medium-Term Strategy 2022-2029 should take in account the Sendai Framework for Disaster Risk Reduction, Key Performance Indicators (KPI) process and the PTWS drivers of the UN Decade of Ocean Science for Sustainable Development.
- 2) Analyze and propose new PTWS structures that align with the draft Medium-Term Strategy 2022-2029, and link with wider IOC and WMO (JCOMM or the equivalent body, following the expected restructuring of WMO) efforts to engage in a multi-hazard early warning system framework.

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Financial implications: None

#### Recommendation ICG/PTWS-XXVIII.4

### **Full Operation of South China Sea Tsunami Advisory Center**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Recalling** that the Intergovernmental Oceanographic Commission (IOC) adopted Resolution EC-XLI.6, which encourages the Member States around the South China Sea and other regional seas, as appropriate, to actively promote the development, establishment and sustained operation of national and sub-regional Tsunami Warning and Mitigation Systems within the framework of ICGs,

**Recalling further** that the ICG/PTWS adopted Recommendation ICG/PTWS-XXIII.5, which established the Working Group for the South China Sea (WG-SCS), and Recommendation ICG/PTWS-XXIV.4 to establish a sub-regional Tsunami Warning and Mitigation System for the South China Sea region within the framework of the ICG/PTWS,

**Recalling further** that the ICG/PTWS adopted Recommendation ICG/PTWS-XXV.3, which approved the establishment of a WG-SCS Task Team on the Establishment of a South China Sea Tsunami Advisory Centre (SCSTAC), and accepted China's offer to host the SCSTAC and recommended to initiate the establishment of the SCSTAC under the guidance of the WGSCS,

**Recalling further** that the ICG/PTWS adopted Recommendation ICG/PTWS-XXVII.3, which decided to commence the trial operation of SCSTAC in late 2017, with specific date to be decided by the Steering Committee of the ICG/PTWS, and also **recalling** that the PTWS SC at its virtual meeting accepted the proposal to start the trial issuance of SCSTAC products in January 2018,

**Recalling further** that the trial operation of SCSTAC started on 26 January 2018, as decided by the Steering Committee of the ICG/PTWS on 11 September 2017, with satisfactory performance,

#### **Having considered:**

1. the report of the Fourth meeting of the ICG/PTWS WG-SCS, held in Jakarta, Indonesia, 11-12 February 2015,
2. the report of the Fifth meeting of the ICG/PTWS WG-SCS, held in Manila, the Philippines, 2-4 March 2016,
3. the report of the Second Task Team Meeting on the Establishment of the South China Sea Tsunami Advisory Centre (SCSTAC), held in Beijing on 24-26 October 2016,
2. the report of the Sixth meeting of the ICG/PTWS WG-SCS, held in Shanghai, China, 1-3 March 2017,
3. the report of the Seventh meeting of the ICG/PTWS WG-SCS, held in Hanoi, Vietnam, 6-8 March 2018, as well as the Third Task Team Meeting on the Establishment of the SCSTAC preceding WG-SCS-VII on 5 March 2018,

4. the report of the Eighth Meeting of the ICG/PTWS WG-SCS, held in Jakarta, Indonesia, 4-6 March 2019,

**Having considered** the coordination among the Pacific Tsunami Warning Center (PTWC), the North West Pacific Tsunami Advisory Center (NWPTAC) and SCSTAC on consistency of earthquake parameters in the South China Sea region after the full operation of SCSTAC as follows:

1. Noting that SCSTAC responds to an earthquake with magnitude equal to or greater than 6.0 within its Area of Service (AoS), and to major earthquakes that occur outside but pose a threat to AoS,
2. SCSTAC takes the priority on determining earthquake parameters at its AoS,
3. For Centroid Moment Tensor (CMT) solutions of major earthquakes within SCSTAC's AoS, the TSPs rely on their own operations,

**Agrees** to accept the document "Users Guide for Tsunami Advisory Products for the South China Sea Regional Tsunami Warning and Mitigation Centre" as an official publication within the IOC Technical Series upon endorsement of the IOC Assembly;

**Decides** to commence the full operation of SCSTAC on 5 November 2019, to be announced by the IOC Secretariat to WG-SCS Member States through Circular Letter at least 60 days in advance;

**Expresses** appreciation to NWPTAC for its reliable interim tsunami services which was started in 2006 and will be stopped following the full operation of SCSTAC;

**Requests** PTWC to continue to provide tsunami services to the SCS region in parallel with SCSTAC during its full operation.

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Financial implications: None

#### Recommendation ICG/PTWS-XXVIII.5

### **Trial Operation of Central America Tsunami Advisory Center**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Considering** the report of the fourth meeting of the Regional Working Group for Central America of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS), held in Managua, Nicaragua, on 11 February 2019,

**Considering** recent tsunamis on the Pacific (September 1992 and August 2012) and Caribbean Central America coasts (1991, 2009 and 2018), and the potential loss of life and economic impact caused by such possible future events,

**Considering** that in 2011, at its second meeting, the Regional Working Group for Central America of the ICG/PTWS recommended the strengthening of the human resources of the institutions responsible for tsunami early warning systems, the establishment of a tsunami

early warning centre in Central America, and the implementation of education on tsunami hazards and their impact (floods) by the institutions responsible for emergency response systems,

**Recalling** that on 1 October 2014, the Pacific Tsunami Warning Center (PTWC) began providing the new Enhanced Tsunami Products, endorsed by the Pacific Tsunami Warning and Mitigation System (PTWS) and UNESCO/the Intergovernmental Oceanographic Commission (IOC),

**Considering** the Coordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC) as the institution specialized in integrated disaster risk management in Central America and that harmonizes the approach to these priorities with the strategies and agendas of other specialized bodies of the Central American Integration System (SICA),

**Considering** the efforts of Central American countries and regional organizations to establish new seismic stations, to maintain existing stations, and to make progress in the exchange of seismic data so as to advance tsunami and earthquake warning and research capabilities in Central America,

**Urges** further reduction of the gaps in seismic coverage through the exchange of seismic data and the establishment of new seismographic stations, particularly in the Caribbean area, to support the Pacific Tsunami Warning and Mitigation System (PTWS) in accordance with the requirements recommended by the ICG/PTWS and the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS);

**Considering** the experience of the Nicaraguan Institute of Territorial Studies (INETER) in monitoring seismic activity and operating the tsunami warning system 24 hours a day, seven days a week, since 1992,

**Considering and appreciating** the technical cooperation provided by the Japan International Cooperation Agency (JICA) to Nicaragua for the creation of the Central America Tsunami Advisory Centre (CATAC) and the strengthening of the regional system, including technical training,

**Decides** to support the efforts and progress made by Nicaragua in the creation of the Central America Tsunami Advisory Centre (CATAC), as a tsunami service provider (TSP) within the framework of the ICG/PTWS;

**Also decides** to support the proposal to begin sending trial tsunami messages as of August 2019, based on the progress made in capacity-building for the establishment of the Central America Tsunami Advisory Centre (CATAC) using the official IOC ICG/PTWS list of NTWCs and TWFPs;

**Recommends** that countries ensure the development and strengthening of national institutional and personnel capacities in early warning systems;

**Also expresses its appreciation** for the funding that the European Union, through its Directorate-General for European Civil Protection and Humanitarian Aid Operations (ECHO), provided to UNESCO, through the Intergovernmental Oceanographic Commission (IOC), for the strengthening of the regional warning and prevention system, including technical training;

**Further decides** to submit to CEPREDENAC the report of the fourth meeting of the Regional Working Group for Central America of the ICG/PTWS for inclusion in the agenda of its second ordinary meeting;

**Instructs** the Technical Secretary of the PTWS to deliver this recommendation to the ICG/CARIBE-EWS and to forward this recommendation to CEPREDENAC for appropriate action.

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Financial implications: None

#### Recommendation ICG/PTWS-XXVIII.6

### **UN Decade of Ocean Science for Sustainable Development**

The Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS),

**Recognizing** the unique opportunity to advance the global tsunami forecast and warning system capability provided through the UN Decade of Ocean Science for Sustainable Development given the close alignment between the Decade and ICG/PTWS strategic outcomes,

**Advocates** that the UN Decade of Ocean Science for Sustainable Development adopts an initiative aimed at enhancing sensing and analysis strategies to enable the rapid characterization of tsunami sources which we hold as fundamental in transforming our ability to forecast and warn of local and/or non-seismic source tsunami threats;

**Noting** that this initiative further advances the global tsunami forecast and warning system's ability to detect and measure tsunamis formed by atypical sources for example landslides, volcanic eruptions, and complex ruptures, for which there is currently little to no near-real time capability,

**Further noting** that a key underpinning of this effort relates to our ability to precisely map the sea floor, particularly near coastal zones. This not only contributes to tsunami forecast accuracy, but also the ability of emergency managers to plan for the threat and for communities to evacuate before the first waves arrive,

**Recommends** that Member States contribute where possible to the UN Decade of Ocean Science for Sustainable Development by sharing existing and new data that advance detection capabilities and to promote conceptually this effort within their own policy making arenas to demonstrate progress in realizing the initiative;

**Further recommends** this initiative be endorsed by the TOWS WG, be advocated for at the upcoming Ocean Decade Planning Group meeting, WMO Congress, IOC General Assembly, and the UN General Assembly.

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Financial implications: None