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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)**

Thirty-second Session of the Assembly

UNESCO, Paris, 21–30 June 2023

ADOPTED DECISIONS & RESOLUTIONS

ADOPTED DECISIONS

IOC Decision A-32/3.4.1

Warning and Mitigation Systems for Ocean Hazards

The Assembly,

Having examined the executive summary reports of the recent sessions of the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS-XVI/3s), the IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS-XIII/3s), and the report of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-XVI),

Accepts the reports by the IOC/ICGs and TOWS-WG;

Notes with satisfaction the progress made during the intersessional period, including:

- (i) Tsunami exercises conducted in the Caribbean (CARIBE WAVE 22 and CARIBE WAVE 23), and Pacific (PacWave 22) regions;
- (ii) Work of the TOWS-WG *Ad hoc* Teams on Meteotsunamis and Tsunamis Generated by Volcanoes under the Task Team on Tsunami Watch Operations (TT TWO);
- (iii) Continuing expansion of capabilities and services of the Tsunami Service Providers (TSPs) for each region, especially with regards to tsunami events, and including development of new products and capabilities, such as for the maritime community and growing capability in response to tsunamis generated by non-seismic and complex events;
- (iv) Enhancements to monitoring and detection capabilities, such as growing use of GNSS data globally and installation of undersea cable systems (SMART) in the North-eastern Atlantic and Southwest Pacific Oceans;
- (v) the appointment of Dr Laura Kong, Director, International Tsunami Information Center (ITIC as the Chair of the UNESCO/IOC Tsunami Ready Coalition);
- (vi) Continued progress in the implementation of UNESCO/IOC Tsunami Ready in the North-eastern Atlantic, the Mediterranean and connected seas, Indian Ocean, Pacific Ocean, and Caribbean and Adjacent regions;
- (vii) Efforts of the Indian Ocean Tsunami Information Center (IOTIC) and International Tsunami Information Center (ITIC) in preparing Tsunami Awareness, UNESCO/IOC Tsunami Ready and Tsunami Evacuation Maps, Plans and Procedures (TEMPP) training through the Ocean Teacher Global Academy (OTGA) platform and hybrid training workshops and training videos;
- (viii) Initiatives like Hotel Resilient, as a benchmarking and certification of hotels and resorts for disaster risk management (multi-hazard including tsunami) and climate change adaptation, as well as the example for a major hotel in Waikiki, Hawaii, United States;
- (ix) Work of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS) to develop a National Tsunami

Warning Centre (NTWC) Competency Framework (2019), and the ITIC's leadership to pilot training courses based on the Framework;

- (x) Activities undertaken by the respective regions for World Tsunami Awareness Day (WTAD) 2022, and as part of this, the strong engagement in the #GetToHighGround Initiative, and the success achieved through United Nations Office of Disaster Risk Reduction (UNDRR) and IOC collaboration;
- (xi) Efforts of the Intergovernmental Coordination Group for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE-EWS) and the IOC Secretariat to coordinate and contribute to global initiatives related to Multi-Hazard Early Warning Systems (MHEWS);
- (xii) Continuing collaboration with the International Union of Geodesy and Geophysics (IUGG), World Meteorological Organization (WMO), United Nations Office of Disaster Risk Reduction (UNDRR), International Hydrographic Organization (IHO), and International Maritime Organization (IMO);
- (xiii) The ICG/PTWS for quick implementation of the Interim Hunga Tonga-Hunga Ha'apai (HTHH) Volcano Tsunami Response Procedures by 15 March 2022 (cf. IOC Circular Letter 2882).

Welcomes the appointment of the new ICG/CARIBE EWS Officers for the biennium 2023–2025;

I. Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (CARIBE-EWS)

Notes with appreciation:

- (i) the planned hosting of a five-day Tides Training Course to be taught in Spanish for both oceanographic and hydrographic organizations jointly organized and funded by the International Hydrographic Organization (IHO), the International Maritime Organization (IMO), and the Intergovernmental Oceanographic Commission (IOC) of UNESCO, 13–17 November 2023, hosted by Costa Rica;
- (ii) NOAA's support to the Puerto Rico Seismic Network (PRSN) for hosting a training workshop for GNSS network operators in the region during the second week of August 2023;
- (iii) the strong cooperation between the Caribbean Tsunami Information Center (CTIC), the Caribbean Office of the International Tsunami Information Center (ITIC-CAR), CARIBE-EWS WG4, Task Teams CARIBE WAVE and Tsunami Ready and UNDRR for advancement of preparedness, readiness and resilience to mitigate the impacts of tsunamis and other coastal hazards in the CARIBE-EWS, particularly in relation to the implementation of the Tsunami Ready programme, the dissemination and development of outreach and educational resources, support to the United Nations Decade of Ocean Science for Sustainable Development including the work of the Tropical America and Caribbean Decade Safe Ocean Working Group;
- (iv) the consideration of the Central America Tsunami Advisory Center (CATAC) as a Tsunami Service Provider (TSP) in its 17th Session in 2024 to enable the IOC Executive Council to consider the final admission of CATAC as TSP in June 2024;
- (v) the decision to hold CARIBE WAVE 24 on Thursday 21 March 2024, commencing at 15:00 UTC with two scenarios: (a) an earthquake along the Puerto Rico Trench;

and (b) an earthquake along the North Panama Deformed Belt based on the 1882 event;

- (vi) the decision to realign the ICG/CARIBE-EWS Working Groups (WG) around the Sendai Framework for Disaster Risk Reduction, the EW4ALL and the ODTP pillars, including capacity development functions for all;

II. Indian Ocean Tsunami Warning and Mitigation System (IOTWMS)

Notes with appreciation:

- (i) the successful completion and outcomes of Phases 2a and 2b of the UNESCAP funded project “Strengthening tsunami early warning in the North-West Indian Ocean through regional cooperation” and the commencement in 2023 of the Phase 2c of the project;
- (ii) the hosting of the Indian Ocean Tsunami Ready Workshop in Bali, Indonesia, 22–26 November 2022 and the UNESCO/IOC Tsunami Ready recognition of a further nine communities in Indonesia in 2022;
- (iii) IOTWMS plans to undertake a full Capacity Assessment of Tsunami Preparedness in the Indian Ocean in 2024 to evaluate progress of the IOTWMS since the Indian Ocean Tsunami of 2004;
- (iv) IOTWMS plans to hold the 14th session of the ICG/IOTWMS in late 2024 to coincide with the 20th Commemoration of the Indian Ocean Tsunami of 2004 and the offer from the Government of Indonesia to host it;
- (v) the decision to hold the Exercise IOWAVE23 in October of 2023;

III. Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG)

Decides that warning systems for tsunamis generated by volcanoes should be considered and coordinated as part of the UNESCO/IOC Global tsunami and other Ocean-related Hazards Warning and Mitigation System (GOHWMS), and also when possible be part of a MHEWS;

Acknowledges the WMO request to the WMO-IOC Joint Collaborative Board to review tsunami issues as they relate to meteotsunamis, to clarify the roles and responsibilities for the WMO and UNESCO-IOC, and to determine how best to strengthen collaboration in support of Member States;

Welcomes the organisation of a Global Scientific Symposium and establishment of an Organizing Committee composed of two Co-chairs nominated by the TT-TWO and TT-DMP, the Chair of the ODTP Scientific Committee, a representative from the Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), a representative of the IUGG-Joint Tsunami Commission, and a representative of each of the Tsunami Information Centres to be hosted by the Government of Indonesia in December 2024 as part of the plans by the ICG/IOTWMS to commemorate the 20th Anniversary of the Indian Ocean Tsunami of 2004;

Decides to endorse the 10-Year Research, Development and Implementation Plan of the Ocean Decade Tsunami Programme as presented in document IOC/A-32/3.4.1.2.Doc(1);

Instructs the regional Intergovernmental Coordination Groups (ICGs) to:

- (i) encourage sea level data is sampled at one second intervals and with the highest available accuracy and transmitted in real-time as a matter of priority, given the

critical need to resolve and understand the near-field threat to high at-risk communities where a tsunami generated by non-subduction earthquake sources as well as non-seismic sources (e.g. generated by volcanoes) may arrive in minutes;

- (ii) encourage sea-level network operators to undertake regular and routine calibration of their sea-level monitoring instrumentation, following recommendations of IOC Manuals & Guides 3 and 14 (Volumes I–V);
- (iii) routinely monitor the status of seismic and sea level related observing networks to identify and better help rectify gaps in coverage and free and open data exchange;
- (iv) Consider and implement the recommendations of the Ad Hoc Team on Tsunamis Generated by Volcanoes with respect to the hazard assessment, monitoring and warning requirements, including costs of deploying and maintaining such systems. Where identified tsunamis generated by volcanoes may impact multiple Member States, TSPs for the relevant ocean basin tsunami warning and mitigation systems should consider if they need to be involved in monitoring and provision of threat advice;
- (v) TSPs in collaboration with NAVAREA operators of the International Hydrographic Organization (IHO) test the tsunami maritime safety products in 2023/24, with a view to operationally implementing them in 2024-2025;
- (vi) add the task to the Terms of Reference of the ICGs and TICs to facilitate the implementation and functioning of the UNESCO/IOC Tsunami Ready Recognition Programme;
- (vii) add the role of ICGs as regional Steering Committees for the ODTP in their Terms of Reference;
- (viii) undertake sub-regional exercises as part of WAVE Exercises as an efficient way to further engage Member States on exercises as appropriate;
- (ix) follow the initiative of ICG/PTWS to enable sub-regional live information sharing during tsunami events to inform neighbouring country decision-making;
- (x) investigate mechanisms for recognition of standards mechanisms similar to UNESCO/IOC Tsunami Ready Recognition Programme already in place in some countries and inform the TOWS-WG TT-DMP;
- (xi) Caribbean Tsunami Information Center (CTIC) to share UNESCO/IOC Tsunami Ready survey questionnaire and feedback forms on implementation process to receive information from the UNESCO/IOC Tsunami Ready communities;
- (xii) encourage the standard text in the UNESCO/IOC Tsunami Ready signage for vertical evacuation, such as “Go to the designated building for vertical evacuation”;
- (xiii) properly inform the public on the validity of the recognition, as indicated on the UNESCO/IOC Tsunami Ready signage and certificate under the UNESCO/IOC Tsunami Ready logo;
- (xiv) ITIC to pilot the draft PTWS National Tsunami Warning Centre (NTWC) Competency Framework (2019) for endorsement by ICG/PTWS with the goal to develop a global framework for all ICGs to use;

Encourage Member States to provide voluntary financial contributions to the IOC special account and in-kind contributions to support the Ocean Decade Tsunami Programme and UNESCO/IOC Tsunami Ready Recognition Programme;

Requests the IOC Secretariat:

- (i) provide a timelier update of the UNESCO/IOC Tsunami Ready database;
- (ii) explore how to develop an automated application system for UNESCO/IOC Tsunami Ready application and renewal;
- (iii) enhance the renewal process of UNESCO/IOC Tsunami Ready and learning about the renewal experience in the United States TsunamiReady® program;
- (iv) facilitate the finalization of the OTGA basic tsunami training materials as soon as possible to support the UNESCO/IOC Tsunami Ready Recognition Programme;
- (v) develop a paper on the tsunami threat on coasts along the Southern Atlantic Ocean to assist concerned Member States of IOC on the decision to be part of the global Tsunami Warning and Mitigation System;
- (vi) help inform Member States widely on the potential tsunami hazard from volcanoes by distributing the Tsunamis Generated by Volcanoes Report, including the List of Tsunamigenic Volcanoes, to:
 - Volcano Observatories;
 - UNESCO/IOC Member States.

Extends the tenure of the Working Group on Tsunamis and Other Hazards related to Sea-Level Warning and Mitigation Systems and its Task Teams on: (i) Disaster Management & Preparedness (TTDMP), and (ii) Tsunami Watch Operations (TTTWO), with terms of reference as given in IOC Resolution XXIV-14 [for TOWS-WG], report IOC/TOWS-WG-VI/3, Annex II [for TTDMP] and report IOC/TOWS-WG-X/3, Annex II (Appendix 1) [for TTTWO].

Notes that the regular budget for these activities will be identified as part of the overall Resolution on Governance, Programming and Budgeting matters of the Commission.