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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION
(of UNESCO)**

Fifty-fifth Session of the Executive Council

UNESCO, Paris, 14–17 June 2021

ADOPTED DECISIONS & RESOLUTIONS

Also invites GOOS to propose awareness-raising and capacity building activities to help States realize the value of observations, including positive impact on States' adaptation to climate change and sustainable economic development.

IOC Decision EC-55/3.5.1

Warning and Mitigation Systems of Ocean Hazards

The Executive Council,

Taking note of the executive summary reports of the recent sessions of the Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS), the Intergovernmental Coordination Group for the Tsunami Early Warning and Mitigation System in the North-Eastern Atlantic, the Mediterranean and Connected Seas (ICG/NEAMTWS), the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS). and the report of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (IOC/TOWS-WG-XV),

Also taking note of the reports by the IOC/ICGs and TOWS-WG;

Expressed its solidarity with the people who are affected by the Hunga Tonga-Hunga Ha'apai volcanic eruption and tsunami on 15 January 2022;

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

- (i) the wave exercises conducted in the Caribbean (CARIBWAVE21) and NEAM (NEAMWave21) regions during the ongoing pandemic;
- (ii) the finalization and publication of the IOC Manual and Guides, 74 "Standard Guidelines for the Tsunami Ready Recognition Programme" and IOC Manual and Guides, 86 "Multi-Annual Community Tsunami Exercise Programme: Guidelines for the Tsunami and other Coastal Hazards Warning System for the Caribbean and Adjacent Regions";
- (iii) the continued progress in the implementation of Tsunami Ready in the NE Atlantic and Mediterranean and connected seas, Indian Ocean, Pacific Ocean and Caribbean regions, which indicates that Tsunami Ready has now established itself as a globally popular and recognized tsunami preparedness tool;
- (iv) the development and production of a global Tsunami Ready Interactive Map Viewer and the hosting of the Tsunami Ready web site by the International Tsunami Information Center (ITIC);
- (v) the development and production of a new Tsunami Ready Board Game and supporting animation video series prepared by IOTIC, bearing in mind that additional resources will be required for the production and translation of Tsunami Ready Board Game into several languages;
- (vi) the efforts of the IOTIC, BMKG (Indonesia) and ITIC in preparing Tsunami Ready and Tsunami Evacuation Maps, Plans and Procedures (TEMPP) training through the Ocean Teacher Global Academy (OTGA) platform as well as offering hybrid training workshops and training videos;

- (vii) the near finalisation of a global Key Performance Indicators (KPI) framework with goals, targets and corresponding measures in alignment with the Sendai Framework for Disaster Risk Reduction 2015–2030; United Nations Decade of Ocean Sciences for Sustainable Development – A Safe Ocean; IOC Tsunami Programme; Tsunami Ready; current ICG Strategies; and the ICG/PTWS KPI Framework completed in 2018/2019;
- (viii) the work of the PTWS to develop a National Tsunami Warning Centre (NTWC) Competency Framework (2017), and the ITIC's leadership to pilot training courses based on the Framework;
- (ix) the activities undertaken by the respective regions for WTAD 2021, and the success achieved by UNDRR;
- (x) the 2022, WTAD theme will highlight Sendai Framework Global Target G: Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to the people by 2030;
- (xi) the efforts of the CARIBE-EWS and the Secretariat to coordinate and contribute to global initiatives related to Multi-Hazard Early Warning Systems;

Welcomes the appointment of the new ICG/PTWS Officers for the biennium 2021–2023.

Part I: Indian Ocean Tsunami Warning and Mitigation System (IOTWMS)

Notes with appreciation the development of workplans to address issues raised in the 2020 report on the Capacity Development of Tsunami Preparedness in the IOTWMS;

Also notes with appreciation the planning to utilise the Tsunami Programme of the UN Decade for Ocean Science to deliver more timely and accurate tsunami warnings to 100% Tsunami Ready at-risk coastal communities;

Further notes with appreciation the efforts to expand capacity development for SIDS and LDCs;

Notes the efforts continuing to address the challenges of warning for atypical tsunami events;

Notes with concern the continuing challenges with regards to timely and open exchange of seismic and sea-level data for tsunami warning;

Congratulates IOTWMS Member States for the successful completion of Phase-1 of the UNESCAP funded project “Strengthening Tsunami Warning in the North West Indian Ocean through Regional Collaboration”;

Encourages Member States to promote the engagement of more disaster managers in the work of the ICG/IOTWMS, especially with regards to the widespread implementation of the Tsunami Ready Programme;

Welcomes the extension of the Government of Indonesia (BMKG) and IOC-UNESCO agreement in support of the Indian Ocean Tsunami Information Centre (IOTIC);

Also welcomes the extension of the Government of Australia support for the Secretariat Office of the ICG/IOTWMS;

Further welcomes the decision to organize and conduct the next Indian Ocean Wave Exercise in 2023 (IOWave23);

**Part II:
North-Eastern Atlantic, the Mediterranean
and Connected Seas (ICG/NEAMTWS)**

Notes with appreciation the organization of NEAMWave21 conducted between 8 and 10 March 2021 and the major increase in media interest;

Notes the continued national efforts to increase awareness on tsunami hazards and preparedness in line with and as contributions to the World Tsunami Awareness Day, 5 November 2021;

Further notes the establishment of a new Task Team on Tsunami Ready and the progress made by communities in several countries towards becoming Tsunami Ready and prepared;

Appreciates the continued support of the European Commission (EC) and the Joint Research Centre (JRC) in the development of NEAMTWS;

Further appreciates the approval of a new European Union DG-ECHO project on "Strengthening the Resilience of Coastal Communities in the North-Eastern Atlantic, Mediterranean Region to the Impact of Tsunamis and Other Sea Level-Related Coastal Hazards";

Notes on the study prepared by the Secretariat on Coastal Multi-Hazard Risk Perception, Resilience and Survey Questionnaires to contribute to the implementation of the new project;

Welcomes the target to establish at least ten Tsunami Ready recognized communities in the Mediterranean countries in the next two years, contributing to making 100% of communities at risk of tsunami prepared for and resilient to tsunamis by 2030;

Congratulates the ICG/NEAMTWS for the finalization and publication of a new ICG/NEAMTWS 2021-2030 Strategy in line with the UN Ocean Science Decade for Sustainable Development;

Welcomes the decision to organize and conduct the next North-Eastern Atlantic, the Mediterranean and Connected Seas Wave Exercise in 2023 (NEAMWave23);

**Part III:
Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation
System (ICG/PTWS)**

Notes the establishment of a Task Team of the Tsunami Service Providers (TSPs) under ICG/PTWS Working Group 2 and a Task Team on UN Ocean Decade with particular reference to the Ocean Decade Tsunami programme;

Congratulates the ICG/PTWS for the finalization and publication of the Pacific Tsunami Warning and Mitigation System (PTWS) Strategy 2022–2030;

Further notes the start of the Central America Tsunami Advisory Centre (CATAC)'s full functionality as interim service for PTWS as of 17 January 2022;

Welcomes the decision to organize and conduct a tenth Exercise Pacific Wave in 2022 (PacWave 22) in the months of September through November 2022 to support International Disaster Risk Reduction Day (13 October) and World Tsunami Awareness Day (5 November), as a series of regional exercises organized through the PTWS regional working groups;

Further welcomes the hosting of a scientific meeting of experts on the New Hebrides Trench and a scientific meeting of experts to discuss tsunami sources, hazard and risk associated with the Chile-Perú subduction zone;

Recommends that Member States make data from their GNSS networks publicly available in real-time, and that all stations within 200 km of the coast are included since such inland stations also provide valuable constraints on tsunami excitation;

**Part IV:
Working Group on Tsunamis and Other Hazards related
to Sea Level Warning and Mitigation Systems (TOWS-WG)**

Recalling IOC Assembly Resolution XIV-14 proposing the establishment of a Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG),

Further recalling IOC Assembly Decision IOC-31/3.4.1 establishing the Ocean Decade Tsunami Programme (the Programme) with TOWS-WG serving as the Global Steering Committee for the Programme,

Reiterates that the UN Ocean Decade provides a once-in-a-generation opportunity to leverage novel sensing platforms, techniques and/or infrastructures in order to more quickly and accurately detect and warn for tsunamis and increase community preparedness and resilience including through the Tsunami Ready programme;

Approves the establishment of the UNESCO/IOC Tsunami Ready Recognition Programme as described in the working document “Tsunami Ready Programme – Proposal for endorsement by IOC” dated 21 February 2022;

Approves also:

- (i) the amendments to the Terms of Reference of the TOWS-WG, including new functions assigned to it by the Decision IOC-31/3.4.1. in the context of the UN Ocean Decade as in Annex 1 to this decision;
- (ii) the Terms of Reference for the Tsunami Ready Coalition, as included under Annex 2 to this decision;
- (iii) the amendments to the Terms of Reference for the Scientific Committee, as included under Annex 3 to this decision;

Recommends that GOOS consider ocean bottom pressure as an Essential Ocean Variable (EOV), given its importance for the detection and characterisation of tsunamis and computation of general ocean circulation;

Instructs the regional Intergovernmental Coordination Groups (ICGs):

- (i) to encourage sea-level network operators to undertake regular and routine calibration of their sea-level monitoring instrumentation, following recommendations of IOC Manuals and Guides, 3 and 14 (Volumes I-V),
- (ii) to 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,
- (iii) that Tsunami Service Providers (TSPs) and National Tsunami Warning Centres (NTWCs) identify all coastal areas or near-shore faults that could generate large earthquakes and submarine landslides and be prepared to issue warnings as appropriate,

- (iv) the addition of the task to facilitate the UNESCO/IOC Tsunami Ready Recognition Programme to the Terms of Reference of each ICG Tsunami Information Centre;

Requests the PTWS to:

- (i) share their local source SOPs efforts with other ICGs, with a view toward developing consistent approaches,
- (ii) share its document on NTCW Competency Framework (2017), with other regions, and invite comments and feedback with a view toward developing a global framework;

Supports continuation of the strong collaboration between the IOC and UNDRR for World Tsunami Awareness Day (5 November), noting that the WTAD 2022 will highlight Target F of the Sendai Framework for Disaster Risk Reduction;

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 Annex 1 for TOWS-WG, IOC/TOWS-WG-VI/3, Annex II for TTDMP and IOC/TOWS-WG-X/3, Annex II (Appendix 1) for TTTWO;

Agrees that the regular budget for these activities will be identified as part of the overall IOC Programme and Budget draft resolution A-31/[4.4].

Annex 1

Revised Terms of Reference of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG)

Mandate

The TOWS-WG will:

- (a) Advise on co-ordinated development and implementation activities on warning and mitigation systems for tsunamis and advise on coordination between tsunami and other hazards related to sea level of common priority to all ICG/TWSs, with special emphasis on:
 - (i) harmonization and standardization of relevant observation, data management and communication, forecast and warning, disaster management and preparedness practices,
 - (ii) development of synergies in capacity-building and outreach activities,
 - (iii) reinforcement of intergovernmental, international and national capabilities on hazard knowledge, vulnerability, and impact assessment,
 - (iv) effective coordination with all related subsidiary bodies, expert groups and partner organizations,
 - (v) effective coordination of tsunami warning and mitigation systems with other hazards relating to sea level across IOC, WMO, IMO, and IHO.
- (b) Perform Global Steering Committee functions for the UN Ocean Decade Tsunami Programme (the programme) including:

- (i) define the programme deliverables and Key Performance Indicators (KPI) based on the expectations of the operational tsunami community, research scientific opportunities and the availability of resources,
 - (ii) define the Tsunami Implementation Plan (TIP) to guide the execution of the programme during the course of the UN Ocean Decade,
 - (iii) identify opportunities for collaboration between the programme, IOC and other UN Ocean Decade programmes, IHO, IMO, UNDRR, WMO and related initiatives undertaken by for example the FDSN, IUGG JTC, GEBCO, SMART Cables Joint Task Force and other relevant partners;
- (c) Report to the IOC Executive Council and Assembly on these related activities and propose new recommendations and actions, as required;
- (d) Advise the IOC Executive Council and Assembly regarding:
- (i) instructions to the relevant subsidiary bodies responsible for coordinating the implementation of TOWS-WG actions,
 - (ii) any liaison or consultation required with relevant international and intergovernmental stakeholders in implementing TOWS-WG actions not under the unique mandate of IOC, including inter alia WMO, IHO, and IMO;

The TOWS-WG shall review and provide guidance on establishing the framework mechanism for a comprehensive, sustained and integrated end-to-end global system covering tsunami and other hazards related to sea level, exploiting existing IOC mechanisms, capacities and capabilities, and facilitating priority projects and programmes, in alignment with the IOC Strategic Plan and IOC Executive Council decisions, and in coordination with relevant stakeholders.

Membership and modus operandi

The membership of the TOWS-WG will be constituted by:

- a) The Chairpersons of the four ICG-TWSs, the Scientific Committee of the UN Ocean Decade Tsunami programme, the special Tsunami Ready Coalition, and representatives of the GOOS Steering Committee and IODE,
- b) Three Members of the IOC Executive Council, nominated by the IOC Chairperson, taking into account geographical distribution,
- c) High-level non-voting representatives invited from the key TOWS-WG stakeholders in scientific, earth observation and disaster risk reduction fields outside IOC, including CTBTO, FDSN/GSN, IHO, IMO IUGG Joint Tsunami Commission, UNDRR, WMO, and other relevant intergovernmental and international agencies,
- d) Appointed members of the Executive Council may be re-appointed for a second two-year term;

The TOWS-WG shall be chaired by one of the Vice-Chairpersons of IOC.

The TOWS-WG shall meet once a year, prior to the IOC Executive Council or the Assembly.

The IOC Executive Secretary shall provide the secretariat for the TOWS-WG.

Annex 2

Terms of Reference of the Tsunami Ready Coalition

Goal: Contribute to increasing the number of Tsunami Ready recognized communities as part of the UN Ocean Decade.

Objectives:

The goal should be achieved through the following objectives:

1. Raise the profile of Tsunami Ready in collaboration with critical stakeholders across the UN system, interested regional organizations, national disaster management agencies and the public,
2. Increase funding resources for the implementation of Tsunami Ready,
3. Advise the TOWS-WG, TTDMP, and TTTWO on the implementation of Tsunami Ready, including on measures related to:
 - (i) flexibility with regards to accomplishing the indicators to allow for circumstances where formal bureaucratic frameworks/requirements may pose barriers,
 - (ii) consideration of unique regional and/or local circumstances,
 - (iii) recognition of similar standards already in place in some countries,

The Coalition will not have a programmatic role with regards to the Tsunami Ready initiative; the technical aspects (i.e. IOC Manual & Guides, 74: Standard Guidelines for the Tsunami Ready Recognition Programme) will remain the mandate and responsibility of the TT-DMP and the respective ICGs.

Membership could include, as appropriate, representatives from international, regional and national organizations, such as:

International:

- IFRC
- International Association of Emergency Managers (IEAM)
- International Council for the Exploration of the Sea (ICES)
- Relevant ICG Working Groups and Task Teams
- Save the Children
- Tsunami Information Centres
- UNDP
- UNDRR

Regional:

- Arab League Educational, Cultural and Scientific Organization (ALESCO)
- ASEAN
- Caribbean Disaster Emergency Management Agency (CDEMA)

- CARIDIMA Youth Platform for DRM in the Caribbean.
- Coordination Center for Disaster Prevention in Central America and the Dominican Republic (CEPRENAC)
- Directorate-General for the European Civil Protection and Humanitarian Aid Operations of the EC (DG-ECHO-EC)
- Islamic World Educational, Scientific and Cultural Organization (ICESCO) (Headquarters in Rabat, Morocco).
- Joint Research Centre of the European Commission (JRC-EC)
- Pacific Community (SPC)
- U-INSPIRE Alliance (Asia and the Pacific Alliance of Youth and Young Professionals in Science, Engineering, Technology, and Innovation for Disaster Risk Reduction and Resilience)
- UNESCAP

National:

- AID National Agencies/Organizations
- Emergency Management Agencies/EDMAs
- French Inter- Ministerial for the Antilles Estate Major Zone (EMIZA)
- IOC & Tsunami National Contacts (TNCs) & Tsunami Ready Focal Points (TRFPs)
- National Commissions for UNESCO
- National Youth organisations, and
- relevant Members of the UN Ocean Decade Alliance with a focus on commitments towards Tsunami Ready actions;

Organizational structure

Given the potential size of the Coalition, the Chair of the Coalition will propose a governing structure to the TOWS-WG at its sixteenth meeting.

The Chair of the Coalition will be appointed by the Chair of IOC in consultation with the Chair of the TOWS-WG.

Reporting

The Coalition will report activities and progress to the TOWS-WG.

Annex-3

Revised Terms of reference of the Scientific Committee for the Ocean Decade Tsunami Programme [original in Annex to IOC Dec. A-31/3.4.1]

[new text underlined]

The Scientific Committee will:

- (i) Develop a Draft 10-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme based on the concept paper *“Protecting Communities from the World’s Most Dangerous Waves: A Framework for Action under the UN Decade of Ocean Science for Sustainable Development”*;

- (ii) Identify and address gaps in global tsunami hazard assessment as follows:
 - a) comprehensive assessment to include all potential tsunamis, anywhere in the world, regardless of their source,
 - b) strategies to validate historical tsunami sources, through the application of paleotsunami techniques and historical seismology;
- (iii) Identify gaps in tsunami detection, measurement, forecasting, with a special emphasis on tsunamis generated close to populated coastlines;
- (iv) Propose to enhance sensing and analysis strategies to enable the rapid characterization of tsunami sources through the combined use of land-based seismic and geodetic sensors, GNSS terminals, coastal sea level gauges, deep-ocean tsunameters, SMART repeaters on deep-ocean fiber-optic cables and satellite-based observations;
- (v) Propose a roadmap for collaboration with the ITU/WMO/IOC SMART Joint Task Force cable initiative to fully explore the feasibility of widespread deployment of scientific instrumentation on deep-ocean fiber-optic cables to improve capability to rapidly detect and characterize tsunami sources as well as propagating tsunami wave fields;
- (vi) Consider and propose strategies, programmes and content to enhance societal resilience for tsunami and other ocean hazards;
 - a) build the framework needed to ensure the training and development of the next generation of technical-scientific expertise,
 - b) identify strategies that allow to characterize structural and social vulnerability in tsunami hazard zones,
 - c) propose strategies for promoting implementation of community preparedness initiatives such as IOC Tsunami Ready to ensure 100 % at risk communities are prepared & resilient to tsunamis by 2030;
- (vii) Overview the consolidation of inputs received to IOC [Circular Letter 2825](#) on Inventory of actions being considered under the United Nations Decade of Ocean Science for Sustainable Development (2021–2030) in the field of Tsunamis and Other Sea-Level Related Hazards warning and mitigation;
- (viii) (viii) Submit a Draft 10-Year Research, Development and Implementation Plan for endorsement by the TOWS-WG at its 16th meeting.

IOC Decision EC-55/3.5.2

Progress Report of the Open-ended Working Group on the Status of the Regional Committee of the Central Indian Ocean (IOCINDIO)

The Executive Council,

Having examined document IOC/EC-55/3.5.2.Doc(1) that conveys the progress report of the Intersessional Open-ended Working Group on the Status of the Regional Committee of the Central Indian Ocean established by Decision A-31/3.5.6 of the IOC Assembly at its 31st session,