

## DECISIONS AND RECOMMENDATIONS

The Seventeenth Meeting of the Working Group on Tsunamis and Other Hazards Related to Sea-Level Warning and Mitigation Systems (TOWS-WG-XVII) was held during 22–23 February 2024 under the Chairpersonship of Mr Srinivasa Kumar Tummala (IOC Vice-Chair). The meeting evaluated the progress made in respect to the Decisions adopted at the 32nd IOC Assembly (21–30 June 2023, Paris), namely IOC Decision A-32/4.3.1.

**The Group expressed** its solidarity with the people who are affected by the 2024 Noto Peninsula Earthquake and tsunami, in Japan, on 1 January 2024;

**The Group reviewed** reports by the IOC Intergovernmental Coordination Groups (ICGs) as well as of the Inter-ICG Task Teams on Disaster Management and Preparedness (TT-DMP) and on Tsunami Watch Operations (TT-TWO);

**The Group noted with appreciation** the progress made during the intersessional period, including:

- (i) the exercises conducted in the Caribbean on March 23, 2023 (CARIBE WAVE 23), the Indian Ocean on 4, 11, 18, and 25 October (IOWave23) and the North-eastern Atlantic, the Mediterranean, and connected seas on November 6–7, 2023 (NEAMWave 23);
- (ii) the continuing work of the Ocean Decade Tsunami Programme Scientific Committee (ODTP-SC) chaired by Mr Srinivasa Kumar Tummala;
- (iii) the publication of the Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme (ODTP-RDIP) ([IOC/2023/TS/180](#));
- (iv) the publication of the report on monitoring and warning for tsunamis generated by volcanoes ([IOC/2024/TS/183](#)) prepared by the TT TWO Ad Hoc Team on Tsunamis Generated by Volcanoes (TGV) led by Francois Schindele and the research paper submitted to the Journal of Pure and Applied Geophysics (PAGEOPH);
- (v) the update on the IUGG meetings organised in 2023-2024, including the participation of IUGG members on the ODTP-SC meeting on January 25, 2024, collaboration in organising the 8th Joint IOC ICG/PTWS - IUGG Joint Tsunami Commission (JTC) Technical Workshop on 11 September 2023 during ICG/PTWS-XXX on Understanding and Lessons Learned from Tsunami Generated by the Hunga Tonga - Hunga Ha'apai Volcano Eruption on 15 January 2022, expected participation in the [UNESCO-IOC Second Global Tsunami Symposium](#) on the Reflection of the Two Decades Indian Ocean Tsunami 2004 Commemoration, 11–14 November 2024, and its contributions towards several reports, including the report [IOC/2024/TS/183](#);
- (vi) the work of ITIC and the ICG/PTWS in the development of a PTWS [NTWC Competency Framework](#);
- (vii) the extensive preparation work to-date of Dr Harkunti Rahayu and the Programme Organising Committee (POC), Suci Anugrah and the Local Organising Committee (LOC), and the support of Meteorology, Climatology, and Geophysical Agency (BMKG) of the Government of Indonesia in hosting the [UNESCO-IOC Second Global Tsunami Symposium](#);

- (viii) the work of the TT-TWO in developing specialized TSP bulletins for the maritime community in consultation with the International Hydrographic Organisation (IHO) Sub-Committee on the World Wide Navigational Warning Service (WWNWS-SC);
- (ix) the work of Director of the Pacific Tsunami Warning Center (PTWC), Dr Chip McCreery in drafting an extensive update to the Tsunami Watch Operations: Global Service Definition Document ([IOC/2016/TS/130 Rev](#));
- (x) the role of the Tsunami Information Centres (TICs) in the efforts of the Task Teams on Disaster Management Preparedness and Tsunami Watch Operations;
- (xi) the roles of Tsunami Information Centres (TICs) in developing community awareness and preparedness in support of helping effective community responses to tsunami warnings, and the critical support provided to Member States in facilitating tsunami preparedness and resilience, and the advancement of the work programmes of the TOWS-WG and its Inter-ICG Task Teams;
- (xii) the continued progress in the implementation of UNESCO-IOC Tsunami Ready Recognition Programme (TRRP) in the Caribbean, Indian Ocean, Pacific region, and in the NEAM region;
- (xiii) Cannes Municipality (Alpes Maritimes), France, as the first UNESCO-IOC Tsunami Ready recognized community in France, the North-Eastern Atlantic, the Mediterranean, and the connected seas region, and new communities in Indonesia (Nagari Tapakih) in the Indian Ocean, Barbados (Christ Church West), Guadeloupe (Deshaies), and St. Vincent and the Grenadines (Saint George) in the Caribbean, and Costa Rica (Dominical, Dominicalito and Barú; Playa Hermosa; Puerto Jiménez and Tivives), Fiji (Navuevu, Sila) in the Pacific;
- (xiv) the training programmes of IOTIC for the Indian Ocean Member States on National Tsunami Ready Training, Training for UNESCO-IOC Tsunami Ready Facilitators, and Training for Field Verification for the TRRP;
- (xv) the progress made by ICG/PTWS concerning exploring mechanisms of how to include national tsunami preparedness and readiness programmes and initiatives in the UN Ocean Decade Programme, and that Tsunami Ready Equivalency Approach framed under other similar initiatives seeks to enable reporting on tsunami preparedness in a manner compatible with the TRRP, using existing national frameworks and requirements;
- (xvi) the continued collaboration between the UNDRR and IOC UNESCO on the World Tsunami Awareness Day (WTAD) in 2023, and the success achieved in scaling up the #GetToHighGround Campaign mobilizing action globally;
- (xvii) the presentation of Dr Harkunti P. Rahayu on the initiatives done in Indonesia on several types of critical infrastructures: (1) Yogyakarta International Airport Tsunami Ready, (2) Bali Tsunami Ready Hotel, and (3) the needs of Industrial Zone Ready for Tsunami learning from Cilegon Industrial Estate. These could form the basis for the development of guidelines for Tsunami Ready Critical Infrastructure, as an effort to achieve goal n° 2 of ODTP on achieving 100% people at risk to be ready and resilient to tsunami by 2030;
- (xviii) the presentation by Ms. Suci Dewi Anugrah on progress and status of ISO 22328-3 (Community-based Early Warning Systems for Tsunamis) which is targeting the large-scale private sector to be Tsunami Ready;

**The Group also noted with appreciation** the work of the Japan International Cooperation Agency (JICA) on Disaster Risk Reduction (DRR) and Tsunami Early Warning and Mitigation systems and **encouraged** closer collaboration with JICA;

**The Group further noted with appreciation** the important commitments of Barbados, Indonesia, and USA to host the CTIC, IOTIC, and the ITIC to support the ICGs;

**The Group noted:**

- (i) the increasing challenges in receipt success and cost concerning the use of fax in disseminating and receiving tsunami threat information from Tsunami Service Providers (TSPs);
- (ii) that the Ocean Decade Tsunami Programme ([ODTP](#)) does not include all aspects of the UNESCO-IOC Tsunami Programme, but focuses on the enhancements represented by the goals: 1) Develop the warning systems' capability to issue actionable and timely tsunami warnings for tsunamis from all identified sources to 100 percent of coasts at risk ; and 2) 100 percent of communities at risk to be prepared and resilient to tsunamis by 2030 through efforts like the UNESCO-IOC Tsunami Ready Recognition Programme (TRRP);
- (iii) the low number of endorsed actions related to the ODTP for Ocean Decade Challenge 6 "Increase Community Resilience to Ocean Hazards";
- (iv) that a draft Vision 2030 White Paper Challenge 6 Increase Community Resilience to Ocean Hazards is now available for public review;
- (v) the progress achieved in the revision to the Tsunami Glossary 2023 ([IOC/2008/TS/85](#) rev 5) concerning clarifying definitions (e.g., meteotsunamis, arrival time) and updates (e.g., global, regional, deadly tsunami maps, tables, tsunami service provider, edits, and simplifying), as well as addressing new terms, including Lamb Wave, TRRP, and volcanic tsunamis, and that the IOC is working to finalise the layout for publishing in 2024;
- (vi) progress of the *Ad Hoc* Team on Meteotsunamis;
- (vii) the concerns of WMO on the term and definition of Meteotsunami;
- (viii) that the regional/sub-regional exercise in the Pacific (PACWAVE 24) is planned between 1 September and 30 November 2024;
- (ix) that the Indian National Centre for Ocean Information Service (INCOIS) announced India's candidacy and acceptance by the IUGG JTC for hosting the International Tsunami Symposium (ITS) 2025 in Hyderabad, India;
- (x) the progress made by the European Commission's DG DEFIS towards introducing in the Galileo infrastructure the "Emergency Warning Satellite Service" (EWSS) as a multi-hazard alert dissemination means by satellite offered to EU national civil protection authorities to complement existing terrestrial alert systems, as well as the completion of the demonstration campaign conducted in 2023/2024 with national civil protection authorities in France, Germany, Cyprus, and Belgium/Luxemburg, and the intended declaration of the initial service in 2025, for adoption by European Union Member States civil protection services, and eventual adoption by end users;

- (xi) the importance of National Tsunami Warning Centre (NTWC) staff competency frameworks and training in support of the efficient and effective development and dissemination of tsunami threat information and warnings;
- (xii) that the Ocean Teacher Global Academy (OTGA) Regional Training Centre operated by INCOIS in India has already developed and delivered competency training for NTWC staff from Oman;
- (xiii) that the Meteorology, Climatology, and Geophysical Agency of Indonesia (BMKG) has conducted on-job training for NTWC staff from Oman and Timor-Leste;
- (xiv) the short-term secondment of staff from NTWCs of PTWS South China Sea region Member States to the South China Sea Tsunami Advisory Center (SCSTAC);
- (xv) tsunamis are included in the key Action Areas of the UN Early Warnings for All ([EW4All](#)) Global Initiative for the Implementation of Climate Adaptation;
- (xvi) that the UN EW4All development approach is to focus and adapt to specific country needs engagement and ownership with regards to their priority hazards and areas of work;
- (xvii) that tsunami hazard was already identified by a number of UN EW4All concerned countries, especially SIDS, as part of their priority hazards;
- (xviii) that capacity development and enhancement of meteorological and climate warning systems, for example in national warning infrastructure of the identified UN EW4All priority countries, will also benefit national tsunami warning systems;
- (xix) that forensic review and enhancements to national tsunami warning chains, through activities such as undertaken by the ICG/IOTWMS for all its 24 Member States, will be beneficial to MHEWS and contribute to the UN EW4All initiative;
- (xx) the need and dependency of TSPs and NTWCs on seismic and sea level information for timely and accurate warnings to save lives;
- (xxi) the Goal of the ODTP to quantitatively enhance the timeliness and accuracy of tsunami warnings by expanding and increasing access to all existing sea level and seismic data and to utilise new technologies to fill data gaps;
- (xxii) the new requirements to monitor sea level at enhanced resolution to be able to detect and warn for tsunamis generated by non-seismic sources;
- (xxiii) the benefits of multiple-purpose monitoring systems supporting MHEWS in terms of maximising the data available and sharing the costs to purchase and maintain;
- (xxiv) the requirement for vessels at sea to be aware while in transit of any potential tsunami hazard impacting their port of destination;
- (xxv) NAVAREAs (NAVigational AREAs) are the maritime geographic areas in which various governments are responsible for navigation and weather warnings;
- (xxvi) concerns raised by some International Hydrographic Organisation (IHO) NAVAREA operators responsible for advising vessels at sea of navigational hazards of difficulties they have in interpreting tsunami warnings to develop advice for mariners;

- (xxvii) the need for more accurate and precise tsunami forecasts, especially in the complex tectonic context;
- (xxviii) the ICG/NEAMTWS investigation and possible adoption of the tsunami probabilistic forecasting method by TSPs in NEAMTWS, which may represent an improvement over the method in use with the goal of reducing uncertainty and false alarms, particularly the forecasting methods that consider tsunami numerical modelling and uncertainty quantification;
- (xxix) the appreciation at ICG/PTWS-XXX for the long contributions of the ITIC to PTWS Member State capacity development, awareness-raising and warning, and emergency response SOP training in the Pacific and Indian Ocean, the appreciation of Indian Ocean Member States to the IOTIC to support their implementing Tsunami Ready, and to the CTIC for advocating the implementation of tsunami warning systems in a multi-hazard context;
- (xxx) that the seismic zone in the Scotia Arc region is very active and has produced 33 earthquakes of magnitude 6.5 or greater since the year 2000, 13 of which were of magnitude 7.0 or greater;
- (xxxi) that the August 12, 2021, magnitude 8.1 earthquake in the Scotia Arc produced a tsunami recorded widely, including throughout the Pacific region;
- (xxxii) that the Scotia Arc is currently not part of the PTWS Earthquake Source Zone (ESZ);
- (xxxiii) that the ICG/PTWS decided to expand the PTWS Earthquake Source Zone (ESZ) to include an area from 63° to 52° South latitude and from 72° to 18° West longitude in order to routinely provide Member States of the ICG/PTWS with information about the frequent large earthquakes from this region, and any subsequent tsunami threat;
- (xxxiv) the existence of National Tsunami Ready Focal Points (TRFP) in the ICG/IOTWS and their participation in the ICG/IOTWMS WG3 on Tsunami Ready Implementation to help champion and facilitate national and international coordination and communication;
- (xxxv) the Evaluation Form prepared by CARIBE-EWS Tsunami Ready Task Team for recognized UNESCO-IOC Tsunami Ready communities, and the CARIBE WAVE Exercise evaluation conducted in the Caribbean on the interest of countries in implementing the UNESCO-IOC Tsunami Ready Programme;
- (xxxvi) that IOC Tsunami Resilience Section is developing a new website to highlight the importance of the Tsunami Ready components, such as the community pages hosted by the ITIC, which will be continued and with high visibility;
- (xxxvii) the important role of the Special Coalition for Tsunami Ready in raising the profile globally in support of the UN Ocean Decade Tsunami Programme goals;
- (xxxviii) that the IOC will host at the UN Ocean Decade Conference (Barcelona, Spain, 10-12 April 2024) a Satellite Event on Coastal Cities and Communities Joining Tsunami Ready, appreciating the achievements of the recognised TR communities, and issuing the global tsunami resiliency challenge;
- (xxxix) that both local and distant tsunamis can cause damaging and deadly tsunami impacts to communities, and specifically, that strong or long shaking from earthquakes will not be felt by distant communities;

- (xi) the current standard text in the UNESCO-IOC Tsunami Ready signage is *'In case of a strong or long (duration) earthquake, or any official message, go to high ground or inland'*;
- (xli) the need for Tsunami Ready Disaster Risk Reduction approach (Assessment, Prevention, Mitigation, Emergency Response, and Recovery) to critical Coastal Infrastructures, including Tsunami Ready Airports, Tsunami Ready Hotels, Tsunami Ready Ports;
- (xlii) that linking Tsunami Ready with Making Cities Resilient 2030 (MCR2030) is an opportunity to capitalize on the cities' efforts in making cities resilient, to increase the visibility of Tsunami Ready, with TRRP as an example of good practice;
- (xliii) that the 2024 theme of WTAD is *Empowering Children and Youth, ensuring the next generation is tsunami prepared*;
- (xliv) the planned collaboration between IOC-UNESCO and UNDRR on Eyewitness and Survivors Project and the Indian Ocean Youth Tsunami Conversation and Campaign of IOTIC;
- (xlv) the importance of creating dialogues on challenging issues to attract greater stakeholder engagements (vulnerable groups), and social integration and technical support needed to bridge and facilitate effective engagement and social integration;

**The Group welcomed** the major events and activities planned by the UNDRR in partnership with IOC which includes:

- the commemoration of the 20th anniversary of the 2004 tsunami and engaging children and youth,
- the Asia Pacific Ministerial Conference on DRR and the Africa Regional Platform on DRR,
- Global Exhibition bringing the story of eyewitness survivors, progress since 2004, art and hope for a resilient future, schools and community dialogues, youth advocates, engagement and #GetToHighGround initiatives.

**The Group further welcomed** other activities planned by the UNDRR, encompassing the Global media engagement on tsunami documentaries, innovative tools, games and stories for disaster risk reduction (Stop Disasters Game), Social and Digital Activation toolkit with social cards, customizable cards, videos, dedicated WTAD webpage, video collaboration UNESCO-IOC and reinforcing interlinkages with Early Warning for All Initiative (EW4All);

**The Group endorsed** the [UNESCO-IOC Second Global Tsunami Symposium](#) programme outline and proposed 8 sessions, which align with the four pillars of Early Warning Systems (EWS) and the objectives and focus of the ODTP and its RDIP;

**The Group decided to** include in the Steering Committee of the UNESCO-IOC Second Global Tsunami Symposium the Head of Secretariat for ICG/IOTWMS, the Chair of the ODTP Scientific Committee and a representative from UNDRR, and decided to appoint Ms Suci Dewi Anugrah as Co-Chairperson of the POC;

**The Group encouraged** the POC to ensure the programme takes into consideration UNESCO priorities with regards African States, SIDS, and LDCs and **requested** the POC to identify invited speakers inclusively, especially taking into account gender balance and regional representation;

**The Group recommended** the IOC Sea Level Station Monitoring Facility (IOC SLSMF) kindly hosted by the Flanders Marine Institute (VLIZ) of Belgium to increase the tabled sea level data at one second intervals (where available) and display sea level time series as a continuous line;

**The Group acknowledged** the World Meteorological Organisation (WMO) Marine competency activities and the potential synergies and collaboration to complement the delivery of marine weather and tsunami capacity frameworks for the mutual benefits of Member States;

**The Group recommended** IOC collaborate more closely with the WMO to connect tsunami activities with the Multi Hazard Early Warning Systems (MHEWS) and UN Secretary General Early Warning for All Initiative (EW4All), such as the WMO Coastal Inundation Forecasting Initiative (CIFI) that is an example of a multi-activity addressing coastal inundation, no matter the source of the coastal inundation;

**The Group further recommended** that operational tsunami information products also be disseminated in XML format such as Common Alerting Protocol (CAP) Standard format;

**The Group suggested** the IOC/WMO Joint Collaborative Board (JCB) explicitly explore opportunities for further collaboration on MHEWS, noting TOWS-WG Terms-of-Reference cover tsunamis and other sea level related hazards;

**The Group recommended** the Ocean Teacher Global Academy (OTGA) Regional/Specialised Training Centres, including ITIC and INCOIS, support the development and delivery of course content for training programmes in support of the global [NTWC Competency Framework](#);

**The Group encouraged** the completion of the OTGA Tsunami Awareness and Tsunami Ready courses by the ITIC and IOTIC as a key contribution to building capacity for implementation of the UNESCO-IOC Tsunami Ready Recognition Programme (TRRP) globally;

**The Group recognised** the importance of building UNESCO-IOC Tsunami Ready on existing capacities and strengths and **encouraged** ICGs and Member States to explore these synergies,

**The Group recalled** that the Tsunami Ready Coalition (TRC) advises the TOWS-WG, through its Chair as a member of the TOWS-WG, and that the TRC does not have a programmatic role in the UNESCO-IOC TRRP as that is the mandate and responsibility of the TOWS-WG and its Inter-ICG Task Teams, the ICGs, and Member States;

**The Group encouraged** the Tsunami Ready Coalition, through its Chairperson to elaborate a Concept Note, including a governance structure, for presentation at the next TOWS-WG;

**The Group encouraged** the National Tsunami Ready Board of Member States to include where applicable the national agency working on Making Cities Resilient 2030 (MCR2030) to be member of the NTRB, and to see the possibilities for ICGs and TICs to promote Tsunami Ready in MCR2030 events;

**The Group recommended** for locations that will not feel the earthquake, the use of the standard text in the UNESCO/IOC Tsunami Ready signage such as *“In case of any official tsunami message, go to high ground or inland”* as an alternative to *‘In case of a strong or long (duration) earthquake, or any official message, go to high ground or inland’*;

**The Group recommended** formal engagement of trained social science experts by Tsunami Resilience Section to support the production of guidance for enhancing stakeholder engagement;

**The Group encouraged** TOWS WG and Task Teams members to review the Ocean Decade Vision 2030 Challenge 6 White Paper and provide comments by February 2024;

**The Group recommended to Intergovernmental Coordination Groups (ICGs):**

- (i) that the ICG/CARIBE-EWS share methodology and documents concerning the registration of participants in CARIBE WAVE exercises;
- (ii) that ICGs consider performing exercises outside of working hours, in particular during the night, but being careful to take into consideration difficulties and possible issues of involving the public in night-time drills;
- (iii) to consider submitting coordinated Ocean Decade actions in future calls that contribute to the goals of the ODTP, including identification of and submission of existing actions that may align with the ODTP;
- (iv) to consider whether TSPs may also need to provide services where volcano generated tsunamis may impact several Member States;
- (v) once the optimal sea level and seismic networks design has been completed for the Area of Service (AoS), work with Member States to fill identified gaps, including the strategic and coordinated submission of projects to the UN Ocean Decade and potential funding sources for support;
- (vi) TSPs routinely monitor as frequently as possible (at least every 6 months) the status of sea level and seismic observing networks and the quality of the data to meet existing and enhanced tsunami warning requirements in their AoS, including the provision of status summaries for the Secretariat to follow-up with relevant Member States to correct data issues (coverage gaps and data quality);
- (vii) utilise exercises and communication tests as an opportunity to simultaneously monitor data availability and quality;
- (viii) routinely monitor as frequently as possible (at least every 6 months) the status of national sea level and seismic observing networks and the quality of the data to meet existing and enhanced tsunami warning requirements, correcting any issues with outages, quality and real-time accessibility of data as soon as possible, desirably within 6-months;
- (ix) utilise and promote the use of multi-purpose sea level monitoring stations in support of MHEWS to enhance data coverage and reduce costs;
- (x) sample sea level data at one second intervals and transmit this in real-time, given the critical need to resolve and understand the near-field threat to high at-risk communities where a tsunami may arrive within 5-30 minutes;
- (xi) share information and procedures on deployments of new technologies to monitor sea level variations used for tsunami warning purposes, such as the ongoing project of the CAM SMART cable off Portugal, TAM TAM SMART cable between New Caledonia and Vanuatu, undersea cable installations being deployed by Indonesia and India, and the Insea wet demo smart cable in the Ionian Sea offshore Sicily;



- (xii) TSPs identified for each ICG to trial dissemination of maritime bulletins to respective NAVAREA operators in their Area of Service (AoS) in the second half of 2024 for full operational implementation in 2025;
- (xiii) ICG/NEAMTWS TSPs implement threat levels described in the Tsunami Watch Operations: Definition Document to help harmonise global tsunami threat information products as soon as practical;
- (xiv) ICG/PTWS Task Team Tsunami Ready to share the ICG/PTWS guidance on *Tsunami Ready Equivalency* for further consideration by TT-DMP, as a potential mechanism for reporting toward this goal;
- (xv) ICGs and TICs to advocate Member States implementing Tsunami Ready to link with Making Cities Resilient 2030 (MCR2030);
- (xvi) ICG/IOTWMS WG1 and WG3 to develop and share guidelines for Tsunami Ready Critical Infrastructure

**The Group requested** the IOC Secretariat to:

- (i) advise all Member States via Circular Letter (CL) that TSP fax transmissions of tsunami information products will cease from 6 months of CL date, unless Member States advise within 3 months that fax transmissions of tsunami information products is essential for National Tsunami Warning Centre (NTWC) functions and there is no other back-up;
- (ii) work closely with the Decade Coordination Unit (DCU), keep track of future Calls for Decade Actions, and improve communication with DCU on tsunami community needs and requirements;
- (iii) facilitate socialisation and advice to the ICGs on the Ocean Decade processes and opportunities, such as Calls for Decade Actions;
- (iv) develop a reporting mechanism to allow ICGs to report progress on related projects within the Ocean Decade and against the ODTP-RDIP KPIs, aligning this with the proposed Global KPI Framework for the UNESCO-IOC Tsunami Programme;
- (v) distribute the report on Monitoring and warning for tsunamis generated by volcanoes ([IOC/2024/TS/183](#)), including the List of Tsunamigenic Volcanoes, to Volcano Observatories and UNESCO/IOC Member States;
- (vi) organise online webinars for each ICG involving relevant Volcano Observatories and Volcanic Ash Advisory Centers (VAACs) to:
  - a. brief on the report on Monitoring and warning for tsunamis generated by volcanoes ([IOC/2024/TS/183](#)) and its recommendations,
  - b. highlight the hazard and vulnerable Member States,
  - c. initiate the required partnerships between NTWCs and Volcano Observatories and VAACs,
  - d. Initiate consideration of whether TSPs may also need to provide services where tsunami generated by volcanoes may impact several Member States;
- (vii) organise in 2024 webinars in coordination with IHO for the NAVAREA operators and back-up METAREA operators to introduce the new service and products for the

maritime community, and obtain and advise TSPs of the contact information for their respective NAVAREA and METAREA operators to disseminate the new maritime bulletins;

- (viii) distribute the latest draft of the revised Tsunami Watch Operations: Global Service Definition Document to members of the TT-TWO for review and feedback by the end of April 2024;
- (ix) provide the updated Tsunami Watch Operations: Global Service Definition Document to the Member States;
- (x) distribute the basic tsunami warning product/template for use in radio developed by the ICG/CARIBE EWS to TT-TWO members to review and provide feedback by the end of May 2024 to develop guidance to Member States;
- (xi) update the ICG/PTWS Earthquake Source Zone (ESZ) map in the Tsunami Watch Operations: Global Service Definition Document;
- (xii) the Secretariat, led by the TICs, to develop and share a Tsunami Ready Toolkit to assist Member States in implementing the TRRP. The toolkit may include a standard and clear procedure, format, and method for submitting the Tsunami Ready application and its supporting documentation, including clarification on the definition of community in the frame of the UNESCO-IOC Tsunami Ready Recognition Programme;
- (xiii) inform Member States on the Tsunami Ready Toolkit's availability via IOC Circular Letter to the Tsunami National Contacts, National Tsunami Ready Boards, and widely through attaching this as an appendix of the Standard guidelines for the Tsunami Ready Recognition Programme ([IOC/2022/MG/74](#));

**The Group recommended Member States:**

- (i) to consider submitting coordinated Ocean Decade actions in future calls that contribute to the goals of the ODTP, including identification of and submission of existing actions that may align with the ODTP;
- (ii) to work with the UN EW4All partners in addressing any gaps in consideration of tsunami, including geohazard observations required for tsunami warning, where required as part of their national MHEWS;
- (iii) ICG/NEAMTWS Member States to support and contribute to the NEAM-TIC considering its important role in capacity building;

**The Group requested the Task Teams:**

- (i) TT-TWO and TT-DMP to develop KPIs for the relevant sections of the ODTP - Research, Development and Implementation plan to monitor progress;
- (ii) TT-TWO *Ad Hoc* Team on Meteotsunamis in consultation with WMO and IUGG JTC to review the term and definition of meteotsunami for consideration by TOWS-WG and to inform discussions on this topic by the IOC/WMO JCB, taking into account the historical derivation and use of the term, any potential confusion with other existing products/services, and the public understanding of any associated warnings, with a view to updating future versions of the Tsunami Glossary;

- (iii) TT-TWO to review existing Tsunami SOPs and develop general guidelines on SOPs to warn for volcano generated tsunamis;
- (iv) TT-TWO Ad Hoc Team on Meteotsunamis to complete a draft of the report for offline review by the TOWS-WG to be utilised as background information for consideration of the recommendations by the next meeting of IOC/WMO JCB in third quarter of 2024;
- (v) TT-TWO to contribute to the evaluation of the pilot NTCW Staff Competency training to be provided to Pacific Island Countries and Territories (PICTs) by ICG/PTWS and ITIC in 2025 to facilitate development of a global framework for endorsement by TOWS-WG;
- (vi) TT-TWO to:
  - a. Continue to monitor the optimal sea level and seismic network design studies by US, New Zealand, and India being undertaken for the PTWS and support same studies to be undertaken by respective ICGs for IOTWMS, NEAMTWS and CARIBE-EWS;
  - b. Identify core information and indicators required by each ICG to monitor status of observing networks and the quality of the data to meet existing and enhanced tsunami warning requirements as identified in the Research, Development and Implementation plan for the Ocean Decade Tsunami Programme (ODTP-RDIP) (IOC/2023/TS/180);
  - c. Review the previously recommended data format for sea level data (IOC Manual on sea level measurement and interpretation, v. IV (SC.2006/WS/38) and update as required to ensure measurement and facilitate exchange of data at required resolutions and sampling rates, and to ensure data format contains metadata to enable TSPs and NTCWs to determine level of individual station suitability for tsunami detection and warnings;
- (vii) TT-TWO incorporates the feedback in the updated version of the Tsunami Watch Operations: Global Service Definition Document by the end of July 2024;
- (viii) TT-TWO develop a global CAP template for TSPs to facilitate exchange of bulletins between basin TSPs and their NTCWs, between TSPs of different basins, and for public TSP bulletins (e.g. for IOTWMS);
- (ix) Organise in 2024 webinars in coordination with IHO for the NAVAREA operators and back-up METAREA operators to introduce the new service and products for the maritime community, to obtain and advise TSPs of the contact information for their respective NAVAREA and METAREA operators to disseminate the new maritime bulletins;
- (x) TT-TWO evaluate tsunami probabilistic forecasting methods and provide advice to TSPs and NTCWs in all ICGs;
- (xi) TT-TWO and TT-DMP to explore requirements and existing methods to warn people with disabilities and underserved communities, especially given WTAD objective 2023 “fighting inequality for a resilient future”;
- (xii) TT-DMP to consider a similar approach to ICG/IOTWMS in establishing National Tsunami Ready Focal Points (TRFP) in other ICGs;

- (xiii) TT-DMP consider the introduction of a Tsunami Ready Evaluation Form in the other ICGs than ICG/CARIBE EWS, its translation to Spanish and French and its administration by the IOC Tsunami Resilience Section;
- (xiv) TT-DMP to follow up on the Making Cities Resilient 2030 (MCR2030) ISO requirements;
- (xv) TT-DMP to explore the possibility of implementing ISO22328-3 for the large-scale private sector to be Tsunami Ready;

**The Group noted** the time limitations experienced during the past two meetings of the TT-DMP and TT-TWO that hindered important discussions and recommended to extend the TT DMP and TT TWO meetings with a provision for 3-days, including one day joint meeting and half-day to agree on outcomes and recommendations to provide to TOWS-WG

**Noting** that that many advances have been made, and new needs have been identified since the TT-DMP and TT-TWO Terms of Reference was prepared;

**The Group recommended** reviewing and revising the TT-DMP and TT-TWO Terms of Reference and also recommended both Task Teams continue for another term.