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| **A blue and black sign with white text  Description automatically generated** | **MEETING OF THE INTER-ICG TASK TEAM ON DISASTER MANAGEMENT AND PREPAREDNESS****INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC)- UNESCO** |
|  | 27 - 28 February 2023 - Hybrid |

**TOWS Task Team on Disaster Management and Preparedness (TT-DMP)**

 **Members and Observers**

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| Harkunti Pertiwi Rahayu (Chair)  | ICG/IOTWMS | Denis Chang Seng | IOC Secretariat / TT- DMP Secretariat / ICG/NEAMTWS/NEAMTIC |
| Laura Kong | ITIC, ICG/PTWS | Jamel Ben Abdallah  | CoastWave Project Consultant |
| Ardito Kodijat | IOTIC, ICG/IOTWMS | Regina Khanbekova (Observer) | UNDRR/ Invited Guest |
| Cecilia Valbonesi (Online) | ICG/NEAMTWS | Silvia Chacón-Barrantes (Observer) | ICG/ CARIBE-EWS |
| Marinos Charalampakis (Online)  | ICG/NEAMTWS | Ignacio Aguirre Ayerbe (Observer) (Online) | ICG/NEAMTWS |
| Christa von Hillebrandt- Andrade | ICG/CARIBE-EWS |  Alejandro Rojas Aldana (observer)  | ICG/NEAMTWS/ NEAMTIC |
| Alison Brome | CTIC; ICG/CARIBE-EWS |  |  |
| Derya Vennin | ICG/NEAMTWS /CoastWave Project  |  |  |

**DECISIONS AND RECOMMENDATIONS**

**Recommendations to TOWS-WG**

**Welcomes** the development of a questionnaire in the Caribbean to receive feedbacks from the UNESCO IOC Tsunami Ready communities on their implementation process;

**Recommends** 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;

**Requests** the Secretariat to provide a timelier update of the UNESCO IOC Tsunami Ready database;

**Recommends** developing additional implementation guidance documents to support the implementation of Tsunami Ready;

**Recommends** to prepare a guideline for critical infrastructures from tsunami impacts e.g., AirportGetReady to Tsunami;

**Recommends** that TICs join the MCR2030 to explore potential regional and city interest and opportunities in tsunami preparedness and UNESCO IOC Tsunami Ready Recognition Programme;

**Recommends** to update the Tsunami Hotel guide (IOC Manuals and Guides 69) developed by NEAMTWS in 2012 to include the ITIC materials and other recent documents, and translate in other languages, including other lessons learned;

**Further recommends** to consider for the future to integrating into the UNESCO -IOC Tsunami Ready Recognition Programme other options to recognize entities other than Communities;

**Noting** that some Member States already have similar tsunami hazard mitigation programmes in place that **encourages** Member States to apply other programmes, to confirm alignment with the twelve UNESCO IOC Tsunami Ready Indicators in relevant communities and report outcomes;

**Requests** Working Group 3 to explore, in cooperation with the TOWS Task Team on Disaster Management and Preparedness, ways to recognize communities that choose not to implement the UNESCO-IOC Tsunami Ready Recognition Programme, as compliant with the Tsunami Ready indicators;

**Appreciates** the progress by the PTWS concerning exploring mechanisms of how to include other tsunami preparedness and readiness programmes and initiatives in the UN Ocean Decade Tsunami Programme “tsunami readiness” goal;

**Recommends** ICGs to explore and inform on mechanisms for recognition of UNESCO -IOC Tsunami Ready similar standards already in place in some countries;

**Appreciates** continued progress in the implementation of UNESCO- IOC Tsunami Ready in the Caribbean regions, the Indian Ocean, the Northeast Atlantic, Mediterranean and connected seas and Pacific Ocean;

**Recommends** additional guidance to be provided by UNESCO- IOC on the renewal process of UNESCO -IOC Tsunami Ready Recognition Programme and TICs to organize an online meeting on the renewal of UNESCO IOC Tsunami Ready Recognition Programme;

**Notes** the importance to properly inform the public on the validity of the recognition, currently indicated on the UNESCO IOC Tsunami Ready Recognition signage and certificate under the UNESCO IOC Tsunami Ready Recognition logo;

**Notes** the new tsunami signage developed by IOTIC for vertical evacuation when there is no high ground and/or could not go inland;

**Recommends** the development of standard text in the UNESCO- IOC Tsunami Ready signage for vertical evacuation and request the TT DMP members to take stock of its region for discussion at next TT meeting;

**Request** Secretariat to explore and implement more efficient ways in which to process the UNESCO -IOC Tsunami Ready application and renewal system, such as through automation;

**Appreciates** efforts of the Indian Ocean Tsunami Information Centre (IOTIC) and International Tsunami Information Centre (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;

**Requests** the finalization of the OTGA basic tsunami training materials as soon as possible to support the UNESCO IOC Tsunami Ready Recognition Programme;

**Requests** Secretariat to facilitate the organization of a UNESCO- IOC Tsunami Ready expert meeting to finalize the OTGA Tsunami Ready training programme;

**Notes** the activities undertaken by the respective regions for WTAD 2022, and as part of this, the strong engagement in the #GetToHighGround initiative, and the success achieved through the United Nations Disaster Risk Reduction (UNDRR), and IOC collaboration;

**Further notes** to build connections with EW4ALL, multi-hazard approach and coastal risk and Making Cities Resilient (MCR2030);

**Recommends** continued collaboration between the UNESCO-IOC and the UNDRR, noting the 2023 WTAD theme will highlight the importance of fighting inequality for a resilient future and activities will include continuing the #GetToHighGround initiative and the #TsunamiReady to engage citizens on tsunami awareness. The theme aligns closely with the current focus of the TOWS-WG in the context of the UN Ocean Decade, The Mid-Term Review of the Sendai Framework, and action to accelerate the implementation of the Early Warnings for All (EW4All) initiative to ensure everyone on earth is covered by MHEWS in the next four years, prioritizing the most at-risk communities;

The Group **requested** the UNDRR to strengthen collaboration with respective ICGs and corresponding TICs and use the hashtag #TsunamiReady;

**Noted** the absence of the Tsunami Information Centers in the governance sections, especially for its important role in facilitating the implementation of the UNESCO IOC TRRP as a key contributor to the UNOD;

**Recommends** to expand and explicitly state the role of the ICGs, their Working Groups, Tsunami National Contacts, National Tsunami Warning Centers, Tsunami Warning Focal Points, Tsunami Service Providers, and Tsunami Information Centres in the Governance and Implementation chapters of the ODTP RDI;

**Recommends** work with relevant ICG Working Groups and Task Teams, in coordination with the Tsunami Information Centres, to propose mechanisms by which National tsunami preparedness and readiness programmes and initiatives will be able to fully participate and contribute to the UN Ocean Decade Tsunami Programme’s “100 percent of at-risk communities to be prepared and resilient to Tsunamis” goal;

**Requests** add the role of ICGs in their Terms of Reference as regional Steering Committees for the Ocean Decade Tsunami Programme;

**Requests** to include the map of the Global Tsunami Warning and Mitigation System map in the Governance chapter to clearly illustrate the components;

**Recommends** organizing TOWS Task Team meetings over a full 3-days, with one full day on Joint agenda discussions;

**Notes** the importance ofmainstreaming disaster risk reduction in urban planning and development is a key to preventing systemic disaster impacts, and that this is a cross-sectoral effort;

**Recommends** TT-DMP to share the information to its ICGs to obtain feedback and guidance on whether to prepare a global guideline for mainstreaming tsunami disaster risk reduction for coastal urban development planning;

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| **A blue and black sign with white text  Description automatically generated** | **MEETING OF THE INTER-ICG TASK TEAM ON** **TSUNAMI WATCH OPERATIONS****INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (IOC) of UNESCO** |
|  | 27 - 28 February 2023 - Hybrid |

UNESCO-IOC Working Group on Tsunamis and Other Hazards

Related to Sea-Level Warning and Mitigation Systems (TOWS-WG):

**Task Team on Tsunami Watch Operations (TT-TWO)**

 **Members, Invited Experts and Secretariat**

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| --- | --- | --- | --- |
| Mr. Yuji NISHIMAE (Chair)  | ICG/PTWS | Dr. Charles (Chip) McCREERY  | ICG/CARIBE-EWS  |
| Dr Dakui Wang(absent) | ICG/PTWS | Ms. Elizabeth VANACORE | ICG/ CARIBE-EWS |
| Mr. Pattabhi Rama Rao ELURI (online) | ICG/IOTWMS | Mr. Rick BAILEY  | UNESCO-IOCTechnical Secretary TT TWOHead of Secretariat ICG/IOTWMS |
| Dr. Mohammad MOKHTARI (Online) | ICG/IOTWMS | Mr. Bernardo Aliaga ROSSEL | UNESCO-IOCHead, IOC Tsunami Resilience Section |
| Mr. Alessio PIATANESI (Online)  | ICG/NEAMTWS | Ms Nora. Gale | UNESCO-IOCSecretariat ICG/IOTWMS |
| Dr. Hélène HÉBERT | ICG/NEAMTWS | Dr. François SCHINDELÉ  | Invited expertChair *Ad Hoc* Team Tsunamis Generated by Volcanoes |
| Alison Brome | ICG/CARIBE-EWS | Mr. Michael ANGOVE | Invited expertChair *Ad Hoc* Team on Mete-tsunamis |
| Dr. Ahmet C. YALCINER | Invited Expert |  |  |

**Summary of TT TWO Recommendations and Actions**

**Actions for TT TWO Members and ICGs**

1. In addition to providing guidance to NTWCs, develop a global CAP template for all TSPs, not for public exchange, but to facilitate exchange of bulletins between basin TSPs and their NTWCs, and between TSPs of different basins.
2. All ICGs routinely monitor and report on status of sea level and seismic networks (like CARIBE-EWS currently does) to better understand data availability and work with operators to resolve instrument issues, in order to help improve present tsunami forecasts and help identify needs and monitor implementation of enhanced data systems to meet UN Ocean Decade goals
3. TT TWO on US and NZ efforts to explore specific design of risk-based grid integrated monitoring network in support of UN Decade Objectives and provide , recognizing the role of the TT TWO in helping to enhance the monitoring and warning aspects of the Global Tsunami Warning and Mitigation System
4. TSPs from each basin to issue test the tsunami maritime safety products within next 12 months and implement in 24 months.
5. Implement threat levels described in Global Services Definition Document in NEAMTWS to help harmonise global tsunami warning products
6. Develop a recommended basic tsunami warning product/template for use in eg radio
7. The definition of near-field needs to be reviewed
8. Update the GSDD within month for current services
9. TSPs to not list countries with threat less than minimum threshold, subject to review and approval by each ICG as relevant
10. Interim procedures for a repeat tsunamigenic eruption of HTHH Volcano have now been finalized by the ICG/PTWS and can be described and referenced in the GSDD as an example for handing this type of event.
11. The *Ad Hoc* Team on Tsunamis Generated by Volcanos (TGV) report once completed can be described and referenced in the GSDD.
12. Dr Chip McCreery and Dr Francois Schindele finalize the updated GSDD within the next month and send it to the IOC for publication, noting the last published version was in 2016.

**Recommendation to IOC Sea Level Monitoring Facility:**

1. IOC-UNESCO Sea Level Monitoring Facility increase the tabled sea level data at one second intervals (where available) and display sea level time series as a continuous line.

**Recommendations to TOWS-WG:**

1. TOWS-WG, given the critical need to resolve and understand the near-field threat to high at-risk communities where a tsunami may arrive in 5-30 minutes, reiterate the urgent need for all Member States to sample sea level data at one second intervals and transmit this in real-time.
2. TOWS-WG request IOC Assembly at its next session to reconsider the request to extend the Pacific Earthquake Observing Zone to include the South Atlantic, given the ongoing threat in this region to generate tsunamis that also impact the Pacific and Indian Oceans (eg South Sandwich Islands event, 12 August 2021)

**Recommendations to TOWS-WG TT DMP:**

1. TT DMP to further investigate requirements and methods to warn people with disabilities and underserved communities, especially given WTAD objective 2023 “fighting inequality for a resilient future”.
2. TT DMP take action now to upgrade NTWC competency training framework from a Pacific to global approach and include competency training for Tsunami Warning Focal Points (TWFPs) in the framework given their key role in tsunami warnings.

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|  | 27 - 28 February 2022 – Hybrid |

**JOINT TT TWO AND TT DMP SESSION**

**DECISIONS AND RECOMMENDATIONS**

**Recommendations to TOWS-WG**

**Commends** the PTWS Pacific Islands and Southeast Pacific for testing and enabling communication methods by which to share key tsunami information regionally to assist neighboring countries in their national tsunami warning decision-making.

**Recommends** ICGs to align Wave exercises with World Tsunami Awareness Day and UNESCO IOC Tsunami Ready implementation.

**Recommendations to TOWS-WG:**

* TOWS-WG, given the critical need to resolve and understand the near-field threat to high at-risk communities where a tsunami may arrive in 5-30 minutes, reiterate the urgent need for all Member States to sample sea level data at one second intervals and transmit this in real-time.
* TOWS-WG request IOC Assembly at its next session to reconsider the request to extend the Pacific Earthquake Observing Zone to include the South Atlantic, given the ongoing threat in this region to generate tsunamis that also impact the Pacific and Indian Oceans (e.g., South Sandwich Islands event, 12 August 2021)

**Recommendations to Member States**

*Monitoring and Warning:*

1. As a first step, organization(s) should be designated for monitoring and warning of Tsunamis Generated by Volcanoes (TGV). The second and third steps are to install monitoring instrumentation and develop Standard Operating Procedures (SOPs) to handle volcanic tsunamis.
2. The TGV monitoring and warning system should be implemented by, or in cooperation with the National Tsunami Warning Centre (NTWC) and regional Tsunami Service Provider and national and regional Volcano Service Providers, where such exist.
3. All volcanoes mentioned in the TGV report should be monitored and have processes in place to warn for tsunamis. Should other, potentially tsunamigenic volcanoes begin erupting, these should also be monitored and included within the tsunami warning process.
4. Detect/warn geophysical (seismology, GNSS, tiltmeter, barometric and sea level data streams need to be available to the designated tsunami monitoring/warning agency (and possibly also to the volcano monitoring agency)
5. As well as monitoring systems for volcano activity and potential far-field propagation of sea level signal, a sea level gauge~~s~~ network with real-time continuous data transmission should be deployed close to each identified volcano to verify risk and then ongoing monitoring and warning. One second sampling with 1 cm accuracy (< 1 mm sampling) is recommended for recording and automatic detection. Data transmission through radio or microwave links, fiber optic, or dedicated telephone lines, or other modes should be implemented to ensure the data is transmitted and received and widely shared with the international community in a timely manner.
6. Methods to also specifically alert persons in remote areas (such as scientific teams in the field, or recreational hikers) should be considered.
7. TGV SOPs for tsunami warning should be linked with existing Volcano Alert Activity scales.

 *Risk Assessment and Preparedness:*

1. TGV hazard and risk assessment should be undertaken to determine vulnerable areas.
2. For TGV, multi-stakeholder meetings should be convened that include~~d~~ science agencies, volcano and tsunami warning operations centres, and disaster management agencies. For each identified potential source, worst-case and credible scenario planning discussions should start as soon as possible.
3. During a period of heightened TGV hazard, consider closing access to vulnerable areas. When an eruption is imminent and thetsunami hazard is high, consider evacuating populations from vulnerable locations.
4. Specific TGV signage and evacuation routes should be implemented in all areas that may be impacted by tsunamis generated by volcanoes.
5. TGV public awareness campaigns should be conducted regularly – the type and frequency of awareness activities may be different for the local population compared to transient populations such as tourists.

**Recommendations to TOWS-WG**

1. TGV warning notification systems should be considered and coordinated as part of the IOC-UNESCO Global Tsunami Warning and Mitigation System, and also when possible be part of a Multi-Hazard Early Warning System (MHEWS).
2. TOWS-WGs recommend ICGs examine TGVs in the region of responsibility and review TGV hazard monitoring and warning requirements, including costs of deploying and maintaining such systems.
3. TOWS-WG recommend, where identified TGVs may impact multiple Member States, Tsunami Service Providers (TSPs) for the relevant ocean basin tsunami warning and mitigation systems consider if they need to be involved in monitoring and provision of threat advice.
4. IOC-UNESCO Ad hoc Team on TGV should continue and finalize the TGV Report by mid-2023.

**Recommendations to IOC-UNESCO Secretariat**

IOC Secretariat to help inform Member States widely on the potential tsunami hazard from volcanoes:

1. Publish the TGV report as an IOC-UNESCO publication in 2023
2. Provide the TGV Report, including the List of Tsunamigenic Volcanoes to Volcano Observatories
3. Provide the TGV Report, including the List of Tsunamigenic Volcanoes to IOC-UNESCO Member States

**Recommendations to TOWS-WG**

**Noting** the report from the *Ad Hoc* Team on Meteotsunamis initially sought to look at meteotsunami the perspective of global tsunami services;

**Further noting** the report from the *Ad Hoc* Team on Meteotsunamis discovered responsibility for issuing public alerts related to meteotsunami currently is typically addressed by national or regional Met services offices, but usually in the context of storm surge or anomalous coastal flooding event;

**Further noting** as tsunami detection and measurement capabilities are rapidly improving and this is expected to accelerate under the UN Ocean Decade, it is now possible to consider non-seismic tsunami sources in the global instrumentation strategy, including volcanoes and meteotsunami, among others;

**Further noting** combining the direct tsunami detection capability of the GTWS with the NWP-based algorithms tuned to meteotsunami prediction could deliver significant advances in global capability at minimal cost;

1. TOWS-WG initiates a comprehensive dialogue between the IOC and WMO to ensure full exchange of information in support of a robust international alerting system for meteotsunamis is achieved. It is the *Ad Hoc* Team for meteotsunami’s recommendation that this report be used as a starting point of those discussions.
2. TOWS-WG to establish a mechanism for input from national and regional meteorological services offices on data needs for meteotsunami monitoring and alerting as the Global Tsunami Early Warning System (GTEWS) considers a new generation of tsunami detection and measurement networks.
3. TOWS-WG to establish a task team made up of experts from both GETWS and NWP systems be formed with the expressed intent of outlining the potential construction of an integrated meteotsunami prediction system.
4. TOWS-WG establish an *ad-hoc* team to conduct a global meteotsunami hazard assessment to provide all MS advice on the meteotsunami hazard and risks on their coasts.

 **Commends** the work of the *Ad Hoc* Team on Meteotsunamis;

**Acknowledges** that meteotsunami are a meteorological driven phenomenon, and as such, better clarification of the roles of NMHS and WMO and IOC will be critical in supporting the development of any potential future detection and alerting service for meteotsunamis;

**Recommends** that WMO experts be engaged to assist in this task and **acknowledges** that WMO requests the WMO-IOC Joint Collaborative Board to discuss tsunami related issues with respect to meteotsunami, to clarify the roles and responsibilities for the WMO and UNESCO-IOC, and how best to strengthen collaboration for supporting Member States;

**Recommends** the *ad-hoc* team on Meteotsunami continue through 2023, including WMO representatives for the purpose of recommending a global altering strategy to include specific roles of met services and TSPs/NTWCs;

**Recommends** the establishment of an *ad-hoc* team to conduct a global meteotsunami hazard assessment to provide all MS advice on the meteotsunami hazard and risks on their coasts;

**Noted** with appreciation the nomination of Dr Laura Kong as the chair of the UNESCO IOC Tsunami Ready Coalition;

**Accepts** with appreciation the offer of the Government of the Republic of Indonesia to host the Global Symposium in December 2024 as part of the plans by the ICG/IOTWMS to commemorate the 20th Anniversary of the Indian Ocean Tsunami of 2004;

**Recommends** the nomination of a Tsunami Symposium co-chair and members of the committee;

**Noted** that Japan has defined a flag called “Tsunami Flag” as a visual communication method of tsunami warning in order to disseminate tsunami warning to people with hearing difficulties and people at the beach. The flag has been used since June 2020;

**Recommends** global harmonisation of the tsunami beach flag in consultation with other groups using flags to warn for other coastal hazards, and the broader consideration of people with disabilities in tsunami warnings.

**Recommendations to TOWS-WG TT DMP**:

1. TT DMP to further investigate requirements and methods to warn people with disabilities and underserved communities, especially given WTAD objective 2023 “fighting inequality for a resilient future”.
2. TT DMP take action now to upgrade NTWC competency training framework from a Pacific to global approach and include competency training for Tsunami Warning Focal Points (TWFPs) in the framework given their key role in tsunami warnings.

**Recommendations to TOWS-WG**

**Noted** 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;

**Recommends** ITIC to pilot the PTWS NTWC Competency Framework with the goal to develop a global framework for all ICGs to use;

**Notes** the recent EGU 2022 meetings on tsunamis from source processes to coastal hazard and warning;

**Notes** the publication of IUGG concerning the Sulawesi/Palu (2018) and Anak/Krakatau (2018) Tsunamis;

**Further notes** the support provided by IUGG to IOC on the tsunami glossary update in 2019 and reports on meteotsunamis and tsunamis generated by volcanoes;

**Welcomes** the engagement of the members of the TOWS-WG task teams at the 28th IUGG General Assembly, 11-20 July 2023 at the Messe Berlin – City Cube, Berlin, Germany;

**Further welcomes** the proposed joint IUGG and IOC Tsunami Symposium prior to ICG/PTWS meeting in September 2023 in Tonga.

**Noted** the expanded services to be offered by Galileo European Global Navigation System in 2024 for satellite-based dissemination of targeted alerts to the population and the Galileo demonstration examples to be carried out in France, Germany, Cyprus, and Belgium, the workshop planned in February 2024, and **welcomed** the offer of the Galileo Programme to provide relevant documents, storylines, protocols, guidelines and manuals to support the design of the demonstration examples;

**Acknowledges** the gaps in the global coverage of the tsunami early warning system and **recommends** full global coverage be pursued to ensure that all at risk coastal areas are assured of access to tsunami early warnings by 2027. This is a commitment to the UN “Early Warnings for All” initiative;

**Notes** the activities undertaken by the respective regions for WTAD 2022, and as part of this, the strong engagement in the #GetToHighGround initiative, and the success achieved through the United Nations Office for Disaster Risk Reduction (UNDRR), and IOC collaboration;

**Further notes** to build connections with EW4ALL multi-hazard approach to coastal risk and Making Cities Resilient (MCR2030);

**Further notes** the 2023 WTAD theme will highlight the importance of fighting inequality for a resilient future;

**Further** **notes** activities will include continuing the #GetToHighGround initiative and the #TsunamiReady to engage citizens on tsunami awareness. The theme aligns closely with the current focus of the TOWS-WG in the context of the UN Ocean Decade, The Mid-Term Review of the Sendai Framework, and action to accelerate the implementation of the Early Warnings for All (EW4All) initiative to ensure everyone on earth is covered by MHEWS in the next four years, prioritizing the most at-risk communities;

**Recommends** continued collaboration between the UNESCO IOC and the UNDRR;

**Requests** the UNDRR to strengthen collaboration with respective ICGs and corresponding TICs.

**Express appreciation** to the IUGG-JTC Terminology Working Group and ITIC for leading the effort to review the Tsunami Glossary 2019.

**Approves** the glossary updates and requested the IOC to implement the updates to create the Tsunami Glossary 2023, with support from ITIC.

**Requests** the IUGG JTC Terminology Working Group and ITIC to undertake a review to advise the next meeting of the TOWS Inter-agency Task Teams on whether the 2023 Tsunami Glossary is sufficient to meet the needs of the scientific community, tsunami stakeholders, and other practitioners, or if separate target audience specific versions are required.