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**ICG/IOTWMS
SG, WGs, TTs
Terms of Reference
&
Actions**

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*Meeting of ICG/IOTWMS Steering Group
5-6 February 2004, Hyderabad, India*

ICG/IOTWMS-XIII Decisions

1. Include the instructions from IOC Executive Council #55, 13-17 June 2022, and the recommendations from TOWS-WG XII, XIV and XV in the work plans of the ICG for the next inter-sessional period;
2. Extend the TSP services to include tsunamis generated by non-seismic and complex sources;
3. Adopt V5.0 of the IOTWMS Service Definition Document prepared by Working Group 2;
4. Continue with TSPs only sending notifications to the NTWCs of Member State to update on the availability of TSP bulletins on the registered user web sites;
5. Establish Tsunami Ready Focal Points (TRFPs) in each Member State to enhance communication, coordination, and implementation of the TRRP or similar initiatives across the Indian Ocean;
6. Undertake a full Capacity Assessment of Tsunami Preparedness in the Indian Ocean again in 2024 to evaluate progress of the IOTWMS since Indian Ocean Tsunami of 2004;
7. Undertake a shorter assessment before each session of the ICG for review by Member States through an online questionnaire to continuously monitor progress after each intersessional period and guide the work plans of the ICG/IOTWMS;
8. Organise a symposium in 2024 to commemorate the 20th Anniversary of the Indian Ocean Tsunami of 2004;
9. Continue existing Working Group 1 with modified Terms of Reference as attached in Annex 1, with Chair Dr Harkunti Pertiwi Rahayu (Indonesia) and a Vice-chair to be confirmed by Circular Letter;



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ICG/IOTWMS-XIII Decisions

10. Continue existing Working Group 2 with modified Terms of Reference as attached in Annex 2, with Chair Dr Karyono (Indonesia) and two Vice-chairs: Mr Robert Greenwood (Australia) and Mr. Padmanabham Jijavarapu (India);
11. Continue existing Sub-Regional Working Group for the North-West Indian Ocean with modified Terms of Reference as attached in Annex 3, with Chair Dr Mohammad Mokhtari (Iran) and Vice-chair Ms Vijaya Sunanda Maneela (India);
12. Continue the Steering Group with Terms of Reference as attached in Annex 4, with TSP Representatives and NTWC Representative to be confirmed;
13. Establish a new Working Group 3 with Terms of Reference as attached in Annex 5, with Chair Ms Suci Dewi Anugrah (Indonesia) and Vice-Chair from Seychelles (to be confirmed);
14. Continue intersessional Task Team on Scientific Tsunami Hazard Assessment of the Makran Subduction Zone, reporting to the Sub-Regional Working Group for the North-West Indian Ocean with modified Terms of Reference as attached in Annex 6, and with Chair and Vice-chair to be confirmed by Circular Letter;
15. Establish a new intersessional Task Team on Exercise Indian Ocean Wave 23 (IOWave23) reporting to the new Working Group 3 with Terms of Reference as attached in Annex 7, and with Chair Ms Weniza (Indonesia) and Vice-chair Mr Ajay Kumar Bandela (India);
16. Endorse the new Terms of Reference of the Indian Ocean Tsunami Information Centre (IOTIC), including addition of the World Tsunami Awareness Day (WTAD) task, as attached in Annex 8;
17. Continue to hold inter-sessional activities as integrated meetings to optimise resources if available;
18. Dissolve the IOWave20 Task Team;
19. Dissolve the Task Team on Tsunami Preparedness for a Near-field Tsunami Hazard.



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Key areas for 2024

1. Provide TOWS-WG TT DMP with advice on Tsunami Ready incorporation of critical infrastructure and integration with urban planning
2. Monitor seismic and sea level network status
3. Training on seismic and sea level data analysis
4. Continue to develop threat information and provide guidance on tsunamis generated by non-seismic complex sources
5. Finalise updates to Service Definition Document (SDD) and User Guide
6. Integrate TSP threat information onto single website
7. Expand where possible number of countries implementing Tsunami Ready Recognition Programme or similar national initiatives
8. Report outcomes from Exercise IOWave23
9. Conduct 2024 IOTWMS Capacity Assessment
10. Prepare Member Status reporting template for ICG meetings
11. Contribute to planning for 2nd Global Tsunami Symposium
12. Organise ICG/IOTWMS-XIV in Indonesia



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Steering Group ToRs

Coordinate and integrate the work of ICG/IOTWMS in the inter-sessional periods, as implemented through the ICG's various Working Groups and Task Teams to:

1. Oversee the execution of the Decisions and Recommendations of the ICG.
2. Monitor the overall performance of the IOTWMS.
3. Identify areas of priority for action following assessments, communications tests, exercises, and real tsunami events.
4. Ensure the IOTWMS is implemented in line with the guidance of the TOWS-WG for the harmonisation of global tsunami warning and mitigation systems.
5. Identify and assess resource requirements to support implementation of the IOTWMS.



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Steering Group ToRs

Activities may include:

1. Promote and enhance the institutionalisation of tsunami early warning systems, their implementation, exercises, and maintenance.
2. Develop and maintain the Medium-Term Strategy and Outreach Plan.
3. Identify funding priorities for the ICG/IOTWMS Work Plans
4. Oversee the planning and implementation of ocean wide tsunami exercises and drills.
5. Oversee performance assessment of IOTWMS for real tsunami events, with assistance of IOC-UNESCO IOTIC and ICG/IOTWMS Secretariat through post-event questionnaires to be completed by Member States, for finalisation and distribution within two months after the event.
6. Contribute to the work of the TOWS-WG to coordinate the most effective global implementation and harmonisation of tsunami warning and mitigation systems.



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ICG/IOTWMS-XIII Requests relevant to SG



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Requests IOC-UNESCO TOWS-WG to:

1. Complete and harmonise the KPI Framework for the global tsunami warning and mitigation system to facilitate monitoring and reporting of implementation of the IOTWMS and progress towards Member State goal of 100% of at-risk communities resilient and prepared for tsunamis; **OPEN**
2. Expand the TRRP to also include preparedness with respect to critical infrastructure; **OPEN**
3. Hold the 2nd Symposium in 2024 to coincide with the 20th Commemoration of the Indian Ocean Tsunami of 2004, taking care not to conflict with individual Member State commemorations; **AGREED**
4. Hold the 2nd Symposium together with the planned ICG/IOTWMS symposium in 2024 as one global symposium. **AGREED**

Requests Chair of ICG/IOTWMS to:

Discuss at the next TOWS-WG meeting the option of holding the 2nd TOWS-WG Symposium with the ICG/IOTWMS symposium in 2024 to mark the 20th Commemoration of the Indian ocean Tsunami of 2004 as one global symposium. **CLOSED**

Requests the IOC-UNESCO Executive Secretary to:

Prepare the Executive Summary Report of the 13th Session of the ICG/IOTWMS within 30 days. **CLOSED**

ICG/IOTWMS-XIII Requests relevant to SG



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Requests IOC-UNESCO Secretariat for the ICG/IOTWMS:

1. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
2. In collaboration with IOC-UNESCO IOTIC, follow up the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean, including share a summary table of Member States needs based on the assessment (and other more recent surveys) for Member State to review and provide feedback; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
3. Review the previous Member State Survey for Capacity Assessment to develop a subset of questions for Member States to respond to in order to help prepare a status report of the IOTWMS at each ICG session; **OPEN**
4. Through a Circular Letter seek nominations from each Member State for a Tsunami Ready Focal Point (TRFP) to facilitate coordination and implementation of the TRRP and similar initiatives; **CLOSED**
5. Survey Member States via Circular Letter, especially considering African States, SIDS and LDCs as high priority, to ascertain if other regional or sub-groups need to be established to facilitate capacity development and regional cooperation; **OPEN**
6. Consult with WMO on GTS issues with public notification of TSP bulletins to avoid relay of older notifications. **OPEN**

TOWS-WG/IOC Assembly Instructs relevant to SG

1. 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;
2. Secretariat help inform Member States widely on the potential tsunami hazard from volcanoes:
 - a. Publish the Tsunamis Generated by Volcanoes Report as an UNESCO-IOC publication in 2023; **REPORT BY AD HOC TEAM TSUNAMIS GENERATED BY VOLCANOES FINALISED AND SUBMITTED FOR PUBLICATION IN JANUARY 2024**
 - b. Distribute the Tsunamis Generated by Volcanoes Report, including the List of Tsunamigenic Volcanoes to Volcano Observatories; **OPEN DISTRIBUTE REPORT AS SOON AS PUBLISHED, BUT PROVIDE CL WITH LIST OF VOLCANOES ASAP**
 - c. Distribute the Tsunamis Generated by Volcanoes Report, including the List of Tsunamigenic Volcanoes to UNESCO-IOC Member States **OPEN DISTRIBUTE REPORT AS SOON AS PUBLISHED, BUT PROVIDE CL WITH LIST OF VOLCANOES ASAP**
3. 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; **OPEN**



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TOWS-WG/IOC Assembly Instructs relevant to SG

4. Undertake sub-regional exercises as part of WAVE Exercises as an efficient way to further engage Member States on exercises as appropriate; **OPEN**



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WG1 Tsunami Risk, Community Awareness & Preparedness TORs

Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Assist, develop and strengthen the overall capacity and capability of Member States in tsunami risk assessment and mitigation, community awareness and preparedness, including for tsunamis generated by non-seismic and complex sources.
2. Encourage Member States to mainstream tsunami Disaster Risk Reduction into sustainable development to help achieve resilient communities in the region.
3. Provide advice on any future development of IOC-UNESCO Tsunami Ready Recognition Programme.
4. Support implementation of IOWave Exercises.
5. Identify areas of priority for action following assessments, exercises, and real tsunami events.
6. Provide advice on user requirements and utility of tsunami warning products and services.
7. Provide advice to the IOC-UNESCO Indian Ocean Tsunami Information Centre (IOTIC) on educational, awareness and preparedness materials.
8. Promote collaboration among academia, research institutions and disaster management offices to encourage multidisciplinary and multi sectoral interaction in ensuring tsunami risk knowledge are lined to risk reduction strategies.



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WG1 Tsunami Risk, Community Awareness & Preparedness TORs



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Activities may include:

1. Monitor, assess and routinely report to the Steering Group and ICG on the status of Tsunami Risk Assessments, Community Awareness and Preparedness in each Member State.
2. Seek resources and coordinate projects to develop guidelines and build capacity in Member States.
3. Support the organisation of workshops and symposiums for training and capability development.
4. Contribute to the conduct of regular exercises of the IOTWMS.
5. Encourage Member States to integrate tsunami risk assessment, community awareness and preparedness within national disaster risk reduction programmes for multi-hazards.
6. Stimulate and share information on best-practices between Member States.
7. Assist with development and application of guidelines on hazard, vulnerability and risk assessment and mitigation, exercises, and post-event surveys.
8. Work closely with Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC, and IOC-UNESCO Secretariat for the ICG/IOTWMS to help develop the capacity of Member States across the Indian Ocean to implement the IOC-UNESCO TRRP or similar initiatives.
9. Work closely with Working Group 2 "Tsunami Detection, Warning and Dissemination" and Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for OICG/IOTWMS to help develop effective national tsunami warning chains, warning products, services, Standing Operating Procedures, and warning chains.
10. Under the direction of the Steering Group, assist with national assessments of the IOTWMS performance after each exercise and real tsunami event.

ICG/IOTWMS-XIII Requests relevant to WG1

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
2. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
3. Update the Probabilistic Tsunami Hazard Assessment (PTHA) for the whole Indian Ocean in collaboration with relevant experts from the Member States, based on recent PTHA developed for the North-West Indian Ocean under the UNESCAP funded project “Strengthening Tsunami Early warning in the North-West Indian Ocean Through Regional Cooperation”; **OPEN Bilateral proposal between UKRI and the Indian Ministry of Earth Sciences through INCOIS (4-year project, starting Feb 2024) will look to expand PTHA for all sources in Indian Ocean**
4. Develop community education materials in collaboration with IOTIC on the natural warnings signs for tsunamis generated by non-seismic and complex sources; **OPEN**
5. Develop guidance on Tsunami Ready indicators required for critical infrastructure (ports, harbours, airports, power stations, hospitals, etc.) to present to ICG and TOWS-WG Task Team Disaster Management & Preparedness (TT DMP) for consideration in the further development of the TRRP; **OPEN**
6. Noting the poor responses to the COVID-19 survey in 2021, provide a sub-nation case study to the 14th Session of the ICG to develop greater awareness of the issues and importance of preparedness to other Member States; **OPEN**



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ICG/IOTWMS-XIII Requests relevant to WG1

7. Noting the achievement of two Special Issues of IJDRB published in 2020 and 2021, discuss a possible topic for the next special issue related to warning and mitigation and UN ODTP that can include all ocean basins;
8. Noting the UN ODTP definition “The goal of an early warning system is the protection of life, as well as livelihoods”, and further noting one of the two main goals of the UN Ocean Decade is that 100% of communities at risk from tsunamis be prepared and resilient through programmes like Tsunami Ready or other similar programmes implemented by the Member States”. Working Group 1 needs to discuss the following issues:
 - a) What is Community?
 - b) How many Communities are at Risk from Tsunami?
 - c) Are public awareness and educational activities conducted?
 - d) Are public awareness and response tested and exercised?
 - e) Institutionalizing Tsunami Awareness and Response?



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WG2 Tsunami Detection, Warning & Dissemination TORs



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Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Coordinate and strengthen the operational implementation of tsunami detection, warning and dissemination, including for tsunamis generated by non-seismic and complex sources.
2. Support the Tsunami Service Providers (TSPs) delivery of interoperable regional tsunami threat information products to Member States.
3. Support Member States in the development of their national tsunami warning capabilities.
4. Monitor the performance of key observational, warning and communication system components.
5. Support implementation of IOWave Exercises.
6. Identify areas of priority for action following assessments, communications tests, exercises, and real tsunami events.
7. Provide advice on further development of IOC-UNESCO TRRP.
8. Provide advice to the Indian Ocean Tsunami Information Centre (IOTIC) on educational materials about the warning systems and services.
9. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, help strengthen the capacity and capability of Member States.

WG2 Tsunami Detection, Warning & Dissemination TORs



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Activities may include:

1. Help coordinate and facilitate the development and operational implementation of tsunami detection, warning and dissemination systems and procedures within Multi-Hazard Early Warning System (MHEWS) frameworks and systems.
2. Monitor, assess and routinely report to the Steering Group and ICG on the performance of Tsunami Service Providers (TSPs), observational seismic and sea level monitoring networks, communication systems and procedures.
3. Consult with Working Group 1 “Tsunami Risk, Community Awareness and Preparedness” on the requirements and suitability of threat information and warning products.
4. Work closely with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 “Tsunami Ready Implementation”, IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, to help develop the capacity of Member States across the Indian Ocean to implement the IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) or similar initiatives.
5. Work closely with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 “Tsunami Ready Implementation”, IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, to develop effective national tsunami warning chains, warning products, services, Standing Operating Procedures, and warning chains.

WG2 Tsunami Detection, Warning & Dissemination TORs



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6. Monitor existing international and national arrangements and provision of real-time data required for tsunami monitoring and warning with regards to seismic, GNSS, sea level and other kinds of measurements and data exchange.
7. Undertake studies to determine warning requirements for seismic and sea level data.
8. Facilitate the ongoing development and benchmarking of tsunami modelling, forecast and verification systems.
9. Contribute to the conduct of regular exercises and communication tests of the IOTWMS.
10. In collaboration with Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", Working Group 3 "Tsunami Ready Implementation", IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, help to develop, coordinate, and implement training and capacity building programmes for NTWCs, DMOs and Broadcast Media in the Tsunami Warning Services.
11. Develop and maintain relevant documentation, such as the IOTWMS Service Definition and IOTWMS NTWC Users Guide.

ICG/IOTWMS-XIII Requests relevant to WG2

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
2. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
3. Investigate methods of detection and threat assessment of non-seismic and complex source tsunami events, including volcanoes and landslide events; **OPEN**
4. Explore possible new tsunami-detection technologies such as pressure sensors attached to undersea communications cables; **OPEN Indonesia and India investigating deployment of sensors on underwater cables**
5. Extend the TSP services to include tsunamis generated by non-seismic and complex sources; **OPEN TSP-Australia has developed products and trialled in IOWave23. Indonesia and India developing systems. Service Definition Document and User Guide urgently need updating before being able to consider new products fully operational**
6. Adopt the updated IOTWMS TSP Service Definition Document (Version 5) and request the TSPs to conform to it; **OPEN Updates made to draft SDD V5.0 but awaiting updates to User Guide before finalising**



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TOWS-WG/IOC Assembly Requests relevant to WG2

1. 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; **OPEN Secretariat to issue joint Circular Letter related to TOWs-WG/IOC Assembly requests**
2. 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); **OPEN Secretariat to issue joint Circular Letter related to TOWs-WG/IOC Assembly requests**
3. 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; **OPEN Secretariat to issue joint Circular Letter related to TOWs-WG/IOC Assembly requests**
4. 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 in 2024/25: **OPEN**
5. Follow the initiative of ICG/PTWS to enable sub-regional live information sharing during tsunami events to inform neighbouring country decision-making; **OPEN**



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ICG/IOTWMS-XIII Requests relevant to WG2

7. Implement further the TOWS-WG request on TSP messages for the maritime community; **OPEN TOWS-WG AND IOC ASSEMBLY request implementation by 2024**
8. Assist the implementation of the IOC-UNESCO TRRP; **OPEN Need to prepare guidelines for national implementation by NTWCs of CAP**
9. Replace the task to assist TSPs with the task to assist NTWCs with their implementing CAP, mobile applications, and social media for effective dissemination of national tsunami warning information; **OPEN CAP VERSION OF TSP products will also facilitate exchange of TSP bulletins between TSPs and NTWCs. TSP Public Bulletins require CAP version**
10. Develop guideline of best practice to share with NTWCs about how to integrate tsunami into the multi-hazard early warning approach or system for mutual benefits; **OPEN**
11. Include an additional one-day session on Tsunami Warning Centre and Seismic Network Operations as part of all future Standard Operating Procedure (SOP) training; **OPEN Insufficient time to prepare and include in busy SOP training schedule. Also need for sea level.**



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WG3 Tsunami Ready Implementation TORs



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Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. Monitor and evaluate the implementation Tsunami Ready Recognition Programme, National Warning Chains, and related activities to deliver tsunami resilient and prepared communities for the Indian Ocean
2. Provide guidance on tsunami hazard and risk assessment, including for tsunamis generated by non-seismic and complex sources.
3. Provide guidance to Member States on reviewing and enhancing national tsunami warning chains.
4. Provide guidance on how to nationally initiate IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) and similar initiatives
5. Facilitate sharing of experiences between Member State Tsunami Ready Focal Points (TRFPs)
6. Update Member States on IOC-UNESCO TRRP developments and other related initiatives
7. Develop exercise tools and coordinate implementation of IOWAVE Exercises and other drills as required
8. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for ICG/IOTWMS, identify capacity development and resource needs of Member States to implement TRRP, national tsunami warning chains, and related activities
9. Assist with training programmes of Member States implemented by IOC-UNESCO IOTIC and coordinated by IOC-UNESCO ICG/IOTWMS Secretariat to facilitate enhanced national tsunami warning chains and at-risk communities becoming resilient and prepared for tsunamis

ICG/IOTWMS-XIII Requests relevant to WG3



1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
2. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
3. Provide guidance on tsunami hazard and risk assessment, including for tsunamis generated by non-seismic and complex sources in collaboration with Working Group 1; **OPEN**
4. Develop guidelines on how to nationally initiate IOC-UNESCO TRRP and similar initiatives; **OPEN**
5. Facilitate coordination and sharing of experiences between Member States on implementation of IOC-UNESCO TRRP through the Member State Tsunami Ready Focal Points (TRFPs); **OPEN TRFP nominations so far from about nine Member States. Secretariat to follow-up with other Member States**
6. Assist Working Group 1 and IOTIC with the sharing and development of community awareness materials, including for tsunamis generated by non-seismic and complex sources; **OPEN**

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ICG/IOTWMS-XIII Requests relevant to WG3

7. Collaborate with IOTIC to update Member States on IOC-UNESCO TRRP developments and other related initiatives; **OPEN**
8. Collaborate with IOTIC and Secretariat for ICG/IOTWMS to identify capacity development and resource needs of Member States for implementing IOC-UNESCO TRRP; **OPEN 2024 IOTWMS Capacity Assessment Project in collaboration with UNESCAP and funded by ADB and Switzerland has commenced. Survey questions being reviewed and updated (only where absolutely necessary due tight timeframes to complete project) and to distributed in March. Need decide which 2-3 countries may need assistance completing the surveys by survey teams**
9. Support IOC-UNESCO Secretariat for the ICG/IOTWMS and IOC-UNESCO IOTIC conduct two training workshops on Standard Operating Procedures, including national warning chain development, in the intersessional period in first half of 2023 and before IOWAVE23, subject to the availability of funding, with one to be conducted in the western region of the Indian Ocean and the other to be conducted in the eastern region of the Indian Ocean. **CLOSED Two Preparatory Meetings and three SOP workshops (WIO, EIO, NWIO) all completed in hybrid form.**



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TOWS-WG/IOC ASSEMBLY Instructs relevant to WG3

1. Explore and inform the TOWS-WG TT-DMP on mechanisms for recognition of UNESCO-IOC Tsunami Ready similar standards which are already in place in some countries; **OPEN**
2. Encourage the use of standard text in the UNESCO-IOC Tsunami Ready signage for vertical evacuation, such as “Go to the designated building for vertical evacuation”; **OPEN**
3. 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; **OPEN**



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RWG-North-West Indian Ocean TORs



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Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

1. In collaboration with IOC-UNESCO IOTIC and IOC-UNESCO Secretariat for the ICG/IOTWMS, evaluate capabilities and identify capacity building requirements of Member States in the region for providing end-to-end tsunami warning and mitigation services within the framework of the ICG/IOTWMS and within a multi-hazard framework
2. In collaboration Working Group 1 "Tsunami Risk, Community Awareness and Preparedness", promote and facilitate tsunami hazard and risk assessments and research in the region, including for tsunamis generated by non-seismic and complex sources.
3. In collaboration with Working Group 3 "Tsunami Ready Implementation", support implementation of IOC-UNESCO TRRP or similar activities across the region to help make at-risk communities resilient and prepared for tsunamis
4. In collaboration with Working Group 3 "Tsunami Ready Implementation", facilitate sharing of experiences between Member State Tsunami Ready Focal Points (TRFPs) on Tsunami Ready implementation

RWG-North-West Indian Ocean TORs



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Liaise with other working group(s) and task team(s) within the ICG/IOTWMS and with working groups from the other ocean basins through the TOWS-WG to:

5. Facilitate cooperation in the establishment and upgrading of seismic, sea level and GNSS stations and networks and communication systems in the region
6. Facilitate the timely sharing of tsunami-related data and information in the region
7. Establish and maintain procedures for National Tsunami Warning Centres (NTWCs) across the region to exchange information on national tsunami warnings, observations, and impacts during events.
8. Support the implementation of IOWAVE Exercises and other similar drills across the region and encourage all Member States to participate at full level (from issuing warnings to the evacuation of the public in selected regions, at least in tsunami-ready pilot regions).



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ICG/IOTWMS-XIII Requests relevant to RWG-NWIO

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN Being addressed through UNESCAP funded project**
2. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN Being addressed through UNESCAP funded project**
3. Support further strengthening of tsunami warning chains, improvement of SOPs of DMOs and Broadcast Media, and timelines in passing the information between multiple stakeholders; **OPEN Addressed through SOP workshops and report summarising status and recommendations for each Member State in preparation**
4. Include complex sources in national tsunami early warnings; **OPEN Much development work still required**
5. Utilise proposed UNESCAP project Phase 2c to develop hazard, inundation and evacuation maps for agreed pilot areas in pathway towards Tsunami Read recognition; **OPEN PHASE 2C just starting and due complete end of Sep24.**
6. Employ unified tsunami modelling approach developed by UNESCAP project; **OPEN has been applied for NWIO PTHA and will be utilized in Phase 2c in 2024 to develop inundation maps in support of evacuation mapping**
7. Encourage all Member States to participate at full level (from issuing warnings to the evacuation of the public in selected regions, at least in tsunami-ready pilot areas) in upcoming drills (IOWave Exercise). **CLOSED Encouraged and successful in India, Iran, and UAE (See TT IOWAVE23 report for further details). UNJESCAP funded project will use inundation maps to develop evacuation maps in 5 active Member States with drills in at least one-pilot community in each in August 2024**

TT Scientific Tsunami Hazard Assessment MSZ TORs



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Under the direction of the Regional Working Group North-West Indian Ocean:

1. Draft an agreement document for real-time exchange between Member States of seismic/sea-level/GNSS data in the Makran Subduction Zone (MSZ)
2. Specify optimal number and configuration of seismic/sea-level/GNSS and other observing networks needed for real-time tsunami warning in the MSZ
3. Investigate and report on the credible maximum earthquake magnitude in the Makran Subduction Zone and define a strategy to develop a unified hazard map
4. Investigate and report on the seismicity of the Makran Subduction Zone.
5. Review and report on the status of research into modelling of secondary non-seismic effects tsunamis in Makran for potential use in the IOTWMS

NB TT NOT ESTABLISHED DUE TO NO NOMINATIONS FOR MEMBERSHIP BY MEMBER STATES. MOST OF THE WORK BEING CARRIED BY UNESCAP FUNDED PROJECT PHASE 2C. ANY REMAINING WORK WILL NEED TO SUPPORTED BY RWG-NWIO ITSELF.



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ICG/IOTWMS-XIII Requests relevant to TT THA MSZ

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **BEING ADDRESSED BY UNESCAP FUNDED PROJECT**
2. Support making output from Probabilistic Tsunami Hazard Assessment (PTHA) V1.0 for NWIO region available to all Member States; **BEING ADDRESSED BY UNESCAP FUNDED PROJECT**
3. Begin work on PTHA V2.0 to include tsunami generated from other sources; **OPEN**
4. Explore the possibility of using GNSS and HF Radar data for enhancing national operational tsunami early warning systems; **OPEN BETTER AS WG2 ACTION?**
5. Support more paleo-tsunami studies to help better understand the seismicity of the region, particularly the western Makran Trench; **OPEN** Study the potential consequences of tsunamis generated **FIELD WORK UNDERTAKEN AND SEMIAR PROVIDED IN IRAN PROJECT FUNDED BY IGCP 740 West Makran Paleo-tsunami Investigation**
6. Study the potential consequences of tsunamis generated by mud volcanoes and splay faults, as the near-source regions are becoming industrial hubs due to rapid development in the region; **OPEN**
7. Identify the optimal networks and improve regional data-sharing through bilateral and multilateral arrangements, while also sharing data with TSPs. **OPEN**
8. **THIS WORK IS MOSTLY BEING UNDERTAKEN BY UNESCAP- FUNDED NWIO PROJECT. ANY REMAINING WILL NEED TO BE CARRIED BY RWG-NWIO ITSELF**

TT Exercise IOWave23 TORs



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Under the direction of Working Group 3 “Tsunami Ready Implementation”:

1. Plan and coordinate the next IOWave Exercise (IOWave23), taking on-board suggestions from the post-IOWave20 lessons learnt workshop, including an increased focus on involving Local Disaster Management Offices (LDMOs) down to community level and implementation of IOTR. Prepare the IOWAVE23 Exercise Manual in accordance with the Guideline on "How to Plan, Conduct and Evaluate Tsunami Exercises" (IOC Manuals and Guides No. 58) at least 6 months in advance of the exercise. **CLOSED Submitted and electronic version used in IOWave23 by Member States. Awaiting final publication by IOC**
2. Prepare the Exercise Report for ICG/IOTWMS-XIV. **OPEN Member States have completed online evaluation survey and provided one-page templated summaries for Post-IOWAVE23 webinar in December 2023**

ICG/IOTWMS-XIII Requests relevant to TT Exercise IOWave23



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Requests new Task Team IOWAVE23 to:

1. Address the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN Awaiting full results to be finalised and published in 2024**
2. Conduct Indian Ocean Wave Exercise (IOWave23) in 2023 noting suggestions from the post-IOWave20 lessons learnt workshop, including an increased focus on participation of Local Disaster Management Offices (LDMO) down to community level and exercising communities recognised or planning to be recognised under the TRRP or similar initiatives; **CLOSED See TT IOWave23 report**
3. Explore mechanisms where resources are available for participation of international observers with expertise in tsunami warning in countries conducting community evacuations and implementing TRRP and similar initiatives during future IOWave exercises; **CLOSED due insufficient funds.**
4. Conduct IOWAVE23 in Sept/Oct 2023, with three scenarios run one week apart and not on consecutive days, with at least one scenario with major tsunami impacts; **CLOSED Successfully carried out**
5. Include near-field tsunami scenarios, with scenarios for tsunami generated by non-seismic and complex sources; **CLOSED one scenario involved tsunami generated by volcano on Heard island in the south of the Indian Ocean**
6. Support pre- and post-IOWAVE workshops to facilitate planning, conduct, and review of Exercise. **CLOSED Great support by members of the TT IOWave23 and Secretariat**
7. Encourage Member States to test/verify the UNESCO-IOC Tsunami Ready Indicators during the Exercise; **CLOSED See TT IOWave23 report**

IOTIC TORs



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1. Help reduce the overall tsunami risk across the Indian Ocean by working closely and in coordination with the IOC-UNESCO ICG/IOTWMS, it's Steering Group, Working Groups, Task Teams, IOC-UNESCO ICG/IOTWMS Secretariat, and the TOWS-WG Task Team on Disaster Management & Preparedness (TT DMP) to:

- a. Contribute to the development of global guidelines in tsunami risk reduction and their implementation in the Indian Ocean.
- b. Maintain close familiarity of the operations and needs of the Indian Ocean Tsunami Warning System and work closely with the Tsunami Service Providers (TSPs), National Tsunami Warning Centers (NTWCs), and Disaster Management Organisations (DMOs) to assist, as needed, with the promotion, and capacity building required for an effective tsunami emergency response.
- c. In coordination with the IOC-UNESCO ICG/IOTWMS Secretariat and as needed, and its Working Groups and Task Teams to conduct training programmes, workshops, and seminars.
- d. In collaboration with the IOC-UNESCO ICG/IOTWMS Secretariat develop project proposals and assist with project implementation in support of the ICG/IOTWMS programmes and activities in the Indian Ocean Region.
- e. Manage tsunami post-event performance surveys and compilation of reports in close collaboration with the IOC-UNESCO ICG/IOTWMS Secretariat under the overall direction of the ICG/IOTWMS Steering Group, assisted by the International Tsunami Information Center (ITIC), IOC-UNESCO Tsunami Unit, and teams of experts nominated by the UNESCO-IOC ICG/IOTWMS Steering Group as required

IOTIC TORs

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Steering Group Meeting ICG/IOTWMS, 05-06 February 2024

IOTIC TORs



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2. Help Member States of the IOC-UNESCO ICG/IOTWMS reduce their tsunami risk by:
 - a. Serving as the focal point under the guidance of the IOC-UNESCO ICG/IOTWMS to guide, facilitate, and process the implementation of the UNESCO/IOC Tsunami Ready Recognition Programme (TRRP) in the Indian Ocean.
 - b. Serving as the focal point under the guidance of the ICG/IOTWMS, in coordination with the IOC-UNESCO Secretariat, to guide, facilitate, support, and coordinate the activities of the World Tsunami Awareness Day (WTAD) in the Indian Ocean.
 - c. Assisting national stakeholders in the overall improvement of tsunami preparedness and effective tsunami emergency response through tsunami risk assessment, warning guidance and emergency response, education and awareness, tsunami mitigation, and the implementation of national initiatives to reach certification against the IOC-UNESCO Tsunami Ready indicators.
 - d. Serving as an information resource providing for the development, publication, and distribution of resource materials on tsunami hazard, awareness, preparedness, and education for the Indian Ocean.
 - e. Serving as a technical resource and help foster research and its application to strengthen technical and institutional aspects of tsunami preparedness and tsunami emergency response to prevent loss of life and minimize damage to property.

IOTIC TORs

3. Coordinate activities and exchange materials, resources, and information with other Tsunami Information Centres (TICs) of the other ocean basins (Caribbean Tsunami Information Centre (CTIC), International Information Centre (ITIC), and North-East Atlantic and Mediterranean Seas Tsunami Information Centre (NEAMTIC)) to ensure global consistency and potential use of derived products across all regions.
4. Share information on programmes, activities, and events, as well as information on tsunami education, awareness, and preparedness resources by managing and maintaining the IOTIC Website and social media channels as platforms for information exchange



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ICG/IOTWMS-XIII Requests relevant to IOTIC



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Requests the IOC-UNESCO IOTIC to:

1. Follow up the recommendations contained in the IOWave20 Exercise Report; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
2. In collaboration with IOC-UNESCO Secretariat for ICG/IOTWMS, follow up the recommendations of the 2018 Capacity Assessment of Tsunami Preparedness in the Indian Ocean; **OPEN ONGOING SECRETARIAT PRESENTS AT EACH MEETING FOR FACTORING IN TO WORK PLANS**
3. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat, create a capacity development work plan for the intersessional period, where appropriate utilising the International Training Centre for Operational Oceanography (ITCOcean) operated by INCOIS in India, and the BMKG Training Center in Indonesia that serves as an OTGA Specialized Training Center (STC Indonesia), and STC ITIC in Hawaii; **OPEN**
4. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat create use the summary table of Member States capacity development requirements presented by IOC-UNESCO Secretariat to ICG/IOTWMS XIII to develop a capacity building work plan focusing on those areas most required by Member States, such as SOP training and community awareness. **OPEN**

ICG/IOTWMS-XIII Requests relevant to IOTIC

Requests the IOC-UNESCO IOTIC to:

5. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat and new Working Group 3 “Tsunami Ready Implementation”, continue to organise regional workshops such as the Indian Ocean Tsunami Ready Workshop in Nov 2022 as platforms for sharing experience and lessons learnt on the implementation of IOC-UNESCO TRRP in the Indian Ocean. **OPEN WORKSHOPS CARRIED IN SEYCHELLES AND EAST TIMOR IN 2023. MORFE TO BE CARRIED OUT IN 2024**
6. In consultation with the IOC-UNESCO ICG/IOTWMS Secretariat, Working Group 1 and new Working Group 3, develop urgently an online webinar for TRFPs on tools and strategies for implementing Tsunami Ready, supported by a one-page brochure. **OPEN**



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