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Commission

TOWS WG TASK TEAM ON DISASTER MANAGEMENT AND PREPAREDNESS REPORT AND RECOMMENDATION & UN-ODTP

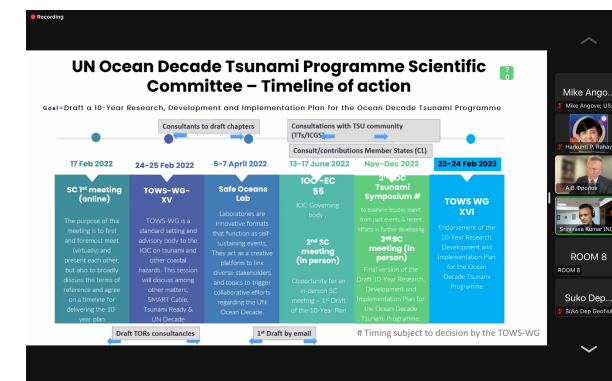
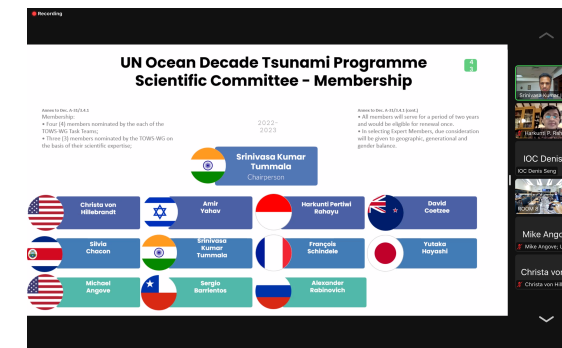
Harkunti P. Rahayu

Chair of TOWS WG Task Team on DMP (2022 – 2024)

Chair of WG1 ICG/IOC IOTWMS

Members of TTDMP

Harkunti Pertiwi Rahayu	ICG/IOTWMS (Chairperson)
Alison Brome	CTIC, ICG/CARIBE-EWS
Ardito M. Kodijat	IOTIC, ICG/IOTWS
Laura Kong	ITIC, ICG/PTWS
David Coetzee	ICG/IPTWS
Cecelia Varlbonesi	ICG/NEAMTWS
Christa von Hillebrandt-Andrade	ICG/CARIBE-EWS
Amir Yahav	ICG/NEAMTWS
Sarah Grimes	WMO, Observer
Denis McClean	UNDRR, Observer
Silvia Chacón	Observer
Alejandro Rojas Aldana	Observer
Suci Dewi Anugrah	BMKG, Observer
Mrs. Weniza	BMKG, Observer
Alexander Frolov	TOWS WG (Chairperson)
Bernardo Aliaga Rossel	IOC Secretariat
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Denis Chang Seng	IOC Secretariat, NEAMTIC
Nora Gale	ICG/IOTWMS Secretariat
Jiuta Korovulavula	IOC Secretariat /Observer
Salim Slaoui	IOC Secretariat, intern
Quinn Tiff	IOC Secretariat



Agenda Item 3

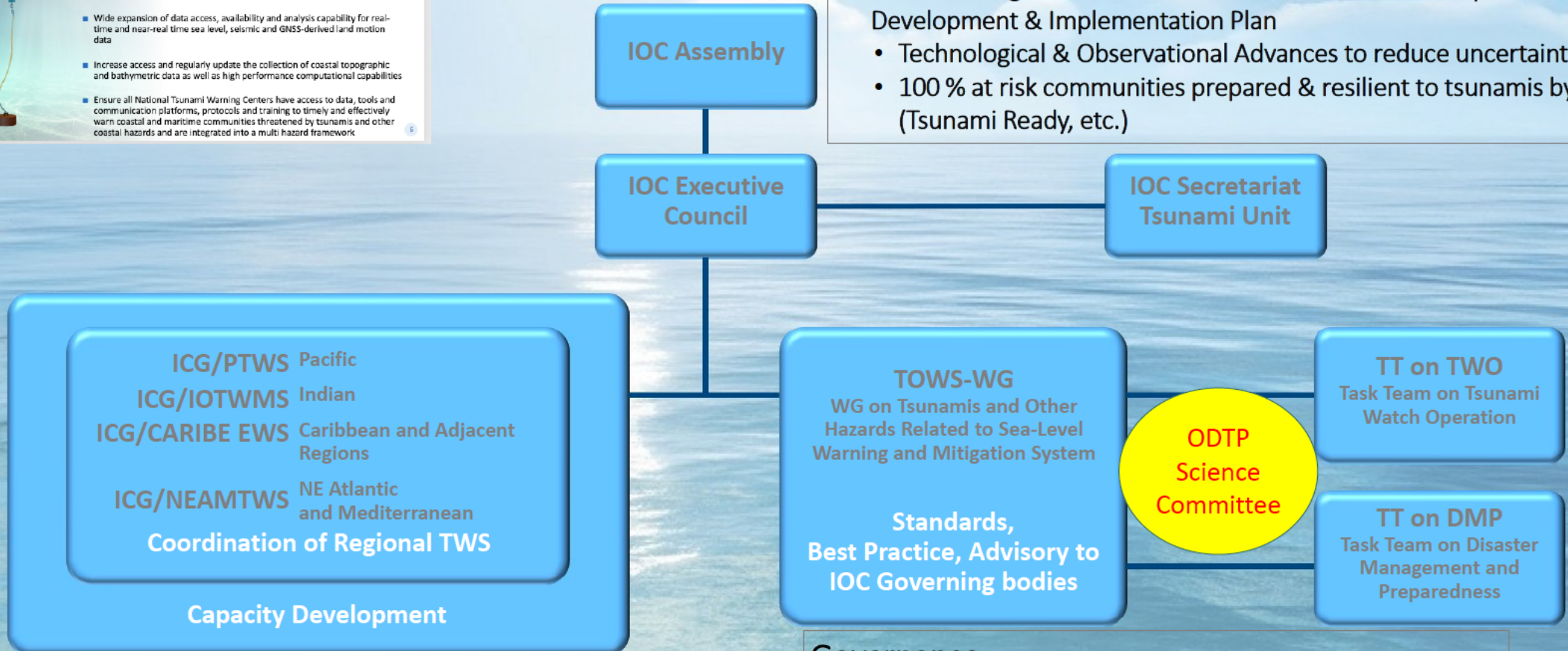
IOC Tsunami Programme and UN Ocean Decade

OCEAN DECADE TSUNAMI PROGRAMME:
the Focus Areas Related to Tsunami Warning Capabilities

- Expansion of existing observational systems to fill identified gaps
- Deploy new technologies such as scientific instrumentation on deep-ocean telecommunications cables
- Wide expansion of data access, availability and analysis capability for real-time and near-real time sea level, seismic and GNSS-derived land motion data
- Increase access and regularly update the collection of coastal topographic and bathymetric data as well as high performance computational capabilities
- Ensure all National Tsunami Warning Centers have access to data, tools and communication platforms, protocols and training to timely and effectively warn coastal and maritime communities threatened by tsunamis and other coastal hazards and are integrated into a multi hazard framework

UN Ocean Decade (2021-30)

- Once-in-a-generation opportunity to address gaps in tsunami warning, enhance community preparedness and contribute to "A Safe Ocean"
- IOC Assembly 31 (Dec. A-31/3.4.1) established the Ocean Decade Tsunami Programme + Scientific Committee to Develop Research, Development & Implementation Plan
 - Technological & Observational Advances to reduce uncertainties
 - 100 % at risk communities prepared & resilient to tsunamis by 2030 (Tsunami Ready, etc.)



Governance

- TOWS-WG & ICGs: Global & Regional Steering Committee
- Scientific Committee: Advisory Role
- Special coalition for Tsunami Ready

Member of UN – Ocean Decade Tsunami Program

Annex to Dec. A-31/3.4.1

Membership:

- Four (4) members nominated by the each of the TOWS-WG Task Teams;
- Three (3) members nominated by the TOWS-WG on the basis of their scientific expertise;

2022-2023

Annex to Dec. A-31/3.4.1 (cont.)

- All members will serve for a period of two years and would be eligible for renewal once.
- In selecting Expert Members, due consideration will be given to geographic, generational and gender balance.



**Srinivasa Kumar
Tummala**

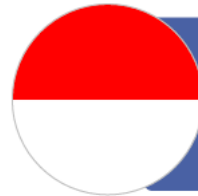
Chairperson



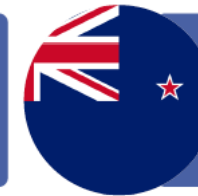
**Christa von
Hillebrandt**



Amir Yahav



**Harkunti Pertiwi
Rahayu**



David Coetzee



Silvia Chacon



**Srinivasa Kumar
Tummala**



François Schindele



Yutaka Hayashi



Michael Angove



Sergio Barrientos



Alexander Rabinovich

Scientific Committee for the UN Ocean Decade Tsunami Programme (SC-ODTP)²¹

Goal=Draft a 10-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme

Proposed Timeline



Activities Online and Offline

UN Ocean Decade Tsunami Programme Scientific Committee - Membership

Annex to Doc. A/70/A.1
 Membership:
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2022-2023

Annex to Doc. A/70/A.1 (cont.)
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Christa von Hillebrandt	Amir Yahav	Harkunil Partiwil Rahayu	David Coates
Silvia Chacon	Srinivasa Kumar Tummala	Françoise Schindeler	Yutaka Hayashi
Michael Angove	Sergio Barrientos	Alexander Rabinovich	

Srinivasa Kumar Tummala
Chairperson



UN Ocean Decade Tsunami Programme Scientific Committee – Timeline of action

Goal – Draft a 10-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme

Consultants to draft chapters

17 Feb 2022

24-25 Feb 2022

5-7 April 2022

13-17 June 2022

Nov-Dec 2022

23-24 Feb 2023

<p>SC 1st meeting (online)</p> <p>The purpose of this meeting is to first and foremost meet virtually and present each other, but also to broadly discuss the terms of reference and agree on a timeline for delivering the 10-year plan</p>	<p>TOWS-WG-XV</p> <p>TOWS-WG is a standard setting and advisory body to the IOC on tsunami and other coastal hazards. This session will discuss among other matters, SMART Cable, Tsunami Ready & UN Decade</p>	<p>Safe Oceans Lab</p> <p>Laboratories are innovative formats that function as self-sustaining events. They act as a creative platform to involve diverse stakeholders and topics to trigger collaborative efforts regarding the UN Ocean Decade.</p>	<p>IOC-EC 55</p> <p>IOC Governing body</p> <p>2nd SC meeting (in person)</p> <p>Opportunity for an in-person SC meeting – 1st Draft of the 10-Year Plan</p>	<p>IOC Tsunami Symposium #3</p> <p>To create lessons learnt from past events & recent efforts in further developing 3rd SC meeting (in person)</p> <p>Final version of the Draft 10-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme</p>	<p>TOWS WG XVI</p> <p>Endorsement of the 20-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme</p>
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Draft TORs consultancies | 1st Draft by email | # Timing subject to decision by the TOWS-WG



Call for Action

- Under the UN Decade of Ocean Science for Sustainable Development, a **framework** from which actions can be developed to address critical gaps in the tsunami warning and mitigation system as a whole.
- We envision realizing transformational gains related to **rapid tsunami detection, measurement and forecasting capability** and communities that are **Tsunami Ready** along with **dedicated capacity development efforts**, specifically targeted at **SIDS and LDCs**
- We seek to identify and advance specific actions that align with the components of UNDRR **People-Centered Early Warning Systems** including:
 - Risk Knowledge
 - Monitoring and Warning
 - Warning Dissemination and Communication
 - Response Capability
 - Capacity Development and attention to SIDS and LDCs

1. Risk Knowledge

Understanding the risk and developing a plan to mitigate the risk is what saves lives. While tsunamis are infrequent, and the catastrophic ones rare, historical record shows that tsunamis have the potential to hit every coast around the world – we don't know when, where, or how big.

Member States identified in their responses several elements of ongoing programmes (**PTHA in the Indian Ocean - Makran and South West Pacific**) and/or specific requests to improve national capabilities to perform hazard and risk assessment.



ESO- Indian National Centre for Ocean Information Services

2019年12月3日 · 6

The "UNESCO-IOC Intergovernmental Coordination Group for the Indian Ocean Tsunami Warning and Mitigation System (ICG/IOTWMS) Meeting of the Expert Team for the Development of Probabilistic Tsunami Hazard Assessment (PTHA) for the Makran Region" is being hosted at INCOIS during 2-4 December 2019.



2.- Monitoring and Warning

To improve through faster tsunami detection and more accurate tsunami threat assessment and impact forecast, Member States identified the requirement for denser real-time, multi-faceted sensor networks, and faster, integrated algorithms to quickly characterize the tsunami source (seismic and atypical sources) and compute tsunami inundation forecasts for their coasts. Sensors include singly or array-deployed high-quality seismometers and accelerometers, coastal sea level gauges and deep-ocean pressure systems (DART), dedicated seafloor observatories and **trans-basin undersea cables** (such as SMART), and **GNSS land and sea elevation buoys**. High-resolution coastal bathymetry and topography (DEM) contributions were identified (SEABED 2030, LIDAR).

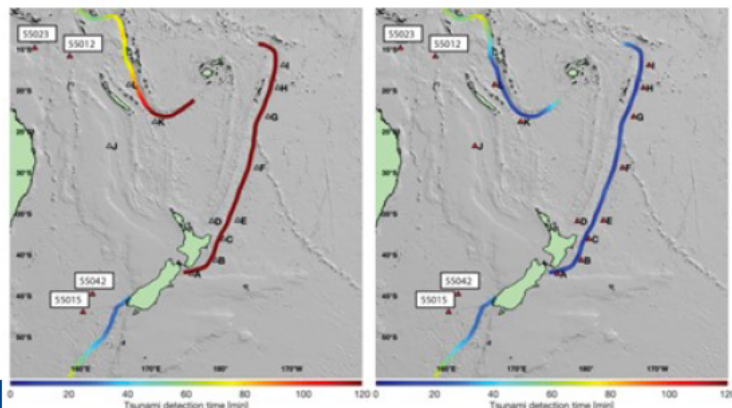
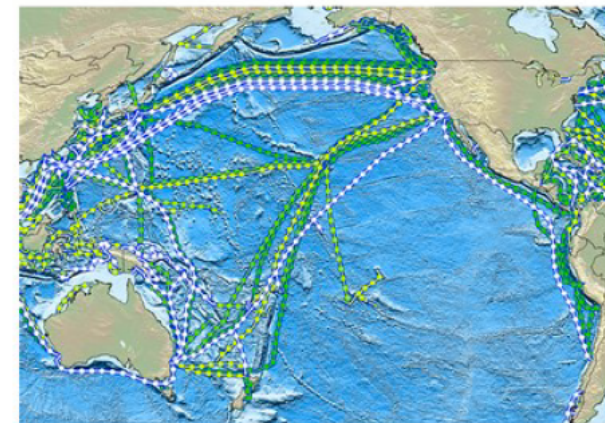


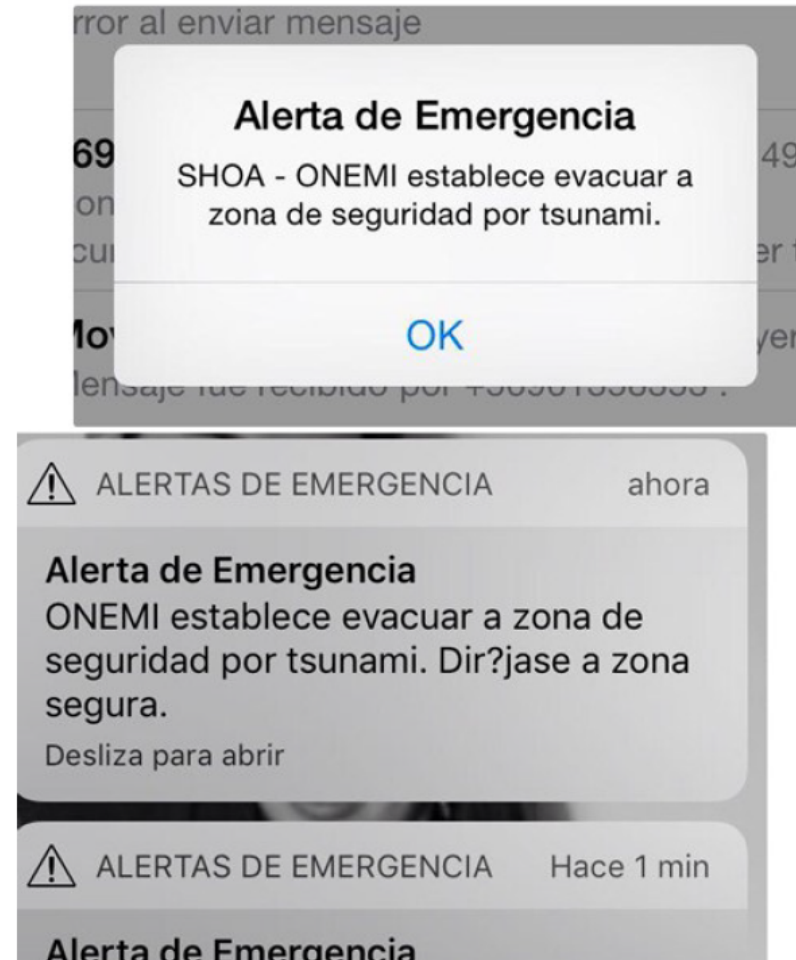
Fig. 1. Approximate locations of new (lettered) and existing (numbered) DART sites. Colored lines indicate faults associated with seismic activity; a tsunami generated along one of these faults will be detected by the DART buoy array in the time indicated by color. Detection times for the existing array (left) can be compared to detection times with the full array (right).



A World of Opportunity: Telecommunications cables criss-cross the oceans, passing through zones of oceanographic and seismic interest. SMART cables will allow scientific sensors to hitch a ride, reporting back data that can help us better understand and mitigate ocean risks like tsunamis and ocean warming.

3.-Warning Dissemination and Communication

A tsunami warning and evacuation advice is only effective when it reaches a person on the coast in time before a destructive wave hits. Both the dissemination (its timeliness and reliability) and the communication of the advice (what the message says) must be successful or lives may be unnecessarily lost. Member States identified the strengthening and enhancing of their **end-to-end warning chains**. Additionally, incorporating tsunami warning dissemination (which may be infrequent) into **Multi-Hazard** communication systems will help to ensure sustainability and readiness.



4. Response Capability

As disasters are foremost local, it will be coastal communities that suffer the brunt of impact from the next tsunamis. The UNESCO IOC Tsunami Ready programme motivates communities to take common-sense preparedness actions, that include hazard assessment, inundation and evacuation mapping, awareness and education and exercises. **Tsunami Ready was identified by most of Member States as a priority activity.** Novel initiatives like the **Blue-Line project** around New Zealand coastlines may also be disseminated in the context of Tsunami Ready. Last but not the least the **World Tsunami Awareness Day (WTAD)** was also mentioned by Member States as a mean of increasing awareness and preparedness.

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5. Capacity Dev. and Attention to SIDS and LDCs

Capacity Development to mitigate against tsunamis continues to be a critical need for SIDS and LDCs. Training has been organized and conducted by the IOC and regional organizations, but it has not been frequent-enough to meet their requests. The development of online, on-demand, and hybrid training, such as through the IOC Ocean Teacher Global Academy (**OTGA**), will help to significantly broaden the audience reach and availability of trainings globally.

Multi-sectoral tsunami exercises, complemented by education and awareness campaigns, have been embraced by Member States contributions as key preparedness activities that test warning and response procedures, alerting, and community evacuation responses. SIDS Member States identified the need for **Regular technical training** (i.e. SeisComP for seismic monitoring) and promotion of **Wave exercises**, National Drills and **WTAD**

OTGA for Tsunami Ready

1. **Tsunami Awareness (ITIC)** – general
2. **Tsunami Ready (BMKG/IOTIC)** – plan for 3 modules: TR for Decision Makers, TR for Community, TR for Facilitators
3. **Tsunami Early Warning Systems (TEWS, ITIC)** – more detail on different components of end-to-end tsunami warning and requirements
4. **TEMPP (ITIC, BMKG/IOTIC)**
 - DEM – background (training on how to make needed?), ITIC with NCEI
 - Tsunami Inundation Modeling – hybrid training ITIC with PMEL
 - Tsunami Evacuation Mapping – ITIC / BMKG
 - SOPs and Response Plans – ITIC / BMKG, incl TsuCAT tool for planning PTWS/CARIBE-EWS exercise injects
 - Exercises – ITIC / BMKG

The Oceania Regional Seismic Network (ORSNET) member states completed an 8-days online Basic SeisComP Training from 26th October to 4th November 2020 delivered by gempa GmbH. ORSNET member states were last trained on SeisComP3 by gempa GmbH in 2013. This gap in capacity development was recognized at the 28th Meeting of ICG/PTWS held in Nicaragua in April 2019 under the Working Group 2- Tsunami Detection, Warning and Dissemination through the Fifth Meeting of the Task Team Seismic Data Sharing in the Southwest Pacific and the Seventh Meeting of the Pacific Islands Countries and Territories Working Group on Tsunami Warning and Mitigation held on March 2019 in Noumea, New Caledonia.



UN Ocean Decade Tsunami Programme Scientific Committee – ToR

1. Develop a Draft 10-Year Research, Development and Implementation Plan for the Ocean Decade Tsunami Programme based on the concept paper *“Protecting Communities from the World's Most Dangerous Waves: A Framework for Action under the UN Decade of Ocean Science for Sustainable Development”*;
2. Identify and address gaps in global tsunami hazard assessment as follows:
 - a. comprehensive assessment to include all potential tsunamis, anywhere in the world, regardless of their source,
 - b. strategies to validate historical tsunami sources, through the application of paleotsunami techniques and historical seismology
3. Identify gaps in tsunami detection, measurement, forecasting, with a special emphasis on tsunamis generated close to populated coastlines;
4. Propose to enhance sensing and analysis strategies to enable the rapid characterization of tsunami sources through the combined use of land-based seismic and geodetic sensors, GNSS terminals, coastal sea level gauges, deep-ocean tsunameters, SMART repeaters on deep-ocean fiber-optic cables and satellite-based observations;

UN Ocean Decade Tsunami Programme Scientific Committee – ToR

5. Propose a roadmap for collaboration with the ITU/WMO/IOC SMART Joint Task Force cable initiative to fully explore the feasibility of widespread deployment of scientific instrumentation on deep-ocean fiber-optic cables to improve capability to rapidly detect and characterize tsunami sources as well as propagating tsunami wave fields;
6. Consider and propose strategies, programmes and content to enhance societal resilience for tsunami and other ocean hazards;
 - a. build the framework needed to ensure the training and development of the next generation of technical-scientific expertise,
 - b. identify strategies that allow to characterize structural and social vulnerability in tsunami hazard zones
7. Overview the consolidation of inputs received to IOC [Circular Letter 2825](#) on Inventory of actions being considered under the United Nations Decade of Ocean Science for Sustainable Development (2021–2030) in the field of Tsunamis and Other Sea-Level Related Hazards warning and mitigation;
8. Submit a Draft 10-Year Research, Development and Implementation Plan for endorsement by the TOWS-WG at its 15th meeting.

1. Wave exercises

ICGs reported on Wave exercise in 2020, and the TTDMP:

- **Noted** that due to the COVID-19 pandemic the planned WAVE exercises workshop has not yet convened, and that CARIBEWAVE, PACWAVE, IOWAVE, and NEAMWAVE exercises did take place in 2020; and *planning for future exercise to adjust with Covid19 pandemic situation*;
- **Requests** the Secretariat to organize a virtual meeting on WAVE exercises to coordinate so as to minimize date conflicts and share best practices for exercise evaluation and the use of online tools, and
- **Agreed** to share outcomes, lessons learned of regional exercises with relevant ICG Working Groups.

2. Performance Indicators

The Task Team discussed KPIs across the ICGs and noted that work has stalled with regards to the consolidation of KPIs across ICGs. Also noting that the theme of the World Tsunami Awareness Day 2021 will link with the target F of the Sendai Framework for DRR 2015-2030 on International Cooperation by developing countries;

- **Recommends** that the CARIBE-EWS, IOTWMS, and NEAMTWS strongly consider including International Cooperation in their KPIs,
- **Requests** that the Task Team on KPIs complete work on a harmonized performance monitoring framework including data collection tools/questionnaire and reporting formats for presentation to the next TOWS meeting, and
- **Requests** the Secretariat to arrange a virtual meeting of the Task Team on KPIs in the near future to discuss a work plan.

3. Local source tsunami SOPs

TTDMP noted:

- The importance of the SOP for local source tsunamis, especially in regards to building preparedness through *natural warning signs*, as well as taking into consideration *atypical tsunamis*. The local source tsunami SOP would also be a good reference for UNESCO-IOC Tsunami Ready.
- The IOC Tsunami Glossary is being updated to include new information on volcanic and landslides sources.
- ICGs / Working Groups are encouraged to further advance the discussion on local source tsunami SOPs

4. NTWC Competency Framework

The TTDMP **noted**:

- The ITIC report on the NTWC Competency Framework to the TT-TWO regarding progressing on finalizing the PTWS Framework, and piloting training according to the Framework in Tonga in 2019,
- That ITIC and the Indonesia BMKG have been designated as **Ocean Teacher Global Academy Specialized Training Centres (OTGA STC)** in 2020
- The confirmation by ITIC that it will take the lead to develop such training under the OTGA, in collaboration with the IOC, TICs, practitioner experts, and Indonesia BMKG, and

Requested the ITIC to report to the TT on the progress at the next TOWS meeting.

5. Tsunami Evacuation Mapping

The TTDMP:

- **Noted** with appreciation the development of community evacuation exercise guidance by the CARIBE-EWS through a draft *IOC MG 86*, and
- **Noted** that community exercises are an Tsunami Ready indicator,
- Encouraged the CARIBE-EWS to finalize and published IOC MG 86, and
- Agreed that the TOWS TT-DMP consider IOC MG 86 for global applicability

6. Structural Design Guidance

The TTDMP:

- **Noted** with appreciation the completion by ITIC of the compilation of international structural design guidance for buildings used as evacuation shelters, and its sharing through the ITIC web site, per the request of the PTWS and TOWS TT-DMP

7. Schools Programmes

The TTDMP:

- **Noted** with appreciation the completion by IOTIC of the compilation of school DRR and preparedness materials, and
- **Recommended** its inclusion as a resource by Member States, and especially as part of Tsunami Ready pilots that include schools.

8. WTAD 2021 and WTAD 2022

The TTDMP:

- **Noted** with appreciation the UNDRR IOC 2020 campaign consisting of high-level events, regional webinars, social media visuals, videos, and eyewitness accounts, and the creation of 15 videos highlighting countries joining the global Tsunami Ready community, and
- **Noted** that the 2021 WTAD highlighted Target 6 on *International Cooperation in developing countries as complement to their national actions*, and
- **Recommends** the continued strong collaboration between the IOC and UNDRR for the 2021 WTAD, highlighting the UN Decade for Ocean Science for Sustainable Development Tsunami Program transformative goals for 100% Global Tsunami Ready for communities at risk of tsunami and deployment of SMART undersea cables for disaster warning.

9. Tsunami Glossary

The TTDMP:

- **Noted** the ITIC report on Tsunami Glossary to the TT-TWO regarding the 3-year update cycle, Member State requests to date, and the planned IUGG Tsunami Commission Working Group on Terminology input, and
- **Recommended** that the ITIC compiles proposed updates for vetting by the TT-TWO and TT-DMP and approval at the next TOWS meeting in 2022.

10. Tsunami Guidance for Maritime and Ports

The TTDMP appreciated the completion by ITIC of the compilation of international guidance for maritime and ports, and its sharing through the ITIC web site per request of the PTWS and TOWS TT-DMP,

- **Noted** the pending TOWS WG request to Japan to assist in the translation of Japan best practices,
- **Requests** the IOC to report on the progress at the next TOWS TT-DMP, and
- **Agreed** that the TT-DMP considers the development of guidelines at its next meeting.

11. Training

- ITIC and IOTIC presented the plan and progress of the training activities and programme under the Ocean Teacher Global Academy.
- ITIC and BMKG Indonesia have received the status of Specialized Training Centre for Tsunamis.
- Under the coordination of the Tsunami Unit in UNESCO IOC and in collaboration with the Tsunami Information Centres (CTIC, ITIC, IOTIC, NEAMTIC) 7 planned courses will be developed until 2023.
- The training programmes consist of Tsunami Awareness, Tsunami Ready, Tsunami Early Warning Systems, Tsunami Warning and Emergency Response SOPs, TEMPP, and Tsunami Warning Centre Competencies. These training courses will be developed based on the related IOC Manual Guides and training that have been implemented by the TICs. Some courses have been developed with hybrid delivery in mind.

12. Tsunami Ready Pilot Programme

The Task Team:

- **Noted** the significant progress achieved by NEAMTIC/NEAMTWS, CTIC, IOTIC, PTWS in **piloting Tsunami Ready in each basin**. There is a strong link observed between TR and WTAD efforts.
- ITIC proposed **to add definitions for the next update of Tsunami Glossary (expected in 2022) on:**
 - Ready Community (UTsunami Ready)
 - Tsunami Ready Programme (UNESCO IOC)
 - Tsunami NESCO IOC)

13. Tsunami Ready Pilot Programme - Recommendation

The TTDMP:

- **Appreciates** the growing interest and excellent progress by MS in all ICGs in piloting UNESCO IOC Tsunami Ready,
- **Notes** the challenges of upscaling required to achieve 100% Tsunami Ready in highly vulnerable communities as one of the transformative goals of the UN Decade for Ocean Science for Sustainable Development Tsunami Programme,
- **Notes** the progress by Indonesia in their application for **ISO certification of a Community Based Early Warning System**,
- **Appreciates** the continued support from USAID/OFDA and DIPECHO and Member States to provide funding support to Tsunami Ready pilots and invites contributions from other agencies,
- **Recommends** the urgent **completion of the IOC TS 74 Tsunami Ready Guidelines for widespread distribution to Member States**, and
- **Recommends** the IOC to finalize and provide guidance for a Tsunami Ready logo.

14. UN Ocean Decade

The TT:

- **Noted** the significant advancements in the implementation of Tsunami Ready with pilots in all regions, and that that the proposed goal of *100% of communities at risk of tsunamis being Tsunami Ready by 2030* is an audacious and transformative goal in line with the vision of the UN Decade of Ocean Science for Sustainable Development.

Some of the challenges that will need to be addressed include:

- defining the number of target tsunami ready communities
- human resources for administration and facilitation
- acquiring data related to coastal bathymetry and topography and tsunami sources for inundation modeling and mapping
- implementation at regional, national local levels
- guidelines and tools/training for each of the indicators
- inclusion of countries that have their own 'tsunami ready' programmes
- need for local/national TR champions and funding.

14. UN Ocean Decade

- Opportunities to accelerate the implementation of the program include virtual/blended training like **OTGA, regional modeling and training hubs** with a special focus on universities and optimization of the regional and national exercises for community exercises.
- Other opportunities noted were the **synergies with the Sendai Framework (local and national disaster risk reduction strategies) and WMO efforts in Multi Hazard efforts**. It was noted that it will be critical to establish alliances with other stakeholders such as WMO and those working in community-based disaster risk reduction like Red Crescent and Red Cross. This also includes partnering with NGOs, establishing community champions, creating regional and national bathymetry grids, and online/blended training.

14. UN Ocean Decade - Recommendation

The TTDMP:

- **Considering** the high numbers of population living along the coastlines that are at risk of tsunamis, the strong interest from Member States across all ICGs in implementing Tsunami Ready, and the opportunity for transformational and bold actions as part of the UN Decade of Ocean Science for Sustainable Development (2021-2030),
- **Recommends** that the TOWS WG proposes a Comprehensive Tsunami Programme under the UN Decade dedicated to achieving the societal outcome of A Safe Ocean with the aim of making *100% of communities at risk of tsunami prepared for and resilient to tsunamis by 2030* through the implementation of the UNESCO/IOC Tsunami Ready Programme and other initiatives.
- **Further recommends** that this Comprehensive Decade Tsunami Programme should focus on inclusiveness and delivery through:
 - The adoption and continued implementation of the UNESCO IOC Tsunami Ready Guidelines and Indicators as the international standard for evidence-based community preparedness for tsunamis.

14. UN Ocean Decade – Recommendation (cont'd)

- Enhanced access and capacity development for **high-resolution near shore bathymetry and topography data and tsunami source identification** for accurate and improved inundation modelling and evacuation mapping and planning in support of Tsunami Ready communities.
- Enhanced integration to minimize tsunami disaster impacts and **to enable rapid restoration of socio-economic activities and critical infrastructure services** post tsunami impacts.
- The establishment of a **Tsunami Ready Coalition** of stakeholders charged with delivering a strategic plan for consideration at TOWS WG XV to facilitate the implementation of the Comprehensive Decade Tsunami Programme through the UNESCO/IOC Tsunami Ready Programme and other initiatives.

Thank you ...