INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION (of UNESCO)
Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS)

Steering Committee Meeting

16-20 September 2024

Report

1) Welcome and Opening

The Chair opened the session and appreciated the ITIC for hosting and providing the venue and added that the Next ICG/PTWS session will be held in 2025, in Beijing, China.

2) Adoption of Agenda

The Chair opened the floor for any comments on the agenda. Dr Kong requested to extend the allocated time on Agenda 9: UNESCAP Capacity Assessment Project. The Chair confirmed that Agenda 9 discusses 40 minutes, and the agenda 10: ICG/PTWS-XXXI Session allocates for 10 minutes.

ICG/PTWS Steering Committee approved the agenda with the proposed updates.

3) Review of Action Items from the ICG/PTWS-XXX session

The Chair presented on overview of the ICG/PTWS Action Items. He informed the participants that the next ICG/PTWS meeting (ICG/PTWS-XXXII) will be held in China. Additionally, the Chair recalled the rejection of the expansion of the PTWS Earthquake Zone by the 57th Session of the IOC Executive Council and highlighted some changes to PTWC text products and preparation for the NAVAREA coordinators as well as the full functional operations of CATAC in the next year. Concerning the delayed process, the Chair encouraged colleagues to achieve progress in the Ocean Decade For upcoming actions, the Chair mentioned the engagement with Argentina regarding Argentinian Search and Rescue (SAR) and NAVERA VI coordination responsibilities and an endorsement letter to UNESCAP regarding PTWS involvement in Phase II of the IOC/UNESCAP Tsunami Capacity Assessment Project based on the consensus.

ICG/PTWS Steering Committee noted the status of the ICG/PTWS Actions.

4) Chair's Report on the TOWS-WG XVII session and the IOC EC-57

The Chair informed the SC on the past meetings he has attended as the Chair of the ICG/PTWS since September 2023, starting with the TOWS-WG 17th Session (19-23 February 2024, Sendai Japan). He recalled the TOWS-WG recommendations regarding sea-level observations. In this regard, TSPs should routinely monitor as frequently as possible the status of sea level and seismic observing networks and the quality of the data and transition to real-time data. Concerning the Tsunami Ready Recognition Programme (TRRP), the Chair highlighted that the Group recommended to ICGs that ICG/PTWS Task Team Tsunami Ready needs to share the ICG/PTWS guidance on Tsunami Ready Equivalency for further consideration by TOWS TT-DMP.

TSP Messages for the Maritime Community, the Chair stated that TSPs identified for each ICG to trial dissemination of maritime bulletins to respective NAVAREA operators in their Area of Service (AoS) in the second half of 2024 for full operational implementation in 2025. Based on this, the trial transmission of a dummy message to the NAVAREA coordinators will take place during PacWave24.

At the 57th Session of the IOC EC (25 June to 28 June 2024), the Chair presented the PTWS activities, specifically focusing on the significant earthquakes from January 2022 to May 2024, Hunga Tonga Hunga Ha'apai Event, expansion of the ICG/PTWS Earthquake Source Zone, TSP Messages for the Maritime Community, Start of Operation of Central America Tsunami Advisory Center (CATACT), Minimum competency levels for National Tsunami Warning Centre (NTWC) operations staff, IOC/UNESCO TRRP, and Exercise Pacific Wave 22 and Exercise Pacific Wave 24. The Chair stated the content related to the approval of the PTWS NTWC and the report regarding the NTWC Operational staff was added to the IOC Decision EC-57/3.2.1.

The Chair summarized the delay in the official full operational start of the CATAC, explaining that it will commence in 2025 with the recognition of the IOC Governing Body. Concerning the expansion of the ICG/PTWS Earthquake Source Zone, the Chair recalled the disagreement from Argentina. Additionally, he mentioned that the related paragraph to the recommendation ICG/PTWS-XXX.3 was deleted, and relevant notes were added.

Lastly, the Chair raised the below WMO draft of the 'Meteotsunami' definition during the Joint WMO IOC Collaborative Board from 4 to 6 September 2024 and hoped to discuss with TOWS WG and TT for the tsunami community, taken into consideration the following aspects:

- A meteorological tsunami ("meteotsunami") is a technical term sometimes used to refer to long waves generated by weather disturbances.
- These long waves can be produced by pressure jumps associated with frontal passages, squalls, cyclones, or other meteorological sources.
- These unusual events have the same temporal and spatial scales as tsunami waves and can cause coastal inundation similar to seiches or storm surges, especially in bays and inlets with strong amplification and well-defined resonant properties.
- In issuing alerts for these long waves, meteorological services focus on their coastal impacts and in general do not use the term "meteotsunami" to avoid confusion with tsunami events generated by disturbances such as undersea earthquakes, volcanic eruptions, or landslides, which occasionally lead to devastation.
- These weather-driven long wave events are sometimes referred to as *rissaga*, *abiki*, *marrobbio* based on regional language.

Dr Kong expressed concerns that the draft from the WMO lacks a scientific basis and questioned who had made the preliminary decisions regarding its content. The Secretariat emphasized the importance of addressing the concerns raised rather than altering the terminology, as the draft was developed by the scientific community. In response, the Secretariat advised against adopting a purely scientific approach to the draft and highlighted the flexibility for the WMO to propose alternative terminology tailored to their operational requirements. The Chair underscored the importance of achieving a shared understanding and consistency in terminology between UNESCO-IOC and the WMO. Dr Titov sought clarification on the functional application of the WMO's proposed definition, questioning how the definition is intended to operate within WMO processes. He expressed concerns that smaller tsunamis might not be recognized as such based on the draft, despite still meeting the criteria of a tsunami. Dr Fry recommended that the draft explicitly describes specific phenomena to avoid ambiguity. Additionally, he noted the scientific accuracy demonstrated by the meteotsunami community in classifying volcanic eruptions and suggested including a summary of relevant phenomena in the draft to support clarity. Dr Kong raised the concern about the approval process for modifying glossary definitions, suggesting that the issue be addressed through the PTWS. The Chair explained the process shortly, including having a meeting with the dedicated Task Team for consensus and discussing with JCB. In addition, he highlighted that the

draft is not finalized and remains open to modification based on expert input. Lastly, the Chair suggested addressing these differences in terminology during the next TOWS-WG meeting, with the goal of aligning the UNESCO-IOC glossary with broader discussions. The Secretariat emphasized the importance of addressing various aspects of the definition, including language nuances and associated phenomena. Additionally, the Secretariat raised a critical question regarding whether the opportunity exists to identify and clarify these factors under the draft, ensuring the definition provides sufficient guidance for observing tsunamis and avoiding potential confusion. The Chair expressed his hope to discuss this in the next TOWS-WG meeting with proposals and recommendations related to the meteotsunami definition. Dr Chacon-Barrantes mentioned that WMO does not have confidence about whether this definition is applicable or if they should issue alarming for them. In addition, she raised the question if they should issue the alerts for this wave and expressed her concern regarding the expression 'These weather-driven' because not all tsunamis are weather-driven, for example: the HTHH event. She believed that this point needs to be clarified in the next step. Additionally, she suggested using alternative terminology such as atmospheric tsunami, not meteotsunami.

The Secretariat commented on two points: 1) Warning components: The source phenomena are observers that are monitored in special domains by meteorological agencies. Some countries have capabilities directly or indirectly report/inform the NTWCs regarding sources of scale, strong disturbance, and atmospheric phenomena while some have not. Observers are not the phenomena highlighting the discussion is not for giving the warning. However, he also mentioned that there is room for a dedicated discussion. 2) the HTHH event is not a meteotsunami and it is an explosion-generated atmospheric pressure wave and ocean surface disturbances. Dr. Titov expressed a differing opinion, asserting that the HTHH event could be considered a meteotsunami. However, he criticized the existing definition of meteotsunamis, pointing out that it lacks clarity and consistency. Specifically, he raised concerns about the use of the term "small" to describe meteotsunamis, which he deemed both inaccurate and misleading, given the wide variability in tsunami sizes and impacts. Dr Kong proposed expanding the glossary to include terms related to alerts, recognizing the challenges of achieving global consensus on such terms but emphasizing their necessity for harmonized communication across member states.

The Chair explained that TOWS-WG established the two ad-hoc teams for the TGV and meteotsunamis and the Report of the meteotsunami will be published in November. The Secretariat reported that while the initial request from the WMO is to modify the term meteo-tsunami, driven by the initial public reaction in response to the HTHH 2022 event, but the JCB provides a productive forum to engage with WMO to have a better understanding on the whole phenomena and operational aspects. Dr Kong raised an acceptable approach to proceed with the draft without a glossary and then decide what glossary needs to be added and published in 2027. The Chair explained that TOWS-WG has the responsibility of editing the glossary.

ICG/PTWS Steering noted the report of the Chair.

5) Report of Tsunami Service Providers

5.1 PTWC Report

Dr Charles McCreery, Director of the Pacific Tsunami Warning Center (PTWC), presented a report on the status and activities of PTWC as a TSP for the PTWS. He noted that several formerly vacant positions at PTWC are now filled for the first time in many years and that having a full staff is helpful for all aspects of PTWC's mission. He provided maps illustrating the current status of the seismic and sea level data streams that support PTWC operations. Although a certain percent of the stations is unavailable at any given time, there is generally enough redundancy to prevent any significant degradation in PTWC performance.

Dr McCreery reviewed PTWC message products issued for the PTWS since the last report at the ICG/PTWS-XXX Meeting in September of 2023. There were 37 Tsunami Information Statements issued for large earthquakes that did not present a tsunami threat, and 6 sequences of Tsunami Threat Messages for earthquakes with a potential or confirmed tsunami threat. The most significant of these was the January 1, 2024, magnitude 7.6 earthquake and subsequent tsunami that occurred near the Noto Peninsula along the west coast of Honshu, Japan. More that 300 people in Japan were killed by the earthquake and at least two persons were killed by tsunami waves that were up to several meters high in some nearby coastal locations.

Dr McCreery next presented a series of figures to illustrate the PTWC performance as it compares to the some of the Key Performance Indicators (KPIs) for Tsunami Service Providers given in the IOC's Tsunami Watch Operations Global Services Definition Document (IOC Technical Series 130). These included the elapsed time from the earthquake to the first TSP message, the accuracy of the earthquake epicenter in the first message, the accuracy of the earthquake depth in the first message, and the accuracy of the earthquake Moment Magnitude (Mw) in the first message. The plots covered the six-year interval from 2019 to 2025, and USGS earthquake parameters were used for reference values. In most cases, the KPIs are being met by PTWC. He also showed a plot of the CMT Mw used by PTWC as the basis for RIFT model forecasts usually issued in its second Tsunami Threat Message. These Mw values are much more accurate than those issued in initial messages, and they help to validate the basis of the forecast.

Dr McCreery noted the activities of PTWC and the US National Tsunami Warning Center towards a more common management structure, analysis tools, and message creation and dissemination that will facilitate efficiencies in their operation, long-term sustainability, and more seamless backup capabilities when either Center becomes disabled by some event. These efforts are now underway and will take several more years to be fully realized. The U.S. tsunami website, tsunami.gov, is also undergoing a redesign to be easier to use and have more information.

Lastly, Dr McCreery announced that PTWC will soon be resuming its unannounced communication tests – this time using a SurveyMonkey form to collect feedback. These tests were paused several years ago due to poor response and difficulty in compiling results that came back in various forms with incomplete information. But unannounced tests that may happen at night or on weekend are just like the unannounced earthquakes that can cause tsunamis and also require a quick response. These are a more effective test of the readiness of our system to respond quickly.

Several other PTWC activities were not included in this presentation but were covered in other agenda items of this meeting.

ICG/PTWS Steering noted the report of the PTWC.

5.2 NWPTAC Report

Dr Takeshi Sato reported that NWPTAC has issued bulletins for 22 events that have an earthquake of magnitude 6.5 or more in the area of the service of the northwestern Pacific Region since the last PTWS meeting in September 2023. Additionally, NWPTAC issued a lot of NWPTA between September 2023 and August 2024, there has been no event of the issued 'Possibility of a destructive ocean-wide tsunami'.

Concerning the communication test, Dr Sato indicated that NWPTAC conducted the communication tests twice in December 2023 and May 2024. However, some countries have not responded to communication tests recently. He added telefax failure that fails to disseminate the warning and burdens the TSP with the retransmission process. Therefore, NWPTAC waited for the confirmation of the fax receiving system or notification of the end of the reception by the next test.

Dr Sato illustrated that the NWPTAC User's Guide is edited based on the proposed common Table of Contents and is currently being reviewed by the Japan Meteorological Agency (JMA).

ICG/PTWS Steering noted the report of the NWPTAC.

5.3 SCSTAC Report

Mr Zhiguo Xu reported that SCSTAC has been in full operation since November 5th, 2019, with nine member states of the SCS region, including Brunei, Cambodia, China, Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam. He added that SCSTAC issued the tsunami information and the tsunami threat message depending on the bulletin type and it issued for 11 events between September 2023 and September 2024. Among 11 events, an earthquake (M7.3) occurred in Hualien waters in Taiwan and generated a tsunami with a maximum wave height of up to 1m.

Mr Xu reported that the average elapsed time, one of the key performance indicators, is within 9.9 minutes. In addition, the location deviation is ± 0.1 °, magnitude ±0.29, and the depth deviation is ±22 kilometers as the KPI. He also informed that the Backup South China Sea Tsunami Advisory Center (BSCSTAC) was established in Hong Kong and the switchover procedure laid down at ICG/PTWS-WG-SCS-X was followed in the context of the operation of SCSTAC, as well as 4 communication tests since September 2023.

Concerning the Tsunami Warning Capacity Enhancement, Mr Xu raised the Smart Tsunami Information Processing System (STIPS) is a tsunami early warning and decision-making products release system, developed by SCSTAC's staff using Python language, and it has been put into full operation at the end of 2022 and the Global Earthquake Automatic Detecting and Location System under the automatic location and magnitude calculation module. Lastly, he added the GTS sea level data decoding and processing module that effectively expands the channels for acquiring sea level data and enhances the automatic capability of tsunami monitoring.

Mr Xu informed the SC on the regional training and workshops, including the ICG/PTWS Regional WG on Tsunami Warning and Mitigation System in the South China Sea Region in Guangzhou, the International Training Course on Numerical Tsunami models for the South China Sea Region, and Management and Operation seminar on seismic station for tsunami warning services.

For further plans, he addressed a stable operation of the SCS Tsunami Warning and Mitigation System, Continuation of the SCSTAC Communication Test and tsunami warning drill, as well as opportunities for in-person education, outreach, and training activities in the region. Mr Xu also added an online training workshop on Tsunami Warning Technology and Platform in the SCS region hosted by China, the 12th meeting of the ICG/PTWS SCS-WG and the second tsunami global symposium, and preparation for next year's ICG/PTWS meeting.

The Chair raised a question about the regular BSCSTAC switchover procedure in Hong Kong. Mr Xu answered that the activity is scheduled for the end of the year, and they announced to the Member State about the operation via emails.

ICG/PTWS Steering noted the report of the SCSTAC.

5.4 CATAC Report

Dr Strauch informed the SC that out of the 7,400 seismic events located by CATAC, only 73 events were above M5.0 for which CATAC reported information statements to the Central American institutions, and there were no events above m 6.5 resulting in the dissemination of a tsunami

message. Dr Strauch addressed the technical process, including 3 new workstations with GPU RTX 4090 to help conduct more tests and research as well as SeisComP 5 and 6 in progress.

Dr Strauch further report on the progress in the earthquake Early Warning System established in Nicaragua, through which alerts are disseminated the message to the public and government. However, he highlighted that there are still additional actions required to improve the messaging system. Additionally, he recalled the request to include the earthquake early warning in the CATAC with threat messages in the last ICG meeting and mentioned that the CATAC is working on that. Dr Strauch reported that through a new project, CATAC has improved its monitoring network and succeed in the repairment of 3 sea gauges.

Dr Strauch addressed a cooperation with Central American Institutions regarding a 'One week course with uses of civil protection institutions in CA, on SOPs' and the CATAC will have a WG-CA meeting on the 10th of May 2024. He raised the problem of the delay of CATAC email messages during the Caribe Wave 2024, which were related to INETER's mail service. Lastly, he mentioned the new Center for Early Warning of Earthquakes and Tsunamis in Nicaragua, which consists of around 30 staff, mainly from the Seismology section of INETER.

The Secretariat raised a question on the status of the user's guide. Mr Strauch answered that the CATAC still has a legal problem in terms of the decision of the Nicaraguan Presidency and ensured that they will have the user's guide in the next ICG/PTWS in Beijing.

ICG/PTWS Steering Committee noted that CATAC will present its User's Guide at ICG/PTWS-XXXI.

6) Report of ITIC

Dr Kong reported on ITIC's assistance in establishing and strengthening national and regional systems such as capacity building and training, IOC Wave Exercises, and the UN Decade for Ocean Science for Sustainable Development. ITIC collects, compiles, and shares the information resources for the historical tsunami by using databases, global and regional hazards, and post-event surveys.

For Tsunami Warning Decision Support Tools, Dr Kong highlighted the Tsu Coastal Assessment Tool (TsuCAT v4.4, Aug 2024) and illustrated that TsuCAT developed the scenario by using provided PTWC messages from multiple countries, customized community exercise injects and calculated the near-real time USGS earthquake.

Dr Kong reported on the status of the TRRP implementation in the Pacific region, including the Federated States of Micronesia, Marshall Islands, and Palau, as an ongoing project with the completion in Chuuk state and Pohnpei state. Additionally, ITIC supported Vanuatu and Solomon Islands by conducting a kick-off meeting, and Samoa and Kiribati are planning to achieve TR status. Lastly, she raised the recent recognition in Fiji (Naveuvu and Sila) and the Federated States of Micronesia (Chuuk state and Pohnpei state).

Dr Kong reported on the Ocean Teacher Global Academy (OTGA) TRRP course that was launched in June 2024, and the users are available to obtain the certificate if they reach a certain percentage during the course. Lastly, she added that the ITIC conducted the ITP-TEWS Chile supported by SHOA on 19-30 August 2024 with 32 participants from 18 countries.

Dr Kong recalled the approved framework and training requirement in the ICG/PTWS-XXX and added that ITIC conducted the development of training courses (online, hybrid, in-person) with USAID funding. She explained that the ITIC collected data from the trainee document as well as learning from New Zealand and Australia for competency seismology and tsunami. Concerning the Pilot 1 small cohort Q1 will be in 2026. She added that the ITIC has supported interns from the IOC

Ocean Training Interns (Tonga and Indonesia) and the University of Tokyo Ocean Alliance Intern. Lastly, she recalled the request from the Pacific Islands to devise a national 'assessment' and 'certification' process.

Concerning the ITIC Awareness materials, **Dr Kong** mentioned that the Tsunami Glossary 2019 was updated in 2024, and the Tsunami Safety Flyer (Braille) led by Christa (ITIC-CAR) was conducted in 2024. Additionally, ITIC-NCEI Hazard Posters were updated to 2023. Lastly, she highlighted that the 2004 Historical Tsunami Effects that the ITIC is working on will be available at the Nov 2024 2nd Global Tsunami Symposium.

Dr Kong addressed the role of the ITIC in supporting the UNESCO-IOC Tsunami Resilience Section and PTWS. As the ITIC Director, Dr Kong explained herself as Tsunami Ready – TR Coalition Chair (TRC) and the UN Ocean Decade Scientific Community as a member TRC Chair, including IOTWMS and Decade Conference in Barcelona, IOTWMS and PTWS Tsunami Preparedness Capacity Assessment Workshop, Bangkokian Group of Expert for Capacity Development as member representing tsunami, IO OTGA, and co-chair in the SMART Cable. Lastly, she added that she was nominated for the Japan Hamaguchi Award in Nov 2023.

Concerning the website, Dr Kong mentioned that all tsunami sites moved to the UNESCO Server from IODE, and the ITIC is currently transitioning to the UNESCO website. She explained that ITIC is responsible for general information and that PTWS activities will be supported by the Technical Secretary. She added that the ITIC hosted the PTWS, CARIBE TWFP-NTWC, and TNC backup-2 email list servers.

In terms of the UNESCO-IOC Tsunami Ready, Dr Kong mentioned that the website changed and the enable link: Tsunami Ready. The migration process is ongoing and checked the possible way to populate all information on the new webpage. She highlighted that if any information is needed during the migration process, the ITIC will provide it separately.

Dr Necmioğlu expressed his gratitude for support from the ITIC regarding the webpage migration process. Additionally, he commented on the delicate OceanExpert document list for the PacWave 24 and the TSR hired a dedicated human resource to manage and populate the new website in time. Lastly, he added that the UNESCO-IOC TSR will contribute to the migration process to ensure that the necessary information is on the new website.

Mr Shingo conveyed a congrats message to Kong regarding the Japan Hamaguchi Award which is an international award for individuals and/or organizations that have made significant scientific or pragmatic contributions related to the coastal resilience against tsunamis and other coastal disasters.

Dr Moore expressed his gratitude for creating the TsuCAT and that the training was successful and delivered his gratitude to the UNSCO-IOC and ITIC. Mr Sifon also commented that this training was impressive in terms of the multicultural and multi-regional features with the participation of regional people from different sectors.

ICG/PTWS Steering Committee noted the report of ITIC.

7) Report of WGs

7.1 Working Group 1 – Understanding Tsunami Risk

Dr Moore introduced the Terms of Reference by highlighting the Hazard assessment and coastal inundation models and products, including the risk assessment that will be mostly covered throughout this report.

Dr Moore recalled the request from the ICG-XXX regarding the Probabilistic Tsunami Hazard Assessment (PTHA) and ensured that the WG1 will continue to work on supporting PTHA studies. He added that related discussions took place during the Expert Meeting in Vanuatu in May 2024. The deadline for the report delivery is set as 2024/12. Currently, input from experts on landslides sources and Tsunamis Generated by Volcanoes (TGV) is expected. Mmax(min) and Mmax(max) values per earthquake source segment are updated. WG1 requested PTHA to be considered in the agenda of the ICG/PTWS XXXI.

Dr Moore commented on the Tiered Hazard Assessments / Models (PTHA/M) and while inundation mapping should not rely on stochastic assessment, he also noted the need for ideas related cheaper engineering solutions. Related recommendations include i) gathering info on model resolution, isobath depth, tools available, ii) cataloguing the sources used in each: Circum-Pacific Source Model, and iii) organization of a possible Tsunami Source workshop to include PTHA.

TsuCAT v 4.4 was released and used in TRRP for the Pacific (Fiji, Pohnpei, Majuro, Palau) and the Caribbean (Antigua & Barbuda) for the TRRP. Real-time event notification is now also included in TsuCAT v 4.4. PTHA/M could provide tools to allow easy comparison of impact of a source on a given coastline to aid in choosing a return period/probability, and also open-ocean/deep-water wave amplitudes offshore. Hence, it would allow for varying needs from member states, without the need for high resolution DEM or hydrodynamic modeling support

Dr Moore noted the lack of social scientists involved with the work of WG1 and pointed out the need to focus on vulnerability assessment. He also emphasized the need to connect better with the WG2 towards impact-based forecast. Lastly, Dr Moore introduced a new idea for assessing risk basin-wide by using the coastal population raised by Dr Fry and this idea discovered that some earthquake sources for which at least 20 minutes of pre-impact warning could not be given, and these are near-field sources with travel times less than 45 minutes. Lastly, he proposed a Joint ICG/PTWS & ICG/CARIBE-EWS Experts Meeting for the Scotia Arc and South Sandwich Islands.

The Secretariat expressed its gratitude for the hard work to Dr Moore in relation to the conduct and reporting of the Vanuatu Expert Meeting in 2024/05.

ICG/PTWS Steering Committee noted the report of WG1.

7.2 Working Group 2 – Tsunami Detection, Warning and Dissemination

Dr Fry explained the developments of Task Team Tsunami Generated Volcanoes (TT-TGV), including the confirmation of membership and Co-chairs as Matías Sifon and Geoff Kilgour and the need for a catalog of volcanoes that pose a tsunami threat for PTWS service areas. Concerning the upcoming tasks, he addressed the hazard development based on maximum credible earthquake (MCE), forecasting, and development links with IAVCEI-WOVO and WMO-VAAC, the establishment of Point of Contact for Volcanic Alert Levels, interactions with TT Tsunami Forecasting from Ocean Observations (TT-FOO) regarding both pragmatic short-term source dependent and long-term source agnostic, and discussion with WG 1 & WG 3 about the availability of providing information to support the development of hazard and risk assessment or response plans.

Dr Fry raised an example from New Zealand as the TT-TGV interim response products in the Member State Pilot to address the damage from the TGV by using source models and generating tsunami models to create the database and mentioned the current discussion about which information needs to be provided to evacuate the community in terms of a national emergency.

Concerning TT-ISN 1 (Ms Moseley and Dr Melbourne), Dr Fry summarized the two groups: In-Use technologies and In-Use candidate technologies. He explained that In-Use technologies include OBP, Seismic, GNSS Static displacement, tide gauges, and inclusive HF coastal radar, and in-use

candidates for near real-time operational measurements are the SMART Cables, MERMAID, and Satellite altimetry. In terms of the Technology Readiness Level (TRL) level, these are in TRL 7-9, which means 'System test, launch, and operations.' Lastly, he explained that novel technologies include Optical Fibre Interferometry, Optical Fibre DAS, and GNSS TEC, which are in TRL Level 3-4 or 5-6, and more research is needed to use data in operations.

Dr Fry addressed some concerns regarding the TT-ISN 3 by mentioning the availability of data sharing. He also raised the GeTEWS Oceania, an effort to increase GNSS infrastructure for DRR In Southwest Pacific, and planning of a regional meeting in November 2025, and the need to establish contact with GOOS and GGOS to raise awareness about the needs of PTWS and promote top-down advocacy for data to be made available for tsunami DRR.

Dr Fry described the TT-ISN 2 working on the OSN assessment to deliver the ODTP implementation plan target warning times completed by raising a map prepared by Mr Moore to detect tsunamis within 10 minutes for known sources and 16 minutes for unknown sources. Lastly, he added that the report is in progress.

Concerning the TT-FOO (Mr Titov and Mr Fry), Dr Fry summarized the big data approaches from non-operational scientific studies that are applicable to real-time tsunami forecasting by mentioning the current test in the U.S.A. and New Zealand. He highlighted that these include both source-dependent and source-agnostic capabilities and have possible links with WG1 basin-wide hazard assessment. Additionally, he explained that French and New Zealand studies suggest using regional Green's Functions can improve the time-dependent accuracy of Wphase results for tsunami forecasting in the Southwest Pacific and Japan. He lastly raised the strong alignment with TT-ISN and TT-TGV for the TT-FOO by mentioning the revision of the ToR in the next ICG/PTWS session.

Dr Fry noted the WG 2's goal, including the recognition of the need across all TT to improve links to international bodies responsible for various data activities relevant to tsunami forecasting, the contribution from the U.S.A. about the development of a common ocean observation-based source inversion for forecasting and operational system deployed in Aotearoa New Zealand, and the development of an SC module to improve analysis of slow tsunami earthquakes based on rupture duration and effort to provide an availability to member states.

Dr Fry that the WG 2 developed a simple risk-based method to assess multi-sensor network warning time capability and proposed to make this available to member states for their own use in informing network investment. He also mentioned the prototype of Australia, the U.S.A, France, and Aotearoa New Zealand for the system for real-time sharing of W-Phase solutions and future capability of ocean observation inversion solutions. In addition, he raised the upcoming event that utilizes the 2025 Capability Assessment to stock take current monitoring capability across member states.

The Chair raised a question regarding the potential of operational scientific studies for the protocol because it has not been used in the operational protocol for the tsunami warning. Dr Fry confirmed that this is beyond the scientific approach and high-level theory in that they only used the data that is available to record and playback. The Chair inquired about the timeline for those operations. Dr Fry added that the TT developed the recommendation paper to investigate what is promising and advanced for the operation, including the ocean observation with both a hybrid type of approach and a deterministic approach used for the inundation map.

ICG/PTWS Steering Committee noted the report of WG2.

7.3 Working Group 3 – Disaster Risk Management and Preparedness

Ms Fromont introduced the agenda item. Working Group 3 was continued at the ICG/PTWS-XXX, with one change to the terms of reference. That was to split out activities regarding Tsunami Ready

into a Tsunami Ready Task Team, which are reported in Agenda Item 8.2.1 Tsunami Ready Recognition Programme.

Working Group 3 continues to engage with the TOWS-WG and TT -DMP on behalf of the PTWS with respect to disaster management and preparedness, in order to support the exchange of experiences and information on risk reduction and preparedness actions. The TT-DMP meeting in February 2024 primarily regarding the Tsunami Ready Recognition Programme. The TOWS-WG noted the progress that ICG/PTWS has made with regard to 'Equivalency" for Tsunami Ready and recommended that the Task Team Tsunami Ready share the guidance to TT-DMP for further consideration. In the next period the TT-DMP will be working on sharing information on requirements and existing methods to warn people with disabilities, considering a number of Tsunami Ready initiatives, including:

- Tsunami Ready Evaluation form (currently in ICG/CARIBE EWS)
- Tsunami Ready Focal Points (currently in ICG/IOTWMS)
- ISO22328-3 for large scale private sector Tsunami Ready

The Group recognized the ongoing value and importance of exercises, such as PacWAVE, and community involvement in these as a preparedness and awareness tool. A number of public events and exercises are being conducted within regions and by Member States in 2024 coinciding with World Tsunami Awareness Day, and the 20th Anniversary commemorations of the Indian Ocean tsunami.

The Group also sees value in an effort to collate guidance and material on certain topics (e.g. preparedness, risk assessment, risk reduction) for member states, to enable the spread of best practice, and reduce the duplication of effort. This could be at a global scale, specific to the Pacific, or multi-hazard as preferred. This has previously been recommended but is lacking a sharing mechanism. The Group intends to progress with the Secretariat prior to the ICG/PTWS-XXXI technical options both for hosting a landing page for Member States to find documentation, but also a manner for which Member States can share their own guidance.

The Group recognized the ongoing significant effort and leadership provided by the ITIC for tsunami preparedness in the Pacific, including through SOP training, awareness products and facilitation of Tsunami Ready capacity. It will be important that Working Group 3 continues to provide support.

The Group also noted the importance of encouraging more NDMO participation, and involvement in the PTWS discussion and governance mechanisms, especially given the nature of the UNOD goals and their connection with disaster management and preparedness. The Group has some preliminary ideas for recommendations and welcomes ideas from the Steering Committee.

Ms Anugrah recommended leveraging the platform of the World Tsunami Symposium to promote the TR programme. She underscored that such an opportunity could reinforce tsunami-focused initiatives within UNESCO-IOC's ongoing work.

Dr Fry highlighted the importance of specific data resources for constructing effective impact assessments, such as inundation maps influenced by earthquake potential. However, he pointed out that many generic communities are predominantly affected by singular hazards, rendering a multi-hazard approach less critical for those cases.

ICG/PTWS Steering Committee noted the report of WG3.

7.4 Regional Working Group on Tsunami Warning and Mitigation System on the Central American Pacific Coast

Dr Strauch reported that the last WG-CA meeting was held on May 10th, 2024, in Managua, Nicaragua, with the participation of Guatemala, El Salvador, Honduras, Costa Rica, Panama, Nicaragua, and CATAC.

He presented the improvements of the data center as SeisComP at INSIVUMEH and the Seismic Network with 76 stations in Guatemala, including their capacity of monitoring Guatemala and the surrounding area and installations of three new tide gauges. He highlighted that Guatemala is able to have its own data to disseminate warnings based on the collected data as well as the information from the CATAC and PTWC. He explained that a tsunami would arrive 25 minutes after the earthquake, and it would alert about 14 minutes for the evacuation. Lastly, he added that this would cover most of the regions except for the area near the coast and some parts of the Caribbean coastline.

Concerning the MARN system from El Salvador, he stated that the system is similar to the CATAC but, it does not have a SeisComP module because of its cost. Dr Strauch mentioned that El Salvador started working on their SOPs and is currently under review. In terms of the informative materials, he mentioned that El Salvador has a proposal for a Tsunami Ready community in San Juan del Gozo, considering its vulnerability to earthquakes and tsunamis. Concerning capacity building, he mentioned that they supported the community in developing evacuation maps.

Dr Strauch reported on the improvements by the COPECO in Honduras in the recovery of the seismic networks after their collapse in 2020 due to COVID-19.

Dr Chacon-Barrantes informed the SC that the national sea level station supported by the Spanish corporation agency related to climate change in Costa Rica will also serve tsunami monitoring & warning and sea level monitoring. Se further informed on the current human resource limitations at SINAMOT. Lastly, she described that they are working on the creation of a national earthquake evacuation drill and mentioned the 11 TRR communities (ten communities for the Pacific region, including one expired community and one community for the Caribbean region) and they are in the process of renewal for the expired community.

Dr Strauch informed that a separate report for Panama is not available, but he is aware of the collaboration between the University of Panama and SINAPROC. Concerning the Tsunami Ready, Puerto Armuelles was ready to be recognized as Tsunami Ready before but failed to be recognized and it is now in the process of attempting to obtain the recognition.

The Secretariat inquired about the availability of skilled human resources from the sea-level training course conducted last year under the ICG/CARIBE-EWS. It was suggested that if such resources are not available from the Member States, exploring this option could help mitigate potential risks associated with unforeseen situations in terms of addressing station failure and maintenance problems.

Dr Chacon-Barrantes responded that the University of Hawaii Sea Level Center expressed their willingness to provide support but there is currently no budget allocated for travel. She indicated that an agreement was reached to have experts visit the site and provide assistance during the NOAA Tsunami Ready Programme. In addition, she noted that officers from the Ministry who participated in the training course mentioned by the Secretariat are scheduled to visit in the second week of October. The purpose of this visit is to inspect three sites and assess potential needs for installations. Finally, she expressed hope that once the installations are finalized, human resources will be hired at the earliest opportunity.

ICG/PTWS Steering Committee noted the report of WG-CA.

7.5 Regional Working Group on Tsunami Warning and Mitigation System in the Southeast Pacific Region

Mr Morales explained that the group meeting is conducted at least once every three months and one annual in-person meeting and raised there are three meetings since December 2023, which are 2023 virtual meeting in Dec 2023, a regular virtual meeting in Mar 2024, and an Extra Ordinary virtual meeting in May 2024 that approved to conduct the in-person meeting in Chile instead of Ecuador due to the ITP training held in SHOA.

Mr Morales indicated that they conducted two regional tsunami exercises in May and June 2024. During the exercise, they implemented the communication test and examined the reaction from the Tsunami Warning Centre from each country via e-mail, satellite phone, cellular phone, and Google-chat and mentioned problems with the communication tools, especially the satellite phone and Google-chat were observed, specifically related to the utilization of the programme.

Mr Morales elaborated on the ITP training course (2024/08), proposal for the TR recognition of 3 communities in Galapagos, deployment of DART Buoys, dissemination of special maritime products to NAVAREA coordinators, working document on SMART Cables, regional exercise under PACWave 2, and JICA project with a presentation a regional proposal and funding for a capacity building.

Dr Kong inquired whether the TRRP in Colombia encompasses the Pacific region or the Caribbean region. Mr Morales clarified that Colombia currently covers the Pacific region as well as CPPS. Dr Kong suggested that the regional training could serve as an opportunity to address the TRRP and its full process, providing valuable information for Member states considering participation in the programme.

ICG/PTWS Steering Committee noted the report of WG-SEP.

7.6 Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region

Ms Anugrah introduced the agenda item. She referred to the 11th meeting of the SCS WG of the ICG/PTWS, held in Guangzhou. The meeting was attended by 15 participants from China, Hong Kong Indonesia, Malaysia, Vietnam, and the Secretariat. She highlighted the election of new leadership positions, including Ms Suci Dewi Anugrah (Indonesia) as Chair and Mr Ching-chi Lam (Hong Kong, China) as Vice-Chair of the SCS-WG, as well as Mr Zhingou Xu (China) as Chair and Mr Indra Gunawan (Indonesia) as Vice-Chair of the Capacity Development Task Team. Additionally, she noted key activities of the WG, including support for China's proposal to establish the Multi-Hazard Early System (MHEWS) for the SCS region, quarterly communication test exercises conducted by SCSTAC and BSCTAC, and capacity-building initiatives such as the International Staff Programme. She also mentioned that the 12th meeting of the SCS WG is scheduled to take place in Jakarta, Indonesia, from 7 to 8 November 2024.

Ms Anugrah reported on the two regional training and workshops, including the international training course on Numerical Tsunami models for the SCS region on the 22nd of May 2024 and the Management and operation seminar on seismic stations for tsunami warning services on the 22nd of August 2024.

Ms Anugrah described that the SCSTAC continues the International Secondment Programme with full funding by hosting three experts from the SCS-WG Member States from July to September for two months. She illustrated the major activities will be involved in are receiving training on the earthquake location and focal mechanism inversion and tsunami scenario database, forecast model and decision support system of the SCSTAC, serving as a watch-stander once every week with shift

time of 12 hours, and conducting communication and coordination among WG-SCS Member States regarding the activities related to the full operation of SCSTAC.

Ms Anugrah mentioned that the WG Member States representatives participated in the ITIC Training Programme in Hawaii, the ICG/PTWS-XXX in Tonga, a collaboration with members in signed an MoU with STMKG of Indonesia, participation in the 57th session of the Executive Council, and technical exchanges on Marine disaster prevention and reduction in Italy and South Pacific Island countries.

Ms Anugrah presented plans for future, including the opportunities for in-person education, outreach, and training activities, an online training workshop on Tsunami Warning Technology and Platforms hosted by China, the Tsunami Ready Programme, engagements from all members of the SCS-WG ICG/PTWS, and the 12th meeting of the ICG/PTWS SCS-WG in Jakarta.

The Chair requested whether the SCS-WG ICG/PTWS will be held before the World Tsunami Symposium. Ms Anugrah noted that it will be held in Jakarta from 7th November to 8th November in Jakarta before the World Tsunami Symposium (11-14 November).

ICG/PTWS Steering Committee noted the presentation of WG-SCS.

7.7 Regional Working Group on Tsunami Warning and Mitigation System in Pacific Island Countries and Territories

Dr Jamelot explained that the PICT includes almost 20 members and raised the difficulty of organizing in-person meetings considering the regional organization in the CROP agencies, SPC, ITIC, and WMO. He mentioned the last meeting was conducted online on the 4th of July 2024 as well as the last in-person meeting in February 2023.

Mr Korovulavula illustrated that WG-PICT, and its current ToR have been submitted for endorsement as the 5th Task Team under the PIMOS (Marine Weather and Ocean Services) Panel of the PMC at the 7th Meeting of PMX in Port Villa, Vanuatu (17th – 19th September 2024). He addressed that this approach would reinforce the collaboration of the tsunami community and highlighted that this is the new approach to updating the governance.

Dr Jamelot presented the progress of the Task Team Seismic Data Sharing in the Southwest Pacific. He explained the discussion during the last meeting was at the end of 2023, including availability of SeisComP 5 Operation for all members, Delivery of workstation and online training for ORSNET, Technical support to Vanuatu and Fiji about configuration SeisComP5 from the Geosciences Australia (GA) with 4 weeks SeisComP training, new BB station in Fiji, as well as the new BB stations in Tonga Eua and Va'vau Islands, upgrade 5 BB stations to be completed by end of 2024, and progression the seismic data sharing agreement for ORSNET member countries.

Concerning the Task Team Capacity Development, Dr Jamelot described relevant events such as the Preliminary Gap Assessment completed for Fiji, Tonga, and Solomon Islands to inform National Consultation on UN EW4ALL and Weather Ready Pacific Programme (WRP), a kick-off meeting for PTWS NTWC Minimum Staff Competency Training Pilot coordinated by ITIC and hosted by NEAM NZ, Tsunami Awareness Sessions at the UNSG, the Pacific Leaders Meeting, ICG/PTWS Tsunami Capacity Assessment Validation Workshop for India and Pacific Oceans.

Dr Jamelot noted that 3 online meetings have been conducted since March 2024 in Task Team Information Sharing Platforms. SLACK, a new application, has been built by a dedicated workspace and is currently being tested by the TT members. He added that this will be introduced and tested during the WG-PICT Regional Pacwave 24 Exercise. Additionally, Dr Jamelot mentioned the update

for Guidelines regarding each communication platform, including email and HF radio, and preparation for dual earthquake source scenario for the WG-PICT Regional PacWave 24 Exercise.

Dr Jamelot highlighted a point in the ToR to promote and facilitate tsunami hazard and risk studies in the PICT region and the Tsunami Hazard Modelling completed in Fiji (Coral Coast), Federated States of Micronesia (Pohnpei, Chuuk, YAP) and Marshall Islands (Majuro), including ongoing progress for Solomon Islands. Additionally, he raised the cooperation in the establishment and upgrade of earthquake and tsunami monitoring networks in the region and the cooperation with PTWS WG 1,2, 3, and relevant task teams.

Concerning the recommendations, Dr Jamelot indicated the installation and maintenance of observation instruments, national internal agency cooperation, and increase of the collaboration and support under ORSNET, MVN, USGS, GA, Pacific Weather Ready Programme of the PMC, and the UN EW4ALL project. Lastly, he highlighted that the WG-PICT encouraged sharing technical and expertise competency among member states at every level, strengthening national and regional end-to-end communication platforms, and the application of the Tsunami Ready Programme, including the National Tsunami Ready Boards and National Tsunami Ready Implementation Plans.

Mr Korovulavula added that the mechanism established within the meteorological community could be addressed as regional cooperation, which is an opportunity to bring the international set-up through regional activities and mentioned the possibility of discussing the recommendation about meteotsunami. Lastly, he added that the next WG meeting will be held on the 25th of November in Samoa.

Dr Kong inquired about the status of the absence of Mr Ofa. Mr Korovulavula responded that the matter would be addressed during an online meeting with TT officers, scheduled to take place prior to the WG meeting in Samoa.

Dr Howe raised a question regarding the status of international data sharing and ORSNET. In response, Dr Jamelot explained that the private regional network facilitates data sharing among OSRNET members, adding that the agreement process for data sharing within ORSNET is ongoing. Mr Korovulavula further noted that while most countries maintain national networks, the majority of stations do not participate in data sharing. However, regional collaboration enables shared data connections with the PTWC to support tsunami warning efforts.

The Secretariat commented on the new development related to the PMC, emphasizing its potential to enhance regional synergy and thanking the contribution of Mr Korovulavula. The Secretariat also noted that the PMC could serve as an exemplary model for regional collaboration under the JCB.

ICG/PTWS Steering Committee noted the report of WG-PICT.

8) Policy Matters

8.1 Tsunami Detection, Warning Dissemination
8.1.1 Sea Level Observations

The Chair mentioned the recommendation to ICGs at TOWS-WG XVII by highlighting

- TSPs routinely monitor as frequently as possible (at least every 6 months) the status of sea level and seismic observing networks and the quality of the data to meet existing and enhanced tsunami warning requirements in their AoS, including the provision of status summaries for the Secretariat to follow-up with relevant Member States to correct data issues (coverage gaps and data quality)

- Routinely monitor as frequently as possible (at least every 6 months) the status of national sea level and seismic observing networks and the quality of the data to meet existing and enhanced tsunami warning requirements, correcting any issues with outages, quality and real-time accessibility of data as soon as possible, desirably within 6- months
- Sample sea level data at one-second intervals and transmit this in real-time, given the critical need to resolve and understand the near-filed threat to high at-risk communities where a tsunami may arrive within 5-30 minutes
- Share information and procedures on deployments of new technologies to monitor sea level variations used for tsunami warning purposes, such as the ongoing project of the CAM SMART cable off Portugal, TAM TAM SMART cable between New Caledonia and Vanuatu, undersea cable installations being deployed by Indonesia and India, and the Insea wet demo smart cable in the Ionian Sea offshore Sicily

The Chair indicated that the TSPs, the National Tsunami Warning Center, and relevant organizations should routinely monitor as frequently as possible and highlighted its importance to detect the tsunami and update the tsunami warning. Additionally, he expressed a willingness to discuss the possibility of that recommendation.

Dr McCreery noted that while the principle originates from a commendable initiative, there are practical issues that must be considered, particularly concerning variations in sampling methods and seismic data. He emphasized that the approach is most applicable for Member States to implement locally using their own gauges, tailored to their respective national contexts.

Dr Fry concurred with Mr McCreery's observations, adding that it would be challenging to rely on a single example or event as a reference for the community. He suggested enhancing the network connections to obtain assessments regarding their system's performance in the context of TR monitoring, emphasizing that the responsibility for network delivery qualifications rests with the network itself.

The Chair shared insights from his experience with the JMA, which utilized domestic sea level data, not overseas sea level data. He highlighted efforts by the PTWS to establish a unified format for the sea level data. Dr Weinstein also recalled similar efforts to conduct network assessments across the Pacific, but these were complicated by other organizations introducing their own data formats.

Ms Moseley proposed that the GOOS could assist by standardizing the format. Mr Sifon noted that most of the real-time ocean observing systems are on the GOOS platform, but the problem is that this information is uploaded by the owner of the network and needs to be in a format accepted by GOOS.

Dr Fry requested financial and technical support from the IOC to address these challenges, citing the significant workload involved. The Secretariat responded that he could seek a possibility but did not have a clear answer at this moment.

Dr Jamelot emphasized the need to enhance sea-level monitoring and real-time data access. He noted that while a common format is already available through the GTS and the IOC Sea Level Monitoring website, these platforms are not equipped for high-level applications such as satellite communication. Additionally, he highlighted New Zealand's example, where a national monitoring system is operational and available for seismic data sharing. Dr Jamelot expressed agreement with the request for funding to improve the website.

The Chair commented that the purpose of using another organization's format with higher sampling is not necessary for low-rate sampling for their observation and difficulty to raise higher sampling at this point to tsunami detection. Lastly, he added that he will investigate its dedicated topic for the next ICG/PTWS meeting.

ICG/PTWS Steering Committee noted that relevant discussions will continue at the next ICG/PTWS Session.

8.1.2 SMART Cable

The Chair reminded the recommendation at TOWS-WG XVII;

The Group recommended to Intergovernmental Coordination Groups (ICGs):

- Share information and procedures on deployments of new technologies to monitor sea level variations used for tsunami warning purposes, such as the ongoing project of the CAM SMART cable off Portugal, TAM TAM SMART Cable between New Caledonia and Vanuatu, undersea cable installations being deployed by Indonesia and India, and the Insea wet demo smart cable in the Ionian Sea offshore Sicily;

The Chair raised the request from the SMART Cable Group regarding the change ToR of Regional WGs during the PTWS-SC meeting in March 2024:

To serve as a focal coordination point within the region for member states for the SMART Cable Initiative and to develop and maintain a regional science report describing the advantages of having real-time SMART data (ocean bottom temperature, pressure, and seismic acceleration) for tsunami and earthquake early warning and other purposes.

Dr Howe reported the SMART Cable as the United Nations' effort to unite science with the telecom industry to observe the oceans and Earth as well as tsunamis, earthquakes, and climate change. He added a sensor module that delivers data to INGV in real-time and the data will be available internationally at any time.

Dr Howe stated that SMART Cables is a Global Ocean Observing System (GOOS) Emerging Network, and it will be aligned with the annual published GOOS report. Additionally, he indicated that there has been an improvement in the warning times for seismic and tsunamis, and they will have the updated results from the WG 2.

Concerning the funded SMART Cable Systems, Dr Howe reported the progress in the Portugal SMART Atlantic CAM that connected Lisbon, the Azores, and Madeira. The cost for this project is 154 million euros and is supported by the EU for 56 million euros. He added another case TAM TAM SMART Cable Systems SMART with 4 SMART modules funded by France. Lastly, he highlighted that the SMART Cable is reliable and low lifetime cost in the long term and both cases are set up for optical Fiber sensing, as well as the benefit from the tsunami warning time improvement. Sience community will meet in Lisbon on the 4th of October to seek assistance for additional funding.

Dr Howe described the positive impacts of the JTF SMART Cables, including the improvement of earthquake and tsunami early warning, GOOS with new long-term data in terms of climate change, and cable integrity. Lastly, he raised the CPPS GT-ATPS report that they worked together and will be updated in English, and the proposals for the Drake Passage cable for climate purposes.

Dr Howe raised the points related to the ICG/PTWS:

1) The TRL levels for 'existing' and 'innovative' for the operational status
2) A framework for multi-sensor, data utilization, and forecasting to reduce the uncertainty
3) Improvement of the interaction with other ICG equivalent groups
4) Request support to prospective systems such as SEPac trench, Galapagos, Drake Passage, AMOC, Indonesia, Vanuatu, Portugal
5) Request proactive IOC support from IOC and Tsunami approaching Member States such as circular letters

6) Improvement of the interaction with GOOS
7) Cooperation with UN, IOC, WMO legal international real-time data availability

Dr Howe summarized that SMART Cable works with Telecom industry and many stakeholders in telecom are willing to support the project with the anticipation additional 1.3 Gm of cable in water by 2037. He added some remaining challenges such as funding, tech, data, legal, security, etc, and cooperation with GOOS, Tsunami, Ocean Decade, DOOS, and RENs.

The Chair commented that the SMART Cable will have a large impact on the Member States and Regional Working group by giving the floor to the participants.

Dr Jamelot suggested implementing the circulation at the highest level such as through Governments rather than having a Circular Letter from only the UNESCO-IOC so that the Member States do not lose an opportunity to join the project.

Ms Anugrah recalled that there is an interest during the SCS WG for the SMART Cables and recommended reaching out to him during the next ICG/PTWS Meeting in Beijing.

Dr Fry expressed that the WG 2 keeps supporting the SMART Cable and indicated that they used the same data with the SMART Cable and this operational flow would make it easy to use the data in the current system. Concerning the TRL levels, he considered that the range of the SMART Cable is 7-9 because they used the data already in the existing data and indicated that lots of systems and projects rely on the benefits provided by station and geometry.

The Chair asked Mr Fry about the possibility of sharing the results of the SMART Cable in the next ICG/PTWS Meeting. Dr Fry confirmed the availability of presenting the result as well as the TAM TAM SMART project and other ocean observations Mr Moore has worked on.

Dr Moore highlighted the differences in the placement of dedicated cables and expressed curiosity about their impact on tsunami forecasting, referencing the example of Chile's coastline. In response, Dr Howe noted that in general, telecommunications infrastructure, including cables, often runs parallel to the coast in South America. He added that the cables installed with government involvement tend to optimize sensor placement for improved functionality, citing Portugal as an example where scientists provided guidance to ensure optimal cable orientation when connecting three cities. Dr Howe further clarified that cable installation is geographically constrained, requiring careful selection of locations based on feasibility. Dr Moore commented on the price comparison between Dart Buoys and the SMART Cable by arguing that the cost would be effective to use Dart Buoys rather than the cable.

ICG/PTWS Steering Committee noted the report of the JTF for SMART Cables.

8.1.3 SOP of Tsunami Generated by Volcanoes and Meteo-tsunami

The Chair raised the recommendation as follows;

The Group recommended to Intergovernmental Coordination Groups (ICGs):

- To consider whether TSPs may also need to provide services where volcano-generated tsunamis may impact several Member States;

The Group requested the IOC Secretariat to:

(i) Organise online webinars for each ICG involving relevant Volcano Observatories and Volcanic Ash Advisory Centers (VAACs) to:
   a. Brief on the report on Monitoring and warning for tsunamis generated by volcanoes (IOC/2024/TS/183) and its recommendations,

b. Highlight the hazard and vulnerable Member States,
c. Initiate the required partnerships between NTWCs and Volcano Observations and VAACs,

Initiate consideration of whether TSPs may also need to provide services where tsunamis generated by volcanoes may impact several Member States;

The Group requested the Task Teams:

- TT-TWO to review existing Tsunami SOPs and develop general guidelines on SOPs to warn for volcano-generated tsunamis;

The Chair asked the Secretariat about the status of the request related to the TT-TGV. The Secretariat confirmed that no actions were taken due to a lack of connection with the TT-TGV with the expertise and a need to find a good example of that connection.

Dr Fry stated that the TT-TGV will take one example and establish the first context to facilitate the work within 8 weeks. Mr Korovulavula raised the relevant work for Fiji, Tonga, and Vanuatu and confirmed the speed of work depends on the finalization of the TT-TGV SoPs.

The Group requested the Task Teams:

- TT-TWO Ad Hoc Team on Meteotsunamis in consultation with WMO and IUGG JTC to review the term and definition of meteotsunami for consideration by TOWS-WG and to inform discussions on this topic by the IOC/WMO JCB, taking into account the historical derivation and use of the term, any potential confusion with other existing products/services, and the public understanding of any associated warnings, with a view to updating future versions of the Tsunami Glossary;

- TT-TWO Ad Hoc Team on Meteotsunamis to complete a draft of the report for offline review by the TOWS-WG to be utilized as background information for consideration of the recommendations by the next meeting of IOC/WMO JCB in the third quarter of 2024;

The Chair explained that the first bullet point is the review for the definition of meteotsunami in the IOC/WMO JCB as he introduced the first day of the meeting. Regarding the second bullet, he mentioned that the relevant report would be published in November.

Dr Kong inquired whether the Ad Hoc would include the recommendation related to the meteotsunami and raised a question about the necessity of further discussion on the topic, given that the planned publication already provides possible references. The Secretariat responded that he would review the matter and follow up with Dr Kong.

The Chair addressed the draft decision from a discussion with the WMO, highlighting that ‘Meteotsunami’ is not an officially recognized term by the WMO. He noted WMO’s concerns about the unclear definition of roles and responsibilities and terminology associated with this non-standard term.

The Chair asked the Secretariat about the status of the request related to the TT-TGV. The Secretariat confirmed that no actions had been taken due to a lack of connection between the TT-TGV and expertise and emphasized the need to identify a suitable example to establish this connection.

The Secretariat added that in the contractual framework, this report is a draft based on the feedback and interaction with different communities. He noted that several considerations are taken related to this report and make sure that it addresses the WMO’s point and communication with members as well as efforts for the consensus of language.

The Secretariat provided the overall timeline, including the presentation about the status of the draft in October (3rd World Conference on Meteotsunamis) and the finalization of the draft in November.

Dr Fry indicated that the meteorological community would be in a better position to take part in a meteotsunami. He explained that it would be beneficial to divide parts as forecasting that WMO would take part and a warning part that IOC has a better capability.

Dr Kong outlined the difficulty of taking any actions before including the revised term in the glossary and suggested focusing on the scientific matter prior to the inclusion. The Secretariat reiterated the importance of the progress, including the conference in October, its outcomes, and the evaluation of the ad-hoc Task Team on meteotsunami shape. He added that the decision on the glossary inclusion will depend on Mr Aliaga, Head of the Tsunami Resilience Section, and Dr Kong.

The Chair argued that the meteotsunami warning should be issued by the MET service and proposed not discussing the SoPs of meteotsunamis specifically in the PTWS session. Mr Shingo stated that the PTWS does not need to discuss the procedure but should discuss the procedure for the specific tsunamis when the tsunami is caused by a meteorological anomaly.

Mr Sifon illustrated that the difficulty of detecting meteotsunani depends on the capability of using all information as well as the local conditions of the coastline and atmospheric conditions.

Dr Titov indicated that from the scientific point, many cases of meteotsunamis do not come with only meteo phenomena and if they have an institution, it would be easy to forecast. Lastly, he requested the intervention from Dr McCreery regarding the operation part of how meteotsunami warning can be facilitated.

Dr McCreery responded that they do not get the capability to forecast meteotsunami other than reporting or observation. He recalls a lot of discussions in the U.S.A. trying to link the weather service community with the NTWC to get information about the conditions and share the whole responsibility with them. After that, the weather service community issues guidance for sea-level fluctuations.

The Secretariat highlighted a need to move forward and suggested getting clarity on the meteotsunami definition first and then discussing who will be issued an alert during the JCB platform.

The Chair stated that the discussion could also be in the TOWS-WG.

ICG/PTWS Steering Committee noted that this issue will be further discussed at the upcoming TOWS-WG meetings.

8.1.4 Common Format for Tsunami Products from TSPs

The Chair raised the recommendation at TOWS-WG XVII:

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

The Group requested the Task Teams:

- TT-TWO develop a global CAP template for TSPs to facilitate exchange of bulletins between basin TSPs and their NTWCs, between TSPs of different basins, and for public TSP bulletins (e.g. for IOTWMS);

The Chair explained the difficulty of combining different formats from each TSP from the member state and expressed his willingness to discuss the necessity of unifying the format as CAP.

Dr McCreery stated that the text products extract information such as earthquake kilometers and forecasting particular coasts, and having this information, the XML format could give a chance to downstream users when the NTWC edits their message. Lastly, he added that this is an effort that all TSPs have to work on because of the slight differences from each other.

Mr Shingo argued that they need to proceed with assisting the survey about the needs of the receiving country. Mr Xu commented that the CAP code is useful for issuance of the tsunami warning services and raised the willingness to use the new format.

Dr Strauch mentioned their interest in the CAP code and ongoing relevant projects that can benefit people in terms of the tsunami warning.

The Secretariat raised a question about how the CAP is implemented and used for disseminating the emergency and early warning for other hazards by country and highlighted the importance of identifying this point. He suggested having a report from the member states about how CAP is being used for other hazards in countries and which agency has a role if the Chair agreed.

The Chair mentioned that they should investigate the usage of the CAP format from the member states and conduct the Pacific capacity assessment.

ICG/PTWS Steering Committee agreed on the need to conduct a survey to investigate the use of CAP by Member States for different types of Hazards.

8.1.5 Expansion of the ICG/PTWS ESZ

The Chair recalled the decision to expand the PTWS earthquake source zone in the ICG/PTWS-XXX session.

Adopted decision about the ESZ

Notes:

(i) The concerns of ICG/PTWS regarding the seismic activity in the Scotia Arc region as reflected in the Executive Summary of the ICG/PTWS-XXX (IOC/ICG/PTWS-XXX/3s);

(ii) That tsunami bulletins are issued by the PTWC for the ICG/CARIBE-EWS and ICG/PTWS for earthquakes in the Scotia Arc and its adjacent seismic zones for events fulfilling certain criteria as reflected in the IOC Technical Series, 130, 'Tsunami Watch Operations-Global Service Definition Document';

(iii) The need for the active engagement of Argentina with the ICG/CARIBE-EWS and ICG/PTWS regarding Argentinian Search and Rescue (SAR) and NAVAREA VI coordination responsibilities;

The Chair raised two options for this: 1) discussion with the argument from Argentina in the ICG/PTWS or PTWS Steering Committee and 2) Cancelation of the expansion of the ESZ.

Mr Sifon raised his curiosity to Mr McCreery regarding whether anything could be changed in terms of the operational way if they accepted this decision. Dr McCreery confirmed that it would change, but it could be more outside of their original work by explaining the procedure, including the issuance when the event exceeds 0.3 meters and the alerts after forecasting, not immediately.

Ms Moseley inquired about the implementation of TSP agency systems and raised the easier way to not require the completed earthquake sources by highlighting the difficulty of getting concluded sources. The Secretariat indicated that all earthquake source zones are in the PTWC earthquake source map. Therefore, the actual question would be what the impact to their service area with the event occurred outside of them.

Dr Jamelot raised their opinion regarding the inclusion of the Scotia Arc and adjacent seismic zones and mentioned that they avoid discussing the geographical boundaries and take care of the minimum tsunami travel time for any potential sources.

Dr Kong suggested continuing a discussion with the presentation from Argentina because it seems there are a lot of things to know still more, and it would be a good opportunity if they could get information from them. The Secretariat fully agreed with Dr Kong and reiterated the opportunity to have a dedicated workshop related to this topic during the next ICG/PTWS meeting on a separate day, which would allow them to have a scientific review at the scientific level before the discussion by inviting the Argentina representatives. Additionally, he mentioned the possibility of being a future agenda for this dedicated topic.

The Chair stated that he would consider the invitation for the Argentina representative in the next ICG/PTWS.

Dr Kong raised the point of the long distance between the Scotia Arc and the PTWS and mentioned the consideration of another involved country such as Timor Leste by expressing her hope to get a whole idea for the matter and continue the discussion.

The Chair endorsed the continuation of the discussion and recalled the disagreement about the recommendation during the UNESCO-IOC Executive Council from the side of Argentina. Dr Kong pointed out the need-based organization of workshops relevant to policy issues. The Secretariat confirmed that a dedicated workshop does not come from their needs, and its purpose is to have a scientific view before driving to the policy perspective.

The Secretariat raised a proposition for the potential topic as 1) Tsunami Service Provisions consideration for events outside the PTWS earthquake source in a service area or in general 2) Service Provisions consideration for events outside of monitoring that cover all areas of possible concerns. The Chair agreed with the suggestion from the Secretariat.

ICG/PTWS Steering Committee agreed to have these issues addressed/included in the agenda of the next ICG/PTWS.

8.2 Tsunami Disaster Preparedness
8.2.1 Tsunami Ready Recognition Program

Dr Kong introduced the agenda item. The Task Team met several times since July 2024 to progress the Tsunami Ready Equivalency Guidance, including representatives of other ICGs. This guidance is now in a high-level draft and will require more input before decisions at the next ICG/PTWS-XXXI. The Task Team has representation from Chile, China, Ecuador, France, Japan, Malaysia, New Zealand and USA.

In recollection, the purpose of the equivalency is to support reporting to the UN Ocean Decade Tsunami Programme goal of “100% of communities at risk of tsunami prepared for and resilient to tsunamis by 2030 through the implementation of the UNESCO/IOC Tsunami Ready Recognition Programme and other initiatives.”

The approach has been simplified to three steps:

1. Identification of National governance, to fulfil the functions of a National Tsunami Ready Board, and to provide some expertise for the cross-referencing process.
2. Assess tsunami preparedness and resiliency against the Tsunami Ready Recognition Programme indicators. This is based off the checklist included in the Tsunami Ready Recognition

Programme, but broadened to allow for each country's own context, and inclusion of national mechanisms such as legislation to be included as justification.
3. Report progress on the UNOD Goal to the ICG/PTWS. This is proposed to be integrated with PTWS national reporting and KPIs and be in a percentage format.

The draft guidance will be sent to the PTWS Steering Committee, and especially the Regional Working Groups, for sharing to obtain feedback so that the guidance can be appropriately prepared before the ICG/PTWS-XXX. The Task Team will also continue to engage with TT-DMP and other ICGs to set it up for global application as much as possible.

The Equivalency Guidance reports in terms of percentage. While this is not consistent with the current manner of reporting for Tsunami Ready (which is number of communities) this manner is aligned with the language of the UNOD goal and will better support eventual reporting and reflection on progress in the future.

There are some challenges with reporting the progress of implementation of the Tsunami Ready Recognition Programme (or equivalent) in ICG/PTWS, beyond the Tsunami Ready viewer. Member States are encouraged to share progress with Working Group 3, however, there is no mechanism to do so. The Task Team have raised the need for a regular Tsunami Ready survey. This would support monitoring and reporting on Tsunami Ready across the pacific, and also ensure that TT TR activities are representative of whole Pacific needs. Questions would be to the effect of:

- Intent & progress with implementing the Tsunami Ready Recognition Programme
- Barriers and challenges with Tsunami Ready Recognition implementation
- Whether there is a national programme instead of Tsunami Ready

With the PTWS Capacity Assessment now intended to take place before the next ICG, the Task Team proposes that this will be sufficient, and to avoid survey fatigue, but to make consideration of a regular survey following this.

The Tsunami Ready website and Tsunami Ready Viewer were displayed, showing the different features of representation on a global map, including meta data of the tsunami ready community. Some features aren't quite correct as of yet. The intent will be to migrate over all information and data from the original ITIC website. ITIC are seeking input as to what would be desired from a Tsunami Ready Viewer, and the sharing of Tsunami Ready communities.

ICG/PTWS Steering Committee noted the report on the TRRP. The Chair suggested having a more in-depth discussion in the future, and the SC agreed.

8.2.2 Minimum NTWC Competency Framework

Dr Kong provided an overview of the accepted framework for the upcoming training course, highlighting the financial support secured from the USA to conduct a pilot initiative. This pilot included an online component through the Ocean Teacher Global Academy (OTGA). She emphasized the importance of this framework in advancing capacity-building efforts within the region.

Ms Kong reported on the kick-off meeting in July, Wellington, and mentioned the funding to hire a project manager to facilitate the entire process and the subject matter experts who are familiar with the process. She explained the kick-off meeting facilitated by Ms Fromont with the GNS training team, Australian MGA, and Joint Australian Warning Centre, as well as the material provision from Chile.

Dr Kong explained that one of the core components of the pilot project is an online training module focused on seismology and tsunamis. She confirmed that the Joint Australian Warning Centre will

share its materials, and the necessary paperwork to formalize this arrangement is being processed. The project will also involve two interns from the IOC, and Dr Kong expressed a desire to expand the team to include additional members who can assist in reviewing the SoPs for warming centers. She acknowledged that the transition from online to hybrid formats would be one of the project's main challenges, with the aim of launching the pilot project in early 2025.

Dr Kong asked for feedback about their initiative to WG 2 and the PTWC, seeking confirmation on whether it would be beneficial to convene a dedicated TT to support the project. She also mentioned options for obtaining further assistance, including submitting the proposal to the SC, proposing it to the Ad Hoc team, or establishing the TT at the next ICG/PTWS session.

The Chair mentioned the TT under WG 2 for the minimum NTWC Competency and suggested dissolving the TT and submitting the proposal. Dr Kong indicated that the pilot project they suggested was accepted and reiterated the importance of having input and its useful role. Lastly, she requested ideas regarding what could be the best way to get feedback.

Dr Jamelot inquired whether the topic had been discussed in the April meeting and proposed involving PICT as a contributor. He suggested that the outcome of SeisComP could be valuable in this context, particularly as it relates to seismology and tsunami warning systems.

Dr Kong clarified that PICT is not a suitable subject for the dedicated topic under discussion. She noted that the creation of a TT would help increase visibility and contribute officially to the project, emphasizing that the structure of the TT should align with the broader objectives of the initiative.

Dr Kong raised the clarification that the PTWS competency is agnostic and not allowed to cover the Pacific tools unless there is something that everyone has access to and expressed the willingness to be separated. Additionally, she indicated the importance of demonstrating the process and forecasting and utilizing the available materials by raising the development of the offline component Mr Moore is working on.

The Secretariat thanked colleagues for all their efforts and mentioned the agreement between UNESCO and CTBTO, as well as the NDC-in-a-box that provided the seismic component that included the hardware, software, and sustainable training mechanism, especially targeting the SIDS. He explained that most countries have the same stakeholders as the NTWC, and the 15th anniversary will take place in February, including the joint capacity activity. Lastly, he stated the high-level engagement with the CTBTO executive secretariat by mentioning the opportunity to review how the synergy can improve and use the training as well as the financial and human resources available in the CTBTO.

Mr Titov raised a negative view about the draft and some relevant criteria in the document. Ms Kong stated the request and guidance about the competency approved as the list, and they are proposing to be able to cover those with training through online and hybrid modality and raised the IOC request about following the guidance for the member states. The Secretariat disagrees with the fact that the request is coming from the ICG at the national level. Dr Titov stated that the draft doesn't align with the point related to the member state after the review as an actual observer and raised that this needs to be clarified.

Dr Jamelot stated that this could be a good opportunity to share their work internally in the NTWC and train the new officers, as well as bring more member states in the online format. In addition, he describes its benefits, including the tsunami sensitivity of the NDMO but no certificate.

Ms Fromont requested confirmation from the Secretariat about whether there is any possibility of injecting the information and text from the CTBTO into the pilot. The Secretariat mentioned the opportunity to check the development, especially for the SIDS, but the use of scientific data of the CTBTO needs to be agreed with them.

The Chair decided to have the new dedicated TT in the next ICG/PTWS session and requested to prepare the ToRs and the necessary number of assigned officers.

ICG/PTWS Steering Committee agreed to establish a new dedicated TT.

8.2.3 Pacific Wave 2024

Ms Martinez provided an overview of the PacWave Exercises Task Team, including members and Co-Chairs (Mr Margarita Martinez/Chile and Ms Laitia Fifita/Tonga). Ms Martinez mentioned the IOC Circular Letter No 2999 which included the contents of the decision from the Steering Committee about the provision of special tsunami maritime safety products to NAVAREA coordinators through the NTWC from the PTWC and a conduction trial dissemination of the dummy message from the PTWC to the NAVAREA coordinators through the NTWCs as part of Exercise Pacific Wave 2024. Ms Martinez mentioned the duty of PTWS Member States about the choice of participation in all applicable modes of exercises outlined below:

i) One Live Communication Test from the PTWS TSPs to PTWS Member States on 5 November 2024 at 00:00 UTC
ii) One NAVERA Live communication Test from PTWC to the NAVAREA Coordinators referred above through concerned NTWCs, or in the absence of an NTWC, upon request to the PTWS Technical Secretary, directly to the NAVAREA Coordinator, on 5 November 2024 at 01:00 UTC

Ms Martinez informed the SC on the exercise Manual, the IOC Technical Series, 191 for anyone who would like more information.

Concerning the timeline milestones, Ms Martinez mentioned the key dates;

Date	Events
31st August 2024	A deadline for PTWS Regional Working Groups to inform TSPs if products needed, copied to ITIC
1st September 2024 – 30th November 2024	PacWave24 Member State national exercise
2 weeks before the Regional Exercise (5th of November)	TSP products available on the regional exercise webpage
5 November 2024 (00:00 UTC)	Live TSP Communications Test
5 November 2024 (01:00 UTC)	Live NAVAREA Coordination Communication Test from PTWC through concerned NTWC
4 November 2024	PICT Regional Exercise
21 November 2024	SEP Regional Exercise

Concerning the standardized training supporting tsunami ready by ITIC,

Date	Event
15th of December 2024	A deadline for Member States to complete and submit online PacWave24 Post-Exercise Evaluation surveys for 1) Live TSP Communication Test, 2) Live LAVAREA Coordinators Communication Test, 3) National Exercise, and 4) Regional Exercise A deadline for Submission of Regional Exercise Reports for 1) PICT Regional Exercise and 2) SEP Regional Exercise

Ms Martinez indicated that the Draft PacWave 24 Summary Report had been circulated to the member states 10 days prior to the ICG/PTWS-XXXI meeting scheduled for April 2025. She further noted that the final version of the report was published and made publicly accessible on 30 June 2025 via the official website: http://www.pacwave.info/

Ms Martinez mentioned the exercise evaluation forms with the national/regional communication and cooperation post-exercise evaluation form.

Mr Luis Morales Auz commented that they are in the process of adopting the scenario for their regional drill. If the threat comes to nearby Colombia, Peru, or Chile, they have a communication capacity with those countries. He added that they only have the agenda, and the scenario has not been settled. He confirmed that this would be finalized the week before the exercise.

Dr Kong mentioned that the Pacific has not yet generated messages specifically for exercises, except for those related to earthquakes. She also raised the point of customizing messages for volcanic events. In response, Dr McCreery confirmed that they tested this at the regional level last year by organizing two exercises conducted by two countries.

Dr Jamelot stated that the HTHH scenario was played in 2022 and recalled the effort to put direct communication between nearby countries. He added that this year would be the multiple earthquake scenarios in a different region that can impact more the member states to play in real-time.

Ms Anugrah shared their experience regarding the evaluation of the capacity of the tsunami warning community by using the exercise and mentioned that the PacWave could be a platform to evaluate the relevant community to monitor their capacity, especially in terms of evacuation.

ICG/PTWS Steering Committee Committee noted the report on PacWave24.

8.3 Tsunami Service Provider's Products and Messages
8.3.1 User's Guide

The Chair of the PTWS Working Group 2 Task Team of Tsunami Service Providers, Dr McCreery, provided an update on the progress of the TSPs in reorganizing their respective Users' Guides to have a common organizational structure and content. The Task Team had previously agreed on this common format, it had been presented at ICG/PTWS-XXX, and the ICG agreed that this effort should move forward. The structure of this new common format was reviewed again with the Steering Committee for reference and Chip gave an overview of progress based on the Task Team discussion of this issue earlier in the week. He noted that all TSPs had reported that the work was still in progress. Dr McCreery then reported specifically on the PTWC version, noting that it was his intention to include various product changes in the updated Users' Guide and to provide the updated Guide prior to ICG/PTWS-XXXI for ICG review and approval before implementing those product changes. The PTWS Chair then asked each of the other TSP representatives for input on their respective Users' Guides.

The Chair raised the timeline for editing the User's Guide denoted in the PTWS-SC in March. Dr McCreery explained that the TT of TSPs prior to the ICG/PTWS-XXX discussion about the reorganization of their Users' Guides to have a common structure and content as the background. Additionally, he added that they agreed on the common structure and content that was briefed at the ICG/PTWS-XXX with the decision that the TSPs should proceed.

Mr McCreery brought an example of a new tsunami threat message with forecasting. Additionally, he described the general structure they have agreed on and explained that the sources come from each TSP and that the data related to the contact information is available.

Dr McCreery described the current status of the PTWC, NWPTAC, and SCSTAC, that the work is underway, and the PTWC especially expects to complete this before the next ICG/PTWS meeting, and the SCSTAC will provide a progress report during the meeting. For the CATAC, he mentioned the work is temporarily paused due to the legal issue, which is now nearly complete.

Dr Sato explained that the 18 user's guides are in the NWPTAC and expected to be completed in the next ICG/PTWS meeting, but he could not provide the next step timeline at the moment. Mr Shingo added that they have not received any reviews about the new user's guide, but they have the willingness to get feedback from the recipient country by using webinars or other platforms.

The Chair expressed his hope to publish the new user's guide next year and asked each TSP for approval in the regional working group before the next ICG/PTWS session so that they can get an endorsement about the report from the member states.

Dr Wang inquired whether the Steering Committee has the right/authority to approve. The Chair confirmed that the ICG/PTWS session has the role to approve, not the SC, and added that the user's guide should be approved as soon as possible so that the member states will be able to use it.

Dr Sato commented that the common context from each center is duplicated, and it caused confusion; therefore, they should check and review from another center's user guide.

Dr Strauch reminded the SC that CATAC's User's Guide will be available in the next ICG/PTWS meeting.

Dr Kong requested a clarification of the difference between Mr McCreery and Dr Strauch and sought the possibility of setting a certain date for the availability of the user's guide by mentioning the disadvantage of being flexible, which could cause an ambiguous timeline.

Dr McCreery suggested having content related to the responsibility if the report is not on time from the SC sider or the Chair. The Secretariat mentioned the limitation of the authority of the Chair as a Chair and added that based on the IOC rule, the ICG and the member state need to make a decision. Dr Kong requested if they could have a service document such as a concept note and written paper. Dr McCreery stated that changing instruction does not mean a change of content and highlighted that it would be easier to get it in time.

The Secretariat reminded the SC on the IOC rule of procedure, which states that *documentation required for consideration of the various items on the provisional agenda of a session of the Assembly shall be sent not less than two months before the opening of an ordinary session and not less than one month before the opening of an extraordinary session.*

Dr McCreery raised a question about the difference between ordinary sessions and extraordinary sessions. The Secretariat confirmed the extraordinary session would be addressed for the urgent matter. Dr Strauch highlighted that the CATAC needs to fulfill the achievement due to the different customers they have compared to the other countries in the Pacific, as well as the quality of the materials.

The Chair underlined that the submission of the deadline for the documentation should be on time and delivered as soon as possible. The Secretariat suggested having a detailed time for indicating 'as soon as possible' and the Chair confirmed a minimum of two weeks as a manageable timeline. Lastly, The Secretariat raised two points from the ICG/CARIBE-EWS 1) CATAC will use the updated user's guide in the next ICG/CARIBE-EWS meeting, and 2) Request from the WG 3 about review the technical, administrative, and logical regional TSPs that can be baseline documentation to compare the operation of the user's guide.

ICG/PTWS Steering Committee noted the status of the User's Guides.

8.3.2 Cease Telefax Transmission

The Chair explained the recommendation of the ICG/PTWS XXX and the TOWS-WG XVII regarding the suspension of the telefax and asked about the status of the circular letter to the Secretariat.

The Secretariat explained that the draft of the circular letter was sent to Mr Aliaga in late August and anticipated that if the circular letter was finalized this month, the telefax would cease in March 2025, and he would send a reminder. The Secretariat further commented that an update on the User's Guide would be needed after the feedback on the cease of telefax communication is received.

ICG/PTWS Steering Committee noted the need to have the CL sent by the Secretariat.

8.3.3 Tsunami Threat Message of the PTWC

The Chair raised the summary of the proposed Text Product Changes by highlighting the point of removing the forecast category label "less than 0.3 meters" and replacing it with the label "no threat". Additionally, he brought relevant recommendations from the ICG/PTWS-XXVI in 2015 and the decision of the ICG/PTWS about further discussion. Lastly, he requested an update from the PTWC or WG 2 Chair about the status.

Dr McCreery recalled the discussion among Member States at the ICG/PTWS XXX about the confusion caused by the 0.3 meters because this standard is enough for some countries to alert, but some are not. The Chair highlighted that no threat does not mean any tsunami and expressed his willingness to keep the 0.3 metres in the recommendation. Dr McCreery illustrated the problem of continuing the same discussion at the next ICG/PTWS meeting if they do not decide on the topic. The Secretariat addressed the point of the TSP's role to provide the message and should not reflect all requests from the Member States, and if there is a specific concern at the member state level, it should be taken care of by the national system. Additionally, he highlighted the difficulty of making a consensus due to the uncertainty at the operational level for unexpected bathymetry conditions and other reasons.

Ms Moseley raised that there is no issue regarding having a country list related to 0.3 meters in terms of the risk perspective and not issuing any alerts within 'no threat' level at the national level. The Secretariat pointed that no threat decision should be left to the side of the country. Dr McCreery mentioned the value of having the country list because they do not implement the modeling in the whole Pacific.

The Chair noted that the 0.3 meters as a threat level in the PTWC is clear, and the discussion point is that less than 0.3 meters should indicate no threat. Dr Kong suggested having the word "no threat" in the message in the early part, as it would be easier to understand and avoid any confusion. Dr Jamelot suggested having the height information that can benefit a better understanding of people regarding the situation.

The Secretariat mentioned an alternative way to wait for the feedback from the Tsunami Watch Operation for the Global Service Definition Document because it also has been connected to global harmonization at the TSP level by recalling the request from the Chair, and the relevant deadline is the 30th of September. Dr Jamelot reiterated the importance of the argument from Mr McCreery about the difficulty of changing any format from the TSP text message and suggested having the PacWave questionnaires follow the request and change without waiting for the ICG/PTWS session.

The Chair indicated that the dedicated discussion will be continued in WG 2.

ICG/PTWS Steering Committee noted that WG2 will continue to address this issue.

8.3.4 Termination of Notification of Regular Communication Test from TSPs by Circular Letter

The Secretariat explained that the UNESCO-IOC addressed an optimistic view of not having a Circular Letter for regular communication tests from TSPs and raised the purpose of a Circular Letter is to have a generic broadcast from the IOC with a direct policy impact. Additionally, he added that the last communication test from the SCS region did not have a Circular Letter.

8.3.5 Provision of special tsunami maritime safety products to the NAVAREA coordinators

Dr McCreery provided an update on PTWC's progress in developing and implementing the special tsunami maritime products for NAVAREA Coordinators. He first presented the key elements of the request from the IHO Worldwide Navigational Warning System for these products – that they were only needed for tsunamis with forecast or observed coastal amplitudes above 0.3 m, that they should be issued with the first quantitative forecast and not again unless the forecast changed, and that there would be a final message issued when the threat had mostly passed.

Dr McCreery presented the map of the 21 global NAVAREAs, noting that there are seven that cover the Pacific and its marginal seas and proposed steps forward towards PTWC's implementation of these products. The first step will be a communication test to the seven Pacific NAVAREA Coordinators, either through the NTWCs of the countries responsible for those NAVAREA Coordinators, or directly to the NAVAREA Coordinators. This communication test will take place by email on November 5, 2024 at 0100 UTC in conjunction with the PacWave24 communication test that will be issued an hour earlier. He noted there has also been an interest in sending the messages to the Coordinator for NAVAREA IV in the southern Atlantic since it is immediately adjacent to Pacific NAVAREA XV. Although the messages are meant to name the particular affected NAVAREAS, Chip raised the issue of whether the messages should only be sent to those NAVAREAs or always to all Pacific NAVAREAS. He also suggested including estimated times of arrival and estimated tsunami amplitudes for key ports adjacent to the affected NAVAREAS if their expected amplitudes exceeded 0.3 m. Lastly, he reported the software to compose and disseminate the messages was still in development and that it would be completed with a brief descriptive manual in time for review prior to ICG/PTWS-XXXI.

The Steering Committee and Secretariat provided feedback regarding the outstanding issues related to the NAVAREA products, their content, and their dissemination. Following this discussion, PTWC was instructed by the Steering Committee, unless there is alternate clarification later from the IOC, the WWNWS, or the NAVAREA Coordinators, to issue the products always and only to the seven Pacific NAVAREA Coordinators only through the NTWCs of the country responsible for each of the seven Pacific NAVAREAs; and to not include estimated tsunami arrival times or amplitudes for any coastal places. The issue of including NAVAREA VI in the communication test or the product dissemination was not yet decided.

Mr Sifon raised two points, including the suggestion of asking the navigation warning system about their preference to be affected by the message, NAVAREA Coordinator Contact Information from the worldwide NAVAREA warning system, before the last update from the IHO. Lastly, he inquired about the possibility of sending messages to the TWFP or NTWC to be delivered by them to NAVAREA Coordinators.

DR McCreery thanked Mr Sifon for giving some ideas and responded that sending the NTWC could cause another authority for them as the role is to give advice. Mr Sifon replied that in the case of Chile, SHOA is the focal point and communicated with the NAVAREA but, he believed that any additional responsibility will not be caused in another country.

Dr Fry argued that sending all of the NTWC could be better to make them understand the situation and recalled the positive comment from New Zealand as the Chair of WG 2 about the distribution of the message to the NTWC.

Mr Shingo stated the preference for Japan to get the information through the JMA and inquired about the method of deciding the major ports between the products by mentioning the example of the product for the dummy message. Dr McCreery mentioned that there are a lot of ports that are recognized as important, and he did not have a clear answer to that.

The Chair disagreed with including tsunami ETAs because the message is based on the open sea.

The Secretariat agreed with the Chair and he raised the Joint IHO/IMO/WMO Manual on Maritime Safety Information (MSI) by mentioning the following paragraph;

- *When notified by the authority designated to act on reports of piracy and armed robbery against ships, arrange for the broadcast of a suitable NAVAREA warning. Additionally, keep the national or regional piracy control centre informed of long-term broadcast action(s);*

The Secretariat highlighted that the NTWC is the authorized organization for this purpose and mentioned the recommendation of the exception for the absence of the NTWC, like the case of Argentina. Additionally, he underlined the importance of not being behind if there is any concern regarding the recipient of the message. Lastly, he raised the internal memo from UNESCO to avoid using any maps whenever possible and stated that the Google Earth Polygons should only be used for their operational setting and Mr McCreery confirmed this point.

Mr Sifon raised the question regarding the ports and regional requests for more information when the ships are sailing and indicated that if the ship sails from a specific distance, they will not receive any warning or message. Dr McCreery mentioned the unclarity of the list of countries and islands with threat>0.3m and corresponding harbors as the message content and raised uncertainty about not having any relevant samples.

The Secretariat recalled the contact with the IHO and WWNWS to establish the current list of NAVREA Coordinators with their meeting at the beginning of September and make sure that the relevant issue needs to be addressed in the meeting. He illustrated the importance of having a reply if there is any request from the regional level.

Dr Jamelot described the importance of disseminating the message to all NAVAREA Coordinators and expressed concern about the maximum expected amplitudes as well as the inclusion of the ETAs. In addition, he commented that PacWave 24 would be a good opportunity to test the points Mr McCreery raised during his presentation and work directly with the NAVAREA Coordinators if they have the contact.

The Chair stated that most of the member states are not ready to accept the operation and are concerned about the change of SoPs. He agreed with Mr Jamelot about a benefit from PacWave 24 and requested the report from the WG 2 that includes the collection of feedback from the NAVAREA Coordinators in the next ICG/PTWS Session.

Dr Fry stated four types of navigation warnings, including NAVARAEA Warnings, Coastal Warnings, Sub-area Warnings, and Local Warnings, and indicated the responsibility of the NAVREA to issue the message for Sub-area, Coastal, and Local warnings.

Mr Shingo requested the confirmation of the maritime products and the relevant endorsement from the TOWS-WG. The Secretariat provided the background about the TOWS guidance on how to ensure effective warnings are disseminated to the coastal maritime committee in the Pacific by

mentioning the discussion in the last ICG/PTWS session as well as the criteria that ports are not included in the forecasting and expressed the availability of sharing the relevant documentation.

Dr Fry replied to the previous question from The Secretariat and explained the NAVAREA warnings are for the sub-area, coastal, local, user-defined, and relevant satellite area but NAVTEX is only for the NAVTEX service area. Additionally, the only difference depends on the technical capacity of the ship, mentioning that the small ship can receive the NAVTEX and raise the specific reference that NAVAREA Coordinators ensuring information concerning all navigation warning subject areas may not require a NAVAREA warning within their own NAVAREA. The Secretariat requested to share the reference and Dr Fry confirmed.

Dr McCreery confirmed to continue working and make an update later if necessary.

Mr Sifon reiterated the responsibility of the NTWC, emphasizing that while one NAVAREA coordinator may be responsible for multiple countries, each NTWC is solely responsible for its own nation. He cited examples such as Peru, which is responsible for Ecuador, and the U.S.A., which is responsible for Colombia, due to the absence of NTWCs in these countries. He underscored that despite the lack of tsunami threats in Peru and the U.S.A., these countries must still disseminate tsunami messages to the respective NAVAREA coordinators in Ecuador and Colombia.

The Chair noted that during PacWave 2024, dissemination would follow this coordination framework, with feedback from the NAVAREA coordinators expected through the NTWC. He added that dedicated discussions on this topic would continue at the next ICG/PTWS session. The Secretariat emphasized the importance of collecting feedback from all NAVAREA Coordinators and ensuring diligent follow-up to capture responses from those who might not initially reply.

The Chair outlined that two dummy message dissemination tests would take place on November 5th:
1) PTWC will send a dummy message to the NTWC for communication testing at 00:00 UTC, and
2) PTWC will send a dummy message to the NAVAREA Coordinators at 01:00 UTC.

ICG/PTWS Steering Committee noted the report on the special products for the maritime community.

8.3.6 Status of the CATAC

The Chair raised the recommendation from the ICG/CARIBE-EWS-XVII about the consideration of CATAC as a TSP in 2025 to enable the IOC Assembly to consider the final admission of CATAC as a TSP in June 2025 and highlighted that the CATAC has not been fully operational.

Mr Strauch explained that the CATAC needs to fulfill the requirements, and the Nicaraguan government changed the status of the CATAC; hence, the final decision will be taken, and the recommendation of the CATAC as TSP will be considered.

The Chair requested an update about the decisions from the ICG/CARIBE-EWS and raised a point that the PTWS could wait for their decision.

The Secretariat illustrated that the PTWS makes its own decisions based on its consideration without any limitation from the other ICGs and if the Chair decides to wait for the decision of the ICG/CARIBE-EWS, it means the full operation of the CATAC will be automatically postponed. Additionally, the 17th CARIBE-EWS stated the updated user's guide needs to be available in March, and the next ICG/PTWS session will also require this. The Chair thanked The Secretariat for the clarification and Mr Strauch agreed with the Secretariat's argument.

ICG/PTWS Steering Committee noted the current status of CATAC.

8.4 UN Ocean Decade Tsunami Program

The Chair raised the endorsed decade action, including contributions, projects, and programmes related to the Tsunami, and highlighted the insufficient number. He explained the recommendation that encourages the member states and the regional WGs to submit actions related to the UNODTP and recommends that the Chair convene the ICG/PTWS officers meeting to discuss the allocation for the UNODTP among the Officers.

The Chair brought the recommendation from the last TOWS-WG, the Group requested the IOC Secretariat to develop a reporting mechanism to allow ICGs to report progress on related projects within the Ocean Decade and against the ODTP-RDIP KPIs, aligning with the proposed Global KPI Framework for the UNESCO-IOC Tsunami Programme;

During the ICG/PTWS Officers Meeting (online) on 23 April 2024, the summary regarding the UNODTP was as follows:

- The vice-chairs should involve in promotion of the UNODTP. However, it is difficult to assign one of three vice-chairs.
- Therefore, each vice-chair will have responsibility for following up the UNODTP of different familiar regions of each vice-chair,
  Mr Fa'Anunu: PICT, Oceania
  Dr Strauch: Central America, Latin America
  Dr Wang: East Pacific
  Mr Nishimae: North America
  The Chair will also be responsible for the global oversight of the ODTP.
- Fa'Anunu expressed his availability to closely follow the EW3ALL initiative.

The Secretariat indicated that the reporting mechanism was discussed in the scientific committee of the UN ODTP but has not heard any progress yet and raised the change of ToRs during the last ICG in order to strengthen the mandate of the OD Tsunami Programme.

Dr Fry stated that having a reporting mechanism for the ICG could benefit guidance for taking and capturing the action. The Chair highlighted the cooperation for achieving the common goal and asked for their support to proceed.

ICG/PTWS Steering Committee noted the need to continue the discussions at the ICG/PTWS XXXI.

8.5 2nd Tsunami Global Symposium

Ms Anugrah introduced the agenda item. She presented the timetable from the 11th of Nov 2024 to the 14th of Nov 2024, including the opening ceremony, side events like exhibitions, posters, and ignite stages and closing ceremony. Additionally, she explained the expected scope for the pre-event, the main event as the 2nd UNESCO-IOC Global Tsunami Symposium with 1,000 targeted participants, all-day excursion with 300 target participants, and a special event and highlighted its aims, including the commemoration and identification of challenges and synergy at the global level.

Ms Anugrah addressed the steering committee endorsed by UNESCO-IOC TOWS-WG, programme organizing committee approved by TOWS-WG, and the national committee Indonesia. In addition, she provided the schedule for each day, including the dedicated session topic and the keynote speech.

Ms Anugrah explained that there are 350 registered participants and expected 500 participants by November and provided the information on the venue for the main event, specific sessions, and the

ceremony. She stated that the public, youth and young professionals, donors and sponsors will participate in the side-event.

Date	Event
Day 1 (11st November 2024)	Opening Ceremony Session 1: Review of the Tsunami Warning and Mitigation System over the past 2 decades Session 2: Tsunami generated by non-seismic and complex sources
Day 2 (12nd November 2024)	Session 3: Tsunami Hazard and Risk Assessment Session 4: Tsunami Detection, Warning, Dissemination and Response Session 5: Achieving 100% Communities at Risk to be Prepared for and Resilient to Tsunami by 2030 Session 6: Other critical issues for building community resilience
Day 3 (13rd November 2024)	All-day excursion to visit Museum Tsunami Aceh, the affected area (Lampuu), and Tsunami Ready village
Day 4 (14th November 2024)	Session 7: Contributions of TEWS to Global Initiatives Session 8: Warp up/Synthesis/Way Forward Closing Ceremony

Ms Anugrah raised the Pre-Event: International Scientific Workshop and Sem Scientific Workshop hosted by IABI, collaborated with USK TDRMC and IGI and UNESCO-IOC by mentioning the IUGG Special Session on the 9th of November.

Dr Kong thanked her for her hard work and raised the question related to the funding availability to invite the representatives from the TR recognition in the Pacific as presented by Ms Suci. Ms Suci responded that Indonesia would support the Indonesians, but other participants could participate online with the limitation and mentioned their plan to upload the dedicated video on YouTube after the symposium.

Mr Xu inquired about the registration deadline, and Ms Anugrah confirmed that registrations will be possible until the end of September.

ICG/PTWS Steering Committee noted the presentation on the 2nd UNESCO-IOC Global Tsunami Symposium.

9) UNESCAP Capacity Assessment Project

Dr Kong introduced the agenda item. She stated the dedicated initiative covers Indian & Pacific Oceans Project and highlighted the previous comprehensive assessments, including the PTWS 'National capacity assessments for 14 Pacific countries and consolidated regional report in 2009/2010 funded by Australia.

Dr Kong highlighted three objectives such as the evaluation of the existing technical capacity of the PTWS, the identification of specific gaps and capacity development requirements at regional and national levels for the technical and policy aspects, and reinvigoration of the political commitment and a provision for the recommendation for investment.

Dr Kong underscored the three components for the outputs of the PTWS, including the 2.A Member State Survey Analysis for PTWS (IOC), 2.B PTWS assessment summary and comparative analysis (IOC), and 3.C Tsunami preparedness recommendations. Additionally, she mentioned the offer from the UNESCAP to provide the policymakers.

Dr Kong explained the difference between the PTWS and UNESCAP by raising the larger group of the UNESCAP (53 member states) than the PTWS (46 member states). Additionally, she raised PTWS Medium Term Strategy, 2022-2030 (TS 172) that aligned with the Implementation Plan of UN Decade of Ocean Science for Sustainable Development (2021-2030), the UNESCO's Medium-Term Strategy for 2022-2029 as 41 C/4, IOC Medium-Term Strategy 2022-2029, Global targets and priorities for action of Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030, an ICG/PTWS Framework Future Goals and Performance Monitoring of Tsunami Risk Reduction, Hazard Warning, and Mitigation (2018).

Dr Kong highlighted their vision related to tsunami resilience, management of the hazard and risk, as well as tsunami warning and mitigation system and provided the proposed major PTWS milestone, including the planning and inception, data collection and analysis, validation and review, and the finalization and communication.

Concerning the review process and drafting recommendations, Dr Kong briefed the overview, including the review by the ICG/PTWS workshop, all members of WGs and TTs, and ICG/PTWS Steering Group for the survey findings, analysis, discussion of identified gaps, and draft recommendations. Additionally, she mentioned that the UNESCAP would support the facilitation of the report.

Regarding the funding, Dr Kong raised the role of the UNESCAP that supports the workshop for the UNESCAP member travel and venue, and consultants for the technical assessment and policy paper, as well as additional assistance related to the report editing and design. She addressed that the UNESCO-IOC has a responsibility for the support workshop for the remainder of IOC-PTWS member travel.

Dr Kong brought the example from the IOTWMS Online Survey Structure and Procedures by raising the engagement with the Disaster Management Agency as a focal point in terms of Risk Assessment and Reduction and Public Awareness, Preparedness & Response. Concerning how they collected data, she added the Survey Monkey platform and shared the unique online survey links with all Tsunami National Contacts.

Dr Kong mentioned the need to approve the process followed by the IOTMWS regarding the survey and the review workshop for recommendations. She raised the established deadline of the PTWS Proposal for the UN ESCAP approval about the funding before the 8th of Oct and the need for confirmation about the decision of who is involved in the workshop and review, finalization of survey questions (who, when, how-method), and the funding confirmation.

Ms Baker from UNESCAP explained that the dedicated project was established right after the Indian Ocean Tsunami and addressed two points: 1) the gap between the technical complexity of the tsunami warning system and policy understanding as well as the sustainable finance for the mechanism and 2) a need to develop the decision-making process to invest in the tsunami system.

Ms Baker expressed their hope to get a clear indication from the Pacific country and a limitation as to the tight timeline for the budget and its usage.

Ms Anugrah added the methodology for the national technical online survey, survey analysis, and validation consultation workshops. Additionally, she provided the information regarding the assessment that will be completed within a total duration of 23 months (14 months for Phase-one and 9 months for Phase-two), from November 2023 to 2etember 2025, for data collection and analysis, drafting, and validation, editing and design, and adoption and launching across all relevant platforms.

Concerning result presentation, Ms Anugrah planned that the results will be presented in the UNESCO-IOC Member States at the 14th Session ICG/IOTWMS, UNESCO-IOC 2nd Global Tsunami

Symposium, and Asia-Pacific Ministerial Conference on Disaster Risk Reduction by presenting the timeline. She reiterated the need to define who will be involved in the workshop and mentioned that they request all Chairs of WG and TT for the relevant activity.

Ms Anugrah reiterated the process of drafting recommendations;

1. The experts from the ICG/IOTWMS, the Chairs of the Working Groups and Task Team, met in Bangkok 3-6 September 2024 to review the analysis of the survey data and the identified gaps, along with input from the national warning chains review and other capacity gaps identified by the WGs and TT of the ICG/IOTWMS.
2. Draft recommendations to address the identified gaps have been produced during the workshop.
3. Draft recommendation is classified into: Tsunami Plans and Policies, Tsunami Hazard and Risk Assessment; Tsunami Detection, Warning, and Dissemination; Tsunami Public Awareness, Preparedness & Response; Tsunami Ready Recognition Programme (TRRP) or Similar National Initiatives; Tsunami Warning Exercises
4. The draft recommendations will be reviewed by the Steering Group of the ICG/IOTWMS, chaired by the Chair of the ICG/IOTWMS, to be endorsed by the Chair.
5. A full report will be produced on the outcomes of the capacity assessment, including an Executive Summary, the results from which will be tabled at the upcoming 2nd Global Tsunami Symposium and 20th Commemoration of the Indian Ocean Tsunami of 2024 in November 2024.
6. The full report will also be reviewed in detail at the 14th Session of the ICG/IOTWMS in November in Banda Ache, Indonesia.
7. UNESCAP is also producing a summary of the full report for policy and decision-makers to facilitate the uptake of the outcomes of the assessment for action

Ms Anugrah indicated an example of the result of TR to confirm whether countries have an interest in participating in the UNESCO-IOC TRRP. She indicated that 13 countries (59%) confirmed that they are already participating in TRRP and raised the reason related to a lack of understanding about the programme. Concerning whether countries are currently implementing any other Tsunami Resilience and Preparedness initiatives or programmes, she stated that six countries (27%) responded, and 14 countries (63%) responded and confirmed they are not currently implementing any other Programme or initiatives.

Ms Anugrah also addressed the estimated number of villages related to the TR because one of the recommendations of the WG3 meeting in Hyderabad is to identify the number of communities/villages living in the Tsunami prone area, in order to develop complete information to respond to the UNESCO Tsunami Programme and prioritize number of communities to be supported to implement the TR Programme or Similar initiative.

Concerning the National Tsunami Ready Board (NTRB), only five countries (23%) reported having the NTRB. Ms Anugrah described the country's response of having NTWC, NDMO/LDMO, National and Local Government Agencies, Emergency Services, Humanitarian agencies, and other collaborators such as the private sector, critical infrastructure, universities, and media for the question regarding which institutions should be involved in the implementation of TRRP or similar national initiative.

Ms Anugrah addressed that National and Regional Training and Workshop Capacity Building are the points that need a strong need for technical support or some international expertise. On the other hand, advocacy, guidance, and tools can be easily done by mobilizing national experts and funding based on the summary of national capacity according to different aspects of the TRRP. Lastly, she described the importance of addressing the multi-hazard approach as challenges that inhibit the implementation of the TRRP and their effort to have SIDS (Comoros, Maldives-2024, Mauritius, Seychelles-2023, East-Timor-2023) and LDCs (Bangladesh, Myanmar, East-Timor -2023) as priorities in the Indian Ocean.

Ms Anugrah remarked on the identification of the gap and progress after 2018, the need for stakeholder engagements (NTWC, NDMO, Sea Level Monitoring Organization), validation of the result, cross-cutting recommendation, final recommendation endorsed by the ICG Steering Committee and Promotion in the Global Platform.

The Chair expressed his concern about the tight timeline for the funding. The Secretariat recalled the agreement from the Steering Committee that the Chair will send the endorsement to the UNESCAP for the Phase-2 project so that they could finalize it. The Chair confirmed.

Dr Kong raised her concern about the budget and the possibility that the UNESCO-IOC will cover some parts and asked Ms Baker about the estimated budget. Ms Baker responded that it depends on different aspects, but she could confirm that 12 different country participants and a few full resource people will be needed at least and expressed an opportunity to have co-financing and the importance of having a decision from the Steering Committee regarding who will be attending, etc.

Ms Bland informed on the group needed to design, drive, and validate the assessment:

- Membership (incl countries)
    - Steering Committee plus TT Chairs/Co-Chairs:
        - 25 individuals (19 if remove duplicates from countries)
        - Chile, China (3), Costa Rica, Ecuador (2), El Salvador, Indonesia, Japan (2), New Zealand (3), Nicaragua, Peru (2), PNG, Tonga (TBC), USA (2), Vanuatu, ITIC and 4 TSPs
        - Additions from Chair
- Additionally
    - TT Chairs/Co-Chairs (self-funded)
        - 32 individuals (23 if remove duplicate representation)
        - Adds Australia, PNG, Tonga (if not above), Solomons, France

Dr Kong inquired to Ms Baker if the proposal was achievable. Ms Baker expressed her positive view about the proposal and added if the UNESCO-IOC could join to support the countries that are not UNESCAP, it would be beneficial. The Secretariat needed internal confirmation. Mr Korovulavula expressed his curiosity about how they can validate the information the country provided in terms of the timeline. Dr Kong responded that they do not have an opportunity to visit every country and recognized the submitted materials and information as the validation by each country.

Mr Sifon inquired about the scope of the representative from the country based on the design presented by Ms Bland. Dr Kong requested clarification about the Ecuador case that they have two representatives. Ms Bland confirmed that they represent two different steering committees as Chair and Co-chairs and mentioned that if the country is not included in the UNESCAP member states, the UNESCO-IOC will review. Dr Chacon-Barrantes suggested having several surveys because the answers to the survey will depend on the different organizations. Additionally, she indicated a possibility that the organization will not be able to fill out the form in one day and need to have a function of saving responses or no need to answer all questions as mandatory, etc.

ICG/PTWS Steering Committee agreed for an endorsement letter to be sent by the Chair.

10) ICG/PTWS-XXXI Session
10.1 Expected Date for the ICG/PTWS-XXXI session

Dr Wang presented information about the venue of the ICG/PTWS-XXXI session which will be held in Beijing, China on 8-11 April 2025.

ICG/PTWS Steering Committee noted the plans and preparations for the ICG/PTWS XXXI.

10.2 Draft Agenda of the ICG/PTWS-XXXI session

The Chair presented the draft Agenda for the next ICG/PTWS session was presented as follows:

1. Welcome and Opening of Session
2. Organization of the session
   2.1 Adoption of Agenda
   2.2 Designation of the rapporteur
   2.3 Conduction of the session, timetable and documentation
3. Report on Intersessional Activities
   3.1 Chairperson report
   3.2 Secretariat report
   3.3 TOWS-WG report
   3.4 Tsunami Services Providers report
      3.4.1.1 PTWC
      3.4.1.2 NWPTAC
      3.4.1.3 SCSTAC
   3.5 ITIC's report
   3.6 National Progress Reports
   3.7 Working Groups and Task Team Reports
   3.8 Status of progress in other ICGs
   3.9 Reports from UN and Non-UN organisations
4. Policy Matters
   4.1 PTWS Status Report
   4.2 Tsunami Ready Recognition Programme
   4.3 Minimum Competencies for National Tsunami Warning Centers
   4.4 Integration of PTWS Sensors networks for tsunami detection and chracterisation
   4.5 TSP Tsunami Message against an earthquake outside the ICG/PTWS ESZ
   4.6 Provision for Tsunami Information Services for the Maritime Community
   4.7 Revised user's manuals and services overview document
   4.8 Pacific Wave Exercise
      1.8.1. Report of the Pacific Wave 2024
      1.8.2. Planning for the Pacific Wave 2024
   1.9. Central America Tsunami Advisory Center (CATAC)
   1.10. Ocean Decade Tsunami Programme (ODTP)
   1.11. Tsunami Generated by Volcanoes
   1.12. UNESCAP Tsunami Preparedness Capacity Assessment in Indian and Pacific Oceans Project
   1.13. Tiered use of PTHA results in assessments
2. Programme and Budget for 2026-2027
3. Next Session
   6.1 Confirmation of date and place of ICG/PTWS-XXXII
   6.2 Target date for ICG/PTWS-XXXIII
4. Elections of Officers
5. Any Other Business
6. Adoption of decisions and recommendations
7. Closure

The Secretariat highlighted the importance of the submission of the necessary presentation and documentation at least two weeks before the session as well as the summary of the presentation to facilitate the report draft. Additionally, he also described the clarification of the vice-chair (two or three) needs to be confirmed to be reflected in the circular letter and emphasized the gender balance in all activities, including WG, TT, and especially in the governance.

The Chair reiterated the submission of the presentation and summary and encouraged colleagues to provide them as soon as possible. Additionally, he expressed his idea to keep three vice chairs at this moment and discussed the dedicated topic in the ICG/PTWS in 2026.

Dr Kong illustrated the advantage of recognizing three vice-chairs and the relevant declaration and mentioned the role of the vice-chair that supports the chair. Ms Lara indicated that having three vice-chairs could be helpful not only in capability but also the role in terms of performance. The Secretariat mentioned the job description is only in the circular letter and its detail in the vice chair is generic compared to the chair and stated that to have a specific role and definition for them would be important.

Dr Kong suggested discussing the role of the vice-chair before the coming election because it would be clear to have an agreement about how the vice-chair can help the chair. The Chair expressed his negative view of its possibility and expressed his plan to have a dedicated meeting about the number of vice-chairs in the ICG/PTWS in 2026.

ICG/PTWS Steering Committee noted the draft agenda of the ICG/PTWS XXXI.

10.3 ICG/PTWS 60-year Anniversary Workshop

The Chair introdcued the one-day IOC/IUGG-JTC Joint Workshop for the ICG/PTWS 60th anniversary and requested to provide input. Dr Kong suggested dividing the two parts in terms of the UN ODTP. Ms Fromont agreed with this approach and mentioned that it could be a good opportunity to review the progress and goals as well as other relevant topics about PTWS, such as social community side warnings and disaster management side warnings, in a scientific way. The Chair expressed that the suggestion is good, but it would be difficult to implement due to the tight timetable and limited speakers.

The Secretariat indicated that the suggestion would be great and raised a question about to what extent the IUGG Joint Tsunami Commission could engage with more scientific parts. Dr Kong mentioned that they deal with the resilience part. Dr Titov also stated that having a scientific theme in the ICG would be beneficial and illustrated that a scientific workshop for the whole ICG would also be great. Dr Jamelot agreed with Mr Vasily's point.

Dr Kong clarified whether the workshop is focused on the 60th anniversary and if it is, they need to follow the agenda and table of contents to review their task and achievements. The Chair stated that the workshop theme is related to the UNOD and the workshop needs to focus on the future aspect of the PTWS related to the UNOD and mentioned the future meeting that will discuss the forecasting, disaster management against the non-seismic tsunami and the TGV.

Dr McCreery indicated that the UNOD is wide enough, and they could select and give the dedicated presentation, or every presentation has the background of the respective task. Dr Kong raised the necessity to have the information between the past and now with two slides at least.
The Secretariat indicated that the workshop should be different from the ICG and its presentation to not miss the opportunity to discuss deeply in the scientific way to avoid repeating and discussing same matters. He also highlighted that the issue could be more complicated by raising the case of the Expansion Source zone and Scotia Arc and raised an alternative way to proceed with the dedicated workshop. Additionally, he suggested the workshop focusişng on the capacity assessment with the UNESCAP.

Dr Titov agreed with the comment from the Secretariat and indicated that since it is connected to the ICG, discussing outstanding scientific issues related to tsunamis would be beneficial.

Dr Chacon-Barrantes illustrated that the workshop for the Scotia Arc would not be appropriate in the next ICG/PTWS because the participants are different from the usual attendants of the ICG, and it might cost the budget to invite the experts to Beijing. She raised the same suggestion with the Secretariat about the workshop in the capacity assessment as an opportunity.

Dr Kong indicated that in the case of the workshop for capacity assessment, the Chair needs to convince the UNESCAP and propose the survey before the deadline of the ICG with an ambitious effort to review and validate. Dr Chacon-Barrantes raised the suggestion about implementing the task through regional WGs because of the tight timeline.

The Secretariat suggested creating the proposal list they raised during the Steering Committee and sharing it with the IUGG Joint Tsunami Commission to obtain their response since this is a joint workshop.

The Chair confirmed that he will draft the concept note with 2-3 scenarios, gather the comments, and propose the Chair of Joint Tsunami Commission.

ICG/PTWS Steering Committee agreed that the Chair will prepare the concept note for 2-3 scenarios in order to propose the Chair of the Joint Tsunami Commission.

11) Any Other Business

The Secretariat reminded the participants to provide the presentations and their summary at their earliest convenience. Ms Bland inquired about whether the summary requires any specific format. The Secretariat responded that the format depends on the participants and there is no limitation.

12) Special Lecture: Nankai Trough Earthquake Information presented by the JMA

This presentation was provided by Mr Ushida Shingo. At 4:42 pm on August 8, the earthquake with a JMA magnitude of 7.1 (moment magnitude of 7.0) occurred in the Hyuganada Sea off Miyazaki in Kyushu. After this earthquake, JMA issued “Nankai Trough Earthquake Extra Information”.

Nankai Trough earthquakes occur with a cycle of roughly 100-150 years in the region ranging from Suruga Bay to the Hyuganada Sea with various repetition intervals and source areas. A Nankai Trough mega-earthquake could cause severe damage over a wide area due to strong shaking and subsequent tsunami.

Nankai Trough Earthquake Extra Information is that the probability of a mega-earthquake occurring is assessed to be relatively higher than usual. It should be noted that this information does not necessarily mean that the Nankai Trough earthquake will actually occur. This earthquake on August 8 occurred in the possible epicenter area of the Nankai Trough earthquake, and it was assessed that this earthquake was possibly a foreshock of the Nankai Trough earthquake. Therefore, the JMA issued the Nankai Trough Earthquake Extra Information (Information (Megathrust Earthquake Attention). Following the information of Megathrust Earthquake Attention, the government of Japan called for people to remain prepared for an earthquake on a daily basis for a week.

Fortunately, no mega-earthquake occurred and no significant changes were observed in the Nankai Trough. The Nankai Trough Earthquake Extra information does not predict the occurrence of an earthquake. Some report that the information this time has increased residents' awareness of disaster prevention. The most important thing is to make people aware that an earthquake could occur at any time, and to encourage people to prepare for an earthquake on a daily basis.

The Secretariat thanked Mr Shingo for his presentation and mentioned that this event could be a milestone in earthquake and disaster preparedness. In addition, he indicated that it would be great to have a brief English description of the mega-quake advisory for future similar occasions to assist other authorities and governments to respond to the questions. Mr Shingo recognized a lack of English materials in JMA and agreed with the Secretariat.

Dr Titov thanked his presentation and indicated that to save all information, such as analysis and review in scientific component from the JMA for the earthquake extra information would be useful.

Ms Bland thanked his presentation and raised a question regarding whether people were not satisfied with the warning because there were no occurrences of mega-earthquake even though they were alerted. Mr Shingo responded that some people were indeed not very happy with the overall situation, as it was a busy season at that time, but most of them understood the meaning of the information and warning.

Ms Anugrah expressed gratitude for the presentation and raised concerns regarding the public understanding of natural warnings, especially about how people can become more aware of and comprehend the natural warning signs of earthquakes and subsequent tsunamis. In response, Mr Shingo explained that in Japan, the general public typically receives alerts through TV and radio broadcasts. He emphasized the importance of transmitting information via smartphones, highlighting this as a key method for reaching people effectively.

The Chair underscored that the procedures and guidelines discussed are specifically tailored for the Nankai Trough region, mentioning that there are varied scenarios depending on the earthquake type within the area. He further referenced the case of Hokkaido to illustrate the differences in approach based on regional variations.

13) Closing

Ms Chacon-Barrantes expressed keen interest in hosting the ICG/PTWS session in 2029 in Costa Rica while noting that hosting it in 2027 may be impossible due to potential changes in government.

The Chair concluded the session by thanking colleagues for their hard work and emphasizing the significance of the ICG/PTWS session given the higher frequency of tsunamis and earthquakes in the Pacific region compared to other regions. He expressed optimism for the continued development of tsunami warning systems and the TR Programme, commending the efforts of the WGs and TTs.

Agenda

1) Welcome and Opening
2) Adoption of Agenda
3) Review of Action Items from the ICG/PTWS-XXX session
4) Chair's Report on the TOWS-WG XVII session and the IOC 57th EC
5) Report of Tsunami Service Providers
   5.1) PTWC
   5.2) NWPTAC
   5.3) SCSTAC
   5.4) CATAC
6) Report of the ITIC
7) Report of WGs
   7.1) Working Group 1 - Understanding Tsunami Risk
   7.2) Working Group 2 – Tsunami Detection, Warning and Dissemination
   7.3) Working Group 3 – Disaster Risk Management and Preparedness
   7.4) Regional Working Group on Tsunami Warning and Mitigation System on the Central American Pacific Coast
   7.5) Regional Working Group on Tsunami Warning and Mitigation System in the Southeast Pacific Region
   7.6) Regional Working Group on Tsunami Warning and Mitigation System in the South China Sea Region
   7.7) Regional Working Group on Tsunami Warning and Mitigation System in Pacific Island Countries and Territories
8) Policy Matters
   8.1) Tsunami Detection, Warning and Dissemination
     8.1.1) Sea Level Observations
     8.1.2) SMART Cable
     8.1.3) SoP of Tsunami Generated by Volcanoes and Meteo-tsunami
     8.1.4) Common Format for Tsunami Products from TSPs
     8.1.5) Expansion of the ICG/PTWS ESZ
   8.2) Tsunami Disaster Preparedness
     8.2.1) Tsunami Ready Recognition Program
     8.2.2) Minimum NTWC Competency Framework
     8.2.3) Pacific Wave 2024
   8.3) Tsunami Service Provider's Products and Messages
     8.3.1) User's Guide
     8.3.2) Cease Telefax Transmission
     8.3.3) Tsunami Threat Message of the PTWC
     8.3.4) Termination of Notification of Regular Communication Test from TSPs by Circular Letter
     8.3.5) Provision of special tsunami maritime safety products to the NAVREA Coordinators
     8.3.6) Status of the CATAC
   8.4) UN Ocean Decade Tsunami Program
   8.5) 2nd Tsunami Global Symposium
9) UNESCAP Capacity Assessment Project
10) ICG/PTWS-XXXI Session
   10.1) Expected Date for the ICG/PTWS-XXXI session
   10.2) Draft Agenda of the ICG/PTWS-XXXI session
   10.3) ICG/PTWS 60-year anniversary workshop
11) Any Other Business
12) Special Lecture: Nankai Through Earthquake Information presented by the JMA
13) Closing

Participants
(R) Remote participants

Ms Adrienne Moseley (Geoscience Australia, Australia)
Dr Anthony Jamelot (CEA/DASE/LDG, French Polynesia) (R)
Ms Ashleigh Fromont (NEMA, New Zealand)
Dr Bill Fry (GNS Science, New Zealand)
Dr Bruce Howe (SMART Cables JTF/USA)
Dr Charles McCreery (PTWC/USA)
Dr Christopher Moore (NOAA, USA) (R)
Ms Corina Allen (NOAA, USA) (R)
Dr Dakui Wang (NMEFC, China)
Mr Gregory Mitchel Schoor (NOAA, USA) (R)
Dr Hélène Hébert (CEA, France) (R)
Mr Indra Gunawan (BMKG, Indonesia)
Mr James William Peronto (NOAA, USA) (R)
Mr Jiuta Korovulavula (UNESCO-IOC)
Ms Lara Bland (NEMA, New Zealand)
Dr Laura Kong (ITIC, USA)
Mr Luiz Morales Auz (INOCAR, Ecuador)
Ms Margarita Martinez (SENAPRED, Chile)
Mr Matias Sifon (SHOA/Chile)
Dr Öcal Necmioğlu (Technical Secretary of ICG/PTWS)
Ms Patricia Arreaga (INOCAR, Ecuador)
Dr Silvia Chacon-Barrantes (SINAMOT, Costa Rica)
Mr Shingo Ushida (JMA, Japan)
Mr Sifon Matias (SHOA, Chile)
Dr Stuart Weinstein (PTWC, USA)
Ms Suci Anugrah (BMKG, Indonesia)
Dr Takeshi Sato (JMA, Japan)
Ms Temily Isabella Baker (UNESCAP)
Dr Timothy Melbourne (CWU, USA)
Dr Vasily Titov (NOAA, USA)
Dr Wilfried Strauch (CATAC, Nicaragua) (R)
Mr Yuji Nishimae (JMA, Japan)
Mr Zhiguo Xu (NMEFC, China)

Group Photo of the Participants of the ICT/PTWS Steering Committee Meeting (18-20 September 2024, Honolulu, USA)