

Intergovernmental Oceanographic Commission

Reports of Meetings of Experts and Equivalent Bodies



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**Intergovernmental
Oceanographic
Commission**

**Regional Working Group
on Tsunami Warning
and Mitigation System
for the South China Sea Region
(WG-SCS)**

Thirteenth Meeting

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1. WELCOME AND OPENING

The Thirteenth Meeting of the Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (WG-SCS-XIII) was held on 18 and 19 November 2025, online.

Ms Suci Dewi Anugrah, Chair of WG-SCS, opened the meeting and welcomed participants from various countries across the South China Sea (SCS) region (China, Indonesia, Malaysia, the Philippines, Singapore, Thailand and Viet Nam), and the Secretariat (Dr Bernardo Aliaga). She expressed her sincere appreciation to all member states and to Dr Bernardo Aliaga and his team, for taking on the role of the ICG/PTWS Secretariat and for organizing the meeting. Although the meeting was virtual, Ms Anugrah believed that the participants would demonstrate their region's commitment to advancing tsunami-risk reduction. She then outlined the two high-level objectives of the Ocean Decade Tsunami Program. The first objective is to develop the capability of tsunami warning systems to deliver timely, actionable warnings from all identified sources, aiming to achieve 100% coverage. The second objective is to ensure that 100% of at-risk communities are prepared and resilient to tsunamis by 2030. She encouraged the Member States to update the group on progress in identifying gaps and priorities for strengthening the effort—powered by network warning chains—and to assess capacity building, updated guidance, and the implementation of the Tsunami Ready Recognition Programme (TRRP).

2. ORGANIZATION OF THE SESSION

2.1 ADOPTION OF AGENDA

The Chair, Ms Anugrah, acknowledged the participants the provisional agenda that had been circulated before the meeting. Indonesia proposed that two additional items be added under “Any Other Business” (AOB): (1) a presentation by Dr Januar Arifin on the observations of the July 29th, 2025 Kamchatka tsunami in Indonesia, and (2) a presentation by Dr Iyan Turyana on the vandalism against the Indonesian Buoy. A further proposal was put forward by China to add a presentation item by Ms Queenie Lam on a proposal of a demonstration project to use a low-frequency time-coded broadcasting station for disseminating tsunami advisories in the SCS Region. Without any other comments, these proposals were accepted and added to AOB in the meeting on 19 November. The agenda was finalized and is included under Annex I.

2.2 DESIGNATION OF RAPPORTEUR

The Delegation of China volunteered Mr Chan Wai-soen from the Hong Kong Observatory (HKO) to serve as rapporteur and Mr Zongchen Wang from the National Marine Environmental Forecasting Center (NMEFC) to support Mr Chan. These recommendations were accepted by the Group.

2.3 CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION

The Chair outlined the conduct of the session, noting that this meeting follows the decision from the previous plenary to alternate between in-person meetings every second year and online meetings otherwise. The XIII meeting was held virtually. The session was structured over two half days on 18 and 19 November 2025, with each day scheduled from

0630 UTC to around 0900 UTC. The timetable was adopted as presented. The Chair reminded that all relevant documents and materials are accessible on the ICG/PTWS-WGSCS-XIII meeting website.

3. REVIEW OF DECISIONS, RECOMMENDATIONS AND ACTIONS ARISING FROM ICG/PTWS-WG-SCS-XII MEETING

The Chair noted that the previous meeting of the WG-SCS (ICG/PTWS-WG-SCS XII) requested the IOC Secretariat to make an announcement to all Member States' National Tsunami Warning Centers (NTWCs), Tsunami National Contacts (TNCs) and Tsunami Warning Focal Points (TWFPs) on the International Staff Programme of the WG-SCS to host seconded experts at the South China Sea Tsunami Advisory Center (SCSTAC) from the Member States of the WG-SCS in 2025, with the travel and local expenses covered by the NMEFC. The action had been taken and the letter was circulated on 12 June 2025. The Chair recalled that the International Staff Programme was under way from 21 October 2025 to 20 December 2025.

The Chair also recalled that the WG-SCS XII requested the Task Team on Capacity Development and Services (TT-CDS) to promote and conduct of trainings related to the indicators in the TRRP by engaging more experts from WG-SCS to serve as resource persons or trainers for this activity. The Chair reported that the action had not yet been completed but that an online training on Tsunami Ready was planned for December 2025 with focus on the 12 indicators of TRRP. She added that representatives from some of the Member States participated in the 2025 ITIC Training Programme-Tsunami Early Warning Systems Hawaii conducted by ITIC in collaboration with PTWC from 15 to 26 September 2025.

The Chair continued by recalling that the WG-SCS XII requested the SCSTAC to make ready the draft revised User's Guide by December 2024 for the Chair of the WG-SCS to circulate it to Member States for review by January 2025. The action had been taken as the User's Guide had been drafted by the SCSTAC, had been reviewed by the Chair and had been posted on IOC website of this meeting by the Secretariat for Member States to review.

The Chair then recalled that the WG-SCS XII strongly encouraged Member States to contribute to capacity development activities such as identification of resource persons or experts to conduct roving seminars/workshops/technical visits to promote exchanges and experience sharing among Member States in order to achieve the goal of tsunami resilience in a sustainable way. There were activities conducted in line with this recommendation. Some of the Member States like Indonesia conducted training on Tsunami Mitigation and Tsunami Ready under the BMKG Specialist Training Center of OTGA from 14 to 18 July 2025, with participants including from Indonesia and the Philippines.

The Chair noted that the previous meeting of the WG-SCS (ICG/PTWS-WG-SCS XII) and ICG/PTWS-XXXI decided that the Terms of Reference (ToR) of WG-SCS (Appendix 1) remained unchanged. The meeting also strongly encouraged the Member States of the WG-SCS to share more seismic and sea level stations data for tsunami warning purposes in accordance with the IOC Oceanographic Data Exchange Policy to further enhance the tsunami warning capability in the SCS region. The Chair reported Indonesia had shared 21 sea level stations through the IOC sea level station monitoring facility website, five of which were located in the SCS region.

The Chair continued recalling that the previous meeting of the WG-SCS (ICG/PTWS-WG-SCS XII) requested the Member States of the WG-SCS to regularly update information on NTWC, TNC and TWFP with IOC Secretariat following the established procedures. The Chair encouraged the Member States to update the information whenever there are changes. The Secretariat confirmed that new information had been received from the Philippines and the updated email address of Cambodia was also obtained. The contact list had been updated.

The Chair inquired about the method for updating information with the Secretariat. The Secretariat responded that email requests could be sent to the Secretariat. If there is a change in the name of the institution that is in charge of TNC, TWFP or NTWC, a formal communication via letter to the Executive Secretary through either the Ministry of Foreign Affairs, the National Commission for UNESCO or the permanent delegation of the Member State at UNESCO would be required. There is no specific format of the letter, Member States can follow the Circular Letter No.2563 for updating information on NTWC and TWFP (<https://oceanexpert.org/document/14576>).

4. REPORTS

4.1 NATIONAL PROGRESS REPORTS

4.1.1. China

Mr Jianyu Shi from NMEFC, Ministry of Natural Resources (MNR), China, presented the report of China. He reported that their global seismic data network consists of nearly 800 broadband seismic stations, with data from multiple sources including the MNR, China Earthquake Administration (CEA) and globally shared seismic data server. The main seismic data processing software are SeisComP, the self-developed Global Earthquake Detection and Location System (GEDLS), and the Earthquake Instant Messaging (EQIM) imported from CEA. The Antelope results, as well as earthquake parameters from USGS and PTWC subsequently received are also taken into account when fine tuning the initial assessment.

The global sea-level monitoring system comprises nearly 600 functional tidal gauges and DART buoys and their data are retrieved via GTS, and data from sea-level monitoring facility website are also acquired. In addition, NMEFC receives real-time sea-level data from more than 150 tidal gauges along the coast of China. Five of them are contributed to international sharing via GTS for the tsunami warning and mitigation system in the SCS region, three from the Chinese Mainland and two from Hong Kong. This year, 38 new tidal gauges have been added to the network globally, including those from Indonesia, the Caribbean, and near Central America.

Two sets of tsunami database are in use for tsunami hazard analysis along the coast of China and over the SCS region, namely the NW Pacific Scenario Database (NWPSD) covering the Northwest Pacific and the Pacific Unit Source Database (PUSD) covering the Pacific Ocean. This year, the NMEFC expanded the NWPSD from 60,000 to nearly 120,000 scenarios, with the additional scenarios mainly covering the local sources of China.

On-the-fly tsunami forecast model with the GPU accelerator was capable of producing a Pacific tsunami forecast within 45 seconds. In the Northwest Pacific and the SCS region, the respective model run can be completed in less than 5 seconds. Besides, the numerical tsunami model forecast covers the Indian Ocean, North Atlantic Ocean, Mediterranean Sea, and Caribbean in support of domestic users and stakeholders.

From November 2024 to October 2025, NTWC responded to 43 major earthquakes, and 87 information bulletins and 8 threat bulletins were issued with an average latency of 8.7 minutes for the initial message. On July 29th 2025, 23:24:52 (UTC), a 8.7-magnitude earthquake occurred off the east coast of Kamchatka, Russia. The Tsunami Warning Center issued a Yellow alert for potential tsunami hazards in accordance with the “Marine Disaster Emergency Response Plan of China”. This earthquake triggered an ocean-wide tsunami and generated moderate impacts on some coastal areas in the Pacific. Wushi Port of China reported a 10-centimeter tsunami amplitude.

Mr Shi briefed on the coordination, training, workshops, and site visits involving the NTWC in 2025. In April 2025, the Thirty-first Session of the Intergovernmental Coordination Group for the Pacific Tsunami Warning and Mitigation System (ICG/PTWS-XXXI) was hosted in Beijing, China. Dr Dakui Wang has been elected as the new chairman of ICG/PTWS. In 2025, the NMEFC participated in the PTWS Tsunami Preparedness Capacity Assessment (ESCAP Phase II) Evaluation Workshop in May, the United Nations Ocean Conference and the 33rd Session of the IOC Assembly in June. The NMEFC also sent people to Indonesia for application training on the “Mazu” series autonomous mode, and participated in the international tsunami training organized by the ITIC. The NMEFC would participate in the 1st APEC Ocean Resilience Conference and the UNESCAP Resilient Workshop on Multi-hazard Risk Assessment for Risk Reduction in November. For 2025 Ocean Day and World Tsunami Day, the NMEFC also conducted tsunami disaster science publicity through various forms such as on-site lectures, live broadcasts, and news interviews.

4.1.2 Indonesia

Mr Indra Gunawan from the Agency of Meteorological, Climatological and Geophysics (BMKG) presented the national report on Indonesia’s Tsunami Early Warning system. He detailed the expansion of Indonesia’s seismic network, which now includes 553 stations, with 21 stations sharing real-time data internationally. This increase, particularly after the 2004 Indian Ocean tsunami, has significantly improved detection times, for example, reducing earthquake detection to 15 seconds in Java Island, though eastern regions such as the Banda area still require up to 60 seconds for detection. For sea-level monitoring, BMKG operates 888 national tide gauges and contributes data from 21 stations to global networks via UNESCO’s IOC.

In terms of processing and dissemination, BMKG currently uses the SeisComP system for earthquake analysis and TOAST for tsunami warnings, alongside the InaTNT for sea-level monitoring and detection of non-seismic tsunamis. The agency had developed a database of 18,000 tsunami scenarios and had been working to integrate an additional 4,000. Dissemination times have been reduced from five to three minutes since 2023. As for innovation of earthquake and tsunami processing, the BMKG worked with the World Bank on the Indonesia Disaster Resilience Initiatives Project (IDRIP) to strengthen the capacity to develop earthquake and tsunami processing. An in-house development of an AI-enhanced earthquake and tsunami processing system named “Merah Putih” aimed to reducing dependency on licensed software was conducted. The BMKG also developed the prototype Indonesia Earthquake Early Warning System for early warning ahead of arrival of seismic waves. The BMKG was enriching dissemination channels including the new generation of Warning Receiver System (WRS) being installed in local offices around the country. Mr Indra Gunawan also reported on the time response of recent earthquakes around the basin.

Mr Indra Gunawan reported Indonesia's work in earthquake and tsunami preparedness and mitigation, strengthening community preparedness through field school programs at 181 locations with 10,000 participants. For Tsunami Ready program, at least 22 local communities have been recognized as Tsunami Ready.

For the future development, Mr Indra Gunawan reported that efforts would be put to develop a new formula of magnitude according to the tectonic characteristics of Indonesia, establish MT analysis catalog, the AI "Merah Putih" processing system, develop a regional velocity structure model, and a machine learning technique for earthquake epicenter determination for earthquake catalogs and providing rapid and real-time information.

The Chair inquired about if Indonesia had plans to improve the earthquake detection time for the eastern part of Indonesia. Mr Gunawan replied that Indonesia planned to install more seismic stations at remote islands, however due to transportation there were difficulties in deployment of equipment. Dr Bernardo Aliaga inquired about the aspect of operation the development of AI would aim for. Indonesia replied that the consortium project was in collaboration with universities. The AI tool for earthquake detection was not yet operational but efforts would be put to validate its performance against conventional earthquake software.

4.1.3 Malaysia

Before beginning of the national report of Malaysia, Mr Zaidi Bin Zainal Abidin from Malaysian Meteorological Department (MET Malaysia) informed the meeting about the staffing changes. Madam Jah Salmihani would be in charge of the technical aspects of Malaysia's earthquake and tsunami operations.

Mr Zaidi Bin Zainal Abidin began by an introduction of the Malaysian National Tsunami Array Warning System (MNTEWS) which was established after the destructive tele-tsunami off the west coast of northern Sumatra on 26 December 2004. MNTEWS is the office to provide timely and effective early warning to the public when a tsunami occurs in the Indian Ocean, SCS, Sulu Sea or the Pacific Ocean that will affect Malaysia. Mr Zaidi Bin Zainal Abidin highlighted the tsunami warning process of the MNTEWS. The MNTEWS disseminates output via channels including SMS and WhatsApp. In the tsunami early warning process, the control node ADMIS generates and disseminates earthquake and tsunami bulletins within 8 minutes after the detection of an earthquake. MNTEWS aims to reduce the bulletin dissemination time in 6 minutes by 2026.

Mr Zaidi Bin Zainal Abidin continued to report different components of the Malaysian tsunami early warning system. For the data collection component, the seismic network comprises 81 seismic stations in total, with 43 in the Malaysian Peninsular, 28 in Sabah and 10 in Sarawak. The tide gauge network consists of 25 stations in total with 12 in the Malaysian Peninsular, 9 in Sabah and 4 in Sarawak. For the data processing component, the Malaysian tsunami early warning system uses TOAST, and Malaysia would deploy SeisComP6 by the end of 2025. For the dissemination component, Malaysia would use tsunami sirens if tsunami occurs. There are 83 siren stations in total with 47 in the Malaysian Peninsular, 26 in Sabah and 10 in Sarawak. The use of sirens will be localized such that it will be triggered only when a tsunami is expected in the same area. Dissemination of outputs includes web site, YouTube, X, Instagram, Facebook, and MET Malaysia's app.

Mr Zaidi Bin Zainal Abidin further reported, for the public awareness and tsunami drills, 20,310 people participated in the 11 public awareness campaigns in 2025. He concluded the report and highlighted the Malaysia's National Disaster Management Agency (NADMA) Directive No. 1 has been effective since 1 August 2024.

The Chair inquired Malaysia about the plan to shorten the dissemination time for bulletins from 8 to 6 minutes. Mr Zaidi Bin Zainal Abidin replied that the plan is to consider every detected earthquake event as an input for dissemination, however the accuracy in earthquake location and magnitude will still be a challenge. Mr Zongchen Wang inquired whether Malaysia had any plan to share the sea level data from the tide stations located in the coastline of Sulu Sea and Celebes Sea. Malaysia replied that there was no confirmation regarding sharing of the sea level data at the moment. The representative explained that the primary function of these stations is to monitor tsunamigenic events triggered by earthquakes originating from the western Philippines region. The Malaysian delegate indicated they would consult their director regarding any future collaborative projects on the matter.

4.1.4 The Philippines

Dr Winchelle Ian G. Sevilla from the Department of Science and Technology Philippine Institute of Volcanology and Seismology (PHIVOLCS) presented the national report of the Philippines. He began with reporting the country's active engagement in regional tsunami warning mechanisms, including participation in the ICG/PTWS XXXI in Beijing and the nomination of Deputy Director Dr Mylene Villegas as the vice-chair. He also noted ongoing cooperation with the SCSTAC, having received five tsunami information bulletins and participated in a communication test in November 2025.

He outlined the current national monitoring infrastructure, which includes 125 seismic stations, with plans to expand to 300, and 26 sea-level stations, alongside 65 community-based tsunami alert devices which are used to issue alerts in near real-time. Dr Sevilla detailed the agency's operational response to several significant events in 2025. For the distant magnitude 8.7 Kamchatka earthquake, PHIVOLCS issued a series of public advisories and monitored wave heights of up to 30 cm at the Philippines tide gauges, later cancelling the advisory after the threat passed. Domestically, the agency responded to three local tsunamigenic earthquakes. For the magnitude 6.9 earthquake on 30 September 2025 offshore northern Cebu, one tsunami information bulletin was issued by PHIVOLCS and later issued cancellation. For the magnitude 7.6 earthquake offshore of the Philippines on 10 October 2025, the agency issued a tsunami warning to seven provinces nearest to the epicenter. A cancellation was later issued, and based on assessment and sea-level data, a maximum wave amplitude of 13 cm was recorded. Later on, the same day of the event another magnitude 6.9 earthquake occurred, a tsunami warning was issued to three nearest provinces again and were followed by cancellation. These events served to validate and test the national warning workflows.

The presentation concluded with an overview of capacity-building initiatives, including staff participation in ITIC training in Hawaii and a secondment to SCSTAC, as well as domestic activities co-organized with the United Nations. He also highlighted public engagement efforts such as a "Tsunami Run for Safety" involving over 600 runners, held in observance of the World Tsunami Awareness Day.

Mr Zongchen Wang expressed appreciation for the Philippines' active participation in the communication test with SCSTAC and inquired why the test message via the GTS had not been received. Dr Sevilla replied that the matter would be looked into during the upcoming communication test to be conducted by the Backup South China Sea Tsunami Advisory Center (BSCSTAC) (Hong Kong).

4.1.5 Singapore

Mr Gabriel Lim from Meteorological Service Singapore (MSS) presented the national report of Singapore. He outlined Singapore's earthquake and tsunami monitoring system. Singapore utilizes SeisComP, linked to a network of five local and over 250 international seismic stations, with the "Earthquake View" web interface alerting forecasters to potential events. For tsunami, given Singapore's geographical position, the primary tsunami threats are identified as large earthquakes originating from the Andaman-Sunda and Manila Trenches. The MSS employs a Tsunami Simulation Tool (TOAST) to model scenarios from these zones and assess potential impacts.

Mr Lim then detailed Singapore's National Tsunami Response Plan. The objectives of the plan are to mitigate the impact of tsunami on Singapore by monitoring and providing early alerts for the agencies under the task force. A whole-of-government coordination of response and recovery will take place in the event of a tsunami affecting the country. Currently the plan was being aligned with the national response plans for coastal flooding or inundation. He outlined the three phases of the tsunami response plan: from disseminating warning at 12 hours ahead of tsunami arrival to recovery phase after the impact is passed.

Mr Lim also reported Singapore's participation in various tsunami exercises including communication tests with SCSTAC, BSCSTAC, IOTWMS and PTWS. Singapore also participated exercise IOWave25.

Mr Lim then shared key findings from a new study by MSS in collaboration with Nanyang Technological University, which updated the assessment of risks from tsunami of Singapore from the previous assessment established in 2008. The analysis of worst-case scenarios, including large trench earthquakes and non-seismic sources like landslides or volcanic eruptions, indicates that tsunami arrival times for Singapore would range from 9 to 15 hours, with the maximum wave heights of less than one meter, which could be localized to specific coastal areas. A significant new finding highlighted the risk of strong currents, presenting a potential future focus for risk mitigation efforts.

4.1.6 Viet Nam

Dr Truyen The Pham from Earthquake Information and Tsunami Warning Center, Institute of Earth Sciences, Vietnam Academy of Science and Technology (IES – VAST) presented the national report of Viet Nam. He began by noting the administrative reorganization of the National Tsunami Warning Center, which is now under IES-VAST, and provided updated contact information. The Center operates a warning system that integrates data from regional, national, and local seismic networks. When the system detects an earthquake, the parameters would be processed, followed by a look-up in tsunami scenario database, and checking of sea-level gauges. Information would be disseminated to government agencies, media, and communities.

Dr Pham detailed the national monitoring infrastructure, which comprises 31 broadband seismic stations supplemented by denser local networks at parts of the country to monitor induced seismicity from mining and hydropower dams, particularly in northern and central Vietnam. For data processing, the center utilizes SeisComP for automatic analysis, Earthworm for rapid processing, and SeisAn for manual analysis of micro-earthquakes. Regarding the seismicity of Viet Nam, the country experienced magnitude 6.7 – 6.8 earthquakes in the northern part of the country and a magnitude 6.1 earthquake in the

southern part in the past. Regarding sea-level data, Dr Pham reported that the National Hydro-Meteorological Service operates 22 tide gauge stations in their national hydro-meteorological network.

He reported that based on scientific studies, Viet Nam has identified nine tsunami sources zones that are capable of affecting the Vietnamese coast, with the Manila Trench and the 109° meridian source near the coast considered the most hazardous. The center has developed a database of hundreds of tsunami scenarios for these sources, modelled using COMCOT software.

He highlighted the SOP for potential tsunami emergencies and the timeline of Viet Nam's warning system for handling near-field and distant tsunamis. Regarding tsunami warning dissemination, Dr Pham presented the multiple channels used, including email, Viber, and the local platform Zalo. Tsunami information would be disseminated to multiple government disaster-response entities. For tsunami response, Dr Pham highlighted a recent tsunami drill conducted in central Vietnam that tested siren activation and public evacuation, including schools. For future development, plans include enhancing the national seismic network with more broadband seismometers, developing more tsunami scenarios, and conducting quantitative tsunami hazard assessments for major harbors and high-exposure coastal zones in Viet Nam.

Mr Zongchen Wang from China inquired about the magnitude of the worst-case scenario from the 109° meridian source and how large the threat would pose to other Member States in the SCS region. Dr Pham replied that the largest magnitude Viet Nam had simulated was 8.0, and in that case about a 2-meter tsunami would arrive at the coast of Viet Nam in approximately 30 minutes.

4.2 REPORT FROM SCSTAC

Mr Zongchen Wang presented a report on the performance of the SCSTAC during the intra-session period. From November 2024 to November 2025, the SCSTAC responded to 8 earthquakes with a magnitude of 6.0 or above within its AoS. The average time required for the issuance of the first bulletin was about 6.1 minutes. All the target values of other key performance indicators of the SCSTAC were met, except for the "Percentage of Member States that receive products issued by SCSTAC" reflected by the feedback of quarterly communication tests. SCSTAC received no responses from Thailand and Cambodia after the first quarter in 2025.

Mr Wang also reminded that dissemination of SCSTAC & BSCSTAC bulletins via fax had been terminated at 00:00 UTC on 1 April 2025 in accordance with the notification issued by the UNESCO-IOC Circular Letter No. 3006. In the future, SCSTAC would further revise its product manual according to the feedback of the Member States of WG-SCS after the meeting. Mr Wang, on behalf of SCSTAC, proposed a recommendation to kindly invite NTWCs and TWFPs of ICG/PTWS Member States in the SCS region to share their tsunami bulletins to SCSTAC by email if an earthquake occurs in the region and its surrounding areas with a magnitude of 6.0 or above.

The Chair, Ms Anugrah, inquired the reason for SCSTAC to acquire Member States' tsunami bulletins given the PTWC products are available. Mr Wang responded that PTWC might not be able to get access to the real-time sea level data of every Member State. By receiving the bulletins directly from the Member States of the SCS region, especially those

with tsunami observation data, SCSTAC can make a more comprehensive assessment of the situation and redistribute the data as appropriate. The Secretariat, Dr Aliaga, shared a case in the South America region that the countries used a simple tool to share the bulletins among themselves.

4.3 REPORT FROM BSCSTAC (HONG KONG)

Ms Queenie Lam from the HKO presented the report on the operation of the BSCSTAC. She reported that the center's operational status, which began in March 2023 and now functions on a 24/7 basis, maintaining a hot standby mode. Annually, during the cool season, BSCSTAC would conduct scheduled activation with a period pre-agreed with the main center (SCSTAC) around three months ahead of the commencement of activation. In response to the earthquakes within the AoS, the BSCSTAC would follow SOP of SCSTAC to prepare the advisory products. System checks by watchstander are conducted twice daily to ensure system availability. So far two times of scheduled activations have been conducted with communication tests carried out beforehand. Switchover procedure laid down at ICG/PTWS-WG-SCS-X was followed. No event triggered the BSCSTAC to issue tsunami bulletins during its past activation periods.

Ms Lam presented the performance review results of the BSCSTAC during the non-activation period when the bulletins have been saved for internal validation. The key performance metrics from 2023 onwards were all met. The average time required for the issuance of the first bulletin was 9.9 minutes. The detection rate for tsunamigenic earthquakes was 100%. The earthquake parameters fell within the targeted tolerance when benchmarked against the United States Geological Survey (USGS). The focal mechanism solutions were also found to be in good agreement with those of the USGS.

Finally, Ms Lam announced the upcoming third scheduled activation for BSCSTAC would be conducted from 11 to 24 December 2025. A communication test states was scheduled for 28 November 2025 and notification of which had been sent to the Member States of the SCS region via email. The switchover and resumption notifications would be issued via email and the GTS respectively by the BSCSTAC and the SCSTAC.

In response to the inquiry from the Chair, Ms Anugrah, Ms Lam clarified that the performance metrics were evaluated up to October 2025 by using the bulletins prepared for internal assessment during the 24/7 hot standby mode operations, and no advisories were required to be issued during the past scheduled operations.

4.4 REPORT FROM WG-SCS TASK TEAM ON CAPACITY DEVELOPMENT AND SERVICES (TT-CDS)

Dr Peitao Wang, Chair of TT-CDS, presented the report from the task team. He began by recalling the dissolution of Task Team on Establishment of the SCSTAC of WG-SCS, and the establishment of TT-CDS at ICG/PTWS-WG-SCS-X on 28 and 30 September 2021. He highlighted the efforts made over the past years to enhance earthquake and tsunami monitoring and warning services in the region.

He reported that the SCSTAC has issued numerous bulletins for seismic events in the region since 2019, with most initial products released within eight minutes of an earthquake's origin time. This achievement supports the first objective of the Task Team. Dr Wang outlined the tsunami warning capacity enhancements such as the revision of the User's Guide for SCSTAC products to unify its framework and align with the other TSPs, development of a

tsunami data simulation system, a joint inversion system for fault slip distribution, and the expansion of a tsunami scenario database for the SCS. Regarding the sharing of seismic and sea level data in the SCS region, Dr Wang noted that efforts would still be required to promote data sharing, while he expressed gratitude to BMKG for the sharing of new sea level data from Indonesia. Dr Wang also mentioned the operation development of a backup center in Sanya, Hainan Province.

For tsunami preparedness and training, efforts were put to evaluate the potential impacts to China from Nankai Trough in Japan, and the reconstruction of the 1960 Chilean earthquake. Besides, impacts from extreme earthquake scenario from the Manila Trench to southern China was also evaluated. These efforts had motivated local governments in the area to take actions for the TRRP. Moreover, face-to-face training courses on tsunami modelling were conducted at STMKG and SCSTAC in 2025. TT-CDS also engaged in a number of international cooperation and capacity building activities. TT-CDS looked forward to the capacity assessment of the Member States and TT-CDS could carry out capacity development activities based on the survey results in the future. The SCSTAC continued to host the International Staff Programme with full funding in 2025 for a two-month period.

Looking ahead, Dr Wang highlighted a workshop on Tsunami Ready in the SCS region would be held online in December 2025. He encouraged Member States to share more seismic and sea level data, and encouraged Member States to share earthquake and tsunami products during the major events in the SCS region. He suggested that the Working Group might adjust and determine new tasks for the Task Team based on the current developments and future capacity assessment results.

The Chair, Ms Anugrah, inquired whether the TT-CDS had assessed the impact of potential tsunami sources to the SCS region. Dr Wang replied that the assessments were performed in view of supporting local governments to implement the TRRP, and the assessment region could be extended to other areas over the coast of the SCS region. The Chair noted tsunami risk assessments and tsunami data assimilation are interesting topics and hoped that the TT-CDS could organise training for the Member States.

5. REVIEW AND PLAN OF THE SCSTAC INTERNATIONAL STAFF PROGRAMME

Ms Tingting Fan from China reported the International Staff Short-term Secondment Programme. She began by recalling the background, noting a proposal by the Task Team in 2018 and its annual implementation by the SCSTAC, with all expenses covered for the secondees. She outlined the programme core activities, which include professional training on tsunami warning systems, operational duty shifts as backup watch-standers, and the conduct of technical seminars.

Ms Fan then highlighted the programme implementation since its pilot in 2018, noting a temporary suspension during the COVID-19 pandemic and its resumption in 2023. She indicated that the participation from Member States, including those from Malaysia, the Philippines, and Indonesia reflected their ongoing recognition and support for the programme. She reported the key achievements of each cohort, such as sharing national warning experiences, participating in specialized training, and conducting field visits to a marine observation station.

Ms Fan concluded by summarizing the programme significance in strengthening regional communication, data sharing, and coordination, and affirmed SCSTAC's commitment to continuing the programme to enhance the collective tsunami warning and mitigation capacity of the SCS region.

Ms Nur Faizah Mohamad from MET Malaysia presented on behalf of the four participants of the international staff who were seconding in the SCSTAC in Beijing. She shared the experience in working and living in Beijing, and she detailed the roles and participation as a watch-stander in the operation room of the SCSTAC. She also highlighted three expectations for the secondees: 1) understanding SCSTAC's monitoring operations and working culture; 2) gathering insights and ideas on automation and SOPs for potential adoption; and 3) experiencing technical tools that could enhance operational efficiency. The secondment programme could benefit the participating international staff in experience sharing, connection building and further collaboration exploring in the future.

6. REVIEW OF REVISED USER'S GUIDE FOR SCSTAC PRODUCTS

Mr Zongchen Wang presented the progress on the revision of the User's Guide for SCSTAC Products for the South China Sea Tsunami Warning and Mitigation System. Firstly, he emphasized that the User's Guide is a living document that may require changes over time to reflect changes in the TSP services, products, and other information. The SCSTAC User's Guide published in 2019 was not up-to-date in some aspects. He recalled the 30th session of ICG/PTWS reviewed and agreed on the proposed common Table of Contents proposed by the WG2 TT-TSPs. Following the unified structure and the main headings and sub-headings that should be included in all TSP User's Guides, SCSTAC had reorganized the contents.

Then, Mr Wang underlined major updates for end-users, including product types and criteria changes, as well as template formatting. The products were divided to three types, namely "A" - information messages for the source within the Earthquake Source Zone (ESZ) of South China Sea region, "B" - threat messages for the source within the ESZ, and "C" - threat messages for the source outside the ESZ. He then introduced the criteria. For example, according to the original guide, a threat message would be issued if an earthquake occurred in the ESZ with a magnitude Mw7.1 or above. However in the revised version, the type of message would be determined to be "informational" or "threat" depending on the numerical results of the on-the-fly tsunami model run. Furthermore, the criteria for a possible destructive basin-wide tsunami would be adjusted from Mw7.6 to Mw8.0 for an earthquake in the ESZ, with a new type of evaluation, namely regional tsunami, added for the earthquake of magnitude ranging from Mw7.6 to Mw7.9. Regarding the earthquake outside the ESZ, the SCSTAC will evaluate the possible threat on the basis of the tsunami model results and update the evaluation result in line with the latest earthquake and tsunami information.

Mr Wang detailed the criteria and the bulletin contents for the aforementioned three types of products. Two sub-types of downgrading bulletins, belonging to informational type, were highlighted. The evaluation result could downgrade from the threat in the first bulletin to the informational bulletin according to the up-to-date tsunami forecast or observations. Meanwhile, the other two sub-types of upgrading bulletins were also highlighted for the similar notion. "C" type products, meaning an earthquake occurred outside the ESZ but posed potential threat to the AoS of the SCSTAC, were taken as an example to be illustrated. He also mentioned that tsunami forecast maps had been removed from the SCSTAC website to avoid public misunderstanding, but would still be attached to the product email.

Mr Wang further introduced other updates on explanatory descriptions in the revised User's Guide. The major changes include enhancing operational tools; adding a buffer zone to the AoS as the ESZ, contact information of the BSCSTAC (Hong Kong), and information of the new sea level observation sites. He expressed great appreciations to Indonesia for sharing 5 new stations surrounding the SCS region in 2025. He expressed concern about the existing sea level sensors that were not sufficient to fulfil the first Objective of the ODTP regarding tsunami verification within 10 minutes in the SCS region. He appealed to the Member States to share more real-time sea level data.

Mr Wang quoted the TT-TSPs online meeting after the 31st Session of ICG/PTWS recommended that the Member State to which forecast points belong to choose and confirm their names. 55 forecast points were illustrated in a table and on a map within the SCSTWMS. Two recommendations were raised for consideration:

- 1) Request the Member States of South China Sea Tsunami Warning and Mitigation System to review the revised SCSTAC User's Guide, and focus on adding, deleting and revising their respective forecast points, and give feedback to SCSTAC (wangzc@nmeffc.cn) until 19 January 2026;
- 2) Request SCSTAC to further revise the User's Guide according to the feedback from the Member States, and submit it to the next WG-SCS meeting for endorsement.

7. PLAN ON THE IMPLEMENTATION OF TSUNAMI READY PROGRAMME IN THE SOUTH CHINA SEA REGION

7.1 China

Dr Jingming Hou from NMEFC presented the preparatory work for the TRRP in China. He reported that a comprehensive tsunami risk assessment had been conducted at three levels, including 11 coastal provinces and 219 counties, identifying risk at the southeastern coast, including Jiangsu Province, Shanghai City, Zhejiang Province, Guangdong Province, and eastern Hainan Province. Utilizing a self-developed numerical model capable of simulating the full tsunami process from generation, propagation, to coastal inundation, detailed analyses for hazard classification, vulnerability, and risk zoning were completed.

Regarding practical implementation, Dr Hou outlined several completed steps. These include the compilation of a national tsunami evacuation standard to guide development of map and plan, the production of evacuation maps for over 30 areas, and field surveys to identify suitable pilot communities for the TRRP.

For the 2026 plan, Dr Hou highlighted that a dedicated budget has been prepared to support tsunami ready work. He noted one of the key challenges is to maintain public and community engagement due to no significant tsunami events in recent years which has led to decreased awareness. To address this, the NMEFC will continue organizing community drills, developing and distributing targeted awareness materials to high-risk areas, and to select one or two high-risk communities as pilot projects with a goal of fulfilling all 12 key indicators for Tsunami Ready Recognition.

7.2 Indonesia

Mr Abdul Rosid from BMKG presented the country's implementation plan for the TRRP. He explained that, given most of Indonesia's coastline faces tsunami risk, where over 5,700 coastal villages have been identified as vulnerable, including more than 1,000 classified as high-risk. As of late 2024, BMKG has successfully facilitated 22 communities across 10 provinces to receive international Tsunami Ready Recognition from UNESCO. An additional number of villages have achieved national-level recognition from Indonesia's National Tsunami Ready Board.

To accelerate the implementation of the programme, BMKG integrates TRRP field verification with its "Earthquake and Tsunami Field School" capacity-building initiative, which has engaged nearly 10,000 participants in 181 locations since 2015. The agency also encourages university partnerships to assist coastal villages in fulfilling the programme's 12 indicators. Mr Rosid highlighted the active participation in international exercises like IOWave25, which involved over 206,000 participants across 172 locations, with 21 recognized Tsunami Ready Villages joined the exercise.

In summary, he stated that BMKG will continue to assist the remaining villages in seeking UNESCO recognition, promote the programme in eastern Indonesia, and encourage universities collaboration to assist and support coastal villages in implementing TRRP.

Ms Queenie Lam inquired Indonesia in what aspect the universities assisted in the TRRP. Mr Abdul Rosid replied that the university students assisted the village in filling in the documents required for fulfilling the 12 indicators of Tsunami Ready.

7.3 The Philippines

Dr Ma. Mylene M. Villegas from PHIVOLCS presented an update on the plan for implementation of Tsunami Ready programme in the Philippines. She presented that efforts towards the enhancement of tsunami preparedness for effective community response have been laid over the last 20 years. These include the development of comprehensive hazard maps at various scales and extensive community preparedness activities. While a harmonization process for the national tsunami programme was initiated before the pandemic, progress was temporarily slowed down as the activities shifted online. Guidelines were prepared for local governments to provide reference on information about volcano, earthquake and tsunami impacts. The materials also provide step-to-step guide for local governments to access DOST-PHILVOCS information, tools and services. Dr Villegas recalled that numerous activities were conducted in the past years with the communities including putting up signages, sharing education materials, and discussing with local communities.

To formalize the recognition process, PHIVOLCS has been collaborating for two years with the National Disaster Risk Reduction and Management Council (NDRRMC) to establish a National Tsunami Ready Board. She reported that the necessary documentation is now in its final approval stages.

Looking ahead, Dr Villegas introduced a timeline for future activities. A Tsunami Ready Philippines National Workshop was scheduled for December 2025 in coordination with NOAA. Pilot communities will be selected for Tsunami Ready in 2026 to begin the formal process of seeking Tsunami Ready Recognition, subject to the official establishment of the National Tsunami Ready Board. The Philippines would also participate in a lineup of international activities and conference in 2026.

7.4 Results from 2025 Pacific Ocean Capacity Assessment of Tsunami Preparedness

Dr Villegas presented the results from 2025 Pacific Ocean Capacity Assessment of Tsunami Preparedness. She explained that this first system-wide evaluation, conducted as part of the 60th anniversary of the PTWS, benchmarked progress against medium-term strategies. The survey aimed to evaluate technical capacities, identify gaps, and inform recommendations for investment. The UN ESCAP Workshop 2025 was conducted in May 2025 to review and validate the results of the capacity assessment. 42 of the 46 PTWS Member States responded with a significant 89% response rate from the SCS region.

The presentation highlighted key recommendations across several thematic areas. For Policies, Plans and Guidelines, it invited 100% of Member States at risk to have at least a national policy, plan, or guideline pertaining to tsunami; encouraged Member States directly to include tsunami in all DRR policies, including sectoral. For Risk Assessment and Reduction, countries prioritized capacity improvements in inundation mapping, evacuation mapping, and hazard mapping and the capacity improvement should be priorities in the national level. The recommendations on areas of efforts include hazard assessment from earthquake-generated tsunamis, preparation of evacuation maps for vulnerable communities and capacity building to perform hazard and risk assessments.

Regarding Detection, Warning, and Dissemination, the recommendations included the priority of ensuring 100% of countries have the capability to receive threat information and issuing timely warnings to their coastal communities. For Awareness, Preparedness and Response, data indicated most SCS countries require assistance to develop or enhance public awareness, with specific needs for customised materials and expert support. Dr Villegas noted that while nine countries intended to participate in the UNESCO-IOC TRRP, they face constraints such as human resources. She concluded by highlighting the recommendation that 100% Member States have SOPs that cover both upstream and downstream processes and encouraging Member States to make use of the available training programmes offered by ITIC and other agencies to ensure effective emergency response.

8. ENHANCEMENT OF TT-CDS AND PLAN ON CAPACITY DEVELOPMENT

Ms Queenie Lam presented the proposed enhancements to the TT-CDS. She began by proposing increasing the participation and contribution of Member States in various aspects including risk assessment and communication, monitoring and warning, as well as preparedness and response. She then suggested each Member State in the SCS region to nominate at least one expert to join the task team as a member.

Regarding the future activities, Ms Lam detailed a multi-faceted approach. This includes continuing the successful online training in the series. The upcoming training session on the TRRP was scheduled for December 2025. Besides, she proposed organizing face-to-face workshops and seminars on specific technical topics, such as tsunami modeling, sea-level observation, seismic data analysis, and potential application of AI techniques, when resources permit. She also suggested holding intersessional online meetings for the task team every three to four months to review plans, share progress on the TRRP implementation, and to share information and opportunity to leverage Tsunami Ready.

Concluding her presentation, Ms Lam revisited the task team's ToR and introduced a draft recommendation for the working group. The recommendation requests the IOC

Secretariat to issue a Circular Letter to request each Member State in the SCS region to nominate at least one expert to join the TT-CDS to deepen and synergise local, regional, and international cooperation in advancing and promoting the capacity building in technology and service development for tsunami risk assessment and communication, tsunami monitoring and warning, preparedness and response through regular exchanges and conduct of capacity development activities in the region. Members of the TT-CDS will also serve as resource persons or trainers of capacity building activities which fit their expertise, as well as the focal point of Member States on capacity development matters.

Mr Zongchen Wang suggested revising the third item in the ToR of TT-CDS (Appendix 2(a)) which reads “To explore ways for furthering the sharing and exchange of relevant data and information in the South China Sea region” to “To evaluate the status on the sharing and exchange of relevant data and information in the South China Sea region” (Appendix 2(b)). The meeting agreed. The Secretariat inquired if TT-CDS had a specific plan for the training on Tsunami Ready in December 2025, and what the future plans for the training on the specific topics would be. Ms Lam replied that the list of specific topics was a wishlist. But, a joint WMO-VCP IOC-PTWS workshop on storm surge and tsunami forecasting was being planned to be held at HKO in early December 2026. Regarding the details of the training in December 2025, Mr Zongchen Wang added that TT-CDS was seeking and coordinating with expert resources and that the schedule had not yet been finalised. The Secretariat supplemented that he could discuss with the TT-CDS about the planned training in the other basins in the near future, such as the topic of tsunami monitoring.

9. UPDATE OF CONTACT INFORMATION OF NTWC, TNC AND TWFP

The Secretariat, Dr Bernardo Aliaga, presented an update on the procedures and status for nominating and updating national contact information for the region’s tsunami warning system. He clarified that the formal nomination of TNCs, TWFPs, and NTWCs must be communicated officially to the IOC Secretariat through one of the three diplomatic channels: a country’s Ministry of Foreign Affairs, its National Commission for UNESCO, or its Permanent Delegation in UNESCO. This formal process, initiated via Circular Letter 2563 in 2015, ensures the reliability and official standing of these appointments for receiving critical warnings.

Dr Aliaga confirmed that for all SCS region Member States, this formal appointment process has been completed and the information is recorded in the IOC database. He explained that while the initial appointments often designated operational agencies (like meteorological services), there is a growing trend for countries to reconsider and update these roles to involve disaster management agencies, reflecting a broader focus on policy and preparedness.

He further detailed the distinction between major organizational changes and routine updates. If a country wishes to change the institution holding a TNC, TWFP, or NTWC role, it must resubmit a formal communication through the same diplomatic channels. However, simpler updates, such as changing a contact person’s name, adding alternate contacts, or updating email addresses, can be handled directly via email to the IOC Secretariat, as recently done by the Philippines and Cambodia. This streamlined process ensures the contact database remains current without requiring full diplomatic re-nomination.

10. HOSTING OF THE WG-SCS-XIV MEETING

The Secretariat, Dr Bernardo Aliaga, presented the agenda item regarding the hosting of the 14th Working Group meeting (WG-SCS-XIV). He explained that, in line with UNESCO/IOC recommendations to enhance efficiency, reduce carbon emissions, and align with the Paris Agreement, the working group had previously decided to alternate between in-person and online meetings. Following this model, the 13th meeting in 2025 was held online, and the 14th meeting would be held in person tentatively in December 2026.

Dr Aliaga noted that China recommended the hosting of the WG-SCS-XIV meeting in Hong Kong during the previous session. Ms Queenie Lam indicated that the meeting was scheduled for 30 November and 1 December 2026 at the HKO. The meeting expressed appreciation and support.

11. ELECTION OF OFFICERS

The Secretariat, Dr Bernardo Aliaga, noted the need to elect office bearers. Following the rules of procedure which apply to IOC subsidiary bodies, the Chair and at least one Vice-Chair must be elected either by the ICG/PTWS or members of WG for two years with possible re-election of one term in the same position.

He noted that the current Chair, Ms Suci Anugrah (Indonesia), and Vice-Chair, Ms Queenie Ching-chi Lam (China), were elected at the 11th session of WG-SCS in September 2023. For TT-CDS, Mr Peitao Wang (China) was elected as Chair of TT-CDS in the 12th session of WG-SCS while Mr Indra Gunawan (Indonesia) as the Vice Chair of TT-CDS in the 11th session. The Secretariat had received one nomination for the upcoming term from China, proposing Ms Suci Anugrah to continue as Chair of WG-SCS, Mr Zongchen Wang (China) to serve as Vice-Chair of WG-SCS, and Ms Queenie Ching-Chi Lam to serve as Chair of the TT-CDS.

On behalf of Indonesia, Ms Anugrah nominated Mr Indra Gunawan (Indonesia) to continue as Vice-Chair of TT-CDS and, to support the group's expanded activities, proposed Dr Mylene Villegas (Philippines) to serve as a co-Vice-Chair. All nominees accepted their appointments.

The proposal was accepted. Accordingly, **Ms Suci Anugrah of Indonesia will continue to serve as Chair of WG-SCS, Mr Zongchen Wang of China will serve as Vice Chair of WG-SCS, Ms Queenie Ching-Chi Lam of China will serve as Chair of WG-SCS TT-CDS, Mr Indra Gunawan of Indonesia and Dr Mylene Villegas of Philippines will serve as co-Vice Chairs of WG-SCS TT-CDS** in the next intersessional period of ICG/PTWS WG-SCS. The ToR of the WG SCS (Appendix 1) remained unchanged.

12. ANY OTHER BUSINESSES

- 12.1 PROPOSAL FOR A DEMONSTRATION PROJECT TO EVALUATE THE USE OF LOW-FREQUENCY TIME-CODE BROADCASTING STATION SERVICE FOR DISSEMINATION OF TSUNAMI ADVISORY MESSAGES IN THE SOUTH CHINA SEA REGION

Ms Queenie Lam from China presented a proposal for a demonstration project to evaluate the use of low-frequency timecode broadcasting stations as a supplementary channel for tsunami advisory dissemination in the SCS region. She cited post-event evaluations of PacWave24 exercise, which revealed an over-reliance on internet-based email and GTS, creating a vulnerability to single-point failures during tsunamis. To address this, the proposal advocates for redundant and non-internet system.

The project would leverage an existing long-wave radio technology used for time synchronization. Ms Lam highlighted that a new, high-power station planned by the National Time Service Center (NTSC) for Zhaoqing, China (tentatively operational in late 2027) could be deployed to broadcast text-based warning messages to smart devices. This system offers a wide coverage (1,000 km for ground waves and 3,000 km for sky waves if earth weather and space weather conditions permit), strong signal penetration, and relatively low cost. The user-side equipment would consist of a compact antenna and a smart device with a decoding chip and a display.

She outlined a future plan to develop a detailed service design for comments from Member States hopefully in late 2026. Feasibility studies and testing were planned for 2027-2028. Ms Lam concluded the presentation with a draft recommendation and the WG-SCS welcomed the proposal.

Dr Iyan Turyana from Indonesia asked for clarification on the proposed technology's protocol, specifically inquiring if it was a new protocol established by the International Telecommunication Union (ITU). Ms Lam clarified that it is not a new ITU protocol. She explained that the system utilizes the existing, standardized protocol for time signal broadcasting. The text message would take up a small portion of remaining data alongside the primary time signal. She noted that the warning messages may need to be segmented into batches for transmission and then decoded and reassembled on the user's device. The Chair asked about the data transmission capacity and the format of content for the proposed low-frequency broadcast channel, specifically whether the warning messages would include forecast points. Ms Queenie Lam clarified that the protocol's limited bytes require efficient encoding. She also added that exploration of how to efficiently encode to prioritize the transmission of critical threat information and forecast points was underway in coordination with NTSC.

12.2 VANDALISM AGAINST BUOYS IN INDONESIA BPPT – BRIN EXPERIENCES

Dr Iyan Turyana, from National Research and Innovation Agency (BRIN) of Indonesia, presented on the persistent challenge of buoy vandalism affecting oceanographic and tsunami monitoring data collection in Indonesian waters. He detailed the historical difficulties, noting that plans to deploy buoys were significantly hindered by vandalism. From 2007 to 2011, nearly every deployed buoy, including Indonesian and international assets such as American and German buoys, was compromised or lost. The vandalized, stolen, or lost buoys created critical data gaps.

In response to these challenges, Dr Turyana outlined several mitigation strategies implemented by his institution. These included designing more robust buoys, putting more efforts in socializing, avoiding locations with fishing activities, coordinating with the Police and Navy, and the installing of identification stickers and hidden GPS and adding surveillance cameras on buoys, though their effectiveness was limited without integrated law enforcement cooperation.

12.3 DETECTION OF THE JULY 29th 2025 KAMCHATKA TELETsunami IN INDONESIA

Dr Januar Arifin from BMKG of Indonesia presented on the agency's successful monitoring and analysis of a significant 8.7 magnitude earthquake and subsequent tsunami near Kamchatka on July 29th 2025. He detailed how BMKG utilized its enhanced observation network and proprietary platform to issue timely warnings and track the tsunami's propagation across the Pacific, ultimately detecting its signals in eastern Indonesian waters.

The presentation highlighted two key technological advancements: the new Tsunami Gauge network and the InaTNT (Indonesia Tsunami Non-Tectonic) platform. The tsunami gauges, installed at 106 locations nationwide, are specially designed for tsunami monitoring with coastal cameras and air pressure sensors, and 21 stations now share data openly via the IOC. The InaTNT platform integrates real-time data from national and international sources, enabling automatic detection, validation, and visualization of sea-level anomalies. During the Kamchatka event, this system effectively combined alerts from international buoys and tide gauges, including the earliest signal from a DART buoy, with detections from BMKG's own tsunami gauges at locations such as Talaud and Sarmi, where wave amplitudes reached approximately half a meter.

In summary, Dr Arifin highlighted that the event was successfully detected in the Indonesia's Tsunami Gauge Network within minutes of arrival across eastern Indonesia, demonstrating the reliability and effectiveness of the real-time sea-level observation infrastructure.

13. SUMMARY OF DECISIONS, RECOMMENDATIONS AND ACTIONS

The Recommendations of the ICG/PTWS-WG-SCS XIII are available in Annex II of this report.

14. CLOSE OF MEETING

The Chair, Ms Suci Anugrah, invited the Vice Chair to deliver closing remarks. The Vice Chair, Ms Queenie Lam, on behalf of the WG-SCS, extended gratitude to all Member States for their active participation, fruitful discussions, and valuable sharing during the meeting. Appreciation was also expressed to the IOC Secretariat for its continued support in organizing the meeting. The Vice Chair looked forward to the participation of all members in the next meeting, scheduled to be held in Hong Kong in 2026.

Following the remarks, the Vice Chair officially declared the meeting closed. The Chair echoed these sentiments, thanking the Secretariat and all delegations for their contributions, and expressed anticipation for the next gathering in Hong Kong. The session concluded with acknowledgments to all participants and organizers.

ANNEX I

AGENDA

- 1. WELCOME AND OPENING**
- 2. ORGANIZATION OF THE SESSION**
 - 2.1. ADOPTION OF AGENDA
 - 2.2. DESIGNATION OF RAPPORTEUR
 - 2.3. CONDUCT OF THE SESSION, TIMETABLE AND DOCUMENTATION
- 3. REVIEW OF DECISIONS, RECOMMENDATIONS AND ACTIONS ARISING FROM ICG/PTWS WG-SCS-XII MEETING**
- 4. REPORTS**
 - 4.1. NATIONAL PROGRESS REPORTS
 - 4.2. REPORT FROM SCSTAC
 - 4.3. REPORT FROM BSCSTAC (HONG KONG)
 - 4.4. REPORT FROM WG-SCS TASK TEAM ON CAPACITY DEVELOPMENT AND SERVICES
- 5. REVIEW AND PLAN OF THE SCSTAC INTERNATIONAL STAFF PROGRAMME**
- 6. REVIEW OF REVISED USER'S GUIDE FOR SCSTAC PRODUCTS**
- 7. PLAN ON THE IMPLEMENTATION OF TSUNAMI READY PROGRAMME IN THE SOUTH CHINA SEA REGION**
- 8. ENHANCEMENT OF TT-CDS AND PLAN ON CAPACITY DEVELOPMENT**
- 9. UPDATE OF CONTACT INFORMATION OF NTWC, TNC AND TWFP**
- 10. HOSTING OF THE WG-SCS-XIV MEETING**
- 11. ELECTION OF OFFICERS**
- 12. ANY OTHER BUSINESSES**
- 13. SUMMARY OF DECISIONS, RECOMMENDATIONS AND ACTIONS**
- 14. CLOSE OF MEETING**

Appendix 1

Terms of Reference

Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (WG-SCS)

1. To evaluate capabilities of countries in the South China Sea region for providing end-to-end tsunami warning and mitigation services.
2. To ascertain requirements from countries in the South China Sea region for the tsunami warning and mitigation services.
3. To promote and facilitate tsunami hazard and risk studies in the region.
4. To facilitate cooperation in the establishment and upgrading of seismic and sea level stations and networks and communication systems in the region.
5. To facilitate improvement of the education programmes on tsunami mitigation in the region.
6. To facilitate capacity building and the sharing of tsunami information in the region, including the free and open exchange of data.
7. To serve as a coordination point within the region for member states proposals related to UNODTP objectives, and advising the PTWS SC on details of such proposals for consideration.

The Group will be composed of members nominated by Member States Brunei, Cambodia, China, Indonesia, Malaysia, The Philippines, Singapore, Thailand, Viet Nam and invited experts with a Chair and Vice-Chair to be elected by the members of the Working Group and endorsed by the ICG/PTWS.

Appendix 2(a)**Terms of Reference****Regional Working Group on Tsunami Warning and Mitigation for the South China Sea
Region Task Team on Capacity Development and Services**

1. To coordinate training workshops and other technical exchanges on topics related to earthquake and tsunami for enhancing the tsunami warning capabilities of the WG-SCS Member States.
2. To facilitate implementation of the International Staff Programme for short-term secondment of staff from WG-SCS Member States to SCSTAC on an annual basis.
3. To explore ways for furthering the sharing and exchange of relevant data and information in the South China Sea region.
4. To ascertain the latest requirements of WG-SCS Member States for tsunami advisory service provided by SCSTAC.

Membership: Representatives of Member States of the ICG/PTWS WG-SCS (Brunei Darussalam, Cambodia, China, Indonesia, Malaysia, The Philippines, Singapore, Thailand and Viet Nam) and invited experts; representatives of PTWC and NWPTAC (JMA); with Chair and Vice-Chair to be elected either by the WG-SCS or the ICG/PTWS.

Appendix 2(b)

Terms of Reference

**Regional Working Group on Tsunami Warning and Mitigation for the South China Sea
Region Task Team on Capacity Development and Services**

1. To coordinate training workshops and other technical exchanges on topics related to earthquake and tsunami for enhancing the tsunami warning capabilities of the WG-SCS Member States.
2. To facilitate implementation of the International Staff Programme for short-term secondment of staff from WG-SCS Member States to SCSTAC on an annual basis.
3. To evaluate the status on the sharing and exchange of relevant data and information in the South China Sea region.
4. To ascertain the latest requirements of WG-SCS Member States for tsunami advisory service provided by SCSTAC.

Membership: Representatives of Member States of the ICG/PTWS WG-SCS (Brunei Darussalam, Cambodia, China, Indonesia, Malaysia, The Philippines, Singapore, Thailand and Viet Nam) and invited experts; representatives of PTWC and NWPTAC (JMA); with Chair and Vice-Chair to be elected either by the WG-SCS or the ICG/PTWS.

Annex II

Draft Recommendations

The Regional Working Group on Tsunami Warning and Mitigation System for the South China Sea Region (WG-SCS),

Welcomes China's proposal to continue with the International Staff Programme to host seconded experts at the South China Sea Tsunami Advisory Center (SCSTAC) from the Member States of the WG-SCS in 2026, with the travel and local expenses covered by the National Marine Environmental Forecasting Center (NMEFC), and requests the IOC Secretariat to make an announcement to all Member States' National Tsunami Warning Center (NTWC), Tsunami National Contacts (TNC) and Tsunami Warning Focal Points (TWFP) of WG-SCS to encourage participation of the Member States especially those who have not joined before;

Notes with appreciation the Government of China's contribution in conducting the International Staff Programme at the National Marine Environment Forecasting Center,

Invites National Tsunami Warning Centers (NTWCs) and Tsunami Warning Focal Points (TWFPs) of ICG/PTWS Member States in the South China Sea region to share their tsunami bulletins to the South China Sea Tsunami Advisory Center (SCSTAC) by email whenever an earthquake of magnitude 6.0 or above occurs in the South China Sea and its surrounding areas to facilitate a comprehensive assessment and consolidation of information for all Member States;

Requests the Member States of South China Sea Tsunami Warning and Mitigation System to review the revised SCSTAC User's Guide, and focus on adding, deleting and revising their respective forecast points, and give feedback to the SCSTAC (wangzc@nmefc.cn) until 19 January 2026;

Requests the SCSTAC to further revise the User's Guide according to the feedback from the Member States, and submit it to the ICG/PTWS-SC in 2026 for comment and to the 14th meeting SCS-WG for endorsement;

Welcomes China's proposal for the demonstration project to evaluate the use of low-frequency time-code broadcasting station service for dissemination of tsunami advisory messages in the SCS region and to consider it as a supplement channel in the future,

Recalls the objective of the Ocean Decade Tsunami Programme, which aims for 100% of at-risk communities to be prepared and resilient to tsunamis by 2030, through initiatives of the IOC-Tsunami Ready Recognition Programme (TRRP) or similar activities,

Encourages the Member States of the WG-SCS to implement the IOC-UNESCO Tsunami Ready Recognition Programme (TRRP) or its equivalency for building community preparedness and resiliency to reduce tsunami-related risks, and to share progress and outcomes to meet the UN Ocean Decade Tsunami Programme goal of 100% Tsunami Ready by 2030;

Requests The Task Team on Capacity Development and Service (TT-CDS) to conduct a structured training series on Tsunami Ready by engaging more experts from WG-SCS to serve as resource persons or trainers for this activity. This series consists of **Introductory Tsunami Ready Training**, providing the principal approach and the 12 indicators of Tsunami Ready; **Tsunami Ready Implementation Training**, focusing on defining the community and

practical steps; **Application for Tsunami Ready Recognition Training**, guiding communities and stakeholders through the process of preparing, submitting, and achieving official recognition under the Tsunami Ready framework.

Requests the TT-CDS to organize face-to-face workshops or seminars with a focus on specific topics related to tsunami (such as tsunami modelling, sea level observation and seismic data analysis, tsunami data assimilation technique, potential application of AI techniques in the next generation analysis and forecasting system, risk assessment and communication, etc.), subject to availability of resources;

Requests the TT-CDS to convene intersessional meetings every four months. These meetings should serve to share plans and progress on Tsunami Ready implementation among Member States, exchange information on Tsunami Ready training activities and related workshops, highlight opportunities to leverage and expand the Tsunami Ready initiative through partnerships, resources, and collaborative actions;

Requests the IOC Secretariat to issue a Circular Letter to request each MS in the SCS region to nominate at least one expert to join the TT-CDS to deepen and synergise local, regional and international cooperation in advancing and promoting the capacity building in technology and service development for tsunami risk assessment and communication, tsunami monitoring and warning, preparedness and response through regular exchanges and conduct of capacity development activities in the region. Members of the TT-CDS will also serve as resource persons or trainers of capacity development activity which fits their expertise, as well as the focal point of Member States on capacity development matters.

Strongly encourages the Member States of the WG-SCS to share more seismic and sea level stations data for tsunami warning purposes in accordance with the IOC Oceanographic Data Exchange Policy to further enhance the tsunami warning capability in the South China Sea region;

Notes with appreciation the Government of Indonesia's contribution to sharing data from 21 sea level observation stations, including 5 stations located in the South China Sea region;

Requests the Member States of the WG-SCS to regularly update information on NTWC, TNC and TWFP with IOC Secretariat following the established procedures;

Accepts with appreciation the offer of China to host the Fourteenth Meeting of WG-SCS in Hong Kong tentatively on 30 November -1 December of 2026;

Decides to conduct the 15th meeting of the ICG/PTWS WG-SCS in 2027 online;

Accepts the revision of the ToR of the TT-CDS (Appendix 2(b))

Congratulates Chair Suci Dewi Anugrah (Indonesia) and Vice Chair Zongchen Wang (China); and Chair of TT-CDS Queenie Ching-chi Lam (China) and co-Vice Chair Mylene Villegas (The Philippines) and Indra Gunawan (Indonesia) on their election to leadership of the ICG/PTWS WG-SCS.

ANNEX III

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