Twelfth Meeting of the ICG/PTWS Regional Working Group
on Tsunami Warning and Mitigation System in the South China Sea Region,
7-8 November 2024, Jakarta, Indonesia

Report from SCS WG Task Team on Capacity Development and Services

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Outline

1. SCS WG TT on Capacity Development
2. Tsunami Warning Capacity Enhancement
3. Tsunami Preparedness and Trainning
4. Further Plans

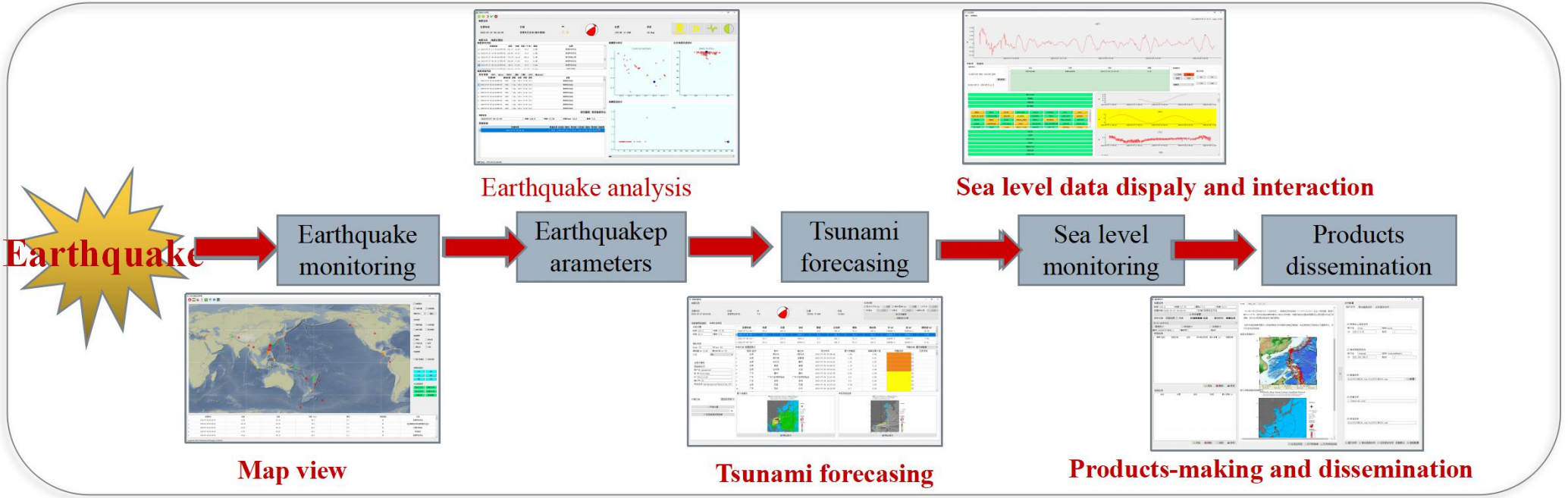
1. SCS WG TT on Capacity Development

- Recommendedto dissolve the Task Team on Establishment of a South China Sea Tsunami Advisory Center of the Regional Working Group on Tsunami Warning and Mitigation in the South China Sea, and further establish a Task Team on Capacity Development and Services at Tenth meeting of ICG/PTWS WG-SCS (online) on 28 and 30 September 2021;
- WG-SCS Task Team on Capacity Development and Services - **Chair Dr. Zhiguo Xu (China)**, 2021.
- ICG/PTWS-WG-SCS-XI, Mr **Zhiguo Xu (China)** to continue serving as Chair of TT-CDS in the next intersessional period of ICG/PTWS, and **Mr Indra GUNAWAN (Indonesia)** as the Vice Chair of TT-CDS in the next intersessional period of ICG/PTWS.

2. Tsunami Warning Capacity Enhancement

2.1 Smart Tsunami Information process System in full operation

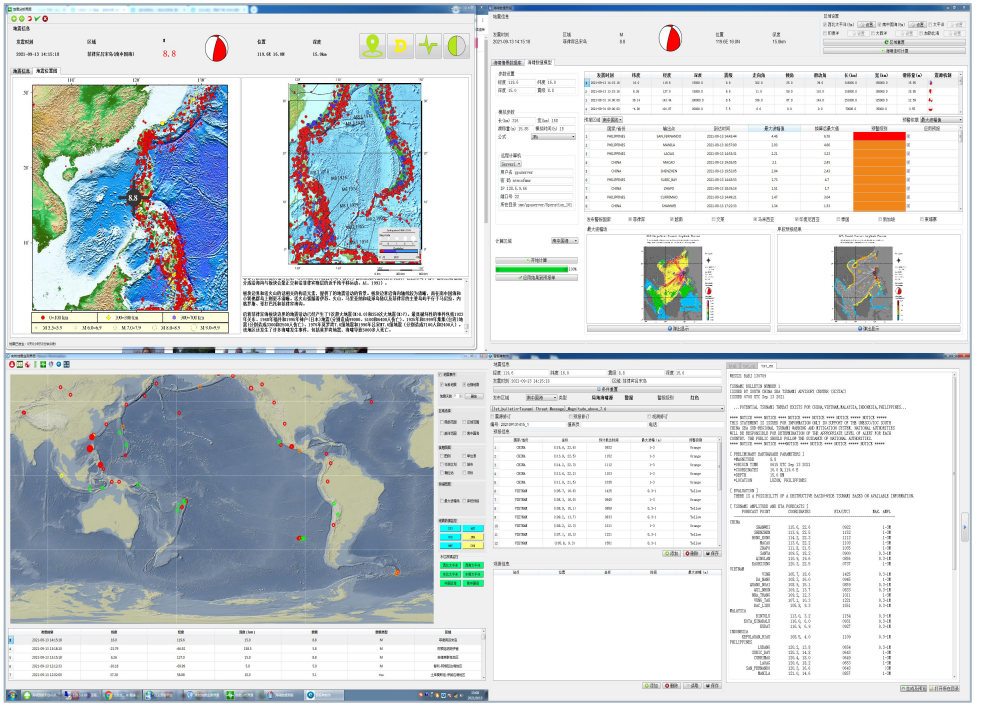
The Smart Tsunami Information Processing System (STIPS) is a tsunami early warning and decision-making products release system, which developed by SCSTAC's staff using Python language, and it has been put into full operation at the end of 2022.



2. Tsunami Warning Capacity Enhancement

2.1 Smart Tsunami Information process System in full operation

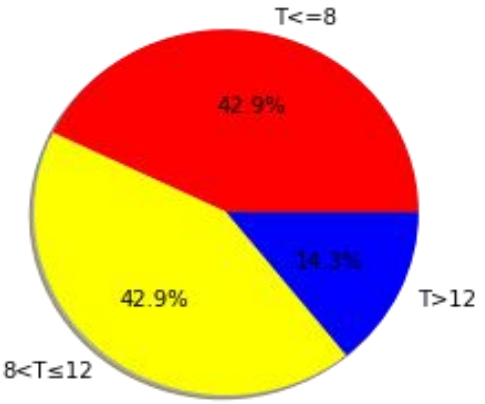
- An integrated decision support system for tsunami warning;
- User-friendly, comprehensive, well-maintained and open source software.
- Real-time monitoring, receiving and processing of seismic and sea level data;
- Tsunami scenario database;
- GPU parallel tsunami numerical simulation;
- Automatic generation and release of tsunami warning products;



2. Tsunami Warning Capacity Enhancement

2.1 Smart Tsunami Information process System in full operation

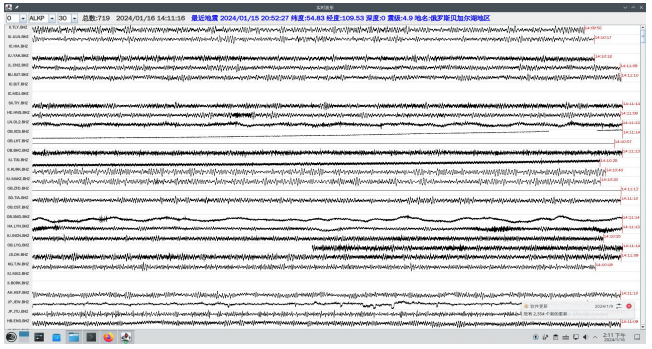
- Debugged and upgraded to ensure that the system can issue tsunami information successfully;
- According to the suggestions from watchstanders to optimize the functions of the water level and earthquake information processing module;
- Research and development of the earthquake parameters acquisition module based on the message triggering mechanism, and the development and deployment of the message communication service have been completed and tested;
- Since 2023, the average elapsed time of the first tsunami warning information issued is about 10 minutes, which satisfied the needs of tsunami warning services.



2. Tsunami Warning Capacity Enhancement

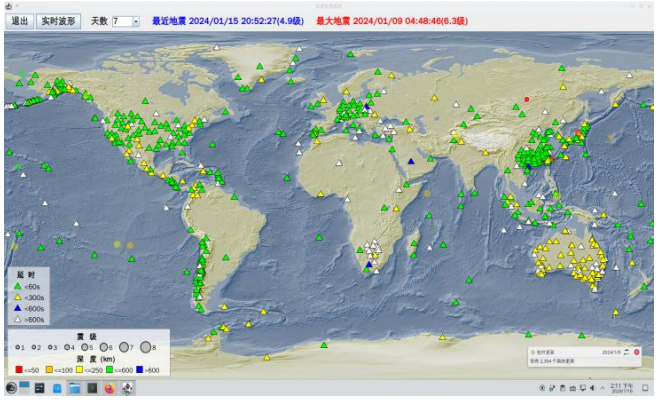
2.2 Global Earthquake Automatic Detecting and Location System

✓The near real-time waveform reading and format conversion module;
✓Earthquake phase picking module;
✓ Automatic location and Magnitude calculationmodule;
✓ Parameters storage and release module;
✓Realizes the near real-time automatic location to the global moderate-strong earthquake.



Real-time waveform display

Stations Map

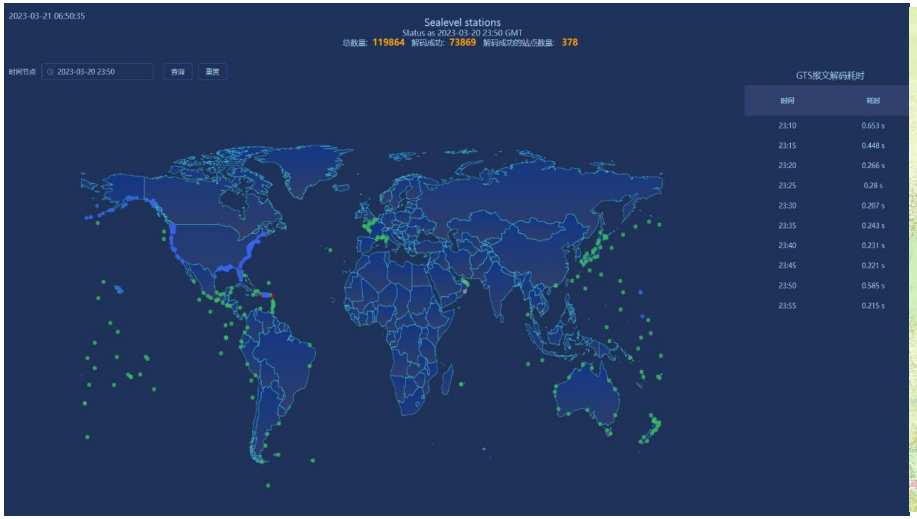


2. Tsunami Warning Capacity Enhancement

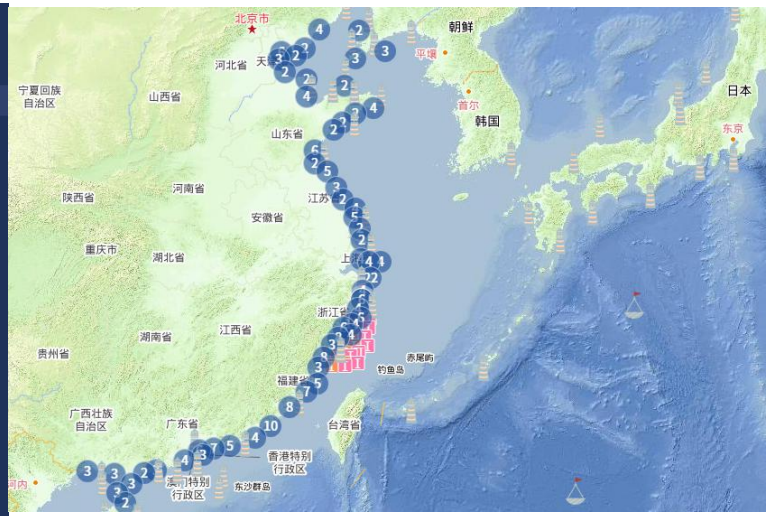
2.3 GTS sea level data decoding and processing module

Independantly developed GTS sea level data decoding and processing module, effectively expanding the channels for acquiring sea level data and enhanc the automatic capability of tsunami monitoring; Realized controllable decoding and processing function of shared sea level observation data.

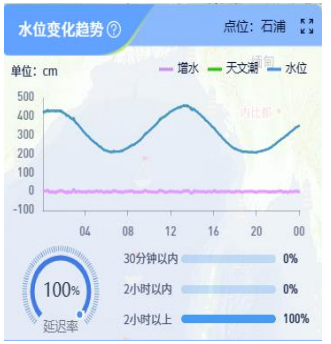
sea level monitoring



GTS transmission data decoding



Data mergng and Monitoring Analysis System

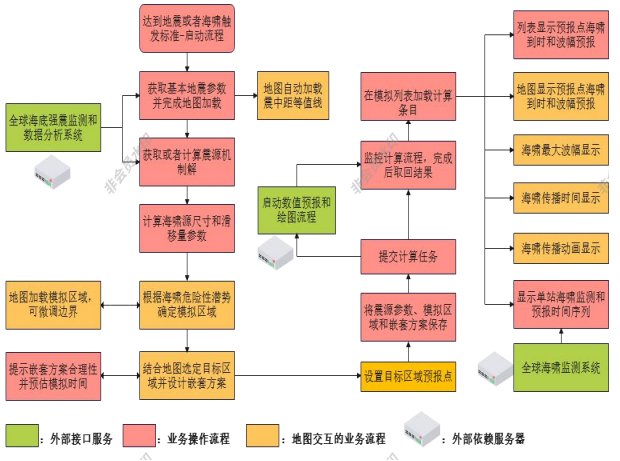


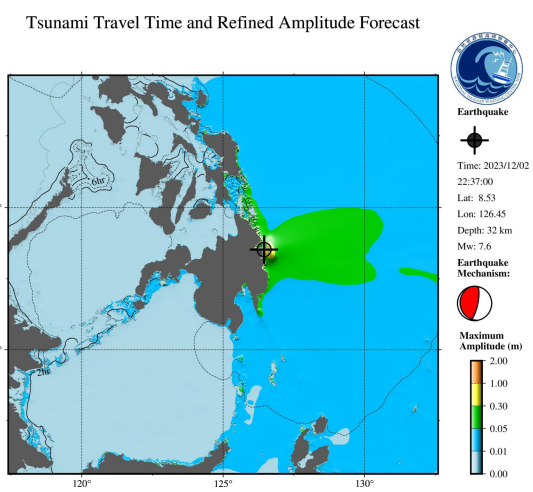
data interactive

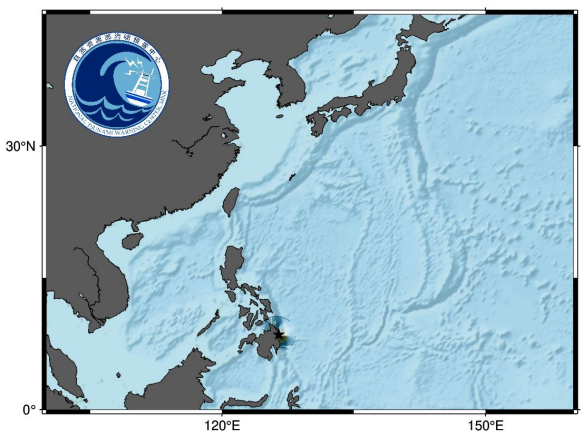
2. Tsunami Warning Capacity Enhancement

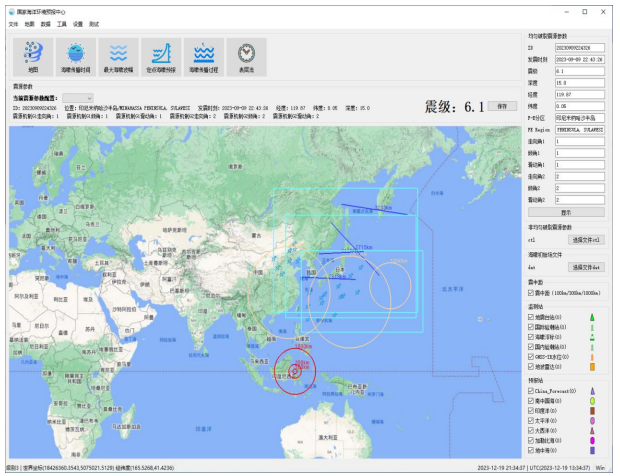
2.4 Global tsunami warning product production and release

In response to significant global tsunami events, the NTWC has established a standard operation procedure to generate tsunnami products,such as animations depicting the propagation of tsunamis, focal points forecasts, and the comparsions of observed and simulated tsunami waveforms . The NTWC possesses the capability to generate and disseminate numerical tsunami forecast products for major oceans worldwide.







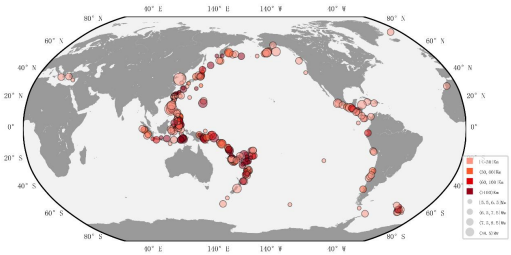


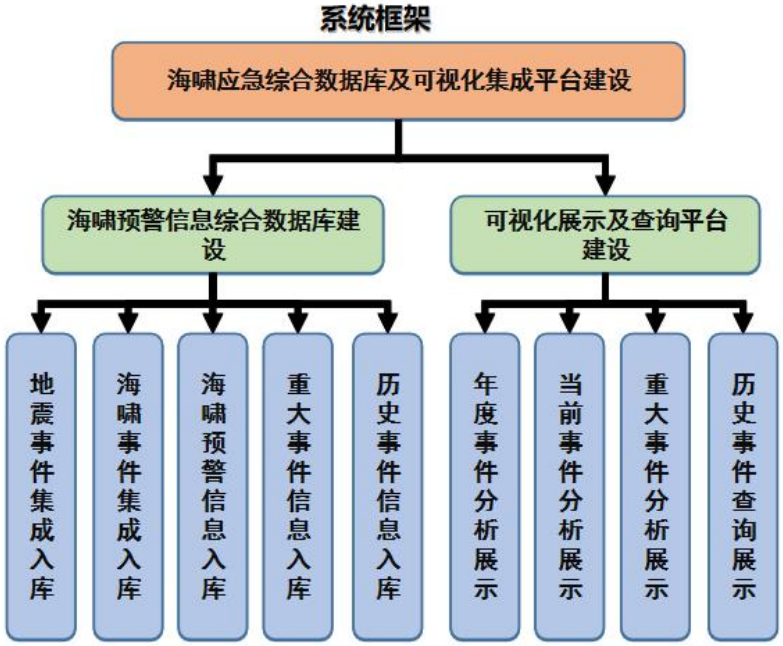
Numerical prediction products for the magnitude M7.6 Philippines earthquake and tsunami in 2023

2. Tsunami Warning Capacity Enhancement

2.5 Construction of tsunami emergency comprehensive database and visualization integration platform

In order to solve the storage problem of tsunami warning events and related data, the construction of a tsunami emergency comprehensive database and visualization integration platform was carried out. The platform integrates various tsunami warning information data, laying the foundation for further mining tsunami warning data resources.

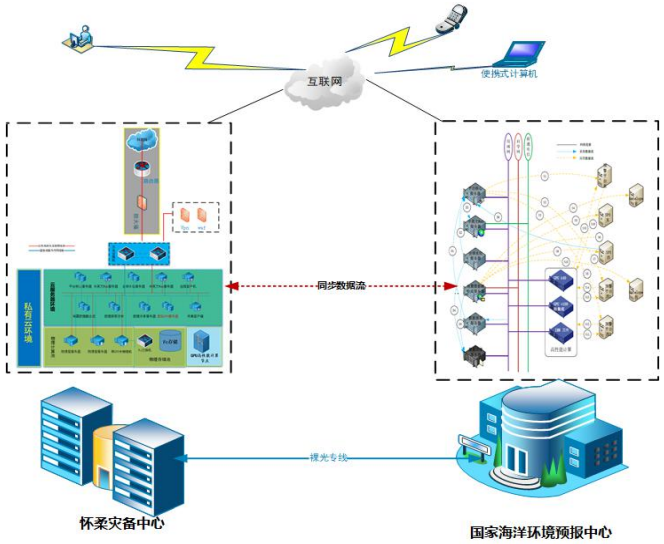


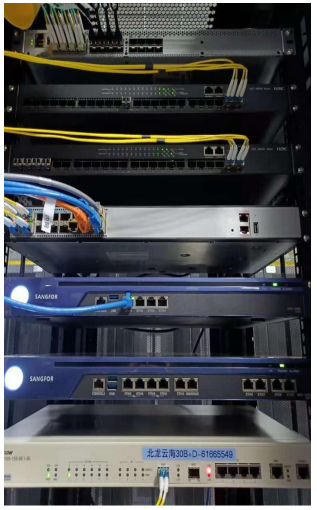


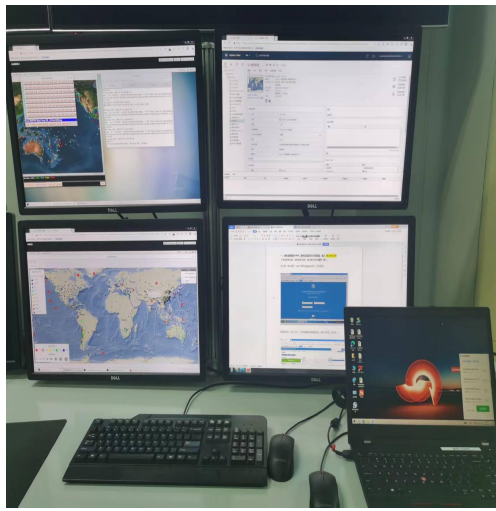
- Integrated storage and display of earthquake and tsunami events;
- Quantitative inspection of tsunami warnings
- Annual report analysis and display;
- Major event notification and watchstanders information

2. Tsunami Warning Capacity Enhancement

2.6 Backup tsunami warning system in Huairou District Beijing, China







- **Implement independent function backup**
- **The synchronization of data but not dependence**

2. Tsunami Warning Capacity Enhancement

2.7 Backup SCSTAC (Hong Kong) in full operation

香港天文台 HONG KONG OBSERVATORY

臨近預報區域專業氣象中心 RSMC for Nowcasting
WMO
亞洲航空氣象中心 AAMC Asian Aviation Meteorological Center
unesco 南中國海區域海嘯預警中心備份中心(香港) Backup South China Sea Tsunami Advisory Center (Hong Kong)

- MNR approved the construction of the BSCSTAC by Hong Kong Observatory on January 13, 2020 ;
- Sharing technical issues with the Hong Kong Observatory through online meeting and on-site visiting;
- Further improvements and modifications for the BSCSTAC in accordance with the local needs of the Hong Kong Observatory;
- Complete the optimization and deployment of the backup website, and achieve synchronous operation with SCSTAC;
- Conducted data and product sharing with the Hong Kong Observatory;
- The BSCSTAC officially launched its full operation on March 29, 2023;
- The **first scheduled activation** of BSCSTAC on 11-22 December 2023

3. Tsunami Preparedness and Trainning

3.1 Tsunami Disaster Mitigation and Popularization

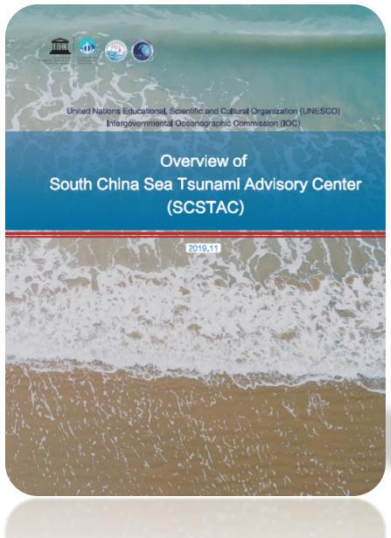
- ✓Technical Guidelines for Tsunami Risk Assessment and Zoning;
- ✓Modern Earthquake Tsunami Warning Technology;
- ✓Introduction to the South China Sea Tsunami Advisory Center;
- ✓ Frequently Asked Questions of Tsunami.

Guidelines for Tsunami Risk Assessment

- ☐Unify the tsunami risk assessment method;
- ☐Standardize the tsunami risk assessment process.

Introduction to SCSTAC

- ☐Introduction to the SCSTAC;
- ☐Enhancement of communication among countries.



《Modern Earthquake Tsunami Warning Technology》

- ☐Summarize tsunami early warning research;
- ☐Promote tsunami warning technology.

《Frequently Asked Questions of Tsunami》

- ☐A question-and-answer format;
- ☐Popularize tsunami knowledge;
- ☐Raise awareness of tsunami mitigation.

3. Tsunami Preparedness and Trainning

3.2 Regional Training and Workshop

International Training Course on Numerical Tsunami models for the South China Sea Region

Hosted by the Intergovernmental Oceanographic Commission (IOC) and the National Marine Environmental Forecasting Center (NMEFC), about 100 people from Indonesia, Malaysia, the Philippines, Vietnam, Tonga, China and other countries.

Management and operation seminar on seismic station for tsunami wavrning services

Hosted by the National Marine Environmental Forecasting Center (NMEFC), domestric technicians from Marine bureaus, central stations, ocean observation stations et al..

3. Tsunami Preparedness and Trainning

3.3 Short-Term visits of International Staff in 2023

SCSTAC continues International Secondment Programme with full funding by hosting 3 experts from SCS-WG Member States from Jul. to Sept. 2024 for a two-month period.

- Mr. Mohammad Obie Restianto from BMKG of Indonesia,
- Mr. Bhenz Rodriguez from PHIVOLCS of the Philippines
- Mr. Yip Weng Sang from MMD of Malaysia.

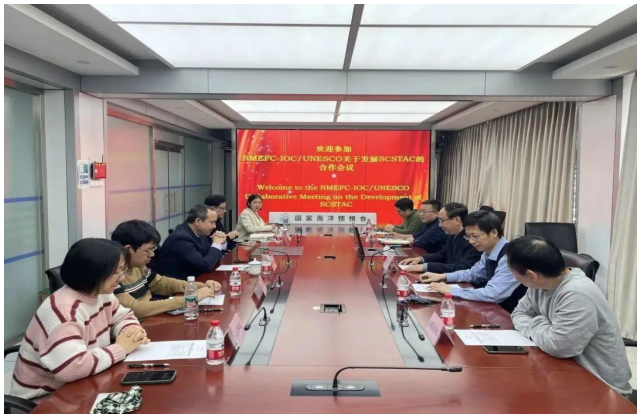
the major activities will be involved in are:

- ✓ Receive training on the earthquake location and focal mechanism inversion and tsunamiscenario database, forecast model and decision support system of the SCSTAC;
- ✓ Serve as a watch-stander once every week with shift time of 12 hours;
- ✓ Conduct communication and coordination among WG-SCS Member States regarding theactivities related to the full operation of SCSTAC.

3. Tsunami Preparedness and Trainning

3.4 Attend Meetings and Sessions

- Take active in the ITIC Trainning Program (Hawaii) in 2023;
- Attend the ICG/PTWS-XXX hosted by Tonga in 2023;
- The Director of the Tsunami Resilience Department of the IOC/UNESCO visited NMEFC in 2024;
- Signed a Memorandum of Understanding (MoU) with STMKG of Indonesia;
- Participation in the 57th session of the Executive Council;
- Carry out technical exchanges on Marine disaster prevention and reduction with Italy, South Pacific island countries, Indonesia, Bangaladesh
- Director of the Solomon Islands Meteorological Service visited NMEFC



4. Further Plans

- Develop methods and tools for tsunami warning and mitigation to enhance the capability of tsunami services;
- Deepen domestic and international cooperation and communication on tsunami warning, promote tsunami warning technology and platforms;
- Provide opportunities for in-person education, outreach and training activities in the region;
- Conducts an online Training Workshop on Tsunami Warning Technology and Platforms in the South China Sea region hosted by China.

Thank You

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