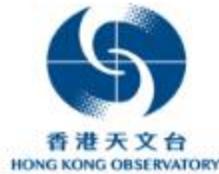


Trial And Full Operation Of The Backup South China Sea Tsunami Advisory Center (Hong Kong)

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Setup History of BSCSTAC



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)



Date	Milestone
3/7/2019	The National Marine Environmental Forecasting Center (NMEFC) of the Ministry of Natural Resources, China invited Hong Kong Observatory (HKO) to set up and operate the Backup South China Sea Tsunami Advisory Center (Hong Kong) (BSCSTAC)
2/4/2020	Preparations including system setup, data sharing, capacity building
29/3/2022	Commenced trial operation of BSCSTAC and backup website of SCSTAC
29/3/2023	Official launch of BSCSTAC



Preparation for the setup of BSCSTAC

Personnel

- **Training**
 - Experts from SCSTAC provided training on earthquake analysis, tsunami prediction and operating procedures
 - Regular refresher course for watchstanders on SOP, operating system, and earthquake analysis skills
- **Practice**
 - Watchstanders conduct 3 tsunami simulation exercises every day to familiarise themselves with the procedures and advisory products
 - Outputs are recorded for internal evaluation
- **Evaluation**
 - Case reviews are conducted regularly



South China Sea Tsunami Advisory Center (SCSTAC) [Virtual Website]

2023-07-20 08:06:42 (UTC)

Home

- Recent Events
- Tsunami Service
- Latest News
- Tsunami Education
- SCSTAC
- FAQ
- LINK
- Historical Events

No Current Tsunami Information or Threat in Effect within the SCS Region !

• Latest Event Details

Earthquake: Magnitude: 6.4
Origin Time: 2030-05-03 09:23:00(UTC)
Location: PHILIPPINE ISLANDS REGION

Depth: 140KM
Lat: 16.1°N Lon: 118.7°E

• Events List

No	Mag	Origin (UTC)	Depth (km)	Lon (°)	Lat (°)	Location	Message
						PHILIPPINE ISLANDS	

Preparation work of BSCSTAC

Operating System

- **Software**

- Operating software developed by SCSTAC/NMEFC
- SeisComP, Antelope

- **Hardware**

- 2 workstations (with hot standby backup) for watchstanders with operating software installed
- 2 GPU servers for real-time tsunami simulation
- 1 web sever hosting BSCSTAC website, which is a redundant website for SCSTAC

Trial Operation of BSCSTAC

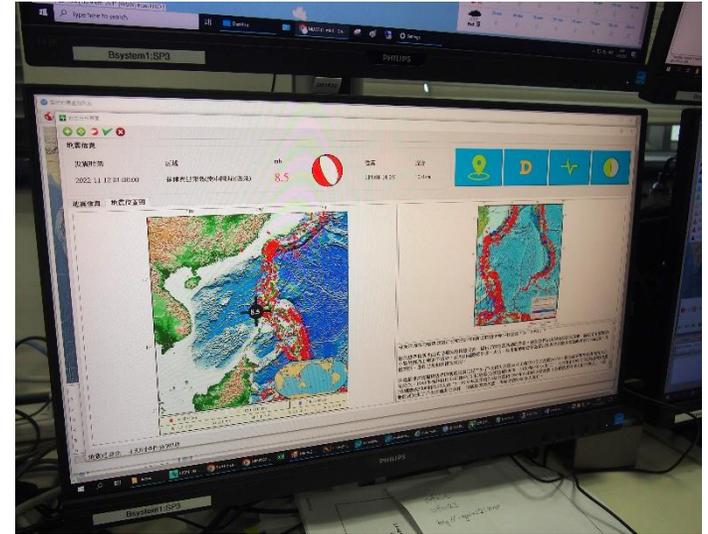
(29 March 2022 – 28 March 2023)

- Watchstander at the Central Forecasting Office of the HKO round-the-clock
- Response to earthquakes within AoS:
 - follow SOP to prepare advisory products
 - record products for internal evaluation
- Watchstander conducts system check twice a day to ensure the system availability



ICG/PTWS Pacific Tsunami Exercise 2022 (PacWave22)

- HKO participated in PacWave22 and organised a **government-wide table-top exercise** of tsunami based on a **Mw 8.8 earthquake at Manila Trench** under the framework of PacWave22 and assuming a **multi-hazard scenario** on 11 November 2022
- Around **100 staff from 35 government departments** participated. Briefing and debriefing were organised respectively before and after the exercise
- **5 bulletins** were issued in the capacity of BSCSTAC (to an internal website for performance monitoring)
- **Local tsunami warning and situation reports** were issued (to internal email address)



Bulletin Criteria adopted by SCSTAC and BSCSTAC

(<https://unesdoc.unesco.org/ark:/48223/pf0000370602.locale=en>)

Bulletin Type	Criteria	Content	Timeline
Tsunami Information; Only one bulletin	Magnitude of 6.0-6.4; or on land; or depth \geq 100km	EQ parameters and statement of 'No tsunami threat'	5-10 min
Tsunami Information; Only one bulletin unless minor waves observed and should be reported	Magnitude of 6.5-7.0	EQ parameters and statement of 'No tsunami threat'	5-10 min
Tsunami Threat Message; Bulletin with quantitative forecast	\geq 7.1 and shallow under water earthquake	EQ parameters and quantitative forecasts on threat level and Estimated Time of Arrival (ETA)	8-15 min
Tsunami Threat Message; Supplementary with observations	\geq 7.1 and shallow under water earthquake	Observations EQ parameters, quantitative forecast and tidal gauge observations	If updating EQ & tsunami forecasts, or observation available
Tsunami Threat Message; Final bulletin	\geq 7.1 and shallow under water earthquake	Statement of 'No tsunami confirmed or threat passed'	Hazardous waves has passed or no significant tsunami observations

Key Performance of BSCSTAC during Trial Operation

15 review cases since commencement of trial and full operation (29 March 2022 – 22 September 2023)

Performance Indicators	Performance of BSCSTAC
The time required to issue the first tsunami product from earthquake occurrence	10.6 minutes ¹
Probability of detection of $M_w \geq 6.0$ earthquakes	100% ²
Difference in epicenter between BSCSTAC and SCSTAC / USGS	0.19° / 0.22°
Difference in earthquake magnitude between BSCSTAC and SCSTAC / USGS	0.1 / 0.3
Difference in focal depth between BSCSTAC and SCSTAC / USGS	38 / 30 km
Percentage of time that the advisory center is operational and able to respond to the events	100%

¹ 14 cases with magnitude 6.0-7.0, 1 case with magnitude 7.1 in BSCSTAC message (7.0 in SCSTAC / USGS message)

² 1 case with magnitude 5.9 in BSCSTAC message, but 6.1 in SCSTAC & 6.0 in USGS message

SeisComP focal mechanism solution used by BSCSTAC as compared with that published by USGS

(29/3/2022 - 20/1/2023)

Event Datetime (UTC)	2022-04-07 23:36	2022-06-30 18:40	2022-07-27 00:43	2022-09-17 13:41	2022-09-18 06:44	2022-10-25 14:59	2022-12-15 04:03	2023-1-18 0:34	2023-1-18 6:06
SeisComP Moment Tensor									
USGS Moment Tensor									

SeisComP focal mechanism solution used by BSCSTAC as compared with that published by USGS

(21/1/2022 to 22/9/2023)

Event Datetime (UTC)	2023-01-28 19:15	2023-04-21 10:21	2023-06-15 02:19	2023-09-09 14:43	2023-09-11 12:51	2023-09-12 11:03			
SeisComP3 Moment Tensor	nil								
USGS Moment Tensor									

Operational Arrangement

- BSCSTAC will take over from SCSTAC for **not more than 2.4 months per year for scheduled operation in winter**
- The **first-year scheduled operation** will be **02 UTC 11 -22 December 2023**
- **Communication test (with response)** is proposed to be conducted **at 02 UTC on 20 November 2023**
- Advisory bulletins will be issued for $M \geq 6.0$ over the AoS within 10 minutes, and quantitative forecast of tsunami height will be provided at $M \geq 7.1$ within 15 minutes
- Disseminate through **fax, email, GTS, website**
- Operate **backup website of SCSTAC** (<https://bscstac.hko.gov.hk>)
- BSCSTAC will arrange **communication test** with TWFPs within the AoS once a year
- **Update of dissemination list**

