

Tsunami Warning, Mitigation and Plans for Tsunami Ready

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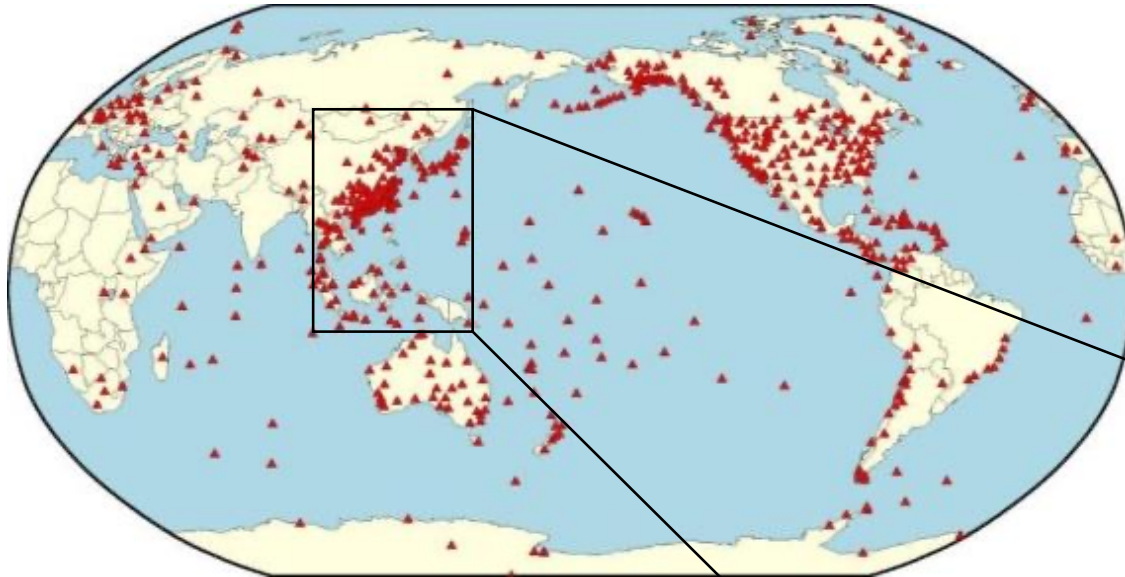
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Plans for Tsunami Ready

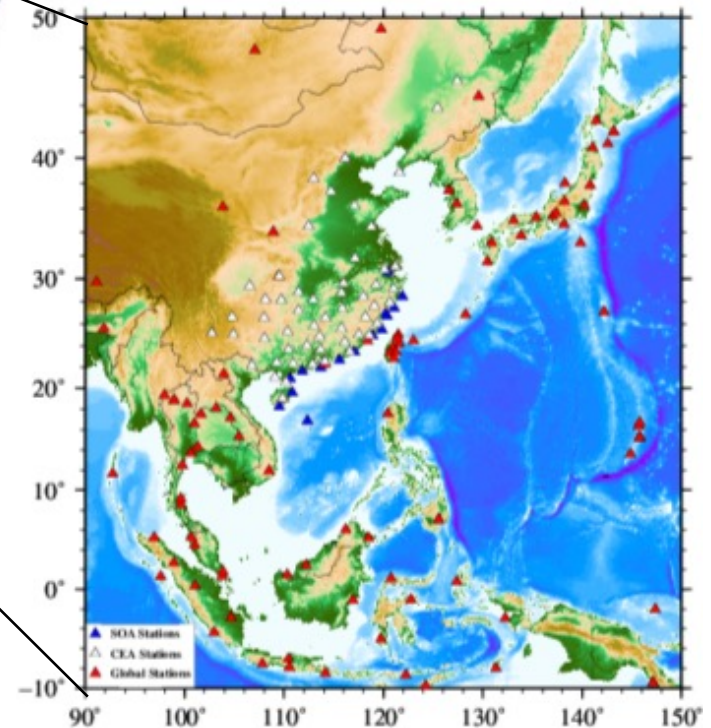
Earthquake Detecting and Sea Level Monitoring Capability

Global Seismic Station



- Antelope
- SeisComp3
- CEA EQIM
- PTWC, USGS earthquake info.: via GTS, FAX and Email

Regional Seismic Networks



Real-time, broadband seismic waveform data from:

- MNR(27)
- CEA(54)
- IRIS + GEOFON+GEOSCOPE (~580)

Earthquake Detecting and Sea Level Monitoring Capability

- Real-time sea-level data from nearly **600** functional tidal gauges and Dart bouys via GTS and from sea-level monitoring facility website
- Metadata file and Tide Tool update following PTWC's Emails

Added since 2020

Tidal gauge:

Karachi Pakistan

Kerguelen Island

Mar del Plata

Fort Stanley

Cape Disappointment

Martinez-Amorco Pier

Imbituba

haif Haifa Israel

zygi Zygi Cyprus

ohig O'Higgins

Chuuk.....

Dart Buoy:

Dnzd(NZ), dnzb(NZ)

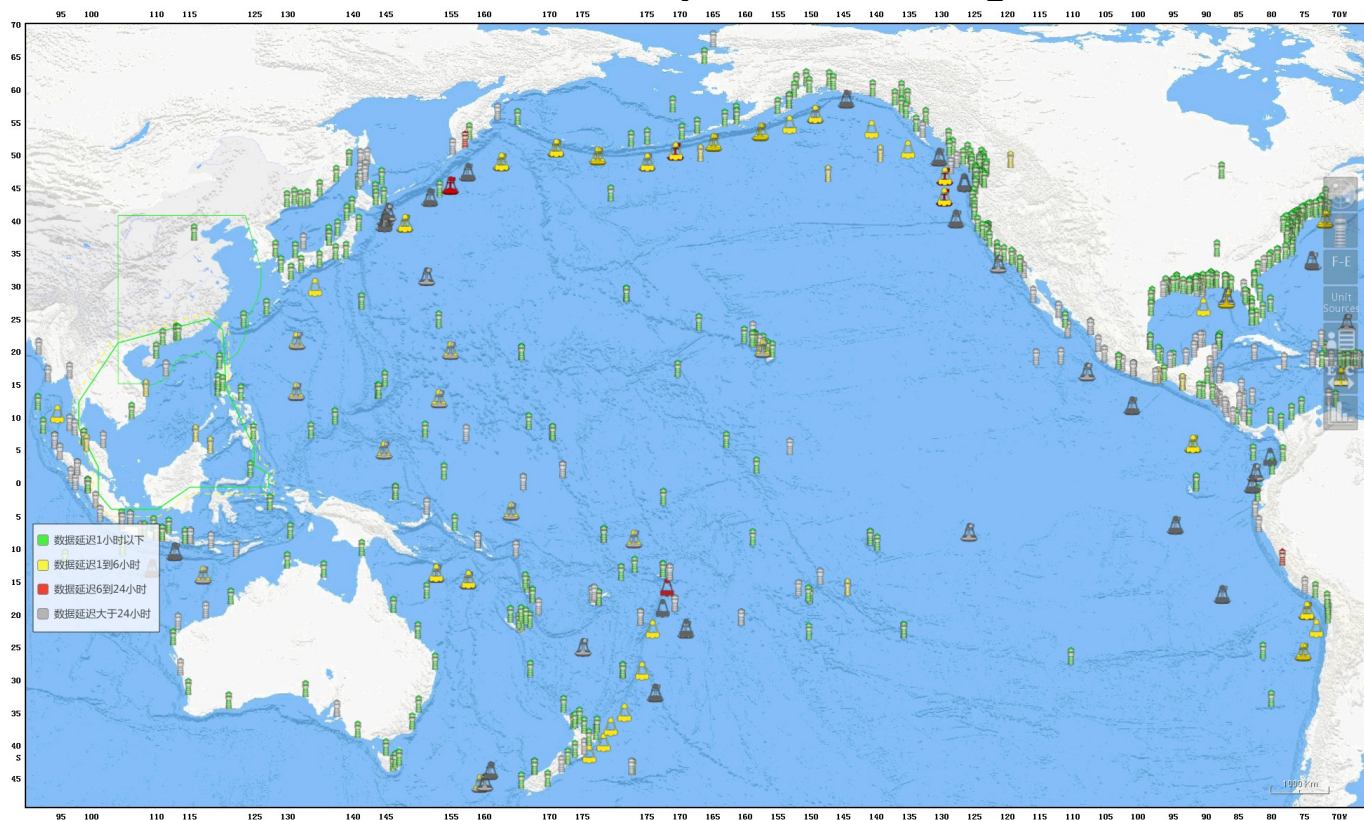
Dnzj(NZ), dnzf(NZ)

Dnzk(NZ), dnzg(NZ)

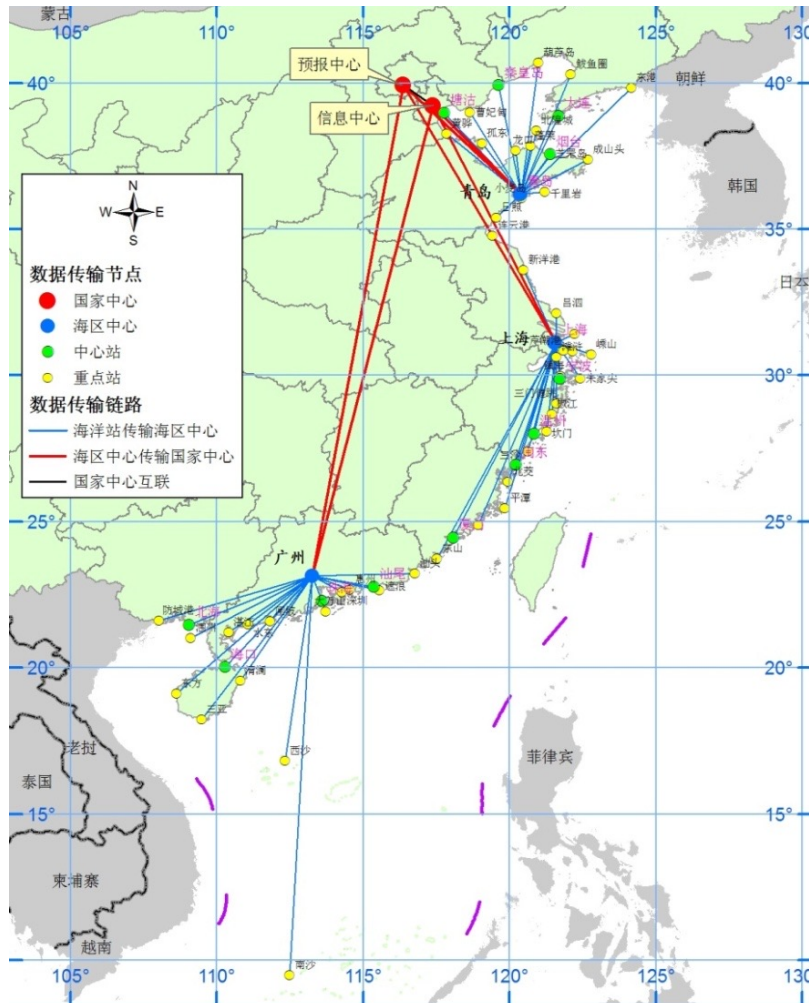
Dnzl(NZ), dnzh(NZ)

Dryu(JP), dnzi(NZ)

Dhai(CA).....

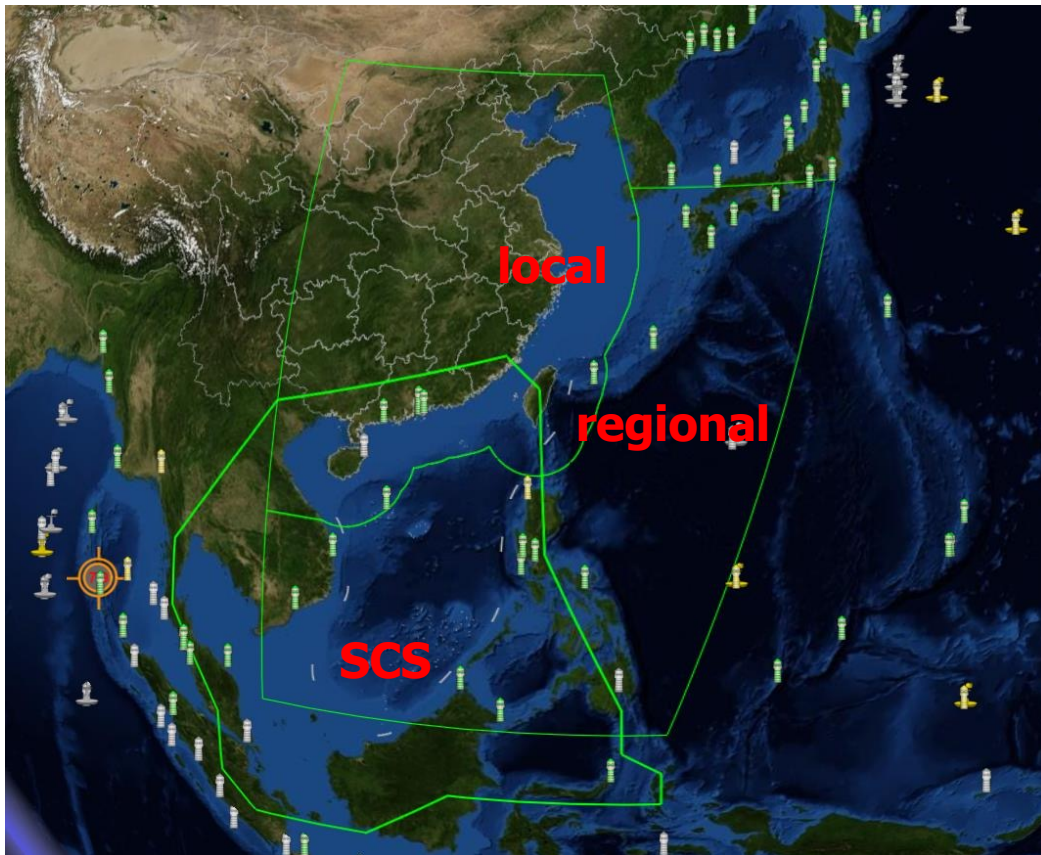


Earthquake Detecting and Sea Level Monitoring Capability



- 130~ tidal gauges along the Chinese coasts
- Data sharing via GTS for tsunami warning and mitigation system in the SCS region:
 - ✓ Shenzhen
 - ✓ Zhapo
 - ✓ Qinglan

Tsunami Warning SOPs



Tsunami bulletin issued

- ◆ Local : $M \geq 5.5$
- ◆ SCS : $M \geq 6.0$
- ◆ Regional 、 Distant and Other Oceans : $M \geq 6.5$

Tsunami bulletin with quantitative forecast

- ◆ Local : $M \geq 7.1$
- ◆ SCS : $M \geq 7.1$
- ◆ Regional and Distant : $M \geq 7.6$
- ◆ Other Oceans : No quantitative forecast

Tsunami Warning SOPs

Tsunamigenic potential adopted by SCSTAC

Magnitude(M _w)	Tsunami Potential Description
6.0 ≤ M _w ≤ 7.0	There is no tsunami threat from this earthquake
7.1 ≤ M _w ≤ 7.5	Possibility of a destructive local tsunami confined to 100-300 km of the epicenter
M _w ≥ 7.6	Possibility of a destructive basin-wide tsunami in the SCS region

SCSTAC Criteria

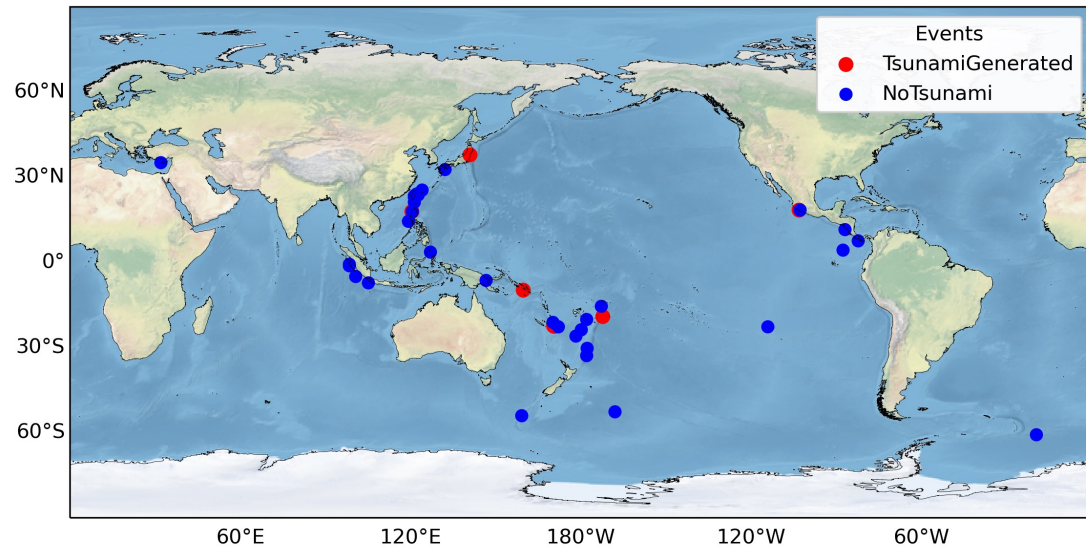
Criteria adopted by SCSTAC

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

Tsunami Warning Messages in 2022

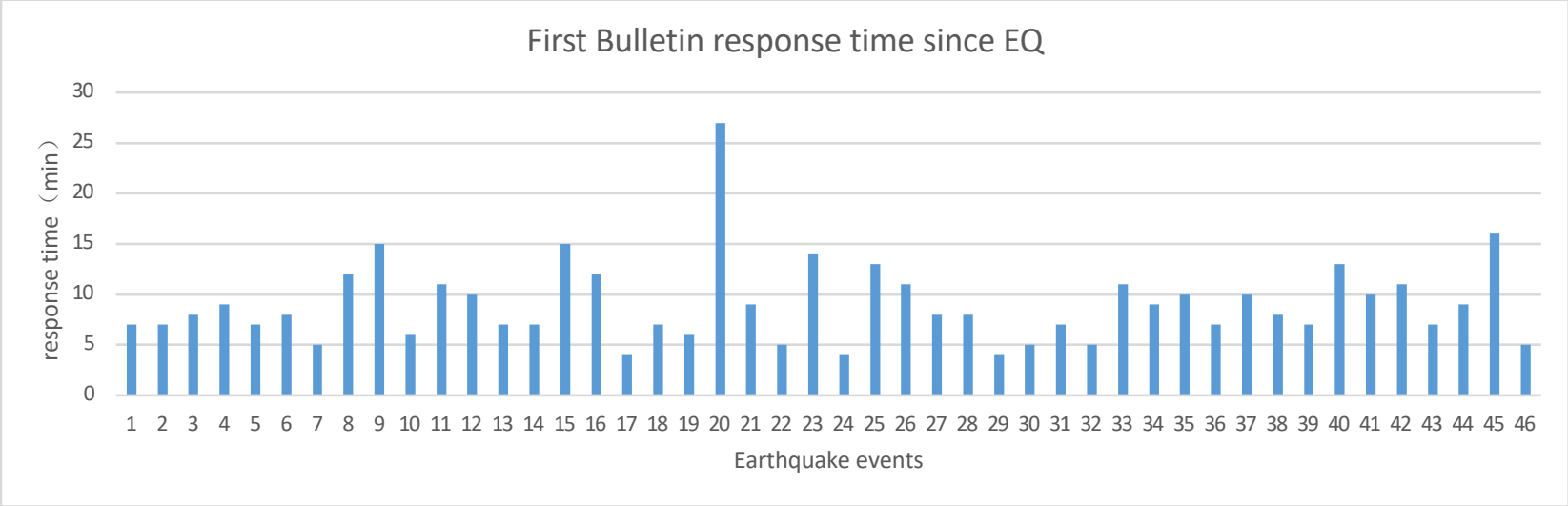
In 2022, totally issued

- ◆ 92 bulletins
- ◆ 46 earthquake events
- ◆ 7 earthquake events generated tsunami waves

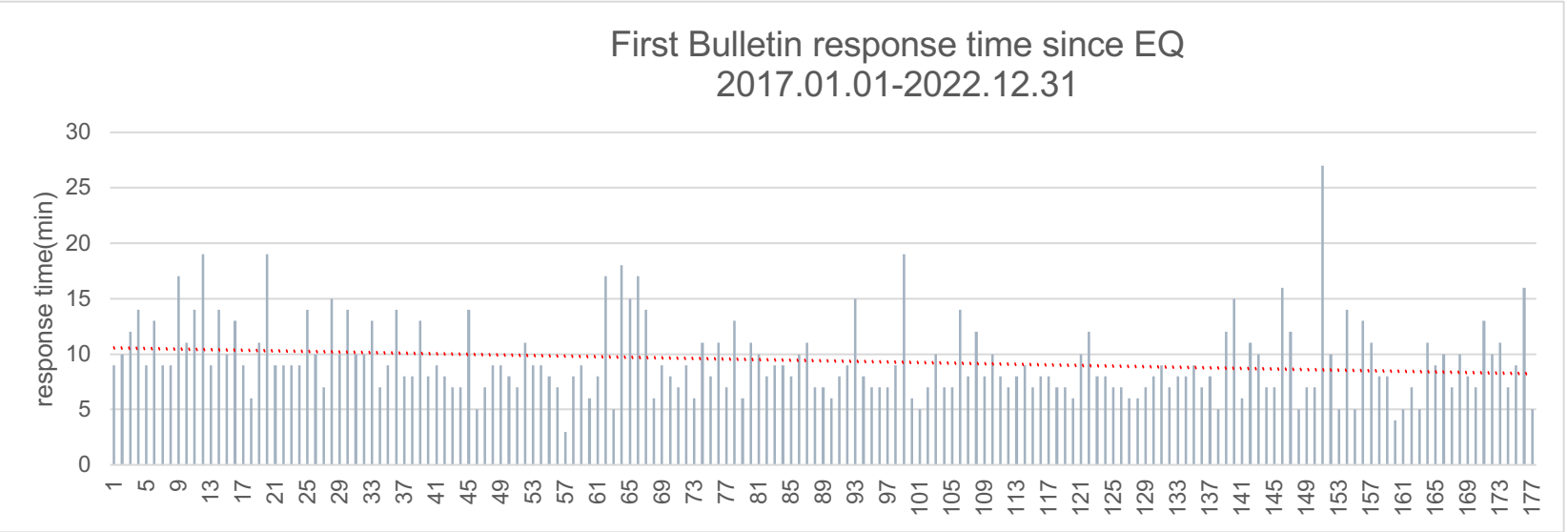


Time	M	Location	Lat	Lon	Amp (cm)
2022-0316-2236	7.3	East of Honshu, Japan	37.80	140.90	35
2022-0331-0457	6.5	Loyalty Islands	-22.55	170.41	7
2022-0331-1344	6.7	Loyalty Islands	-22.32	170.22	6
2022-0727-0843	7	Luzon, Philippines	17.85	120.37	8
2022-0920-0205	7.6	Mexico	18.40	-103.23	93
2022-1111-1848	7.4	Tonga	-19.15	-172.39	12
2022-1122-1003	7.2	Solomon Islands	-9.82	159.6	3

Tsunami Warning Messages in 2022



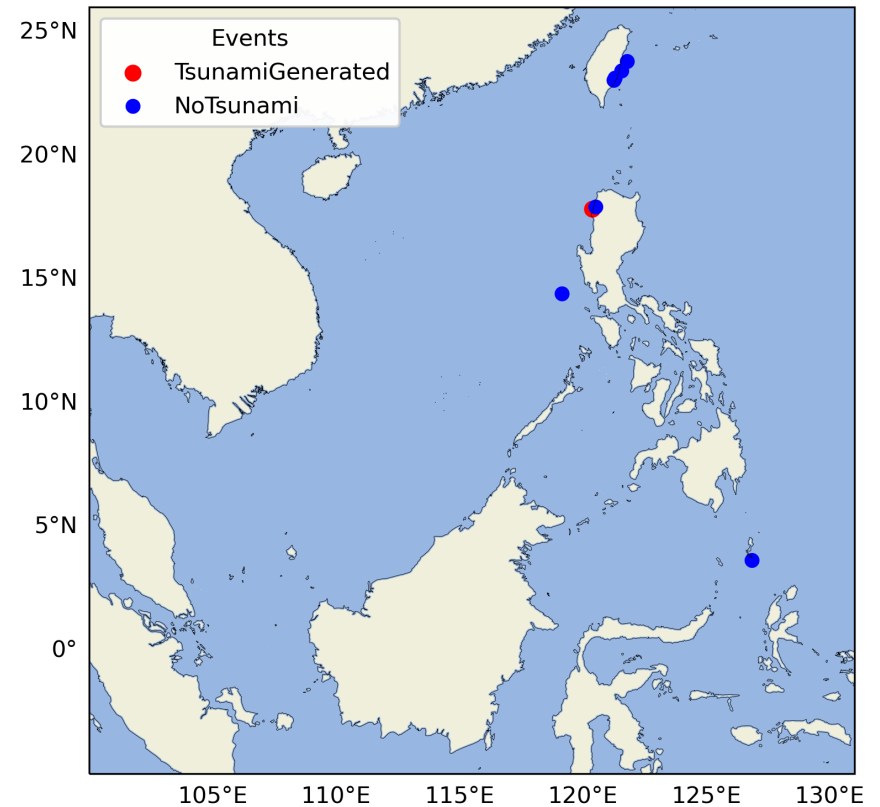
- average ~ 9min;
- mostly within 10min.



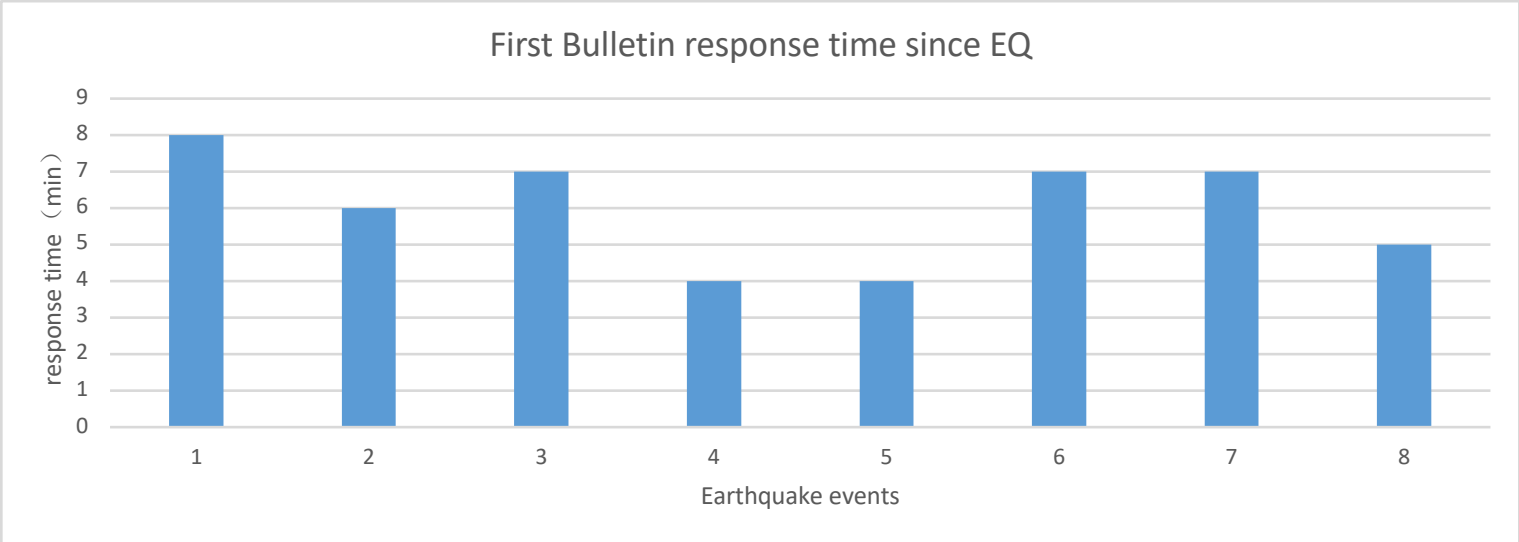
Tsunami Warning Messages in 2022

8 Earthquakes, 10 Bulletins.

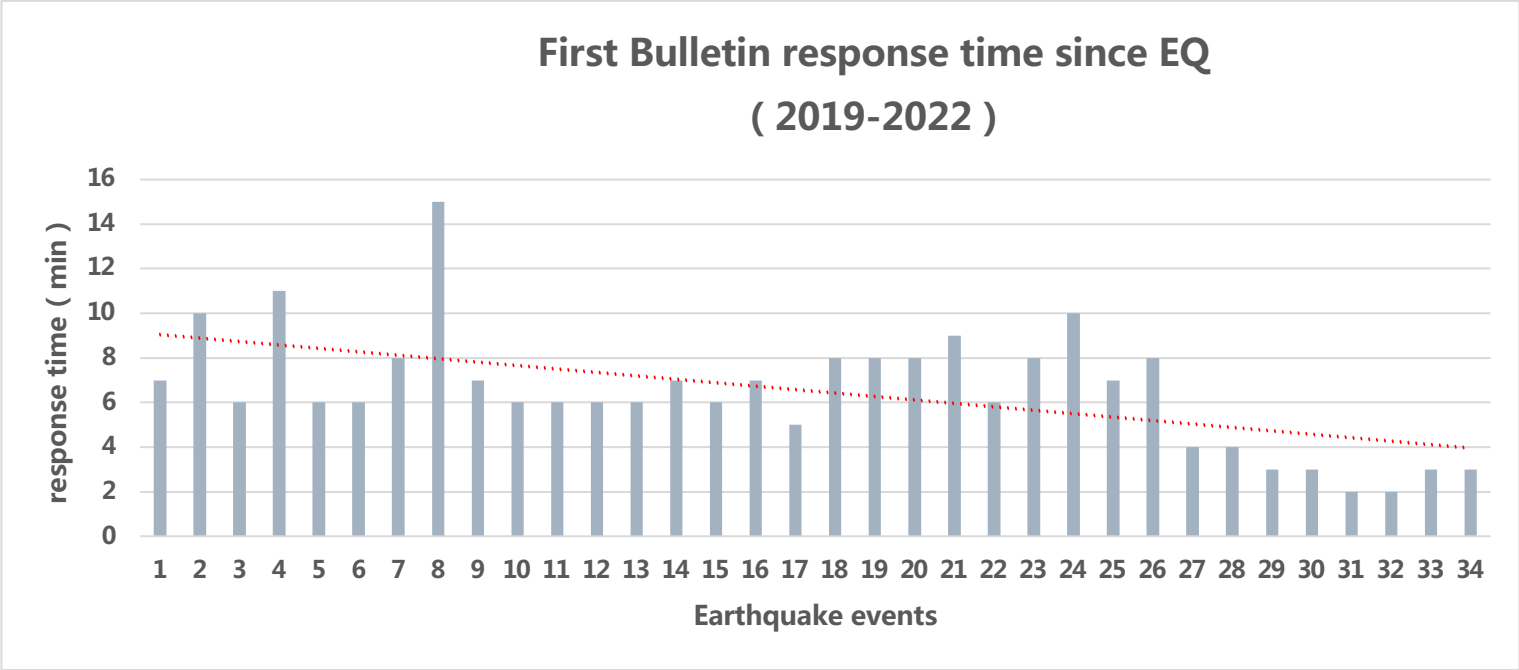
No	Origin	Mag	Depth (km)	Location	Lat (°)	Lon (°)
1	2022-0122-0234	6.0	70	Talau Islands, Indonesia	3.63	126.84
2	2022-0313-2105	6.2	10	Luzon, Philippines	14.42	119.15
3	2022-0323-0141	6.7	15	Taiwan, China	23.43	121.57
4	2022-0727-0843	7.0	15	Luzon, Philippines	17.85	120.37
5	2022-0917-2141	6.6	10	Taiwan, China	23.06	121.25
6	2022-0918-1444	6.9	10	Taiwan, China	23.15	121.30
7	2022-1025-2259	6.6	15	Luzon, Philippines	17.93	120.52
8	2022-1215-1203	6.1	10	Taiwan, China	23.82	121.78



Tsunami Warning Messages in 2022



~6 min



WESS31 BABJ 180617

Tsunami

TSUNAMI BULLETIN NUMBER 1
ISSUED BY SOUTH CHINA SEA TSUNAMI ADVISORY CENTER (SCSTAC)
ISSUED 0616 UTC Jan 18 2023

...TSUNAMI INFORMATION...

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE ***** NOTICE *****
THIS STATEMENT IS ISSUED FOR INFORMATION ONLY IN SUPPORT OF THE UNESCO/IOC SOUTH
CHINA SEA SUB-REGIONAL TSUNAMI WARNING AND MITIGATION SYSTEM. NATIONAL AUTHORITIES
WILL BE RESPONSIBLE FOR DETERMINATION OF THE APPROPRIATE LEVEL OF ALERT FOR EACH
COUNTRY. THE PUBLIC SHOULD FOLLOW THE GUIDANCE OF NATIONAL AUTHORITIES.
**** NOTICE **** NOTICE *****NOTICE **** NOTICE **** NOTICE ***** NOTICE *****

[PRELIMINARY EARTHQUAKE PARAMETERS]

*MAGNITUDE 7.0
*ORIGIN TIME 0606 UTC Jan 18 2023
*COORDINATES 2.85 N, 127.22 E
*DEPTH 60.0 KM
*LOCATION NORTHERN MOLUCCA SEA

[EVALUATION]

THERE IS NO TSUNAMI THREAT FROM THIS EARTHQUAKE BASED ON HISTORICAL EARTHQUAKE
AND TSUNAMI DATA. HOWEVER, NON-DESTRUCTIVE SEA LEVEL FLUCTUATIONS MAY BE GENERATED
ALONG COASTS NEAR THE EPICENTER.

[RECOMMENDED ACTIONS]

PERSONS ALONG COASTAL AREAS NEAR THE EPICENTER SHOULD BE AWARE OF POSSIBILITY
OF MINOR TSUNAMI WAVES AND UNUSUAL CURRENT. NO OTHER ACTION IS REQUIRED.

[UPDATES]

THIS WILL BE THE ONLY BULLETIN REGARDING THIS EVENT UNLESS MAJOR REVISION ON
EARTHQUAKE PARAMETERS BECOME AVAILABLE OR TSUNAMI WAVES ARE CONFIRMED.

[ADDITIONAL INFORMATION]

* MORE DETAILED INFORMATION CAN BE FOUND AT WEBSITE WWW.SCSTAC.ORG.
* TSUNAMI BULLETIN REGARDING THIS EVENT MAY BE ISSUED BY PACIFIC TSUNAMI WARNING
CENTER. IN CASE OF CONFLICTING INFORMATION, MORE CONSERVATIVE INFORMATION SHOULD
BE ADOPTED.
* TEL: +86-10-62104561
* EMAIL: TSU@NMEFC.CN

-----END OF BULLETIN-----

Tsunami Bulletin for SCSTAC

海啸信息

Tsunami Warning

时间: 2023年1月18日14时17分

编号: 海啸2023-0118-1406-1

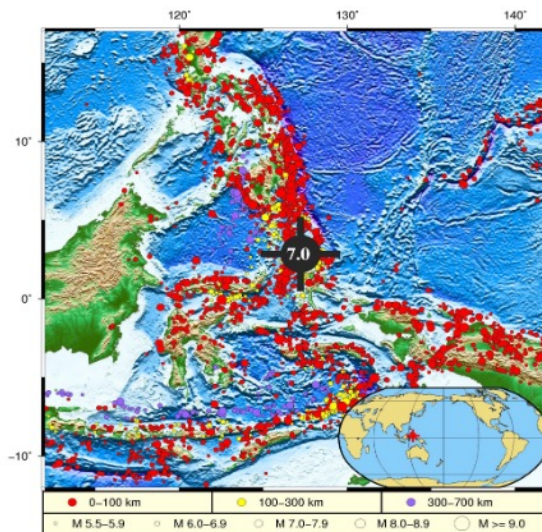
签发: 于福江

海啸信息

2023年1月18日14时6分(北京时间), 印尼马鲁古海北部海域(2.85°N,127.22°E)发生7.0级地震, 震源深度为60.0千米。自然资源部海啸预警中心根据初步地震参数判断, 地震可能会在震源周围引发局地海啸, 但不会对我国沿岸造成影响。

自然资源部海啸预警中心将继续跟踪分析地震和海啸监测数据, 并及时发布信息。

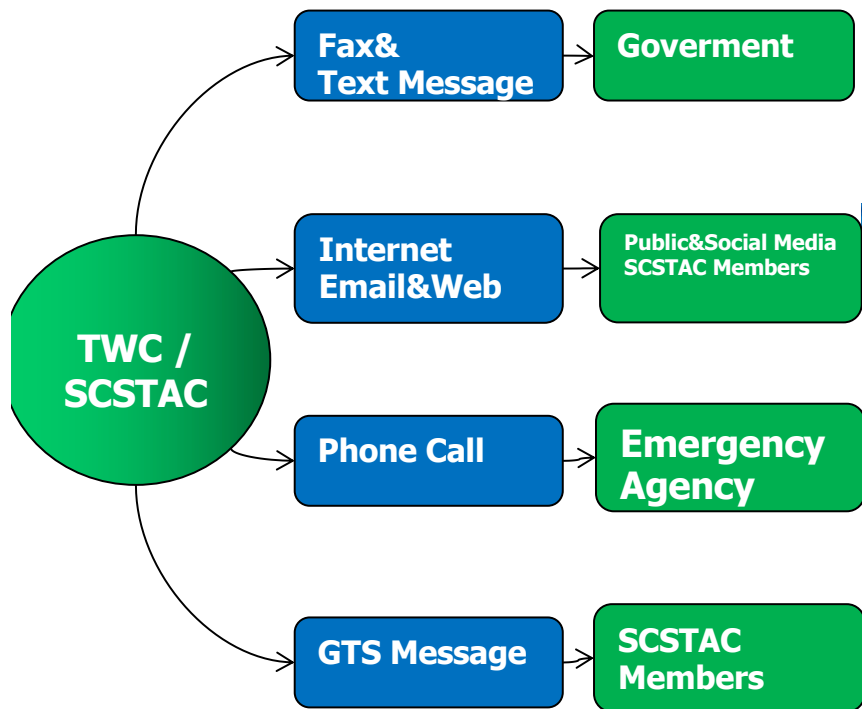
地震位置图如下:



注: 根据地震参数测定结果和海啸波幅预报结论, 海啸预警产品分为海啸信息和海啸警报两类。其中, 海啸信息指发生的地震事件预计不会产生海啸, 或不会对我国沿岸造成重要影响; 海啸警报指发生的地震事件预计会对我国沿岸造成重要影响。根据《海啸灾害预警发布》标准, 海啸警报按照沿岸最大海啸波幅预报结果和可能造成的灾害性影响可分为黄色、橙色和红色三级。

Tsunami Bulletin for Domestic Area

Dissemination



海洋预报

国家海洋环境预报中心
NATIONAL MARINE ENVIRONMENTAL FORECASTING CENTER
国家海洋预报台

South China Sea Tsunami Advisory Center (SCSTAC)

国家海洋预报台
粉丝: 32.1万 关注: 323
视频累计播放量: 117.4万

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认证: 国家海洋环境预报中心官方账号
简介: 发布海洋环境预报信息, 聚焦海洋热点新闻, 分享海洋科普知识

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国家预警信息发布

中国海洋预...

中国海洋预...

国家海洋预报台

全球海洋预警

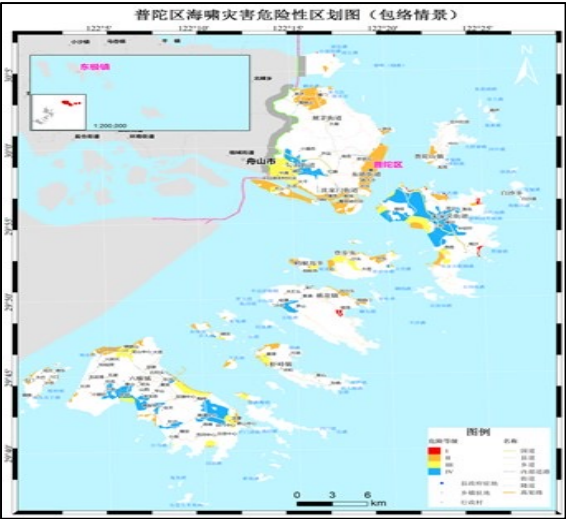
地震海啸消息
6.8 级地震
厄瓜多尔沿海近海海域发生

抖音

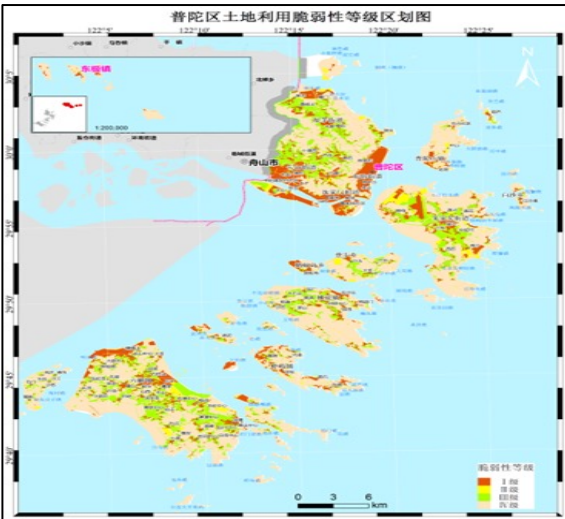
bilibili

今日头条

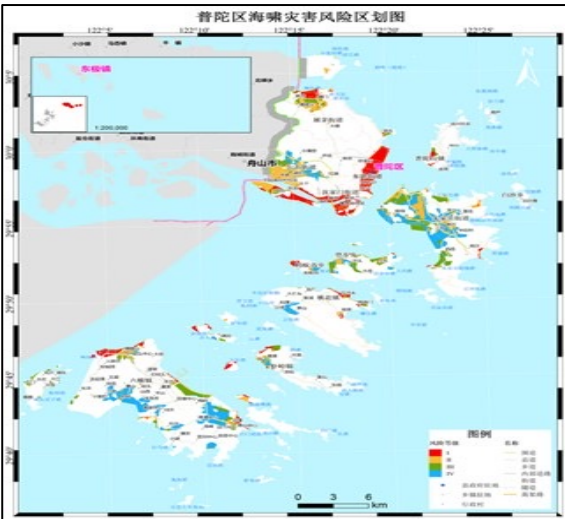
Tsunami Mitigation-Hazard Assessment



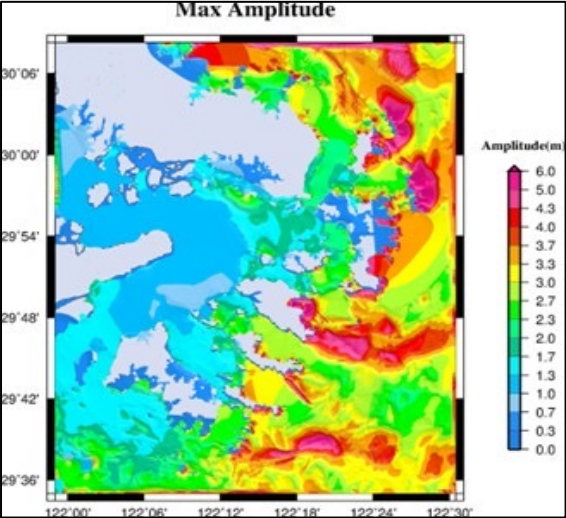
Hazard



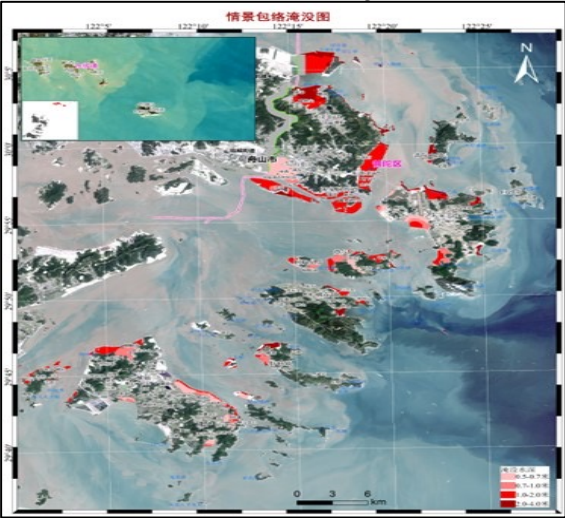
Vulnerability



Risk



Max Amp



Inundation



Evacuation

Tsunami Mitigation- Domestic Tsunami Desk Exercise, 2022

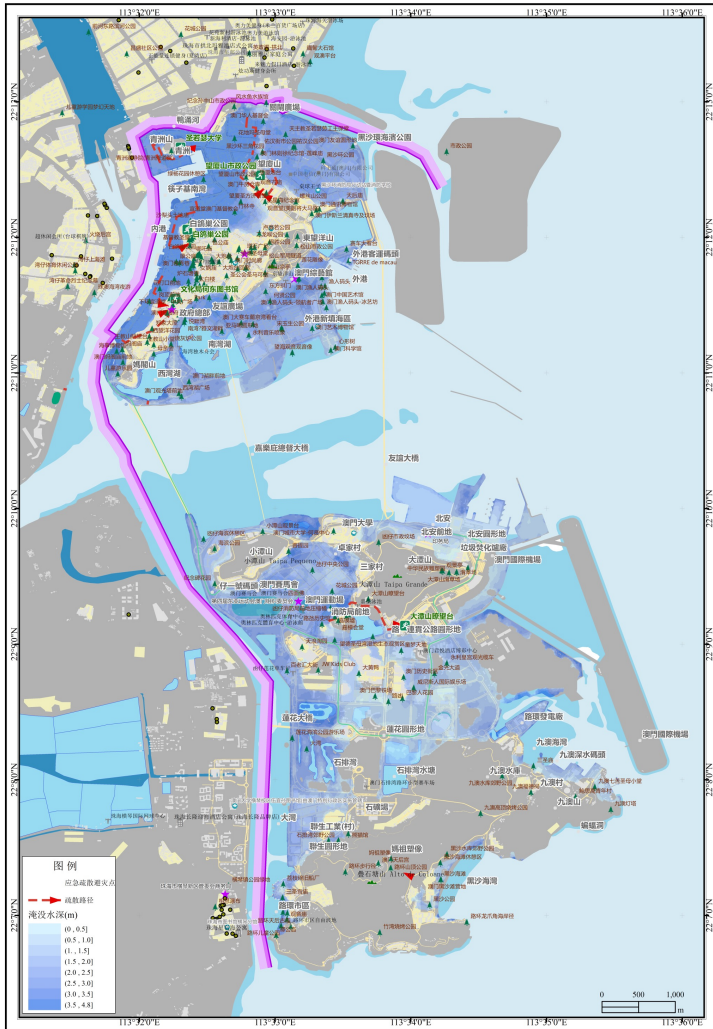
Hypothesis Source: Earthquake with $M_w 8.8$ in Manila trench

Warning: Catastrophic impact in Hainan, Guangdong, Guangxi and Fujian

Dissemination: Warning Mes. Sent and Received Effectively in 10 minutes



Tsunami Mitigation-Publicity



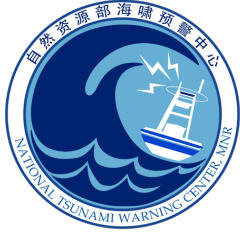
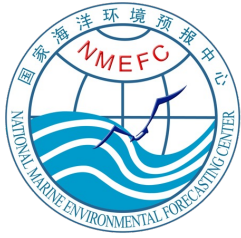
Inundation and Evacuation Map



Tsunami Awareness Video

Plans for Tsunami Ready

- ◆ Strengthen seismic detecting and water level monitoring capabilities
- ◆ Optimize the tsunami warning SOPs and conduct tsunami warning training
- ◆ Expand dissemination ways for tsunami products
- ◆ Improve tsunami awareness for public
- ◆ Conduct community-level tsunami hazard risk assessments



Thank You
