

12th Meeting of the Intergovernmental Coordination Group for the
Pacific Tsunami Warning and Mitigation System (ICG/PTWS)
Regional Working Group on Tsunami Warning and Mitigation System
in the South China Sea Region (ICG/PTWS/WG-SCS-XII)
7-8 November 2024

Philippine Institute of Volcanology and Seismology

Country Report

Ma. Mylene Martinez-Villegas



Philippine Institute of Volcanology and Seismology (PHIVOLCS)

Service institute of the Department of Science and Technology (DOST) that is principally mandated to mitigate disasters that may arise from volcanic eruptions, earthquakes, tsunami and other related geotectonic phenomena

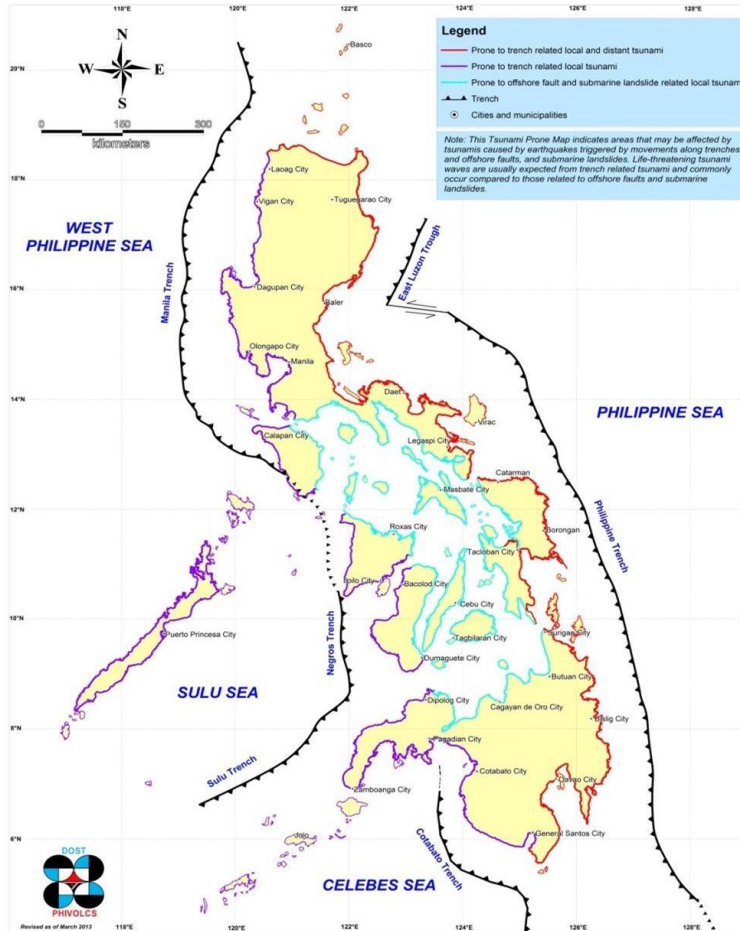


KEY ACTIONS FOR DISASTER RISK REDUCTION

- Know Hazards and Risks
 <Hazard and Risk Assessment
- Monitor
 <Monitoring
- Warn and Disseminate Information
 <Communication
- Respond Properly and Timely
 <Preparedness, Mitigation, Response,
 Recovery



Tsunami Prone Areas in the Philippines

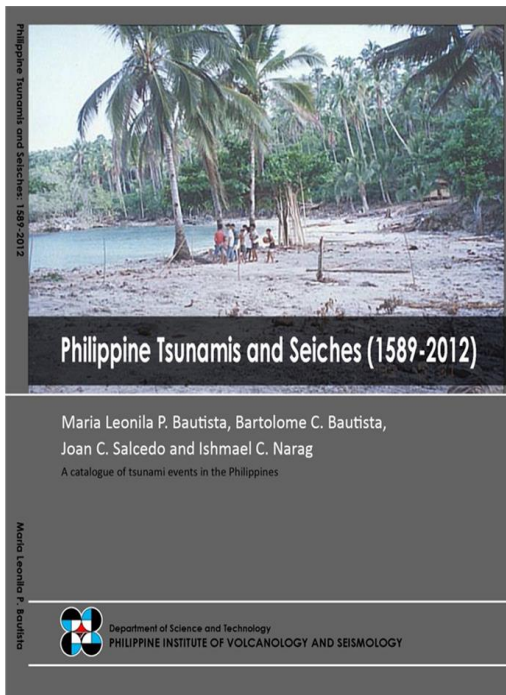


Prone to trench related local and distant tsunami

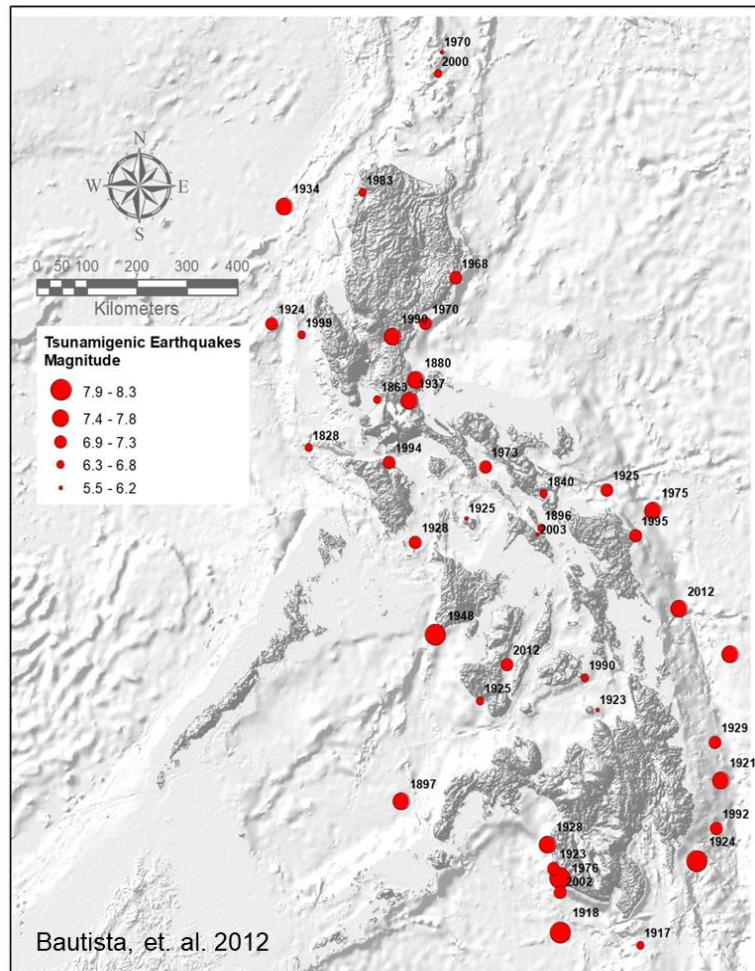
Prone to trench related local tsunami

Prone to offshore fault and submarine landslide related local tsunami

Historical Tsunami in the Philippines



41 confirmed tsunami events based on historical accounts and earthquake events catalogues from 1828 to 2012



17 August 1976 Moro Gulf Earthquake & Tsunami



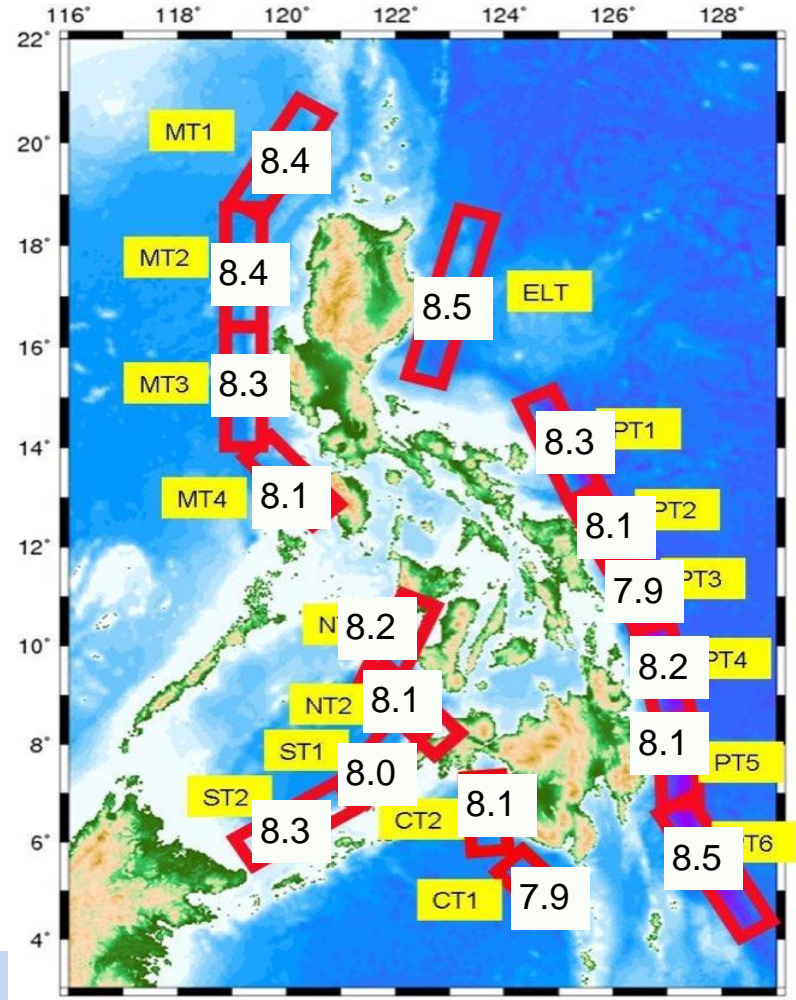
- Magnitude 8.1, Shallow depth (<33 km)
- First waves reported within 2 to 5 minutes of the main shock
- Series of waves (~3- 7 waves reported), 1-5 minutes apart
- Height up to 9 meters
- Death ~8000

Inundated Village



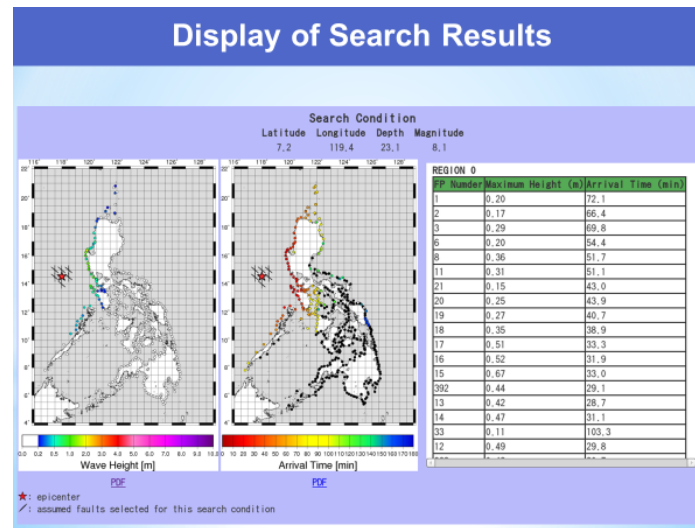
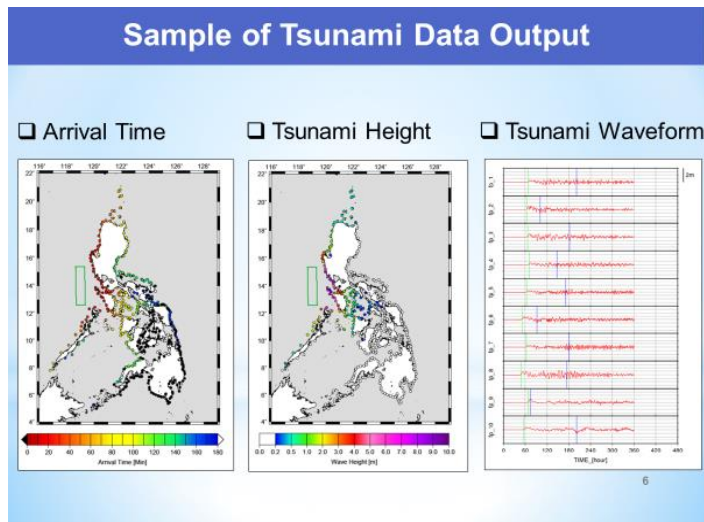
Earthquake Sources

(Salcedo, 2010)



Tsunami Detection, Warning and Dissemination

~30,000 Event-Based Tsunami Scenario Database (2012/2013)



0.5 degree interval

5 magnitude cases
 (M8.5, M8.0, M7.5,
 M7.0, M6.5)

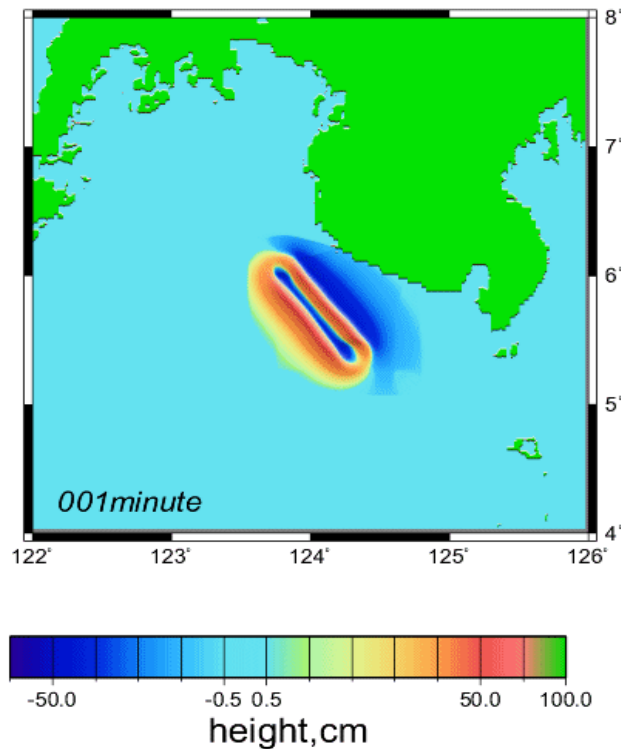
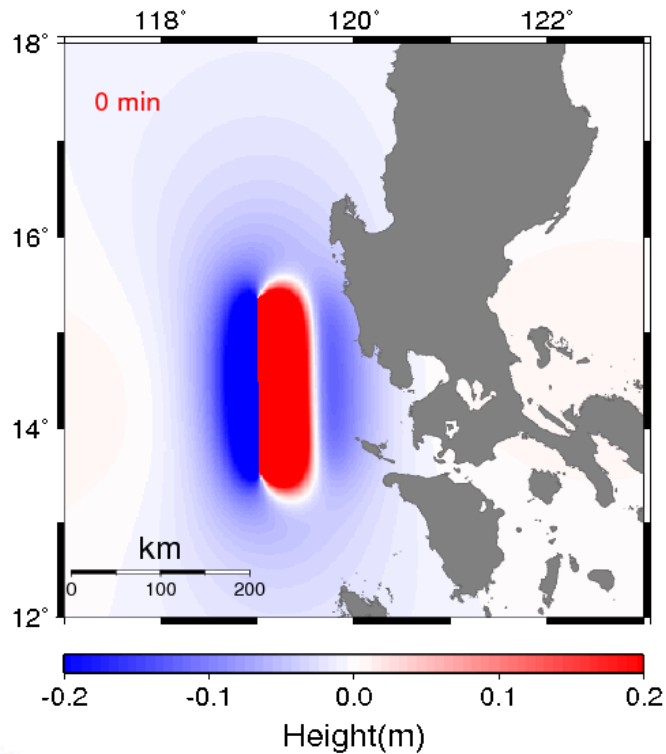
5 depth cases (10km, 20km, 40km,
 80km, 100km)

2 strike angles for some faults



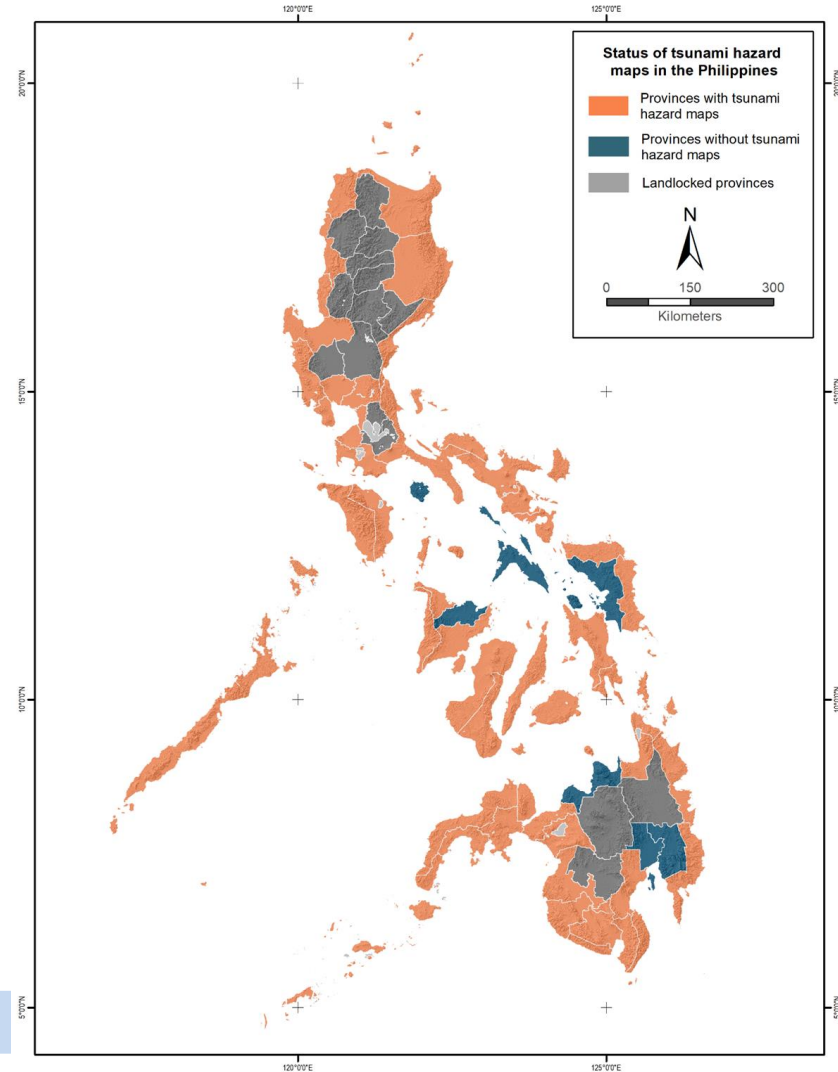
Tsunami Detection, Warning and Dissemination

Tsunami simulation

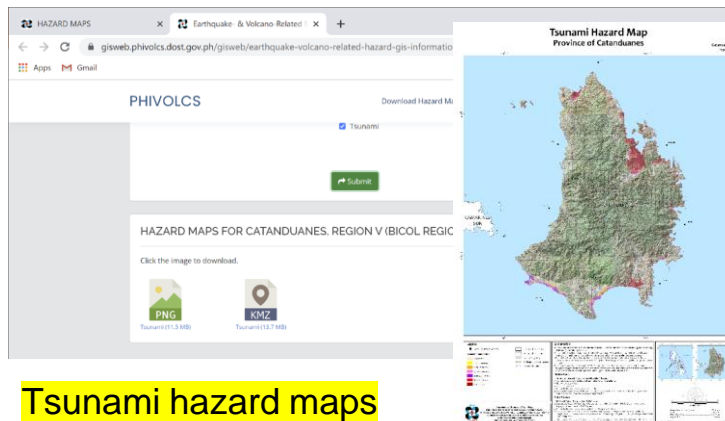
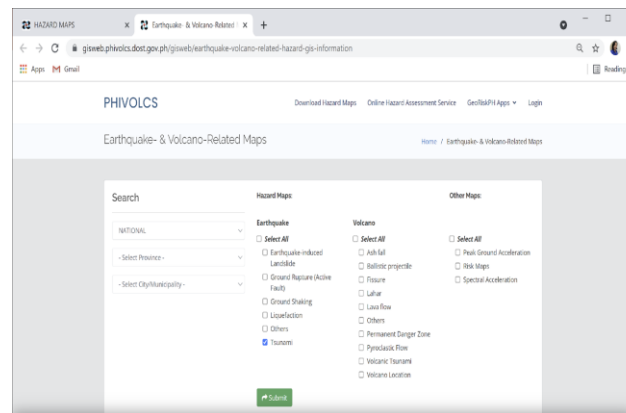


Status of Tsunami Hazard Maps in the Philippines

	No. of Provinces	Year Generated
Tsunami Prone Areas with Hazard Map	30	2007-2013
Tsunami Inundation Maps (with specific inundation depths)	29	2018-2022 ao 2024 Tsunami Hazard Maps:80 municipal scale maps
No tsunami hazard map	8	
Landlocked Provinces	15	



Status of Tsunami Hazard Maps in the Philippines



Tsunami hazard maps

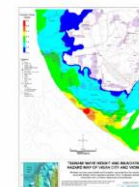
Tsunami Hazard Maps



Indicative Map
Tsunami Prone
Areas in the
Philippines



1:50,000 Scale Tsunami
Hazard Maps for Provinces



1:10,000 Scale Tsunami
Hazard Maps for Cities



1:5,000 Scale Tsunami
Hazard Map for Metro
Manila



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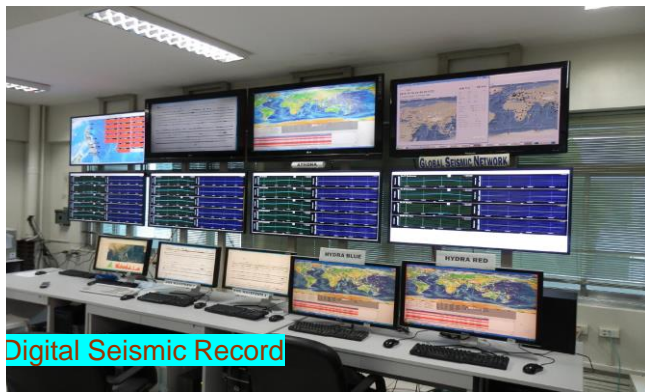
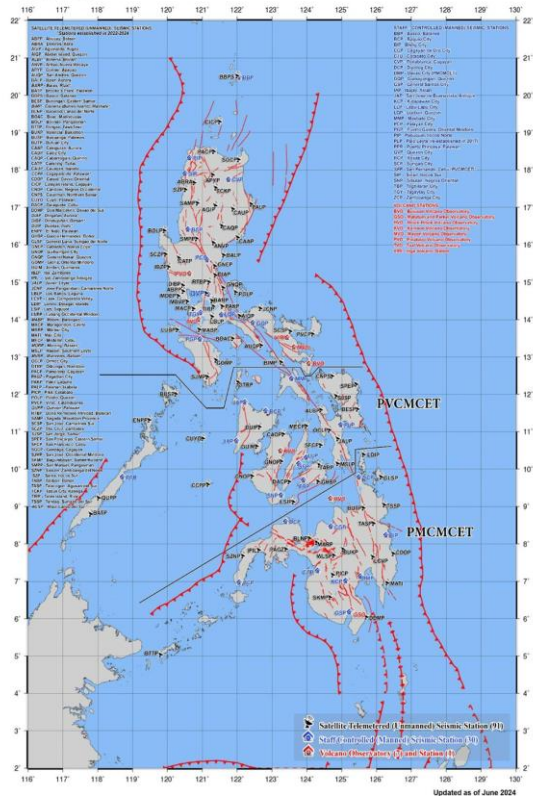
Tsunami Detection, Warning and Dissemination

EARTHQUAKE MONITORING NETWORK

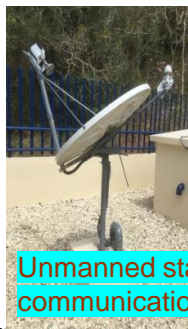
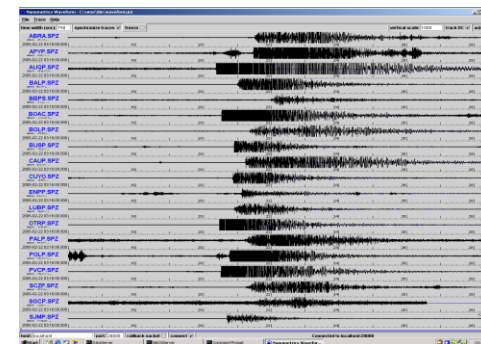
Philippine Seismic Network
2024

- 121-station network (seismographs)

- 30 manned seismic stations, 91 unmanned seismic stations with satellite telemetry communication, 6 volcano-seismic station with satellite telemetry



Digital Seismic Record



Unmanned stations with satellite communication

- PMCMCET - PHIVOLCS Mindanao Cluster Monitoring Center for Earthquake and Tsunami
- PMCMCET - PHIVOLCS Visayas Cluster Monitoring Center for Earthquake and Tsunami
- Tagaytay City Mirror Station

Tsunami Detection, Warning and Dissemination

TSUNAMI MONITORING NETWORK

Network	Existing
Real-time tide gauges	*19 (PHIVOLCS thru JICA) 5 (PTWC, RIMES, GLOSS)
Community tsunami detection and warning system	10 (PHIVOLCS)

* Unmanned sea level stations need to be set up in more areas



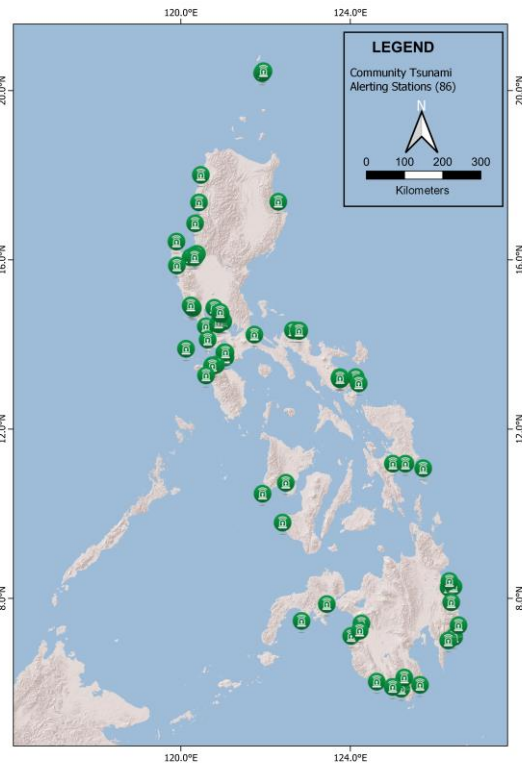
- PHIVOLCS thru JICA
- ★ PHIVOLCS Community Tsunami Detection



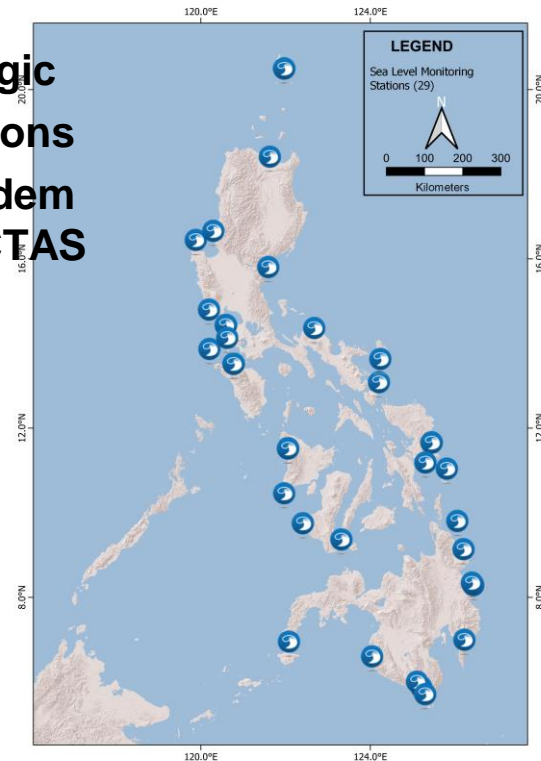
Tsunami Detection, Warning and Dissemination

TSUNAMI MONITORING NETWORK

87 Community Tsunami Alerting Stations (CTAS)



Strategic Locations In tandem with CTAS

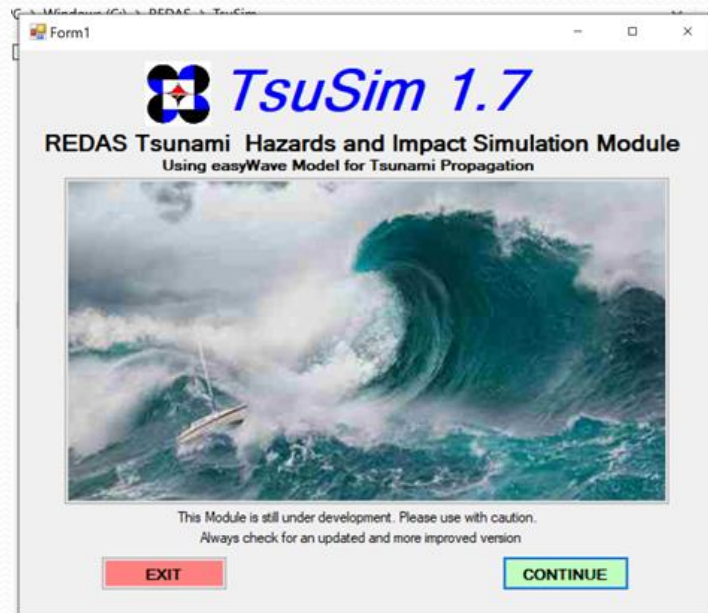
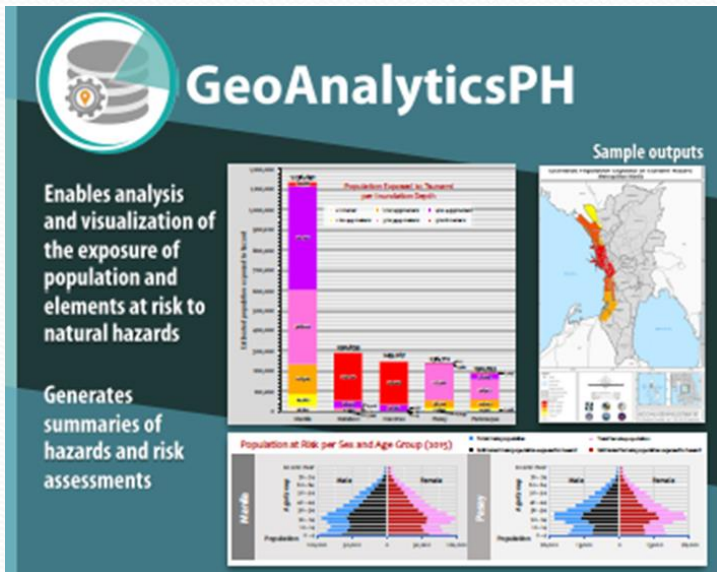


29 Sea Level Monitoring Stations



Tsunami Detection, Warning and Dissemination

Hazard and Impact Assessment Software

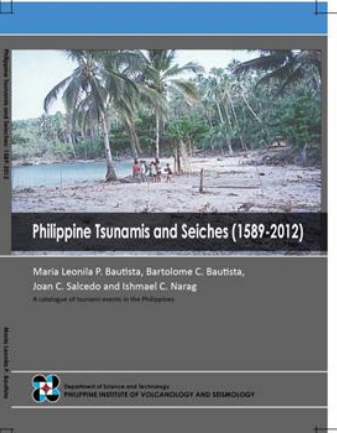


TsuSIM (Tsunami Simulation and Impact Assessment Module) which can estimate tsunami impacts.

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Increase awareness on basic tsunami information



HOW TO CONDUCT TSUNAMI DRILL

A **TSUNAMI** is a series of waves commonly generated by under-the-sea earthquakes, and whose heights could be greater than 5 meters. Because of this, tsunami waves can flood and inundate coastal areas.

A **TSUNAMI HAZARD MAP** shows areas that can be affected by a tsunami. Hazard maps are meant to educate and prepare the community and can be used as tools in planning evacuations. These maps are generated by experts and specialists after careful study of the area.

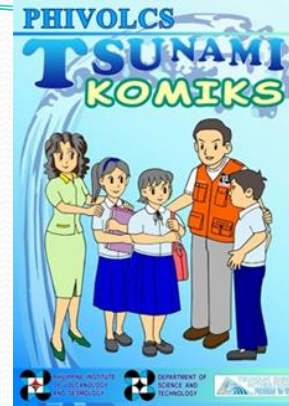
DESIGNING A TSUNAMI EVACUATION PLAN

- Step 1: Acquire a tsunami hazard map. Acquire detailed community map.**
- Step 2: Identify safe evacuation areas.**
 - (a) The following are possible bases for site selection:
 - (i) Should be located outside tsunami hazard zone.
 - (ii) Can be reached by foot within the shortest possible time.
 - (iii) The total area of the site can hold an entire community or entire percentage of population of the community if several sites are selected and used.
 - (iv) Can be easily identified by residents (avoidance a permanent hill, school, an open park, strong church).
- Step 3: Recommended evacuation routes.**
 - The tsunami evacuation map should show the best routes (land, elevated) best way for people to see in case of emergency.
 - The following are some characteristics of ideal evacuation routes:
 - (i) Wide enough, if possible, no bridge;
 - (ii) away from hazardous areas; and
 - (iii) Inland (elevated) power lines and other hazards.
 - While in the process of changing the plan, it is best to walk along routes to verify hazards and check on ground conditions that may not be obvious on maps.
- Step 4: Discuss with community leaders and residents to put up three levels of agencies at hazard prone area. 1) tsunami evacuation route, and 2) tsunami evacuation site. 3) tsunami evacuation site.**
 - Create a list of tsunami evacuation sites / marking maps showing tsunami evacuation route, identified evacuation areas and routes.
 - Conduct a small group workshop with community leaders and residents.
 - Discuss drill time and test contents and signals to organize route.
- Step 5: Develop complete version of the map.**
 - Routes are made from the inputs of community members.
 - Evacuation maps should be simple and easy to read, avoid include unclear information and use the following:
 - (a) tsunami hazard zones;
 - (b) safe evacuation routes;
 - (c) recommended evacuation routes; and
 - (d) local symbols to help people orient themselves on the map.

PHIVOLCS TSUNAMI HAZARD MAP shows areas identified within hazard zones and areas which are safe. This map provides direction to identified evacuation sites.

PHASES OF A TSUNAMI DRILL

- 1 ALARM PHASE:** 1 minute after sighting a strong earthquake
- 2 REACTION:** People do the response procedure during the earthquake such as the "duck, cover and hold"
- 3 EVACUATION PHASE:** Evacuees quickly move out of their houses to go to designated evacuation area
- 4 ASSEMBLY PHASE:** Families from the same area or general drill group together to better facilitate headcount/ accounting of members
- 5 HEADCOUNT PHASE:** How many are expected to arrive based on demographic population information?
- 6 DRILL TERMINATION:** The drill master should inform the participants that the drill has ended.
- 7 POST-DRILL EVALUATION:** Asking the conduct of drill is important for reporting future activities.



PHIVOLCS TSUNAMI AVP_Final
High Res 720p

TSUNAMI SAFETY AND PREPAREDNESS

The best way to save lives during coastal areas after a strong earthquake, move to higher grounds immediately.

If unusual sea conditions (the rapid lowering of sea level) are observed, immediately move towards high grounds.

Never go down the beach to watch for a tsunami. When you see the waves, you are too close to escape it.

During the retreat of sea level, swimming rights are often situated. These may be stranded on dry land nearby attracting people to collect sea shells, seaweed, and coral fragments. These waves may be strong enough to knock you to the shore with the force of the water, increasing the number of people at risk.

Be alert of danger areas with "all clear" issued by competent authority. A parent is not a single wave but a series of waves.

Conduct community-level awareness about earthquake and tsunami focused on natural signs of an approaching tsunami, warning and evacuation procedures.

Pre-determine high ground in your area and identify routes to get there.

Pick up signals.

DEVELOPING A TSUNAMI PREPARED COMMUNITY

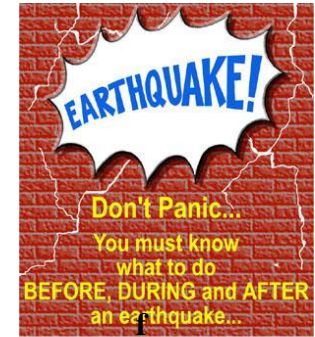
This infographic provides a comprehensive guide to community preparedness, including sections on:

- Community Assessment
- Evacuation Routes and Sites
- Drill Procedures
- Communication Systems
- Signage and Markers
- Community Meetings
- Documentation and Reporting

 It features numerous small images of people participating in drills and community activities, along with flowcharts and checklists.

- **Enhancing Tsunami Preparedness for Effective Community Response**

**Education,
Awareness,
Preparedness
Campaigns**



For inquiries and information, please contact:
Department of Science and Technology
PHILIPPINE INSTITUTE OF VOLCANOLOGY AND SEISMOLOGY
1311 Corra Avenue 1/F Campus, Marikina, Quezon City
Tel. Nos. 426-1448 to 49 | Website: www.phivolcs.dost.gov.ph

Educational materials
(print, digital, video, you
tube) seminars, drills,
press conferences,
media programs





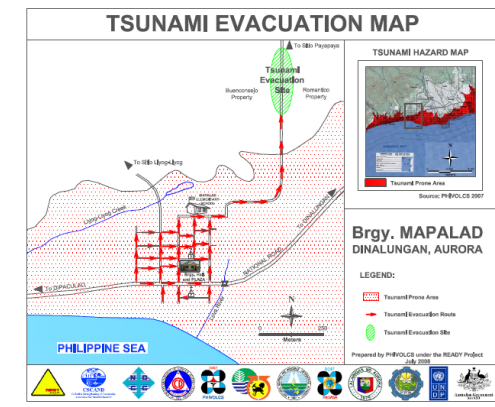
Educational Tour



Establish community-based early warning system for tsunami and conduct tsunami preparedness drills in communities

Evacuation plans and maps

- Signage installation
- IEC seminars
- Community Drills



Tsunami

Ang **TSUNAMI** ay sunud-sunod na dumabalgang alon na karaningwag lilitaw ng lindol na nagmumula sa ilalim ng dagat. Ang mga ito ay maaaring bumigay sa 50 metro. Ang tsunami ay nagdadagdag sa tidal waves ng kung mayon ay inilagay sa ilalim ng bayog (storm surge). Ang tsunami ay nangyayari kung ang paglulungat ng lindol ay madalas na nagtatagpo sa mga likas ng bayog ng dagat at maling-ong tubig na maaaring babigay.



MGA LIKAS NA PALATINDAGAN NG ISANG PAPA LAPIT NA 'LOCAL NA TSUNAMI'



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Tsunami

A **TSUNAMI** is a series of giant sea waves commonly generated by under-the-sea earthquakes and whose heights could be greater than 5 meters. It is erroneously called tidal waves and sometimes mistakenly associated with storm surges. Tsunamis can occur when the earthquake is shallow-seated and strong enough to disturb the equilibrium of water over it.

The coastal areas in the Philippines especially those facing the Pacific Ocean, South China Sea, Sulu Sea and Celebes Sea can be affected by tsunamis that are generated by local earthquakes.

On 17 August 1976, a M7.8 earthquake in Moro Gulf produced tsunamis which devastated the southeast coast of Mindanao and left more than 3,000 people dead, with at least 4,000 people missing. More than 8,000 people were injured and approximately 12,000 families were rendered homeless by rising than 5-meter high waves.

The 15 November 1984 Mindoro Earthquake also generated tsunamis that left 78 casualties.

These tsunamis occurred within a very short time, with a first wave reaching the shoreline nearest the epicenter, 2 to 5 minutes after the main earthquake. These tsunamis were both locally generated. There were no tsunamis known to be generated in case of locally generated tsunami.

Tsunamis may also be generated from deep locations, such as those coming from the continental bordering the Pacific Ocean, Chile, Alaska in the USA and Japan (Pacific tsunamis). The tsunami of 2 May 1960 was generated by a strong earthquake in Chile that led to 161 deaths. However, while 30 feet were reportedly killed in the Philippine Tapat areas, far tsunamis generated in deep locations are longer (1 to 24 hours) and may reach a height less than 1 meter.

The Pacific Tsunami Warning Center (PTWC) and National Pacific Tsunami Advisory Center (NPTAC).

MGA SINYALES SA SARONG PANGANI NA 'LOCAL NA TSUNAMI'

An **TSUNAMI** ay ang sunud-sunod na darakulang alon na nangyayari dara sa paglulungat ng lindol.

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SOME NATURAL SIGNS OF AN APPROACHING LOCAL TSUNAMI

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Local Language Versions Ilocano, Bicolano, Maguindanaoan, Cebuano, Ilonggo (2006-2007)

'BICOLANO'

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'CEBUANO'

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Stories of Filipinos in Japan during the Great East Japan Earthquake and Tsunami 2011

Filipino

Learning from the experiences of others



Fig. 6. A JICA-Philippines representative with the Director of PHIVOLCS unveiling the first two comics at the launching event, March 2013.



English





*Earthquake, Tsunami
and Volcano Disaster
Narratives for an
Experiential
Knowledge-based
Science
Communication*





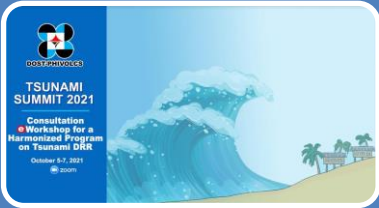
National Consultation Workshop for Harmonized Tsunami Program 2019

- Venue for a coordinated multi-agency, multi-stakeholder discussion



National Harmonized Tsunami DRR 2020 (virtual, focus on Clusters 1,2,3 (Mindanao))

- Platform/venue for a coordinated multi-agency, multi-stakeholder discussion
- Toolkit/manual/unified template for reporting past accomplishments, current initiatives and short-term



National Harmonized Tsunami DRR 2021 (virtual, Clusters 1-9)

- Platform/venue for a coordinated multi-agency, multi-stakeholder discussion
- Toolkit/manual/unified template for reporting past

Introduced to NDRRMC in 2022

UNESCO/IOC Tsunami Ready Recognition Programme



The Tsunami Ready Recognition Programme is an international community-based recognition programme developed by Intergovernmental Oceanographic Commission (IOC) of UNESCO. It aims to build resilient communities through awareness and preparedness strategies that will protect life, livelihoods and property from tsunamis in different regions.

2022 onwards

TSUNAMI READY PHILIPPINES – in coordination with NDRRMC, OCD

- December 2022 - Letter to OCD, for exploratory meeting
- March 2023 exploratory meeting for the establishment of National Tsunami Ready Board (NTRB)
 - Ways forward:
 - List of activities the 12 indicators of Tsunami Ready Recognition Program drafted
 - OCD-PDPS to present to heads the need to establish NTRB
- 2023: DEVELOPING A TSUNAMI-READY COMMUNITY: BRGY. CONCORDIA, BOLINAO, PANGASINAN
- -2024: DEVELOPING A TSUNAMI-READY COMMUNITY: CALATAGAN, BATANGAS



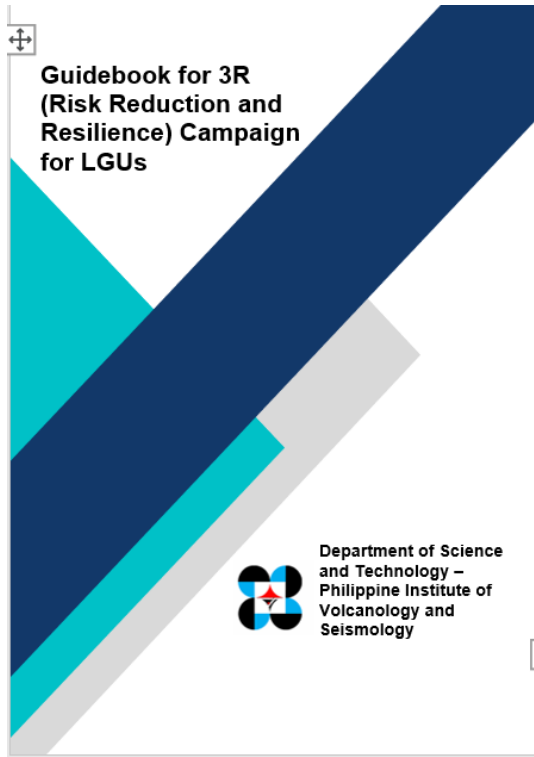
TSUNAMI READY INDICATORS

TSUNAMI READY INDICATORS	
I	ASSESSMENT (ASSESS)
1	ASSESS-1. Tsunami hazard zones are mapped and designated.
2	ASSESS-2. The number of people at risk in the tsunami hazard zone is estimated.
3	ASSESS-3. Economic, infrastructural, political, and social resources are identified.
II	PREPAREDNESS (PREP)
4	PREP-1. Easily understood tsunami evacuation maps are approved.
5	PREP-2. Tsunami information including signage is publicly displayed.
6	PREP-3. Outreach and public awareness and education resources are available and distributed.
7	PREP-4. Outreach or educational activities are held at least 3 times a year.
8	PREP-5: A community tsunami exercise is conducted at least every two years.
III	RESPONSE (RESP)
9	RESP-1. A community tsunami emergency response plan is approved.
10	RESP-2. The capacity to manage emergency response operations during a tsunami is in place.
11	RESP-3. Redundant and reliable means to timely receive 24-hour official tsunami alerts are in place.
12	RESP-4. Redundant and reliable means to timely disseminate 24-hour official tsunami alerts to the public are in place.

collaboration effort to meet a **standard level of tsunami preparedness** through the fulfillment of a set of established indicators



Guidebook for 3R (Risk Reduction and Resilience) Campaign for LGUs



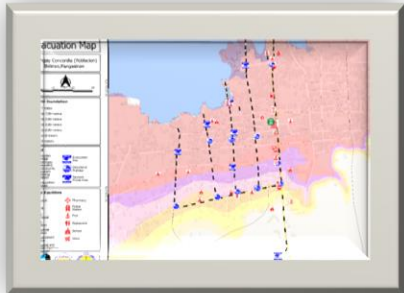
- This Guidebook serves as a document that will provide reference and guide for local government unit officials on information about volcano, earthquake and tsunami impacts.
- It also aims to provide a step-by-step guide to **access the DOST-PHIVOLCS information materials, tools and services** that will aid them in the development of their disaster risk reduction and management plans and other related plans.





Tsunami Exercise/Drill

Consultations, Lectures, IECs, Workshops



Evacuation Planning



Coordination Meetings for the 3R Campaign project – Tsunami Ready Community

3R Campaign Project conducted a community-level survey in all coastal barangays of Calatagan, Batangas

Validation of evacuation maps and signage locations



PSTO Batangas PDRMO Batangas



Poblacion 3

Poblacion 4

Poblacion 1



Balibago

Gulod

Poblacion 2

MDRRMO Calatagan



Tsunami Markers

Local government initiated in collaboration and technical support from PHIVOLCS



For the 1994 Mindoro Tsunami



For the 1976 Moro Gulf Tsunami



For the 1970 Baler Tsunami





WORLD TSUNAMI AWARENESS DAY

5 NOVEMBER

The Philippines is one with the whole world in commemorating the World Tsunami Awareness Day



WTAD 2016

PHIVOLCS Open House Exhibit
and Tsunami Orientation
(PHIVOLCS, Quezon City)



WTAD 2017

Interactive Exhibit and
Tsunami Orientation
(Iba, Zambales)



WTAD 2018

Interactive Exhibit and
Tsunami Orientation;
Partnership with Smart
(Parañaque City)



WTAD 2019



Press Briefing, Tsunami Forum for Oriental Mindoro LDRRMOs, Interactive Exhibit, Unveiling of Tsunami Signage in Calapan City, SMS Broadcasting (Globe), Partnership with Smart

WTAD 2020



WORLD TSUNAMI AWARENESS DAY

Digital-Poster Making Contest
5 November 2020



MARIANNE FAITH O. AVISO
1ST PLACE
RTRMF-DVOREF, Palo, Leyte



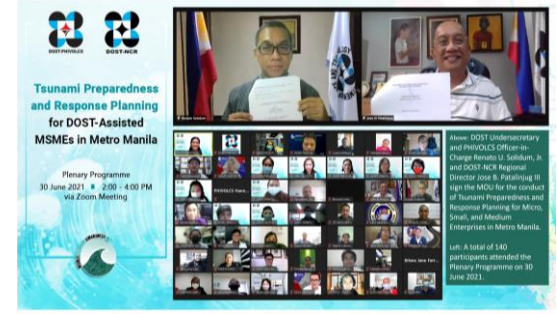
JANA PAULA V. RAMIREZ
2ND PLACE
Sto. Domingo National High School
Sto. Domingo, Albay Province



DARLENE MARIZ L. SUNLAO
3RD PLACE
Tagbilaran City Science High School
Bohol Province

Online Press Briefing, Slogan and Digital Poster-Making Online Contests, Webinars, SMS Broadcasting (Smart)

WTAD 2021



PHIVOLCS-DOST NCR Ceremonial MOU Signing, Webinars, Tsunami Planning Workshops, and Online Press Briefing

Tsunami Preparedness and Response Planning for MSMEs in Metro Manila (partnership with DOST-NCR)

WTAD 2020

**WORLD
TSUNAMI
AWARENESS
DAY**
5 NOVEMBER
2020

Play (k)

www.undrr.org/tsunamiday UNDRR

0:02 / 2:03

CC Settings Full Screen

The video player features a background image of a world map. The main text is in large, bold, black and teal letters. To the right is a circular graphic of a teal tsunami wave. The player interface includes a progress bar, volume icon, and various control icons.

The Philippines: Joining the global Tsunami Ready community



United Natio...
18.1K subscribers

🔔 Subscribed ▾


👍 11 | 🗨️

➦ Share

⋮



WTAD 2024

 Philippine Institute... was live. 7h

WORLD TSUNAMI AWARENESS DAY

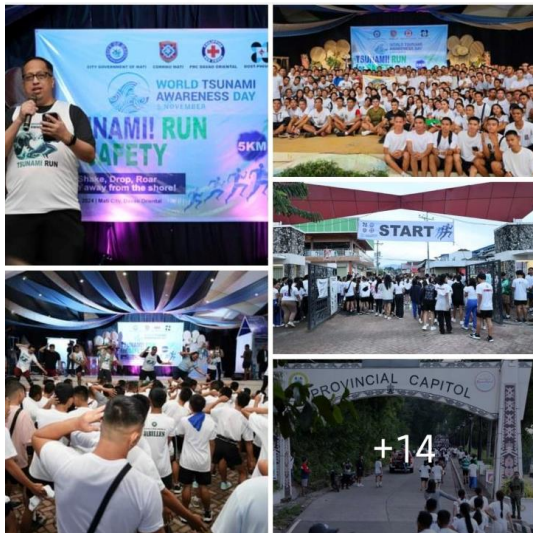
- #TsunamiReadyPH
- #wtad2024
- #tsunamiready
- #HandaAngMayAlam
- #gettothehighground




 Philippine Institute of... 9h

MORE RUN PHOTOS

More than 1,600 participa... See more



 Philippine Institute... was live. 8h

ATM: Ribbon-cutting and opening of exhibit in observance of the World Tsunami Awareness Day



Short-term secondment of international staff from NTWCs of WG-SCS Member States to the SCSTAC.

South China Sea Tsunami Advisory Center,
Beijing, China
24 July- 23 September 2024 (2 months)



THANK YOU

