Global Coordination of Warning and Mitigation Systems for Ocean Hazards

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ACKNOWLEDGMENTS:
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GLOBAL TSUNAMI WARNING AND MITIGATION SYSTEM

4 Regional Tsunami Information Centres
- NEAMTIC
- IOTIC
- ITIC
- CTIC
Supporting the Regional System

4 Regional Systems
- NEAMTWS
- IOTWMS
- PTWS
- CARIBE EWS
36 – SIDS
12 – African
139 MS
have established National Tsunami Warning Focal Points/National Tsunami Warning Centres

13 Tsunami Service Providers
- InaRTSP
- ITEWC
- JATWC
- InaTEWS

Coordinated by the IOC UNESCO

5 – NEAMTWS
3 – Indian Ocean
3 – Pacific Ocean
2 – Caribbean via PTWC + CATAC
SIGNIFICANT TSUNAMI EVENTS IN THE LAST FIVE YEARS

03/04/21  
Kermadec Islands  
Mw 8.1 – Pacific-wide tsunami but generally small non-hazardous impacts

08/12/21  
South Sandwich Islands  
Mw 8.2 – Tsunami generated in southern Atlantic observed on southern Atlantic coasts including Antarctic peninsula as well as far into the Pacific and Indian Oceans

01/15/22  
Explosive eruption of the Hunga Tonga – Hunga Haʻapai Volcano generated a tsunami with destructive impacts across the Pacific

12/22/18  
Landslide Sunda strait tsunami – 426 deaths and struck multiple coastal regions

03/04/21  
Kermadec Islands  
Mw 8.1 – Pacific-wide tsunami but generally small non-hazardous impacts

09/28/18  
Mw 7.5 – over 4000 fatalities and severe damage to several areas in and around Palu City

02/06/23  
Mw 7.8 – Turkey – small tsunamis
PTWS responses

- Based on sea level data, the Tonga's NTWC issued a tsunami warning at 4:31 UTC (17 min after the explosion)
- The PTWC in Hawaii issued an initial threat bulletin for the entire Pacific Ocean at 6:23 UTC
- ICG/PTWS quickly implemented of the Interim HTHH Volcano Tsunami Response Procedures by 15 March 2022 (CL-2882)
- User’s Guide Published (CL-2902)
- The report of the Ad Hoc Team on Tsunamis Generated by Volcanoes is ready for publication

BUT

- Mechanism of tsunami generation is complicated and has not clear yet
- It is challenging to forecast tsunami and issue tsunami warning
TSUNAMIS GENERATED BY VOLCANOES

MAP OF POTENTIALLY TSUNAMIGENIC VOLCANOES
courtesy Ad Hoc Team on Tsunamis Generated by Volcanoes

CHALLENGES
● The source of a tsunami observed during an eruption is often difficult to characterize
● All source mechanisms have different characteristics in terms of location, duration, volume, mass flux, and energy, which have consequences on the wave generated

WHAT’S NEXT?
● To make a list of the volcano observatories that monitor and warn of volcanoes that may generate tsunamis
● To send to the volcano observatories a specific questionnaire on the issue
● To develop best practice guidelines of how to warn communities at-risk of the threat from tsunamis generated by volcanic related sources
● To increase public awareness for tsunamis generated by volcanic phenomena and earthquakes

TSUNAMIS GENERATION MECHANISMS BY VOLCANO ACTIVITY AND INSTABILITY
updated from Paris et al., 2014
The first objective of the ODTP is to develop the warning systems’ capability to issue actionable and timely tsunami warnings for tsunamis from all identified sources to 100 percent of coasts at risk.

The second objective of the ODTP is that 100 percent of communities at risk to be prepared and resilient to tsunamis by 2030 through efforts like the IOC-UNESCO Tsunami Ready Recognition Programme (TRRP).
OCEAN DECADE TSUNAMI PROGRAMME: the Focus Areas Related to Tsunami Warning Capabilities

- Expansion of existing observational systems to fill identified gaps
- Deploy new technologies such as SMART cable
- Wide expansion of data access, availability and analysis capability for real-time sea level, seismic and GNSS-derived land motion data
- Increase access and regularly update the collection of coastal topographic and bathymetric data
- Ensure all NTWCs have access to data, tools and communication platforms, protocols and training

Rethinking Ocean Observations
Source: National Oceanic and Atmospheric Administration
PLANNING AND RESOURCES

- The TRRP is implemented by Member States, who establish National Tsunami Ready Programmes.
- IOC Manual and Guides are available to support the implementation.
- For a community to be recognized by UNESCO IOC as Tsunami Ready, all 12 indicators must be met.

COORDINATION

- The ICGs will provide mechanisms for the sharing of experience and expertise.
MAJOR ACTIVITIES IN 2021-2023

- Development of a global Tsunami Ready Interactive Map Viewer
- Hosting by ITIC of the Tsunami Ready web site
- Development of a new Tsunami Ready Board Game
- Publication of the IOC Manuals and Guides 74 «Standard Guidelines for the tsunami Ready Recognition Programme»
SPECIAL TSUNAMI READY COALITION

ToRs
Contribute to increasing the number of Tsunami Ready recognized communities as part of the UN Ocean Decade

GOAL

OBJECTIVES
Raise the profile of Tsunami Ready in collaboration with critical stakeholders across the UN system, interested regional organizations, national disaster management agencies and the public

OBJECTIVES

REPORTING
The Coalition will report activities and progress to the TOWS-WG

OBJECTIVES
Increase funding resources for the implementation of Tsunami Ready
SYMPOSIUM TO COMMEMORATE THE 20th ANNIVERSARY OF THE 2004 INDIAN OCEAN TSUNAMI

- Symposium and Poster Session: 10-14th December 2024 (Aceh, Indonesia)
- The Commemoration day of the 20th Anniversary of the 2004 Indian Ocean Tsunami, 14th December 2024 (Aceh, Indonesia)
- Tsunami Drill and Field Trip to Tsunami Aceh Museum, and Tsunami Ready Community Village in Aceh, 14th December 2024 (Aceh, Indonesia)
- Tsunami Ready Inauguration, 14th December 2024 (Aceh, Indonesia)
- 14th Session of ICG/IOTWMS: December, 16-19th 2024 (Jakarta, Indonesia)

INVITED PARTICIPANTS OF THE SYMPOSIUM

- Countries with lives lost and/or being severely impacted by the 2004 Indian Ocean Tsunami
- Member States of ICG and potentially global
- Youth Organization
- Expert/University
- NGO
- Media

DECEMBER – 2024 – INDONESIA
KEY RECOMMENDATIONS (1/2)

THE TOWS-WG RECOMMENDED THE IOC ASSEMBLY AT ITS SESSION IN 2023:

**to decide**
that warning systems for tsunamis generated by volcanoes should be considered and coordinated as part of the UNESCO/IOC Global tsunami and other Ocean-related Hazards Warning and Mitigation System (GOHWMS), and also when possible be part of a MHEWS.

**to endorse**
the 10-Year Research, Development and Implementation Plan of the Ocean Decade Tsunami Programme as presented in document IOC-32/3.4.1.2.Doc(1).

**to encourage**
Member States to provide voluntary financial contributions to the IOC special account and in-kind contributions to support the Ocean Decade Tsunami Programme and UNESCO/IOC Tsunami Ready Recognition Programme.
KEY RECOMMENDATIONS (2/2)

THE GROUP RECOMMENDED THE IOC ASSEMBLY AT ITS SESSION IN 2023 TO INSTRUCT THE REGIONAL ICGS (AMONG OTHERS):

to encourage

- Sea level data is sampled at one second intervals and with the highest available accuracy and transmitted in real-time as a matter of priority.

add

- The task to the Terms of Reference of the ICGs and TICs to facilitate the implementation and functioning of the UNESCO/IOC Tsunami Ready Recognition Programme.

add

- The role of ICGs as regional Steering Committees for the ODTP in their Terms of Reference.
THANK YOU FOR ATTENTION!
QUESTIONS? COMMENTS?