



Tsunami Preparedness: CARIBE WAVE

24th Conference of the Meso American - Caribbean Sea Hydrographic Commission



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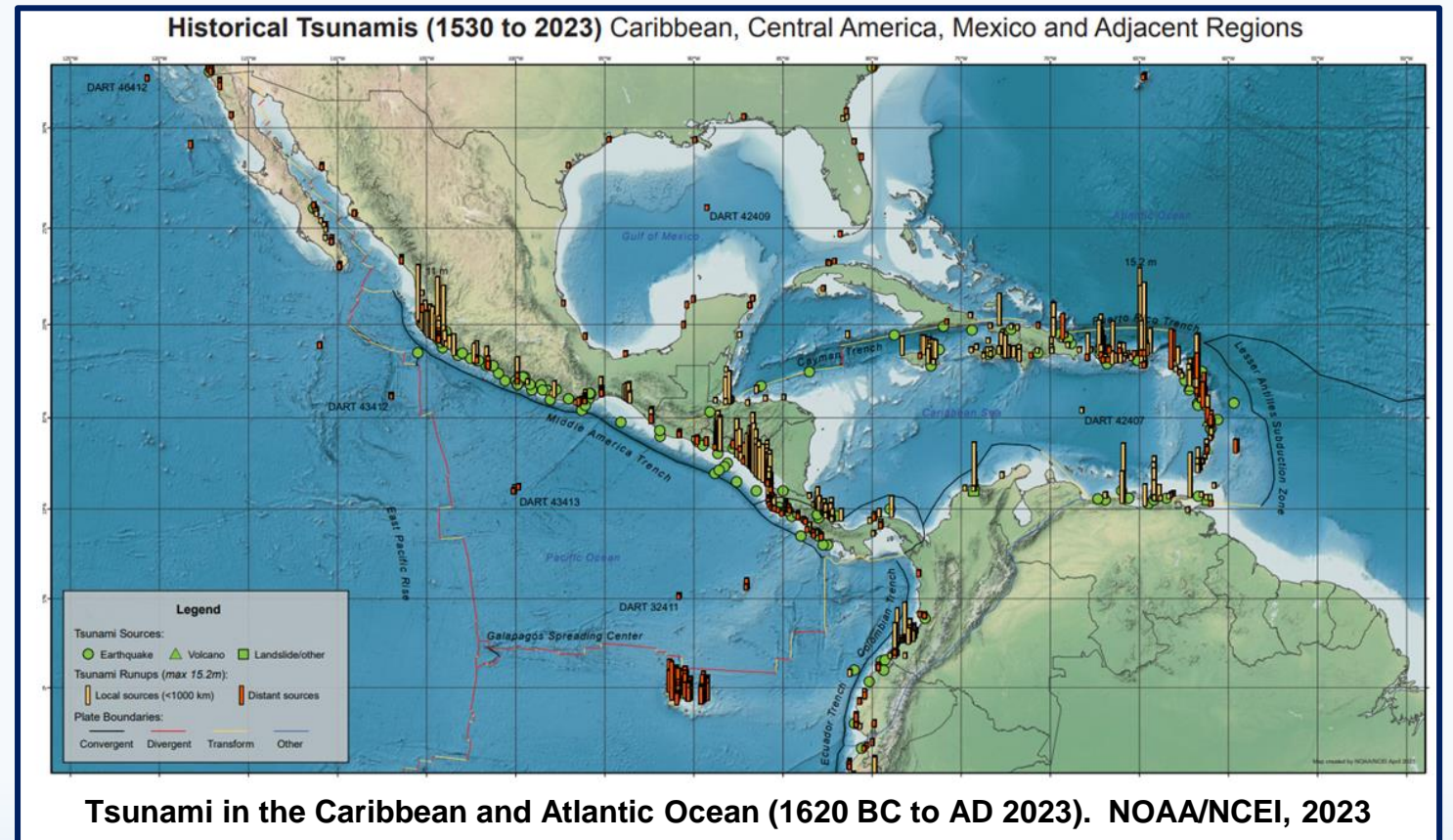
International Hydrographic Organization

Gerard Metayer
Chair of the CARIBE EWS



Forgotten Danger in the Caribe

- Given the relative infrequency of tsunamis in the Caribe, these high-impact events can be left behind in disaster risk reduction planning.
- For years tsunamis were known as the “**forgotten danger**” in the Caribe.
- But tsunamis **do** occur in the Caribe



Tsunami Hazards in the Caribe

- According to NOAA and the Global Tsunami Database, **65** confirmed tsunamis have impacted coastal communities in the Caribbean and Adjacent Regions in the last 500 yrs. Over **4500** people have lost their lives from these events.
- Since the most recent devastating tsunami in 1946, there has been a growth in population, tourism, infrastructure, and economic activity along the coastlines, increasing the potential for casualties, economic loss, and community disruption.
- The Caribe is particularly vulnerable to tsunamis due to its large number of small, low-relief islands, as well as its coastal population and infrastructure.
- Tsunamis in the Caribe can reach the shores within minutes of an earthquake, volcanic eruption, or submarine landslide.



Photo: Artistic rendition of the US Navy Ship, La Plata, caught by the tsunami in the Charlotte Amalie Harbor, Saint Thomas (1867)
Credit: Harper's Weekly (1868)

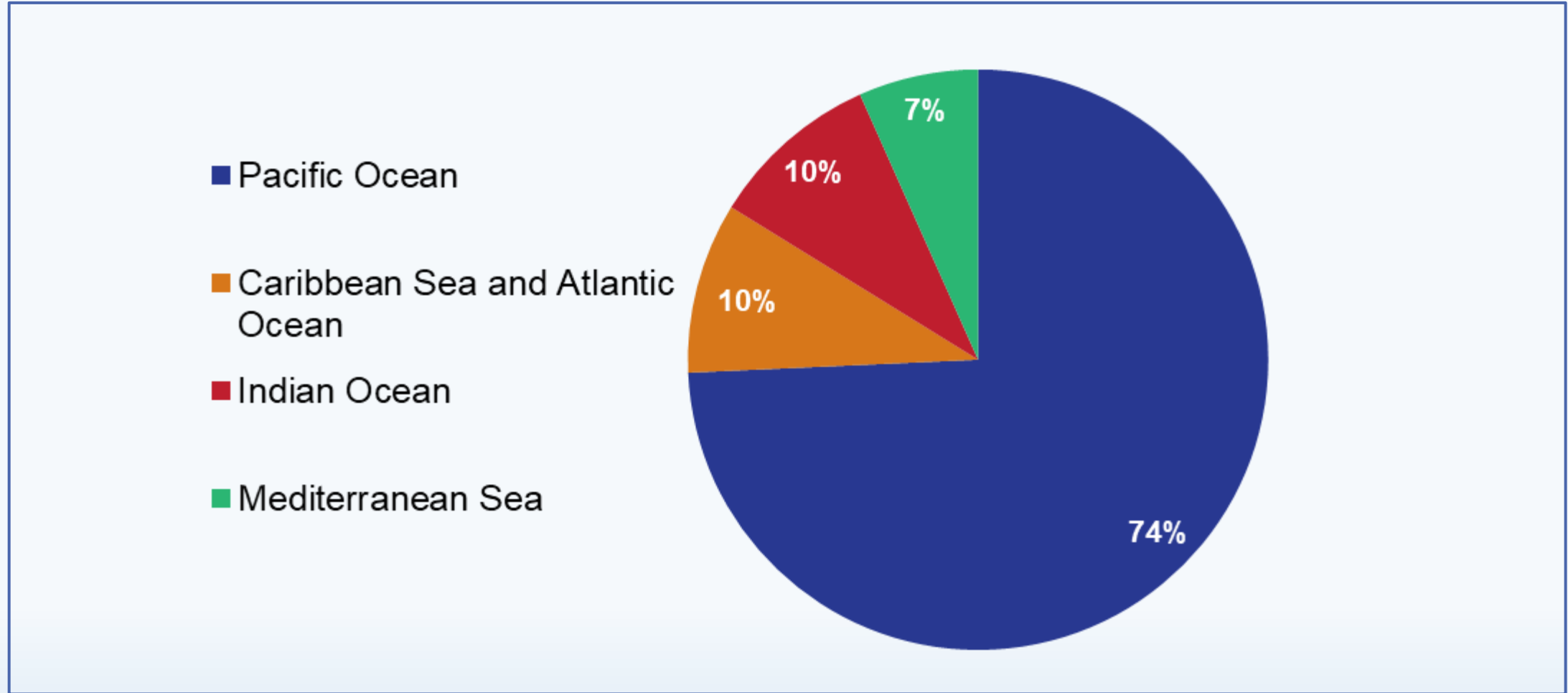


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Infrequency does not protect us, but makes us dangerously complacent



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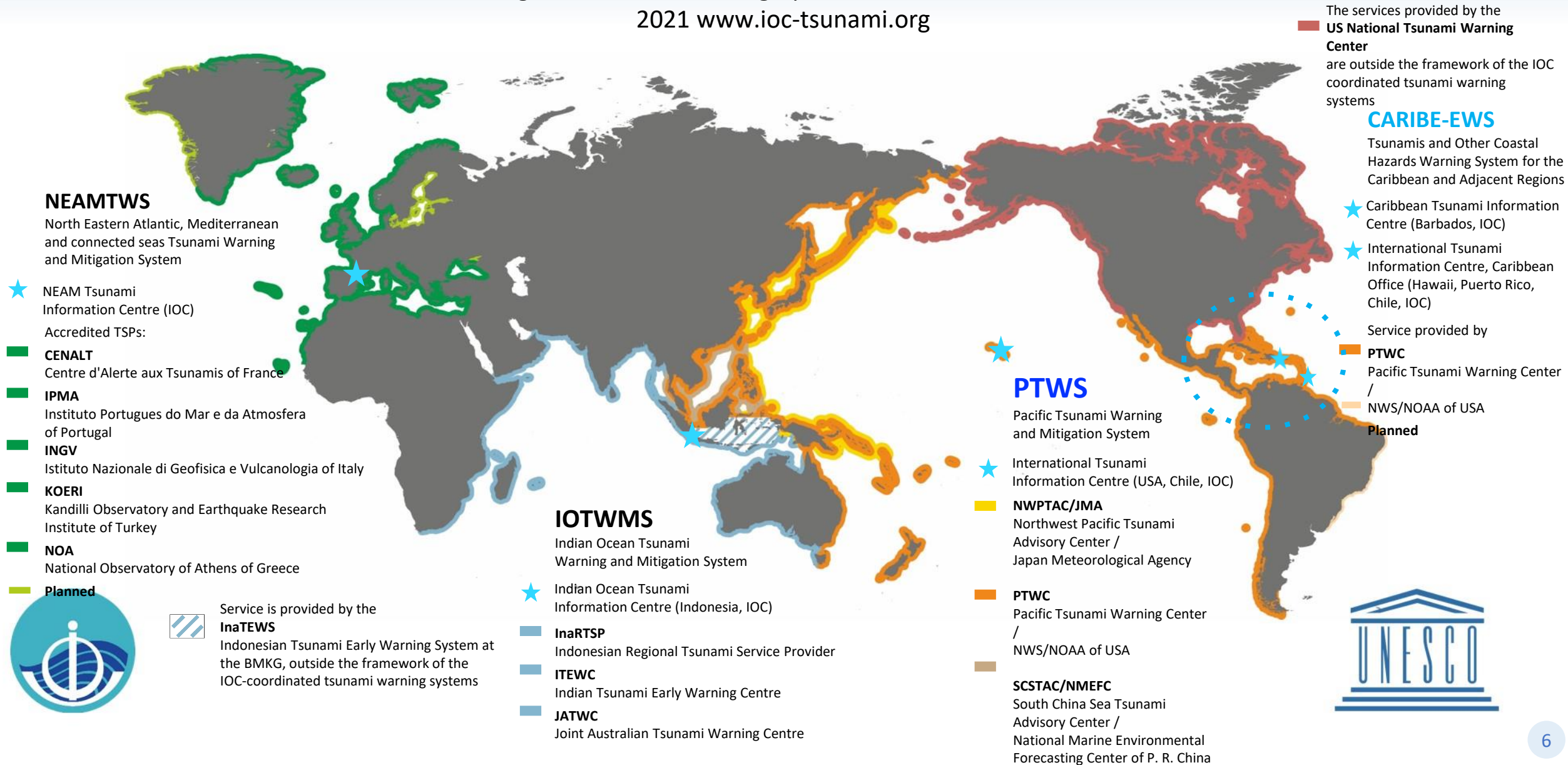
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HOW IS THE CARIBBEAN AND ADJACENT REGIONS ADDRESSING THE TSUNAMI RISK?

EXISTING SERVICES OF THE GLOBAL TSUNAMI WARNING SYSTEM

Intergovernmental Oceanographic Commission of UNESCO
2021 www.ioc-tsunami.org



CARIBE WAVE



- CARIBE WAVE is THE regional tsunami exercise held every March.
- It is the Annual reminder that tsunamis are a threat
- CW is conducted within the framework of the UNESCO/IOC ICG/CARIBE-EWS.
- Opportunity for the 48 countries and territories to test and validate their tsunami warning system
- The exercise also supports the **Tsunami Ready Programme**
 - A community recognition programme which revolves around the fulfilment of 12 'indicators' under Assessment, Preparedness, and Response which requires a community tsunami exercise at least every two years.
- Each Member State and Territory provides their feedback on the exercise and status of tsunami awareness and preparedness by completing a post-exercise evaluation.

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.



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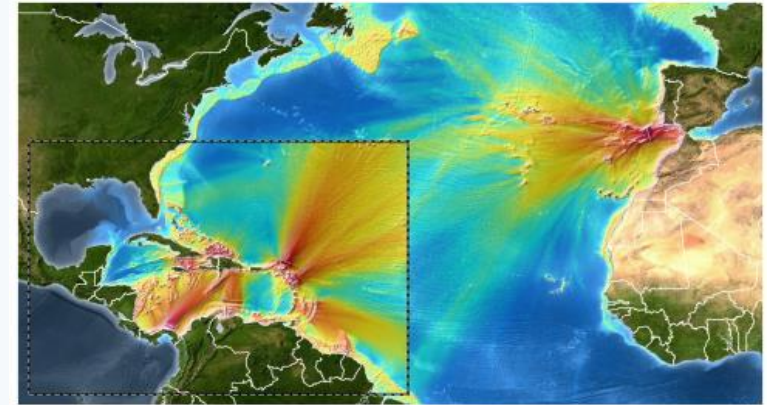
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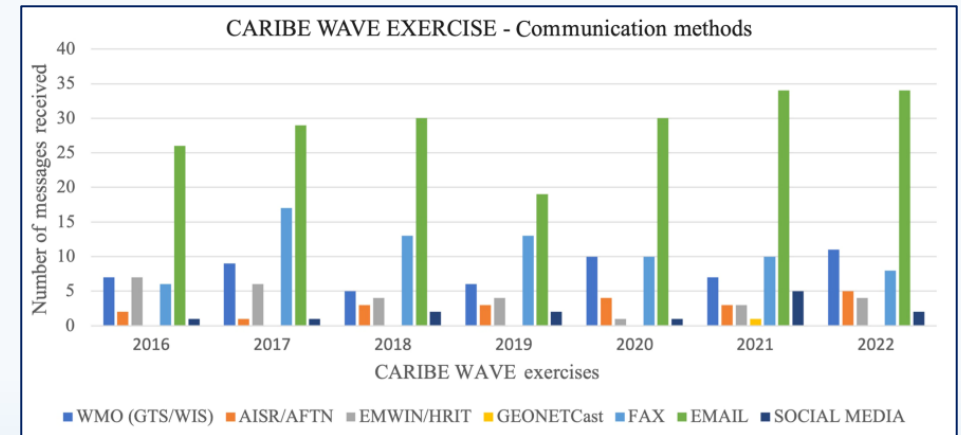


CARIBE WAVE

- For each CARIBE WAVE two or more scenarios are chosen. Most scenarios are seismic, but volcanic scenarios have also been used.
- A handbook is prepared and published by IOC with detailed information on the exercises and samples of simulated products
- Webinars are held in January and February to present and discuss the scenarios, recommendations, and resources.
- As of 2016, simulated text and graphical products are prepared and disseminated by the Pacific Tsunami Warning Center and since 2022 by the Central America Tsunami Advisory Center hosted by Nicaragua.
- On the day of the exercise a live communication test is conducted between the Tsunami Service Providers (PTWC and CATAC) and the National Tsunami Warning Focal Points and National Tsunami Warning Centers



Energy plot map of CW exercises and their respective scenario's location from 2011 to 2022 generated using the Real-time Inundation Forecast of Tsunamis forecast model (Soto et al, 2023).



From Soto et al, 2023



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PTWC Dummy (Start of Exercise) Messages

- For the exercise, the PTWC disseminates an initial “dummy” message through its standard broadcast channels to start the exercise and test communications with the TWFPs and NTWCs .
- The initial tsunami messages are sent through different communication methods, such as:
 - The World Meteorological Organization Information System and Global Telecommunications System (WIS-GTS)
 - Advanced Weather Interactive Processing System (AWIPS)
 - NOAA Weather Wire Service (NWWS)
 - Emergency Managers Weather Information Network (EMWIN)
 - Aeronautical Information System Replacement (AISR)
 - GEONETCast Americas (GNC-A)
 - Fax, e-mail, and social media

*Example from 2023

PTWC ← **Center**

WECA41 PHEB 231400 ← **WMO ID**

TSUCAX ← **AWIPS ID**

TEST...INITIAL DUMMY START OF EXERCISE MESSAGE...TEST
NWS PACIFIC TSUNAMI WARNING CENTER/NOAA/NWS
ISSUED AT 1400Z 23 MAR 2023

...TEST...CARIBE WAVE 23 TSUNAMI EXERCISE DUMMY MESSAGE.
REFER TO THE EXERCISE HANDBOOK. THIS IS AN EXERCISE
ONLY...TEST...

THIS MESSAGE IS BEING USED TO START THE CARIBE WAVE 23 TSUNAMI
EXERCISE AND TEST COMMUNICATIONS WITH UNESCO IOC CARIBE EWS
NTWCS AND TWFPS. THIS WILL BE THE ONLY EXERCISE MESSAGE
BROADCAST FROM THE PACIFIC TSUNAMI WARNING CENTER EXCLUDING
SPECIAL EMAIL MESSAGES DISCUSSED IN THE HANDBOOK. THE
HANDBOOK IS AVAILABLE AT THE WEB SITE CARIBEWAVE.ORG. THE
EXERCISE PURPOSE IS TO EXERCISE AND EVALUATE THE CARIBE EWS
TSUNAMI WARNING SYSTEM.

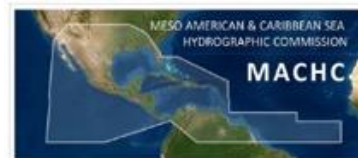
THIS IS ONLY AN EXERCISE.

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PTWC Messages

- The first simulated threat message is issued by the PTWC within 2–10 min after an earthquake and are updated every hour. It includes information on earthquake location, magnitude, estimated wave arrival time and indicates potential areas under threat.
- The second and subsequent tsunami threat messages include wave height forecasts and observation. The tsunami threat forecasts stipulate the levels of threat and the countries in which they apply.
- The enhanced graphical products provide real-time tsunami height forecasts with detailed information on the expected directionality and wave amplitude. It includes plots of Coastal Forecast, Energy Forecast, and Coastal Forecast Polygons.

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PTWC Message #1
ZCZC
WECA41 PHEB 231407 WMO ID
TSUCAX AWIPS ID
TEST...TSUNAMI MESSAGE NUMBER 1...TEST
NWS PACIFIC TSUNAMI WARNING CENTER HONOLULU HI
1407 UTC THU MAR 23 2023

...THIS MESSAGE IS FOR TEST PURPOSES ONLY...
...TEST TSUNAMI THREAT MESSAGE TEST...

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE ****

THIS IS A TEST MESSAGE. THIS MESSAGE IS ISSUED FOR INFORMATION
ONLY IN SUPPORT OF THE UNESCO/IOC TSUNAMI AND OTHER COASTAL
HAZARDS WARNING SYSTEM FOR THE CARIBBEAN AND ADJACENT REGIONS
AND IS MEANT FOR NATIONAL AUTHORITIES IN EACH COUNTRY OF THAT
SYSTEM.

THIS IS A TEST MESSAGE. NATIONAL AUTHORITIES WILL DETERMINE THE
APPROPRIATE LEVEL OF ALERT FOR EACH COUNTRY AND MAY ISSUE
ADDITIONAL OR MORE REFINED INFORMATION.

**** NOTICE **** NOTICE **** NOTICE **** NOTICE **** NOTICE ****

TEST... PRELIMINARY EARTHQUAKE PARAMETERS ...TEST
-----
* MAGNITUDE      7.4
* ORIGIN TIME    1400 UTC MAR 23 2023
* COORDINATES    16.1 NORTH 87.5 WEST
* DEPTH          11 KM / 7 MILES
* LOCATION       NORTH OF HONDURAS

TEST... EVALUATION ...TEST
-----
* THIS IS A TEST MESSAGE. AN EARTHQUAKE WITH A PRELIMINARY
MAGNITUDE OF 7.4 OCCURRED NORTH OF HONDURAS AT 1400 UTC ON
THURSDAY MARCH 23 2023.

* THIS IS A TEST MESSAGE. BASED ON THE PRELIMINARY EARTHQUAKE
PARAMETERS... HAZARDOUS TSUNAMI WAVES ARE POSSIBLE FOR
COASTS LOCATED WITHIN 300 KM OF THE EARTHQUAKE EPICENTER.

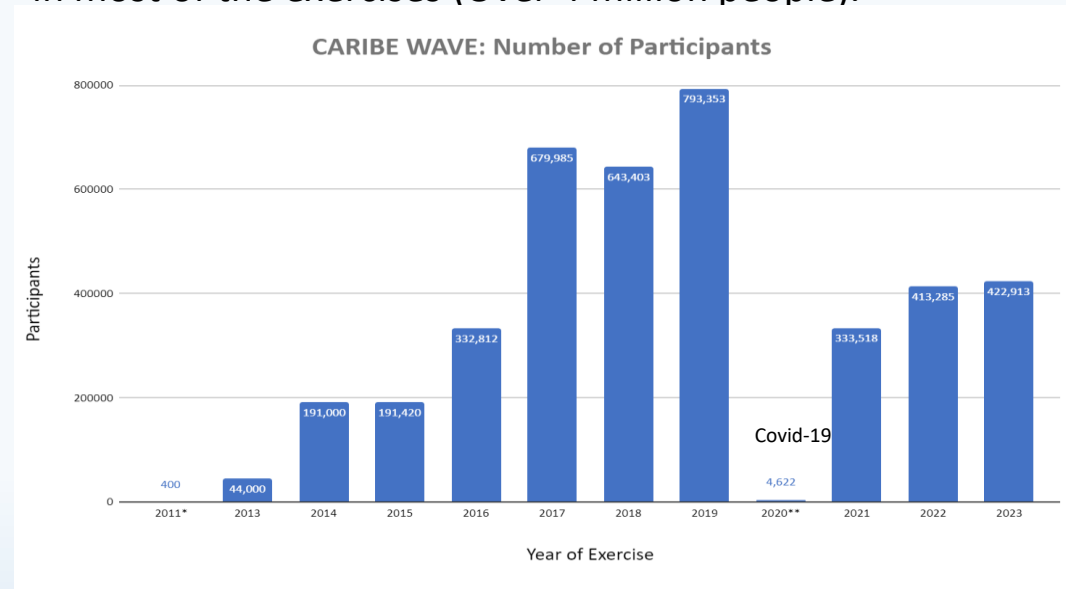
TEST... TSUNAMI THREAT FORECAST ...TEST
-----
* THIS IS A TEST MESSAGE. HAZARDOUS TSUNAMI WAVES FROM THIS
EARTHQUAKE ARE POSSIBLE WITHIN 300 KM OF THE EPICENTER ALONG
THE COASTS OF

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Member State Participation: The *TsunamiZone* Registration

- **TsunamiZone** registration is used to track the number of participants (<https://www.tsunamizone.org/>)
- Countries can keep track of registration by clicking on « Who is Participating »
- All of the forty-eight member states and territories participate in most of the exercises (Over 4 million people).



Edited from Soto et al, 2023

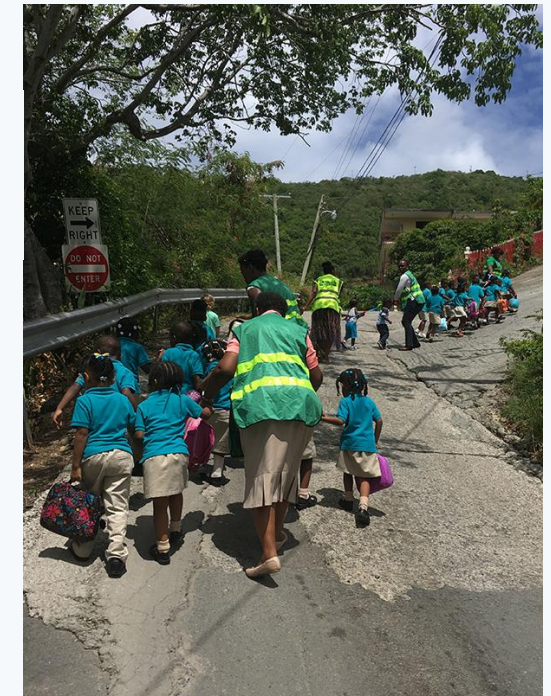


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Photos:



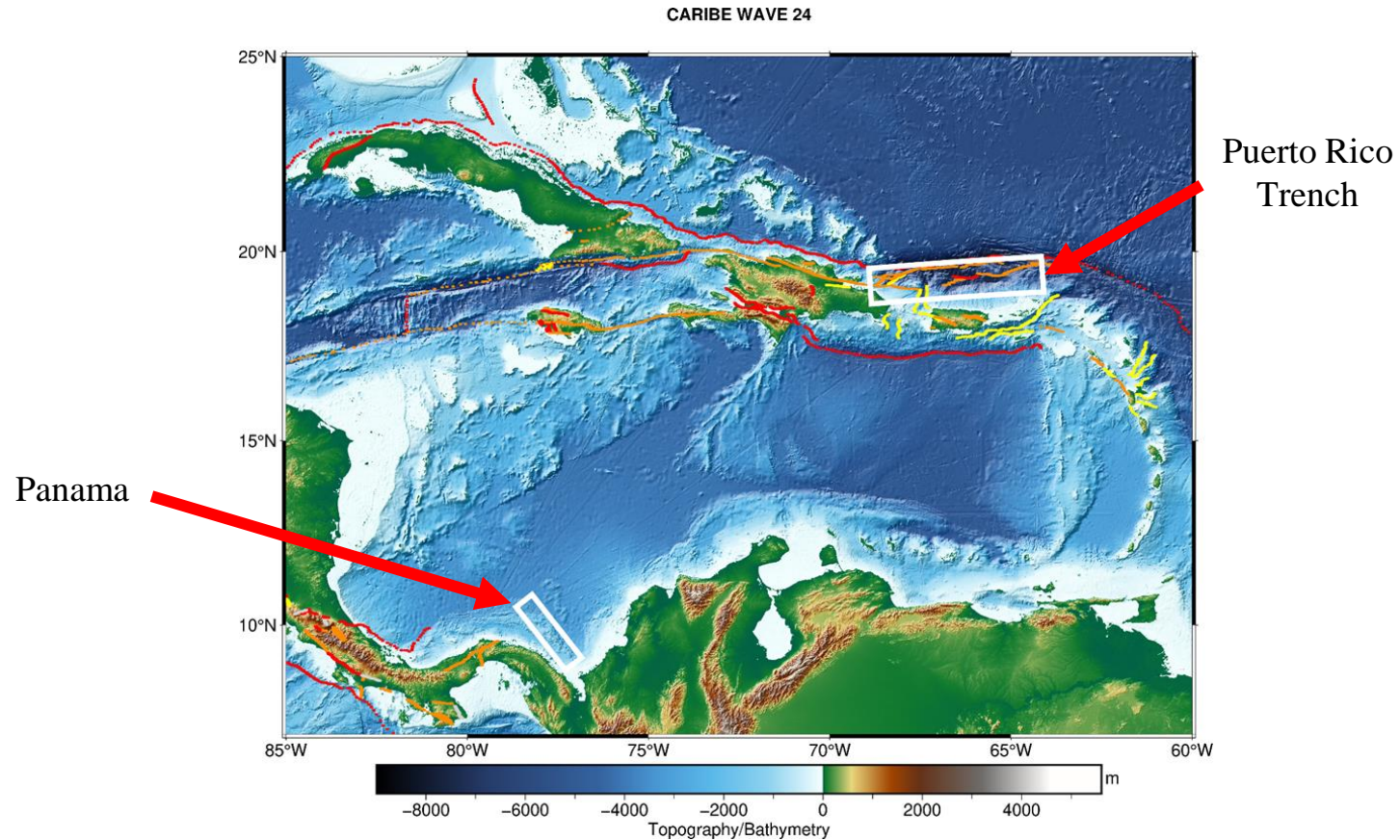
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CARIBE WAVE 24



Scenario	Origin Time	Mw	Epicenter
Puerto Rico Trench	15:00:00 UTC	8.7	19.25°N, 66.5°W
Panama	21 March 2024	8.47	9.80°N, 77.75°W

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How Can You Participate?

- Check out the website caribewave.org for past and future exercises
- Contact your National Tsunami Warning Center, National Tsunami Warning Focal Point
- Plan an activity for CARIBE WAVE 24
- Register for the exercise on TsunamiZone.Org

Be Tsunami Ready!

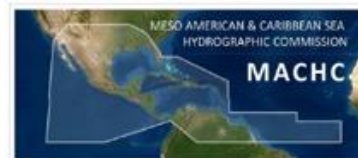


[Video Overview of CW](#)



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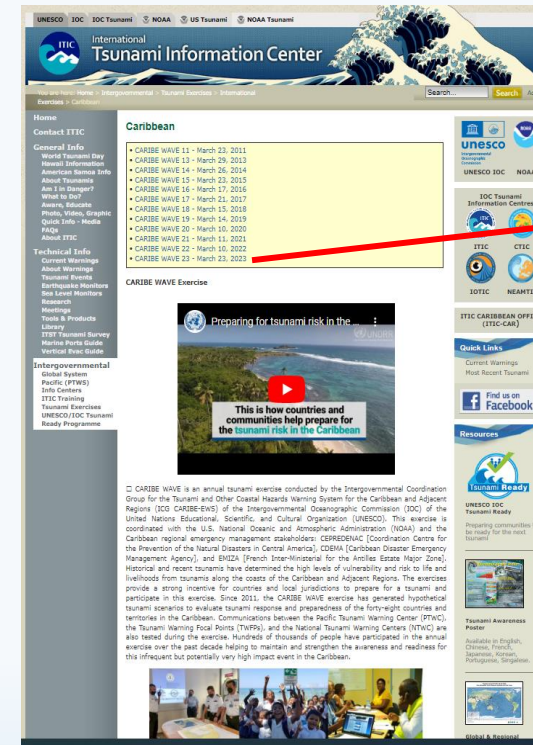
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Resources available at itic.ioc-unesco.org

- Manual and Guides 86: Multi-Annual Community Tsunami Exercise Programme Guidelines for the Tsunami and Other Coastal Hazards Warning System for the Caribe and Adjacent Regions.
- PTWC Enhanced Products and Staging for the Caribbean and Pacific, English
- IOC Manuals “How to plan, conduct and evaluate tsunami exercises” and “Module on Tsunami Exercise” are useful resources.
- CARIBE WAVE 2011 through 2023 Handbooks
- CARIBE WAVE 2013 through 2022 Final and Media Report
- PTWC Communications Plan for the Caribbean

CARIBE WAVE Website <http://tsunamiwave.org>



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Questions, Comments

Thank you for your attention and the International Tsunami Information Center Caribbean Office for their assistance with this presentation and the conduct of Caribe Wave



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