



The UWI Seismic Research Centre
&
The Office Of Disaster Preparedness
And Management

*Presentation at the ITIC Training
Programme in Hawaii (ITP-HAWAII)*

7 - 18 August 2023

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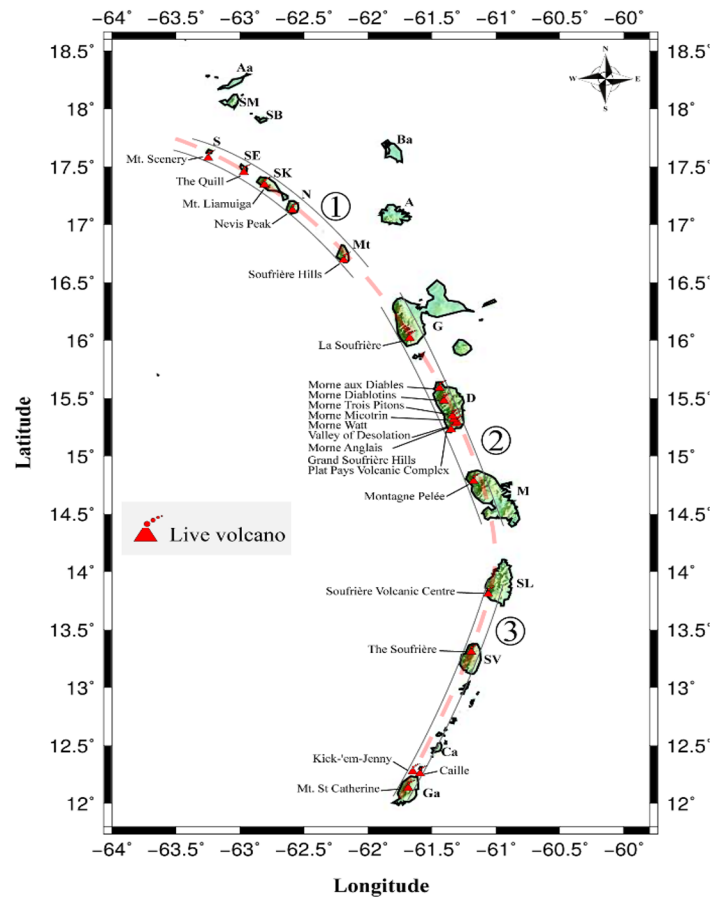
The UWI Seismic Research Centre

Primary source of information for earthquakes and volcanoes in the English-speaking Eastern Caribbean with the largest geophysical network of >60 stations in the region.

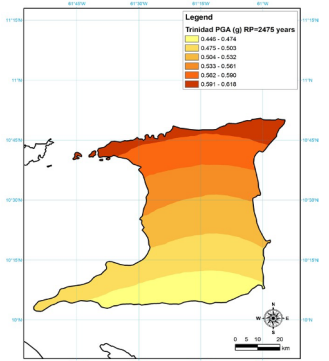
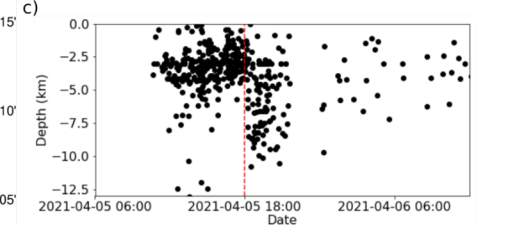
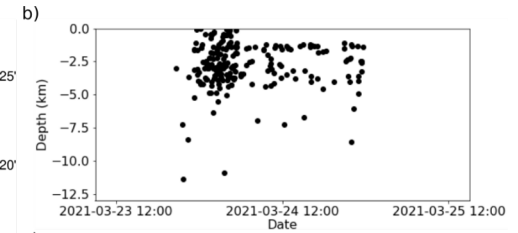
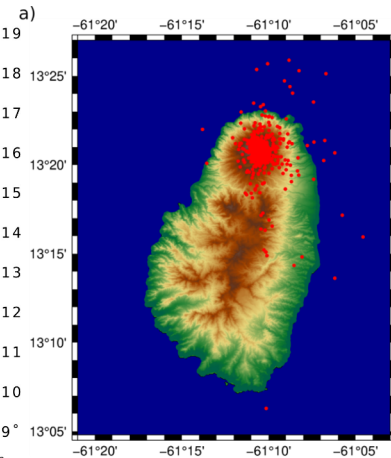
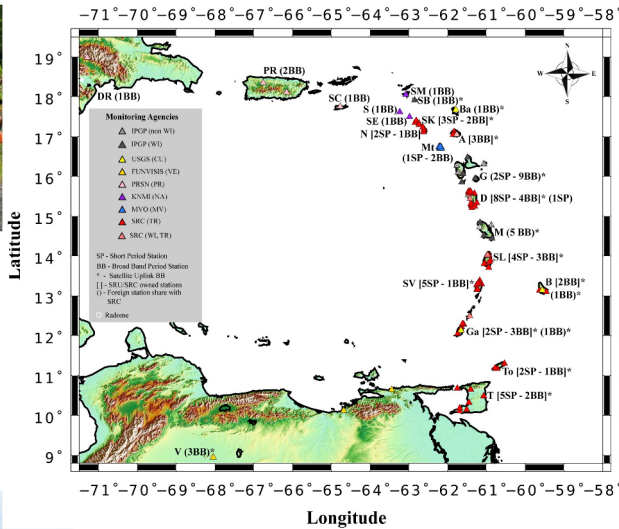
Provide services to 11 separate government of countries that host 17 of the region's 21 volcanoes.

Support disaster management agencies with public education efforts.

Conduct research on geological processes in the region.



Monitor, Mitigate, Research, Educate



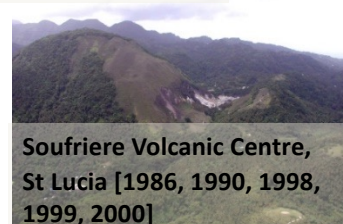
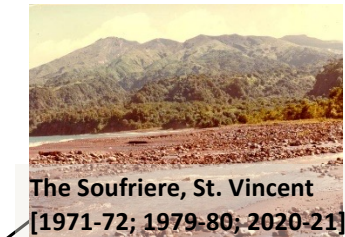
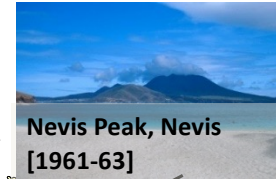
Volcanic eruptions & Volcano-seismic crises since 1953

Volcano observatories are focal points for understanding volcanic activity, making eruption forecasts, and communicating information about volcano hazards and, in some cases, risks, on a variety of geographic and temporal scales.

Volcano observatories serve as the point of contact for scientific information related to volcanic activity to authorities, the media, and the public at large. The observatory is the place where **scientific credibility** is established and **trust with stakeholder communities** is nurtured.

Minimal monitoring can identify volcanic unrest, allow useful detection and forecasting of eruptions, and save lives and property. **Additional monitoring reduces** uncertainties and improves forecasts. Prioritization of monitoring investment according to threat level is essential.

Expanded and multi-parameter monitoring, is also recommended as it reduces uncertainties and improves forecasts.



Kick 'em Jenny, Grenada [1965;
1966; 1972; 1974; 1977; 1988;
1990; 2001, 2015, 2017, 2018,
2020]

Historical Tsunamis which have Affected the Caribbean (<http://www.ngdc.noaa.gov/seg/hazard>)

Date					Earthquake Mag	Volcano	Tsunami Source Location				Parameters		Effects	
											Max Water Height	Num. Runups	Deaths	
Year	Mo	Dy	Hr	Mn			Country	Name	Latitude	Longitude			Num	De
1530	9	1	14	30	*		VENEZUELA	CUMANA	10.7	-64.1	7.3	3		
1690	4	16			8		ANTIGUA AND BARBUDA	ANTIGUA; S	17.5	-61.5		3		
1692	6	7			7.7		JAMAICA	PORT ROYAL	17.8	-76.7	1.8	4	2000	3
1755	11	1			*		PORTUGAL	LISBON	36	-11	30	52		3
1761	3	31			*		PORTUGAL	LISBON	37	-10	2.4	11		
1767	4	24	6		*		MARTINIQUE	MARTINIQUE	14.4	-61		2		
1770	6	3			*		HAITI	PORT-AU-PR	18.5	-72.3		4		
1775	2	11			*		CUBA	SANTIAGO D	19.9	-76		2		
1802	8	15			*		VENEZUELA	CUMANA	10.48	-64.2		1		
1823	11	30			*		MARTINIQUE	SAINT PIER	14.4	-61		1		
1842	5	7			7.7		HAITI	CAP-HAITIA	19.75	-72.2	5	8	300	3
1843	2	8	14	50	8.3		GUADELOUPE	POINTE-A-P	16.5	-62.2	1.2	1	12	1
1853	7	15			6.7		VENEZUELA	CUMANA	10.5	-64.2		4	113	3
1856	8	9			7.5		HONDURAS	OMOA	15.75	-88.17	5	5		
1860	4	8			7.5		HAITI	ANSE-A-VEA	18.52	-73.35		4		
1867	11	18	18	45	7.5		USA TERRITORY	VIRGIN ISLA	18.1	-65.1	10	33	30	1
1868	3	17	11	37	*		USA TERRITORY	VIRGIN ISLA	18.1	-65.1	1.5	5		
1882	9	7	7	50	7.9		PANAMA	SAN BLAS A	9.5	-78.9	3	4	100	2
1887	9	23	12		*		HAITI	MOLE SAINT	19.7	-74.4		4		
1900	10	29			8.4		VENEZUELA	MANCUTO	11.2	-66.5	10	4		
1902	5	5					MARTINIQUE	MONT PELEE	14.82	-61.17	5	1		
1902	5	7				Vol	SAINT VINCENT AND TH	SOUFRIERE	13.33	-61.18		3	1565	3
1902	8	30					MARTINIQUE	MOUNT PEL	14.82	-61.17	1	1		

Earthquake, Volcano and Tsunami Monitoring in the Insular Caribbean

Jurisdiction	No		Hazards	Monitoring Agency
Trinidad & Tobago	1	IS	Eq./Ts.	UWI-SRC
Barbados	1	IS	Eq./Ts.	UWI-SRC
OECS States	6	IS	Eq./Vo.-1/Ts.	UWI-SRC, GSN-CU*
French West Indies	3	FDT	Eq./Vo.-1/Ts.	IPGP, BRGM
Montserrat	1	BDT	Eq./Vo./Ts.	UWI-SRC
Dutch West Indies	5	DDT	Eq.-1/Vo.-1/Ts.	KNMI
Puerto Rico & V. Is.	4	DT	Eq./Ts.	PRSN
Anguilla	1	BDT	Eq./Ts.	No Mon.
Dominican Republic	1	IS	Eq./Ts.	ISU, GSN-CU*
Haiti	1	IS	Eq./Ts.	No Mon.
Jamaica	1	IS	Eq./Ts.	UWI-EU
Turks and Caicos Is.	1	BDT	Eq./Ts.	GSN-CU*
Cuba	1	IS	Eq./Ts.	CENAI
Caymans Is.	1	BDT	Eq./Ts.	CHMA
Bahamas	1	IS	Ts.	No Mon.

Independent
States - 13
Dependent
Territories - 12

Monitoring
Agencies - 8

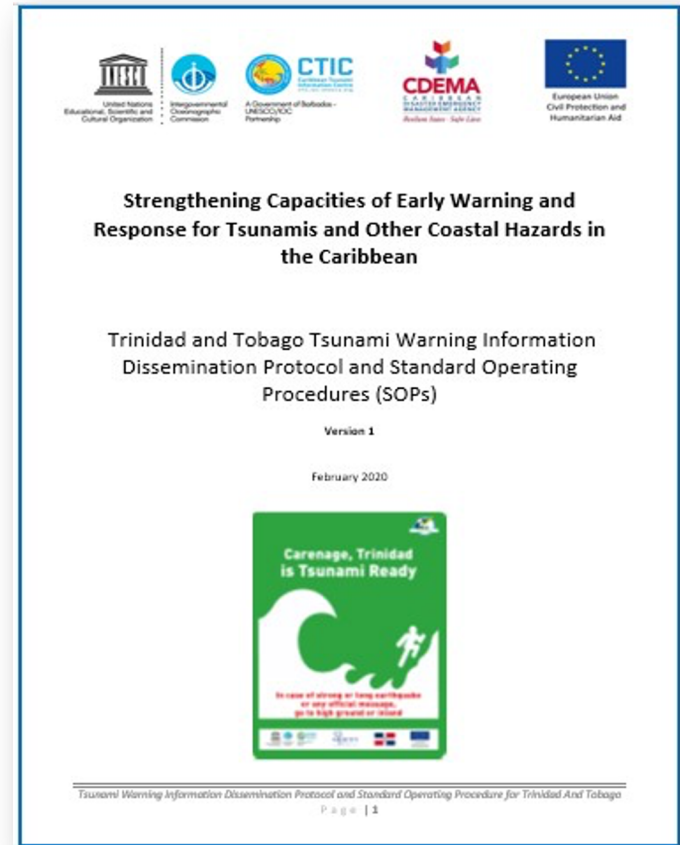
* USGS Tsunami
Monitoring
Stations

Assessment of the status of MHEWS for all CDEMA participating states (PS): 2022

- With regards to tsunami hazards, there is no comprehensive, regional Caribbean tsunami warning system which serves the entire Caribbean basin.
- The region relies on the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (UNESCO-IOC) led Intergovernmental Coordination Group for the Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions (ICG/CARIBE EWS).
- In the instance that an earthquake triggers a tsunami, which will potentially impact the Caribbean, the Pacific Tsunami Warning Center (PTWC) will issue a bulletin to Tsunami Warning Focal Points (TWFP), the official agency responsible for receipt of the warning message in each Caribbean country. For CDEMA PSs, the focal points are either the meteorological offices, the national disaster management offices, or the police department.
- The communication of the warning to the public is the responsibility of the national disaster management agency in each country.
- The PTWC also manages forecast and risk assessment data regarding the likely amplitude of waves which may impact a given geographical location under varying magnitudes of earthquakes.

National Tsunami Warning Information Dissemination Protocol and SOPs

This document aims to provide procedural guidance for action in the event of a tsunami threat. It defines associated mechanisms, roles and responsibilities for organisations and individuals to undertake in order to effectively coordinate early warning and response to mitigate against losses in the face of tsunami threat.





Tsunami Threat Message – NTWC Immediate Actions



1 PTWC issues a Tsunami Threat Message #1 within 10 minutes of the occurrence of a major earthquake.

2 Message is received by email and fax at both the Meteorological Services (TTMS) and the ODPM.

3 TTMS Duty Meteorologist reviews document and forwards it to the ODPM.

4 The Duty Meteorologist then immediately calls the ODPM to ensure it has been received.

5 The Signaller on duty immediately calls the Country Tsunami representative or alternate and informs him/her of the threat message.

6 The Country Tsunami representative quickly reviews the document and calls the CEO to inform him of the threat and advise activation of the NEOC. NOTE: It is always advisable, in this situation, to activate to level III. This is because a tsunami is a sudden onset event, it is likely to affect large areas of the coastline and involve numerous municipalities and it is much easier to over-react and stand down resources' as needed than it is to be scrambling to get resources into the impact zone after the fact.

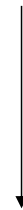
7 The CEO approves and then calls the National Security Council to advise of the threat.

8 The Country Tsunami representative then calls the Signallers on duty to instruct a call-up for full activation of the NEOC.

9 The Country Tsunami representative calls the Operations Manager and the Training and Education Specialist and briefs them. In order to save time, this should be a conference call if possible.

10 The Operations Manager will then call the TEMA, the Fusion Centre, the DFHQ, TTCG, TTPS Operations Command Centres and inform them of the threat.

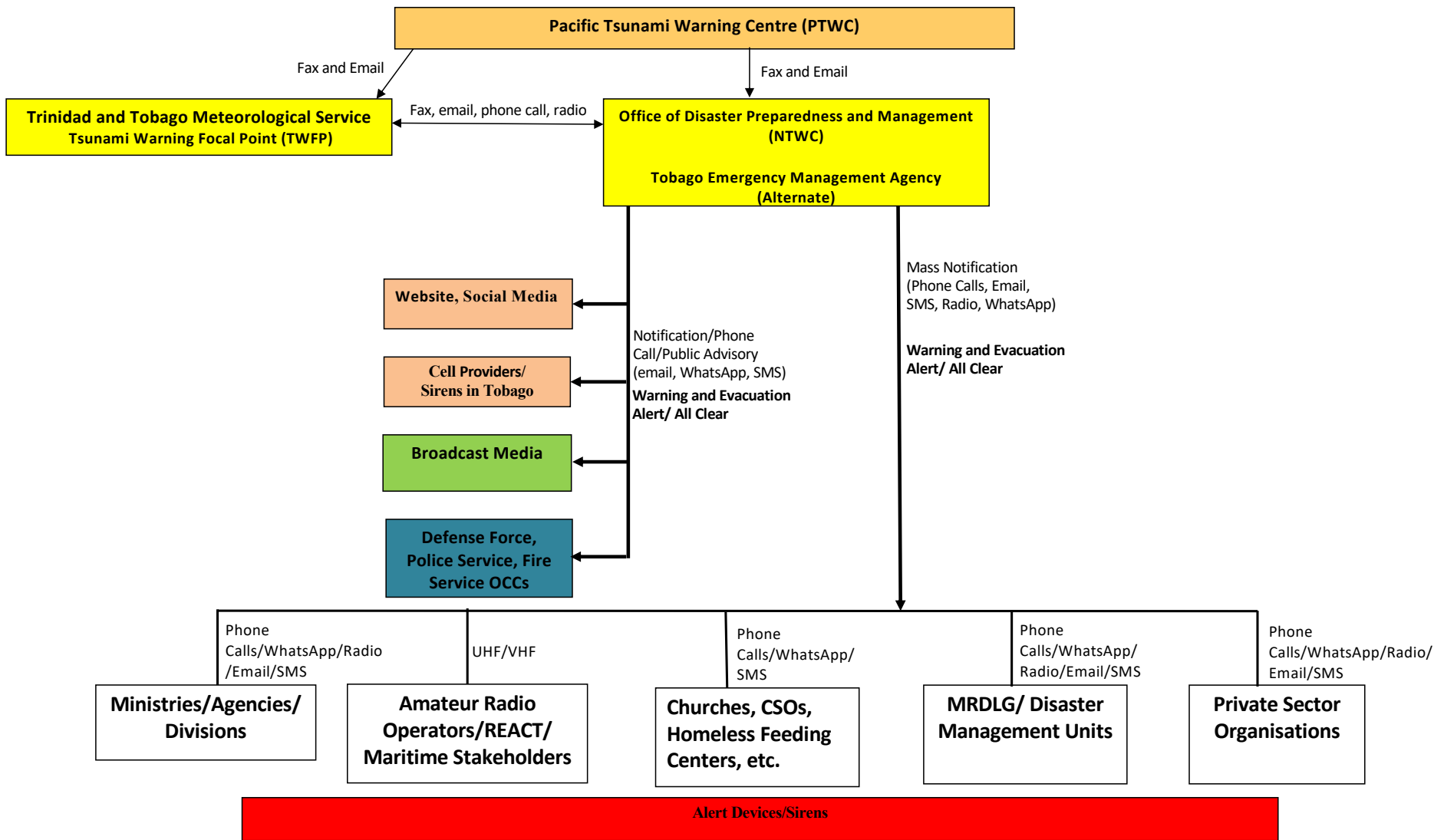
Issuance and Receipt of
Tsunami Information
Statement/Threat Message



Authentication and Decision
Making

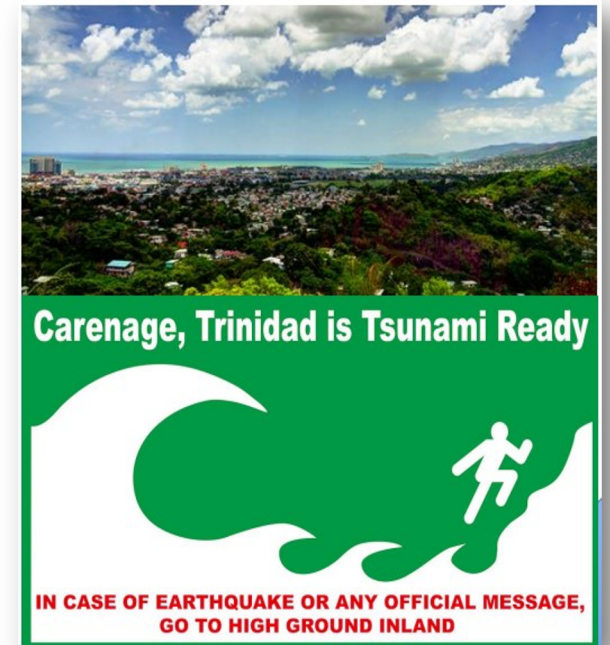


Initiation of National Early
Warning Dissemination
Mechanism/NEOC Activation



Tsunami Ready Communities

In June 2020, the Carenage community became Tsunami Ready. At present, the community of Plaisance, which is situated in Mayaro, has been earmarked for the next Tsunami Ready project.



Tsunami Readiness Activities

- **Monthly testing of stakeholder alerts**
 - PTWC monthly testing
 - MHEWS - Tobago
- **Annual Exercises**
 - Caribe Wave - Regional Tsunami Exercise
 - World Tsunami Awareness Day
 - Carenage Community
- **Public/Community awareness activities**
 - Social Media
 - Traditional Media
 - Community Outreach
 - Tsunami Signage



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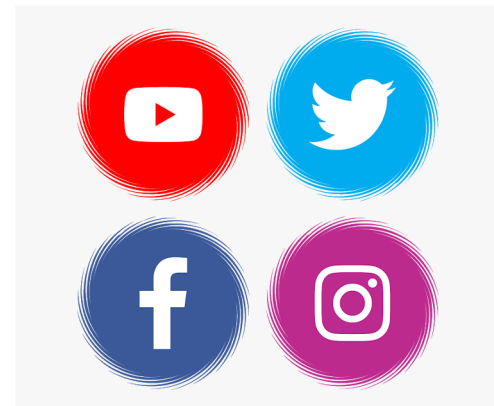
+1-868-662-4659

src@sta.uwi.edu

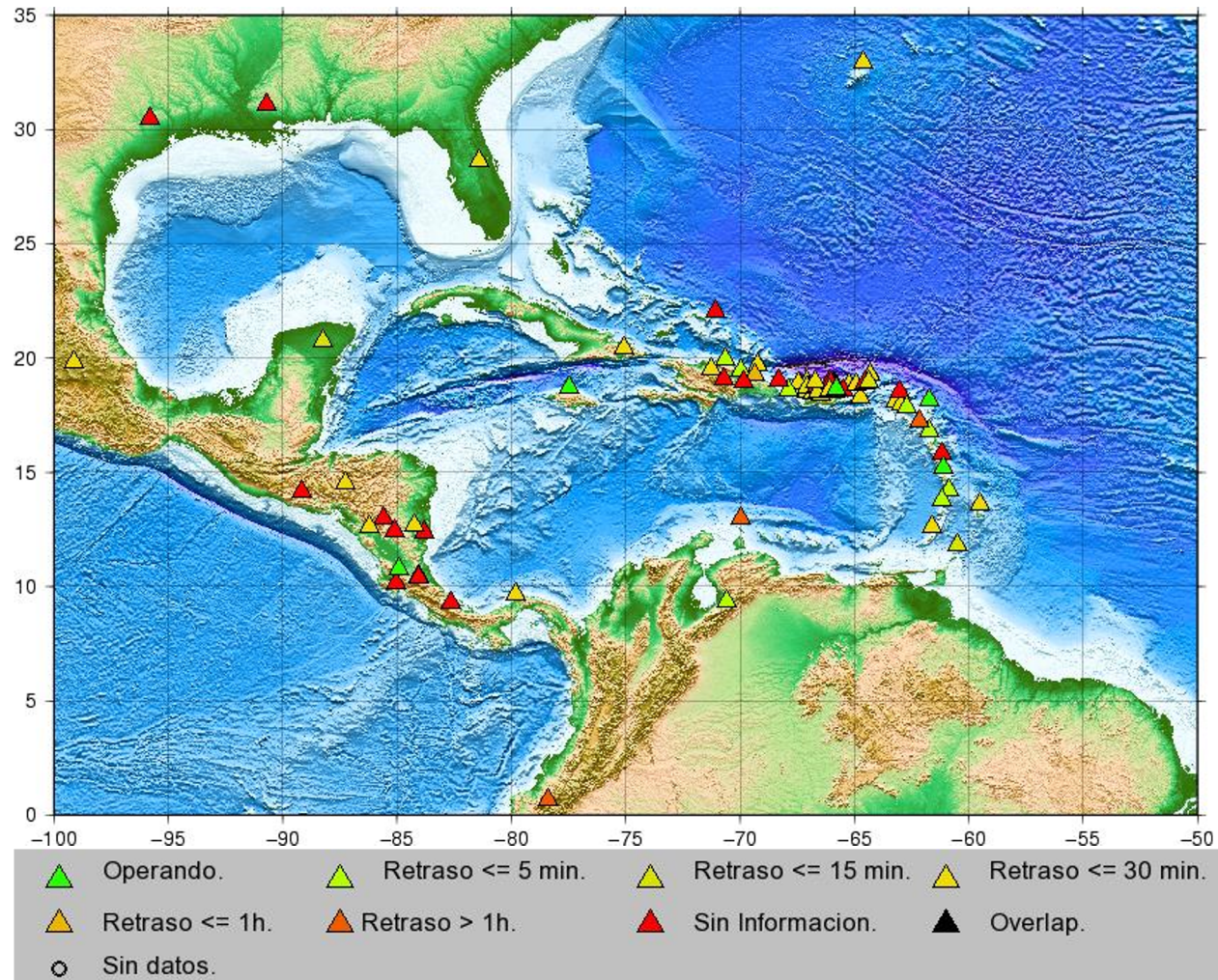


Get in touch with us!

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- **You Tube: ODPMTT Official**
- **Work : 868-640-1285**
- **Email: publicinfo.odpm@gmail.com**



Map of Stations Contributing Data to the Tsunami Warning Network



Three lessons



Make Education and Outreach a key component of VO operations



Strengthen Risk Communication at the highest level



Maintain a robust early detection monitoring network and secure resources for rapid response to crisis

Operational challenges & Strategies

Funding (inconsistent & deficient) => reflects low GDP-per capita of contributing territories => **grants, partnerships & collaborations**

Logistical challenges of operating over a large geographical space consisting of separate, independent territories => **remote techniques, build local technical capacity**

Long repose periods between volcanic eruptions => complacency => lower commitment to funding => **education & outreach**

Impact of hydro-meteorological hazards => **low-cost instruments, improve installations**

Vandalism of field-deployed scientific equipment in remote sites => **enhance public awareness, improved security**

