Saint Lucia's Tsunami Warning and Mitigating System

- **ITP – TEWS Hawaii 2025**

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- ***Liaison Officer with NEMO***

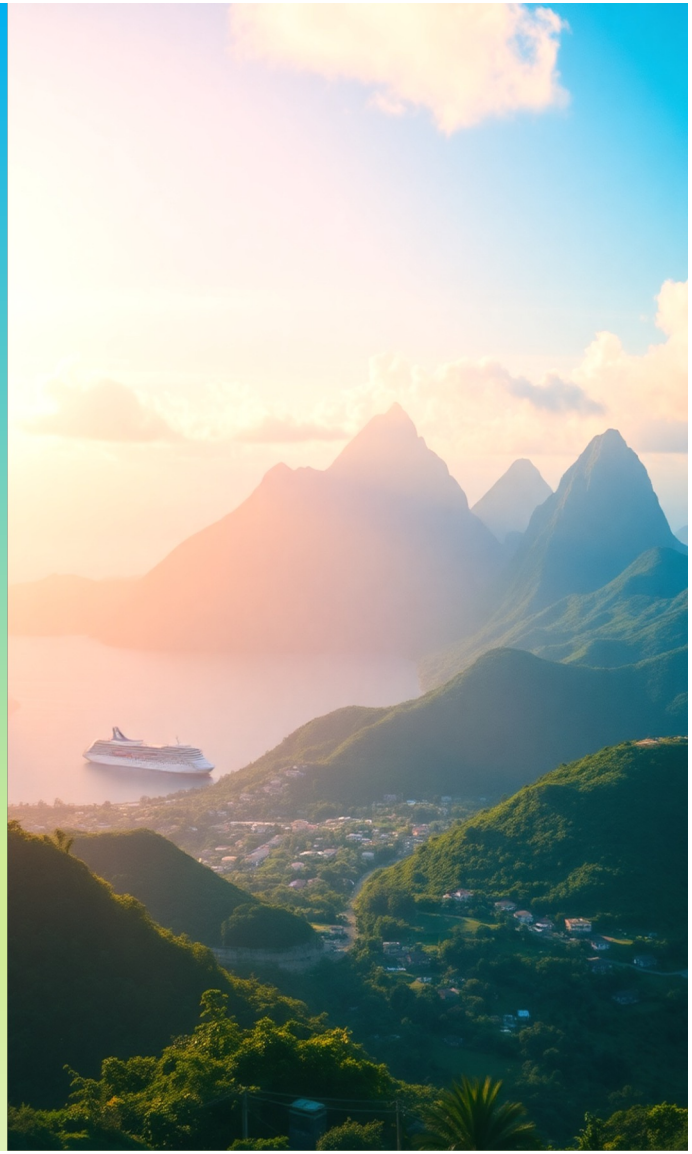
Overview of Saint Lucia

Geography and Demographics

- **Location:** Eastern Caribbean
- **Capital:** Castries
- **Population:** 180 000
- **Size:** 238 square Miles
- **Language:** English and French Creole

Society and Economy

- **Ethnicity:** is diverse, mainly Black, mixed, and East Indian.
- **Religion:** Christianity though other minorities exist.
- **Economy:** is based on tourism and agriculture.
- **Topography:** is of volcanic origin, featuring mountainous terrain and a hot tropical climate.

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USA
Florida (USA)
Gulf of Mexico
Miami
Atlantic Ocean
Havana
Mexico
San Juan
Kingston
Caribbean Sea
CARIBBEAN
Honduras
Central America
Nicaragua
400 mi
400 km
St. Lucia
Costa Rica
Panama Canal
Pacific Ocean
Panama
Colombia
Caracas
Venezuela
SOUTH AMERICA
Atlantic Ocean
N
Arctic
Atlantic
Pacific
Indian
Pacific
Southern

Why Tsunami Risk Matters to Saint Lucia

1

Tectonic and Volcanic Hazards

Located in the Lesser Antilles volcanic and seismic arc, where the North American Plate subducts beneath the Caribbean Plate, Saint Lucia faces risks from earthquakes, submarine landslides, and volcanic activity, including eruptions and flank collapses, which increase tsunami threats.

2

Warning Times and Exposure

Research indicates that the worse-case scenario for Saint Lucia would results from activity from one or several near-field faults lines.

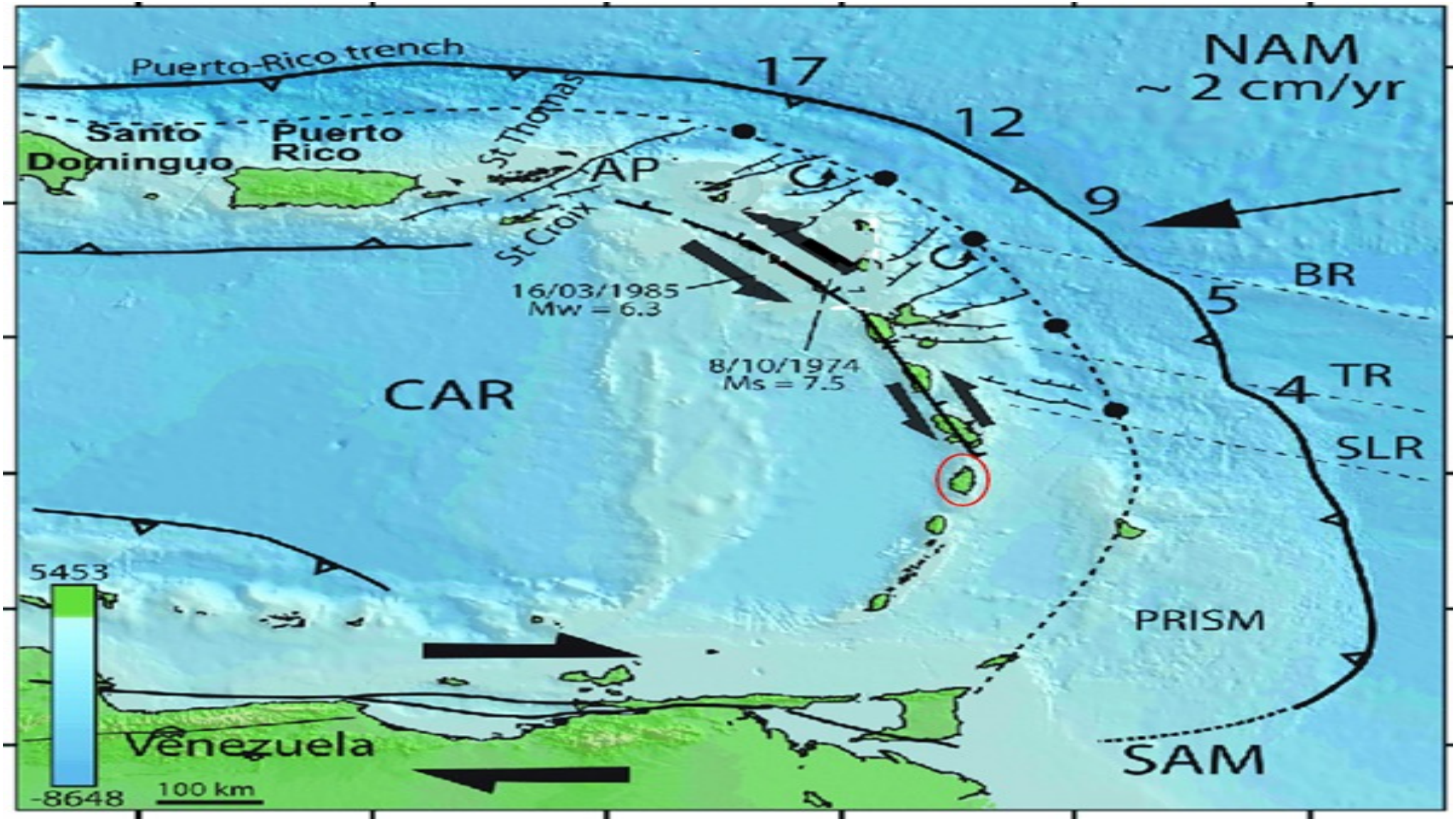
- Local tsunamis <30 minutes.
- Regional tsunamis within 30–180 minutes, allowing little time for evacuation.

3

Vulnerability

Most of the population and critical infrastructure are located along the coast, making the island highly vulnerable.


USGS
Search Results
14 earthquakes.
Only List Earthquakes Shown on Map
Format
Magnitude
Sort
Largest Magnit...
8.5 Northeast of Grand-Terre, Guad...
1843-02-08 14:50:00 (UTC) 40.0 km
7.8 16 km NNW of Miches, Dominic...
1946-08-04 17:51:10 (UTC) 15.0 km
7.7 45 km N of San Antonio, Puerto...
1943-07-29 03:02:17 (UTC) 15.0 km
7.6 Near Santiago de los Caballero...
1842-05-07 21:37:00 (UTC)
7.5 25 km NW of Saint John's, Anti...
1974-10-08 09:50:58 (UTC) 47.0 km
7.4 18 km WNW of Basse-Pointe, ...
2007-11-29 19:00:20 (UTC) 156.0 km
7.3 40 km ENE of Carúpano, Venez...
2018-08-21 21:31:47 (UTC) 146.8 km
M7.8, 1946
M7.7, 1943
M7.3, 1867
M7.1, 1918
M7.5, 1974
M7.0, 1914
M8.5, 1843
M7.2, 1969
M7.4, 2007
M7.3, 1953
M7.3, 2018
M7.0, 1997
200 km
100 mi
12.254°N : 63.545°W


Puerto-Rico trench
17
12
9
5
4
NAM
~ 2 cm/yr
Santo Domingo
Puerto Rico
St Thomas
St Croix
AP
CR
BR
TR
SLR
16/03/1985
Mw = 6.3
8/10/1974
Ms = 7.5
CAR
PRISM
SAM
Venezuela
5453
-8648
100 km

There are a total of 55 potential tsunami sources in the NCEI CATSAM database for the Caribbean.

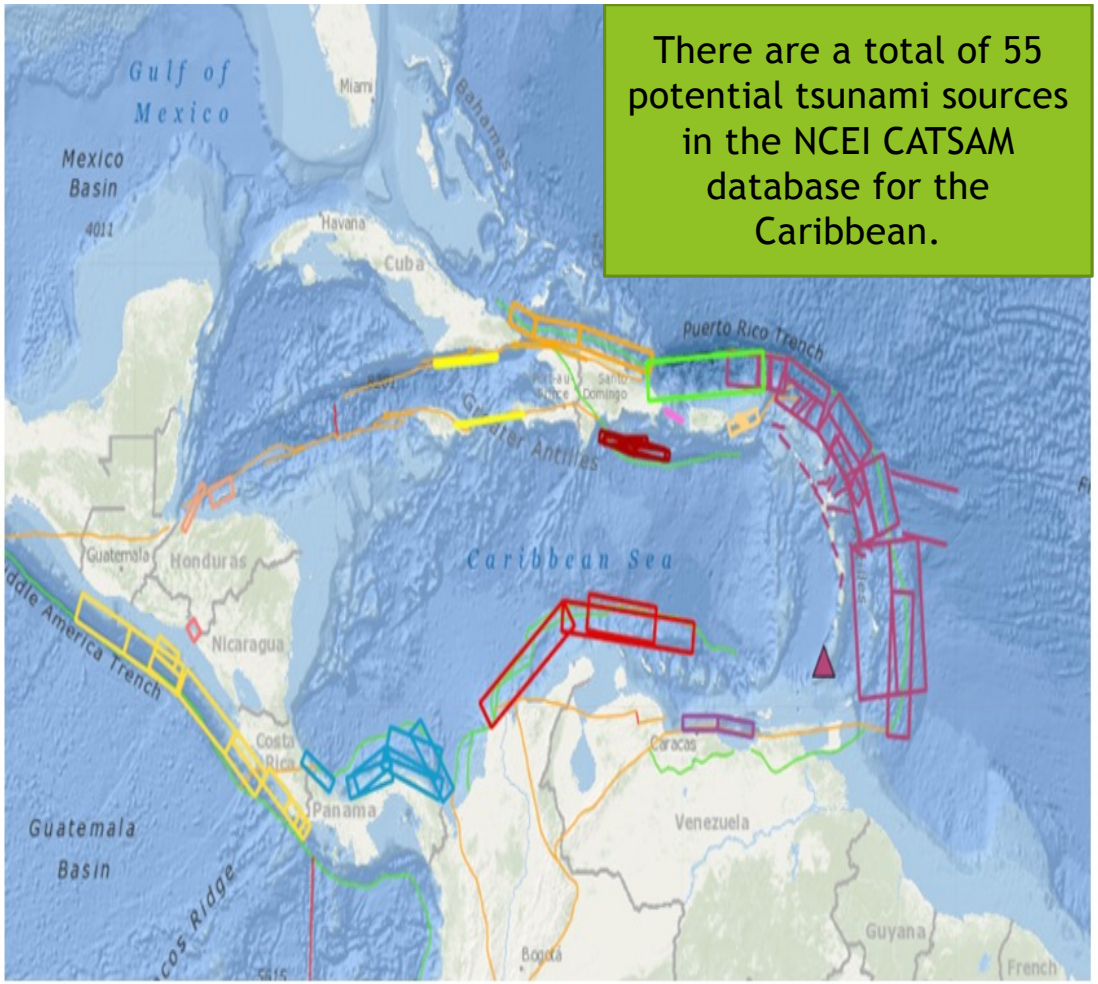
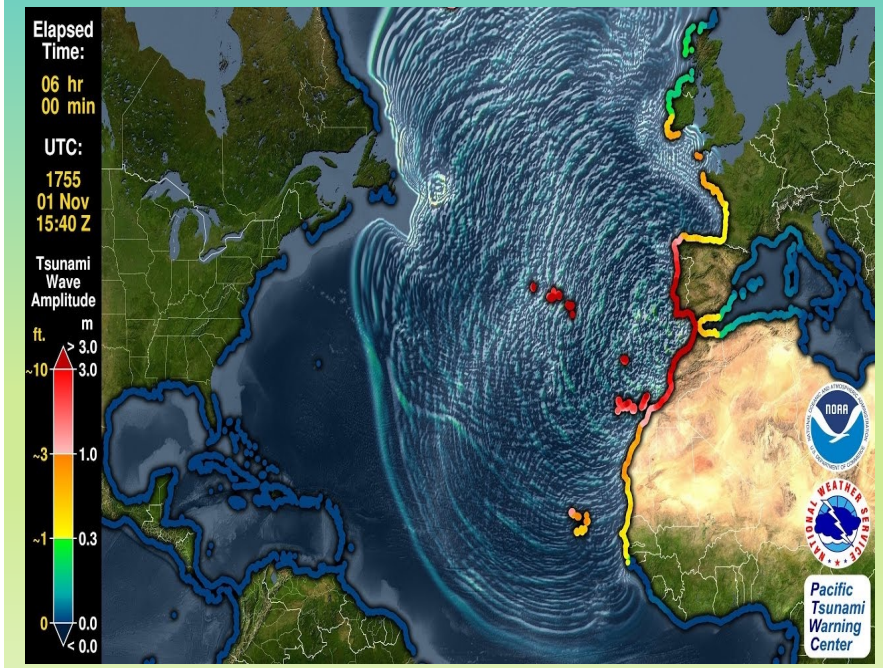
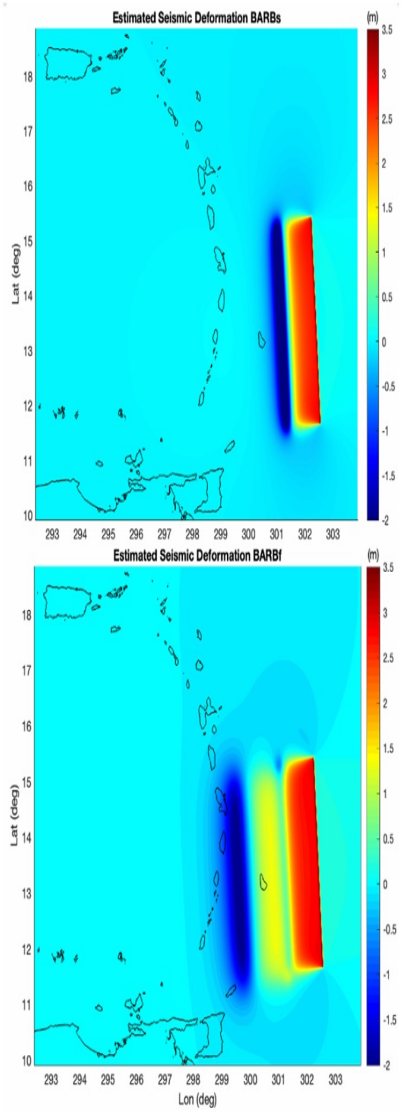


Figure 3: Fault planes for all CATSAM sources in the NCEI database. Some of the sources have been identified at regional meetings of seismic experts and some used in operational response exercises. Sources in the Pacific basin were not modeled.

Two (2) of the major threats for Saint Lucia are near-field faults created by the North American and Caribbean plates, and farther away the Lisbon fault.





A Tsunami Hazard Assessment Study for Saint Lucia

The main goal was to create detailed inundation data to design **accurate evacuation maps and plans for seismically generated tsunamis.**

Also to identify the credible worst-case tsunami scenarios for the island

BARBs: Single segment rupture Mw 8.86

BARBf: Two-segment rupture (includes the BARBs segment) Mw 9.05

Dr. Diego Arcas

Christopher Moore

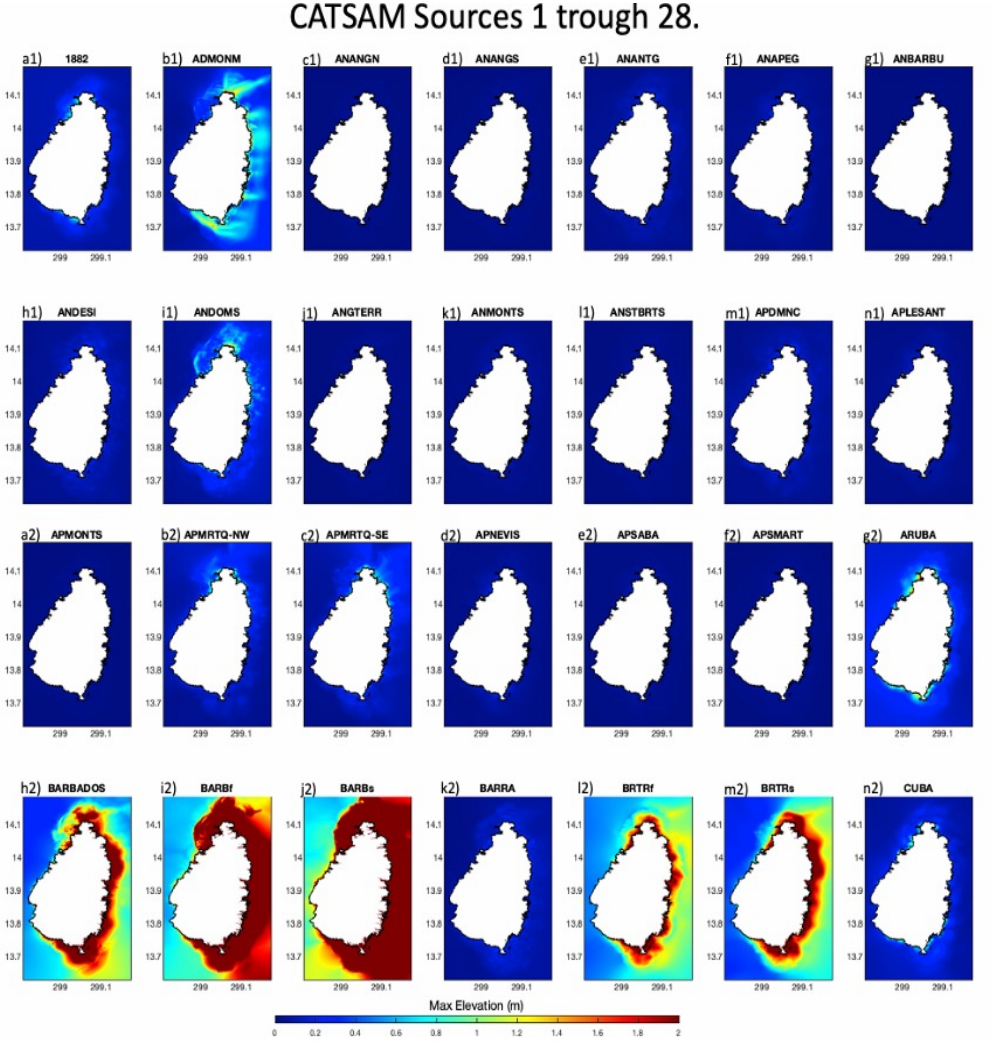


Figure 4: Maximum tsunami amplitude computed around the island of Saint Lucia for sources1 through 28 of the 56 sources considered in the study. The sources simulated include 55 CATSAM sources plus the 1778 Lisbon events.

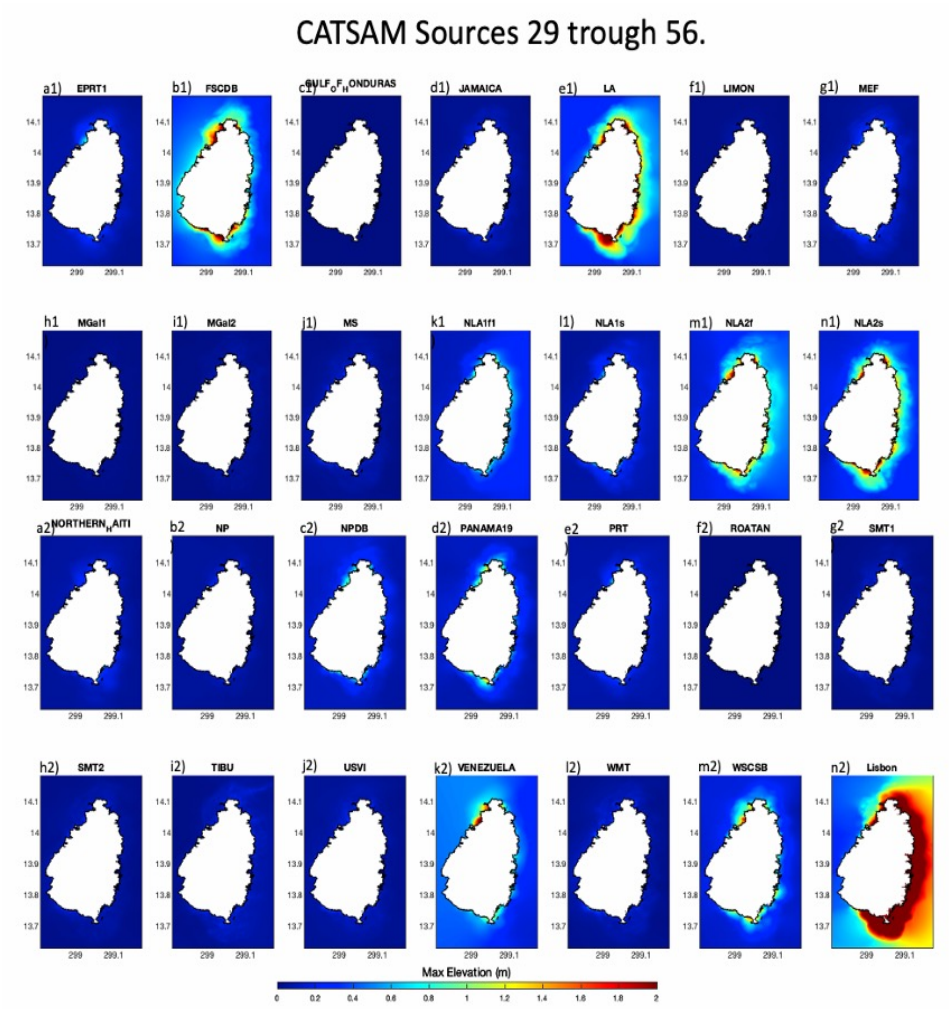


Figure 5: Maximum tsunami amplitude computed around the island of Saint Lucia from sources 29 through 56 of the sources considered in the study. The sources simulated include 55 CATSAM sources plus the 1778 Lisbon events.

RESULTS of ASSESSMENT

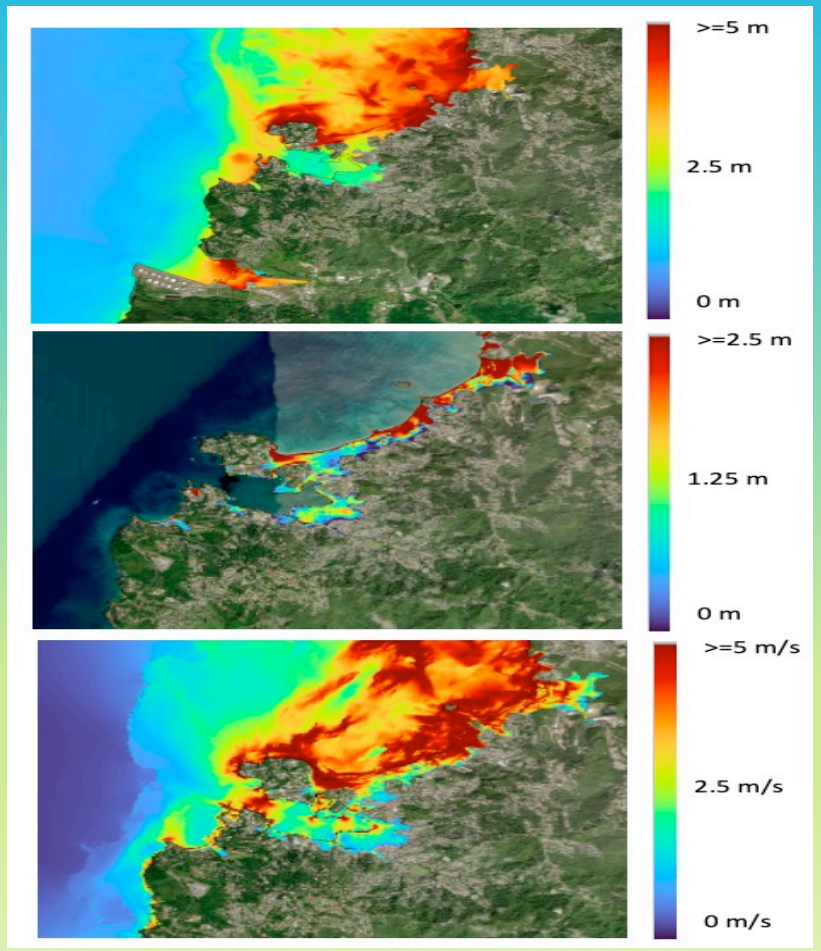
These results form the basis for evacuation maps, public awareness efforts, and emergency planning as Saint Lucia moves toward Tsunami Ready certification.

Model-to-Model Comparison (HySEA vs. MOST): Results for the west coast (Castries area) showed "good agreement" between two different, state-of-the-art tsunami models, adding confidence to the results.

Eastern Coast: First impact in ~20-23 minutes.

Highest Waves: Eastern coastline, northern tip (Cap Estate), and southern tip.
Values can exceed 20m at northern cliffs (likely wave splashing).

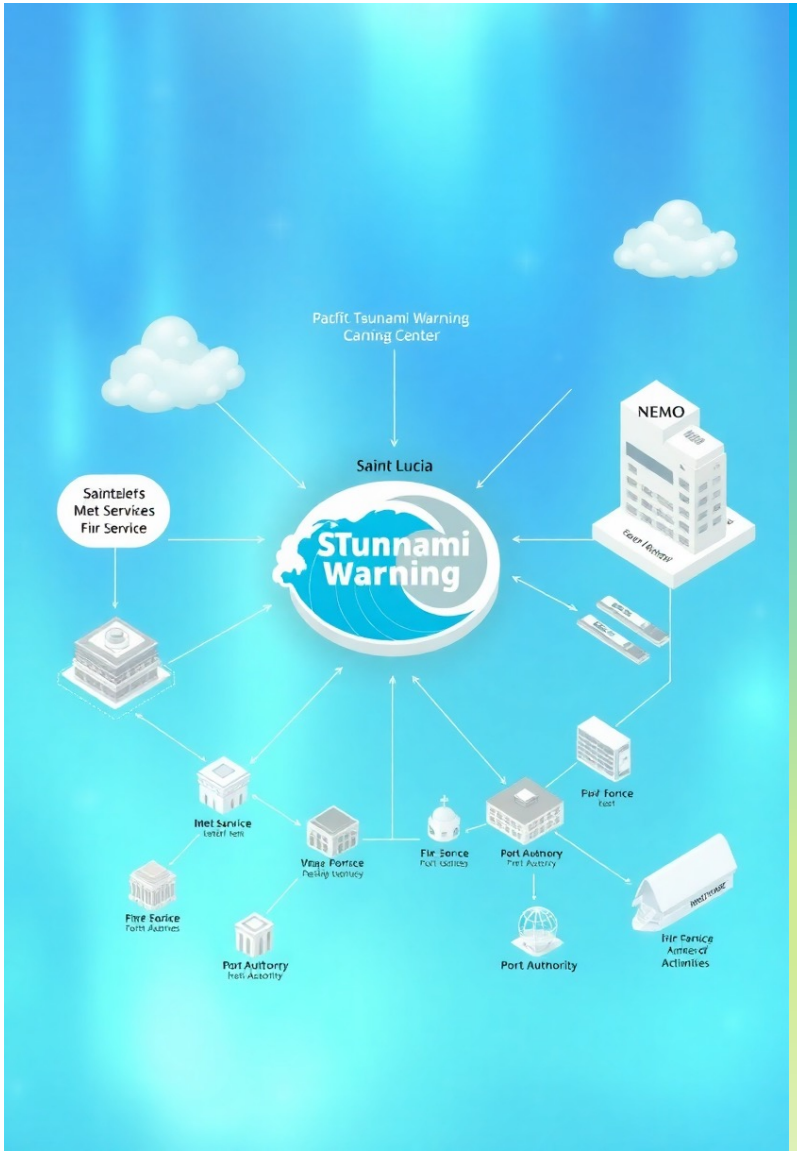
Inundation Extent and Maximum Tsunami Amplitude



Sea Level and Tsunami Monitoring

Monitoring Stations
The island maintains tide gauges at Ganter's Bay, Vieux Fort, Dennery, and Soufriere. This is part of IOC sea level monitoring program to provide timely detection of sea level changes associated with tsunamis.

Role of University of the West Indies (UWI)
It contributes through operating seismic and volcanic monitoring networks across the Eastern Caribbean, including Kick 'em Jenny – which is an active submarine volcano.



Governance: Tsunami Response Structure

Regional and National Collaboration

- ❖ The Pacific Tsunami Warning Center (PTWC) serves as the Tsunami Service Provider (TSP).
- ❖ Saint Lucia's Met Services and Saint Lucia Fire Service serve as the Tsunami Warning Focal Point(TWFP).
- ❖ National Emergency Management Organization (NEMO) is the Official National Authority

Key Responders

- Saint Lucia Fire Service
- Royal Saint Lucia Police Force
- SLASPA
- DDC's
- MoE
- MoA
- Local Government.

National Emergency Management Organisation (NEMO)

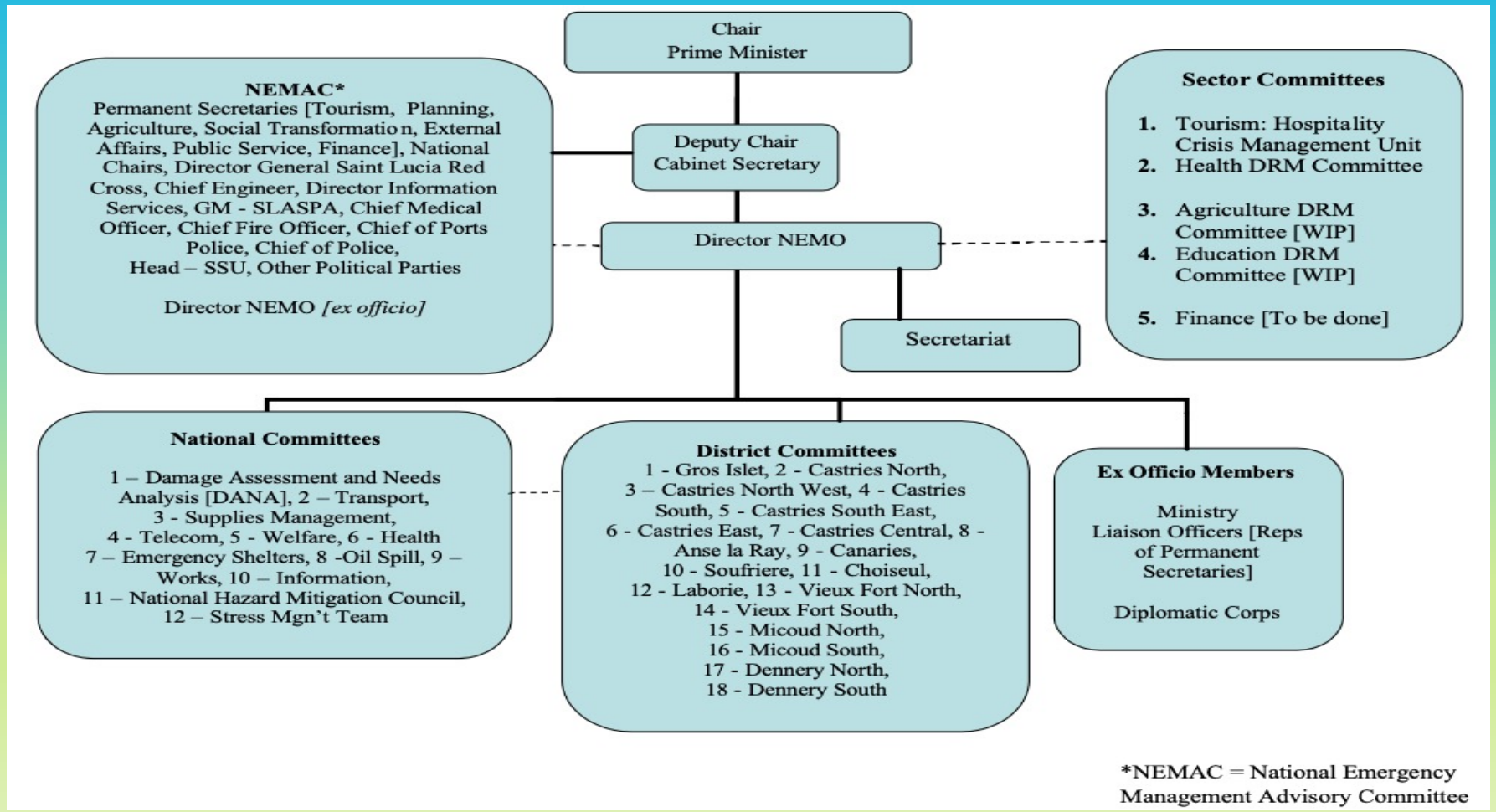
Mandate

NEMO is mandated to create, test, and execute strategies to safeguard Saint Lucia from disaster impacts.

National Tsunami Warning Centre

The National Tsunami Warning Centre, operating under NEMO. It activates protocols for tsunami detection, validation, dissemination of alerts, and coordination of response actions during threats.

Disaster Management System



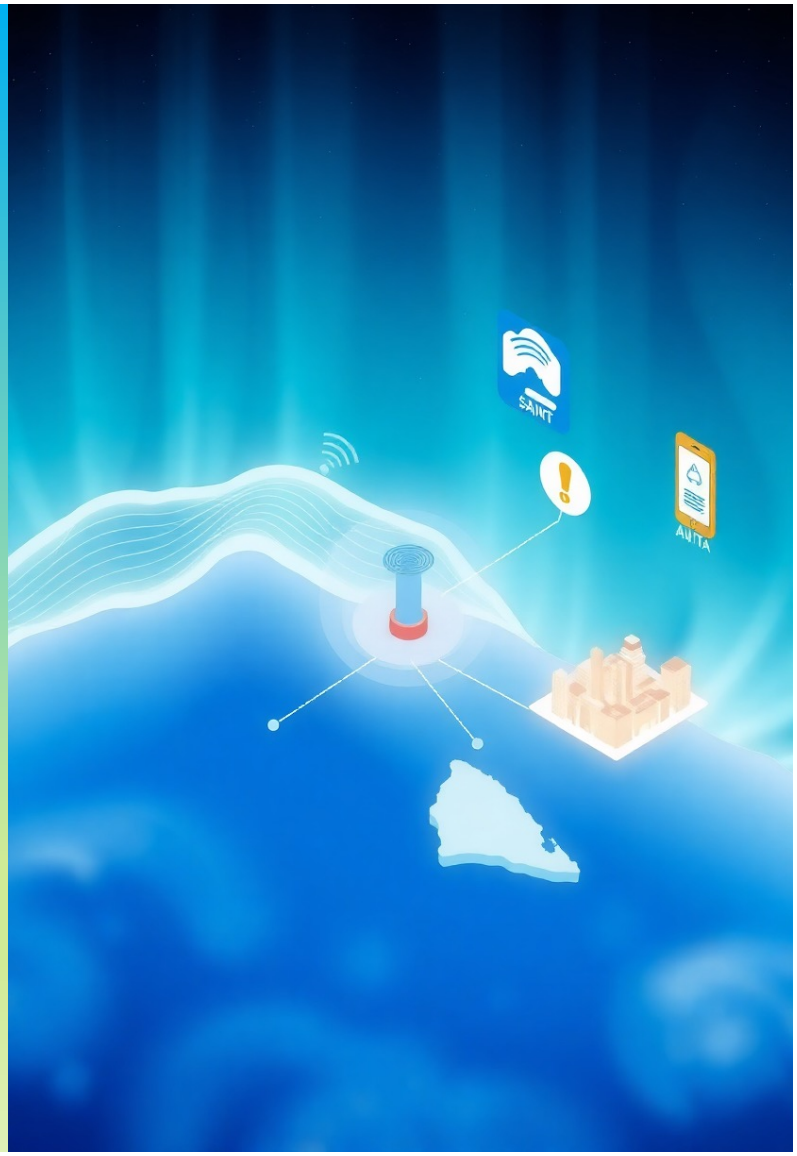
End-to-End Warning System

Detection and Assessment

Using global and regional seismic networks and tide gauges, PTWC detects tsunamis and sends alerts and information to NEMO through its TWFP across multiple channels.

Decision and Dissemination

NEMO validates alerts, sets national warning levels, and disseminates information through SMS, radio/TV, church bells, sirens, and social media.



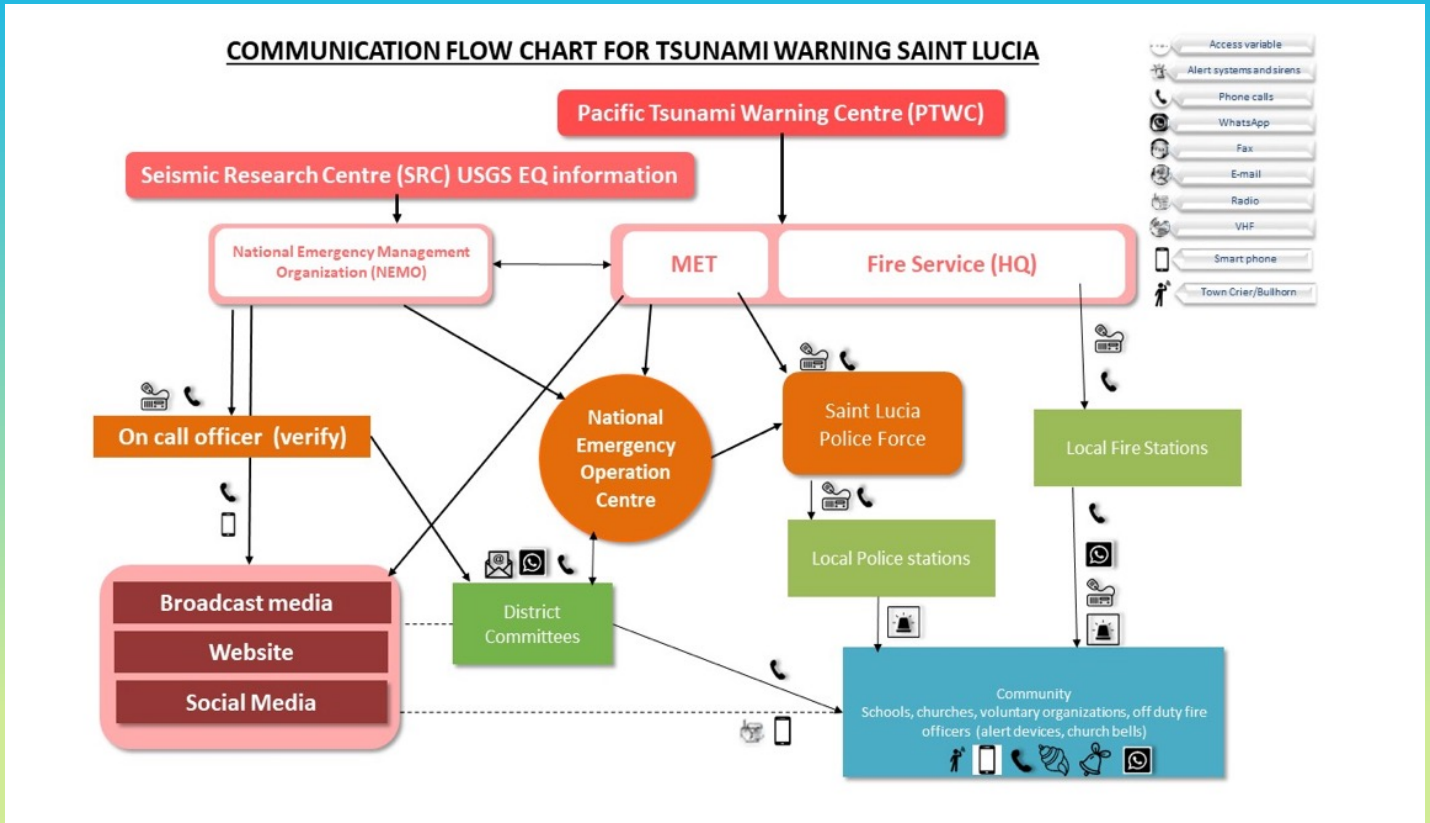
Disaster Management and National Warning Chain

Concept of Operations

NEMO activates the NEOC as needed, and issues national alerts, including advisories, warnings, and cancellations. Immediate communication reaches responders, critical facilities, schools, and communities.

Information Management

Public instructions, rumor control, and media coordination are essential. Alerts provide guidance on evacuation zones and safety procedures.


COMMUNICATION FLOW CHART FOR TSUNAMI WARNING SAINT LUCIA
Pacific Tsunami Warning Centre (PTWC)
Seismic Research Centre (SRC) USGS EQ information
National Emergency Management Organization (NEMO)
MET
Fire Service (HQ)
On call officer (verify)
National Emergency Operation Centre
Saint Lucia Police Force
Local Fire Stations
Local Police stations
Broadcast media
Website
Social Media
District Committees
Community
Schools, churches, voluntary organizations, off duty fire officers (alert devices, church bells)
Access variable
Alert systems and sirens
Phone calls
WhatsApp
Fax
E-mail
Radio
VHF
Smart phone
Town Crier/Bullhorn

Saint Lucia Fire Service – Focal Points

The St. Lucia Fire Service established in 1974 is the national agency with responsibility for:

- Fire and other emergencies
- National Emergency Ambulance Service

There are nine (9) fire stations on island.

Drills and Routine Testing

Annual Drills

The annual drills like CARIBE WAVE validate readiness and the communication chain.

Testing and Accessibility

Monthly communications tests and annual exercises confirm channel reliability.

Community-Based Disaster Risk Reduction (DRR)

Community Engagement

NEMO promotes disaster prevention and community resilience by offering targeted training and support to local committees, including evacuation map development, simulation drills, and technical assistance.

Tsunami Ready Project

Saint Lucia's goal is to achieve **full Tsunami Ready recognition by 2030.**
Building on the success of **Laborie District**, which earned Tsunami Ready status in 2024.

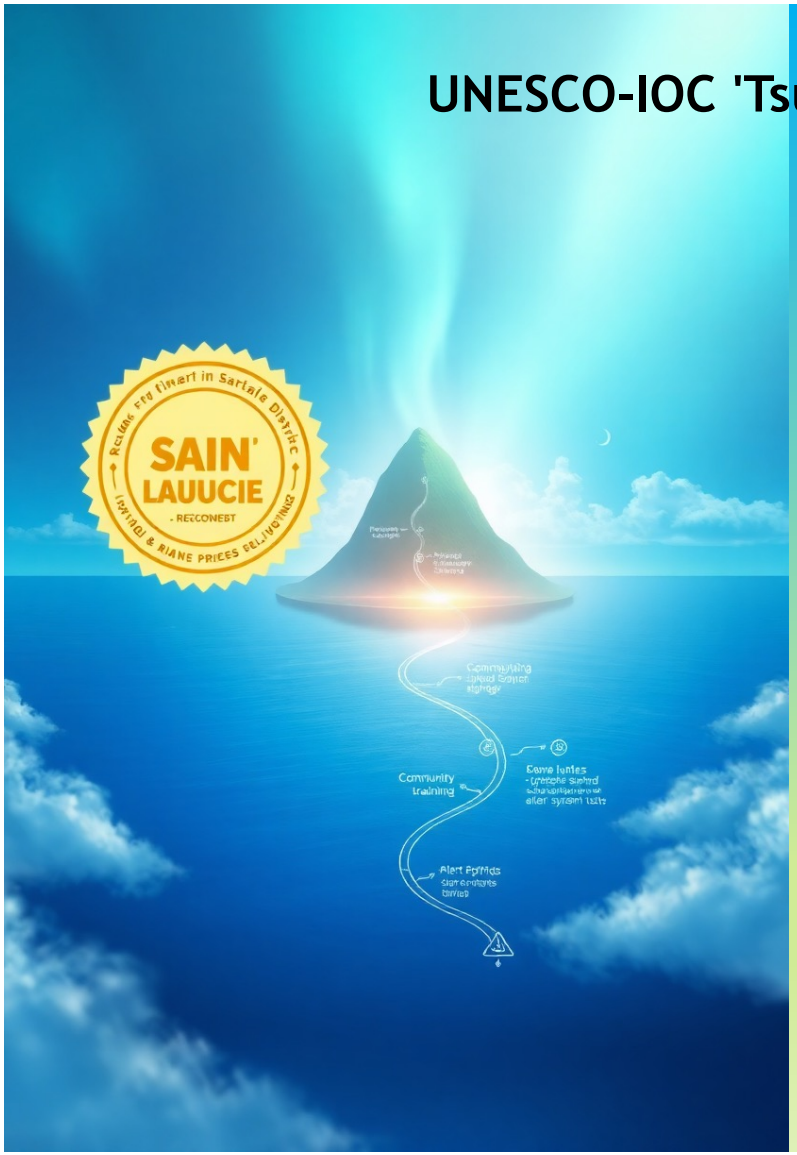

TSUNAMI HAZARD ZONE
IN CASE OF EARTHQUAKE
OR ANY OFFICIAL MESSAGE,
GO TO HIGH GROUND OR INLAND


EVACUATION ROUTE
Move away from the
Tsunami Hazard Zone


LABORIE WELLNESS CENTRE
TSUNAMI
ASSEMBLY POINT
Wait for official
all clear


TSUNAMI
ASSEMBLY POINT
Wait for official
all clear

UNESCO-IOC 'Tsunami Ready' Initiative



Scaling Nationwide

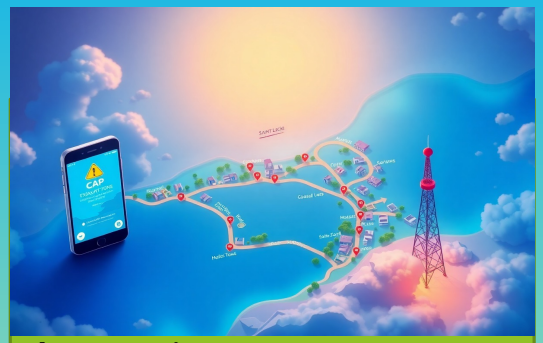
Recognizing priority districts and applying Laborie's model will enable communities like Choiseul, now in the planning stage, to progress effectively and efficiently toward Tsunami Ready recognition.


VIEUX FORT FIRE STATION

Early Warning Systems

Institutional Strengthening

Multi-hazard early warning systems are deployed in four (4) vulnerable communities.



Innovative Communication Tools

Early warning tools include a CAP-enabled mobile app and radio broadcast interrupt systems.

Merci

Gracias

Arigato gozaimasu