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Rebuilding nations.

Caribbean Early Warning System Workshop

14-16 April 2016

Bridgetown, Barbados

**Towards Harmonization of Caribbean EWS:
Perspectives of the Seismic Research Centre, UWI**

Lloyd LYNCH

Instrumentation Engineer

**Seismic Research Centre,
UWI**

Risk Knowledge (Geologic Hazards)– Eastern Caribbean

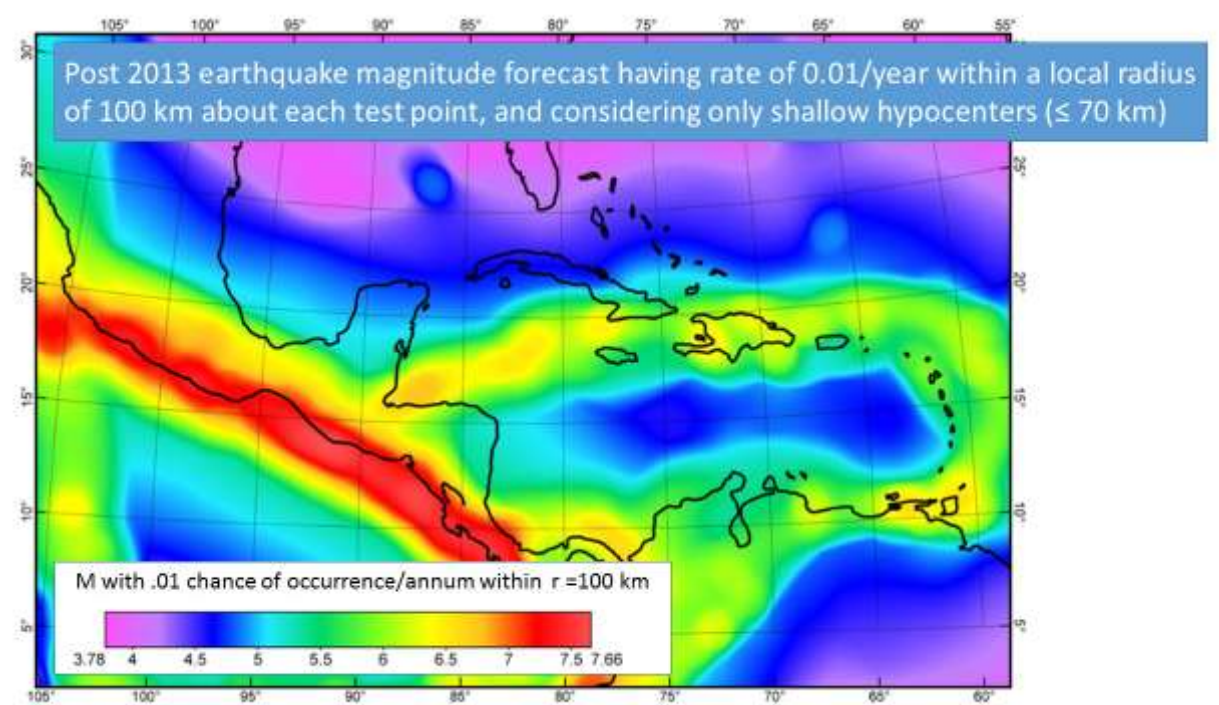
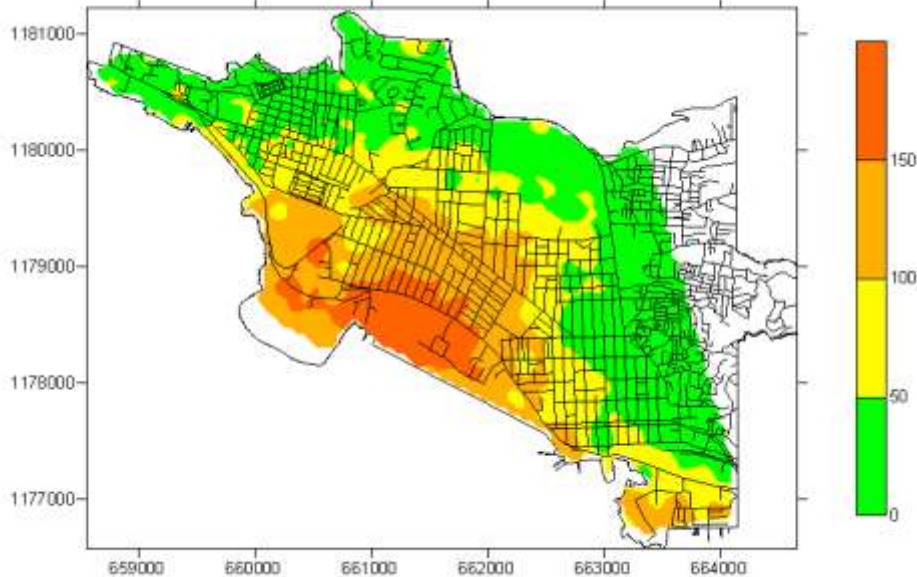
- Volcanic Activity: Potential for high national impact
 - Long fused (but there are exceptions)
 - Frequency
 - *Every few - several decades*, e.g. Kick-em-Jenny in the **Grenadines**, Soufrieres of **St. Vincent** and **Guadeloupe**, Mt Pelee of **Martinique**
 - Every few hundred years, e.g. Morne Patate, Morne Plat Playe and Morne au Diable of **Dominica**, Mt Liamuiga, **St. Kitts**, Nevis Peak, **Nevis**
 - *Every thousand – few thousand years* e.g. Mt. St. Catherine, **Grenada**
 - EWS feasible: Success in 1971, 1979 (St. Vincent), 1995+ (Montserrat)
- Earthquakes: Potential for high multi-national impact
 - Very short fused
 - Frequency: Variable – M 7 expected every 20 years
 - Limited Feasibility. (exploring early response services/products based on risk probability)
- Tsunamis: Potential for high multi-national impact
 - Lead time variable but skewed towards short fuse
 - Frequency: 5-6 in 500 years
 - EWS construction underway since 2005

Risk Knowledge

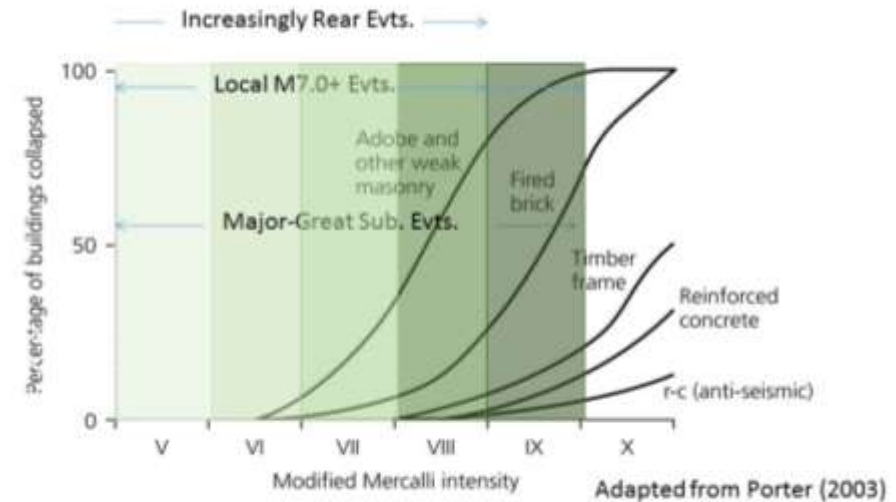
Special Considerations for Earthquakes

Development of early response services/products based on risk probability

Microzonation Map of POS



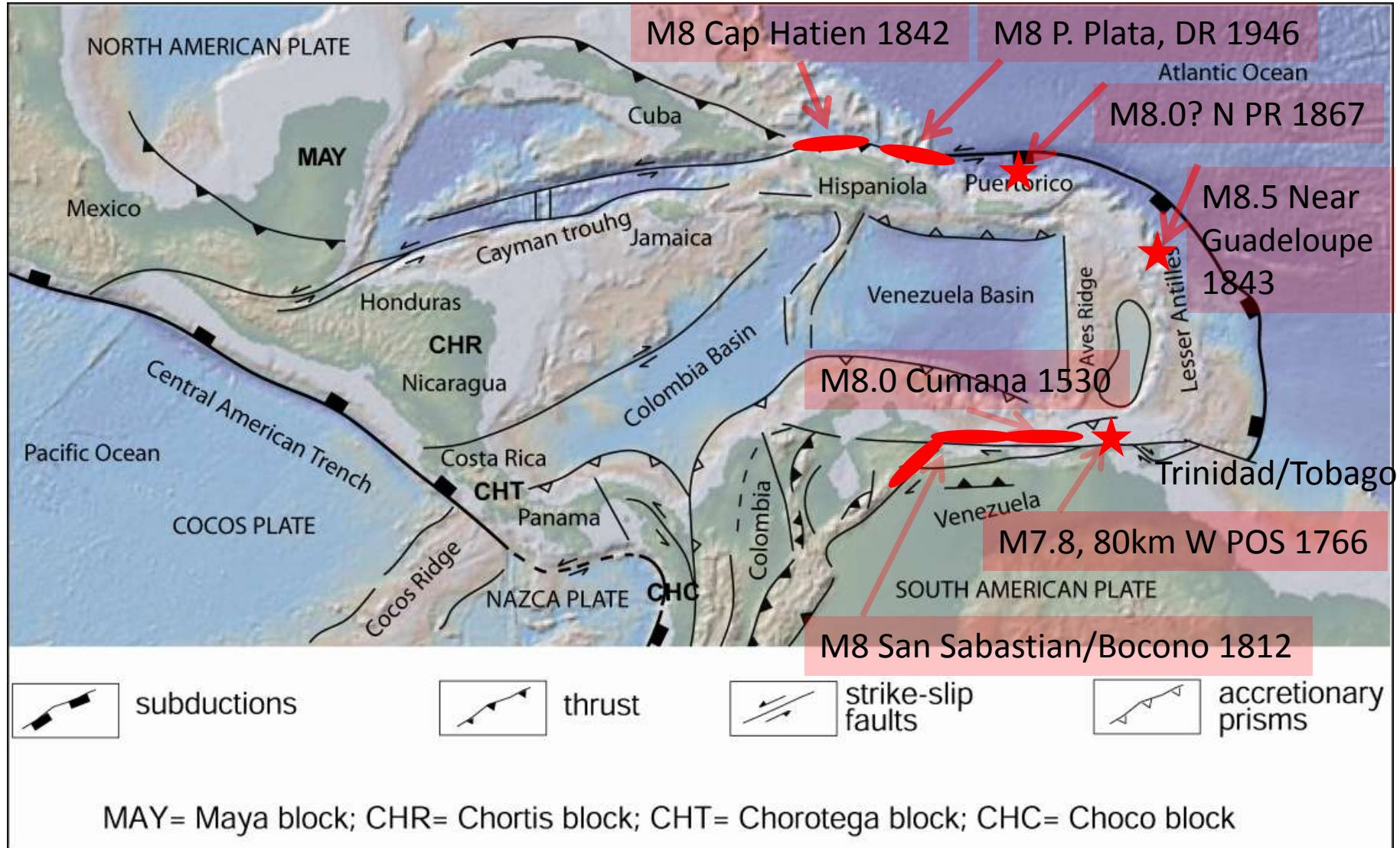
Building Fragility and Earthquake Susceptibility



Most earthquake-related deaths/injuries = $f_n(\text{collapse of buildings})$

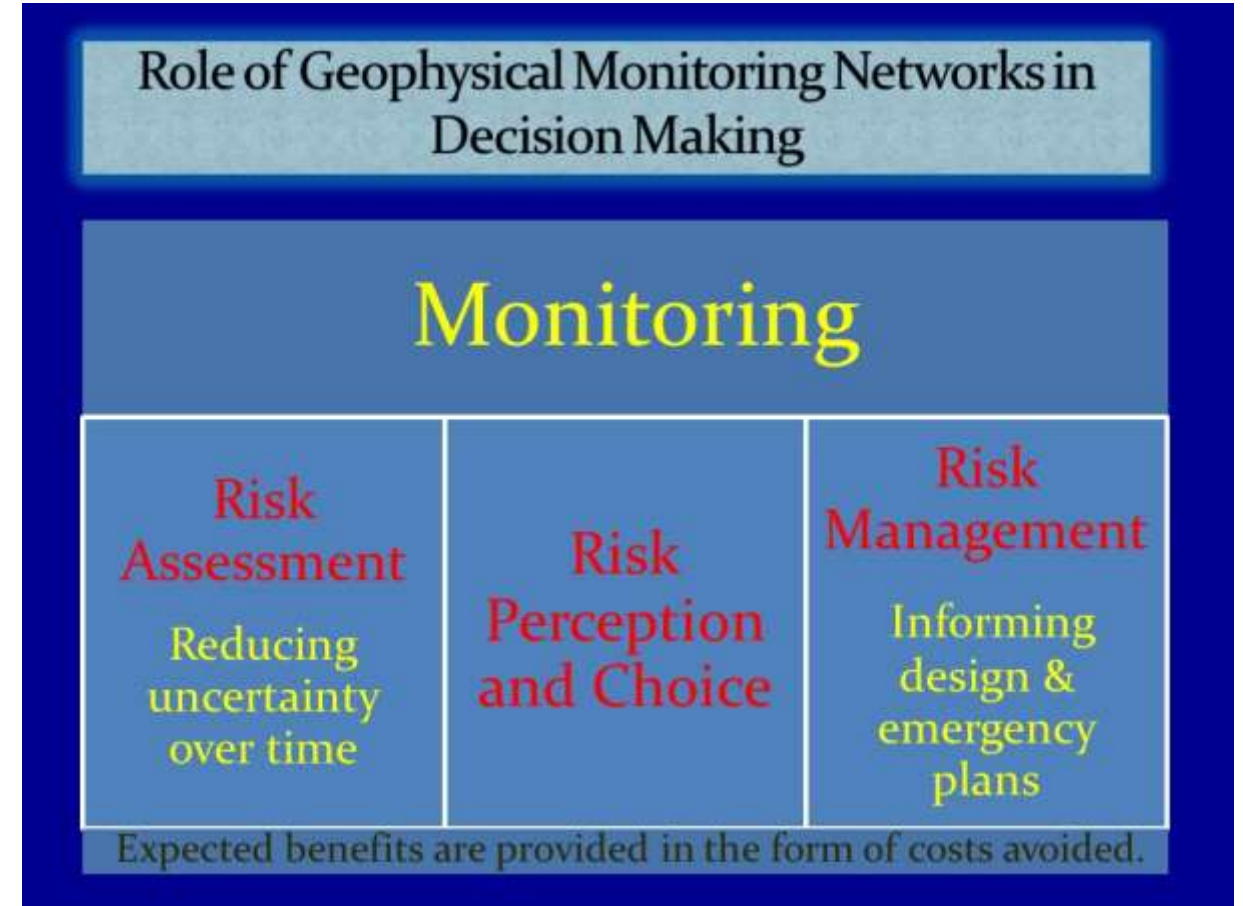
The primary defense = structures that won't collapse.

Some Large Earthquakes of the eastern Segment of the Caribbean Plate



Harmonization across EWS Components

- Monitoring information is applicable to several key areas of DRR and in particular decision making.
- Monitoring information is one of the key elements that harmonizes the components of an EWS
- Harmonization simplify efforts, improves consistency, trust and most importantly *efficacy*.




YEAR	COUNTRY	CAMPAIGN NAME	PARTNER AGENCY	TARGET GROUP
2011- 2 nd Quarter 4 th Quarter	Tobago Trinidad	Tsunami Smart Earth Science Week	TEMA ODPM	Teachers, Students and General Public
2012- 2 nd Quarter 4 th Quarter	St. Vincent Grenadines	Volcano Awareness Week Tsunami Smart	NEMO NEMO	Students, Teachers, Disaster Co-coordinators Students and General Public
2013- 2 nd Quarter 3 rd Quarter 4 th Quarter	St. Vincent Trinidad Dominica	Volcano Awareness Week S3 Mall Tour Earth Science Week	NEMO ODM	Students, Stakeholders, Disaster Co-coordinators General Public
2014- 1 st Quarter 2 nd Quarter 4 th Quarter	Barbados St. Vincent St. Kitts/ Nevis Tobago	Tsunami Smart Volcano Awareness Week Tsunami Smart Earth Science Week	DEM NEMO NEMA & NDMD TEMA	Teachers, Students, Public Students, Stakeholders, Disaster Co-coordinators Students and General Public
2015- 1 st Quarter 2 nd Quarter 4 th Quarter	Barbados St. Vincent Grenada	Tsunami Smart Volcano Awareness Week Earth Science Week	DEM NEMO NaDMA	Students and General Public Students, Stakeholders, Disaster Co-coordinators

locator

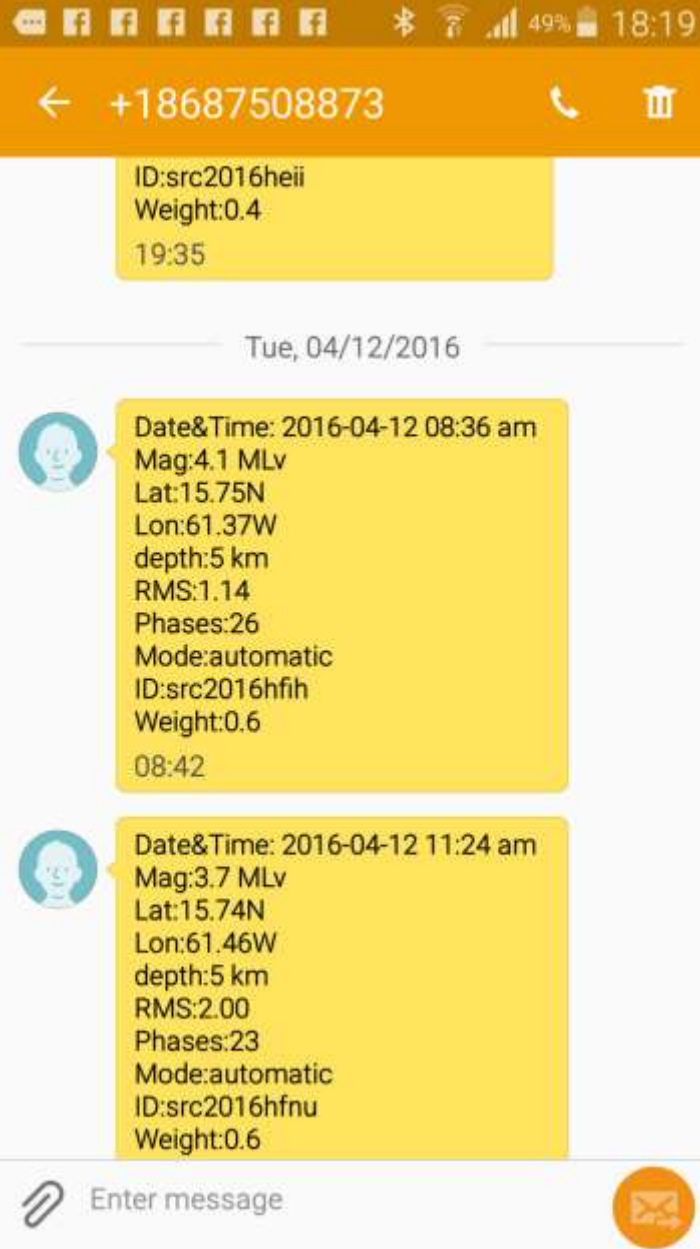
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4.1 MLv	5 km	2016-04-12 12:36 (UTC)
		2016-04-12 08:36 am (Local Time)

NEARBY CITIES	AGENCY	MODE	WEIGHT
50.0 km N of Roseau, Dominica	SRC	automatic	0.6
59.0 km SSE of Point-à-Pitre, Guadeloupe			
132.0 km NNW of Fort-de-France, Martinique			



[View this location with Google Maps](#)

Extract of Email sent by Event Auto-locator



← +18687508873

ID:src2016heii
Weight:0.4
19:35

Tue, 04/12/2016

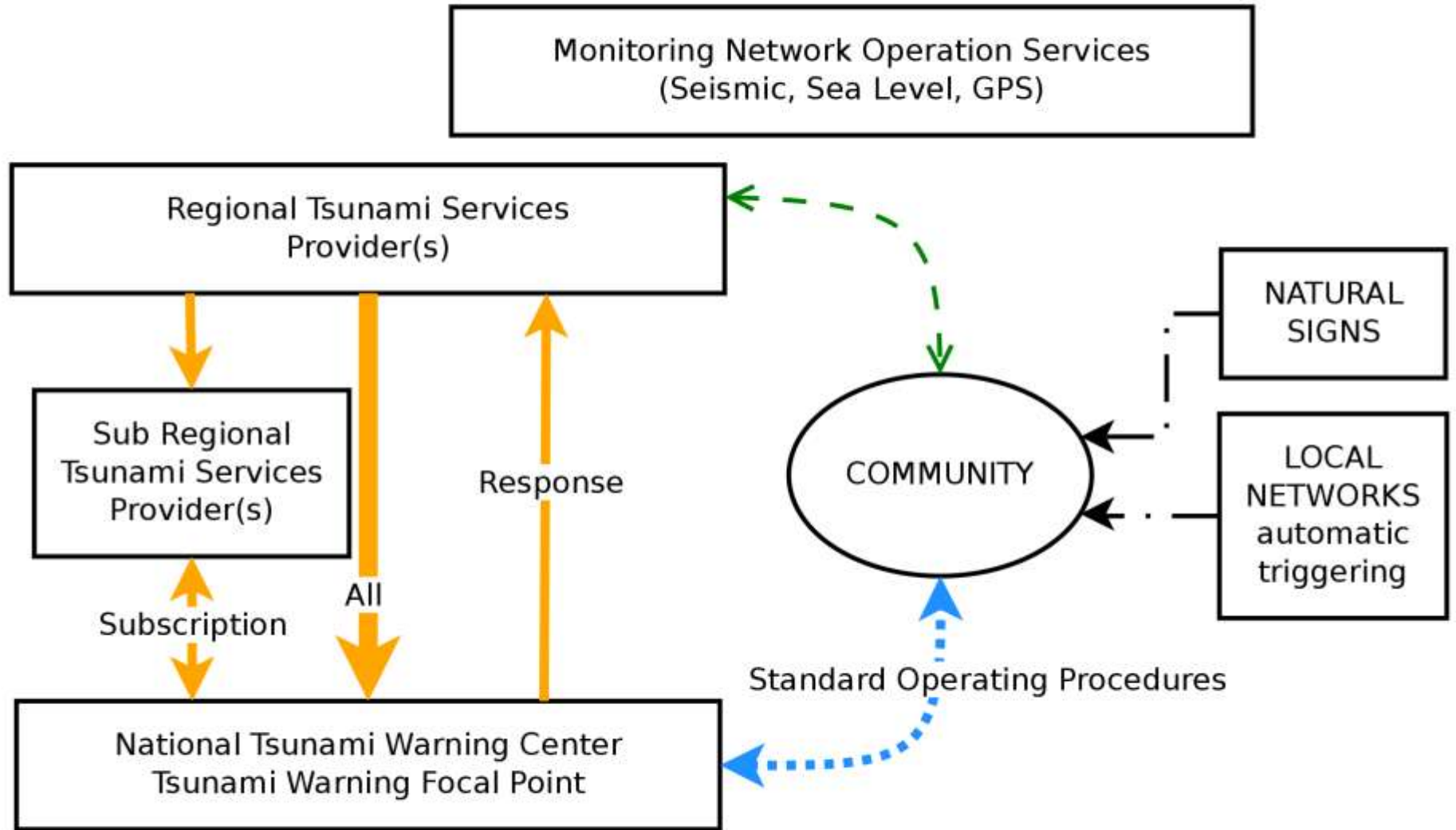
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Lat:15.74N
Lon:61.46W
depth:5 km
RMS:2.00
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Weight:0.6

Enter message

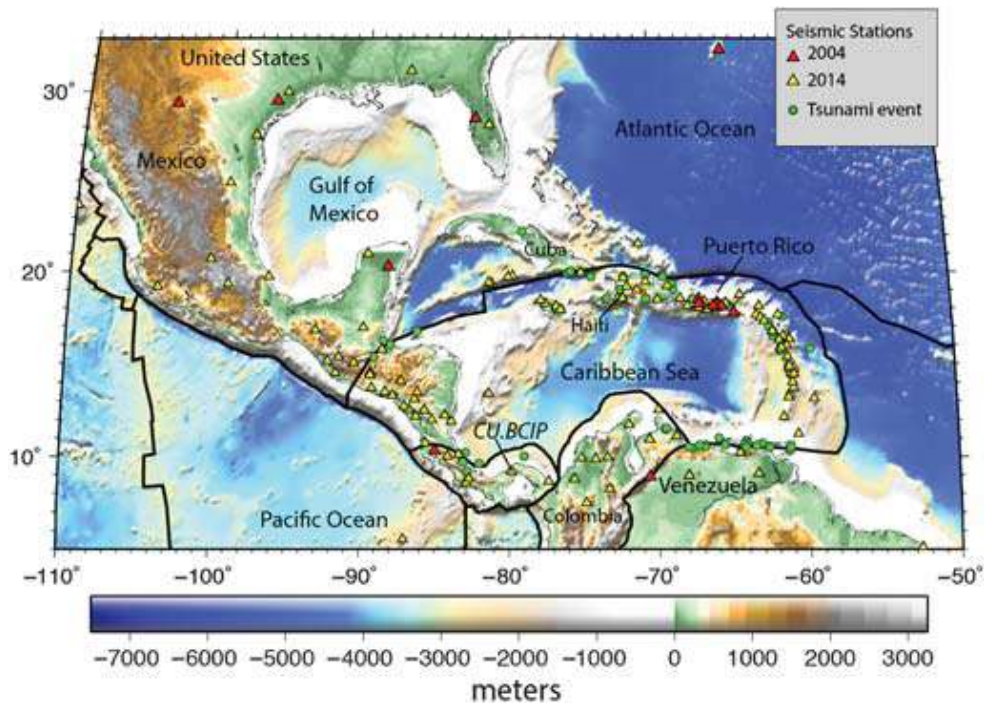
SMS Screen Shot

CARIBE EWS Tsunami Service Model

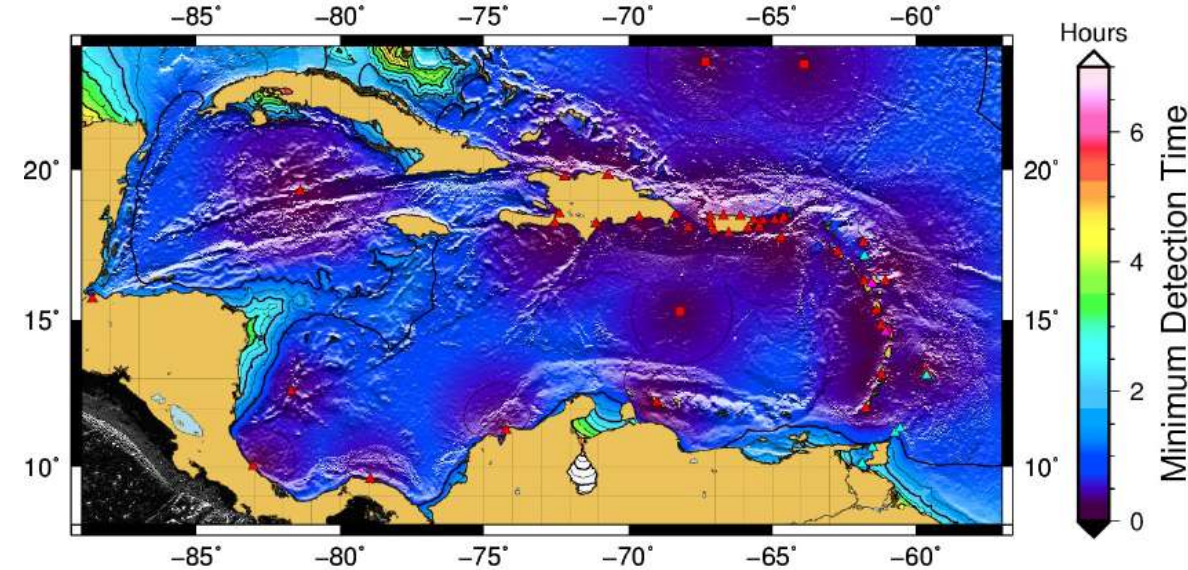


- ICG-CARIBE-EWS SOPs (Communication Plan/PTWC enhanced products manual)
- Member state and territory SOPs for alert dissemination
- Public information according to ICG-CARIBE-EWS guidelines

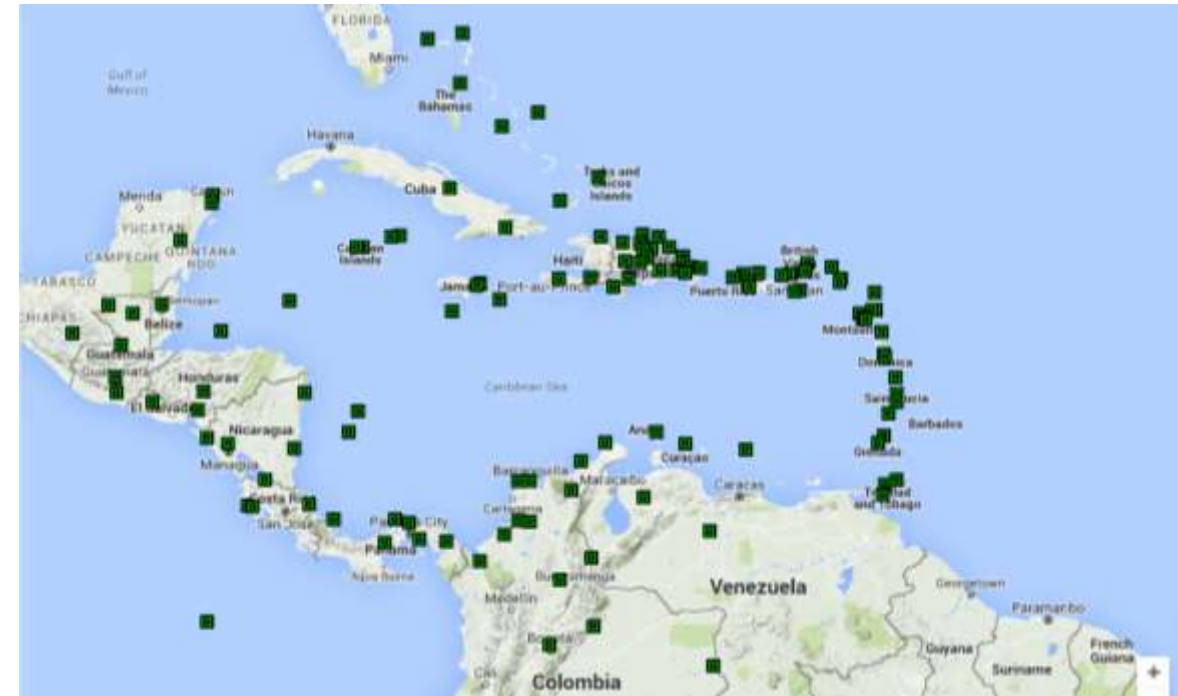
At the 9th session of the ICG/CARIBE-EWS held in St Thomas, US Virgin Islands, from 13-15 May 2014, the US indicated that it would not be establishing a Caribbean Tsunami Warning Center, in any of its Caribbean Territories but would continue to support the PTWC provision of tsunami services and the CTWP. A Task Team on CARIBE-EWS Tsunami Services Model was established to determine and recommend a way forward. The Proposed service model is shown in the diagram.



Sea Level Network Capabilities (2014 network)



- 86 out of 98 (88%) of the seismic stations contemplated in the Implementation Plan 2013-2017 are now available.
- 71 tide gauge stations were available in March 2015 (65% of completion of the core network defined in the Implementation Plan)
- 120 cGPS stations comprising 60 funded by the NSF (USA) and 60 of the existing stations operated by regional institutions



Ongoing Harmonization Efforts and Practices

- Ocean Observing Network – To confirm tsunami occurrence and track progress, etc
 - Storm surge observation (Tide gauges)
 - Climate change - sea level rise (Tide gauges)
- Seismic Network – To provide early detection of earthquake and determine if tsunamigenic
 - Earthquake Monitoring
 - Volcano Monitoring
- GPS Reference Network - To id potentially tsunamigenic sources and characterize events
 - Volcano deformation monitoring, tectonic strain, (cGPS levelling network)
 - Climate change (cGPS)
 - Weather (Met. Pack)
- Institutional Collaboration – Sharing of infrastructure
 - Colocation of equipment (siting) – CIMH & SRC, CCCCC and SRC
 - Sharing of utilities (comms medium and power) CIMH & SRC, CCCCC and SRC

Ongoing Harmonization Efforts and Practices (Cont'd)

- Institutional Collaboration – Sharing of infrastructure
 - Sharing of utilities (comms medium - GTS) ICG & WMO
 - Sharing of utilities (comms medium - EMWIN) ICG & NWS
 - Sharing of utilities (comms medium Commercial VSAT Space) UNAVCO & SRC
- Institutional Collaboration – Data Sharing, Training
 - Data Sharing (SRC & IPGP)
 - Do
 - Do
 - Do

The UWI-SRC endorses:

The proposed initiative to harmonize Caribbean Early warning Systems on the following grounds:

- The harmonized approach provides the most “bang for the buck”
- It facilitates greater use of disaster risk reduction resources.
- It provides better opportunities and capabilities to build resilience
- It facilitates better definition and clarification of roles and responsibilities.
- It can maximise efficacy.

However, there must be a suitable enabling framework!