Tsunamis in Puerto Rico: A Real Threat

Rotary Club of San Juan

Geologist Christa G. von Hillebrandt-Andrade, MSc
Manager
NOAA Caribbean Tsunami Warning Program
c/o Puerto Rico Seismic Network
Dept. of Geology, UPR-Mayagüez

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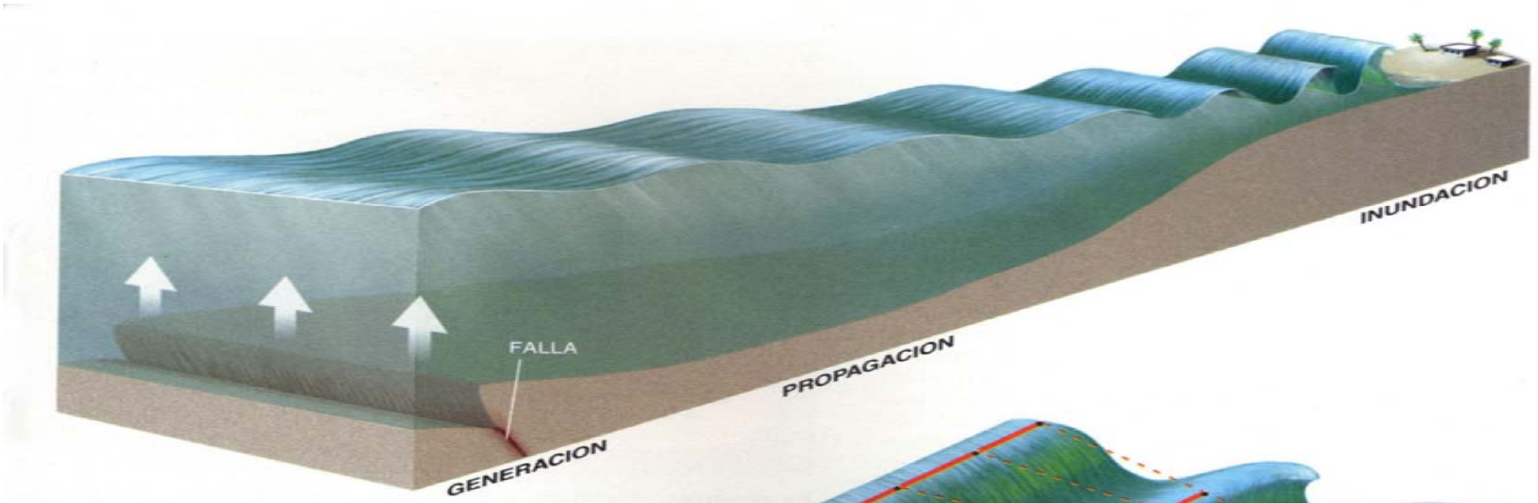
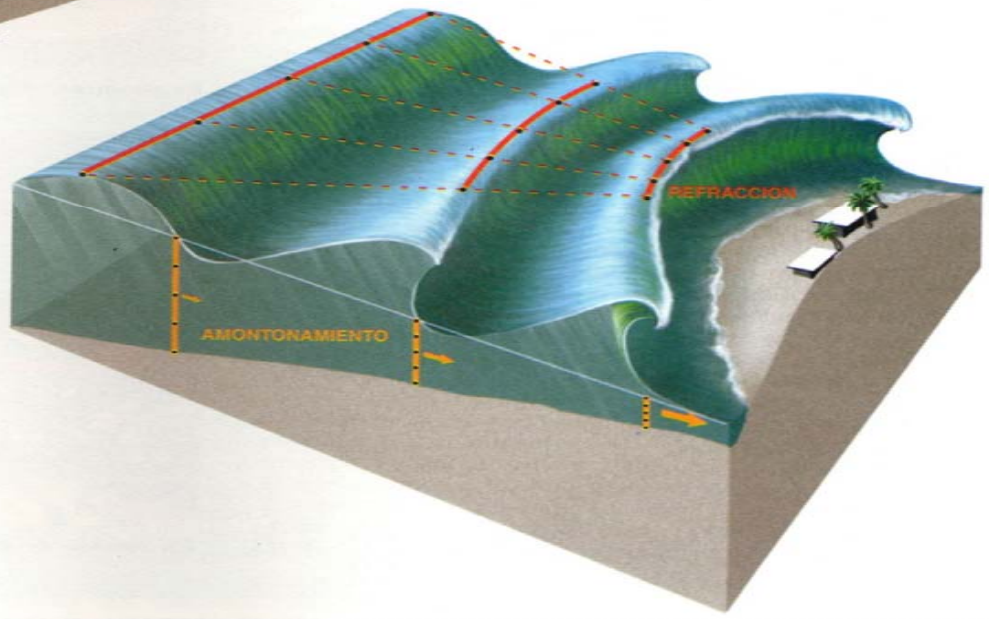
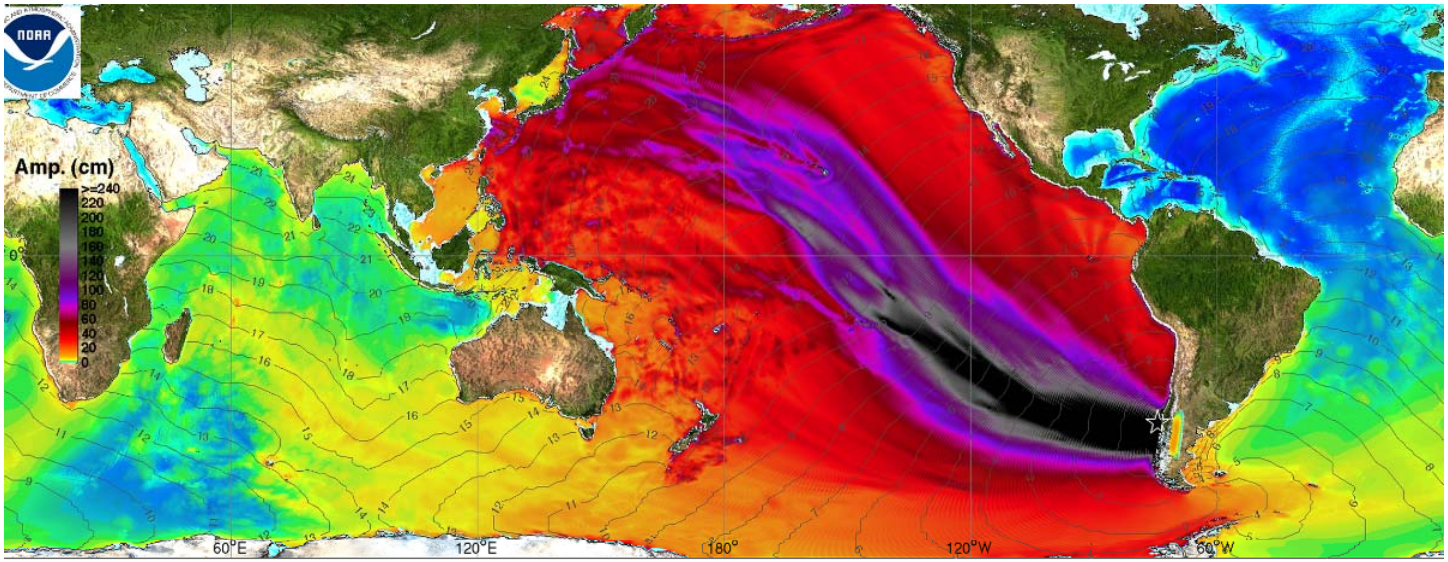
Tsunamis



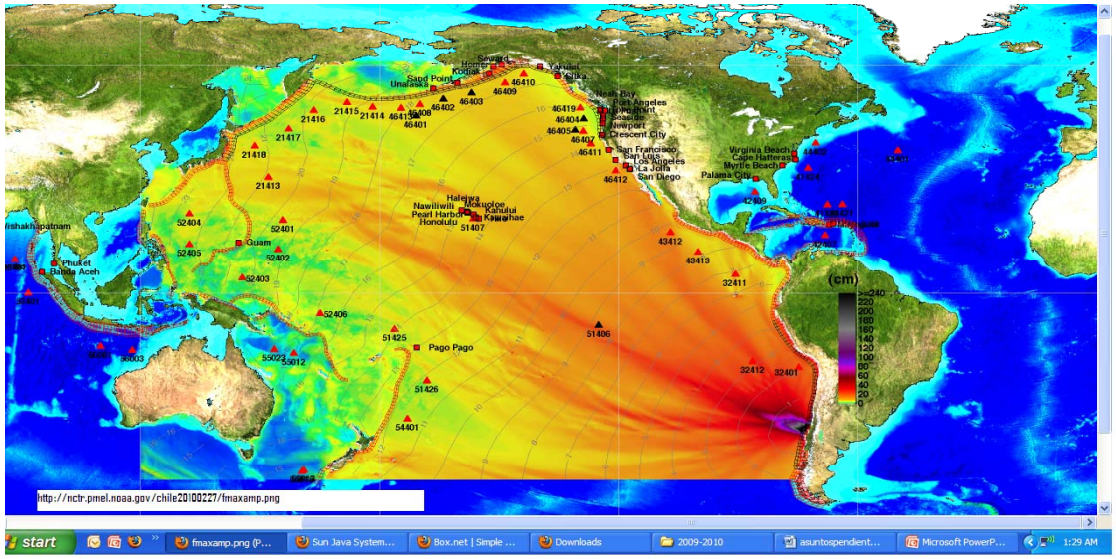


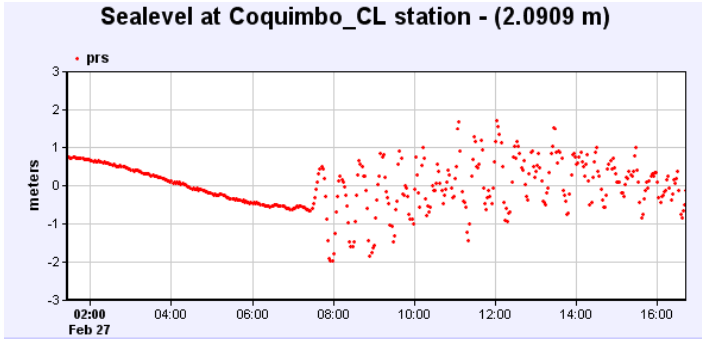
Hawaii
Terremoto de Alaska, 1964

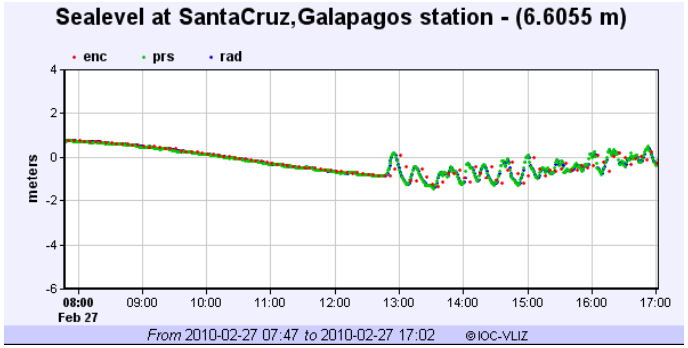
Chile and its Tsunamis



1960 Chile tsunami (earthquake magnitude Mw 9.5) Maximum amplitude plot -- for comparison with Feb 27, 2010 Chile tsunami event

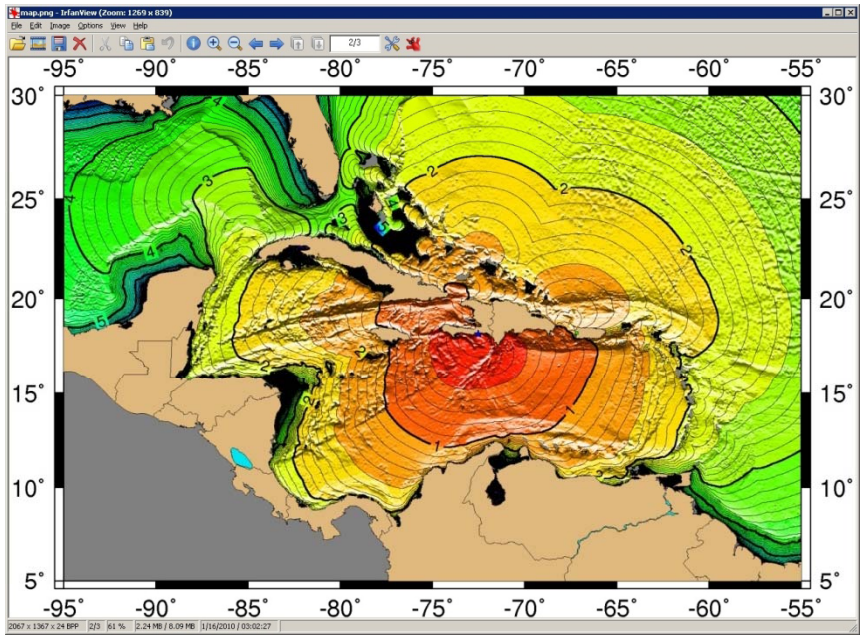






Haiti Earthquake and Tsunami

Jan. 12, 2010, Mw 7.0, > 200,000 dead (EQ)



The tsunami took the lives of at least seven villagers in the town of Petit Paradis, on Haiti's western coast.

Samoa Islands Tsunami

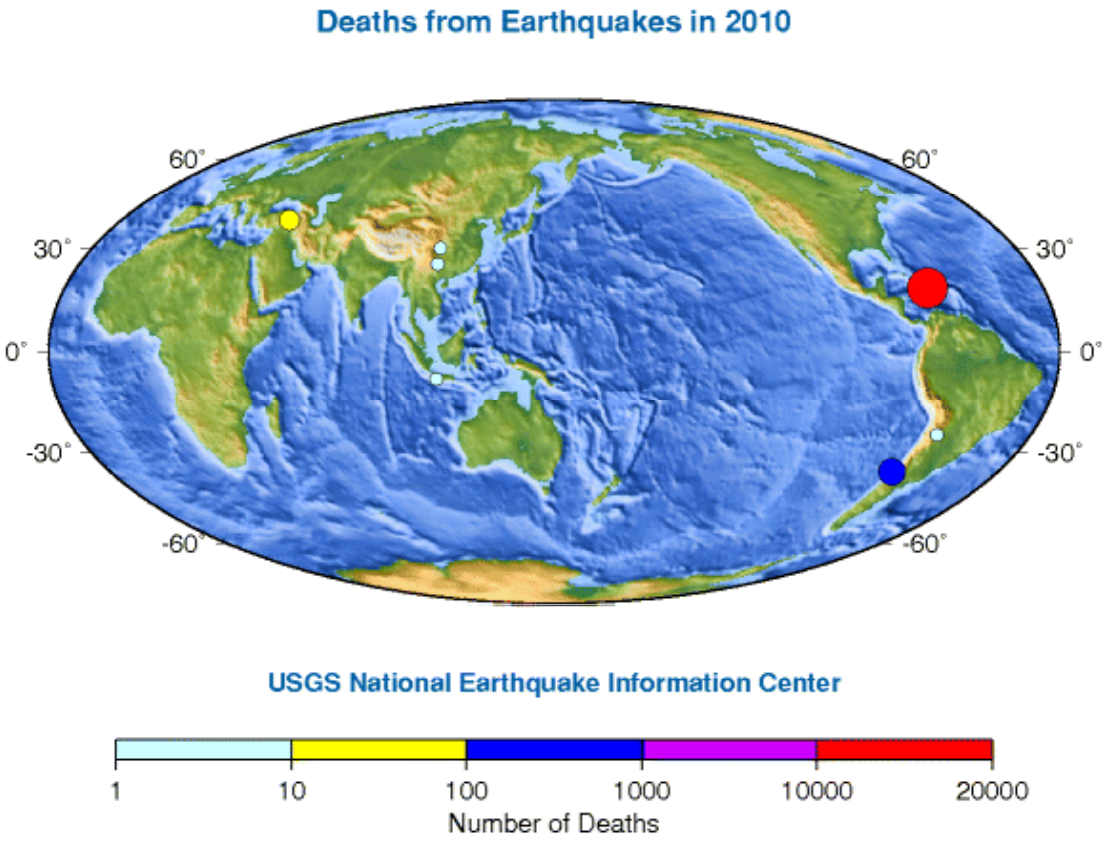
September 29, 2009

Mw 8.0, Max. Runup: 16.3 m

192 dead in American Samoa and Samoa

Fotos por Gordon Yamasaki , NOAA

So are we Next?



Date UTC	Region	Magnitude	Number Killed *
2010 01 10	Java, Indonesia	5.1	1
2010 01 12	Haiti region	7.0	222570
2010 01 17	Guizhou,China	4.4	8
2010 01 30	Eastern Sichuan, China	5.1	1
2010 02 27	Offshore Maule, Chile	8.8	507
2010 02 27	Salta, Argentina	6.3	2
2010 03 08	Eastern Turkey	6.1	51
Total			223140

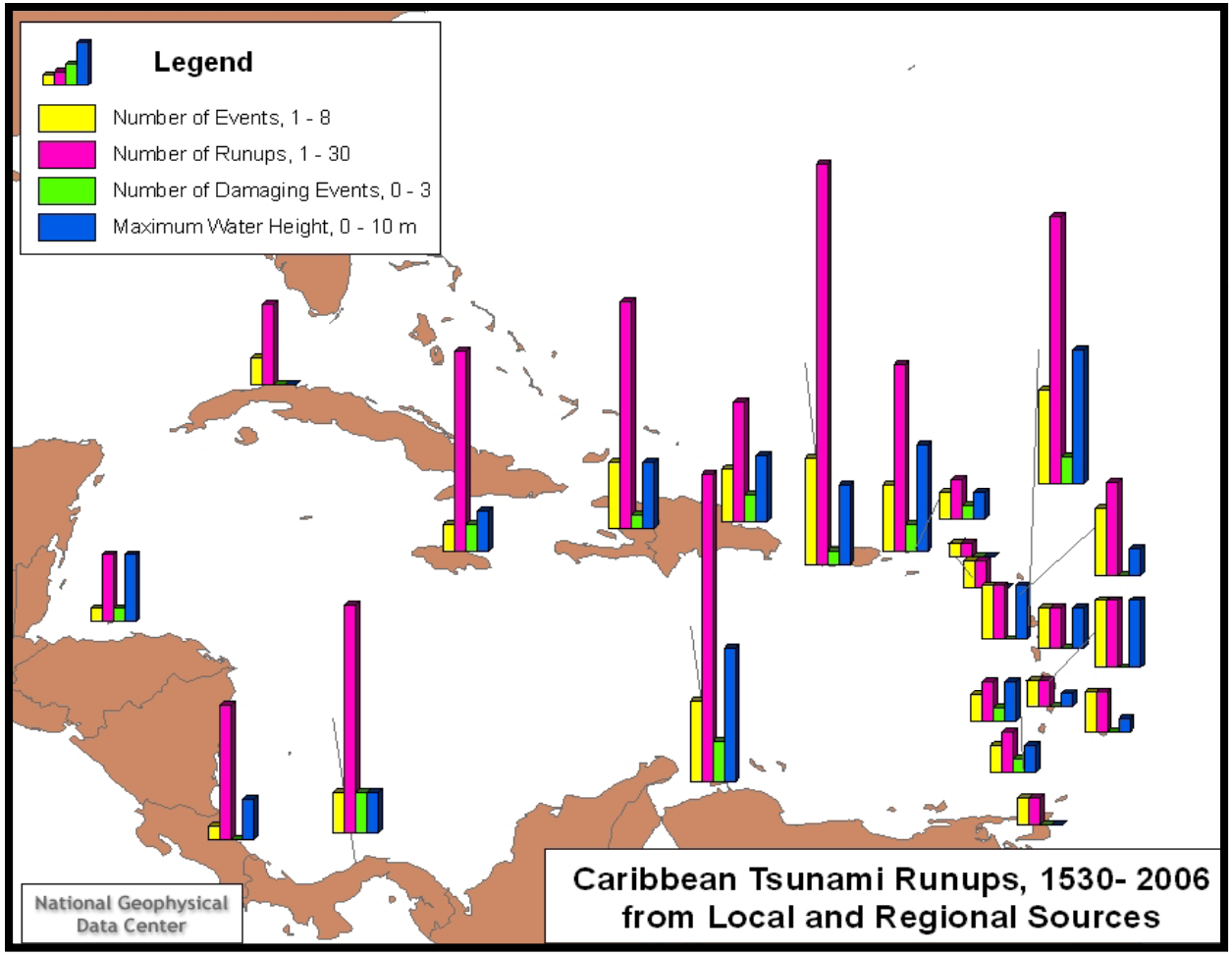
Earthquakes and Tsunamis are Inevitable, but death and destruction are Avoidable with the proper planning and preparation….

1918 Tsunami in Puerto Rico

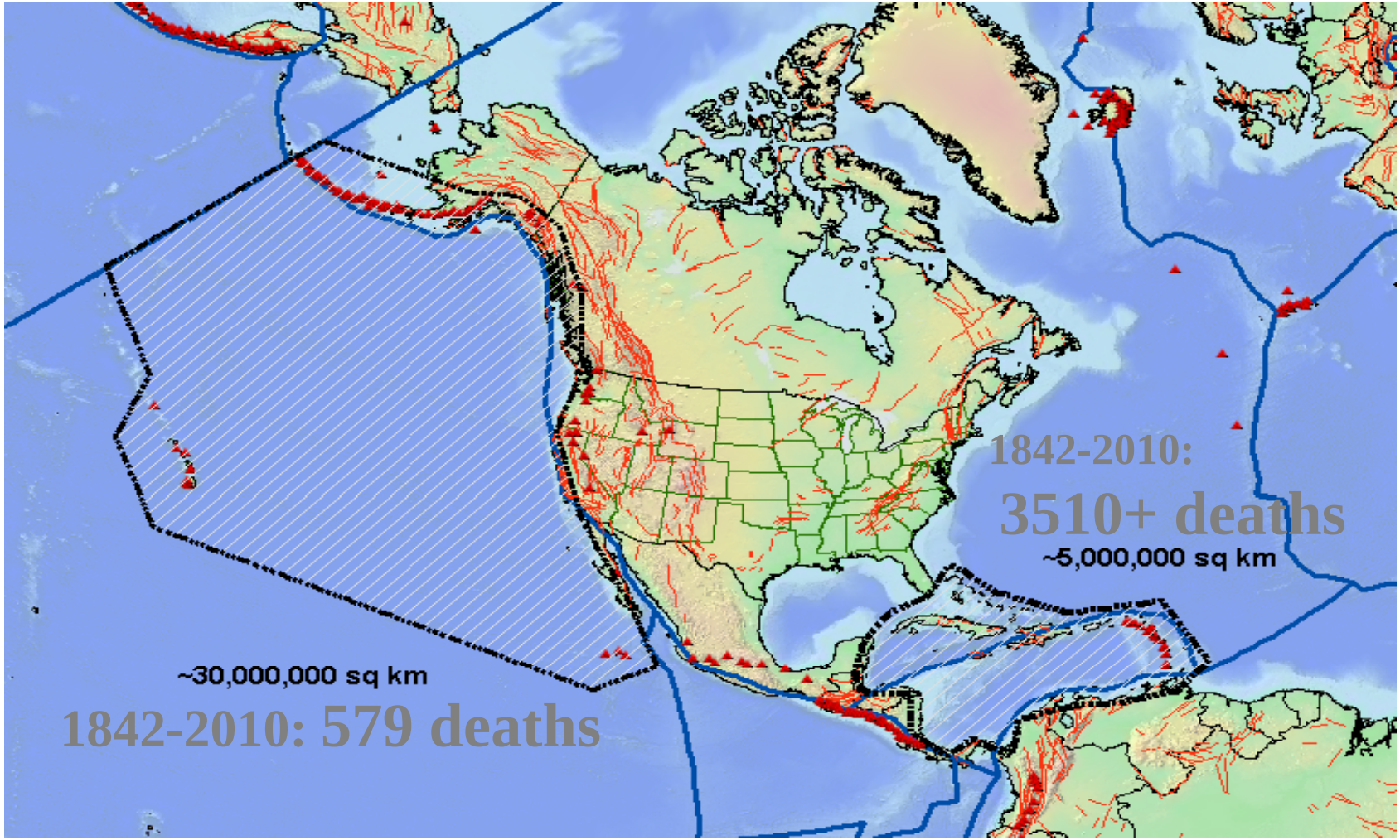
M 7.3 EQ, 20 ft. Max. Wave Height, First Arrival 1 minute

Damage in Mayagüez, PuertoRico

Tsunamis in the Caribbean

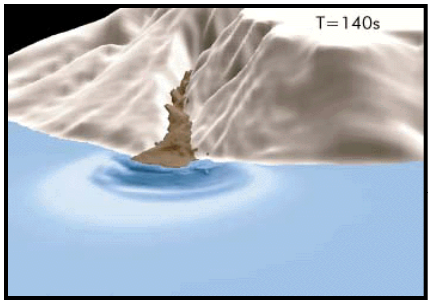


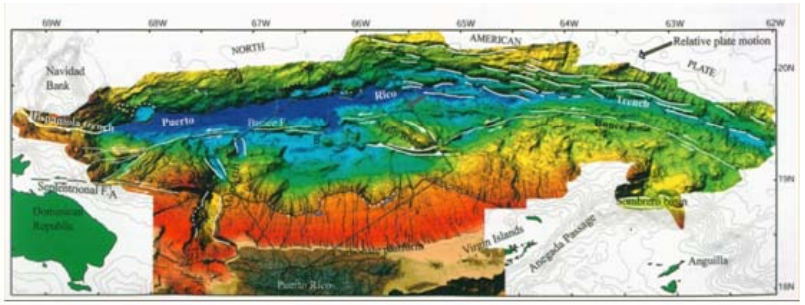
Tsunami deaths since 1842 in two key areas, the northeastern Pacific (Alaska, Hawaii, West Coast States) & the Caribbean Basin (includes Puerto Rico & US Virgin Islands). ***The Caribbean basin with only 1/5 the area has 6x more deaths !***

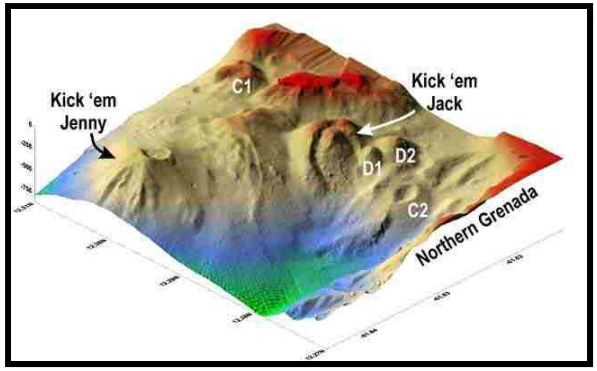


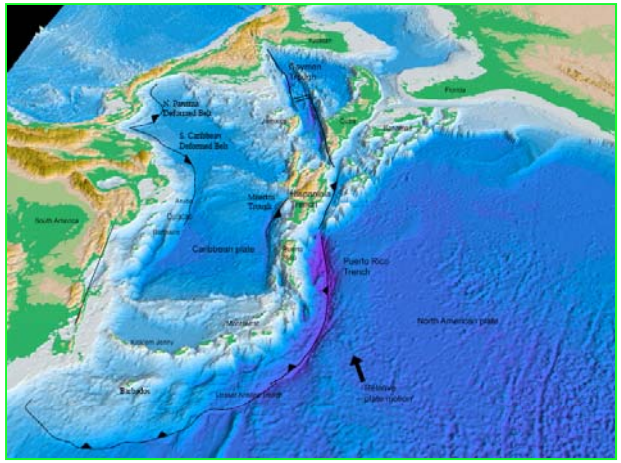
Caribbean Tsunamigenic Sources, ***Mostly short-fused***

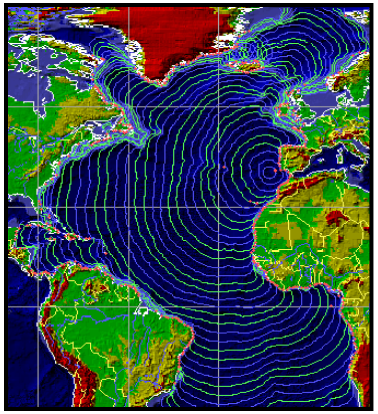
- Local and Regional Earthquakes
- Subaerial and Submarine Landslides
- Subaerial Volcanoes-Soufriere Hills, Montserrat
- Submarine Volcanoes-Kick ‘em Jenny
- Tele-tsunami (e.g. “Lisbon” Nov. 1, 1755)



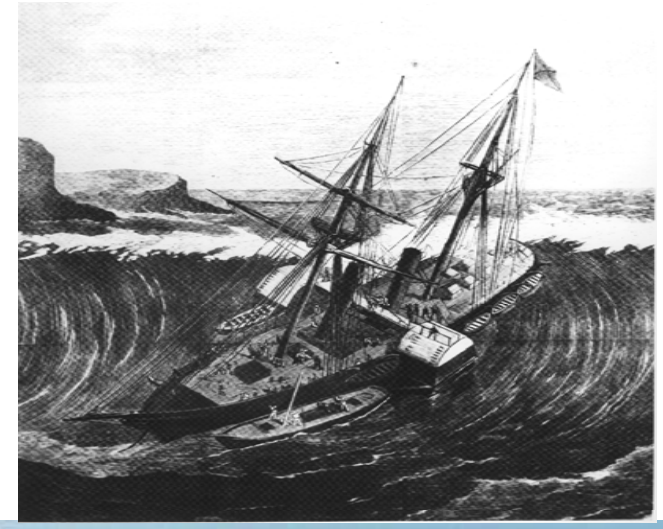








The risk from tsunamis has increased dramatically due to population growth, coastal infrastructure development and tourism

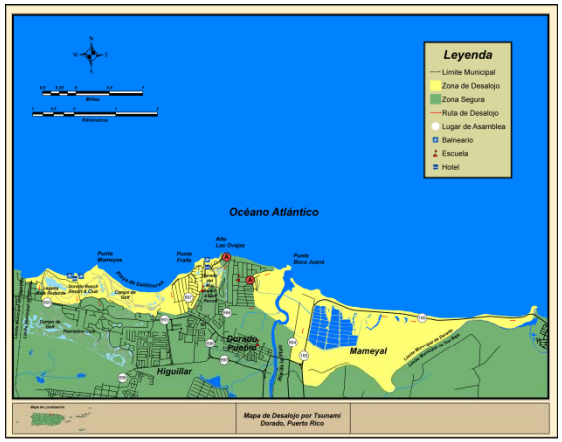


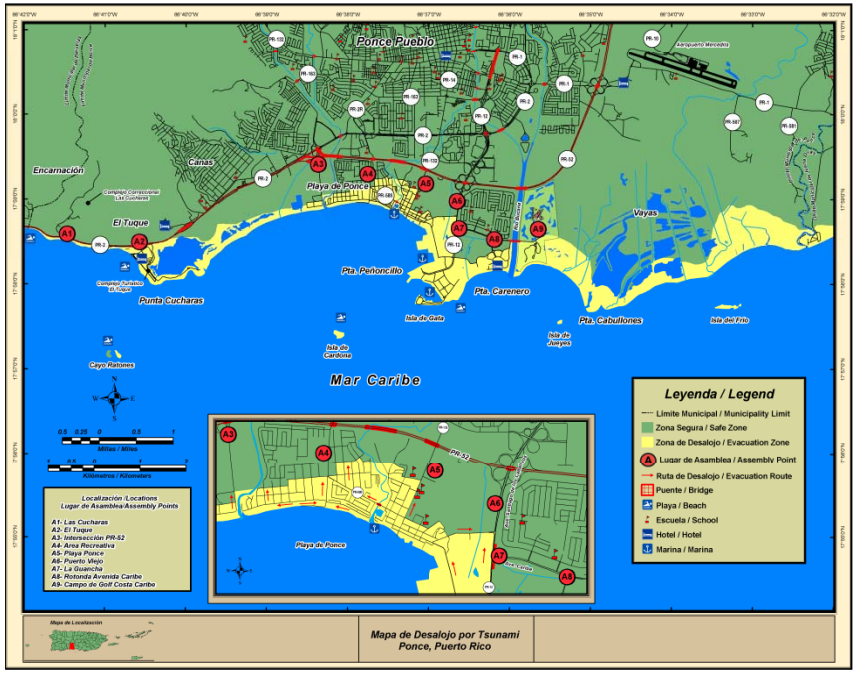
US Virgin Islands, 1867

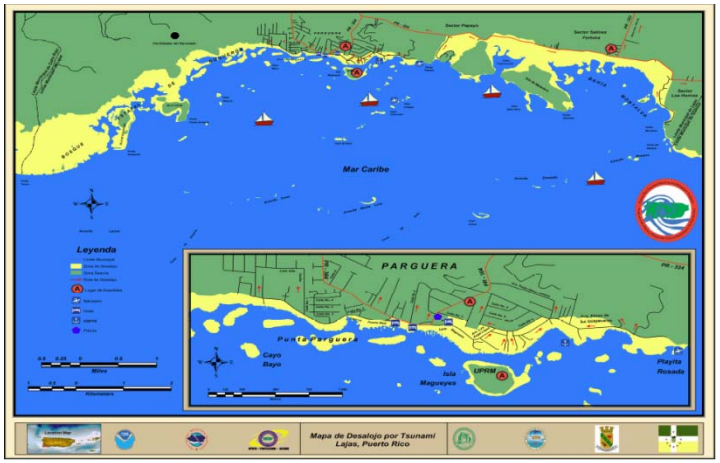
US Virgin Islands, today

During high season, there can be as many as 25,000 people arriving on cruise ships during a day. During low season, as much as 15,000 people/day.

Tsunami Evacuation Maps

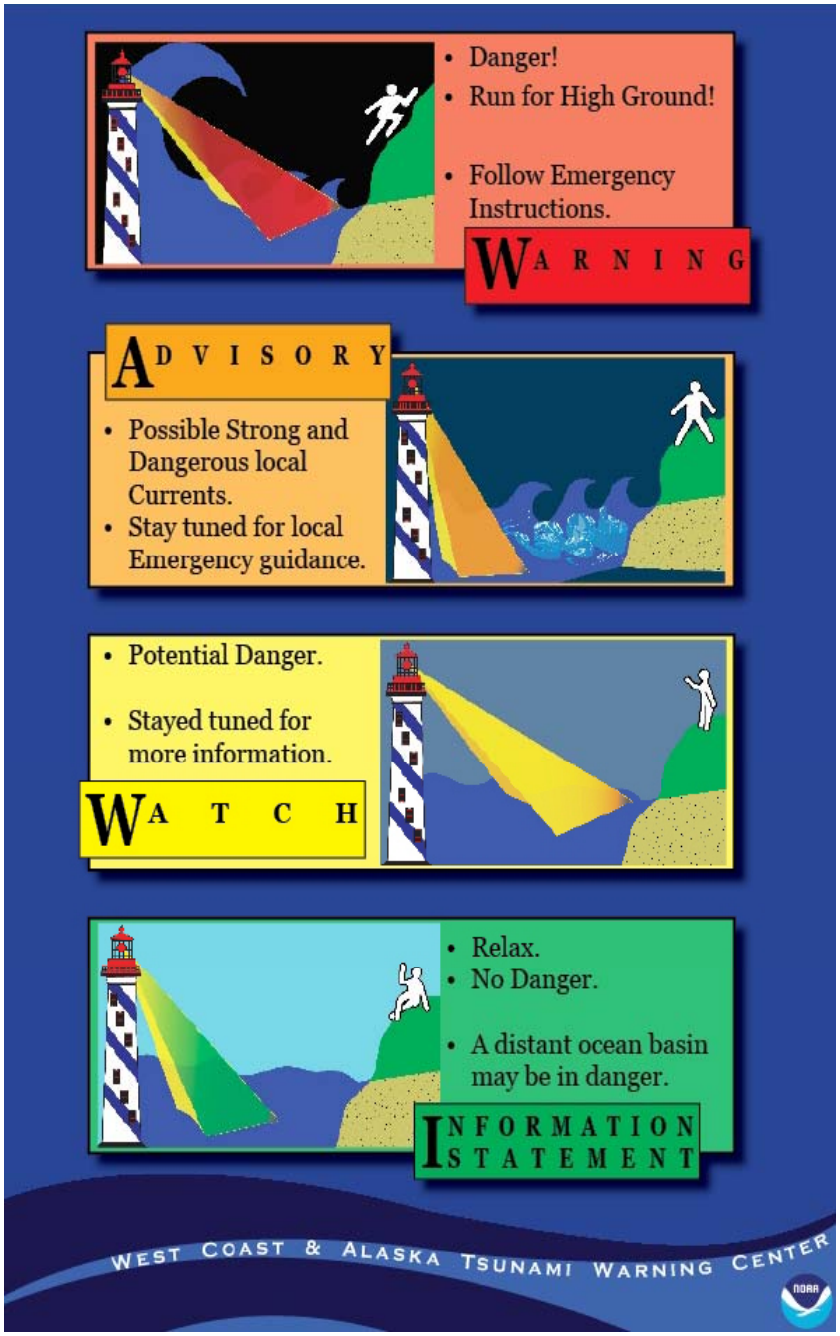






Current Tsunami Warning Service Providers

- Pacific Tsunami Warning Center
  - Provides Interim Tsunami Warning Guidance Service to the non US Caribbean and adjacent regions
- West Coast and Alaska Tsunami Warning Center
  - Provides Interim Warning Service to Puerto Rico and the USVI (US Government)
  - Backup to the PTWC
- Puerto Rico Seismic Network
  - Provides 24 x 7 tsunami warning service to Puerto Rico and the USVI and BVI (local governments protocol)
- Caribbean Tsunami Warning Center (in development phase)


• Danger!
• Run for High Ground!
• Follow Emergency Instructions.
WARNING
ADVISORY
• Possible Strong and Dangerous local Currents.
• Stay tuned for local Emergency guidance.
• Potential Danger.
• Stayed tuned for more information.
WATCH
• Relax.
• No Danger.
• A distant ocean basin may be in danger.
INFORMATION STATEMENT
WEST COAST & ALASKA TSUNAMI WARNING CENTER

Red Sísmica de Puerto Rico
http://redsismica.uprm.edu Teléfono: 787-833-8433
Centro de Alerta de Tsunami de la Costa Oeste & Alaska
http://wcatwc.arh.noaa.gov
4 Niveles de Mensajería de Tsunami
• ¡Peligro!
• ¡Corra a tierras altas!
• Siga las instrucciones de emergencia.
Aviso
Advertencia
• Posibles corrientes locales fuertes y peligrosas.
• Manténgase escuchando las instrucciones locales de emergencia.
• Peligro potencial.
• Permanezca alerta para mas información.
Vigilancia
• Permanezca tranquilo.
• No hay peligro.
• Una cuenca oceánica distante puede estar en riesgo.
Declaración de Información
WEST COAST & ALASKA TSUNAMI WARNING CENTER

Communications and Dissemination

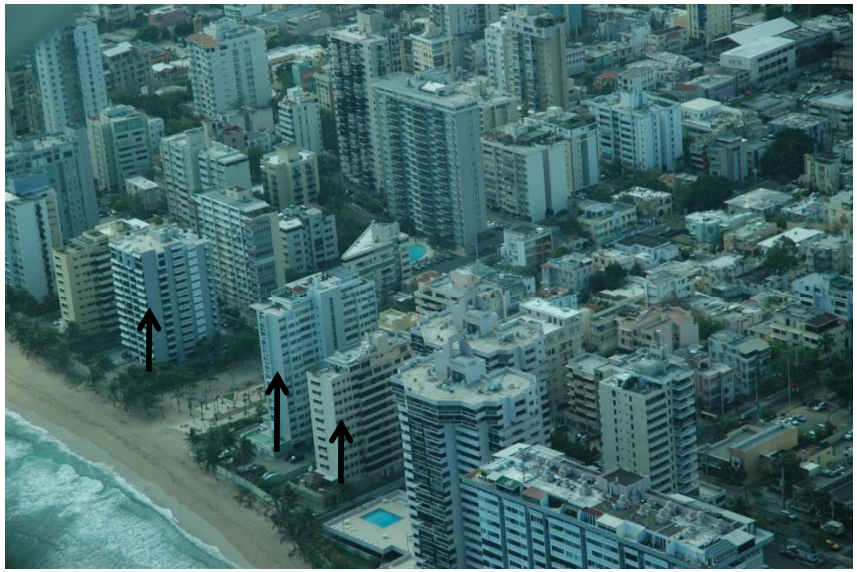
NOAA Weather Radio All Hazards

Natural Warning Signs of a Tsunami

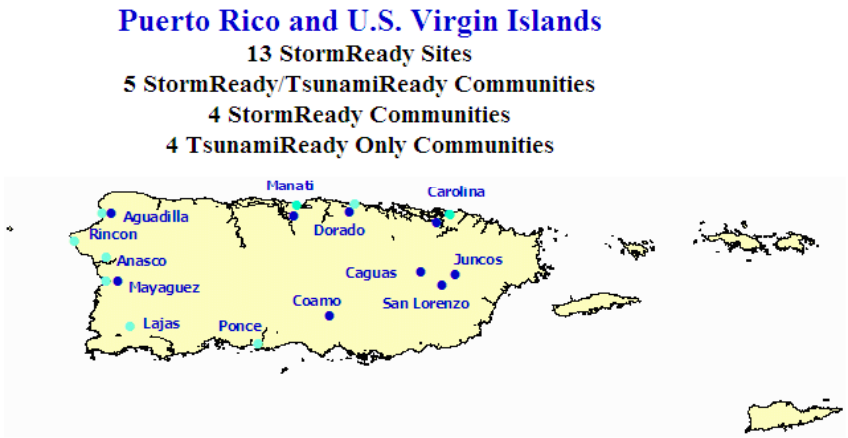
- Very strong earth shaking, objects falling off shelves, walls cracking
- Very long (> 1 minute) ground shaking
- Water suddenly recedes or rises (over the course of minutes, not hours)
- Strange noises from the sea

At any of these signs, run for high ground INMEDIATELY

Evacuate to Safety



NOAA TsunamiReady Designations



StormReady/TsunamiReady Blue and Cyan Dots StormReady Communities: Blue Dot TsunamiReady: Cyan Dot	
• Aguadilla • Anasco • Caguas • Carolina • Coamo • Juncos • Dorado	• Lajas • Manati • Mayaguez • Ponce • Rincon • San Lorenzo

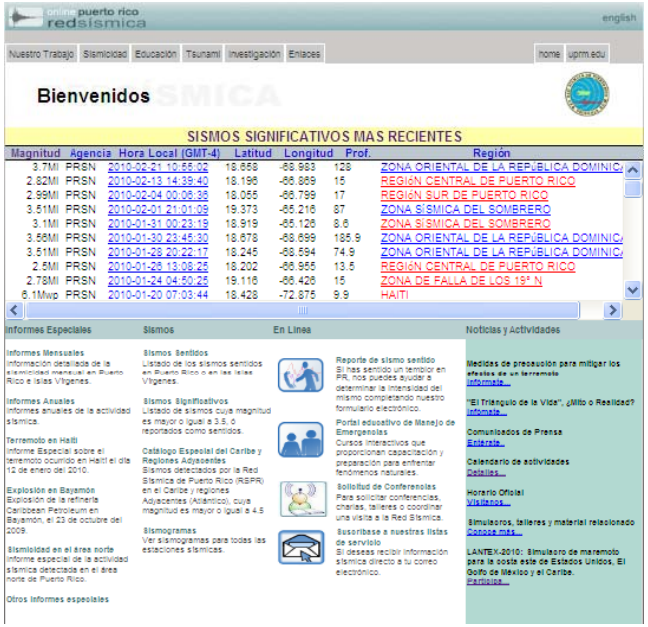
- 24 hour tsunami warning reception and dissemination point
- Local emergency response plan
- Signage
- Evacuation Map
- Education and outreach activities, including drills

Our Mission: Avoid this…

Thank you very much

More information…

- PRSN
  - http://redsismica.uprm.edu
- NOAA Tsunami Site
  - http://tsunami.gov
- PRTWMP website with tsunami inundation maps
  - http://poseidon.uprm.edu
- UNESCO IOC Caribe EWS



Thanks for your support and attention