



THE UNIVERSITY OF THE WEST INDIES  
ST. AUGUSTINE, TRINIDAD AND TOBAGO, WEST INDIES  
SEISMIC RESEARCH CENTRE

## TSUNAMI WARNING SYSTEM – DEVELOPMENT EFFORTS AND LIMITATIONS

The Indian Ocean tsunami of 26th December 2004, which exerted a devastating toll in human suffering and destruction in affected coastal areas, was a harsh reminder that coastal communities are vulnerable to natural events that can produce massive unforeseen effects.

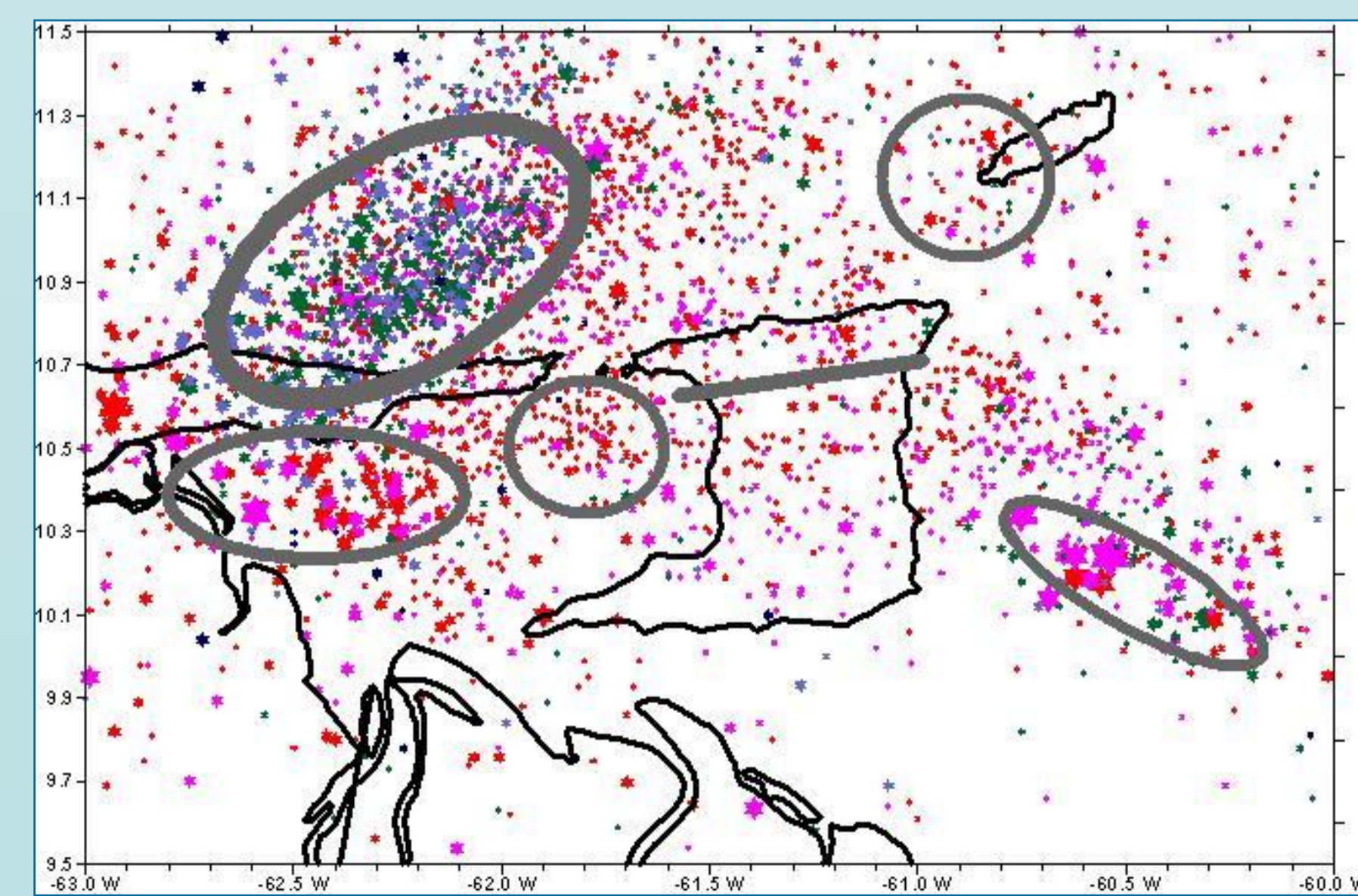


Banda Aceh post 2004 Indian Ocean Tsunami.  
Source: <http://geosun.sjsu.edu>

When compared to other natural disasters, the tsunami risk in the Caribbean is “minor” however the impact could be “major”, with the increase in population concentrated in vulnerable coastal areas. Infrequent events with limited predictability pose the greatest risk of disaster with an associated extended period of disaster recovery. Although tsunamis are not a frequent natural hazard in the Caribbean, their impact can be as devastating as hurricanes or earthquakes.



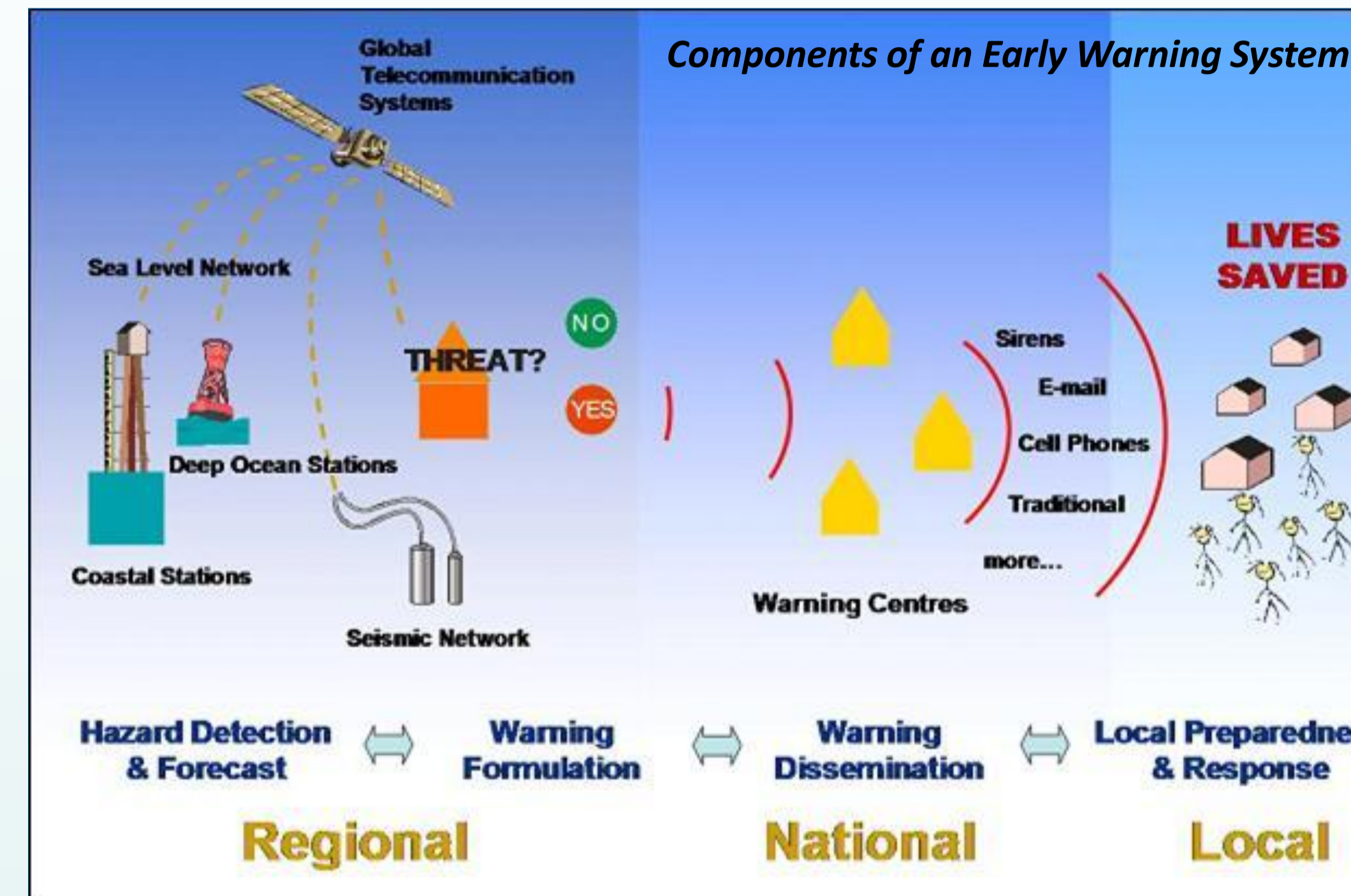
Oblique aerial photo of the coastal city of Port of Spain Trinidad (Johnson 2010). Port and Warf facilities are often located on reclaimed land and in areas susceptible to liquefaction and land slippage.



Instrumental epicenters surrounding Trinidad and Tobago 1964–1996 (Seismic Research Centre)

Recent events have also highlighted the potential for shallow earthquakes near coastal areas to induce landslides and liquefaction often resulting in coastal flooding.

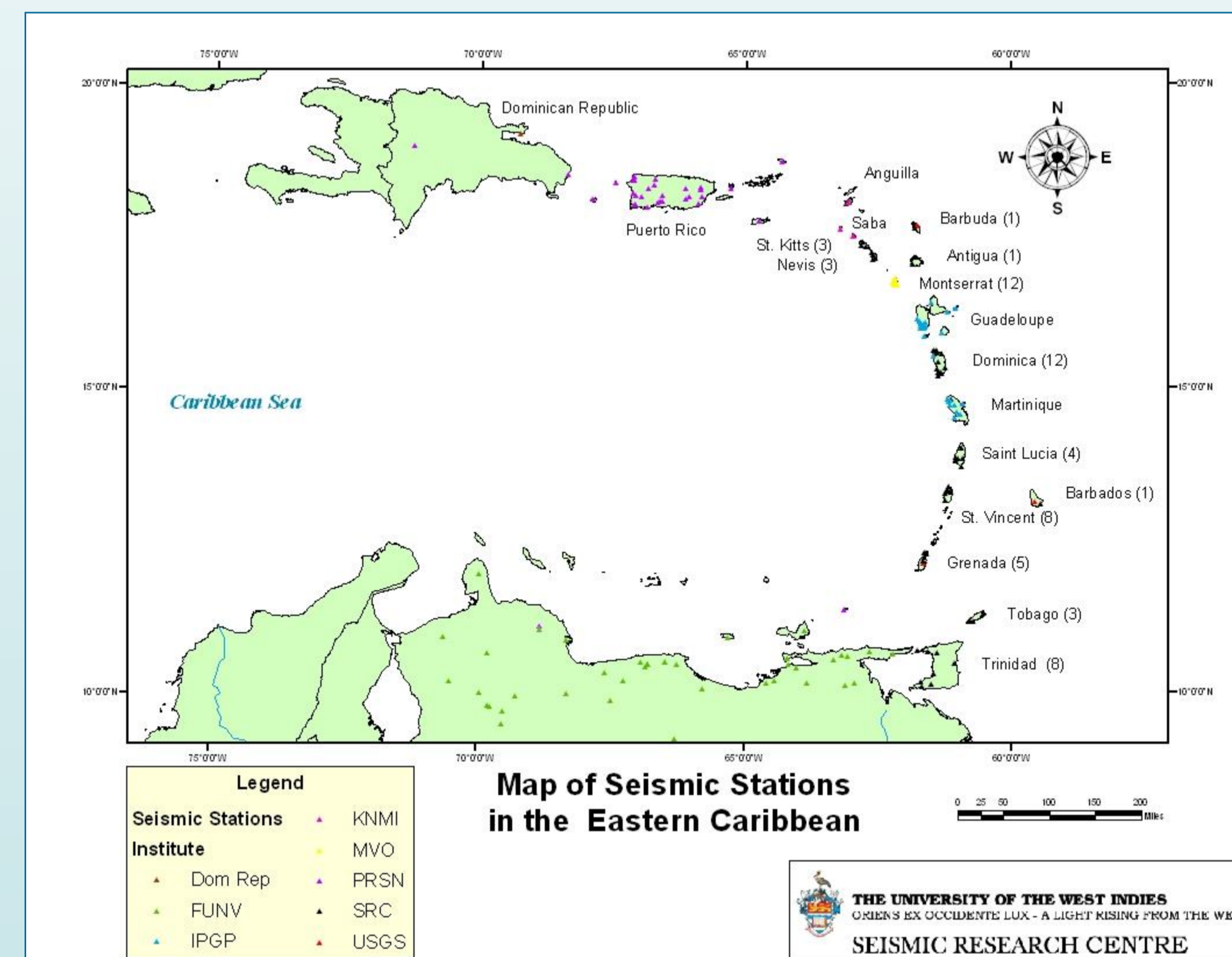
Such damage can have drastic consequences, obstructing emergency response and rescue operations.



The SRC currently monitors and maintains, the seismic network for the English-Speaking islands of the Eastern Caribbean. Since 2004, the SRC has been partnering with regional seismic networks in efforts towards establishing a platform for a Tsunami and Other Coastal Hazards Warning System for the Caribbean and Adjacent Regions.

A total of 80 seismic stations including those from regional seismic networks are available for the real time exchange of seismic data through GSN or bilateral agreements. Continued efforts to increase the number of stations in the regional system are necessary to quickly and precisely detect and locate all earthquakes of at least Magnitude 5 in the Caribbean region.

To achieve an effective Tsunami Warning System, SRC compliments its monitoring capabilities with a series of education and outreach initiatives under the **Tsunami Smart** Banner, including the production of a suite of multi-media teacher education targeting students of Forms 1 to 3 and public information materials. SRC also continues to conduct workshops and lectures to keep the public informed and prepared for the event of a tsunami.



Tsunami Smart Beach Sign and Newspaper Ad

Along with monitoring and education and outreach initiatives, a COMPLETE Tsunami Warning System requires the development of **tsunami inundation modeling** and seismic source characterization. Research into this field, and the provision of high resolution Bathymetric data is critical in the development of **tsunami hazard maps** to identify vulnerable coastal areas and possible evacuation routes for quick escape in an emergency situation.

The development of protocols and improved dissemination techniques for quick response in the limited time between the issuing of tsunami warnings and the impact of a tsunami are also imperative to saving lives.

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