

SEISMIC AND TSUNAMI MONITORING IN THE CARIBBEAN

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The circum-Caribbean region has a documented history of large damaging earthquakes and tsunamis that have affected coastal areas, including the events of Jamaica in 1692, the Virgin Islands in 1867, Mona Passage in 1918, the Dominican Republic in 1946 and the most recent the M 7.0 Haiti event which killed more than 250,000 people. There is clear evidence that tsunamis have been triggered by large tsunamigenic earthquakes that deformed the ocean floor around the Caribbean Plate (CP) boundaries. The seismic water waves originating in the prominent fault system around the Puerto Rico Trench are considered to be a near-field hazard for Dominican Republic, Puerto Rico and the Virgin islands because they can reach coastal areas within a few minutes after the earthquake. Sources for regional and teleseismic tsunami-earthquakes have also been identified.

The Caribbean region is monitored jointly by national/regional/local seismic networks, and there are plans to establish a Caribbean Tsunami Warning Center. All Caribbean networks are participating in this initiative that consists in real time (RT) earthquake and sea level data sharing and the warning center. Currently, more than 100 broad-band seismic and more than 20 sea levels channels are received in the Puerto Rico Seismic Network (PRSN) in real time, in addition to more than six GPS live stations. These RT streams are used by the EarthWorm/EarlyBird/TideView/PR DANIS packages to locate and determine the size of events in the Caribbean with magnitudes greater than 4.5 as well as the sea level evaluation, the solutions are provided in a timely framework. This program is also the base of a broader Caribbean Early Warning System (CEWS) with the added capability of estimating strong ground shaking and the tsunami potential in advance.

The CEWS is motivated both by research interests and seismic and tsunami hazard monitoring and warning; it will allow to define the structure of the Caribbean region to a high detail, to study properties of the seismic source for intermediate and large events, and to apply this knowledge to procedures of civil protection. To reach its goals, the virtual network has been designed following the highest technical standards: BB sensors, 24 bits A/D converters with 140 dB dynamic range, real-time telemetry and good location. In addition countries are working together to improve the sea level monitoring capabilities. All data generated by this virtual network are also shared with international seismic and tsunami centers.

The need to establish a system of rapid notification for earthquake/tsunami alerting in the Caribbean region has been recognized by the emergency management and scientific community. Presently, the PRSN of the University of Puerto Rico at Mayagüez jointly with NOAA are working to establishing such system for PR/VI. Also, a protocol for exchanging data and information on potentially tsunamigenic events in the PR/VI is currently in place. The goal of this presentation is to describe the **CEWS**, including the real time earthquake and tsunami monitoring as well as the specific protocols used to broadcast earthquake/tsunami messages.