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## UH involved in tsunami effort

### Faculty monitored approach, prepared to assess damage

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The Feb. 27 tsunami warning brought into public view the work performed by NOAA Warning Centers in monitoring tsunamis and the role of Hawai'i state and county civil defense in implementing the response.

A number of faculty at the University of Hawai'i-Mānoa also contribute to studying and mitigating tsunami hazards as well as to training scientists, engineers and disaster managers. Here's some of what they were doing as the day's events unfolded:

Some of us UH scientists with expertise in earthquakes and tsunamis accessed public data and models, trying to assess how large a tsunami might arrive in Hawai'i. One of us, a UH ocean engineer, was at the state Civil Defense Emergency Operations Center from 3 a.m. to 2 p.m. The earthquake was truly enormous and caused great concern among us, but we also realized that the severity of the tsunami depended on a number of factors, including the geometry of the fault and the exact way it ruptured.

The tsunami generated by the Chilean earthquake was tracked on data publicly posted on the Web from a global monitoring network of water level stations operated by the UH Sea Level Center. These stations can detect tsunami waves and report within minutes to operational warning centers.

UH stations in French Polynesia, the Galapagos and the Line Islands provided some of the few direct estimates of the size and timing of the tsunami hours before it reached Hawai'i.

In the Department of Ocean and Resources Engineering, we have been working for years on numerical modeling of tsunamis, leading to the update of Hawaii's tsunami inundation maps and a new generation of wave transformation models for tropical coastal environments with fringing reefs.

This modeling effort also contributed to the operational, Pacific-wide forecast system at the NOAA Pacific Marine Environmental Laboratory that produced accurate forecasts of the Chilean tsunami before it hit Hawai'i.

UH engineers prepared for the possibility of conducting post-tsunami surveys of damage to assess the performance of Hawai'i's buildings and bridges. None of the buildings in Waikiki used for so-called vertical evacuation during this tsunami have been designed for tsunami loading because such design guidance is either not available or based on research performed in the 1970s.

Some of us have been conducting research and developing design provisions to be incorporated into the state building code for tsunami-resistant new construction and to evaluate existing buildings to determine their suitability for vertical evacuation.

Based on bridge failures caused by the Indian Ocean tsunami, and the catastrophic effects of the Hurricane Katrina storm surge on coastal bridges, we had real concern whether coastal bridges in Hawai'i could be damaged. The Hawai'i Department of Transportation recently funded UH engineers to investigate the susceptibility of bridges to tsunami inundation and hurricane storm surge.

At the National Disaster Preparedness Training Center in the Department of Urban and Regional Planning, at UH and funded by the Federal Emergency Management Agency, the Saturday tsunami warning provided a valuable opportunity to assess our resiliency across the early phase of the disaster

cycle, in preparedness and response. The lessons ranged from the scientific aspects to emergency management and public engagement during an emergency and will be used to better prepare for future disasters.

While we "dodged a bullet" this time, it is inevitable that a devastating tsunami will arrive. A tsunami generated by an earthquake in the Aleutians would only give Hawai'i about four hours of warning.

There is a local community devoted to hazard mitigation, and faculty at the University of Hawai'i play a critical role in this effort.

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