

UC SANTA BARBARA

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Effects of Tsunami Caused by Chile Earthquake Detected in Santa Barbara, According to UCSB Earth Scientists

Waves from the tsunami produced by the massive earthquake that struck Chile last week reached the Santa Barbara harbor roughly 14 hours after the event, according to geographers and marine scientists at UC Santa Barbara. The first tsunami waves appeared in the harbor at about 12:45 p.m. on February 27, and continued for several hours.

The waves were detected by a pressure sensor attached to a piling on Stearns Wharf. The sensor is part of an instrument package maintained by UCSB's Marine Science Institute (MSI) through a partnership with the Santa Barbara Coastal Long Term Ecological Research project, the Partnership for Interdisciplinary Studies of Coastal Oceans, and the Southern California Coastal Ocean Observing System.

"It's not a surprise to see the waves, but it was a surprise that they were so large and easy to detect," said Libe Washburn, an oceanographer at UCSB and one of the lead scientists in charge of the sensors. "We saw the effects from the 2004 tsunami following the earthquake in Indonesia."

Margaret O'Brien, a data information manager at MSI, first spotted the waves in the sensor output that is posted on the Internet every few minutes, Washburn said. He and Chris Gotschalk, a research analyst at MSI, then analyzed the sensor data to verify that they were indeed tsunami waves.

Unlike the more familiar short-period waves that are caused by wind and swell that have periods of up to about 20 seconds, the tsunami waves had periods of 20 to 30 minutes. The small wave heights -- less than two feet -- and long periods made these tsunami waves difficult to see from shore. However, they were detected by the pressure sensor, which is situated 10 feet below the water level.

"The sensor measures pressure, and the pressure it reads depends on how much water is above it," said Washburn. "The sensor is fixed on the piling, so we know it's not moving. So the changes in pressure are due to changes in the water level as the tsunami waves arrive."

The sensor package affixed to Stearns Wharf is one of many located along the California coast from San Diego to Bodega Bay. They detect not only the water level, but water temperature, salinity, and the amount of chlorophyll present. "We keep track of the data around the clock and post it on the Internet," Washburn said.

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† Top photo: This chart shows the water level above the Stearns Wharf pressure sensor, which is mounted about 10 feet below the surface on average. The large oscillations in the figure depict the natural tidal cycle. The red dashed line marks the time of the Chilean earthquake and the red arrow marks when the first tsunami waves arrived. The tsunami waves appear as depth irregularities to the right of the arrow.

About UC Santa Barbara

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