

## Size of Japan's quake surprises seismologists

*The 8.9 magnitude earthquake is among the top 10 ever recorded and occurred on an irregular fault line where a smaller temblor would be expected.*

**Thomas H. Maugh II, Los Angeles Times, 3-11-11**

The magnitude 8.9 earthquake that struck Friday off the coast of Japan "is going to be among the top 10 earthquakes recorded since we have had seismographs," said seismologist Susan Hough of the U.S. Geological Survey in Pasadena. "It's bigger than any known historic earthquake in Japan, and bigger than expectations for that area."

Geologists had expected the portion of the Ring of Fire that produced this quake to yield a temblor on the order of magnitude 8 or perhaps 8.5, she said. "Something as big as an 8.9 is a bit of a surprise."

A quake that big usually requires a long, relatively straight fault line that can rupture, such as those found in Peru and along the eastern coast of South America. Thursday's quake occurred in the Japan Trench, where the Pacific tectonic plate slides under the Japan plate.

Scientists did not expect such a big quake in the area because the plate boundary is not straight, but is fairly irregular. According to Lucile Jones of the U.S. Geological Survey, producing a quake of that size would require rupturing a zone at least 300 miles long.

The region had a magnitude 7.2 temblor Wednesday in almost exactly the same area. Typically, with any large earthquake, there is about a 5% chance that such a quake is a precursor of a larger quake. This appears to have been that 1-in-20 chance.

There have been at least two aftershocks of magnitude 7 or greater, and researchers expect more.

The quake was a "perfect storm for tsunami generation," Hough said — it was large in magnitude and very shallow. The quake was so close to land, about 80 miles offshore, that people on shore really had no warning that a 15-foot wave was imminent.

But that wave is now spreading out in the opposite direction at about 500 mph, the speed of a jet airplane. It should hit Hawaii just before 3 a.m. local time and should begin reaching the West Coast around 8 a.m. PST.

Experts do not yet know how high the waves will be by the time they reach U.S. shores. But a series of buoys have been installed at various locations in the Pacific that should monitor the passage of the wave and allow researchers to refine their predictions during the night.

"Given the size of the tsunami near the epicenter, if I were in a low-lying area, I would get out of the way," Hough said.

The Indonesian earthquake that produced the Indian Ocean tsunami on Dec. 26, 2004, was a magnitude 9.1. The largest quake on record was the 9.5 temblor that struck Valdivia, Chile, in 1960.