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RESEARCH SHAKEUP

Data reveals new tsunami risk

Slow-moving plates like those in Japan could spell trouble, geophysicists argue

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HAWAII'S chances of facing a tsunami like the one that devastated Southeast Asia in 2004 could be more realistic than previously thought, something that may require the state to re-evaluate its evacuation plans, new information about that catastrophe suggests.

The magnitude-9.1 quake that triggered the Dec. 26 tsunami almost two years ago startled researchers who had, until then, considered the subduction zone where it happened an unlikely place for a large temblor to develop.

That assumption was supported by scientific and historical data that showed slow-moving tectonic plates -- like the ones near Sumatra -- were not known to cause large earthquakes.

A subduction zone is where one plate moves under another.

"Most seismologists, before Sumatra, they would say the plate would never (create a quake) larger than magnitude 8," said Gerard Fryer, a geophysicist at the Pacific Tsunami Warning Center. "Right after the event, it was a big surprise, and everyone realized that their view of the past had completely failed them."

The analysis of the 2004 quake was highlighted in a study by Rob McCaffrey, a geophysics professor at Rensselaer Polytechnic Institute in Troy, N.Y. Its findings were presented during last week's annual American Geophysical Union fall meeting in San Francisco, which was attended by about 13,000 people.

In a summary of his presentation, McCaffrey wrote that, "The lesson we should be gleaning is that every subduction zone is a suspect as a future site of a great quake and, where conditions are right, a tsunami."

Fryer said the study's conclusion basically is that "you could have a gigantic earthquake anywhere, anytime."

"It's a reminder that the Earth is capable of providing us with surprises," he said.

That, he said, serves as an important warning to scientists in Hawaii, who have discarded moving plates in Japan and elsewhere

in the Pacific Ocean as being too sluggish to be looked at as potential sources for a large tsunami that could hit the islands.

"There is this problem about whether we are ready for a really big tsunami from any subduction zone, anywhere," Fryer said yesterday in a telephone interview. "That's something that I have to check up on."

The last tsunami to hit Hawaii from the Northwest Pacific was generated by a quake off Kamchatka in 1952.

After the Indian Ocean tsunami, state officials became concerned about strong, tsunami-generating quakes occurring in faults surrounding Hawaii.

At the time, models simulating different scenarios showed the state's evacuation zones would not be threatened by a seismic sea wave, Fryer said. However, in light of McCaffrey's study, those plans may need to be adjusted to consider the likelihood of more powerful earthquakes striking near Japan and other seismic-active areas.

Of greatest worry is Tokyo, which sits on three adjoining tectonic plates that, under significant stress, could push a monster wave toward Hawaii's shores.

"This new perspective means that some of the places where we've have had tsunamis in the past, such as Japan, that we might have underestimated how bad those could be," he said, adding: "We are not completely sure that our evacuation plans are big enough to handle such an event."

He said the reminder about how unpredictable Mother Nature can be arrived at a good time because University of Hawaii researchers are currently updating evacuation maps using new capabilities of flood models.

Additionally, more instruments being installed throughout the islands will expand and improve detection and measurement of earthquakes and tsunamis, Fryer said. The new equipment are expected to be functioning within a year, he said.

Besides the Indian Ocean tsunami, Hawaii's Oct. 15 earthquakes were another hot topic at the AGU convention, where a special session was chaired by Hawaiian Volcano Observatory geophysicist Paul Okubo.

"Scientists now believe those earthquakes were caused by the weight of the volcanoes on the plate," said Vindell Hsu, one of 12 scientists at the Pacific Tsunami Warning Center. "There may be new faults discovered this time."

Most scientists agree two earthquakes occurred off the Kona Coast that day, the first at a depth of 40 kilometers followed by another at 25 kilometers, he said. The event may have created a 50-mile crack on the ocean floor, according to Fryer.

"The later quake almost certainly was a response to shaking," Fryer said. "The Mahukona quake was probably pretty close to going anyway and it felt the shaking of the first earthquake and that was just enough to push it over the top."

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