

Not My Fault: The ever changing landscape of tsunami warnings

Lori Dengler/For the Times-Standard
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It's Valentines Day. Can I entice you to read about tsunamis on a day devoted to adoring your loved ones? Nothing says "I Love You" better than protecting your special people from harm. When it comes to tsunamis, knowledge is power and love. Be aware of the hazard, know how to find out a tsunami is on its way, and what to do to get out of harms way.

The most obvious addition after the March 1964 tsunami was the establishment of a second US tsunami-warning center located in Alaska, with the primary purpose of alerting Alaska communities. In 1982 it became the West Coast Alaska Tsunami Warning Center expanding the focus to include the US and Canadian west coasts.

There were tsunamis during the years between 1966 and 2004. A horrific one in 1976 killed at least 5000 people in the Philippines and two tsunamis in the Sea of Japan in 1983 and 1993, killed more than 300. But this period was notable for the absence of great earthquakes. Between 1946 and 1966, there were eight earthquake of magnitude 8.5 and larger, including three in the M9 range. Between 1966 and December 25, 2004, not a single earthquake on the planet reached this size. Great ocean-wide tsunamis require big earthquakes. The deadly tsunamis of this period all concentrated their destructive powers on communities near the earthquake source. Warning centers' ability to send out alerts to areas far from the source area wasn't tested.

Then came December 26, 2004 and the first earthquake to exceed M8.5 in nearly 40 years. It was beneath the ocean and there was no question in anyone's mind that it had the capacity to produce a tsunami. How did the tsunami warning centers respond? Both US warning centers had no problem detecting the earthquake and recognizing that it was very large. Japan's Meteorological Agency also had a sophisticated tsunami center. But no alert was issued by any tsunami center on that day.

The problem? The earthquake was in the wrong ocean. The US Centers were focused on the Pacific. PTWC had an agreement with 26 nations in the Pacific to provide tsunami guidance. The December 26th, 2004 rupture

began beneath the Indian Ocean seafloor just off the west coast of Northern Sumatra, Indonesia and then propagated to the north for over 900 miles, ending just short of Myanmar. It was the longest earthquake rupture in at least a century and earned a magnitude of 9.1.

It took less than 15 minutes for Pacific Tsunami Warning Center to have a good idea of where the epicenter was and its tsunamigenic potential. But the earthquake was outside of their area of responsibility and they had no agreements and no legal authority to issue a warning. I know several of the scientists at PTWC and talked to them afterwards about how terrible that afternoon and evening was.

Who are you going to call? The PTWC group tried to find official contacts for countries likely to be impacted. Finally, nearly seven hours after the earthquake, they were able to reach Somalia. But it was of little use. A civil war raged and the government had no capacity to alert people on the coast. The tsunami claimed 176 lives in Somalia and 136 people are still listed as missing and never found.

In 2004, the technology was adequate to detect the earthquake and its tsunami potential. But there was no capacity to deliver that information to the people that needed it, and even if it had reached them, few people would have understood what a tsunami was or what they should do. It was not a complete surprise that tsunamis could occur in the Indian Ocean, but historically, they are much less frequent than in the Pacific.

Thirty-eight countries and territories have coastlines touching the Indian Ocean. Many struggle with economic and political strife and some have difficult relationships with each other. Immediately after the 2004 earthquake, PTWC was given temporary authority to issue alerts. An Indian Ocean tsunami warning system was officially launched in 2006 with Australia, India and Indonesia spearheading dissemination of warnings. There have been several deadly tsunamis since the system was installed, but the impacts were local. The effectiveness of its ability to disseminate information trans-Indian Ocean has yet to be tested.

Establishing a warning center and official paths for the reception and dissemination of data is an essential first step for protecting people from tsunamis, particularly when they come from far away. But it is challenging to maintain a system's effectiveness. To keep a system working effectively requires investment in hardware and

software and people. It is more complicated across political boundaries and when deadly events recur rarely.

The 2004 earthquake began a new era of great earthquakes. In the past 16 years, five M8.5 or larger earthquakes struck the planet. It's no surprise that our tsunami warning systems have been tested anew.

How will you know that a tsunami may be on its way? Be sure to sign up for emergency notifications from your county. When a tsunami comes from far away, you will be notified via text, email, or telephone and told what if anything you need to do. It's a different story if the earthquake is nearby. Then Mother Nature provides the alert and the shaking will be your warning. On this Valentine's Day, take your special someone on a walk to the beach and then show him or her exactly what to do if you feel an earthquake, head to higher ground and give them a big fat congratulatory kiss.

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. All Not My Fault columns are archived at <https://www2.humboldt.edu/kamome/resources> and may be reused for educational purposes. Please leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions/comments about this column, or to request a free copy of the North Coast preparedness magazine "Living on Shaky Ground."
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