

Not My Fault: A day that changed the world of tsunami monitoring

Lori Dengler/For the Times-Standard

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This is the time of year for holiday traditions and family gatherings. For me, it is also tied to memories an earthquake 13 years ago that profoundly changed perceptions of tsunami hazards. The December 26, 2004 Andaman-Sumatra earthquake and ensuing tsunami killed an estimated 230,000 people, impacting 13 Indian Ocean countries. Tourists and travelers from 46 additional countries were among the victims, including a man from McKinleyville, 59-year-old Brian King.

It was about 5:30 pm on Christmas Day 2004 when I became aware something was afoot. We had just finished dinner when I took a peek at my email. There was message from the Pacific Tsunami Warning Center (PTWC) announcing an M8 earthquake offshore of Sumatra, Indonesia. It got my attention – this size quake is capable of producing a damaging tsunami to areas nearby. I also knew that the magnitude was preliminary. The tsunami centers have to get information out quickly which means there isn't time for a thorough analysis of global seismograms. The final magnitude could end up a bit smaller, or significantly larger.

Fifty minutes later a second bulletin was issued revising the magnitude to 8.5. This was a bad direction for the magnitude to be trending. 8.5 is already a huge earthquake with major tsunami potential. It was now the largest quake anywhere in the world in nearly 40 years. By now I had fully succumbed to the grip of my computer. Around 10 pm, an email from the Harvard seismology team pushed the magnitude up to 8.8, and by the next day it had grown to a 9.

Of course the earthquake hadn't grown – it was over in about ten minutes after rupturing more than 900 miles of the megathrust fault boundary between the Indian and Eurasian plates. It just takes scientists much long to get a good handle on the true size of very large earthquakes. Even 13 years later, there is still some controversy about the magnitude with calculations ranging between 9.1 and 9.3, placing it number two or three on the all time list of the globe's biggest quakes.

By the time of the second bulletin, I wasn't too concerned about how big it would end up to be. I knew that the

impacts could be catastrophic. I was looking at news feeds trying to get an idea of what was happening in Indonesia and surrounding areas, but unlike the 2011 Japan tsunami that we were able to watch in grisly near real-time, information was sketchy. Around 10 pm I found some reports of building collapses in Indonesia and several hundred tsunami deaths in Thailand. In my journal I noted "it was going to be bad – several 1000?" Sadly, my initial hunch was several orders of magnitude too low.

If this earthquake had occurred within the Pacific basin, there would have been more updates. The PTWC bulletins included a brief evaluation of tsunami potential that because the earthquake was not located in the Pacific "no destructive tsunami threat exists." In hindsight given the magnitude of impacts, this might seem like a glaring failure of the tsunami warning system. And it was, but not in the way you might think. The US operates two tsunami warning centers – the PTWC in Hawaii and the National Tsunami Warning Center in Alaska. In 2004, PTWC had the responsibility of issuing warnings to Hawaii and US territories in the Pacific and providing guidance to 26 countries within the Pacific basin coordinated through UNESCO's International Oceanographic Commission. This quake was outside their area of responsibility.

An effective tsunami warning system requires much more than detecting earthquakes. There was no problem locating and getting an estimate of how big this earthquake was. Barry Hirshorn, a colleague of mine, was on duty that day/night at PTWC. He recalls the frustration and agony as it became clear to all of them that a catastrophic tsunami was unfolding but there was no one to call, and no system in place to alert people at risk. At one point they even pulled out national directories for the east coast of Africa. They did get a message to diplomats in Somalia before the tsunami arrived, but there was a war going on and no way to get information to coastal residents.

Mother nature further complicated the ability to disseminate information. The Andaman and Nicobar Islands are just north of Sumatra and are part of India. When the tsunami arrived in the islands, Indian officials tried to convey information to the Indian mainland that devastation could be headed their way. But the earthquake had changed and distorted the land, tilting microwave facilities so they could no longer communicate.

Much has changed since 2004. The Indian Ocean now has their own warning system and most Indian Ocean countries have education programs and evacuation maps. And thanks to the 2004 tsunami, you can rarely hear a political story without the T word being invoked. There's a health care tsunami, an aging tsunami and of course a #metoo tsunami.

If there is any one legacy I hope we remember from 2004 is that rare events are difficult to prepare for, technological warning systems require continued care and support, and that technology alone is not enough. It could be three, five twenty generations or more before the next major tsunami strikes and we better make sure the lessons are remembered.

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