

Times Standard

Not My Fault: Tsunami Lessons from Peru

Lori Dengler for the Times-Standard

Posted March 18, 2023

<https://www.times-standard.com/2023/03/18/lori-dengler-tsunamis-lessons-from-peru/>



International Tsunami Survey Team member Sebastian Araya interviews a survivor of the June 2001 earthquake and tsunami in Camaná, Peru.

In June 2001, I spent two weeks in Southern Peru as part of an International Tsunami Survey Team (ITST). A magnitude 8.4 earthquake occurred two weeks before we arrived, and our purpose was to learn as much as we could about the tsunami. We spent most of our field time looking for evidence of the tsunami height and how far inland it penetrated.

High-water marks on buildings and strandlines are ephemeral, easily washed away by rain or destroyed by cleanup crews. It is a delicate balancing act to arrive early enough to document such evidence before it disappears and not hamper response efforts in the region. Large tsunamis are rare events and each one provides critical data to understand what happened and validate numerical models used to forecast future tsunamis elsewhere in the world including our own coast.

I was happy to assist the team on measuring tsunami characteristics, but my main interest was listening to people recount their experience of the tsunami. All ITSTs rely on interviews as well as measurements to understand the tsunami as completely as possible. People can tell you the appearance of the tsunami, what it sounded like, how many surges, and how much time between them.

I wanted to know what they did and what prompted them to take action to save themselves. Did they know about tsunamis and how did they learn. I don't speak Spanish but fortunately I brought someone with me who did. Sebastian Araya was an undergraduate in the Humboldt Geography Department. He had taken my Natural Disasters class the semester before and was the best student in the class. I got to know him over the hours of completing GIS labs and was impressed by his academic ability and his perspectives as a native of Chile.

As we were putting the Peru ITST teams together, I asked if I could bring Sebastian with me. He was a native Spanish speaker, and I knew the rest of the team spoke some of the language but most weren't fluent. Graduate students were often included on these field reconnaissance trips, but Sebastian would be the first undergrad. They agreed as long as I could pay for him. Fortunately, the University and PG&E came up with the necessary support.

Sebastian was a wonderful addition to the team and conducted most of our interviews. All ITSTs cooperate with in-country professionals and several members of the Peruvian Navy, responsible for tsunami alerts in Peru, were part of our team. But most of the people impacted by this tsunami were from indigenous roots. Class relations in Peru are touchy and the Navy folks weren't comfortable with interviews. Sebastian was perfect. As a Chilean, he carried no cultural baggage and his youthful friendly manner disarmed everyone.

All disasters occur in context. The time of year, the weather, pre-existing problems and strengths, all come into play. For Peru in 2001 there were pluses and minuses. It occurred in the Southern Hemisphere's midwinter. Camaná, the hardest hit city, was a summer resort area where the well-to-do from Lima, Arequipa, and other cities vacationed. The winter population was roughly a fifth of what it would be six months later. Many of the few residents were from out of the area: caretakers hired to watch over homes in the off season and farm workers.

Resort communities have special vulnerabilities in disaster. Few visitors are aware of local hazards, have a solid situational awareness of surroundings, and are in a "vacation frame of mind," slowing their reactions. In the case of Camaná, the reduced population was a blessing. But many of the caretakers and farmers didn't know that shaking meant a tsunami and by the time they saw the water surge it was too late for them to get to safety; 103 people perished.

We got a different picture from the fishermen who lived in small communities up and down the coast. They were well aware of tsunamis and could recount experiences in past tsunami events, providing us with detailed accounts of how much further this tsunami had penetrated than earlier ones.

Several things stuck with me. The first was how they thought of earthquakes and tsunamis as they would storms and weather. It was familiar and something they were aware of since childhood. The second, their reliance on watching for a drawdown of the ocean as a sign a tsunami was coming. It is true that many tsunamis are preceded by the lowering of the ocean

surface, and the water receding far further than normal exposing seafloor. Drawdowns are always a danger sign as the water will roar back much higher than normal. But nearly as many tsunamis arrive as a positive surge, with no lowering of the water.

The tsunami source determines how the first surge will appear. If the sea floor drops relative to your coast, the first surges will be drawdowns. But some faults produce uplift and positive or rising waters will be the first to affect you. These fishermen had seen drawdowns in past tsunamis and incorporated it into their understanding. Our team emphasized that the next tsunami could be different. Use shaking as your evacuation trigger. It will buy you valuable minutes in getting to high ground.

Third was a phrase I heard in several interviews from different towns, “the next earthquake/tsunami will occur when we have forgotten the last.” Humans are a forward-thinking species, anticipating what might affect us today, tomorrow and the weeks ahead. But we are not so good at longer term planning and even worse for events that are uncertain.

After the December 20th M6.4 Ferndale earthquake, many of you started keeping a flashlight near your bed. I hoped you refreshed emergency supplies and took some actions to keep items from falling. But you haven’t felt an earthquake in a number of weeks and storms are probably a higher priority now for most of you. Please do your best to keep those memories alive.

I was privileged to take part in five post-earthquake and/or tsunami field teams after 2001. In 2010, I reconnected with Sebastian. He was named Humboldt’s student of the year in 2002 and went on to get a master’s degree. In February 2010, a magnitude 8.8 earthquake struck Chile, spawning another major tsunami and within hours we were planning our own ITST (see <https://kamome.humboldt.edu/sites/default/files/Chile%20Post%20Tsunami%20Survey%20Blog.pdf>). The one common thread from all of my field experiences is education and awareness are the best ways to save yourself and your loved ones.

Lori Dengler is an emeritus professor of geology at Cal Poly Humboldt and an expert in tsunami and earthquake hazards. The opinions expressed are hers and not the Times-Standard’s. All Not My Fault columns are archived online at <https://kamome.humboldt.edu/resources> and may be reused for educational purposes. Leave a message at (707) 826-6019 or email rctwg@humboldt.edu for questions and comments about this column, or to request a free copy of the North Coast preparedness magazine “Living on Shaky Ground.”