

Not My Fault: Why we forget Chile's big quake of 2010

Lori Dengler/For the Times-Standard
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It was the last weekend of summer. Coastal campgrounds and hotels were packed with vacationers enjoying the beaches. Many service personnel including hotel staff, campground operators and police were also from out of town, brought in to handle the annual surge of coastal visitors. Many people were still awake, partying and socializing. Others had retired to hotel rooms, tents, campers or just fell asleep on the beach.

Just past 3:30 AM on February 27, 2010, the ground began to shake and shake. The fault rupture began offshore of Pelluhue in Chile's Maule region and grew both to the north as far as Valparaiso and south to the town of Tirua. When done, it would extend 350 miles in length and 40 miles in width and earn a magnitude of 8.8. The earthquake currently ranks as the 6th largest ever recorded on the planet. An estimated 60,000 square miles experienced very strong to violent ground shaking, directly affecting more than 12 million people, nearly three-quarters of Chile's population.

The impacts didn't end with the shaking. The fault deformation would spawn a tsunami that hit the central and southern Chilean coasts in as little as twenty minutes after the earthquake. Successive surges continued to arrive for many hours, some cresting at more than 60 feet above the tide level and causing major damage over 370 miles of Chilean coastline. The Chilean government reported 525 deaths and 25 persons missing, attributing 181 of the casualties to the tsunami. At least 370,000 homes were destroyed and losses from the earthquake and tsunami combined was estimated at \$30 billion.

The tsunami also traveled outward producing a Pacific-wide tsunami recorded at over 150 locations in the Pacific basin. Tsunami alerts were issued for 54 countries and territories, and some damage was reported in French Polynesia and California. Nearly a dozen California harbors reported damage, including Santa Cruz, Ventura, and Mission Bay. The tsunami in California caused over \$3-million in damages to boats and docks.

Unlike last month's ten-year marker for the much smaller Haiti earthquake, the Maule earthquake merited almost

no mention in the international media. There were no "How does Chile Fare Ten Years Later" headlines, and only a two-sentence note in UPI's On This Day in History feature. The reason for the media slight? The death toll was relatively small and the damaged infrastructure was 100% rebuilt within two years. The earthquake caused barely a blip in the country's economic fortunes.

There is a good reason to look back on the Chilean experience in 2010. The country is more akin to California than other counties hit by major earthquakes and tsunamis in the past few decades. The geography, economy, building codes and engineered infrastructure is very similar to the US West Coast. Understanding the vulnerabilities and strengths of the Maule earthquake provides important lessons for us.

I led a post tsunami field investigation of the Chile earthquake and tsunami. We arrived in Chile just under four weeks after the earthquake and spent 12 days studying factors that exacerbated or reduced impacts. It was my sixth earthquake/tsunami reconnaissance trip and the first time I got to choose the team members. Sebastian Arraya, a former HSU undergrad and native Chilean, was my logistics person. He brought in Pancho Luna, a freelance Chilean journalist, who knew how to contact anyone in the country. The final team members were Troy Nicolini of the Eureka NWS Forecast office and Nick Graehl, a grad student in the Geology Department at the time.

It was an amazing 12 days. We drove 700 miles and visited cities, ports, vacation communities and campgrounds. We talked to mayors, emergency personnel, radio staff, teachers and many survivors. You can view my daily blog reports of the trip on the Kamome Resource page scroll and down to Post Reconnaissance <https://www2.humboldt.edu/kamome/resources> .

Two reasons for the low impact and rapid recovery stand out. Chile is a developed country with building codes comparable to those in the United States. Many buildings experienced minor to moderate damage but very few collapsed. That is the intent of building codes in most places in the world – to provide life safety but not necessarily be able to continue functioning. Chile is also a country with a long history of damaging tsunamis and the level of awareness is very high. The coastal tsunami hazard is mapped and hazard signs posted in most areas. School children in coastal communities practice regular earthquake and tsunami drills.

The biggest vulnerability on my list was the lack of outreach to tourists and transient employees. No tsunami information was provided in campgrounds and as a result, tourists tended to rush to the beach thinking they would be safe from falling limbs. Sadly vacationers made up a sizeable portion of the tsunami victims.

Another problem was locations off the radar screen with no evacuation plan. La Isla Orrego is an undeveloped island just offshore of the city of Constitución. No tsunami plans had been made for the island as it received so little use. Sadly the one time of year it was used was the weekend of February 27 when the island was packed with locals who camped overnight to get a better view of a special fireworks show. The only access was by boat and there was no way to ferry everyone off in the half hour between the earthquake and the tsunami. Over 30 people died in the fourth and largest surge.

Chile's tsunami experience reinforces the importance of outreach, education, and drills. Coastal communities have gone much farther than most countries in institutionalizing hazard preparedness training in schools. Many survivors emphasized the importance of practicing evacuation drills. The drills enabled them to remain calm during the earthquake and to evacuate effectively. Giving people the tools to remain calm and the resultant clarity of mind needed to make decisions in a stressful situation is a recognized benefit of drills.

I am hoping that ten years after a North Coast earthquake and tsunami, the media will choose to ignore us for the same reason as the Maule earthquake – damages were minimal, few people died and we recovered quickly. Learning from Chile's successes and failures in 2010 can help achieve that goal.

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. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions or comments about this column, or to request a free copy of the North Coast preparedness magazine "Living on Shaky Ground." <https://www.times-standard.com/2020/03/01/lori-dengler-why-we-forget-chiles-big-quake-of-2010/>