

## **Not My Fault: Remembering the Papua New Guinea tsunami twenty years later**

Lori Dengler/For the Times-Standard

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July 17, 1998 was a Friday and the beginning of a three-day national holiday in Papua New Guinea. Many people returned home, swelling the population of villages for family celebrations. A little before 7 pm, people felt an earthquake along the north coast. The earthquake (magnitude 7) knocked items from shelves but caused almost no other damage to the flexible traditional bush homes built out bamboo near the epicenter.

I became aware of the earthquake about six hours later as I was compiling the Earthquake Hotline, my daily telephone update of global earthquake activity (see below on how to access). I noted “another good-sized earthquake in Papua New Guinea.” Earthquakes are common in this part of the world. On average, there is about one earthquake in the magnitude 7 – 8 range each year in this nation that occupies the eastern half of the island of New Guinea. The worst quake of 2018 (so far) was a 7.5 in the Southern Highlands of the country.

I thought nothing more about the earthquake until the next day when the Tsunami Bulletin Board started posting information about a tsunami “twenty feet high and 70 casualties.” By the next day the toll had climbed to over 1000. The final assessment: four villages destroyed, at least 2,100 casualties, 10,000 displaced. It was Papua New Guinea’s third most deadly natural disaster of the 20th century.

Post tsunami survey teams flocked to the area measuring water heights, damage and interviewing survivors. Surges left debris hanging in trees 45 feet above the beach and penetrated nearly a half mile inland. It made no sense for a M7 earthquake. Our 1992 earthquake was a bit larger and produced a tsunami on the order of a few feet, typical for earthquakes of this size. There were other unusual features about 1998 tsunami. A strong aftershock occurred about 20 minutes after the main quake and most survivors remembered feeling it just before the tsunami arrived. The timing didn’t make sense. The epicenter was only a few miles off the coast and waves should have arrived more quickly.

The pattern of heights was also unusual. Water levels in the 30 to 45 foot range were measured along a nine-mile zone near Sissano Lagoon and then quickly fell to very low levels, disappearing completely within 15 miles of either side of the devastated zone. Tsunamis caused by fault movement don’t look like this. They may show a few peaks related to local topography and offshore characteristics, but the general pattern is smooth and a tsunami with a maximum of 30 or more feet should be detected hundreds of miles away.

There is a mechanism to explain these discrepancies – a submarine slump or landslide that failed about 15 minutes after the main earthquake. How can a landslide cause a tsunami? When a slump occurs beneath the water, it pulls the water down with it, causing a significant drawdown or receding of the ocean. All of the eyewitnesses reported seeing the water disappear. The water won’t stay depressed - it rebounds in a number of large surges. Landslide sources are small compared to the faults that cause M 8 or 9 earthquakes, so the heights die off more quickly. Most tsunami scientists became convinced of the landslide source when post-tsunami offshore studies revealed signs of a recent slump that matched the observations.

My relationship with the 1998 tsunami became highly personal four months later. I was part of an Earthquake Engineering Research Institute team looking at factors that made the tsunami so deadly lessons for reducing tsunami impacts in other parts of the world. We met with public officials in the capital Port Moresby and spent time visiting the villages affected, the shelters, hospital and aid officials and interviewing survivors. It was my first experience at ground zero of a natural disaster and it was very difficult.

Just getting to the site was arduous – the long flights to Port Moresby and then squeezed in between chickens and crates of betel nut on a small plane that landed on a grass strip near Aitape. We found a fisherman to take us in his 20-foot long open boat to travel to the lagoon area and survey the damage. It was eerily quiet in this area where thousands of people had lived. Uprooted trees and housing debris were still strewn everywhere. There had been no significant government response. Survivors had been given shovels and gloves to bury their dead and small grave mounds dotted the landscape. Relatives had collected belongings – a kitchen supplies, children’s clothes, soccer balls and so forth – near the graves. It is a sight I will never forget.

There were several reasons the impacts were so deadly – the timing of the tsunami when so many people were concentrated on vulnerable sand spits near the coast, weak government institutions and the delay in getting help to the affected area. But the main reason was that almost no one was aware of the tsunami threat. Many of the people were relatively recent arrivals to the area and had no memory of past tsunami events. Very few people were aware that earthquake shaking and the ocean retreat were signs that a tsunami could be on its way.

One of the positive outcomes of the Papua New Guinea tsunami was the global media attention that it received. A little over a year later, a M 7.5 earthquake produced a similar-sized tsunami in Vanuatu. Only five deaths were reported and colleagues of mine who visited the area said that survivors mentioned what they had learned from the Papua New Guinea experience. Feel an earthquake – go to high ground became an international mantra.

Note: You can listen to the Humboldt Earthquake Hotline by calling (707) 826-6020 or clicking the Daily Earthquake Update link at <https://www2.humboldt.edu/kamome/resources>.

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