

Deadly Tsunami Sweeps Through South Pacific

by The Associated Press

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September 29, 2009

A powerful Pacific Ocean earthquake spawned towering tsunami waves that swept ashore on Samoa and American Samoa early Tuesday, flattening villages, killing at least 39 people and leaving dozens of workers missing at devastated National Park Service facilities.

Earthquake Near American Samoa



Source: U.S. Geological Survey

Credit: Alyson Hurt/NPR

Cars and people were swept out to sea by the fast-churning water as survivors fled to high ground, where they remained huddled hours later. Signs of devastation were everywhere, with a giant boat getting washed ashore and coming to rest on the edge of a highway and floodwaters swallowing up cars and homes.

American Samoa Gov. Togiola Tulafono said at least 50 were injured, in addition to the deaths.

Hampered by power and communications outages, officials struggled to assess the casualties and damage. But the death toll seemed sure to rise, with dead bodies already piling up at a hospital in Samoa.

The quake, with a magnitude between 8.0 and 8.3, struck around dawn about 20 miles below the ocean floor, 120 miles from American Samoa, a U.S. territory that is home to 65,000 people.

The territory is home to a U.S. National Park that appeared to be especially hard-hit. Holly Bundock, spokeswoman for the National Park Service's Pacific West Region in Oakland, Calif., said the superintendent of the park and another staffers had been able to locate only 20 percent of the park's 13 to 15 employees and 30 to 50 volunteers.

Mike Reynolds, superintendent of the National Park of American Samoa, was quoted as saying four tsunami waves 15 to 20 feet high roared ashore soon afterward, reaching up to a mile inland. Holly Bundock, spokeswoman for the National Park Service's Pacific West Region in Oakland, Calif., said Reynolds spoke to officials from under a coconut tree uphill from Pago Pago Harbor and reported that the park's visitor center and offices appeared to have been destroyed.

Bundock said Reynolds and another park service staffer had been able to locate only 20 percent of the park's 13 to 15 employees and 30 to 50 volunteers.

Residents in both Samoa and American Samoa reported being shaken awake by the quake, which lasted two to three minutes. The initial quake was followed by at least three aftershocks of at least 5.6 magnitude.

The Pacific Tsunami Warning Center issued a general alert from American Samoa to New Zealand; Tonga suffered some coastal damage from 13-foot waves.

Japan's Meteorological Agency also issued a tsunami warning all along that country's eastern coast.

Mase Akapo, a meteorologist for the National Weather Service in American Samoa, said at least 19 people were killed in four different villages on the main island of Tutuila. He had no additional details.

In neighboring Samoa, an Associated Press reporter saw the bodies of about 20 victims in a hospital at Lalomanu town on the south coast of the main island of Upolu, and said the surrounding tourist coast had been devastated. At least three villages were flattened.

An unspecified number of fatalities and injuries were reported in the Samoan village of Talamoa.

New Zealander Graeme Ansell said the beach village of Sau Sau Beach Fale was leveled.

"It was very quick. The whole village has been wiped out," Ansell told New Zealand's National Radio from a hill near Samoa's capital, Apia. "There's not a building standing. We've all clambered up hills, and one of our party has a broken leg. There will be people in a great lot of need 'round here."

The Samoan capital was virtually deserted with schools and businesses closed.

Local media said they had reports of landslides in the Solosolo region of the main Samoan island of Upolu and damage to plantations in the countryside outside Apia.

American Samoa Gov. Togiola Tulafono was at his Honolulu office assessing the situation but was having difficulty getting information, said Filipp Ilaoa, deputy director of the office.

Rescue workers found a scene of destruction and debris with cars overturned or stuck in mud, and rockslides hit some roads. Several students were seen ransacking a gas station/convenience store.

Chicken of the Sea's tuna packing plant in American Samoa was closed after the tsunami hit, although the facility wasn't damaged, the San Diego-based company said in a statement. Tuna canneries are American Samoa's dominant industry, accounting for nearly 60 percent of all economic activity.

Prior to the tsunami, Chicken of the Sea had announced plans to close the plant on Wednesday, laying off more than 2,100 workers.

Rear Adm. Manson Brown, Coast Guard commander for the Pacific region, said the Coast Guard is in the early stages of assessing what resources to send to American Samoa. Coast Guard spokesman Lt. John Titchen said a C-130 was being dispatched Wednesday to deliver aid, assess damage and take the governor back home. A New Zealand air force P3 Orion maritime search airplane also was being sent.

One of the runways at Pago Pago International Airport was being cleared of widespread debris for emergency use, Federal Aviation Administration spokesman Ian Gregor said in Los Angeles.

The Federal Emergency Management Agency said it was deploying teams to American Samoa to provide support and assess damage.

"Our thoughts and prayers go out to the people of American Samoa and all those in the region who have been affected by these natural disasters," Interior Secretary Ken Salazar said.

The ramifications of the tsunami could be felt thousands of miles away, with federal officials saying strong currents and dangerous waves were forecast from California to Washington state. No major flooding was expected, however.

In Los Angeles, lifeguards said they will clear beaches around 8 p.m. in response to a tsunami advisory for possible dangerous currents.

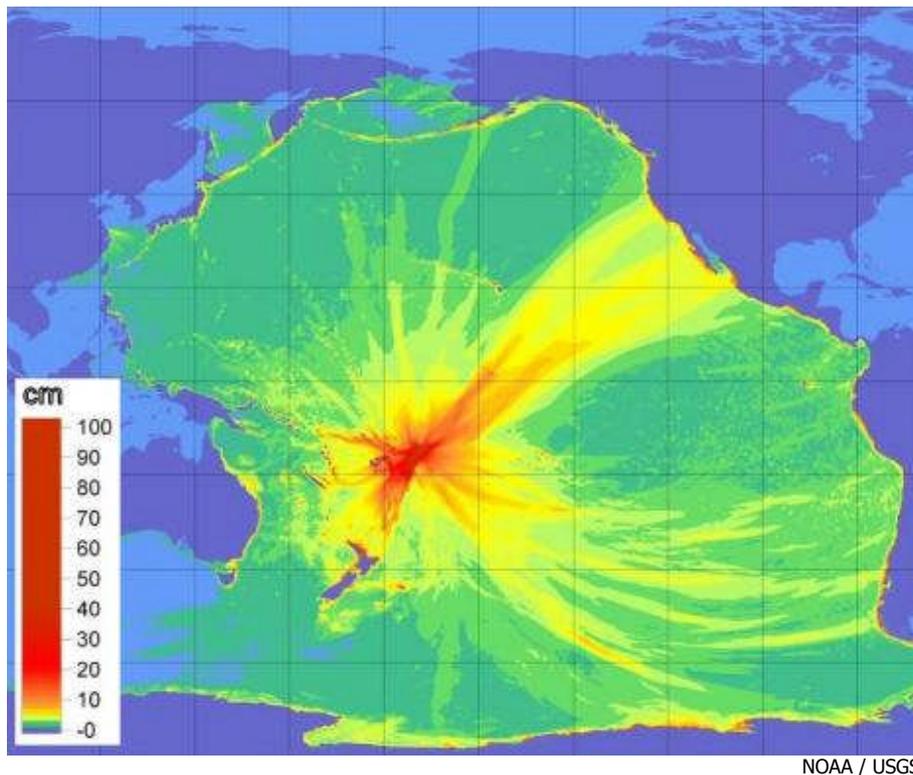
While the earthquake and tsunami were big, they were not on the same scale of the 2004 Indonesian tsunami that killed more than 150,000 across Asia the day after Christmas in 2004, said tsunami expert Brian Atwater of the U.S. Geological Survey in Seattle.

The 2004 earthquake was at least 10 times stronger than the 8.0 to 8.3 measurements being reported for Tuesday's quake, Atwater said. It's also a different style of earthquake than the one that hit in 2004.

The tsunami hit American Samoa about 25 minutes after the quake, which is similar to the travel time in 2004, Atwater said. The big difference is there were more people in Indonesia at risk than in Samoa.

How wave warnings work

Posted: Wednesday, September 30, 2009 8:38 PM by Alan Boyle



This color-coded map models how high waves rose in the wake of the Samoa Islands earthquake. The color key is calibrated in centimeters above sea level.

Five years after a catastrophic Indian Ocean quake pointed up serious shortcomings in the world's tsunami warning network, a beefed-up monitoring system worked quickly to sound the alarm about [this week's undersea shocks](#) in the Pacific, seismologists say.

The tsunami alarm may not have gotten out quickly enough to avoid the [loss of life in Samoa](#), and there are still gaps in the system. Nevertheless, this week's response demonstrated how much things have changed since 2004.

"It's night and day," Stuart Weinstein, deputy director of the National Oceanic and Atmospheric Administration's [Pacific Tsunami Warning Center](#) in Hawaii, told me today. "So much more has transpired in the intervening five years."

The best news about the past five years is that the network of sensors watching for seismic and ocean activity has expanded dramatically. Satellite communication systems pass along readings from those sensors every 15 minutes or less.

"Back in 2004, when the Sumatran disaster struck, there were only four instruments in the Indian Ocean that were transmitting their data and making it available in near real time," Weinstein said. "Now there are over 50."

Back then, about 20 seismometers around the Pacific Rim were watching for earthquake activity. "Now, typically, we're bringing in well over 200 seismic stations from around the world," Weinstein said.

Paul Whitmore, director of NOAA's [West Coast and Alaska Tsunami Warning Center](#) in Alaska, said the network also receives data from about 400 tide gauges around the world. "Five years ago, it was less than half that, and the data was often delayed one to three hours," he said.

15-minute warning

This week, the center in Hawaii sent out its first tsunami bulletin just 15 minutes after the first signs of the magnitude-8.0 South Pacific quake were detected. That's a dramatic change from the hours that were required to get a good fix on the magnitude of the 2004 quake and tsunami. But it still wasn't soon enough for Samoa, which was already being hit by tsunami waves rising as high as 20 feet (6 meters) by the time the bulletin was issued.

The system's performance varied from agency to agency. A warning system run by the European-backed [Global Security and Crisis Management Unit](#) reportedly failed to evaluate the tsunami's impact in real time due to a hardware failure. Tsunami-watchers in Australia and New Zealand, meanwhile, said that their warning systems [worked well](#).

The impact of tsunami waves can vary dramatically, depending on the direction and depth of a seismic fault as well as the nature of the underwater terrain. The South Pacific quake had such an effect on Samoa because the most powerful waves radiated in that direction - and strangely enough, America's West Coast was another directional target.

The West Coast and Alaska Tsunami Warning Center could see those waves coming, and Whitmore said an appropriate advisory was issued for Californians and Oregonians.

"We didn't need them to be evacuating, and we didn't want them to be doing nothing," he told me. "Our estimates were a little bit high, but I believe the emergency management systems that I'm familiar with took the right action in keeping people out of the harbors."

Whitmore said the center's bulletin estimated that waves could be 4 to 25 inches (10 to 65 centimeters) above sea level. The actual maximum wave heights were 1.4 feet (42 centimeters, in Arena Cove, Calif.). The timing estimate for the waves' arrival, about 11 hours after the quake, was "very good," Whitmore said.

The Pacific center had yet another potential threat to assess just hours after the tragedy in Samoa. When today's magnitude-7.6 quake hit western Indonesia, experts had to decide quickly whether a tsunami might follow. "We were not expecting a destructive wave, but sometimes you can't tell," Weinstein said. So a regional tsunami watch was sent out 10 minutes after the quake was detected.

According to reports from the scene, fears of a tsunami caused thousands of people to flee the Sumatran coastal city of Padang in panic. But it turned out that no giant waves were generated, and the tsunami watch was canceled 65 minutes after it was issued.

Far from perfect

Tsunami-watchers admit that the warning system is still far from perfect. "While we have come a long way in five years, there's still a lot of analysis yet to be gained," Whitmore said.

Forecasters rely on computer models to take the data from widely spread sensors and figure out which way the waves are heading. And the models are constantly being tweaked to reflect real-life events such as this week's shocks. "That's going to be an ongoing, never-ending battle," Whitmore acknowledged.

There's also a serious issue relating to maintenance of the sensor network: Just three months ago, Public Employees for Environmental Responsibility [issued a report](#) pointing to what it said were "gaping holes" in the tsunami warning system. NOAA's records indicate that 10 out of its 39 deep-ocean pressure monitoring stations, also known as DART buoys, were failing. Still more deep-ocean sensors operated by other countries are on the blink.

Weinstein noted that neither of NOAA's two DART buoys in the Indian Ocean are currently functioning - which certainly didn't help when it came time to assess the impact of today's Indonesia quake. "They probably need to be checked out," Weinstein told me.

The important thing is for folks in coastal communities to [be prepared](#) - even before authorities sound the alarm.

"If you feel an earthquake, get to high ground as fast as you can," John Bellini, a geophysicist with the National Earthquake Information Center in Denver, told [Inside Science News Service](#). "Five minutes was not enough time for emergency services to move into action. It is hard to get a warning out faster than five minutes, so people have to know to move to higher ground."

Powerful Earthquake Rocks Western Indonesia



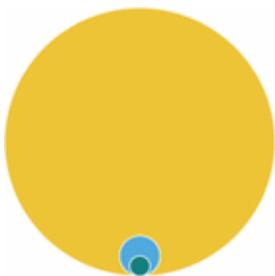
Enlarge Tundra Laksamana/AP

Earthquake survivors receive medical treatment Wednesday at a hospital in Padang Panjang in West Sumatra after a 7.6 magnitude temblor rocked western Indonesia.

September 30, 2009

At least 75 people were dead in Indonesia after a powerful quake struck off the island of Sumatra on Wednesday, causing buildings to collapse and leaving thousands trapped under rubble, government officials said.

The magnitude 7.6 temblor hit off the coastal city of Padang, in West Sumatra province, at 5:15 p.m. local time and sent people running from their homes. The Pacific Tsunami Warning Center issued an alert for Indonesia, Malaysia, India and Thailand, but it was lifted about an hour and a half later.



Comparing Earthquake Power

The earthquake comes a day after a magnitude 8.0 quake in the South Pacific hurled a massive tsunami at the shores of Samoa and American Samoa, flattening villages and leaving nearly 100 dead and dozens missing. Experts said the seismic events were not related.

Indonesian television reported that hundreds of buildings in Padang had collapsed and many people were feared trapped under the rubble. Footage from the city showed flattened buildings, with at least one person trapped underneath, a foot sticking out from beneath the debris.

Rustam Pakaya, head of the Health Ministry's crisis center in Jakarta, said thousands of people were trapped and that a field hospital was being prepared to assist the injured.

Vice President Jusuf Kalla said at a late-night news conference that 75 people had been killed.

"We have received a report from the mayor of Padang that the death toll is 75. But many others are trapped in collapsed shops, building and hotels. It is difficult to know because it is dark now," Kalla said.

Major Earthquakes



Source: U.S. Geological Survey

Credit: Alyson Hurt/NPR

Padang, a low-lying city with a population of about 900,000, lies some 300 miles south of — and on the same fault line — where a 9.1 magnitude quake struck in 2004, spawning the Indian Ocean tsunami that killed some 230,000 people across Asia. The city was also hit by an 8.4 magnitude quake two years ago, when dozens of people died and several large buildings collapsed.

Power in the city was reportedly cut and telecommunications networks were down or overloaded, making it difficult to get accurate information about the extent of the damage.

"I want to know what happened to my sister and her husband," said Fitra Jaya, who owns a house in downtown Padang and was in Jakarta when the quake struck. "I tried to call my family there, but I could not reach anyone at all."

The quake also triggered a landslide that cut off land transport to the provincial town of Padang Pandang, which lies about 45 miles north of Padang, said a police officer in the town, who identified himself only as Riko.

"The earthquake was very strong," said Kasmiasi, who lives on the coast, near the epicenter.

"People ran to high ground. Houses and buildings were badly damaged," said Kasmiasi, who like many Indonesians goes by only one name. "I was outside, so I am safe, but my children at home were injured," she said before her cell phone went dead.

From NPR staff and wire reports

Disaster aid flows to tsunami-hit Samoas

Death toll at 119 after waves from massive earthquake pound islands



Phil Walter / Getty Images

People walk among the debris on the road to the beach following Tuesday's strong earthquake, which triggered a tsunami wave up to 1.5 metres across areas of the island.



Dozens still missing in Samoan tsunami

Sept. 30: An earthquake-generated tsunami struck Samoa Wednesday, leaving at least 100 dead and 1,000 injured. NBC's Lee Cowan reports.

Nightly News

APIA, Samoa - Police in green reflective vests searched a ghastly landscape of mud-strewn streets, pulverized homes and bodies scattered in a swamp Wednesday as dazed survivors emerged from the muck and mire of an earthquake and tsunami that killed at least 119 in the South Pacific.

Military transports flew medical personnel, food, water and medicine to Samoa and American Samoa, both devastated by a tsunami triggered by an undersea earthquake. A cargo plane from New Zealand brought in a temporary morgue and a body identification team.

Officials expect the death toll to rise as more areas are searched.

Survivors fled to higher ground on the islands after the magnitude 8.0 quake struck at 6:48 a.m. local time (1:48 p.m. EDT; 1748 GMT) Tuesday. The residents then were engulfed by four tsunami waves 15 to 20 feet high that reached up to a mile inland.

The waves splintered houses and left cars and boats — many battered and upside down — scattered about the coastline. Debris as small as a spoon and as large as a piece of masonry weighing several tons were strewn in the mud.

'I was scared'

Survivors told harrowing tales of encountering the deadly tsunami.

"I was scared. I was shocked," said Didi Afuafi, 28, who was on a bus when the giant waves came ashore on American Samoa. "All the people on the bus were screaming, crying and trying to call their homes. We couldn't get on cell phones. The phones just died on us. It was just crazy."

With the water approaching fast, the bus driver sped to the top of a nearby mountain, where 300 to 500 people were gathered, including patients evacuated from the main hospital. Among them were newborns with IVs, crying children and frightened elderly people.

A family atop the mountain provided food and water, while clergymen led prayers. Afuafi said people are still on edge and feared another quake.

"This is going to be talked about for generations," said Afuafi, who lives just outside the village of Leone, one of the hardest hit areas.

On Samoa, the two-hour drive from the Apia airport to the heavily damaged southeast coast initially showed no sign of damage before becoming little more than a link between one flattened village after another. Mattresses hung from trees, and utility poles were bent at awkward angles.

It was clear that tourists were among the casualties, but figures were impossible to ascertain immediately with officials saying they had no solid head count on the number of visitors in the area.

"There's not a single house up, it's total devastation (in) the most popular place for tourists," Dr. Ben Makalavea from Apia's main hospital told New Zealand's National Radio Thursday. He said some couples can't find their children, and fear they may have been washed out to sea.

"One woman we saw was so confused that she doesn't even know where she comes from," he said.

Shortage of medical personnel

Makalavea added that the hospital needs nurses, doctors, surgeons and blood to treat the increasing numbers of casualties with broken bones and cuts.

At Sale Ataga village, more than 50 police, some wearing masks to filter out some of the growing stench of decay in the steamy conditions, searched for bodies underneath uprooted trees and palms piled up at the foot of a mountain.

Tony Fauena, a 29-year-old taro farmer, said the bodies of his 35-year-old niece and her 6-month-old son were found Tuesday but four other family members were still missing. "We don't know if the rest are under there or released out to sea," he said.

Suavai Ioane was rattled by the violent earthquake that shook Voutosi, a village of 600 people. But he didn't have much time to calm down.

"After the shaking finished, about five or 10 minutes after, the wave very quickly came over us," said Ioane, who was carried by a wave about 80 yards (meters) inland. He knew he was lucky to be alive; eight bodies were found in a nearby swamp.

The Pacific Tsunami Warning Center in Hawaii said it issued an alert, but the waves got to the islands so quickly that residents only had about 10 minutes to respond. Another system designed to alert aid agencies suffered a hardware malfunction that delayed notification, but that did not affect island residents.

The quake was centered about 120 miles south of the islands of Samoa, which has about 220,000 people, and American Samoa, a U.S. territory of 65,000.

Another quake rocks Indonesia

Another strong underwater earthquake rocked western Indonesia Wednesday, briefly triggering a tsunami alert along the Indian Ocean. The 7.6-magnitude quake toppled buildings, cut power and triggered a landslide on Sumatra island, and at least 75 people were reported killed. Experts said the seismic events were not related.

Hampered by power and communications outages, officials in the South Pacific islands struggled to determine casualties and damage.

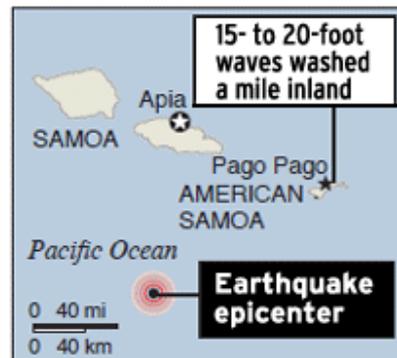
Samoa National Disaster Management committee member Filomina Nelson told New Zealand's National Radio the number of dead in her country had reached 83 — mostly elderly and young children. At least 30 people were killed on American Samoa, Gov. Togiola Tulafono said.

Authorities in Tonga, southwest of the Samoas, confirmed at least six dead and four missing, according to Tongan government spokesman Lopeti Senituli. He said the waves practically flattened two of the island's three villages. The government dispatched a boat with supplies to the island to help its more than 1,000 residents.

In Pago Pago, the streets and fields were filled with debris, mud, overturned cars and boats. Several buildings in the city — just a few feet above sea level — were flattened. Power was expected to be out in some areas for up to a month and officials said some 2,200 people were in seven shelters across the island.

Samoa tsunamis

A massive tsunami unleashed by a powerful earthquake flattened villages and left nearly 100 people dead with the toll expected to rise.



SOURCES: USGS; ESRI

AP

Earthquakes weaken distant faults

The major 2004 earthquake in Sumatra may have weakened the San Andreas fault, 8,000km away in California.

This is according to scientists who took measurements from the fault over two decades. Reporting in the journal *Nature*, the team found that small "repeating earthquakes" became more frequent as the San Andreas Fault weakened. This pattern, they say, could help to forecast earthquakes in the future, something that is currently impossible.

The team, led by Taka'aki Taira, of the University of California at Berkeley, studied a section of the San Andreas Fault near Parkfield, which is sometimes called the "earthquake capital of the world".

The area has long been studied by earthquake researchers and it contains a fixed array of seismometers called the high resolution seismic network.

Dr Taira, who was based at Washington DC's Carnegie Institution when he carried out the work, used measurements from these highly sensitive seismometers, some of which are several kilometres below the Earth's surface.

"The equipment is at depths where the noise level is very low, so it collects very good data," explained Dr Taira.

He and his team studied repeating earthquakes because they provided a "background frequency" against which changes in the fault could be compared.

"These events happen regularly and the size of the event is about the same," he told BBC News.

"But after Sumatra, the frequency changed - it increased - but the magnitude decreased.

"That is a signal of the fault weakening; you only have to push a little bit and the fault fails."



The researchers took measurements from the fault over two decades

“ It is possible that the strength of faults and earthquake risk is affected by seismic events on the other side of the world ”

Fenglin Niu, Carnegie Institution

[Into Japan's earthquake zone](#)

Fenglin Niu from Carnegie, who also took part in the research, said: "So it is possible that the strength of faults and earthquake risk is affected by seismic events on the other side of the world."

The 2004 Sumatran earthquake was magnitude 9.3 - one of the strongest on record - and triggered the tsunami that killed more than 220,000 people.

The 30 September 2009 earthquake along the same fault line was measured at magnitude 7.6.