

Chile's M8.2 quake causes little damage, death

By Associated Press, Published: April 1 | Updated: Wednesday, April 2, 10:31 AM

IQUIQUE, Chile — Hard-won expertise and a big dose of luck helped Chile escape its latest magnitude-8.2 earthquake with surprisingly little damage and death.

The country that suffers some of the world's most powerful quakes has strict building codes, mandatory evacuations and emergency preparedness that sets a global example. But Chileans weren't satisfied Wednesday, finding much room for improvement. And experts warn that a "seismic gap" has left northern Chile overdue for a far bigger quake.

Authorities on Wednesday discovered just six reported deaths from the previous night's quake. It's possible that other people were killed in older structures made of adobe in remote communities that weren't immediately accessible, but it's still a very low toll for such a powerful shift in the undersea fault that runs along the length of South America's Pacific coast.

"How much is it luck? How much is it science? How much is it preparedness? It is a combination of all of the above. I think what we just saw here is pure luck. Mostly, it is luck that the tsunami was not bigger and that it hit a fairly isolated area of Chile," said Costas Synolakis, an engineer who directs the Tsunami Research Center at the University of Southern California.

Chile is one of the world's most seismic countries and is particularly prone to tsunamis, because of the way the Nazca tectonic plate plunges beneath the South American plate, pushing the towering Andes cordillera ever higher.



About 2,500 homes were damaged in Alto Hospicio, a poor neighborhood in the hills above Iquique, a city of nearly 200,000 people whose coastal residents joined a mandatory evacuation ahead of a tsunami that rose to only 8 feet (2.5 meters). Iquique's fishermen poked through the aftermath: sunken and damaged boats that could cost millions of dollars to repair and replace.

Still, as President Michelle Bachelet deployed hundreds of anti-riot police and soldiers to prevent looting and round up escaped prisoners, it was clear that the loss of life and property could have been much worse.

The shaking that began at 8:46 p.m. Tuesday also touched off landslides that blocked roads, knocked out power for thousands, briefly closed regional airports and started fires that destroyed several businesses. Some homes made of adobe also were destroyed in Arica, another city close to the quake's offshore epicenter.

Shaky cellphone videos taken by people eating dinner show light fixtures swaying, furniture shaking and people running to safety, pulling their children under restaurant tables, running for exits and shouting to turn off natural gas connections.

"Stay calm, stay calm! My daughter, stay calm! No, stay calm, be careful, cover yourself," said Vladimir Alejandro Alvarado Lopez as he recorded himself pushing his family under a table. "Shut the gas ... It's still shaking. Let's go," he said as he then hustled them outside.

The mandatory evacuation lasted for 10 hours in Iquique and Arica, the cities closest to the epicenter, and kept 900,000 people out of their homes along Chile's 2,500-mile (4,000 kilometer) coastline. The order to leave was spread through cellphone text messages and Twitter, and reinforced by blaring sirens in neighborhoods where people regularly practice earthquake drills.

But the system has its shortcomings: the government has yet to install tsunami warning sirens in parts of Arica, leaving authorities to shout orders by megaphone. And fewer than 15 percent of Chileans have downloaded the smartphone application that can alert them to evacuation orders.

Alberto Maturana, the former director of Chile's Emergency Office, said Chileans were lucky the quake hadn't caught them in the middle of the day when parents and children are separated, or in the middle of the night.

And he was highly critical of the government's response, citing the need for better access to roads, transportation, health care, coordination and supplies.

Bachelet, who just returned to the presidency three weeks ago, had no margin for error. The last time she presided over a major quake, days before the end of her 2006-10 term, her emergency preparedness office prematurely waved off a tsunami danger. Most of the 500 dead from that magnitude-8.8 tremor survived the shaking, only to be caught in killer waves. Some 220,000 homes were destroyed as large parts of many coastal communities were washed away.

The U.S. Geological Survey said more than 60 significant aftershocks, including one of magnitude 6.2, followed the Tuesday night quake centered 61 miles (99 kilometers) northwest of Iquique.

And seismologists warn that the same region is long overdue for an even bigger quake.

"Could be tomorrow, could be in 50 years; we do not know when it's going to occur. But the key point here is that this magnitude-8.2 is not the large earthquake that we were expecting for this area. We're actually still expecting potentially an even larger earthquake," said Mark Simons, a geophysicist at the California Institute of Technology.

Nowhere along the fault is the pressure greater than in the “Iquique seismic gap” of northern Chile.

“This is the one remaining gap that hasn’t had an earthquake in the last 140 years,” said Simons. “We know these two plates come together at about 6, 7 centimeters a year, and if you multiply that by 140 years then the plates should have moved about 11 meters along the fault, and you can make an estimate of the size of earthquake we expect here.”

The USGS says the seismic gap last saw quakes of more than magnitude 8 in 1877 and 1868.

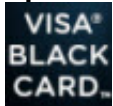
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