

New Zealand earthquake so strong it lifted sea floor 2 meters

Rocks, marine animals exposed above tide level

Elizabeth Roberts, CNN News, 11-18-16

(CNN) - The 7.8 magnitude earthquake that hit New Zealand this week lifted the seabed two meters, leaving seaweed-covered rocks and marine animals exposed above tide level.

Incredible photographs show the extent of the devastation on South Island's coastline from Monday's quake.

"Much of the northeastern coast of the South Island was uplifted during the earthquake. We know this from photos of rock platforms covered in seaweed and marine animals such as crayfish and paua (sea snails) stranded above tide levels," GNS Science, a New Zealand government-owned research institute, said in a report.

Researchers estimate that the coast was raised between 0.5 m and 2 meters in the northeastern region of the South Island, from about 20 km south of the town of Kaikoura all the way north to Cape Campbell. Photographs posted on social media also show how roads in the area were destroyed.

New Zealand is regularly hit by earthquakes because it sits in between the Indo-Australian and Pacific tectonic plates. A series of powerful quakes jolted the South Island Monday, triggering a tsunami and sending aftershocks across the country that left at least two dead, officials said.

The first event, a 7.8-magnitude quake, struck just after midnight Monday near Kaikoura, some 93 kilometers (55 miles) northeast of the city of Christchurch, the US Geological Survey (USGS) reported. A 6.2-magnitude quake struck around 1:30 p.m. 39 kilometers west-southwest of Kaikoura, further north of Christchurch.

The USGS has recorded over 60 aftershocks with magnitudes 4.5 or greater since then.

"The earthquake involved slip on at least four to six distinct faults, with the greatest slip occurring on the Kekerengu fault, which appears to have slipped about 10 meters along part of its length," said Dr. Michael Blanpied, associate coordinator with the USGS Earthquake Hazards Program, explaining how the coastline lifted.

"Most of these fault slips were horizontal, but a component was also vertical. The vertical component of slip on the Kekerengu fault is responsible for the 'steps' now seen in the landscape, dramatically illustrated in photos of roads that now have drop-offs.

"There also appears to have been vertical slip on a newly revealed fault in Waipapa Bay. The effect of these motions was to lift portions of the coast by one half to as much as two meters," he told CNN.

He said similar coastal lifts have been observed in the past, including in earthquakes that hit New Zealand in 1855 and 1931.

According to GNS Science, the newly raised coastline of Kaikoura could be a permanent feature.

"Historical and pre-historical examples show that in many parts of New Zealand, these raised beaches remain high above sea level," researchers reported.

"However, in some parts of the world, raised beaches have been known to gradually drop down again over centuries or be dropped down suddenly in a large earthquake with a different sense of movement."

As for the sea creatures left stranded outside their usual comfort zone, the scientists said: "Some of the animals that have been raised will be accustomed to air exposure for short periods of time, but not the full tidal cycle that they will now experience. As the animals not suited to this environment die from the reef, they will be replaced by seaweed and animals appropriate for the new tidal level."