Geologists warn of mega quake for north Chile

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People walk along a cracked road in Iquique, northern Chile, a day after a powerful 8.2-magnitude earthquake hit off Chile's Pacific coast on April 2, 2014

North Chile is at risk of a mega earthquake after a tremor in April released only some of the tension building along a high-risk fault zone since 1877, researchers said Wednesday.

Two studies published in the journal *Nature* said the 8.1-8.2 magnitude quake that shook the city of Iquique, killing six people and forcing a

million to leave their homes, may not have been the anticipated Big One.

Scientists have long kept an eye on the north Chile subduction zone, where a slab of the Earth's crust is driving under the South American continent at an average rate of about seven centimetres per year.

Subduction zones are known for yielding powerful quakes.

In 1877, a tremor with an exponentially much higher 8.6-8.8 magnitude ruptured nearly 500 kilometres of the north Chilean fault.

The April 1 Iquique rattler, followed by a strong aftershock, broke only a section of the so-called seismic gap—a section of an active fault that had not ruptured in a long time, building up stress to be released as a major quake.

"Our results... indicate that this (Iquique) was not the earthquake that had been anticipated," wrote the authors of the first study led by Gavin Hayes of the United States Geological Survey.

"Significant sections of the northern Chile subduction zone have not ruptured in almost 150 years, so it is likely that future megathrust earthquakes will occur to the south and potentially to the north of the 2014 Iquique sequence."

Megathrust earthquakes are often followed by killer tsunamis.

"Observations suggest that enough strain has accumulated along this plate boundary segment to host an earthquake close to M9 (magnitude 9)," the team cautioned.

The authors of the second study said the Iquique quake broke about a third of the northern Chile seismic gap, and agreed that "the remaining

locked segments now pose a significant increased seismic hazard."

They put the potential magnitude of such a quake at 8.5.

"The Big One may still be to come," added University of California geologist Roland Burgmann, who wrote a comment on the studies that was also published by *Nature*.

Hayes and his team said that on the basis of their findings, "Chilean and global seismologists now face the difficult task of communicating this uncertain yet perhaps elevated hazard, without appearing alarmist."

Chile is one of the most seismically active countries in the world.

More information: *Nature* papers: dx.doi.org/10.1038/nature13677 and dx.doi.org/10.1038/nature13681

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