

Quake could alter Tokyo risk: experts

March 11 2011, by Marlowe Hood



People wait for transport services to resume at the Tokyo station as commuter trains stopped their services in the Tokyo metropolitan area. Seismologists were crunching data Friday to figure out if the magnitude 8.9 quake that rocked Japan increased the chances of a mega-quake hitting the Tokyo basin, home to 30 million people.

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The Japanese government's [Earthquake](#) Research Committee has long warned that Tokyo faces a serious risk of a major [quake](#) -- 8.0 or higher -- in the coming decades.

[Japan](#) is still haunted by the "Big One" that devastated its capital in 1923 and left more than 140,000 dead. The 1995 Kobe quake, which claimed 6,400 lives, added to this ever-present fear.

Experts said it was too soon to know if the tectonic upheaval that shook northeast Japan Friday and unleashed a 10-metre (33-foot) tsunami put Tokyo at greater risk.

It could even reduce the odds of a killer quake hitting the capital.

"That is going to be hotly debated in the scientific community," said Jochen Woessner, a [seismologist](#) with the Swiss Seismological Service in Zurich.

But -- one way or the other -- it is almost sure to have an impact, experts agree.

"There will very likely be a strong interaction with the Kanto Plains," said John McCloskey, a professor of Geophysics at the University of Ulster in Northern Ireland, referring to the seaside basin that holds greater Tokyo.

An earthquake doesn't always relieve stress -- sometimes it redistributes it, he said by phone.

"Places that have not failed during a quake can actually be more stressed by the earthquake happening beside them. But we can't tell at this stage whether it has made the next earthquake more or less likely."

For Jerome Vergne, a seismologist at Strasbourg University in eastern France, "the risk for Tokyo cannot have diminished."

Only in the region north of the quake's epicentre -- some 400 kilometres (250 miles) northeast of Tokyo -- would stress levels have relaxed, he said in an interview.

"An increase in loading" -- added pressure -- "could advance the date of a future quake near Tokyo," he said.



A lone car rests among the remain of water on a street in Chiba city, suburban Tokyo. Seismologists were crunching data Friday to figure out if the magnitude 8.9 quake that rocked Japan increased the chances of a mega-quake hitting the Tokyo basin, home to 30 million people.

The Japanese capital is only 300 kilometres (200 miles) from an underwater "triple junction" where three of the two dozen tectonic plates that comprise Earth's constantly shifting crust meet.

Tokyo sits atop the Eurasian plate. Beneath it, the Philippine Sea plate descends, or subducts, from the south, while the Pacific plate slips down from the east.

Subduction is not a slow-and-steady process, but occurs in a "stick-slip" motion that gives rise to infrequent, but massive, convulsions.

A major earthquake in or near Tokyo could cause a trillion dollars in damage, experts have calculated.

Over the last decade scientists have developed computer programmes to measure stresses in Earth's outer layer in three dimensions, making it possible to see how those stresses might impact neighbouring faults.



People stand outside a building following a huge 8.8 magnitude quake to hit Japan in Tokyo. Seismologists were crunching data Friday to figure out if the magnitude 8.9 quake that rocked Japan increased the chances of a mega-quake hitting the Tokyo basin, home to 30 million people.

But it will be several days, perhaps weeks, before we know whether the tectonic time bomb sitting under Tokyo may have been reset, said Bob Holdsworth, a professor of structural geology at Durham University in Britain.

"When you have a big event on one fault, it affects the behaviour of adjacent faults," he said by phone. "The faults are, as it were, able to communicate with one another."

McCloskey said that the massive 8.9 quake Friday was, strictly speaking, an aftershock of a nearby 7.2 magnitude quake two days earlier, despite it far greater power.

"We have calculated that the stress field from the 7.2 quake on Wednesday is consistent with the triggering of this earthquake," he said.

But connecting the dots with the Tokyo region, several hundred kilometres distant, is far more difficult, he added.

Experts also look for patterns in the thousands of quakes that occur across the globe each year.

"Earthquakes are known to cluster, both in space and in time," Holdsworth said, pointing to recent quakes over 8.0 in or near Peru, Indonesia, China and Chile.

"There was a similar cluster spanning the period 1957-64, which included -- around the Ring of Fire -- the three biggest earthquakes on record," he said.

The Ring of Fire reaches from Indonesia to the coast of Chile in a 40,000 kilometre (25,000-mile) arc of nearly daily seismic violence around the Pacific rim.

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