Scientists find increase in microearthquakes after Chilean quake

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An aerial view of the San Andreas fault in the Carrizo Plain, Central California. Image: USGS, Wikimedia Commons.

By studying seismographs from the earthquake that hit Chile last February, earth scientists at the Georgia Institute of Technology have found a statistically significant increase of microearthquakes in central California in the first few hours after the main shock. The observation provides an additional support that seismic waves from distant earthquakes could also trigger seismic events on the other side of the earth. The results may be found online in the journal *Geophysical*

Research Letters.

It has been well known that microearthquakes can be triggered instantaneously by distant earthquakes. However, sometimes the triggered events could occur long after the passage of the direct surface waves that take the shortest path on the earth surface. There are several other explanations out there about how such delayed triggering occurs. Some involve the redistribution of pore fluids and triggered aseismic creep, while others simply consider them as aftershocks of the directly triggered events. But the group from Georgia Tech found something different.

"From our research, we've concluded the delayed triggering that occurs in the first few hours after an earthquake could be caused by multiple surface waves traveling back and forth around the earth multiple times," said Zhigang Peng, assistant professor in the School of Earth and Atmospheric Sciences at Georgia Tech.

In a previous paper, also published in Geophysical Research Letters last December, Peng's research group found that the direct surface waves of the Chilean earthquake triggered seismic activity in central California. In this new study, Peng's group looked beyond the direct surface waves and focused on secondary and tertiary waves that return after traveling across the globe multiple times. In addition, they went beyond earthquake information published in the U.S. Geological Survey catalog and instead studied the seismographs.

"So when you look at the events that have been reported in the catalog, you won't see this effect," said Peng. "But if you look at the seismographs, you'll see many small events and notice that they occurred mostly when those multiple surface waves arrived."

Peng said that the finding is significant because it also suggests that

scientists can look beyond the direct surface waves and understand that those later-arriving waves could affect the seismic activity on the other side of the earth. But his team believes that seismic waves circle the globe only for large earthquakes. They are currently examining other regions and quakes to see just how widespread this effect is.

Provided by Georgia Institute of Technology