Research shows carbon dioxide levels influenced by earthquakes

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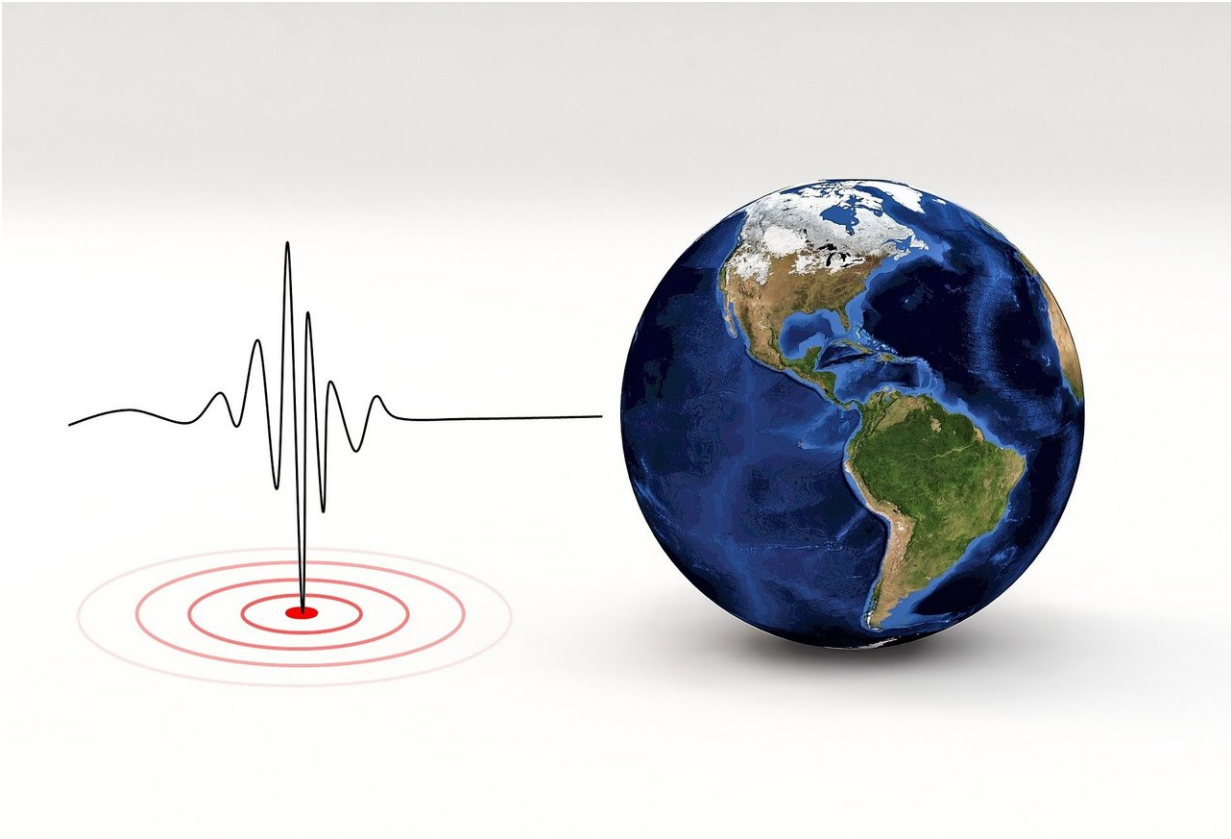

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The findings are the result of a research collaboration between Victoria University of Wellington, Durham University in the United Kingdom, the University of Otago and GNS Science.

"According to our findings, large earthquakes along New Zealand's Alpine Fault both mobilise and bury large amounts of carbon and in doing so may remove carbon dioxide from the atmosphere," says Dr. Jamie Howarth from Victoria University of Wellington's School of Geography, Environment and Earth Sciences.

To determine the link between large earthquakes and carbon dioxide levels, researchers examined sediments that have accumulated over the past thousand years at the bottom of Lake Paringa in the Southern Alps.

"We measured the levels of carbon isotopes present in the sediment during and after earthquakes to show that earthquakes on the fault produced over 43 percent of the carbon in the biosphere released from the Alps," Dr. Howarth says.

According to Professor Sean Fitzsimons from the University of Otago, simulations of earthquake triggered landslides suggest that 14 million tonnes of carbon are released during each Alpine Fault earthquake.

However, the research team's findings show these same earthquakes may also draw carbon out of the atmosphere if that carbon is transported to lake and ocean basins.

"Lush vegetation on the mountains draws carbon dioxide from the atmosphere," Dr. Howarth says. "In an earthquake, this vegetation is caught up in landslides, which sends the vegetation and the carbon to rivers, which in turn transport it to lakes and ocean basins where it is rapidly buried, removing it from the atmosphere."

This research is significant because it shows a clear link between tectonic activity and the climate on Earth.

Professor Fitzsimons concludes that "these findings tell us that the

development of mountains plays a critical role in the global carbon cycle over millions of years and provide a piece of the puzzle in understanding how atmospheric carbon is regulated by earth surface processes".

The findings were published this month in *Nature Geoscience*.

More information: Nicole V. Frith et al. Carbon export from mountain forests enhanced by earthquake-triggered landslides over millennia, *Nature Geoscience* (2018). DOI: 10.1038/s41561-018-0216-3

Provided by Victoria University of Wellington

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