

## It's not an earthquake—it's an aftershock from long ago

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Courtesy Nature  
and World Science staff

**Earthquakes that occur on land far from the boundaries of tectonic plates may actually be aftershocks of large quakes centuries ago, a new report suggests.**

**Tectonic plates are distinct segments of the Earth's crust whose borders tend to undergo large amounts of seismic, or earthquake-related, activity. This occurs when a buildup in pressure along these boundaries causes the ground to slip suddenly.**



University students visiting a deformation in the ground left by the 1959 magnitude 7.5 Hebgen Lake, Montana earthquake. This earthquake triggered an enormous landslide that buried a campground, causing 28 deaths and dammed the Madison River, forming Quake Lake. Even today, aftershocks continue. (Credit: Seth Stein)

**This can also occur within the plates, along cracks in the crust called faultlines, but less often. Such an event, though, was the 2008 Wenchuan earthquake in China, which killed some 68,000 people by official estimates. It came as a surprise to many because it occurred on a faultline that had undergone little recent seismic activity.**

**Because of the infrequent seismic activity at continental interiors like the Wenchuan region, assessment of earthquake hazard in these areas relies on a relatively short historical record, according to researchers Seth Stein of Northwestern University in Illinois and Mian Liu of the University of Missouri.**

**This, they added, makes it hard to distinguish potentially long aftershock sequences from “background” seismic activity, which can point to a stress build-up foreshadowing a possible earthquake.**

**In their study, to be published in the Nov. 5 issue of the research journal *Nature*, Stein and Liu developed a model comparing the length of aftershock sequences to the rate at which stress builds up in a fault in a variety of scenarios.**

They found that at plate boundaries, where most large earthquakes occur, the motion of tectonic plates rapidly “reloads” faults with stress that must be released through an earthquake. However, aftershock activity drops off relatively quickly also, after a decade or so.

Within continents, the opposite happens. Slower changes in the position of the underlying crust means aftershocks can continue much longer.

The scientists didn’t speculate as to which past earthquake the Wenchuan event might be related to. China has had several major earthquakes over the country’s history. In addition, the researchers wrote, other “seismicity in the areas of past large earthquakes, including those in New Madrid, Missouri (1811-1812), Charlevoix, Quebec (1663), and Basel, Switzerland (1356), may be aftershocks.”

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