



## **Connecting Aftershocks and Farfield Triggering through Regional Sensitivity Measures**

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Earthquake triggering is a route into constraining earthquake initiation. When one earthquake generates another in quick succession we can use the natural experiment to determine the driving stresses and thus the threshold for failure.

Recent mechanistic studies of short-term earthquake interactions have taken two separate tracks. One is to study farfield triggering. The other is to study aftershocks. Here we connect these two types of triggering by measuring regional sensitivity for each type. We find that Japan is less triggerable than the Western US in both the short-range and long-range senses. Mainshocks of magnitude 2.7 (the mean catalog magnitude) in California have an average of 0.9 aftershocks of magnitude 2-2.7 in the first hour after mainshock occurrence and within a 15 km radius. Using the same aftershock criteria, magnitude 2.7 mainshocks in Japan have only 0.05 aftershocks. Long-range triggering is also less efficient in Japan with no observable distant triggering for 15 earthquakes between 1998-2004 that had similar amplitudes to earthquakes that triggered widespread microseismicity in the Western US. On a finer scale, the productivity and long-range triggerability measures are both correlated with tectonic regions under extension.

As the sensitivity to the two types of triggering correlate, the observation suggests that both near and farfield triggering reflect similar processes. For instance, if both processes are simple Coulomb failure, then the triggerability in both cases should reflect the effective stress on the faults and thus provide a means of stress mapping.