

Can intraplate earthquakes produce stronger shaking than at plate boundaries?

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New information about the extent of the 1872 Owens Valley earthquake rupture, which occurs in an area with many small and discontinuous faults, may support a hypothesis proposed by other workers that these types of quakes could produce stronger ground shaking than plate boundary earthquakes underlain by oceanic crust, like many of those taking place along the San Andreas fault.

Published estimates of the 1872 Owens Valley earthquake in southeastern California put the [quake](#) at a magnitude 7.4-7.5 to 7.7-7.9. Early work indicates the Owens Valley fault is ~140 kilometers long, and ~113 kilometers ruptured in 1872. Recent work comparing magnitude estimates from reported shaking effects versus fault rupture parameters suggests that the Owens Valley surface rupture was either longer than previously suspected, or that there was unusually strong ground shaking during the event. Colin Amos of Western Washington University and colleagues tested the hypothesis that the 1872 rupture may have extended farther to the south in Owens Valley. They conclude that the 1872 Owens Valley earthquake did not trigger additional rupture in the Haiwee area, indicating that the 1872 rupture was not likely significantly longer than previously reported.

Amos and colleagues dug trenches in the southwestern Owens Valley area to look at the prominent Sage Flat fault east of Haiwee Reservoir. The trench data, combined with dating of the exposed sediment, allowed them to preclude the southern extent of the 1872 rupture from the Sage Flat area and identify two other much older surface-rupturing

earthquakes in the area 25,000 to 30,000 years ago. The evaluation of their trench site suggests that the only recent ground disturbance, possibly coincident with the 1872 [earthquake](#), was mostly weak fracturing that may have resulted from ground shaking—rather than triggered slip along a fault. Soil liquefaction—the conversion of soil into a fluid-like mass during earthquakes – likely occurred at other nearby saturated wetlands and meadows closer to the axis of the valley.

More information: "Refining the southern extent of the 1872 Owens Valley Earthquake rupture through paleoseismic investigations in the Haiwee area, southeastern California" by Colin B. Amos et al. *Bulletin of the Seismological Society of America*, 2013.

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