## Are we still seeing aftershocks of the M~6.8 1872 Central Washington State earthquake?

Tom Brocher

Earthquake Science Center, U.S. Geological Survey

brocher@usgs.gov

We investigate spatial and temporal relations between an ongoing and prolific seismicity cluster in central Washington state, near Entiat, and the December 14, 1872 Entiat earthquake, the largest historic crustal earthquake in Washington. A fault scarp produced by the 1872 earthquake lies within the Entiat cluster, and the locations and areas of both the cluster and the estimated 1872 rupture surface are comparable. Seismic intensities and the 1 to 2 m of coseismic displacement suggest a magnitude range between 6.5 and 7.0 for the 1872 earthquake. Aftershock forecast models for (1) the first several hours following the 1872 earthquake, (2) the largest felt earthquakes from 1900 to 1974, and (3) the seismicity within the Entiat cluster from 1976 through 2016 are also consistent with this magnitude range. Based on this aftershock modeling, most of the current seismicity in the Entiat cluster could represent aftershocks of the 1872 earthquake. Other earthquakes, especially those having long recurrence intervals, have long-lived aftershock sequences, including the M<sub>w</sub> 7.5 1891 Nobi earthquake in Japan, with aftershocks continuing 100 years after the mainshock. Although we do not rule out ongoing tectonic deformation in this region, a long-lived aftershock sequence can account for these observations.