Kentucky Geological Survey

September 28, 2018 Indonesia (M 7.5)

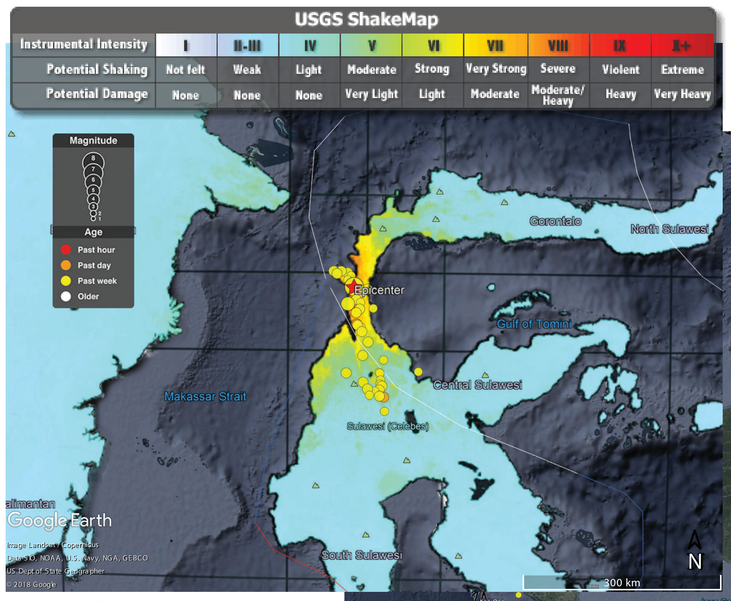
10:02:43 UTC / 18:02:43 at epicenter

University of Kentucky

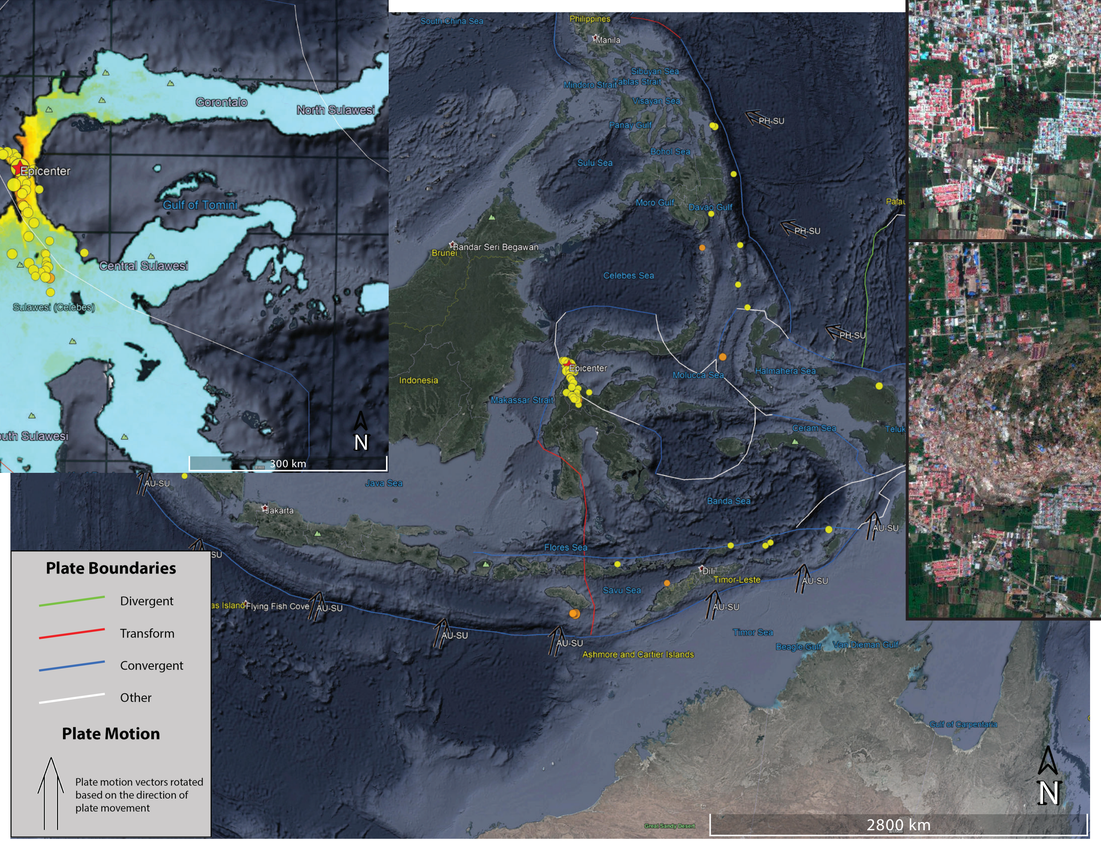
Kentucky Seismic and Strong Motion Network

College of Arts and Sciences
Department of Earth and Environmental Sciences

The September 28, 2018 magnitude 7.5 earthquake near Palu, Indonesia occurred near a microplate (minor tectonic plate) boundary within the Sunda tectonic plate. Very strong shaking was experienced from this earthquake due to its magnitude and shallow depth (10 km) and its proximity to populated areas, including Palu (population of more than 335,000), ~40 km to the south of the modeled causative fault. Soil liquefaction was induced and widespread destruction and damage, especially in low-lying and coastal areas, occurred. The shallow earthquake also generated a tsunami. More than 1,200 deaths have been reported from this earthquake.



Top: Predicted (modeled) shaking intensities.

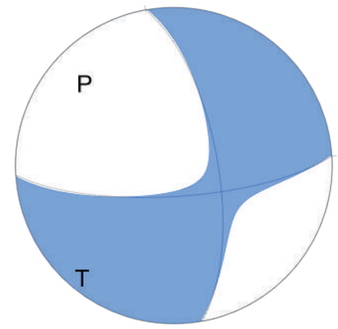


Right: Tectonic plate boundaries, colored by type, and recent earthquakes.

Before and after satellite images of the Petobo neighborhood, in SE Palu.

Courtesy of: http://www.abc.net.au/news/2018-10-02/satellite-images-before-and-after-indonesia-tsunami/10328562

USGS Source Mechanism



W-Phase Moment Tensor (Mww)

Moment	2.497e+20 N-m
Magnitude	7.53 Mww
Depth	13.5 km
Percent DC	90%
Half Duration	20.48 s
Catalog	US
Data Source	US
Contributor	US

Nodal Planes

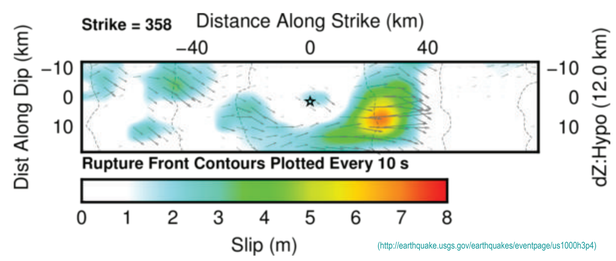
Plane	Strike	Dip	Rake
NP1	87°	74°	-156°
NP2	350°	67°	-17°

Principal Axes

Axis	Value	Plunge	Azimuth
T	2.429e+20 N-m	4°	217°
N	0.132e+20 N-m	62°	119°
P	-2.561e+20 N-m	28°	309°

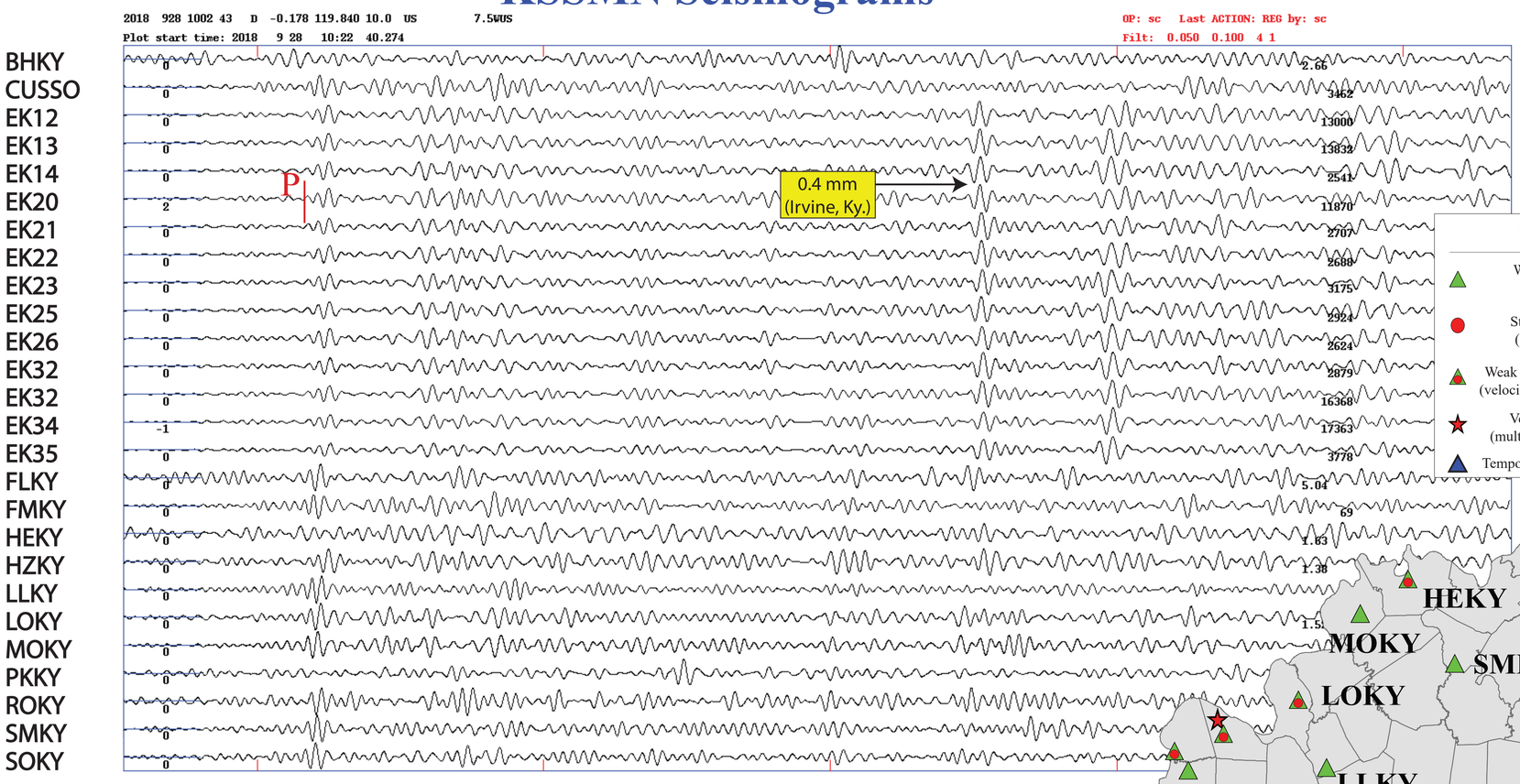
This mechanism indicates predominantly strike-slip faulting. The aftershock distribution clarifies that the 350° striking plane ruptured in the earthquake.

Slip (rupture) along Fault

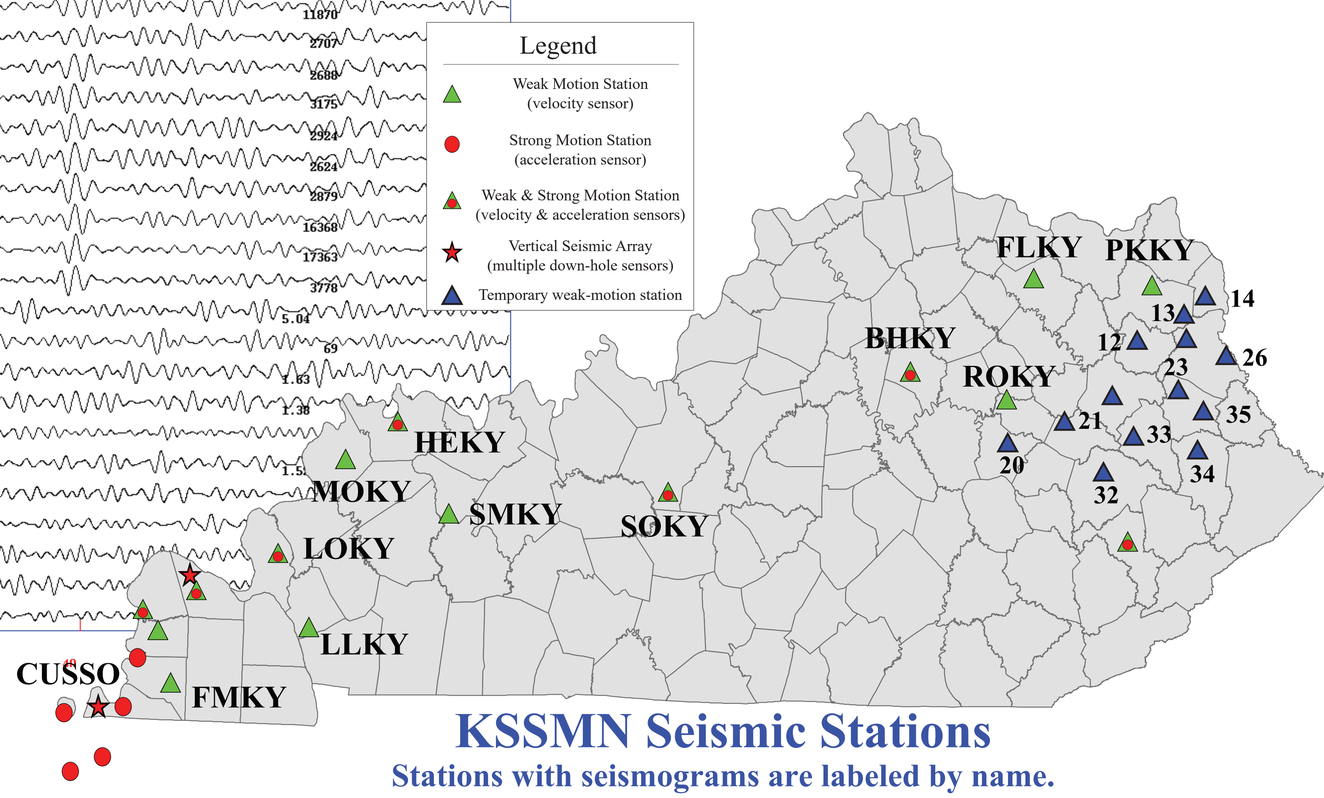


Fault rupture occurred for more than 30s and slip (i.e. displacement) of up to 8 m may have occurred, at a location 20 m down the fault plane.

KSSMN Seismograms



"P" marks arrival time of primary body-wave in Irvine, Ky. Peak up-and-down surface-wave displacement recorded at EK20 is labeled.



KSSMN Seismic Stations

Stations with seismograms are labeled by name.