Kentucky Geological Survey

August 9, 2020 Sparta, N.C. (Mw 5.1)

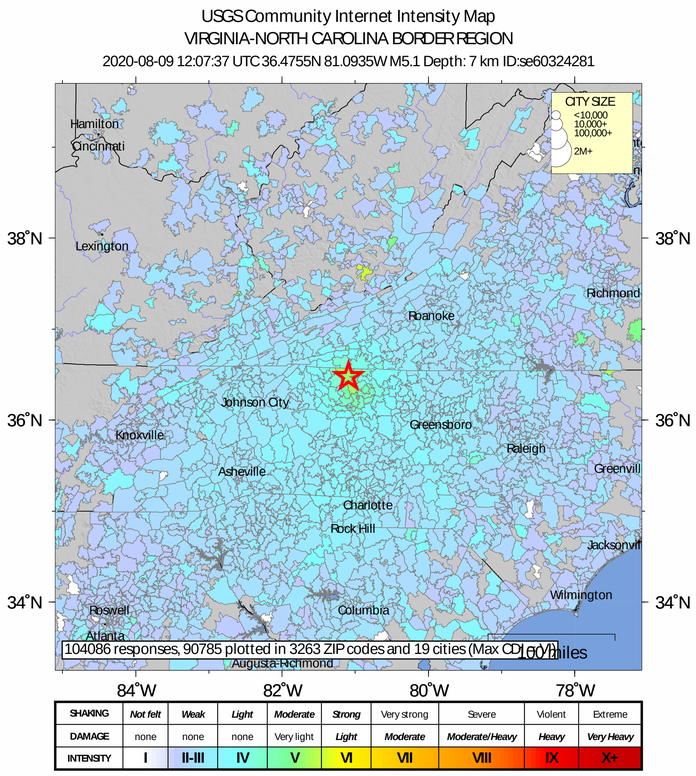
12:07:37 UTC / 08:07:37 at epicenter

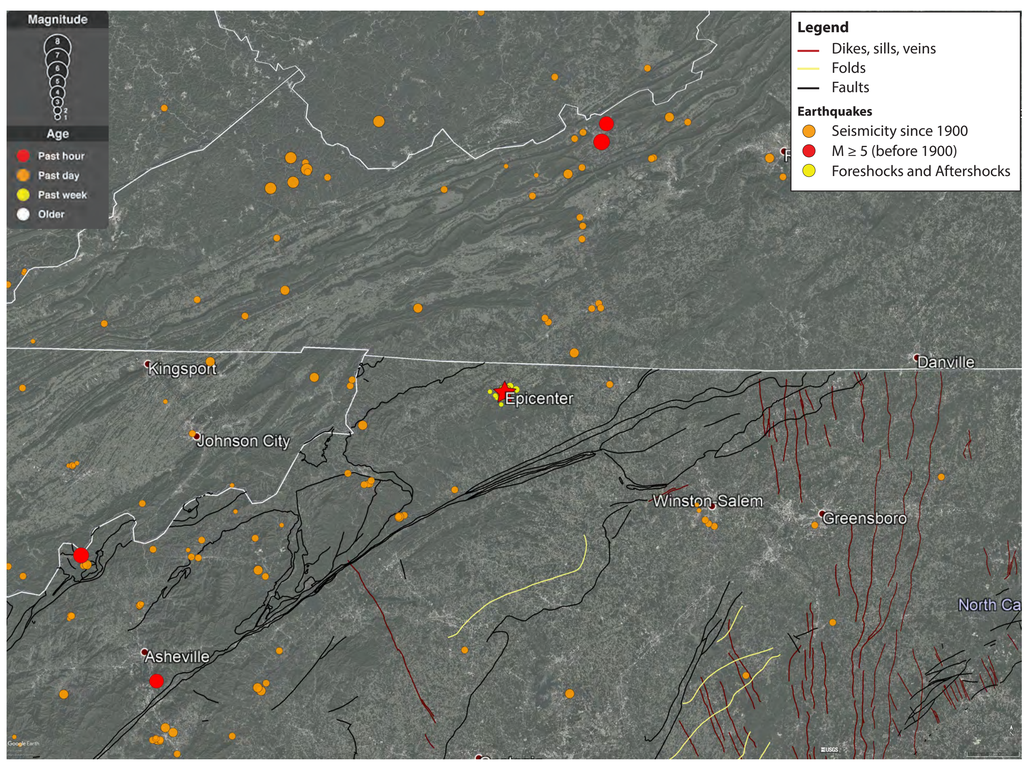
University of Kentucky

Kentucky Seismic and Strong Motion Network

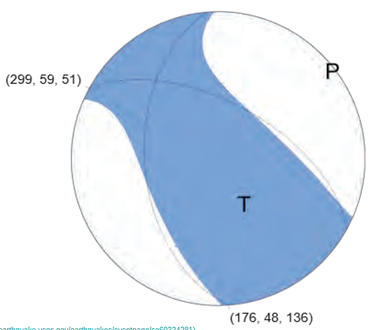
College of Arts and Sciences
Department of Earth and Environmental Sciences

The August 9, 2020 moment magnitude 5.1 earthquake near Sparta, North Carolina, occurred in a region of sparse and infrequent earthquake activity (below). The earthquake is the largest event within 100 km of the epicenter to have occurred since 1897 and was felt across a large area (below, left), and caused damage near the epicenter. As with most earthquakes in the central and eastern U.S., this event did not occur on a known fault. The source mechanism (below, right) indicates that compressive tectonic forces caused rupture on an upper-crustal fault whose orientation is oblique to the major structures related to the Appalachian mountains, which trend northeast-southwest in the region.



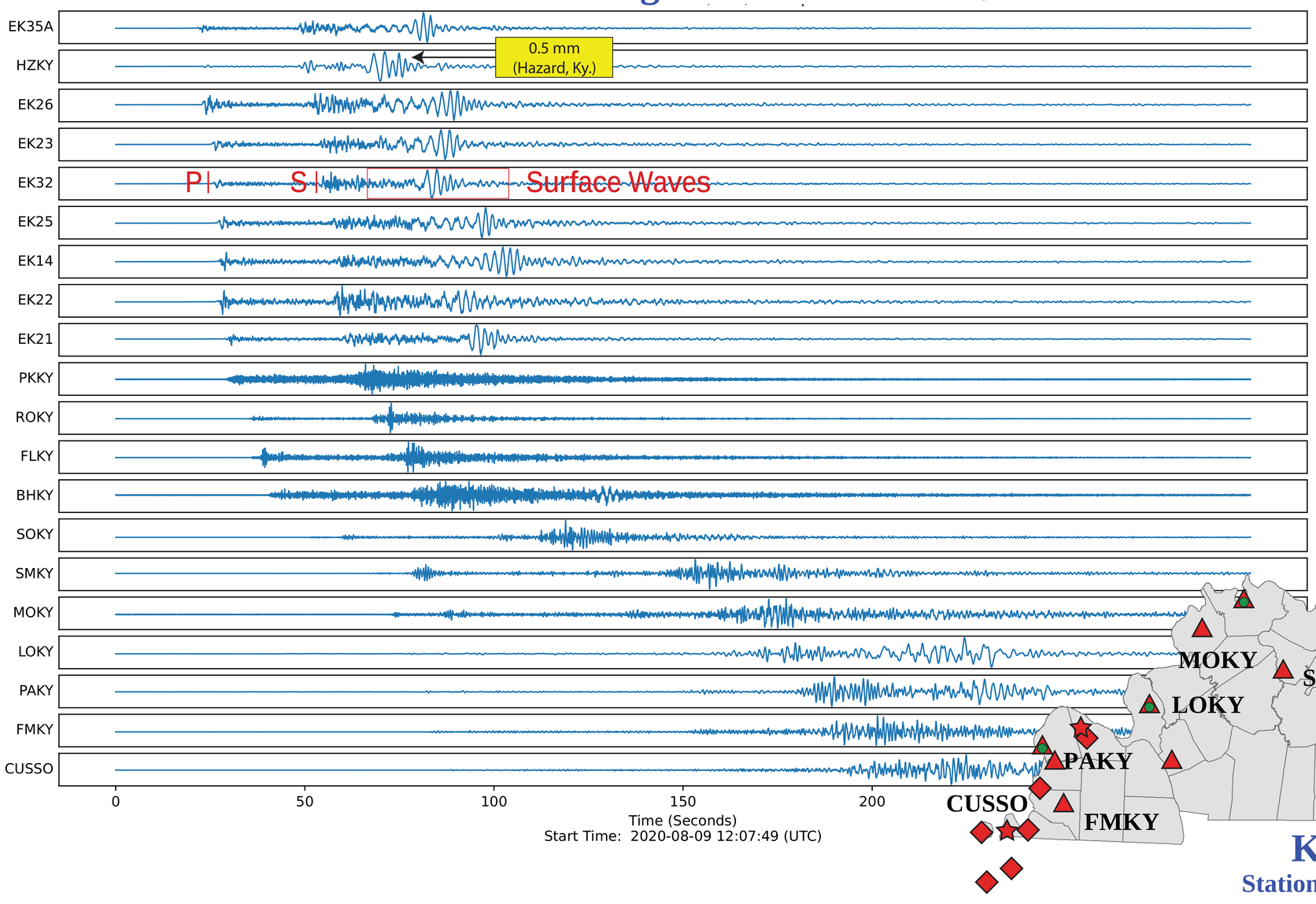


USGS Source Mechanism

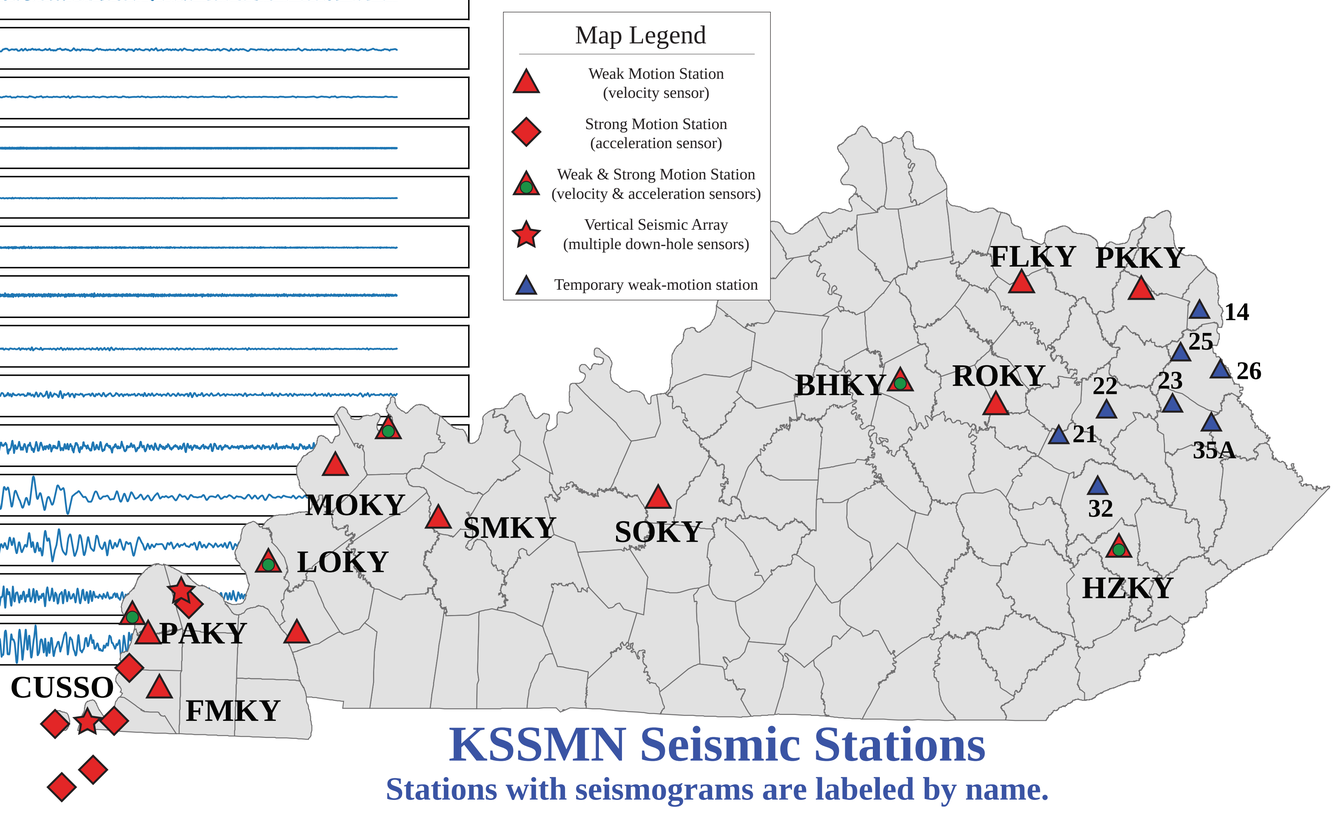


This focal mechanism, derived from seismograms, shows that oblique-reverse faulting occurred on a west- or northeast-dipping fault plane.

KSSMN Seismograms (~200-750 km away)



"P" and "S" mark P- and S-wave arrival times, respectively, at monitoring station EK32 in Jackson, Ky. Peak surface-wave displacement recorded at HZKY (Hazard, Ky.) is labeled. Some differences in waveform appearances are due to the different types of KSSMN instruments.



KSSMN Seismic Stations

Stations with seismograms are labeled by name.