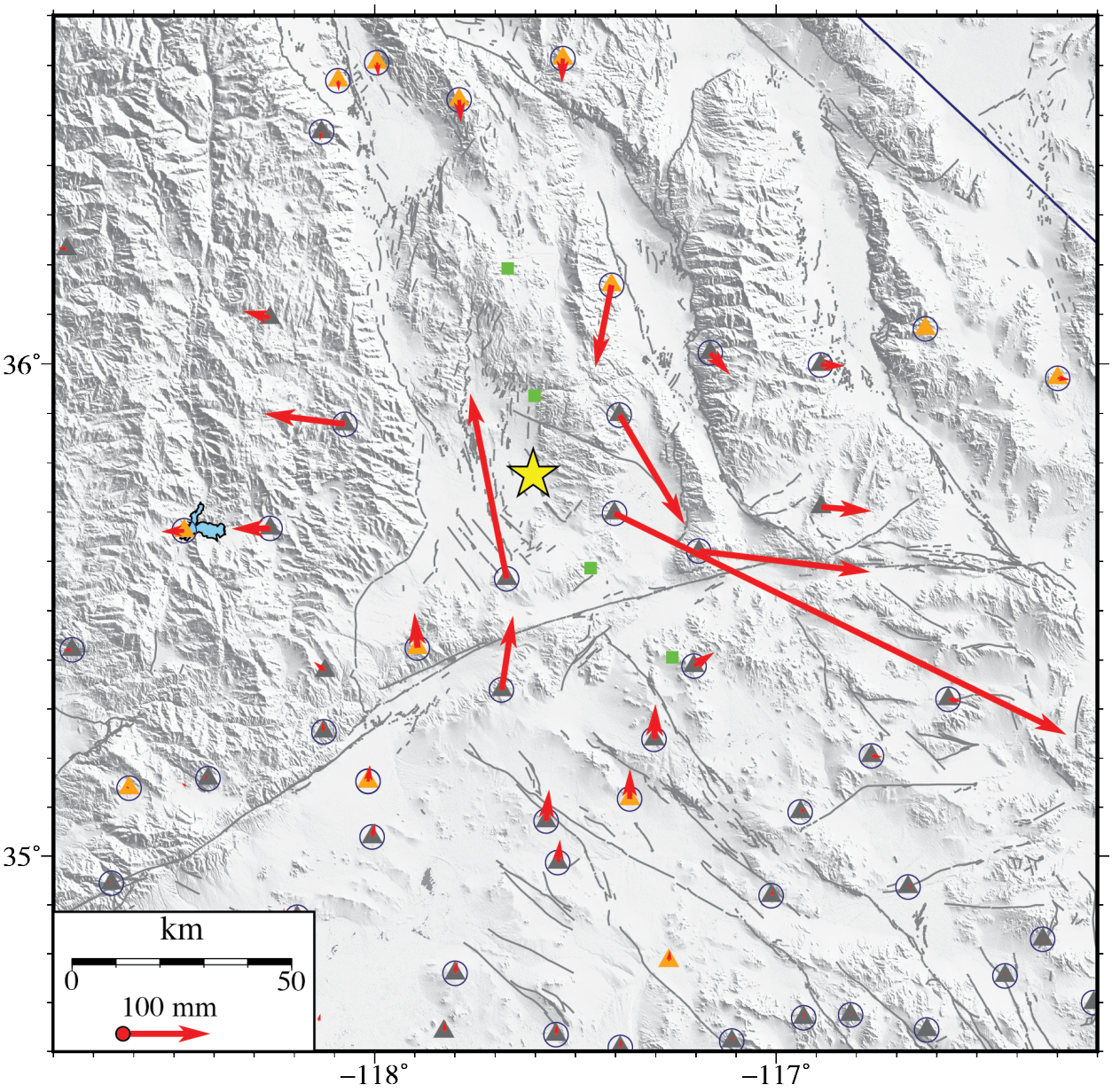
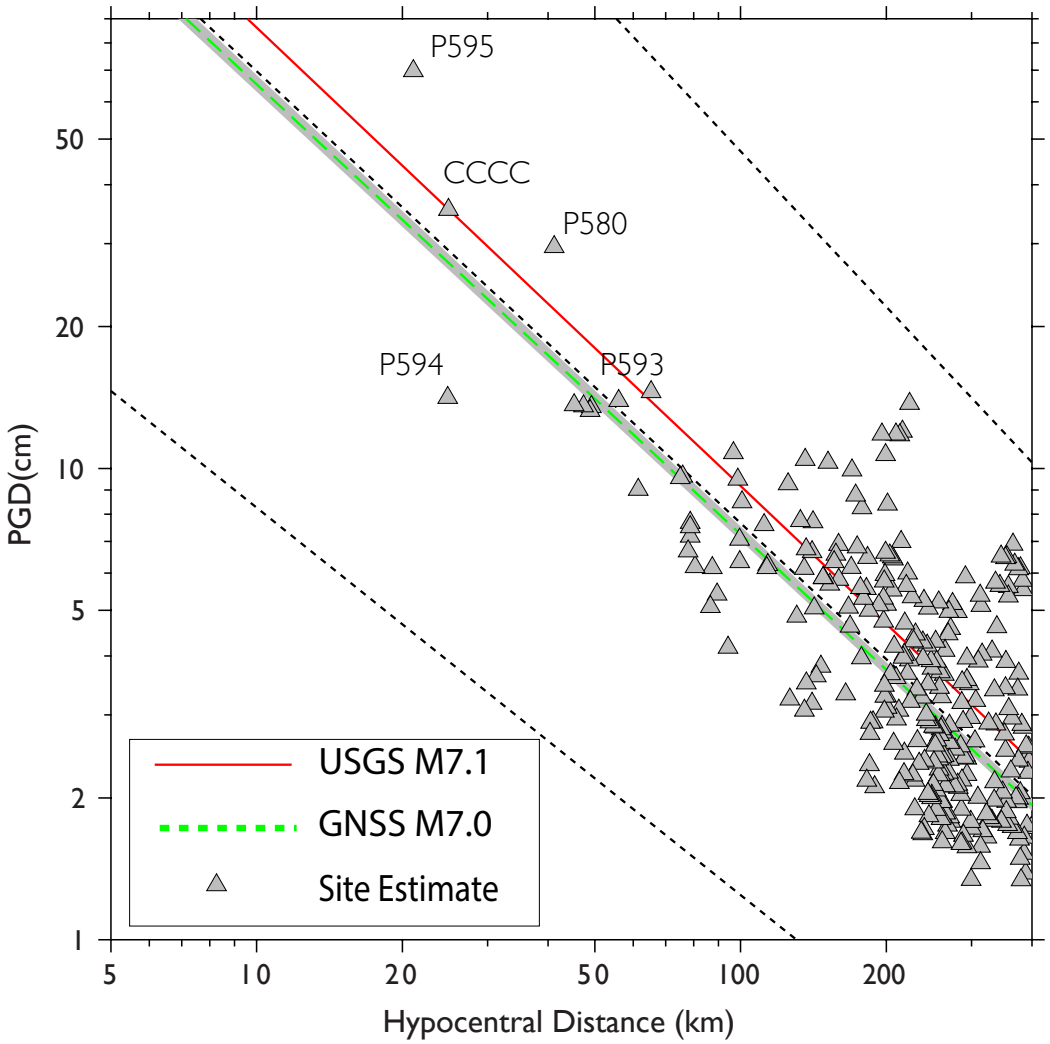
The Ridgecrest earthquake sequence occurred within the footprint of the Network of the Americas (NOTA), which federates the former EarthScope Plate Boundary Observatory, TLALOCNet in Mexico, and COCONet in the Caribbean. NOTA is operated by UNAVCO and funded by the National Science Foundation as part of the Geodesy Advancing Geoscience (GAGE) Facility. Streaming and archived GPS/GNSS, borehole seismic and borehole strainmeter data have yielded a wide array of incredibly valuable dynamic displacements and strains, and these data highlight the utility of NOTA to support diverse applications, including earthquake early warning. Most importantly, the M7.1 Ridgecrest earthquake sequence provided a series of tests for the NOTA real-time streaming and analysis system, telemetry robustness and latency, and station response to high local ground acceleration.

VSat, cellular and microwave telemetry at NOTA stations within shaking intensity zones of MMI VIII and below remained online and continued to stream GNSS, strain, and seismic data during the events. Three VSat systems within 25 km of the Ridgecrest mainshock epicenters did continue to operate, but these stations had streams with either increased latency or decreased completeness, and thus the VSat systems needed adjustment due to local coseismic displacement/rotation. Within days following the event, 100% of 15 s, 1 Hz, and 5 Hz GNSS data logged during the event were retrieved from all stations within 200 km of the epicenters and ~93% of data for 774 stations out to 1000 km.

NOTA 1 Hz GNSS data streams are used to estimate precise point positions, in turn used to estimate peak ground displacements (PGD), which were on the order of 350 and 700mm for the closest stations during the Ridgecrest sequence. If GNSS-derived PGD from stations proximal to the hypocenter were integrated into the southern California earthquake early warning system, a magnitude estimate of M6.8±0.2 would have been available within ~20 seconds or an estimate of M6.95±0.2 within 35 seconds for the M7.1 rupture. We note that the estimate from the ShakeAlertLA system saturated at M6.3 for this event. The NOTA RT-GNSS PGDs clearly illustrate the incredible value that these additional observations would have during major earthquakes, where strong ground shaking is expected in at risk urban areas.



Co-seismic horizontal displacements from the M7.1 as measured by 24hr daily position data. Offsets provided by Tom Herring (MIT). Displacement of the two closest stations are ~60cm for P595 and 25 cm for CCCC.



Magnitude estimated from the GNSS data using the Melgar and Crowell (2015) earthquake magnitude scaling relation using horizontal GNSS measurement. Red line shows the USGS estimate based on seismic data; green dashed line shows the estimated derived from an inversion of the GNSS data.