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Absolute locations for shallow earthquakes in eastern Iran with SAR interferometry, macroseismic and teleseismic data

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Absolute locations of earthquakes in parts of Asia including Iran can be difficult to determine with teleseismic data. Shallow earthquakes deform the Earth's surface and that can be measured with synthetic aperture radar (SAR) interferometry. To compare the epicenter locations determined with teleseismic data to the SAR interferometry (InSAR) locations, we use small earthquakes to reduce the uncertainty between the centroid and epicenter locations. Since InSAR measures the static deformation, it can only locate the final rupture configuration. We determine a precise absolute location for the M_w 5.4 Chakhu earthquake of 20 June 1997 in eastern Iran using the InSAR deformation on both ascending and descending track interferograms. To distinguish which earthquake caused the observed deformation, we used the macroseismic observations of strong damage at the village of Chakhu. This event is then used to calibrate the absolute location of an entire cluster of earthquakes in this area that were located with a relative location technique.