

The surface displacement field of the November 8, 1997,
Mw7.6, Manyi (Tibet) earthquake observed with ERS
InSAR data

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ERS2 radar data acquired before and after the Mw7.6, Manyi (Tibet) earthquake of November 8, 1997, provide geodetic information about the surface displacement produced by the earthquake in two ways. (1) The sub-pixel geometric adjustment of the before and after images provides a two dimensional offset field with a resolution of ~1m in both the range (radar line of sight) and azimuth (satellite track) directions. Comparison of offsets in azimuth and range indicates that the displacement along the fault is essentially strike-slip and in a left-lateral sense. The offset map reveals a relatively smooth and straight, N78E surface rupture that exceeds 150 km in length, consistent with the EW plane of the Harvard CMT solution. The rupture follows the trace of a quaternary fault visible on satellite imagery (Tapponnier and Molnar, 1978; Wan Der Woerd, pers. comm.). (2) Interferometric processing of the SAR data provides a range displacement map with a precision of a few millimeters. The slip distribution along the rupture reconstructed from the range change map is a bell-shaped curve in the 100-km long central section of the fault with smaller, local maxima near both ends. The curve shows that the fault slip exceeds 2.2 m in range, or 6.2 m strike-slip, along a 30-km long section of the fault and remains above 1 m in range, ~3 m strike-slip, along most of its length. Preliminary forward modeling of the central section of the rupture, assuming a uniform slip distribution with depth, indicates that the slip occurred essentially between 0 and the depth of 10 km, consistent with a relatively shallow event (Velasco et al., 1998).