

Geodetic Study of the Kangra Earthquake 1905

Kali Wallace » Dept of Geological Sciences, University of Colorado

Vinod Gaur » CMMACS, Bangalore, India

Frederick Blume » Dept of Geological Sciences, University of Colorado

Susan Hough » U.S. Geological Survey, Pasadena, CA

R. Bilham » Dept of Geological Sciences, University of Colorado

Until the occurrence of the Kashmir earthquake of 2005, the rupture dimensions of few Himalayan earthquakes were constrained by geodetic or well-located aftershock data. The relatively modest Chamoli earthquake (M6.4) is an exception because this quake occurred when Interferometric Synthetic Aperture Radar (InSAR) imagery was available (Satyabala and Bilham, 2006). A second exception is the 1905 Mw=7.8 Kangra earthquake (Wallace et al., 2005). We recovered geodetic points in the vicinity of the rupture zone using GPS methods and were able to provide constraints on the southernmost and western extent of rupture. From a re-calculated magnitude (Ambraseys and Bilham, 2000) and re-evaluated intensity data (Ambraseys and Douglas, 2003), we calculated a possible rupture area and hence along-strike

rupture length and slip. The study suggests that rupture did not extend beneath the lesser Himalaya and stopped close to the Jawalmuki thrust, near a hydrocarbon seep, flames from which are alleged to have suddenly engulfed priests in the Hindu Temple in the minutes before the earthquake (Baduwi, 1905). A reported zone of high intensity shaking near Dehra Dun was shown to be caused by a triggered earthquake with $M \leq 7$ that shows in the coda of the mainshock in some European seismograms (Hough et al., 2005). The absence of significant slip 200 km SW of the Kangra mainshock is consistent with the detection of an error in the leveling data that had hitherto been interpreted as significant uplift in the region (Bilham, 2001), and which had been the subject of much previous fruitless theoretical modeling.

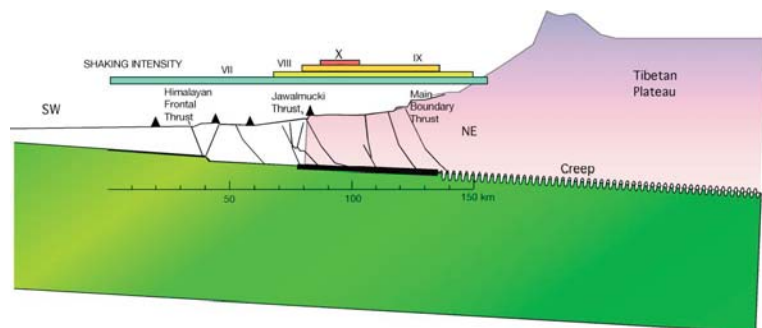
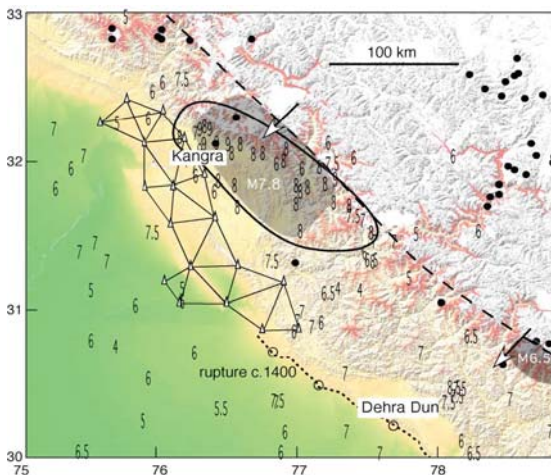


Figure 1. Geodetic network, intensities and recent earthquakes near the inferred rupture zone of the 1905 Kangra earthquake. **Figure 2.** Section through inferred rupture showing intensities and geodetic coverage.

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