



The 1994-2004 Al Hoceima (Morocco) earthquake sequence: conjugate strike-slip fault ruptures deduced from InSAR

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We study the May 26, 1994 (Mw=6.0) and February 24, 2004 (Mw=6.4) earthquakes that occurred in the Al Hoceima region of northern Morocco. The exact location and kinematics of these earthquakes are not known in detail because neither of them produced surface ruptures, i.e., the two earthquakes took place on nearby blind strike-slip faults. Using Synthetic Aperture Radar interferometry (InSAR) we map the surface displacement field of the two earthquakes to characterize their seismic source parameters. The analysis of the ascending and descending interferograms of both earthquakes and subsequent elastic modeling suggest that the two mainshocks occurred on conjugate strike-slip faults; the 1994 earthquake being associated with N20°E trending left-lateral fault and the 2004 earthquake with N50°W trending right-lateral fault. This result contradicts previous inferences on the kinematics, location and rupture geometry of the earthquakes deduced from conventional analyses of seismic waveforms and aftershocks distribution. The InSAR analysis and the recent seismic events reveal the fragmentation of the Rif Mountain throughout a complex network of conjugate strike-slip faults with an east-west extension.