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Co-Seismic Deformation of Iran, 2021 Earthquake using DInSAR Technique

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Abstract

In the present study, the co-seismic deformation of an earthquake of Mw 6.4 magnitude (maximum intensity between VII-IX) occurred NNW side of the Bandar Abbas in Iran on 14th November 2021 at 12:08:38 (UTC) was estimated. The epicenter of the event was 27.73º N, 56.068º E with a focal depth of 10km. The epicentral region was near the southern margin of the collision zone of the Eurasian plate and the Arabian plate. Co-seismic de-formation of the earthquake was estimated using the differential InSAR (DInSAR) technique, which is carried out using microwave SAR data pairs from both ascending and descending pass of the Sentinel-1A satellite. LOS ground deformation for the Iran earthquake that occurred on 14th November 2021 is estimated using GMTSAR open software. SRTM DEM of 30 m is used in the processing of the SAR data. The preliminary results indicate that the earthquake deformation field has thrust fault characteristics. In ascending pass, subsidence of about -200 mm SSE side of the fault, i.e., away from the line of sight (LOS) of satellite and uplift of about 300 mm NNW side of the fault, i.e., towards the line of sight of the satellite. In descending pass, subsidence of about -135 mm SSE side of the fault and uplift of about 348 mm NNW side of the fault.

Keywords: Sentinel-1A, DInSAR, Co-seismic deformation, Thrust fault, Microwave SAR data