

Co-Seismic Surface Deformation Induced By 24 September 2019 Mirpur, Pakistan Earthquake Along an Active Blind Fault Estimated Using Sentinel-1 TOPS Interferometry

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Abstract : On 24 September 2019, an earthquake with 5.6 Mw and 10 km depth stroke in Mirpur. The Mirpur area was highly affected by this earthquake, with the death of 34 people. This study aims to estimate the surface deformation associated with this earthquake. The interferometric synthetic aperture radar (InSAR) technique is applied to study earthquake induced surface motion. InSAR data using 9 Sentinel-1A SAR images from 11 August 2019 to 22 October 2019 is used to investigate the pre, co-, and post-seismic deformation trends. Time series investigation reveals that there was not such deformation in pre-seismic time period. In the co-seismic time period, strong displacement was observed, and in post-seismic results, small displacement is seen due to aftershocks. Our results show the existence of a previously unpublished blind fault in Mirpur and help to locate the fault line. Previous this fault line was triggered during the 2005 earthquake, and now it's activated on 24 September 2019. Study area is already facing many problems due to natural hazards where additional surface deformations, particularly because of an earthquake with an activated blind fault, have increased its vulnerability.

Keywords : surface deformation, InSAR, earthquake, sentinel-1, mirpur

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