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# ANALYSIS OF COSEISMIC SURFACE DEFORMATIONS AFTER THE 2022 M6.2 AFGHANISTAN EARTHQUAKE

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Integration of satellite radar interferometry (InSAR) methods with geophysical information is a powerful tool for detecting seismic effects on the surface and better understanding the phenomenon of both natural and induced tremors. Interferometric data provide information about pre-seismic, coseismic and post-seismic changes taking place on the ground surface in the area of the tremors. This enables the process of source inversion for a finite rectangular fault plane and to examine the occurrence of discontinuous deformations related to the movement of rock masses along the fault.

This research was about the Afghanistan M6.2 earthquake occurred on June 21, 2022 at 20:54:34 (UTC) with its range covering both the eastern area of Afghanistan and western and northern Pakistan. According to the USGS, the main shock was characterized as strike-slip faulting, either left-lateral slip on a northeast-striking fault or right-lateral slip on a northwest-striking fault. Following the main shock, a sequence of 16 aftershocks took place between June 21 and August 22, 2022.

The computational work provided a multifaceted analysis of the Afghanistan June 21, 2022 earthquake, which was divided into several stages:

1. Determination of one-dimensional coseismic displacements along the radar line of sight (LOS) for two paths (ascending and descending) using the GMTSAR.

2. Decomposition of displacements into horizontal (east-west) and vertical components.

3. Performing an earthquake source inversion to define the parameters of the fault surface in the GROND package.

4. Generation of phase gradient maps for coseismic and post-seismic displacements to detect small-scale discontinuous deformations as a consequence of the main tremor.