

Title :

Continuous Monitoring of Seismic and Aseismic Slip along the Chaman Fault System from InSAR

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Abstract:

The Chaman fault system (Afghanistan, Pakistan) is a major tectonic boundary between the Indian and Eurasian plates, that accommodates 2-4 cm/yr of long-term sinistral slip rate. However, very few large earthquakes have been recorded on this 850 km-long fault system and, thus, a vast amount of slip has to be released aseismically. In order to characterize the recent spatial and temporal distribution of slip, we build and continuously update a time series of ground deformation from 2014 to 2019 using InSAR data from the ongoing Sentinel1 mission (European Space Agency). Efficient monitoring of the fault is performed by a Kalman filter time series analysis, which enables rapid update of pre-existing time series. We identify and characterize the along-fault segmentation of slip with notably an 80 km-long segment creeping at 7 ± 2 mm/yr. Moreover, we identify the signature of three Mw5+ earthquakes and their associated post seismic signal. We discuss the dynamics of fault creep and its interplay with seismic slip along this major plate boundary.

Keywords: Spatial geodesy, Seismology, Data assimilation.