



## **Damavand volcano spreading detected by advanced InSAR time series**

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Unlike the ordinary mountains, volcanoes are mostly formed rapidly. As a result many of them are subject to gradual spreading and sometimes massive flank failures. This spreading specially in case of being directional can be assessed as a precursor for the future flank collapse. Herein using an advanced InSAR time series approach and consuming a data set of ENVISAT radar images spanning period of 2003 till 2009 we obtain spatiotemporal deformation field over Damavand volcano, in north Iran. This volcano that is located in the north-east of the capital city Tehran with over 13 million inhabitants, exhibit continuously fumarolic activity and considered as potentially active volcano. The obtained deformation time series shows sort of gradual spreading in the direction of the regional stressing access which emphasizes that spreading and probable failure can happen even without any associated magmatic activity. In this work using InSAR time series, geological and metrological data we investigate the presence of spreading partitioning regarding the geological units and also we assess the influence of the rain fall on the occasional changes in the rate of spreading. Finally we underline the importance of continuous monitoring (such as the approach we employed here for InSAR time series generation) for timely forecasting future flank failure associated to Damavand volcano, which might be another significant hazard for Tehran city, regardless of magmatic activity.