**Atmospheric Correction on DInSAR Measurement of the Himalaya and Adjoining Piedmont Zone of the Ganga Plain, Uttarakhand, India**

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**ABSTRACT:** The Himalaya and adjoining Ganga (also called Gangetic) plain in Uttarakhand state of India are traversed by a number of neotectonically active longitudinal and transverse faults. However, the pattern and extent of present day surface deformations caused by these faults is not yet well known. Interferometric Synthetic Aperture RADAR (InSAR) technique has been successfully used to observe the surface deformation with the high spatial resolution. In this study, we applied this technique to monitor the recent deformation of our target area. The propagation delay when radar signals travel from the troposphere has been one of the major limitations for the application of InSAR. To solve this problem, some methods have been proposed in the past decade years. (1) InSAR technique, which combines the optical images to correct the atmospheric delay caused by water vapor. (2) Persistent Scatterer InSAR (PSI) technique, which chooses the stable scatterers with time series images, can estimate and reduce the effects by processing high-pass filtering in time and low-pass filtering in space. The atmospheric effect is especially significant in our study area because some parts are covered with forest, under agricultural and of high mountains with different climate situation. Therefore, except for the PSI technique, we also applied an atmospheric correction model based on MODIS data for the generated interferograms. Then through the method of stacking, we generated a mean deformation velocity map, which is quite consistent with the PSI result of the area. These results successfully reveal obvious surface deformation, which may be related directly to the active movements along some of the major fault /thrust in the area. For example the Himalayan Frontal Thrust (HFT) and the transverse Garampani-Kathgodam Fault (G-KF).