**Coherence Analysis of Small Baseline Subset Displacement Model Types in Deformation Monitoring**

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***ABSTRACT***

In coastal cities around the globe, engineering projects for land reclamation are being implemented to accommodate the demands of rapid population growth and economic development. To provide the necessary transformation services, airports are constructed in a variety of reclaimed areas, including overly moist agricultural regions, oceans, seas, lakebeds, and riverbeds. Nevertheless, the process of land reclamation can give rise to subsidence phenomena, which may subsequently result in damage to the infrastructure and buildings. It is therefore imperative that deformation monitoring be conducted in reclaimed airports to prevent potential risks. In this context, the small baseline subset technique, which is a multi-temporal interferometric synthetic aperture radar approach, has been adopted in numerous studies and has subsequently become a valuable asset. Moreover, the utilisation of the small baseline subset technique facilitates the implementation of deformation time series analysis in the reclaimed airport areas. In this study, coherence analysis was conducted on two types of small baseline subset displacement models: linear and quad. The analysis was carried out by monitoring deformation in Hatay Airport with a dataset of Sentinel-1A single-look complex images, spanning the period between 2 December 2017 and 29 January 2023. Furthermore, atmospheric correction was conducted using the Generic Atmospheric Correction Online Service for interferometric synthetic aperture radar data. In this context, both the mean deformation velocity and the cumulative deformation were acquired in the satellite line of sight direction. Additionally, the cumulative deformation in the vertical direction was obtained for the linear and quad displacement models, with values ranging from -145 mm to 62 mm and from -228 mm to 77 mm, respectively. Finally, the vertical cumulative deformation difference map of the linear and quad displacement models was generated, and a coherence analysis was conducted.

**Keywords:** deformation monitoring, displacement model, multi-temporal synthetic aperture radar, reclamation area, small baseline subset