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MEASUREMENT OF LAND DEFORMATION IN KARACHI USING STAMPS

Abstract

Karachi is a coastal and the largest city of Pakistan whose population is continuously increasing with time. The increase in population has caused large-scale infrastructure construction in terms of both big industries as well as highly dense residential localities. These effects have been reported to cause ground subsidence in urban areas. The effects of land subsidence are more critical in coastal area populations due to the threat of sea-level rise. Assessment of land deformation in Karachi is direly needed to study the effect of this phenomenon. This article studies the land deformation assessment of Karachi city using Interferometric Synthetic Aperture Radar (InSAR) which is a state-of-the-art remote sensing technique for land deformation assessment. 11 interferograms have been generated from Sentinel-1 images and the StaMPS method has been used due to improved processing and results. Land deformation, as high as 39 mm/year, has been measured for some areas, with accuracy as fine as 0.1mm/year. By evaluating the obtained results given ground truth information, important effects related to the dynamics of Karachi city become evident, which have been discussed.