

Monitoring Coastal Land Subsidence in Western Taiwan by Using SBAS-InSAR Technique

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Coastal land subsidence has been identified as one of the major global problems, which may induce various coastal hazards along with socio-economic losses. In Taiwan, because of rapid development and over-pumping of groundwater, many areas along the west coast are also affected by land subsidence. However, the spatiotemporal patterns of the coastal subsidence are less understood. Therefore, we apply Small Baseline Subset Interferometric Synthetic Aperture Radar (SBAS-InSAR) technique to study coastal subsidence between 1995 and 2008 based on ERS-1/2 and Envisat ASAR interferograms. Further, we assess the performance of tropospheric corrections and different phase deramping manners. Results show that Changhua County and Yunlin County were the two major subsidence zones. Besides, Chiayi County, northern Tainan City, and Pingtung County underwent significant coastal subsidence as well. During the period 1995-1999, a maximum subsidence rate of 6.0 cm/yr was observed in Dacheng Township, Changhua County, and 5.3 cm/yr in the northern part of Sixth Naphtha Cracker Complex (which was constructed on reclaimed land), Yunlin County. Between 2006 and 2008, the subsidence center in Changhua County moved inland while the subsidence rate near the coast reduced to about 2.7 cm/yr. The subsidence center in the Sixth Naphtha Cracker Complex moved southward, having a maximum subsidence rate of 7.5 cm/yr.

Keywords: coastal land subsidence, InSAR, SBAS, ERS-1/2, Envisat ASAR