



## **Satellite radar interferometry time series analysis of land subsidence caused by groundwater overexploitation in Tehran, Iran**

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Land surface deformation associated with groundwater overexploitation is a serious challenge for plain aquifers of Iran, particularly in semiarid and arid region. In the Greater Tehran area, the capital of Iran with a population of 14 million people, groundwater discharge has exceeded natural recharge over the last decades, causing significant drawdown of groundwater level and land subsidence. In this study we use 70 interferometric displacement maps derived from Envisat ASAR data acquired in descending and ascending orbits between 2003 and 2007 to map surface subsidence in the Tehran region during these time periods. We compile an optimally accurate displacement time series from all interferometric observations using a weighted least squares technique. The resulting displacement time series of differential SAR interferograms allow us to detect and analyse subsidence in Tehran in far greater detail than currently possible with ground- and satellite-based geodetic measurements from leveling and GPS