Interferometric Synthetic Aperture Radar (InSAR) is a powerful tool that uses radar signals to measure deformation of the Earth's crust. InSAR is now being used to map and monitor subsidence caused by the compaction of aquifer systems. In Hamedan Northern Plains, water is demanded for agriculture, drinking and industry; thus over-extraction of groundwater and drought, leads to water table decline in aquifer as much as at least 15 meters during 20 years. In this area Sate SAR interferometry is used to investigate the slowly compacting ground subsidence at the Noozhe airport nearby Kabudarahang city in Hamedan Province. The aforementioned airport was constructed on carbonate bedrock beneath a thick cohesive alluvial aquifer. High purity of limestone, considerable porosity and existence of numerous joints and fractures favors high karstification in the area which has increased the potentiality of subsidence occurrence. In this research, we used eight Envisat scenes to identify and measure the subsidence occurred in the area over the three years. Our study showed up to 70 mm subsidence in the area from 2003 to 2005, most of which occurred in the last year. The SAR measurement results correlate with the groundwater table measurements in the area where the over-extraction and drought are responsible for the occurred problems.