Investigation of the land subsidence in the Konya plain using hydrogeological and Sentinel-1 time-series data

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Land subsidence due to overuse of groundwater is a common problem in urban areas built on thick, unconsolidated loose soil as is the case in the Konya plain. In this study, we characterize the hydrologically induced time-dependent ground deformation using Sentinel 1 A-B radar images collected between 2014-2018 on both ascending and descending orbits. The vertical velocity fields obtained through the decomposition of two tracks (T160 and T167) show that the Konya plain is sinking at rates up to 5 cm/yr. Two prominent subsidence lobes fall primarily into the urban area of Konya and both of them largely result from groundwater exploitation. Combining InSAR-derived ground deformation and groundwater level pressure head variations in the aquifer throughout the subsidence basin, we analyzed the aquifer system properties such as compressibility and storativity (storage coefficient) properties of the underlying basin.