



## **Land subsidence in Wuhan, China: Results from C-band and X-band Multi-Temporal InSAR analysis and Geological interpretation**

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**ABSTRACT:** As the central city of central China and the core city of the Yangtze River Economic Belt, Wuhan has experienced significant regional land subsidence and uplift in recent decades due to industrial production, rapid population growth and intensive municipal construction. These regional non-uniform deformation poses a serious threat to the urban infrastructure and even causes geological hazards to the environment, which, in turn, hinders the process of urban development in Wuhan. Little information is already known about the rates and patterns of long-term ground deformation in Wuhan. In this study, we use 31 medium-resolution, C-band Sentinel-1A ascending SAR images (2015.4.11-2017.9.15) and a total of 120 high-resolution X-band TerraSAR-X SAR images from two ascending tracks covering (2003.4.16-2017.9.8) to extract the characteristics of land subsidence in large areas and long-term scales in Wuhan. The results of these two satellites on one hand can be used to make a cross validation, and on the other hand can be used to demonstrate the complementarity of C- and X-band in urban and non-urban areas measurement. The results are compared with 110 leveling/GPS data. Finally, a geological analysis of the detected subsidence is given based on the soil thickness of Wuhan, groundwater level measurements and water level changes in the Yangtze River to assess the effect of different parameters contributing to ground deformation in Wuhan.