

The pace of urbanization has been unprecedented. Rapid urbanization poses significant social and environmental challenges, including sprawling informal settlements, increased pollution, urban heat island, loss of biodiversity and ecosystem services, and making cities more vulnerable to disasters. Therefore, timely and accurate information on urban changing patterns is of crucial importance to support sustainable and resilient urban development. The overall objective of this research is to develop Earth Observation (EO)-based urban information services to support smart cities and sustainable urbanization. The specific objectives are: 1) to develop novel methods for better characterization of spatiotemporal patterns of urbanization and assessment of urban capacity; 2) to explore advanced InSAR and Optical image processing technique for land surface classification and change detection; and 3) to exemplify the smart city approach through Earth Observation in conjunction with GIS and urban models, in order to address two fundamental pillars of urban climate and environment: urban thermal environment and urban hydrology, with emphasis to urban flooding and subsidence. Novel methods have been developed using SAR, InSAR and optical time series for urban extent and land cover mapping, 2D and 3D change detection, urban thermal environment and subsidence monitoring, as well as analysis of the environmental impact of urbanization at multiple scales. The results show that SAR and optical time series can be effectively used for deriving urban information, monitoring their spatial-temporal changing patterns, and assessing environmental impact, thus support smart cities and sustainable urbanization. The project has produced high number of peer-reviewed publications during the Dragon 4 program.