

Sentinel Data Cube for Urban Change Detection

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Abstract

Since 2008, more than half of the world population live in cities, and by 2015, nearly 4 billion people -54 per cent of the world' s population - lived in cities. That number is projected to reach 5 billion by 2030 (UN, 2018). Rapid urbanization poses significant social and environmental challenges, including sprawling informal settlements, increased pollution, urban heat island, loss of biodiversity and ecosystem services. Therefore, accurate, timely and consistent information on urban growth patterns is of critical importance to support sustainable development. The objective of this research is to develop novel methodologies to exploit Sentinel-1 SAR and Sentinel-2 MSI time series for monitoring urban changes aiming at globally applicable methods. First, model-based urban change detection method is being developed using multitemporal Sentinel-1 SAR data. Then an integrated approach between Sentinel-1 SAR and Sentinel-2 MSI data will be developed in order not only to detect changes but also to be able to label the different types of changes (e.g., agriculture or forest to urban, old low-rise urban to new high-rise urban, etc.) using a near real-time processing of the Sentinel big data. It is anticipated that urban changes in general, new builtup areas in particular, will be detected in a timely and accurate manner. The urban change information has the potential not only to support sustainable planning at municipal and regional levels, but also contribute to the monitoring objectives of UN Sustainable Developments Goal (SDG) 11: Making cities and human settlements inclusive, safe, resilient and sustainable.