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## Land cover mapping analysis using Sentinel-1 satellite: A case study of Hyderabad, India

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In this study, the capability of using Sentinel-1 satellite SAR (Synthetic Aperture Radar) data for land cover mapping in metropolitan areas is investigated. The dual-polarization (VV+VH) Interferometric Wide (IW) swath mode image acquired on February 10th 2018 along descending orbit over Hyderabad city, India has been used. Data have been calibrated, terrain corrected, and filtered by a kernel using gamma filter method. For terrain correction a 30 m resolution Shuttle Radar Topography Mission Digital Elevation Model (SRTM DEM) has been used. Radar data has been reduced to a spatial resolution of 20 m. In general SAR images are well suited to detect urban areas thank to the strong signal responses by double-bounce scattering at the dihedral corner reflector between the ground and the building wall. Different combinations of VV and VH polarizations have been analyzed and the resulting classified images have been evaluated to assess the total classification accuracy. At the end it has been demonstrated that, combining dual-polarization Sentinel-1 (SAR) data are suitable for producing accurate land cover maps in urban areas for metropolitan cities management purposes. This could represent a significant advantage in the case of regions frequently affected by clouds.

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