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PRISMA Hyperspectral – First insights in the performance in urban surface cover and coastal seascape analysis

Dimitris Poursanidis and Nektarios Chrysoulakis
Foundation for Research and Technology - Hellas, Institute of Applied and Computational Mathematics, The Remote Sensing lab, Heraklion, Greece (dpoursanidis@iacm.forth.gr)

The characterization of the Earth's surface cover based on predefined classes is among the fundamental activities in the domain of satellite image analysis image since the early 70s. It was the joint NASA/ U.S. Geological Survey Landsat series of Earth Observation satellites that start to continuously acquired images of the Earth's land surface, providing uninterrupted data to help land managers and policymakers make informed decisions about natural resources and the environment. However, in 2020, the collected data even if are of continuous flow in terms volume of terrabytes per day from various optical and radar systems, are limited in terms of spectral resolution since almost all sensors are limited to a maximum of 25 spectral channels in the visible, near-and-shortwave-and-thermal infrared spectrum. The need of denser spectral information has been highlighted in early 80s and the first satellite-based hyperspectral sensor, AVIRIS, start to provide data allowing the extraction information on material composition and precise surface cover information. Since then few attempt appear but more are undergoing for launching. In 2019, the Italian Space Agency launch the PRISMA hyperspectral satellite which collect spectral data in the 400-2500nm spectrum; in total 250 spectral channels with a spectral width of ~ 12nm, at 30m pixel size. Here we present first results of the use of Level 2D PRISMA hyperspectral data in mapping the surface characteristics of the urban and periurban area of Heraklion city along with the coastal zone of the urban front aiming at the simultaneous creation of a land-and-coastal cover map along with the extraction of coastal bathymetry information using artificial intelligence approaches within open access platforms. The use of hyperspectral information allow the separation of urban surfaces based on material signatures, while the availability of dense spectral information in the blue-green spectrum allow the more accurate retrieval of coastal seascape characteristics. It is envisaged that hyperspectral missions soon to be the normal in Earth Observation, allowing the accurate creation of geospatial information for further use in several applications.