Mapping the land cover in coastal Gabes oases using the EO-1 HYPERION hyperspectral sensor

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Gabes region is characterized by unique maritime oases in Mediterranean basin. Unfortunately these oases are sensitive areas due to a harsh competition for land and water between different user groups (urban, industry, agriculture). An industrial complex is now located in center of this region, cultivation practices have shifted from a traditional multi-layer plant association system and moreover the Gabes city itself is expanding in the very core of oases. The oases of Gabes are transformed into city oases; they undergo multiform interactions whose amplify their environmental dynamic. A proper management of this environment should be based on a fine cartography of land use and remote sensing plays a major role in this issue.

However the use of legacy natural resource remote sensing data is disappointing. The crop production strategies rely on a fine scale ground split among various uses and the ground resolution of these satellites is not adequate. Our study relies on hyperspectral images in order to cartography oases boundaries and land use. We tested the potential of Hyperion hyperspectral satellite imagery for mapping dynamics oases covered. We have the opportunity to access EO1/Hyperion data on seven different dates on 2009 and 2010. This dataset allows us to compare various hyperspectral based processing both on the basis on information pertinence and time stability. In this frame some index appear as significantly efficient: cellulose index, vegetation mask, water presence index. On another side spectral unmixing looks as more sensitive to slight ground changes.

These results raise the issue of compared interest of enhancing spatial resolution versus spectral resolution. Whereas high resolution ground observation satellites are obviously more appropriate for visual recognition process, reliable information could be extracted from hyperspectral information through a fully automatic process.