

Looking for mangroves: detection of the northernmost West-African mangroves in a non-mangrove dominated landscape using remote sensing

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Detection of mangrove forests in the Parc National du Banc d'Arguin (PNBA), Mauritania, in two satellite images is the overall objective of this study. These forests have an extremely discontinuous distribution and are only composed of *Avicennia germinans* (L.) Stearn. The mangroves do not provide a direct social or economic benefit for the fishermen villages located in the PNBA (Dahdouh-Guebas & Koedam, 2001). Nevertheless, mangroves provide breeding, spawning, hatching and nursing areas for fish and shellfish, maintenance of biodiversity, coastal protection, and aesthetic value (Walters *et al.*, 2008). Furthermore, the mangroves of the PNBA are interesting because of their biogeographical characteristics. They are the northernmost mangroves in West Africa and are able to survive in a very dry environment (Dahdouh-Guebas and Koedam, 2001; Blasco, 2010). The mangrove forests of the PNBA have a poor regeneration rate and there are records of a more extended mangrove area 4,000 to 5,000 years ago (Mahé, 1985; Gowthorpe, 1993; Dahdouh-Guebas and Koedam, 2001). Remote sensing is a technique used to detect, describe, quantify and monitor changes of land cover and land-use patterns in spatial and temporal dimensions (Dahdouh-Guebas, 2002; Dahdouh-Guebas and Koedam, 2008). This study analyses two satellite images from Cap Timiris area in the National Park. One image was captured in 2004 with the QuickBird Sensor and the second image was captured in 2011 with the GeoEye-1 Sensor. The image of 2004 has a spatial resolution of 61cm in the panchromatic layer and 2.4m in the multispectral layers. The image of 2011 has a spatial resolution of 41cm in the panchromatic layer and 1.65m in the multispectral layers. The detection of mangroves in this area is challenging because the reflectance of the surrounding land cover – silt, clay and desert soils, herbaceous terrestrial vegetation, and seagrass – confuses the detection process. In particular, this ongoing study will: (i) verify whether given the current technical and local characteristics it is possible to detect mangroves unambiguously and (ii) identify the more useful approaches to detect mangroves according to the current characteristics. Both pixel-based and object-based classifications will be explored, the former being based on spectral information only, the latter on a combination of spectral and shape features. The classifications will be evaluated by means of an error matrix analysis.

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