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Exploring the relationships between biodiversity and benthic habitat in the Primeiras and Segundas Protected Area, Mozambique

The Primeiras and Segundas Archipelago Reserve, located in the waters of northern Mozambique, is the largest marine protected area in Africa, extending over 200 km of coastline. Despite the region's importance for the local economic, information on the marine ecosystem, notably benthic habitat is very scarce.

Twelve atolls were mapped in the region using object-based image classification of very-high resolution satellite imagery (IKONOS, Quickbird, and WorldView-2). Geographically referenced data on benthic cover and depth were gathered in the course of three fieldwork expeditions covering a total of four atolls and two shallow reef structures. The resulting maps allow the estimation of three distinct types of coral cover (field, patches, spurs and grooves); the differentiation of sand, rubble and rock substrate; and the detection of seagrass and brown macroalgae, identifying up to 24 benthic habitats with overall accuracy above 50%.

The results of the analysis of coralline and ichthyological data support the local perception that ecosystems are in decline. It was not possible to verify its connection with fishing practices and the assumption of greater fish biodiversity farther away from the main fishing harbour, i.e. in the southern islands. New information indicates the presence of deep benthic cover extending from the atolls, suggesting the need for further research, and supporting current knowledge of the existence of an almost continuous coral reef from Kenya to Mozambique.

This work provides a detailed depiction of marine habitats adequate for standard management and planning purposes, namely in the definition of fishing zones and coral cover monitoring, while contributing to the advance of the application of remote sensing to the biodiversity and conservation fields.

Keywords: Physical Geography and Ecosystem analysis, Very-high resolution remote sensing, Object-based image classification, Benthic habitats, Coral reef, Fish biodiversity

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Master degree project 30 credits in Geomatics, 2015

Department of Physical Geography and Ecosystems Science, Lund University. Student thesis series INES nr 353