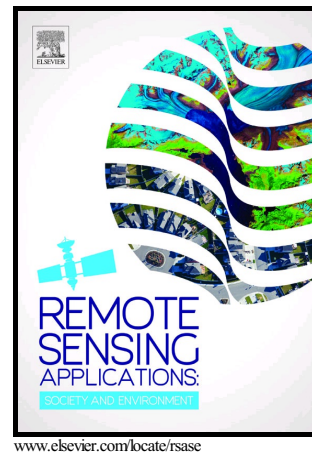


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Remote sensing for Marine Spatial Planning and Integrated Coastal Areas Management: Achievements, challenges, opportunities and future prospects

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Remote sensing for Marine Spatial Planning and Integrated Coastal Areas Management: achievements, challenges, opportunities and future prospects

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Abstract

This paper addresses the past and current uses of remote sensing technologies that are supporting Marine Spatial Planning (MSP) and Integrated Coastal Area Management (ICAM). Satellite and airborne remote sensing have a key role to play in studying the marine and coastal environment. The paper introduces the characteristics of remote sensing systems of interest for studying the oceans and coastal ecosystems. Secondly, a conceptual framework is defined which relates all important components of ICAM/MSP: 1) Ecosystem health and pollution, 2) Natural (coastal) hazards, 3) Marine Space and Use, 4) Coastal land cover and use, 5) population (dynamics), with their respective data collection goals and the most appropriate state-of-the-art sensor technologies to study them, summed up in a comprehensive table. A summary of achievements of remote sensing in each component of ICAM and MSP is given, with a particular interest for developing countries where their implementation is made difficult by several technical and governance issues. Opportunities are also presented to nuance those challenges in the form of programs and initiatives to increase capacity and resources to exploit RS in a MSP/ICAM context, but also to facilitate RS data accessibility and usability. Finally, future satellite missions of particular interest for ICAM and MSP are introduced. Overall, the word "Integrated" in ICAM suggests that a multidisciplinary approach is needed to understand the dynamics of marine and coastal environments, and remote sensing is identified as a piece of the puzzle which coastal and ocean managers should not hesitate to integrate in their practices. This paper acknowledges the need for more in-depth understanding of the underlying structures and ecological functioning of ecosystems, their habitats and their species, before RS can become a truly reliable tool in biophysical variable monitoring.

Keywords: ICAM, MSP, coastal ecosystems and habitats, ecosystem health and pollution, coastal hazards, marine space and use

Introduction

The concepts of Integrated Coastal Area Management (ICAM) and Marine Spatial Planning (MSP) are multidisciplinary in their approach, and the management plans and strategies adopted should always be knowledge-based. In ecological terms, knowledge stands for information about species and ecosystem structures, as well as their interactions and their intrinsic functioning. Data however, concerns the so-called raw information collected about the environment, but which in themselves do not tell us what to do from a planning and management point of view, unless carefully studied and interpreted. The problems that ICAM

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