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OCEANS, RESOURCES, AND CLIMATE APPLICATIONS FROM SPACE

Abstract

The world's economy depends on the oceans. Sea routes facilitate more than 90% of global trade, and millions of jobs closely intertwine with the ocean and its exploitation. The oceans also hold the key to addressing current and future global challenges, including food security, climate change, energy, and natural resources. The value added to some ocean industries, including aquaculture, capture fisheries, fish processing, offshore wind, and port activities, is set to grow faster than the world economy. However, this exciting economic potential comes with concerns that these vast environments are struggling to cope with human-caused stresses. Expanding human exploitation through increasing reliance and pressure on the oceans and their resources will escalate as the demand for associated products and services continues to grow.

The main goal of this work is to look at space-ocean-climate interactions to provide a set of recommendations to maximize the value of an Atlantic Constellation system currently planned by the Portugiese Space Agency, evaluating its governance, management, and implementation. The analysis examines how this space-based platform can impact sustainability and enhance our understanding of the oceans and the communities they support in the face of changing marine-coastal environments and the global climate crisis.

To fulfill this mission, the research focused on identifying technical challenges and solutions of a geospatial ecosystem to measure ocean and climate parameters based on certain case studies, namely; aquaculture, biotic ocean resources exploitation, and environmental monitoring and protection. This work also proposes a governance model, including the administrative structure, which ensures a balanced and agile approach among the different bodies. Business opportunities deriving from the integration of EO data with in-situ measurements and other sources of data, including citizen science data, have also been analyzed and highlighted in the recommendations given in this work.