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OCEANS, RESOURCES, AND CLIMATE APPLICATIONS FROM SPACE: ADDRESSING ENVIRONMENTAL AND CLIMATE CHALLENGES

Abstract

When Voyager 1 last looked back, it saw the pale blue dot - our Earth, the only planet in the solar system overwhelmingly covered in liquid water. This 70% of the Earth's surface has attracted 40% of humanity, which lives within 100km of the coast. Oceans are vital for our survival: From regulating greenhouse gases and controlling global temperatures to holding the keys to addressing global challenges such as food security, natural resource management, and climate change. This paper identifies how modern space systems can support the monitoring and managing of the oceans and their resources and aid with understanding the dynamics of the Earth's ecosystems to better respond to coastal disasters.

Initially, this work analyses the state of the art of ocean monitoring and identifies significant gaps in currently available data. Solutions for acquiring this data are identified, as well as the crucial role of synergistic partnerships between observation of the Earth's oceans from space and data more readily collected by in-situ platforms.

Following this, techniques for monitoring and mitigating maricoastal disasters, both naturally occurring and manufactured, are identified. These techniques range from technologies to end-user methods for enabling communities to mitigate and adapt to natural and manufactured hazards, understand their potential risks, and develop resilience.