



From Satellite Imagery to In-Situ Sensors: Innovations in Technologies for Tracking Marine Ecosystem Changes

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Abstract

Marine ecosystems face significant threats, and this article discusses the strengths and limitations of satellite imagery and in-situ sensors, highlighting how they complement each other to provide comprehensive insights into marine ecosystem health. By integrating these technologies, we can enhance our understanding of marine environmental changes and develop more effective conservation strategies. Future directions in technological advancements and data integration are also explored to ensure the long-term sustainability of marine ecosystems.

Keywords: Satellite imagery; In-situ sensors; Marine ecosystem monitoring; Technological innovations; Ecosystem changes; Marine conservation; Environmental monitoring

Introduction

Marine ecosystems are vital to global biodiversity and human well-being, yet they face unprecedented threats from climate change, pollution, overfishing, and habitat destruction. Understanding and managing these changes require robust monitoring systems that provide accurate, real-time data on various environmental parameters. Recent technological innovations, particularly in satellite imagery and in-situ sensors, have significantly enhanced our capability to monitor marine ecosystems [1].

This article explores these innovations, their applications, and their role in advancing marine conservation and management. We will delve into the specific technologies, their strengths and limitations, and how they can be integrated to offer comprehensive insights into marine ecosystem changes [2].

Methodology

1.

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