



## Let's talk about Ocean & Climate

📅 12 June 2025 – 10:30 am - 1:30 pm CEST

📍 Inspire Area – European Digital Ocean Pavilion

🌐 United Nations Ocean Conference 2025

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### Abstract

# How observations from space advance our knowledge of the oceans

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Covering 71% of Earth's surface, the oceans are critical for sustaining life, regulating climate, and supporting ecosystems and economies. Yet they face unprecedented stress from climate change, pollution, and acidification—threats that compromise ecosystems and biodiversity. Supporting Sustainable Development Goal 14: Life Below Water, Earth Observation (EO) from space has become essential for monitoring ocean health and understanding its role in the Earth system.

The European Space Agency (ESA) is at the forefront of this effort. With its fleet of EO satellites, including the Copernicus Sentinels - working in close collaboration with the European Union and EUMETSAT - and Earth Explorer missions, ESA observes the ocean to help society monitor, protect, and adapt to environmental change. These satellites measure key parameters such as sea surface temperature, wave height, sea level, sea ice extent, salinity, and phytoplankton distribution, providing a comprehensive and continuous record of ocean dynamics.

This talk will showcase how EO contributes to detecting early warning signs of ocean tipping points, such as disruptions in major ocean currents, deoxygenation, and marine ecosystem collapse. EO data also underpin research into the ocean carbon cycle, from carbon uptake and storage in surface waters to the role of biological processes such as phytoplankton productivity in sequestering atmospheric CO<sub>2</sub>.

At the midpoint of the UN Decade of Ocean Science for Sustainable Development (2021–2030), the talk will highlight major advances in EO-enabled oceanography, focusing on multi-scale, long-term monitoring of Essential Climate Variables. Looking ahead, the talk will explore the next generation of Copernicus missions and their potential to fill remaining knowledge gaps. These advances will further enhance Europe's capacity to detect critical thresholds, improve prediction models, and support informed ocean governance.

