



European Pavilion  
**Digital  
Ocean**

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# ESA as a building block of Copernicus Marine

9 June 2025





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the EU and policies



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# ESA and CMEMS

ESA initiated precursor services of CMEMS as part of the so-called GMES Service Element (GSE) projects early in the 2000s.

It enabled end-users to become involved in 'closing the loop' between operational results obtained from the (at that time) present generation of EO satellites and the definition of future systems.

The following initiatives completed the consolidation and scaling-up phases in the marine domain:

- MarCoast (MARine & COASTal) environmental information services, started in 2005 and aimed at scaling up services consolidated in the frame of ROSES and COASTWATCH ESA (older) projects.
- Polar View project for environmental monitoring and safety in the polar regions and the cryosphere.
- MARISS (Maritime security information services)

➔ They led to the GMES Marine Core Service which, in turn, became CMEMS, officially implemented by Mercator OI since 2014

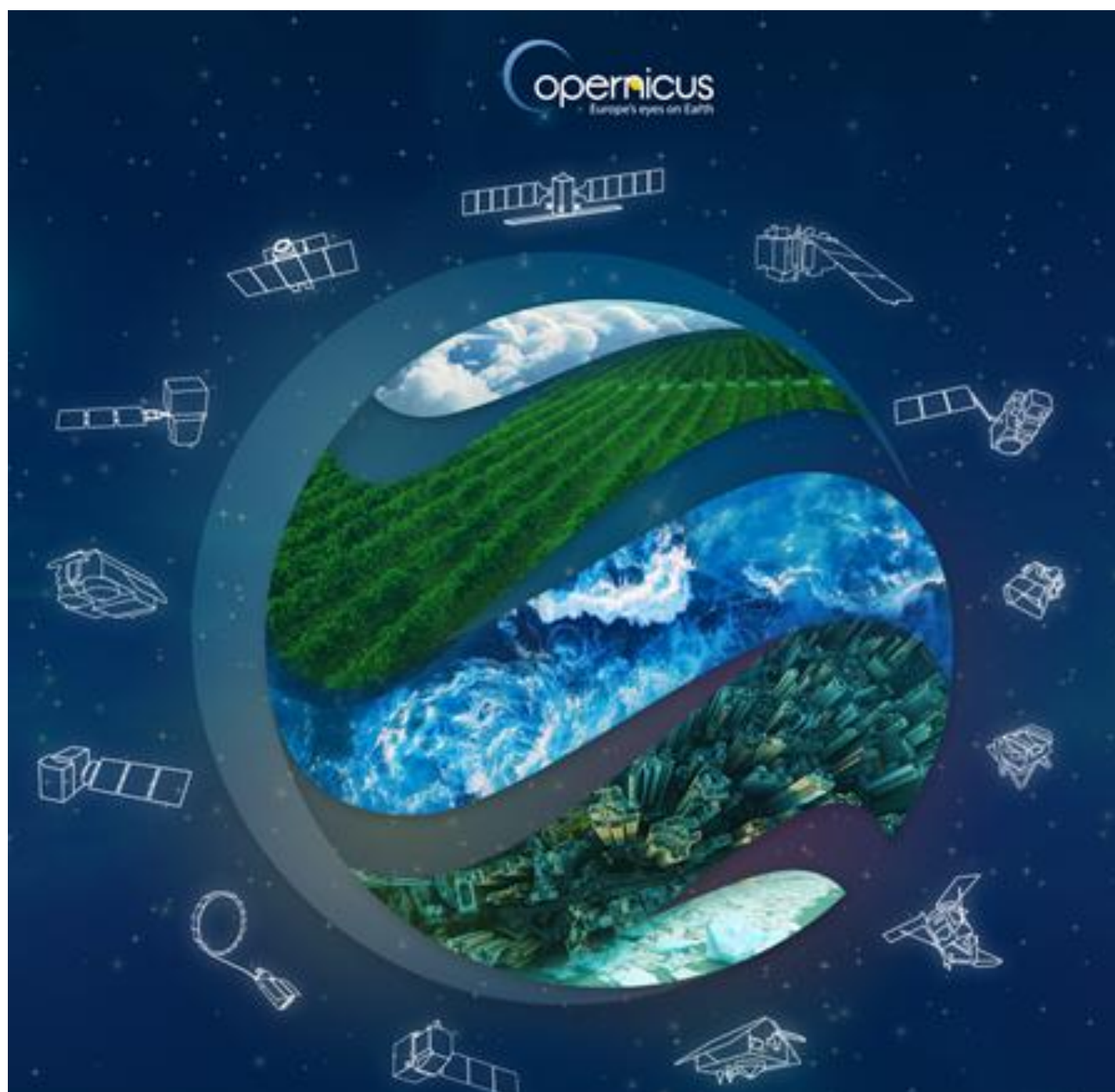


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# CMEMS benefits from Copernicus missions



**Sentinel-1** provides data used by CMEMS to monitor the ocean, including sea surface conditions, ocean currents and waves, and is key for sea-ice and iceberg monitoring

**Sentinel-3** provides sea level and wave products as well as data for measuring ocean (and land surface) colour, sea (and land surface) temperature, and sea surface topography for CMEMS

**Sentinel-6** data is used by CMEMS to monitor global sea levels and improve ocean forecasts

**Sentinel-2**, which is a high-resolution optical mission designed primarily for land related applications, is more and more used for marine and coastal monitoring

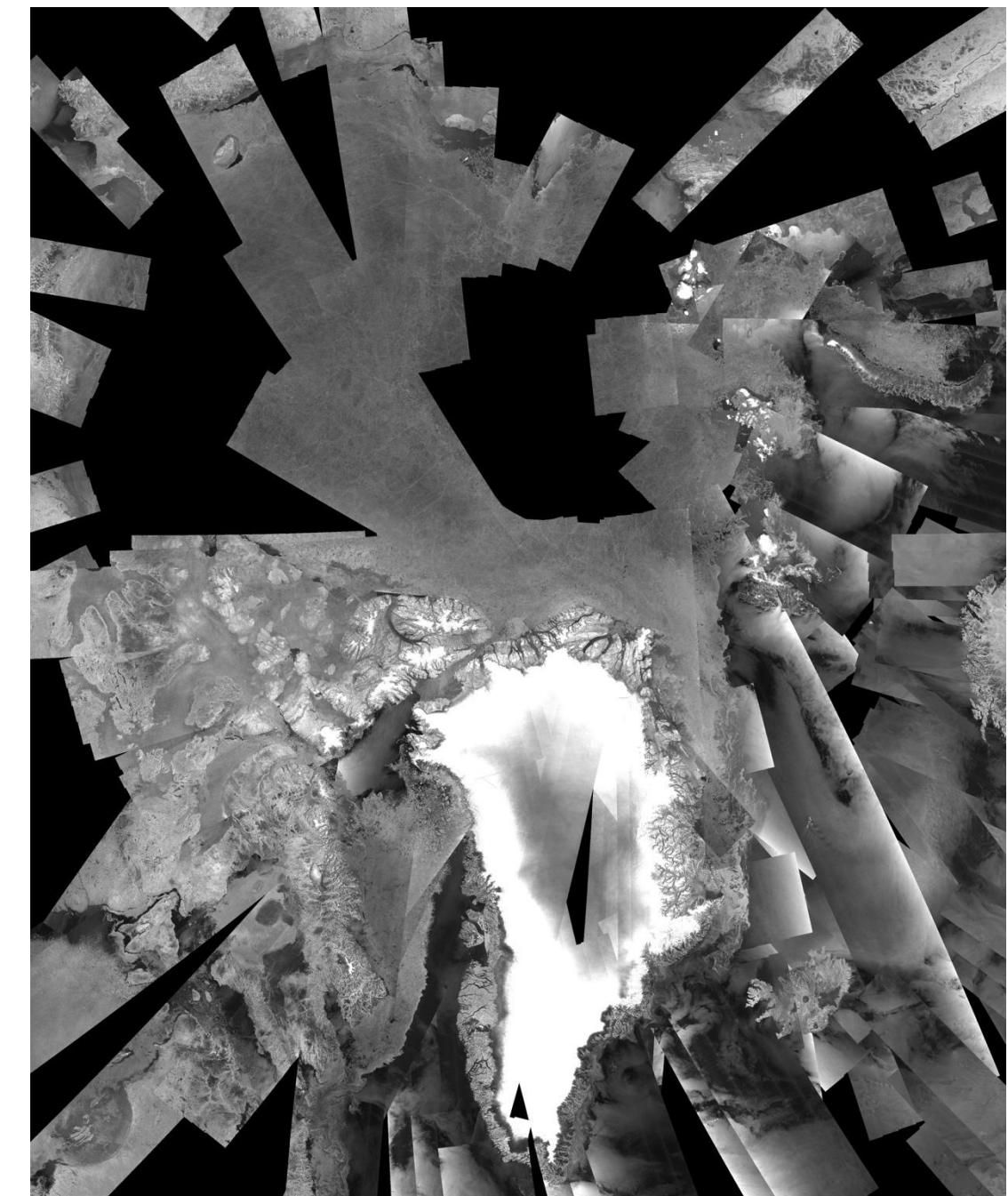
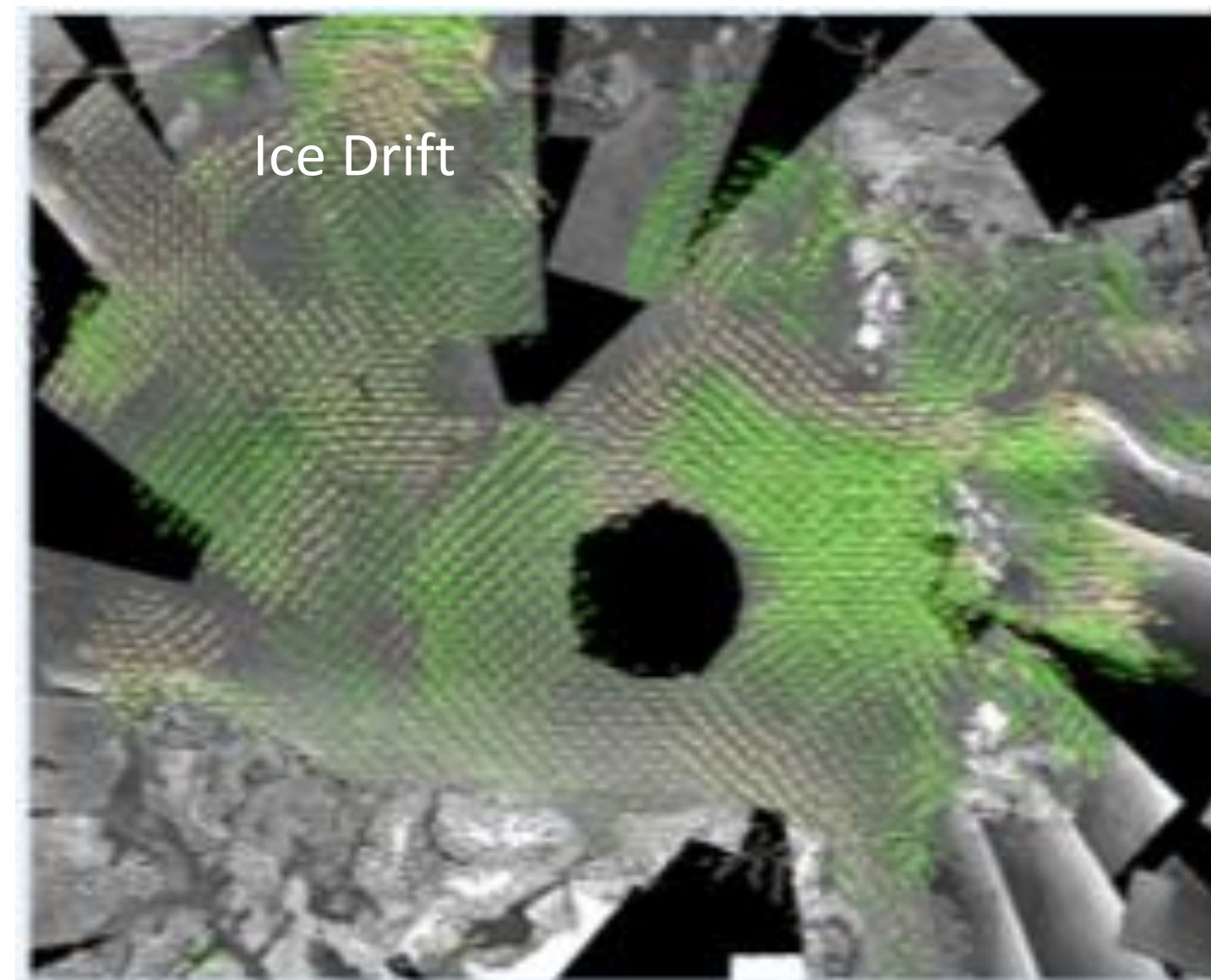
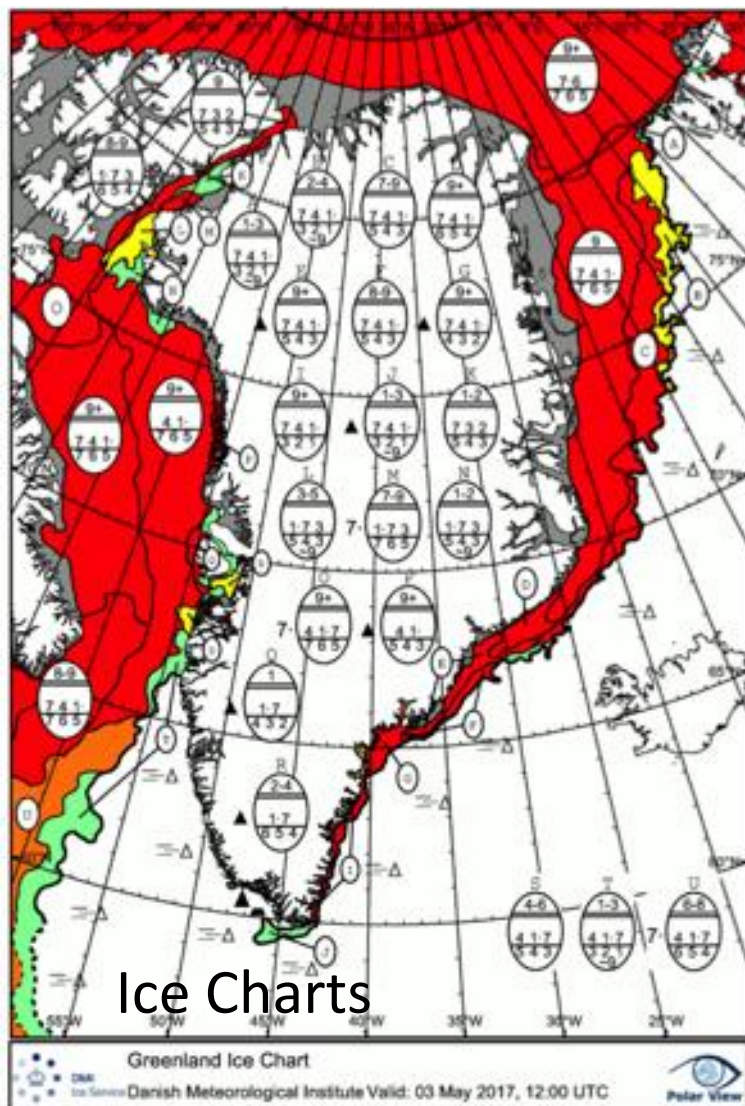
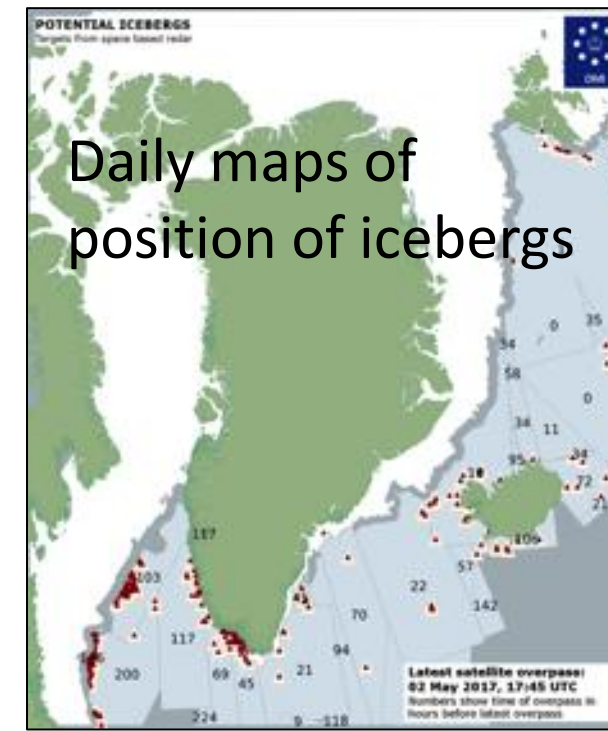
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Operational support to CMEMS on-going, since start of Sentinel-1A operations in 2014

Examples of radar-based applications



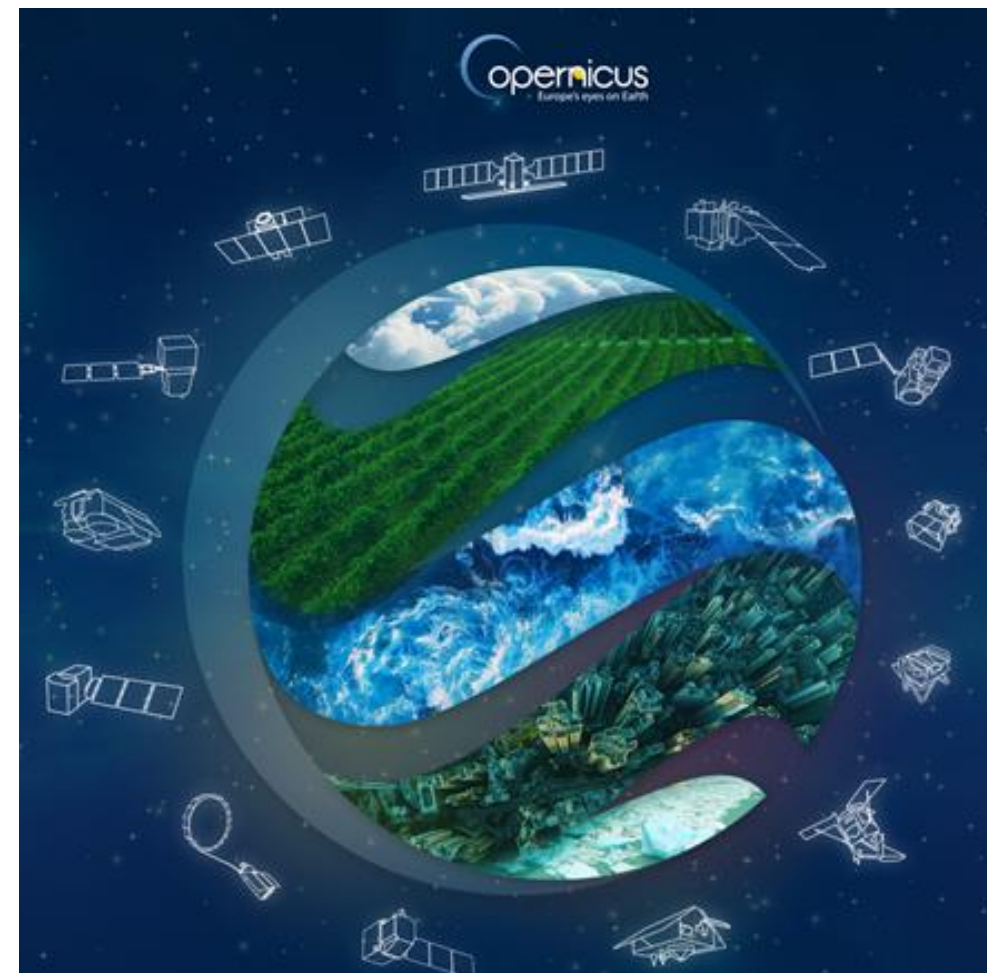
3-day Mosaic 6-7-8 June 2025  
<http://www.seaice.dk/>



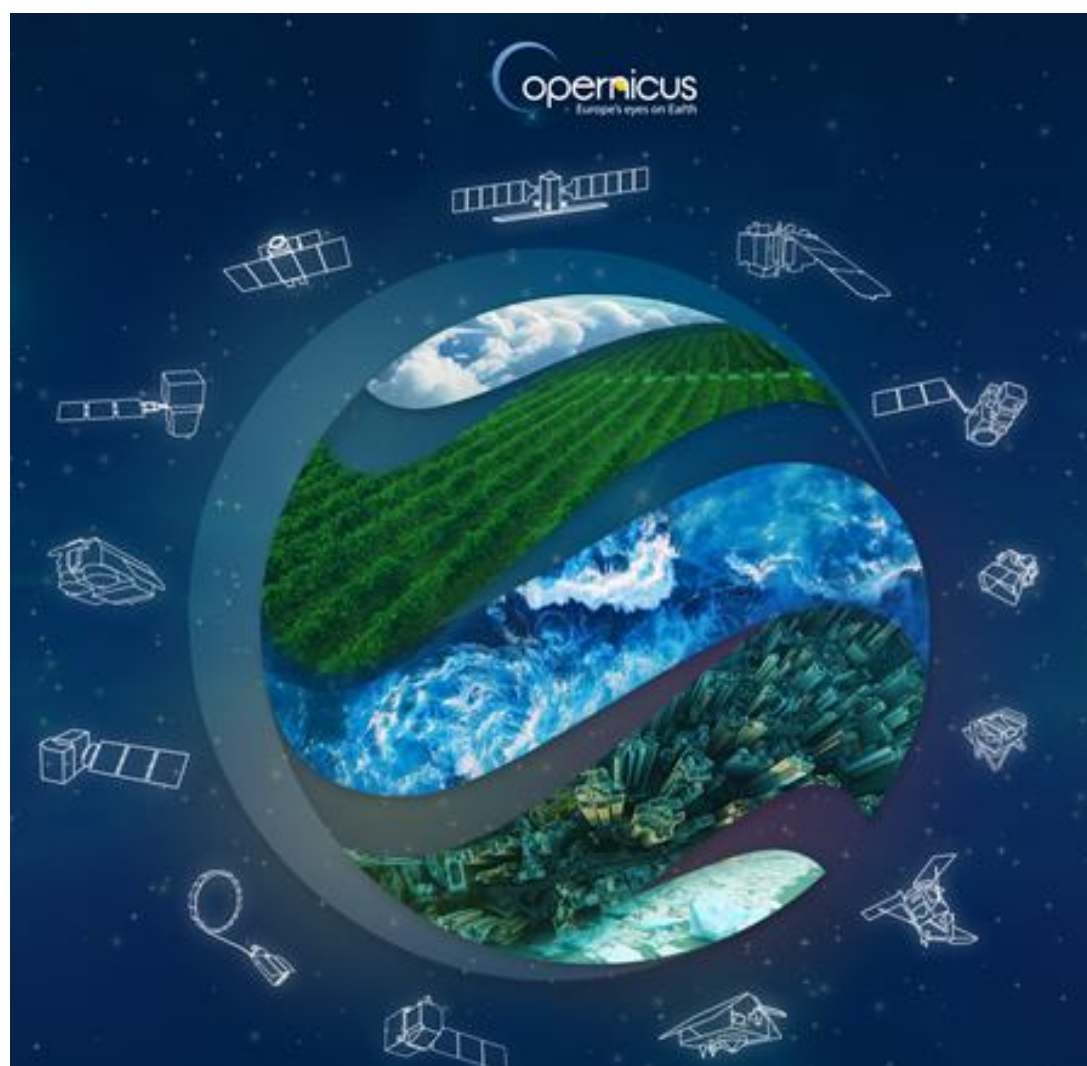


# CMEMS will benefit from future Copernicus missions

- **CRISTAL** will support maritime operations in the polar oceans and contribute to a better understanding of climate processes
- **CIMR** will monitor global change with a focus on the polar regions.
- The future **Sentinel-1 Next Generation mission** will be extremely important for ensuring continuity of radar observations with improved performance
- High-quality satellite Aquatic Colour radiometry data from **Sentinel-3 Next Generation Optical mission**, will improve the quality of marine products and will validate marine models for the blue/green ocean.
- Global scale altimeter sampling over the open oceans and a high-res mode designed for hydrology applications will be provided by the **Sentinel-3 Next Generation Topographic mission**.
- **Sentinel-6 Next Generation mission** will enhance current Sentinel-6 precision sea level, sea surface height, significant wave height, inland water heights and other products



# ESA and Copernicus



The mandate of ESA on Copernicus is to:

- Develop Sentinel missions (co-funded by the EU and ESA Member States)
- Operates some of them, together with EUMETSAT, making the data available to Copernicus services like CMEMS (EU funded)
- Coordinate the access to Copernicus Contributing Missions (CCMs) (EU funded)

- In parallel, in the frame of FutureEO, ESA perform R&D activities on EO applications, including in the marine domain
- The Sentinel User Preparation programme allows preparing the exploitation and use of future Copernicus missions including the Expansion missions
- It is expected that CMEMS will benefit from these application-related actions





# ESA and Mercator Ocean International partnership agreement



**MERCATOR  
OCEAN**  
INTERNATIONAL



On 25 Jan 2025, Mercator OI and ESA signed, at the 17th European Space Conference, a partnership agreement to reinforce EU Space and Digital Ocean collaboration and to respond to Global Ocean challenges. Main focus:

- Strengthening scientific and technological collaborations with common Research and Development priorities
- Fostering an integrative approach of digital ocean twinning
- Enhancing European Space/Ocean leadership internationally
- Facilitating dialogues for responding to environmental challenges





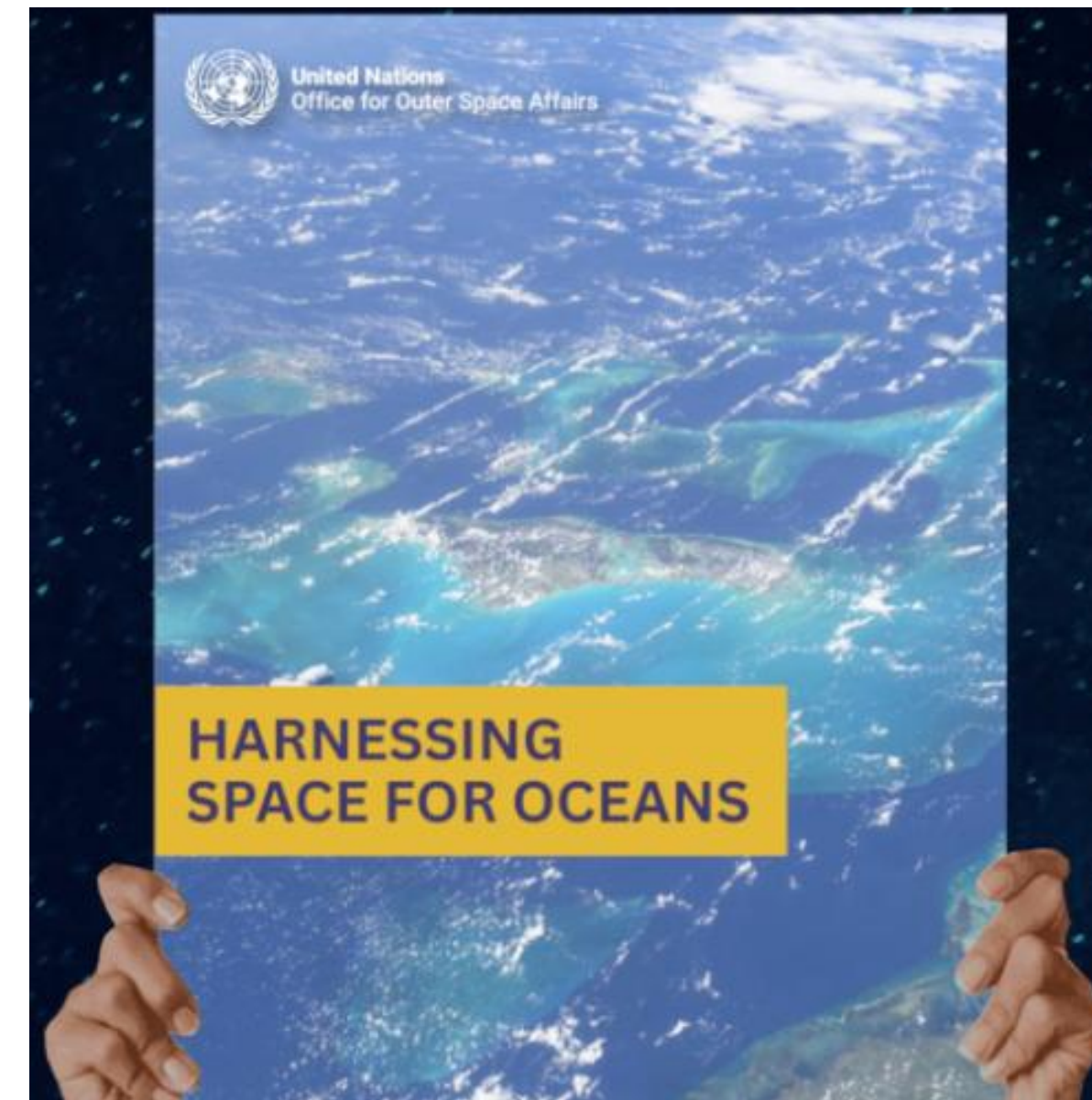
# Space4Ocean Alliance



The Space for Ocean (S4O) Alliance is a CNES initiative and a proposed international alliance of space agencies and space organisations intended to contribute to the preservation, conservation and protection of the ocean in view of UNOC3

The main objective is to strengthen synergies between the space and ocean communities, ensuring that space-based and in-situ data, technologies and solutions are effectively harnessed to support ocean and coastal challenges

➔ ESA has signed the Declaration of Interest to become a member of this initiative





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## Thank you for your attention

