



# 2024 EUROPEAN POLAR SCIENCE WEEK

3 – 6 September 2024 | The Black Diamond | Copenhagen, Denmark



European Space Agency

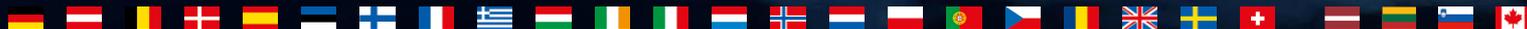
# Common Goal



Polar regions experienced the most rapid rates of warming in recent years triggering a chain of changes and feedbacks mechanisms in the Earth system, whose expected impacts may well exceed those forecasted in many other regions around the planet.

It is imperative we improve our observation capabilities, understanding and predictive capacity to understand processes of change in the polar regions, their root causes, and future impact on civil society and ecosystems.

Addressing these challenges requires a major coordination effort involving space agencies and European and international institutions.

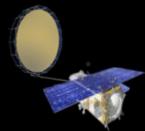


# A comprehensive Polar EO observing architecture



UTC 2021-01-03 11:32:05.353  
Speed: 1000x

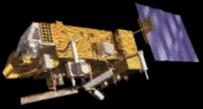
**CIMR**  
Orbit Number: 10410  
Time Since ANX: 5034.760  
Lat: 60°S 40' 59"  
Lng: 112°E 48' 48"  
Alt: 844.423 km  
Daylight



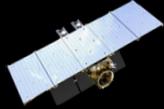
**CRISTAL**  
Orbit Number: 5314  
Time Since ANX: 3401.558  
Lat: 25°S 10' 18"  
Lng: 0°E 34' 34"  
Alt: 748.961 km  
Daylight



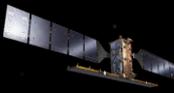
**MetOp-SG-B**  
Orbit Number: 10408  
Time Since ANX: 4597.867  
Lat: 81°S 02' 36"  
Lng: 135°W 22' 35"  
Alt: 849.309 km  
Daylight



**ROSE-L**  
Orbit Number: 1601  
Time Since ANX: 2925.978  
Lat: 1°N 59' 54"  
Lng: 82°W 45' 26"  
Alt: 698.486 km  
Daylight



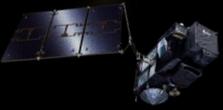
**SENTINEL-1A**  
Orbit Number: 35973  
Time Since ANX: 1371.835  
Lat: 79°N 36' 27"  
Lng: 46°E 02' 02"  
Alt: 708.115 km  
Daylight



**SENTINEL-1B**  
Orbit Number: 24989  
Time Since ANX: 4383.121  
Lat: 81°S 08' 38"  
Lng: 149°W 34' 26"  
Alt: 724.914 km  
Daylight



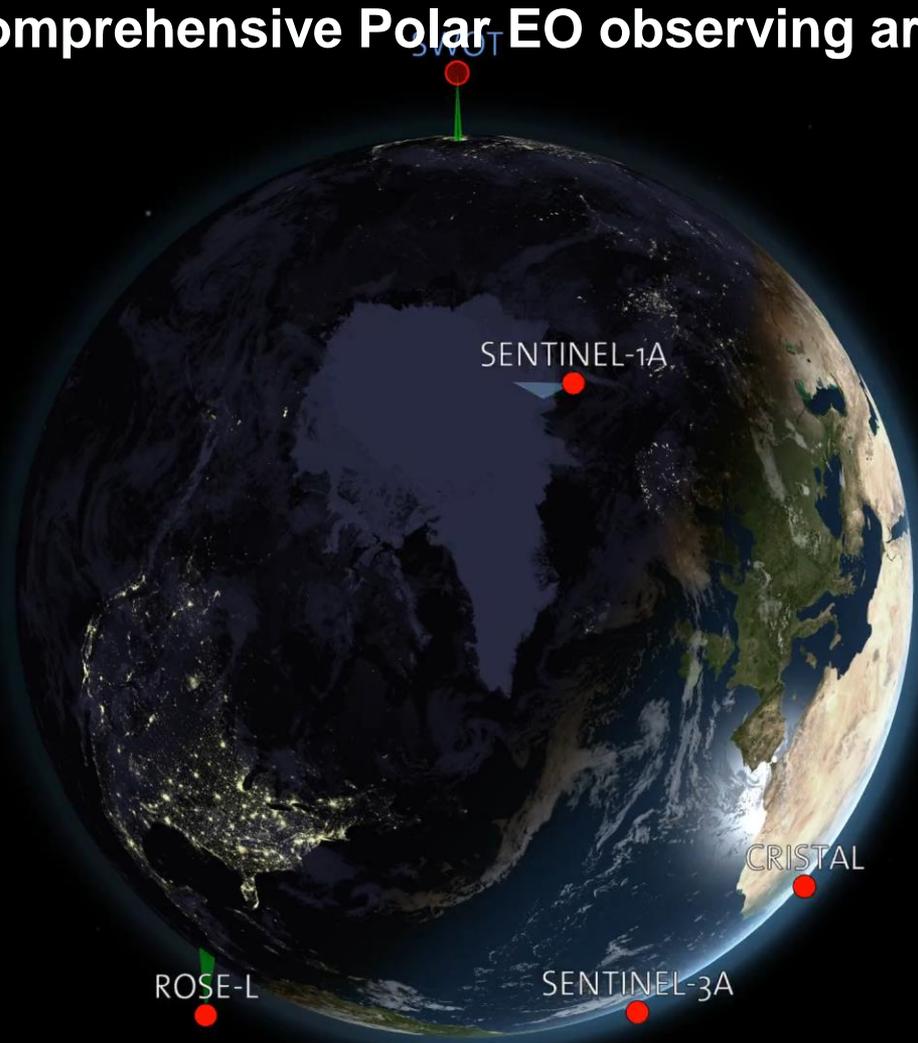
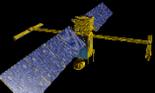
**SENTINEL-3A**  
Orbit Number: 25420  
Time Since ANX: 3534.148  
Lat: 89°S 59' 46"  
Lng: 27°W 59' 54"  
Alt: 814.284 km  
Daylight



**SENTINEL-3B**  
Orbit Number: 14026  
Time Since ANX: 5902.512  
Lat: 9°S 15' 30"  
Lng: 158°E 22' 33"  
Alt: 807.385 km  
Eclipse



**SWOT**  
Orbit Number: 5147  
Time Since ANX: 2404.437  
Lat: 38°N 37' 41"  
Lng: 122°E 47' 48"  
Alt: 923.675 km

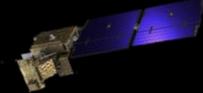


## New Missions

### EarthCARE

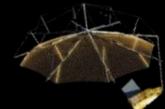


### Arctic Weather Satellite



## Upcoming Research Missions

### Biomass



### FORUM



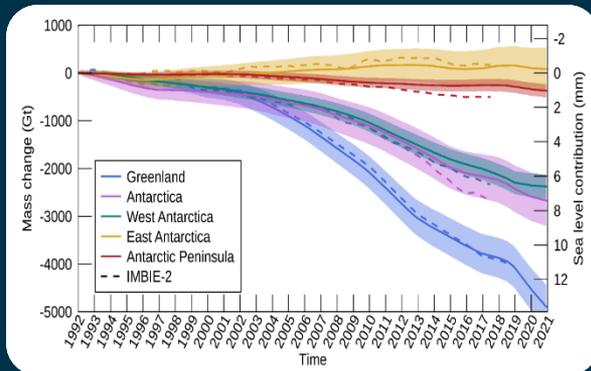
### Harmony



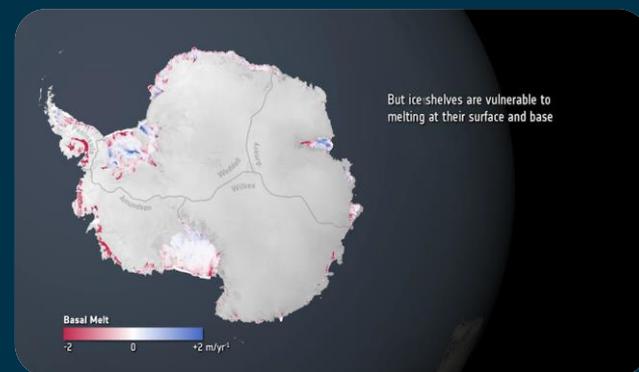
# Major progress in space-based EO for Polar regions....



CryoSat-based global glacier mass balance assessment



Community assessment of Greenland and Antarctica mass balance



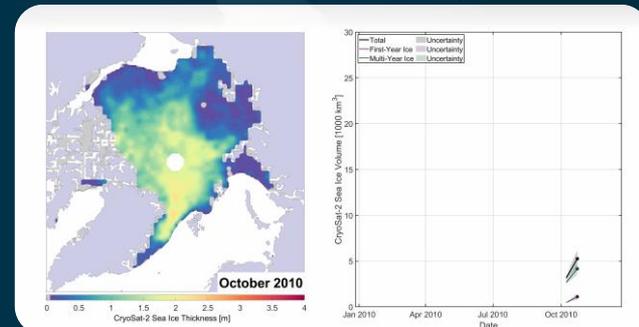
Advances in assessing ice shelf thickness and mass changes



Enhancing understanding of the subglacial environment



Measuring the global cryosphere contribution to sea level rise

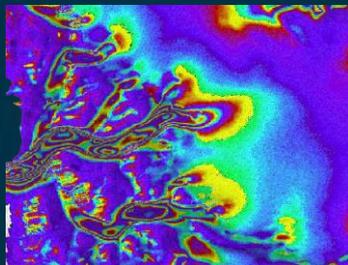
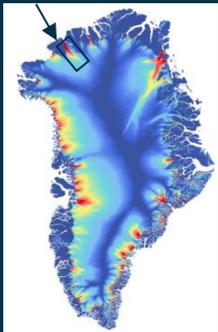


Advances in year round (summer) sea-ice thickness measurements

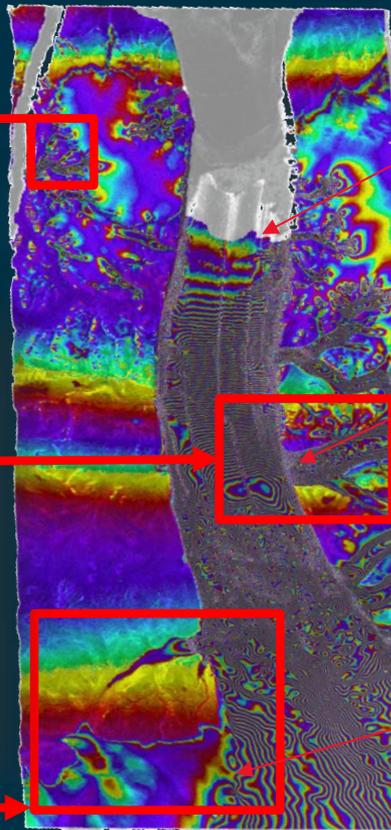
# Preparing for ROSE-L InSAR Ice Velocity at L-Band

SAOCOM Stripmap: 16 Feb – 24 Feb 2022 - 8 days repeat

## Petermann Glacier



Credit:  
ENVEO (AT)



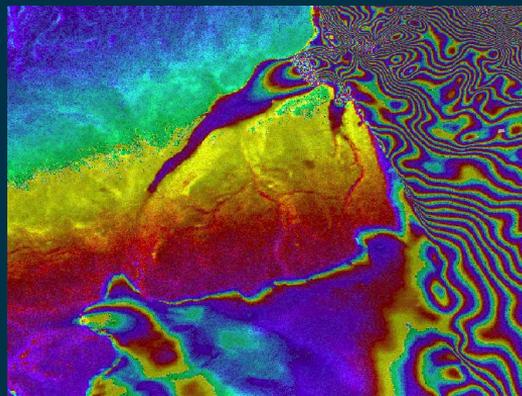
Credit: Mark Drinkwater



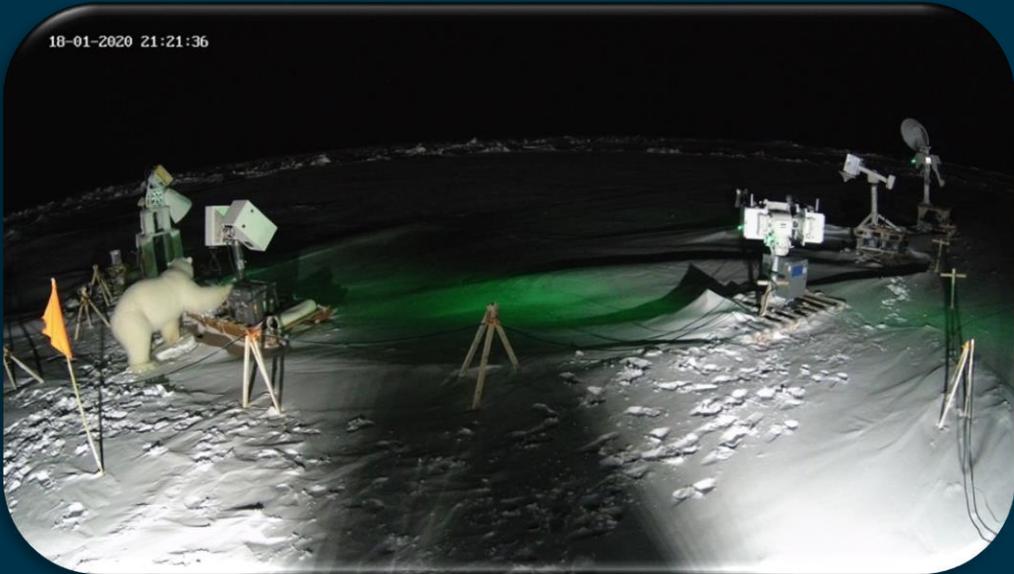
Credit: Mark Drinkwater



Credit: Mark Drinkwater



# Supporting In-situ Data Collection and Campaigns



A Polar bear supporting ESA experiments during MOSAIC (credit: Marcus Huntemann)





# A strong European partnership in Earth Sciences



ESA



## FutureEO

ESA Science and Innovation Earth Observation Programme



EC-R&I

## Horizon Europe

EU Research and Innovation Framework Programme



The European Commission's Deputy Director General for Research and Innovation, Patrick Child and ESA's Director General, Josef Aschbacher at the signing ceremony, January 2020.

**A common goal “.... to jointly advance Earth system science and its contribution to respond to the global challenges that society is facing in the onset of this century”**

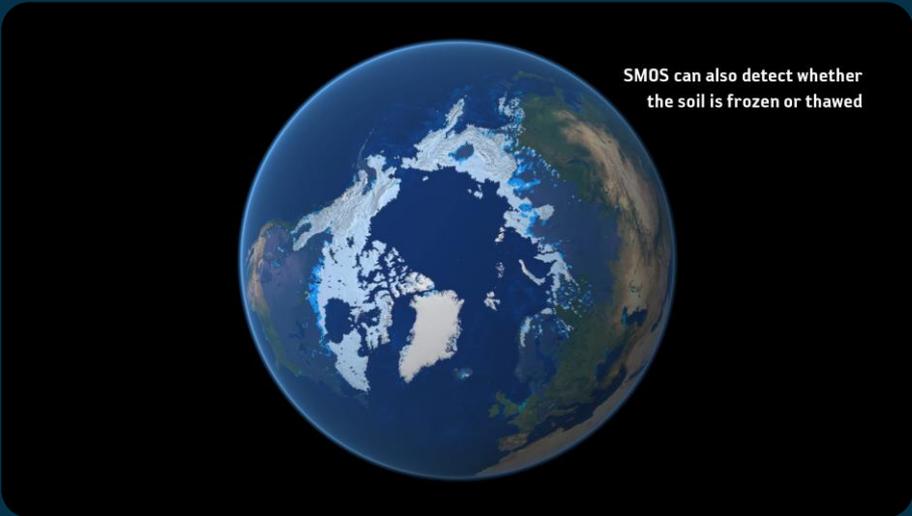


# International Collaboration and Coordination



## IMBIE

*Ice sheet mass balance  
inter-comparison exercise*



## AMPAC

*Arctic Methane and  
Permafrost Challenge*



# ESA's new Earth Observation Science Strategy

Previous ESA's Living Planet Programme Science Strategy published in 2015 – much has changed!

- ❑ Articulates a strategic vision for EO science at ESA
- ❑ Presents cross-cutting science priorities (addressable by EO), that respond to scientific and societal challenges - and have beneficial impact
- ❑ Coherent with a 2040 horizon and identifying strategic areas of action implementable on different timescales
- ❑ Focuses attention on areas where ESA's programmes and activities can address scientific challenges, assemble scientific knowledge with which to take action, and with traceable & beneficial impact
- ❑ Identifies areas of science that ESA may respond to across the value chain, from innovative missions, technology development, through scientific excellence to societal benefits
- ❑ Involves R&D and innovation, strong partnerships with national programmes and funding agencies – also beyond the space sector

Revised/Updated draft Strategy - final review and endorsement at end September '24





The banner features a dark blue background with a central circular graphic showing two globes (Earth and Antarctica) surrounded by concentric circles. The background also shows a snowy landscape with mountains and a starry sky. Navigation links at the top include: HOME, Overview, Objectives, Themes, Session Proposal Submission, Poster Submission, Deadlines, Organisation, Scientific and Organising Committee, Venue, and Contacts. Logos for the European Union, DTU, and ESA are present.

- ... a scientific event...
- ....a coordination event...
- ....a networking event...
- ... a consultation event....

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