ESA program status

(Programmatic lines and scientific SSS achievements)

Roberto Sabia[1]

(with many inputs from ESA colleagues and the wider-SMOS ocean community)

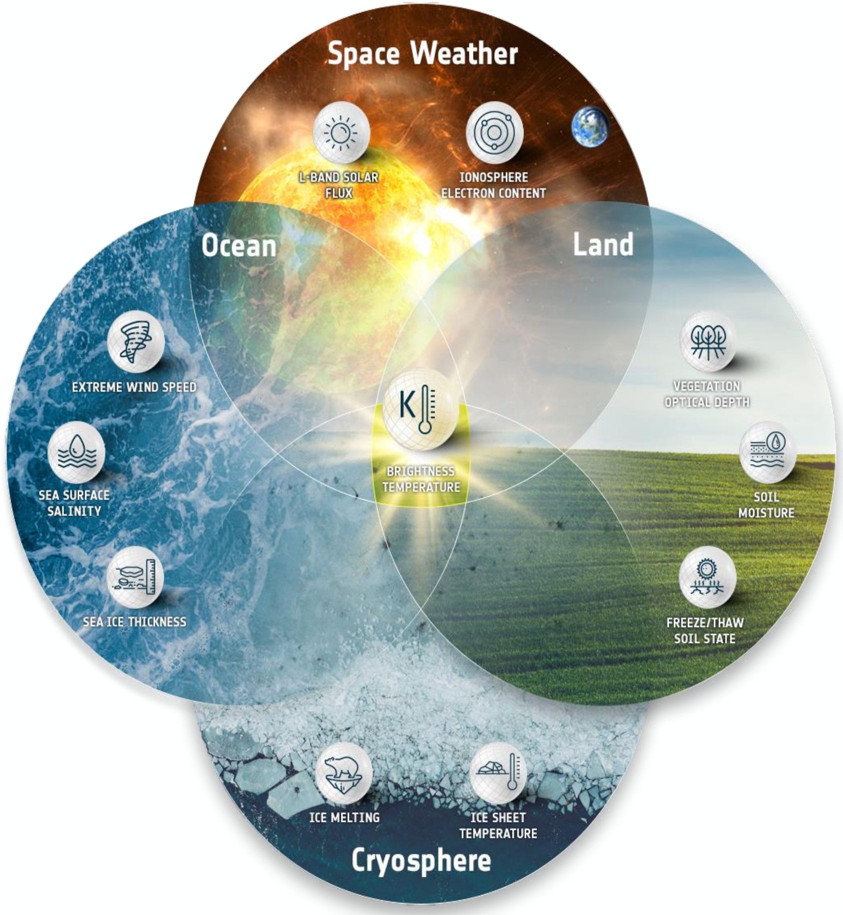
[1] **European Space Agency (ESA), Frascati, Italy**

2026 Ocean Salinity Science and Technology Meeting - 19-21 May 2026, Seattle, WA, USA

[8th Ocean Salinity Conference series]

Outline

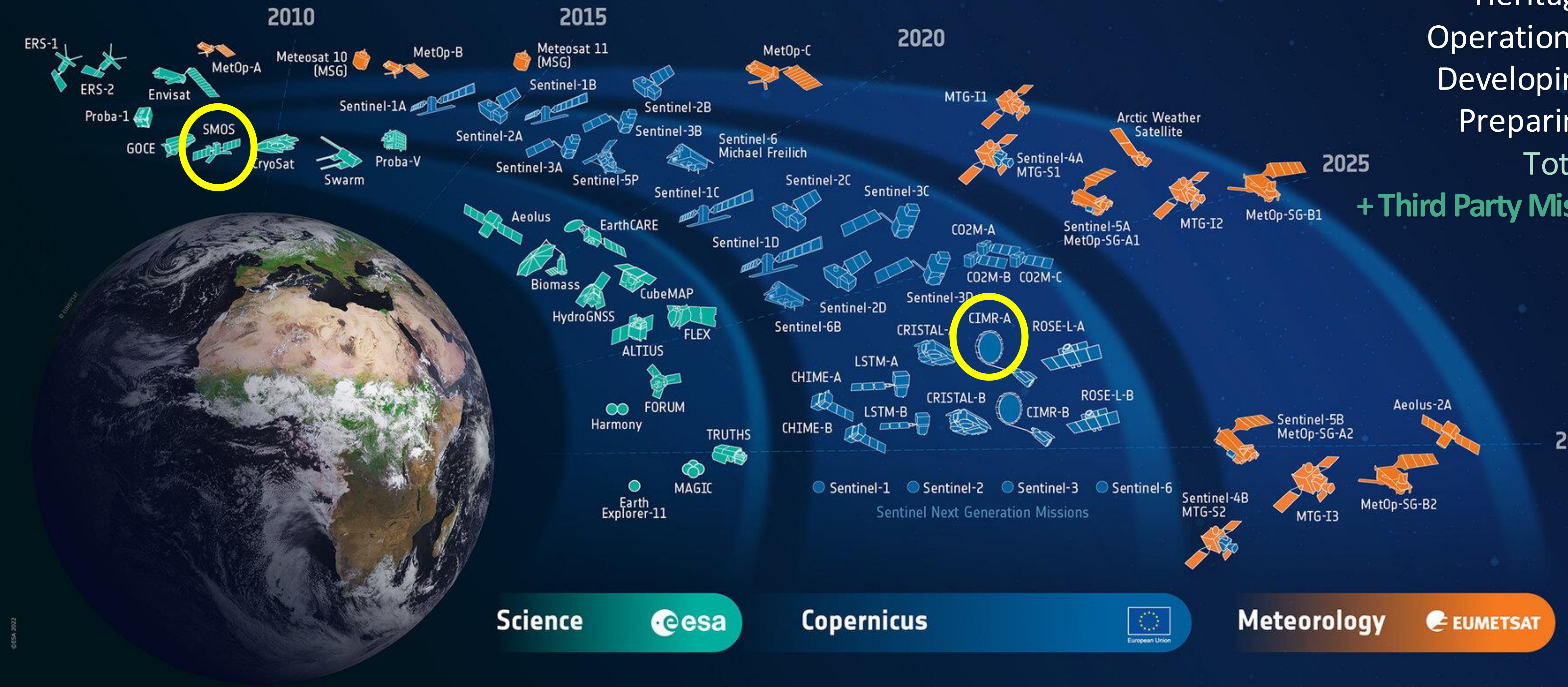
- SMOS SSS in a nutshell
- SMOS L2 processor status and upcoming developments
- CATDS and BEC national distribution centres
- Pi-MEP Salinity Platform
- CCI Salinity
- SMOS oceanographic applications portfolio
- OSC-2024, SMOS-15 and Extension Review 2025
- Future missions – CIMR and co.
- Wrap-up and remarks



SMOS - a true Earth Explorer

ESA develops world-class EO systems with European and global partners to address Scientific and Societal challenges

Satellites
Heritage **04**
Operational **15**
Developing **41**
Preparing **22**
Total **82**
+ Third Party Missions



SMOS SSS in a nutshell

SMOS

- **ESA Earth Explorer opportunity mission – Soil Moisture and Ocean Salinity**
- **Novel EO technique demonstration – microwave radiometry by aperture synthesis**
- **Launch: November 2nd, 2009; currently extended until end of 2028**
- **As of March-2026, longest-ever ESA EO mission flying!**

Level 2/Level 3 – Ocean Salinity

- **Sea Surface Salinity variations governed by: E-P balance, freezing/melting ice, freshwater run-off and horizontal/vertical advection**
- **Key oceanographic parameter (density); triggers thermohaline circulation and heat redistribution**
- **SSS as ECV by UNFCCC / IPCC**

	Accuracy (STD)	L3 Spatial window	L3 Temporal window
Ocean salinity	0.5-1.5 psu for single observation 0.1 psu for a 10-30 day average for an open ocean area of 200x200 km	100-200 km	10-30 days

Data are available from SMOS data dissemination platform:

https://smos-diss.eo.esa.int/

SMOS L2 Ocean Salinity processor – status and developments

L2 OS v700 (ops since May-2021)

- Novel **dielectric constant model (BV)** to better characterize cold waters
- Upgrade of a SMOS-based climatology to estimate a de-biased SSS anomaly
- Improved characterization L2 SSS uncertainty
- Improvement sea-state flagging
- Usage SMOS dynamic Sun BT

Interim release v730 – as of Sep-2023

- Inclusion of a novel inversion scheme called **de-biased non-Bayesian (DnB)**
- Implementation of **Latitudinal/seasonal correction**
- Refined uncertainties in the a-priori auxiliary data (SST, WS)

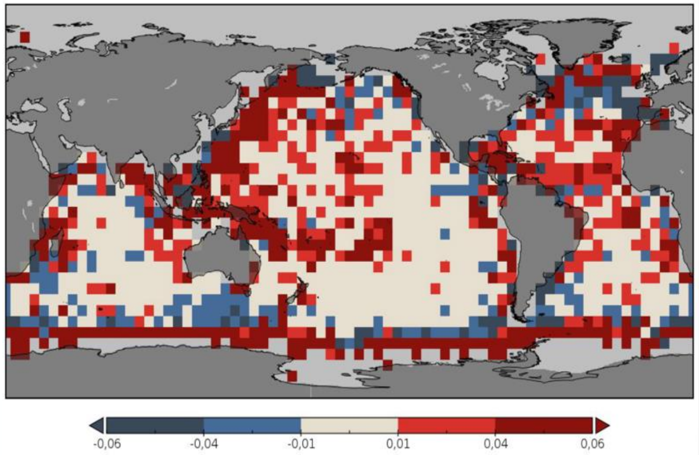
New baseline v740 – as of end-2025 (4th mission reprocessing baseline)

- **Blind Test:** nominal algo vs DNB algo
- Revised dielectric constant model (BVZ) to further mitigate cold waters inaccuracies
- Refinement of **roughness model**

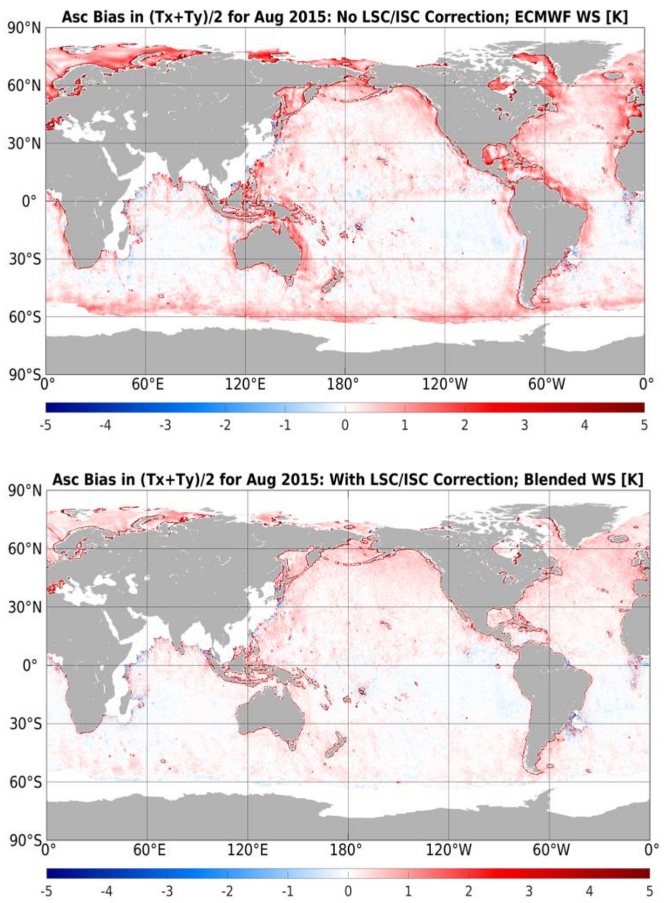
Upcoming v750 – 2027

- **Ice Contamination correction (ICC)**

STDD(V662-Argo) - STDD(V700-Argo)

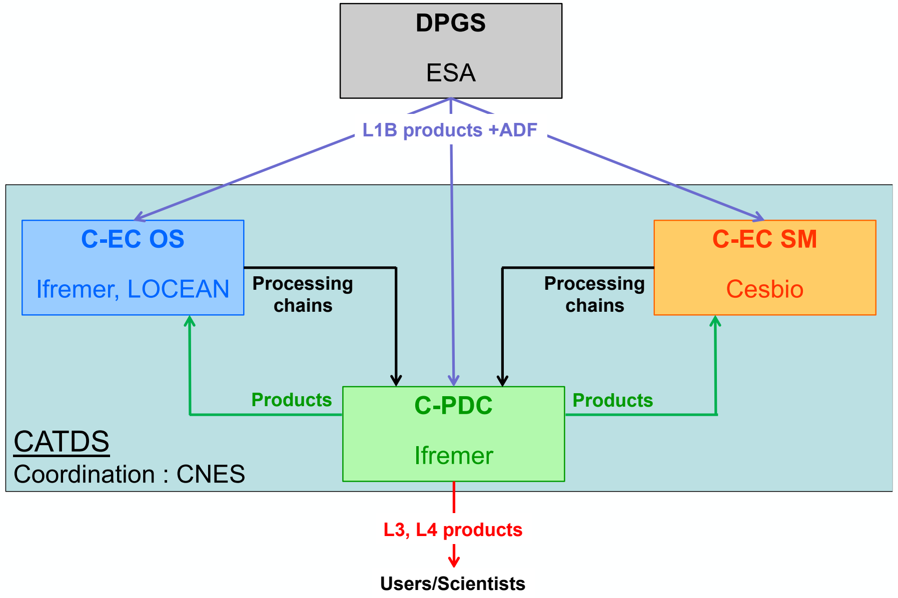


Differences of Salinity STDD (with respect to Argo) between v662 and v700. Red colours indicate a reduction of the STDD (with respect to ARGO data) in v700. - (Credits: BEC)



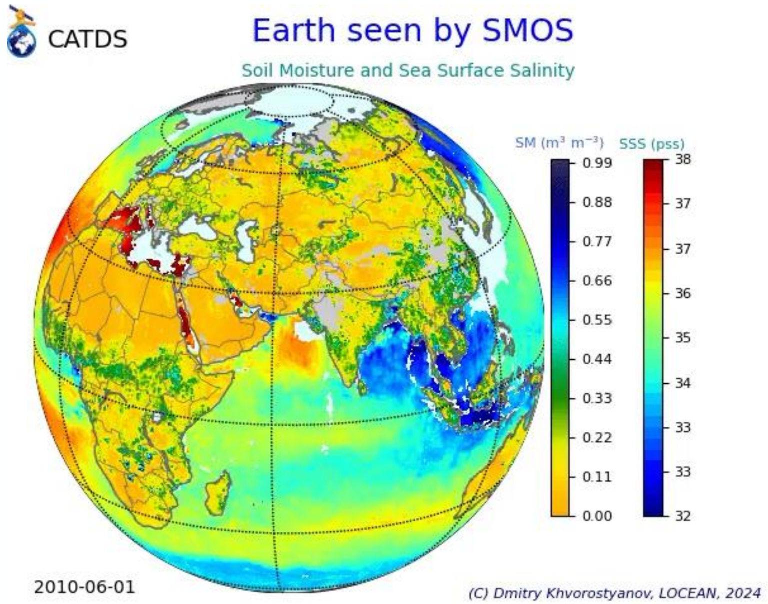
(Tx+Ty)/2 biases without applying any corrections and applying LSC and Ice-Contamination (PSF) corrections - (Credits: ODL)

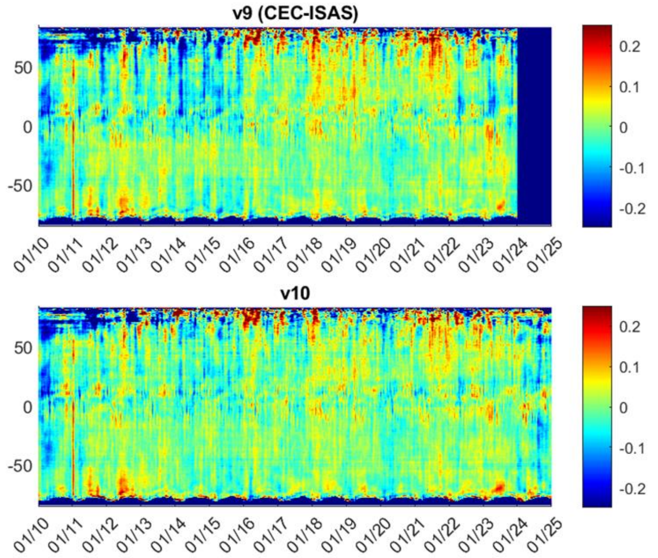
CATDS – L3/L4 SSS



See CATDS poster by J. Boutin

www.catds.fr



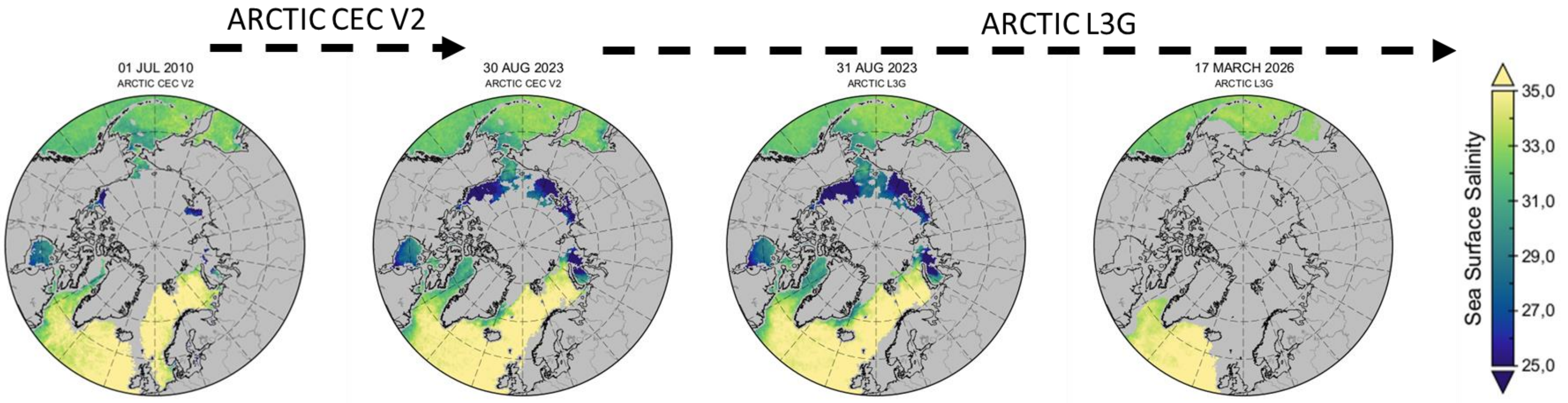


SMOS minus in situ derived SSS (ISAS) – top) CEC v9, bottom) CEC v10

Global C-EC v10 reduces systematic errors, including solar contamination effects.

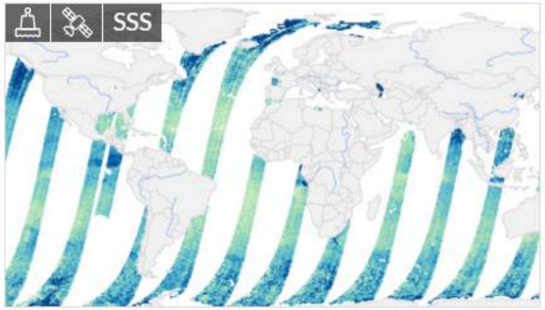
CATDS C-EC v11 (2010-2025) will include an additional sea-ice correction - to be delivered in Summer 2026

CATDS – L3/L4 SSS



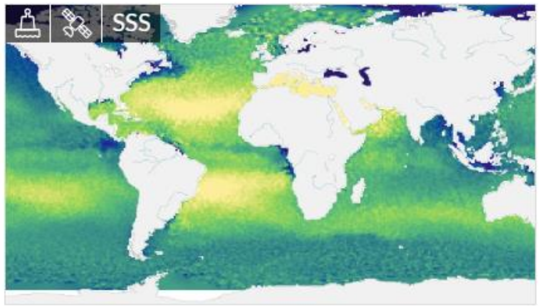
Arctic SSS fields now produced operationally in CATDS C-PDC

CATDS SSS fields also disseminated via Copernicus Marine Service



SMOS CATDS Qualified (L2Q) Sea Surface Salinity product

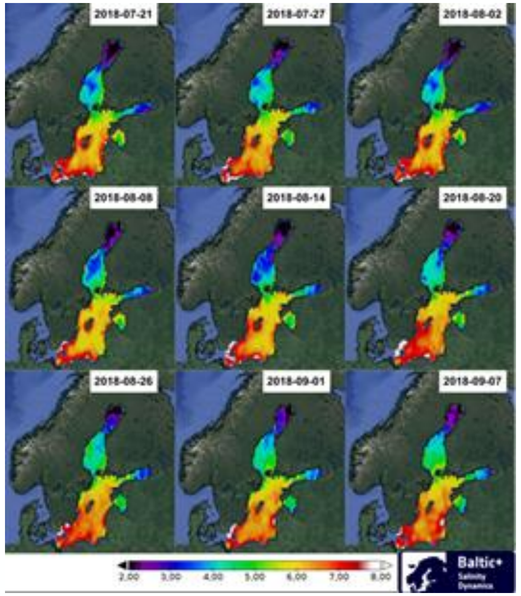
MULTIOBS_GLO_PHY_SSS_L3_MYNRT_015_014
In-situ, satellite (L3)
Global, 0.25° × 0.25°
Since 1 Jan 2010, daily
Salinity

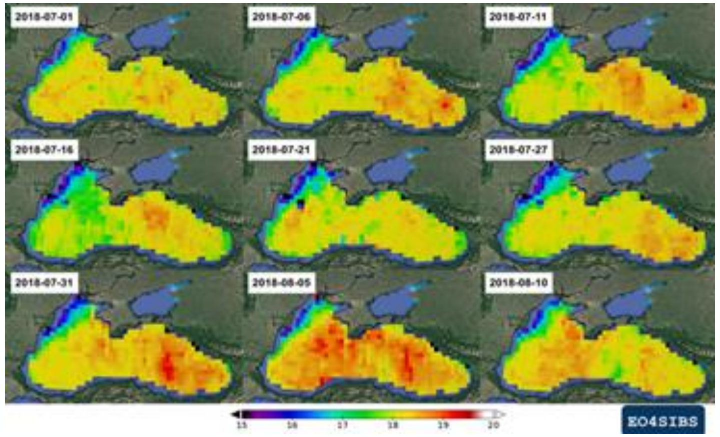


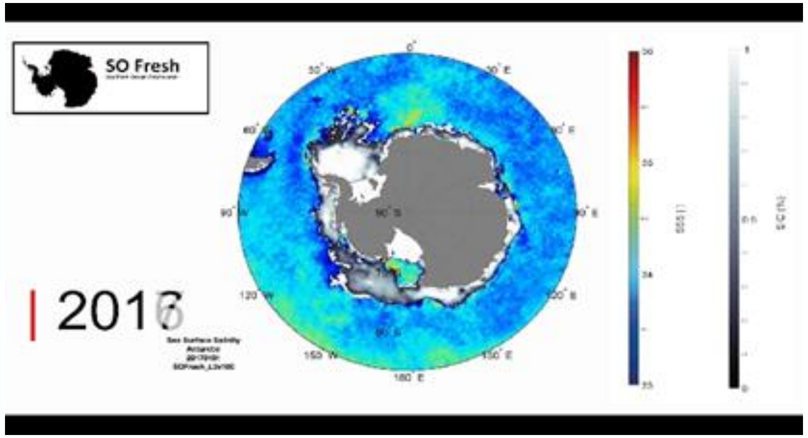
SSS SMOS/SMAP L4 OI - LOPS-v2023

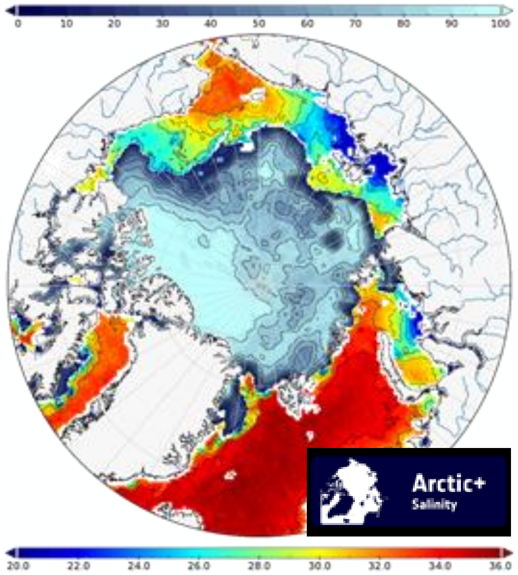
MULTIOBS_GLO_PHY_SSS_L4_MY_015_015
In-situ, satellite (L4)
Global, 0.25° × 0.25°
3 Jun 2010 to 21 Dec 2023, weekly
Temperature, salinity, surface density

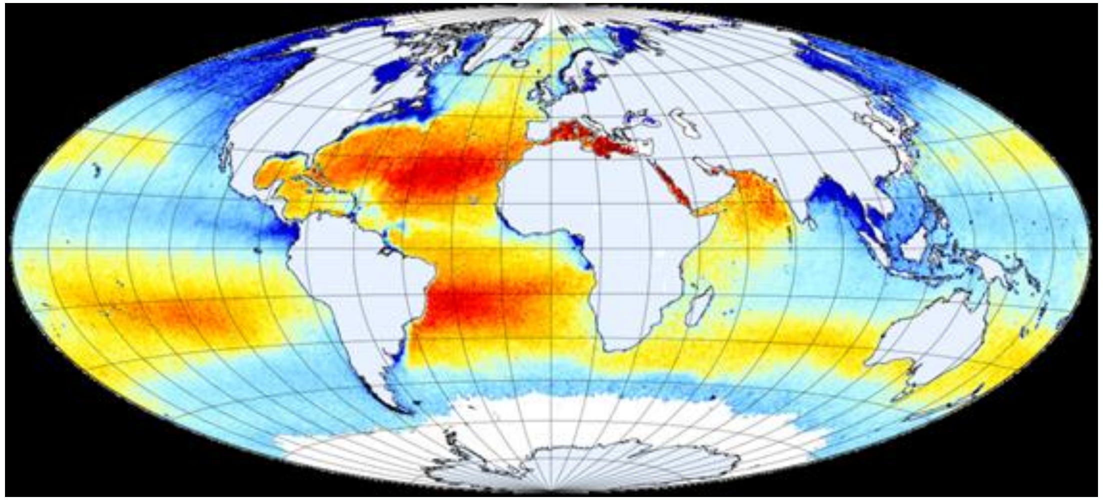
BEC – L3/L4 SSS









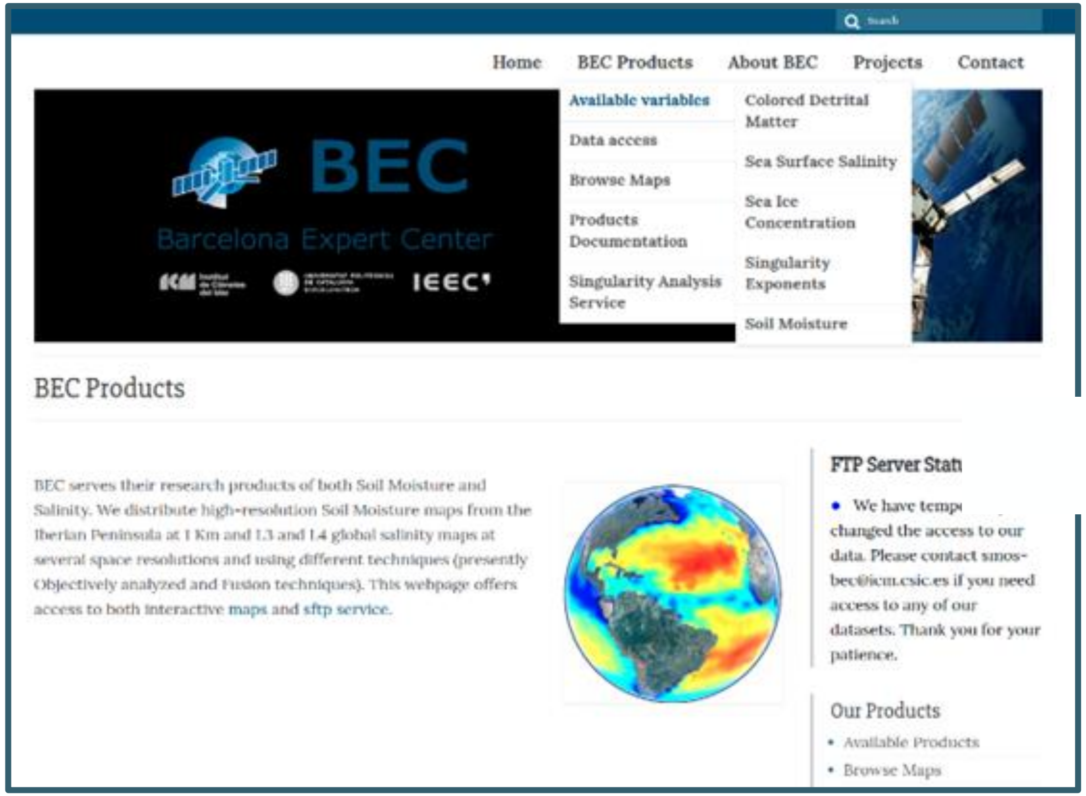


Global and regional products developed under dedicated ESA projects using an in-house data processing chain.

A global reprocessing is currently underway and is expected to be completed by early 2027.

BEC
Barcelona Expert Center

BEC – data access

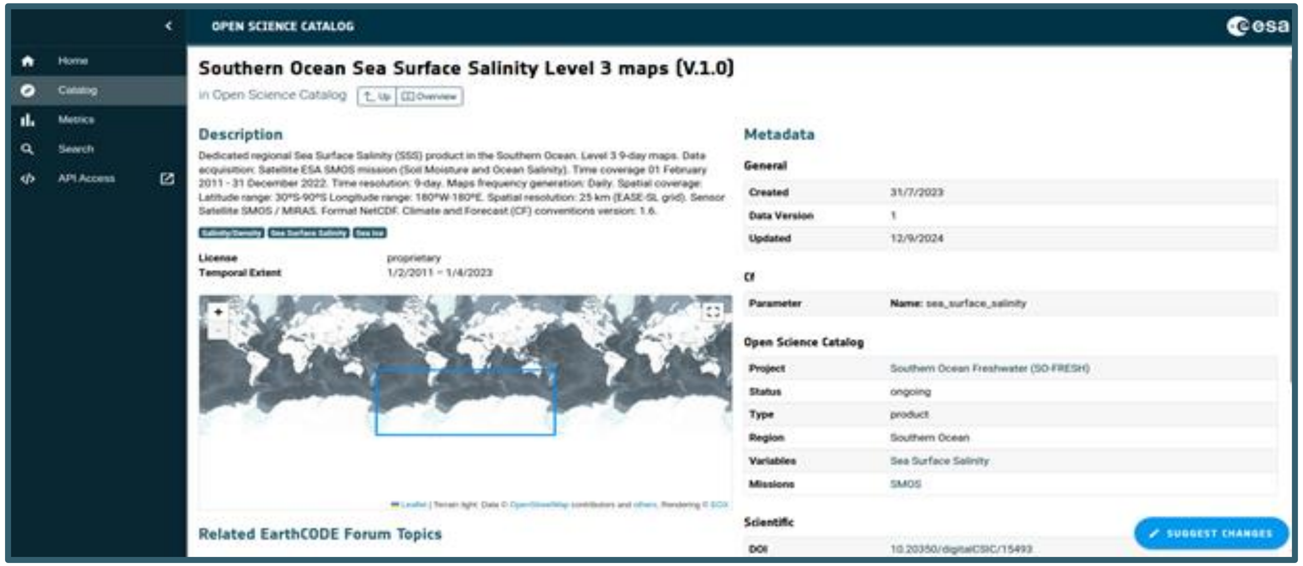


Available in BEC FTP – (change of ftp !)

Host: sftp://eodata-bec.icm.csic.es
Username: ftpuser
Password: .x8UP(ar.YZ2R)
Port: 22758

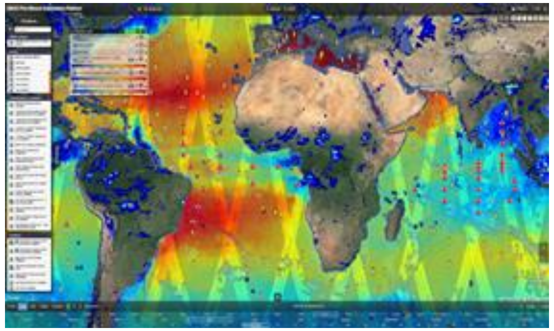
See BEC poster by E. Olmedo

ESA Open Science Catalogue

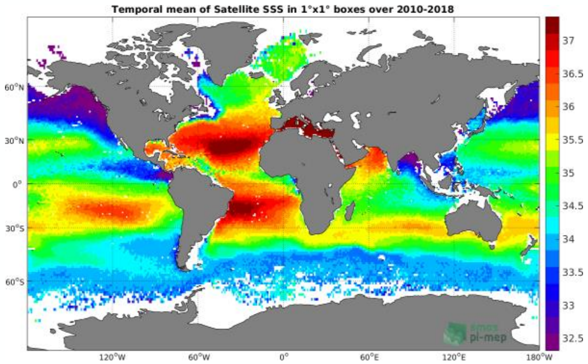


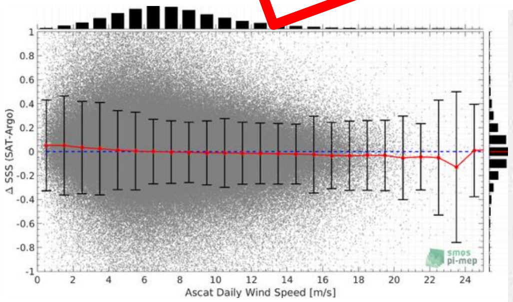
ESA-NASA Pi-MEP Salinity Platform

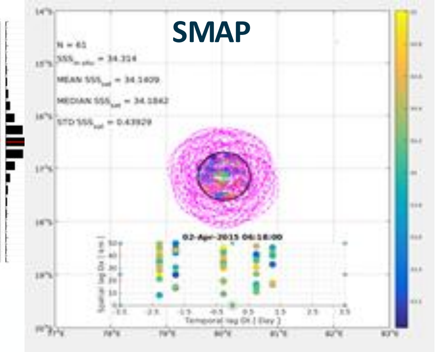
- **Inter-agency** effort for sustained satellite surface salinity validation
- Single web-based environment to **visualize, monitor, assess, validate and exploit** Satellite Salinity data
- Broad variety of **online Tools** to extract, inter-compare datasets and compute relevant statistics
- Match-up databases (**MDB**) **Validation Reports** are provided for any single triplet: Pi-MEP Region / Satellite SSS product / In situ SSS product

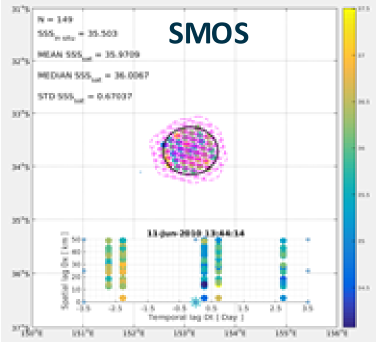


See Pi-MEP Poster by S. Guimbard







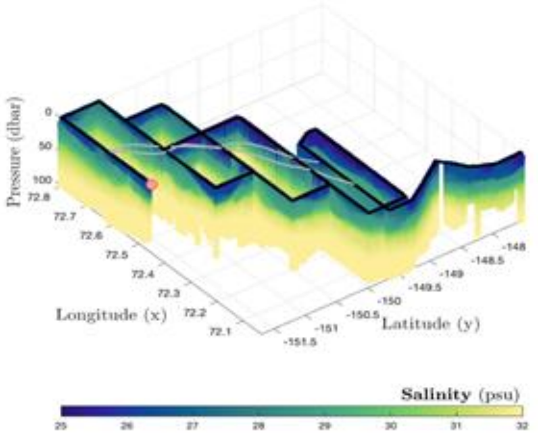


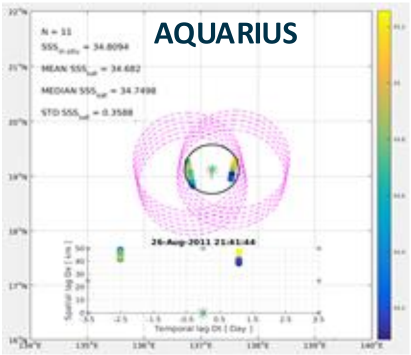
Figures - A variety of metrics and plots extracted by the Platform
www.salinity-pimep.org

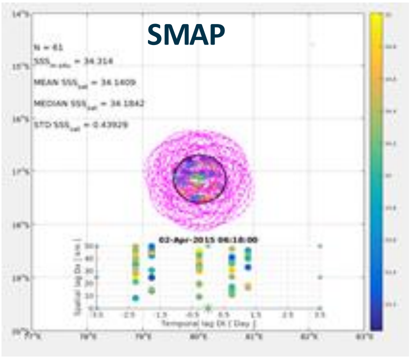
ESA-NASA Pi-MEP partnership – Update 2025 (i)

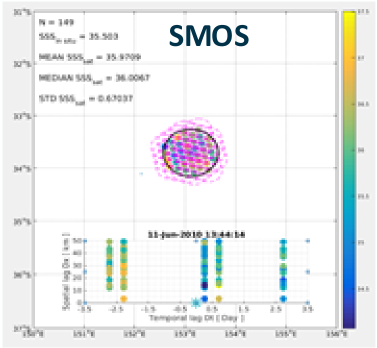
ESA-NASA partnership endorsed by JPPG in 2019; ongoing efforts:

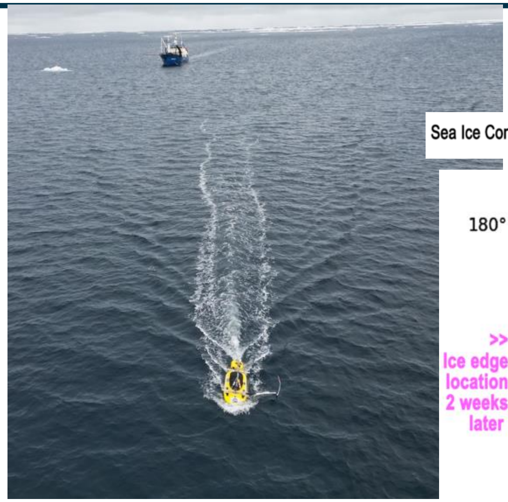
1. **NASA additional criteria for satellite/in-situ salinity Match-ups -> implemented and online.**
2. **NASA field campaigns (SASSIE) data -> included**
3. **Triple-collocation analysis plug-in -> implemented and online.**
4. **Characterize the effect of the sampling difference -> first estimates produced**

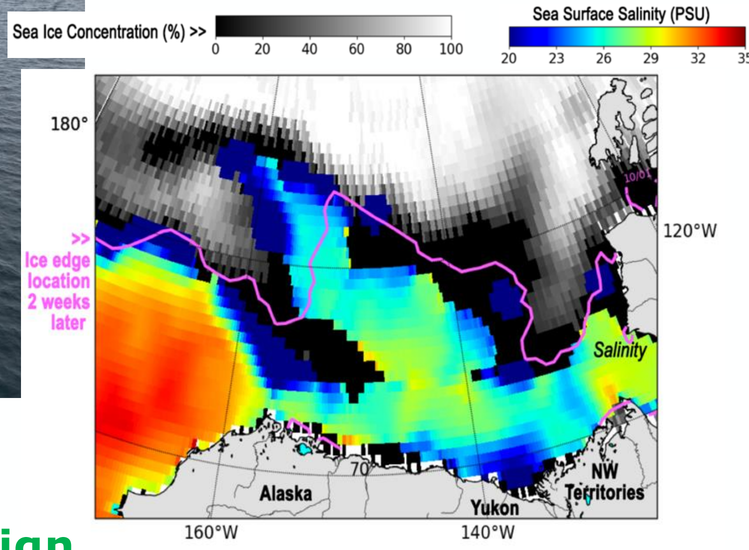












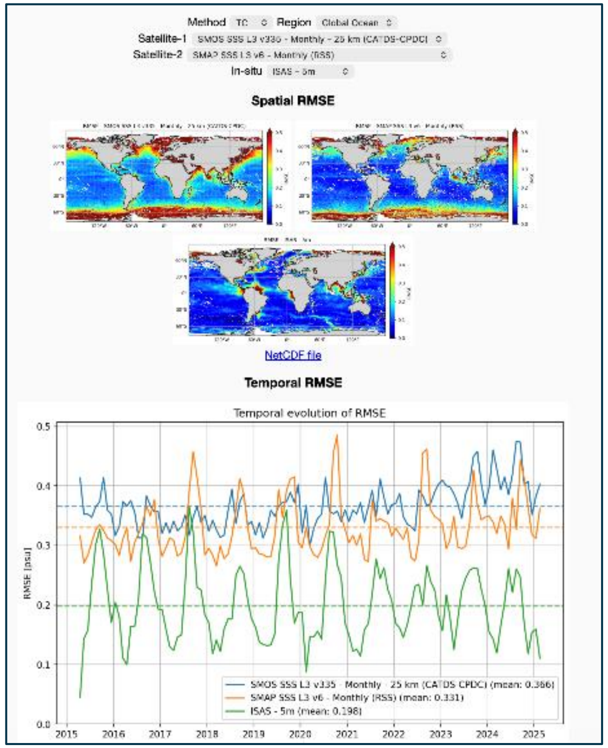
1. Additional match-up criteria

- Additional; match-up strategy provided by NASA
- Implemented and labelled “L2-averaged”
- Online as of 2023

2. SASSIE campaign

- Field campaigns data included
- Preparation of a dedicated case-study (as done for SPURS-1/2)

ESA-NASA Pi-MEP partnership – Update 2025 (ii)



3. Triple Collocation (TC) plug-in

- ESR (Seattle, WA) provided public Github repository with TC code
- https://github.com/EarthAndSpaceResearch/SVDS_PiMEP
- Examples of TC estimates provided (left)
- Recently released online

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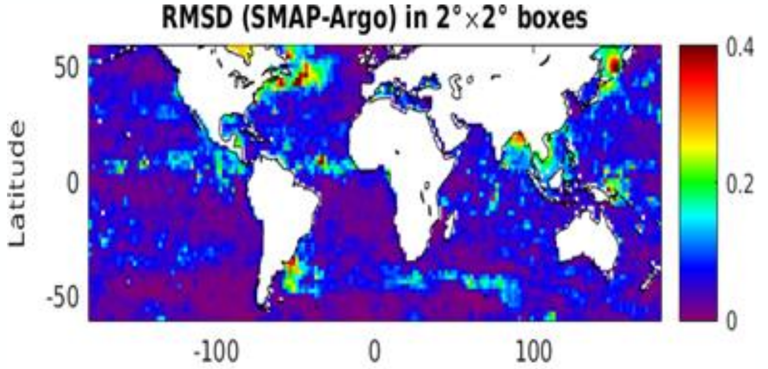
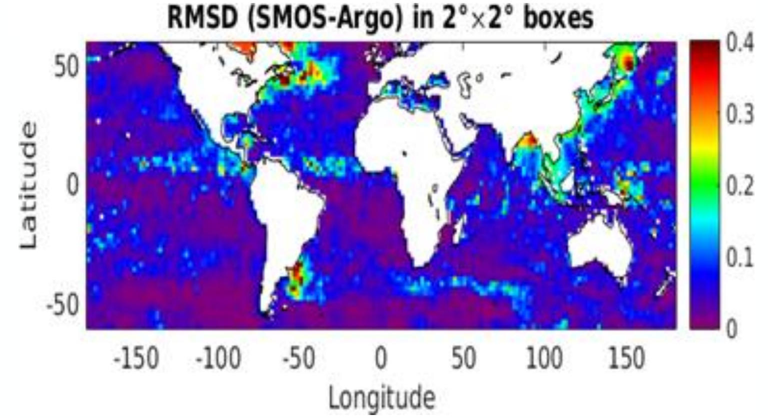
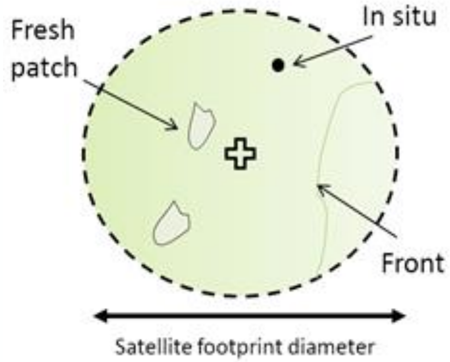
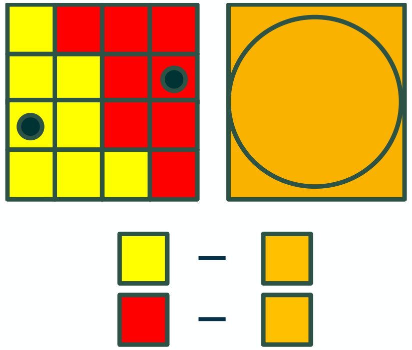
4. Representation errors estimates

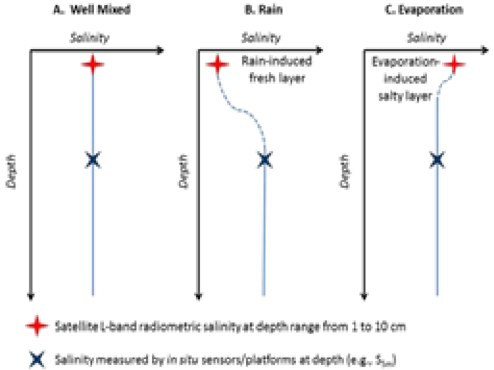
- Very high-resolution model ECCO (1/48º) -> diff (h)
- High-resolution model NEMO-Mercator (1/12º) -> diff (h,v,t)
- First RMSD estimates (right)



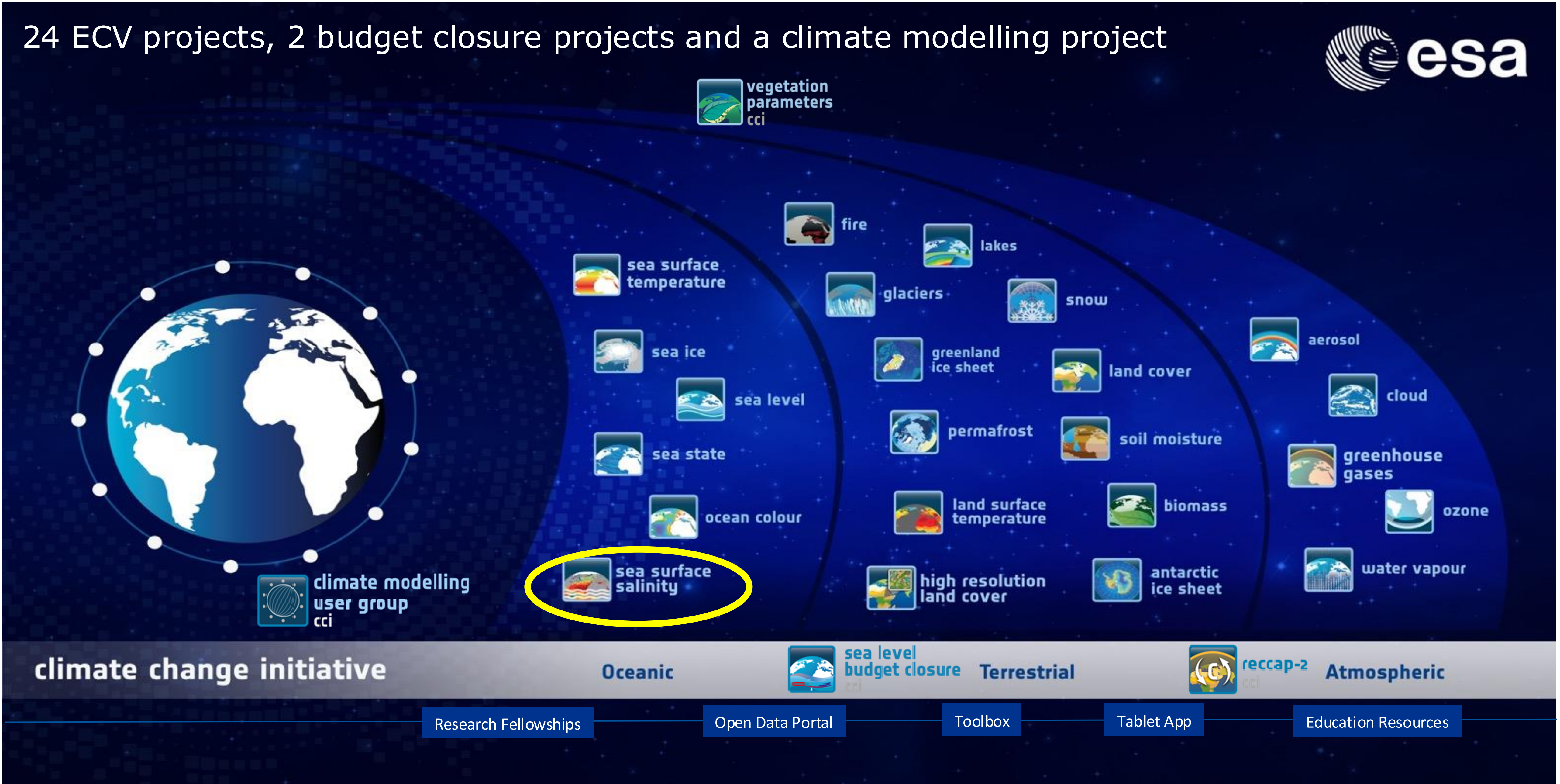




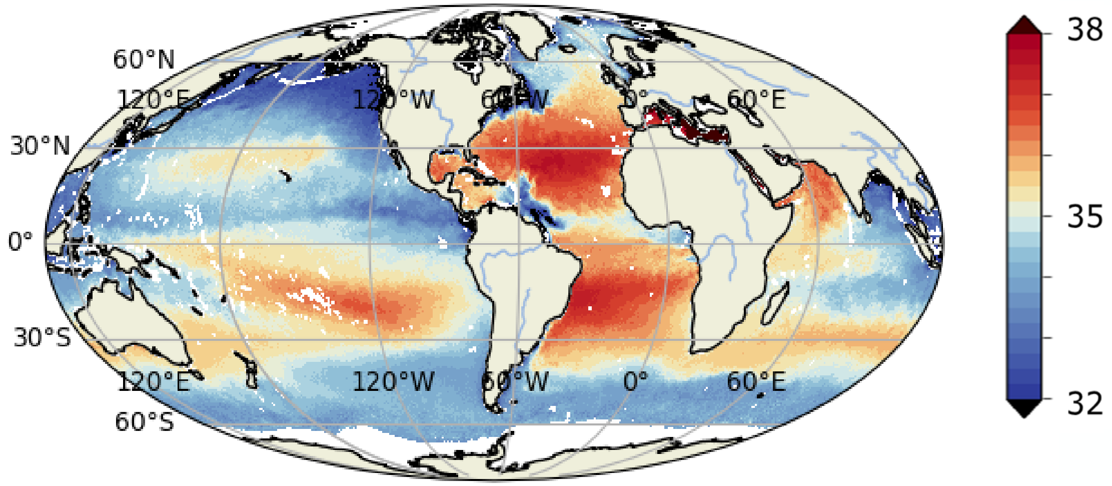




The Climate Change Initiative



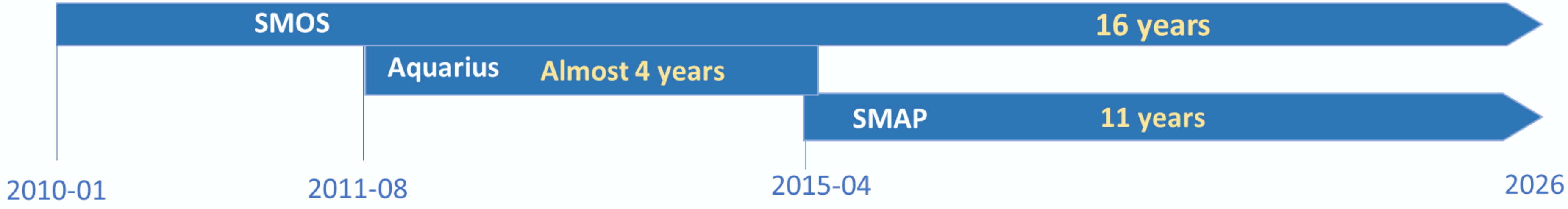
CCI Salinity



CCI+SSS methodology *(Boutin et al., JGR 2021)***:**

- Correct systematic biases depending on satellite geometry acquisition based **on SSS self-consistency**
- **Temporal optimal interpolation** (no spatial smoothing) of satellite SSS
- In situ SSS (ISAS) used to adjust multi-year mean value (**time variability based on satellite SSS**)

The longest operational ESA Earth observation mission!



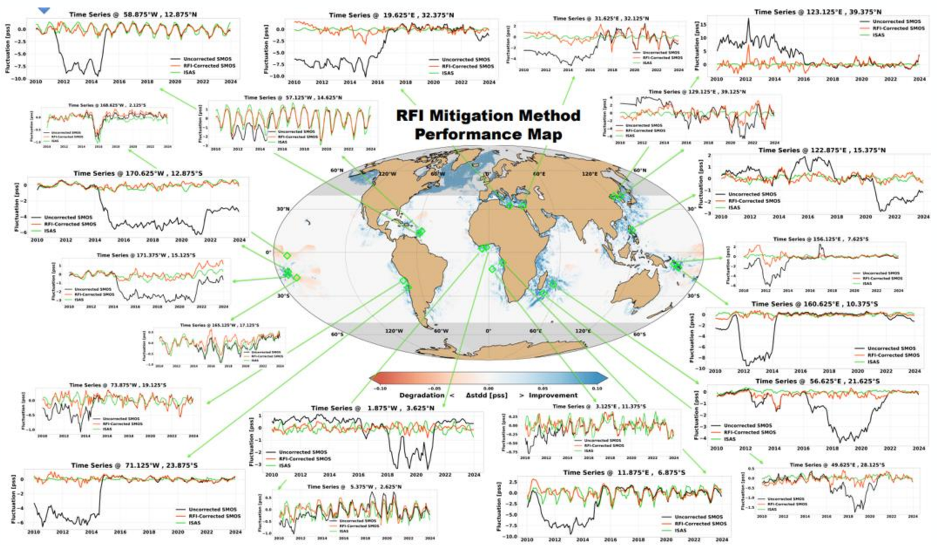
sea surface salinity cci

Data available at CEDA : https://catalogue.ceda.ac.uk/uuid/7294d93479654c139770f13fae4142d1/
ESA News: https://climate.esa.int/en/news-events/Sea-Surface-Salinity-Record-Extended/

LOCEAN LOPS ARGANS UH ACRI ST oceandatalab ICM Institut de Ciències del Mar National Oceanography Centre NATURAL ENVIRONMENT RESEARCH COUNCIL adwäisEO

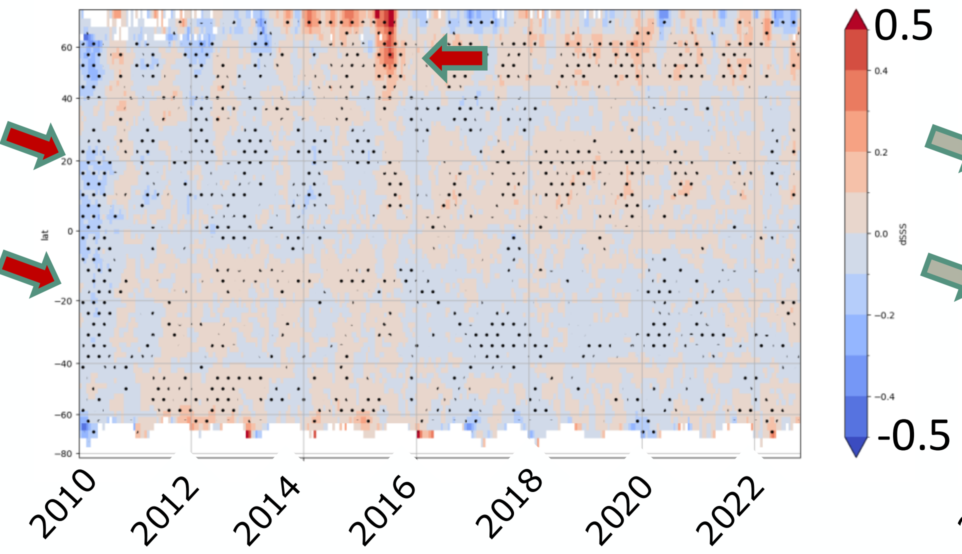
CCI Salinity – v5 (current)

- **CCI V5.5: January 2010 – October 2023**
- **Weekly and monthly fields of SSS and their uncertainty**
- **Global (0.25° grid) and Polar (N and S EASE polar grid) products**
- **Global precision against reference gridded data: 0.14 pss**

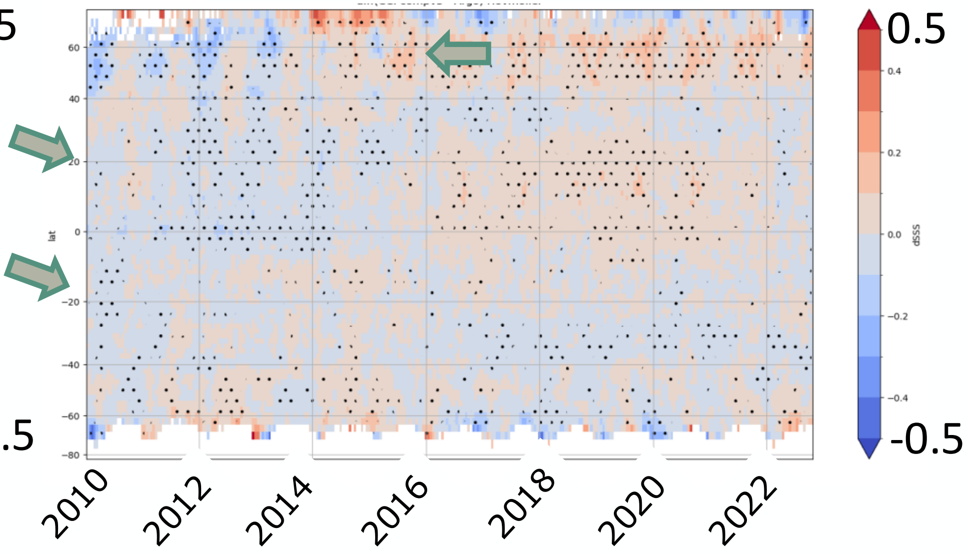


RFI filtering performance

CCI+SSS v4 – Argo SSS



CCI+SSS v5 – Argo SSS



Version 5: 2010-2023

See CCI-Salinity talk by F. Bonjean

CCI Salinity – v6 (upcoming)

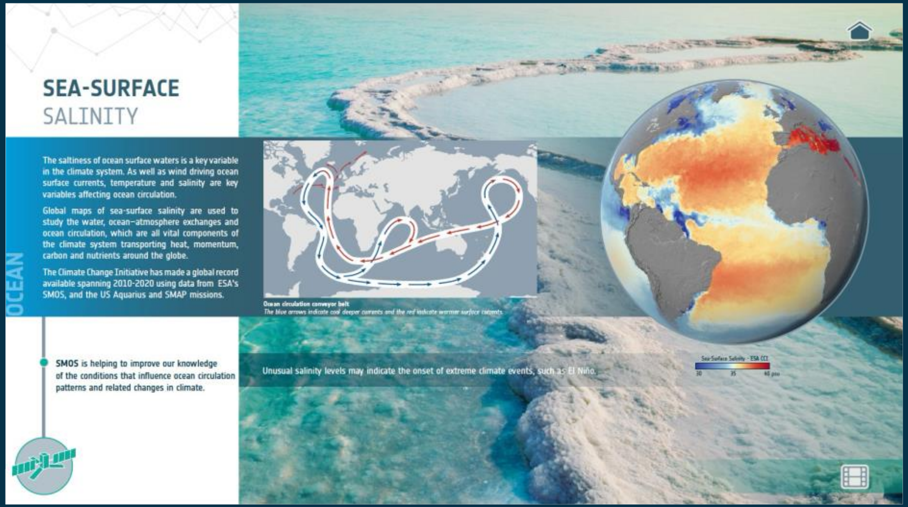
Period extension: **2010 to end 2024**: version to be delivered to users mid 2026
CCI v6 SSS features and **novelties**:

SMOS:

- L2OS reprocessing (OTT ISAS, priors ERA5, new TB-wind LUT)
- **SST diurnal cycle from ERA5 (SMOS L2 processing)**
- **SSS correction related to Sun activity**
- **SSS correction in the Southern Ocean related to distance to sea ice**
- Revise RFI mitigation

SMAP:

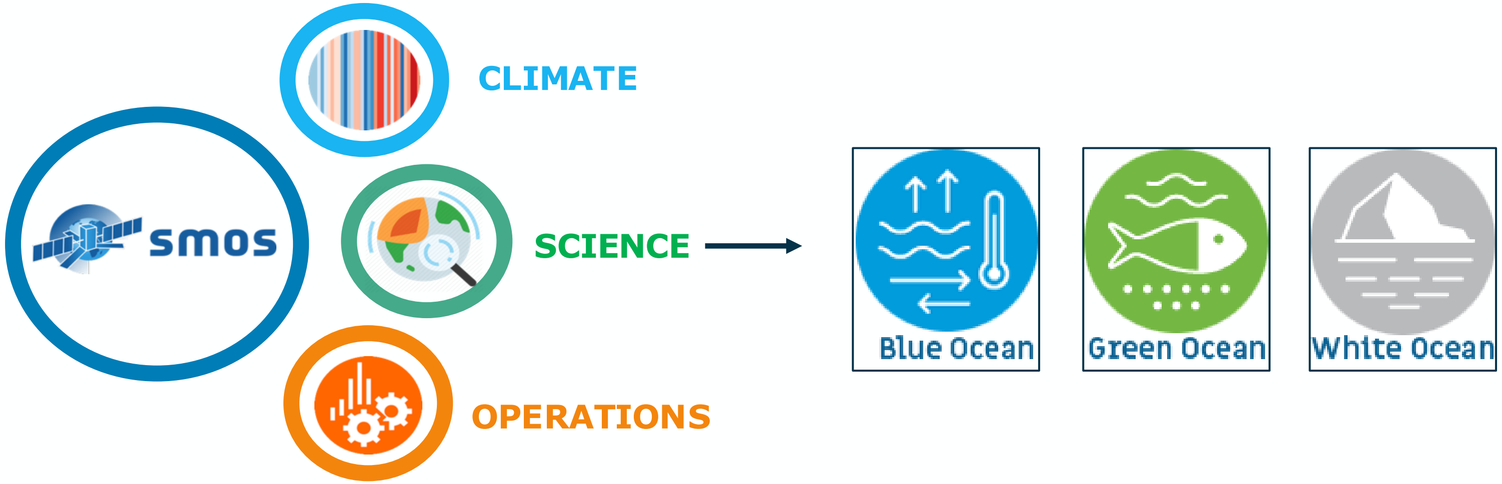
- RSS v6.0 & v6.3 in 2024 (thanks to T. Meissner, RSS)
- SST diurnal cycle correction on SMAP SSS
- **SSS correction related to Sun activity**
- WS-SST correction



Ocean applications - portfolio

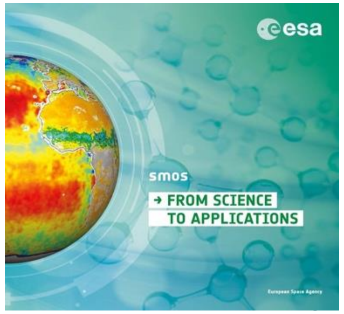
Ocean applications - portfolio

rapid-intensification
thermohaline-circulation
tropical-cyclones
iod
freshwater-lenses
barrier-layers
mesoscale-variability
mediterranean-sea
enso
sea-ice-thickness
upwelling
river-plumes
co2-fluxes
ocean-acidification
arctic-ocean
precipitation
data-assimilation
water-masses-formation
tropical-instability-waves

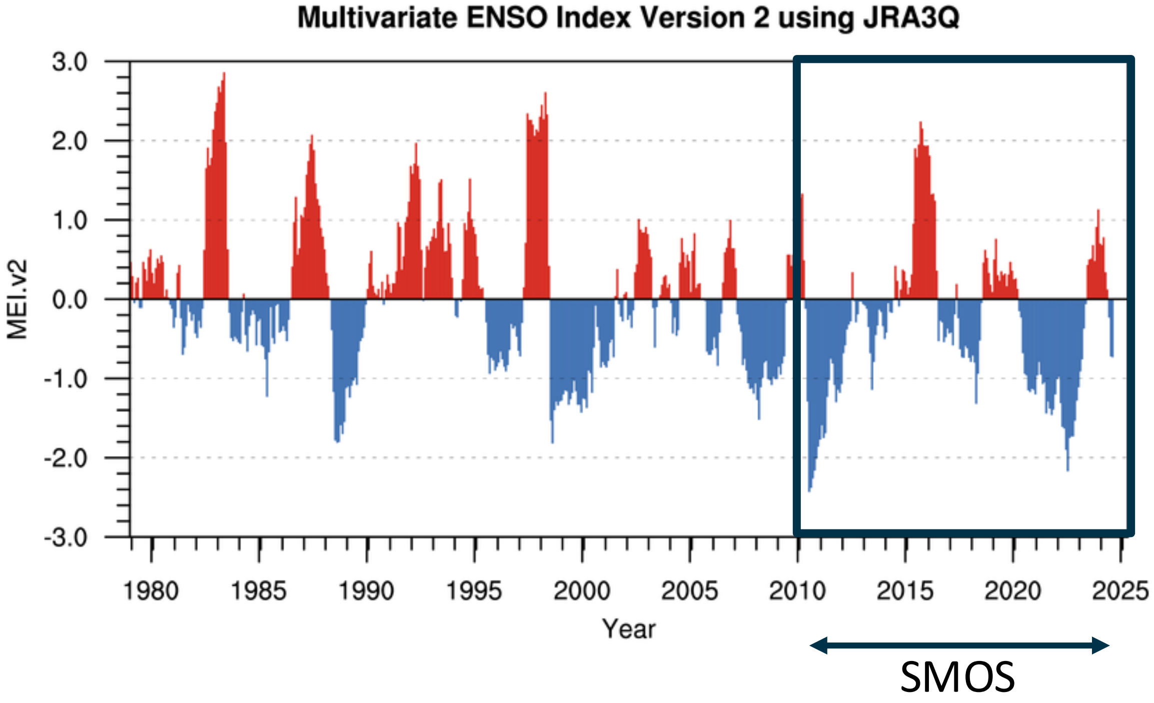


ESA SMOS ocean projects

Arctic+ Salinity
Baltic+ Salinity
SO-FRESH
SMOS+ Med
SMOS+ Niño15
SMOS+ Rainfall
SMOS+ SOS
SMOS+ Storms/Evolution
SMOS Winds
SMOWS
SSS-SLIP
MAXSS
OceanSODA
Pathfinders-OA
OceanHealth-OA
...

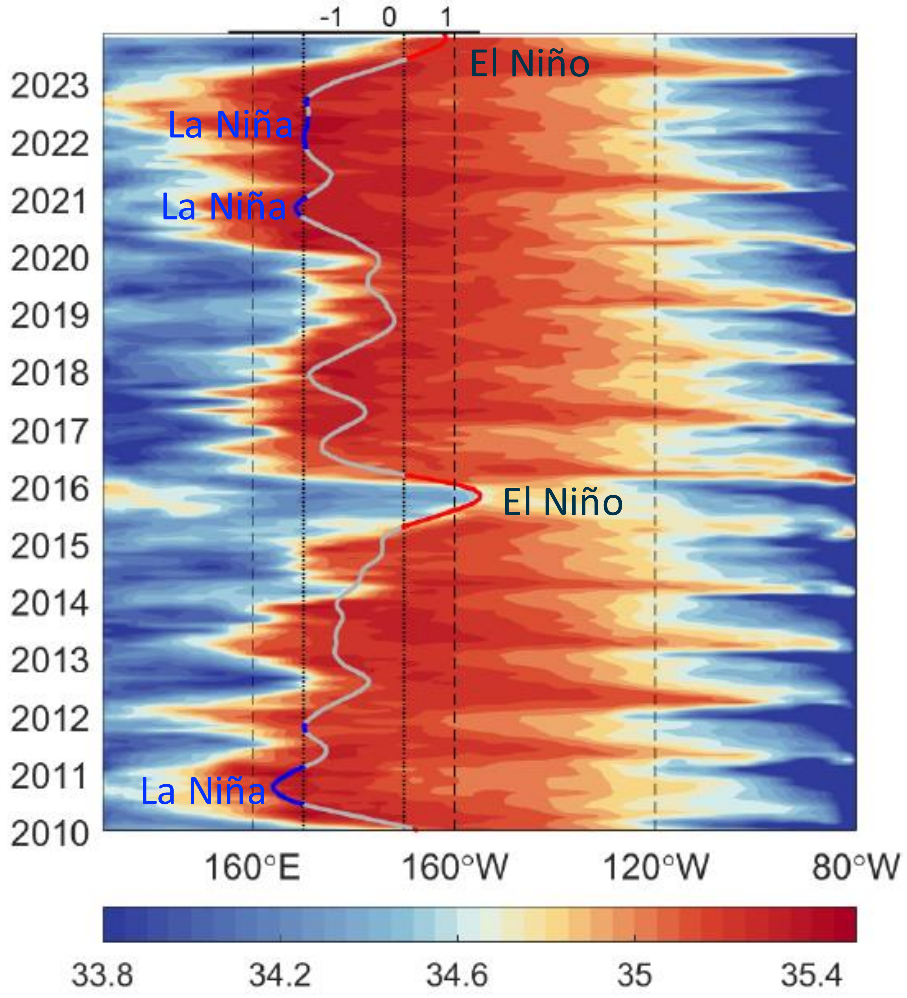


1. Climate - ENSO



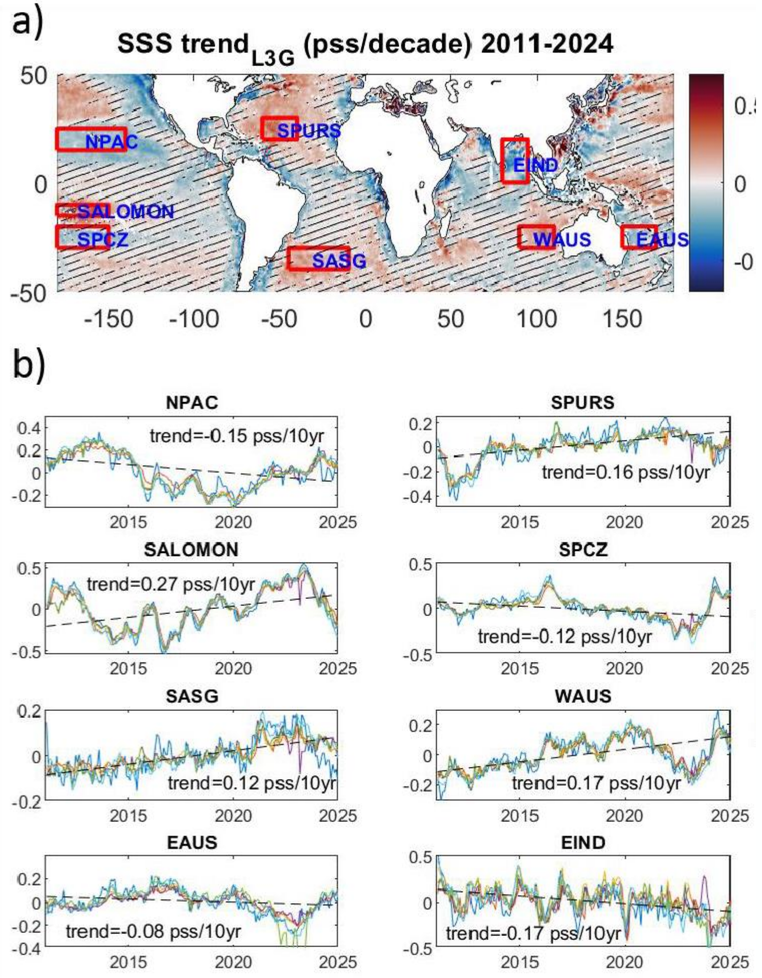
Satellite Microwave Radiometry at L-band for Monitoring Earth's Essential Climate Variables

Yiwen Zhou, *Senior Member, IEEE,* Mike Schwank, *Member, IEEE,* Jacqueline Boutin, Philippe Richaume, Arnaud Mialon, Manu Holmberg, Lars Kaleschke, Pierre Zeiger, Marion Leduc-Leballeur, Ardeshir Ebtehaj, Divya Kumawat, *Member, IEEE,* Nemesio Rodriguez-Fernandez, Estrella Olmedo, Andreas Colliander, *Senior Member, IEEE,* Emmanuel Dinnat, *Senior Member, IEEE,* Andrew Feldman, *Member, IEEE,* Mehmet Kurum, *Senior Member, IEEE,* Juha Lemmetyinen, Kimmo Rautiainen, Ghislain Picard, Nicolas Reul, Stefan Hendricks, Xiangshan Tian-Kunze, Rasmus Tonboe, Cristina Vittucci, Marco Brogioni, *Member, IEEE,* Kenneth Jezek, Giovanni Macelloni, *Senior Member, IEEE,* Matthias Drusch, Joel Johnson, *Fellow, IEEE,* Roger Lang, *Life Fellow, IEEE,* David Le Vine, *Life Fellow, IEEE,* Dara Entekhabi, *Fellow, IEEE,* and Yann Kerr, *Life Fellow, IEEE*

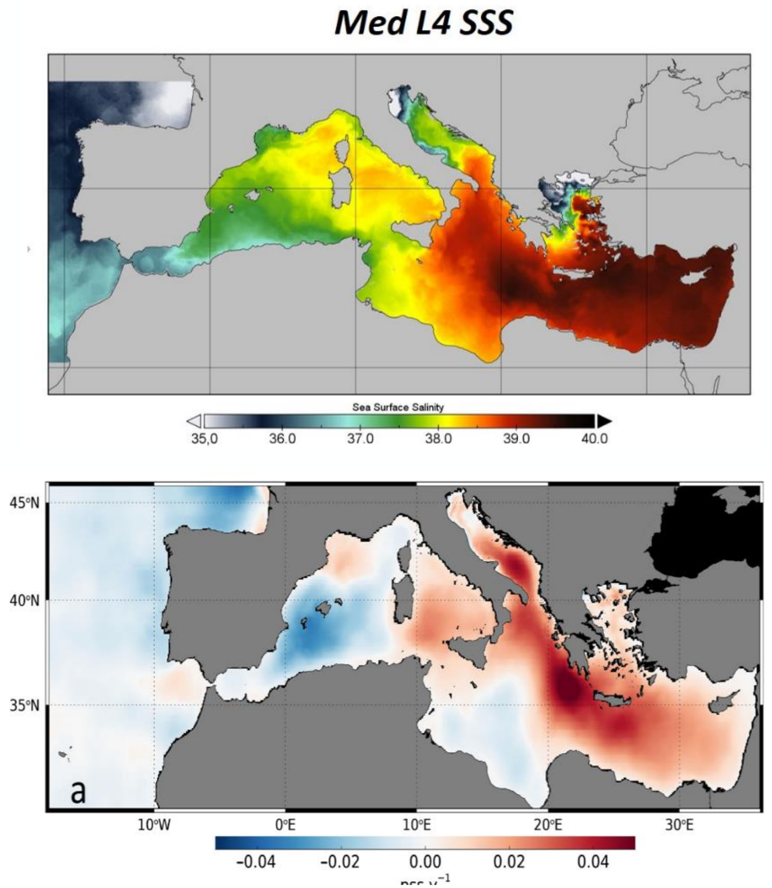


IEEE Geoscience and Remote Sensing Magazine, 2026

1. Climate - trends



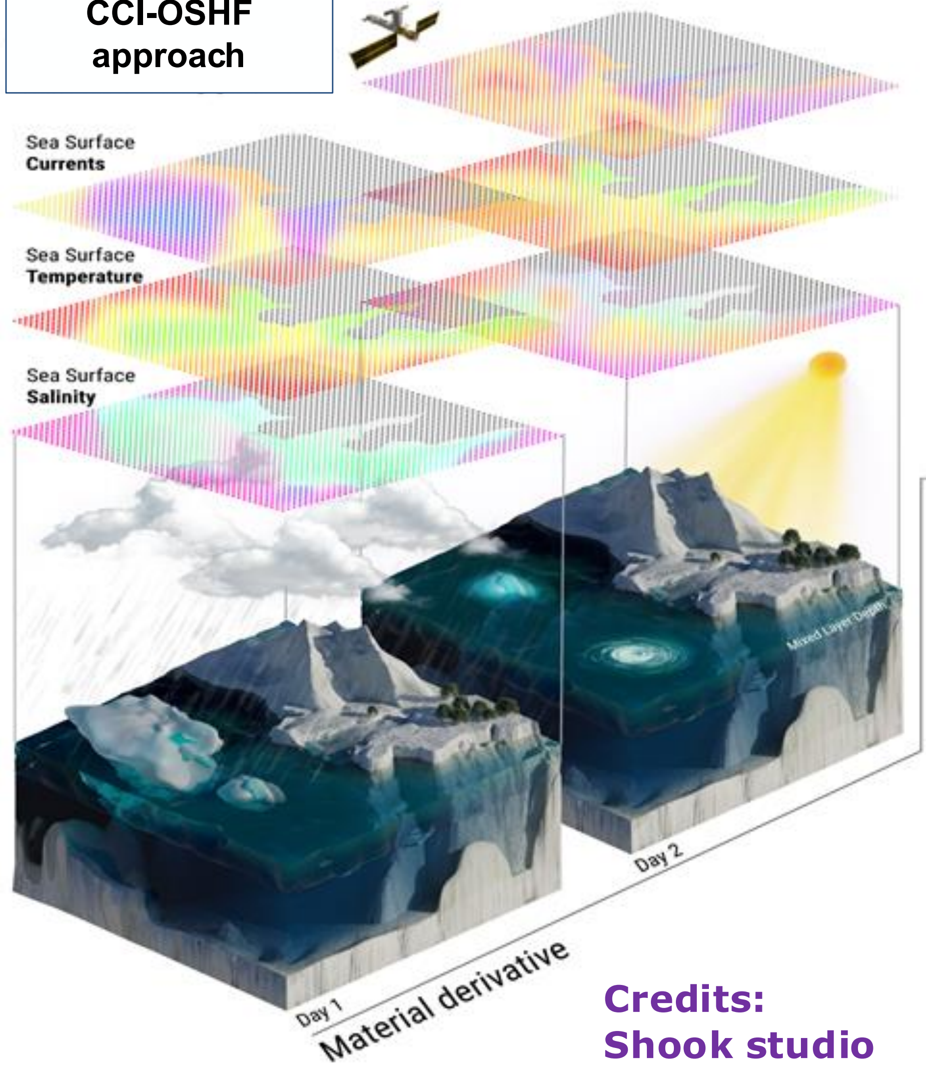
SSS trends and variability [Parracho et al, 2026]



Med SSS and trends [Sammartino et al, 2022]

1. Climate – CCI Heat Fluxes

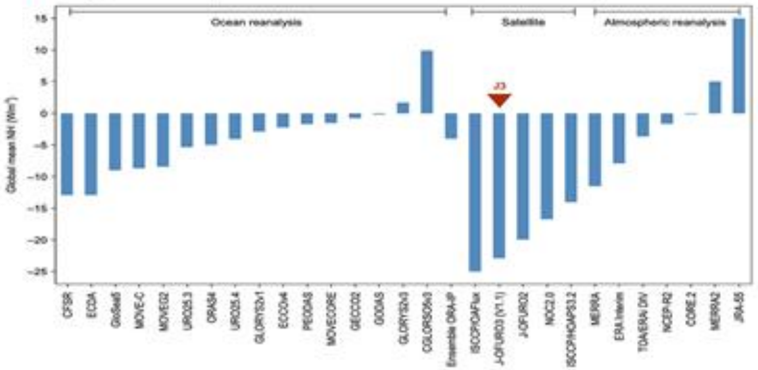
CCI-OSHF approach



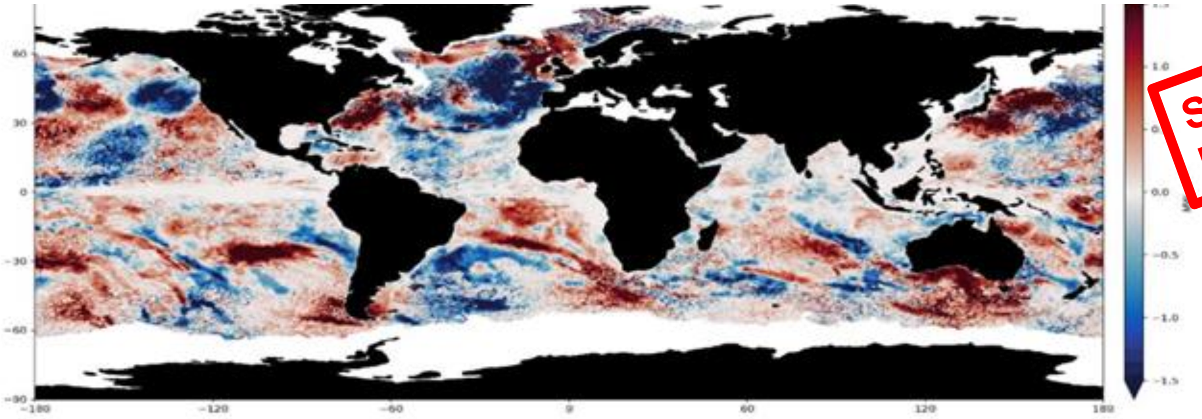
Credits: Shook studio

Nominal Approach leads to

! Big discrepancies between current products



$$\frac{Dq}{Dt}h = h\left\{\frac{\partial q}{\partial t} + u\cdot\nabla q\right\} = \underbrace{(Q_{SW} - Q_{SW(-h)} + Q_{LW} + Q_{sen} + Q_{lat})}_{f_q} + \underbrace{\kappa\nabla^2 q}_{d_q} + \underbrace{(q_0 - q_{-h})\left(\frac{Dh}{Dt} + w_{-h}\right)}_{h_q}$$



See OSHF talk by E. Olmedo

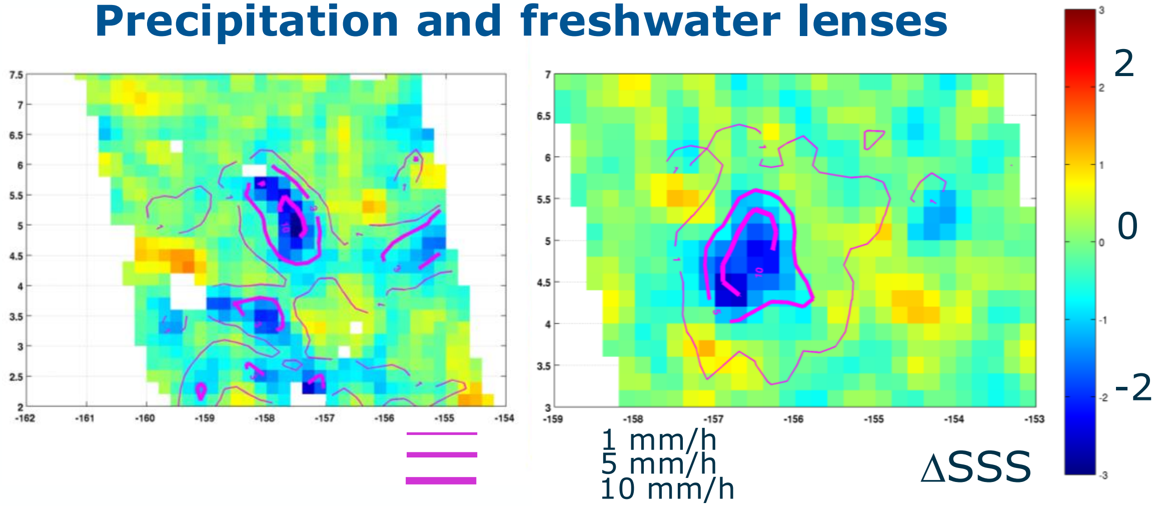
CCI-OSFH aims at creating a new Climate Data Record (CDR) for total Ocean Surface Heat Flux (OSHF), enhancing the spatio-temporal resolutions and complementing other existing products.

2. Science

Blue Ocean

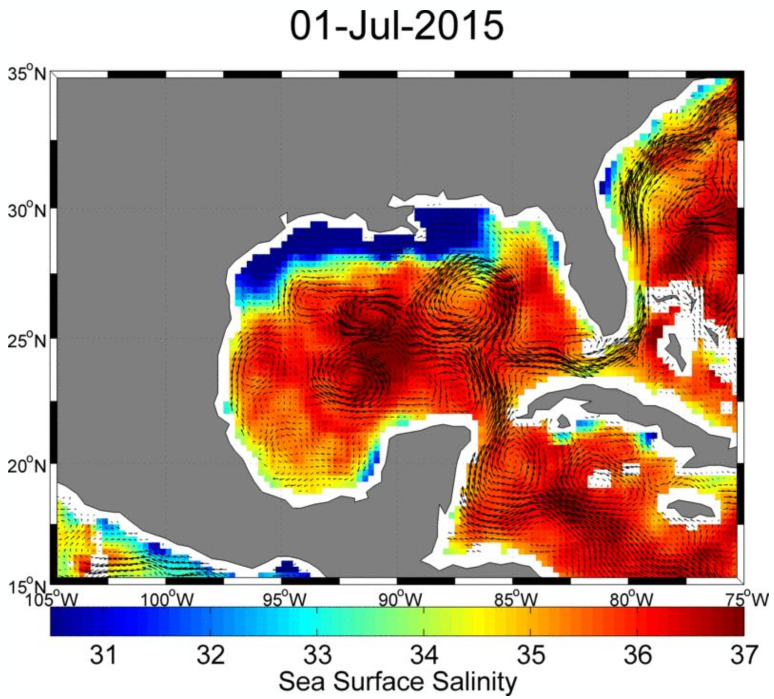
Freshwater galore

Precipitation and freshwater lenses

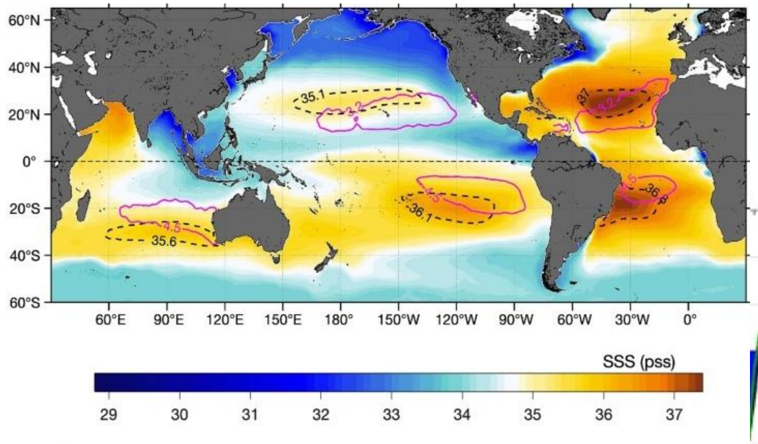


J. Boutin et al.
SMOS+ Rainfall

River plumes monitoring

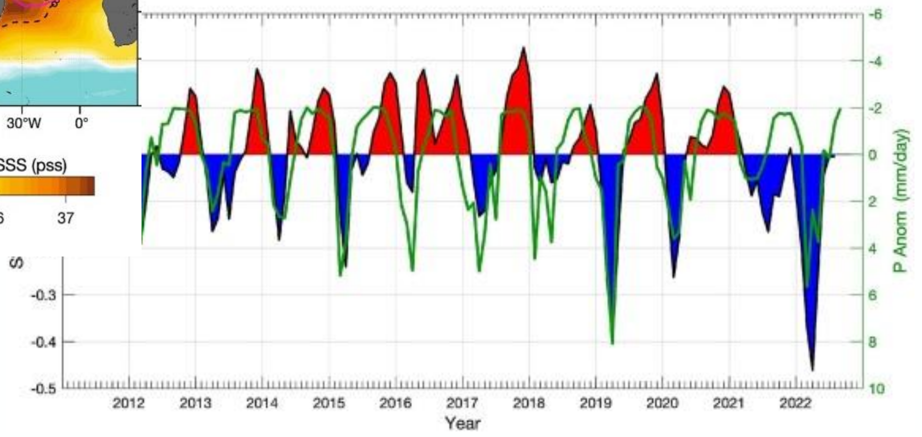


N. Reul et al.
PI-MEP Case Study



L. Yu et al.
2023

Salinity Maxima and Minima sync



2. Science

Blue Ocean

Stratification

scientific reports

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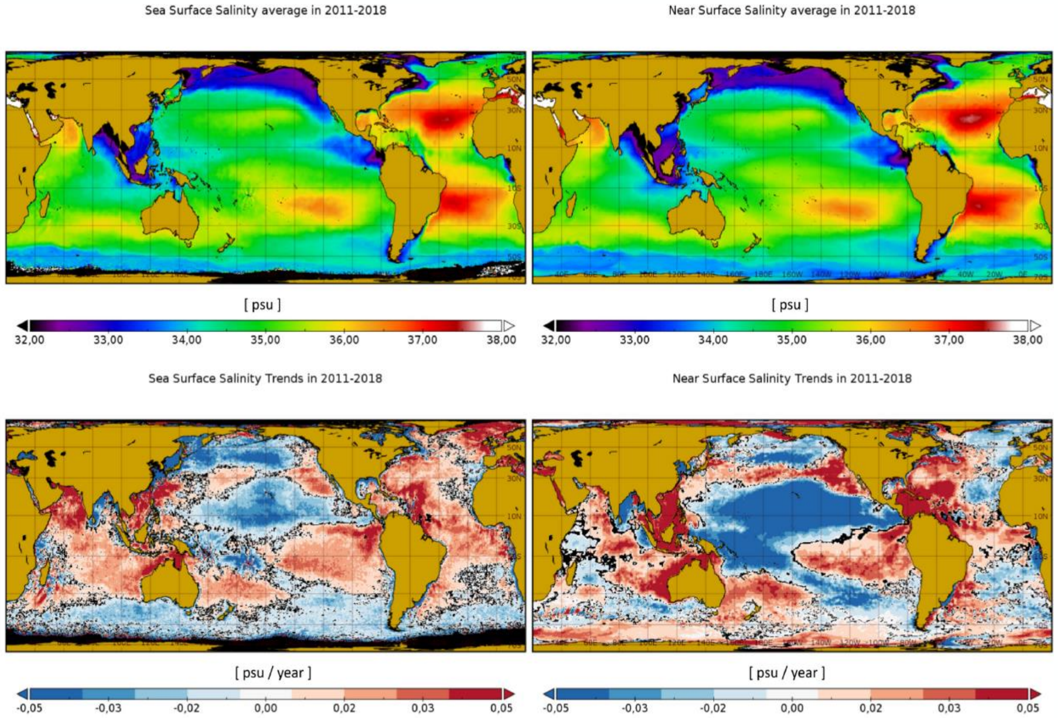
Article | Open Access | Published: 15 April 2022

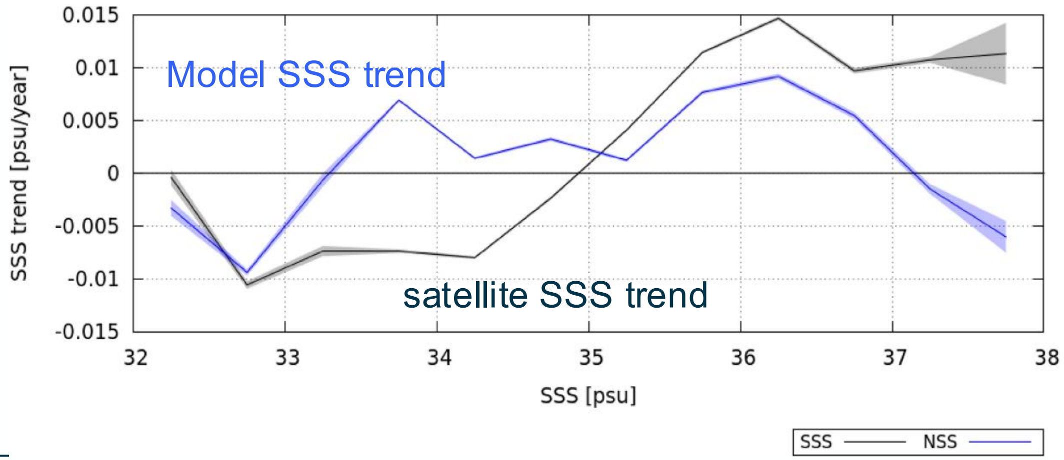
Increasing stratification as observed by satellite sea surface salinity measurements

Estrella Olmedo, Antonio Turiel, Verónica González-Gambau, Cristina González-Haro, Aina García-Espriu, Carolina Gabarró, Marcos Portabella, Ignasi Corbella, Manuel Martín-Neira, Manuel Arias, Rafael Catany, Roberto Sabia, Roger Oliva & Klaus Scipal

Scientific Reports 12, Article number: 6279 (2022) | Cite this article

Olmedo et al., 2022





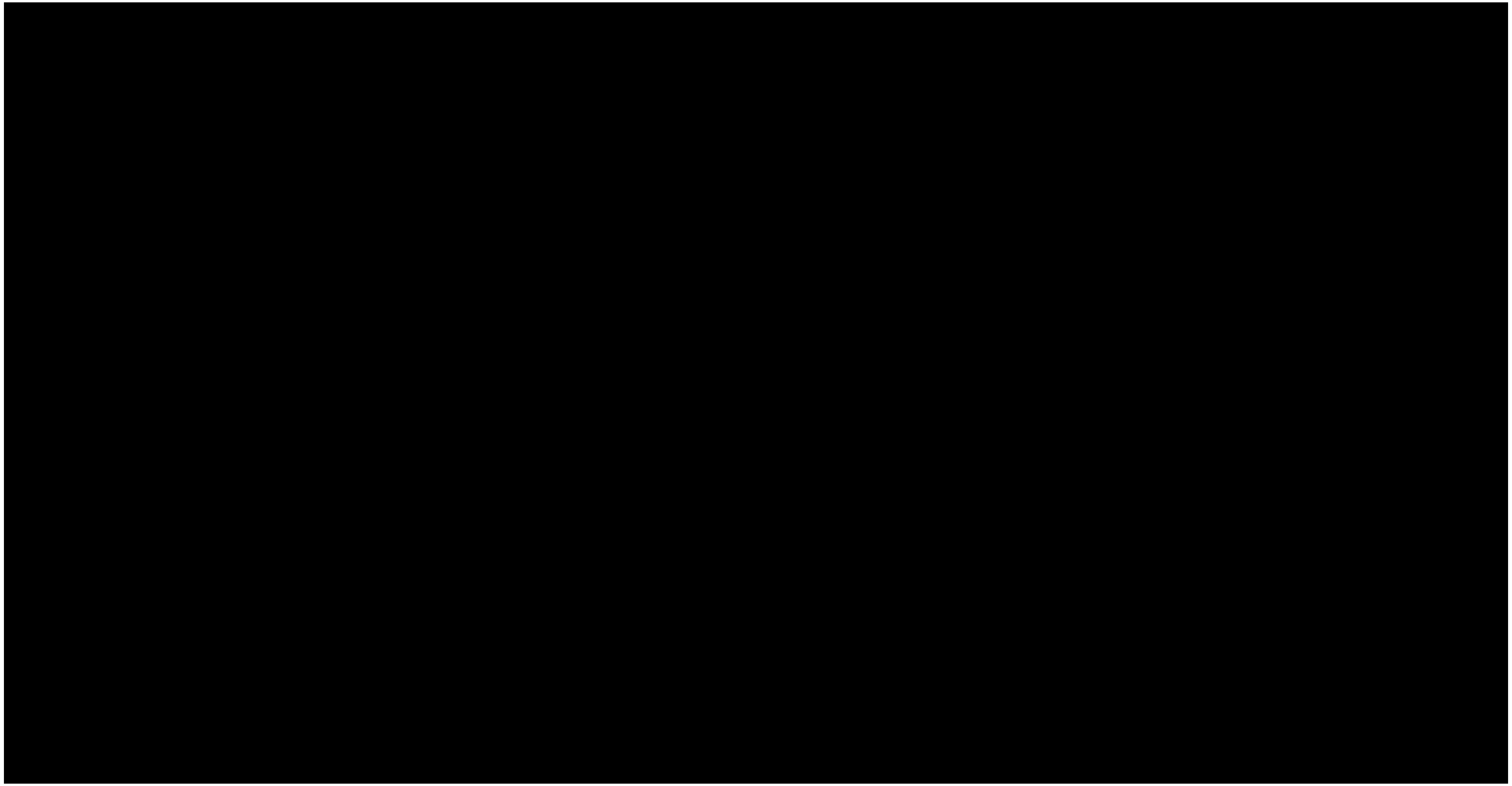
Satellite-derived sea surface salinity measurements evidence an intensification of the water cycle (the freshest waters become fresher and vice-versa) which is not observed at the in-situ near-surface salinity measurements.

The **largest positive differences** between surface and near-surface salinity trends **are located over regions characterized by**

- **a decrease in the mixed layer depth**
- **a decrease in the sea surface wind speed**
- **an increase in sea surface temperature**

2. Science - OA

Green Ocean



Gregor and Gruber, 2022-2024

UNIVERSITY OF EXETER

PML Plymouth Marine Laboratory

Ifremer

ETH zürich

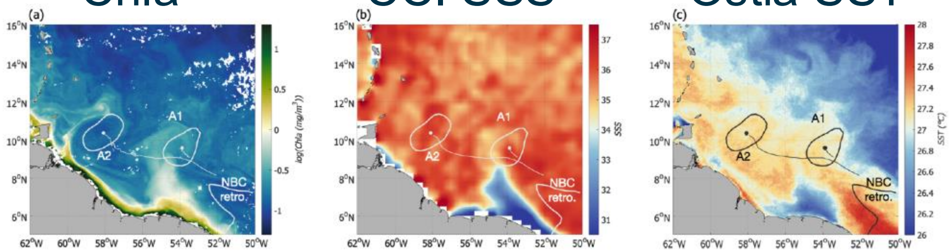
See Ocean Carbon talk by J. Shutler

Ocean Acidification

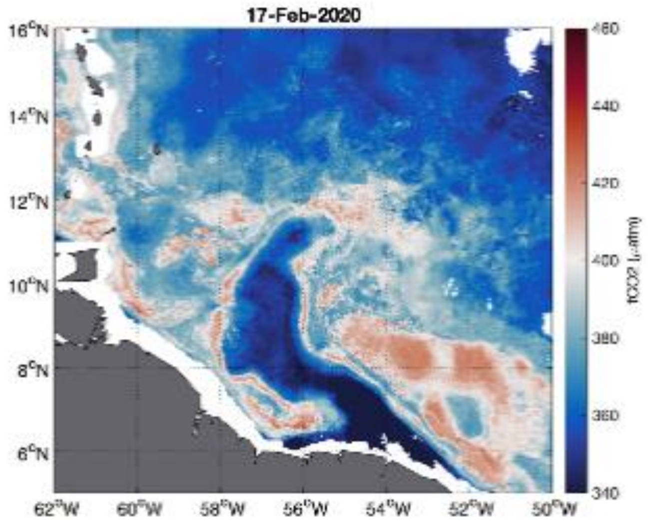
2. Science – CO_2 sink

Green Ocean

Chla CCI SSS Ostia SST



Reconstructed fCO2



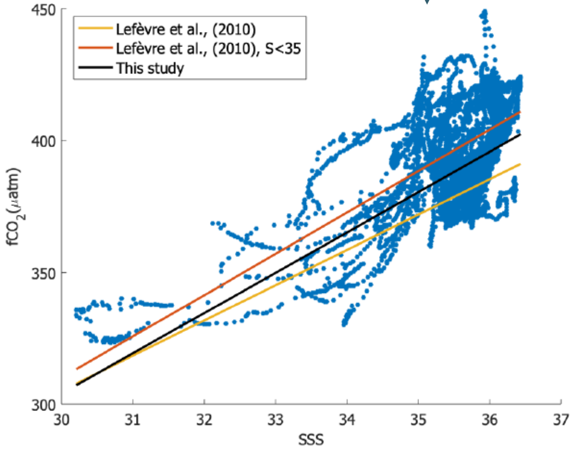


Figure S1. SSS- fCO_2 relation and comparison to Lefèvre et al., (2010)

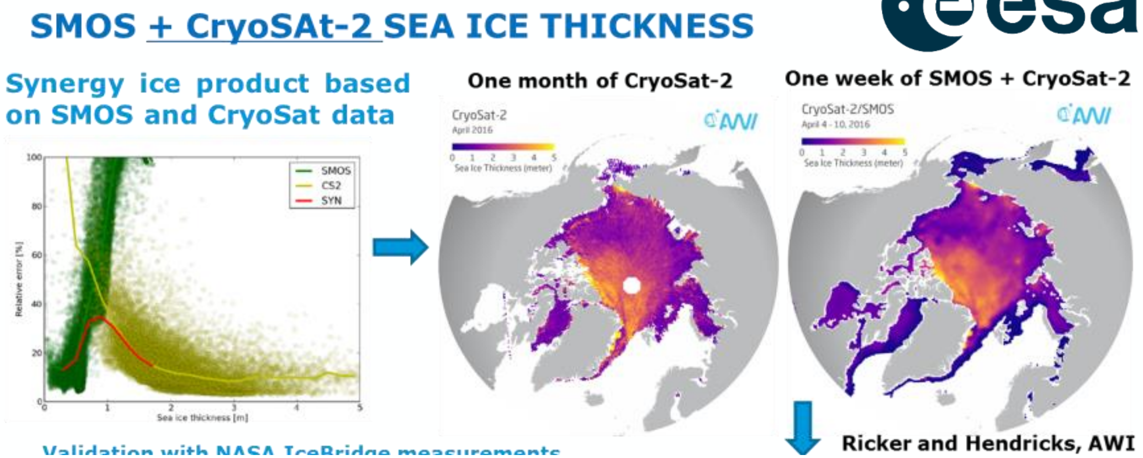
Carbon sequestration

A **nutrient-rich** freshwater plume from the Amazon River is **entrained by a ring** from the shelf up to 12° N **leading to high phytoplankton** concentration and significant carbon drawdown (**larger sink**)

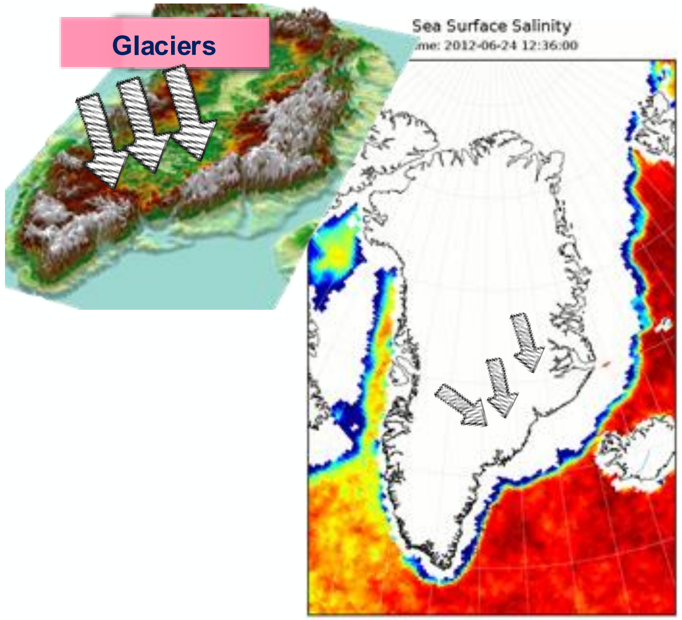
Olivier, et al. Biogeosciences, 2022.

2. Science

White Ocean

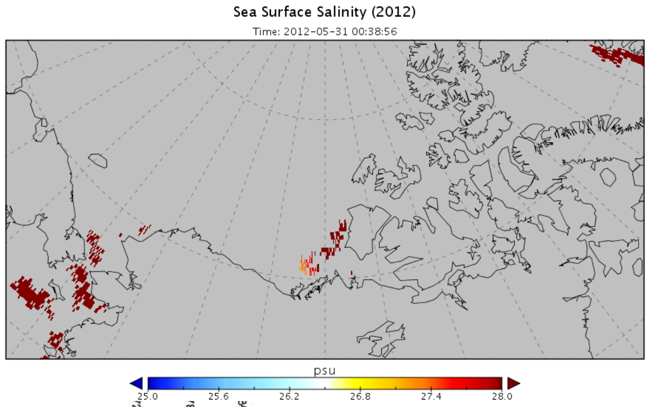


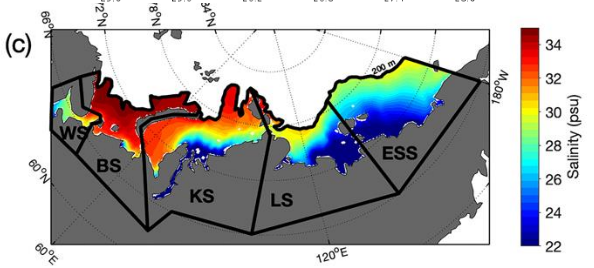
Coastal SSS at high latitudes



Castaleo et al., 2022
Hu and Zhao, 2022
Reverdin et al., 2024

Arctic Salinity and FWC



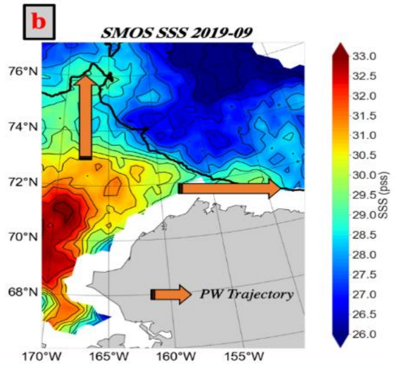


Martinez et al., 2022
Tikhonov. et al 2022
Hall et al 2023
Grodsky et al., 2023

Sea-ice thickness

Kaleschke et al.
SMOS+ Sea-ice

Meltwater Lenses



Supply et al, 2022

2. Science

White Ocean

Polar fronts

JGR Oceans

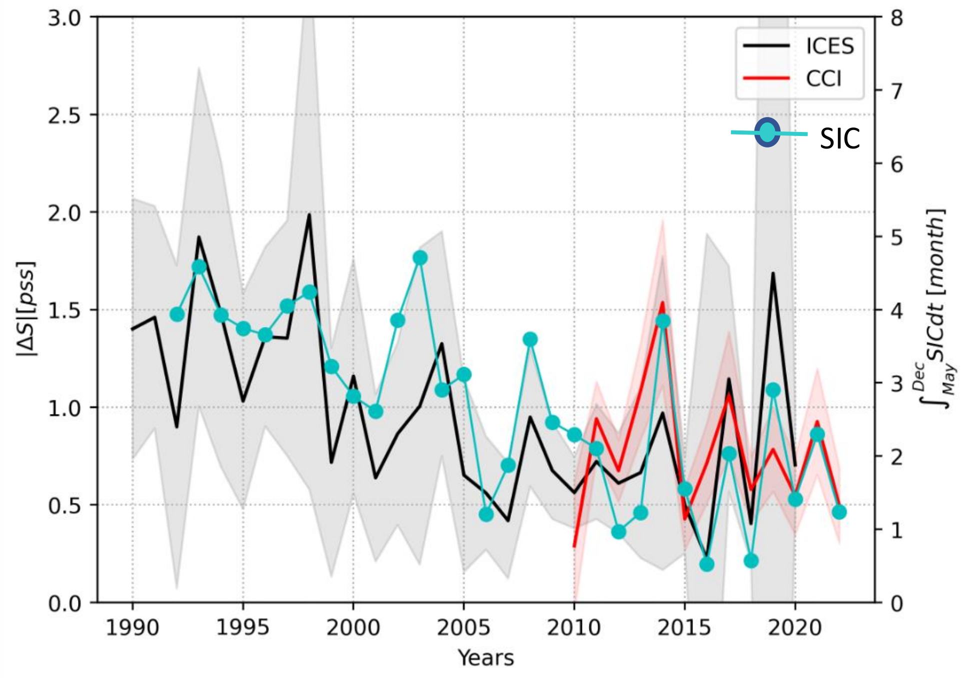
Research Article | Open Access

Interannual Variability of the Polar Front Surface Thermohaline Properties in the Barents Sea

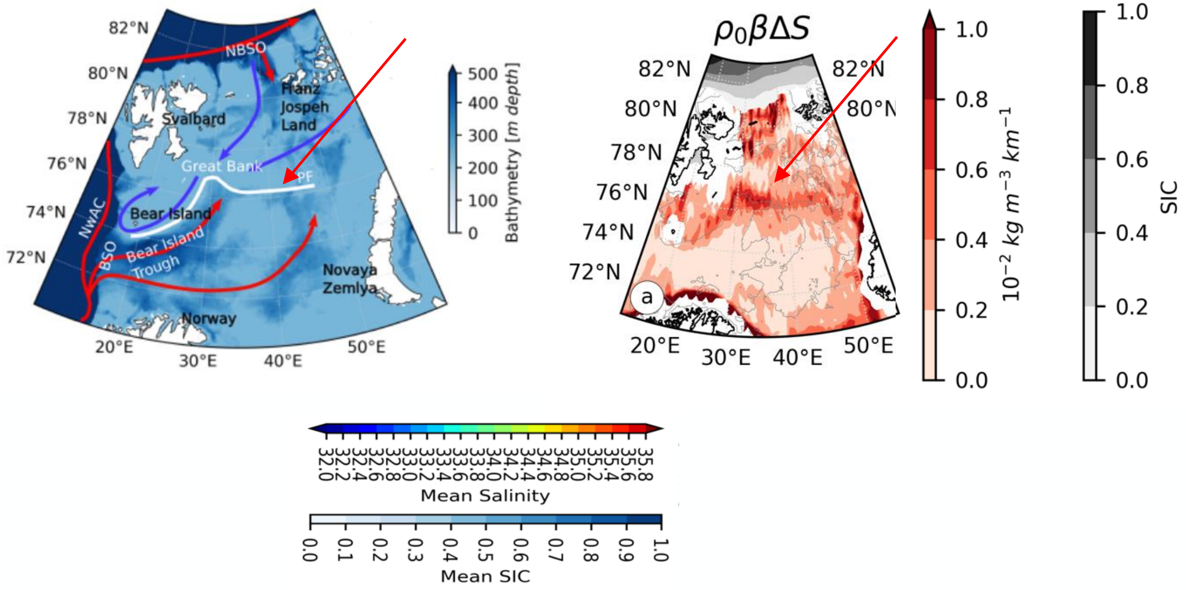
Nicolas Kolodziejczyk, Camille Lique, Jacqueline Boutin, Jean-Luc Vergely, Gilles Reverdin

Kolodziejczyk, 2025

Sept-Oct DS and Dec-May SIC



Satellite SSS reveals that the Polar Front dynamic is mainly controlled by the SSS gradient

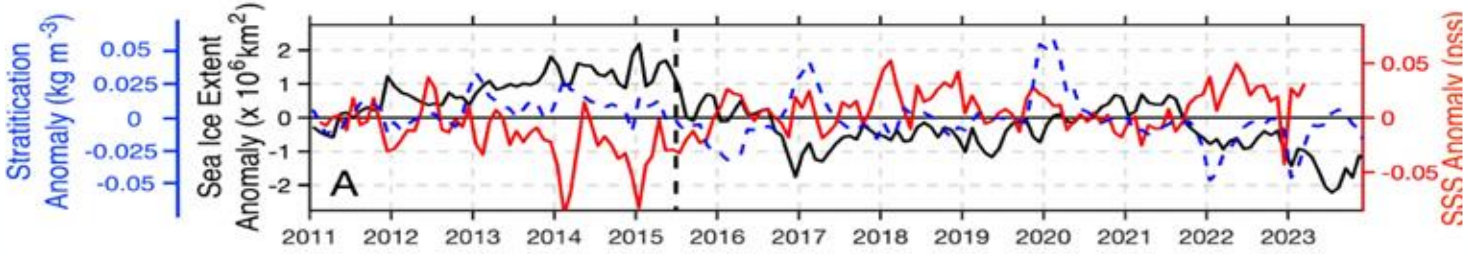


2. Science

White Ocean

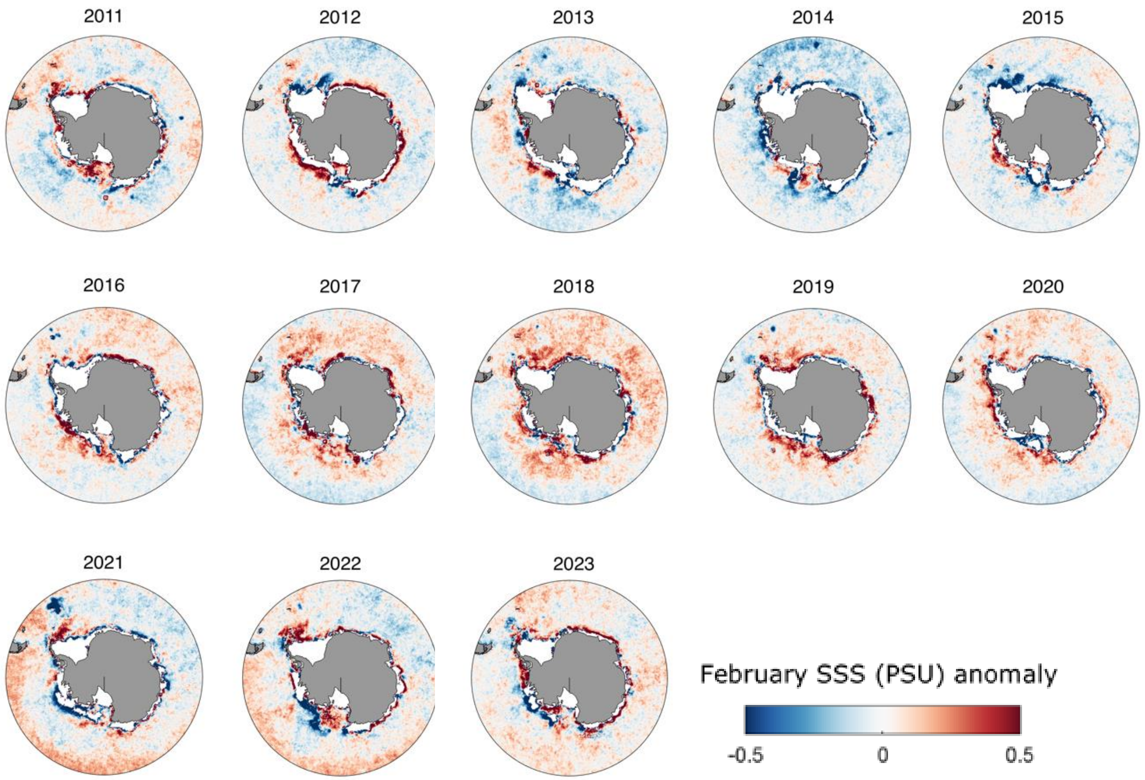
SO Fresh
Southern Ocean Freshwater

esa



Sea-Ice/SSS dynamic

Silvano, 2025



- Assessing oceanic drivers of Antarctic **sea-ice retreat**
- Seemingly counter-intuitive increase in surface salinity in correspondence to sea-ice extent decrease
- **Increase in SSS** detected since early 2016 (before the beginning of the sea ice retreat)
- Causing mechanism: saltier (and warmer) Circumpolar Deep Waters are **upwelled to the surface**
- Upward heat flux and reduced stratification linked with sea ice retreat and Maud Rise polynya opening

PNAS BRIEF REPORT | EARTH, ATMOSPHERIC, AND PLANETARY SCIENCES OPEN ACCESS

Rising surface salinity and declining sea ice: A new Southern Ocean state revealed by satellites

Alessandro Silvano[a,1], Aditya Narayanan[a], Rafael Catany[b,c], Estrella Olmedo[d], Verónica González-Gambau[d], Antonio Turiel[d], Roberto Sabia[e], Matthew R. Mazloff[f], Theo Spira[g], F. Alexander Haumann[h,i], and Alberto C. Naveira Garabato[a]

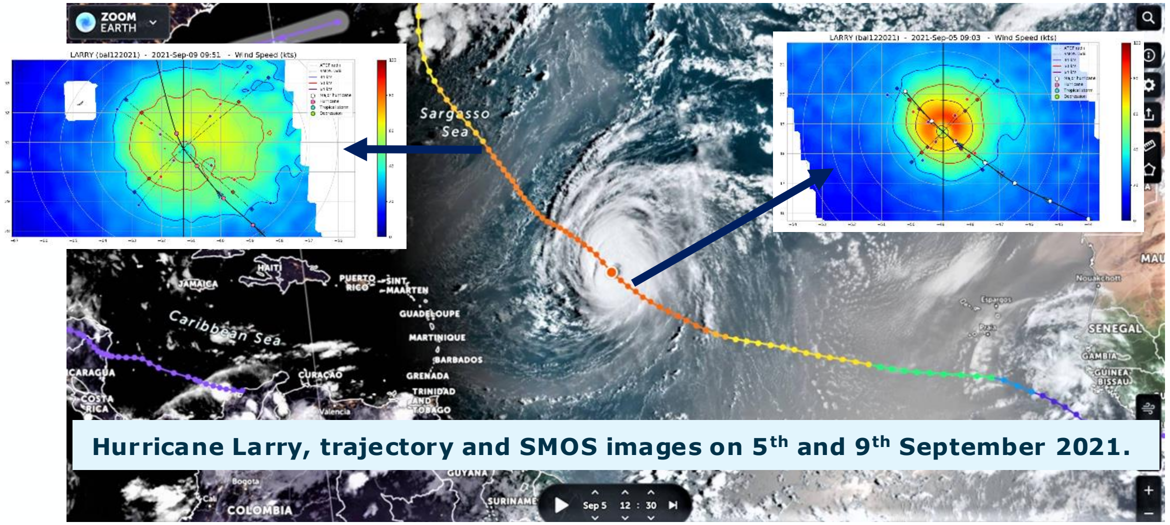
Edited by Andrea Rinaldo, Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland; received January 10, 2025; accepted May 9, 2025

3. Operations – Extreme winds

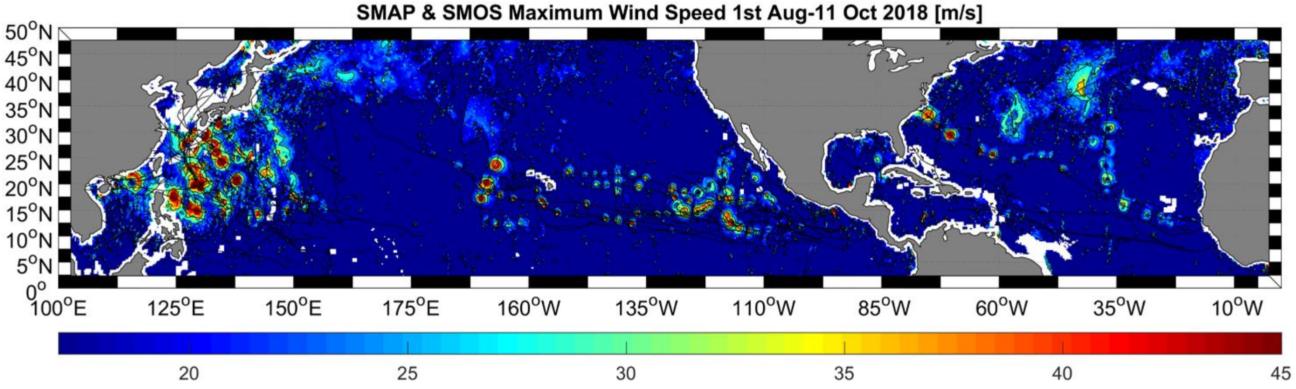
Severe winds product v300 available since August 2021 in Near Real Time (within 4-6 hours from acquisition) from IFREMER and ESA:

- **Based on new L1B v724 (Gibbs-2 correction)**
- **Revised GMF at low speed and Bayesian wind speed retrieval**
- **CCI SSS as auxiliary information**
- **Brightness Temperature filtering improvements**
- **Quality Control flag improvements**

https://www.smosstorm.org/
https://smos-diss.eo.esa.int/

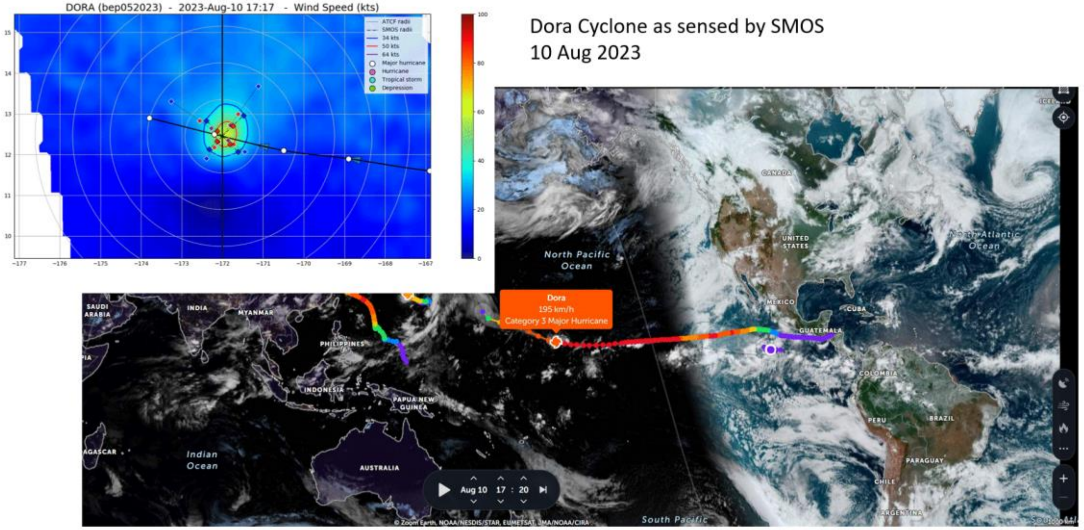


Hurricane Larry, trajectory and SMOS images on 5th and 9th September 2021.

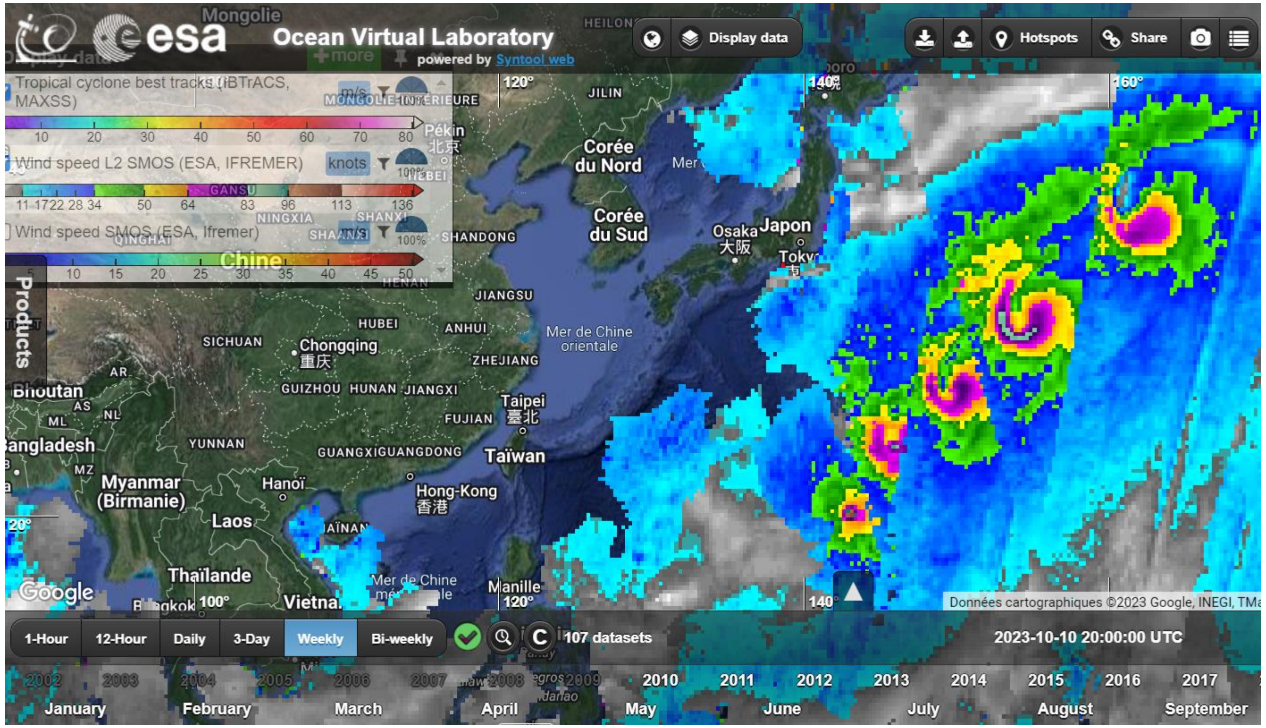


Reul et al., 2012/2024
SMOS+ Storms and Evolution
SMOS Winds

3. Operations – Ops products



Dora Cyclone as sensed by SMOS
10 Aug 2023



Operational Services accessing SMOS NRT wind data:

- Meteo-France La Réunion
- WMO Regional Specialized Meteorological Centres
- US Naval Research Laboratory Automated Tropical Cyclone Forecasts System
- NOAA/NESDIS National Hurricane Center
- Joint Typhoon Warning Center
- …

Ocean Virtual Laboratory:
A SMOS WIND Visualization tool:
https://odl.bzh/KF_ieRqP

3. Operations – SSS DA

Met Office esa

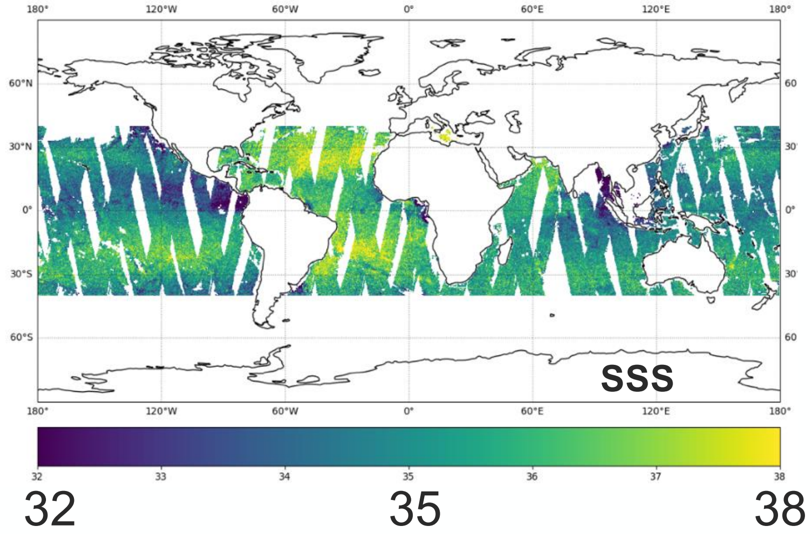
Impact of satellite SSS data in a 5-year ocean reanalysis

Experiments:

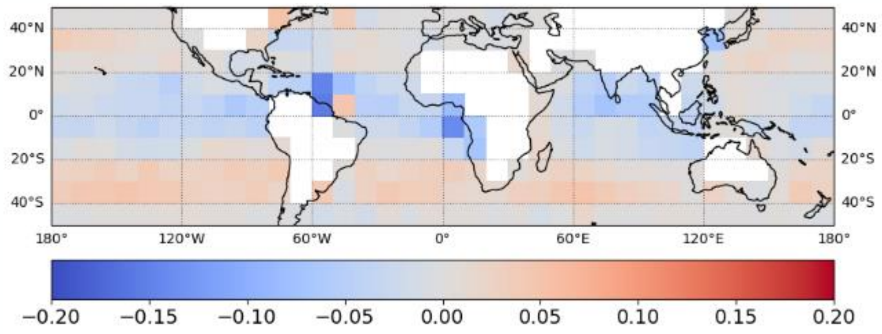
- 5 years (after spin-up) between Jan 2016 - Dec 2020.
- **control** expt with all data except satellite SSS, **sss_assim** includes sat. SSS as well.

Results:

- Compared to CCI+SSS data**, reduction in RMSD in main river outflow regions and maritime continent**.
- Compared to Argo S data, reduction in RMSD throughout the tropics, but increase between 20-40° N/S.



sss_assim RMSD - *control* RMSD (g/kg)



M. Martin, 2025

Assimilated data	Source of data	Processing level and platforms
Satellite SSS	CCI v4.4	L2P SMOS and SMAP, restricted to <40° N/S, uncert.<1 pss
Satellite SST	CCI v3.0	L3 AVHRR
Satellite SLA	CMEMS multi-year v4	L3 along-track from various satellites
Satellite SIC	OSI-SAF CDR v3	L3/L4 SSMIS
In situ profiles	EN4 vEN.4.2.2.g10	T/S profiles from various platforms (including Argo)

OSC-2024 – Outcomes and Recommendations

1. **Community positioning on the societal values** of salinity measurements i.e. why is salinity crucial?
   a. Salinity, as a predictor for rainfall on land, sea ice formation
   b. Salinity, to improve ENSO predictions (even better after the creation of the rainfall correction)
   c. Salinity, to better estimate freshwater content in the Arctic Ocean, freshwater inflow in the GoM
   d. Salinity to better constrain Carbonate system, providing estimates of Ocean Acidification
   e. [L-band TB] to belter estimate TC/ETC/PL tracks, Rapid Intensification and wind radii (evacuation alerts)
2. **Continuity and enhancement of satellite SSS measurements** beyond CIMR - higher resolution - coordination with CryoRad, FReSCH
3. **SASSIE campaign** – extremely relevant both on the in-situ characterization (emphasis on vertical mismatch characterization - skin salinity) and process studies
4. Development of **citizen science** to support the Salinity Science Community (eg, targeting fishermen)
5. Continue efforts on common products (**CCI, OI-SSS**) and partnership on platforms (**Pi-MEP**) between missions and Agencies, and **increased user engagement**
6. Strengthening the utility of salinity measurements through **ocean modeling and data assimilation** (sea-ice formation prediction, ENSO prediction, land/ocean linkages, etc)
7. **Integrating salinity science with other communities** (eg, biogeochemistry)
8. **Improving dielectric constant model**, especially for high salinities

SMOS-15 conference – Sicily, Nov-2024

Where should SMOS direct its **priorities and efforts in the future**?

- **Keep L-band clean and address the issue of RFI; not only for SMOS, but for all other missions.**
- **Level 1 TBs as the foundation** for everything else including operations and climate research.
- Follow the **ESA Science Strategy**, there are plenty of opportunities including synergies with other missions.
- Foster disruptive innovation in terms of data processing, dissemination and scientific ideas.
- Continued interest in **future campaigns** for other mission to transfer knowledge.
- Support the development of **future L-band missions**.

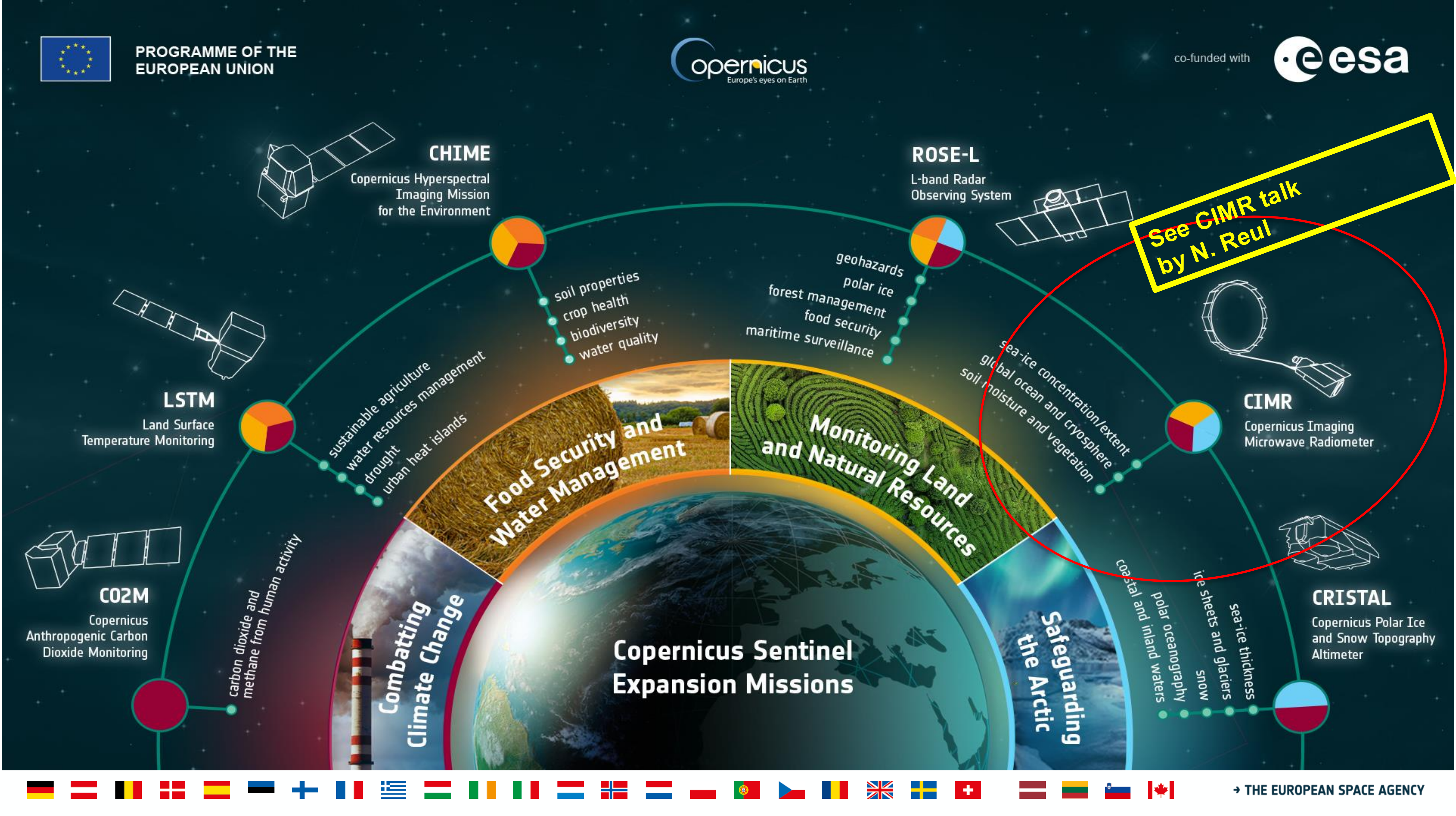
Mission goals proposed (and accepted!) for 2026 - 2028

FUNDAMENTALS Continue the acquisition, processing, monitoring and dissemination of SMOS **L1 brightness temperature** measurements.

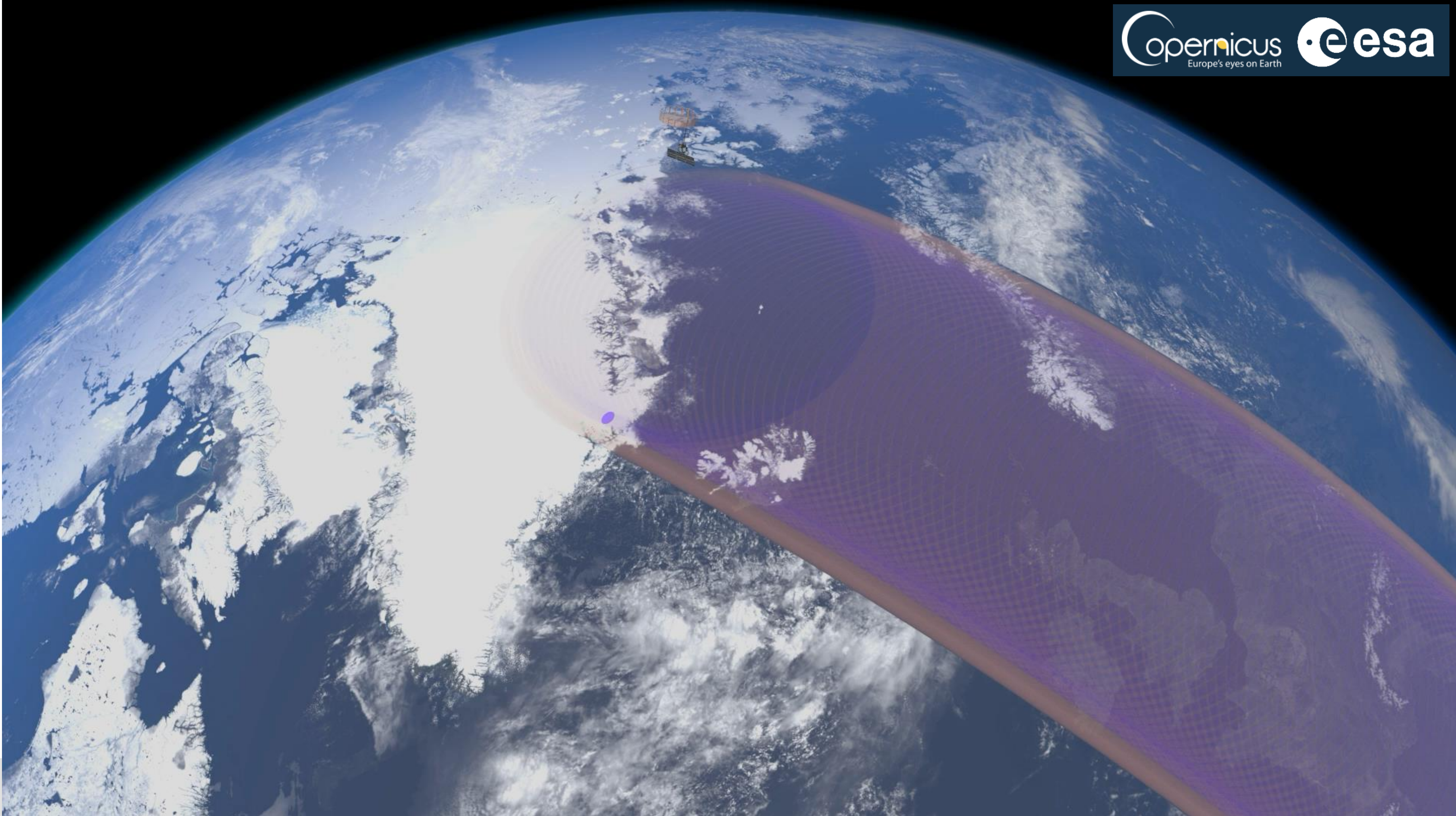
CLIMATE Continue developments in the use of SMOS data for climate research and enable **climate action**.

SCIENCE Enable new science based on the **synergistic exploitation** of data from SMOS and novel observing systems with a focus on carbon cycle research over land and ocean.

OPERATIONS Enable Earth action through further consolidating, **validating** and distributing the latest SMOS data products in a timely manner.



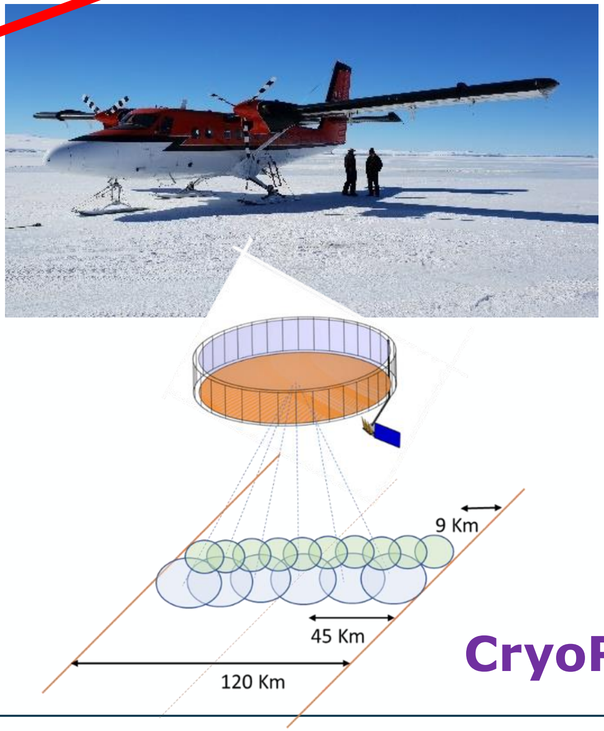
PROGRAMME OF THE EUROPEAN UNION
copernicus
Europe's eyes on Earth
co-funded with
esa
CHIME
Copernicus Hyperspectral Imaging Mission for the Environment
ROSE-L
L-band Radar Observing System
See CIMR talk by N. Reul
LSTM
Land Surface Temperature Monitoring
CIMR
Copernicus Imaging Microwave Radiometer
CO2M
Copernicus Anthropogenic Carbon Dioxide Monitoring
CRISTAL
Copernicus Polar Ice and Snow Topography Altimeter
soil properties
crop health
biodiversity
water quality
geohazards
polar ice
forest management
food security
maritime surveillance
sustainable agriculture
water resources management
drought
urban heat islands
sea-ice concentration/extent
global ocean and cryosphere
soil moisture and vegetation
carbon dioxide and methane from human activity
coastal and inland waters
polar oceanography
ice sheets and glaciers
snow
sea-ice thickness
Food Security and Water Management
Monitoring Land and Natural Resources
Combatting Climate Change
Safeguarding the Arctic
Copernicus Sentinel Expansion Missions
→ THE EUROPEAN SPACE AGENCY


Copernicus
Europe's eyes on Earth
esa

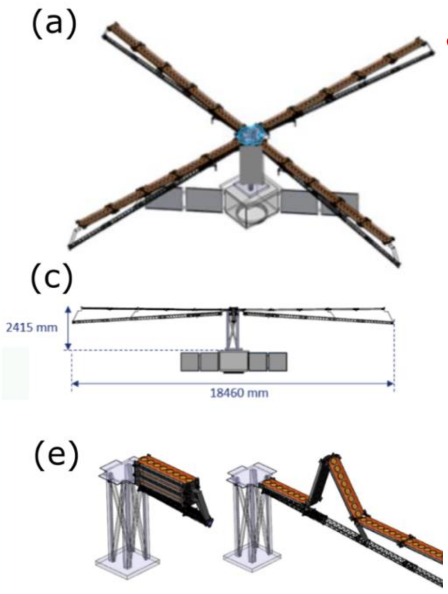
Additional future missions candidates

- **CryoRad** (EE-12 Phase-0 candidate – July 2026 –> Phase A/B1 selection)
- **FReSCH** (commended EE-12 proposal)

See CryoRad talks
by J. Boutin and
by V. Gonzalez



CryoRad



See FReSCH talk
by N. Rodriguez-Fernandez

FReSCH

Wrap-up and Conclusions

- SMOS provided the first ever satellite measurement of Sea Surface Salinity
- Being a one-of-a-kind measurement with a disruptive novel technology (synthetic aperture radiometry), was inherently prone to technical and scientific challenges
- With the acquired expertise over a 16-yr long mission, many of these shortcomings have been addressed or drastically reduced (RFI, LSC, external noise sources contamination)
- The ongoing L2OS v700 release represents now a solid and stable dataset to enable science and applications
- Recent developments provide novel platforms (Pi-MEP) to ensure enhanced validation and stimulate oceanographic process studies embedding salinity from space,
- Sustained focus on the generation of Salinity Climate Data Records (CCI Salinity)
- Whilst tackling these issues, a wide range of oceanographic applications (air-sea interactions, ocean circulation and modelling, climate indexes monitoring, marine biogeochemistry, NWP etc.) started developing, and they are further enlarging with the release of the latest OS reprocessing.
- The planned CIMR mission will perpetuate European expertise in L-band radiometry science, development and operations.

Relevant webpages

ESA-EOP SMOS webpage:

https://earth.esa.int/eogateway/missions/smos

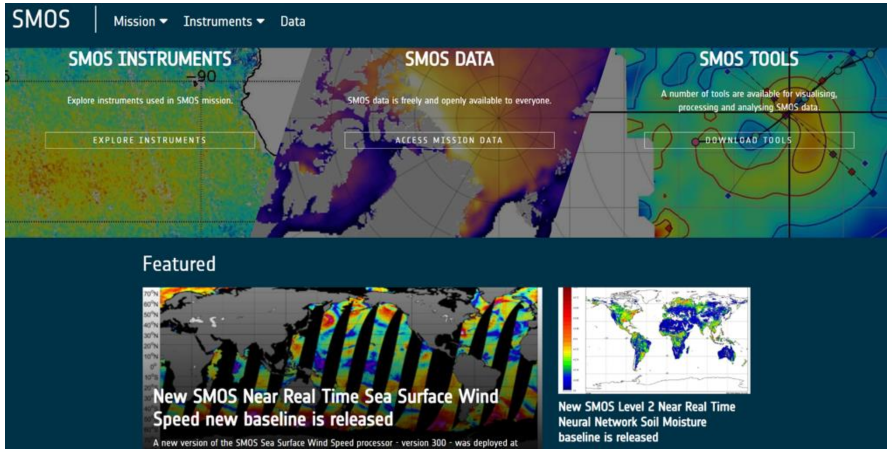
- SMOS multimedia book
- Data access
- Documentation
- Tools

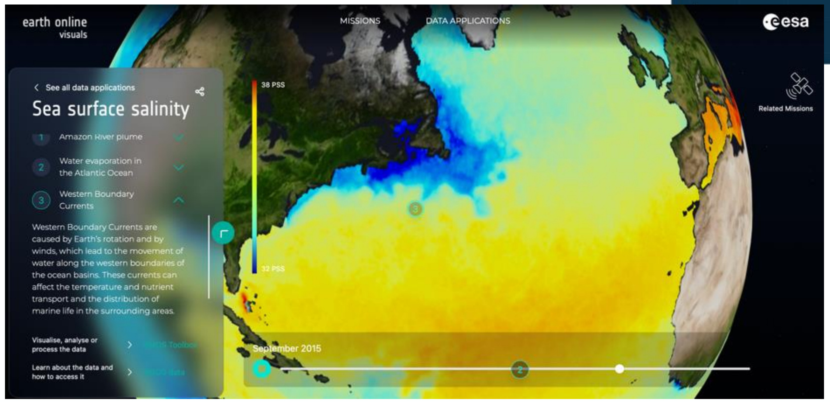
ESA-EOP SMOS Reports webpage:

https://earth.esa.int/eogateway/instruments/miras/quality-control-reports

Relevant webpages – SMOS 3D Visuals

https://visuals.earth.esa.int/data/sea-surface-salinity





Grazie! – and much deserved Credits

N. Reul, J. Boutin, A. Turiel, J.-L. Vergely, J. Tenerelli, M. Arias, F. D’Amico, E. Olmedo, C. Gabarrò, J. Martinez, V. Gonzalez, C. Gonzalez, A. Garcia, D. Khvorostyanov, A. Parracho, S. Tarot, Y. Kerr, R. Catany, E. Jeansou, Y. Rey-Ricord, S. Guimbard, T. Lee, N. Vinogradova, J. Schanze, F. Bingham, D. Levine

K. Scipal, R. Crapolicchio, M. Drusch, M. Martin-Neira, R. Diez-Garcia, S. Mecklenburg, D. Fernandez, P. Cipollini, C. Donlon

…and many more

The bright decade of ocean salinity from space
R. Sabia, J. Boutin, N. Reul, T. Lee, S. Yueh
Remote Sensing,
Special Issue on “Oceans from Space-V”, 2025