

SWOT

# CNES DISTRIBUTION CENTER FOR OCEAN PRODUCTS: ODATIS/AVISO

CHAPEL HILL, NORTH CAROLINA (USA)

June 17-21, 2024

*C. Germaineaud, G. Dibarboure and the AVISO Team*

*CNES, Toulouse, France*



# AVISO DATA PRODUCTS

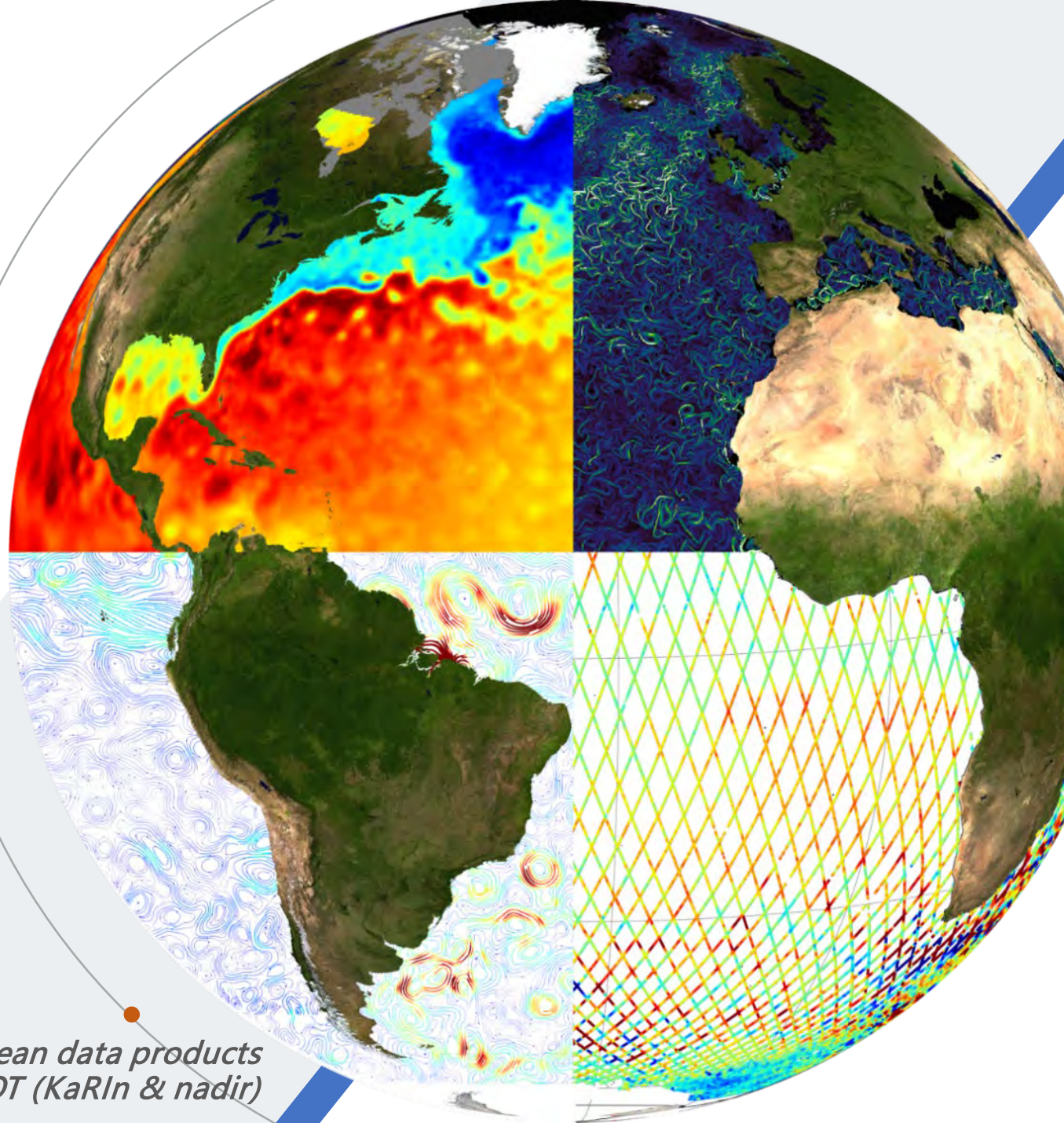
Who  
is it intended for?

OCEANOGRAPHERS  
AND COASTAL USER COMMUNITIES

*What is ODATIS/AVISO?*



*SWOT Level-2 & Level-3 (250-m and 2-km) ocean data products  
Multi-mission Level-4 SLA maps with SWOT (KaRIn & nadir)*



# AVISO DATA PRODUCTS

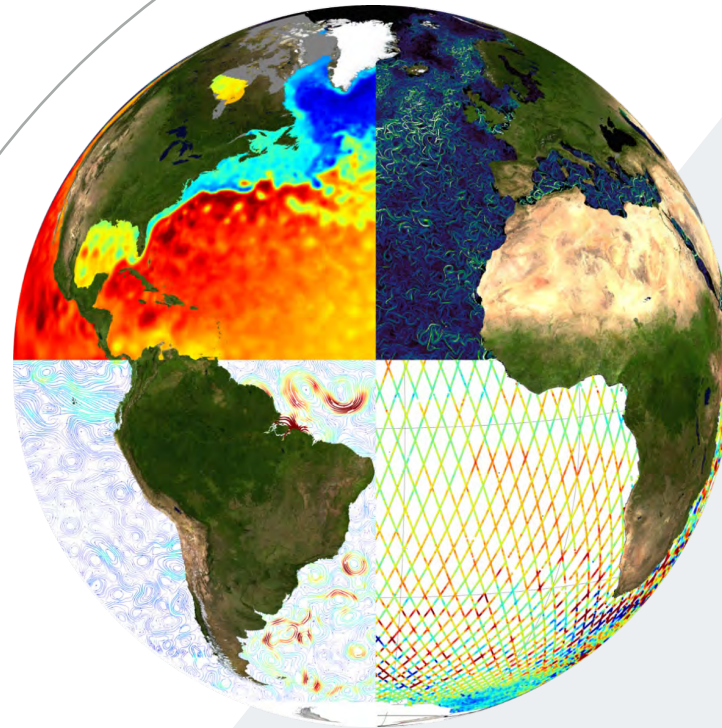
## Who is it intended for?

Oceanographers and Coastal user communities



### Ocean Surface Topography

- INDICATORS  
*Mean Sea Level, S6-MF as reference mission, ENSO index & maps, Kuroshio index, Ionian Sea index*
- MEAN SEA SURFACE  
*MSS CNES-CLS 2022, MSS Hybrid SIO/CNES\_CLS2022/DT23*
- MEAN DYNAMIC TOPOGRAPHIC  
*MDT CNES-CLS22, MDT-HYBRID-CNES-CLS22-CMEMS2020*
- GDR ALTIMETRY ALONG-TRACK PRODUCTS
- MONO-MISSION CORRECTED SLA (L2P)  
*Sentinel-6 MF*
- COASTAL PRODUCTS  
*X-TRACK SLA 23 regions (L2P) / Jason-3 altimeter 20Hz product (ALTICAP)*
- SSALTO/DUACS MONTHLY AND SEASONAL MEANS AND CLIMATOLOGY MAPS (SLA, ADT, EKE)
- SSALTO/DUACS EXPERIMENTAL GRIDDED PRODUCTS  
*Regional: Arctic, Antarctic / Global: DYMOST, MIOST (altimetry + drifters)*
- SSALTO/DUACS EXPERIMENTAL ALONG-TRACK PRODUCTS  
*Regional: SLA 5Hz, Arctic Ocean / Global: Sentinel-3A LR-RMC mode*
- BARYSTATIC AND MANOMETRIC SEA LEVEL CHANGES



*SWOT Level-2 & Level-3 (250-m and 2-km) ocean data products  
Multi-mission Level-4 SLA maps with SWOT (KaRIn & nadir)*

### Ocean: Others Variables

*Antarctic Circumpolar Current Fronts Product / Sentinel-1 SAR images of sea state / OHC and earth energy imbalance / OHC change over the Atlantic Ocean, 4DAtlantic-OHC / Maps of Sargassum detection over the Atlantic / Tides: global model (FES), internal tides (MIOST-IT) & along-track tidal constants (X-TRACK) / Mesoscale Eddy Trajectory Atlas / Ocean surface currents / Filaments (FSLE)*

### Ocean: Wind & Waves

*Gridded (L4) NRT wind/wave products / S3A/3B and S6 MF wind/wave L2P products / CFOSAT wave/wind (L2/L2P) products / Experimental wave L3 products 5Hz / Experimental CFOSAT product for wave-current interactions*

### Atmosphere

*Dynamic Atmospheric Corrections / GDP+ wet tropospheric correction (WTC) / WTC from water vapor climate data records*

### Cryosphere

*Altimetry Sea Ice product / SARAL/ALtiKa (L2) Ice Sheet product*

What is  
ODATIS/AVISO?



# SWOT OCEAN DATA ACCESS & SERVICES

## WHERE TO GET SWOT OCEAN PRODUCTS?



**AVISO**  
L2, L3 & L4 Products

*OPeNDAP / HTTPServer / (S)FTP / WMS / Viewers / ...*

**PODAAC**  
L1B, L2 Products

# CNES OCEAN DATA INTEROPERABLE DISSEMINATION



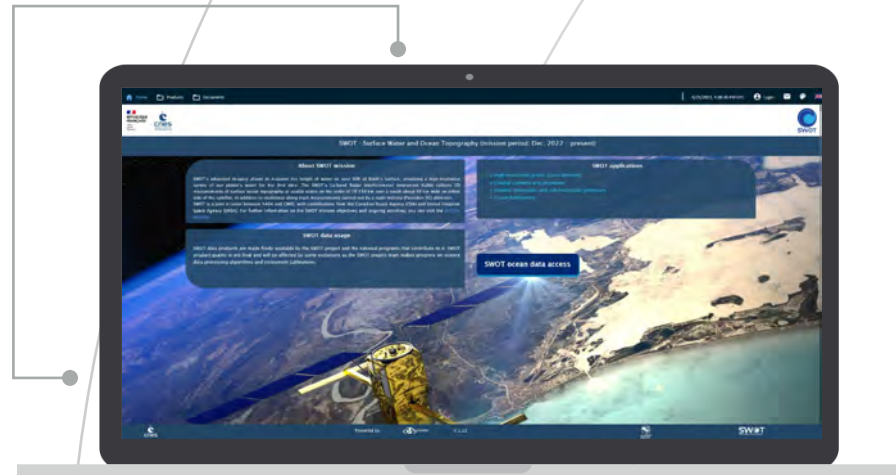
## Data Access on ODATIS/AVISO

Protocols/APIs for exposing/querying metadata  
and have access to related data sets based on FAIR  
(Findable, Accessible, Interoperable and Reusable) → OGC principles standardized interfaces

### Data Access Services:

- AVISO CNES Data Center (archive catalog)
- THREDDS (OPeNDAP, WMS, and HTTP)
- FTP/SFTP,...

**PRIOR REGISTRATION IS REQUIRED USING AVISO+ CREDENTIALS**

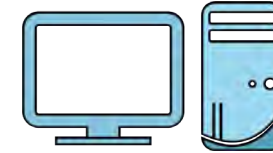


# CNES OCEAN DATA INTEROPERABLE DISSEMINATION



Catalog requests and download tools

Small volumetry downloads



STORAGE ON LOCAL MACHINE

## Free Hosting of SWOT Projects on CNES Cloud



## CNES CLOUD

- FREE HOSTING ON CNES CLOUD/HPC INFRASTRUCTURE
- HIGH PROCESSING POWER (CPU & GPU)
- VERY FAST I/O FOR SWOT 250-M & 2-KM
- A SERIES OF SIMPLE EXAMPLES, POWERFUL TOOLS & EXTERNAL DATA
- PRIVACY FOR PROJECT MEMBERS (OR OPEN REPOSITORY IF YOU PREFER)
- HELPDESK & TECHNICAL SUPPORT FOR SMOOTH SAILING

*aviso-swot@altimetry.fr*



# CENTRE DE CALCUL

**Accès au système d'information scientifique du CNES. Obligation de clore votre session lorsque vous quittez votre poste de travail.**

**Access to the CNES scientific information system. Obligation to close your session when you leave your workstation.**

Bienvenue sur le Jupyterhub du Centre de Calcul du CNES !

Vous pouvez vous connecter avec vos identifiants du Système d'Information Scientifique. Une fois identifié, vous aurez accès à un serveur de notebook Jupyter ou Jupyterlab lancé sur un noeud de calcul. Vous pourrez ainsi explorer vos données et réaliser des calculs de manière interactive. Pour plus d'information sur le fonctionnement du Hub et des notebooks, c'est sur le [Wiki du Centre de Calcul](#).

Welcome on CNES Computing Center's Jupyterhub!

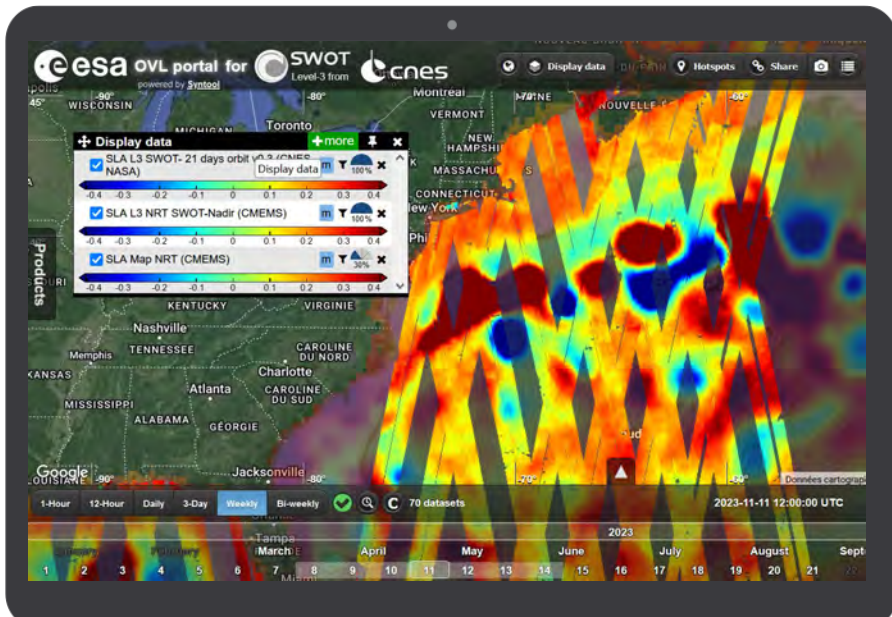
You can connect with your CNES Scientific Information System user account. Once logged in, you'll hae access to a Jupyter notebook server started on a computing node. You'll thus be able to analyse your data or submit computations interactively. For more information, please see the [Computing Center Wiki \(in french\)](#).

### Sign in

**Username:**

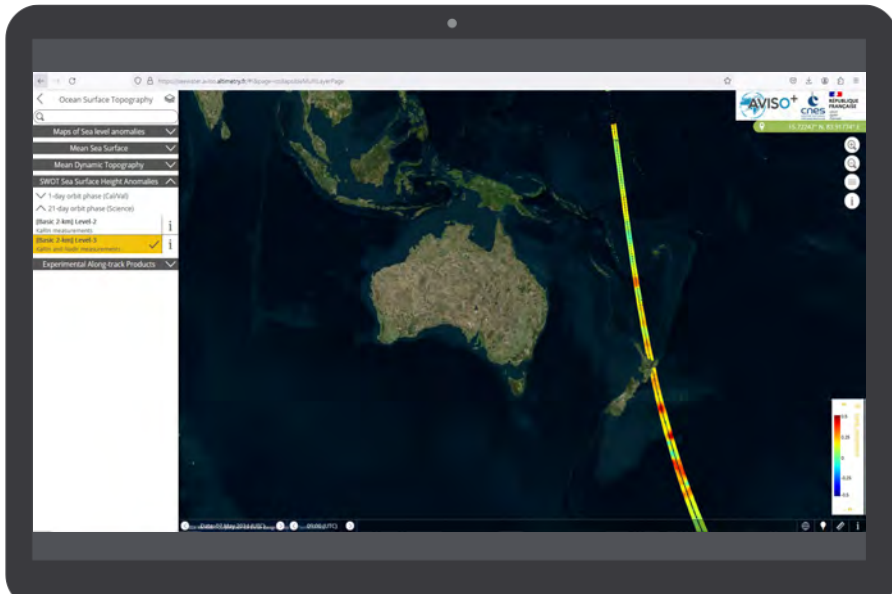
**Password:**

# SWOT OCEAN DATA ACCESS & SERVICES



## OVL WEB PORTAL

Exploration web portal for CNES Level-3 SWOT products (in collaboration with ESA and Ocean Data Lab)



## SEEWATER AVISO WEB PORTAL

Seewater provides an interactive web interface for exploring AVISO products (MSS, MDT, SLA,...)





SWOT

# THANK YOU FOR YOUR ATTENTION

June 17-21, 2024

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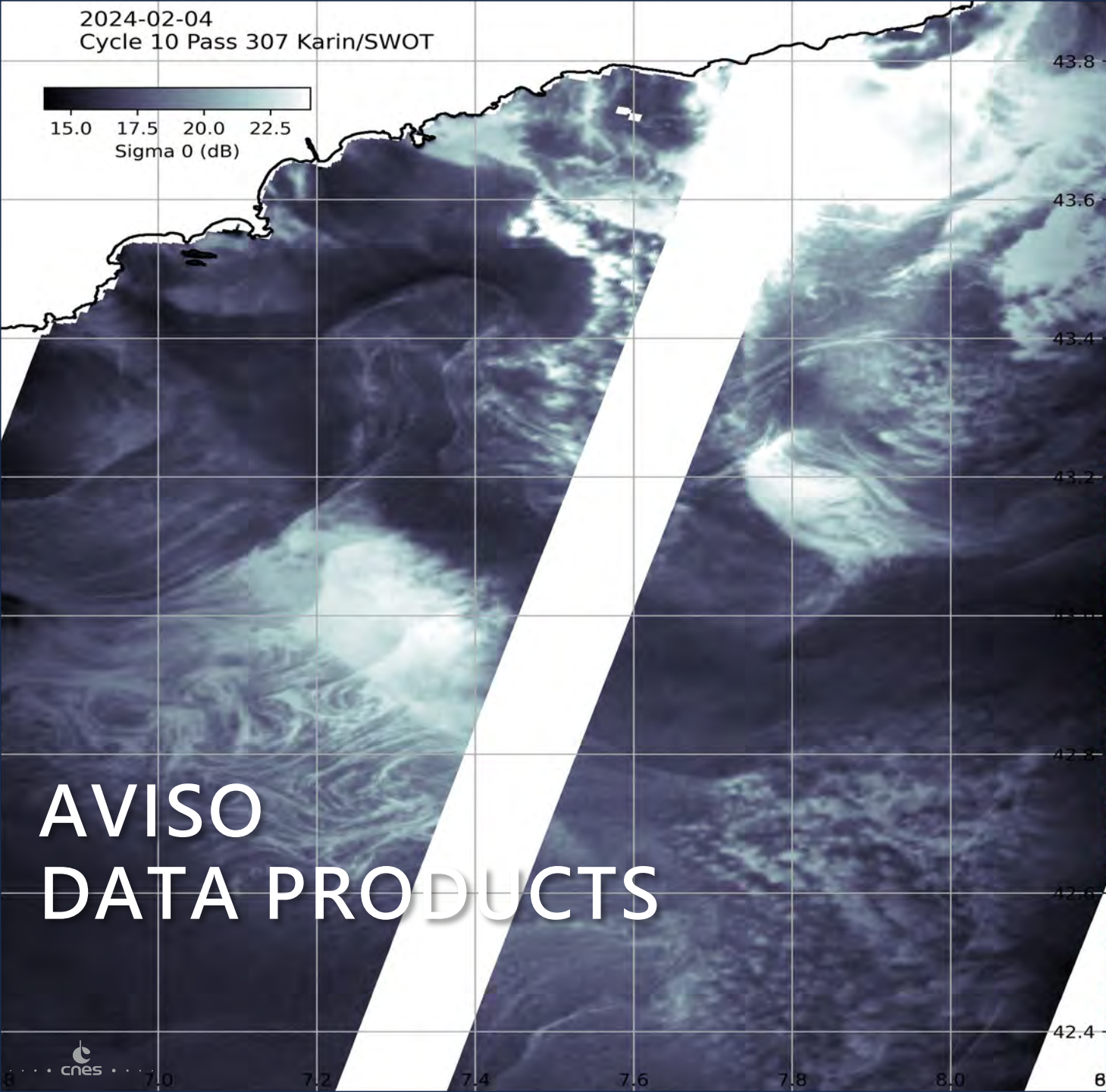
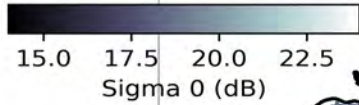
cnes



UK SPACE  
AGENCY



CSA ASC



# AVISO DATA PRODUCTS

## I-Ocean Surface Topography

- **INDICATORS**  
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*S6-MF as reference mission*  
*ENSO index & maps*  
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# AVISO DATA PRODUCTS

## II-Ocean: Other Variables

- Antarctic Circumpolar Current Fronts Product
- Sentinel-1 SAR images of sea state
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- Tides: global model (FES), internal tides (MIOST-IT)
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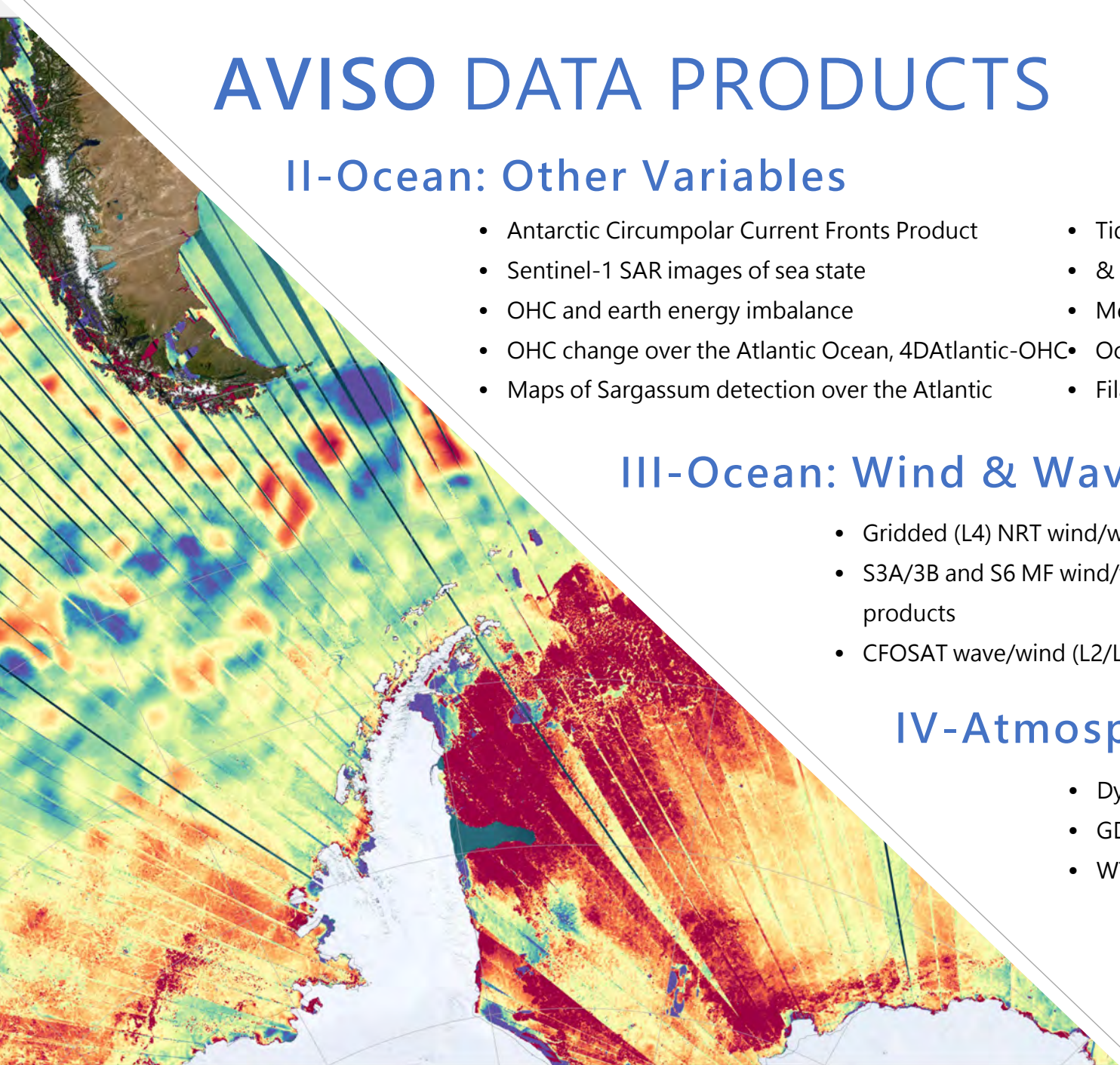
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- Experimental wave L3 products 5Hz
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## IV-Atmosphere

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- GDP+ wet tropospheric correction (WTC)
- WTC from water vapor climate data records

## V-Cryosphere

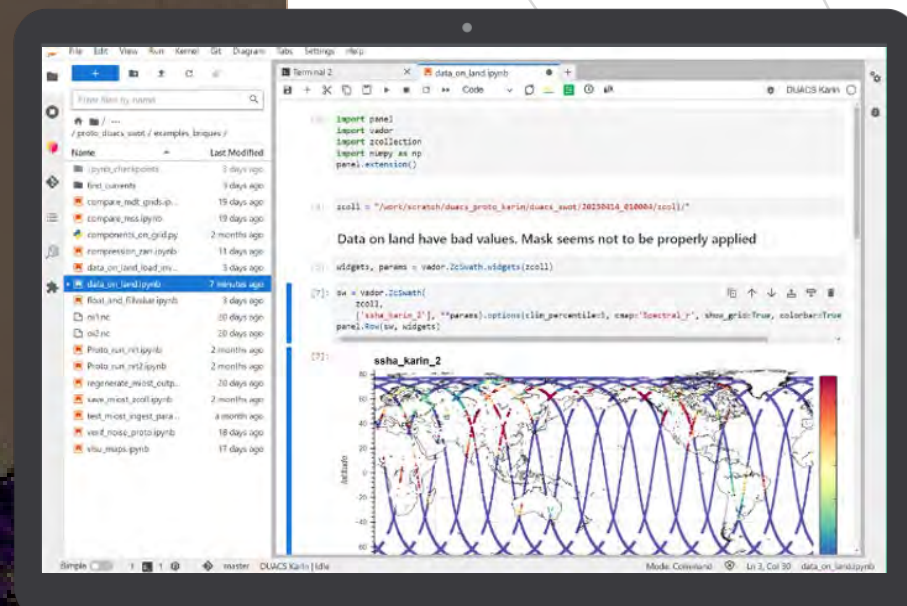
- Altimetry Sea Ice product
- SARAL/ALtiKa (L2) Ice Sheet product



# SWOT OCEAN DATA ACCESS & SERVICES

CNES Cloud support: SWOT project hosting

## JUPYTER NOTEBOOKS



## DATA ACCESS

- SWOT ocean data (L2 & L3 products)
- Easy access to other data sets
- Catalog requests & download tools...

## ENVIRONMENT

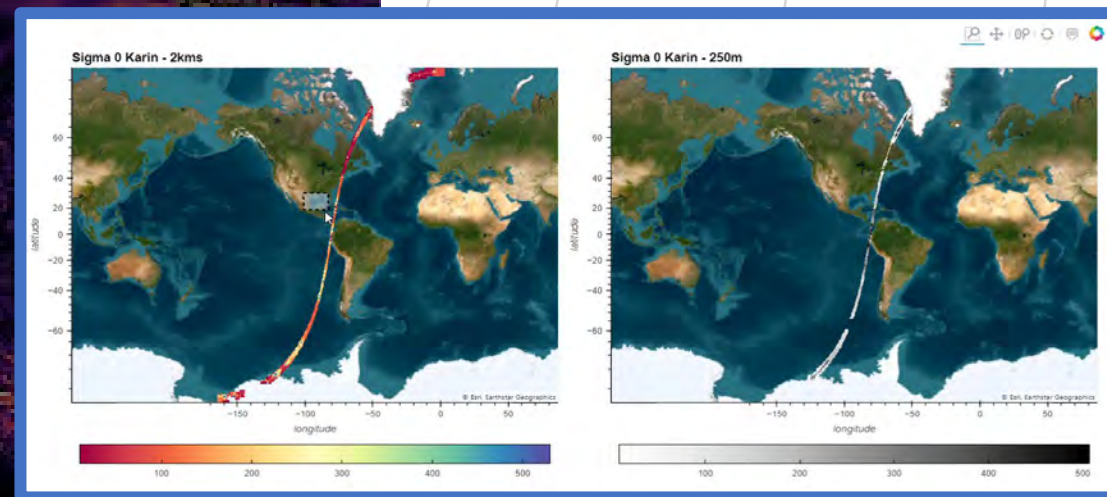
- Research-orientated Python libraries
- SWOT-dedicated toolbox
- Processing power
- Simplified parallel computing
- Remote Desktop...

## DOCUMENTATION

- Dedicated use case examples
- User guides, tutorials, FAQ,...

## USER SUPPORTS

- SWOT data training
- Cluster working methods
- Help for code optimization
- FAQ, Helpdesk...



## INTERACTIVE VISUALISATION TOOL (VADOR)