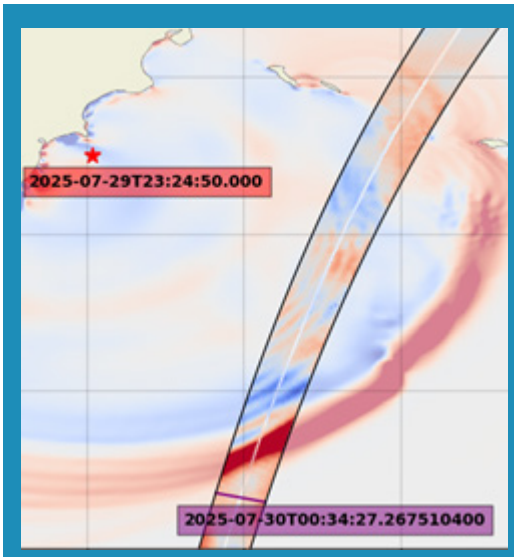
AVISO+
Satellite Altimetry Data

#24

January 2026

Users Newsletter



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Project News

Cyril Germineaud and Project teams, CNES

SWOT

Since the very first days after its launch on December 16, 2022, the Surface Water and Ocean Topography (SWOT) mission has provided impressive observations of the ocean surface topography with a spatial resolution 10 times higher than that obtained by combining the seven active nadir altimeter satellites in operation at the time. In May 2025, a new version, “D” of SWOT products was released, considerably enhancing the quality of nearly all SWOT ocean-related and hydrology data products. This formed the basis for reprocessing all SWOT data from the beginning. This massive reprocessing will be completed by late spring 2026 and last nearly a year. The SWOT Science Team meeting was held in Arcachon (France) in October 2025, with 400 attendees. The meeting shared a variety of results on multiple surfaces, paving the way for new applications of SWOT products. In November 2025, the precalSSH production latency improved by nearly 24 hours, enabling ocean forecasting agencies to assimilate the data daily.

Jason-3

The U.S.-European Jason-3 mission, the third altimetry satellite in the Jason series, celebrated its 10-year anniversary in orbit on January 17, 2026. It has participated in the continuity of high-precision sea-level measurements, focusing on operational ocean and weather applications. In January 2025, Jason-3 joined Sentinel-6 Michael Freilich (Sentinel-6-MF) for a new tandem phase, enabling the first-ever comparison of two different altimeter drifts in the world of altimetry. The new GDR-G altimetry standard was applied to its products at this time. After four months, it transitioned

to a «long repeat orbit» at an altitude of 1309 km to complete geodetic measurements initiated by its predecessor, Jason-2.

Sentinel-6 Michael Freilich and Sentinel-6B

The Copernicus Sentinel-6 Michael Freilich (MF) mission, launched on November, 21 2020, is the reference altimetry mission since April 2022 (after, in chronological order: TOPEX/Poseidon, Jason-1, Jason-2, and Jason-3). The L2P and L3 Non-Time Critical (NTC) along-track altimetry data products from Sentinel-6MF are released since early December 2022 and late January 2023, respectively, as part of a cooperation agreement between CNES and EUMETSAT. As such, Sentinel-6MF data products have been used since February 2023 to estimate the reference global mean sea level, after taking into account the intermission bias with Jason-3.

The Copernicus satellite Sentinel-6B, a clone of Sentinel-6MF, was launched on November 17, 2025. Sentinel-6B will stay in a tandem phase with Sentinel-6MF for almost 1 year and will be the new reference altimetry mission after the commissioning phase. It is planned to process L2P and L3 Non-Time Critical (NTC) altimetry products as soon as the biases will be assessed.

SARAL

The CNES/ISRO SARAL joint mission remains part of the altimetry constellation and is still fully operational after over 12 years in orbit. As a precursor of the SWOT mission, it provides Ka-band nadir measurements and remains useful for cross-calibrating SWOT ocean (low-rate) data products, in addition to serving oceanography, polar oceans, hydrology, and hurricane forecasting in its routine mission. The 2025 exploitation review held in November highlighted an amazing performance for such an "old" satellite and its associated ground segment: availability 100% and data collection over the ocean higher than 97%. Considering this excellent performance, ISRO and CNES have jointly decided to operate SARAL/AltiKa until the end of 2028 with an annual validation done during the REVEX depending on the status of the satellite (platform and payload).

CFOSAT

The Franco-Chinese CFOSAT satellite, launched on October 28, 2018, recently celebrated its six-year anniversary in orbit. This surpasses its initial three-year nominal period. A second extension is ongoing until the end of 2026, and a potential extension for 2027 will be discussed by Q3 2026. CFOSAT is a mission dedicated to studying wind and waves interactions. It carries two scatterometers: one for waves (SWIM) and the other for wind (SCAT). Unfortunately, the SCAT antenna stopped rotating at the end of 2022. Nevertheless, significant results have already been achieved from both an operational and a scientific point of view. Operational results include the daily use of CFOSAT data by weather forecasting agencies for assimilation into sea state prediction models. These excellent results are being validated by an international scientific team that has met five times since launch and will be further improved as the mission continues over the coming months and years. The scientific processing is constantly improving and has already led to two full reprocessing campaigns of SWIM data, with a last one planned at the end of the mission (expected in 2028). The products of these campaigns are available and distributed by AVISO, along with derived products such as Stokes drift estimates and sea ice detection gridded products.

HY-2

The HY-2 satellites are part of the Chinese program "Haiyang" (meaning "Ocean"), which is dedicated to observing and monitoring the ocean. The HY-2 series is a Franco-Chinese collaboration between CNES and NSOAS for altimetry and orbitography applications. The HY-2A satellite mission, the first in the HY-2 constellation, launched in August 2011 and ended in 2020. This was followed by the launches of the HY-2B satellite in October 2018, the HY-2C satellite in September 2020, and the HY-2D satellite in May 2021. Two additional units, HY-2E and HY-2F, are planned for launch in 2026. Except for HY-2B, all satellites in the series carry a DORIS instrument for precise orbit determination. CNES/CLS processes this data. Since 2020, the HY-2B mission has been part of the altimetry constellation processed in DUACS. Similarly, altimetry measurements from HY-2B and HY-2C contribute daily to CMEMS Significant Wave Height (SWH) products (https://doi.org/10.48670/moi-00180). SWH and wind speed (WS) measurements from the HY-2D unit are expected to be assimilated by WAVE-TAC in 2026. ■

AVISO CalVal Visualization Portal (Powered by OceanDataLab)

Lucile Gaultier, OceanDataLab, Brest, France

A new visualisation portal to quickly and easily discover the SWOT and CFOSAT products is now available at https://aviso-calval.oceandatalab.com, along with other satellite products, such as Sentinel-1 SAR images.

It provides samples of all SWOT Ocean products and the full archive of the main SWOT SSH 2-km product currently in Version 2 (with the last six month of the new version 3.0) and also the full archive of L2 Wind Speed and Wave Height in its best versions (PIC2 and PID0).

To help the interpretation and evaluation of SWOT and CFOSAT products, the portal also offers all other relevant ocean satellite/model/and in-situ data from the ESA Ocean Virtual Laboratory. A tutorial to help you learn the wide variety of features will also be published on AVISO website.

There are several feedback mechanisms in the upper right corner of the portal and we value any feedback to become even more useful.

Directs links to the main SWOT and CFOSAT products:

- **SWOT Karin 2km and Nadir Sea Surface Height and geostrophic currents**:
Gulf stream and induced eddies off Cape Hatteras:
https://odl.bzh/iloCei7e

- **SWOT Karin 2km and Nadir Significant Wave Height**
Wave modulation by Agulhas current and southern storms:
https://odl.bzh/e65NtMrP

- **SWOT Karin 2km and Nadir Wind Speed**
Southern Ocean gale force winds:
https://odl.bzh/c87qJqmn

- **SWOT Karin long swell spectra and spectral partition**
Long swells from Storm Eddie:
https://odl.bzh/0ZktU87A

- **CFOSAT SWIM L2S Fluctuation Spectra (IWWOC/Ifremer)**
Swell from Storm Eddie:
https://odl.bzh/NKOmrMwm

- **CFOSAT SWIM L2 Wave Spectra (CWWIC/CNES)**
Southern ocean Swell and wind sea:
https://odl.bzh/zZsZf2Gh

- **CFOSAT SCAT L2 Wind Vector (CNSA/NSOAS and CNES)**
North Atlantic and Mediterranean gale force winds:
https://odl.bzh/OD8K4rJB

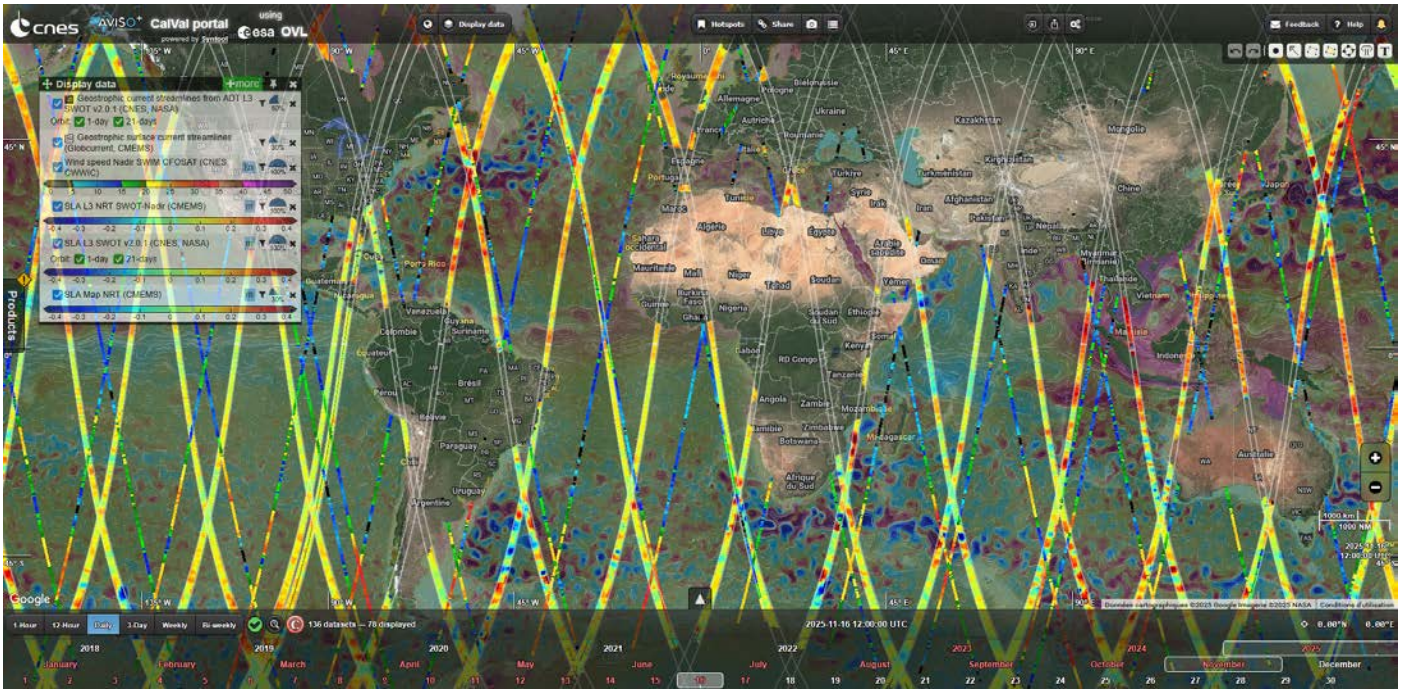
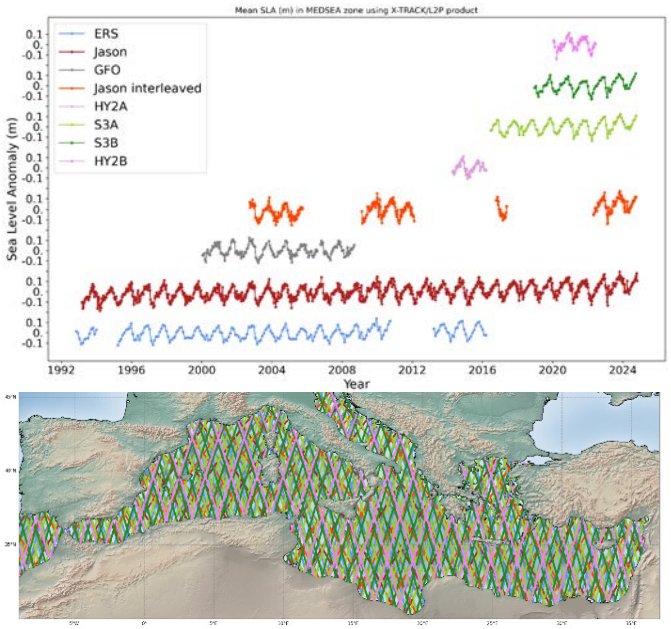


Figure: An example of currently available SWOT and CFOSAT products.

A dataset from 14 satellite missions to observe the coastal ocean of our planet

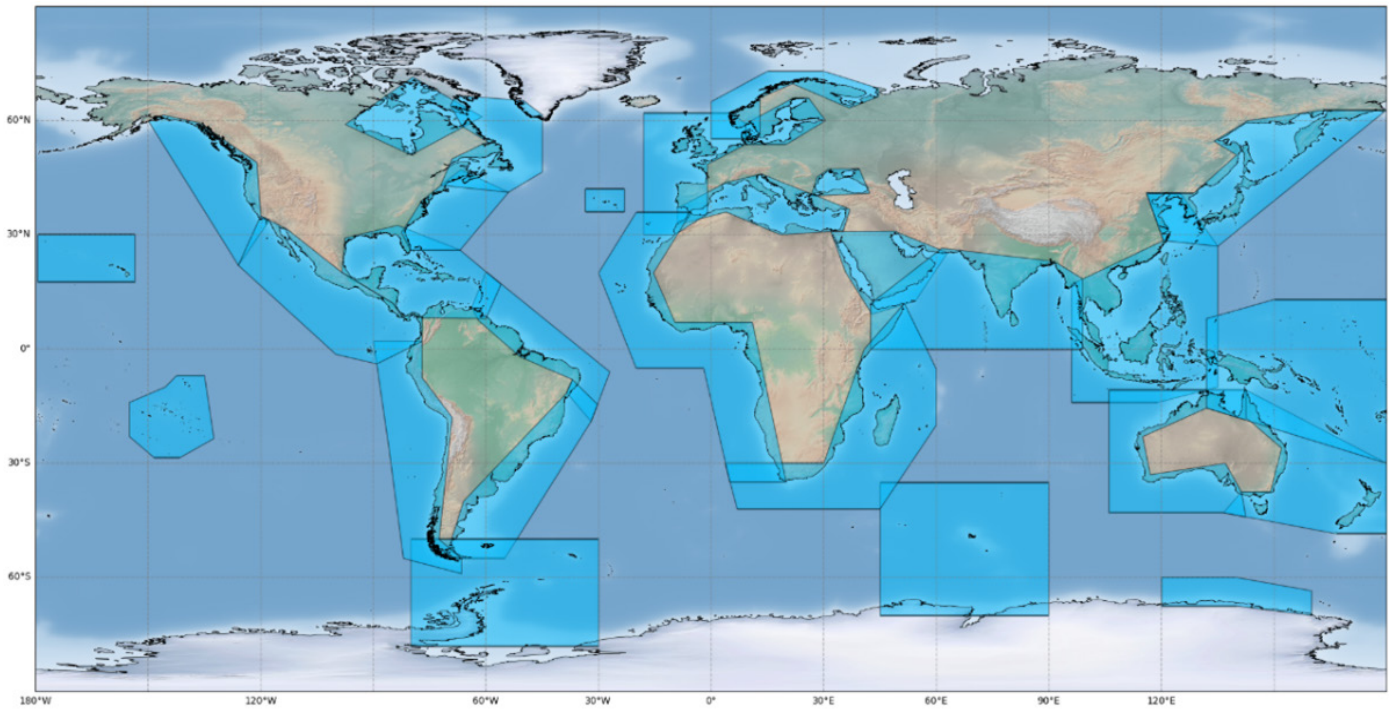
Florence Birol, Fabien Léger, LEGOS, France

In the context of climate change and the resulting need for risk management and adaptation, having observations of the coastal ocean on a global scale is a major challenge, from research to civil society. Since 1992, space altimetry has been measuring sea level variations and enabling synoptic, continuous, and quasi-global estimates of offshore surface ocean currents. Since the 2000s, researchers and engineers at LEGOS (particularly within the CTOH National Observation Service, Center for Ocean and Hydrosphere Topography) have been working to improve these satellite data near the coast, an area where conventional processing does not provide sufficient quality for their use. The laboratory has since developed and perfected a suitable regional processing chain and sea level and tide satellite products dedicated to regional and coastal ocean applications, called X-TRACK. These have been used in more than 150 publications. The latest reprocessing, available on the AVISO+ service website, includes 14 space missions to provide an intercalibrated set of more than 32 years of sea level data extending up to a few kilometers from land, covering all coastal areas around the world (Figures 1 and 2). It represents a completely new potential for studying and understanding the coastal ocean at different timescales and spatial scales. ■



Top: average regional sea level change observed by the X-TRACK product in the Mediterranean Sea between 1992 and 2024. Each curve/color represents altimetry missions located on the same orbit (color code specified in the figure); they are shifted vertically to improve visibility. Bottom: position of the corresponding data based on the mission orbit.

Access to the product: https://www.aviso.altimetry.fr/en/data/products/sea-surface-height-products/regional/x-track-sla.html



The 29 regions covered (blue polygons) by the 2025 version of the X-TRACK sea level product (called X-TRACK-L2P).

Stokes drift product

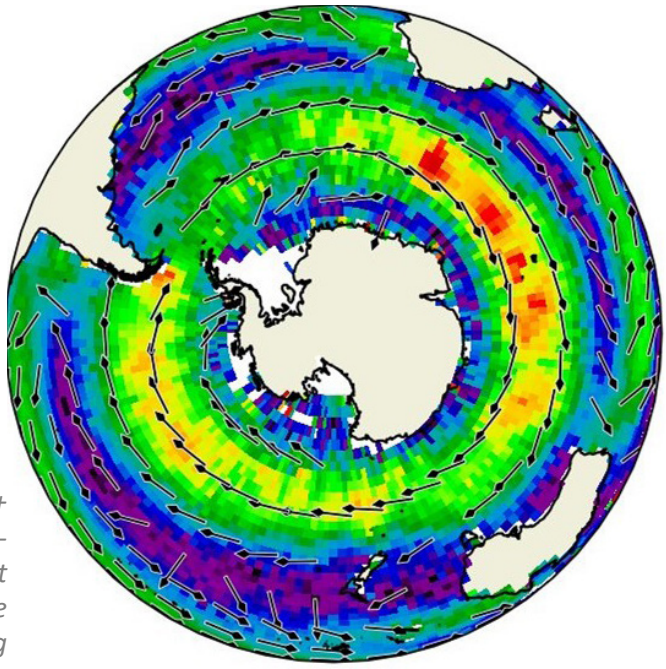
Charles Peureux, CLS, France

Stokes drift is the displacement of floating particles under the action of ocean surface waves solely. It is one of the components of the Total Surface Current Vector that drives the momentum transfer from the atmosphere to the ocean.

Floating particles in the upper ocean layer are diverse: manmade objects (drifters, buoys, human wastes), natural objects (icebergs, oil films, sea ice), or biological organisms (plankton, larvae, algae, sargassum). Studying their Stokes drift is crucial for various applications ranging from ecology to Search and Rescue, including ocean circulation for climate among others.

The knowledge of Stokes drift at the global scale relies mainly on numerical models, but with the launch of CFOSAT in 2018, such estimates can be provided by remote sensing. CFOSAT carries the first spaceborne ocean wave scatterometer that provides ocean wave spectra measurements at the global scale. Their quality allows to resolve waves coming into play in the Stokes drift (wind-sea, down to a few tens of meters length). In collaboration with CNES, Météo France and Latmos, CLS designed a new algorithm for Stokes drift estimation and processed CFOSAT archive between 2019 and 2025. Stokes drift is continuously provided in this time period along CFOSAT track, i.e. every 90 km, both at the surface and at 15 m depth. It is particularly suited to climatological and ocean surface circulation studies. Forecasted atmospheric model wind vectors were only used to solve SWIM inherent limitations (wave propagation direction ambiguity) in addition to CNES provided SWIM ocean surface wave spectra. Qualified against Météo France numerical model data, they exhibit a remarkable accuracy (correlation up to 95%).

Stokes drift data archive is light (less than 4 MB) and can be easily downloaded from AVISO. All collaborators look forward for feedback regarding their use and quality, and hope they can help solve problems for the next generation.



Mean Stokes drift vector over 2021 (2x2°) on SWIM track + Model independent theoretical windsea correction (Elfouhaily et al. 1997) Credits : Towards a global Stokes drift product from SWIM/CFOSAT, 2022 Ocean Surface Topography Science Team Meeting

Sargassum products

Marc Lucas, Laurine Meunier, CLS, France

Sargassum seaweed (sargassum fluitans and sargassum natans) has always been present in the Atlantic Ocean. These floating algae have the particularity of forming large mats, sometimes reaching over 10 kilometres in length. These mats drift around the ocean, driven by currents and winds. They are home to a unique ecosystem and are a breeding ground for many marine species. However, when these large mats make landfall, the algae vegetation decomposes, resulting in the degradation of the nearshore waters ecosystems and the release of harmful sulphur dioxide gases. The sargassum seaweed influxes came to the fore from 2011 onwards when large amounts of mats started landing on the coastlines of the Caribbean islands and the central American countries. The increasingly heavy impact on the live-

lihood of the Caribbean societies spurred the scientific community into investigating the phenomena.

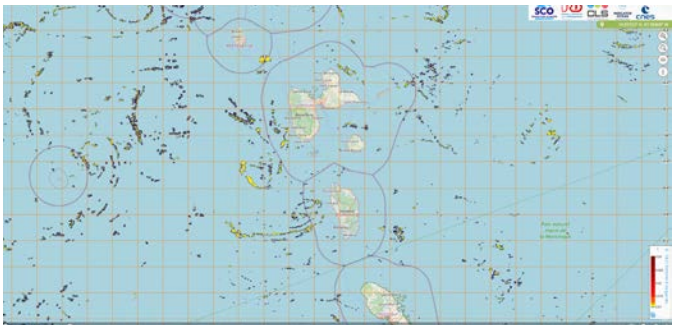
The large geographic extent of the sargassum presence makes it very challenging to have a synoptic overview of the distribution of the rafts at any given moment except through the use of EO data. Indeed, thanks to the Copernicus Sentinel Satellite constellation and NASA/NOAA satellites, it is possible to have a daily overview of the raft distribution over the whole of the tropical Atlantic. This overview is of direct use to public stakeholders developing contingency solutions but is also useful to initialize and validate Sargassum seasonal forecast models. This, in effect, has been the work performed by CLS, IRD and Mercator Ocean in the context of the SeSaM project, funded by the SCO. CLS provided the satellite detection to initialize a Sargassum forecast model developed by the IRD and operationally run by Mercator Ocean.

The end results has been to make available detection information and seasonal forecasts on a web GIS open to all (https://datastore.cls.fr/sargassum-seasonal/#!&page=isv-mainPage) and the data available in the AVISO database.

This viewer is also available on the Sargassum Hub Community web page in the detection section. (https://sargassumhub.org/)

What is the contribution of each Sargassum product in terms of detection ?

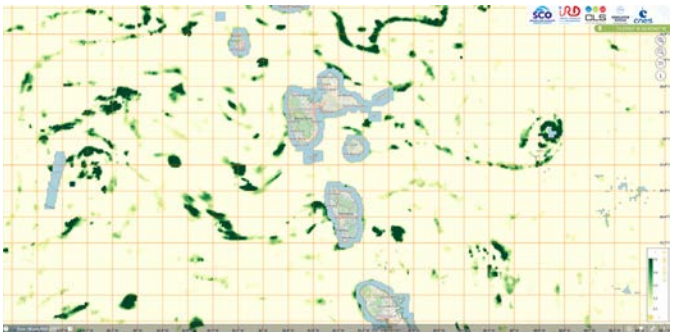
An illustration for the 07/28/2025 around the Carribean Islands (15°N-7.25°N 58.6°W- 64°W)



*OLCI detection (Sentinel-3), **300-m resolution**. Presence of sargassum on both sides of the islands of the Antilles arc. In particular, there is a clear detection west of Dominica, with a long bank over 80 km in length and curling just to the north, characteristic of an ocean eddy. East of Guadeloupe, there are multiple, fairly unstructured detections.*

*Modis (Aqua) detection, **300-m resolution**. The satellite passes slightly further west and its coverage does not extend to the eastern part of the Caribbean arc. The age of the sensor partly affects its detection capacity, and less sargassum is visible than with S3. However, we can still see banks detected by S3, which have drifted slightly between the two images (16.67°N, 62.18°W).*

*MSI OLI detection (Sentinel-2), **20-m resolution**. The satellite's coverage is less extensive than for Sentinel-3, and to date we only have detection data for the eastern part of the Caribbean arc. However, the increased resolution makes it possible to identify much more sargassum, as well as the characteristic swirls of ocean eddies. Some banks extend over more than 150 km.*



*GOES 16 detection, **1-km resolution**. The coverage of the geostationary satellite is more complete than that of the other three. The structures previously detected are clearly visible, particularly to the east of Guadeloupe. Daily averaging means that detections are more spread out spatially. This sensor is a good qualitative indicator, partially compensating for the limitations resulting from cloud cover.*

Aviso User Satisfaction Survey: What are you telling us?

Caroline Mercier

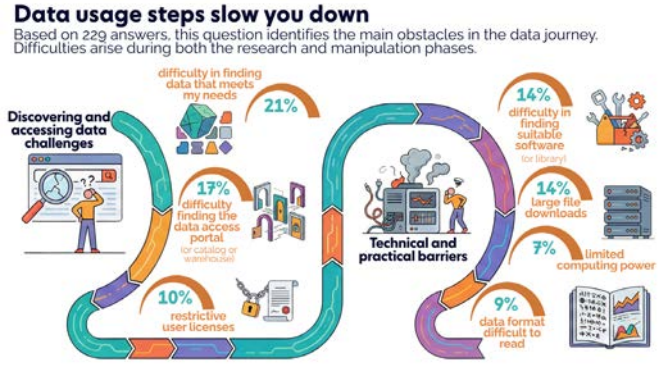
Every year, we send a user satisfaction survey about our products, services and website to our users. Your responses provide us with valuable insights into how our products and services are used. Thank you to all the users who took the time to complete this year's survey. Please be ready to complete the next AVISO survey in 2026 and make your voice heard!

Several topics raised in this survey are now among the recurring questions asked year on year to help us track changes in user practice. Other questions are new to reflect new practices, such as asking about difficulties downloading or handling large volumes of data.

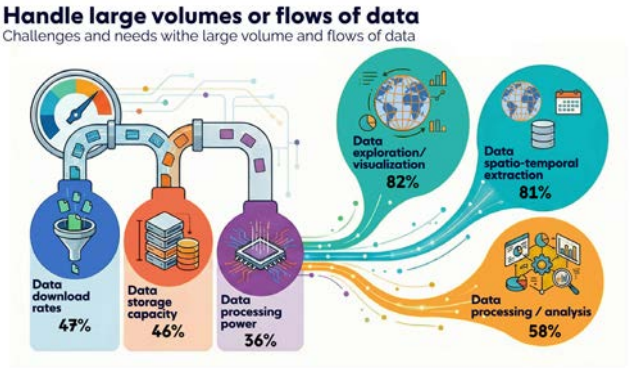
In this 2025 survey, some questions focused on the notoriety of, and difficulty in learning to use, the wide range of AVISO products. The first result is that you are ready to explore SWOT's unprecedented observation capabilities: more than one in two respondents are familiar with SWOT's Level 2 or Level 3 products, and the majority use them with ease.

Results at a glance with quick-to-read infographics

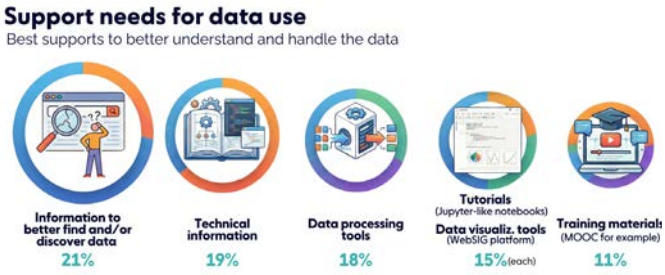
Discovering, accessing, storing, editing and analyzing data is a long journey, and some steps may seem like big challenges to users. The main difficulty for users is finding their way through a large selection and working out which products and variables are most suitable for their particular studies.



Data download rates, processing power, and storage capacity were perceived as constraints by 47%, 36%, and 46% of respondents, respectively. Another question revealed the need for specific capabilities to manipulate data before downloading it. Thus, 82% and 81% of respondents expressed interest in data exploration and visualization, and spatio-temporal data extraction, respectively. Additionally, 58% of respondents expressed interest in remote processing and analysis capabilities, such as cloud platforms.



The illustration below presents an analysis of 445 responses regarding support requirements for data usage. The majority of respondents (21%) expressed a need for information to help them find and/or discover data, as well as technical documentation (19%). Tools for data processing and visualization, such as WebSIG platforms, were also considered important, as were tutorials, such as Jupyter notebooks, and training materials, such as MOOCs.



AVISO Helpdesk: a team in touch

SWOT at COP30 in Belém

Tosca Ballerini, SWOT-AdAC Communication Officer

The contribution of the SWOT mission to the observation of the ocean and the cryosphere, as well as its potential support to climate education, ocean literacy, and the promotion of space science, were presented during a side-event at COP30, in Belém, Brazil.

In the framework of a collaboration between CNES and the Office for Climate Education (OCE) the Surface Water and Ocean Topography (SWOT) mission was presented on Monday, November 17, at the COP30 Cryosphere Pavilion in Belém during the panel «Educating for the Cryosphere: 5 years of lessons learned and future pathways for impact».

Eric Guilyardi, oceanographer (CNRS, LOCEAN-IPSL) and President of the Office for Climate Education (OCE), highlighted how the SWOT project represents a major advance in the observation of the ocean and the cryosphere.

Beyond its scientific implications, the SWOT projects opens up significant opportunities for collaboration between the scientific and educational communities, providing fertile ground for climate education, ocean literacy, and the promotion of space science.

Eric Guilyardi also emphasized how data acquired by SWOT will be used to enrich the next edition of the teacher's manual «Ocean and Cryosphere: The Climate in Our Hands» developed by OCE for primary and secondary educators. Published in 2019, this handbook offers teachers a ready-to-use curriculum enabling them to study the role of oceans in climate regulation, the ecosystem services provided by oceans and the cryosphere, and the effects of climate change on oceans. The activities emphasize investigative approaches and project-based learning. This teaching guide has been published in four languages and adapted for local use in Latin America, Africa, and Asia. It has been implemented by more than 10,000 teachers worldwide, reaching nearly 400,000 students.

The new version of the handbook, supported by many partners including CNES, will showcase a new section on ocean observation, highlighting spaceborne observation and the contributions of the SWOT mission.

The other panelists were Djian Sadadou, Head of International Relations and Communities - Office for Climate Education, International; Narissa Bax, Marine Scientist at Pinngortitaleriffik Greenland Institute of Natural Resources, Nuuk; Ignacio Orellanos, Programs Coordinator, 1.5 Chile. The discussion of the panel focused on the issues linking the ocean, the cryosphere, and education in Latin America.

The SWOT mission is a global survey of Earth's surface water and is carried out by the Centre National d'Etudes Spatiales (CNES) and NASA, with contributions from the Canadian Space Agency (CSA) and the United Kingdom Space Agency.

Launched in December 2022, the SWOT satellite uses state-of-the-art radar interferometry technology to measure the elevation of water, and observes major lakes, rivers and wetlands while detecting ocean features with unprecedented resolution. SWOT data are providing critical information that is needed to assess water resources on land, track regional sea level changes, monitor coastal processes, and observe fine scale ocean currents and eddies.

The SWOT Science Team has researchers from around the globe with expertise in oceanography and hydrology. This multidisciplinary group is tackling pressing issues such as availability of Earth's freshwater resources, our changing ocean and coasts, the cryosphere, and much more. Besides providing a fascinating exploration of our planet, their studies will contribute achieving societal goals of clean air and water, preparedness for extreme events, and adaptation to long-term environmental changes on continental scales. ■

COP30 in Belém Photo by IISD/ENB | Mike Muzurakis

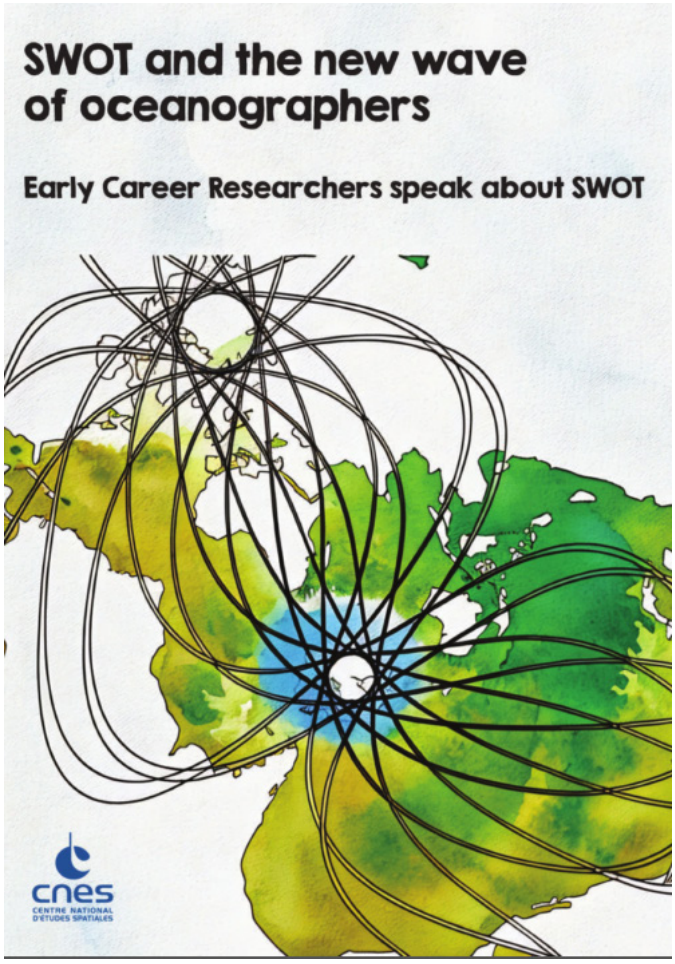
Two e-books published on SWOT

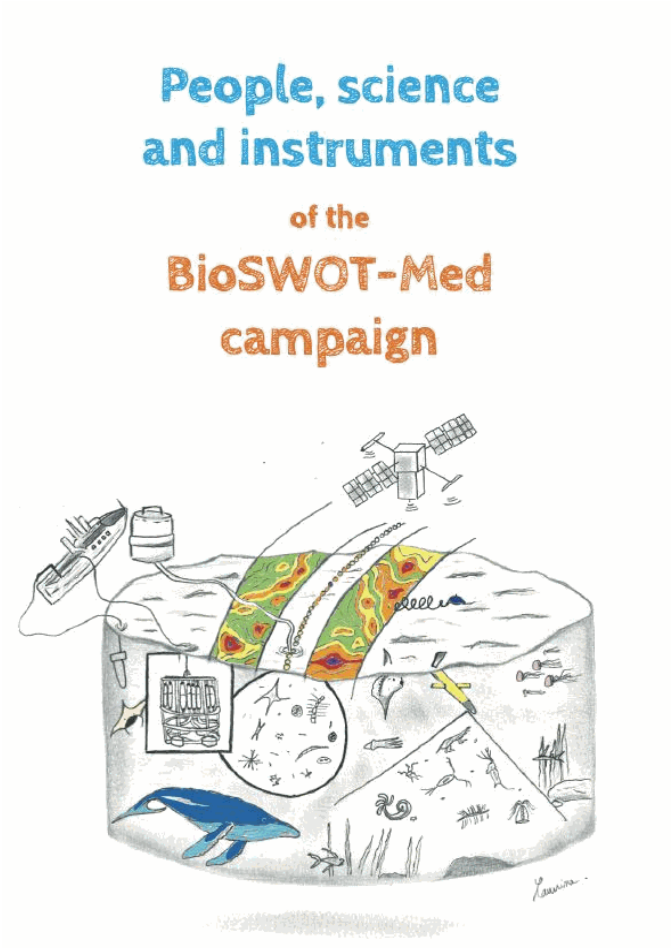
Tosca Ballerini, SWOT-AdAC Communication Officer

SWOT and the New Wave of Oceanographers

SWOT is exciting to oceanographers because it is a next-generation altimeter that brings a new perspective to ocean dynamics. Therefore, it is fitting that many of the exciting research discoveries being made by SWOT are being carried out by a new generation of oceanographers, who also offer a fresh perspective on ocean dynamics. In tribute to their significant contributions to SWOT science, this book, SWOT and the New Wave of Oceanographers: Early Career Researchers Speak About SWOT, attempts to capture the thoughts of a generation of researchers who will help to determine the future of oceanography, offering insights through the lens of SWOT.

Ballerini, T., & d'Ovidio, F. (2025). SWOT and the New Wave of Oceanographers - Early Career Researchers speak about SWOT. CNES. https://doi.org/10.24400/527896/A02-2025.001





People, science and instruments of the BioSWOT-Med Campaign

This book gives an overview of the scientific wealth of an oceanographic campaign, and preserves the memory of the passion and dedication of the participants of the BioSWOT-Med project.

Here you can learn about the people, the science, and the instruments that made the BioSWOT-Med campaign in April – May 2023.

The first three sections present a series of interviews with cruise participants conducted prior to the start of the campaign, covering topics such as research themes, the instruments used by oceanographers, and the new generation of oceanographers. The final section contains stories and anecdotes shared by the researchers while at sea ("Dispatches from sea").

Doglioli, A., Ballerini, T. (2025) People, science and instruments of the BioSWOT-Med Campaign. https://doi.org/10.13155/105690 ■

SWOT: Key Scientific Milestones after Three-Year Mission

Francesco d'Ovidio, CNRS, LOCEAN-IPSL, France, Tom Farrar, Woods Hole Oceanographic Institution, USA

The SWOT mission has been awaited with a lot of excitement by scientists working in diverse fields of oceanography, ranging from physical oceanography to marine geology and ecology. SWOT's prelaunch resolution requirements of about 15 km were already challenging, and have been largely exceeded by the mission performance, which is showing a resolution down to a few kms (depending on sea state). Today, three years from its launch, there are already hundreds of SWOT-related contributions to conferences, special issues, and scientific journals. The 2022 Morrow et al. "Global observations of fine-scale ocean surface topography with the Surface Water and Ocean Topography (SWOT) Mission", which presented before the launch the expected ocean capabilities of the SWOT mission, already has hundreds of citations. In the meanwhile, many far-reaching results based on the exploitation of SWOT data have been already published, including in high impact journals. This year, a Nature paper revealed that SWOT can detect submesoscale eddies (vortices few tens of km size) in sea surface height maps. A Science paper showed how bottom topography mapping, a traditional application of altimetry, can benefit from SWOT, finding that one single year of SWOT data offers already more detailed gravimetric information than 30 years of satellite nadir altimetry, enabling the detection of intricate seafloor structures. Other recent papers demonstrated that SWOT altimetry is a powerful tool even for surface and internal waves, providing for instance estimations of Significant Wave Height at kilometer scale (a key parameter of sea state) with exciting implications for navigation safety and air-sea interaction. On 19 May 2023, observing southeast of Loyality Islands, SWOT measured the 2D signature of a tsunami. SWOT's resolution, low noise, and coverage has been shown to precisely capture extreme storm waves with applications to marine meteorology, ocean and coastal engineering, and the interpretation of ocean-generated seismic signals. Unlike conventional altimeters, SWOT can measure right up to the coast with little contamination from land, enabling many new studies on river deltas, estuaries, and coastal dynamics, with important potential applications on these densely inhabited areas. Similarly, SWOT's measurements over ice-covered regions are opening the way to exciting research subjects for the cryosphere. These include all-weather, high resolution monitoring of sea ice coverage and thickness, two key parameters for estimating heat transfer in polar areas, and for modeling ecological habitats.

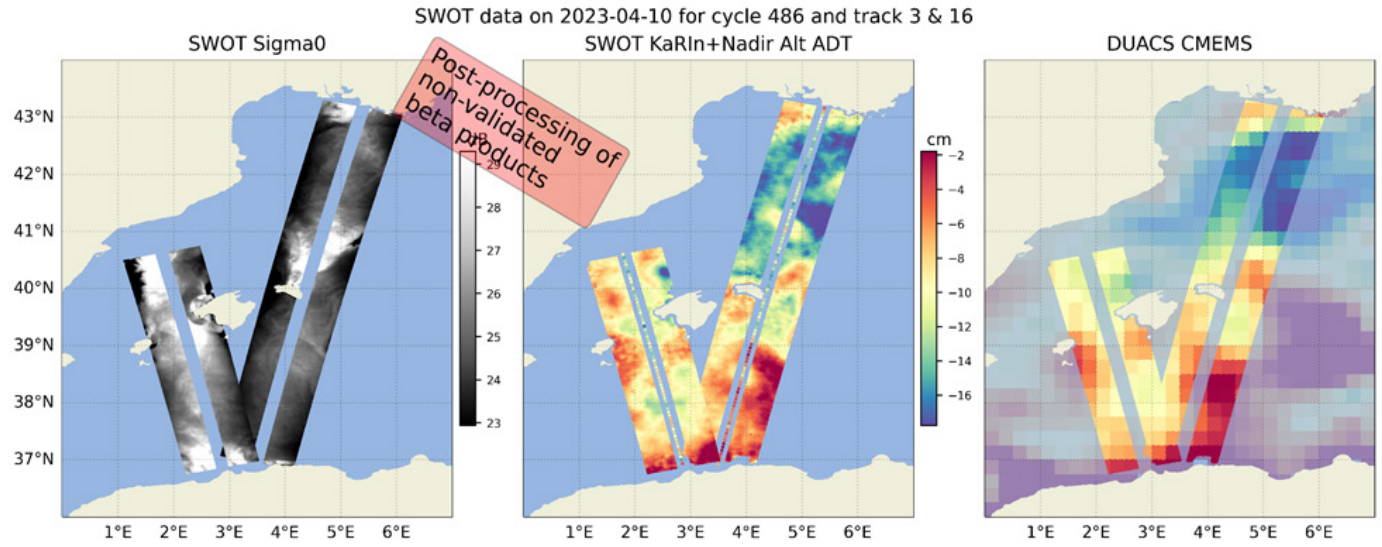


Figure 1 : One of the early SWOT image made available in April 2023, few months after launch, by SWOT Project (NASA, JPL, and CNES and CLS teams) in near-real time to the « Adopt-a-Crossover » Consortium (supported by CNES). The AdAC Consortium federated more than 20 oceanographic campaigns for collecting in situ data under the SWOT's swath during the satellite fast sampling phase. The combination of a short latency at the very beginning of a satellite mission and the deployment of a massive number of instruments in various oceanic basins is an example of a remarkable coordination between a satellite mission project and the international scientific community.

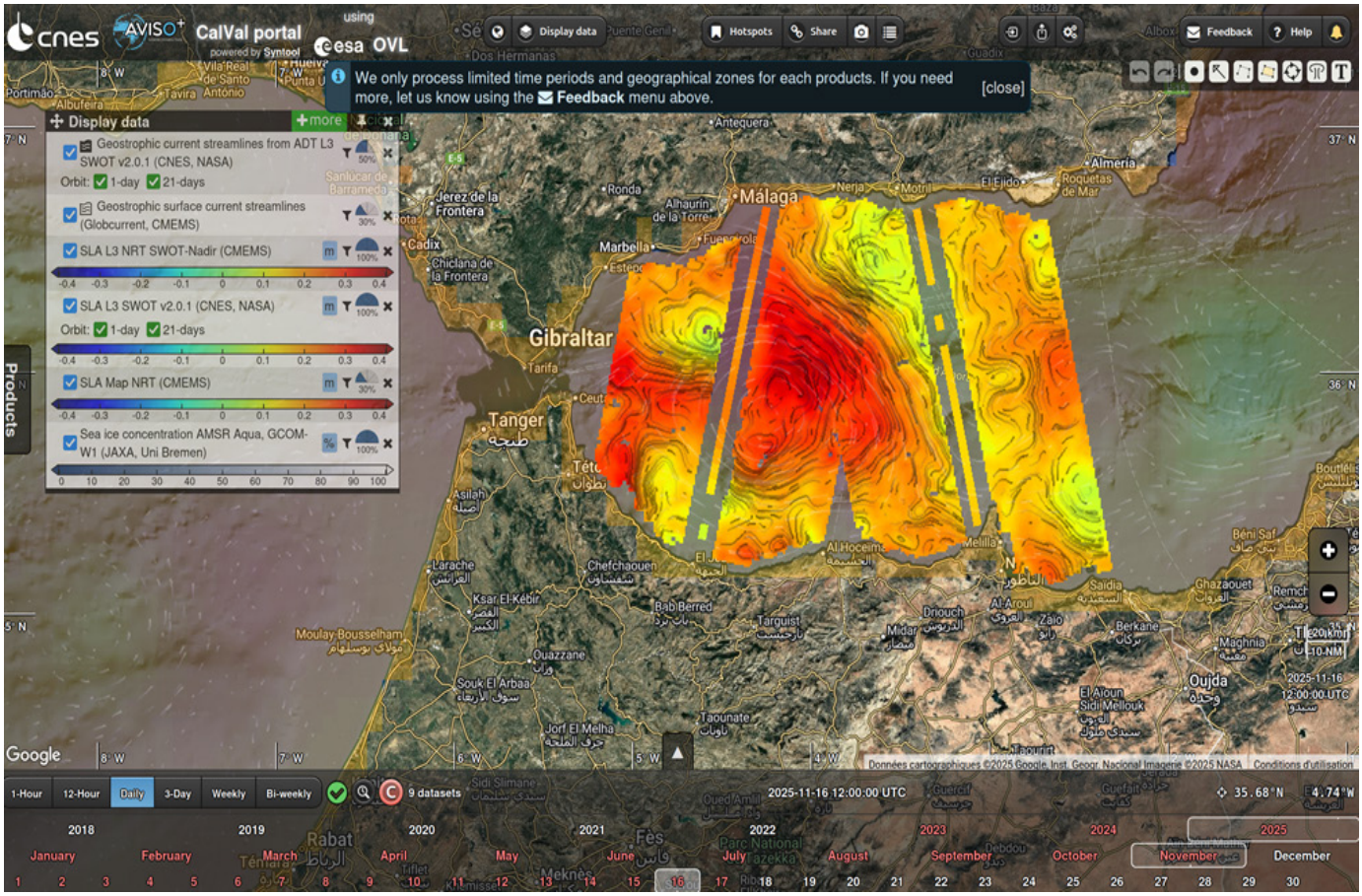


Figure 2: An example of currently available SWOT products and visualization tools

SWOT is an example of remarkable coordination between the mission project team and the scientific community. For the first three months of its mission, SWOT was on a special orbit, in a special 1-day repeat orbit. During this period, regions within SWOT's swaths were sampled at least once per day. At the "cross-over" locations where the ascending (northward) and descending (southward) ground track of this relatively sparse orbit cross, there were two samples per day. Within these regions (Figure 1), the beginning of the SWOT mission provided a unique occasion for mapping sea surface high details in both space and time. In a coordinated effort called the Adopt-a-Crossover Consortium, the international community sized this opportunity by coordinating more than 20 oceanographic campaigns all around the world, a unique multi-site experiment in the history of oceanography (more information at https://www.swot-adac.org).

This synergy between the mission project and scientific community is still continuing (Fig. 2). The strong link between the Science Team and engineering teams (NASA, JPL, Cnes, CLS, and others) is the core of the mission's success. The recent release of version D of KaRIn Science Data Product showcases an impressive number of improvements in calibration corrections, bug fixes, processing enhancement, and geophysical model changes. L2 product latency today is down to 1-2 days, way below pre-mission requirement of 45 days, opening the way for near-real time applications like for instance SWOT support to sampling strategies for oceanographic campaigns. An L3 product, made in collaboration with the SWOT Science Team (algorithms from the community, and content adjusted based on their feedback) has been made available since the early period of the mission and is constantly improving. This product can be used as a test bed for algorithms that need community evaluation (from the Science Team and larger scientific community) before being eventually proposed to future release of the L2 reference product from the Project. A recent important L3 outstanding improvement has been an advanced noise filtering algorithm based on a generative artificial-intelligence algorithm trained on a high resolution circulation model.

Besides science, SWOT is also having a strong impact on the oceanographic community, systematically appearing as a highlight of international conferences and being at the center of dozens of thesis and postdoctoral projects for Early Career Researchers every year: see for instance the book dedi-

cated to the young community of SWOT scientists at https://www.swot-adac.org/swot-and-the-new-wave-of-oceanographers/.

Challenges remain, related to the two main limitations that SWOT has in terms of measuring ocean currents, that is, SWOT's long repeat cycle, and the fact that the sea surface height that SWOT measures gives only an indirect measure of the ocean currents. Indeed, the dynamical features observed by SWOT at the ~10 km scale evolve faster than the ones occurring at larger scales. Models suggest temporal scales of the order of days or less, but SWOT has a repeat cycle of 21 days. Advanced interpolation techniques available in L4 products combine SWOT with the observations of the nadir constellation and employ dynamical (i.e., physically-informed) interpolation schemes. By doing this, the problem related to the long repeat cycles of SWOT is attenuated and daily maps of sea surface height are available everywhere. These daily and global maps however are necessarily smoother than sea surface height available in SWOT's swaths every 21 days in L2 and L3 swath's products. Secondly, the smaller scales observed by SWOT question the validity of the quasi-geostrophic equilibrium, that is the cornerstone of the estimation of surface currents from altimetry measurements. At scales of O(10 km) and smaller, the balance between the pressure gradient and Coriolis force (the geostrophic equilibrium) is still important, but not necessarily dominant, and other balanced or unbalanced terms can be non-negligible. For these applications, promising approaches include the combination of SWOT observations with the ones of other platforms, like surface drifters, or future sea surface velocities satellite which will embark instruments able to detect absolute currents, like for instance Doppler sensors.

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Events

• AGU Ocean Sciences Meeting, Glasgow, Scotland, 22-27 Feb. 2026
https://www.agu.org/Ocean-Sciences-Meeting

• EGU General assembly 2026, Vienna, Austria & Online 3-8 May 2026
https://egu26.eu/

• 30th IOCCG Committee Meeting, Tokyo, Japan, 19-22 May 2026
https://ioccg.org/what-we-do/committee-meetings/ioccg-30/

• 57th International Liège Colloquium on Ocean Dynamics, Liège, Belgium, 25-29 May 2026
https://www.ocean-colloquium.uliege.be/cms/c_14229949/en/international-liege-colloquium-on-ocean-dynamics

• OSTST meeting 2026, Wiesbaden, Germany, 22-26 June 2026
https://www.eventsforce.net/ostst2026

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Front-page image: Kamtchatka tsunami waves, by model and SWOT (+70 min). Credits Cnes/CLS

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