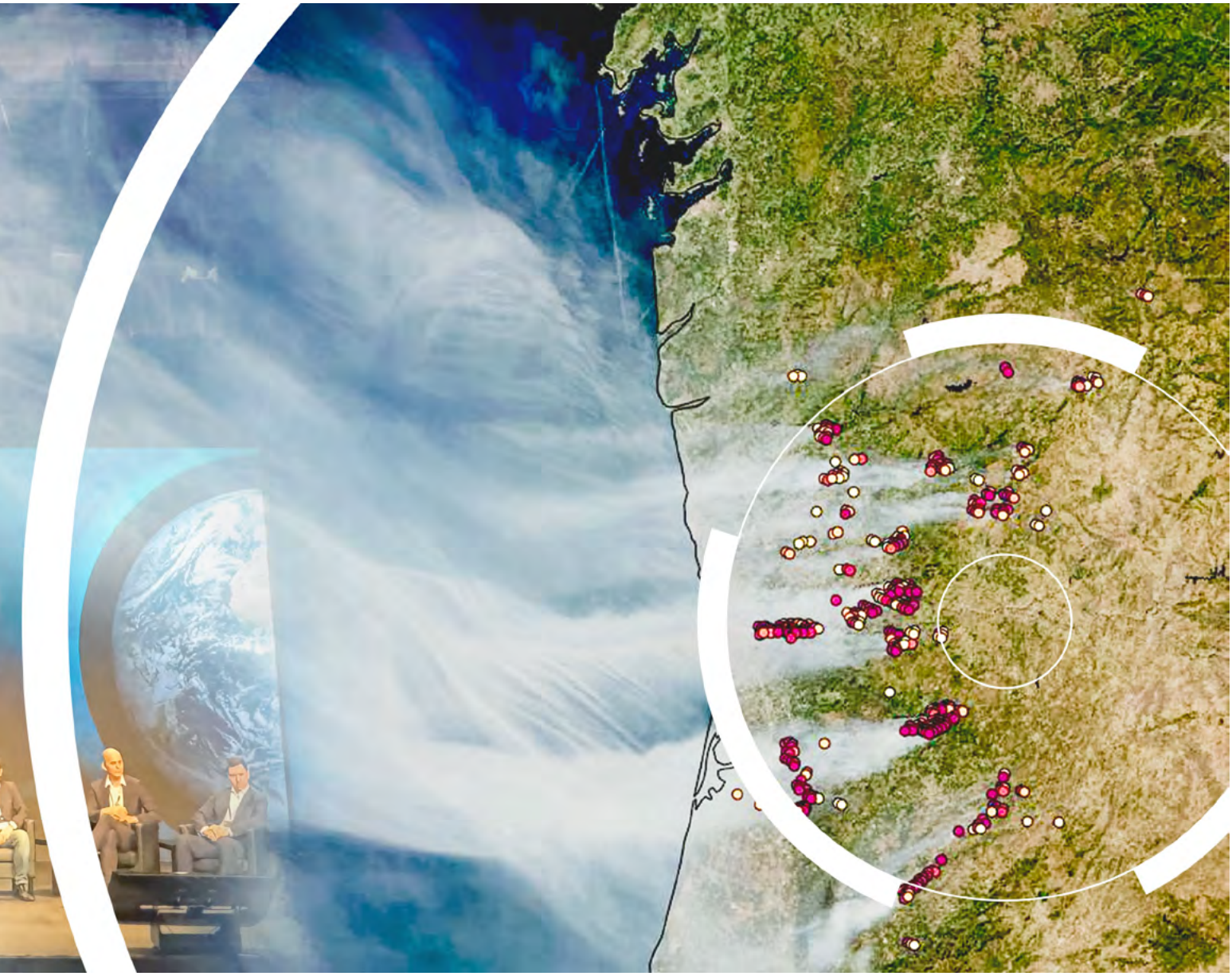
EUMETSAT

Copernicus data user uptake

2024 report

Monitoring weather and climate from space



COPERNICUS AND EUMETSAT IN 2024

EUMETSAT is a key service provider in the Copernicus programme, the Earth observation component of the European Union's space programme. EUMETSAT operates satellite missions, delivers data, and provides support services to Copernicus. EUMETSAT operates the Copernicus Sentinel-3 mission, together with ESA, and the Sentinel-6 mission, together with CNES, NOAA, NASA and ESA. EUMETSAT provides the marine data streams from the Sentinel-3 and -6 missions, as well as atmosphere products relating to aerosols and fires from Sentinel-3.

These satellite missions produce a vast volume of data which EUMETSAT delivers to a wide variety of data users all over the world within stringent operational timeframes, and as reprocessed collections. As well as measurements from the satellites' instruments, the data provided include derived marine and atmospheric geophysical products. These data are also key contributions to the Copernicus marine, atmosphere and climate services and supply governments, businesses, scientists, and the public with vital information about our planet as part of a value-adding chain that rapidly multiplies the benefits of the data.

To maximise the impact and utility of Copernicus data, EUMETSAT works with new and experienced users of Earth observation data through communication activities, user support and training services. The data are made freely available through the Copernicus programme.

In the future, EUMETSAT will operate the Sentinel-4 and Sentinel-5 atmosphere-monitoring missions, Copernicus Anthropogenic Carbon Dioxide Monitoring constellation, and will deliver global ocean and atmosphere products from the Copernicus Imaging Microwave Radiometer (CIMR) and Copernicus Polar Ice and Snow Topography Altimeter (CRISTAL) missions.

The infographics and stories below aim to show how much data was used over the past year, by whom, where, and for what purpose.

Two highlights of 2024 were the marine user days and the fire future focus workshop which gathered users from across the data value chains to share case studies and challenges with turning data into impactful action. EUMETSAT also launched a UN Ocean Decade webinar series in collaboration with partners from Mercator Ocean International, EMODNet and the Early Career Ocean Professionals (ECOP) programme.

Average data availability within NRT timeliness

98.3% (Sentinel-3 Marine)
97.8% (Sentinel-3 Atmosphere)
99.0% (Sentinel-6)
91.0% (Jason-3)

Data made available to users by EUMETCast

419.30 TB

Total data downloaded in 2024

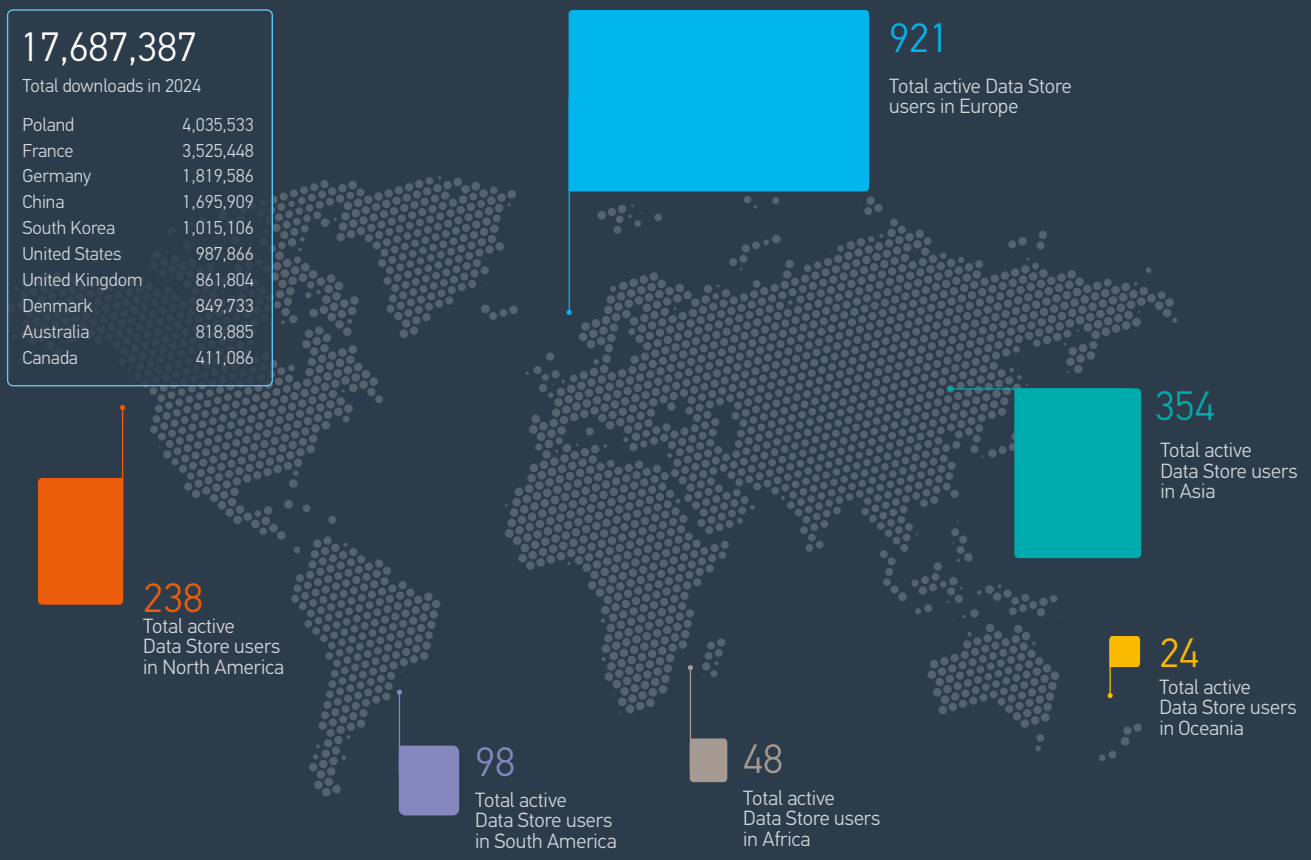
2.22 PB

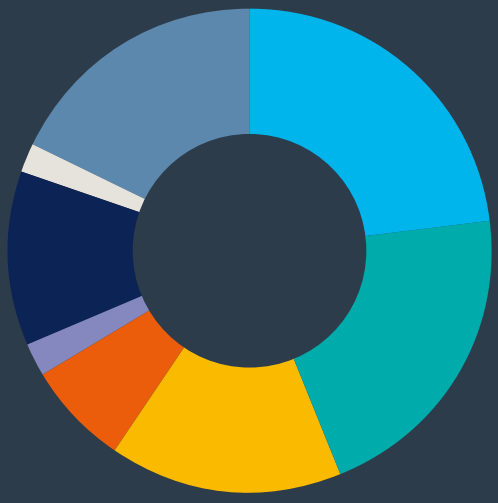
Total data available online 2024

Sentinel-3: 4.3 PB
Sentinel-6: 802 TB

DATA ACCESS

Number of files downloaded in 2024





Number of files downloaded for each thematic stream

Ocean colour	3,980,000
Sea Surface Temperature	3,590,000
S3 Altimetry	2,710,000
S6 Altimetry	1,160,000
Radio Occultation	393,710
Fire Radiative Power	2,010,000
Aerosol Optical Depth	320,580
Level 1 and other	3,050,000

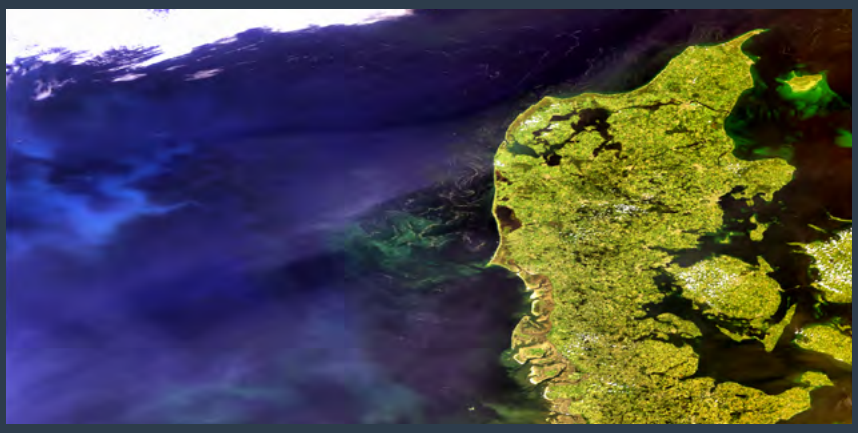
DATA IN USE

https://user.eumetsat.int/resources/case-studies/viewing-algal-blooms-in-european-seas-during-summer-2024

1

A summer of algal blooms in Europe

Blooms of different species of phytoplankton can be readily observed in satellite ocean colour data such as that provided by Sentinel-3 OLCI. The image below shows several different types of plankton present in a single image. This information can be exploited for a variety of societally relevant applications from understanding the ocean carbon cycle to managing poor water quality and its impacts on environmental and human health.

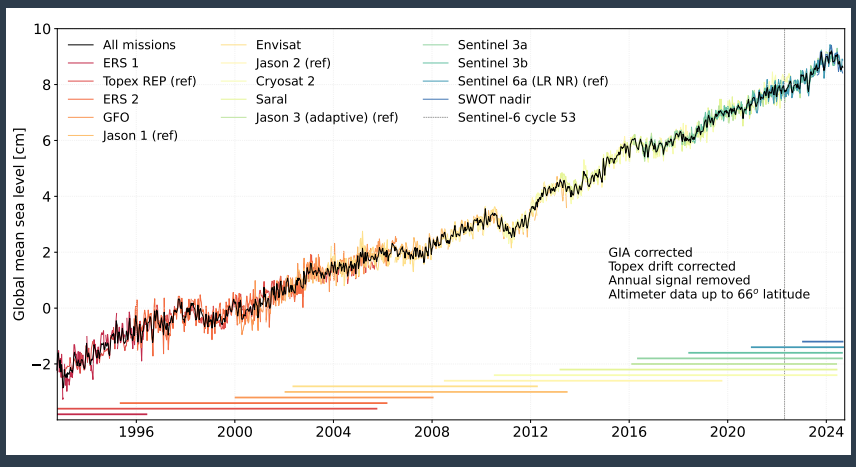


https://user.eumetsat.int/resources/case-studies/monitoring-sea-level-rise-with-sentinel-6

2

Monitoring sea level rise with Sentinel-6

Monitoring sea-level rise requires a long term, consistent, time series of measurements. Building on the TOPEX-Poseidon legacy, Sentinel-6 continues this mission. The figure below shows how the altimetry-based record of sea level rise has been developed over time, using multiple satellite missions. The accompanying case study dives further into the work required to ensure this time series is accurate, as well as how to interpret observed variability and trends.

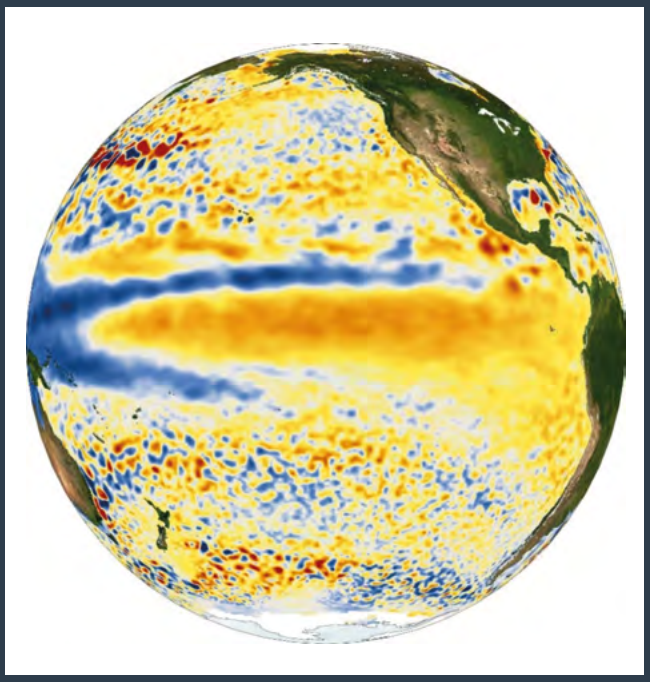


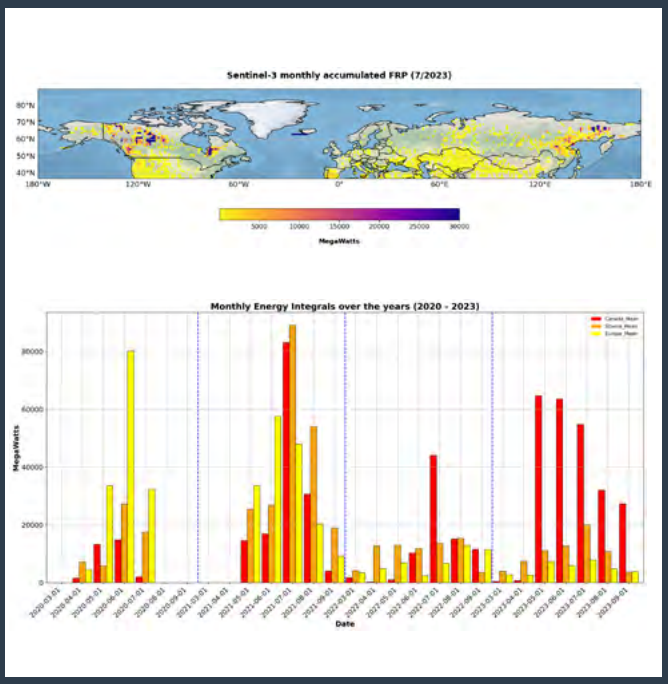
https://user.eumetsat.int/resources/case-studies/observing-marine-enso-progression-throughout-2023

3

Following the marine progression of El Nino in 2023

The El Nino South Oscillation is a climate phenomenon driven by the relationship between the ocean and the atmosphere, with global impacts. The complex dynamics and global impacts of ENSO make satellites an indispensable tool for its monitoring. The figure below shows an example of monthly sea level anomalies across the Pacific in 2023. As well as this data, provided by the Copernicus marine service using data from the EUMETSAT operated altimeters, ENSO and its impact can be understood using many sources of Copernicus data such as sea surface temperature and chlorophyll-a concentrations, also featured in the case study. This case study was put together in March 2024 as a result of an educational collaboration with students at Plymouth University.





4

https://user.eumetsat.int/resources/case-studies/canadian-wildfires-in-2023

Canadian wildfires in 2023

Wildfires in Canada occur every year. The vast areas of forested regions, especially in provinces like British Columbia and Alberta, make Canada a significant contributor to regional and global atmospheric chemistry emissions. However, there are some indications that the fires in 2023 were extraordinarily intense. The figure on the left makes use of the Fire Radiative Power product from Sentinel-3 SLSTR and shows that the cumulated energy of fires in Canada was very high over a course of several months. Satellite data from multiple missions, accompanied by model results and ground measurements, helped to conclude that indeed the 2023 fire season in Canada was anomalous, and the atmosphere over Europe was affected.

ENGAGING WITH DATA USERS THE MARINE USER DAYS AND FIRE WORKSHOP 2024

Engaging with users is a critical activity to ensure the uptake and effective use of Copernicus data. EUMETSAT hosts user days as one activity towards this goal. In 2024, two user days were held, addressing the broad marine user community, and a specific event on Fires.

The EUMETSAT Marine User Days brought together existing and prospective users from across the diverse marine user community. Supported by the European Commission, European organisations involved in the Copernicus programme (EUMETSAT, ESA, ECMWF, and Mercator Ocean International) came together to share their data portfolios and activities and their relevance for oceanography and marine applications. The event included a showcase for use cases, acted as a networking opportunity for users across the value chain, and featured several thematic workshops to engage with user needs and feedback. Emphasis was placed on data from across the value chain including satellite data, derived products, climate data records and their applications. Copernicus contributing mission data from EUMETSAT's meteorological missions and data from the satellite application facility specialising in ocean and sea ice broadened the scope. Use cases presented covered a wide range of topics from fisheries and aquaculture, climate reporting, and policy compliance, through to green shipping, biodiversity assessments, and citizen science. The Marine User Days attracted nearly 100 participants from across the community including those involved at the policy and governance level, academia and research and commercial entities. Attendees benefitted from the opportunity to present their use cases to the wider community of users and potential customers, but also to the European Commission and Copernicus entrusted entity representatives. As well as having an opportunity to discuss their use cases and needs with the latter via the workshops and closing panel. An event report was compiled summarising the use cases and recommendations from the community. Presentations, report, and further information can be found on the event website.

The Future Focus user workshop on Wildfires brought together a diverse community of experts, including leading scientists, data providers, and fire management professionals, to explore the latest advances in satellite-based wildfire monitoring. The event connected the entire value chain—from data to application—aiming to strengthen engagement with users, value adders, and service providers. Over 90 in-person participants from 24 countries and 160 online attendees joined the discussions, highlighting strong interest and momentum in improving wildfire monitoring capabilities. The workshop highlighted the pivotal role of satellite data in the wildfire monitoring cycle, from early warning and active fire management to post-fire impact assessment. Participants had the opportunity to showcase their own use cases and actively engage in focused discussions during the splinter sessions. Key priorities identified included improving active fire and burned area observations, enhancing atmospheric measurements (e.g., smoke and pollutants), and strengthening integration into operational systems. Special attention was given to ensuring continuity in fire monitoring, particularly with Sentinel-3 products (including next-generation data) to succeed legacy missions and support both near-real-time response and long-term value-added services. The workshop reinforced the importance of building a strong EO wildfire community, fostering collaboration between developers and end users to ensure satellite products are tailored to real-world fire management needs. The momentum generated sets the stage for transformative improvements in wildfire monitoring and response. Presentations, report, and further information can be found on the event website.

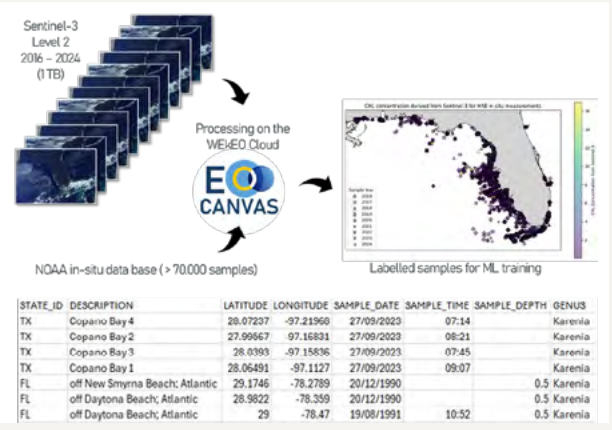
NEW WEKEO, NEW FUNCTIONALITY

WEkEO is the Copernicus data federation platform jointly operated by EUMETSAT, ECMWF, Mercator Ocean International and the EEA. Launched in 2018, WEkEO offers free federated access to Copernicus Data from the Sentinel satellites and the Copernicus monitoring services.

WEkEO features cloud–based hosted processing and tools allowing users to transform the data and services to meet their specific needs. It also offers user support and training, capitalising on the recognized expertise of EUMETSAT, ECMWF, Mercator Ocean International and the EEA.

After the move to a new contract, WEkEO 2.0 was released in December 2023. The year 2024 was then all about the evolution of the WEkEO services

WEkEO EOCanvas: How can I get valuable information out of the massive amounts of satellite data available in Copernicus and WEkEO? As one solution to this question the WEkEO EOCanvas was released in mid-2024, moving the load of data processing and software maintenance on the WEkEO cloud, thus enabling users to scale up their data processing – regardless of how fast their computer or internet connection is.



STATE_ID	DESCRIPTION	LATITUDE	LONGITUDE	SAMPLE_DATE	SAMPLE_TIME	SAMPLE_DEPTH	GENUS
TX	Copano Bay 4	28.07237	-97.21969	27/09/2023	07:14		Karenia
TX	Copano Bay 2	27.99667	-97.16831	27/09/2023	08:21		Karenia
TX	Copano Bay 3	28.0393	-97.15836	27/09/2023	07:45		Karenia
TX	Copano Bay 1	28.06491	-97.1127	27/09/2023	09:07		Karenia
FL	off New Smyrna Beach; Atlantic	29.1746	-78.2789	20/12/1990		0.5	Karenia
FL	off Daytona Beach; Atlantic	28.9822	-78.359	20/12/1990		0.5	Karenia
FL	off Daytona Beach; Atlantic	29	-78.47	19/08/1991	10:52	0.5	Karenia

Expanding our user base by supporting the R community: To make the WEkEO services available to the R community, WEkEO has expanded its offer: The R client for the WEkEO harmonized data access (developed by EEA), the JupyterHub RStudio extension and tutorial notebooks using R bring not only the Copernicus data to the R community but provide them also the necessary processing environment and learning material.

Copernicus data for all: To make Copernicus data available to people independent of their degree of expertise in Earth Observation, Mercator Ocean has released the WEkEO Light Viewer. A low-level entry point to visualize parameters of the Earth without any prior knowledge of data products or sensors needed.

A year of service evolutions is only the beginning: we are excited looking ahead to evolutions coming in 2025: Machine learning capabilities on the Jupyter Hub with a DASK gateway and GPUs, increased interoperability through an OGC-compliant API to the serverless processing capabilities and WEkEO earthkit plugins and a brand new style in a newly designed portal and website!

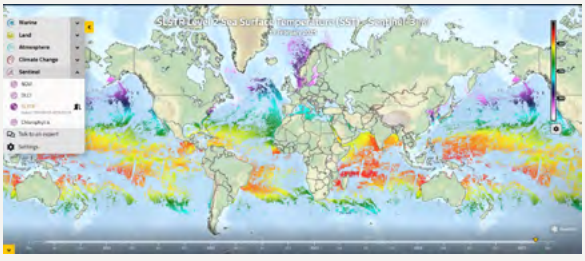


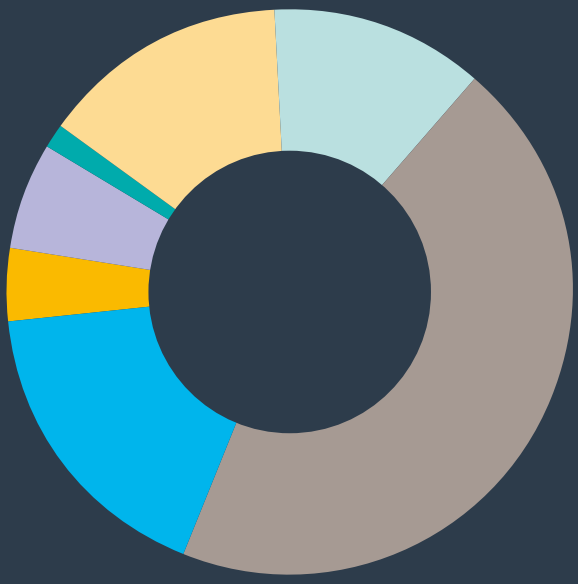
Figure 1: EUMETSAT-provided sea-surface-temperature information displayed in the new WEkEO light viewer developed by Mercator Ocean International.

USER ENGAGEMENT AND TRAINING

14
User engagement events
8 (marine)
6 (atmosphere)

15
Training events
10 (marine)
5 (atmosphere)

880
Trainees
468 (marine)
412 (atmosphere)



832
Sentinel-3 users from EUMETCast

User sectors

- National institution 17.3%
- Private individual 44.9%
- Researcher 12.0%
- Education 14.3%
- International organisation 1.3%
- Commercial SME 6.1%
- Commercial non-SME 4.1%

18,547
WEkEO users

304,357
YouTube views

988,296
X impressions

760,672
Facebook impressions

178,545
Instagram impressions

755,027
LinkedIn impressions

45,623
Website views

342
Help desk queries answered

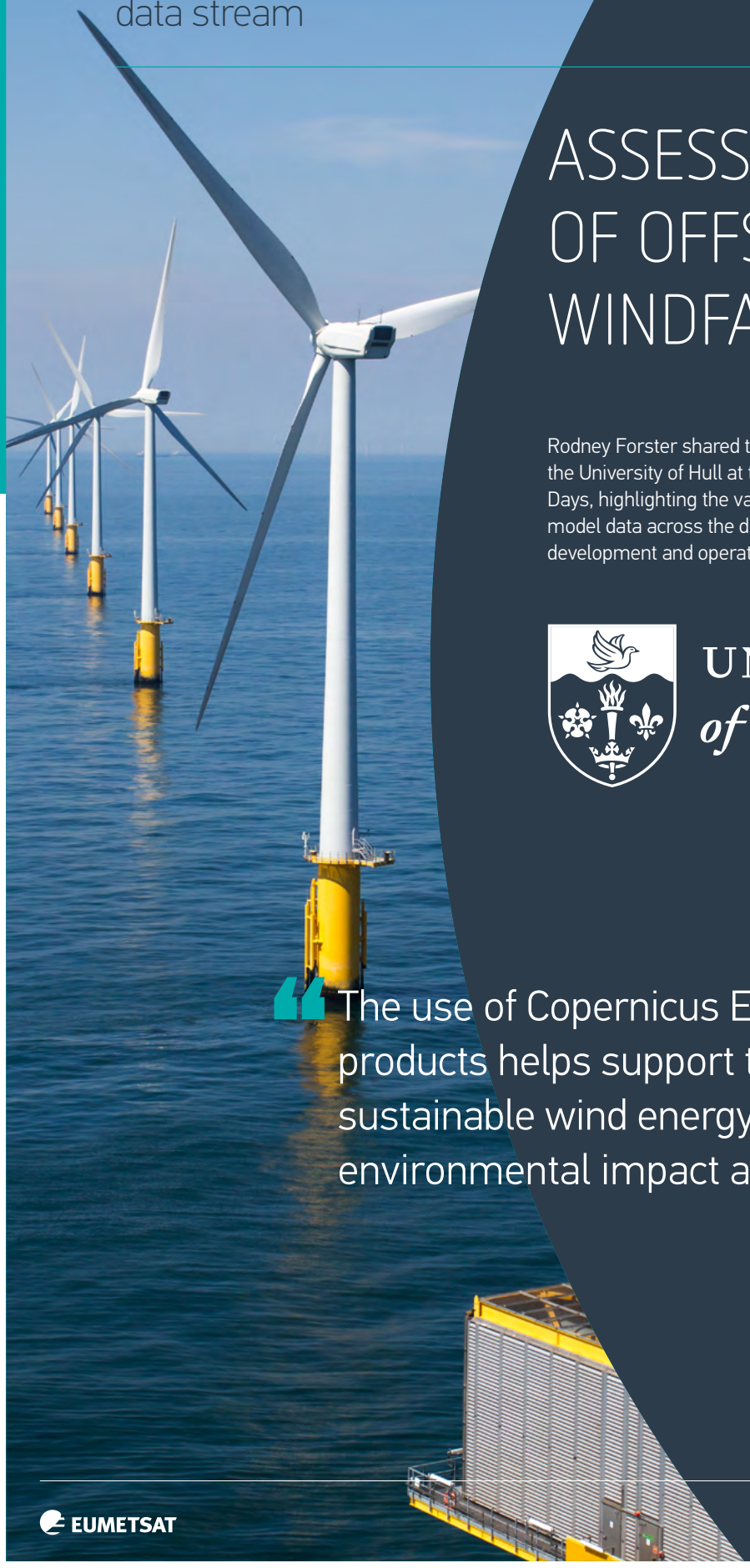
51
New scientific publications using Sentinel-3 data

Follow the data stream

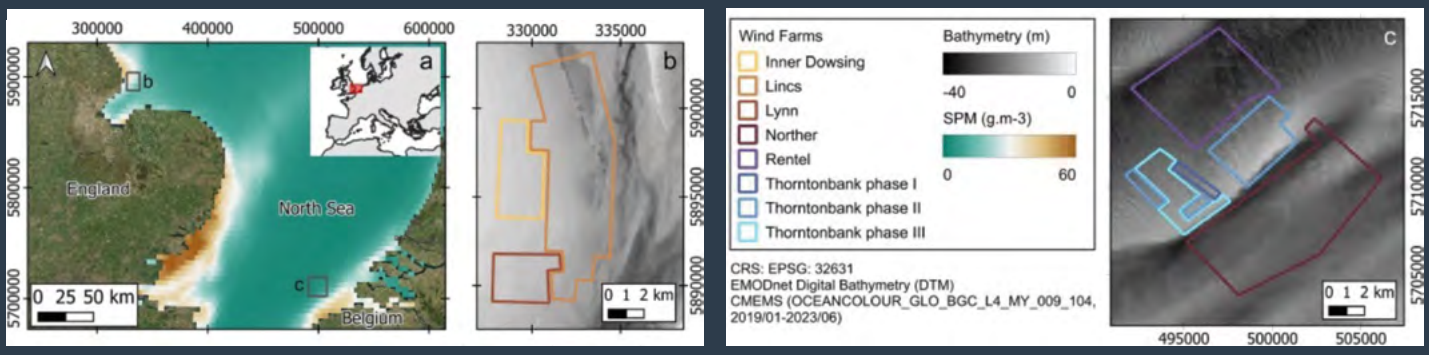
ASSESSING IMPACT OF OFFSHORE WINDFARMS

Rodney Forster shared the work of the team based at the University of Hull at the 2024 EUMETSAT Marine User Days, highlighting the value of satellite and dependent model data across the different stages of windfarm development and operations.

UNIVERSITY of HULL



> The use of Copernicus Earth observation products helps support the transition to sustainable wind energy and reinforces environmental impact assessments.



(a) Monthly averaged suspended particulate matter (g.m–3) from January 2019 to June 2023 in the North Sea. Studied wind farm layouts in (b) the UK and (c) Belgium are displayed on top of bathymetry. Used under Creative Commons license from Lecordier et al., 2025.

USER STORY

The Hull Marine Laboratory, based at the University of Hull, England, have been developing the use of remote sensing products to support decision making for renewable energy during site selection, environmental impact assessments, construction and operational phases.

THE CHALLENGE

There is a strong need to grow the renewable energy sector for future energy sustainably. Doing this requires appropriate site selection and monitoring to minimise impacts by the marine environment on core ecosystem services in compliance with marine policy.

DATA ACCESS

Data are available through the Copernicus space and services portals, including the EUMETSAT Data Store.

PROCESS

Data are selected to support the characterisation of the environment around potential, developing, and operational sites. They are processed to produce useful indicators of environmental baselines and changes in suspended particulate matter/ turbidity, chlorophyll-a concentrations, etc. This analysis has been designed in collaboration with national organisations such as the UK's Offshore Renewable Energy Catapult.

DISTRIBUTION

Derived information has been published in papers, contributed to site license reports, used as central analytics in environmental impact assessment reports (e.g., for the Crown Estate), and delivered to the UK's Marine Management Organisation.

VALUE

Remote sensing data provide cost-effective and spatially and temporally broad coverage of information at all stages of wind farm development and operations, supplementing in situ measurements and modelling, and supporting compliance with national regulations.

Follow the data stream

A CLEARER VIEW OF FIRE FROM SPACE

Operational users—from fire monitoring services to atmospheric researchers—depend on fast, reliable satellite data. Until now, Sentinel-3's Fire Radiative Power (FRP) product was delivered only in large, complex NetCDF files. With the new Collection 3 release, greatly improved detection quality during daytime, lighter formats and accessible CSV summaries make the data far easier to use—supporting real-time decision-making and broader adoption.

> "Exactly our need for our pilot service project for Norway gas flare monitoring (NILU)."

USER STORY

Fire activity is increasing worldwide, with major impacts on air quality, ecosystems, and public health. Sentinel-3 plays a vital role by providing near real-time (<< 2.5 h) fire observations from its early afternoon orbit—crucial for capturing peak fire activity. As NASA's MODIS Terra satellite approaches retirement, organisations are turning to Sentinel-3 as a European-led replacement for mid-morning observation with global coverage. Interest in this data is growing rapidly, both in global monitoring systems and national-level services.

THE CHALLENGE

Earlier versions of the Sentinel-3 FRP product were difficult to use: large (~60 MB) NetCDF files with dozens of variables, even when users only needed a small subset of information. This limited adoption and made quick, targeted analysis more difficult.

DATA ACCESS/DISTRIBUTION

Since 4 July 2024, the Collection 3 products, including both NetCDF and CSV mini files, are accessible through the EUMETSAT Data Store and EUMETCast. Summary CSVs allow quick exploration without downloading full datasets, supporting both experts and lightweight systems. The reprocessing of the data available before this date is already planned as well.

PROCESS

EUMETSAT listened to feedback from across Europe and around the world. Big changes were made: reducing the size of data files by removing unnecessary layers, compressing the content smartly, and—most importantly—adding simple CSV mini files consistent with MODIS & VIIRS fire CSV files (provided by NASA FIRMS), that anyone can open in a spreadsheet. These changes were tested with real users and refined based on their input.

VALUE

The update enables Sentinel-3 FRP data to feed into global fire monitoring, air quality forecasting, and data assimilation systems—helping transition away from heritage systems like MODIS Terra. It also supports regional projects such as gas flare monitoring in Norway. These improvements ensure Copernicus data remains a key asset in Europe's environmental and climate services.

COMMUNICATION AND OUTREACH

In 2024, EUMETSAT kicked off a series of ocean data webinars to highlight how data from Copernicus, EUMETSAT and other EU initiatives can contribute to the goals of the UN Ocean Decade.

The United Nations Decade of Ocean Science for Sustainable Development (UNESCO) has identified **10 ocean-related challenges** to focus research and activities that will help lead to more sustainable use of oceans and marine resources.

To support these efforts, EUMETSAT hosted three Ocean Decade webinars in 2024 , drawing hundreds of participants from a wide range of disciplines. The impact of the webinars has also extended beyond the live sessions, with the recordings on the EUMETSAT YouTube channel amassing over 90,000 views. The webinars will continue during 2025.

Each of the three webinars has included an introduction to the data from each partner (EUMETSAT, EMODnet and Mercator Ocean International) followed by more detailed explanations of useful Jupyter notebooks that relate to specific Ocean Decade challenges. Resources from the webinars are collated on the series website, allowing users to explore further. The resources are also being reused in various conference presentations, and trainings, to further their impact.

Marine User Days group photo, Lisbon, Portugal

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PROGRAMME OF
THE EUROPEAN UNION

Copernicus
Europe's eyes on Earth

September 2025