

eoosc | Blue-Cloud2026

Federation Workshop

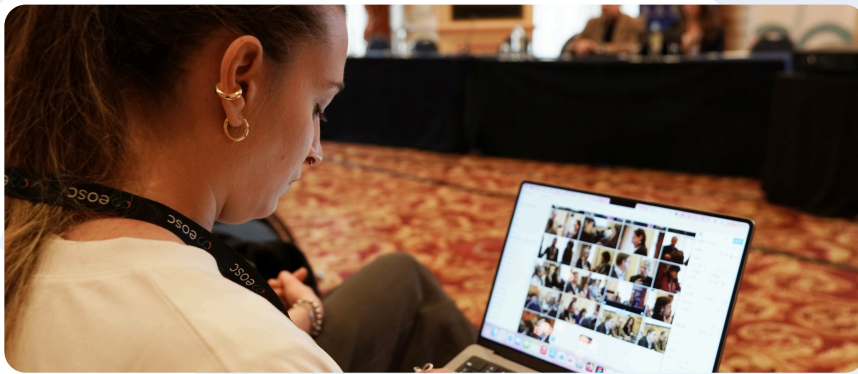
5-6 November 2025, Brussels [Belgium]

The Third Federation Workshop

Held in **Brussels** on **6 November 2025**, immediately after the EOSC Symposium 2025, the Blue-Cloud 2026 Third Federation Workshop gathered more than 70 participants, including Blue-Cloud partners, blue data infrastructures, research infrastructures (RIs), projects and initiatives working on marine, environmental and climate-related topics.

The aim was to:

- showcase the current Blue-Cloud 2026 services, data products, approach and results,
- position Blue-Cloud within the evolving EOSC and EDITO landscape, and
- give visibility to collaborative initiatives in order to stimulate cooperation and federation of services.



Blue-Cloud: The EOSC Node Digital Twin Of The Ocean In Support Of The DTO

After welcoming words from **Sara Pittonet Gaiarin**, Blue-Cloud 2026 Coordinator, the workshop was opened by **Nicolas Segebarth** (DG RTD), who underlined the importance of increased cooperation in the marine data environment. He reminded participants that “the ocean doesn’t work in silos, so why should we?”, stressing that ocean physics, ecosystems and human activities are deeply interconnected and that our responses must reflect this complexity.



“Not only does the ocean know no borders, but its physics, its ecosystems, and the ways in which we humans interact with it are deeply interconnected — and so must our responses be.”
Nicholas Segebarth.

Pasquale Pagano, Scientific Coordinator of the project, then presented Blue-Cloud as one of the Nodes that recently joined the EOSC Federation, under the name “EOSC Node Digital Twin of the Ocean”. The EOSC Node Digital Twin of the Ocean acts as a bridge that makes the EDITO DTO ecosystem fully accessible and integrated within the EOSC Federation. It represents the EOSC-facing research and collaboration component that enables EDITO to operate according to the EU Open Science principles. Blue-Cloud, together with the Italian EOSC node and other national and thematic nodes, ultimately aims to support scientific data federation across Europe.



This was followed by **Conor Delaney** (EMODnet Secretariat) who presented EMODnet as the key European Commission (DG MARE) marine in situ data service. He explained that EMODnet gathers and publishes data from EU Member States, associated countries and the private sector, and has recently moved to a centralised portal, where products and technologies are accessible through a single-entry point and supported by shared standards for data processing and access. EMODnet is integrated into EDITO and is progressively making its products available in the EDITO data lake, as one of the cornerstone data sources for EDITO, ensuring trust, scalability and transparency.



The session closed with **Marina Tonani** (Mercator Ocean International), who introduced EDITO and ongoing discussions to harness Blue-Cloud 2026 know-how and assets to bridge EDITO to EOSC. EDITO is the core, public infrastructure of the European Digital Twin Ocean, providing a public space where the community can explore, create and share tools and data to address ocean challenges and support decision making. Looking ahead, priorities include scaling up not just in resources, but in platform usability, providing more intuitive interfaces, growing the EDITO community, and launching open calls to support research projects and initiatives to onboard EDITO towards co-constructing the European Digital Twin Ocean. In this vision, the EOSC Node Digital Twin of the Ocean will contribute to expose EDITO's services and catalogue to wider research communities through a smart federation of processes and integration of services.

FAO Long-Term Partnership For Global Fisheries Monitoring

The keynote by **Marc Taconet** (FAO) retraced more than 20 years of collaboration between FAO and Blue-Cloud partners under successive EC-funded actions. This long-term partnership has progressively built analytical capacity for global and regional fish stock assessment, in particular through tools such as the Global Record of Stocks and Fisheries (GRSF) and the Global Tuna Atlas, now running within the Virtual Research Environment that serves as a core platform of the EOSC Node Digital Twin of the Ocean.

Taconet highlighted the complexity of monitoring global fish stock status, which requires continuous methodological updates on:

- Data provision, improving coverage and quality of fisheries data;
- Stock assessment methods;
- Reporting and dissemination on the state of stocks.

The Blue-Cloud VRE provides analytical tools, cloud computing environments, notebooks and spatial data management facilities that allow FAO and interested partners to process large volumes of data within shared repositories, FAIR data services and processing servers in a single environment. The demanding needs of FAO and its partners (RFMOs, national institutes, NGOs, etc.) have in turn pushed Blue-Cloud to enhance its capacities for data sharing and analysis, benefiting the wider EOSC DTO offer.

More than 1,000 participants from over 100 countries have used these tools, contributing not only to stock assessment, but also to scientific publications, data products for governance bodies and material for standardisation activities. As Taconet stated, “Sustainability is not a state, it’s a process”, underlining the dynamic, iterative nature of this collaboration.



Services, Tools And Approaches For Open Science

Federated Services Serving Mission Ocean Objectives

The first session, moderated by Julia Vera (SSBE), focused on services and tools that support Mission Ocean & Waters objectives, in particular mapping and understanding marine ecosystems and species.

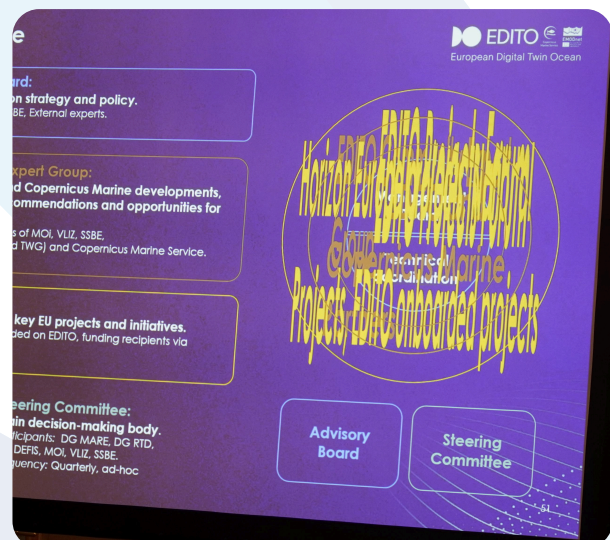
Julien Barde (IRD) presented the Global Fisheries Atlas VLab, a FAIR-compliant entry point to discover, access and interpret data on major fish stocks and fisheries worldwide. The VLab integrates diverse datasets and code, enabling users to reproduce and explore fisheries data products.

Alessandra Giorgetti (OGS) and Simona Simoncelli (INGV) showcased two of the Blue-Cloud analytical WorkBenches: the Eutrophication WorkBench and the Physics WorkBench for temperature and salinity, providing services to analyse key Essential Ocean Variables.

Samuel Fooks (VLIZ), one of the winners of the Blue-Cloud Hackathon, presented TwinTrack, a digital twin prototype for aquatic animal movement in the North Sea, combining EOVS data and VLab resources into an interactive web application built on EDITO.

Valentina Costa (SZN) introduced a workflow for mapping and monitoring seagrass meadows using low-cost drones and open-source software, demonstrating how accessible technologies and citizen science can support biodiversity monitoring and EU policy goals.

Jean-Olivier Irisson (Sorbonne Université) and Alexandre Schickele (ETH Zurich) presented the Ecosystem WorkBench for plankton biodiversity and biomass, another Blue-Cloud service providing ecosystem-scale analyses.



Key outcomes of the session

- The European Digital Twin Ocean programme offers a major opportunity to make existing tools and services more widely available and upscaled to new levels of impact.
- Many excellent solutions remain “locked” within specific communities; EDITO and EOSC can help open them up to broader users and policy objectives.
- A strong recommendation to build systems based on open data, open-source software and open standards, ensuring transparency, reproducibility and relevance to policy needs.
- A recurring message on the need to break down silos: “the ocean is one ocean”, and research infrastructures and projects should work in a more integrated way.



Services For Tracking & Forecasting Ocean Health

The second scientific session, moderated by **Marine Vernet** (IFREMER), focused on services aimed at tracking and forecasting ocean health, particularly through indicators and Essential Ocean Variables (EOVs).

Abel Dechenne (ULiège) presented the service “Coastal currents from observations” providing integrated ocean surface current maps by merging data from multiple sources, originating from one of the Blue-Cloud Virtual Labs.

Francesco Palermo (CMCC) introduced the Marine Environmental Indicators developed within the same VLab, illustrating how combined indicators can support monitoring and assessing the marine environment.

Dina Eparkhina (EuroGOOS) presented BioGeoSea, a recently launched project improving observation, validation and modelling of biogeochemical EOVs (BGC EOVs) and emphasising the role of EuroGOOS.

Key outcomes of the session

- There is a large diversity of projects working on EOVs, indicators and services; coordination through initiatives like EuroGOOS and BioGeoSea is crucial to avoid fragmentation.
- The emerging EU federated ecosystem, including EOSC and related platforms, plays a key role in breaking silos and enabling collaboration across communities.
- Transparency and sharing of methods and good practices are essential to ensure that services can be understood, reused and extended beyond the research community, including by the private and industrial sectors.
- Services and indicators must be user-oriented, designed with end-users’ needs in mind to truly support decision-making and ocean health monitoring.
- Training is a key enabler, particularly for younger generations and new users, to ensure these advanced services can be effectively used and maintained.



Supporting Marine Spatial Planning With Data And Services

The final session, moderated by **Cyrielle Delvenne** (VLIZ), addressed how data and services can support marine spatial planning and sustainable ocean management.

João Paulo do Nascimento Vitorino (IH) presented services available through the ICOOE Virtual Lab (Integration of Coastal Ocean Observations along Europe), including tools for assessing transboundary transport and connectivity, the impact of major storms on coastal and offshore structures, and applications based on ocean gliders.

Mauro Caccavale (CNR) introduced the Italian Integrated Ocean Observing System, focusing on integrating multi-source digital data and near real-time processing to support different management phases.

Alessandro Sarretta (CNR) showcased participatory tools and services designed to support sustainable ocean management and planning by involving different stakeholders.

Laurence Janssens (HUB Ocean) presented the HUB Ocean Data Platform, which aims to ingest private-sector data into major biodiversity repositories such as OBIS and GBIF, expanding the range of available information.

Shreshtha Sharma (TNO) highlighted services from BioDT and DTO-BioFlow, two projects contributing to biodiversity-related digital twins.



Key outcomes of the session

- The diversity of perspectives (from industry, research, Blue-Cloud partners and external initiatives) was seen as a major strength, underscoring the need to work together in a federated and FAIR ecosystem.
- Participants stressed the importance of data provenance and consent, ensuring clarity on where data comes from and under what conditions it can be used.
- There is a clear need to better involve data collectors, including field researchers and other contributors, in federated ecosystems, recognising their role and ensuring feedback flows back to them.
- Marine spatial planning is directly linked to broader questions on how to create useful, shared services, and how to encourage data sharing from both research and industry.



What's Next

Looking ahead, Blue-Cloud 2026 is reinforcing its capacity-building efforts through the Blue-Cloud Training Academy. The Academy is enriched with a series online courses designed to provide ocean scientists with practical skills on how to use the Virtual Laboratories running in the Blue-Cloud VRE.

Thanks to collaboration with the **UNESCO / IOC Project Office for IODE**, a set of **4 hour courses** are now offered via the IOC OceanTeacher Global Academy (OTGA) platform, designed to empower ocean scientists by providing a comprehensive understanding and practical skills in using the Virtual Laboratories (VLabs) running in the Blue-Cloud Virtual Research Environment (VRE).

More information is available at: <https://blue-cloud.org/otga-courses>

Through these training activities and the continued evolution of its federated services, Blue-Cloud 2026 is consolidating its role as a marine thematic Node within the EOSC Federation and as a key contributor to the European Digital Twin of the Ocean, supporting better science, better services and better decisions for the ocean.



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