



EMODnet in Blue-Cloud 2026: Advancing ocean research through cloud- based data integration and Open Science

Patricia Martin-Cabrera¹ orcid.org/0000-0003-3293-5612

Simona Simoncelli² orcid.org/0000-0003-1283-2798

¹ Flanders Marine Institute, (VLIZ), Belgium.

² Istituto Nazionale di Geofisica e Vulcanologia Sezione di Bologna (INGV): Bologna, Emilia-Romagna, Italy.

eosc | Blue-Cloud2026

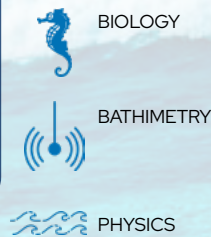


Blue-Cloud 2026 is a collaborative project that brings together existing data infrastructures, such as EMODnet, to create a federated ecosystem for FAIR and open data in marine research. Through a web-based platform, it offers simplified access to multidisciplinary datasets, analytical services, and computing facilities. Some examples of the close interactions between Blue-Cloud2026 and EMODnet are shown below:

1 Blue-Cloud DD&AS

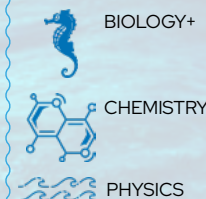
Blue-Cloud offers simplified access to EMODnet data collections and data services of multiple Research Infrastructures through the **Data Discovery & Access Service (DD&AS)** and for use in the Blue-Cloud **Virtual Research Environment (VRE)**, built on the **D4Science** infrastructure.

More than 10 million data sets are managed in the Blue Data Infrastructures (BDIs) that are connected to the DD&AS to serve an unprecedented federated discovery and access in the marine domain.



2 Blue-Cloud V Labs

Blue-Cloud V Labs combine multidisciplinary data types from several **Blue Data Infrastructures**, such as EMODnet (among others) to generate innovative data products, providing their data, scripts and outputs in the **Blue-Cloud VRE**.



Carbon-Plankton Dynamics VLab

This VLab provides a methodology that helps understanding the spatio-temporal variations of plankton dynamics and carbon sequestration, combining data sources available in EMODnet Biology and Chemistry, and using open science tools that allow their re-use by other researchers. The workflow applies the Nutrient Phytoplankton Zooplankton Detritus (NPZD) model to analyse the relative contribution of the drivers in phytoplankton dynamics in the Belgium part of the North Sea.



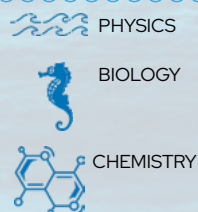
Physics Workbench Temperature & Salinity

It considers EMODnet Physics as a potential data source, among other BDIs, to integrate T&S data, harmonising the metadata and removing duplicates, to obtain new consistent datasets with enhanced spatio-temporal coverage and quality. EMODnet Physics is also a target user of the WB workflow for its further exploitation.

PHYSICS

3 Workbenches

Blue-Cloud WorkBenches (WB) will provide workflows to harmonise, integrate and qualify large and various in situ datasets from different BDIs for selected Essential Ocean Variables (EOVs) exploiting the blue analytical services in the Blue-Cloud VRE.



4 Take home message

- » Blue-Cloud is building a marine thematic EOSC, supported by EMODnet, Copernicus Marine and several leading marine Research Infrastructures, stimulating and supporting open science. This accelerates gaining more scientific knowledge and establishing analytical workflows, which are highly relevant for new services and products of EMODnet.
- » The collaboration between EMODnet and Blue-Cloud increases the visibility and discoverability of EMODnet Data collections on a cross-domain virtual environment.
- » Interaction among marine domains is critical to improve interoperability, to achieve "ocean integration" for enhanced science, to respond to the United Nations (UN) Ocean Decade key challenges and the Digital Twin of the Ocean.

The D4Science e-infrastructure is at the core of the Blue-Cloud VRE's. D4Science core services are used for building and running Virtual Labs and WorkBenches, which are VRE's that are dedicated to specific research objectives. Next to it please add the logo from D4Science, that can be downloaded from here: <https://data.d4science.net/fixBn>



The Blue-Cloud 2026 project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement No 101094227. The H2020 project Blue-Cloud received funding from the European Union's Horizon programme call BG-07-2019-2020, topic: [A] 2019 - Blue Cloud services, Grant Agreement No. 862409.