

Virtual Laboratories in the Blue-Cloud VRE

Operational science environments on D4Science for marine observations, modelling, indicators and fisheries knowledge services

At a glance

All V Labs are running on D4Science in the Blue-Cloud VRE.

- 5 Virtual Laboratories
- 2 User handbooks (Jan 2025, Jan 2026)
- 1 Blue-Cloud Gateway account required (For free!)
- 5 OTGA self-paced training pathways

Access, training and portfolio overview

The project produced five domain-focused V Labs. Each combines data access, analysis services and reproducible workflows, while the handbooks and Ocean Teacher Global Academy courses support onboarding and re-use.

- Register on the Blue-Cloud 2026 Gateway before accessing services.
- Handbooks document data sources, how-to workflows and options to include additional data.
- Each V Lab is paired with a self-paced OTGA training course.

VLab 1 IC0oE

VLab 2 Coastal Currents

VLab 3 Carbon-Plankton

VLab 4 Indicators

VLab 5 Fisheries Atlas

How to use the V Labs

User handbooks

Released in January 2025 (beta) and January 2026 (latest version).

Gateway access

Users first create an account on the Blue-Cloud 2026 Gateway; the first section of the handbook explains the steps.

Training

A dedicated OTGA self-paced course has been developed for each V Lab to help users work with the services and outputs.

Links & QR codes

URLs / QR codes for the Gateway, handbooks, V Lab pages and course pages.

VLab 1 | Integration of Coastal Ocean Observations along Europe (ICOOE)



Coastal observations platform integrating JERICO-RI and other European Blue Data Infrastructures.

- Integrates coastal observations to study connectivity, contaminants, river outflows, extreme events and repeated glider sections.
- Offers dashboards, data reporting, QC/pre-processing, trajectory analyses, current-field statistics and glider processing/viewing tools.

Thematic services address transboundary transport, extreme events and ocean-glider added value.

TS1 Connectivity

TS2 Extreme Events

TS3 Ocean Glider

Partners:

Conference-ready link panel



D4Science Infrastructure Gateway



V Labs Users Handbook



Virtual Labs 2026



Vlab 2 course



Vlab 3 course



Vlab 5 course

VLab 2 | Coastal Currents from Observations



Integrated surface current maps from HF radar, drifters and satellite altimetry using DIVAnd.

- Produces gridded NetCDF surface-current maps by merging HF radar, drifters and altimetry over coastal regions.
- Uses optimisation and validation against independent drifters, then supports Lagrangian trajectories and oil-spill simulations.

HF radar

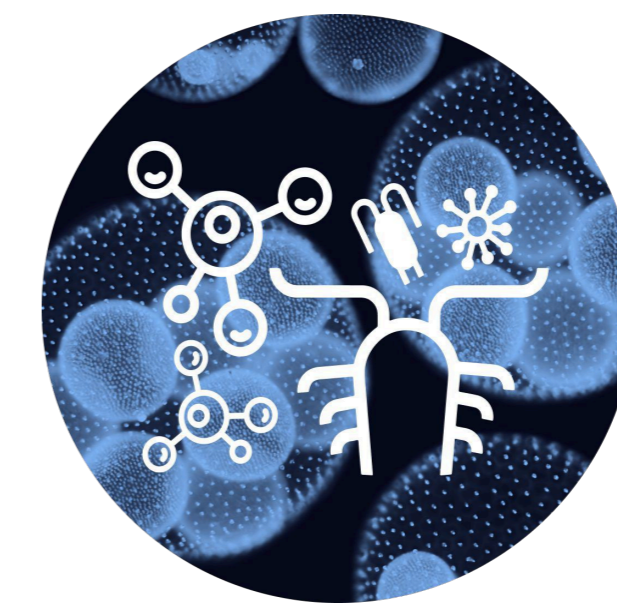
Drifters

Altimetry

DIVAnd

Partners:

VLab 3 | Carbon-Plankton Dynamics



NPZD modelling in carbon units for plankton dynamics and carbon-flow simulations.

- Simulates nutrients, phytoplankton, zooplankton and detritus while tracking carbon flows.
- Provides Jupyter notebooks and an interactive RShiny app using SST, salinity, nutrients, pCO₂, wind and pH forcing.

NPZD

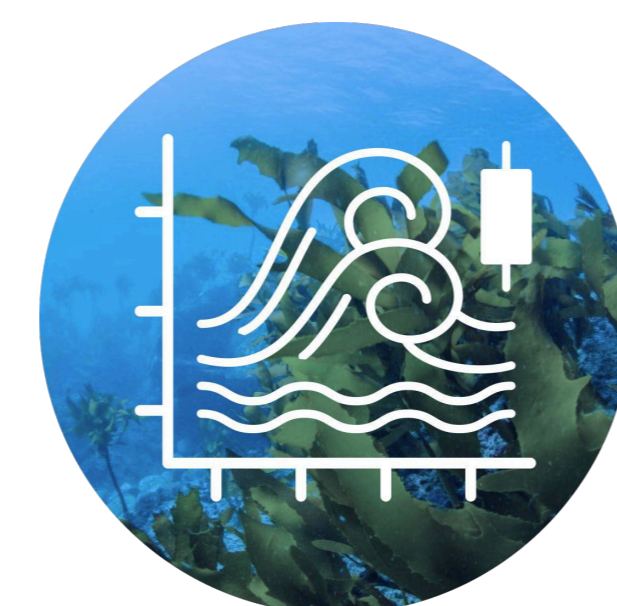
Jupyter Notebook

EDITO

RShiny

Partners:

VLab 4 | Marine Environmental Indicators



Unified indicator workflows for marine environmental assessment and decision support.

- Computes Marine Heatwaves, Ocean Heat Content, TRIX eutrophication and Storm Severity Index v2 via notebooks and a dedicated web application.
- Produces maps, time series and downloadable outputs, with job handling through the VRE Analytics Engine and Cloud Computing Platform.

MHW

OHC

TRIX

SSI v2

Web app

A video tutorial is available on the Blue-Cloud YouTube channel.

Partners:

VLab 5 | Global Fisheries Atlas



Global fisheries knowledge and data services built from authoritative sources.

- Harmonises fisheries data and knowledge sources for graphical interfaces and programmatic access.
- Combines GRSF knowledge services with Global Tuna Atlas workflows, dashboards and web mapping, supported by GitHub, Zenodo DOIs and RStudio/CI environments.

GRSF KB

Tuna Atlas

RStudio

Zenodo DOIs

Partners:

Contributing teams acknowledged in the source text

VLab 1: Instituto Hidrográfico, SOCIB, IEEE

VLab 2: Université de Liège, CMCC Foundation

VLab 3: Flanders Marine Institute, VLIZ, National Institute of Oceanography and Applied Geophysics - OGS

VLab 4: CMCC, INGV, OGS, KNMI, Nubisware

VLab 5: IRD, FORTH, FAO and tuna RFMO / FIRMS data managers

| Blue-Cloud2026 +

Five V Labs, two handbooks and a complete training path for marine research communities.

Reproducible science services

Gateway onboarding

Self-paced learning

