

# From FAIR-EASE to the EOSC Node Data Terra

Alessandro Rizzo, EOSC Node coordinator (IRD)

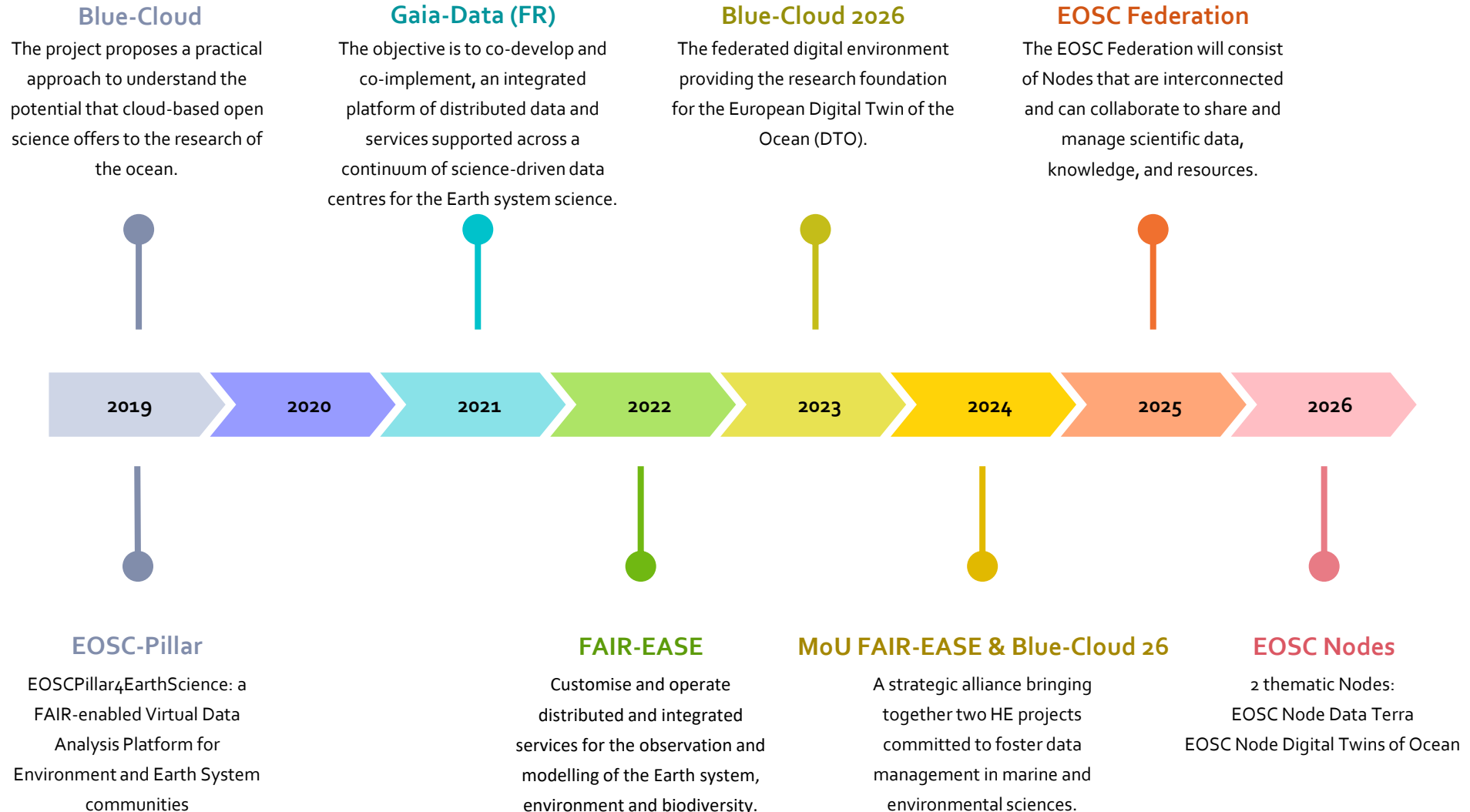
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Erwann Quimbert, Data Terra ODATIS Director (Ifremer)



# Intertwined pathways towards the Federation



# From a national node to a thematic one

34 contributing organisations



# Data Terra RI

The EOSC Node for the Earth system and environmental sciences



Atmosphere



Solid earth



Ocean



Land Surfaces



Biodiversity

# Key contributions to the Federation

## 01 Single access

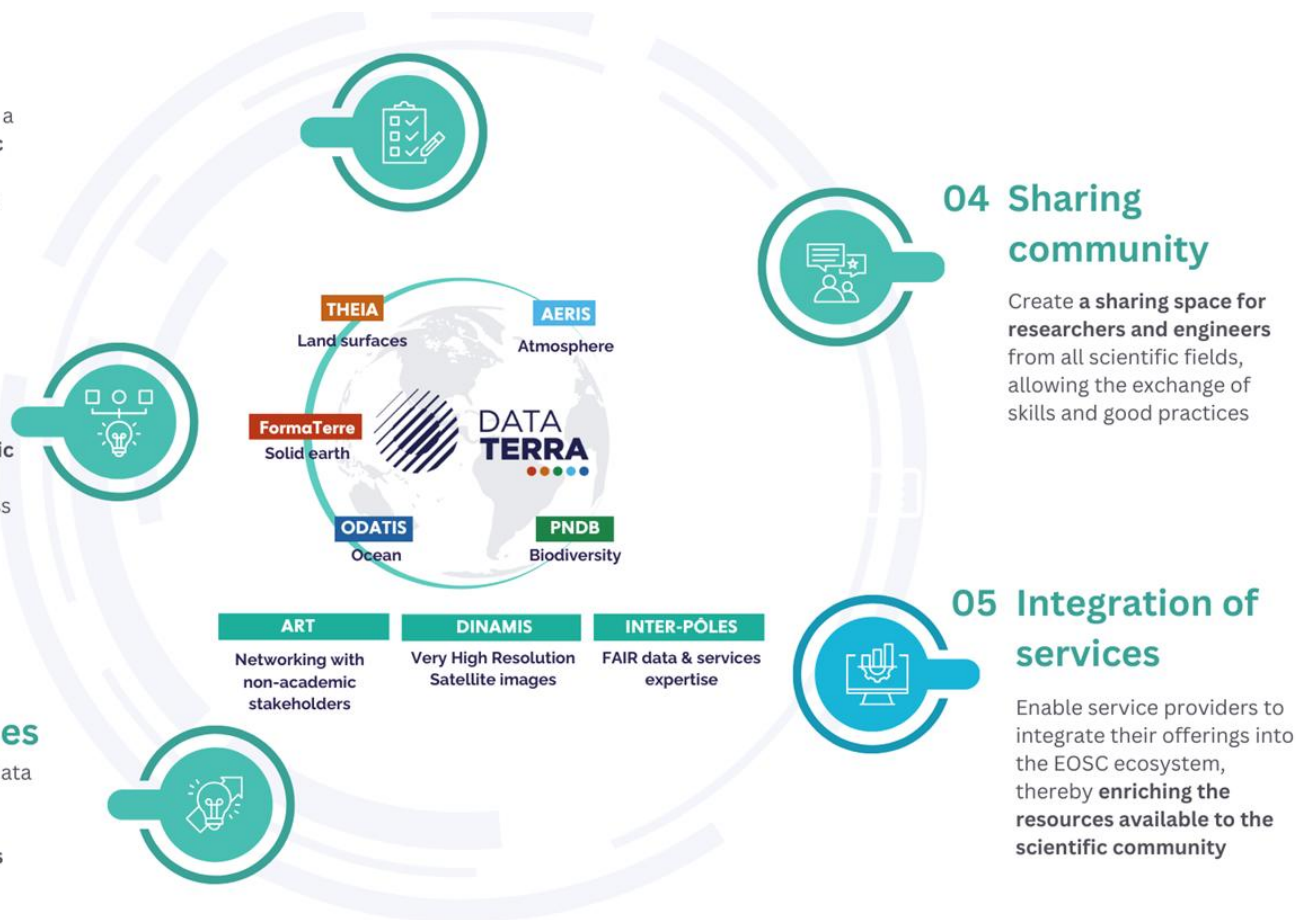
Provide researchers with a single access to **scientific data, services and infrastructure** needed to analyze the data

## 02 Federation of resources

Federate existing **scientific data infrastructures**, currently dispersed across disciplines and Member States

## 03 Collaboration inter-disciplines

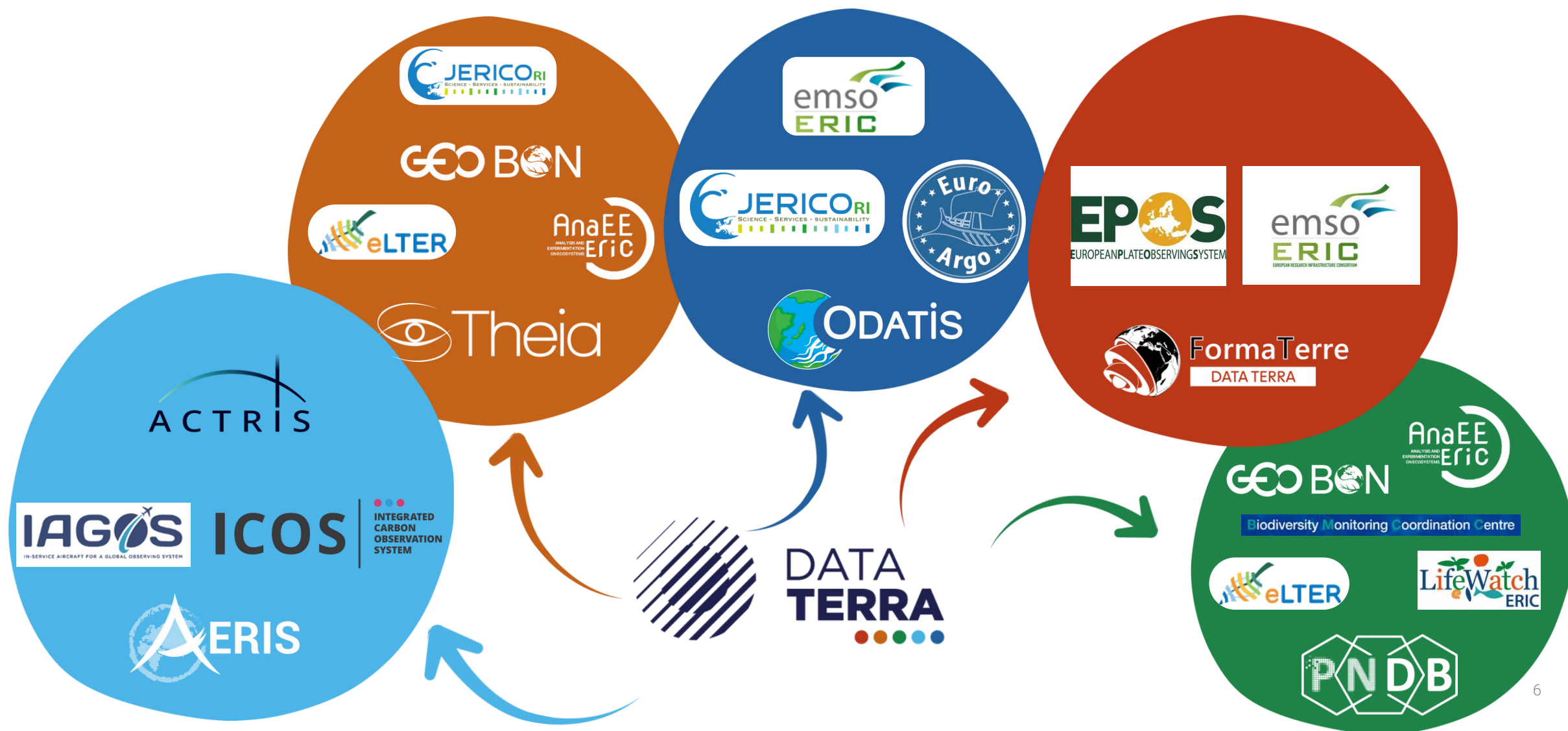
Promote the sharing of data and services **across disciplinary and geographical boundaries**



1. A **seamless access** to high-quality, trusted FAIR and AI-ready multi-domain and multi-source data for the Earth, climate, environment and biodiversity system with rich metadata, semantic interoperability and provenance information.
2. **Cross-domain data analysis** workflows addressing emerging urgent multidisciplinary research challenges in relation to global changes, climate adaptation, extreme events characterisation, loss of biodiversity and societal impacts enhancing the linkages with other Data-Spaces and Data-hubs in Europe and beyond.
3. A **federated layer** towards the environment-oriented Research Infrastructures in coordination, as well as with other European organisations and programs such as Copernicus and Destination Earth.

# Promoting inter-domain collaboration and integration

Collaboration with European research infrastructures





Promoting and facilitating the use of observations made in the ocean or at its interface with other environments

Satellite, in situ, laboratory and modeling data

From the coast to the open sea, from the surface to the ocean floor

Physics, chemistry, biology in the different compartments : Water, Sediment, Biota



Un Océan de DONNÉES

## Data

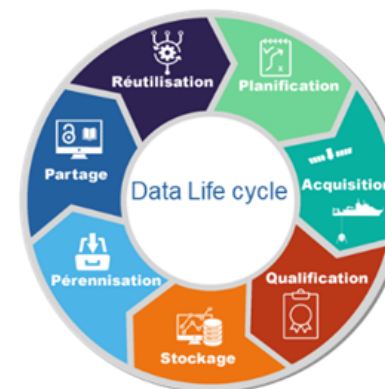
Marine data management applying the FAIR principles: "Findable - Accessible - Interoperable, - Reusable".

## Scientific Expertise

Innovative processing methods and products for all ocean data and its interfaces

## Services and tools

Training workshops, Services for publishing, host, catalog, combine, analyze, process data.





# ODATIS: the Data Terra Ocean data hub

A full range of services

## Storage



ODATIS' IT infrastructure is based on 2 HPC data and computing centres, combining computing resources and storage dedicated to hosting and processing massive amounts of data.

## Warehouse



The SEANOE marine data warehouse and the ODATIS CDS data warehouse enable datasets to be deposited, described, stored, searched and disseminated.

## Catalogue



The ODATIS catalogue harvests several existing catalogues in the CDS, OSU, projects and SEANOE with multidisciplinary data in oceanography, with application of the FAIR principles on metadata.

## Visualization



The ODATIS catalogue on the Sextant interface enables the creation of interoperable display services and interactive thematic maps.

## VRE

Access to virtual research environments with multidisciplinary data and toolboxes for manipulating and exploring multidisciplinary data



## Support and guidance

For data producers and users: organisational and technical support (DMP), support for enriching metadata, harmonising formats, publishing data, FAIRising data, etc.



## Workshops

Technical and thematic workshops for training in good data management practice, getting to grips with tools, sharing feedback, ...



## Webinar

Webinars to promote the activities of the CDS, to share feedback on the use of data and to present useful tools and services to the scientific community.







# ODATIS: the Data Terra Ocean data hub

## Data and Service Centres (DSCs)



*in situ data*

### Biogeochemistry

Dissolved oxygen, carbonate system - CO<sub>2</sub> Marine pH, nutrients, pigments, CDOM, metals, chemical elements and contaminants, isotopes, marine waste, ...



### Marine biology

phytoplankton, zooplankton, benthic habitats, macroalgae, dissolved organic matter, biotoxins, bioinformatics, pathogenic organisms

### Ocean Physics

Salinity, temperature, sea surface height, tides, waves, currents, ice, heat content, optical parameters, turbidity, ...



### Geology

Geomorphology, coastline, bathymetry, sediment flows, sediment cores, mineral resources, etc.

### Meteorology

Surface pressure and wind, radiative flux, ...

A DSC assembles, harmonizes, maintains and makes accessible the data sets for the perimeter for which it is responsible.

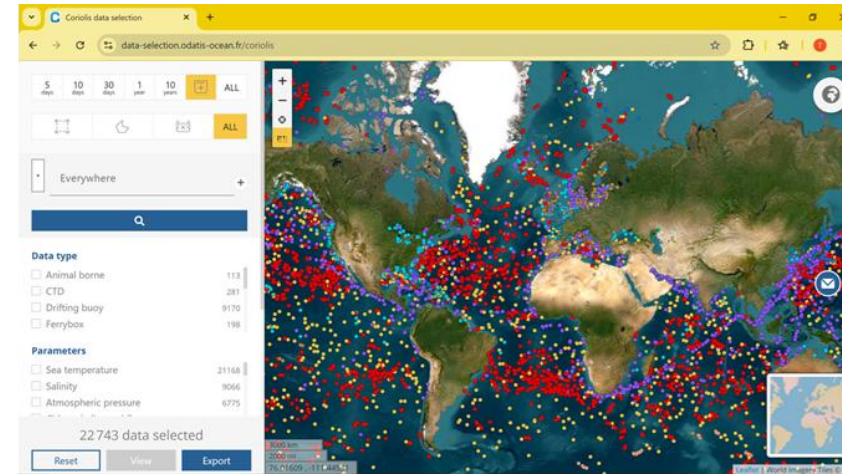
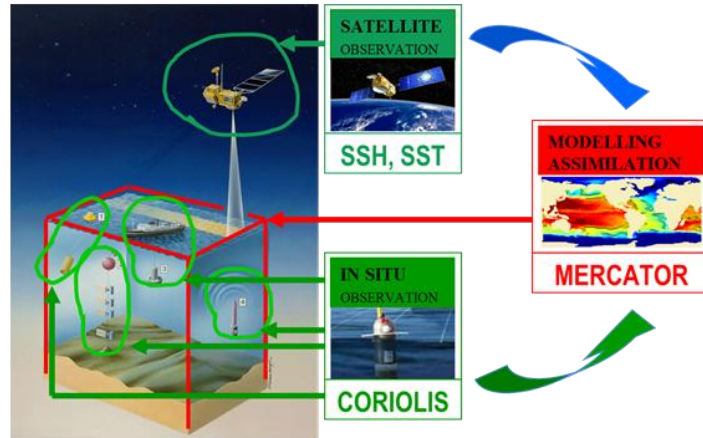
- Data Management
- Storage
- Metadata
- Quality control
- Online access services
- Preservation





# ODATIS: the Data Terra Ocean data hub

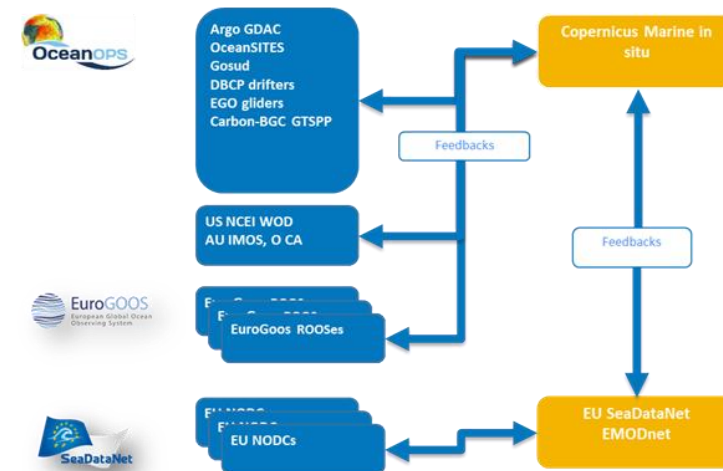
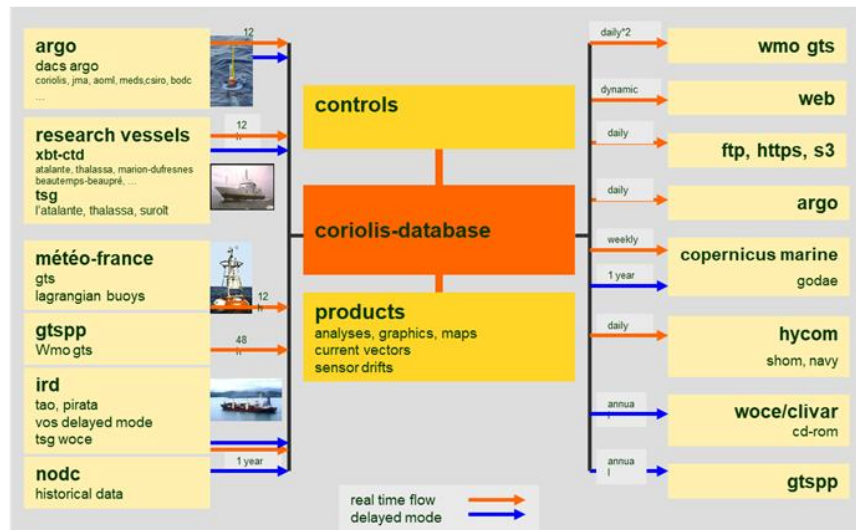
The most european Data and Service Centre: CORIOLIS



The last five days of observations from Coriolis data selection

<https://data-selection.odatis-ocean.fr/coriolis>

Coriolis data flows



CDS-Coriolis major in situ data sources





# ODATIS: the Data Terra Ocean data hub

FrOOS-ODATIS dashboard on French Oceans Observing System

Objective - To set up a dashboard of the French observation systems, showing the various IRs and observation networks (observation points, parameters measured, access to data) and development plans.

## Data selection



<https://data-selection.odatis-ocean.fr/froos>

## Platform catalogue

Platform Code	Platform Name	Platform Type	Model	Research infrastructures & Observation Networks
IF000000	LA Riquet	Fixed buoy, mooring		REPMAR Networks
IF000536	Dieppe	Fixed buoy, mooring		REPMAR Networks
IF000506	Port-Vendres	Fixed buoy, mooring		REPMAR Networks
IF000503	Sète	Fixed buoy, mooring		REPMAR Networks
IF000416	Calais	Fixed buoy, mooring		REPMAR Networks
IF000376	Toulon	Fixed buoy, mooring		REPMAR Networks
IF000375	Saint-Nazaire	Fixed buoy, mooring		REPMAR Networks
IF000374	Saint-Malo	Fixed buoy, mooring		REPMAR Networks

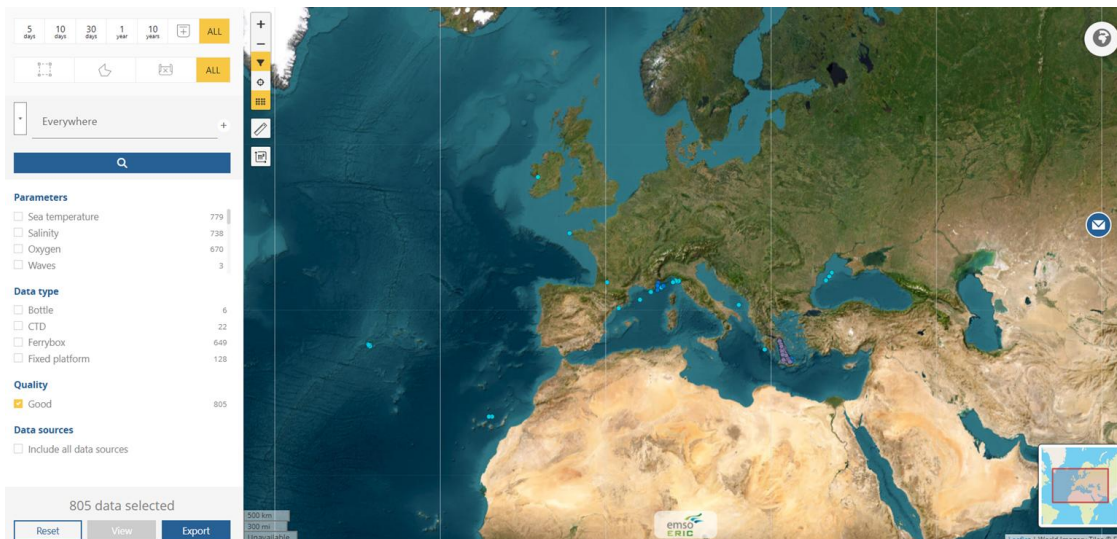
<https://platform.odatis-ocean.fr/froos>



# ODATIS: the Data Terra Ocean data hub

Activities with EMSO ERIC (forecasted actions)

## Data visualization



<https://data-selection.odatis-ocean.fr/emso>

## Data publication in SEANOE

Geochemistry of hydrothermal fluids at the Lucky Strike Hydrothermal Field data from the EMSO-Azores observatory, 2025

DATE: 2025  
 TEMPORAL EXTENT: 2025-09-14 - 2025-09-01  
 AUTHORS: Chantal Valses, Castello Alan  
 AFFILIATIONS: 1 CNRS, GET, UMR5063  
 DOI: 10.17842/2025087  
 PUBLISHER: SEANOE

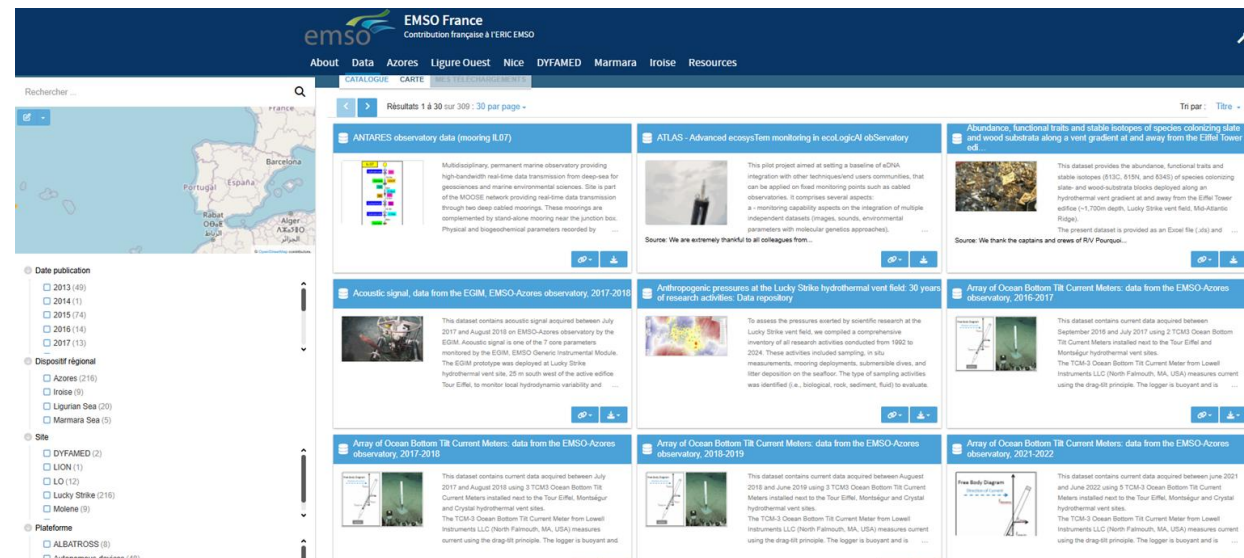
High temperature hydrothermal fluids are collected by gas-tight fluid sampler manipulated and triggered by the hydraulic arm of the submarine vehicle (ROV Nautilus). Several hydrothermal vents are sampled, namely: Azores, Eiffel tower, Montserrat, Isabel, Sintra, Y3, White Castle, Cyprus, South Crystal, Crystal, Capelinhos, Roldan.

Several chemical analyses are performed aboard the research vessel, such as salinity and density by refractometer. Conductivity, salinity and total dissolved solid (TDS) by electrode (standard solution at 143 µS/cm), pH and Eh by electrode (pH standard 4.01 and 7.0 standard solution at 220mV), iron concentration by photometer (up to 5 ppm), H2S and total S concentrations measured by electrode (Aqua45, amperometric method) at measured pH value.

DISCIPLINES: Environment, Chemical oceanography  
 PARAMETERS: Alkalinity, acidity and pH of the water column; Dissolved metal concentrations in the water column; Salinity of the water column; Density of the water column; Temperature of the water column; Water body radiochemical; thermometer, pH sensor, redox potential sensors, spectrophotometers, refractometers  
 DEVICES: Mid-Atlantic Ridge, EMSO-Azores, hydrothermal fluids, Lucky Strike, geochemistry, MONTAGUT 2025  
 LOCATION: 37.28N, 37.28E, -32.27E, -32.27W



## Data catalogue in progress



## OSO ontology

OSO (Observatories of Seas Ontology) provides a semantic framework to describe marine research infrastructures, with a focus on deep-sea observatories operated by EMSO-ERIC and national nodes like EMSO-France.

<https://earthportal.eu/ontologies/OSO>

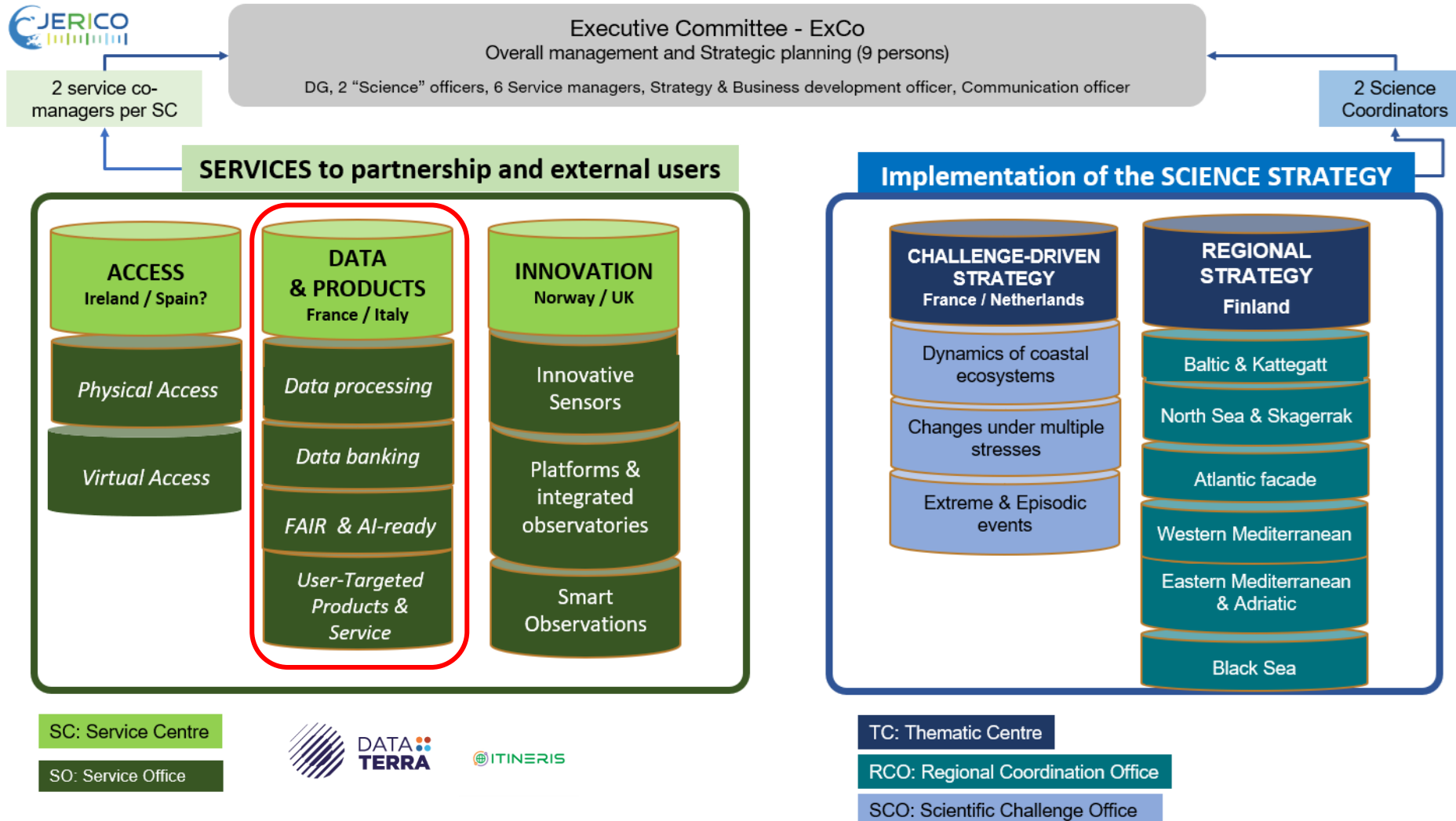
<https://github.com/emso-eric/oso-ontology>



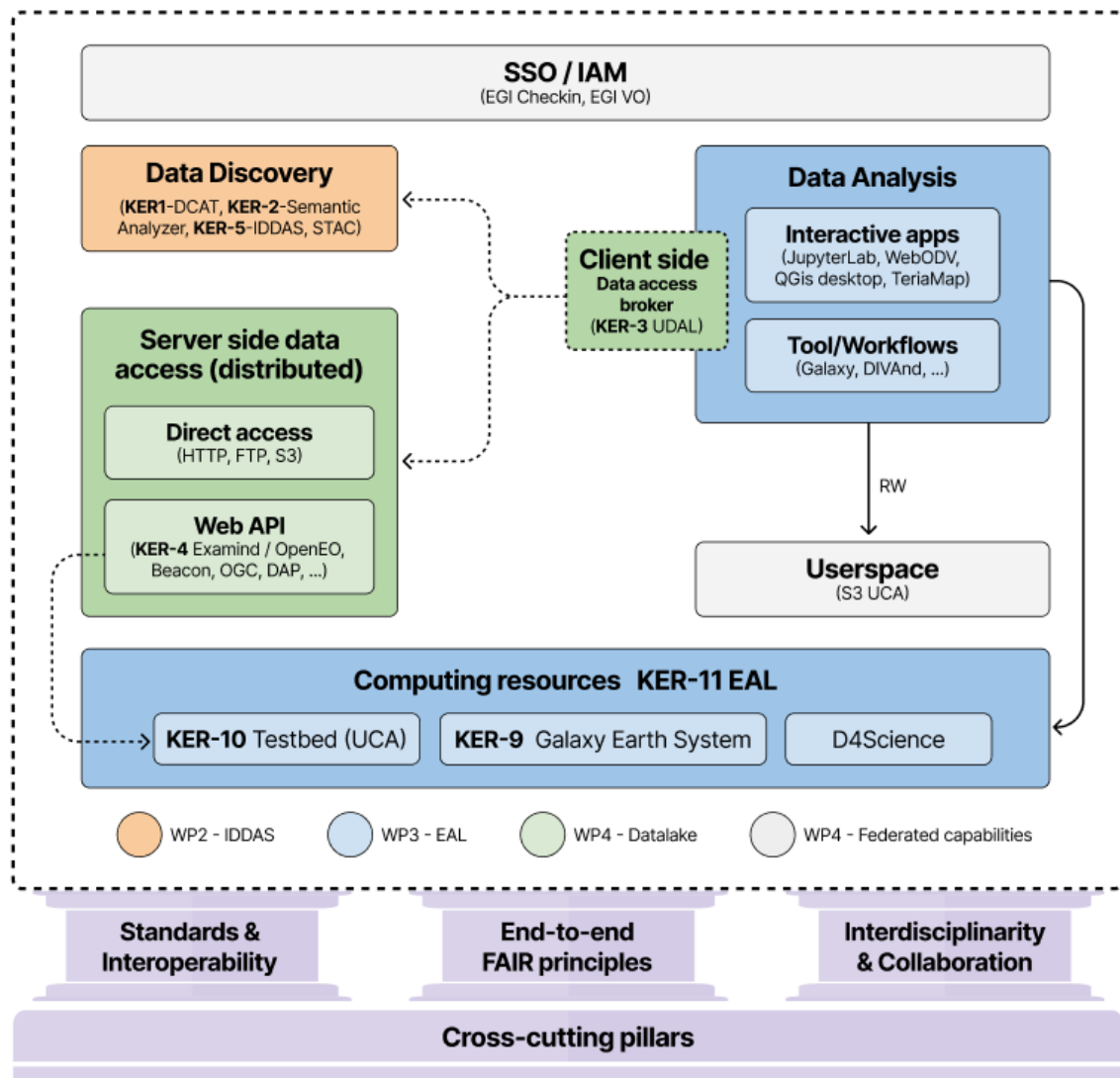


# ODATIS: the Data Terra Ocean data hub

Activities with JERICO RI - Data Terra co-lead with ITINERIS of the Data and products Service Center



## How FAIR-EASE paves the way to the EOSC Node Data Terra



### Data Discovery

**IDDAS (Interdisciplinary Data Discovery and Access Service)** Semantically enriched metadata catalogue based on a customised DCAT-AP profile, enabling seamless data discovery and access across domains and platforms, both for human and machine.



### Data Access

**High-performance subsetting** with S3/ARCO/STAC/OpenEO, and Beacon.

**UDAL (Uniform Data Access)** Innovative client-side layer that decouples data functionality from its source and format, reducing technical complexity and enhancing flexibility.



### Data Analysis

**Interactive applications** : interactive notebooks, Galaxy, WebODV

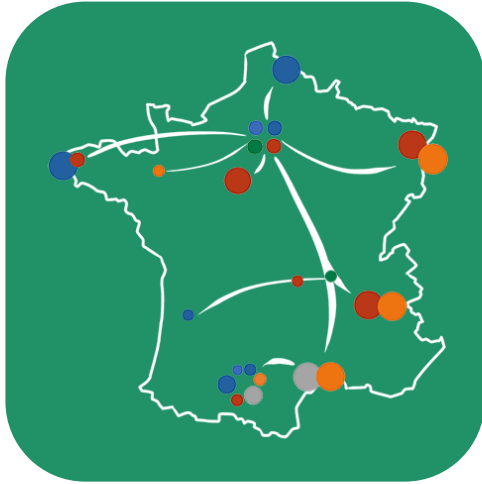
**EAL (Earth Analytics Lab)** Integrated e-infrastructure providing tools for data processing and visualisation, supporting collaborative research. Federated capabilities allows to move from one EAL to another.

### In close collaboration with Real-life use cases

Coastal Water Dynamics, Ocean BGC, Volcplume, Marine Omics, Earth Cirtical Zone, Hunga Tonga

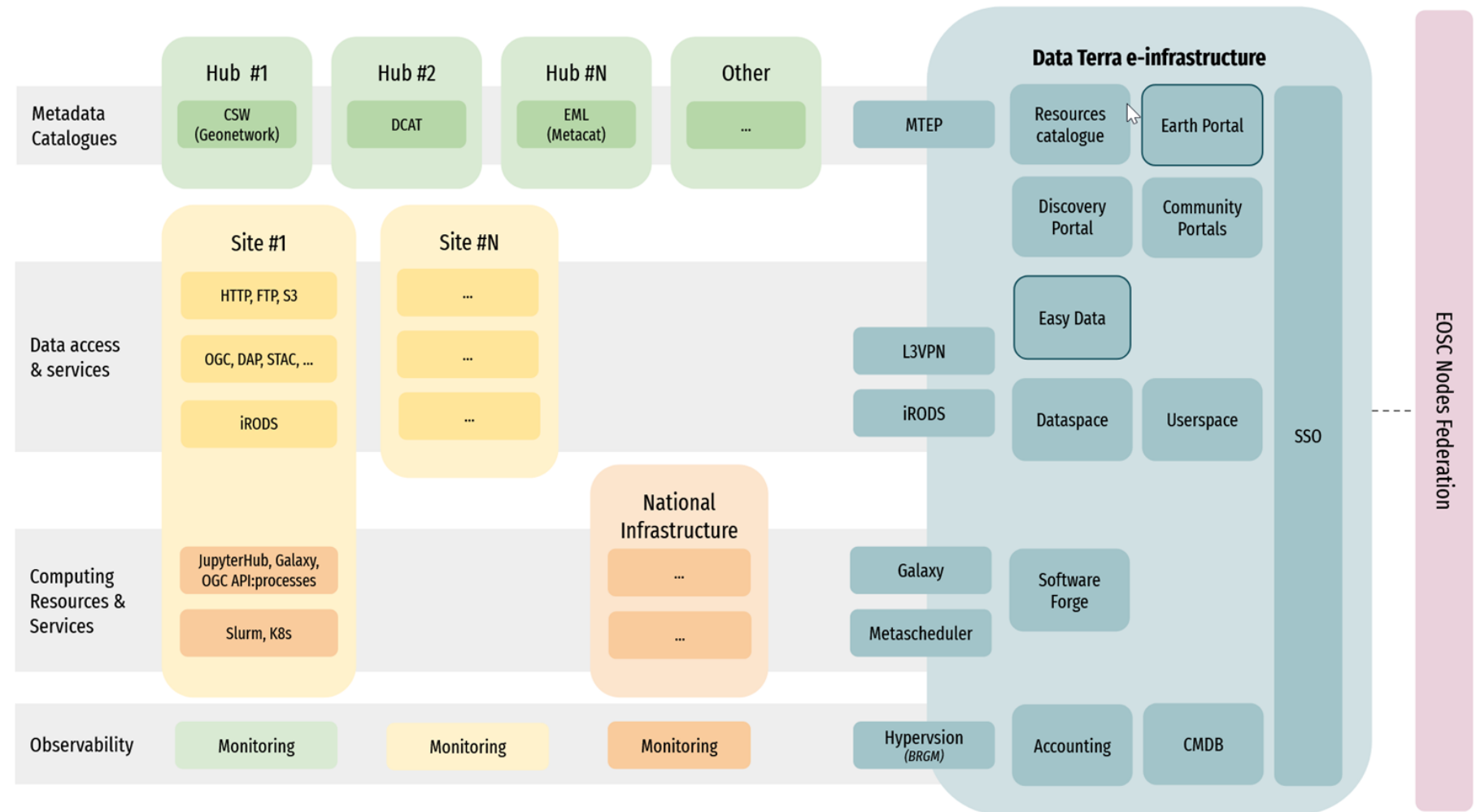
# To Data Terra e-infrastructure

Distributed and federated infrastructure, with shared services

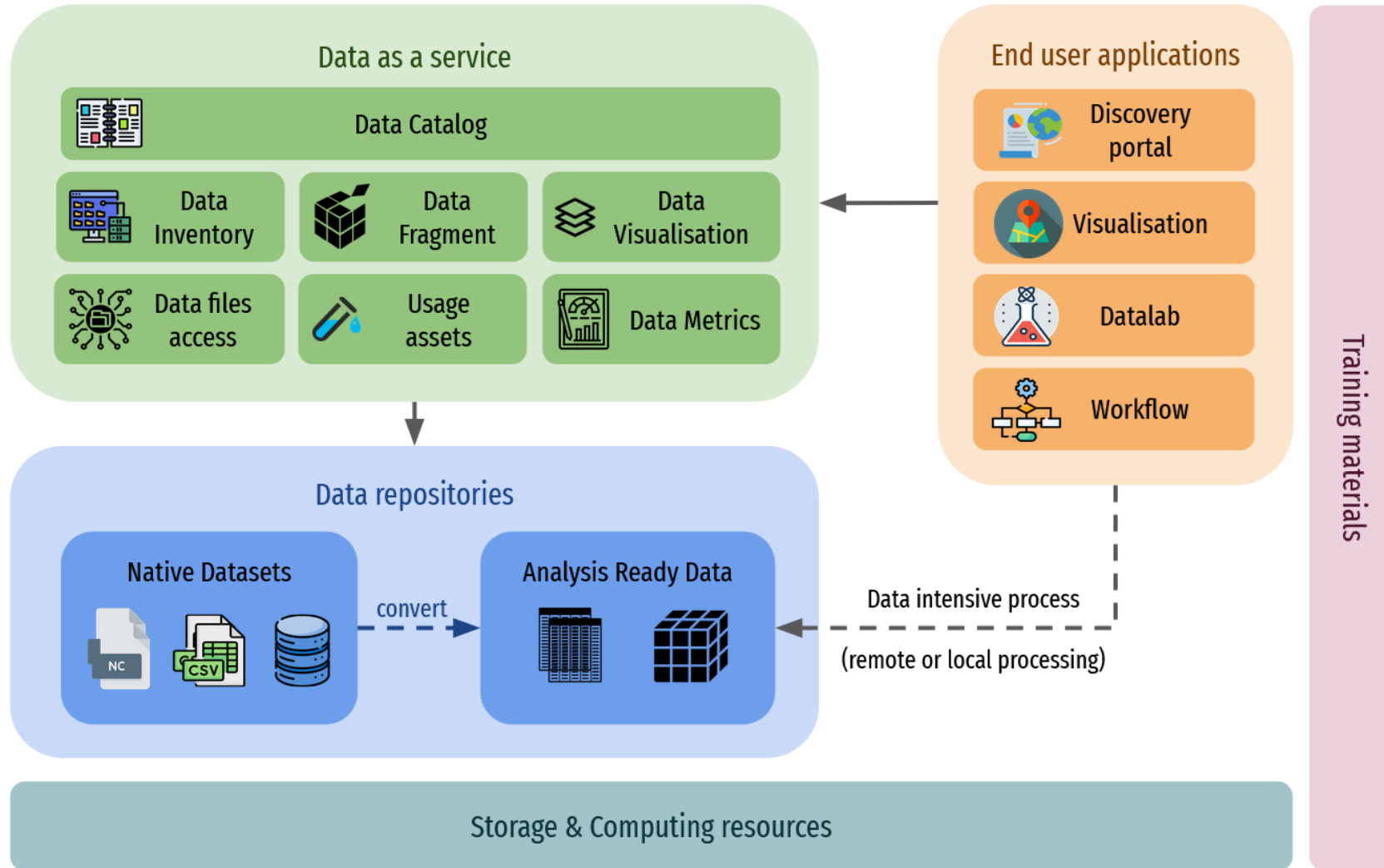


**Relying on existing, interconnected and reinforced storage and computing capacities.**

**Distributed services with new capabilities and functionalities to facilitate seamless and continuous cross-fertilisation and exploitation.**



# Towards Data As a Service



## Managing data as a software

- Track changes as with git
- Check the quality, performance, security, etc.
- Provide documentation : user manual, examples of use with notebooks, etc.

## Meeting user expectations

- Discover data collections
- Download raw files
- Retrieve a data fragment
- [Pre]Visualise

## Simplified use

- Hide technical stuff
- Interoperability
- Integrated in analysis platforms
- Compatibility with big data and AI techniques



EOSC

FAIR-EASE

Building Interoperable Earth Science & Environmental Services

EOSC Node

Data Terra

Environment

