GRACE collaboration and synergies with LifeWatch ERIC

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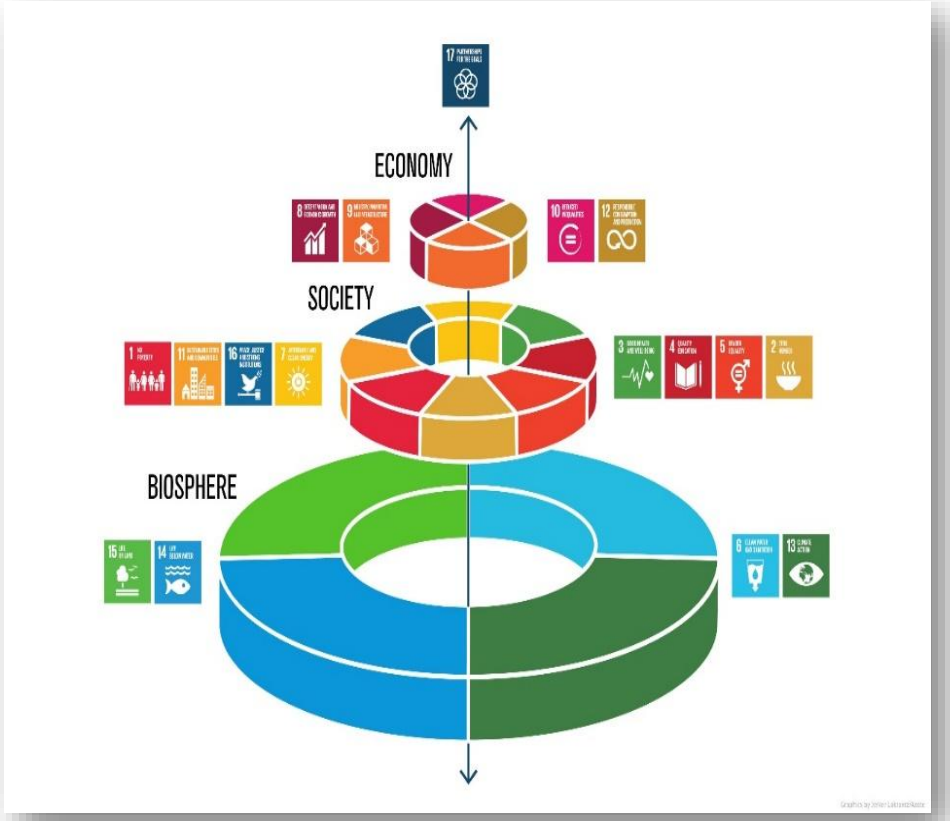
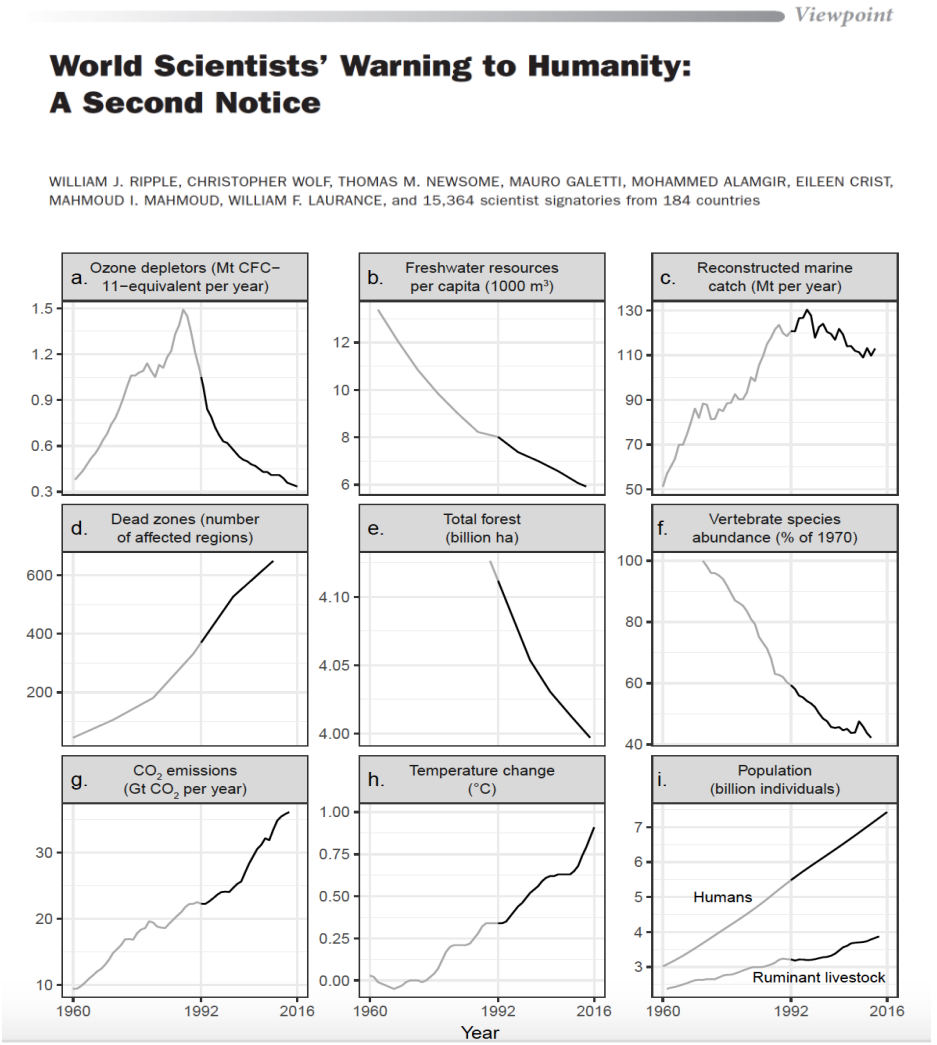
LifeWatch ERIC

Workshop: GRACE collaboration and synergies with International Organizations and Research Infrastructures
Chania, 9th October, 2025

The Sustainability challenge

The **Biosphere** is changing **fast** and is challenging our **adaptability** to **change**

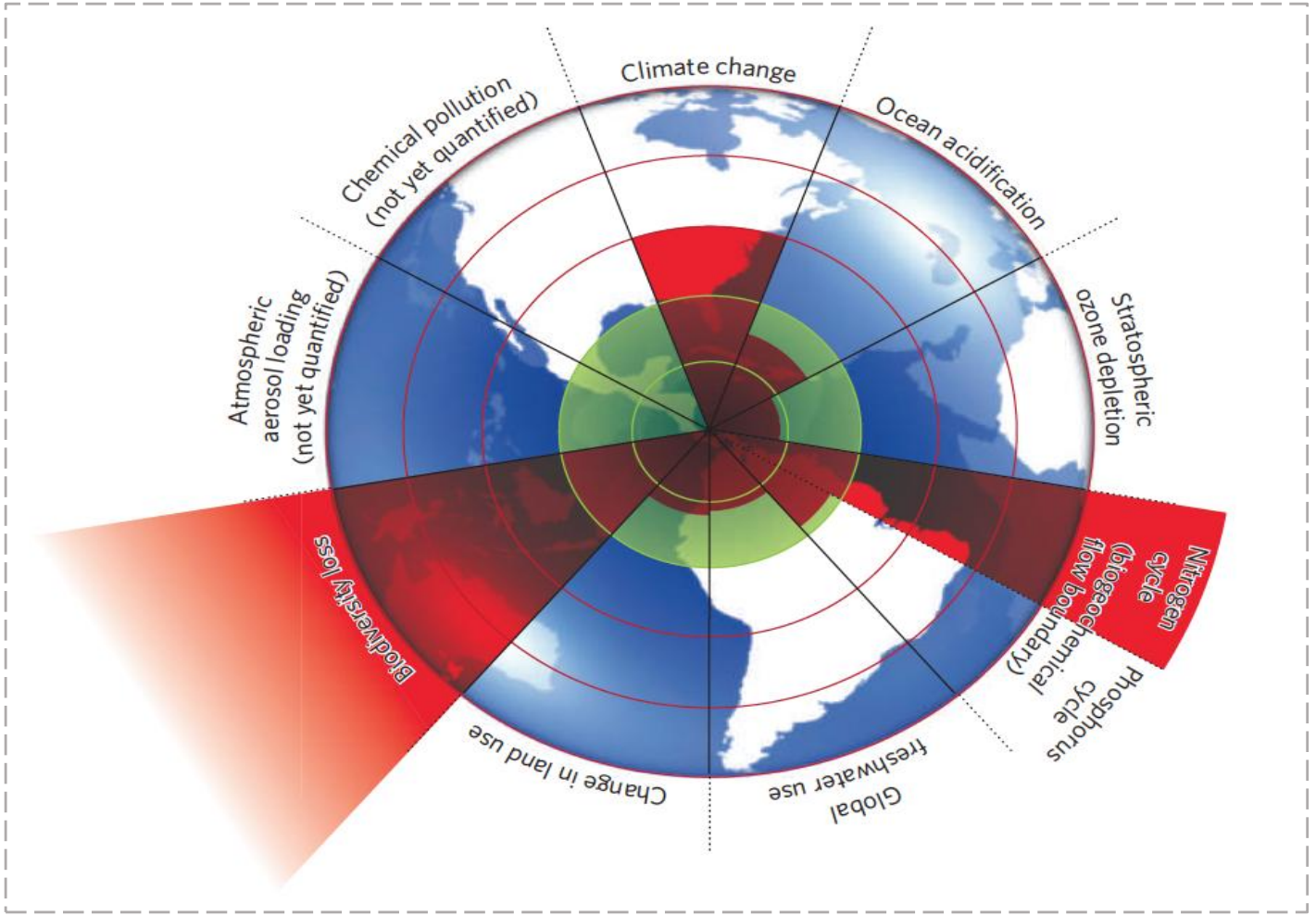




Ripple et al.2017, BioScience

The Sustainability challenge

… and some key **Biosphere components** have already been brought **outside** their **sustainability limits**.



Major drivers of change

OVERHARVESTING

CLIMATE CHANGE

CHEMICAL POLLUTION & EUTROPHICATION

INVASION OF EXOTIC SPECIES

PHYSICAL ALTERATIONS

Data-hungry nature of PGR for food security & climate resilience

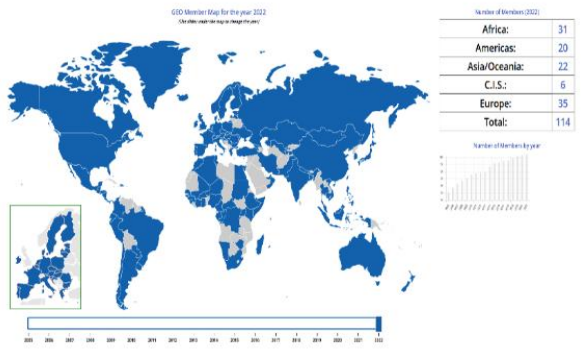
Tackling key challenges — like developing climate-resilient crops and securing future food systems — relies on **analysing vast, heterogeneous and high-quality data** to guide **robust, evidence-based decisions**

Data collection → Data aggregation → Data analyses → Data Visualization → Knowledge Transfer

Geospatial Data

GROUP ON EARTH OBSERVATIONS

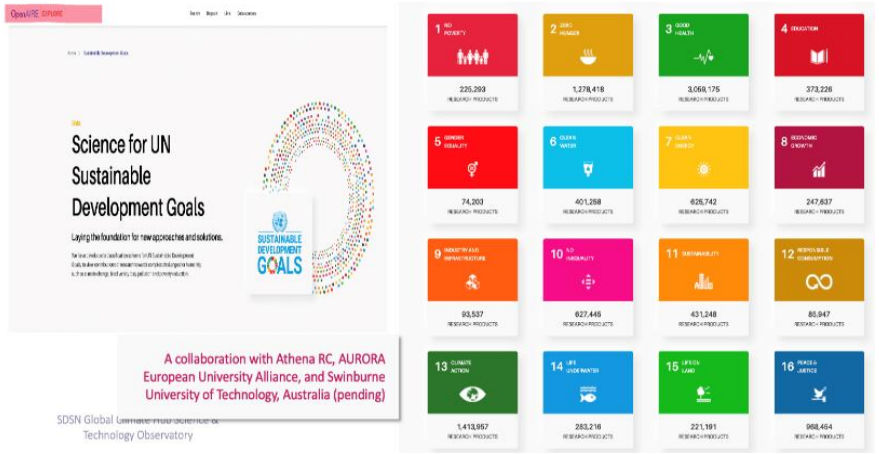
GEO is a partnership of more than 100 national governments and in excess of 100 Participating Organizations that envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.



Africa:	31
Americas:	20
Asia/Oceania:	22
C.I.S.:	6
Europe:	35
Total:	114

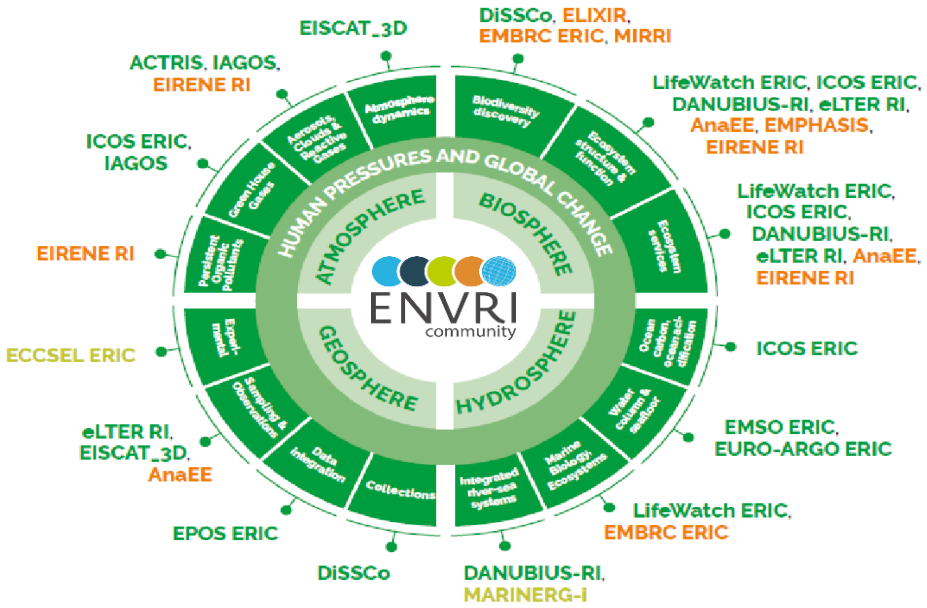
- Biodiversity and Ecosystem Sustainability
- Disaster Resilience
- Energy and Mineral Resource Management
- Food Security and Sustainable Agriculture
- Public Health Surveillance
- Infrastructure and Transport Management
- Sustainable Urban Development
- Water Resources Management

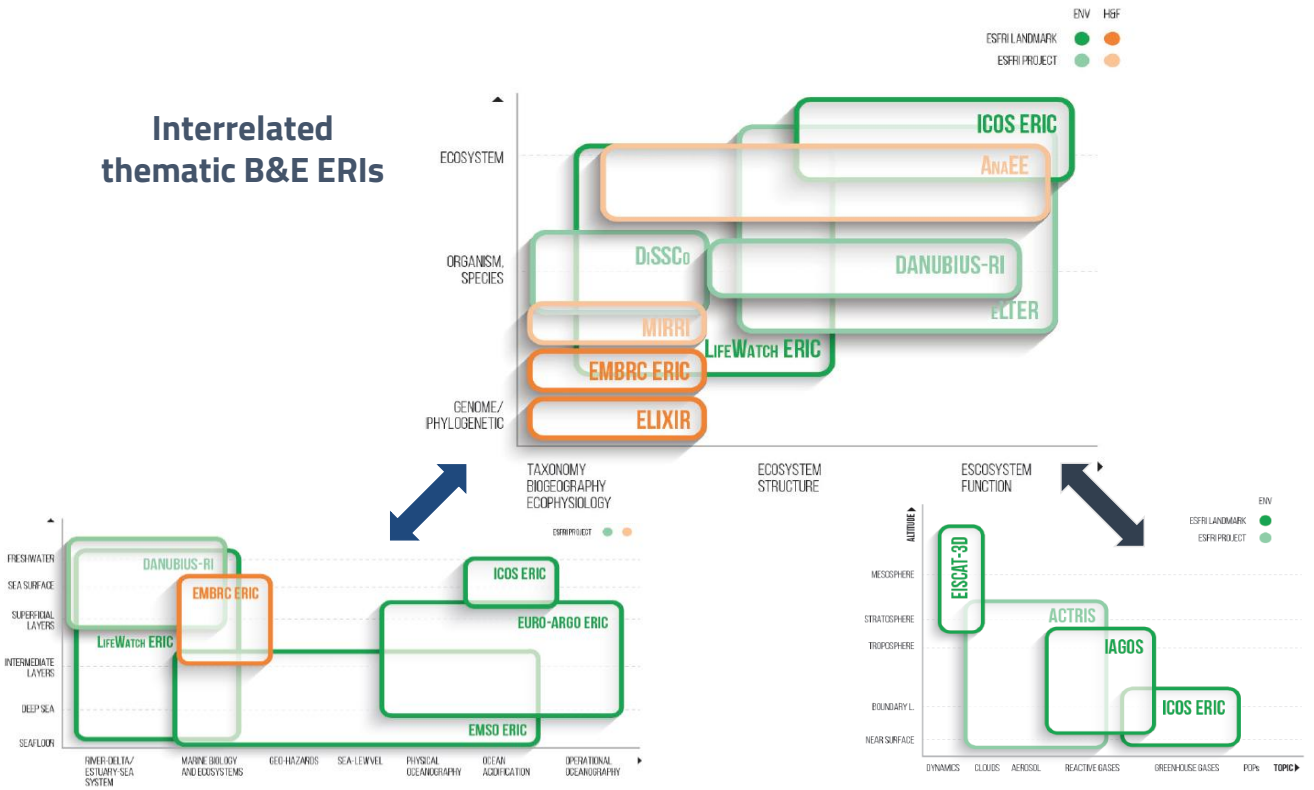
Socio-Economic and General SDGs-related data



European Research Infrastructures landscape

European Research infrastructures provide **data access, computational and support services** from four domains of the Earth System. They work together to make their data, services and infrastructures interoperable and harmonized

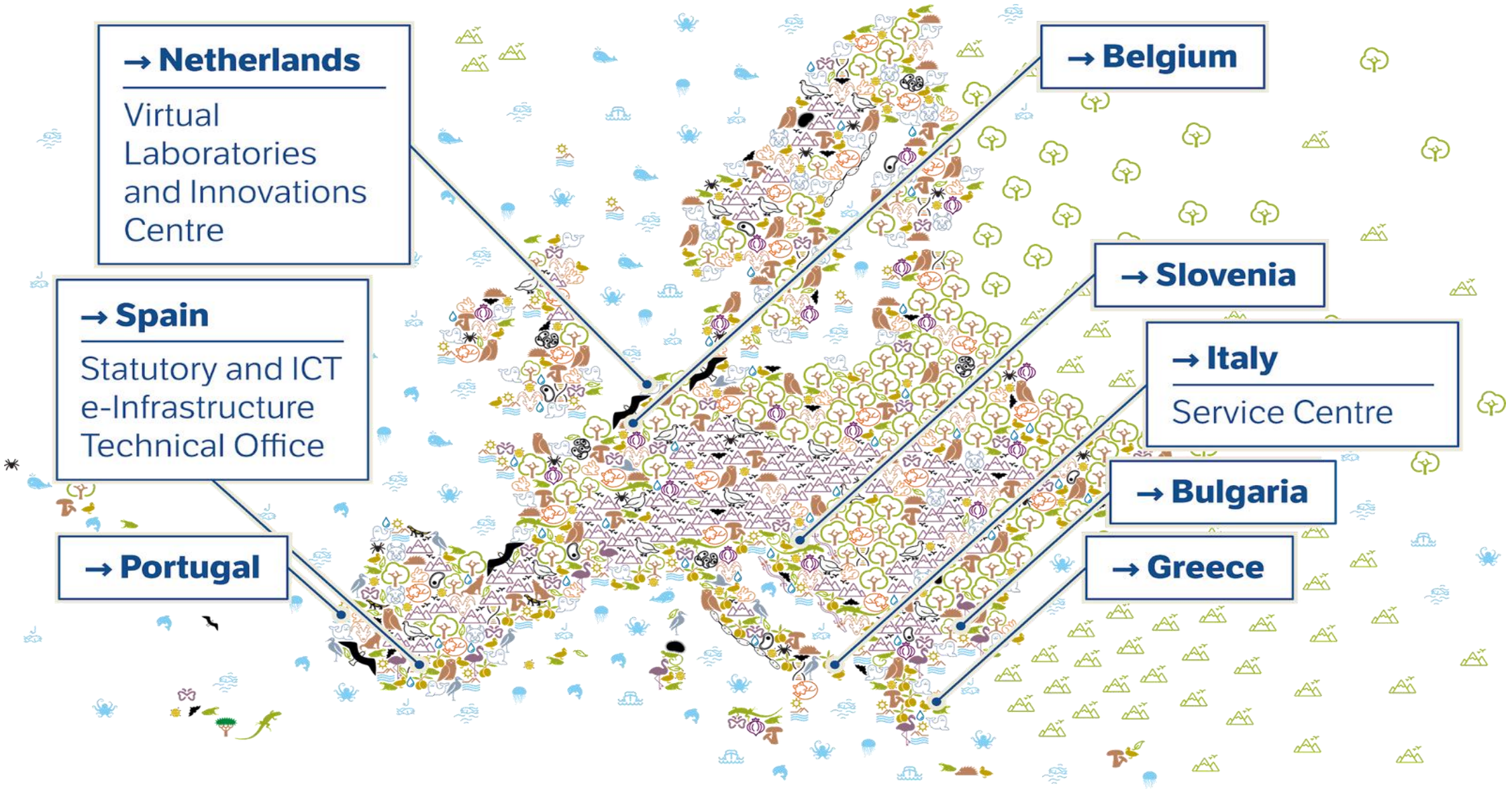




What is LifeWatch ERIC?

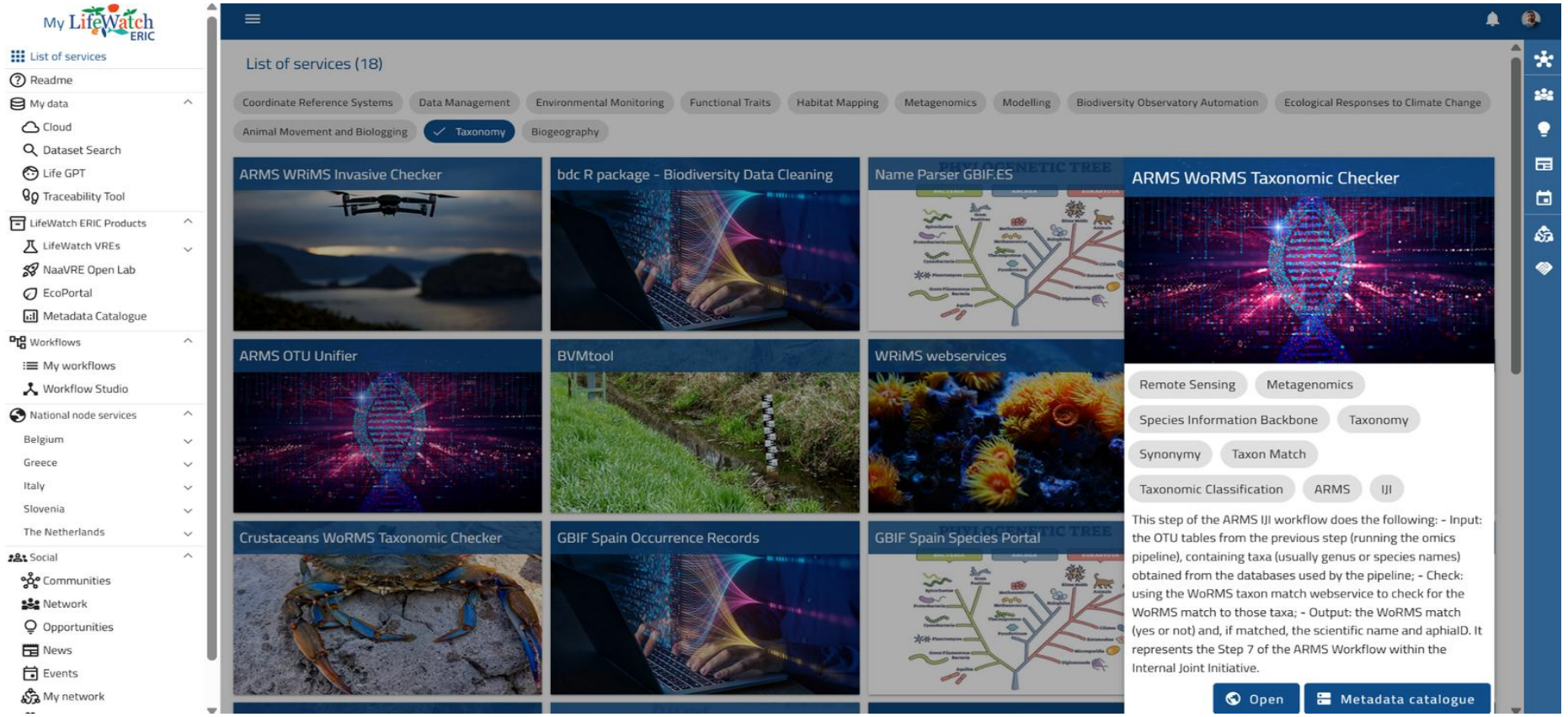
LifeWatch ERIC is a European Research Infrastructure Consortium providing **e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services** in order to support society in addressing key planetary challenges

What is LifeWatch ERIC?



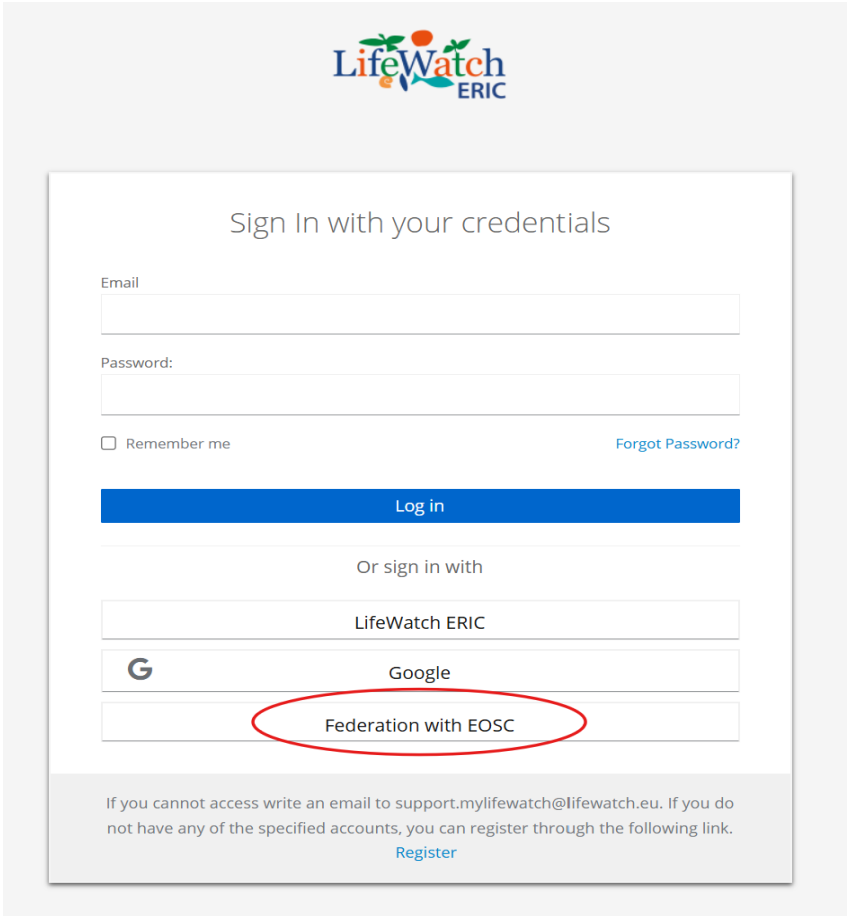
Findable and Accessible services : MyLifeWatch

A single, user-friendly access portal where all the services provided by LifeWatch ERIC and its collaborating infrastructures can be found.



Findable and Accessible services : MyLifeWatch

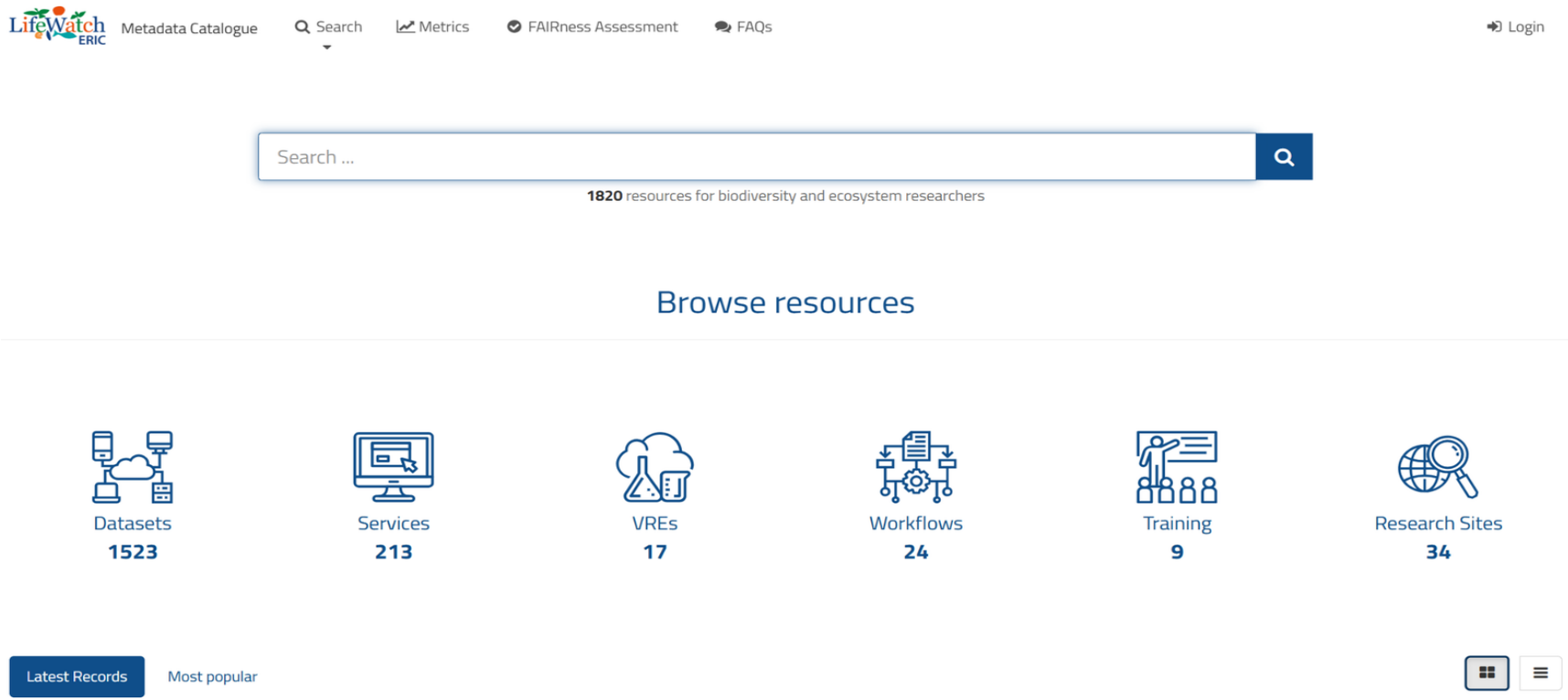
EUROPEAN OPEN SCIENCE CLOUD



https://my.lifewatch.eu

Findable and Accessible services : LifeWatch metadata catalogue

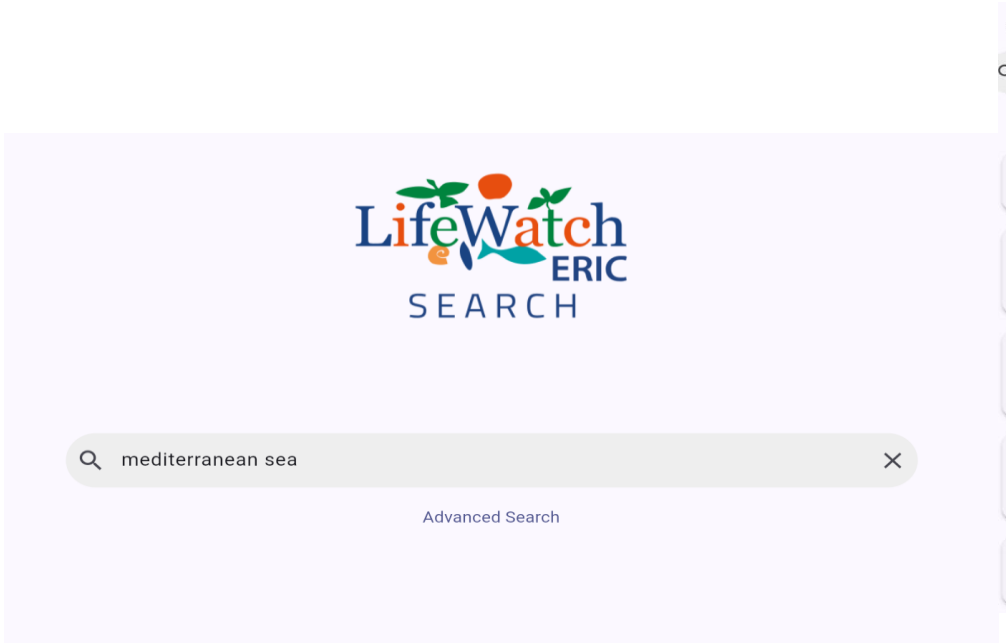
A portal where metadata from all LifeWatch services can be found, following a common metadata standard.

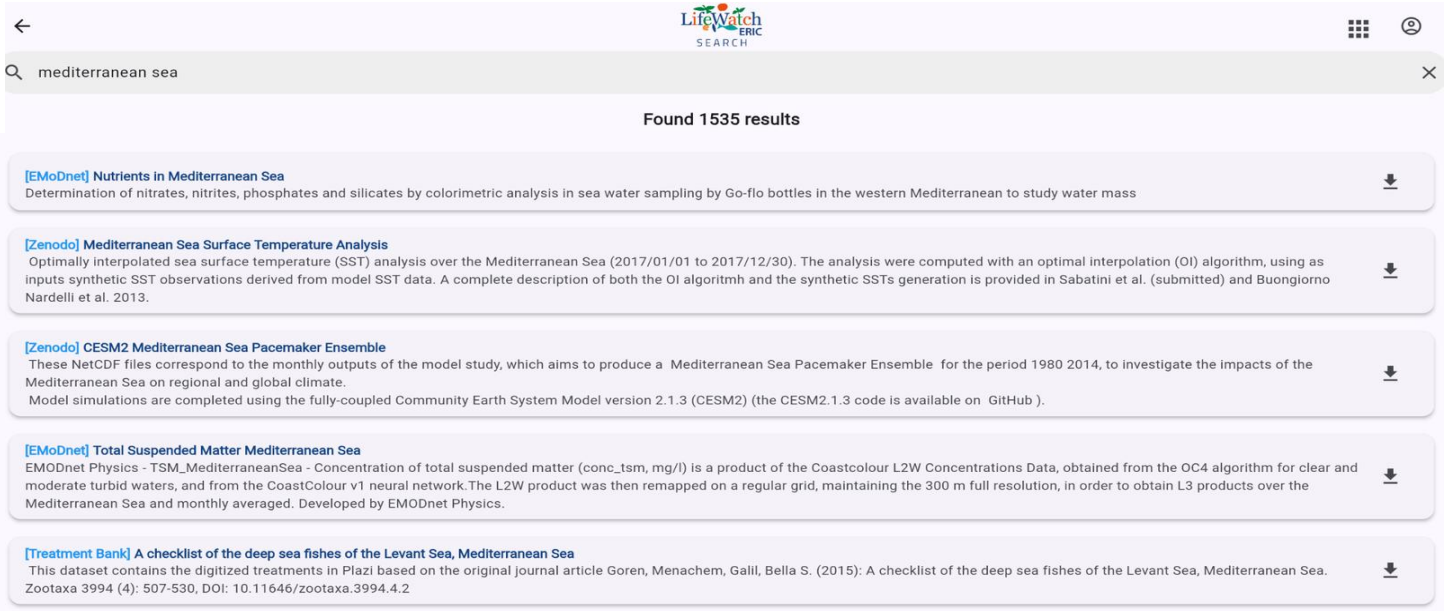


https://metadatacatalogue.lifewatch.eu

Findable and Accessible services : LifeWatch Search Engine

A search tool to find and access harmonized metadata from datasets provided by more than 15 infrastructures and data aggregators.



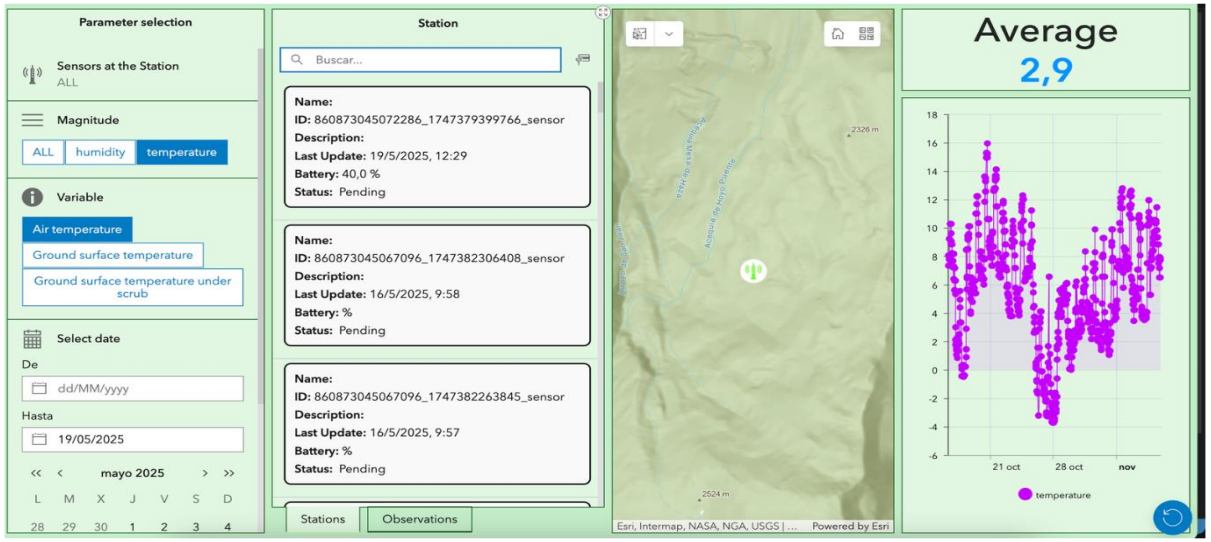


https://search.lifewatch.eu

Interoperable services and data : IoT Monitoring Automation with LifeWatch ERIC dataloggers

LifeWatch ERIC has manufactured its own dataloggers to address the main issues that arise when developing Environmental Monitoring Systems.

LifeWatch ERIC provides a complete, plug-and-play solution that includes the necessary infrastucture to ensure the data lifecycle—from measurement, persistence, and metadata management to visualization and interoperability—is accurate and efficient.



LifeSensors

LifeSensors, a management platform that allows:

The administration of the dataloggers, enabling their assignment to scientific teams.

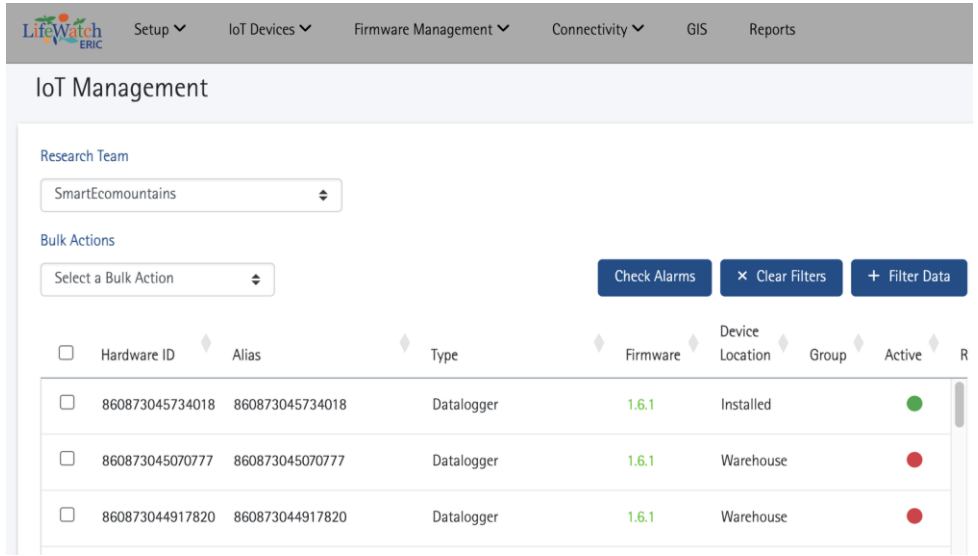
It provides remote access to the dataloggers, ensuring continuous control over their operation.

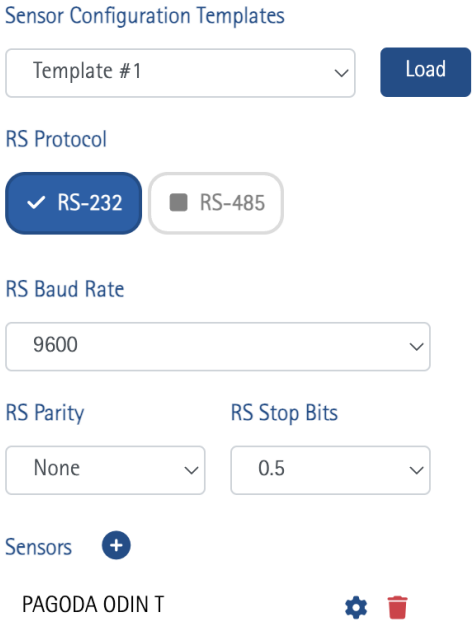
It facilitates the replication of scientific experiments:

Setting up new dataloggers is quick and easy, requiring only a few clicks.

The configuration of working sensors is offered to the community and can be reused in any datalogger.

Datalogger templates are also offered.

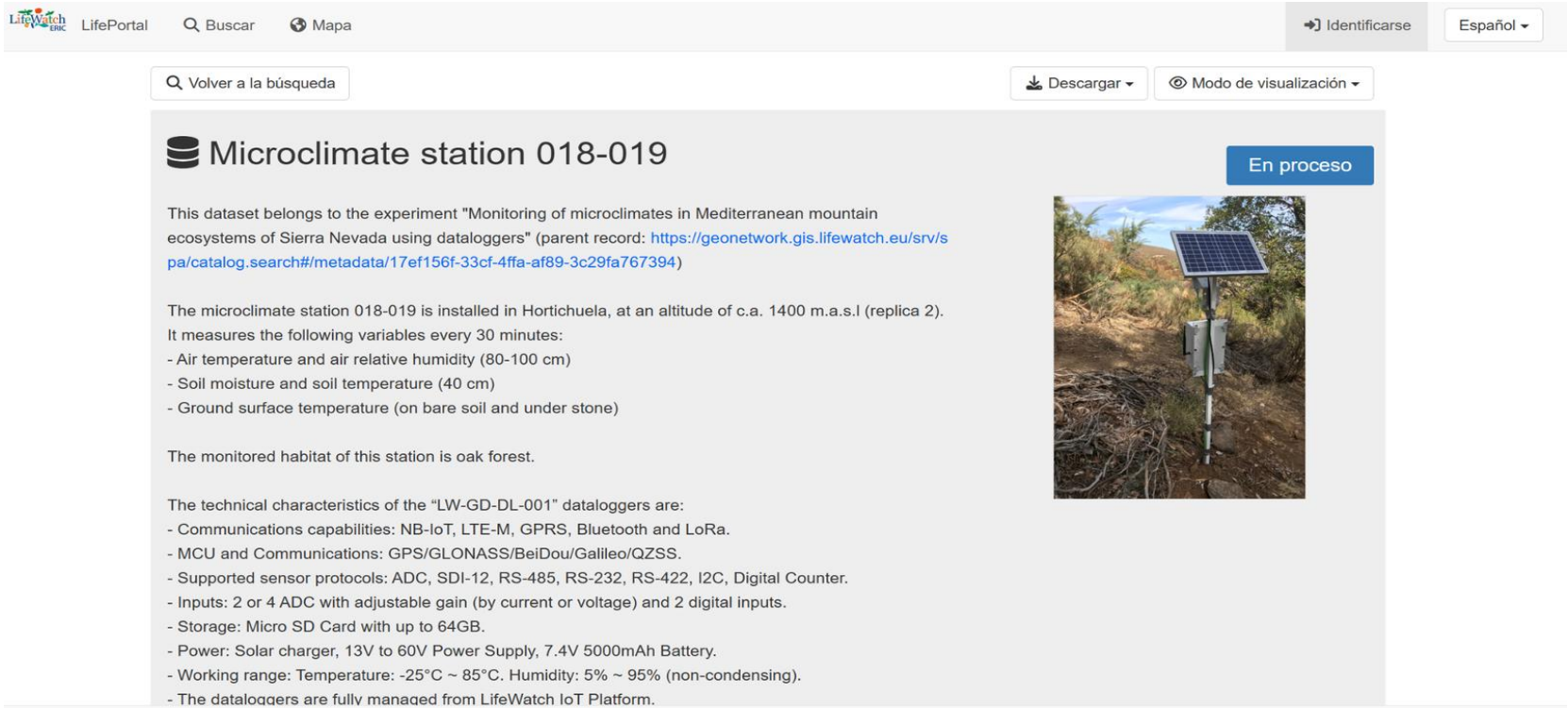


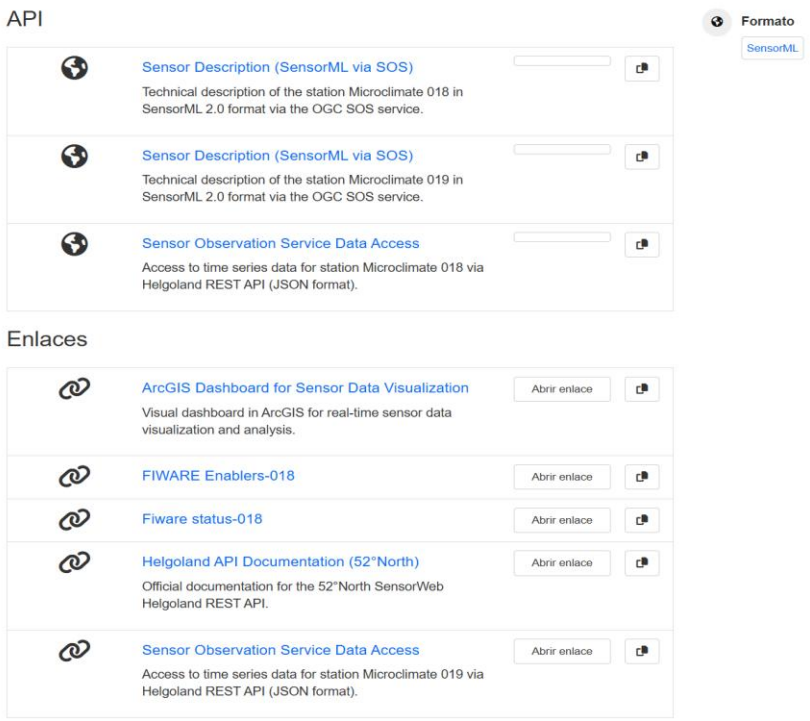


https://lifesensors.iot.lifewatch.eu

LifePortal

A metadata catalogue integrated with LifeSensors that enables the identification, description, location, and structured access to collected data.

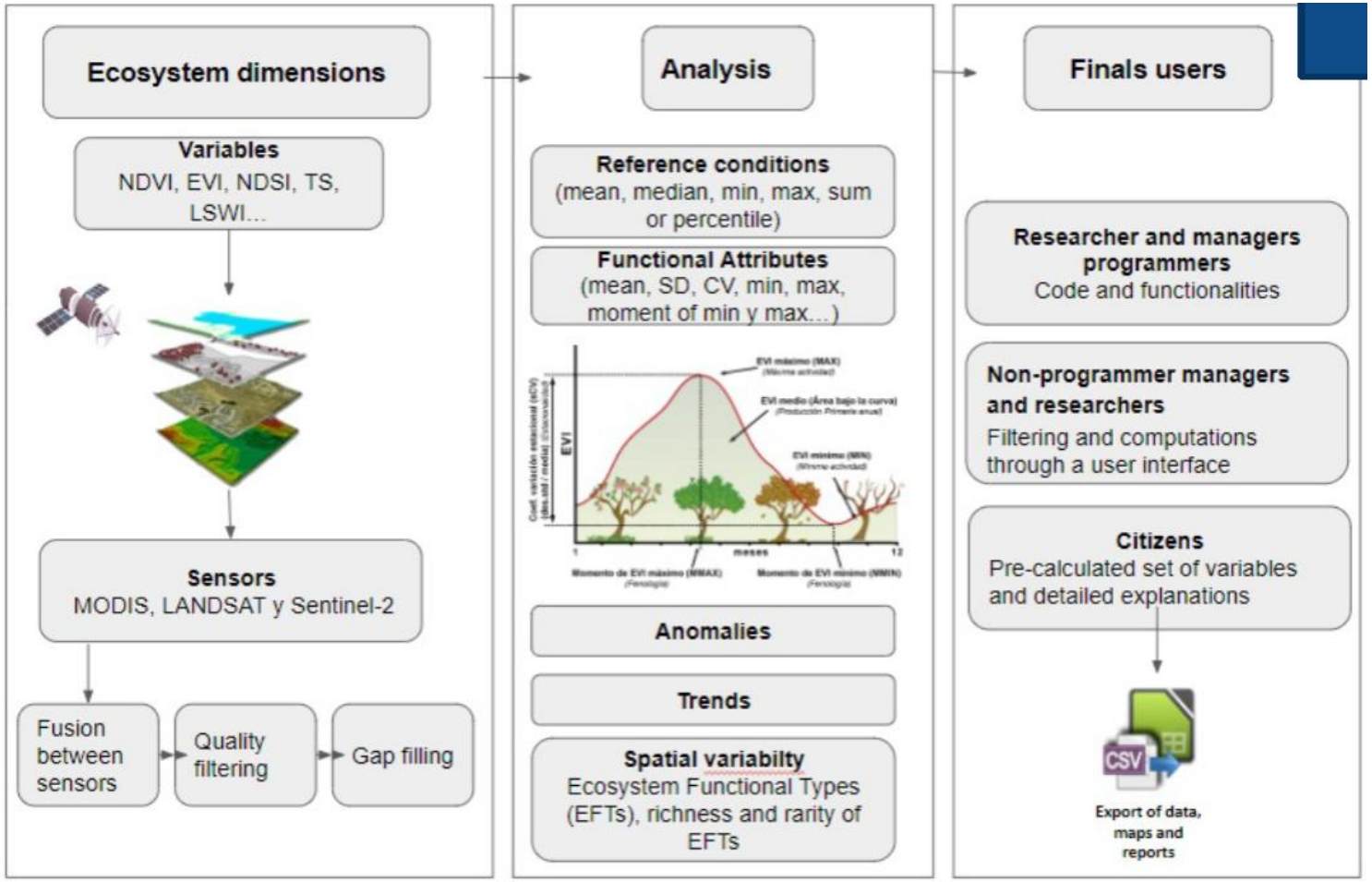




MonitorEO tool

A system for **monitoring changes in essential biodiversity and climate variables related to ecosystem functioning** (**nutrient cycle – aerosol inputs-**, primary production, soil moisture, snow cover, etc.).

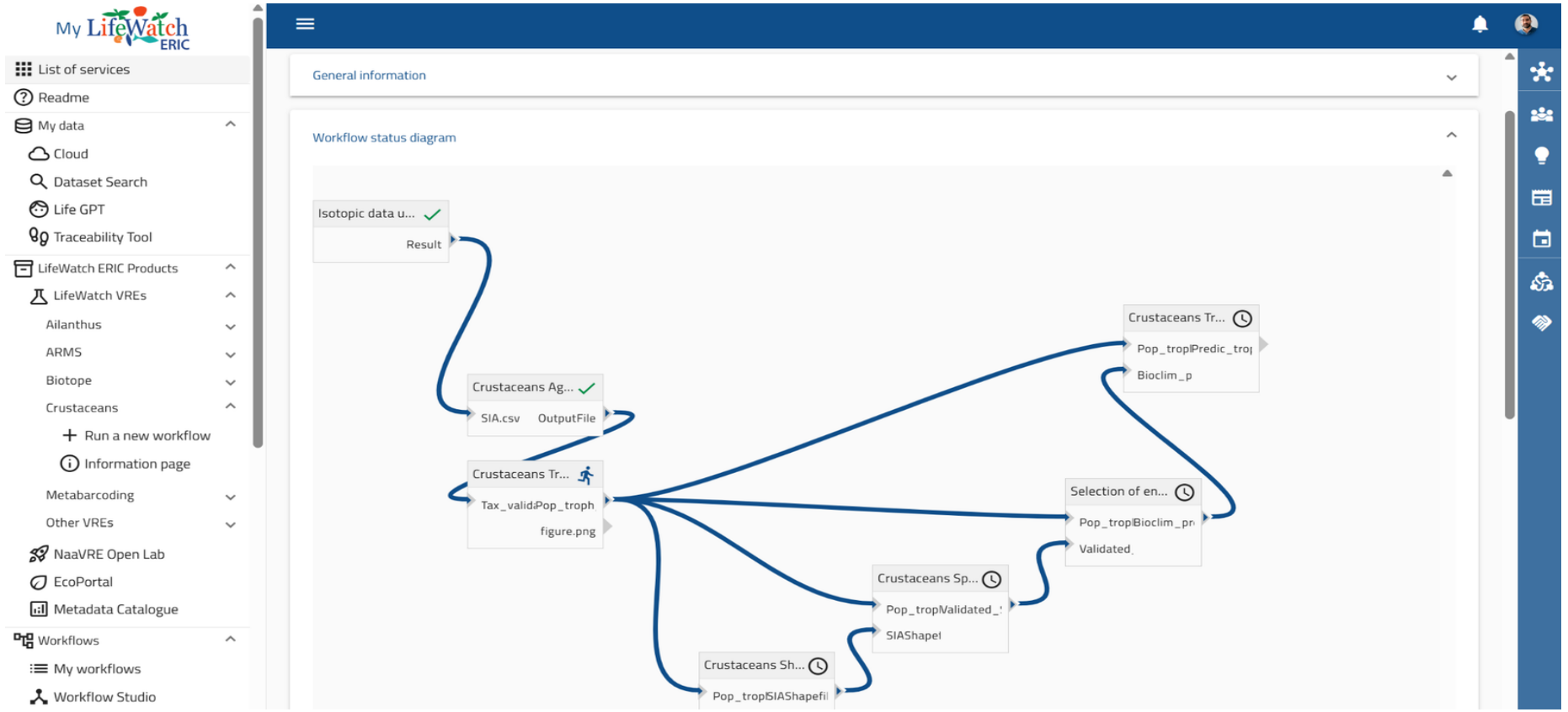
- **Select** a series of **ecosystem variables obtained from satellite images.**
- **Analyze** anomalies, trends and spatial variability.
- Aimed at **different types of users** (1) researchers and managers with programming skills; (2) researchers and managers without programming skills but need access to satellite information to make decisions; and (3) citizens.



SMART ECOMOUNTAINS
GOBIERNO DE ESPAÑA MINISTERIO DE CIENCIA E INNOVACIÓN
UNIÓN EUROPEA
Fondo Europeo de Desarrollo Regional
Una manera de hacer Europa
UNIVERSIDAD DE GRANADA
LifeWatch ERIC

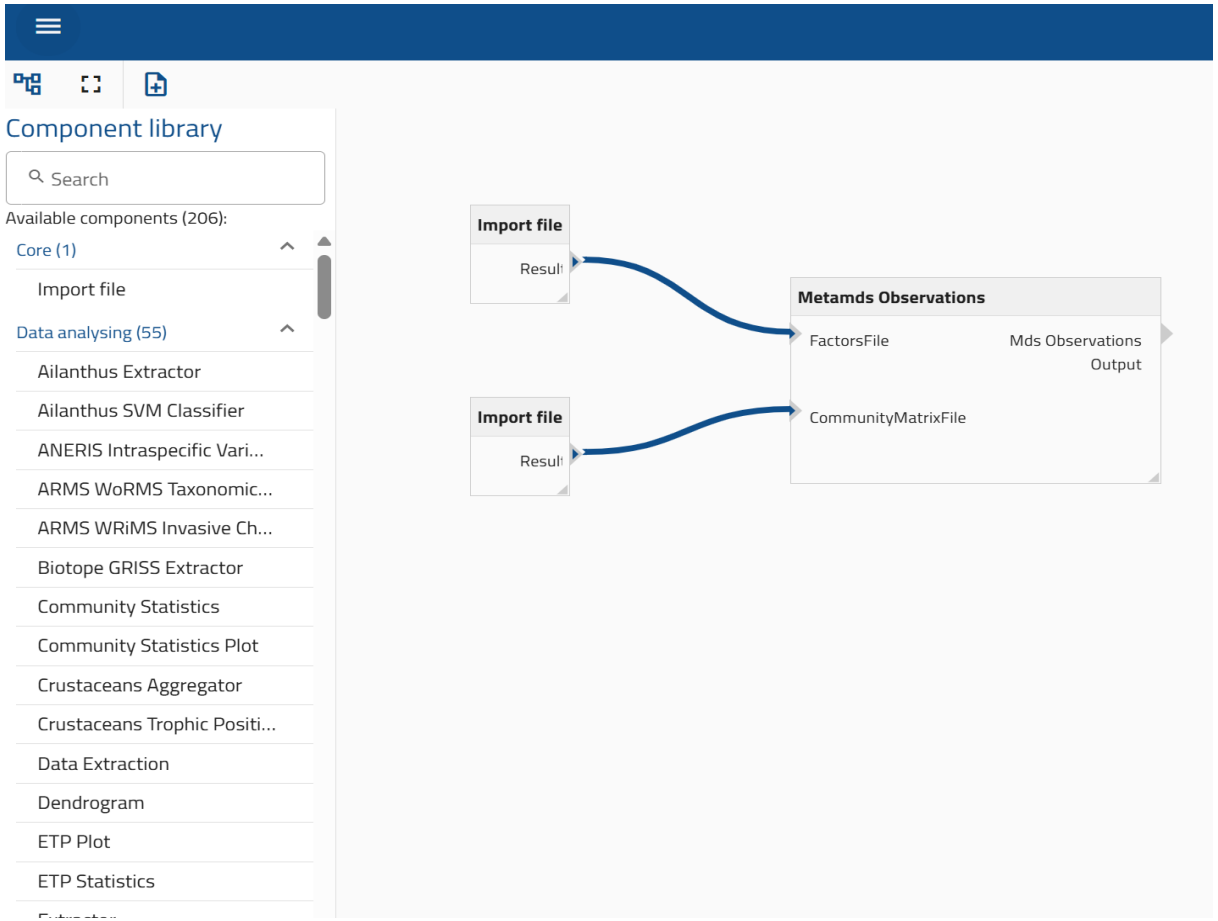
Interoperable and Reusable Services: Workflows

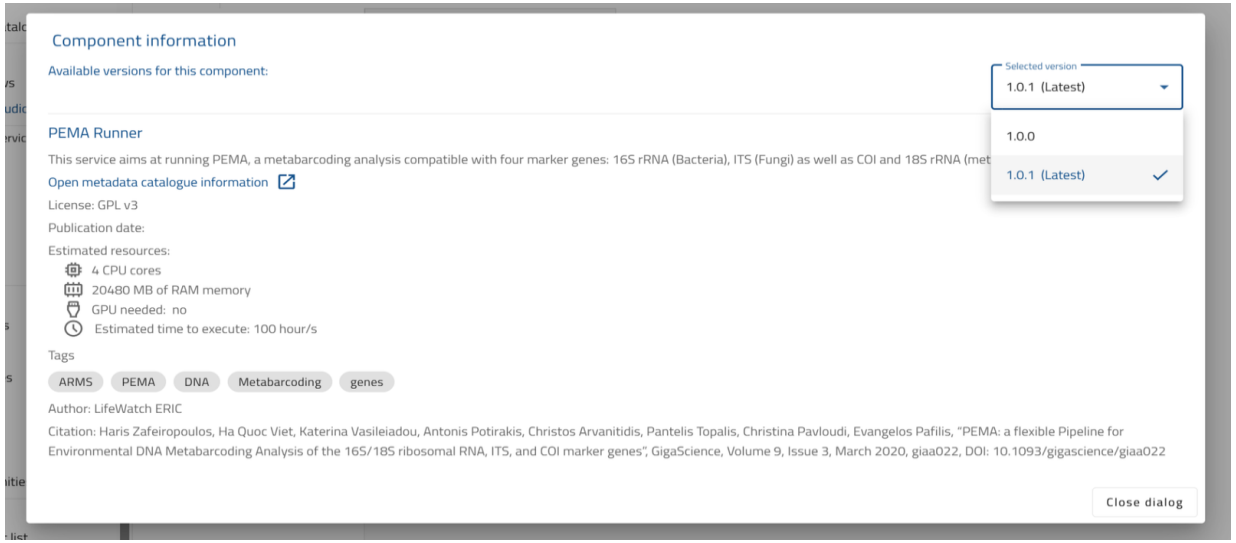
- A **Virtual Research Environment (VRE)** for running workflows based on interoperable and reusable components.



Interoperable and Reusable Services: Workflows

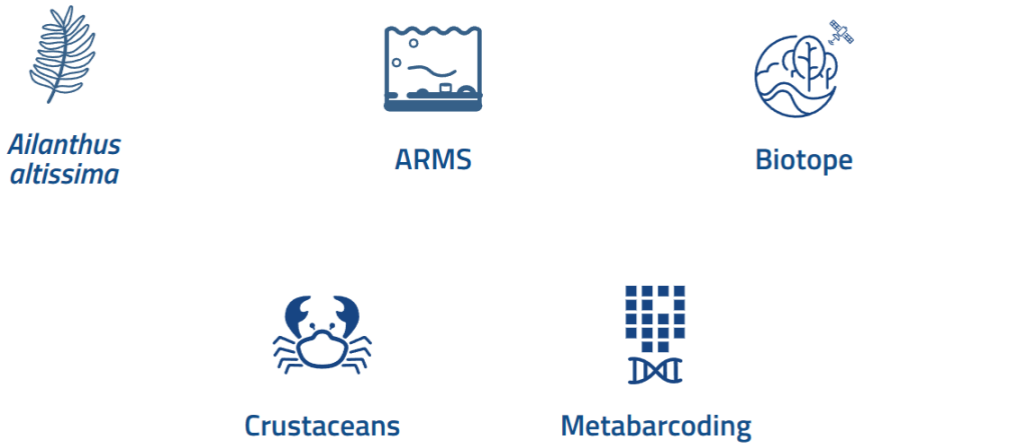
- A catalogue of workflow components, validated by researchers and annotated with metadata to make them discoverable and reusable.





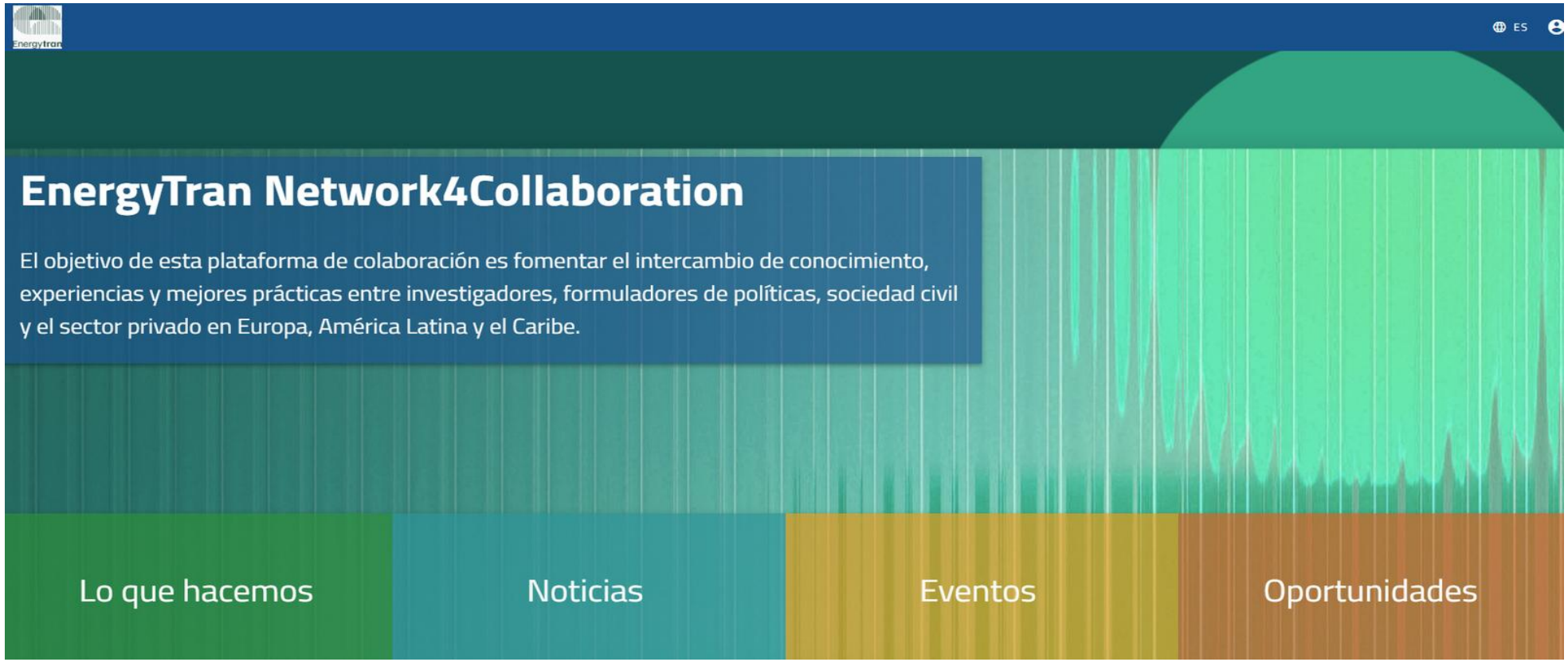
Non-native and Invasive Species (NIS)

1. Combining **modeling and remote sensing techniques to monitor and control the spread of invasive species**: the case of Ailanthus altissima.
2. European Autonomous Reef Monitoring Structures (ARMS) program: **long-term monitoring of seabed communities for marine invasive species**.
3. **Assessment of the risk of introduction and establishment of NIS**, vulnerability of habitats to NIS, and estimation of the impact on large assemblages of plants and animals.
4. Functional biogeography of invasive species**: stable isotope analysis to determine the trophic position and feeding habits** of two widely distributed omnivorous crustaceans.
5. **Early warning tool that combines metabarcoding and molecular ecology techniques** to study freshwater fish communities and identify new invasive species



Reusable Services & Data: Network4Collaboration

A collaborative environment for sharing data and communicating ideas within the context of open and interconnected science.



Take-home message

PGR conservation and use are data-hungry, **demanding integrated, high-quality information.**

LifeWatch ERIC provides the digital backbone — from **data discovery** to **monitoring and analysis.**

Interoperable tools and VREs enable effective tools for **collaboratively build predictive models** for natural population, crop performances and habitat suitability, early detection of threats like invasive species.

Combining genomic-phenomic with in-situ and EO data strengthens decision-making for conservation and breeding.

Collaboration drives innovation — together, PRO-GRACE and LifeWatch accelerate Europe's transition to resilient, biodiversity-based agriculture

OPEN CALL

AGROECOLOGY PARTNERSHIP

https://www.agroecologypartnership.eu/

AgroServ

https://agroserv.eu/

MICROBES 4CLIMATE

https://microbes4climate.eu/

Thanks for your attention!

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