

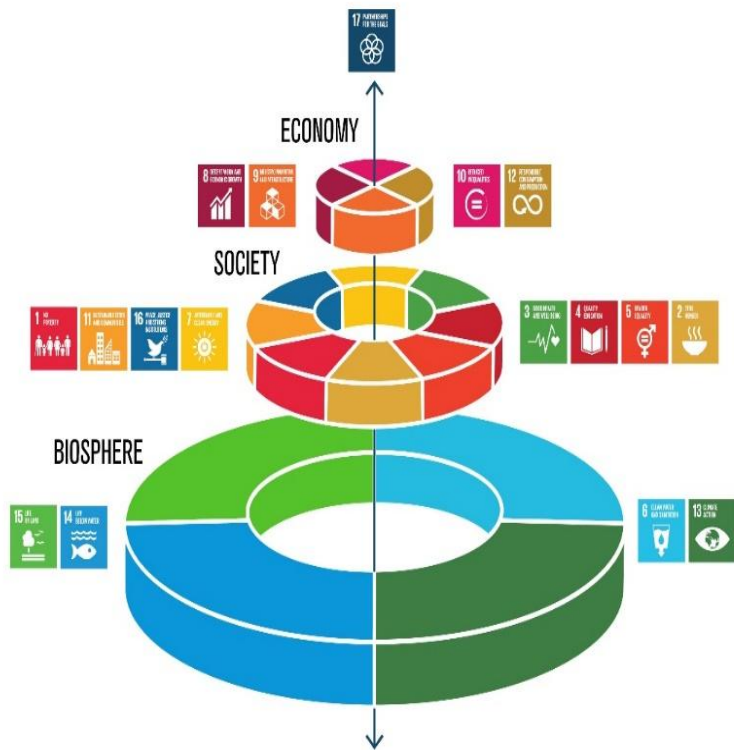
GRACE collaboration and synergies with LifeWatch ERIC



José Manuel Ávila, Ana Mellado, Iria Soto
LifeWatch ERIC

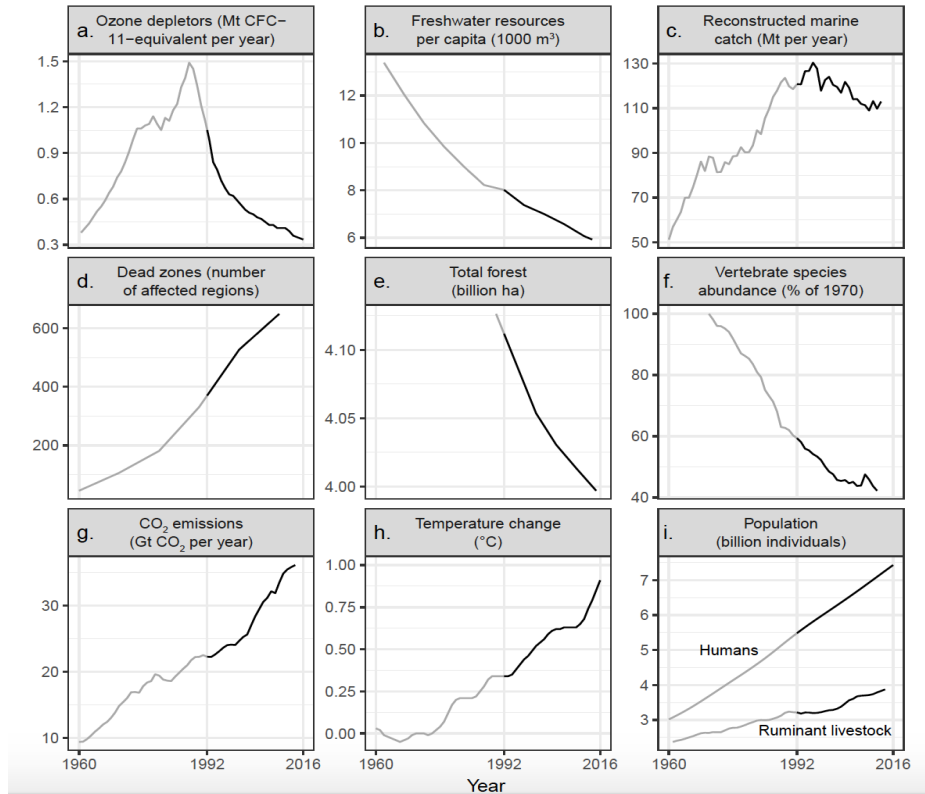
Workshop: GRACE collaboration and synergies with International Organizations and
Research Infrastructures
Chania, 9th October, 2025

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

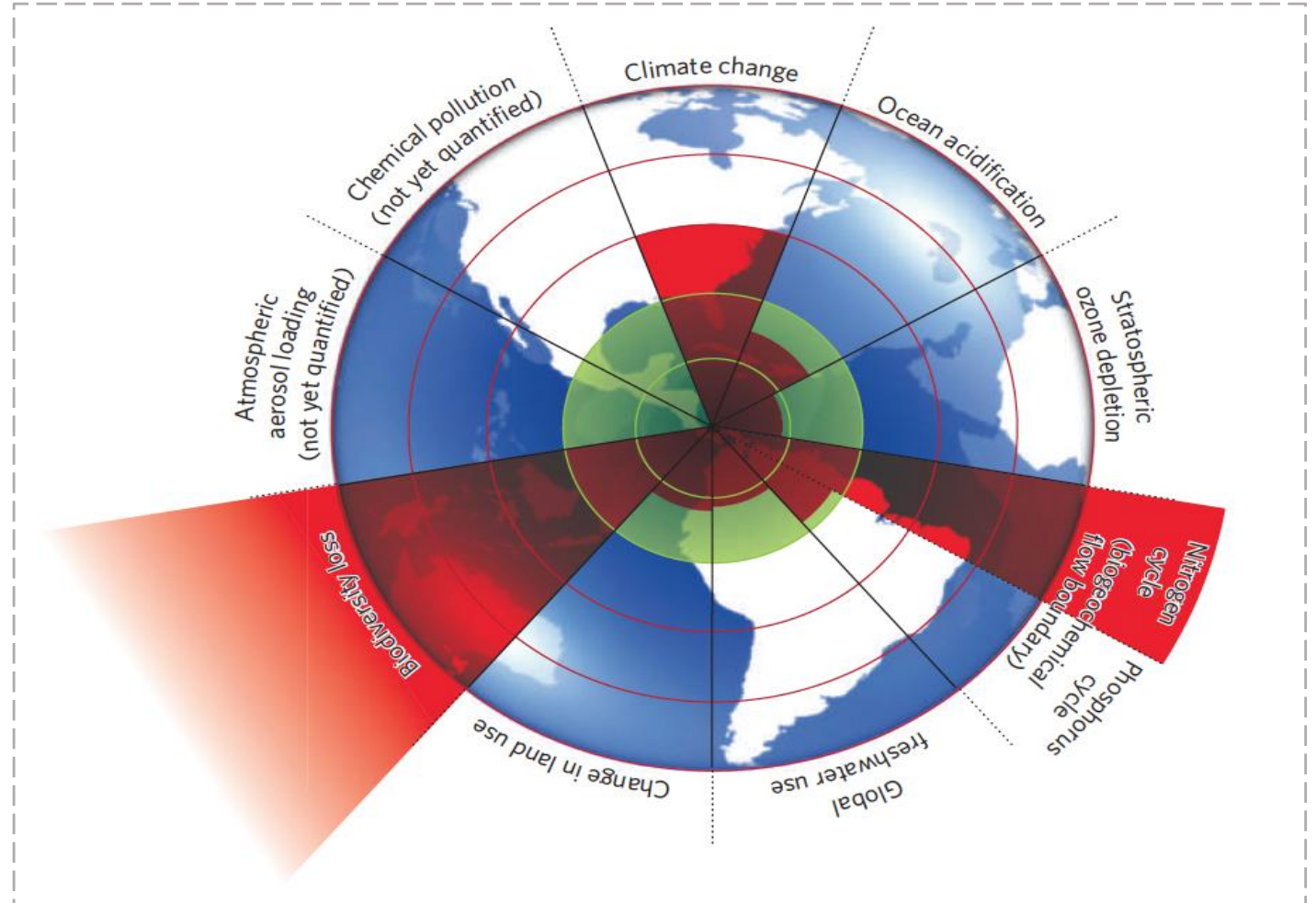


World Scientists' Warning to Humanity: A Second Notice

WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, MAURO GALETTI, MOHAMMED ALAMGIR, EILEEN CRIST, MAHMOUD I. MAHMOUD, WILLIAM F. LAURANCE, and 15,364 scientist signatories from 184 countries



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



Major drivers of change

OVERHARVESTING



CLIMATE CHANGE



CHEMICAL POLLUTION & EUTROPHICATION



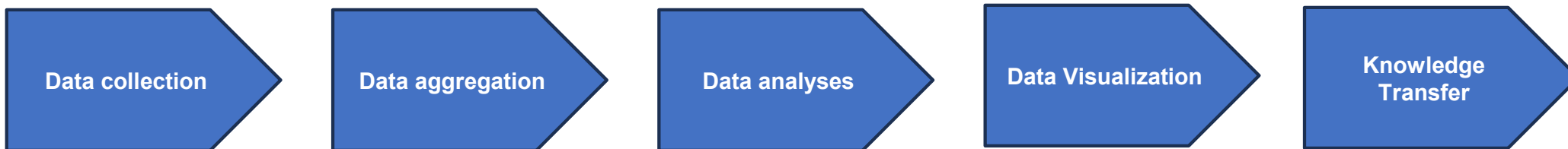
INVASION OF EXOTIC SPECIES



PHYSICAL ALTERATIONS



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**



Geospatial Data



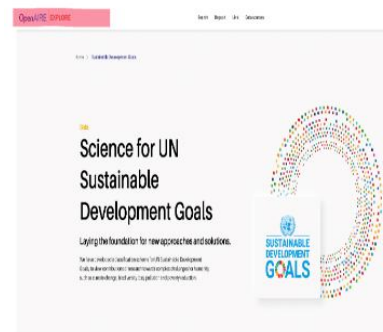
GEO is a partnership of more than 100 national governments and in excess of 100 Participating Organizations that envisions a future where decisions and actions for the benefit of humankind are informed by coordinated, comprehensive and sustained Earth observations.



Number of Members (2022)	
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

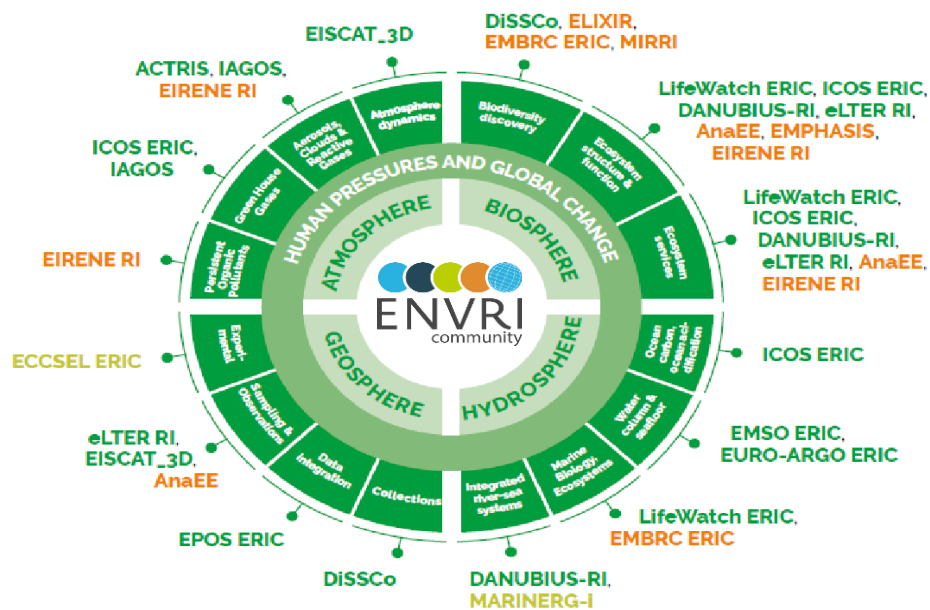


A collaboration with Athena RC, AURORA European University Alliance, and Swinburne University of Technology, Australia (pending)

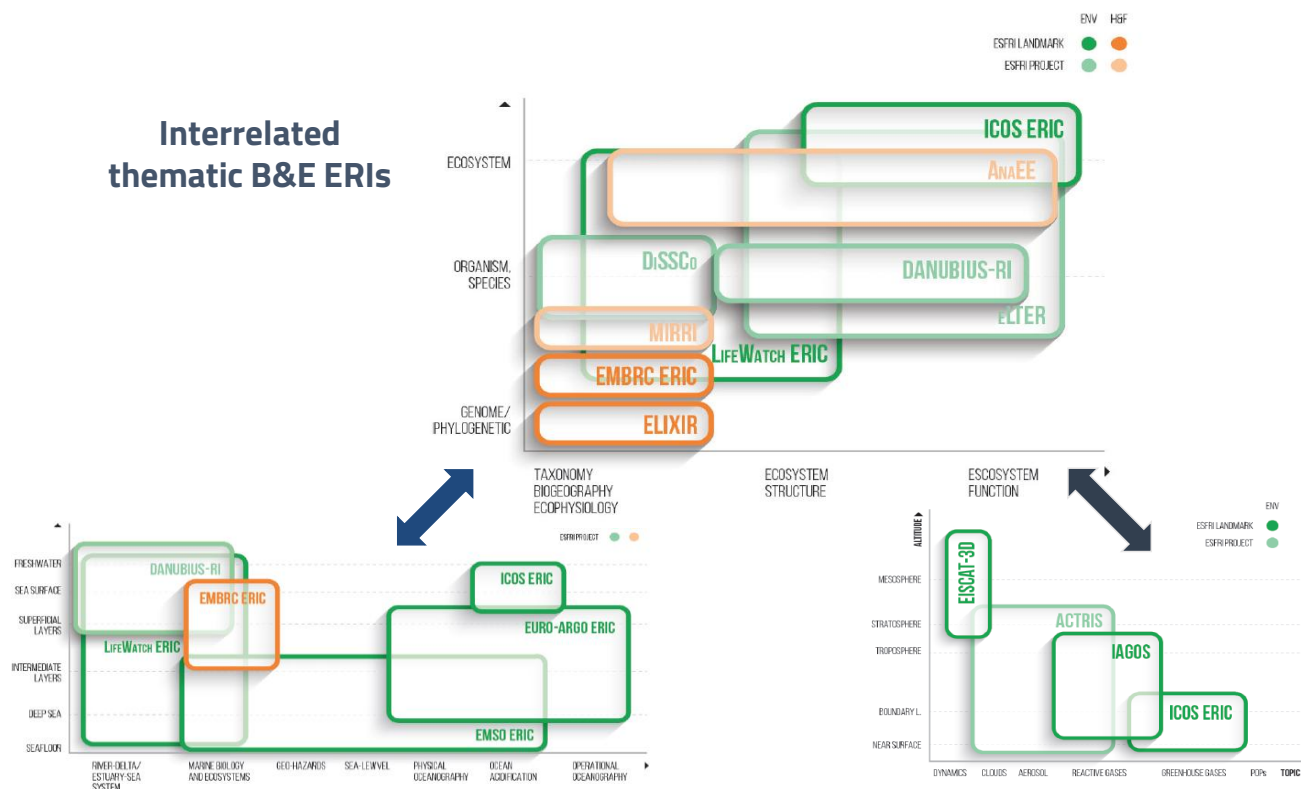
SDSN Global Geospatial Information Technology Observatory



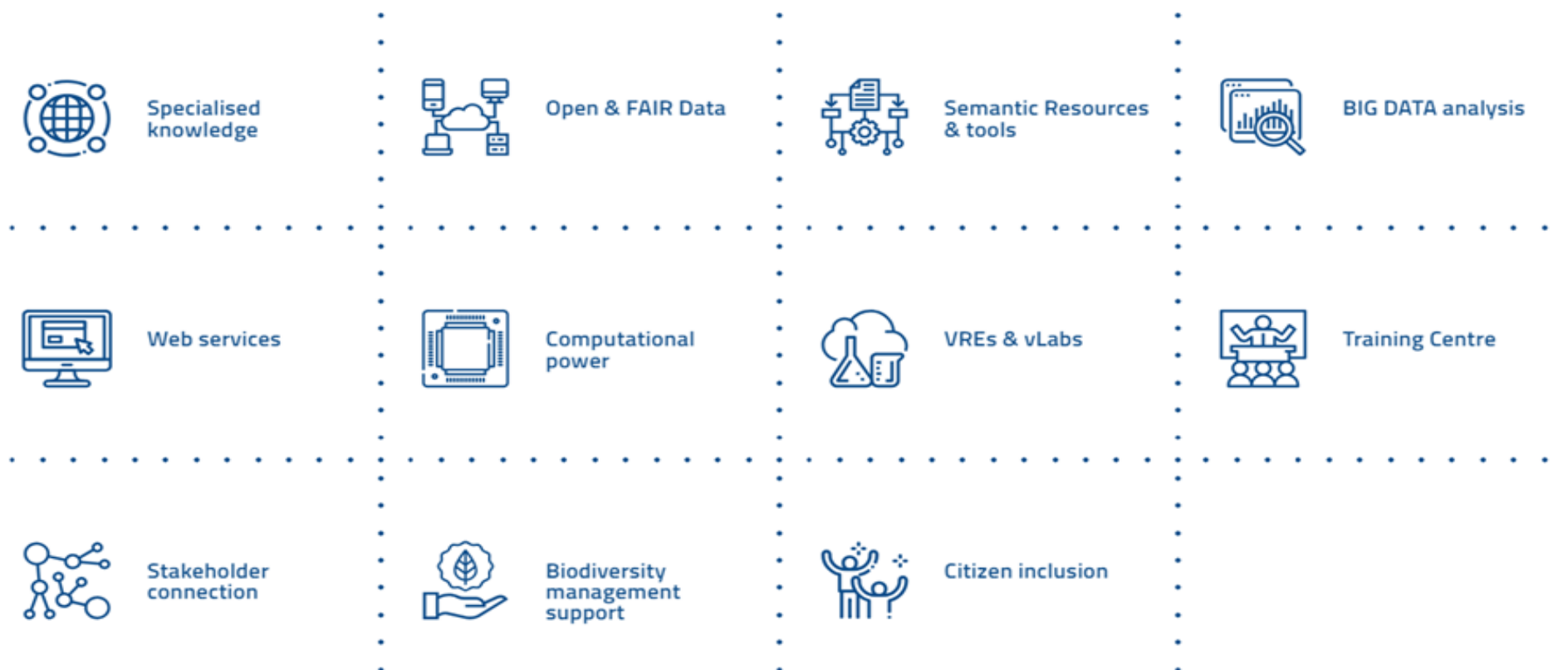
European Research infrastructures provide **data access, computational and support services** from four domains of the Earth System. They work together to make their data, services and infrastructures interoperable and harmonized



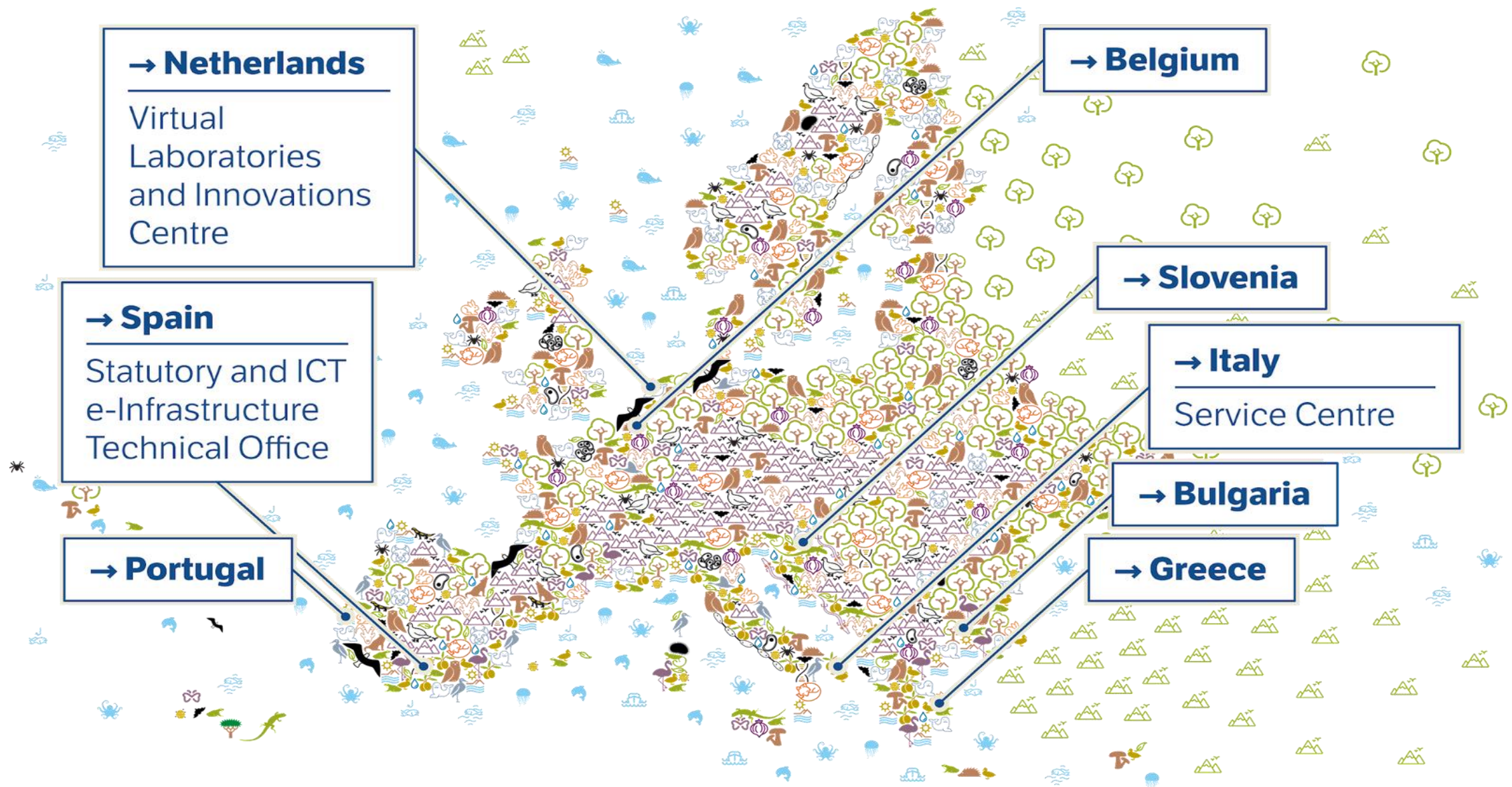
Interrelated thematic B&E ERIs



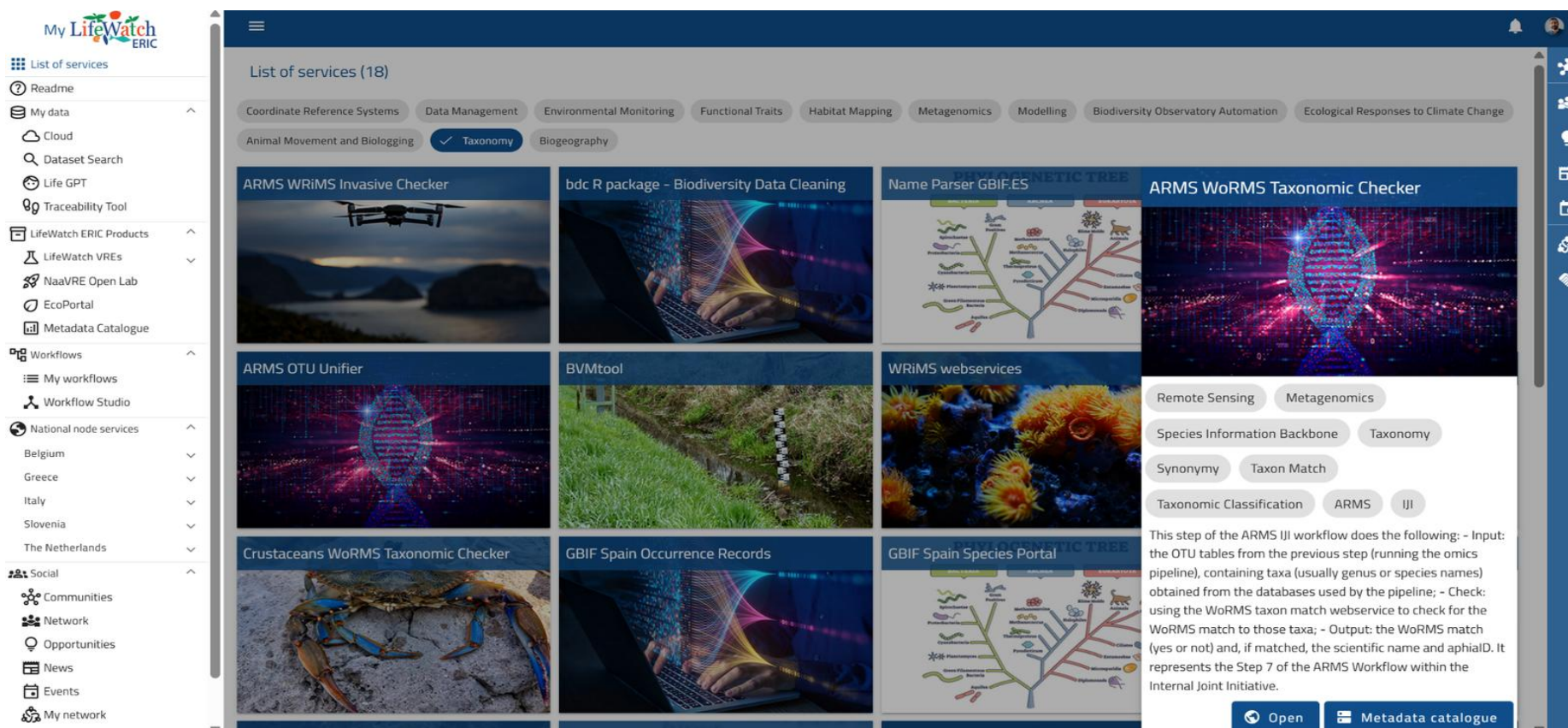
LifeWatch ERIC is a European Research Infrastructure Consortium providing **e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services** in order to support society in addressing key planetary challenges



What is LifeWatch ERIC?



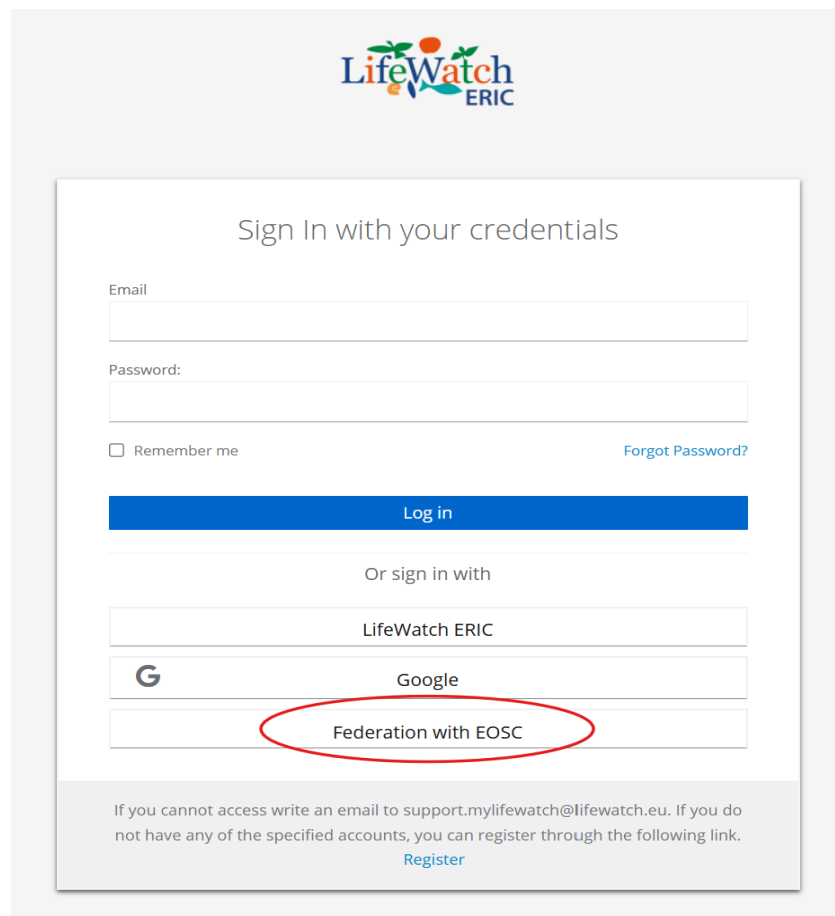
A single, user-friendly access portal where all the services provided by LifeWatch ERIC and its collaborating infrastructures can be found.



The screenshot displays the MyLifeWatch portal interface. On the left is a sidebar with navigation options: List of services, Readme, My data, Cloud, Dataset Search, Life GPT, Traceability Tool, LifeWatch ERIC Products, LifeWatch VREs, NaaVRE Open Lab, EcoPortal, Metadata Catalogue, Workflows, My workflows, Workflow Studio, National node services (Belgium, Greece, Italy, Slovenia, The Netherlands), and Social (Communities, Network, Opportunities, News, Events, My network). The main content area is titled 'List of services (18)' and features a grid of service tiles. The 'Taxonomy' filter is selected. The 'ARMS WoRMS Taxonomic Checker' service is highlighted, showing a detailed description: 'This step of the ARMS IJI workflow does the following: - Input: the OTU tables from the previous step (running the omics pipeline), containing taxa (usually genus or species names) obtained from the databases used by the pipeline; - Check: using the WoRMS taxon match webservice to check for the WoRMS match to those taxa; - Output: the WoRMS match (yes or not) and, if matched, the scientific name and aphialD. It represents the Step 7 of the ARMS Workflow within the Internal Joint Initiative.' Below the description are buttons for 'Open' and 'Metadata catalogue'.



**EUROPEAN OPEN
SCIENCE CLOUD**

A screenshot of the LifeWatch ERIC login page. The page has a light gray background. At the top center is the LifeWatch ERIC logo. Below it is a white box with a gray border containing the login form. The form has the heading "Sign In with your credentials". It includes an "Email" input field, a "Password:" input field, a "Remember me" checkbox, and a "Forgot Password?" link. A blue "Log in" button is below these fields. Underneath the button is the text "Or sign in with". There are three buttons for alternative sign-in methods: "LifeWatch ERIC", "Google" (with a Google 'G' logo), and "Federation with EOSC" (which is circled in red). At the bottom of the white box is a gray footer area with text about email support and a "Register" link.

LifeWatch
ERIC

Sign In with your credentials

Email


Password:

☐ Remember me [Forgot Password?](#)

Log in

Or sign in with

LifeWatch ERIC

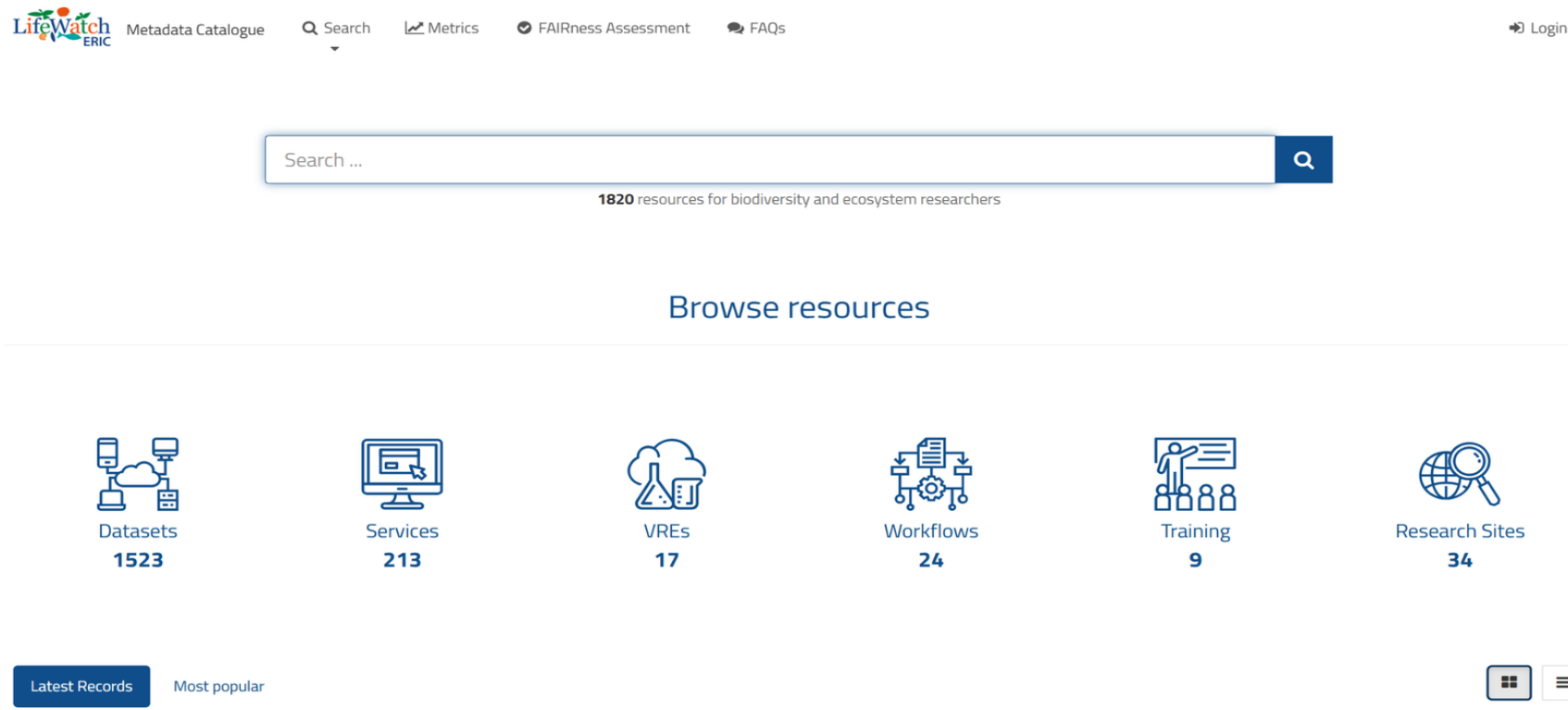
 Google

Federation with EOSC

If you cannot access write an email to support.mylifewatch@lifewatch.eu. If you do not have any of the specified accounts, you can register through the following link.
[Register](#)

<https://my.lifewatch.eu>

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



The screenshot shows the homepage of the LifeWatch metadata catalogue. At the top, there is a navigation bar with the LifeWatch ERIC logo, a 'Metadata Catalogue' link, a search icon, and links for 'Metrics', 'FAIRness Assessment', and 'FAQs'. A 'Login' button is located on the right. Below the navigation bar is a large search bar with the placeholder text 'Search ...' and a magnifying glass icon. Under the search bar, it states '1820 resources for biodiversity and ecosystem researchers'. The main section is titled 'Browse resources' and features six categories with icons and counts: Datasets (1523), Services (213), VREs (17), Workflows (24), Training (9), and Research Sites (34). At the bottom, there are two buttons: 'Latest Records' and 'Most popular'. On the right side of the bottom bar, there are two icons: a grid icon and a hamburger menu icon.

LifeWatch ERIC Metadata Catalogue Search Metrics FAIRness Assessment FAQs Login

Search ...

1820 resources for biodiversity and ecosystem researchers

Browse resources


Datasets 1523 Services 213 VREs 17 Workflows 24 Training 9 Research Sites 34

Latest Records Most popular

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




Advanced Search



Found 1535 results


[EMODnet] Nutrients in Mediterranean Sea

Determination of nitrates, nitrites, phosphates and silicates by colorimetric analysis in sea water sampling by Go-flo bottles in the western Mediterranean to study water mass




[Zenodo] Mediterranean Sea Surface Temperature Analysis

Optimally interpolated sea surface temperature (SST) analysis over the Mediterranean Sea (2017/01/01 to 2017/12/30). The analysis were computed with an optimal interpolation (OI) algorithm, using as inputs synthetic SST observations derived from model SST data. A complete description of both the OI algorithm and the synthetic SSTs generation is provided in Sabatini et al. (submitted) and Buongiorno Nardelli et al. 2013.




[Zenodo] CESM2 Mediterranean Sea Pacemaker Ensemble

These NetCDF files correspond to the monthly outputs of the model study, which aims to produce a Mediterranean Sea Pacemaker Ensemble for the period 1980-2014, to investigate the impacts of the Mediterranean Sea on regional and global climate. Model simulations are completed using the fully-coupled Community Earth System Model version 2.1.3 (CESM2) (the CESM2.1.3 code is available on GitHub).




[EMODnet] Total Suspended Matter Mediterranean Sea

EMODnet Physics - TSM_MediterraneanSea - Concentration of total suspended matter (conc_tsm, mg/l) is a product of the CoastColour L2W Concentrations Data, obtained from the OC4 algorithm for clear and moderate turbid waters, and from the CoastColour v1 neural network. The L2W product was then remapped on a regular grid, maintaining the 300 m full resolution, in order to obtain L3 products over the Mediterranean Sea and monthly averaged. Developed by EMODnet Physics.



[Treatment Bank] A checklist of the deep sea fishes of the Levant Sea, Mediterranean Sea

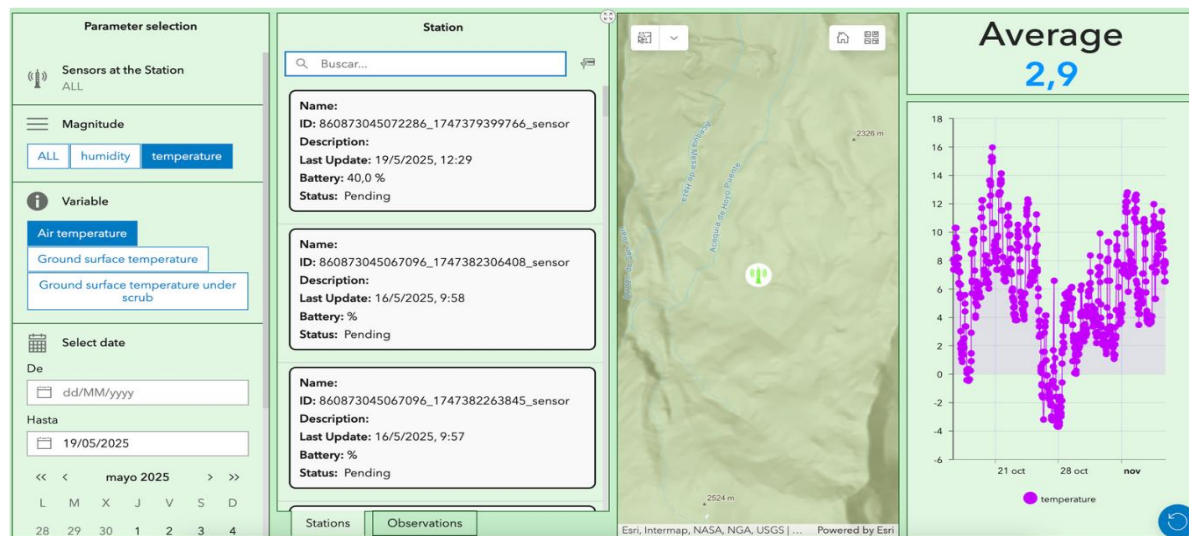
This dataset contains the digitized treatments in Plazi based on the original journal article Goren, Menachem, Galil, Bella S. (2015): A checklist of the deep sea fishes of the Levant Sea, Mediterranean Sea. Zootaxa 3994 (4): 507-530, DOI: 10.11646/zootaxa.3994.4.2



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 infrastructure to ensure the data lifecycle—from measurement, persistence, and metadata management to visualization and interoperability—is accurate and efficient.



LifeSensors, a management platform that allows:

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

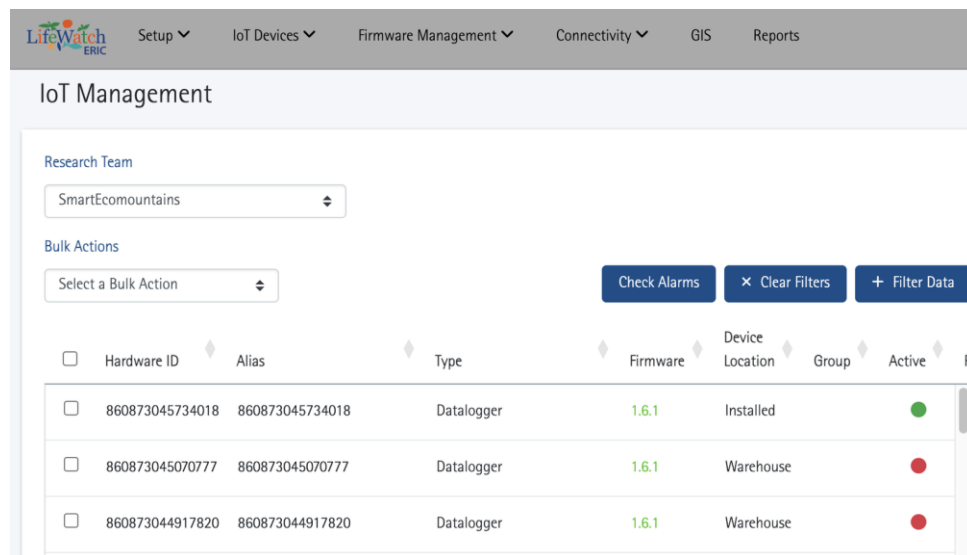
It provides remote access to the dataloggers, ensuring continuous control over their operation.

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.



The screenshot shows the 'IoT Management' section of the LifeSensors platform. At the top, there is a navigation bar with links for Setup, IoT Devices, Firmware Management, Connectivity, GIS, and Reports. Below this, the 'IoT Management' header is followed by a 'Research Team' dropdown menu set to 'SmartEcomountains'. Under 'Bulk Actions', there is a 'Select a Bulk Action' dropdown and three buttons: 'Check Alarms', 'Clear Filters', and 'Filter Data'. A table displays a list of dataloggers with columns for Hardware ID, Alias, Type, Firmware, Device Location, Group, Active status, and a 'R' column. The table contains three rows of datalogger information.

Hardware ID	Alias	Type	Firmware	Device Location	Group	Active	R
860873045734018	860873045734018	Datalogger	1.6.1	Installed		●	
860873045070777	860873045070777	Datalogger	1.6.1	Warehouse		●	
860873044917820	860873044917820	Datalogger	1.6.1	Warehouse		●	

Sensor Configuration Templates

Template #1

Load

RS Protocol

✓ RS-232

■ RS-485

RS Baud Rate

9600

RS Parity

None

RS Stop Bits

0.5

Sensors




PAGODA ODIN T



<https://lifesensors.iot.lifewatch.eu>

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


LifePortal

Español ▾

Microclimate station 018-019

En proceso

This dataset belongs to the experiment "Monitoring of microclimates in Mediterranean mountain ecosystems of Sierra Nevada using dataloggers" (parent record: <https://geonetwork.gis.lifewatch.eu/srv/sa/catalog.search#/metadata/17ef156f-33cf-4ffa-af89-3c29fa767394>)


The microclimate station 018-019 is installed in Hortichuela, at an altitude of c.a. 1400 m.a.s.l (replica 2). It measures the following variables every 30 minutes:

- Air temperature and air relative humidity (80-100 cm)
- Soil moisture and soil temperature (40 cm)
- Ground surface temperature (on bare soil and under stone)


The monitored habitat of this station is oak forest.

The technical characteristics of the "LW-GD-DL-001" dataloggers are:






- Communications capabilities: NB-IoT, LTE-M, GPRS, Bluetooth and LoRa.
- MCU and Communications: GPS/GLONASS/BeiDou/Galileo/QZSS.
- Supported sensor protocols: ADC, SDI-12, RS-485, RS-232, RS-422, I2C, Digital Counter.
- Inputs: 2 or 4 ADC with adjustable gain (by current or voltage) and 2 digital inputs.
- Storage: Micro SD Card with up to 64GB.
- Power: Solar charger, 13V to 60V Power Supply, 7.4V 5000mAh Battery.
- Working range: Temperature: -25°C ~ 85°C. Humidity: 5% ~ 95% (non-condensing).
- The dataloggers are fully managed from LifeWatch IoT Platform.



API

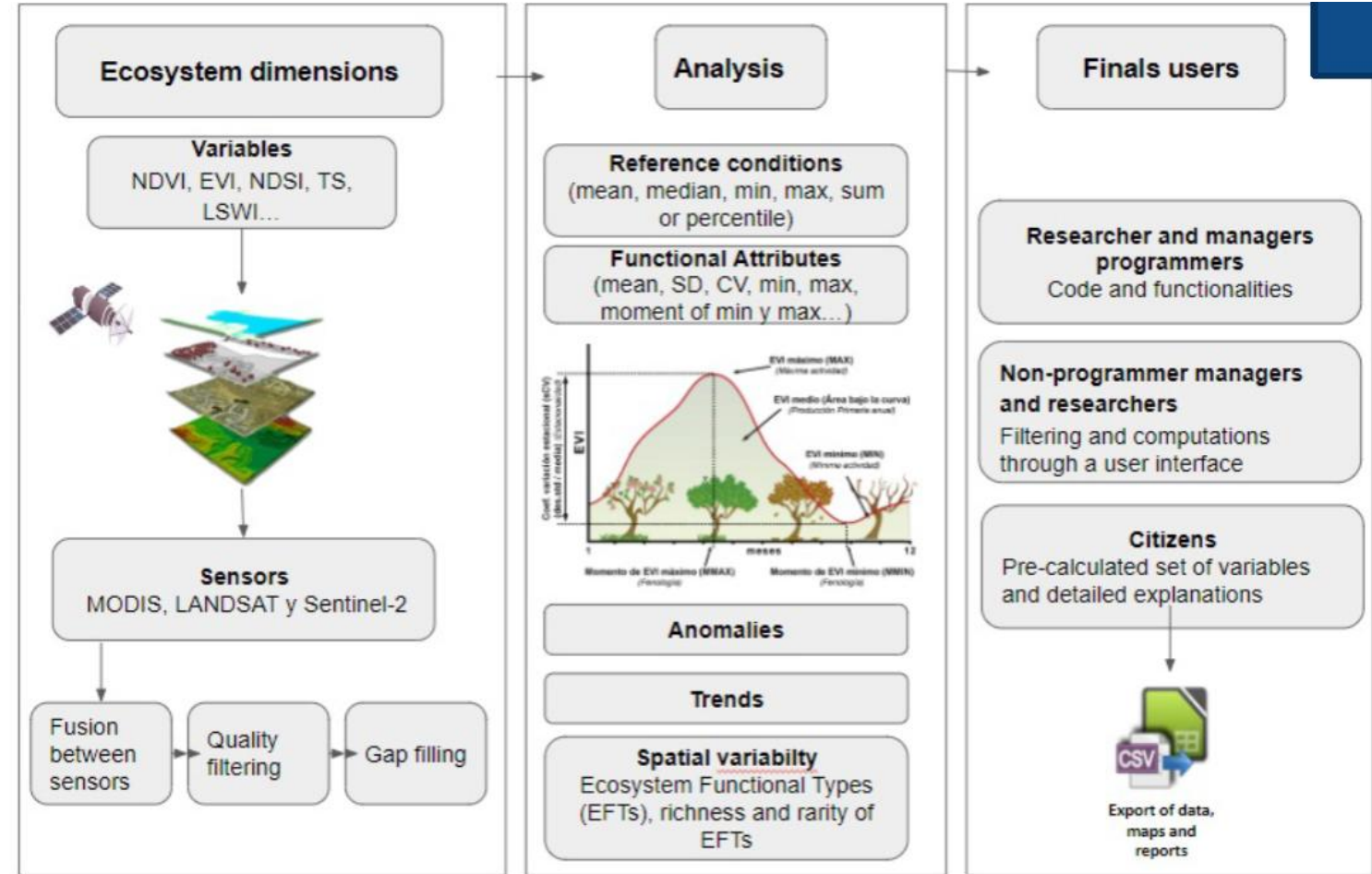
	Sensor Description (SensorML via SOS)	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Technical description of the station Microclimate 018 in SensorML 2.0 format via the OGC SOS service.		
	Sensor Description (SensorML via SOS)	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Technical description of the station Microclimate 019 in SensorML 2.0 format via the OGC SOS service.		
	Sensor Observation Service Data Access	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Access to time series data for station Microclimate 018 via Helgoland REST API (JSON format).		

Enlaces

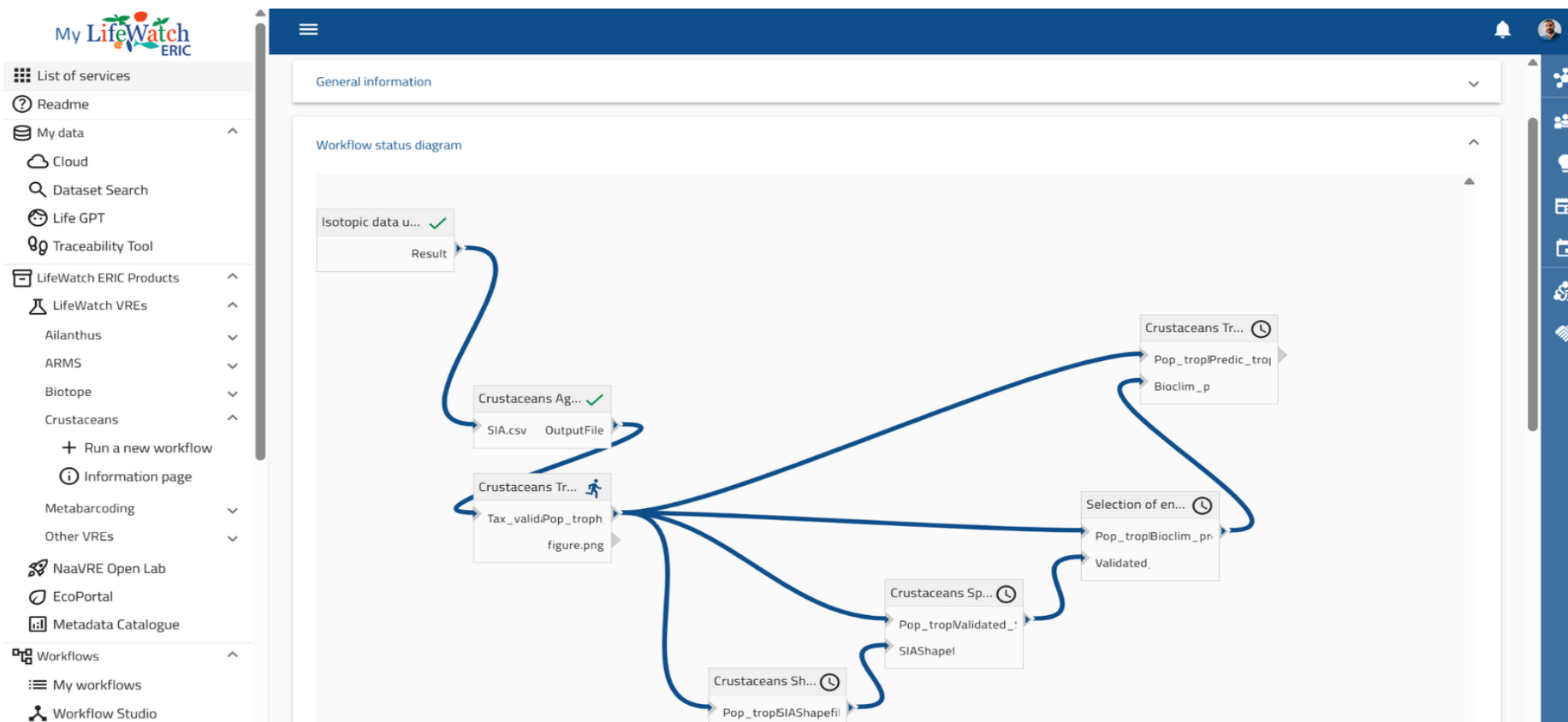
	ArcGIS Dashboard for Sensor Data Visualization	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Visual dashboard in ArcGIS for real-time sensor data visualization and analysis.		
	FIWARE Enablers-018	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Fiware status-018	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Helgoland API Documentation (52°North)	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Official documentation for the 52°North SensorWeb Helgoland REST API.		
	Sensor Observation Service Data Access	<input type="text"/>	<input type="button" value="Abrir enlace"/>
	Access to time series data for station Microclimate 019 via Helgoland REST API (JSON format).		

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.).

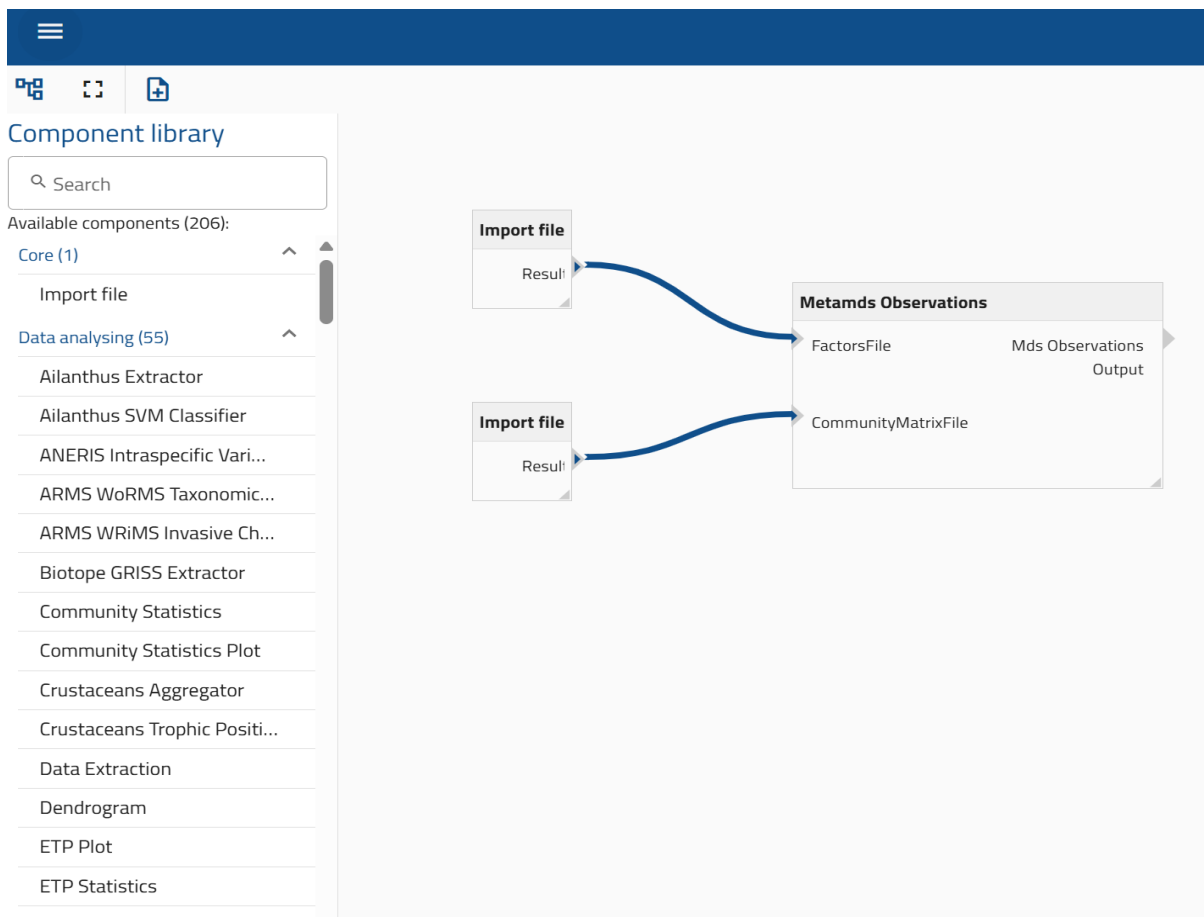
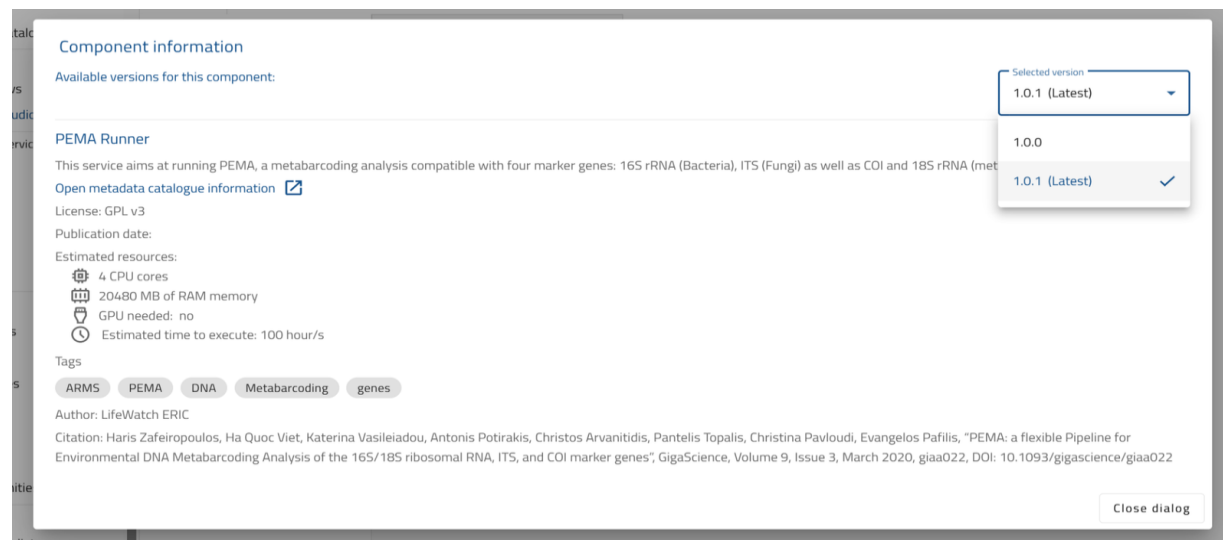
- **Select** a series of **ecosystem variables obtained from satellite images**.
- **Analyze** anomalies, trends and spatial variability.
- Aimed at **different types of users** (1) researchers and managers with programming skills; (2) researchers and managers without programming skills but need access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



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



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

The 'Component information' dialog for the 'PEMA Runner' component is shown. It includes the following details:

- Component information:** Available versions for this component: 1.0.1 (Latest) (Selected version), 1.0.0, 1.0.1 (Latest) (checked).
- PEMA Runner:** This service aims at running PEMA, a metabarcoding analysis compatible with four marker genes: 16S rRNA (Bacteria), ITS (Fungi) as well as COI and 18S rRNA (met).
- Open metadata catalogue information:** [Open metadata catalogue information](#)
- License:** GPL v3
- Publication date:**
- Estimated resources:**
 - 4 CPU cores
 - 20480 MB of RAM memory
 - GPU needed: no
 - Estimated time to execute: 100 hour/s
- Tags:** ARMS, PEMA, DNA, Metabarcoding, genes
- Author:** LifeWatch ERIC
- Citation:** Haris Zafeiropoulos, Ha Quoc Viet, Katerina Vasileiadou, Antonis Potirakis, Christos Arvanitidis, Pantelis Topalis, Christina Pavlouidi, Evangelos Pafilis, "PEMA: a flexible Pipeline for Environmental DNA Metabarcoding Analysis of the 16S/18S ribosomal RNA, ITS, and COI marker genes", GigaScience, Volume 9, Issue 3, March 2020, giaa022, DOI: 10.1093/gigascience/giaa022
- Close dialog**

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



Ailanthus altissima



ARMS



Biotope

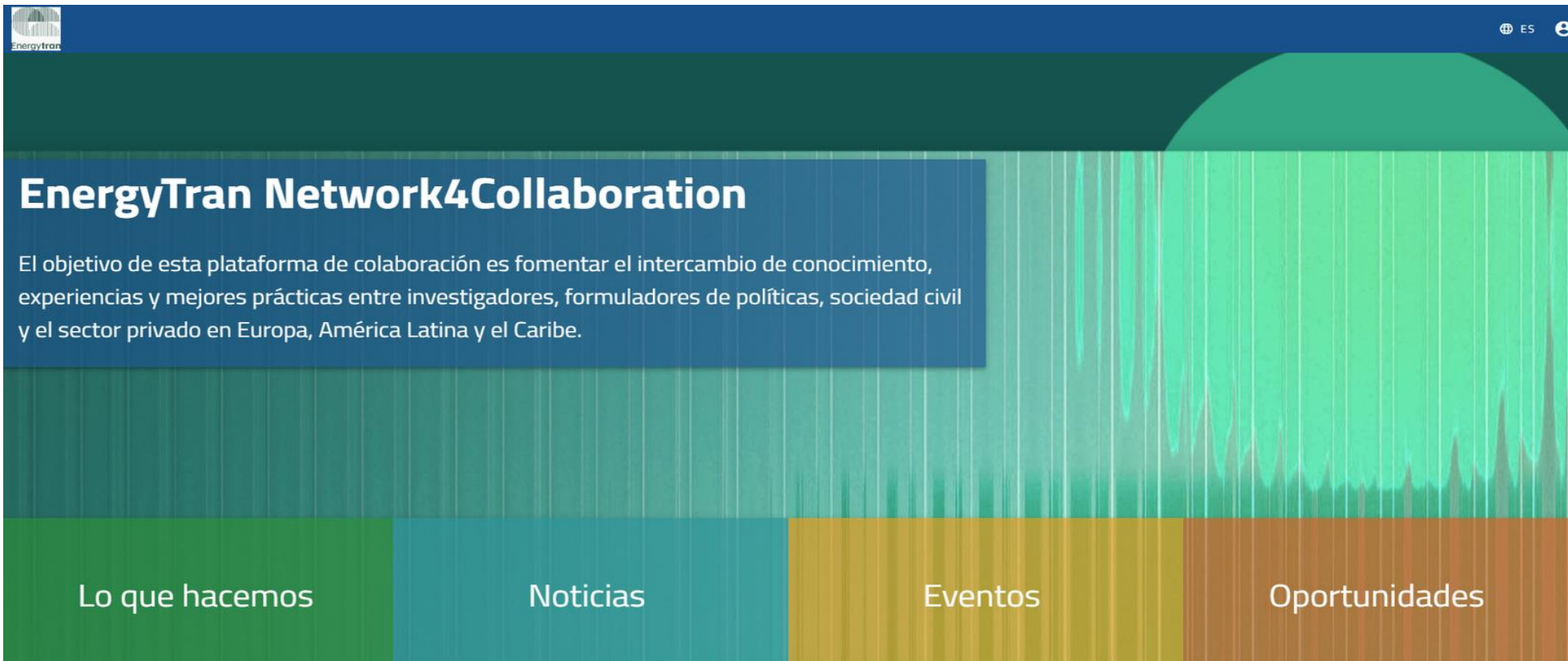


Crustaceans



Metabarcoding

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



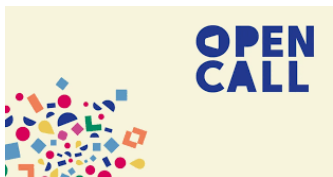
PGR conservation and use are data-hungry, **demanding integrated, high-quality information**.

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



<https://www.agroecologypartnership.eu/>



<https://agroserv.eu/>



<https://microbes4climate.eu/>

Thanks for your attention!



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LifeWatch ERIC

josem.avila@lifewatch.eu