

GRACE collaboration and synergies with LifeWatch ERIC



José Manuel Ávila, Ana Mellado, Iria Soto
LifeWatch ERIC

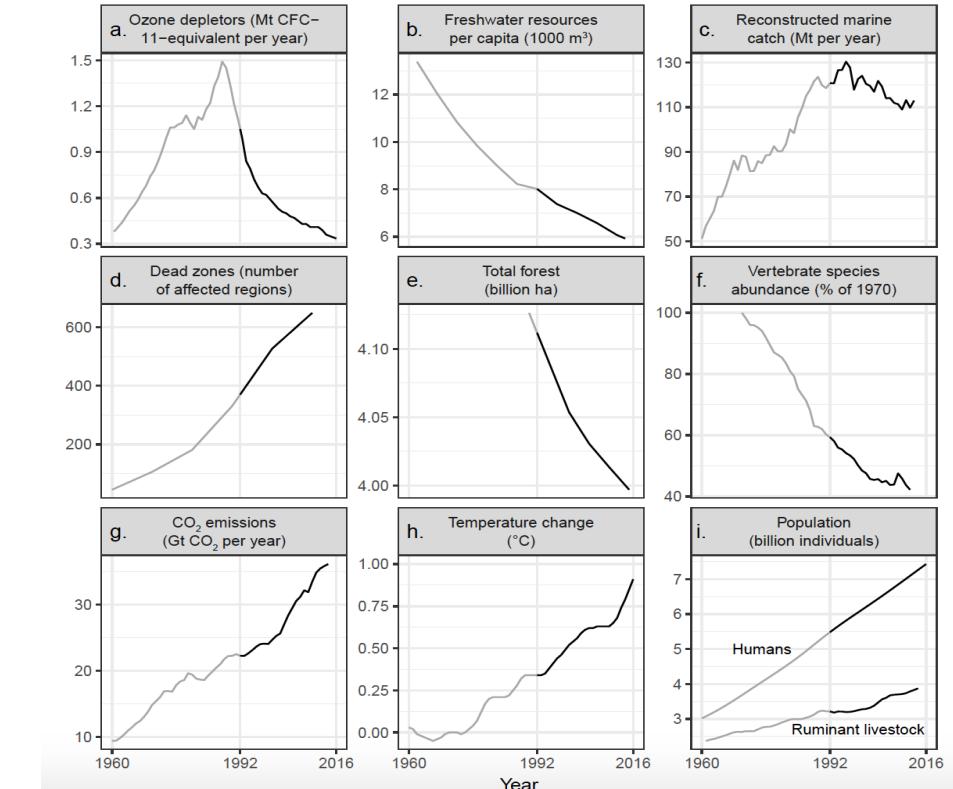
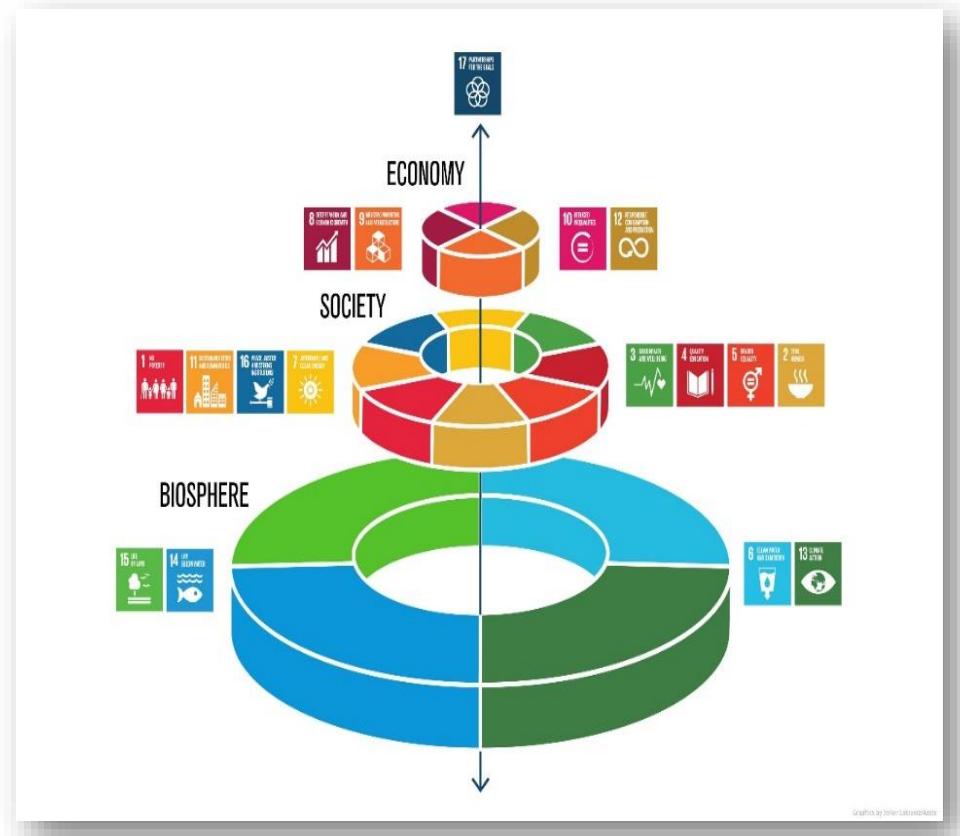
Workshop: GRACE collaboration and synergies with International Organizations and
Research Infrastructures
Chania, 9th October, 2025

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

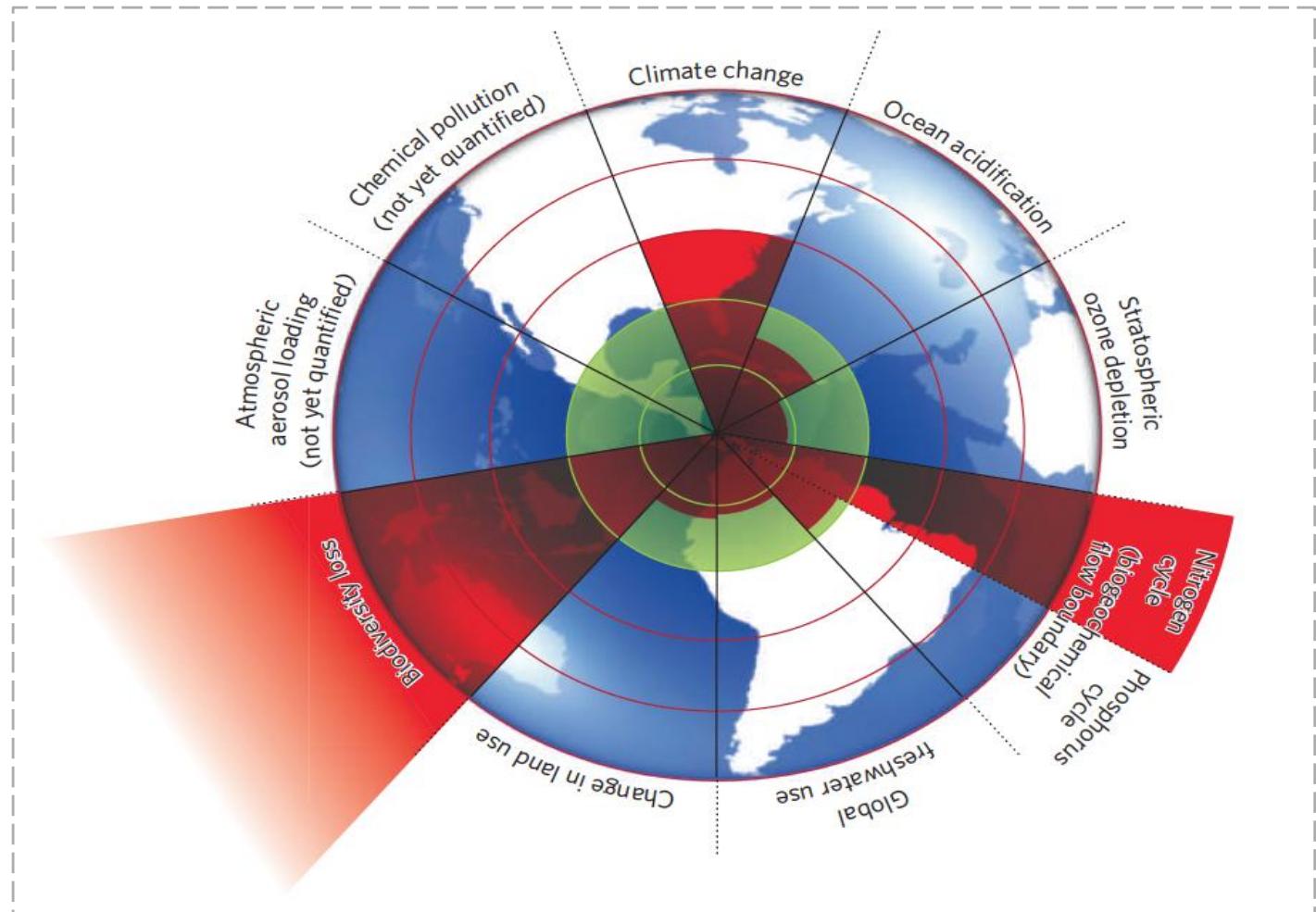
Viewpoint

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



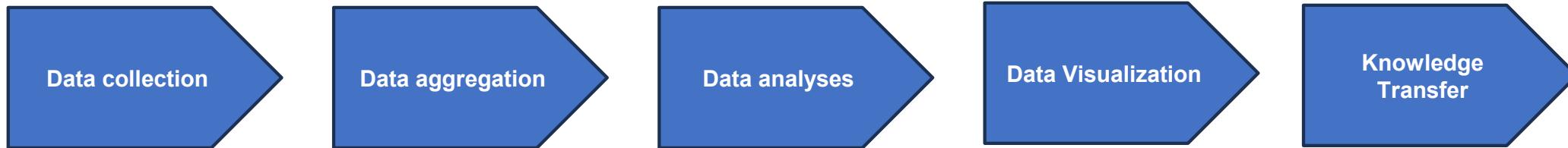
INVASION OF EXOTIC SPECIES



PHYSICAL ALTERATIONS



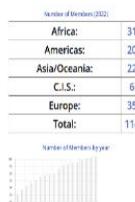
Tackling key challenges — like developing climate-resilient crops and securing future food systems — relies on **analysing vast, heterogeneous and high-quality data** to guide **robust, evidence-based decisions**



Geospatial Data

GEO 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.

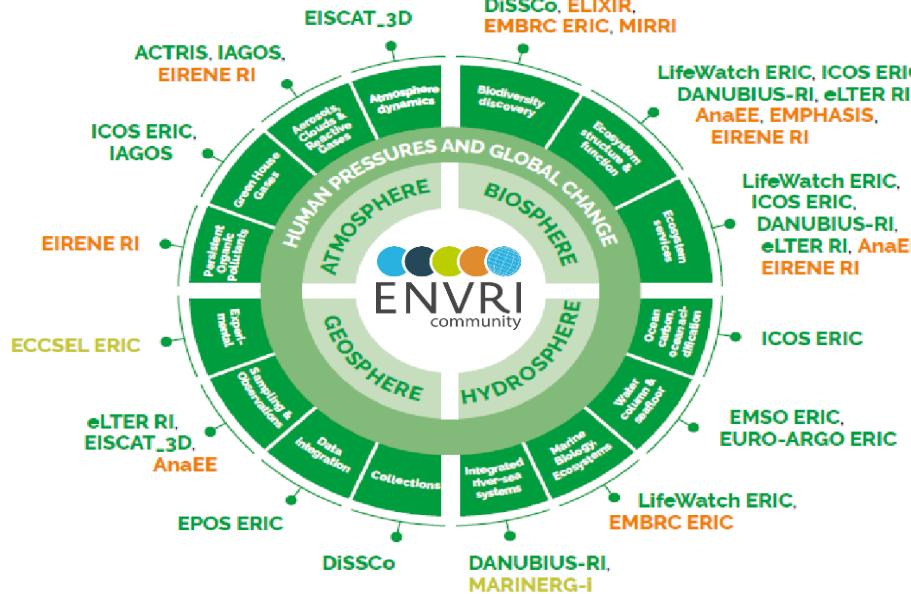


-  Biodiversity and Ecosystem Sustainability
-  Disaster Resilience
-  Energy and Mineral Resource Management
-  Food Security and Sustainable Agriculture
-  Public Health Surveillance
-  Infrastructure and Transport Management
-  Sustainable Urban Development
-  Water Resources Management

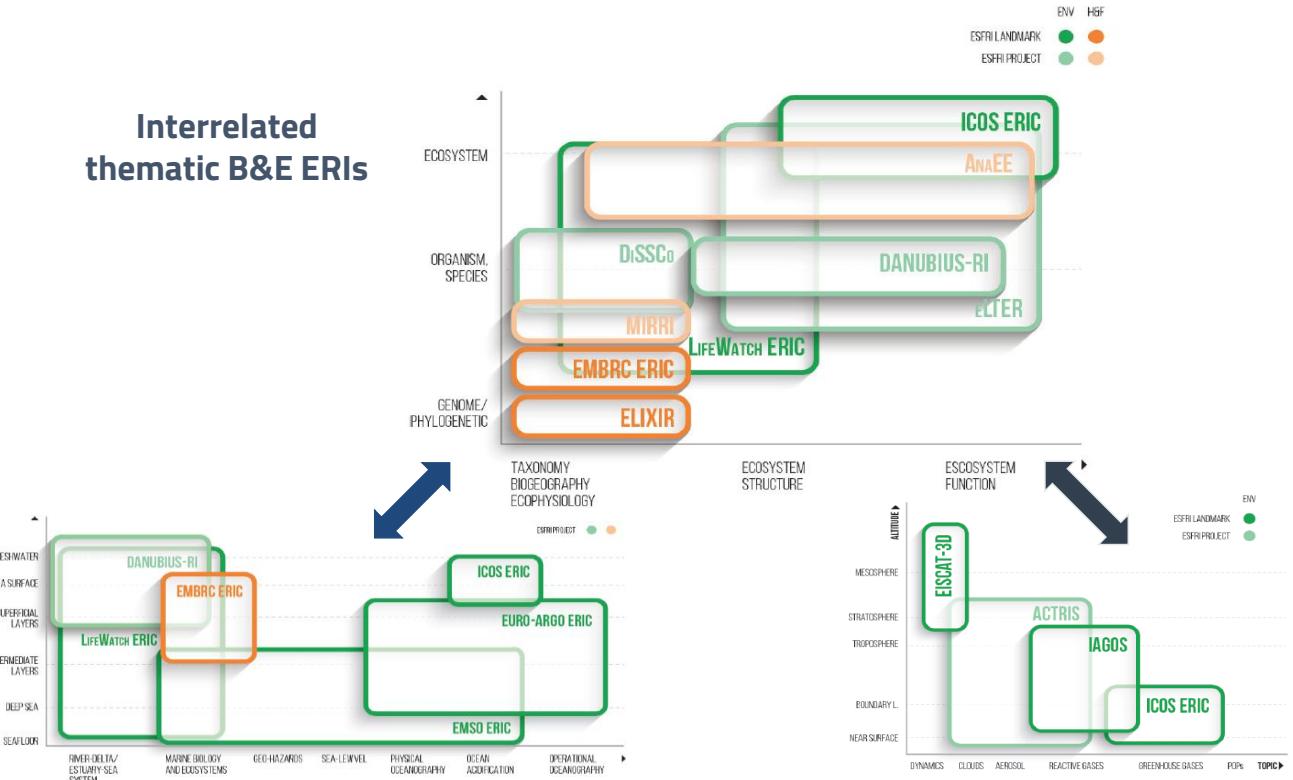
Socio-Economic and General SDGs-related data



European Research infrastructures 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

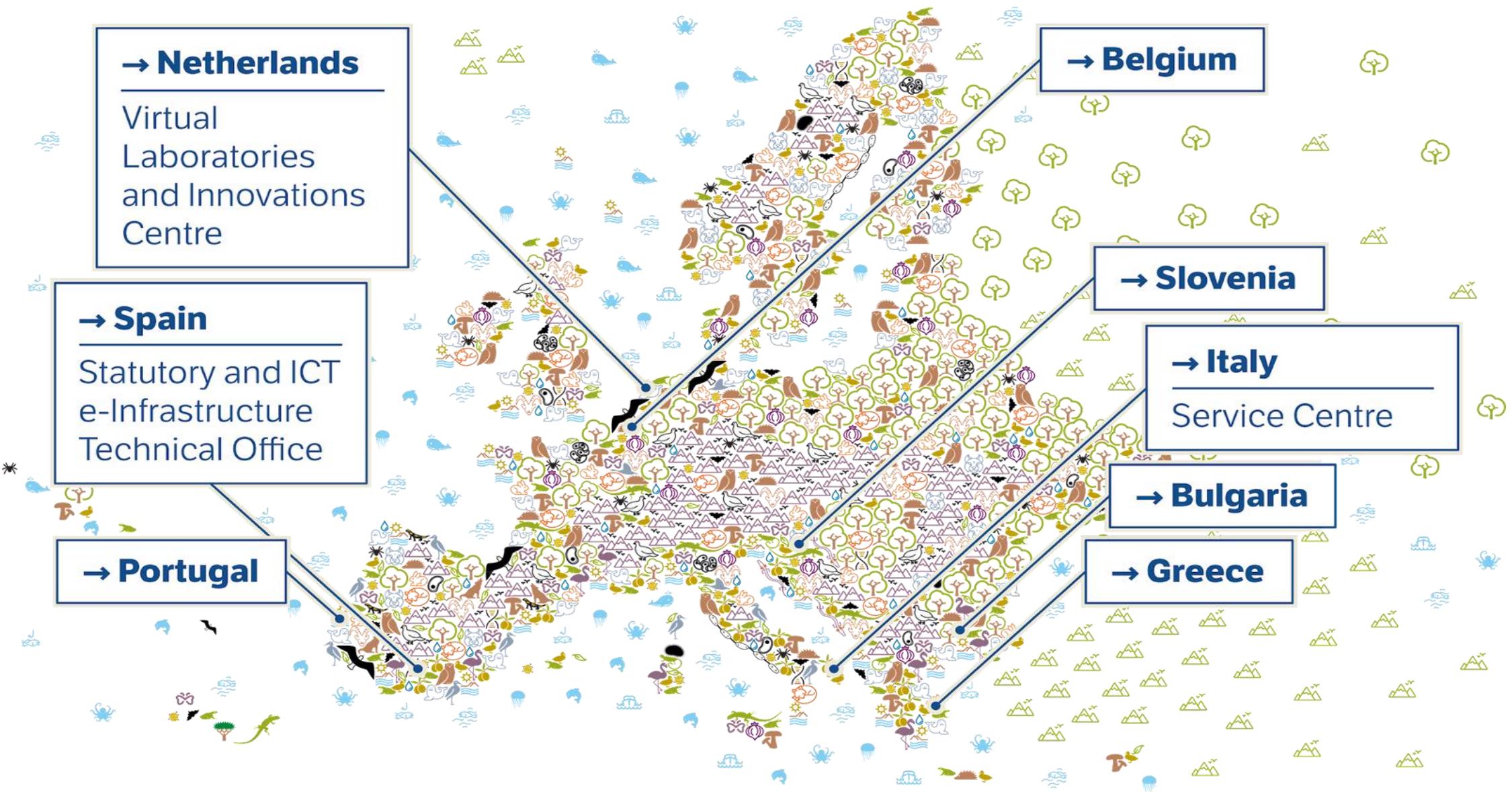


What is LifeWatch ERIC?

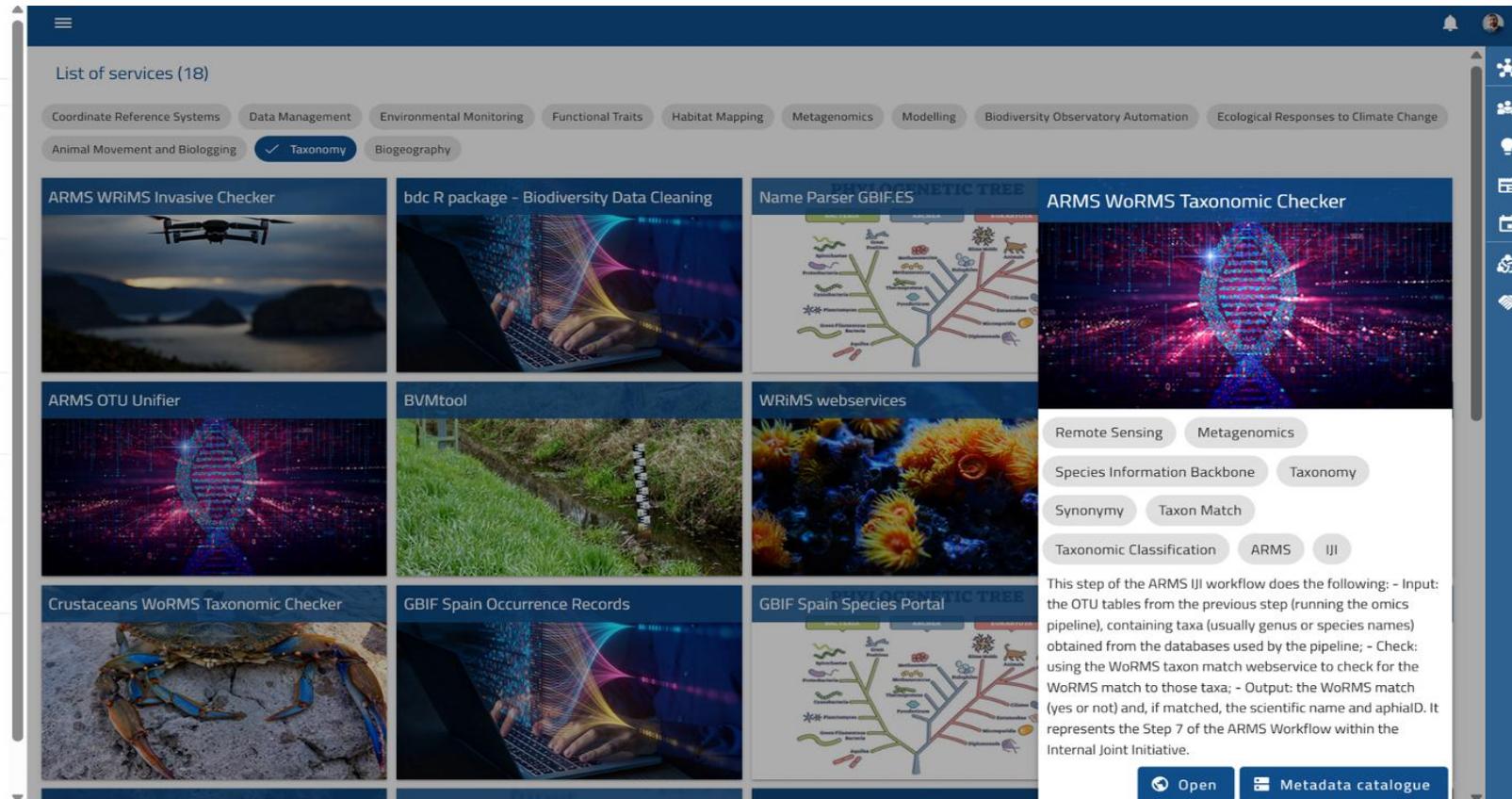
LifeWatch ERIC is a European Research Infrastructure Consortium providing **e-Science research facilities to scientists investigating biodiversity and ecosystem functions and services** in order to support society in addressing key planetary challenges



What is LifeWatch ERIC?



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 'List of services (18)' page on the MyLifeWatch portal. The sidebar on the left contains links for 'List of services', 'Readme', 'My data', 'Cloud', 'Dataset Search', 'Life GPT', 'Traceability Tool', 'LifeWatch ERIC Products' (with sub-links for 'LifeWatch VREs', 'NaavRE Open Lab', 'EcoPortal', and 'Metadata Catalogue'), 'Workflows' (with sub-links for 'My workflows' and 'Workflow Studio'), 'National node services' (with sub-links for 'Belgium', 'Greece', 'Italy', 'Slovenia', and 'The Netherlands'), 'Social' (with sub-links for 'Communities', 'Network', 'Opportunities', 'News', 'Events', and 'My network'), and a 'Logout' button.

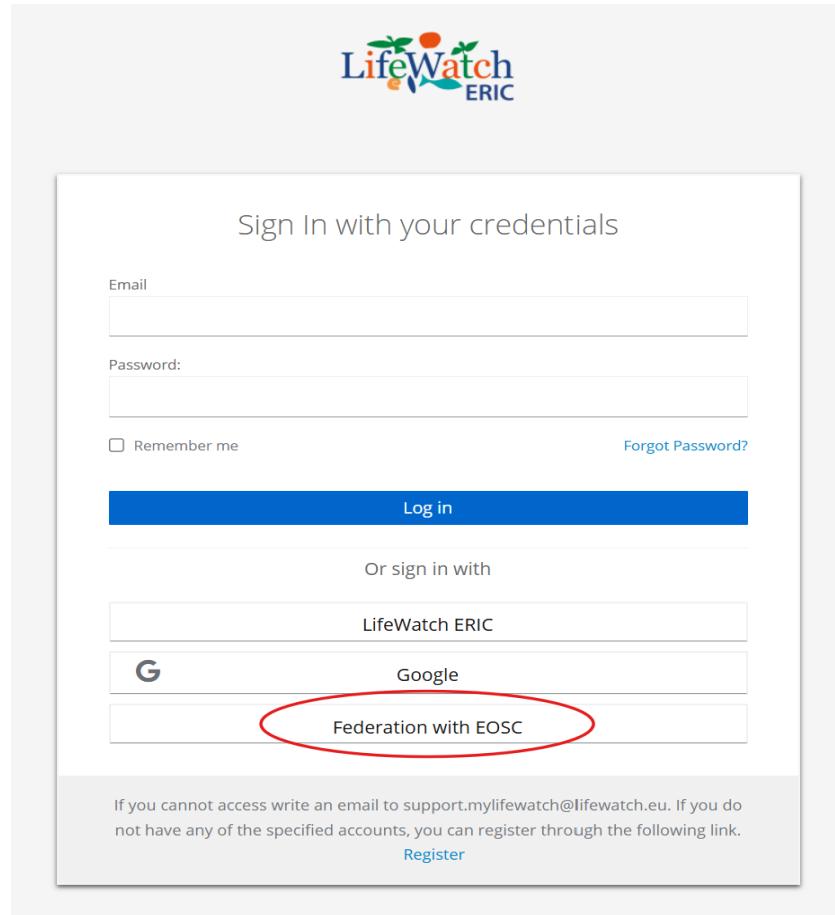
The main content area shows a grid of 12 service cards:

- ARMS WRiMS Invasive Checker**: Image of a drone flying over a body of water.
- bdc R package - Biodiversity Data Cleaning**: Image of a person's hands on a laptop keyboard.
- Name Parser GBIF-ES**: Image of a phylogenetic tree.
- ARMS WoRMS Taxonomic Checker**: Image of a glowing, complex digital structure.
- ARMS OTU Unifier**: Image of a digital hexagonal structure.
- BVTool**: Image of a grassy field with a small stream.
- WRiMS webservices**: Image of a coral reef.
- Crustaceans WoRMS Taxonomic Checker**: Image of a blue crab.
- GBIF Spain Occurrence Records**: Image of a phylogenetic tree.
- GBIF Spain Species Portal**: Image of a phylogenetic tree.

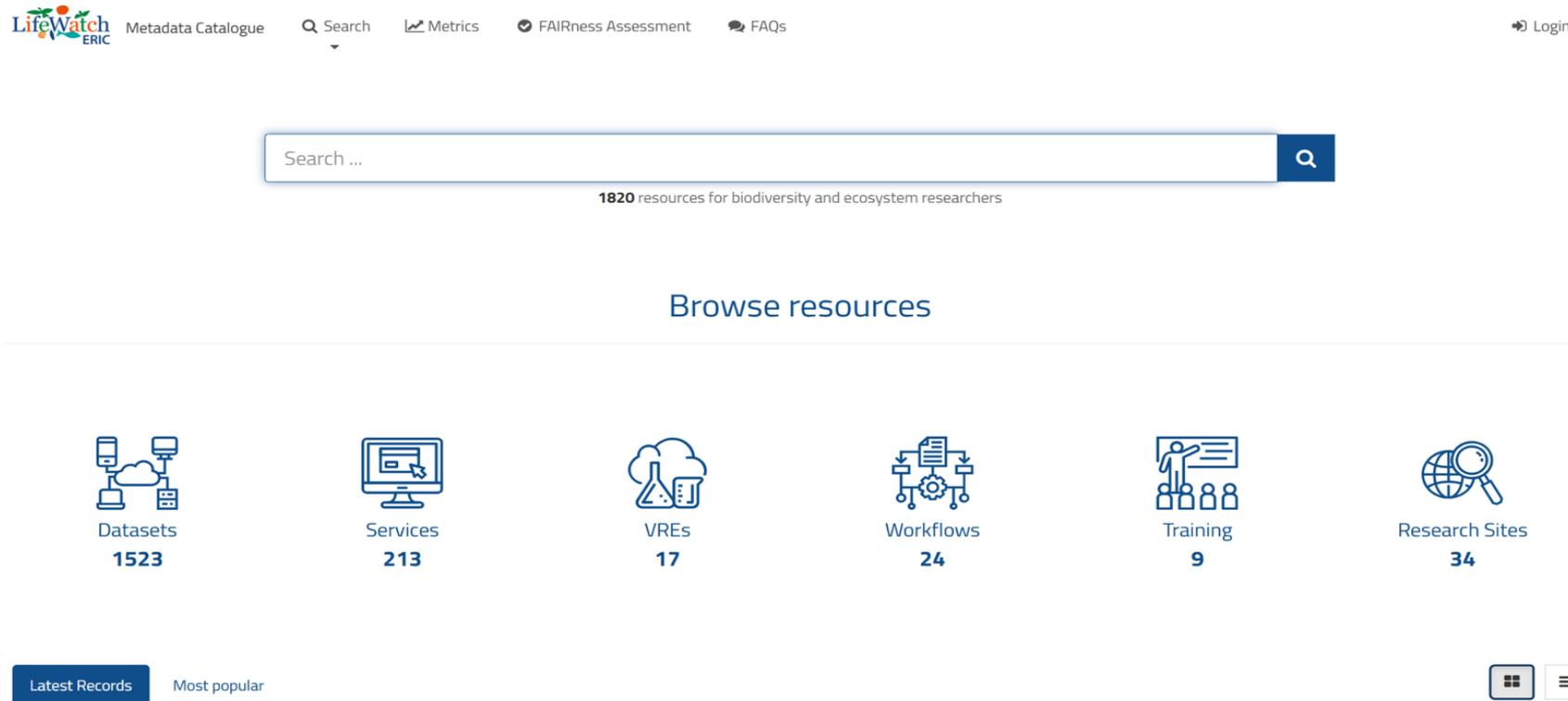
Below the grid, a text box provides a detailed description of the ARMS IJI workflow step 7:

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 aphiaID. It represents the Step 7 of the ARMS Workflow within the Internal Joint Initiative.

At the bottom right are 'Open' and 'Metadata catalogue' buttons.

**EUROPEAN OPEN
SCIENCE CLOUD**A screenshot of the MyLifeWatch sign-in page. The page features the LifeWatch ERIC logo at the top. Below it is a "Sign In with your credentials" section with fields for "Email" and "Password", and a "Remember me" checkbox. To the right of the "Email" field is a "Forgot Password?" link. A large blue "Log in" button is centered below the password field. Below this section is a "Or sign in with" heading followed by three buttons: "LifeWatch ERIC", "Google" (with a red oval highlighting the "G" icon), and "Federation with EOSC". At the bottom of the page, a note states: "If you cannot access write an email to support.my lifewatch@lifewatch.eu. If you do not have any of the specified accounts, you can register through the following link." A "Register" link is provided. The URL <https://my.lifewatch.eu> is also displayed at the bottom right of the page.<https://my.lifewatch.eu>

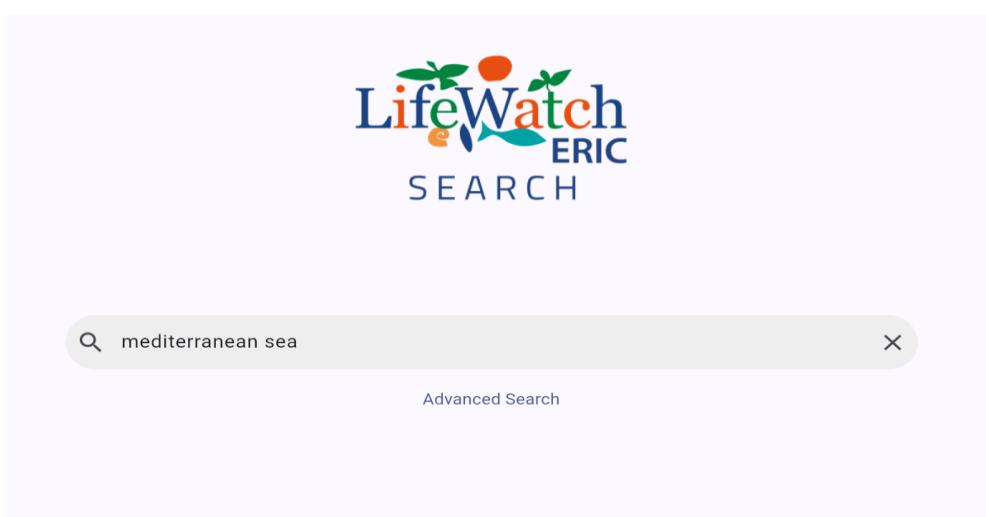
A portal where metadata from all LifeWatch services can be found, following a common metadata standard.



The screenshot shows the homepage of the LifeWatch Metadata Catalogue. At the top, there is a navigation bar with the LifeWatch ERIC logo, a search bar, and links for Metrics, FAIRness Assessment, and FAQs. On the right, there is a 'Login' button. Below the navigation bar is a search bar with the placeholder 'Search ...' and a magnifying glass icon. A message below the search bar states '1820 resources for biodiversity and ecosystem researchers'. The main content area 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 links for 'Latest Records' and 'Most popular', and a navigation menu with icons for grid and list views.

<https://metadatacatalogue.lifewatch.eu>

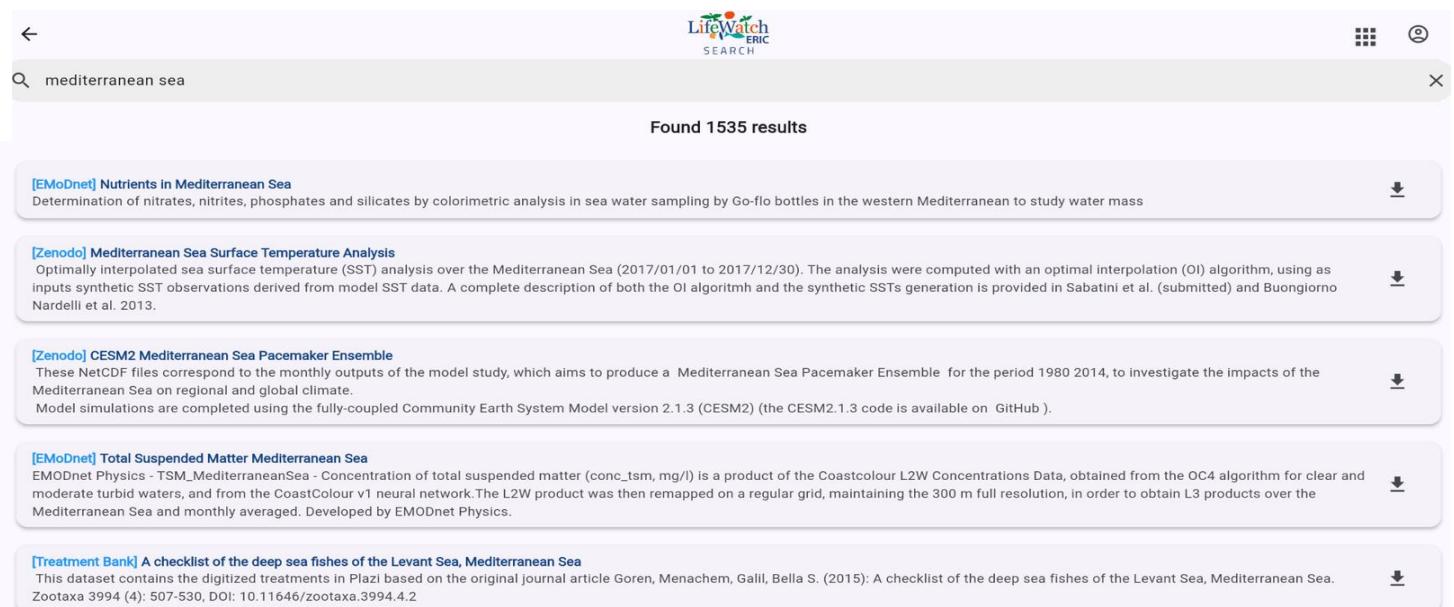
A search tool to find and access harmonized metadata from datasets provided by more than 15 infrastructures and data aggregators.



LifeWatch
ERIC
SEARCH

mediterranean sea

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 [Download](#)

[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. [Download](#)

[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). [Download](#)

[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. [Download](#)

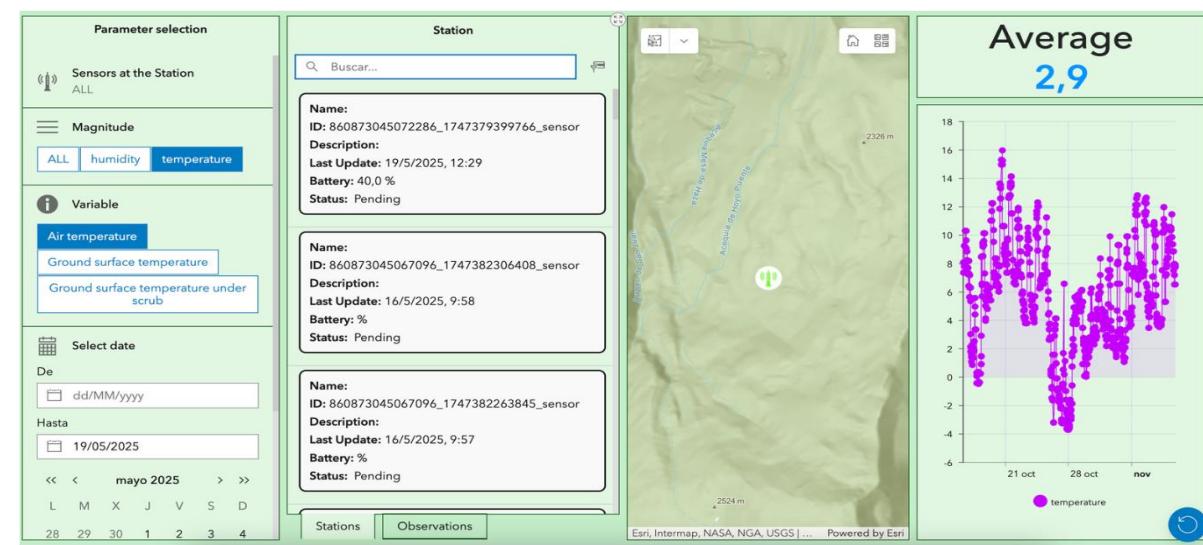
[Treatment Bank] A checklist of the deep sea fishes of the Levant Sea, Mediterranean Sea
This dataset contains the digitized treatments in Plazi based on the original journal article Goren, Menachem, Galil, Bella S. (2015): A checklist of the deep sea fishes of the Levant Sea, Mediterranean Sea. Zootaxa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

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



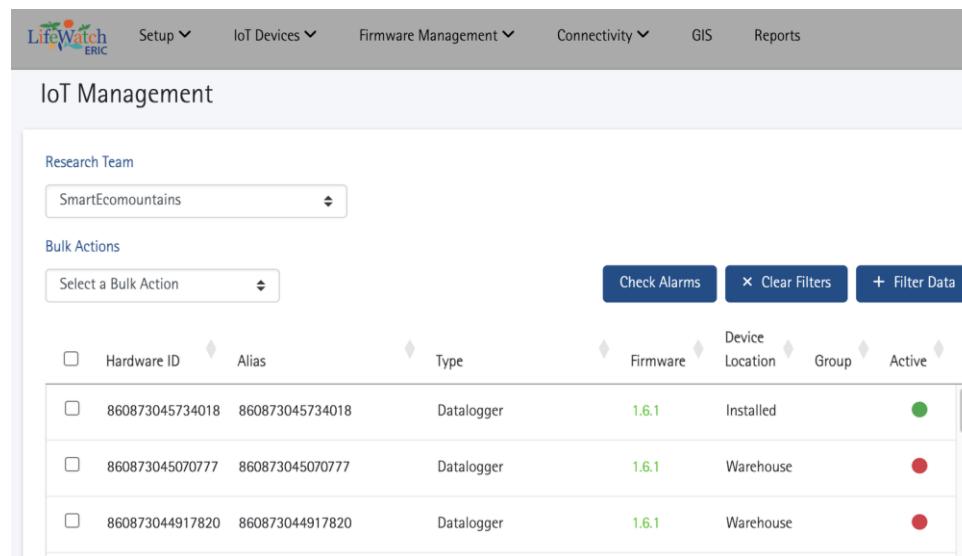
LifeSensors, a management platform that allows:

- 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.

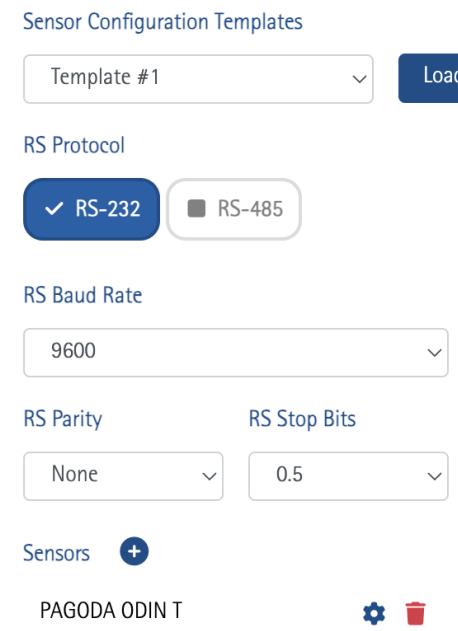
The configuration of working sensors is offered to the community and can be reused in any datalogger.

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 the navigation bar, the title 'IoT Management' is displayed. Under the 'Research Team' section, a dropdown menu shows 'SmartEcomountains'. The 'Bulk Actions' section includes a dropdown for 'Select a Bulk Action' and buttons for 'Check Alarms', 'Clear Filters', and 'Filter Data'. The main table lists three dataloggers with columns for 'Hardware ID', 'Alias', 'Type', 'Firmware', 'Device Location', 'Group', 'Active', and a 'R' column. The first datalogger has an 'Active' status indicated by a green dot, while the others have red dots.

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		●	



The screenshot shows the 'Sensor Configuration Templates' section. At the top, there is a dropdown menu for 'Template #1' and a 'Load' button. Below this, the 'RS Protocol' section has two radio buttons: 'RS-232' (selected) and 'RS-485'. The 'RS Baud Rate' section has a dropdown menu set to '9600'. The 'RS Parity' and 'RS Stop Bits' sections each have dropdown menus. At the bottom, there is a 'Sensors' section with a '+' button, a status bar showing 'PAGODA ODIN T', and a trash can icon.

Sensor Configuration Templates

Template #1 Load

RS Protocol

✓ RS-232 RS-485

RS Baud Rate

9600

RS Parity RS Stop Bits

None 0.5

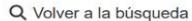
Sensors +

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.

LifeWatch ERIC LifePortal  Buscar  Mapa  Identificarse  Español

 Volver a la búsqueda  Descargar  Modo de visualización

Microclimate station 018-019

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/spa/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.

 En proceso

API

 Sensor Description (SensorML via SOS)	Technical description of the station Microclimate 018 in SensorML 2.0 format via the OGC SOS service.	
 Sensor Description (SensorML via SOS)	Technical description of the station Microclimate 019 in SensorML 2.0 format via the OGC SOS service.	
 Sensor Observation Service Data Access	Access to time series data for station Microclimate 018 via Helgoland REST API (JSON format).	

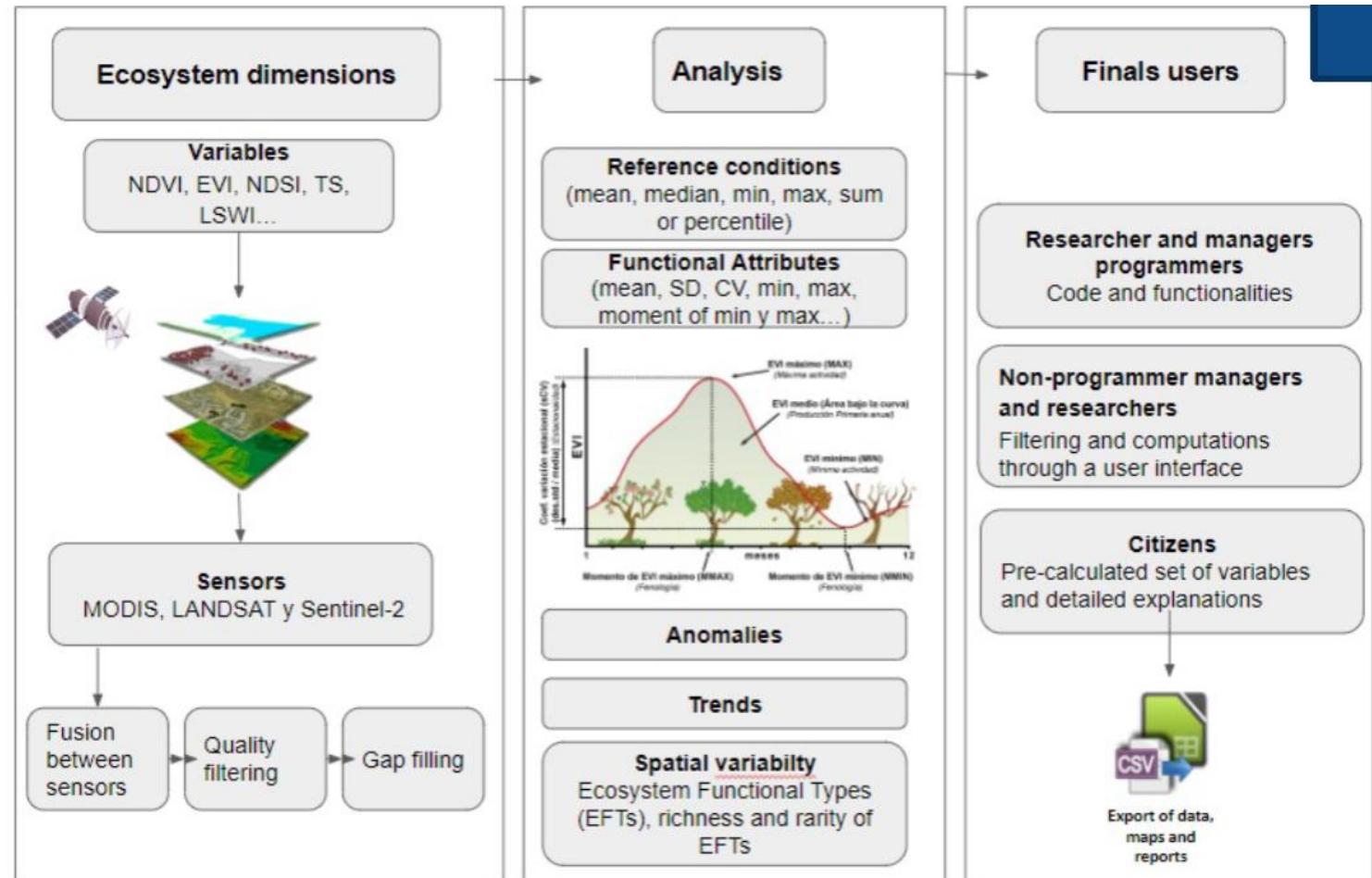
Enlaces

 ArcGIS Dashboard for Sensor Data Visualization	Abrir enlace 
 FIWARE Enablers-018	Abrir enlace 
 Fiware status-018	Abrir enlace 
 Helgoland API Documentation (52°North)	Abrir enlace 
 Sensor Observation Service Data Access	Abrir enlace 

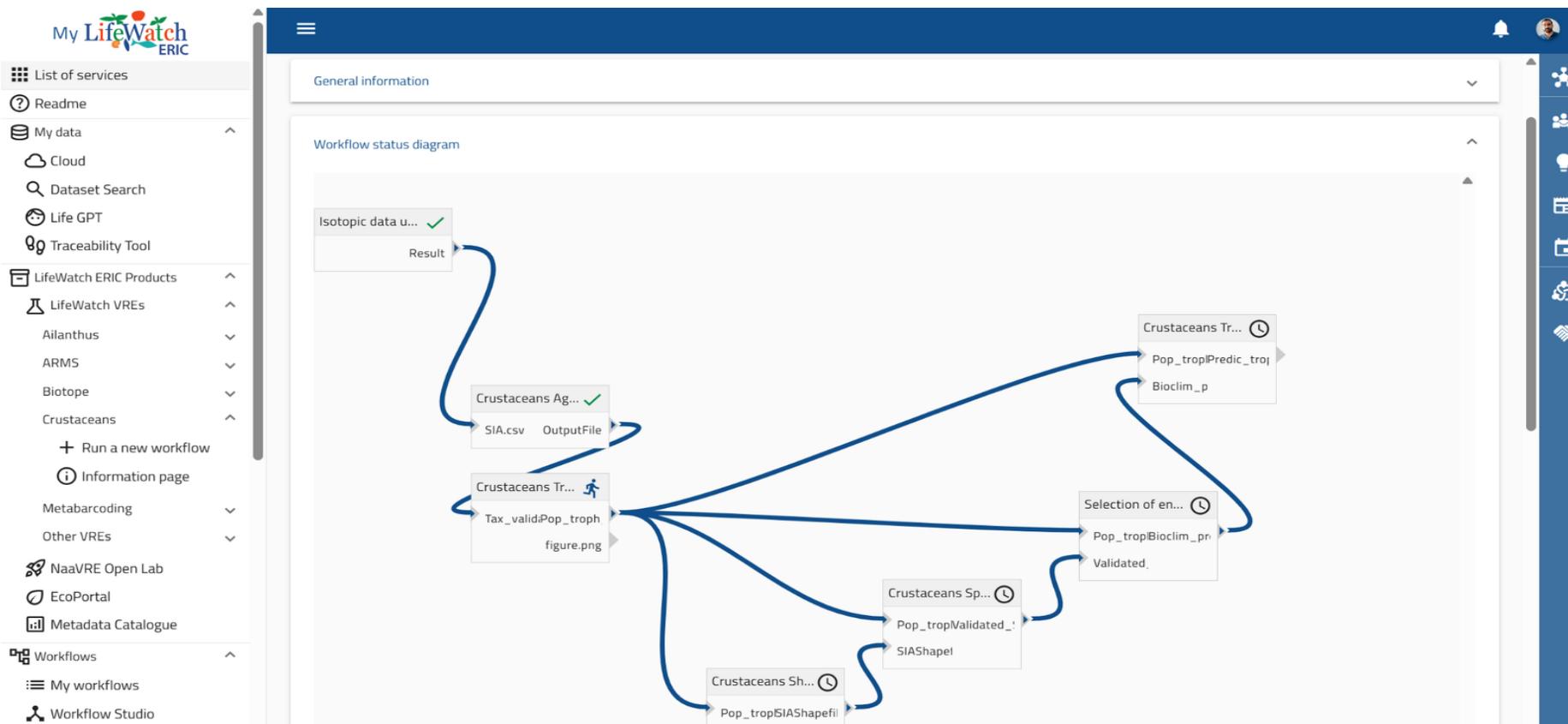
MonitorEO tool

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.



- 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.

Component library

Search

Available components (206):

- Core (1)
 - Import file
- Data analysing (55)
 - Ailanthus Extractor
 - Ailanthus SVM Classifier
 - ANERIS Intraspecific Vari...
 - ARMS WoRMS Taxonomic...
 - ARMS WRiMS Invasive Ch...
 - Biotope GRISS Extractor
 - Community Statistics
 - Community Statistics Plot
 - Crustaceans Aggregator
 - Crustaceans Trophic Positi...
 - Data Extraction
 - Dendrogram
 - ETP Plot
 - ETP Statistics

Component information

Available versions for this component:

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 [\[link\]](#)

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 Pavloudi, 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, giga022, DOI: 10.1093/gigascience/giaa022

Selected version 1.0.1 (Latest)

1.0.0

1.0.1 (Latest)

[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

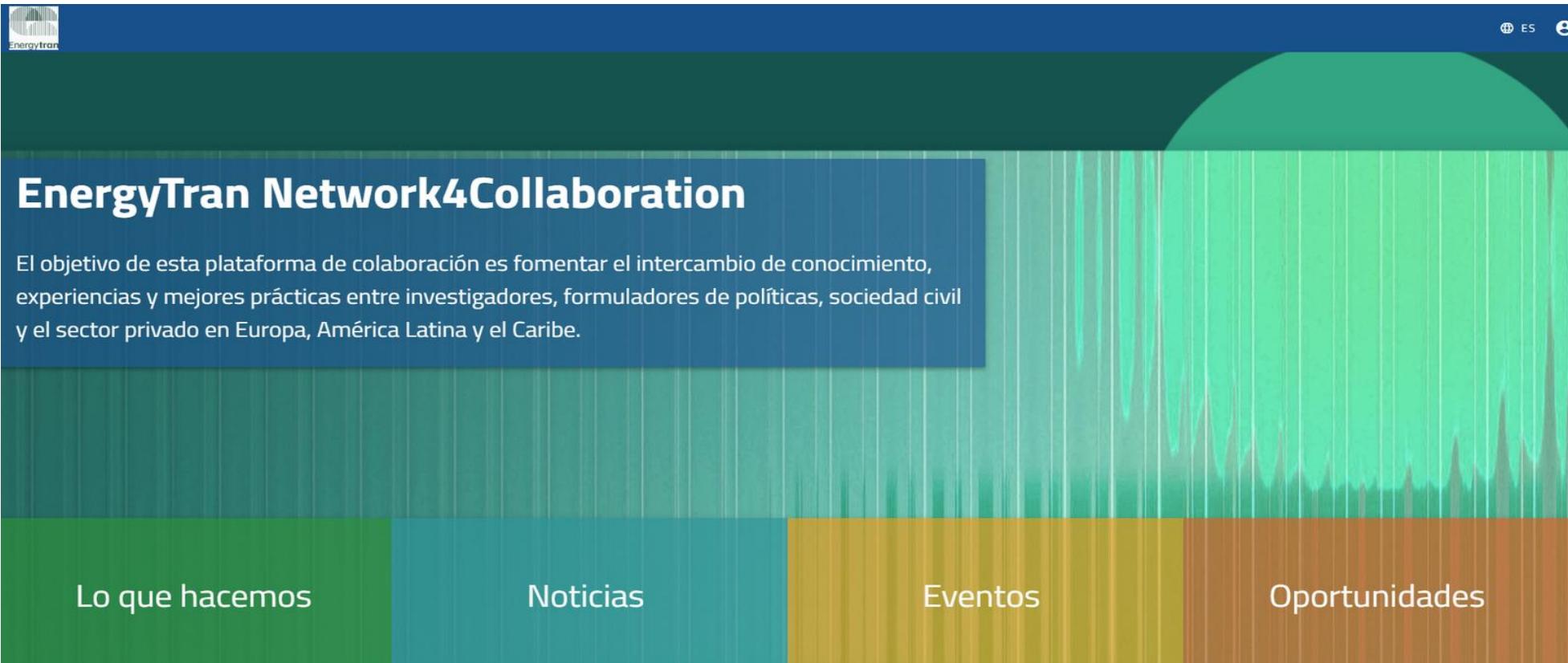


Crustaceans



Metabarcoding

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



The screenshot shows the homepage of the EnergyTran Network4Collaboration website. The header features the EnergyTran logo and a language selector (ES). The main title "EnergyTran Network4Collaboration" is displayed prominently. A text box below the title states: "El objetivo de esta plataforma de colaboración es fomentar el intercambio de conocimiento, experiencias y mejores prácticas entre investigadores, formuladores de políticas, sociedad civil y el sector privado en Europa, América Latina y el Caribe." The footer is divided into four colored sections: green, teal, yellow, and orange, with the text "Lo que hacemos", "Noticias", "Eventos", and "Oportunidades" respectively.

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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