

# THE EARTH IS OUR LAB.



An introduction to the community  
of European Environmental  
Research Infrastructures.

[envri.eu](http://envri.eu)



# Foreword



The Earth is like a puzzle. Beautifully complicated. Interconnected. And just like you need to understand how the puzzle works to solve it, we need to know how the Earth system works to respond to all the challenges our planet faces.

Air, Life, Water and Land - all these parts of the Earth interact together. ENVRI is a community of environmental research infrastructures working together to observe the Earth as one system. We collaborate to provide multidisciplinary environmental in situ data, tools, and other harmonised services that can be used by anyone for free.

Welcome to the ENVRI Community.



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 824068.

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# 01/ Introduction

This introduction will help you navigate through the main features common to all the research infrastructures in the ENVRI Community: the domain(s) they belong to, their readiness level, their structural type and the services they propose.

## Domains covered by the ENVRI Community



### Atmospheric domain

The research infrastructures of the atmospheric domain aim to define the processes that influence the composition of the Earth's atmosphere – from the lower troposphere to the magnetosphere.



### Biosphere & ecosystem domain

The research infrastructures studying the life on Earth focus on ecosystems and the interactions between the biological, physical and chemical processes affecting their viability.



### Marine domain

Marine research infrastructures are operating in/on the water, whether it is seawater that is studied from the sea floor to the surface, freshwater in rivers and lakes, or cryosphere: water in its solid form.



### Solid Earth domain

The research infrastructures studying our land cover the deepest interior where they investigate the internal structure and dynamics of the Earth up to agricultural, urban or pristine land on the surface.



### Multi-domain

The Earth is not a collection of isolated systems: all domains interact with each other. Multi-domain research infrastructures study phenomena that involve several of these components.

## Services provided by the environmental research infrastructures



### Data services

- **Open and FAIR environmental data** from the four domains of the Earth system
- **Data offered through specific RI data portals**, and soon also through one ENVRI-hub interface integrated in the European Open Science Cloud
- **Elaborated data products**



### Access services

- **Physical, remote, and virtual access** to observational and exploratory platforms, experimental facilities, scientific resources (e.g. samples, specimen, etc.)



### Computational services

- **Virtual research environments**
- **Data visualisation tools modelling platforms**
- **Data analysis tools & software**



### Support services

- **Education and training**
- **Support for research**
- **Design and planning other practical services**

## Readiness levels of the research infrastructures

The research infrastructures in the ENVRI Community have reached different levels of maturity or "readiness levels" (RL), which bear a direct impact both on their practice and/or their capacity to deliver services to their users, as well as on the scope of the delivered services themselves.

The RIs featured in this ENVRI brochure can be at one of the four following stages: in planning, under construction, partially operational, and fully operational. The attribution of the stage to a RI depends on the level of implementation of the Long Term Sustainability (LTS) indicators:

- ensuring scientific excellence
- attracting and training the managers, operators and users of tomorrow
- unlocking the innovation potential of RI
- measuring SocioEconomic Impact of RI
- exploiting better the data generated by RI Framework conditions for effective governance and sustainable longterm funding for RI
- structuring the international outreach of RI

**In planning (RL3):** LTS prepared with agreed policies in development

**Under construction (RL4):** LTS under construction and policies in place

**Partially operational:** some LTS available and operational

**Fully operational (RL5):** all LTS available and fully operational

## Types of research infrastructures: single-sited or distributed

The research infrastructures in the ENVRI Community can be organised in two groups: single-sited or distributed. Single-sited RIs are "research plants" in a single or a few, hardware-dependent site (such as extreme laser sites, for example), designed for user access either in-person or remotely. Distributed RIs are networks of observatories that can be either physical or virtual, consisting of a central hub and interlinked national nodes or networks.

## Background, vision and objectives of the ENVRI Community

European environmental research infrastructures are key providers of high-quality data, research products and services from the main components of the Earth system - Atmosphere, Marine, Solid Earth, and Biodiversity / Terrestrial Ecosystems.

Understanding the Earth is not possible without interdisciplinary science. We need a holistic approach where environmental data and services produced by the different research infrastructures are harmonised and easy to use for scientists from any field of environmental research. These scientists, in turn, deliver new insights into the current state of our planet.

Such integration efforts are organised within the ENVRI Community, a common forum for research infrastructure collaboration and co-creation. ENVRI Community is currently supported by the EU funded project ENVRI-FAIR.

### FAIR services

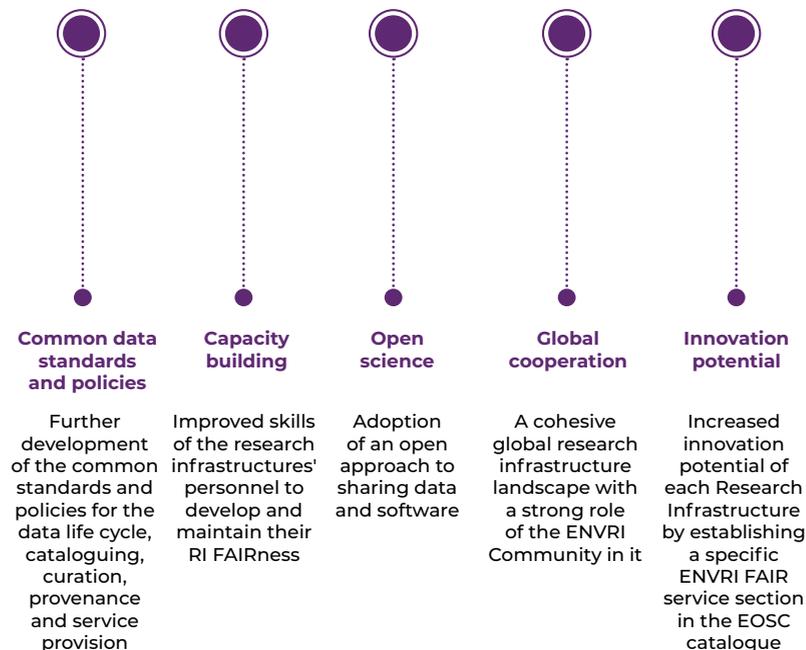
The aim of the ENVRI-FAIR project is to make the data and services provided by ENVRI research infrastructures easily findable, accessible, interoperable and reusable (FAIR) and, therefore, available to a wide variety of user communities. In addition, we are keen to ensure our data and services are well connected to the emerging service ecosystem of the European Open Science Cloud (EOSC).

### The ENVRI-hub

ENVRI-FAIR will deliver an open access platform for interdisciplinary environmental research data, called the ENVRI-hub. The hub will form an interface to the EOSC and will be realised as the services across ENVRI research infrastructures become progressively more integrated.

## GOALS

### Primary goals of the ENVRI-FAIR project



# The ENVRI Community landscape

Single domain



AnaEE  
DiSSCo  
EMPHASIS  
INTERACT



EPOS



Eurofleets+  
Euro-Argo  
GROOM RI  
JERICO-RI  
SeaDataNet



ACTRIS  
ARISE  
EISCAT3D  
EUFAR  
HEMERA  
IAGOS

Multi domain



EuroGOOS  
ICOS  
IS-ENES  
SIOS



DANUBIUS-RI  
eLTER  
EMBRC  
LifeWatch  
AQUACOSM-plus



EMSO



# 02/ Atmospheric domain



ACTRIS  
ARISE  
EISCAT3D  
EUFAR  
HEMERA  
IAGOS



Exploring the Atmosphere

[actris.eu](https://actris.eu)

#### Domain

Atmosphere

#### Readiness level

Implementation phase,  
partially operational

#### RI type

Distributed

#### Services

Data services, access services,  
computational services,  
support service

#### Social Media

Twitter: @ACTRISRI  
LinkedIn: @ACTRIS-RI  
YouTube ACTRIS

## Aerosol, Clouds and Trace Gases Research Infrastructure

Understanding atmospheric  
processes predictions rely  
on complex models that are  
underpinned by observations.

Without high-quality observation  
data to constrain predictive models,  
any forecast of the atmosphere  
is highly unreliable. ACTRIS produces  
high-quality data and information on  
short-lived atmospheric constituents  
and on the processes leading to the  
variability of these constituents in  
natural and controlled atmospheres.

ACTRIS provides services, including  
access to instrumented platforms  
and simulation chambers, tailored  
for scientific and technological usage  
for users from the public and private  
sectors.





[arise-project.eu](https://arise-project.eu)

**Domain**  
Atmosphere

**Readiness level**  
Under construction

**RI type**  
Distributed

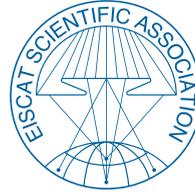
**Services**  
Multi-instrument data service about atmospheric dynamics

## Atmospheric Dynamics Research Infrastructure In Europe

The ARISE project combines for the first time complementary observations - infrasound technology, lidars, radars, and satellites - with modelling, for a better description of the dynamics from the troposphere to the lower thermosphere, where routine high resolution observations are rare.

Data provides an optimized estimation of the evolving state of different atmospheric layers. The objective is to determine the effects of poorly resolved disturbances - such as sudden stratospheric warming events, gravity and planetary waves - on uncertainties in weather and climate models and infrasound simulations.

The expected benefits would be a better description of the atmosphere, an improved accuracy in short- and medium-range weather forecasts and remote natural hazard monitoring for societal applications.



[eiscat.se](https://eiscat.se)

**Domain**  
Atmosphere

**Readiness level**  
Fully operational (VHF, UHF, ESR)  
Under construction (EISCAT\_3D)

**RI type**  
Single sites

**Services**  
Data services, access services, computational services, support services

**Social Media**  
Twitter: @EISCATofficial  
LinkedIn: eiscat-scientific-association  
Facebook: @EISCAT

## European Incoherent Scatter Radar

EISCAT is an international non-profit organisation, founded in 1976, conducting incoherent scatter radar (ISR) measurements in the Earth's polar upper atmosphere and providing data for the research community. EISCAT operates 3 ISR systems on 4 sites in Northern Scandinavia and Svalbard.

EISCAT\_3D, a next-generation ISR system expected to be in operation in 2023 is under construction in the same area. The data the EISCAT provides include height profiles of electron density, electron and ion temperatures, and ionospheric drift velocities.

The primary design of the EISCAT systems is for investigating the coupling between the Earth's atmosphere and space, but they are also suitable for a wide range of other science targets including upper atmospheric dynamics and radio astronomy.



## eufar.net

### Domains

Atmosphere, land surface, biosphere, water

### Readiness level

Fully operational as AISBL

### RI type

Distributed

### Services

Access services, data services, knowledge transfer

### Social Media

Twitter: @EUFAR\_science

## European Facility for Airborne Research in Environmental and Geosciences

EUFAR is a multidisciplinary research infrastructure that links the operators of research aircraft and instrumentation with the broader scientific user community. Its objectives are to broaden access to the facilities and to the data provided by them and to promote collaboration amongst its members and user community.

EUFAR presently comprises of 13 member organisations in 9 countries. EUFAR facilities are typically deployed on observing campaigns of limited duration in the geographical location and time period that is appropriate the processes and phenomena of interest. Members support the user community with the preparation and deployment of facilities on these campaigns and with the subsequent provision of data. Measurement payloads generally comprise a mixture of instruments operated and maintained by the member flight facilities and separate user-supplied instruments.



## hemera-h2020.eu

### Domain

Atmosphere

### Readiness level

Fully operational

### RI type

Distributed

### Services

Provision of stratospheric balloon flights, provision of data from HEMERA and pre-HEMERA balloon flights

### Social Media

Twitter: @HemeraH2020

## Integrated access to balloon-borne platforms for innovative research and technology

HEMERA is a Research Infrastructure funded by the Horizon 2020 framework Programme of the European Union which integrates a large starting community in the field of tropospheric and stratospheric balloon-borne research, to make existing balloon facilities available to all scientific teams in the European Union, Canada and associated countries.

The complementary of the HEMERA members' capabilities in the field of balloon systems and operations will offer an easy and enhanced service to the scientific community.

A wide range of scientific and technical themes are addressed, such as astronomy, atmospheric physics and chemistry, climate research, fundamental physics, biology, space research and technology.



## In-Service Aircraft for a Global Observing System

[iagos.org](https://iagos.org)

### Domain

Atmosphere

### Readiness level

Fully operational

### RI type

Distributed

### Services

Data provision, data services

### Social Media

Twitter: @IAGOS\_RI

LinkedIn: @IAGOS\_RI

Youtube IAGOS\_RI

IAGOS is a European Research Infrastructure for global observations of atmospheric composition from commercial aircraft.

IAGOS combines the expertise of scientific institutions with the infrastructure of civil aviation to provide essential data on climate change and air quality.

The objective of IAGOS is to provide the most complete set of high quality Essential Climate variables (ECV) over several decades. The observations are stored in the IAGOS data centre along with added-value products to facilitate the scientific interpretation of the data.



# 03/ Biosphere & ecosystem domain



AnaEE  
DiSSCo  
EMPHASIS  
INTERACT



[anaee.eu](http://anaee.eu)

**Status**  
ERIC

**Domains**  
Land, water, life, air

**Readiness level**  
Partially operational

**RI type**  
Distributed

**Services**  
Open-air and enclosed experimentation facilities on terrestrial and aquatic ecosystems, analytical facilities, data and modelling services

**Social Media**  
Twitter: @AnaEE\_EU  
FB @anaeeri

## Analysis and Experimentation on Ecosystems

AnaEE brings together a series of state-of-the-art experimental and analytical platforms for ecosystem research throughout Europe.

At the core of AnaEE's approach is a network of distributed experimental facilities, through which ecosystems can be exposed to a series of controlled conditions, from land-use change, pollution, biological invasions, rising atmospheric greenhouse gases concentrations, and to increasing extreme events such as droughts and heatwaves.

AnaEE also provides analytical services to support experimentation and offers access to models that can be used for the interpretation of experimental data, notably in conjunction with other sources of data, and also to assess the quality of the data.

The services are coordinated by the Central Hub with the support of 3 services centres: the Technology Centre, the Data and Modelling Centre and the Interface and Synthesis Centre.





## Distributed System of Scientific Collections

### diSSCo.eu

#### Domains

Geo- and bio-diversity, natural history collections, environment, research

#### Readiness level

In planning

#### RI type

Distributed

#### Services

European loans & visits system, collection digitisation dashboard, specimen data refinery, knowledge base, helpdesk, unified curation & annotation system, digital specimen repository

#### Social Media

Twitter: @DiSSCoEU

The Distributed System of Scientific Collections is a new world-class Research Infrastructure (RI) for natural science collections. The DiSSCo RI works for the digital unification of all European natural science assets under common curation, access, policies and practices, and aims to ensure that the data is easily Findable, Accessible, Interoperable and Reusable (FAIR).

As such, DiSSCo will transform a fragmented landscape of crucial natural science collections into an integrated knowledge base that provides interconnected hard evidence of the natural world.

DiSSCo represents the largest ever formal agreement between natural history museums, botanic gardens and collection-holding universities in the world.



## emphasis.plant-phenotyping.eu

#### Domains

Life sciences, environmental sciences

#### Readiness level

Implementation phase

#### RI type

Distributed

#### Services

Access to instrumented facilities, data and computational services, modelling, training, harmonisation, innovation

#### Social Media

Twitter: @EMPHASIS\_EU  
 LinkedIn: @EMPHASIS  
 Facebook: @EMPHASIS.EU  
 Instagram @emphasis\_eu

## European Infrastructure for Plant Phenotyping

EMPHASIS aims at improving food security and agricultural business in a changing climate. As the world's population is growing, we will have to significantly increase the yields of major crops.

At the same time, climate change causes more droughts and extreme temperatures with negative effects on crop yields, further increasing the pressure to improve crop production. Plant phenotyping describes the scientific exploration of plant performance with respect to structure, function, quality and interaction with the environment. It has become the bottleneck for the exploitation of crop genetic diversity.

The distributed research infrastructure EMPHASIS has been launched to tackle this bottleneck. EMPHASIS will provide access to instrumented facilities across Europe, develop tools for data management, novel technologies and knowledge sharing to enable scientists to better understand plant performance and translate this knowledge into application.



[eu-interact.org](http://eu-interact.org)

**Domain**  
Terrestrial

**Readiness level**  
Fully operational

**RI type**  
Distributed

**Services**  
Trans-national, remote and virtual access

**Social Media**  
Twitter: @INTERACT66  
Instagram: @eu\_interact  
Facebook: InteractArctic

## International Network for Terrestrial Research and Monitoring in the Arctic

INTERACT is a network of 89 terrestrial research stations in the Arctic and adjacent high-alpine areas. It builds capacity for identifying, understanding, predicting and responding to diverse environmental changes throughout the wide environmental and land-use envelopes of the Arctic. Currently focusing on six societal challenges in the Arctic (extreme weather events, communication and transport, retrieving hidden data with AI, educating the new generation, emerging pollutants, increasing tourism).

INTERACT has provided funding for over 1,000 researchers to visit research stations through its transnational access, and in addition provides remote access whereby station staff makes observations and provides virtual access to data. INTERACT's Station Managers' Forum have provided several best practice handbooks about station management that are available on INTERACT's web site. INTERACT has also developed educational resources that have reached schools in over 50 countries, more than 200 universities and more than 15 000 users.



# 04/ Marine domain



**Eurofleets+**  
**Euro-Argo**  
**GROOM RI**  
**JERICO-RI**  
**SeaDataNet**



## **An alliance of European marine research infrastructures**

### **eurofleets.eu**

#### **Domains**

Land, water, life, air

#### **Readiness level**

Fully operational

#### **RI type**

Distributed

#### **Services**

Physical remote and virtual access to research vessels, instrumentation and large exchangeable equipment, data provision, education & training.

#### **Social Media**

Twitter: @eurofleets

EUROFLEETS is a distributed research infrastructure facilitating open free of charge (currently funded under the H2020 Programme) access to an integrated and advanced research vessel fleet, designed to meet the evolving and challenging needs of the Marine science user community.

Interdisciplinary research groups can access European, global seas and oceans to conduct excellent research, with priority given to new users, early stage researchers, women scientists and researchers from less equipped countries.

Eurofleets develops tools and equipment to meet the evolving challenges of marine research, especially for deep ocean research and exploration, data management, and virtual access. Free and open access to data is ensured, adding value, advancing knowledge and enabling further innovation. Additionally, training and exchange programmes for user communities and professional staff are provided.





**euro-argo.eu**

**Status**  
ERIC

**Domain**  
Marine

**Readiness level**  
Fully operational

**RI type**  
Distributed

**Services**

Float procurement, testing and deployment planning, at-sea monitoring, Argo data management and access, trainings for capacity building

**Social Media**

Twitter: @EuroArgoERIC

**Euro-Argo ERIC,  
the European  
contribution  
to the Argo programme**

Euro-Argo ERIC sustains and optimises the European contribution to the international Argo program, providing, deploying and operating nearly 25% of the Argo floats network.

The ERIC is composed of 12 European countries that join their efforts to provide data both in real time for operational services (oceanography and weather forecast) and in delayed mode for climate and ocean health research, as well as ocean reanalysis and seasonal forecast.

The ERIC facilitates logistic-supporting monitoring at-sea, and has developed related services for its 12 members, from float procurement to data management and enhanced services for users.



**groom-ri.eu**

**Domain**  
Marine

**Readiness level**  
Under construction

**RI type**  
Distributed

**Services**

Data Services, Access Services, Computational Services, Support Service

**Social Media**

Twitter: @Groom2RI  
LinkedIn: @Groom-ii-ri

**Gliders for Research,  
Ocean Observations  
and Management:  
Infrastructure and  
Innovation**

GROOM RI is a distributed European Research Infrastructure harnessing the advantages of Marine Autonomous Systems (MAS). MAS are highly capable platforms that can collect water column measurements at a wide range of spatio-temporal scales and, in recent years, they have become ubiquitous for marine research, Ocean Observing Systems and for industrial applications.

GROOM RI integrates national infrastructures for Marine Autonomous Systems and promotes a collaborative approach to collect and share oceanographic data. It provides access to platforms and services to the broadest range of scientific and industrial users, as well as other ocean observing RIs.

By maintaining a unique centralised provision of cyber-infrastructure, data and knowledge, it optimises the use of MAS in Europe to study climate and marine environments, and also supports operational services and the blue economy.



## Joint European Research Infrastructure network for Coastal Observatories

**jerico-ri.eu**

**Domain**  
Coastal

**Readiness level**  
Fully operational

**RI type**  
Distributed, virtual

**Social Media**  
Twitter: @JERICORI

JERICORI is an integrated pan-European multidisciplinary and multi-platform research infrastructure dedicated to a holistic appraisal of coastal marine system changes.

It is seamlessly bridging existing continental, atmospheric and open ocean RIs, thus filling a key gap in the ESFRI landscape. JERICORI establishes the framework upon which coastal marine systems are observed, analysed, understood and forecasted.

JERICORI enables open-access to state-of-the-art and innovative facilities, resources, FAIR data and fit-for-purpose services, fostering international science collaboration.



## Pan-European infrastructure for ocean & marine data management

**seadatanet.org**

**Domain**  
Marine

**Readiness level**  
Operational

**RI type**  
Virtual

**Services**  
Data services

**Social Media**  
Twitter: @seadatanet

SeaDataNet - Pan-European infrastructure for ocean & marine data management - is a standardized system for managing the large and diverse data sets collected by the oceanographic fleets and the automatic observation systems. The SeaDataNet infrastructure links already 117 national oceanographic data centres and marine data centres from 35 countries riparian to all European seas.

The data centres manage large sets of marine and ocean data, originating from their own institutes and from other parties in their country, in a variety of data management systems and configurations. A major objective and challenge in SeaDataNet is to provide an integrated and harmonised overview and access to these data resources, using a distributed network approach.

The networking of these professional data centres, in a unique virtual data management system provide integrated data sets of standardized quality on-line.

# 05/ Solid Earth domain



EPOS



[epos-eu.org](https://epos-eu.org)

**Status**  
ERIC

**Domain**  
Solid Earth Science

**Readiness level**  
Partially operational

**RI type**  
Distributed

**Services**  
Data services, access services,  
computational services, support  
service

**Social Media**  
Twitter: @EPOSeu  
FB @EPOSeu  
Youtube @EPOSeu

## European Plate Observing System

EPOS, the European Plate Observing System, is a multidisciplinary, distributed research infrastructure that facilitates the integrated use of data, data products, and facilities from the solid Earth science community in Europe.

EPOS brings together Earth scientists, national research infrastructures, ICT (Information & Communication Technology) experts, decision makers, and public to develop new concepts and tools for accurate, durable, and sustainable answers to societal questions concerning geo-hazards and those geodynamics phenomena (including geo-resources) relevant to the environment and human welfare.



# 06/ Multi-domain

EuroGOOS  
ICOS  
IS-ENES  
SIOS

DANUBIUS-RI  
eLTER  
EMBRC  
LifeWatch  
AQUACOSM-plus

EMSO



## European Global Ocean Observing System

### eurogoos.eu

**Domains**  
multi-domain (atmosphere, ocean, ecosystem)

**Readiness level**  
Operational

**RI type**  
Distributed, non-profit organisation

**Services**  
Operational oceanographic services for marine research

**Social Media**  
Twitter: @EuroGOOS



EuroGOOS is an International Non-Profit Association of governmental agencies and research organisations, established in 1994 within the context of the IOC's Global Ocean Observing System.

Today, EuroGOOS has 40 members from 19 European countries providing operational oceanographic services and carrying out marine research, coordinating six regional operational systems: the Arctic ROOS, BOOS (Baltic), NOOS (North-West Shelf), IBI-ROOS (Ireland-Biscay-Iberian area) and MONGOOS (Mediterranean): Strong regional cooperation enables the involvement of many more partners and countries. Through its ROOSes, working groups and networks of marine operational platforms, EuroGOOS delivers strategies, priorities and standards, towards an integrated European Ocean Observing System, to underpin sustainable blue growth. EuroGOOS activities feed into national and European strategies, enhance coordination and synergy at regional and European levels and promote European leadership in research infrastructures, science and technology.

# ICOS

Integrated  
Carbon  
Observation  
System

## icos-ri.eu

**Status**  
ERIC

**Domains**  
multi-domain (atmosphere,  
ocean, ecosystem)

**Readiness level**  
Fully operational

**RI type**  
Distributed

**Services**  
Data services, Computational  
Services and Support Services

**Social Media**  
Twitter: @ICOS\_RI  
Instagram: @icosri  
Youtube: @icosri



## Integrated Carbon Observation System

Solving the climate crisis and dealing with its consequences requires science-based knowledge.

ICOS provides standardised and open greenhouse gas data from 150 measurement stations across 14 European countries.

This open and high-quality data makes scientists' work easier, and faster and helps in providing reliable results. The in situ measurements also provide an important verification for satellite measurements.

The stations observe greenhouse gas concentrations in the atmosphere as well as carbon fluxes between the atmosphere, the land surface, and the oceans.

The analysed, verified and quality-processed data from the stations is continuously published in the ICOS Carbon Portal. Besides thousands of data sets, it offers also scientific and educational products and services for the scientists and for a wider audience.



## is.enes.org

**Domains**  
multi-domain (atmosphere,  
ocean, ecosystem)

**Readiness level**  
Fully operational

**RI type**  
Virtual, distributed

**Services**  
Climate model data access and  
computational service, access to  
software

**Social Media**  
Twitter: @ISENES\_RI



## Infrastructure for the European Network for Earth System Modelling - Phase 3

IS-ENES3 gathers the community developing and using climate models of the Earth system and their data, with the key objectives to better understand and predict climate variability and change.

IS-ENES3 activities support the World Climate Research Program coordinated global and regional simulations and contribute to the standards for data and metadata required for WCRP's international repository. This community is a key player in the assessments of the Intergovernmental Panel on Climate Change and provides the multi-model climate projections on which EU mitigation and adaptation policies are built.

During its third phase, IS-ENES3 aims at pursuing the integration of the Earth's climate system modelling community, fostering the common development of models and tools and the efficient use of HPC, as well as supporting the exploitation of model data by the Earth system science community, the climate change impact community and the climate service community.



## sios-svalbard.org

### Domains

multi-domain (Biosphere, geosphere, atmosphere, cryosphere, hydrosphere)

### Readiness level

Fully operational

### RI type

Distributed

### Services

Science optimisation, remote sensing services, data services, computational services, access services, support services (e.g. webinars, training, logistical coordination)

### Social Media

Twitter: @SIOS\_KC  
Instagram: @SIOS\_KC  
LinkedIn: @sios-svalbard  
Facebook: SIOSKnowledgeCentre

## Svalbard Integrated Arctic Earth Observing System

SIOS is a Norwegian initiated international multidisciplinary research infrastructure that develops and maintains a regional observation system for long-term measurements in and around the high-Arctic archipelago of Svalbard. Its central node is the SIOS Knowledge Centre in Longyearbyen.

The observing system and research facilities offered by SIOS build on the extensive observation capacity and distributed world-class research infrastructure already established in Svalbard by its members. This includes a substantial capability for utilising remote sensing resources to complement ground-based observations. SIOS focuses on processes and their interactions between all Earth system spheres. The core observational programme of SIOS provides the research community with systematic observations - sustained over time. To use the observing system more efficiently, SIOS offers a range of services and capacity building activities.



## danubius-ri.eu

### Domain

Multidomain (Hydrosphere, ocean, ecosystems, sediments)

### Readiness level

Under construction

### RI type

Distributed

### Services

Physical, online and virtual access to data and services for observation, in situ measurements, analysis and modelling in River-Sea Systems

### Social Media

Twitter 1: @DANUBIUS\_RI  
Twitter 2: @DANUBIUS\_PP  
LinkedIn: @danubius-ri  
Facebook: @DANUBIUSRI



## The International Centre for Advanced Studies on River-Sea Systems

DANUBIUS-RI aims to provide interdisciplinary expertise and integrated research infrastructure: remote and in-situ observation systems (including ships), experimental facilities, laboratories, modelling tools and resources for knowledge exchange along freshwater/seawater continua throughout Europe, from river source to sea.

DANUBIUS-RI will draw on existing research excellence across Europe, providing access to a range of European River-Sea Systems a 'one-stop shop' for knowledge exchange; access to harmonised data; and a platform for interdisciplinary research, inspiration, education and training.

DANUBIUS-RI's Vision is to achieve healthy River-Sea Systems and advance their sustainable use, in order to live within the planet's ecological limits by 2050.



## elter-ri.eu

### Domains

Critical zone

### Readiness level

Under construction

### RI type

Distributed and virtual

### Services

Access services; Data Services

### Social Media

Twitter: @eLTER\_Europe

LinkedIn: @eLTER

Youtube: @eLTER

FB: @eLTEReurope

## Integrated European Long-Term Ecosystem, Critical Zone & Socio-Ecological Research

eLTER facilitates high impact research and catalyses new insights about the compounded impacts of climate change, biodiversity loss, soil degradation, pollution, and unsustainable resource use in terrestrial, freshwater, and transitional water ecosystems.

eLTER provides researchers with access to over 500 sites and 50 larger LTSE Platforms across Europe and biogeographical regions, establishing and offering harmonised and standardised data, services and training useful to citizens and experts in their joint efforts to find sustainable solutions to the Grand Societal Challenges.



**EMBRC**  
EUROPEAN  
MARINE  
BIOLOGICAL  
RESOURCE  
CENTRE

## European Marine Biological Resource Centre

## embrc.eu

### Status

ERIC

### Domains

Marine biology, ecology

### Readiness level

Fully operational

### RI type

Virtual, distributed

### Services

Services for marine biology and ecology research

### Social Media

Twitter: @EMBRC\_EU

LinkedIn: @embrc



EMBRC is Europe's research infrastructure for marine biological resources and marine ecosystems. We provide access to wild-type macro and microorganisms, tools, methods and training for fundamental and applied research. EMBRC sites are spread across nine countries and provide access to ecosystems from the Norwegian Arctic to tropical Israel.

Our on-site laboratories and experimental set-ups cater to all types of research involving marine biological organisms, from gene expression and physiology to ecology and climate change impact, with support from our highly-experienced technicians.

EMBRC aims to advance the understanding of life in the oceans and sustainably harness its potential for the benefit of humankind in sectors such as health, biotechnology, and environmental monitoring.



## The e-Science European Infrastructure for Biodiversity and Ecosystem Research

### lifewatch.eu

**Status**  
ERIC

**Domains**  
Multi-domain (biodiversity & ecosystem functions)

**Readiness level**  
Fully operational

**RI type**  
Distributed

**Services**  
Data Services, ICT services, cloud services, web services, training

**Social Media**  
Twitter: @LifeWatchERIC  
Facebook: @ERICLifeWatch  
LinkedIn: @LifeWatch ERIC



LifeWatch ERIC invests in three essential components: open access resources, reproducible analytics and mobilised communities.

By equipping scientists with distributed computational and storage capacity, tools and web-services for data integration and interoperability, as well as with Virtual Research Environments, LifeWatch ERIC makes it possible to test scenarios of change in biodiversity, ecosystems and their services, and support the formulation of nature-based solutions.

Such evidence-based synthetic knowledge can then be made available to decision makers and citizens, empowering society to tackle planetary challenges and supporting the UN Sustainable Development Goals, the EU Green Deal and the 2030 Biodiversity Strategy targets. LifeWatch ERIC also provides training and learning opportunities for a range of users, ensuring access to all the data, services and resources available within the infrastructure.



### aquacosm.eu

**Domains**  
Multi-domain

**Readiness level**  
Fully operational

**RI type**  
Distributed

**Services**  
Near-real-time data services, scientific training, transnational access to experimental facilities, joint research activities

**Social Media**  
Twitter: @aquacosm  
Facebook: AquacosmEU



## EU network of mesocosms facilities for research on marine and freshwater ecosystems

AQUACOSM-plus advances European mesocosm-based aquatic RIs by integrating the leading mesocosm infrastructures into a coherent, interdisciplinary, and interoperable network covering all ecoregions of Europe. It widens the user base by extending TA provision (> 13000 person-days), and strengthening the offered services, with 10 new partners, including an NGO and doubling of SMEs. We initiate actions to increase competence in mesocosm science in new EU member states (Hungary and Romania), and emphasize training of young scientists through summer schools covering various disciplines including effective science communication.

AQUACOSM-plus develops near-real-time Open Data flows and improved metadata, thus promoting Open Mesocosm Science in collaboration with leading EU-supported initiatives in the EOCS and fosters wider sharing of information, knowledge, and technologies across fields and between academia, industry, and policy makers/advisers.



**emso.eu**

**Status**  
ERIC

**Domains**  
Marine research

**Readiness level**  
Partially operational

**RI type**  
Distributed

**Services**  
Data services, access services,  
computational services, support  
service

**Social Media**  
Twitter: @EMSOeu  
Facebook: @emso.eu



## The European Multidisciplinary Seafloor and water column Observatory

EMSO is a European Research Infrastructure Consortium that aims to gain a better understanding of the phenomena happening within and below the oceans and explain the critical role that these phenomena play in the broader Earth systems.

EMSO consists of a system of regional facilities placed at key sites around Europe, from North East to the Atlantic, through the Mediterranean and Black Sea, equipped with multiple sensors along the water column, in the deep sea and on the seafloor. These observatories constantly measure biogeochemical and physical parameters across temporal and spatial scales and support the transdisciplinary co-development of cutting-edge marine technologies.

EMSO advances the knowledge of ocean processes improving the resilience to climate change and natural and anthropogenic disasters. EMSO promotes sustainable blue growth in the marine sector through innovative services helping to preserve the marine ecosystem.



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COMMUNITY