



# D9.5

## RI operational services

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### Deliverable abstract

The overarching goal of ENVRI-FAIR is that all participating research infrastructures (RIs) improve their FAIRness and become ready for connection of their data repositories and services to the European Open Science Cloud (EOSC). Deliverable 9.1 has reported on the roadmap of the RIs in the marine subdomain towards improving their FAIRness. It presented the approach of using FAIR questionnaires (together with WP5) to identify the strengths and weaknesses of each RI and a first indicative set of activities foreseen to improve identified weaknesses or gaps. After formulation in Deliverable D9.2 of implementation plans for mitigating these gaps during the next phase of the ENVRI-FAIR project, the RIs from the marine subdomain have specified in Deliverable D9.3 the technical services and interfaces to be implemented at RI level and have undertaken the implementation. The RI services are demonstrated in this deliverable D9.4 (M27) and will be operational for EOSC operations in this D9.5 deliverable (M36).



## DELIVERY SLIP

	Name	Partner Organization	Date
Main Author	Thierry Carval	Ifremer	15-12-2021
Contributing Authors	Valérie Harscoat	Ifremer	22-12-2021
Reviewer(s)	Sylvie Pouliquen	Ifremer	22-12-2021
Approver	Andreas Petzold	FZJ	12-01-2022

## DELIVERY LOG

Issue	Date	Comment	Author
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## DOCUMENT AMENDMENT PROCEDURE

Amendments, comments and suggestions should be sent to the Project Manager at [manager@envri-fair.eu](mailto:manager@envri-fair.eu).

## GLOSSARY

A relevant project glossary is included in Appendix A. The latest version of the master list of the glossary is available at <http://doi.org/10.5281/zenodo.4471374>.

## PROJECT SUMMARY

ENVRI-FAIR is the connection of the ESFRI Cluster of Environmental Research Infrastructures (ENVRI) to the European Open Science Cloud (EOSC). Participating research infrastructures (RI) of the environmental domain cover the subdomains Atmosphere, Marine, Solid Earth and Biodiversity / Ecosystems and thus the Earth system in its full complexity.

The overarching goal is that at the end of the proposed project, all participating RIs have built a set of FAIR data services which enhances the efficiency and productivity of researchers, supports innovation, enables data- and knowledge-based decisions and connects the ENVRI Cluster to the EOSC.

This goal is reached by: (1) well defined community policies and standards on all steps of the data life cycle, aligned with the wider European policies, as well as with international developments; (2) each participating RI will have sustainable, transparent and auditable data services, for each step of data life cycle, compliant to the FAIR principles. (3) the focus of the proposed work is put on the implementation of prototypes for testing pre-production services at each RI; the catalogue of prepared services is defined for each RI independently, depending on the maturity of the involved RIs; (4) the complete set of thematic data services and tools provided by the ENVRI cluster is exposed under the EOSC catalogue of services.

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## D9.5 - RI operational services

### 1 Scope

Each RI involved in WP9 has developed an implementation plan [D9.2] that addresses the results of their FAIRness self-analysis [D9.1], with the shared objective to improve the FAIRness at the Marine subdomain level as illustrated in the following figure.

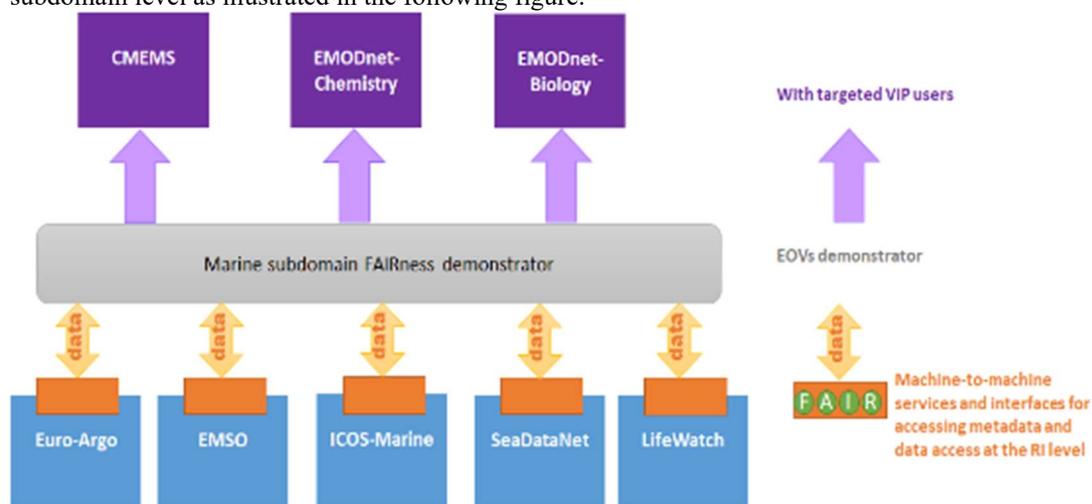


Figure 1: Marine subdomain implementation plan

In [D9.3], Euro-ARGO, EMSO, ICOS-Marine, SeaDataNet and LifeWatch documented the technical specification of the machine-to-machine services, interfaces for accessing data and metadata to be implemented at the RI level (up to M36). For each RI, the on-going activities for the technical implementation concern:

- Upgrades of existing machine-to-machine services and interfaces, by either improving or adding features
- Development of newly defined machine-to-machine services and interfaces
- Upgrades of shared (meta)data published via the services to increase Interoperability and Reusability

The present deliverable **D9.5** is the list (and links) of the services developed or improved within ENVRI-FAIR by the five Marine subdomain Research Infrastructures as defined in [D9.3]. These services are operational by month 36.

These services will remain operational beyond ENVRI-FAIR project and managed by the individual ERICs.

These services will also be connected to the ENVRI-HUB through the catalogues of services.

These services will that way be available for the EOSC catalogue of services.

## 2 List of operational services

### 2.1 Marine RIs cross domain services

#### 2.1.1 NVS vocabulary server

The NERC Vocabulary <https://vocab.nerc.ac.uk/>

Operated by: BODC

The vocabularies of the five Marine subdomain Research Infrastructures are managed in the NVS.

#### 2.1.2 ERDDAP servers

An ERDDAP server provides metadata and data from various sources. It gathers decentralized data in order to provide search, visualization and subset capabilities on multiple datasets. The features are:

- **List datasets:** provides a list of the datasets described on the server and/or others.
- **Graph:** creates data plots or maps on selected parameters.
- **WMS:** provides map service for gridded datasets.
- **Data:** provides subsetting capabilities into a variety of output formats.
- **Display metadata:** displays the metadata of the dataset and its variables.
- **Subscription:** lets the user subscribe to an alert each time a specific dataset changes.

Users can be developers, data managers as well as people who want to easily discover the dataset. ERDDAP is an open source software developed at NOAA.

Among the services and interfaces implemented at RI level, all the five Marine subdomain Research Infrastructures distribute data and metadata through ERDDAP API.

RI	Link	Operated by
Euro-ARGO	Argo parameters vocabulary is R03 <a href="https://www.ifremer.fr/erddap/tabledap/ArgoFloats.html">https://www.ifremer.fr/erddap/tabledap/ArgoFloats.html</a>	Ifremer
EMSO	EMSO parameters vocabularies are P01 or P09. <a href="http://erddap.emso.eu">http://erddap.emso.eu</a>	EMSO
ICOS-Marine	ICOS-Marine parameters vocabulary is P01. <a href="https://erddap.icos-cp.eu">https://erddap.icos-cp.eu</a>	UIB
SeaDataNet	SeaDataNet parameters vocabulary is P01. <a href="https://www.ifremer.fr/erddap">https://www.ifremer.fr/erddap</a>	Ifremer
LifeWatch	Parameters vocabulary is P01 <a href="https://erddap.eurobis.org/erddap/index.html">https://erddap.eurobis.org/erddap/index.html</a>	VLIZ/LifeWatch Belgium

### 2.2 RI operational services

#### 2.2.1 Euro-Argo

A series of seven operational FAIR services are operational for Euro-Argo ERIC.

##### OpenSearch API

- <https://opensearch.ifremer.fr>

The users of this search engine on Argo data include among others EU EOSC Blue-Cloud data portal, Copernicus Eumetsat for Argo-satellite matchup.

Here is an [example of request](#)

##### Metadata API

- <https://fleetmonitoring.euro-argo.eu/swagger-ui.html#>
- Adopted by [Argo floats dashboard](#)

##### Data API

- <https://dataselection.euro-argo.eu/swagger-ui.html#>
- Adopted by [Argo data subsetting](#)

#### **ERDDAP data and metadata API**

- <https://www.ifremer.fr/erddap/index.html>
- [Example of request](#)

#### **Argo vocabulary server**

- <http://www.argodatamgt.org/Documentation/Argo-vocabulary-server>
- [Example of request](#)

#### **Argo ontology**

- <http://www.argodatamgt.org/Documentation/Argo-vocabulary-server/Argo-linked-data-and-SPARQL-endpoint>

#### **Argo SPARQL endpoint**

- <https://sparql.ifremer.fr/argo/query>
- [Example of request](#)

### 2.2.2 EMSO

#### **EMSO data portal**

- <https://data.emso.eu/home>

#### **ERDDAP data and metadata API**

- <http://erddap.emso.eu>

### 2.2.3 ICOS Marine

#### **ERDDAP data and metadata API**

- <https://erddap.icos-cp.eu>

### 2.2.4 LifeWatch Marine

#### **ERDDAP data and metadata API**

- <https://erddap.eurobis.org/erddap/index.html>

### 2.2.5 SeaDataNet

#### **Metadata catalogues SPARQL endpoints**

- <https://edmo.seadatanet.org/sparql>
- <https://edmed.seadatanet.org/sparql>
- <https://edmerp.seadatanet.org/sparql>
- <https://csr.seadatanet.org/sparql>

#### **Data CDI SPARQL endpoint**

- <https://cdi.seadatanet.org/sparql>

#### **Sextant data products SPARQL endpoint**

- <https://sextant.seadatanet.org/sparql>

#### **ERDDAP API**

- <https://www.ifremer.fr/erddap>

## 3 Conclusion

Within ENVRI-FAIR, the FAIRness of the services provided by the Marine RIs (Euro-Argo, EMSO, ICOS, LifeWatch and SeaDataNet) has been improved and new metadata and data services have been set-up to facilitate Findability, Accessibility, Interoperability and Re-usability of the Marine RIs data, through operational machine2machine services for a wider use of these products at the RIs level, at the Marine sub-domain level, and at the ENVRI-Level through the ENVRI-Hub and soon through EOSC when connected to the ENVRI-Hub.