



## Assessment Information

[CoreTrustSeal Requirements 2017–2019](#)

Repository: IFREMER-SISMER  
Website: <http://www.ifremer.fr>  
Certification Date: 13 November 2019

This repository is owned by: **Institut français de recherche pour l'exploitation de la mer (IFREMER)**



# IFREMER-SISMER

## Notes Before Completing the Application

*We have read and understood the notes concerning our application submission.*

True

*Reviewer Entry*

**Reviewer 1**

Comments:

**Reviewer 2**

Comments:

Accept

## CORE TRUSTWORTHY DATA REPOSITORIES REQUIREMENTS

### Background & General Guidance

### Glossary of Terms

## BACKGROUND INFORMATION

### Context

*R0. Please provide context for your repository.*

*Repository Type. Select all relevant types from:*

Domain or subject-based repository, Institutional repository, National repository system; including governmental, Research project repository, Other (Please describe below)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

#### **Reviewer 2**

Comments:

Accept

## ***Brief Description of Repository***

### ● Domain or subject-based repository

Marine sciences is the main (and about exclusive) domain which drives the perimeter of data collected. Main roadmap and objectives of the repository are driven by marine science community, national or European marine directives.

### ● Institutional repository

Ifremer is the French institute for marine sciences; all Ifremer's data are hosted in SISMER repository, but most of the "filières" are part of national or European marine data infrastructures. Only the "filière" F6 "Data and derived products catalogue" may be considered as an institutional repository.

### ● National repository system, including governmental

The "filière" F5 "Fisheries data" is mainly driven and sponsored by the French Ministry of Agriculture and Fisheries, with the aim of providing data and products to support national public policies in the domain of fisheries.

### ● Research project repository

SISMER's repository includes many data coming from present or former research projects, but there is no specific interface or "filière" for these data.

### ● Other (Please describe)

IFREMER-SISMER is an international repository for some programs like Argo, Gosud, dbcp, oceansites.

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

#### **Reviewer 2**

Comments:

Accept

## ***Brief Description of the Repository's Designated Community.***

Marine science community works on a shared and in-motion environment (the ocean) and has a long history of sharing data and information: : this is crucial to Marine Science.

Moreover, and in addition to the introductory description, SISMER's repository is the stakeholder of several strategic

partnerships. At national level, the French Ministry of Research certifies and pilots “Research Infrastructures”; the “Earth Data Pole” is one of them and it includes the “ODATIS : Ocean Data Cluster”, led by Ifremer/SISMER.

At the European level, Ifremer leads or is a main partner of several marine data and/or services organizations :

SeaDataNet/SeaDataCloud (DG Research), EMODnet (DG Mare), Copernicus CMEMS in situ TAC (DG Growth).

At the international level, Ifremer/SISMER is the French NODC (accredited by IODE/IOC).

The “designated community” may differ significantly between these partnerships, but they all focus on marine data.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

### ***Level of Curation Performed. Select all relevant types from:***

A. Content distributed as deposited, B. Basic curation – e.g. brief checking; addition of basic metadata or documentation,

C. Enhanced curation – e.g. conversion to new formats; enhancement of documentation, D. Data-level curation – as in C

above; but with additional editing of deposited data for accuracy

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

### ***Comments***

As described in the Ifremer/ISO9001:2015 process P8, and in accordance with all our strategic partnerships, SISMER’s repository has a policy of “D.data-level curation”, managed at partnership level: the curation policy is a consistent part of all our European and national data infrastructures ; Each partner repository has to be compliant with a common policy for naming scientific parameters and data curation. Automatic curation is expected as often as possible, including comparison between several data sources. Aggregated data products are automatically built .

Thereby, in some cases and in the filière “F6 data and derived product catalogues”, we may apply A- or B- or C- level of curation.

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

***Outsource Partners. If applicable, please list them.***

Ifremer's repository is hosted by Ifremer's IT infrastructure. All technical processes such as security, changes, hardware upgrades and service-desk are managed and operated by Ifremer employees.

In the Ifremer QMS, the process designated to manage the IT infrastructure services and projects is called P14.

Ifremer is compliant for most data in the context of national, European and international partnerships as described above.

The main partners (such as SeaDataNet or Argo) govern the data flow upstream.

***Reviewer Entry***

**Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

***Other Relevant Information.***

In addition to the previous description, Ifremer and SISMER's repositories are major players in French governmental institutional networks (the French Ministry of Environment, the European Commission: DG-ENVironment, DG-MARitime Affairs) who implement the European Environmental Directives for environmental data management:

- The Water Framework Directive (Coastal monitoring data),
- The Inspire Directive (Environmental data from public bodies),
- The Marine Framework Strategy Directive,
- The Common Fisheries Policy

**"filières" description**

Incoming data in Ifremer-SISMER repository relates to at least one of following items :

- Data are observation measurements produced by a "Research Infrastructure" (RI) labellized and funded by the French Ministry of Research, or a National Observation System (NOS) labellized by the CNRS (National Centre for Scientific Research). Exemples : French Oceanographic Fleet (FOF), Argo (French contribution), EMSO (French contribution), ILICO (Coastal Areas). Each RI and NOS has its own governance for data acquisition, data qualification, data dissemination and DOI attribution policy. (see R0-L6 and R0-L7)
- Data are produced by or inherited from a satellite mission. These missions are decided and managed by CNES (French Space Agency) or ESA (European Space Agency). In some other cases, some relevant data from other satellite are simply downloaded to complete our datasets or improve our scientific relevance. Each satellite mission has its own governance for data acquisition, data qualification, data dissemination and DOI attribution policy. (see R0-L8)

- Data are collected, assembled and processed in the frame of a public policy decided and managed by French government. Fisheries data are typically in this case. (see R0-L9)
- Data is produced by scientific teams and then uploaded at Ifremer-SISMER center. 2 way of deposit are available : for geographic data, the Sextant web portal provides Inspire Directive compliance (ISO19115 metadata are required) and DOI. For other datasets, SEANOE provides public visibility and DOI (Dublin core metadata required), for easy citation in publications. (see R7-L1 and R7-L2)

The data sources are numerous, and the global SISMER management needs to share human and technical resources ; so in the ISO9001 process, we chose to group in several data “filières”, corresponding to different kind of data source or contractors or services to provide.

The design of “filières” is :

- Data deposit in Sextant or Seanoe is a direct service to scientists. Datasets building and DOI policy are coopted between scientist and SISMER. Datasets are full-open. This is filière F6.
- Fisheries data is managed by a specific contract with French government. Raw data access is restricted. The contract requires some specific service level agreement to provide periodically indicators. This is filière F5.
- Satellite data are specific for both technical and governance reasons. Data storage, processing and disseminating are well defined in the frame of the mission. In some cases, an NRT (Near Real Time) service is required. The volume of data requires specific tools. This is filière F4.
- Data coming from French Oceanographic Fleet (FOF) need a specific approach because of interoperability at international level (IOC/IODE, Seadatanet), DOI attribution policy (1 DOI by cruise), moratorium allowed to scientists PI of the cruise for data dissemination. Then we decided to manage data catalog (coming from FOF) as “filière F1”; These catalogs have to be shared as soon as possible with international partnership (IOC/IODE, Seadatanet). The FOF datasets are designed as filière F2, with specific access right to manage, especially in the moratorium time.
- Other data from labellized RI or NOS income in automatic flow, requires NRT services in some cases, are fully open immediately. So, we chose to group them into an unique filière F3.

Clearly, for the “filières” F1 to F5, the scope of data involved, the access right, the kind of dissemination services, the DOI attribution policy are all decided by RI, NOS, contracts and partnerships. Therefore there is no need for a steering committee for that in the data center.

For filière F6 (Sextant part – geographical data), in the frame of INSPIRE directive, standard catalogs and data are made available in the French national portal Geocatalog (see R13-L4) ; an internal specific animation network about Sextant is operational in Ifremer : it plays the role of a steering committee. (see R0-L10).

For the filière F6 (Seanoe part), it's a true deposit system. The scientist decide the content of his datasets. This datasets are full open, and attached to a DOI. The only control operated by SISMER is the thematic of data which have to be in the scope of marine sciences.

Acronyms:

NRT : Near Real Time data services

Moratorium = delay before open access, to provide time for publication to scientist who collected the oceanographic data.

In the French law about “open science”, this delay is under a maximum of 6 month, after scientific qualification of data.

Attached documents :

R0-D1-Certification ISO9001-2015 Ifremer

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D1-Certification%20ISO9001-2015%20Ifremer.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D1-Certification%20ISO9001-2015%20Ifremer.pdf))

R0-D2-Accreditation IODE SISMER

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D2-SISMER\\_Accrediation\\_IODE\\_diplome\\_2017.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D2-SISMER_Accrediation_IODE_diplome_2017.pdf))

R0-D3-ISO9001 Ifremer-P8 process sheet

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D3-ISO9001%20Ifremer-P8%20process%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D3-ISO9001%20Ifremer-P8%20process%20sheet.pdf))

R0-D4-ISO9001 Ifremer-P8 filière F1 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D4-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D4-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf))

R0-D5-ISO9001 Ifremer-P8 filière F2 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D5-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F2%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D5-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F2%20sheet.pdf))

R0-D6-ISO9001 Ifremer-P8 filière F3 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D6-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F3%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D6-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F3%20sheet.pdf))

R0-D7-ISO9001 Ifremer-P8 filière F4 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D7-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F4%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D7-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F4%20sheet.pdf))

R0-D8-ISO9001 Ifremer-P8 filière F5 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D8-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F5%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D8-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F5%20sheet.pdf))

R0-D9-ISO9001 Ifremer-P8 filière F6 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D9-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F6%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D9-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F6%20sheet.pdf))

R0-D10- ISO9001 Ifremer-P14 process sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D10-%20ISO9001%20Ifremer-P14%20process%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D10-%20ISO9001%20Ifremer-P14%20process%20sheet.pdf))

Associated links :

R13-L1-Ifremer Data Portal (<http://en.data.ifremer.fr/>)

R0-L1-Ifremer web portal (<http://www.ifremer.fr/en>)

R0-L2-IODE web portal (<http://www.iode.org/>)

R0-L3-UNESCO/IOC web portal (<http://www.ioc-unesco.org/>)

R0-L4-ODATIS ocean data cluster web portal (<http://www.odatis-ocean.fr/en/>)

R0-L5-Seadatanet web portal (<https://www.seadatanet.org/>)

R0-L6-FOF Web Portal (<https://www.flotteoceanographique.fr/en>)

R0-L7-RI Description

(<https://wwz.ifremer.fr/en/Research-Technology/Research-Infrastructures/Ocean-observation-infrastructures>)

R0-L8-SMOS Ground Segment (<https://www.catds.fr/>)

R0-L9-SIH Description (<http://sih.ifremer.fr/>)

R0-L10-Sextant administrators meeting (<https://sextant.ifremer.fr/Ressources/Journees-annuelles>)

*Reviewer Entry*

**Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

## ORGANIZATIONAL INFRASTRUCTURE

### I. Mission/Scope

*R1. The repository has an explicit mission to provide access to and preserve data in its domain.*

#### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

**Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

#### *Response:*

Context of SISMER activities

The mission of the French representative at the Intergovernmental Oceanographic Commission (IOC) of UNESCO, was delegated in 1971 to the « Centre National pour l'Exploitation des Océans » (CNEXO) by the « Ministère des Affaires Etrangères » (Foreign Office). At this stage, only the management of data collected during research cruises was considered.

After the creation of IFREMER in 1984, by merging two existing organizations (CNEXO and ISTPM), this mission was transferred to IFREMER. The "SISMER – Systèmes d'Information Scientifique pour la Mer" was created accordingly. The scope of managed data types has been extended progressively to data collected by automated in-situ observatories (such as ARGO floats), fishery and environment monitoring (in the framework of the European Environmental Directives and Regional Sea Conventions) and satellites (as part of the ground segments of ESA and CNES missions). There is a 5 year renewable contract accorded to Ifremer by the French Governmental bodies (Ministry of Research, Ministry of Environment) to maintain this mission ("Contrat d'objectifs Etat-IFREMER").



At the French National level, IFREMER-SISMER is now part of the "Odatis - French Marine Data Cluster" which is the Oceanographic component of the French Research Infrastructure for Earth Observation data management. CNES , CNRS , IRD , METEOFRANCE , IGN , IRSTEA , IFREMER and several marine universities contribute to Odatis.

In addition, the 7 institutes involved in operational oceanography in France (CNES, CNRS, IFREMER, IPEV , IRD, Météo-France, SHOM ) decided in 2001 to join together within Coriolis in order to:

- organize and maintain data acquisition in real-time and delayed mode of in-situ measurements essential for operational oceanography,
- set up an operational in-situ data centre,
- develop and improve the technology required for operational oceanography.

A global Coriolis agreement between the involved organizations describes all the objectives and resources assigned by each partner.

As a component of the Coriolis program, the Coriolis data centre operated by SISMER manages the ocean data observed using in-situ autonomous platforms (profiling floats, gliders, moorings, surface drifters, etc.), research vessels and ships of opportunity.

#### Acronyms (\*) :

ESA : European Space Agency

CNES : French National Space Agency

CNRS : French National Research Agency

IRD : Institut de Recherche pour le Développement : French research organism

METEOFRANCE : French National Meteorology Agency

IGN : French National Geography Agency

IRSTEA : Institut national de recherche en sciences et technologies pour l'environnement et l'agriculture : French research organism

IPEV : French Polar Institute

SHOM : French National Hydrographic Service

#### Attached documents :

R1-D1- Contrat d'objectifs Etat-IFREMER 2019-2023 (signature in progress) ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R1-D1-Contrat%20d'objectif%20Ifremer%202019-2023%20\(provisoire\).pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R1-D1-Contrat%20d'objectif%20Ifremer%202019-2023%20(provisoire).pdf))

R1-D2-convention-Coriolis2014-2020-cadre-signée

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R1-D2-convention-Coriolis2014-2020-cadre-sign%c3%a9e.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R1-D2-convention-Coriolis2014-2020-cadre-sign%c3%a9e.pdf))

R1-D3-convention Odatis : le pole ocean

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R1-D3-convention%20Odatis%20le%20pole%20ocean.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R1-D3-convention%20Odatis%20le%20pole%20ocean.pdf))

#### Associated links :

R1-L1-Journal Officiel - Décret n°67-7 du 3 janvier 1967 relatif à la création du CNEXO

([https://www.legifrance.gouv.fr/jo\\_pdf.do?id=JORFTEXT000000692719](https://www.legifrance.gouv.fr/jo_pdf.do?id=JORFTEXT000000692719))

R1-L2-Programme d'orientation océan - août 1968 - CNEXO (<http://archimer.ifremer.fr/doc/1968/rapport-4738.pdf>)

R1-L3-Journal Officiel - Décret n°84-428 du 5 juin 1984 relatif à la création, à l'organisation et au fonctionnement de l'IFREMER ([https://www.legifrance.gouv.fr/jo\\_pdf.do?id=JORFTEXT000000692719](https://www.legifrance.gouv.fr/jo_pdf.do?id=JORFTEXT000000692719))

R1-L4-Ifremer leaflet

([https://wwz.ifremer.fr/content/download/122026/file/GB\\_PLAQUETTE%20INSTIT%20IFREMER\\_250918\\_BREST.pdf](https://wwz.ifremer.fr/content/download/122026/file/GB_PLAQUETTE%20INSTIT%20IFREMER_250918_BREST.pdf))

R1-L5-Ifremer Strategic Plan 2030

(<https://wwz.ifremer.fr/content/download/122494/file/IFREMER%20-%20Projet%20d'institut.pdf>)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

#### **Reviewer 2**

Comments:

Accept

## **II. Licenses**

*R2. The repository maintains all applicable licenses covering data access and use and monitors compliance.*

### ***Compliance Level:***

3 – The repository is in the implementation phase

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

3 – The repository is in the implementation phase

#### **Reviewer 2**

Comments:

3 – The repository is in the implementation phase

### ***Response:***

SISMER mainly manages open access data using the SeaDataNet policy

(<http://www.seadatanet.org/Data-Access/Data-policy>). This open policy is reinforced by the French and European regulations, such as:

- The Water Framework Directive that grants to all citizens an open and free access to fresh and coastal monitoring data,

- The Inspire Directive which imposes the creation of metadata (data description and discovery) and grants access to environmental data,

- The Marine Framework Strategy Directive which imposes access to marine environment monitoring data.

It is also worth noting that European regulations and national directives promote an open and free access to all research data ("Open Research Data").

However, in some cases, the data managed by IFREMER may be covered by a restricted access for a limited period. The objective of these restrictions are:

- To give scientist time for publishing before any wider distribution of the data ("moratorium").

- To protect the environment of sensitive areas or of sensitive species (e.g. fisheries data),

- To restrict access to individual or professional data (e.g. some fishery or aquaculture monitoring data),

- To protect data which have been collected in the EEZ of foreign countries, according to the United Nations Convention on the Law of the Sea (Montego Bay), if no other international convention is applicable to these data (e.g. bathymetry).

- To protect data which may be related to French strategic interests (Navy...).

Data users are prompted to register prior to any data delivery in order to:

- Subscribe to a user license agreement (e.g. the "SeaDataNet license"),

- Be identified to evaluate the utilisation rates of data and services made available.

Generally, data access is granted depending on the data type (called "filières"):

F1 - Oceanographic cruises catalogue : fully open

F2 - Oceanographic cruises : data fully open (Moratorium\* allowed)

F3 - InSitu data for Operational Oceanography : fully open (includes NRT\*)

F4 - Satellite data for Operational Oceanography : fully open (includes NRT\*)

F5 - Fisheries data : restricted (X\*)

F6 - Data and derived products catalog : fully open

A general data policy document is in progress for the whole of IFREMER-SISMER ; it promotes the adoption of Creative Common licenses for the public data of the repository, and to clarify the access rights for the other part, depending on thematic and/or location.

Acronyms:

NRT : Near Real Time data services  
Moratorium = delay before open access to provide time for publication to scientist who collected the oceanographic data. In the French law about "open science", this delay is under a maximum of 6 month, after scientific qualification of data.

X : Under control of French Ministry of Agriculture and Fisheries

Attached documents :

Associated links :

R2-L1-Seadanet Data Policy (<http://www.seadatanet.org/Data-Access/Data-policy>)

R2-L2-The IOC-XXII-6 resolution entitled “IOC Oceanographic Data Exchange Policy”

(<http://www.scor-int.org/IOCDataPolicy.pdf>)

R2-L3- United Nations Convention on the Law of the Sea

([http://www.un.org/depts/los/convention\\_agreements/texts/unclosunclos\\_f.pdf](http://www.un.org/depts/los/convention_agreements/texts/unclosunclos_f.pdf))

R2-L4- Aarhus Convention (directive 2003/4/CE )

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

R2-L5-Inspire European Directive (2007/2/CE)

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

R2-L6-Marine Framework Strategy Directive (2008/56/CE)

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

R2-L7-Water Framework Directive (2000/60/CE)

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

R2-L8-Public Sector Information Directive (2013/37/UE)

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

R2-L9-Article 7 de la Charte de l'environnement de 2004 (loi constitutionnelle n°2005-205 du 1er mars 2005)

(<https://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000000790249>)

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept.

Compliance Level 3 is suitable given that a general data policy document is in progress.

##### **Reviewer 2**

Comments:

Accept.

Monitoring of license compliance is required to obtain Level 4 CoreTrustSeal compliance.

### **III. Continuity of access**

***R3. The repository has a continuity plan to ensure ongoing access to and preservation of its holdings.***

#### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

#### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

Data management is included in the IFREMER mandate (cf. R1). For that purpose, SISMER has been mainly funded by IFREMER since its creation. From 2016, SISMER has been a key player in “Odatis – the French Marine Data Cluster” which is the Oceanographic component of the French Research Infrastructure for Earth Observation data management. Being included in a French Research Infrastructure, directly linked to the French Ministry of Research, provides an additional guarantee of long-term sustainability of the SISMER data centre.

In addition, several data collections managed by SISMER are already replicated in other national or international data centres; with the master copy of data collections kept at SISMER:

- Metadata (metadata catalogues such as Cruise Summary reports , Common Data Index, ... ) are replicated at the European level within the SeaDataNet European infrastructure,
- Physical and chemical oceanographic data managed at SISMER are periodically included in the World Ocean Data Base maintained by the IOC/IODE World Data Centre A,
- Operational oceanography in-situ data, such as ARGO data, are continuously replicated in other regional or global data centres, according to the data management plan of the related international programs like Copernicus CMEMS,
- Bathymetric data sets, when publically available, are provided to the French Oceanographic Office (SHOM), the General Bathymetric Chart of the Oceans (GEBCO) and to the European Marine Observation and Data Network (EMODnet)
- Parts of data linked to the exploitation of ocean resources and environment such as coastal environmental data, fishery monitoring data and geological data are transmitted to National and European legal repositories in accordance with national and European regulations.

In the unlikely case of a SISMER (or IFREMER) closing and according to French regulation, all information and scientific data would be transferred to the French national repository for research data (CINES - Centre Informatique National de l'Enseignement Supérieur) which is mandated for providing a long-term preservation of Research data.

Acronyms:

CSR : Cruise Summary Report : international standard format for oceanographic cruise description

Attached documents :

Associated links :

R3-L1-CINES web portal (<https://www.cines.fr/en/>)

R3-L2-GEBCO web portal (<https://www.gebco.net/>)

R3-L3-SHOM French Oceanographic Office (<http://www.shom.fr/en/>)

R3-L4-EMODnet portal (<http://www.emodnet.eu/>)

R3-L5-Copernicus TAC in-situ portal (<http://www.coriolis.eu.org/Data-Products/Data-Delivery/Copernicus-In-Situ-TAC>)

*Reviewer Entry*

**Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

## IV. Confidentiality/Ethics

*R4. The repository ensures, to the extent possible, that data are created, curated, accessed, and used in compliance with disciplinary and ethical norms.*

### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### *Response:*

As explained above, all the data stored in the SISMER repository focus on marine science; in addition, all the data ingested within the “filières” F1 F2 F3 F4 F5 come from observation systems certified as Research Infrastructure for which all the norms and common practices are taken into account.

For most of these data, open access is a common and desirable objective. However, in the F5 “filière” (fisheries data), the access rights to data have to be compliant with the French Ministry of agriculture and fisheries requirements, and data remain non-public at the SISMER repository level ; the Ministry is fully responsible in terms of results or data publication. The F5 filière shows that SISMER (and Ifremer) are considered as Trustworthy by the Ministry of fisheries, in the domain of restricted access to data.

In cooperation with 2 other French public research institutes CIRAD and INRA, Ifremer has setup an “ethics steering committee” for biological science. This committee may be queried by any scientist or citizen about specific questions or situations; it delivers advice to the scientific community.

Acronyms :

INRA : French National Institute for Research in Agronomy

CIRAD : French agricultural research and international cooperation organization

Associated links :

R4-L1-Ifremer Scientific advisory board

(<https://wwz.ifremer.fr/en/The-Institute/Organisation/Boards-and-Commissions/Scientific-Advisory-Board>)

R4-L2-Ifremer Ethics advisory board (<https://wwz.ifremer.fr/L-institut/Ethique-et-deontologie>)

*Reviewer Entry*

**Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:

Accept

## V. Organizational infrastructure

*R5. The repository has adequate funding and sufficient numbers of qualified staff managed through a clear system of governance to effectively carry out the mission.*

***Compliance Level:***

4 – The guideline has been fully implemented in the repository

*Reviewer Entry*

**Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

## *Response:*

### 1-Staff

The French ocean data centre activity relies on 3 teams, attached to a central department called IRSI (Research Infrastructures and Information Systems):

- SISMER which operates the data centre
- ISI which develops the necessary software for data management and data processing
- RIC which maintains the IT infrastructure (40% of this team is dedicated to data management and the data processing infrastructure: 7 equivalent full-time personnel).

Staff involved in the data centre is detailed below:

#### SISMER

##### Permanent Staff

17 Engineers (7 senior, 10 junior), 4 Technicians (2 senior, 2 junior)

Non permanent staff :

6 Engineers, 0 technicians (6 junior)

Permanent support staff

0,5 finance, 0,5 administration

The main activities in SISMER team are :

Ocean data management project coordination (Seadatacloud, Emodnet, Copernicus, ...)

Geosciences (geology, geophysics)

Physical oceanography and operational oceanography

Coastal and open-ocean oceanography

Chemical oceanography

Satellite data

Deep sea environment

Fisheries

Cruise reports administration

Projects vessels data

Web portal administration

GIS

HOV, ROV and AUVs data management

#### ISI

##### Permanent Staff

12 Engineers (6 senior, 6 junior), 2 Technicians (2 senior)

Non permanent staff :

7 Engineers, 0 technicians (7 junior)

Permanent support staff

0,5 finance, 0,5 administration



RIC

Permanent Staff

15 Engineers (12 senior, 3 junior), 5 Technicians (4 senior, 1 junior)

Non permanent staff :

4 Engineers, 0 technicians (4 junior)

Permanent support staff

0,5 finance, 0,5 administration

## 2-Funding

In the framework of Research Infrastructure “Earth data pole” including “ODATIS”, Ifremer provides adequate funding to SISMER to manage the repository, in coordination with national, European and international partnerships (UE SeaDataNet/SeaDataCloud, Copernicus CMEMS, Emodnet, IOC/IODE).

For the 2019 year, the budget allocated to the 3 services (SISMER, RIC, ISI) is:

- 4.445.395€ as “recurrent” budget

- 936.500€ as “project” budget

## 3-Retraining of Ifremer's employees

The French law requires companies to provide retraining for employee's with a minimal budget of 1% of the gross wages.

Ifremer provides an even higher budget; in 2017, the budget for retraining represented 3.3% of the wages, around 3 M€.

Attached documents :

R5-D1-Rapport annuel unite IDM

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R5-D1-Rapport%20annuel%20unite%20IDM.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R5-D1-Rapport%20annuel%20unite%20IDM.pdf))

Associated links :

R5-L1-Ifremer annual report 2017 (<https://wwz.ifremer.fr/content/download/117517/file/Annual%20Report%202017.pdf>)

R5-L2-FilièreF3 Coriolis data management report 2018 (<https://archimer.ifremer.fr/doc/00469/58109/60529.pdf>)

R5-L3-FilièreF1 French Oceanographic Fleet Cruises Report (<https://archimer.ifremer.fr/doc/00446/55723/57448.pdf>)

## *Reviewer Entry*

### **Reviewer 1**

Comments:

Accept

### **Reviewer 2**

Comments:

Accept

## **VI. Expert guidance**

***R6. The repository adopts mechanism(s) to secure ongoing expert guidance and feedback (either inhouse or external, including scientific guidance, if relevant).***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### ***Reviewer Entry***

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

As described above, SISMER repository has been created and is driven by the IOC/IODE framework. This strategy is applied at every level of the organization :

- At the European level, the Ifremer leadership in SeaDataNet infrastructure and related European projects, or Copernicus, or EMODnet enforce the institute to maintain activities in the topic of marine science by a complete interoperability with partners. This leadership is periodically renewed by the EU commission, which organizes specific calls for tender every 3 or 4 years.
- At a national level, Ifremer/SISMER coordinates the research infrastructure Odatis – Ocean Data Cluster
- At the Ifremer level, all activities and projects are controlled by the Scientific Steering Committee, who manages project involvement. Ifremer Scientific Advisory Board, which organizes a scientific audit of each Department/Unit every 5 years.
- Each “filière” has its own scientific steering committee
- All 3 teams (SISMER, ISI, RIC) are included in a single department which is able to manage all operational processes.

Attached documents :

R6-D1-Rapport\_evaluation\_idm\_2010\_2014\_V5 (audit IDM-SISMER)

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R6-D1-Rapport\\_evaluation\\_idm\\_2010\\_2014\\_V5.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R6-D1-Rapport_evaluation_idm_2010_2014_V5.pdf))

Associated links :

R6-L1- National Roadmap for Research Infrastructures ([http://cache.media.enseignementsup-recherche.gouv.fr/file/Infrastructures\\_de\\_recherche/04/6/Brochure\\_Infrastructures\\_2018\\_UK\\_1023046.pdf](http://cache.media.enseignementsup-recherche.gouv.fr/file/Infrastructures_de_recherche/04/6/Brochure_Infrastructures_2018_UK_1023046.pdf))

R3-L5-Copernicus TAC in-situ portal (<http://www.coriolis.eu.org/Data-Products/Data-Delivery/Copernicus-In-Situ-TAC>)

#### ***Reviewer Entry***

**Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## DIGITAL OBJECT MANAGEMENT

### VII. Data integrity and authenticity

*R7. The repository guarantees the integrity and authenticity of the data.*

#### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

#### *Response:*

As described in R0 (“filiales” organization), all procedures are available and up to date in the frame of ISO9001 “P8” process. This R7 response focus on “integrity” and “authenticity” for each filiale.

Data coming from French Oceanographic Fleet (filiales F1&F2) : all scientific cruise project have to be submitted to a specific workflow called SGC (Système de Gestion des Campagnes) to be evaluated by the FOF scientific committee, and then in case of success, to be scheduled, prepared and realized. All needed instruments and measurement program have to be described before the cruise. The Ifremer-SISMER data center is involved in the SGC since the submission on of cruise projects. Therefore, the data and metadata expected after the cruise are well known, and Ifremer-SISMER team has automatic requests addressed to cruise PI's, until the completeness of data/metadata is reached. Data are validated but not changed ; datasets are built from original data using international format standard (IOC/IODE, Seadatanet), and an unique DOI is attached to the cruise. Metadata include all information about instruments used, or measurement method, making possible any investigation about one or more measurement point.

Data coming from labelled RI and NOS (filière F3) : these observation systems produce continuous flow of measurement in the goal of building long time series. Most metadata (instrument, location, release, method) are known before receiving data, and the completeness of data is quite easy to check. In case of upgrade made in a referenced observation system, Ifremer-SISMER is informed in real time. As in F1-F2 filière, data is validated without change ; datasets are built with DOI attached regarding each RI/NOS's own policy (see R7-L3 Argo exemple) ; datasets are considered as new products and may be deposit in the SEANOE repository (F6 filière).

Data coming from satellite mission (filière F4) : for the SMOS and CFOSAT satellites, Ifremer-SISMER has an operational role in the "ground segment". Data is received after been processed at a low level by CNES or ESA ; Ifremer-SISMER then applies all processing steps well defined in the organization committee of each satellite ground segment. The processed data are delivered, DOIzed in accordance with the same committee. From time to time, the committee decide to change a processing algorithm and may then request a reprocessing of all historical data from the satellite with the new algorithm. For all satellite scientific missions, all the workflow/data products are driven by specific committee, which request data and processor version control, service level agreement, DOIzation policy.

In the filière F5, fisheries data, the specific steering committee decided what data have to be collected, what processing chains have to be applied to these data, and what products (datasets/indicators) have to be delivered. The schedule/period of these deliveries is described as service level agreement in the contract with French Ministry of Agriculture. Fisheries data are one pillar of national and European public policies for fisheries ; the data management requires the ability to reproduce any data processing and track any data origin.

In the filière F6, both SEXTANT and SEANOE deposit interfaces require completeness of metadata (in CSW standard for SEXTANT and Dublin Core for SEANOE). There no version management of datasets (a new version is a new deposit). Identity of depositors are logged, and displayed in the DOI landing page (see R7-L4).

Attached documents :

R0-D4-ISO9001 Ifremer-P8 filière F1 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D4-ISO9001%20ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D4-ISO9001%20ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf))

R0-D5-ISO9001 Ifremer-P8 filière F2 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D5-ISO9001%20ifremer-P8%20fili%C3%A8re%20F2%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D5-ISO9001%20ifremer-P8%20fili%C3%A8re%20F2%20sheet.pdf))

R0-D6-ISO9001 Ifremer-P8 filière F3 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D6-ISO9001%20ifremer-P8%20fili%C3%A8re%20F3%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D6-ISO9001%20ifremer-P8%20fili%C3%A8re%20F3%20sheet.pdf))

R0-D7-ISO9001 Ifremer-P8 filière F4 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D7-ISO9001%20ifremer-P8%20fili%C3%A8re%20F4%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D7-ISO9001%20ifremer-P8%20fili%C3%A8re%20F4%20sheet.pdf))

R0-D8-ISO9001 Ifremer-P8 filière F5 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D8-ISO9001%20ifremer-P8%20fili%C3%A8re%20F5%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D8-ISO9001%20ifremer-P8%20fili%C3%A8re%20F5%20sheet.pdf))

R0-D9-ISO9001 Ifremer-P8 filière F6 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D9-ISO9001%20ifremer-P8%20fili%C3%A8re%20F6%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D9-ISO9001%20ifremer-P8%20fili%C3%A8re%20F6%20sheet.pdf))

Associated links :

R7-L1-Sextant web portal (<https://sextant.ifremer.fr/>)

R7-L2-Seanoe web portal (<https://www.seanoe.org/>)

R7-L3-Argo DOI attribution policy (<https://www.seanoe.org/html/argo-floats-example-of-doi-attribution-policy.htm>)

R7-L4-Seanoe DOI landing page exemple (<https://www.seanoe.org/data/00286/39746/>)

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **VIII. Appraisal**

*R8. The repository accepts data and metadata based on defined criteria to ensure relevance and understandability for data users.*

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

Data archived at SISMER comes from different sources:

- Measurements made on-board the French research vessels by on-board acquisition systems (F1 and F2 filières)

For data collected on-board the IFREMER fleet, SISMER coordinates the quality process for data collection through a working group involving technicians and data managers. This working group defines guidelines for the data collected by

acquisition systems in order to ensure the implementation of procedures that aim to provide an adequate level for data quality.

- Measurements made by autonomous platforms sent automatically in NRT to SISMER (F3 filière)

These measurements are mainly performed in the framework of operational oceanography programs. The recommendations issued by the EuroGOOS Data Management Exchange and Quality Working group (EuroGOOS Data MEQ) are applied:

- o Recommendations for in-situ data Near Real Time Quality Control
- o Real Time Quality Control of biogeochemical measurements
- o Recommendations for enhancing Data Management Exchange and Quality for operational oceanography (2015)
- o Recommendations for a Pan-European data management system for operational oceanography (2010)

In addition for some specific platforms (ARGO floats, gliders, etc.), specific procedures have been adopted at the project level and are strictly applied at the SISMER level:

- o ARGO quality control manual for CTD and trajectory data, version 3, December 15th 2015:

<http://dx.doi.org/10.13155/33951>

- o Bio-ARGO quality control Manual for biogeochemical data, version 1.0, March 1st 2016:

<http://dx.doi.org/10.13155/40879>

- o Bio-ARGO quality control manual for Chlorophyll-A concentration, version 1.0, December 2014:

<http://dx.doi.org/10.13155/35385>

- o EGO Users Manual v1.2

- o EGO data management best practices v1.0

- o GOSUD <http://www.gosud.org/Documents/Format-and-templates>

- Satellite images and processing (filière F4)

Thanks to a contract between the French space agency CNES and Ifremer/SISMER, which contributes to the ground segment of several ocean observation satellites. CNES and ESA provide reliable data to Ifremer, however SISMER applies an additional panel of quality checks at the ingestion point to validate the compliancy of data quality compared to the ground segment definition.

- Fisheries data (filière F5)

All data ingested by this filière come from observation or information systems described in the agreement with the French Ministry of agriculture and fisheries. Controls are made by SISMER at the ingestion point.

- Measurements made in research laboratories after data collection at sea (filière F6 and general principles)

SISMER has contributed to the development of guidelines to assist those involved in the collection, processing, quality control and exchange of various types of (mainly) physical oceanographic data, for example, Moored Current Meters, Shipborne ADCP, Sensors, Chlorophyll and Nutrient data. This is made possible by its prior involvement in the ICES working group on Marine Data Management (now moved to the ICES operational group, Data and Information - DIG), These guidelines have been adopted by the ICES Data Centre and are recommended by SISMER (<http://ices.dk/publications/library/Pages/default.aspx> Data guidelines).

Each guideline addresses the data and metadata requirements of a specific data type. They cover three main areas:

- o What the data collector should provide to the data centre (e.g. collection information, processing, etc.),
- o How the data centre handles data supplied (e.g. value added, quality control, etc.),
- o What feedback the data centre can provide in terms of data, referral services and expertise to the data producer.

Attached documents :

Associated links :

R8-L1-Recommendations for in-situ data Near Real Time Quality Control

([http://eurogoos.eu/download/Recommendations-for-RTQC-procedures\\_V1\\_2.pdf](http://eurogoos.eu/download/Recommendations-for-RTQC-procedures_V1_2.pdf))

R8-L2-Real Time Quality Control of biogeochemical measurements

(<http://archimer.ifremer.fr/doc/00251/36232/34792.pdf>)

R8-L3-Recommendations for enhancing Data Management Exchange and Quality for operational oceanography (2015)

([http://eurogoos.eu/download/DATAMEQ-Working-Group-Recommendations\\_VF.pdf](http://eurogoos.eu/download/DATAMEQ-Working-Group-Recommendations_VF.pdf))

R8-L4-Recommendations for a Pan-European data management system for operational oceanography (2010)

([http://eurogoos.eu/download/Recommendations-for-a-Pan-EU-data-sysem-from-DATAMEQ-WG\\_V2.1.pdf](http://eurogoos.eu/download/Recommendations-for-a-Pan-EU-data-sysem-from-DATAMEQ-WG_V2.1.pdf))

R8-L5- ARGO quality control manual for CTD and trajectory data (<http://dx.doi.org/10.13155/33951>)

R8-L6- Bio-ARGO quality control Manual for biogeochemical data (<http://dx.doi.org/10.13155/40879>)

R8-L7- Bio-ARGO quality control manual for Chlorophyll-A concentration (<http://dx.doi.org/10.13155/35385>)

R8-L8-EGO Users Manual ([http://www.ego-network.org/dokuwiki/lib/exe/fetch.php?media=public:datamanagement:ego\\_guiders\\_netcdf\\_format\\_manual\\_v1.2.pdf](http://www.ego-network.org/dokuwiki/lib/exe/fetch.php?media=public:datamanagement:ego_guiders_netcdf_format_manual_v1.2.pdf))

R8-L9- EGO data management best practices ([http://www.ego-network.org/dokuwiki/lib/exe/fetch.php?media=public:data\\_management:data\\_management\\_good\\_practices\\_manual\\_v1.0.pdf](http://www.ego-network.org/dokuwiki/lib/exe/fetch.php?media=public:data_management:data_management_good_practices_manual_v1.0.pdf))

R8-L10-GOSUD format and templates (<http://www.gosud.org/Documents/Format-and-templates>)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

#### **Reviewer 2**

Comments:

Accept

## **IX. Documented storage procedures**

***R9. The repository applies documented processes and procedures in managing archival storage of the data.***

***Compliance Level:***

3 – The repository is in the implementation phase

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

3 – The repository is in the implementation phase

#### **Reviewer 2**

Comments:

3 – The repository is in the implementation phase

### *Response:*

In our comprehension of R9 and R10 requirement, and for more clarity, we assume that R9 expect a response about technical/IT availability of different kinds of storage, and R10 (preservation plan) concerns the procedure applied to each “filière” using the different kinds of storage, at different steps of processing.

The SISMER repository can apply several levels of security available at Ifremer for the storage:

- High performance storage disk array without “snapshot”

This kind of storage is based on redundant and parallel architectures GPFS or LUSTRE, and is used in all processing steps of the data workflow, especially when processing large datasets (satellite, videos, echosounders, ...).

- High performance storage disk array within “snapshots” (same redundant architecture)

“Snapshots” are recovery procedure internal to storage disk servers ; a snapshot in Ifremer is configured to produce a recovery image every 6 hours and to remain available for 1 month.

For specific data, the snapshots provide the backup to resume a processing step.

Around 2 peta-bytes are used for these 2 storage areas.

- Disk storage NAS with external backup

For data of lower volume, but with longer processing flow, SISMER repository uses a NAS with external backup. The backup policy at Ifremer consists in an daily incremental copy of “updated” files to a magnetic tape library (LTO), located in a separate building. The policy is to make a daily copy of updated files, and to produce a complete copy of the NAS every month. The daily backup remains available for 2 months, after that, a yearly complete copy is moved into the “long-term archive” system.

- Long-term archive

SISMER selects long-term archive for stabilized datasets, which have to be preserved “ad vitam aeternam”. The technique used for that is a double copy on 2 magnetic tape libraries (LTO), located in 2 separate buildings. The system software manages the replacement of the tapes, according to their mean lifecycle; for each release of LTO, the used tapes are progressively replaced by new ones, and the software transfers the information.

Periodically, a statistical survey is carried out, to make sure that the archives remain readable and downloadable.

Archived files are stored on tapes in an opensourced and most used format “tar”, to ensure the perennity of access to the data, and to avoid any dependency on the archiving software editors.



All server architecture use virtualization technologies to avoid hardware failures; in the framework of ISO9001:2015 certification, an indicator targets the global availability of the data services, as described above.

In addition, all SISMER/Ifremer storage areas are covered by a solid hardware maintenance agreement, which includes failed disks replacements.

The disaster recovery plan is an action in progress. Technically, the goal is to install a new data centre room in a separate building, to host a backup server infrastructure for operational data services. The backup principle has been validated in a POC action and will be put instigated in 2019 a purpose building under construction.

Ifremer has a double backup connection to the INTERNET, using 2 different Telecom Providers and 2 independant cable paths.

The disaster recovery plan will be issued at the end of 2019.

Attached documents :

R9-D1-Demande d espace disque Ifremer

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R9-D1-Demande%20d%20espace%20disque%20Ifremer.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R9-D1-Demande%20d%20espace%20disque%20Ifremer.pdf))

R16-D1-Ifremer IT risks analysis

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-D1-analyse%20des%20risques.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-D1-analyse%20des%20risques.pdf))

Associated links :

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept.

Future enhancements to gain a higher Compliance Level: Decision processes to select storage and to move to archival storage need to be formally documented as described in the submission.

## **X. Preservation plan**

***R10. The repository assumes responsibility for long-term preservation and manages this function in a planned and documented way.***

***Compliance Level:***

3 – The repository is in the implementation phase

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

3 – The repository is in the implementation phase

#### **Reviewer 2**

Comments:

3 – The repository is in the implementation phase

### *Response:*

All decisions about data preservation and storage policy are taken in a “data storage” work group, with members representing the “marine science” community and SISMER data managers. For all certified Observation Systems, the policy is stable and robust; but in the case of high volume scientific datasets, the data storage Work Group evaluates the best way for each dataset to be processed and stored. SISMER is working on a document called “Preservation plan” to characterize these cases.

For each “filière”, and in the frame of ISO9001 certification, the procedure exists and is applied, but it doesn’t focus specially on “long-term preservation”. The future SISMER Preservation Plan may centralize relevant information about storage policy. For exemple :

- Filière F1 : central catalog of data from FOF cruises ; the volume of data is low, but the on-line availability has to be very high. All data is managed in a relational database (ORACLE), with external backup. In the future Disaster Recovery Plan, the catalog will remain available in case of complete out-of-service in the IT building.
- Filière F2 : raw data are systematically archived on cartridge robots (Ifremer long-term archive) ; raw data are made available (the possible moratorium delay is managed) on disk space, organized by cruises, and accessible from the catalog (filière F1)
- Filière F3 : in situ data and metadata are stored in an ORACLE database, with external backup. Automatic quality control is done, making the data available in a few hours (NRT service required for part of data). Validated data are duplicated to other data centre involved in the RI or NOS (like Euro-Argo, or EMSO). So, no need to use Ifremer IT long-term archive service.
- Filière F4 : satellite data comes from national or European agencies, which are in charge of their IT long-term archive. These data are processed in Ifremer-SISMER centre to produce finalized geophysical datasets, which are made available to users and are archived into the IT long-term archive.
- Filière F5 : raw fisheries data are stored in the ORACLE database, with restricted access. Processed data are made available to French Fisheries Administration on disk space with managed access rights.
- Filière F6 : For geographical data (Sextant), catalogs are stored in ORACLE database and files are made available on disk space accessible by the Internet through WMS/WFS geographical protocols (ISO19115 standards).  
For SEANOE repository, datafiles are made available on disk space, and archived in the IT long-term archive

Acronyms :

POC : Proof Of Concept

Joint documents :

R10-D1-PRA-PrincipesGeneraux

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R10-D1-PRA-PrincipesGeneraux.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R10-D1-PRA-PrincipesGeneraux.pdf))

R10-D2 - Politique de sécurisation des données ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R10-D2%20-%20Politique%20de%20s%c3%a9curisation%20des%20donn%c3%a9es.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R10-D2%20-%20Politique%20de%20s%c3%a9curisation%20des%20donn%c3%a9es.pdf))

R10-D3-Intranet user s manual for reference data coming from data WG ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R10-D3-Intranet%20user%20s%20manual%20for%20reference%20data%20coming%20from%20data%20WG.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R10-D3-Intranet%20user%20s%20manual%20for%20reference%20data%20coming%20from%20data%20WG.pdf))

Associated links :

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept.

The availability of full documentation will allow for a higher Compliance Level to be allocated in the future.

## **XI. Data quality**

***R11. The repository has appropriate expertise to address technical data and metadata quality and ensures that sufficient information is available for end users to make quality-related evaluations.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

## ***Response:***

The discovery metadata quality is assessed according to the European Inspire Directive and its implementation in France. Conformance to this directive is applied for technical compliance (ISO 19129 XML), for completeness and for use of agreed Common Vocabularies.

The quality of data and related usage metadata is also assessed accordingly to the requirements defined by the related international programs, with the objective to make data comparable at a regional and global scale. Firstly, the ingestion process is fully checked in real time or delayed mode, feedback is provided to the data producers who are mainly the Principal Investigators of the Observation systems (chief scientists of a sea cruise, person in charge of an automated observatory ...). Any anomalies noted will be reported back to the producer for appropriate action if needed.

Several QA/QC tools to perform the quality checks :

SISMER has developed a quality control software (SCOOP) used mainly for the chemical and physical data measured as vertical profiles, time series or trajectories part of the Near Real Time or Delayed data flows received at the data centre. This software was first created in 1995 based on the IODE recommendations (Manual of quality control procedures for validation of oceanographic data, IOC, Manuals and guides n°26, 1993). Since then, 2 releases of the software have been published (SCOOP2 in 2006 and SCOOP3 in 2016). The software stamps all numerical values of the data files (metadata values like latitude, longitude, date, bottom depth and data values) with a quality flag of the SeaDataNet flag scale.

Procedures and algorithms are described in the software specification document.

The SCOOP software works in 2 major stages, metadata and data are firstly automatically checked and flagged and secondly visually and manually checked by a French NODC's operator who validates or rejects the flags resulting on the first step. Metadata values (date, latitude, longitude, bottom depth) are flagged for quality, and can be changed (in that case original data are kept and the quality indicates that the metadata has been corrected), data measurements are never modified but only flagged for quality.

For geophysical data IFREMER CARAIBES/GLOBE software is used for quality checks of the bathymetry, the magnetism and the gravimetry data. Data are not flagged, but inaccurate data are detected in the raw data and filtered when distributed under MGD77 format.

For some data types such as fishery monitoring data, species related data and remote sensing data, SISMER mainly performs consistency checks (compliance of the formats of provided files, of the common vocabularies to use...). Quality assessments of data are delegated to ad-hoc expert groups. However, results of these assessments are collected and recorded in metadata and/or data.

Feedback from data users are also collected and analysed. Keeping track of feedback using the Quality fields of the extension of the ISO 19115 standard (ISO 19115 – 3 and related substandards) is carried out at SISMER within some EMODnet European projects (EMODnet Sea Basin Checkpoints).

Joint documents :

R11-D1-scoop\_documentation\_en

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R11-D1-scoop\\_documentation\\_en.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R11-D1-scoop_documentation_en.pdf))

Associated links :

R11-L1-Seadatanet-quality-control

([https://www.seadatanet.org/content/download/596/file/SeaDataNet\\_QC\\_procedures\\_V2\\_%28May\\_2010%29.pdf](https://www.seadatanet.org/content/download/596/file/SeaDataNet_QC_procedures_V2_%28May_2010%29.pdf))

R1-L2-Globe-data-processing-software (<http://flotte.ifremer.fr/Presentation-de-la-flotte/Logiciels-embarques/GLOBE>)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

#### **Reviewer 2**

Comments:

Accept

## **XII. Workflows**

*R12. Archiving takes place according to defined workflows from ingest to dissemination.*

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

#### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

The general organization is derived from the OAIS Model with specific tasks according to the data types (environmental data with spatial references, needs of processing to produce geophysical variables, ...).

As mentioned before, all SISMER data workflows are managed through a specific process in the IFREMER general ISO 9001:2015 QMS. The process description is based on a general flow chart (figure R12-F1 below) and 6 “filières”.

<img src=[http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F1-Process%20P8%20description.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F1-Process%20P8%20description.png)>

Figure R12-F1 – General workflow of data at IFREMER-SISMER

Data are ingested in the A1-« collection » step, and are disseminated by the A6-“diffusion” step. Two transversal activities are described : A7-“supervision” to manage automatic or non-automatic procedures or systems, and A8-“interoperability” in charge of all synchronous data exchange with other marine data repositories.

For all 4 steps A2-“preservation”, A3-“processing”, A4-“quality control” and A5-“cataloging”, the implementation of these steps in the different “filières” may differ, according to the data volume and the number of instruments involved.

#### SISMER internal organization

For daily management of the workflows, SISMER operates a help-desk service (Service Desk - SD) which provides its customers/end users with information and support related to data, data delivery, software related to data... The service desk is based on ITIL (Information Technology Infrastructure Library) and part of the ISO 9001 certification.

The service desk relies on OTRS , with several email entry points (SLAs Service Level Agreements according to the ITIL definitions). Each of these email entry points is related to one of the data system/projects described in “§R0 section” of this document. It is operated during working hours from Monday to Friday; each working day, one French-NODC staff member is responsible for the service desk. The service desk schedule is prepared 3 months in advance.

A service desk Wiki is available, describing procedures and answers to the well-known or predictable requests. This Wiki is updated regularly by French NODC staff, adding new procedures or updating existing ones.

Emails addressed to all entry points are received by the service desk assistant of the day, an automatic reply is sent immediately to the end user, the assistant will then respond to the query as soon as possible as presented in Figure R12-F2. Each query is identified by a unique ID-ticket in the system.

<img src=http://www.ifremer.fr/datasismer/rda\_wcs\_coretrustseal/R12-F2-Workflow%20for%20data%20request%20coming%20in%20SISMER%20service%20desk.png>

Figure R12-F2 – Work-flow for data request coming in SISMER service desk

The Service Desk (SD) is then organized with 3 levels of support, as presented in Figure 4:

- Level 1 provides basic support to simple and Wiki documented queries; level 1 can reroute the query to level 2 or level 3 depending on the context and the complexity of the query;
- Level 2 support has a broader understanding of one or several specific projects; level 2 can reroute the query to level 3 depending on the context and the complexity of the query;
- Level 3 usually has the most expertise on a specific problem, software...

<http://www.ifremer.fr/datasismer/rda\_wcs\_coretrustseal/R12-F3-Service%20desk\_3%20levels%20of%20support.png>

Figure R12-F3 – Service desk: 3 levels of support

Every 2 months, a survey on any open bookends is performed. Twice a year a global statistic report on the service desk activity is produced giving information such as number of requests per type, the mean delays for answering requests, the number of on-going requests per staff member... Example of statistical graphs is presented in Figure R12-F4.

<img src=http://www.ifremer.fr/datasismer/rda\_wcs\_coretrustseal/R12-F4-Exemples%20of%20statistics%20on%20the%20service%20desk.PNG>

Figure R12-F4 – Example of statistics on the service desk

In some cases, more specific reports per project using the helpdesk are produced on a monthly basis.

A comprehensive customer satisfaction survey is in progress for the whole service desk. Nevertheless, in 2014, for one specific project concerning the fisheries, questions about the helpdesk service were asked concerning its efficiency, reactivity and welcome. These questions were embedded in a more global survey concerning the data management of fisheries data in IFREMER.

The result of this survey (Figure R12-F5) shows that most of the end users were satisfied or very satisfied with the service desk.

<img src=http://www.ifremer.fr/datasismer/rda\_wcs\_coretrustseal/R12-F5-User%20survey%20on%20the%20Fishery%20service%20desk.png>

Figure R12-F5 – User survey on the Fishery service desk

In the framework of ISO 9001 certification review, some of our service desk projects will carry out similar surveys in the near future.

Figures :

Figure R12-F1-Process P8 description

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F1-Process%20P8%20description.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F1-Process%20P8%20description.png))

Figure R12-F2-Workflow for data request coming in SISMER service desk ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F2-Workflow%20for%20data%20request%20coming%20in%20SISMER%20service%20desk.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F2-Workflow%20for%20data%20request%20coming%20in%20SISMER%20service%20desk.png))

Figure R12-F3-Service desk\_3 levels of support

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F3-Service%20desk\\_3%20levels%20of%20support.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F3-Service%20desk_3%20levels%20of%20support.png))

Figure R12-F4-Exemples of statistics on the service desk ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F4-Exemples%20of%20statistics%20on%20the%20service%20desk.PNG](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F4-Exemples%20of%20statistics%20on%20the%20service%20desk.PNG))

Figure R12-F5-User survey on the Fishery service desk ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R12-F5-User%20survey%20on%20the%20Fishery%20service%20desk.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R12-F5-User%20survey%20on%20the%20Fishery%20service%20desk.png))

Joint documents :

R0-D1-Certification ISO9001-2015 Ifremer

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D1-Certification%20ISO9001-2015%20Ifremer.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D1-Certification%20ISO9001-2015%20Ifremer.pdf))

R0-D2-Accreditation IODE SISMER

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D2-SISMER\\_Accrediation\\_IODE\\_diplome\\_2017.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D2-SISMER_Accrediation_IODE_diplome_2017.pdf))

R0-D3-ISO9001 Ifremer-P8 process sheet

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D3-ISO9001%20Ifremer-P8%20process%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D3-ISO9001%20Ifremer-P8%20process%20sheet.pdf))

R0-D4-ISO9001 Ifremer-P8 filière F1 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D4-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D4-ISO9001%20Ifremer-P8%20fili%C3%A8re%20F1%20sheet.pdf))

R0-D5-ISO9001 Ifremer-P8 filière F2 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D5-ISO9001%20fremer-P8%20fili%c3%a8re%20F2%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D5-ISO9001%20fremer-P8%20fili%c3%a8re%20F2%20sheet.pdf))

R0-D6-ISO9001 Ifremer-P8 filière F3 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D6-ISO9001%20fremer-P8%20fili%c3%a8re%20F3%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D6-ISO9001%20fremer-P8%20fili%c3%a8re%20F3%20sheet.pdf))

R0-D7-ISO9001 Ifremer-P8 filière F4 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D7-ISO9001%20fremer-P8%20fili%c3%a8re%20F4%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D7-ISO9001%20fremer-P8%20fili%c3%a8re%20F4%20sheet.pdf))

R0-D8-ISO9001 Ifremer-P8 filière F5 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D8-ISO9001%20fremer-P8%20fili%c3%a8re%20F5%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D8-ISO9001%20fremer-P8%20fili%c3%a8re%20F5%20sheet.pdf))

R0-D9-ISO9001 Ifremer-P8 filière F6 sheet ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R0-D9-ISO9001%20fremer-P8%20fili%c3%a8re%20F6%20sheet.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R0-D9-ISO9001%20fremer-P8%20fili%c3%a8re%20F6%20sheet.pdf))

Associated links :

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
Accept

##### **Reviewer 2**

Comments:  
Accept

## **XIII. Data discovery and identification**

*R13. The repository enables users to discover the data and refer to them in a persistent way through proper citation.*

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### ***Response:***



In the scope of the F1-F2 filières, a DOI is set to each French oceanographic cruise. These cruise DOIs describe the cruise as a scientific activity and provide an access to the data managed by Sismer collected during the cruise.

Example:

ESCARTIN Javier, ANDREANI Muriel (2013) ODEMAR cruise, RV Pourquoi pas ?, <https://doi.org/10.17600/13030070>

Some oceanographic cruises are part of multiannual programs. A specific type of DOI has been attributed to series of cruises. A scientist can publish on and cite a series of cruises with the "series" DOI, or/and cite specific DOIs of cruises.

Example :

BOURILLET Jean-François, ARNAUD-HAOND Sophie, GREHAN Anthony (2009) BOB (CORALFISH), <https://doi.org/10.18142/259>

For the F6 filière, a DOI is set to each dataset published in SEANOE. A DOI can also be set, on-demand, to dataset published in Sextant. Example :

Gaurier Benoit, Germain Gregory, Facq Jean-Valery, Bacchetti Thomas, Baudet Lætitia, Birades Michel (2018). Marine growth effects on the hydrodynamical forces of a circular cylinder. SEANOE. <https://doi.org/10.17882/58038>

For all DOIs set by Sismer, a "How to cite" section is available on the Landing Page of the DOI. The suggested citation is built according to DataCite recommendations.

In the F3, F4 and F6 filières, to manage dynamic datasets, the authors have the possibility to get a new DOI for each new version of the dataset. This solution is appropriate if different versions of a dataset should continue to be specifically cited (e.g. with a list of different authors).

The author can also publish all versions within a single DOI. For example, this solution was selected by the Argo floats program (F3). It is inspired from The Research Data Alliance (RDA) recommendations . To allow reproducibility of studies with Argo data, a snapshot of the entire data set is preserved monthly. The snapshot contains all the Argo data available at the time of its creation. The one-month period between two snapshots was decided on by the Scientific Committee of Argo; within a given month, changes to the whole dataset are not significant.

This Argo DOI quotes either the global data set or a specific snapshot. Each monthly snapshot is assigned a key (#fragment). The key #61117 for example, was assigned to the snapshot 2019-01-08.

The citation of the whole data set is performed by citing the new DOI without parameters:

Argo (2019). Argo float data and metadata from Global Data Assembly Centre (Argo GDAC). SEANOE. <http://doi.org/10.17882/42182>

The citation of a specific snapshot is done by adding the key preceded by the # character to the DOI:

Argo (2019). Argo float data and metadata from Global Data Assembly Centre (Argo GDAC) - Snapshot of Argo GDAC of January 8st 2019. SEANOE. <https://doi.org/10.17882/42182#61117>

In addition of the DOI, and because most of the data are environmental data with a spatial reference (latitude, longitude), all managed databases must be compliant with the European Inspire Directive. (see ISO 19115 further).

Metadata are recorded in catalogues to setup discovery services according to Inspire guidelines.

SISMER manages well documented environmental data stored in its different databases assuring long-term preservation

of the data and metadata. All public data can be easily downloaded from the IFREMER data portal (<http://data.ifremer.fr> for the French version or <http://en.data.ifremer.fr> for the English version). Non-public data are also described on the data portal and can be accessed under specific conditions. SISMER openly encourages the free and unrestricted access to data for non-commercial use. Furthermore, SISMER is an active member of the SeaDataNet infrastructure and as such most of the physical, chemical, geophysical and geological data that it manages are distributed via SeaDataNet portal under standardized formats (<http://www.seadatanet.org/Data-Access>) and also available via the Ocean Data Portal (ODP) of IOC/IODE (<http://www.oceandataportal.net/portal/>).

In SeaDataNet, data and metadata are described as XML files based on the ISO-19115, ISO-19139 content models. These standards are a superset of the Dublin Core format.

These descriptions are updated regularly by a manual transfer to the SeaDataNet portal catalogues (EDMO, EDMED, EDMERP and EDIOS) or by regular automatic harvesting of the metadata (CSR and CDI)

SISMER also develops and manages Sextant, the spatial data infrastructure for marine environments. Since 2006, Sextant has been accessible online and can therefore be used by all IFREMER partners, and by the general public. Since 2008, Sextant has continued to evolve within the framework of the INSPIRE European directive. Sextant aims to collect and make available a catalogue of referential data from marine environments. Sextant is therefore a support for marine studies and decision-making in environmental issues such as biodiversity, marine renewable energy, coastal management, fishing, coastal and deep-sea environments, exploration and exploitation of the seabed, etc. This approach is perfectly adapted to the implementation of the "Grenelle de la Mer" marine environmental summit, and its continuation within the European commission's Green Paper "Marine Knowledge 2020".

As it meets ISO and OGC standards, Sextant is compatible with geographic information portals. Via interoperable services, Sextant data is accessible (harvesting) from several sources such as:

- The French National Geocatalogue
- The European Inspire Geoportal

Sextant provides DOI to datasets, allowing easy citation.

For non-geographical datasets, SEANOE provides DOI ; its interface can be harvested by OAI-PMH protocol.

Joint documents :

Associated links :

R13-L1-Ifremer Data Portal (<http://en.data.ifremer.fr/>)

R13-L2-Seadatanet Data Access (<http://www.seadatanet.org/Data-Access>)

R13-L3-IOC Ocean Data Portal (ODP) (<http://www.oceandataportal.net/>)

R7-L1-Sextant web portal (<https://sextant.ifremer.fr/>)

R7-L2-Seanoe web portal (<https://www.seanoe.org/>)

R13-L4-French National Geocatalogue (<http://www.geocatalogue.fr/>)

R13-L5-European Inspire Geoportal (<http://inspire-geoportal.ec.europa.eu/>)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:

Accept

**Reviewer 2**

Comments:  
Accept

## XIV. Data reuse

*R14. The repository enables reuse of the data over time, ensuring that appropriate metadata are available to support the understanding and use of the data.*

### *Compliance Level:*

4 – The guideline has been fully implemented in the repository

#### *Reviewer Entry*

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### *Response:*

Data reuse is the main objective for all data hosted in the SISMER repository, in compliance with NODC role. It must be available now and in the future. 2 levels of technical organization are implemented :

- The data is archived as “byte files”. This is described in the R9 requirement
- The format of the data (file or organization) has to be compliant with a standard readable at any time

The file formats used in the repositories are mainly open formats recommended by international standard organizations (ISO, W3C, OGC, ...), European regulations (Inspire Directive). These standardized formats are declined for specific datatypes by the marine (or Earth Observation) communities (IOC/IODE, ARGO, Society of Exploration Geophysicists ...) which provide guidelines on formats such as the Climate and Forecast Convention (CF Convention) for NetCDF Files. Format descriptions and guidelines are accessible online (e.g. <https://www.seadatanet.org/Standards/Data-Transport-Formats>) and referenced in the data file itself (version of the guidelines).

Common vocabularies are adopted and maintained by expert groups to reference data within the files, for example to identify each of the many variables observed, the unit, the methodology of observation... Expert groups are identified to

continuously maintain these common vocabularies: obsolete terms are maintained for backward compatibility but cannot be used for recent data. Common vocabulary servers have been set up and made available for data management (e.g. <https://www.seadatanet.org/Standards/Common-Vocabularies>).

Software tools are provided and maintained accordingly with the versions of the standardized formats and the community guidelines in order to make them easier to generate and readable long term.

Some sensors or instruments only produce “vendor” format, so, SISMER processes include data format conversion, even if some automatic functionality may be lost during the conversion process. For example, many submarine videos are collected in vendor format. At the ingestion point, SISMER converts them into adapted MPEG format which is an ISO standard. The MPEG standard is the pivot format for video files.

As described above, all the data coming from F1 F2 F3 F4 F5 filières are managed by certified observation systems, which provide science-oriented metadata. These metadata are equal or above ISO19115 metadata standard, which is the standard required by the European Inspire Directive for Environmental metadata (spatial data).

However, for F6 filière, SEANOE requires only Dublin Core metadata because SEANOE records also in-vitro data from laboratories that have no spatial references (latitude, longitude) .

SISMER engineers are constantly involved in European projects and partnerships; if new standard formats become available and are applicable, SISMER will be in a position to transpose and operate the new norm.

SISMER data are continuously harvested by national or European specialized portals. This synchronization is a kind of control of interoperability and data compliance. No gap is allowed.

Concerning Internet connection, Ifremer has 2 different subscriptions to 2 alternative TELCOs, using 2 separate cable paths.

So the SISMER repository is very attentive to the readability of data, over time and in the long term.

Attached documents :

Associated links :

R14-L1-Seadatanet common vocabularies (<https://www.seadatanet.org/Standards/Common-Vocabularies>)

R14-L2-Seadatanet Common formats (<https://www.seadatanet.org/Standards/Data-Transport-Formats>)

R14-L3-Netcdf format – Climate and Forecast conventions (<http://cfconventions.org/>)

### *Reviewer Entry*

#### **Reviewer 1**

Comments:  
Accept

#### **Reviewer 2**

Comments:  
Accept

# TECHNOLOGY

## XV. Technical infrastructure

***R15. The repository functions on well-supported operating systems and other core infrastructural software and is using hardware and software technologies appropriate to the services it provides to its Designated Community.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### ***Reviewer Entry***

##### **Reviewer 1**

Comments:

4 – The guideline has been fully implemented in the repository

##### **Reviewer 2**

Comments:

4 – The guideline has been fully implemented in the repository

### ***Response:***

The technical infrastructure is described in the IFREMER internal document “Schéma Directeur des Systèmes d’Information et de Télécommunication 2016-2020” and the annexed documentation provided by the IT support unit.

Technical infrastructure for data archiving and long term preservation

All data are stored, for long-term preservation, on magnetic cartridges (at present LTO 8 technology) with robotic access (currently Overland Neo 8000 tape libraries and autoloaders). All magnetic cartridges are duplicated in two libraries located in two separate locations (two buildings 0.5 km apart on the IFREMER campus in Brest). Information on magnetic tapes is periodically controlled (CRC codes) and replaced when their MTBF (mean-time-between-failure) is reached. Technical transitions (new generation of hardware e.g. change from LTO 6 to LTO 8) are periodically (approx. every 5 years) conducted and all tapes are copied and replaced.

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R15-F1-Long%20term%20data%20preservation%20infrastructure.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R15-F1-Long%20term%20data%20preservation%20infrastructure.png))

R15-F1-Long term data preservation infrastructure, including redundancy in two separated buildings

Most data are also recorded on disks in order to allow quality control and processing and to provide online access and visualisation. Disks and computing capacities are provided by a platform named Datarmor (8 petabytes of disk storage and more than 11000 computing cores). Data storage technology is based on parallel architecture (GPFS and LUSTRE) and provide protection against failure of physical drives (hot swap and rebuilt).

Metadata and data that are collected from automated observatories and transmitted from sea to shore in chunks that must be assembled. Complex data (e.g. biology, chemistry contaminants) that include many links to reference tables (such as taxonomy, parameter, unit, method, ...) are managed in relational database systems (Oracle 11). The Oracle databases run on 2 HP servers (dual cores, Linux Redhat) in a cluster for redundancy, failure tolerance and load balancing. In addition, a validation server, located in a separated building, is permanently maintained up-to-date (DataGuard mechanism) and can be used as a recovery mode in case of major disaster. Safeguarding the Oracle database is done by Oracle Resource Manager associated to Time Navigator (ASG Software Solutions). Archive Log mechanism is set up in order to allow recovery for the most recent committed transactions (no typing loss). This system is designed for recording around 200 million rows (100 million at present).

#### Technical infrastructure for data access

Most of data are now accessible on line, mainly in open access, but eventually under moratorium with user authentication and authorization.

Internet connection is provided, under service level agreement, by the French Research Network (Renater) which links all major research institutes and universities in France. Renater is the French component of the European Research Network (Geant) and linked to global networks. A hot backup connection to Internet can be switched on automatically, in case of failure of the RENATER service. This backup connection is provided by a commercial company and is independent to Renater. It uses an alternative cable path.

The portals to access data run on virtual machines (VMWare, RedHat Operating System) which rely on libraries of Dell physical servers. These portals make use of a collection of Apache web servers and Tomcat application servers. In order to be able to absorb load peaks, the web servers are organized in two layers: front-end servers that receive all http requests, filter them and redirect them towards appropriate back-end servers that are in charge of processing them. Dell libraries of physical servers are redundant for failure tolerance and load balancing. In addition, Veeam backup suite is used for backup and recovery of virtual machines (one-day loss maximum, 2 months of retention period).

All servers, disk and cartridge libraries and network components are covered by a maintenance agreement (intervention within 24h which is lead-time compatible with the redundancy level of the equipment).

#### Figures :

R15-F1-Long term data preservation infrastructure ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R15-F1-Long%20term%20data%20preservation%20infrastructure.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R15-F1-Long%20term%20data%20preservation%20infrastructure.png))

#### Joint documents :

R15-D1-Ifremer SDSIT IT general plan ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R15-D1-SDSIT.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R15-D1-SDSIT.pdf))

R15-D2-Ifremer IT costs and tariffs

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R15-D2-Ifremer%20IT%20Tarification%202018.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R15-D2-Ifremer%20IT%20Tarification%202018.pdf))

#### Associated links :

#### *Reviewer Entry*

#### **Reviewer 1**

Comments:  
Accept

**Reviewer 2**

Comments:  
Accept

## **XVI. Security**

***R16. The technical infrastructure of the repository provides for protection of the facility and its data, products, services, and users.***

### ***Compliance Level:***

4 – The guideline has been fully implemented in the repository

#### ***Reviewer Entry***

**Reviewer 1**

Comments:  
4 – The guideline has been fully implemented in the repository

**Reviewer 2**

Comments:  
4 – The guideline has been fully implemented in the repository

### ***Response:***

Physical protection of data holdings

As described above, data holdings are stored in two separate buildings (500 metres apart) located on the IFREMER campus in Brest-Plouzané. Access to the IFREMER campus is controlled by personal electronic cards and, in addition, by gate keepers for visitors and sub-contractors (6:00 – 22:00).

The two data holdings are in secured areas. These areas are equipped with a detection system which automatically issues early warnings and alerts when critical parameters are about to be exceeded (electrical power, temperature, hygrometry, smoke...). These alerts are received by dedicated third party staff who are present 7/7, 24h/24. Both data holdings are equipped with a fire sprinkler system.

Physical access to data holdings and related servers is only granted to people in charge of the IT infrastructure (IT staff). Access to the computer rooms is only possible by personal electronic cards. Access of people who do not work for the IT staff (including IFREMER/Sismer data managers and third party maintenance people) is only permitted under physical supervision of one of the IT staff.

Access to the network

Access to IFREMER internal network (intranet) is only granted to people having a personal IFREMER account (PID, login, password...). Accounts are delivered under the supervision of the IFREMER Human Resource Department. A password

policy has been established and low strength passwords are periodically detected and users warned to change them. When one staff leaves the organization, the account is frozen, the related content (home directories...) transferred to his/her team leader except his/her personal information (/perso directory) which is deleted according to the French regulations.

Because most of the data are made accessible online to the general or specific public, access to the Internet network is necessary. The security policy will not be described in this document as it remains confidential. The main principles of the security policy are:

Several network areas are identified, related to the categories of users the data services are provided to (from general public to IFREMER sub-staffs),

Exchanges between these areas are controlled by firewalls, and some protocols (e.g. http) are prohibited.

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-F1-IFREMER%20network%20areas.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-F1-IFREMER%20network%20areas.png))

R16-F1-IFREMER network areas

Even the area dedicated to interact with the general public (DMZ – De-Militarized Zone) is, at least, protected by two types of firewalls: physical firewall which parses and filters IP frameworks, application firewall which parses and filters content. Suspicious requests are black listed.

All network, firewall and server log files are monitored and archived.

Versions of software, servers are upgraded when security failures are reported by editors.

Personal computers, emails, ... which are connected to the IFREMER intranet are protected by the appropriate software (anti-virus, anti-spams, ...)

All IFREMER staff, when recruited, must agree on an "information technology charter" that lays out IFREMER staff rights and obligations, in order to preserve the security and integrity of the IT infrastructure and the information systems.

Connection to servers that manage data holdings is restricted to personal in charge of them.

Security procedures are recorded in an "Information System Security Plan" in accordance with the recommendations of the French Agency for the Security of Information Systems (ANSSI). The ANSSI sends us, in real time, security alerts and information notices with the appropriate measures to be applied to remove vulnerabilities (e.g. upgrade of firewalls, of servers, of software). Interruption of the internet services may be decided in case of urgent and severe threat.

A security officer and a deputy security officer are nominated. Security audits are periodically conducted and related recommendations taken into account by appropriate measures.

Documentation of the configuration of the various components for SISMER activities is available on demand only. For the purpose of the accreditation process and audits of SISMER, these demands need to be emailed to the Head of SISMER ([sismer@ifremer.fr](mailto:sismer@ifremer.fr)) who will make the necessary internal arrangements.

Security of personal computers

Personal computers which are connected to the IFREMER internal network must be registered in the IFREMER network « Yellow pages/domain ». Otherwise, connection is refused.

Personal computers are protected by anti-virus software (Kaspersky) which is automatically updated. Operating systems are also automatically upgraded to prevent potential vulnerabilities.

Access to "System login" is restricted to authorized staff.



Figures :

R16-F1-IFREMER network areas

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-F1-IFREMER%20network%20areas.png](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-F1-IFREMER%20network%20areas.png))

Joint documents :

R16-D1-Ifremer IT risks analysis

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-D1-analyse%20des%20risques.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-D1-analyse%20des%20risques.pdf))

R16-D2-ANSSI National IT Security Policy for public organisms

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-D2-ANSSI policy \(National Agency for Information Systems Safety\).pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-D2-ANSSI%20policy%20(National%20Agency%20for%20Information%20Systems%20Safety).pdf))

R15-D1-Ifremer SDSIT IT general plan ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R15-D1-SDSIT.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R15-D1-SDSIT.pdf))

R16-D3-Ifremer IT user's policy ([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-D3-Ifremer%20IT%20user%20rules%20of%20procedure.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-D3-Ifremer%20IT%20user%20rules%20of%20procedure.pdf))

R16-D4-Ifremer Campus access regulation

([http://www.ifremer.fr/datasismer/rda\\_wcs\\_coretrustseal/R16-D4-Ifremer%20Campus%20rules%20of%20procedure.pdf](http://www.ifremer.fr/datasismer/rda_wcs_coretrustseal/R16-D4-Ifremer%20Campus%20rules%20of%20procedure.pdf))

Associated links :

R16-L1-ANSSI National IT Security Agency web portal (<https://www.ssi.gouv.fr/en/>)

#### *Reviewer Entry*

##### **Reviewer 1**

Comments:

Accept

##### **Reviewer 2**

Comments:

Accept

## **APPLICANT FEEDBACK**

### **Comments/feedback**

*These requirements are not seen as final, and we value your input to improve the core certification procedure. To this end, please leave any comments you wish to make on both the quality of the Catalogue and its relevance to your organization, as well as any other related thoughts.*

***Response:***

A- The requirements seem to expect that the data ingestion is mainly made by scientist's deposit on a web interface ; there is no place for automatic data collection from automatic observation systems or specific collection of huge datasets coming from great certified Research Infrastructure (Satellite, oceanographic fleet, observation networks). In those cases, data workflow, data policy, data citation and data delivery are well defined by their sources and the repository is only a step in a global workflow.

B- About the data workflow : it will be easier to describe the global workflow (R12) before the details of its different steps (R8 R9 R10 R11)

*Reviewer Entry*

**Reviewer 1**

Comments:

**Reviewer 2**

Comments: