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# Draix Bléone DMP

*Plan de gestion de données créé à l'aide de DMP OPIDoR, basé sur le modèle "ANR - DMP template (english)" fourni par Agence nationale de la recherche (ANR).*

## Plan Details

Plan title	Draix Bléone DMP		
Version	First version		
Fields of science and technology (from OECD classification)	Earth and related environmental sciences		
Language	eng		
Creation date	2023-09-19		
Last modification date	2024-02-06		
License	Name	Creative Commons Attribution 4.0 International	
	URL	<a href="http://spdx.org/licenses/CC-BY-4.0.json">http://spdx.org/licenses/CC-BY-4.0.json</a>	

## Project Details

**Project title** Draix Bléone

**Acronym** Draix Bléone

**Abstract** The SNO (Service National d'Observation) Draix-Bléone Observatory was established in 1983 to study erosion and solid transport in mountainous regions. It is also a member of the Research Infrastructure for Critical Zone Observatory Applications and Research (IR OZCAR). It is located upstream of Digne, on the left bank (Draix site) and right bank (Galabre site) of the Bléone River. Several watersheds are equipped for measuring water and sediment flux, ranging in spatial scales from hillslopes (0.001 km<sup>2</sup>) to medium-sized basins (20 km<sup>2</sup>), with diverse land use patterns. The smaller basins are situated entirely on black marls highly sensitive to erosion, while the Galabre basin encompasses lithological diversity and land use representative of the Pre-Alps. The climate is of a mountain-mediterranean type. These sites are characterized by intense erosion and highly intermittent sediment exports, and their trajectories of evolution in the context of global change are central to the observatory's research questions.

**Funding**

- Institut National des Sciences de l'Univers (INSU) :
- Institut National de Recherche pour l'Agriculture, l'Alimentation et l'Environnement (INRAE) :
- Observatoire des Sciences de l'Univers de Grenoble (OSUG) :

**Start date** 1983-01-01

**Partners**

- Institut des Géosciences de l'Environnement [idref204509416](#)
- Environnement Méditerranéen et Modélisation des Agro-Hydrosystèmes [idref133558258](#)

**Research outputs :**

1. Default research output

**Contributors**

Name	Affiliation	Roles
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Le Bouteiller Caroline - 0000-0002-5927-7253	INRAE-IGE - 003vg9w96	<ul style="list-style-type: none"><li>• DMP manager</li></ul>
Legoût Cédric - 0000-0003-2958-4815	UGA-IGE - 02rx3b187	<ul style="list-style-type: none"><li>• Project coordinator</li></ul>

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# Draix Bléone DMP

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## 1. Data description and collection or re-use of existing data

### 1a. How will new data be collected or produced and/or how will existing data be re-used?

#### Data Collection

Data is acquired from sensors connected to a data acquisition system (with or without teletransmission), and is also obtained through sample collection in the field.

Detailed descriptions of data collection protocols, sensors, sites, and measurement stations can be found in the following data papers:

- For data acquired at Galabre site : Legout, C., Freche, G., Biron, R., Esteves, M., Navratil, O., Nord, G., ... & Spadini, L. (2021). A critical zone observatory dedicated to suspended sediment transport: The meso-scale Galabre catchment (southern French Alps). *Hydrological Processes*, 35(3), e14084. <https://doi.org/10.1002/hyp.14084>
- For data acquired at Draix site : Klotz, S., Le Bouteiller, C., Mathys, N., Fontaine, F., Ravanat, X., Olivier, J.-E., Liébault, F., Jantzi, H., Coulmeau, P., Richard, D., Cambon, J.-P., and Meunier, M.: A high-frequency, long-term data set of hydrology and sediment yield: the alpine badland catchments of Draix-Bléone Observatory, *Earth Syst. Sci. Data*, 15, 4371–4388, <https://doi.org/10.5194/essd-15-4371-2023>, 2023.

#### Data Re-Use

No data has been reused so far.

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### 1b. What data (for example the kind, formats, and volumes), will be collected or produced?

#### Data volume

The size of each dataset listed below varies, with capacities ranging from 8KB to 1.5GB. Nevertheless, there are two notable exceptions: The 'Size distribution and velocity of raindrops' dataset for the Galabre/La Robine and Ainac site, which contains approximately 6GB of data, and The 'Seismic cross-section' dataset which currently holds 600GB, with an annual data increment of 200GB.

#### Global data volume

There are a total of 48 files: 45 files at 1.5GB, 2 files at 6GB, and 1 file at 600GB, summing up to 680GB.

#### Data Format

All dataset are available in a CSV format.

#### Data contact

Galabre site principal investigator: Cédric Legoût (UGA-IGE)

Draix site principal investigator: Caroline Le Bouteiller (INRAE-IGE) and Sébastien Klotz (INRAE-IGE).

Variable kind	Measured variables	Data kind	Time step	Locations	Start
Atmosphere	Air temperature	Numeric time series	15 min	Galabre/La Robine	2014
			15 min	Galabre/Ainac	2019
			10 min	Draix/Plateau	2001
	Air humidity	Numeric time series	15 min	Galabre/La Robine	2014
			15 min	Galabre/Ainac	2019
			10 min	Draix/Plateau	2001
	Wind speed	Numeric time series	15 min	Galabre/La Robine	2014
			15 min	Galabre/Ainac	2019
			10 min	Draix/Plateau	2001
			Numeric time		

River	Wind direction	series	15 min	Galabre/La Robine	2014
			15 min	Galabre/Ainac	2019
	Precipitation amount	Numeric time series	1 min	Galabre/La Robine	2014
			1 min	Galabre/Ainac	2008
			1 min	Draix/Plateau	2005
			1 min	Draix/Archail	2012
			1 min	Draix/Blache	1991
			1 min	Draix/Laval	1983
			1 min	Draix/Pepin	1986
			1 min	Draix/Sevigne	1983
			1 min	Draix/Pompe	1985
			1 min	Draix/Village	2010
	Solar radiation	Numeric time series	10 min	Draix/Plateau	2001
	Water isotopes delta18O and delta2H (partner's data)	Numeric time series	Monthly	Draix/Plateau	2002
	Size and velocity distributions of raindrops	Numeric time series	1 min	Galabre/La Robine	2014
			1 min	Galabre/Ainac	2019
	Liquid discharge	Numeric time series	10 min	Galabre/La Robine (20km <sup>2</sup> )	2007
			1 min	Draix/Brusquet (1,1 km <sup>2</sup> )	1986
			1 min	Draix/Laval (0,9 km <sup>2</sup> )	1983
			1 min	Draix/Moulin (0,1 km <sup>2</sup> )	1990
			1 min	Draix/Roubine (0,001 km <sup>2</sup> )	1982
	Water temperature	Numeric time series	10 min	Galabre/La Robine (20km <sup>2</sup> )	2015
	Electrical conductivity of water	Numeric time series	Weekly and Hourly during floods	Galabre/La Robine (20km <sup>2</sup> )	2017
	Concentrations of major ions	Numeric time series	Bi-monthly	Galabre/La Robine (20km <sup>2</sup> )	2017
	Suspended sediment concentration (SSC)	Numeric time series	10 min	Galabre/La Robine (20km <sup>2</sup> )	2007
			1 min	Draix/Brusquet (1,1 km <sup>2</sup> )	2003
			1 min	Draix/Laval (0,9 km <sup>2</sup> )	1985
			1 min	Draix/Moulin (0,1 km <sup>2</sup> )	1988
			1 min	Draix/Roubine (0,001 km <sup>2</sup> )	1996
	Lithological origin of suspended sediments	Numeric time series	During flood events	Galabre/La Robine (20km <sup>2</sup> )	2007
	Bedload sediment transport volumes	Numeric time series	During flood events	Draix/Brusquet (1,1 km <sup>2</sup> )	1988
			During flood events	Draix/Moulin (0,1 km <sup>2</sup> )	1988

			During flood events	Draix/Roubine (0,001 km <sup>2</sup> )	1983
Geophysical data	Seismic cross section	Numeric 2D profiles	0.01 s	Draix/Moulin	2019
	ERT(Electrical Resistivity Tomography) cross section	Numeric 2D profiles	one-time	Draix/Moulin	2019
			one-time	Galabre	2019
	Electromagnetic map	Raster	one-time	Galabre	2019
Topography	DTM (Digital Terrain Model)	Raster	one-time	Draix	2015
		Raster	one-time	Galabre	2018

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## 2. Documentation and data quality

### 2a. What metadata and documentation (for example the methodology of data collection and way of organising data) will accompany the data?

#### Metadata and documentation for raw data

##### Collected raw data

Galabre site:

Metadata for raw data is meticulously recorded on a form accessible to all researchers within the lab. The documented general information includes date and time (in UTC format), location, temperature, water level, conductivity, pH, and the number of observers. It also includes general information and anomalies in measurements or sensors during data collection, such as the number and types of samples, information on sensor startup and calibration, discrepancies in measurements, or problems with sensors. Additionally, any actions taken during data collection, such as cleanings, specific operations, or interventions performed, are documented.

Draix site:

During field data collection, observations regarding the condition of stations and sensors are documented. Spot measurements of water level and flow are conducted to validate the consistency of the data recorded by the sensors. This information is recorded on sheets and later transferred to the research engineer's PC (Sébastien Klotz).

##### Teletransmitted raw data

There is a file called "SAV" that is teletransmitted daily. It includes information about the sensors' program, the temperature of the location, and details about the battery status. It also includes diagnostic variables, such as data transmission issues or information about sensors that need to be emptied or cleaned.

#### Metadata and documentation for processed data

##### Current state

Visit the official [Draix Bléone website](#) where you can access all metadata and data (excluding geophysical data and topography), along with information on sensors and measurement protocols. Data and metadata are available through two links: [OSUG](#) data center and [BDOH](#).

On the OSUG data center link, users can access detailed metadata for each dataset. This includes information such as DOIs, creators, titles, publishers, publication years, descriptions, rights, resource types, subjects, geolocations, dates, contributors, funding references, primary language, related identifiers, and formats. Each dataset is stored in a ZIP file, and some datasets additionally include a PDF and a README file, offering explanations of associated sensors and variable descriptions.

On the BDOH link, users can access detailed metadata for datasets: dataset ID, measured variables, units, producers, measurement types, start and end dates, the number of measurements, and dataset name. On this link, data visualization is possible, however account creation and authentication are required for data download. Furthermore, BDOH metadata already conforms to the THEIA/OZCAR format explained in the 'Next state' section below.

Access to Draix site DTM and metadata can be found here: <https://entrepot.recherche.data.gouv.fr/dataset.xhtml?persistentId=doi:10.57745/RUQLJL>

Geophysical data is documented on the [OSUR \(Observatoire des Sciences de l'Univers de Rennes\) hydrogeophysical database](#); however, account creation and authentication is required for metadata access.

##### Next state

Metadata will adhere to the Theia/OZCAR metadata model, commonly known as the Theia/OZCAR pivot format, while observed variables will be named in accordance with the Theia/OZCAR thesaurus.

The pivot format comprises three integral components: Observatory description (adhering to the Dublin Core standard), Dataset description (conforming to the ISO 19115/Inspire standard), and Observation description (following the Observation & Measurement standard).

Pivot format section	Components
Observatory description	<ol style="list-style-type: none"> <li>1. Identification: Name, Title and Description</li> <li>2. Fundings</li> <li>3. Contacts</li> </ol>
Dataset description	<ol style="list-style-type: none"> <li>1. Identification : Dataset title, Description,</li> <li>2. Thematic: GEMET Inspire Theme, Topic Category (ISO 19115)</li> <li>3. Keywords</li> <li>4. Spatial Extent</li> <li>5. Temporal Extent</li> <li>6. Access and use constraints</li> <li>7. Contacts</li> </ol>
Observation description	<ol style="list-style-type: none"> <li>1. Sampling feature of interest : Station name, Location</li> <li>2. Variable: name, unit and description</li> <li>3. Acquisition Procedure: Processing information, Sensor Information</li> <li>4. Observation: Temporal extent</li> <li>5. Result: Time series data</li> </ol>

For more in-depth information about the metadata pivot format, kindly refer to the following link:

<https://theia-ozcar.gricad-pages.univ-grenoble-alpes.fr/doc-producer/producer-documentation.html#modele-de-donnees-pivot>

For more in-depth information about the Thesaurus of THEIA/OZCAR, kindly refer to the following link:

<https://theia-ozcar.gricad-pages.univ-grenoble-alpes.fr/doc-producer/producer-documentation.html#thesaurus-theia-ozcar-categories-et-noms-de-variables>

## 2b. What data quality control measures will be used?

### Quality control measures for sensors and data

Overall, there is a well-defined protocol for the calibration and precision of sensors for each measured variable. Additionally, a well-established protocol for critical data analysis is in place to assess and enhance data quality. Detailed information on these procedures can be found in the corresponding data paper links provided below.

Variable	Site	Detailed information
Air temperature	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Air humidity	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Wind speed	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Wind direction	Galabre only	<a href="#">Sensors and data quality control</a>
Precipitation amount	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Solar radiation	Draix only	<a href="#">Sensors and data quality control</a>
Water isotopes delta18O and delta2H	Draix only	<a href="#">Sensors and data quality control</a>
Size and velocity distributions of raindrops	Galabre only	<a href="#">Sensors and data quality control</a>
Liquid discharge	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Water temperature	Galabre only	<a href="#">Sensors and data quality control</a>
Electrical conductivity of water	Galabre only	<a href="#">Sensors and data quality control</a>
Concentrations of major ions	Galabre only	<a href="#">Sensors and data quality control</a>
Suspended sediment concentration (SSC)	Galabre	<a href="#">Sensors and data quality control</a>
	Draix	<a href="#">Sensors and data quality control</a>
Lithological origin of suspended sediments	Galabre only	<a href="#">Sensors and data quality control</a>
Bedload sediment transport volumes	Draix only	<a href="#">Sensors and data quality control</a>
Seismic cross section	Galabre only	<a href="#">Sensors and data quality control</a>
ERT cross section	Draix and Galabre	<a href="#">Sensors and data quality control</a>
Electromagnetic map	Galabre only	<a href="#">Sensors and data quality control</a>
DTM	Draix only	<a href="#">Sensors and data quality control</a>

### 3. Storage and backup during the research process

#### 3a. How will data and metadata be stored and backed up during the research?

##### Raw Data

Raw data is acquired through teletransmission or direct collection. Teletransmitted data is sent multiple times daily via Loggernet (teletransmission software) to an IGE server for Galabre site data (using the SUMMER storage solution) or to the Grdata server for Draix site data. Directly collected raw data is stored on the research engineer's local machine, an external hard disk, an internal SD memory card (for some sensors in case of teletransmission failure), and in the team-shared directory (using SUMMER storage solution) or in the Grdata server.

##### Metadata for raw data



Galabre site:

Metadata for collected raw data is documented in the forms mentioned in section 2a. Additionally, this information is digitized and stored in the team-shared directory.

Draix site:

Metadata is stored locally, and a portion of it is copied into the processing records, which are then stored on the Grdata server.

Teletransmitted raw data:

Metadata for teletransmitted raw data is directly stored in the IGE server or in the Grdata server.

#### **Processed data and metadata**

Subsequently, investigators either receive processed data from the research engineer or download it from the team-shared directory or Grdata server onto their local machines for analysis and quality control procedures. Processed data and metadata are subsequently stored in the team-shared directory or on the Grdata server, and later uploaded for public access on BDOH and OSUG data center.

#### **Storage and backup solutions**

Draix Bléone leverages storage and backup solutions provided by UGA and INRAE infrastructures. These systems are designed to guarantee elevated data security and availability:

1. SUMMER Storage: Provided by UGA University and used by OSUG data center and IGE, SUMMER offers backup on a remote site with a 30-day history and synchronous replication, providing redundancy for data on two geographically distant sites. This robust architecture is based on Netapp@ servers.
2. BDOH is a data storage, visualization, and export tool for various time steps developed by INRAE. It is based on a Postgres SQL database. Physically, the server hosting this service is located at the Lyon data center. However, a migration to a server in Toulouse is under consideration.

<b>Service</b>	<b>Contact</b>
SUMMER	Patrice Navarro (IGE)
OSUG data center	Rémi Cailletaud (OSUG)
BDOH	Fabien Thollet (INRAE)
Grdata	Eric Maldonado (INRAE)
Draix Bléone's website	Cédric Legoût (UGA-IGE) and Caroline Le Bouteiller (INRAE-IGE) OSUG communication service: Marion Papanian, Pierre Jacquet

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### **3b. How will data security and protection of sensitive data be taken care during the research**

#### **Contact information**

The contact point information of contributors in this DMP is considered as personal data. Therefore, we will seek their consent, providing them with the opportunity to refuse, modify, or request the deletion of their information.

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## **4. Legal and ethical requirements, code of conduct**

### **4a. If personal data are processed, how will compliance with legislation on personal data and on security be ensured?**

To comply with the General Data Protection Regulation (GDPR), we will implement the following:

- Obtain consent from individuals regarding the use of their personal contact information.
- An email will be sent once per year reminding them of the possibility to modify or delete their personal information.

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#### 4b. How will other legal issues, such as intellectual property rights and ownership, be managed? What legislation is applicable?

##### **Data produced by Draix Bléone**

###### *Intellectual property*

As the data produced by Draix Bléone is funded by public subsidies, in accordance with the Law for a French Digital Republic (LOI n° 2016-1321 du 7 octobre 2016 pour une République numérique), they are obligated to be open and accessible, and they are made available as soon as the processing is done (usually on an annual basis). Data is freely reusable, with the condition of acknowledging its authors according to the sentence indicated here below:

"This study was carried out in Draix-Bleone Observatory and used its infrastructure and data. Draix-Bleone Observatory is funded by INRAE, INSU and OSUG and is part of OZCAR Research Infrastructure that is supported by the French Ministry of Research, French Research Institutions and Universities."

###### *Licenses*

OSUG data center data: CC-BY

BDOH data: etalab 2.0

Note that there is data subset of 5 years (2015-2019) that has a CC-BY licence as well.

##### **Data produced by Draix Bléone partners**

This data (i.e., the water isotopes data) will be disseminated under the the etalab 2.0: data is freely reusable, with the condition of citing its authors as well.

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#### 4c. What ethical issues and codes of conduct are there, and how will they be taken into account?

The primary ethical consideration is ensuring the appropriate handling of personal information related to contributors. The treatment of such data is outlined in detail in response to questions 3b and 4a.

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## 5. Data sharing and long-term preservation

#### 5a. How and when will data be shared? Are there possible restrictions to data sharing or embargo reasons?

There are no restrictions to data sharing nor embargo.

##### **Current state**

###### *How and when will data be shared*

Following analysis, investigators upload the processed data, at least every year, and disseminate it through the official [Draix Bléone website](#) where you can access all metadata and data (excluding geophysical data and topography), along with information on sensors and measurement protocols. Data and metadata are available through two links: [OSUG](#) data center and [BDOH](#).

Draix site data is totally available on the BDOH link, and a 5-year subset of Draix site data (2015-2019) is directly available at <https://doi.org/10.57745/BEYQFQ>. Most of the Galabre site data is accessible on both BDOH and OSUG links. This is because BDOH's current structure doesn't allow the deposition of certain specific datasets, and OSUG data center doesn't support the visualization of time series or the export of data at different interpolation time steps. On the BDOH link, data visualization is possible (at different interpolation time steps), however account creation and authentication are required for data download.

The "seismic cross section" data, due to its large volume, is undergoing discussions for increased storage capacity between the research support unit GRICAD and OSUG data center. The data will be accessible and downloadable in the coming months.

Access to Draix site MNT can be found here: <https://entrepot.recherche.data.gouv.fr/dataset.xhtml?persistentId=doi:10.57745/RUQLJL>

Geophysical data is published on the [OSUR \(Observatoire des Sciences de l'Univers de Rennes\) hydrogeophysical database](#); however, account creation and authentication is required for data access.

###### *Partners' Data*

Investigators retrieve the processed partner's data (i.e., the water isotopes data) and proceeds to upload it to BDOH data repository (at least once per year).

### Next state

Data will be accessible on the Theia/OZCAR web portal: <https://in-situ.theia-land.fr/>

The data download service will be available in the near future. Users will have the option to download data in CSV and NetCDF formats. Data downloading will require user authentication through Data Terra Single Sign-On authentication, ensuring adherence to embargoes and access restrictions for certain data. Authentication will also grant access to authenticated data producers for statistics on data downloads.

The data will also be indexed in a Geonetwork metadata catalog, allowing for automatic harvesting of the data catalog through the CSW webservice.

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## 5b. How will data for preservation be selected, and where data will be preserved long-term (for example a data repository or archive)?

### Data selection for preservation

- The selection of data for preservation is inclusive, keeping all raw and processed data.

### Data preservation

- Data preservation is planned on platforms like BDOH and OSUG data center, which serve as data repositories. Additionally, the ongoing discussions regarding storage capacity for seismic cross section data indicate a proactive approach to address growing data needs.
  - At the current time, there is no long-term preservation solution. However, all necessary technological guarantees and measures are in place to ensure at least medium-term storage.
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## 5c. What methods or software tools are needed to access and use data?

### Access Tools

Standard software for CSV files.

Furthermore, on the BDOH data repository there are some fonctionnalités to visualize and export data within different time steps, however account creation and authentication are required for data download.

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## 5d. How will the application of a unique and persistent identifier (such as a Digital Object Identifier (DOI)) to each data set be ensured?

### Current state

All the datasets produced by Draix Bléone are referenced by several DOIs provided by the DOI services of the OSUG data center and BDOH (INRAE).

Regarding data stored in OSUG data center (Galabre site) there is a global DOI for this particular site and single DOIs for each dataset as well. Regarding data stored in BDOH (Draix site) there is only one global DOI for all stored datasets. Furthermore, a DOI was also attributed for a 5 year subset of data extracted from BDOH (mentioned in the 4b and 5a sections).

### Next state

Assigning a DOI through the workflow of data imported into Theia/OZCAR is not yet available, but it may be considered in the long terme. If a dataset already possesses a DOI, this identifier will be specified in the metadata record on the Theia/OZCAR portal.

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## 6. Data management responsibilities and resources

### 6a. Who (for example role, position, and institution) will be responsible for data management (i.e. the data steward)?

Project Leader:

- Cédric Legoût, associate profesor, Institute of Environmental Geosciences (UGA-IGE)
- Caroline Le Bouteiller, investigator, Institut of Environmental Geosciences (INRAE-IGE)

Galabre site data management is held by Cédric (UGA-IGE) Legoût and Guilhem Freche (CNRS-IGE)

Draix site data management is held by Caroline Le Bouteiller (INRAE-IGE) and Sébastien Klotz (INRAE-IGE)

Technical service is in charge of the following aspects:

- Instruments maintenance
- Data collection
- Data storage and backup
- Data production and processing (only for Draix site)

Researchers at Draix Bléone are responsible for:

- Data dissemination
- Data production and processing (Galabre site)
- Data storage
- Data quality control

The Data Management Plan is jointly written by the Data Curator and Draix Bléone data managers.

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**6b. What resources (for example financial and time) will be dedicated to data management and ensuring that data will be FAIR (Findable, Accessible, Interoperable, Re-usable)?**

Draix Bléone data managers, with the technical support of OSUG data center, facilitate the creation of DOIs, ensure data security, and develop platforms/websites.

With funding from Labex OSUG 2023-2024, we benefit from a 16-month Data Curator contract.

The technical service of the laboratories is involved in field data collection and data pre-processing.

The laboratories' IT service is responsible for data storage and access.

OZCAR/Theia provides training and workshops on relevant topics.

The scientists and technical staff of Draix Bléone dedicate a portion of their time to collect, analyse, document and share the data.

OSUG and INRAE are in charge of providing necessary storage and backup ressources.