

**The complex INTERlink of safeguarding wATER availabilitY and
quality to mitigate and adapt to hydroclimatic extRemes -
INTERLAYER (Water4All-2022-00261)**

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1. INTRODUCTION

1.1 Document description

In fulfilment of *The complex INTERlink of safeguarding wAter availabilitY and quality to mitigate and adapt to hydroclimatic extRemes - INTERLAYER* (Water4All-2022-00261) Grant Agreement on the obligations of the Consortium partners towards the Project Owners (PO) regarding project deliverables, the current document stands as Deliverable D1.1 – Initial Data Management Plan (DMP).

Research and Innovation projects, such as *The complex INTERlink of safeguarding wAter availabilitY and quality to mitigate and adapt to hydroclimatic extRemes - INTERLAYER* (Water4All-2022-00261) usually produce large datasets; thus, this Data Management Plan (DMP) is a useful and essential tool for the effective management of INTERLAYER data.

This report (Deliverable 1.1) aims to describe the Data Management procedures and targets for the data collected, processed and/or produced within the project, guiding project management and control during the INTERLAYER project life cycle, following the template provided by the European Commission (EC), and complying with EC and Water4All guidelines. The DMP includes a list of all related documents and tools used in the framework of its implementation, as well as information on access to them. However, considering that this represents the initial Data Management Plan, it only includes information available at this time; thus, whenever the consortium was unable to specify certain details, “not known at this time” or “n/a” was presented. Further, changes and/or adaptations are expected along the project course by due log of changes, to comply with the DMP objectives, so, the most recent versions of documents, supported by due log of changes/decisions are stored in the project folder, with access rules also presented in this DMP.

To make data discoverable, accessible, interoperable, and re-usable (FAIR), this DMP contains information on the following:

Management of research data during the project and after its conclusion

What data will be gathered, processed, or generated?

Implemented procedures and criteria

Will data be shared/made accessible to the public?

Data curation and preservation procedures (including after the end of the project)

1.2 WPS and Tasks related with the Deliverable

The DMP (Deliverable 1.1) is part of WP1 - Project Management and Coordination, specifically within the scope of Task 1.4 – Data Management Activities and is being developed by the INTERLAYER project coordinator (UEVORA) since the beginning of the project and will be updated at the end of each reporting period [M18, M36].

This report represents the INTERLAYER project's Data Management Plan, providing clear recommendations in diverse procedures outlined within the project for its appropriate management and the successful fulfilment of the proposed activities.

1.3 DMP updates

This document (first version of the DMP) will be updated during INTERLAYER execution. UÉVORA is responsible for updating the deliverable, thus, it is considered a living document, subject to ongoing changes, namely: data updated, alteration in Consortium Composition and Regulations.

To inform the persons in charge of the DMP (Miguel Potes and Maria Helena Novais), any partner with updated information should contact them as soon as feasible, and an updated version will be prepared for each reporting period: RP1 [M18], RP2 [M36].

1.4 Consortium Partners

INTERLAYER is an international initiative which brings together 7 partners (University of Évora – UÉVORA, Institute of Soil Bioengineering and Landscape Construction (IBLB) of the Universitaet fuer Bodenkultur Wien – BOKU, University of Copenhagen – UCPH, Institutul National de Cercetare-Dezvoltare Pentru Geologie si Geoecologie Marina – GEOECOMAR, Geological Survey of Denmark and Greenland – GEUS, METEOGRID, Region Hovedstaden – REGIONH) from 5 European countries: Portugal (UÉVORA), Spain (METEOGRID), Denmark (UCPH, GEUS, REGIONH), Austria (BOKU) and Romania (GEOECOMAR).

2 DATA SUMMARY

2.1 Data Categories

INTERLAYER will generate different types of data (including the associated metadata), necessary to validate the results presented, for example in scientific publications, system

specifications and the services it supports, or as Key Performance Indicators (KPIs). These include datasets, algorithms, code, protocols, meeting presentations, videos, pictures, lab records, schemes, data from public engagement initiatives, economic data, business models, among others. Thus, in Table 1 the data categories that can be used or generated within the INTERLAYER project are presented, aiming to reflect the heterogeneity of data in a project of this nature.

Table 1. Data categories

Data Type	Description
Experimental datasets	Experimental datasets, such as quantitative measurements, observational data that will be collected, managed, and preserved throughout the project.
Publications	The research results obtained are dully valued through relevant publications that mainly refers to: - Open Access (OA) publication of scientific articles, - Online contents.
Experimental layouts	Description of experiments, experimental installations, monitoring and equipment.
Project deliverables	Includes periodic reports and/or deliverables related to specific tasks.
IP protection	Protection of Intellectual Property stemming from the project.
Personal data	Personal information from event participants, or collected under the project.
External data	Data coming from outside the project is called external data or “third-party” data.

2.2 Datasets to be used or generated within the project

A first evaluation of the datasets anticipated to be used and generated during the INTERLAYER project execution is presented in Tables 2-24. However, since this is the first DMP, the details on each dataset are not fully completed and will be further developed throughout the project duration, with two updated versions presented in each reporting period [M18, M36].

Table 2-24. Datasets generated or used within the INTERLAYER project

Partner: UEVORA – Dataset #1	
Identifier	Water Physico-Chemical and Biological Analysis

Dataset description	Experimental data of water physico-chemical and biological characterization, including nutrients, in situ parameters (e.g. DO, EC, pH, T) and WFD biological quality elements as diatoms and macroinvertebrates
Purpose of the data	It will be experimental data of the quality of the water which will allow the validation of the models, and the ecological status assessment
Type of Data	Text and numeric.
Form of the data	Experimental data and bibliographic research.
Formats	csv., xls
Origin of the data	Laboratory of the University of Évora; sub-contract
Dataset is	Physico-chemical parameters as nutrients (e.g., TP, TN), pH, T, EC, DO; Biological quality elements as Diatom and macroinvertebrate communities analysis and quality indexes
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: UEVORA – Dataset #2	
Identifier	Online meteorological monitoring
Dataset description	This dataset includes typical weather variables such as Temperature, Relative Humidity, Wind Speed, Wind Direction, Barometric Pressure, Precipitation. Data tables from 1, 10, 60 and 1440 minutes.
Purpose of the data	This dataset is used for the meteorological characterization of the Living Lab during the project. Will also support the Water Physico-Chemical and Biological Analysis and the modelling team.
Type of Data	Numeric.
Form of the data	Experimental data.
Formats	csv
Origin of the data	Automatic weather station
Dataset is	weather variables such as Temperature, Relative Humidity, Wind Speed, Wind Direction, Barometric Pressure, Precipitation
Size of data	To be determined
Data security and storage	Database Server

Partner: UEVORA – Dataset #3

Identifier	Copernicus Digital Elevation Model (DEM) from the LL
Dataset description	The Copernicus DEM is a Digital Surface Model (DSM) that represents the surface of the Earth including buildings, infrastructure and vegetation. This instance is the EEA-10 acquired through the TanDEM-X mission between 2011 and 2015 and made available for use in 2019 and will be maintained until 2026. The 1°x1° geocells of the EEA-10 DEM instance (DGED profile) and 100kmx100km tiles of the EEA-10 DEM instance (INSPIRE profile) with continental landmass fully inside the extent of EEA39 or fully available input height information (i.e. WorldDEM) are provided with full coverage (i.e. no pixels set to -32,767).
Purpose of the data	This dataset is used for the characterization of the Living Lab surface.
Type of Data	Numeric.
Form of the data	Observational data.
Formats	Raster layer
Origin of the data	European Space Agency (ESA) - Copernicus Program
Dataset is	Digital Surface Model (DSM)
Size of data	For 100x100km ~800MB
Data security and storage	Google Drive, Database Server

Partner: BOKU – Dataset #4	
Identifier	Meteorological data
Dataset description	"Meteorological input data (daily precipitation, potential evapotranspiration and temperature); point data (daily 1963 – today & hourly since 1996);
Purpose of the data	Gridded data (1961 – today); resolution: point data & gridded (1x1km)"
Type of Data	Used for forcing of hydrological models, and as input to the future climate modelling
Form of the data	Text and numeric.
Formats	Observational data.
Origin of the data	csv., xls
Dataset is	Geosphere Austria
Size of data	
Data security and storage	To be determined

Partner: BOKU – Dataset #5	
Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	Discharge / Water level: Daily, 1981-today; Near Catchment outlet + 2 stations further upstream which measure water levels
Purpose of the data	all data needed for running the hydrological model

Type of Data	Text and numeric.
Form of the data	Observational data.
Formats	
Origin of the data	https://www.ehyd.gv.at/
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: BOKU – Dataset #6	
Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	Groundwater heads: Monthly, 1961 - 2021; 9 point data sources in the catchment
Purpose of the data	all data needed for running the hydrological model
Type of Data	Text and numeric.
Form of the data	Observational data.
Formats	
Origin of the data	https://www.ehyd.gv.at/
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: BOKU – Dataset #7	
Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	DEM (1m)
Purpose of the data	all data needed for running the hydrological model
Type of Data	GIS maps
Form of the data	
Formats	
Origin of the data	
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: BOKU – Dataset #8	
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Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	water temperature (only monthly mean publicly available, but should be possible to request more detailed data from the authority); Additionally, sampled throughout this project
Purpose of the data	
Type of Data	Text and numeric.
Form of the data	Observational data.
Formats	
Origin of the data	https://www.ehyd.gv.at/
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: BOKU – Dataset #9	
Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	landuse
Purpose of the data	
Type of Data	GIS maps
Form of the data	
Formats	
Origin of the data	
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: BOKU – Dataset #10	
Identifier	Model input data (Datasets that form the basis of the hydrological model)
Dataset description	runn-off-coefficient
Purpose of the data	
Type of Data	
Form of the data	Observational data.
Formats	
Origin of the data	https://www.data.gv.at/katalog/de/dataset/hydrobod2-hydrologische-bodenkenndaten-niederosterreich-endbericht-und-rasterdaten
Dataset is	
Size of data	To be determined

Data security and storage	Hard drive, cloud server backup
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Partner: BOKU – Dataset #11	
Identifier	Model results
Dataset description	Specific model results from the hydrological modelling tasks
Purpose of the data	Output data used for analysis of effect of NSBs for slow hydrology
Type of Data	maps, numeric, text,
Form of the data	
Formats	
Origin of the data	generated within the project, model results
Dataset is	
Size of data	To be determined
Data security and storage	Hard drive, cloud server backup

Partner: GEUS – Dataset #12	
Identifier	Meteorological data
Dataset description	Meteorological input data (gridded data of daily precipitation, potential evapotranspiration and temperature from 1989-2024)
Purpose of the data	Used for forcing of hydrological models, and as input to the future climate modelling
Type of Data	numeric
Form of the data	observation data
Formats	.dfs2 (https://docs.mikepoweredbydhi.com/core_libraries/dfs/dfs-file-formats/)
Origin of the data	Danish Meteorological Institute
Dataset is	gridded data of daily precipitation, potential evapotranspiration and temperature from 1989-2024
Size of data	200 MB
Data security and storage	Database Server, server backup

Partner: GEUS – Dataset #13	
Identifier	Model input data
Dataset description	Datasets that form the basis of the hydrological model, including the geological and hydrogeological model, observed time series of groundwater and stream discharge, soil texture information, DEM, land use classifications, river network and cross sections, point sources of waste water and industry, groundwater abstractions, irrigations, and others

Purpose of the data	all data needed for running the hydrological model
Type of Data	maps, numeric, text,
Form of the data	static 2D and 3D maps and layers. Timevarying observation data
Formats	.dfs0, .dfs1, .dfs2, .dfs3
Origin of the data	https://hip.dataforsyningen.dk/
Dataset is	temporally constant 2D data: soil maps/soil properties, landuse/vegetation properties. Observation data: water tables/head/river discharge, geological model layers. Digital Elevation model (DEM)
Size of data	to de determined
Data security and storage	Database Server, server backup
Partner: GEUS – Dataset #14	
Identifier	Model results
Dataset description	Specific model results from the hydrological modelling tasks
Purpose of the data	Output data used for analysis of effect of NSBs for slow hydrology
Type of Data	numeric
Form of the data	model data, 1D, 2D, 3D datasets
Formats	.dfs0, .dfs1, .dfs2, .dfs3
Origin of the data	generated within the project, model results
Dataset is	Output from hydrological modelling, head, river discharge, Hydrogeological parameters
Size of data	to de determined
Data security and storage	Database Server, server backup

Partner: UCPH – Dataset #15	
Identifier	GIS input data
Dataset description	A variety of data layers describing the topographic surface: A. DTM, 0.4 m resolution; B. national land use dataset, 10 m resolution describing physical and environmental conditions (infrastructure, forest areas, agriculture, natural habitats and more); C. Geologic surface types, scale 1:25.000;
Purpose of the data	To be used for modelling of the water flows in the living lab estimated for 60 mm rain events. Besides this to identify possible surface reservoirs for storage of water and location of slow hydrology interventions; See method decription in Balstrøm and Crawford 2018 (Arc-Malstrøm: A 1D hydrologic screening method for stormwater assessments based on geometric networks; Computers & Geosciences, 116, 64-73.
Type of Data	Numeric
Form of the data	Observational data
Formats	A, B: Raster Data; C: Vector data

Origin of the data	A: Datafordeleren.dk; B: dce.au.dk ; C: Geus.dk
Dataset is	DTM; Land Use; Geologic surface
Size of data	A: 100 Mb; B: 25Mb; C: 1Mb
Data security and storage	Database Server, server backup

Partner: UCPH – Dataset #16	
Identifier	Qualitative Interview data
Dataset description	Answer from interview to be conducted with key stakeholders in the living lab (e.g. municipal officers, water supply workers, land owners)
Purpose of the data	To provide input to the WP5 topic on policy observatory and transfer to society
Type of Data	Text
Form of the data	Word document
Formats	(.docx)
Origin of the data	Developed throughout the project period
Dataset is	N/A
Size of data	N/A
Data security and storage	UCPH server + UEVORA Teams site

Partner: GeoEcoMar – Dataset – Dataset #17	
Identifier	Copernicus DEM
Dataset description	The Copernicus DEM is a Digital Surface Model (DSM) that represents the surface of the Earth including buildings, infrastructure and vegetation. Data were acquired through the TanDEM-X mission between 2011 and 2015.
Purpose of the data	Will be used as input for the hydro-meteo model and for runoff analysis
Type of Data	Numerical model
Form of the data	Static, 2.5D
Formats	TIFF
Origin of the data	https://spacedata.copernicus.eu/collections/copernicus-digital-elevation-model
Dataset is	Open data
Size of data	to be determined
Data security and storage	Local and cloud - based storage

Partner: GeoEcoMar – Dataset – Dataset #19	
Identifier	Eleven Parameter Weather Station for LoRaWAN

Dataset description	Eleven Parameter Weather Station: Solar radiation Precipitation Lightning strike count, average distance Wind speed, direction, maximum wind speed Air temperature Vapor pressure Barometric pressure Relative humidity, internal sensor temperature Tilt angle, X and Y orientation North wind speed, east wind speed
Purpose of the data	The observations will be used as input for the hydro-meteo model
Type of Data	see description
Form of the data	Multitemporal
Formats	Text
Origin of the data	Self produced within the project
Dataset is	Private
Size of data	to be determined
Data security and storage	Local and cloud - based storage

Partner: GeoEcoMar – Dataset – Dataset #20	
Identifier	Soil moisture sensor
Dataset description	The sensor measures soil moisture across six levels up to a depth of approximately one meter.
Purpose of the data	The observations will be used as input for the hydro-meteo model
Type of Data	Soil moisture
Form of the data	Multitemporal
Formats	Text
Origin of the data	Self produced within the project
Dataset is	Private
Size of data	to be determined
Data security and storage	Local and cloud - based storage

Partner: GeoEcoMar – Dataset – Dataset #21	
Identifier	Groundwater level
Dataset description	Water level data in the aquifer, from the piezometric boreholes
Purpose of the data	The observations will be used as input for the hydro-meteo model
Type of Data	Groundwater level
Form of the data	Multitemporal
Formats	Text

Origin of the data	ABA JIU
Dataset is	Private
Size of data	to be determined
Data security and storage	Local and cloud - based storage

Partner: MeteoGrid – Dataset #22	
Identifier	Local future Climate projections (temperature and precipitation)
Dataset description	set of 40 climate projections (10 models and 4 SSPs emission scenarios) of temperature and precipitation at local scale generated based on a statistical downscaling methodology for 1951-2100
Purpose of the data	as input to hydrological models
Type of Data	Numeric
Form of the data	Experimental data
Formats	txt, Raster
Origin of the data	generated within the project based on CMIP6 Models
Dataset is	temperature and precipitation future climate projections
Size of data	to be determined
Data security and storage	Database server + Evora Teams Chanel

Partner: MeteoGrid – Dataset #23	
Identifier	Local future Climate projections of climate indicators
Dataset description	set of future scenarios of climate indicators tailor-made for each case study. These indicators will be generated from the temperature and precipitation projections generated in the project.
Purpose of the data	as input to hydrological models
Type of Data	Numeric
Form of the data	Experimental data
Formats	txt, Raster
Origin of the data	generated within the project
Dataset is	climate indicators as IDF curves, Extrem precipitation events, droughts episodes and so on
Size of data	to be determined
Data security and storage	Database server + Evora Teams Chanel

Partner: RegionH – Dataset #24	
Identifier	Qualitative data from stakeholder interviews & meetings

Dataset description	Several minutes and notes from meetings and informal interviews with stakeholders are collected throughout the project
Purpose of the data	To provide input to several WPs and deliverables
Type of Data	Text
Form of the data	Word documents
Formats	(.docx)
Origin of the data	Developed throughout the project period
Dataset is	N/A
Size of data	To be determined
Data security and storage	UÉVORA teams channel

2. FAIR DATA

Fostering an open cooperative work and a systematic sharing of know-how and tools within the Consortium, but also the effective sharing and communication of research results, INTERLAYER implements Responsible Research and Innovation (RRI) practices, integrating Open Science.

Data will be Findable, Accessible, Interoperable and Reusable (FAIR), complying with Horizon Europe guidelines on FAIR data management, will be “As Open as Possible, as Closed as Necessary”, meaning that, if necessary, i.e., due to IP rights, data access will be restricted to actors outside of the project consortium. Open science practices for the above-referred data will be supported using the ZENODO repository and assigning a persistent identifier, a DOI, making it citable and trackable.

Concerning scientific publications, the consortium can also publish scientific papers in the Open Research Europe Platform, an open-access publishing platform, and following the European Commission guidelines on open-access publications.

Depending on the nature of the data, anonymization techniques (e.g. data masking, pseudonymization or data swapping) might be used, fully complying with the General Data Protection Regulation (GDPR).

2.3 Making data findable, including provisions for metadata

Repositories, used to make data and publications available, are online databases that bring together in an organized way the scientific production of a subject. These publications can be selected and filtered by criteria such as year, area, type of publication, author, institution, journal, among others.

Data repositories should meet the following requirements:

- Ensure long-term persistence and preservation of datasets in their published form (minimum of 5 years after publication);
- Provide stable persistent identifiers for submitted datasets (e.g. Data cite DOIs);
- Allow public access to data without barriers, such as logins or paywalls, unless required sensitive datasets requiring access registration and/or acceptance of terms such as Data Usage Agreements;
- Support open licences (CC0 and CC-BY, or their equivalents);
- Provide for confidential review of submitted datasets without the requirement for reviewers to provide identifying information, as well as embargoed data for authors during peer review if required.

Two examples of scientific repositories are Zenodo and Open Research Europe.

Zenodo is a general-purpose open-access repository developed under the European OpenAIRE program and operated by CERN, with the mission to provide open science compliance to researchers without an institutional repository, irrespective of their subject area, funder or nation. Once an associated paper is published, datasets are automatically made open.

Open Research Europe is an open access publishing platform for the publication of research stemming from Horizon 2020, Horizon Europe and/or Euratom funding across all subject areas. The platform makes it easy for beneficiaries to comply with the open access terms of their funding and offers researchers a publishing venue to share their results and insights rapidly and facilitate open, constructive research discussion. Once the article is published, it cannot be sent to another journal for publication.

Data that can be made public will be findable through Zenodo repository, INTERLAYER website and social media (i.e., LinkedIn). An identifier, DOI, will be used for all data sets to aid discovery search keywords. Open datasets described are findable through standard forms including keyword search.

The university of Évora makes its publications available in a public Digital Repository of Scientific Publications, sharing these publications with the RCAAP (Portuguese Open Access Scientific Repositories).

Consortium partners also have access to the data in a shared folder, under authorization, in a collaborative online platform (Microsoft SharePoint, hosted by GEUS).

2.4 Making data accessible

Not all data can be open. Projects can opt out data at any stage (either before or after signing the grant) if:

- participation is incompatible with the obligation to protect results that can reasonably be expected to be commercially or industrially exploited;
- participation is incompatible with the need for confidentiality in connection with security issues;
- participation is incompatible with rules on protecting personal data;
- participation would mean that the project's main aim might not be achieved;
- the project will not generate / collect any research data; or
- there are other legitimate reasons.

This approach can be described as "as open as possible, as closed as necessary". Projects can keep selected datasets closed for any of the reasons above, via their DMP and repositories, which allows the data to be embargoed and show only the metadata. Thus, data can be open (freely available to be accessed by anyone), embargoed (the data can't be accessed until the end of a specified period), or closed (a record of the data is published, but access is not granted to the data).

Data Access Committee. As of today, there is no need for a Data Access Committee.

Conditions for access. Description of data assets includes a link to well-known licences, for which machine-readable versions exist. Either Creative Commons Attribution International 4.0 (CC-BY) or Creative Commons Attribution ShareAlike International 4.0 (CC-BY-SA) will be the recommended licences.

Access control. Microsoft SharePoint also provides standard access control functionalities, with access secured by asymmetric keys or passwords and communications use SSL certificates.

2.4.1 Experimental datasets

The adopted approach is "as open as possible, as closed as necessary". Data assets produced during the project will preferably be published as open data. Nevertheless, during the project the publication of some datasets may not be possible for data protection reasons.

Datasets will be in any case published along with a licence. This licence will be specified as a metadata record in the data catalogue. The recommended licence for general content is the Creative Commons Attribution 4.0 International Licence (<https://creativecommons.org/licenses/by/4.0>). Reports may include the CC-BY logo. The recommended licence for data is the Open Data Commons Attribution Licence (ODC-By) v1.0.

Every INTERLAYER partner will ensure Open Access to all scientific publications.

After the end of the project, data and metadata will remain available and reusable, since the repositories allow it. Zenodo retains data for the lifetime of the repository which currently corresponds to the lifetime of the host laboratory CERN, defined for the next 20 years at least.

Accessibility. Data descriptions (metadata) will be made accessible through the INTERLAYER Zenodo.

Necessary methods and tools to access the data and its documentation. Relevant datasets whose licence is liberal and its size manageable, will be available as downloadable files.

2.4.2 Publications

For access to publications, a hybrid approach is considered (both Green Open Access and Gold Open Access), depending on the item and the available dissemination channels:

- Green Open Access (self-archiving) – immediate or delayed open access provided through self-archiving. INTERLAYER partners will (as soon as possible and at the latest on publication) deposit a machine-readable electronic copy of the published version or final peer-reviewed manuscript accepted for publication in a repository for scientific publications.
- Gold OA (open access publishing) – immediate open access provided by a publisher for the most important outputs.

In the gold open access, the publisher makes all articles and related content available for free immediately on the journal's website. In such publications, articles are licensed for sharing and reuse via [Creative Commons](#) licenses or similar.

[Self-archiving](#) by authors is permitted under green open access. Independently from publication by a publisher, the author also posts the work to a website controlled by the author, the research institution that funded or hosted the work, or to an independent central open repository, where people can download the work without paying.

2.4.3 Experimental layouts

Experimental layouts include description of experiments, experimental installations, monitoring, equipment, etc.

Those layouts that are public will be made available on Zenodo.

2.4.4 Project deliverables

As part of the project management process, periodic reports and deliverables related to specific tasks are included to ensure that the project is progressing as planned and that all stakeholders are informed about the project's status.

Those deliverables that are public, also require Open Access to be provided free of charge by INTERLAYER partners, to related datasets, in order to fulfil the Horizon Europe requirements of making it possible for third parties to access, mine, exploit, reproduce and disseminate the results contained therein: public deliverables will be available at the INTERLAYER website (<https://www.interlayer.uevora.pt/>) and at Zenodo.

The data repository for the project will include support for the storage of related project public deliverables and reports. This can be done by creating a specific folder or section within the data repository where these documents can be uploaded and accessed by relevant stakeholders.

2.4.5 IP protection

DIC2E – Office of Support to Innovation, Cooperation, Entrepreneurship and Employability has the mission of being the connection point of UEvora to Society, namely through the valorisation and transfer of the knowledge produced, thus managing IP Protection, the creation of Spin-Offs or Industry Service contracts.

The research results obtained are fully valued through relevant IP protection. A few examples of the type of protection and what it covers are:

Registering a trade mark - product names, logos, etc.;

Registering a design - appearance of a product, including its shape, decoration, packaging, etc.;

Copyrighting - photography, films, music, art, etc.;

Patenting and invention - new products (machines, medicines, procedure, etc.).

2.4.6 Personal data

Personal data is any information that relates to an identified or identifiable living individual. Further, different pieces of information, which are collected together, can lead to the identification of a particular person and also constitute personal data.

Personal data that has been de-identified, encrypted or pseudonymised but can be used to re-identify a person remains personal data and falls within the scope of the GDPR.

Personal data that has been rendered anonymous in such a way that the individual is not or no longer identifiable is no longer considered personal data.

Data collected when registering and attending INTERLAYER events will be archived and not publicly accessible. Participants will be asked about the possibility of their data being used for future contacts during and after the project.

All persons who make their data available within the scope of the project must be informed about the purpose of this data, where it will be stored and who is responsible. They should also be given the option to stop sharing their data at any time (e.g. leave the contact list for events).

2.4.7 External data

External data include open data, external to the project, but necessary, for example, to implement the algorithms, correlate monitored data or perform any research task (e.g. reports writing). The external data must be archived in a way that respects the terms of use of data owners.

2.5 Making data interoperable

Data integrity describes certain requirements for the protection and quality of digital data. To maintain data integrity, the consistency, completeness, accuracy, and validity of data must be ensured throughout the entire period. All data changes must be documented in a traceable way so that data cannot be changed or manipulated unnoticed or without authorization.

Interoperability. INTERLAYER data will be available, whenever this is possible, granting interoperability between institutions, organizations and countries. This choice optimally facilitates re-combinations with different datasets from different origins.

Data and metadata vocabularies. Specific data and metadata vocabularies (e.g. abbreviation names) will be defined throughout the entire project.

Standard vocabularies and interdisciplinarity. Standard vocabulary will be used whenever possible.

2.6 Making data reusable

Making data citable improves its availability for reuse; this way, it is necessary to specify the data used with precision, by using a formal scheme of naming. This naming typically takes the form of short strings of characters, called 'persistent identifiers', like the DOI (Digital Object Identifier) system, widely used, as in Zenodo and Open Research Europe repositories.

Data, metadata and publications will be stored in free repositories (e.g. Open Research Europe for publications and Zenodo for data and metadata), a collaborative INTERLAYER private platform (GEUS SharePoint) and scientific journals (for publications).

Embargoes. No data embargoes are foreseen. Public data will be published as soon as possible, but private data will remain private as long as the interested parties, rights holders of the data, decide, or as long as necessary due to legal imperative.

Data after the project. INTERLAYER data will remain available in the Zenodo portal.

Data quality assurance. Robust data quality assurance mechanisms will be developed for all data categories and will be incorporated into the next version of this Data Strategy as it becomes clear what data quality risks exist.

3. OTHER RESEARCH OUTPUTS

In addition to data management, INTERLAYER partners should also plan the management of other research outputs that may be generated or re-used throughout the project. These outputs can be either digital (e.g. software, workflows, protocols, models, photographs, videos, etc.) or physical (e.g. new materials, antibodies, reagents, samples, etc.).

Partners should consider which of the questions pertaining to FAIR data above, can apply to the management of other research outputs, and should make an effort to provide sufficient detail on how their research outputs will be managed and shared, or made available for re-use, in line with the FAIR principles.

4. ALLOCATION OF RESOURCES

Costs. The cost of publishing FAIR data includes (a) maintenance of the physical servers; (b) time devoted to the data generation and (c) long term preservation of the data.

Coverage of the costs. Resources to maintain and generate data are covered by the project. Long term preservation of data is free by uploading the research data at Zenodo.

Responsibility of Data Management. UÉvora and GEUS are responsible for managing metadata in the Teams Sharepoint.

5. DATA SECURITY

Files and data are stored in the Microsoft SharePoint hosted by GEUS, and mailing lists. These pieces of data are both digitally and physically secured in a data centre. Backups are made of these systems, to external hard disks or other machines. The INTERLAYER webpage is managed and hosted by UÉvora. Backups are regularly created. The connection to the server is SSL encrypted to ensure any messages sent to and from the server can only be read by the intended recipient.

In the Zenodo repository, data files and metadata are backed up nightly and replicated into multiple copies in the online system. All data files are stored in CERN Data Centres, primarily Geneva, with replicas in Budapest.

Personal data. EU citizens are granted the rights of privacy and data protection by the Charter of Fundamental Rights of the EU. In particular, Art. 7 states that “everyone has the right to respect for private and family life, home and communications”, whereas Art. 8 regulates that “everyone has the right to the protection of personal data concerning him or her” and that processing of such data must be “on the basis of the consent of the person concerned or some other legitimate basis laid down by law”. These rights are developed in detail by the General Data Protection Regulation (GDPR), Regulation 2016/679/EC, which is in force in every Member State since 25th of May of 2018.

6. ETHICS

There are no major ethical issues to consider in the INTERLAYER project, after considering the Ethics Self-Assessment (retrieved from https://ec.europa.eu/info/funding-tenders/opportunities/docs/2021-2027/common/guidance/how-to-complete-your-ethics-self-assessment_en.pdf).

In detail, INTERLAYER activities will involve:

i) human beings that are not part of the staff of the participants (e.g., participants in events organized by the consortium, such as workshops, symposia, or stakeholder meetings). In this case, it is expected to have personal information (as minimum as possible, most probably only the name, institution and professional email address and some general photos of the events). Even though, since personal information will be gathered and stored, attention will be devoted to privacy, data protection, and data management, in accordance with the General Data Protection Regulation (GDPR), as depicted in the previous section. Thus, no information about the participants in the events (e.g., list of participants, photographs or videos) will be published without their consent, so, data processing will be subject to free and fully informed consent of the persons concerned.

ii) animals: only invertebrates will be collected in the field, following the protocols for the ecological status assessment according to the Water Framework Directive (Directive 2000/60/EC), but no endangered species will be sampled;

iii) fieldwork, to be carried out in the four Living Labs, for water and biological quality elements sampling, meteorological, hydromorphological, hydrological, hydraulics and geological characterization. To minimize the risks of the fieldwork, procedures to keep the staff safe will be implemented, such as: keeping careful notes of all work engagements; ensuring that the project is adequately staffed; using mobile phones to keep in touch with the home base; conducting full risk assessments of fieldwork sites; carrying authorised identification.

iv) all laboratory analysis, in which chemicals/dangerous materials are handled, will be carried out by trained and experienced personnel, following the laboratory safety rules;

v) laboratory analysis will not adversely affect the environment, since all waste will be discarded following the safety rules in place in the laboratories, being collected and disposed following the appropriate measures in certified laboratories.

Further, INTERLAYER activities do not involve:

- i) Human Embryonic Stem Cells (hESCs), nor human embryos;
- ii) the use, production or collection of human cells or tissues (including human foetal or embryonic tissues or cells, other than hESC);
- iii) activities, participants, resources, materials imported or exported to/from non-EU countries;
- iv) development, deployment and/or use of artificial intelligence (AI)-based systems or techniques.

7. CONCLUSION

The present report provides the INTERLAYER project's initial Data Management Plan (DMP). As previously indicated, it is a living document that will be modified by partners as the project progresses, and an updated version will be presented at each reporting period: RP1 (M18) and RP2 (M36).

Each INTERLAYER project partner is responsible for keeping the DMP up to date as the project evolves.