
**Search, identification and collection of marine litter
with autonomous robots**

SeaClear



<https://seaclear-project.eu>

D1.1

Data Management Plan

WP1 — Management

Grant Agreement no. 871295

Lead beneficiary: 7 - TUM


Date: 30/10/2020

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 871295	D1.1: Data Management Plan	
	WP1: Management	Version: V1.0
	Author(s): Dr. Shahab Heshmati alamdari (TUM), Dr. Stefan Sosnowski (TUM)	
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Deliverable description	The main objective of this deliverable is to report detailed plans and procedures for data management by the SeaClear project. In particular, the objective of the Data Management Plan (DMP) is to support the data management life cycle for all data that will be collected, processed or generated by the project.


¹R = Document, report, DEM = demonstrator, DEC = Websites, patents filing, etc. OTHER: Software, technical diagram, etc. ETHICS = Ethics

²PU=Public, CO=Confidential, only for members of the consortium (including the Commission Services), CI=Classified, as referred to in Commission Decision 2001/844/EC.

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Definitions


- **Beneficiary:** A legal entity that is signatory of the EC Grant Agreement no. 871295.
- **Consortium:** The SeaClear Consortium, comprising the below-mentioned list of beneficiaries.
- **Consortium Agreement:** Agreement concluded amongst SeaClear Beneficiaries for the implementation of the Grant Agreement.
- **Grant Agreement:** The agreement signed between the beneficiaries and the EC for the undertaking of the SeaClear project (Grant Agreement no. 871295).

Beneficiaries of the SeaClear Consortium are referred to herein according to the following codes:

- **TU Delft:** Delft University of Technology.
- **DUNEA:** Regional Development Agency Dubrovnik-Neretva County - DUNEA.
- **Fraunhofer:** Fraunhofer Center for Maritime Logistics.
- **HPA:** Hamburg Port Authority.
- **Subsea Tech:** Subsea Tech SAS.
- **UTC:** Technical University of Cluj-Napoca.
- **TUM:** Technical University of Munich.
- **UNIDU:** University of Dubrovnik.

Abbreviations

- **EC:** European Commission.
- **GA:** Grant Agreement.
- **DMP:** Data Management Plan.
- **ORD:** Open Research Data.
- **PAKE:** Password Authenticated Key Exchange.
- **SRP:** Secure Remote Password.


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Executive summary

This deliverable reports detailed plans and procedures for data management by the SeaClear project. The SeaClear project declares its intention to participate in the Open Research Data (ORD) Pilot, which requires a Data Management Plan (DMP). The DMP has been written in accordance with the regulations of the Pilot action on Open Access to Research Data of the Horizon 2020 programme (H2020). The objective of the DMP is to support the data management life cycle for all data that will be collected, processed or generated by the project.


Based on H2020 guidelines for DMP, every consortium partner contributed relevant information concerning their datasets that are planned to be developed or collected during the project, and the preliminary data management plan was established. The data will be collected for developing required modular components for the project need.

This is a live document and any actions taken in order to participate in ORD Pilot will be updated in this deliverable. This deliverable contains preliminary information about the data the project will generate, whether and how it will be exploited or made accessible for verification and re-use, and how it will be curated and preserved.

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1 Purpose of data collection

The aim of sustainable data management is to collect, store, and document the research results based on discipline-specific standards and make them available for the subsequent use in a transparent manner. At this early stage of the project, a set of use cases and scenarios have not yet been defined, which would elicit the user requirements, the ethics/regulation/social acceptance and system requirements, modelling the dynamic assessment and defining the system architecture and the system integration plan. Nevertheless, a set of datasets has been identified to initialise the data management plan. All these datasets will further be defined after extensive discussions between the end-users and the technical partners of SeaClear in order to provide the best possible coverage of user needs; in such case, a similar analysis will be performed and the DMP will be updated accordingly.

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2 Participation in the Pilot on Open Research Data

SeaClear participates in the Pilot on Open Research Data (ORD) launched by the EC along with the H2020 programme. The consortium actively supports open science, and the European innovation and economy can draw large potential benefits from reuses of data derived from the project. Therefore, all datasets produced by the project will be evaluated for open access, and open access policy will be exercised whenever possible without compromising the privacy and security of the data subjects or exploitation opportunities.

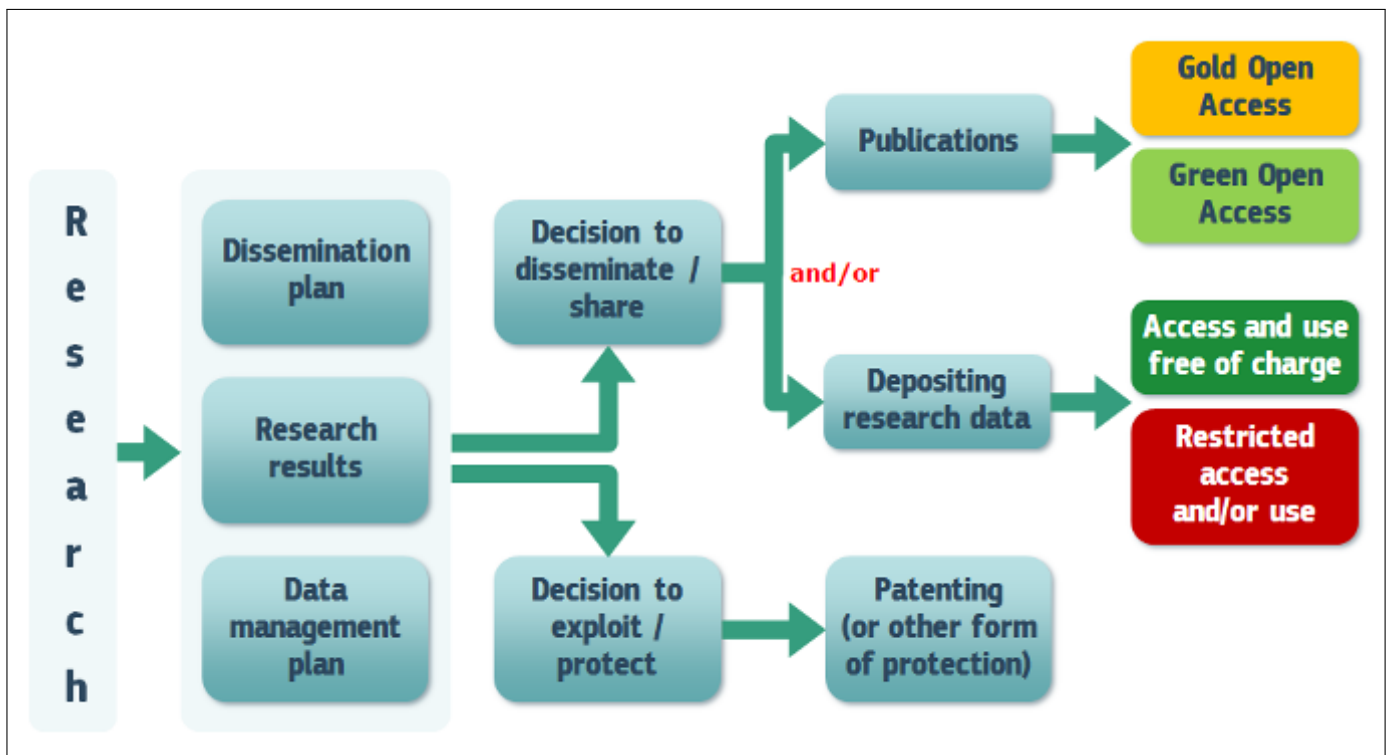




Figure 1: Different routes of management of data generated during the SeaClear project.

[Source: https://ec.europa.eu/research/participants/docs/h2020-funding-guide/cross-cutting-issues/open-access-data-management/open-access_en.html]

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3 Data Summary

Data will be collected for developing modular components for an autonomous marine litter collection system, employing a team of heterogeneous and autonomous robots. The aforementioned components require various forms of data sets such as maps and geo-/hydrographic information, onboard & raw sensor measurements, as well as electrical & mechanical 3D design plans for the development of algorithms. Research data will be gathered in work packages WP2 (concept and use cases), WP3 (robotic hardware developments), WP4 (robotic software developments), WP5 (system integration) and WP6 (demonstrations). The expected data sets from the respective work packages / partners are detailed in Section 8.

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4 FAIR data

SeaClear will respect the principles of FAIR data management, that is Findable, Accessible, Interoperable and Re-usable.

4.1 Making data findable, including provisions for metadata

The primary archive for datasets will be 4TU.Centre for Research Data³. 4TU.Centre for Research Data is a trusted and certified research data repository (it has a Data Seal of Approval certification). All datasets will be accompanied by rich metadata (following the Dublin Core format) to ensure that all datasets can be found. In addition, to further aid their discoverability, keywords describing the datasets will be added. 4TU.Center for Research is also using Dublin Core metadata, meaning that all datasets are indexed in Google Dataset Search. Every dataset will be also assigned a Digital Object Identifier (DOI), to make it citable and persistently available. In addition, we will adhere to the Data Documentation Initiative standard for disciplinary-specific, rich description of all the data files created when applicable. The archive can store files of different formats, including datasets, documents, images, audio and video files and software linked to a descriptive metadata set. The access privileges can be configurable with an option for setting an embargo period, and for granting a license for the data. The dataset repository has been registered at the Registry of Research Data Repositories (re3data)⁴, and 4TU.Centre for Research Data conforms to the OpenAIRE guidelines⁵ for data archives. Some datasets may be stored in another archive when, for example, extra security is needed such as for data covered by IP rights of partners. Links to all datasets will be listed on the project website⁶.

Data that can be made openly accessible, will be submitted to the repository within 6 months after the approval of the deliverable they have contributed to.

4.2 Making data openly accessible and re-usable


Only anonymous data will be publicly available. Any data that can result in identification of individuals or groups of individuals will be not made publicly available. Furthermore, data that may compromise exploitation opportunities by the consortium members will be set aside from open access. Otherwise, the dataset will be publicly available after a publication of a scientific paper or filing of a patent directly resulting from the dataset. Before making them public, all data will be screened by the exploitation chair for appropriateness. A list of screened datasets will be displayed on the SeaClear website which will contain a description of the datasets (data paper) and download links to the datasets. A data paper describes the methods of data collection, quality and limitations of data, as well as possibilities for re-use. The datasets will be designed to allow easy reuse with commonly available tools and software libraries, e.g., a freely available video and image player could be used to view the collected dataset. In principle, all datasets for open access will be stored on the server managed by the Coordinator (i.e., 4TU.Centre for Research Data). Some exceptions may occur when data access requires extra security measures. e.g., screening of the data user by requesting the name, affiliation and purpose. In this case, the SeaClear website will host a link which directs to another website designed for the specific screening. All scientific publications such as research articles and technical papers directly resulting from the project will also be publicly available, either in the Green access, or in the Gold access when the option is available. A list of publications with a download link will be hosted on the project website.


³<https://data.4tu.nl/info/en/>

⁴www.re3data.org

⁵<https://guidelines.openaire.eu>


⁶<https://seaclear-project.eu/>


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TEXT


TEXT


TEXT

1/1
>

HYPER_mean.txt (2.36 MB)
HYPER_stdev.txt (2.27 MB)
README.txt (2.02 kB)

3 files
>

Hyperspectral reflectance of marine plastics in the VIS to SWIR

Cite
Download all (4.63 MB)
Share
Embed
+ Collect

95 views
15 downloads
0 citations

Version 2 ▾ Dataset posted on 09.09.2020 by Els Knaeps, Gert Strackx, Dieter Meire, Sindy Sterckx, Johan Mijnenonckx, Mehrdad Moshtaghi

This dataset contains 47 hyperspectral reflectance measurements of plastic litter samples. The plastic litter samples include virgin and real samples from the Port of Antwerp. They were measured in dry conditions in the VITO calibration facility and a selection of the samples was also measured in wet conditions and submerged in a watertank at Flanders Hydraulics.

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- 08.09.2020 - First online date
- 09.09.2020 - Posted date

PUBLISHER
4TU.ResearchData

TIME COVERAGE
2019


ORGANIZATIONS
VITO nv
Flanders Hydraulics Research

CATEGORIES

- Ecological Applications

KEYWORD(S)

Hyper project
Total Suspended Matter
plastic debris
marine environment
remote sensing data
Pollution


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figshare. credit for all your research.


Figure 2: Example metadata in 4TU.Centre for Research Data.

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4.3 Making data interoperable

Data interoperability is an important aspect within SeaClear to foster collaboration and efficiency between the partners. Whenever possible, existing, well-defined data-exchange standards will be used. The metadata will follow specific conventions of the individual discipline as different data formats may be used depending on the methodology. Specific formats, standards and embargo period for each data is described in Section 8. As a rule of thumb, we exercise the following principles:

- the format should be sustainable; sustainability is enhanced by increasing the range of supporting software,
- the software documentation and format description should be available,
- the format should be usable without legal restrictions such as licences or patents,
- the format should be readable without technical constraints such as encryption or digital rights,
- the format should only contain relevant information and avoid unnecessary formatting information such as type size in tables,
- applied multimedia formats should compress lossless,
- the format should be well-established in the community.

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5 Allocation of resources

The primary archive (4TU.Centre for Research Data) operates free of charge, including the backup server. Furthermore, dedicated hard disk drives will be allocated for storing the data archives at the TUM premise for all datasets archived through 4TU.Centre for Research Data. The hard disk drives will also store all materials shared between the consortium partners such as deliverables, meeting minutes, and presentations. The one-time small cost for the drives will be covered by SeaClear during the project, and the host (TUM) will cover the maintenance cost after the project. The data will be kept available at least 10 years after the completion of the project. For the datasets that will not be centralised at TUM (see Section 8), the data owner will be responsible for local storage, and will also incur small one-time cost covered by SeaClear during the project.

Moreover, since the internal communication is key to an efficient and smooth execution of the project, the coordinator set up a project SURFdrive⁷ domain in order to provide a common workspace for saving and sharing all working documents, minutes and reports within the SeaClear consortium. The SURFdrive domain is provided free of charge to all project partners. It is a secure alternative for commercial personal cloud storage services that was developed for the Dutch education and research community offering staff, researchers and students an easy way to store, edit, synchronise and share files in the secure and reliable community cloud with ample storage capacity. SURFdrive complies with Dutch and European privacy legislation.

The main features and functionalities of SURFdrive are:


- secure and simple sharing of teaching or research files within the education and research community as well as with external parties;
- offline synchronisation ensuring access to the files at all times;
- accessibility from all devices - optimised for computers, laptops, smartphone and tablet running on Windows, Linux, PS X, iOS and Android;
- real-time insight into document edits by other users;
- 500 GB storage capacity;
- 30 days backup and recovery of deleted files.



Name	Size	Modified
Contact details	15 KB	2 months ago
Contracts	26.5 MB	9 months ago
Deliverables	272.9 MB	19 days ago
Media Communications	0 KB	7 months ago
Media Content	40.3 GB	a month ago
Meetings_Telco	193.8 MB	6 days ago
Reports	918 KB	2 months ago
Templates	1 MB	4 months ago
WP	1.2 GB	11 days ago
9 folders	42 GB	

Figure 3: Structure of the SeaClear SURFdrive


⁷SURFdrive website: <https://www.surf.nl/en>

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6 Data security


During the course of the research project, all data will be stored on local servers maintained and automatically backed up by the partners responsible for the activities. Research organisations, working with the research data, in the project have facilities to comply with requirements to storage and access to research data. If necessary, these facilities may be used in a regional context (as defined in the DoA) by other partners who do not have these facilities. The datasets foreseen to be collected through SeaClear are of high value and may contain sensitive personal data or proprietary information from consortium partners. Special care should be taken to prevent such data to leak or becoming hacked. This is another key aspect of SeaClear data management, and all data repositories used by the project will include effective protection. A holistic security approach will be followed, in order to protect the pillars of information security (confidentiality, integrity, availability). The security approach will consist of a methodical assessment of security risks followed by their impact analysis. This analysis will be performed on the personal information and data processed by the proposed system, their flows and any risk associated with their processing. Security measures will include the implementation of Password Authenticated Key Exchange (PAKE) protocols, such as the Secure Remote Password (SRP) protocol, and protection against bots such as captcha technologies. Furthermore, SeaClear will apply monitored and controlled procedures related to the data collection, their integrity and protection. The data protection and privacy of personal information will include protective measures against infiltration as well as physical protection of core parts of the systems and access control measures.

At the coordinator, TU Delft, a Faculty Data Steward (Yan Wang) will provide additional advice, as needed, on data management during the research project.

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7 Ethical aspects

SeaClear activities will involve human participants for various human activity during experiments and demonstrations (i.e., human-in-the-loop). Therefore, in some cases personal data will be collected. Such data will be protected in accordance with the EU’s Data Protection laws, where the main legislation is the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC, also known as the ‘General Data Protection Regulation’ (GDPR), which entered into force on 25 May 2018. Further information on how personal data collection and handling should be approached in the SeaClear project are provided in Deliverable (D)10.1: Ethical manual on security, data protection, privacy, ethics and societal acceptance. Apart from the issue of processing of personal data, the SeaClear consortium, guided by the responsible partner UTC, will investigate if there are further issues that can have impact on data sharing. These issues will also be discussed in more detail in the related deliverable D7.1. When dealing with personal data (e.g., questionnaires), informed consent will be required from participants before any data will be collected to describe information for data sharing and long term preservation.


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8 Datasets

Number	Data owner	Data name
1	DUNEA	DS-0-DUNEA-Exampleset-1
Dataset description		
There is no specific dataset for Regional agency DUNEA.		
Open access policy		
Regional agency DUNEA is a public institution in 100% ownership of the regional authority, thus most of our data are public data. Only the data that are part of specific contract, EU project, a matter of GDPR, or has special conditions, are considered as private.		
Interoperability		
There is no restrictions or specific methodology in the interoperability of our data.		


Number	Data owner	Data name
2	HPA	DS-1-HPA-Video / Photo Footage-1
Dataset description		
HPA will supply available photo and video images of the port for dissemination and exploitation purposes as well as technical developments. Footage may include (aerial) images of the port, test locations and debris findings.		
Open access policy		
The data supply will be coordinated with the HPA Corporate Communications department. The use will be limited to publications within the dissemination and exploitation activities during the project as well as technical developments in regard to the SeaClear system only.		
Interoperability		
The Data will be available in common formats like jpg, png or MP4.		

Number	Data owner	Data name
3	HPA	DS-2-HPA-Technical Infrastructure-1
Dataset description		
Specific data for the test areas at Hamburg port will include information on wifi network, access points, bandwidth, speed to enable data flows, processing and refining within the SeaClear systems.		
Open access policy		
Data will be available to the respective project partner to enable technical developments and ensure system functionality during tests and demonstrations. The data will be available for as long as the SeaClear project is ongoing.		
Interoperability		
-		

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Number	Data owner	Data name
4	HPA	DS-3-HPA-Hydrographic maps -1
Dataset description		
The data set will supply specified geo information on a designated test area in terms of bathymetry. It also indicates maritime navigation marks and (estimated) tidal movements.		
Open access policy		
Data will be available to the respective project partner to enable technical developments and ensure system functionality during tests and demonstrations. The data will be available for as long as the SeaClear project is ongoing.		
Interoperability		
The data set will be available in CVS, PNG, ASCII format.		


Number	Data owner	Data name
5	SST	DS-0-Subsea Tech-Exampleset-1
Dataset description		
The dataset is essentially composed by: <ul style="list-style-type: none"> • Equipment operation description • Mechanical 3D design and manufacturing plans • Software architecture and code • Electrotechnics and Electronics design 		
Open access policy		
Openly available: <ul style="list-style-type: none"> • Equipment operation description • External 3D mechanical design, as well as pictures of external views • Navigation OpenCPN software, if kept for the project <p>Access to control software, potential image processing software, internal mechanics, electrotechnics and electronics detailed designs remain closed. Moreover, all the closed access data, as well as the navigation software has a potential exploitation value.</p>		
Interoperability		
To facilitate the interoperability between the different partners equipment, following will be provided: <ul style="list-style-type: none"> • Mechanical interfaces • Software interfaces • Electrotechnics interfaces 		

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Number	Data owner	Data name
6	UTC	DS-0-UTC-MapSample-1
Dataset description		
A sample 3D map of an area of sea bottom with detected litter areas labeled.		
Open access policy		
The map data will be openly available. This dataset will mostly be useful for research, for simulations involving e.g. motion planning to collect the litter.		
Interoperability		
The map will be represented either as in the Point Cloud Data (PCD) or the OctoMap format. Details on how litter labels will be represented are still to be established.		

Number	Data owner	Data name
7	TUM	DS 001 TUM UUVMotion 01
Dataset description		
The dataset will include a collection of motion profiles of an Unmanned Underwater vehicle moving in an underwater environment. The dataset will be a collection of raw measurements obtained from onboard sensors such as IMU, DVL, video etc during the robot motion and will be valuable for benchmarking sensor-fusion, identification and data driven control algorithms.		
Open access policy		
The motion data will be publicly available along with the task description. An embargo period will be set until the study is published in a scientific journal.		
Interoperability		
The data obtained from the recording of sensor measurements will be in a rosbag file. A rosbag or bag is a file format in ROS for storing ROS message data. These bags are often created by subscribing to one or more ROS topics, and storing the received message data in an efficient file structure.		

Number	Data owner	Data name
8	UNIDU	DS-1-UNIDU-Multimediaset-1
Dataset description		
UNIDU will supply photos and videos of test sites in Dubrovnik for dissemination and exploitation purposes and technical developments. Footage may include aerial and underwater images of test locations and other nearby locations and debris findings.		
Open access policy		
The supply of the data will be coordinated with other partners. Its use will be limited to publications within the disseminations and exploitation activities during the project as well as technical developments .		
Interoperability		
The data will be available in common formats like jpg, png or MP4.		

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Number	Data owner	Data name
9	UNIDU	DS-1-UNIDU-Soft-architecture-1
Dataset description		
Software architecture and code for image processing, control and mapping.		
Open access policy		
The software architecture will be openly available but the code will remain closed due to exploitation potential.		
Interoperability		
To facilitate the interoperability software interface will be provided.		

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9 Deposit license agreement

In order to guarantee the proper function of the Data management platform of SeaClear, a License agreement was prepared for the cases where the owner of a dataset wishes to upload it on the Data management portal server and distribute it directly in this way to the public. The following parties are involved in this Licence agreement:

- The organisation or person authorised to transfer and deposit the digital data, hereafter referred to as the Depositor⁸
- The organisation that is authorized to archive and manage the digital data, hereafter referred to as the Repository⁹

9.1 Licence

The Depositor grants the Repository a non-exclusive license for digital data files, hereafter referred to as ‘dataset/document’. The Repository is authorized to include the dataset/document in its data archive. The Repository shall transfer the content of the dataset/document to an available carrier, through any method and in any form. The Repository is authorized to make the dataset/document (or substantial parts thereof) available to third parties by means of online transmission. In addition, the Repository has the right, on the instruction of third parties or otherwise, to make a copy of the dataset/document or to grant third parties permission to download a copy.

9.2 The Depositor


- The Depositor declares that he is a holder of rights to the dataset/document, or the only holder of rights to the dataset/document, under the Databases act and where relevant the Copyright actor otherwise, and/or is entitled to act in the present matter with the permission of other parties that hold rights.
- By depositing a dataset/document the Depositor does not transfer ownership. The Depositor retains the right to deposit the dataset/document elsewhere in its present or future version(s). The Depositor retains all moral rights in the dataset/document including the right to be acknowledged as creator.
- The Depositor indemnifies the Repository against all claims made by other parties against the Repository with regard to the dataset/document, the transfer of the dataset/document, and the form and/or content of the dataset/document.

9.3 Dataset/document

- The dataset/document to which the license relates consists of all the databases, documentation and other data files and documents that form part of this dataset/document, which have been transferred by the Depositor.
- The Depositor declares that the dataset/document corresponds to the specification provided.
- The Depositor declares that the dataset/document contains no data or other elements that are contrary to European law.

⁸The depositor: The person or legal entity registered as such with the Repository

⁹The primary repository: 4TU.Centre for Research Data: <https://data.4tu.nl/info/en/>

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- The Depositor will supply the dataset/document by means of a method and medium deemed acceptable by the Repository.
- The Repository shall ensure, to the best of its ability and resources, that the deposited dataset/document is archived in a sustainable manner and remains legible and accessible.
- The Repository shall, as far as possible, preserve the dataset/document unchanged in its original software format, taking account of current technology and the costs of implementation. The Repository has the right to modify the format and/or functionality of the dataset/document if this is necessary in order to facilitate the digital sustainability, distribution or re-use of the dataset/document.

9.4 Removal of dataset/documents


The Repository shall, as far as possible, preserve the dataset/document unchanged in its original software format, taking account of current technology and the costs of implementation. The Repository has the right to modify the format and/or functionality of the dataset/document if this is necessary in order to facilitate the digital sustainability, distribution or re-use of the dataset/document.

9.5 Availability to third parties

- The Repository shall make the dataset/document available to third parties in accordance with the access conditions agreed with the Depositor: "Open access".
- The Repository shall make the dataset/document available only to third parties who have agreed to comply with the General Conditions of Use.
- Notwithstanding the above, the Repository can make the dataset/document (or substantial parts thereof) available to third parties:
 - if the Repository is required to do so by legislation or regulations, a court decision, or by a regulatory or other institution,
 - if this is necessary for the preservation of the dataset/document and/or the data archive,
 - (to a similar institution) if the Repository ceases to exist and/or its activities in the field of data archiving are terminated
- The Repository shall publish the metadata and make them freely available, on the basis of the documentation that the Depositor provides with the dataset/document. The term metadata refers to the information that describes the digital files.
- The general information about the research and the metadata relating to the dataset/document shall be included in the Repository's databases and publications that are freely accessible to all persons.

9.6 Provisions relating to use by third parties

- The Repository shall require third parties to whom the dataset/document (or substantial parts thereof) is made available to include in the research results a clear reference to the dataset/document from which data have been used. The reference must comply with the General conditions of use.
- The Repository shall require parties to which a dataset/document is made available to grant a non-exclusive license for the dataset/document(s) they create using the dataset/document that has been made available.

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9.7 Liability

- The Repository accepts no liability in the event that all or part of a dataset/document is lost.
- The Repository accepts no liability for any damage or losses resulting from acts or omissions by third parties to whom the Repository has made the dataset/document available.
- The Repository accepts no responsibility for mistakes, omissions, or legal infringements within the deposited dataset/document.

9.8 Term and termination of the Agreement

- This Agreement shall come into effect on the date on which the Repository receives the dataset/document (hereafter the deposit date) and shall remain valid for an indefinite period. If the repository decides not to include the dataset/document in its data archive, this Agreement is cancelled. The Repository notifies the Depositor of publication or noninclusion of the dataset/document in its data archive. Cancellation of this Agreement is subject to a period of notice of six months, and notice shall be given in writing. It is possible to change the agreed access category at any time during the term of the Agreement.
- Notwithstanding point (a), this Agreement shall end when the dataset/document is removed from the data archive in accordance with this Agreement.
- If the Repository ceases to exist or terminates its data-archiving activities, the Repository shall attempt to transfer the data files to a similar organization that will continue the Agreement with the Depositor under similar conditions if possible.

9.9 Jurisdiction

The SeaClear Data Management Portal is entitled, but not obliged, to act independently against violations of the Copyright Act and/or any other intellectual property right of the holder(s) of rights to the dataset/document and/or the data from the dataset/document.

9.10 Applicable law

Dutch law is applicable to this agreement.