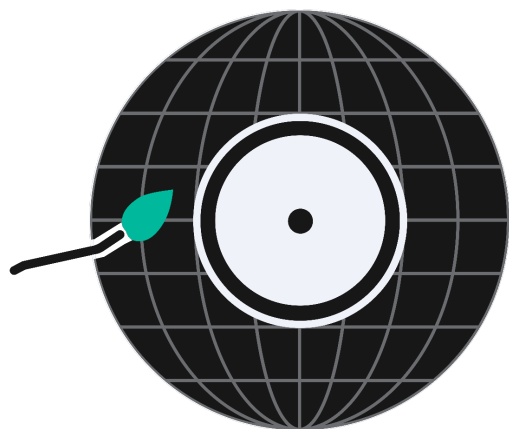




CON CERTO

Deliverable D1.7 – Report on Data Management Implementation

Lead Beneficiary: MEE0

Author/s: Maria Luisa Quarta, Andrea Ricciardelli (MEE0)

30/06/2026



Funded by
the European Union

Views and opinions expressed are those of the author(s) only and do not necessarily reflect those of the European Union or the European Climate, Infrastructure and Environment Executive Agency (CINEA). Neither the EU nor CINEA can be held responsible for them.

Project acronym:

CONCERTO

Project full title:

Improved CarbOn cycle represeNtation through multi-sCale models and Earth obseRvation for Terrestrial ecOsystems

Start of the project:

January 2025

Duration:

48 months

Project coordinator:

Manuela Balzarolo

Deliverable title:

Report on Data Management Implementation

Deliverable n°:

D1.7

Nature of the deliverable:

Report

Dissemination level:

Public

WP responsible:

WP1

Lead beneficiary:

MEEO

Authors: Maria Luisa Quarta (MEEO), Andrea Ricciardelli (MEEO)

Author/reviewers

Reviewers: Matteo Campioli (UNIVERSITEIT ANTWERPEN), Sabrina Outmani (SISTEMA)

Citation:

Quarta, M.L. & Ricciardelli, A. (2026) CONCERTO

D1.7. Report on Data Management Implementation

Due date of deliverable:

Month n°18

Actual submission date:

30/06/2026

Deliverable status:

Submitted

Version	Status	Date	Author(s)/Reviewer
1.0	Draft	16 March 2026	Maria Luisa Quarta - MEEO
			Setting up template

D1.7 DM implementation
#101185000

1.1	Draft	23 March 2026	Maria Luisa Quarta, Andrea Ricciardelli - MEE0 Including content
2.0	Draft	05 June 2026	Maria Luisa Quarta (MEE0) – Finalisation of 1st draft
2.1	Review	08 June 2026	Matteo Campioli – UA
2.2	Review	15 June 2026	Sabrina Outmani - SIS
3.0	Final	30 June 2026	Maria Luisa Quarta – MEE0 – Proofreading, layout, submission

Subject to change

Contents

1. Introduction.....	6
1.1. Relation to project tasks and deliverables.....	6
2. Implementation of the Data Management Plan.....	8
2.1. Overview of the DMP and its operational scope	8
2.2. Governance and coordination	8
3. Metadata catalogue implementation	9
3.1. Structure and organisation of the metadata catalogue	12
3.2. Metadata catalogue functionalities	12
4. Integration with the Data Sharing Framework.....	13
5. Operationalisation of FAIR Principles.....	15
5.1. Findability	15
5.2. Accessibility	15
5.3. Interoperability.....	16
5.4. Reusability	16
5.5. Monitoring and continuous update.....	17
6. Implementation of Open Science Principles.....	17
6.1. Open Science practices.....	18
7. Awareness and capacity-building activities.....	18
7.1. Training and webinars	19
7.2. Metadata catalogue demonstration and feedback collection.....	19
8. Risks and mitigation actions.....	20
9. Next steps and conclusions	20
10. References	22

List of Abbreviations

API	Application Programming Interface
ARCO	Analysis-Ready Cloud-Optimised
D	Deliverable
DMF	Data Mapping Form
DMP	Data Management Plan
DSF	Data Sharing Framework
DSP	Data Sharing Platform
ECV	Essential Climate Variables
FAIR	Findability, Accessibility, Interoperability, Reusability
GSWP3	Global Soil Wetness Project Phase 3
IAM	Identity and Access Management
OGC	Open Geospatial Consortium
STAC	Spatio Temporal Asset Catalogue
T	Task
WCS	Web Coverage Service
WMO	World Meteorological Organization
WMS	Web Map Service
WP	Work Package

Subject to change

Executive summary

Deliverable D1.7 – Report on Data Management Implementation presents the activities carried out under CONCERTO Task 1.5 (T1.5 – Data management implementation) to implement the D8.6 – Data Management Plan (DMP) [1], delivered under T8.4 – Research data, knowledge portfolio and IPR management, and ensure the effective application of data management principles within the project. It builds upon the conceptual and technical foundations established in D1.1 – Report on Data Requirements [2], D1.2 – Report on the Data Sharing Framework [3], and consolidated in D1.3 - Synthesis report on CONCERTO Data Sharing Framework 2 [4] (due by M20) and it describes how these elements have been translated into operational data management practices.

D1.7 outlines the governance, procedures, and tools established to support consistent dataset documentation, sharing, and reuse in line with Horizon Europe requirements and **FAIR** (Findability, Accessibility, Interoperability, Reusability) principles [5].

A key outcome of this work is the development of the **metadata catalogue**, a digital tool that operationalises the metadata collected through the **Data Mapping Form** (DMF) into a structured, searchable system, enabling partners and, by the end of the project, any external users to easily discover and assess project datasets.

The report also summarises awareness and capacity building activities, highlights progress achieved and identifies remaining challenges and next steps to further strengthen data management practices throughout the project lifecycle.

1. Introduction

Effective data management is a cornerstone of modern scientific research, particularly in large-scale, multi-partner projects such as CONCERTO. The project brings together 13 partners across Europe, spanning diverse scientific communities including carbon cycle modellers, machine learning researchers, remote sensing experts, and ecosystem ecologists. This diversity, while scientifically enriching, makes consistent and harmonised data handling a non-trivial challenge.

1.1. Relation to project tasks and deliverables

Work Package 1 (**WP1 – Data Sharing Framework**) serves as the operational backbone for all data-sharing related activities within CONCERTO. Among the five tasks within WP1, T1.5 is specifically charged with translating the principles articulated in the project DMP (D8.6) into tangible actions, ensuring these principles are not merely documented but are actively applied throughout the project lifecycle.

The **three core objectives** of T1.5 are:

- to ensure the implementation of the DMP defined in WP8, including technical and procedural operationalisation of FAIR principles;
- to implement actions supporting data management principles and communicate them within the consortium through webinars, training sessions, and the application of data fairness assessment tools;
- to share structured data both among partners and with external users throughout the full duration of the project and beyond.

D1.7 should be read in conjunction with D1.1 [2], D1.2 [3], D1.3 [4], and D8.6 [1], where:

- **D1.1** defines the categories and characteristics of datasets used within the project, the metadata requirements and expected level of description, the data flows and interactions across WPs, as well as the interoperability needs across heterogeneous data sources;
- **D1.2** provides the strategic foundation and technical implementation details on the process of building the Data Sharing Framework (DSF), supporting both technical and policy objectives by establishing data sharing agreements, usage licensing, and compliance monitoring mechanisms;
- **D1.3 (due by M20)** will represent an updated version of D1.2 by providing details on the latest DSF technical implementations and improvements as well as on the main metadata catalogue system architecture;
- **D8.6** outlines the principles, strategy, and processes guiding the management, sharing, and long-term preservation of project data.

The deliverables and tasks links are illustrated in Figure 1:

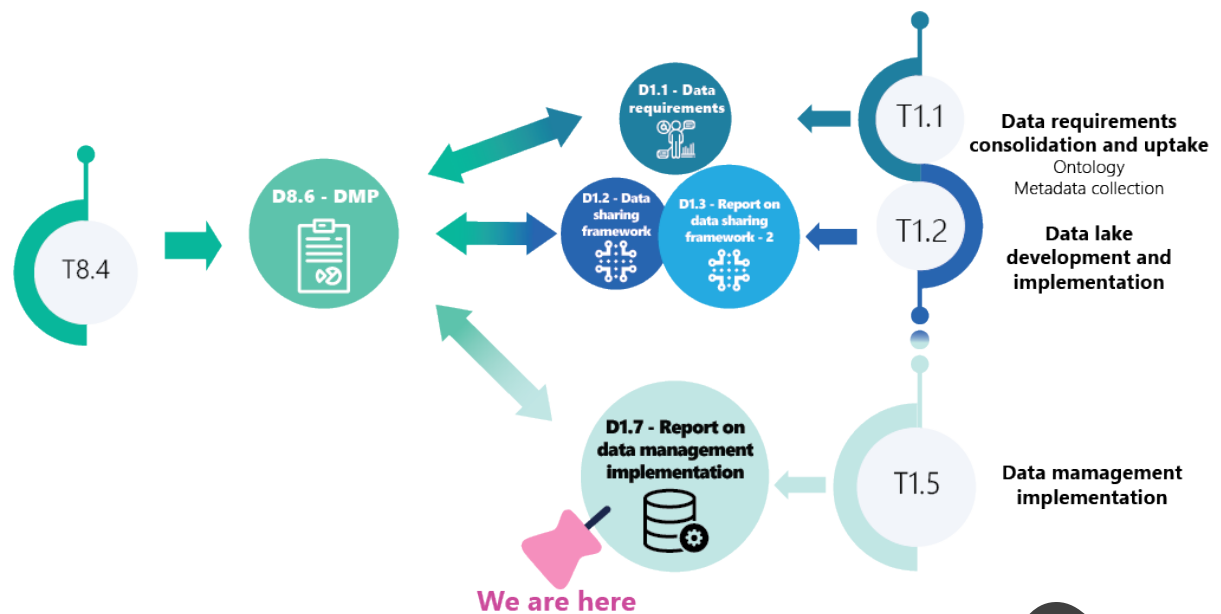


Figure 1 - Interconnection and links between D1.7, D1.1, D1.2, D1.3 (due by M20) and D8.6. The link with the WP1 tasks is also highlighted as they are essential for setting the data management implementation baseline.

2. Implementation of the Data Management Plan

The DMP (D8.6) constitutes the strategic backbone of CONCERTO's data governance. It defines principles, policies, and responsibilities for the lifecycle management of all data generated, collected, or reused within the project. T1.5 is responsible for ensuring that these principles are operationalised in practice.

2.1. Overview of the DMP and its operational scope

The CONCERTO DMP is structured around the four **FAIR principles** and addresses data governance at multiple levels: data collection and cataloguing, data storage and access control, metadata standards, and licensing and long-term preservation. It covers both input data (external datasets ingested by the project) and output data (new datasets generated by CONCERTO researchers).

The DMP is structured to evolve alongside the project, with planned updates to reflect the growing complexity of the data portfolio. T1.5 monitors compliance with DMP requirements and coordinates with WP8 to ensure that any updates to the DMP are communicated and implemented across the consortium.

2.2. Governance and coordination

The implementation of the DMP is aligned with the governance model defined in the Data Sharing Framework (D1.2), which establishes roles, responsibilities, and access control mechanisms for data management.

A central Data Manager coordinates the implementation, ensuring consistency with both the DMP and the DSF. WP leaders ensure that data management practices are embedded within their workflows, while dataset providers are responsible for documenting and maintaining their data.

This governance structure reflects the **role-based approach** described in D1.2 [3], where different user profiles (e.g., guests, registered users, administrators) interact with the system with different levels of responsibility and access.

3. Metadata catalogue implementation

Building on the information collected through the DMF, a metadata catalogue has been developed by MEE0 as a digital tool to organise and provide access to all datasets involved in the project (see Figure 2 and Figure 3).

Subject to change

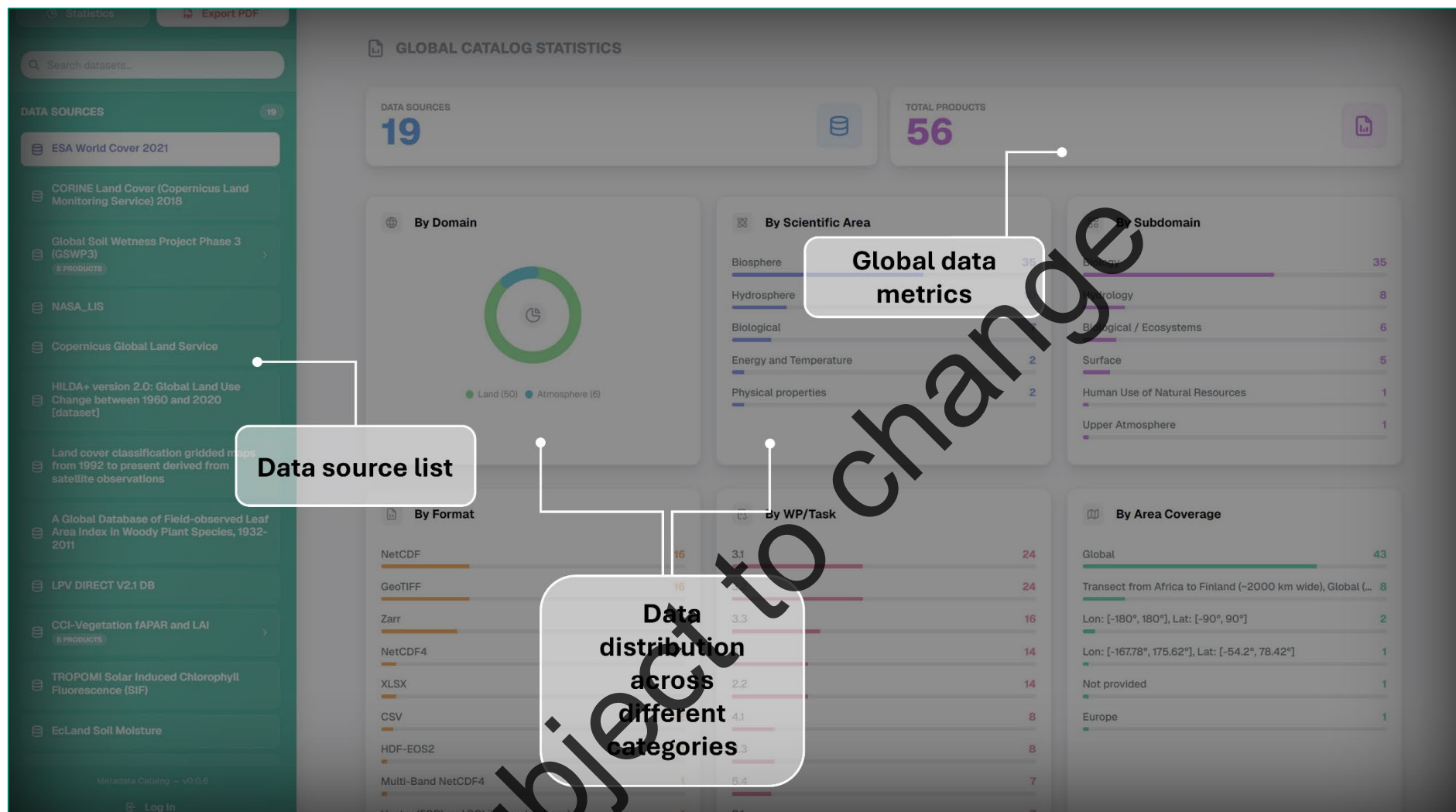


Figure 2 - CONCERTO metadata catalogue user interface (general data and product overview)

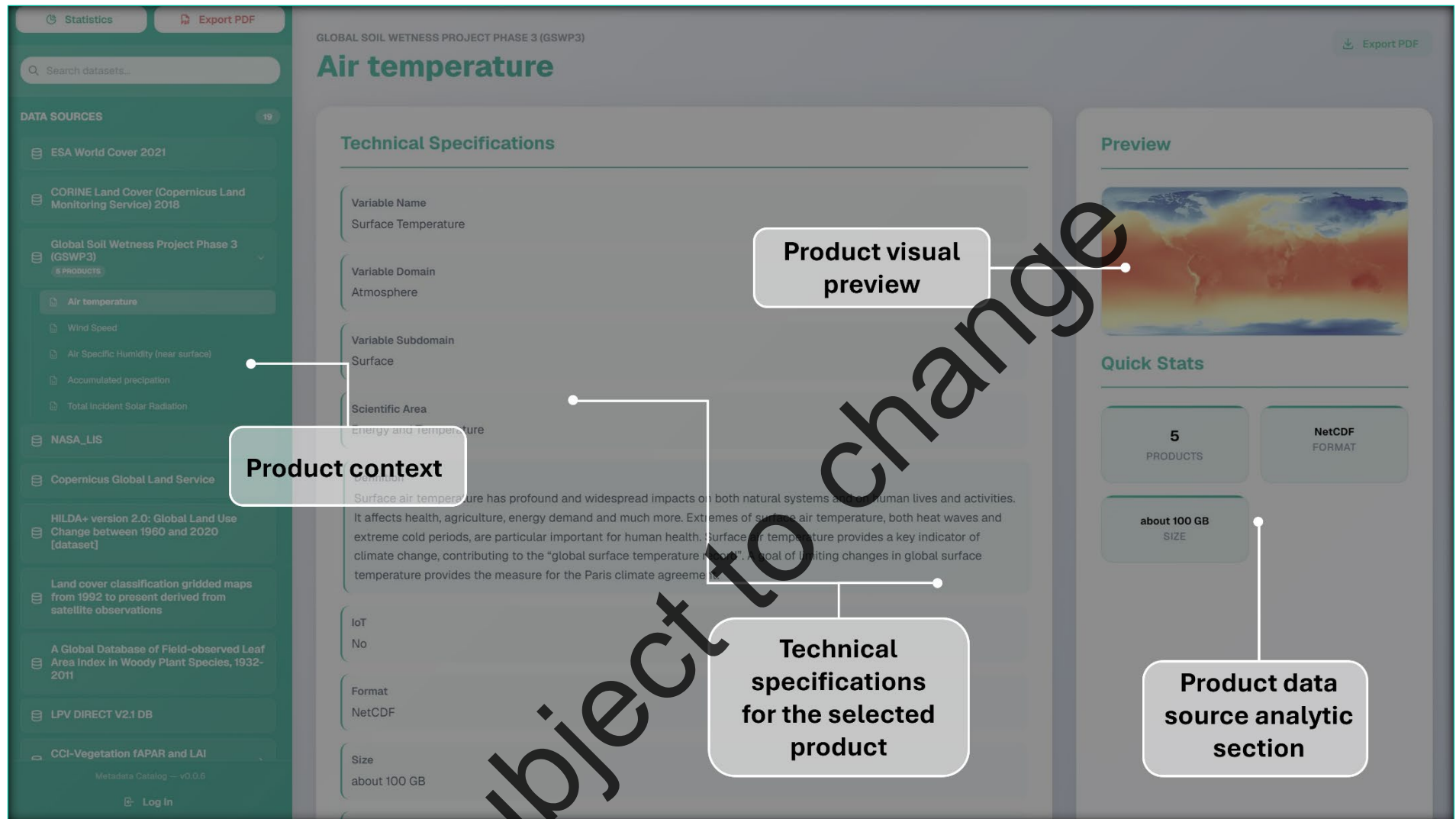


Figure 3 - CONCERTO metadata catalogue user interface (product view)

The catalogue functions as a structured archive of descriptive records, allowing users to obtain a comprehensive overview of available data as well as detailed information on individual datasets. Each record includes key metadata elements such as:

- data producer and affiliated organisation,
- licensing conditions and access modalities,
- scientific description of the dataset,
- data format and volume,
- spatial and temporal coverage,
- update frequency and resolution.

D1.3 [4], that will be released by M20, will provide the description of the metadata catalogue system architecture, the technologies used for its implementation and a detailed description of the user interface.

3.1. Structure and organisation of the metadata catalogue

To ensure clarity and usability, the catalogue adopts a two-level hierarchical structure, as detailed below.

- **Level 1 – Data source:** this level groups datasets according to their origin, representing a specific provider (e.g., Global Soil Wetness Project Phase 3 - GSWP3 [6], [7]) or a data product (e.g., Gross Primary Productivity – GPP). It includes administrative metadata such as ownership, licensing, and access conditions.
- **Level 2 – Variable/Product:** each data source may include one or more variables or products, each characterised by its own technical metadata (e.g., format, resolution, temporal coverage).

This structure enables users to easily navigate from general dataset information to more detailed technical descriptions, supporting both high-level exploration and in-depth analysis.

3.2. Metadata catalogue functionalities

The metadata catalogue has been designed to support both data discovery and exploration within the project. Its main functionalities include:

- **dataset browsing:** users can explore all datasets organised by data source and variable;
- **search capabilities:** the catalogue supports the data search using keywords contained in the product names for easy dataset retrieval;

- **detailed metadata visualisation:** each dataset is associated with a comprehensive record presenting both technical specifications and administrative metadata;
- **data and product overview:** the system provides aggregated statistics on the catalogue contents, such as the number of data sources, number of products, and their distribution across scientific domains and subdomains present within CONCERTO as well as their representations in terms of format, project WP/Task and area coverage;
- **export functionalities:** users can export metadata records in PDF format, either individually or as a complete catalogue, supporting sharing and reporting activities.

These functionalities make the catalogue a central tool for facilitating data discovery, evaluation, and reuse within the consortium.

4. Integration with the Data Sharing Framework

T1.5 coordinates with T1.2 to ensure that metadata registered in the DMF is accurately indexed in the DSF and that the data are accessible through the DSP.

The metadata catalogue and the DSF constitute complementary components of the CONCERTO data ecosystem. While the metadata catalogue focuses on the description, discovery, and exploration of datasets through structured metadata, the DSF provides the services and infrastructure required to store, access, and share project data. Together, they support the implementation of the DMP by ensuring that datasets are both discoverable and accessible through a coherent and interoperable environment.

As mentioned above, the metadata catalogue is populated through information collected via the DMF, which provides a standardised description of input and output datasets contributed by project partners. These metadata records are linked to the corresponding data resources managed through the DSF, thereby establishing a clear connection between dataset documentation and data access services. For **datasets generated within the project** as output, catalogue records include references to the corresponding resources available through the DSP, enabling users to move seamlessly from dataset discovery to data access while maintaining traceability and transparency throughout the process.

From a data management perspective, this integration supports several key objectives:

- it ensures **consistency between metadata and data resources** by maintaining a direct relationship between dataset descriptions and the corresponding access points;

- it facilitates **data governance** by providing users with information on ownership, licensing conditions, access modalities, and responsible contacts before data access is requested or granted;
- it strengthens the **implementation of FAIR principles** by linking dataset discoverability mechanisms with the data access and sharing services provided through the DSF.

The metadata catalogue also supports the progressive implementation of the DSF. Future developments will further strengthen the integration between the two systems through the **connection of the catalogue with the DSF analytics and discovery services**. This evolution will enable metadata information and catalogue statistics to be synchronised dynamically, ensuring that users have access to up-to-date information regarding available datasets and associated resources. At the time of writing the present report, the metadata catalogue is in its deployment phase and it will be soon accessible at: <https://metadatalog.cloud.dev.projectconcerto.eu/> (see D1.3 [4] for more details). For datasets generated by CONCERTO partners, the access link field in the metadata catalogue record will point directly to the corresponding resource in the DSP, ensuring a seamless and traceable connection between the catalogue and the storage layer.

To balance openness, transparency, and legitimate access restrictions, the metadata catalogue has been designed according to a dual-access approach. A **public catalogue** instance will provide openly accessible metadata records for datasets that can be publicly disclosed, supporting external discoverability, stakeholder engagement, and compliance with Open Science principles. In parallel, a **restricted catalogue** instance will be available to authorised consortium members, and it will provide access to complete metadata records, including information related to datasets subject to restricted access conditions or specific usage constraints. Similarly to the CONCERTO NextCloud, authentication is based on the OpenID Connect (OIDC) [8] identity layer built on top of the OAuth 2.0 authorisation framework [9], enabling secure single sign-on (SSO) across project services (see D1.3 [4] for more details).

This approach maximises the visibility and reuse potential of project data while ensuring compliance with data governance requirements, confidentiality obligations, and partner-specific access policies.

By connecting metadata management with the data access and sharing services of the DSF, the metadata catalogue contributes to the creation of a coherent environment in which datasets can be discovered, understood, accessed, and reused efficiently. As such, it represents a key component enabling for the practical implementation of the project's FAIR data strategy and the broader objectives of the DSF.

5. Operationalisation of FAIR Principles

Translating **FAIR principles** into operational practice has been one of the central activities of T1.5 during the first year of the project. Operational procedures have been designed to ensure that datasets identified in D1.1 [2] are properly integrated into the DSF described in D1.2 [3].

These procedures include:

- dataset identification and classification according to project data typologies,
- metadata collection through the DMF,
- validation and harmonisation of metadata,
- integration into the metadata catalogue and indexing within the DSF.

These steps ensure that datasets can be effectively discovered and accessed through the DSF interfaces (e.g., Explorer, APIs), as described in D1.2 and in the upcoming D1.3 [4]. In this context, the metadata catalogue goes beyond its role as a documentation tool and acts as an enabler of FAIR data practices.

The following sub-sections describe how each FAIR dimension has been addressed starting from the guidelines provided through the CONCERTO DMP (see D8.6 [1]).

5.1. Findability

Findability requires that data are assigned unique persistent identifiers, described with rich metadata, and indexed in searchable resources. CONCERTO has addressed this through:

- **metadata standards alignment:** where applicable, metadata records reference recognised standards such as ISO 19115 and INSPIRE, ensuring compatibility with external catalogues and repositories.
- the **metadata catalogue:** by systematically collecting and organising descriptive information about datasets, this tool enhances their discoverability and allows users to identify data relevant to their needs more efficiently.

5.2. Accessibility

Accessibility requires that data and metadata are retrievable via standardised protocols, with clearly defined access conditions. The CONCERTO's Data Sharing Platform (DSP), described in D1.2 [3], has operationalised accessibility through:

- a **role-based access control system** (Identity and Access Management, IAM), distinguishing between guests, registered users, system operators, and administrators, each with appropriate permissions;

- **FAIR services** APIs (S3 API, OGC WMS/WCS, STAC, OpenSearch) that provide machine-readable and machine-to-machine access to datasets, enabling automated workflows and integration with external tools;
- a **public data storage area** accessible without authentication for openly licensed datasets, and a user private storage area for partner-restricted data;
- detailed **documentation** describing access modes, access restrictions, and access links within the DMF metadata records.

Moreover, the **metadata catalogue** supports accessibility by clearly documenting access conditions, ownership, licensing arrangements, and contact points, thereby facilitating the responsible sharing and use of data across the consortium.

5.3. Interoperability

Interoperability requires that the data is described using formal, shared languages and vocabularies, and that datasets can be integrated across different systems. CONCERTO also aims at addressing interoperability.

- The **common minimum ontology** (described in D1.1 [2]), developed through a participatory working group process, defines standardised variable names and definitions using, as much as possible, bodies and organisation of reference (e.g. WMO Essential Climate Variables, ECVs), to ensure consistent terminology across all project activities.
- Adoption of **open geospatial standards** (OGC WMS, WCS) and the Spatio-Temporal Asset Catalog (STAC) specification for data discovery and access.
- Support for Analysis-Ready Cloud-Optimised (ARCO) data formats (e.g. cloud-optimised GeoTIFF, Zarr) to facilitate direct analysis in **cloud environments** without format conversion overhead.
- Use of recognised **coordinate reference systems and data projections** during the ARCO transformation pipeline.
- The adoption of harmonised metadata structures that further contributes to interoperability by promoting a common description framework across datasets originating from different organisations, domains, and data collection systems.

5.4. Reusability

Reusability requires that data are described extensively with accurate attributes and that clear usage licenses are assigned. CONCERTO's approach includes:

- The **metadata catalogue**: the availability of rich contextual information regarding data provenance, license information, quality, coverage, and usage conditions strengthens data reusability, enabling users to assess the suitability

of datasets for specific applications and fostering their long-term value beyond the immediate objectives of the project.

- The CONCERTO **naming convention**, documented within the DMF, ensures unambiguous identification of datasets across the project lifetime.
- **Data examples** following the project naming convention are included in the DMF to facilitate integration into the Data Lake.
- **Open licensing** will be adapted as much as possible (considering the legal restrictions within the specific data source framework), while Creative Commons licences will be preferred for project-generated datasets.

5.5. Monitoring and continuous update

The implementation of the DMP is **continuously monitored** to ensure alignment with both data requirements and the DSF infrastructure.

Monitoring activities include:

- tracking metadata completeness and consistency,
- verifying integration of datasets into the DSF,
- assessing usability of tools such as the metadata catalogue.

This iterative process ensures that the data management approach evolves in line with both technical developments in the DSF and emerging project needs.

6. Implementation of Open Science Principles

Open Science is a key principle underpinning the CONCERTO data management approach and is embedded throughout the project's data lifecycle. In line with Horizon Europe requirements, the project seeks to maximise the visibility, accessibility, and potential reuse of research outputs while ensuring compliance with legal, ethical, security, and intellectual property constraints.

The implementation of Open Science within CONCERTO is supported by the DMP [1], the Data Sharing Framework, and the governance mechanisms established across the consortium. Together, these elements provide the organisational and operational foundations needed to promote transparent data management practices, facilitate collaboration among partners, and support the dissemination and long-term exploitation of project results.

Open Science is therefore considered not only as a data-sharing objective but also as a broader framework for fostering transparency, collaboration, and knowledge exchange throughout the project.

6.1. Open Science practices

To support the practical implementation of Open Science principles, several actions have been undertaken by CONCERTO.

- **Demonstrations of project tools** (metadata catalogue and DSF, see section 7.2) have been organised with partners to assure that Horizon Europe requirements on Open Science, FAIR data management, and responsible data sharing are met, with particular attention given to dataset documentation and metadata management practices.
- Various **mechanisms to improve the visibility of available data resources** have been established. Through the metadata catalogue, partners, and external users (such as stakeholders, peers, etc.) in the future, can easily identify datasets available within the project, understand their characteristics, and assess their potential relevance for specific applications. This contributes to fostering data reuse and cross-domain collaboration.
- CONCERTO promotes **transparency** in data access conditions by clearly documenting ownership, licensing arrangements, and access restrictions. This information enables users to understand under which conditions datasets can be accessed and reused, supporting responsible and informed data sharing practices.
- To further support openness while respecting confidentiality requirements, the metadata catalogue adopts a **dual-access approach**. A publicly accessible instance enhances the discoverability of datasets that can be openly disclosed, while a restricted instance provides authorised consortium members with access to complete metadata records, including information related to datasets subject to specific access conditions.

These actions collectively contribute to creating an open and collaborative data environment, facilitating knowledge exchange and supporting the long-term exploitation of project results.

7. Awareness and capacity-building activities

Ensuring comprehensive coverage of data collection, documentation, storage, access, security, sharing, and preservation is essential to convey the primary data management concepts to the consortium promptly. To support this, two demonstration events were organised to present the Data Sharing Framework and the metadata catalogue (see Section 7.2 for more details) to the Consortium, which served as an opportunity for partners to familiarise themselves with the functionalities of both systems and as occasions to address specific questions.

7.1. Training and webinars

The CONCERTO Data Management Board will continue supporting the Consortium until the end of the project with regards to all the Data Management aspects, by sharing guidelines and best practices as well as relevant events, such as the GEO Dialogue Series organised by the GEO Data and Knowledge Working Group [10] and supported by the GEO Knowledge Hub [11], and other projects' webinars, such as those led by the CLEAR-EO project [12].

7.2. Metadata catalogue demonstration and feedback collection

A key activity supporting the implementation of data management practices was the demonstration of the metadata catalogue given to the consortium. The demo aimed to:

- present the functionalities of the catalogue,
- validate its usability and alignment with user needs,
- collect structured feedback from partners.

To facilitate this process, a dedicated interactive workspace was set up using a Conceptboard. After the main metadata catalogue functionalities have been presented, partners were invited to provide feedback on:

- clarity and completeness of metadata fields,
- usability of the navigation and search functionalities,
- relevance of the two-level structure (data source and variable/product),
- potential improvements and additional features.

The feedback collected highlighted that the metadata catalogue provides sufficient and clear information to understand both the content of the datasets and their potential uses. Reviewers appreciated the added value of positioning the tool as more than a simple catalogue, emphasizing its usefulness for documenting and supporting publications and project deliverables. Additionally, the interface was seen as an effective mean of facilitating data sharing among partners, with users expressing interest in using it to discover and access newly generated data within the project.

In particular, the feedback highlighted several important aspects:

- the importance of intuitive navigation for non-technical users,
- the need for clear and consistent metadata terminology across domains,
- the value of visual elements (e.g., analytics dashboard, data thumbnails) for understanding dataset distribution.

This activity played a crucial role in aligning the tool with user expectations and ensuring its effective adoption across the consortium. It also reinforced partner engagement and ownership of the data management process.

8. Risks and mitigation actions

In situ observational datasets — which constitute a critical input for the land surface models developed within CONCERTO — are sometimes characterised by **lack of information on quality-control and incomplete or non-standardised metadata**, which may compromise their reliable integration into project workflows. This risk is mitigated by a dedicated task (**T1.4 – *In situ* data management**) focused on the systematic review and validation of both the data and their associated metadata, ensuring that quality and completeness requirements are met prior to integration into the metadata catalogue and the DSF. *In situ* datasets meeting all standards and already present in other open access platforms (e.g., ICOS [13]) will not be duplicated but linked to the catalogue, which will play as such the important role of reference list. **Newly generated datasets** produced by CONCERTO partners may be subject to complex or **conflicting licensing conditions**, particularly where they derive from or incorporate third-party restricted data sources, potentially limiting their open dissemination. To mitigate this risk, licensing conditions are documented at the point of dataset registration in the DMF, open licensing under Creative Commons is encouraged wherever legally permitted, and partners are supported in identifying appropriate licensing arrangements through guidance provided by the Data Management Board.

9. Next steps and conclusions

Building on the progress achieved under T1.5, future activities will focus on further strengthening the project's data management ecosystem and supporting the continued implementation of FAIR and Open Science principles. Planned actions include further enhancement of the metadata catalogue, considering feedback collected from consortium partners and evolving project requirements. Additional efforts will be devoted to strengthening its integration with the DSF and other project data services, ensuring greater consistency between metadata management, data discovery, and data access functionalities. Finally, awareness-raising and capacity-building activities will continue throughout the project to promote the adoption of good data management practices, support partner engagement, and ensure the long-term sustainability and reuse of project data assets.

The metadata catalogue represents a key component of the project's data management framework, supporting the practical implementation of the principles and procedures defined in the Data Management Plan (DMP). By providing a centralised and structured inventory of all datasets involved in the project, the catalogue facilitates a common understanding of the available data assets, their characteristics, and the conditions governing their use. In this way, it contributes to improving data transparency, coordination among partners, and the overall governance of project data.

Beyond its role as a documentation tool, the metadata catalogue serves as an important bridge between data producers and data users, transforming distributed and heterogeneous data resources into a **coherent and navigable information ecosystem**. By supporting dataset documentation, discovery, assessment, and sharing, it contributes significantly to the implementation of FAIR principles and to the establishment of a sustainable data management culture within and beyond the project.

Subject to change

10. References

REF NUMBER	DOCUMENT / LINK
1	Totaro, S., Quarta, M. L., Malvolti, F., 2025. CONCERTO D8.6 – Data Management Plan
2	Balzarolo, M., Quarta, M. L., 2025. CONCERTO D1.1 – Report on data requirements
3	Mantovani, S., Barboni, D., 2025. CONCERTO D1.2 – Report on the Data Sharing Framework
4	2026. CONCERTO D1.3 - Synthesis report on CONCERTO Data Sharing Framework 2 (<i>deliverable in progress, due by M20</i>)
5	Wilkinson, M., Dumontier, M., Aalbersberg, I. et al., 2016. 'The FAIR Guiding Principles for scientific data management and stewardship', Sci Data 3, 160018. https://doi.org/10.1038/sdata.2016.18
6	Dirmeyer, P. A. et al., 2006. Global Soil Wetness Project Phase 3 - GWSPP3 https://doi.org/10.1175/BAMS-87-10-1381
7	Kim, H., 2017. Global Soil Wetness Project Phase 3 Atmospheric Boundary Conditions (Experiment 1). https://doi.org/10.20783/dias.501
8	OpenID Foundation (2014). OpenID Connect Core 1.0 incorporating errata set 2. https://openid.net/specs/openid-connect-core-1_0.html
9	Hardt, D. (2012). The OAuth 2.0 Authorization Framework, RFC 6749, Internet Engineering Task Force (IETF). https://datatracker.ietf.org/doc/html/rfc6749
10	GEO Data Knowledge and Working Group. https://earthobservations.org/groups/data-and-knowledge-working-group
11	GEO Knowledge Hub. https://gkhub.earthobservations.org/
12	CLEAR-EO project funded under the European Union's Horizon-Europe research and innovation programme, grant agreement no. 101182722. https://doi.org/10.3030/101182722
13	ICOS data portal. Accessible at: https://www.icos-cp.eu/