ECMWF Copernicus Procurement

Invitation to Tender

Copernicus Climate Change Service

Annex 1 to Volume II

Technical support for the management of ECMWF's ECVs Contracts

ITT Ref: C3S2_120a
ISSUED BY: ECMWF Administration Department Procurement Section
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Copernicus Climate Change Service

Volume II

Essential Climate Variable products derived from observations

ITT Ref: C3S2_312a
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1 Introduction

The Copernicus Climate Change Service (C3S) reached full operational status in 2018. This means that C3S assures timely access to a large number of data products derived from space-based Earth observations, in situ observations and models, in support of climate change adaptation and mitigation strategies. These include, for example, global and regional reanalyses, seasonal forecast data, model-generated climate change scenarios and Essential Climate Variables (ECVs) – gridded products derived primarily from satellite observations. The latter is the subject of this Invitation to Tender (ITT).

Access to data and associated information products is provided by the C3S Climate Data Store (CDS), which has been designed to enable users with diverse levels of expertise to connect with the data using online tools, workflows and applications. The CDS catalogue of datasets, tools and information products is available from the C3S web portal at https://climate.copernicus.eu and also accessible via an open Application Programming Interface (API).

The CDS currently offers open and free access to data products associated with the ECVs listed in Table 1 below. These ECVs have been globally observed for a decade or more, either from space, *in situ*, or both. For each of them, existing capabilities in Europe can be exploited to provide state-of-the-art reliable access to quality-assured and regularly updated Climate Data Records (CDRs) and Interim Climate Data Records (ICDRs) with global or near-global coverage. The Global Climate Observing System (GCOS) Status Report (GCOS-SR 2015) includes brief sections for each ECV that describe commonly used data products and the observations used to produce them. Target requirements for many ECV products, in terms of uncertainty, stability, temporal and spatial resolution, are defined in the GCOS 2016 Implementation Plan (GCOS-IP 2016).

			C3S_312a							
				C3S_312b						
								C3S2_312		
	GCOS	2017	2018	2019	2020	2021	2022	2023	2024
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Albedo	6.3.9	Lot 9							
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Fraction of Absorbed Photosynthet	6.3.11	Lot 9		Lot 5			Land Biosphere		
Leaf Area Index	6.3.12	Lot 9							
Fire	6.3.15								
		2019	2018	2019	2020	2021	2022	2023	2024

Table 1: From proof-of-concept phase (9 Lots) to operations (5 Lots) of C3S ECV services. The column labelled GCOS shows the relevant section in the GCOS Status Report (GCOS-SR 2015).

The purpose of this ITT is, primarily, to ensure continuity of high-quality ECV products that are derived primarily from satellite observations and accessible from the CDS. Production, quality assurance, data access,

documentation and user support services for the set of 22 ECVs listed in Table 1 have been implemented through 5 framework contracts (C3S_312b Lots 1-5) that are due to terminate on 30 June 2021. This ITT is also structured in 5 Lots. Scope and technical requirements are described in Section 2 of this document. ECMWF is looking to secure the highest possible quality for all products, guided by GCOS requirements and best practices, hence bidders will need to maintain consistency with datasets currently available via the CDS, and/or initiate new activities that ensure equivalent (or better) products from ongoing observations.

Whilst ECMWF currently sees a requirement for these type of services beyond the year 2023, it recognises that these may change during the term of these contracts. ECMWF will therefore review, in coordination with other Entrusted Entities responsible for the delivery of the "Copernicus Programme", the overall status of the ECV landscape at C3S prior to the end of these contracts, with a view to retendering for a further period depending on the outcome of the review. The exact form of it will be communicated to all contractors at due course.

2 Technical Requirements

2.1 Service scope and requirements

This ITT is for services ensuring reliable access via the CDS to high-quality, consistent and homogeneous global climate data products associated with a specified set of atmospheric, oceanic and terrestrial ECVs.

The scope of services provision includes:

- Implementation, operation and maintenance of operational processing systems to generate CDR / ICDR datasets (provided these operations are not supported already by other initiatives);
- Quality assurance and validation of the resulting datasets, including contribution to the C3S Evaluation and Quality Control function (EQC);
- Provision of access to datasets and documentation via the CDS;
- Provision of supporting documentation that describes the algorithms used to generate the datasets, the methodology and results of quality assessment, and information to help users make appropriate use of them;
- Maintenance of metadata describing CDR datasets and linked documentation in an evolving Content Management System (CMS) to be provided by ECMWF;
- Provision of user support including user oriented material;
- Provision of input for the European State of the Climate depending on the maturity of the ECV.

Note that for ECVs not owned by the bidder themselves, the proposal should include pre-agreed arrangements with the product owner related to interfaces, documentation, user support, user statistics, licenses, product identification/citation, etc.

2.2 Dataset Characteristics

All datasets delivered as part of the service must:

- Be suitable for use as CDRs, i.e. be of sufficient length, consistency, homogeneity and continuity to represent past climate variability and change and have global or near-global coverage;
- Be derived primarily from satellite observations;
- Provide the best achievable spatial coverage and resolution, consistent with meeting the quality required for ECVs and given the quality of available input observations;
- Include meaningful estimates of uncertainty, in terms of accuracy and precision;
- Include metadata on data provenance to ensure full traceability of information;

Data Processing Level: Priority should be given to higher level (level 3/4) products that facilitate the user uptake of consolidated ECV data products. However, lower level products may be proposed where duly justified.

Frequency of update: CDR datasets shall be updated frequently and in a timely manner using newly acquired input data. Contractors shall propose an update frequency that is consistent with the temporal resolution of the dataset and allowing sufficient time for adequate quality control of the outputs.

Reprocessing: Datasets shall be periodically reprocessed when improved algorithms and/or newly available input data (i.e. from newly launched satellites) enable a significant improvement in product quality for end users, in terms of long-term consistency, temporal/spatial resolution, accuracy or precision.

In addition, all datasets shall be:

- Delivered using data formats, metadata and protocols as described in Section 2.6;
- Fully documented in line with deliverables detailed in Section 2.5;
- Backed up with specialised user support as described in Section 2.4.4.

2.3   Structure of the ECV services

The service shall be organised in 5 Lots addressing ECVs in specific thematic areas as follows:

2.3.1   Lot 1: Atmospheric physics

ECMWF intends to award a single Service Contract under a Framework Agreement (for a maximum duration of 30 months) for this thematic area, with a target starting date in **November 2021**. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs. The contractor for this Lot group shall, in accordance with the requirements described in Section 2.1, maintain consistency with datasets currently available via the CDS and ensure timely access to data products associated with the following ECVs:

- **Precipitation** (GCOS-SR Section 4.3.5)
- **Surface Radiation Budget** (GCOS-SR Section 4.3.6)
- **Water Vapour** (GCOS-SR Section 4.5.3)
- **Cloud Properties** (GCOS-SR Section 4.5.4)
- **Earth Radiation Budget** (GCOS-SR Section 4.5.5)

Table 23 of GCOS-IP 2016 provides guidance on viable data products and requirements related to resolution, accuracy and stability.

2.3.2   Lot 2: Atmospheric composition

ECMWF intends to award a single Service Contract under a Framework Agreement (for a maximum duration of 30 months) for this thematic area, with a target starting date in **November 2021**. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs. The contractor for this Lot group shall, in accordance with the requirements described in Section 2.1, maintain consistency with datasets currently available via the CDS and ensure timely access to data products associated with the following ECVs:

- **Carbon Dioxide** (GCOS-SR Section 4.7.1)
- **Methane** (GCOS-SR Section 4.7.2)
- **Ozone** (GCOS-SR Section 4.7.4)

- **Aerosol** (GCOS-SR Section 4.7.5)

Table 23 of GCOS-IP 2016 provides guidance on viable data products and requirements related to resolution, accuracy and stability.

2.3.3   Lot 3: Ocean

ECMWF intends to award a single Service Contract under a Framework Agreement (for a maximum duration of 15 months) for this thematic area, with a target starting date in **November 2021**. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs. The contractor for this Lot group shall, in accordance with the requirements described in Section 2.1, maintain consistency with datasets currently available via the CDS and ensure timely access to data products associated with the following ECVs:

- **Sea Surface Temperature** (GCOS-SR Section 5.3.1)
- **Sea Level** (GCOS-SR Section 5.3.3)
- **Sea Ice** (GCOS-SR Section 5.3.5)
- **Ocean Colour** (GCOS-SR Section 5.3.7)

Table 24 of GCOS-IP 2016 provides guidance on viable data products and requirements related to resolution, accuracy and stability.

2.3.4   Lot 4: Land hydrology and cryosphere

ECMWF intends to award a single Service Contract under a Framework Agreement (for a maximum duration of 30 months) for this thematic area, with a target starting date in **November 2021**. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs. The contractor for this Lot group shall, in accordance with the requirements described in Section 2.1, maintain consistency with datasets currently available via the CDS and ensure timely access to data products associated with the following ECVs:

- **Lakes** (GCOS-SR Section 6.3.4)
- **Glaciers** (GCOS-SR Section 6.3.6)
- **Ice Sheets and Ice Shelves** (GCOS-SR Section 6.3.7)
- **Soil Moisture** (GCOS-SR Section 6.3.16)

Table 25 of GCOS-IP 2016 provides guidance on viable data products and requirements related to resolution, accuracy and stability.

2.3.5   Lot 5: Land biosphere

ECMWF intends to award a single Service Contract under a Framework Agreement (for a maximum duration of 30 months) for this thematic area, with a target starting date in **November 2021**. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs. The contractor for this Lot group shall, in accordance with the requirements described in Section 2.1, maintain consistency with datasets currently available via the CDS and ensure timely access to data products associated with the following ECVs:

- **Albedo** (GCOS-SR Section 6.3.9)
- **Land Cover** (GCOS-SR Section 6.3.10)

- **Fraction of Absorbed Photosynthetically Active Radiation** (GCOS-SR Section 6.3.11)
- **Leaf Area Index** (GCOS-SR Section 6.3.12)
- **Fire** (GCOS-SR Section 6.3.15)

Table 25 of GCOS-IP 2016 provides guidance on viable data products and requirements related to resolution, accuracy and stability.

2.4   Work to be undertaken

For all Lots, the contractor shall carry out the following tasks:

- Maintain product specifications with target requirements for all CDRs and ICDRs to be delivered, using GCOS requirements as a starting point, but reflecting C3S user needs, availability and timeliness of input observations, the current state of research (e.g. CCI outcomes), technical capabilities, etc.;
- Maintain and/or implement processes and systems for product generation, brokering and data handling as needed to deliver CDRs and ICDRs to C3S users via the CDS, taking full advantage of existing capabilities where possible;
- Maintain well-defined operating schedules and procedures, addressing routine operation, strategy for delivering timely and frequent updates of ICDRs, timely response to system failures, input data interruptions, implementing system upgrades to maintain the state of the art (e.g. incorporating improved algorithms, new data sources, etc.), reprocessing requirements, etc.;
- Make all necessary arrangements with input data suppliers to meet the requirements of operational production, data delivery and regular updates;
- Implement a systematic approach to ensuring the highest possible scientific quality of data products, e.g. using input data quality control, routine monitoring of data production, assessment of CDRs for continuity, accuracy and stability, etc.;
- Maintain metadata of data products in an evolving CMS tool provided by ECMWF;
- Develop complete documentation of all aspects of the production systems, data products and quality assessments;
- Provide specialised user support for all products via the C3S Service Desk;
- Develop user oriented material to help users make appropriate use of data products and encourage user uptake;
- Upon sufficient maturity of the ECV, collaborate to build data products suitable for the European State of the Climate;

For all Lots, the work and key deliverables shall be organised in work packages as described in the following sections. A separate work package (WP0) shall be defined for management and implementation activities, as described in Section 2.7 of this document.

2.4.1   WP1: Dataset definition and preparation

The objective of this work package is to define the characteristics, generation algorithms and validation approach of CDR and ICDR datasets that will be delivered for each family of ECVs. In this work package, the contractor should analyse, select and document the input datasets and scientifically robust processing algorithms used to generate the output datasets. They shall also identify appropriate independent validation data and define the methodology by which the resulting datasets will be validated.

Deliverables associated to this WP should include the following:

Preliminary Dataset Documentation Package (PDDP), containing:

a) **Draft Algorithm Theoretical Basis Document (dATBD):** Describes the physical and mathematical basis of algorithms and systems used to generate data products, e.g. data dependencies; use and

source of auxiliary data; all aspects of data processing and quality control; calibration and bias adjustment; filtering, interpolation, transformation; uncertainty estimation, etc. It shall contain sufficient detail to be able to serve as a reference document for implementing the production systems.

b) **PQAD:** Describes the approach to product quality assurance and methods used for product validation, including the validated products and reference datasets used.

2.4.2 WP2: Data production and access

The main objective of this work package is to maintain or develop production chains to ensure the timely generation and technical and scientific quality of ICDRs, as well as to implement all processes or systems needed for generating (or brokering) new quality controlled CDRs (and corresponding ICDRs) to be accessed via the CDS. The successful bidder shall also ensure reliable and timely access to all data products and associated documentation via the CDS. Further information on the data integration and publishing mechanisms, and expected interaction with the CDS technical team is given in section 2.6.

Deliverables associated to this WP should include the following:

Dataset Registration (DR): Description of all the product characteristics needed to integrate the dataset into the CDS. This shall include summary dataset metadata, access mechanism details, and information needed to populate the CDS landing page. The contractor shall maintain the DR information during the course of the contract. This shall be done in document form or by updating the CMS which will evolve over the course of the contract.

Final Dataset & Documentation Package (FDDP):

c) **Final Algorithm Theoretical Basis Document (ATBD)**: An updated version of dATBD that includes any modifications needed to the algorithms to ensure fitness-for-purpose of the product to the highest quality.

d) **PQAR:** Describes all assessments performed on the provided datasets, including any application-specific assessments if available. Reviews the quality of the products against the data requirements and provides recommendations on data usage.

e) **PUGS:** Description of each data product, including a list of instruments the data product refers to, auxiliary data used in the retrieval process, and any information needed for traceability (e.g. algorithm name and version, processing level, etc.). It shall include the data specification, and any specific information and aspects to consider when using the data, including data format and file names, product content and attributes, quality indicator and flags, data masks and filtering (including information on gap filling strategy), any known issues, data disclaimers and/or suitability for specific sectors/applications.

f) **ECV Data Product(s):** Associated CDR to the above documentation. For brokered datasets, the associated documentation may only need links to the source, to be included in the DR.

Interim Climate Date Records (ICDR): CDR forward processed in time, using the associated baselined CDR algorithm and processing environment. It is not anticipated that a new ATBD, PQAD, PQAR and PUGS will be required for forward processing (ICDRs) of a CDR delivered under this ITT. Exceptions may arise due to significant changes, e.g. satellite instruments, algorithms, quality assurance methods and should be justified. The associated documentation should be cumulative (maintaining relevant content from previous versions as much as possible).

2.4.3   WP3: Service and system quality assurance and evaluation

The objective of this work package is to ensure the technical quality and robustness of the production system of CDRs and ICDRs delivered to the CDS, as well as to evaluate the datasets against user requirements and to contribute to the independent validation undertaken by the EQC.

Independent Evaluation and Quality Control (EQC): The C3S Evaluation and Quality Control (EQC) function has been designed to provide continuous assessments of the technical and scientific quality of all C3S products and services, including their value to users. This function is being performed by independent evaluators within a separate contract, in close coordination with the data providers.

The successful bidder shall produce datasets in line with the quality assurance criteria set out by the EQC function and will also liaise with EQC (both C3S and its contractors) as appropriate. This includes, in particular, the completion and updating of the respective quality assurance templates (QAT) hosted in a Content Management System (CMS) in order to produce standardised quality assurance reports (QARs). These are presented to users via a synthesis table in the EQC tab of the respective CDS catalogue page. Apart from the independent assessment, all fields in the QAT are designed to be populated by the data provider. The table below shows the main categories as displayed in the CDS catalogue. Appendix 1 shows the full QAT.

INTRODUCTION	USER DOCUMENTATION	ACCESS	INDEPENDENT ASSESSMENT
Dataset overview	User guide	Toolbox compatibility	Data check
Temporal and spatial coverage and resolution	Scientific methodology	Archive	Expert evaluation
Providers	Uncertainty quantification		Dataset maturity
Dataset version	Validation		Summary of independent assessment
Data update	Inter-comparison		

A consultation process is foreseen between EQC evaluators and the successful bidder before the start of the EQC workflow to define the respective QARs to be produced including their level of granularity. It is envisaged to keep the number of QARs to a manageable level and use common fields which can be applied to datasets sharing the same features.

Part of the independent assessment, which is performed by the EQC contractor, is a data checker to document consistency and completeness of a dataset. The bidders shall propose means to document, wherever possible, information about relevant data checks being performed prior to delivery in support of the EQC evaluation (e.g. log files). Lastly, data providers are given the opportunity to review the independent, scientific assessments ahead of publication. The bidder shall include in both their budget and their plans a sufficient provision to ensure an adequate responsiveness to requests of the EQC function (both C3S and its contractors).

Deliverables associated to this WP should include the following:

System Quality Assurance Document (SQAD): (for coherent groups of ECV products). Provides an overview of the system elements and interfaces, including a description of the hardware, of the procedures for upgrading the production cycle for data reprocessing, and for handling system maintenance and system failures, and of the support to users.

Target Requirements Document - Gap Analysis Document (TR-GAD): Defines evolving target requirements for CDRs and associated data products based on GCOS requirements and C3S user needs. Describes gaps and limitations to the data fitness-for-purpose according to target requirements, and identifies opportunities and needs to improve the datasets. It addresses limitations in existing coverage, processing algorithms, methods for estimating uncertainties, and identifies scientific research needs, and opportunities for exploiting new observations, in particular from the Sentinels, etc. This report should be produced for each ECV within each Lot.

EQC contribution: The contractor shall coordinate with and support the work of the EQC by a) completing and updating the respective quality assurance templates (QAT) hosted in a Content Management System

(CMS) in order to produce standardised quality assurance reports (QARs); b) performing and documenting recommended data checks and tests ahead of publication; and c) reviewing EQC material produced independently, guidance to users.

ECV Inventory Entry: The Contractor shall also support the wider visibility of the C3S programme and the CDR datasets being generated by maintaining inventory entries in the ECV inventory hosted by GCOS (https://climatemonitoring.info/ecvinventory). Updates shall be provided annually to the inventory administrators.

2.4.4   WP4: User support and engagement

This WP is focused on ensuring C3S users have the required information, tools and resources to make effective use of the datasets generated. The work involves providing specialised support to users of the delivered products and services, contributions to the overall C3S climate intelligence effort, and developing customised materials to provide practical examples to users on the use of the data products.

User support: ECMWF has a well-established centralised Copernicus User Support (CUS) to provide multi-tiered technical support to all users of C3S data, products, tools and services. The CUS is used for ticketing user requests and distributing these requests to specialists as needed. Dedicated staff at ECMWF provides basic support in the form of self-help facilities (FAQs, knowledge bases, tutorials etc.) as well as individualised support on technical queries related to the CDS, data formats, data access etc. In addition, ECMWF staff provide specialised scientific support to address questions related to its industrial contributions to C3S, e.g. in the areas of global reanalysis and seasonal forecasting.

All C3S contractors are expected to contribute to the delivery of multi-tiered technical support for the data and/or services they provide. The successful bidder shall:

- Provide Level-2 support through:
    - The Jira ticketing system with agreed KPIs (for example, 85% of Level-2 tickets should be resolved within 15-working days). The contractor shall provide an email address which acts as the single contact point to resolve issues for all ECVs within a lot.
    - Through the user forum (http://copernicus-support.ecmwf.int/forum) by monitoring topics and providing responses.
- Transfer knowledge to user support by making contributions to the knowledge base. This may include user documentation and FAQs. Such documentation should be available in HTML format.

ECMWF may develop new channels for improvement of the user support function. The contractor will be communicated in advance where their involvement is required.

Climate Intelligence: C3S provides, within its Climate Intelligence activities, information and knowledge products based on the data held in the CDS. Upon demonstrated maturity of the ECV as an indicator of long term changes in climate, the successful bidder shall contribute with products and interpretation derived from the appropriate dataset in the CDS for the annual European State of the Climate.

User engagement: Prospective bidders should propose appropriate materials that will support end users in understanding and using the data products. The materials should be appropriate to the ECVs they are generating. The package may include (but is not limited to):

- Tutorials in document or multimedia form that explain the characteristics of the product(s) and the relevance to climate change;
- Documents describing existing use cases where the datasets (or similar versions) are currently being used;

- Contributions with content specific input to user-oriented communication material such as slides, story maps and user testimonials.

The above list is exemplary and the tenderer is encouraged to propose the most suitable forms of user engagement.

2.5   Schedule of deliverables

Deliverables to be provided by the contractor include:

- Technical /scientific deliverables associated with the CDRs and which help users select and use datasets appropriate for their needs;
- Cross-cutting deliverables that analyse the compliance of the datasets with agreed specifications, and that provide general information or support to the C3S ECV programme;
- Deliverables that directly support users by providing tutorials or examples of dataset users or that respond to specific issues or questions;
- Management deliverables aimed at tracking the progress of the work and ensuring configuration control of datasets and their associated documentation (see section 2.7).

The technical / scientific deliverables to be provided (WP1 & WP2) are summarised in the table below:

Deliverable name	Deliverable id	Contents / Purpose	Primary Audience	Release schedule	Attached to
Preliminary Dataset Documentation Package (PDDP)	WP1-PDDP-ECV-[SENSOR/SATELLITE/algorithm]-[version]	**dATBD:** To describe the algorithms to be used in sufficient detail that ECMC can assess their suitability and agree commencement of the production of the dataset. **PQAD:** To describe the methodology and reference data to be used to assess the quality of the ECV dataset	ECMWF	Per major product release (including reprocessing)	Dataset
Dataset Registration (DR)	WP2-DR-ECV-[SENSOR/SATELLITE/algorithm]-[version]	To specify all the information needed about the dataset to enable its integration into the CDS	ECMWF	Per major product release (including reprocessing)	Dataset
Final Dataset & Documentation Package (FDDP)	WP2-FDDP-ECV-[SENSOR/SATELLITE/algorithm]-[version]	**ATBD:** To describe the algorithms used to generate the ECVs in sufficient detail to allow informed users to understand the applicability of the resulting products for their needs. **PQAR:** To describe the results of the quality assessment described in the PQAD.	Dataset users	Per major product release (including reprocessing)	Dataset

Deliverable name	Deliverable id	Contents / Purpose	Primary Audience	Release schedule	Attached to
		PUGS: A user guide for the dataset allowing users to understand the essential characteristics of the data, its applicability and how to access it. Can reference the ATBD and PQAR for more details

ECV data product: the CDR associated to this package. Note that for brokered dataset the delivery of associated documents may simply be a link to the source documentation. | | | |
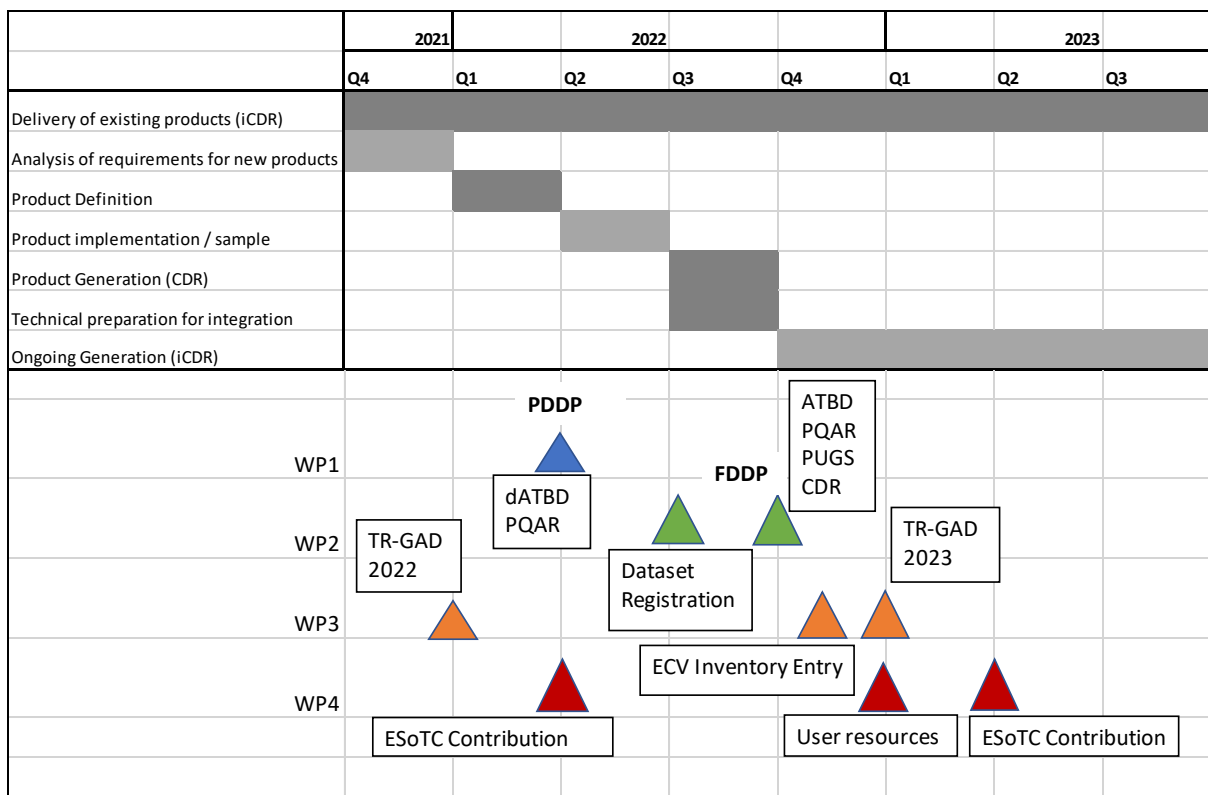| **Interim Climate Data Record (ICDR)** | WP2-ICDR-ECV-[SENSOR/SATELLITE/algorithm]-[version] | Temporal extension of a CDR, using the baseline algorithm of the associated CDR | Dataset users | Ongoing (tenderer should specify the frequency of delivery) | dataset |

The cross-cutting technical deliverables (WP3) to be provided are as follows.

Deliverable name	Deliverable id	Contents / Purpose	Primary Audience	Release schedule	Attached to
Target Requirements / Gap Analysis Document	WP3-TR/GAD-ECV	To provide an overview of the target requirements for an ECV, the current state of performance in meeting those requirements, and a roadmap of future actions to improve performance	General	Annual	Individual ECVs
SQAD	WP3-SQAD	To demonstrate the quality, reliability and sustainability of the production system used to generate the ECV datasets	ECMWF	Per major product release	Group of coherent ECVs
EQC contribution	WP3-EQC-ECV	To accommodate and present quality assurance information about product definition, quality and usability. This information is homogenized across all dataset categories. Only selected fields in the QAT are to be filled by the data provider.	EQC evaluators / Dataset users	Per major product release / Annual update	Dataset or family of datasets
ECV Inventory Entry	WP3-inv-ECV	For each ECV product, input for the ECV Inventory maintained by the CEOS/CGMS WG Climate	General	Annual	Individual ECVs

The user support deliverables to be provided (WP4) are as follows:

Deliverable name	Deliverable id	Contents / Purpose	Primary Audience	Release schedule
User Support	WP4-US	Specialised user support via the C3S Service Desk – To respond to user support queries requiring expertise specific to the ECV products provided	Dataset Users	Ongoing, reported quarterly in the Quarterly Implementation Report (QIR)
ESoTC contribution	WP4-ESOTC	Specific data summary extracts, commentary and interpretation from selected datasets chosen to be represented in the European State of the Climate report.	Dataset Users	Q1 of each year
User resources	WP4-UR	To support users in understanding and using the datasets by providing examples, tutorials or other related material	Dataset Users	To be defined by the contractor and agreed during negotiation

Contractors should propose a schedule of activities that best enables the efficient update and improvement of new products based upon advances in algorithms and on the input observations available. The nominal pattern of activities for any given ECV family is shown below but contractors should adapt this schedule to the specific circumstances of each lot. This example shows an **indicative** schedule of a major product update.

2.6   Data access via the CDS

The CDS has been designed as a distributed system that provides access to datasets and tools through a unified web interface. A general description of the design and functionality can be found in Raoult et al.

(2017). The contractor shall provide the data in a way that is compatible with the working practice of the CDS, but this is not limited to the data format and standard but covers also metadata and documentation.

2.6.1 Dataset registration

Dataset suppliers to the CDS shall provide a comprehensive description of their datasets at least two months prior to delivery, using a dataset registration process established by ECMWF. The corresponding deliverable (DR) is part of the WP2 group of deliverables. Contractors will be required to submit details of the products to be generated, including the temporal scope, input data to be used and summary metadata for the products, as well as to maintain details of the scientific documentation related to the products. Exact details of the registration process, which serves to collect all CDS relevant information (to define metadata, landing page user forms and necessary adaptors), will be provided to the preferred bidder during negotiation.

2.6.2 Access methods

Data access to CDRs, ICDRs and documentation can be implemented in the CDS distributed infrastructure either by:

(a) **Push mode:** uploading datasets to a designated ECMWF CDS server.
(b) **Pull mode:** providing datasets via web services.

ECMWF has a strong preference for push mode. In case pull mode is implemented, the contractor shall ensure that the data products are stored in one or more EU members countries. The contractor is responsible for storing the data for at least 6 years after the contract has come to an end.

The bidder is encouraged to distribute the data in non-proprietary file format (NetCDF, csv, shape files, etc.) provided through a web service and accessible by simple commands like wget. The "*ECMWF metadata recommendations for NetCDF*" document, available at https://confluence.ecmwf.int/x/9IsjDQ, provides recommendations for encoding the datasets in NetCDF. Requests for access to those web services will originate from the CDS, as part of a workflow run on behalf of an end-user. ECMWF will therefore need to have the necessary credentials to invoke these services. ECMWF will not provide information on the end user's identity when invoking the web services, nevertheless it will collect usage statistics for all aspects of C3S.

2.6.3 Publication of Data Catalogue Entries

The main result of the data integration and data publication processes is a Data Catalogue Entry. Data suppliers shall contribute to those processes. A Data Catalogue Entry is a hypertext document providing access to a collection of data or datasets. Typically, the entry has its own Digital Object Identifier (DOI) and citation (which can differ from the DOIs and citations associated with the underlying data or datasets).

Data Integration Process: The data integration process is a machine oriented process designed to automatically produce Data Catalogue Entries. This requires that the information about the data and the associated documentation is described using machine parseable files provided in json, yaml, csv, or other machine parseable format enabling CDS scripts to automatically generate a Data Catalogue Entry. Therefore, in addition to data and associated documentation, the contractor shall also provide a machine parseable description of the data and associated documents. This could, for instance, be through a manifest file which lists of all web addresses to the files of the dataset that will be used to fetch the data.

Data Publication Process: The data publication process is a human oriented process designed to assess, verify and control whether the result of the data integration process matches, a) what was contractually defined to be delivered in terms of data and documentation through the CDS at a specific time (this requires human readable information about deliveries of data and documentation), b) the CDS policies and the agreements made between the data providers and ECMWF concerning the final look and feel of the catalogue

entries. The data publication process follows a procedure similar (but not identical) to the publication of an article in a scientific journal.

Therefore, to publish a dataset in the CDS the contractor shall supply information and collaborate with the CDS team with three different types of contributions:

1. delivering the data and the documents to be served through the catalogue;

2. providing the information needed to describe the product characteristics (dataset metadata, information to complete the catalogue entry, etc.). The contribution (DR) will be carried out either in document format or in an evolving CMS provided by ECMWF;

3. collaborating with the CDS to run the integration and publication processes.

The following link provides more detailed information on the integration of a dataset in the CDS catalogue: https://confluence.ecmwf.int/display/COPSRV/How+to+integrate+a+dataset+into+the+CDS+Catalogue

2.6.4   Deprecation and replacement of datasets

During the course of the contract, some data published in a catalogue entry may have to be deprecated and replaced, for instance due to the identification of an anomaly in a data product. The CDS will tag the data as deprecated. However, the CDS and the contractor will ensure access to the deprecated data during a certain period (deprecation period), typically one year, along side the new data replacing the deprecated one. The deprecation period will provide users the chance to manage the implications of such modifications and to keep the most important scientific imperatives of traceability, reproducibility and accountability for as long as possible. Therefore, data suppliers shall reserve enough resources to keep deprecated data along side the replacement data that can be a single file, or all files concerning a variable, or even the whole dataset.

2.6.5   Data and IPR

It is a condition of EU funding for C3S that ownership of any datasets developed with C3S funding passes from the suppliers to the European Union via ECMWF. Ownership will pass from the date of creation of the datasets. Suppliers will be granted a non-exclusive licence to use the datasets which they have provided to the European Union via ECMWF for any purpose.

All software and products used by the successful Tenderer to produce the C3S datasets will remain the property of the successful Tenderer, except for those components which are acquired or created specifically for C3S purposes, with C3S funding, and which are separable and useable in isolation from the rest of the successful Tenderer's production system. The identity and ownership of such exceptional components will be passed to the European Union annually. The successful Tenderer will be granted a non-exclusive licence to use them for any purpose.

A distinction ought to be made between those datasets (or relating documentation) specifically created as a result of this ITT, which, as Deliverables, will be fully owned by the EU and on the other hand, if pre-existing datasets (or documentation), which are simply brokered / made accessible as part of the services. Such brokered datasets (or documentation) will continue to be owned by their original owner. The successful Tenderer will licence the relevant brokered data/documentation to ECMWF/EU or will procure on behalf of ECMWF a licence directly from the owner. Such licence will ensure the best available terms of accessibility and redistribution, bearing in mind the purpose of the Copernicus Programme and the free and open terms of accessibility and redistribution, established for Copernicus products in the Copernicus Data Regulation. At a minimum, the successful Tenderer shall grant, or procure on behalf of ECMWF, the right for the brokered datasets (or documentation) to be made available via the Climate Data Store (CDS) on terms consistent with any applicable specifications of ECMWF and the Copernicus Data Regulation. The Tenderer will be responsible to provide the license terms to ECMWF in a suitable format in order for ECMWF to make the brokered datasets (or documentation) available via the CDS. The Tenderer will inform ECMWF of any updates

to such terms. In this case, ECMWF is procuring a service, rather than the datasets (or the documentation) themselves.

The proposal shall thus provide a clear distinction between both cases by setting the nature of:

− the datasets (or relating documentation) specifically created as a result of this ITT to "Dataset" or "Report",
− the brokered datasets (or relating documentation) made accessible as part of the service to "Brokerage Dataset" or "Brokered Report".

Please note that, in both cases, the bidder shall warrant that it has all necessary rights to either pass on ownership to the ECMWF/EU or, alternatively, that it has all necessary rights to grant the required license to ECMWF and the EU in respect of brokered datasets (or documentation), as described above. Please refer to the Framework Agreement for further details of the license required.

The source datasets of each ECV product and associated Intellectual Property Rights (IPR) shall, in addition, be detailed as follows in the proposal:

Deliverable name	ECV title	Product title	Version number	Source	Description of IPR on the source dataset (licensing…)
				Brokered from xxx / Produced in house based on datasets from xxx	

Foreseen Assets, Background IPR, Improvements and Brokerage Datasets (as defined in Framework Agreement Clause 3) shall also be described in the proposal.

Detailed contractual terms, including terms to give effect to the arrangements described above, are set out in the terms and conditions for this ITT (Volume V of the ITT documents).

2.7   WP0: Management and Implementation

For each Lot, the Tenderer shall provide a detailed implementation plan of proposed activities for the duration of the Framework Contract (15 or 30 months). It is intended for the Framework Agreement to consist of one Service Contract with a duration of 15 or 30 months, depending on the thematic lot. Before the end of the Service Contract, ECMWF together with other Entrusted Entities responsible for the delivery of the "Copernicus Programme" will assess the status of the ECV-related services and establish the procurement strategy in relation to particular ECVs.

Deliverables should meet the technical requirements specified in Section 2. Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery.

Minor adjustments to the proposed implementation plan can be made on an annual basis depending on needs for service evolution, changed user requirements, or other requirements as agreed between the European Commission and ECMWF. ECV-related Copernicus services have now entered an operational phase and timely delivery of services is essential. The Tenderer shall therefore **ensure that the due dates of deliverables and milestones are realistic and achievable.**

The following management aspects shall be described in the proposal: quality assurance and control, communication management (ECMWF, stakeholders, internal communication), conflict resolution, subcontractor management, personal data management (i.e. how this meets the requirements of Clause 2.8 and Annex 6 of the Volume V Framework Agreement) and risk assessment and mitigation plans.

A list of subcontractors describing their contribution and key personnel, legal name and address shall be provided. The Tenderer shall describe how the Framework Agreement, in particular Clause 2.9 (Sub-contracting) has been flowed down to all their subcontractors.

As part of the general project management description, the Tenderer shall include the following elements:

- Contractual obligations as described in the Framework Agreement Clauses (Reporting).
- Quarterly teleconferences with ECMWF and a proposal for involvement of ECMWF in major project reviews.
- Proposal for payment milestones (linked to major project reviews/milestones). Payment milestones should relate to the deliverables and milestones delivered under the corresponding payment milestone period, i.e. the payment covering period January-June would only relate to the deliverables and milestones delivered under the same period.

2.7.1 Key performance indicators

Contractors shall report to ECMWF on a set of Key Performance Indicators (KPIs) suitable for monitoring of the following aspects of service performance:

- Data quality (accuracy, stability, quality, coverage)
- Service delivery
- Contract management
- User support

The tables below provide examples of KPIs that may be used by the tenderer, along with examples of performance targets, delivery schedules and explanations. The contractor may propose additional KPIs suitable for their specific ECVs.

All KPIs shall be labelled and numbered as indicated. All KPIs shall be updated and reviewed quarterly in the Quarterly Implementation Report (QIR) as described in the tables below. Tenderers shall provide preliminary versions of the completed tables as part of their bid. Note that KPI.U1, KPI.C1 and KPI.C2 must be included in the tables below.

Data quality KPI #	KPI Title	Performance Target and Unit of Measure	Frequency of Delivery	Explanations / Comments
KPI.D1.1	*Accuracy* ECV Product #1 In latest Quarter	According to Target Requirements (TRs)	Per major product release	TRs can evolve over time
KPI.D1.2	*Stability* ECV Product #1 In latest Quarter	According to TRs	Per major product release	….
KPI.D2	….	….	….	….
KPI.D3	ECV coverage with daily observations	….	Annually	….
…..	….	….	….	….

Service delivery KPI #	KPI Title	Performance Target and Unit of Measure	Frequency of Delivery	Explanations / Comments
KPI.S1.1	CDR Product Timelines In latest quarter	Percentage (guideline 100%) delivered on time	Quarterly	….
KPI.S1.2	ICDR Product Timelines Fraction delivered on time In latest Quarter	Percentage (guideline 90%) delivered on time	Quarterly	….
KPI.S2	Number of QA-Checked products In latest Quarter	Percentage (guideline 95%) checked	Quarterly	Checks on completeness, reasonable values, format, …

User support KPI #	KPI Title	Performance Target and Unit of Measure	Frequency of Delivery	Explanations / Comments
KPI.U1	User Support ticket response in latest Quarter	85% within 3 working weeks	Quarterly	Resolve user issue

Contract management KPI #	KPI Title	Performance Target and Unit of Measure	Frequency of Delivery	Explanations / Comments
KPI.C1	Deliverables delivered on time during last Quarter	100%	Quarterly	….
KPI.C2	Number of achieved deliverables relative to the number due so far	100%	Quarterly	….

2.7.2 Cross-CDR Working Group

ECMWF has a well-established Cross-CDR (X-CDR) Working Group in order to:

- Ensure that all Tenderers are fully informed of C3S developments and requirements;
- Share information among the different Lots;
- Identify common requirements and technical specifications for ECV product generation;
- Share expertise and lessons-learnt to avoid duplication of work;

The Service Manager of each Lot shall participate in this group.

2.7.3 Deliverables and milestones

The tables below and in section 2.5 (Schedule of deliverables) provide guidance to be used by the contractor to describe the complete list of deliverables, milestones and schedules for this work package. All milestones and deliverables shall be numbered as indicated. When defining deliverables please consolidate their numbers ideally against one deadline aligned with the proposed payment milestone, where possible. All contract reports shall be produced in English. The quality of reports and deliverables shall be equivalent to

the standard of peer-reviewed publications and practice. Unless otherwise specified in the contract, deliverables in WP0 shall be made available to ECMWF in Word or Excel (for Financial Tables) format to help during the review process and PDF the latest approved document via the Copernicus Deliverables Repository system or if explicitly requested via email.

Each Deliverable shall have an associated resource allocation (person-months and financial budget, resource type: payroll only). The total of these allocated resources shall amount to the requested budget associated with payroll (Please see Volume IIIA Template - Pricing and deliverables).

Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery. They should not duplicate deliverables. All document deliverables shall be periodically updated and versioned as described in the tables. Tenderers shall provide list of Deliverables and Milestones as part of their bid.

ECV-related Copernicus services have now entered an operational phase and timely delivery of services is essential. The Tenderer shall therefore ensure that the proposed due dates of deliverables and milestones are realistic and achievable, i.e. the Tenderer shall consider dependencies, the source of original data and assess the risk accordingly.

WP0 CONTRACTUAL OBLIGATIONS TEMPLATE

#	Responsible	Nature	Title	Due
WP0-QIR1-YYYY, WP0-QIR2-YYYY, WP0-QIR3-YYYY, WP0-QIR4-YYYY	Tenderer	Report	Quarterly Implementation Report QQ YYYY *QQ YYYY being the previous quarter*	Quarterly on 15/01, 15/04, 15/07 and 15/10
WP0-PFI-YYYY	Tenderer	Other	Preliminary financial information YYYY *YYYY being the Year n-1*	Annually on 15/01
WP0- AIR-YYYY	Tenderer	Report	Annual Implementation Report YYYY *YYYY being the Year n-1*	Annually on 28/02
WP0- FR	Tenderer	Report	Final report	60 days after end of contract
WP0- DIP-YYYY	Tenderer	Report	Draft Implementation plan YYYY *YYYY being the Year n+1*	Annually on 28/02
WP0- IP -YYYY	Tenderer	Report	Finalised Implementation plan YYYY *YYYY being the Year n+1*	Annually on 31/10
WP0-FS-YYYY	Tenderer	Other	Copy of prime contractor's general financial statements and audit report YYYY *YYYY being the Year n-1*	Annually

WP0 MILESTONES TEMPLATE

#	Responsible	Title	Means of verification	Due
WP0-KO	Tenderer	Kick-Off meeting	Minutes of meeting	Month 1
WP0-XCDR-RM *(*)*	Tenderer	X-CDR meetings (teleconferences with ECMWF) / Quarterly Review Meeting	Attendance to the X-CDR meeting	Quarterly or as required
WP0-PMx	Tenderer	Payment milestone x (where x is number of payment milestone)		As required
WP0-SRR	Tenderer	System Readiness Review meeting with ECMWF	Minutes of meeting	Annually

(*) The contractor will participate in a quarterly review meeting with ECMWF dedicated to the specific lot (contract) , which will be alternated with the general X-CDR meetings during which all contractors contributing to ECV products will meet together (please also see section 2.6.2). The exact structure and schedule of the X-CDR/review meetings will be communicated at the beginning of the contract.

3 Tender Format and Content

General guidelines for the tender are described in Volume IIIB. This section describes specific requirements to prepare the proposal for this particular tender, along with guidelines for minimum content expected to be included in the proposal, additional to the content described in the general guidelines of Volume IIIB. This is not an exhaustive description and additional information may be necessary depending on the Tenderer's response.

3.1 Page limits

As a guideline, it is expected that individual sections of the Tenderer's response do not exceed the page limits listed below. These are advisory limits and should be followed wherever possible, to avoid excessive or wordy responses.

Section	Page Limit
Executive Summary	2
Track Record	2 (for general) and 2 (per entity)
Quality of Resources to be Deployed	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
Technical Solution Proposed	20 (Table 2 in Volume IIIB, the section on references, publications, patents and any background IP is excluded from the page limit and has no page limit)
Management and Implementation	6 (excluding Table 4 and Table 5 in Volume IIIB) + 2 per each work package description (Table 3 in Volume IIIB)
Pricing Table	No limitation

Table 2: Page limits

3.2 Executive Summary

The Tenderer shall provide an executive summary of the proposal, describing the objectives, team and service level.

3.3 Track Record

The Tenderer shall demonstrate for itself and for any proposed subcontractors that they have experience with relevant projects in the public or private sector at national or international level. ECMWF may ask for evidence of performance in the form of certificates issued or countersigned by the competent authority.

3.4 Quality of Resources to be Deployed

The Tenderer shall propose a team providing the skills required for providing operational services that meet the technical requirements set out in Section 2. The team shall include a Service Manager with at least 5 years of experience in management of large-scale projects. The Tenderer shall describe the experience of the Service Manager and the technical project team in performing activities related to the various aspects of this tender.

3.5 Technical Solution Proposed

The Tenderer shall give a short background to the proposed solution to demonstrate understanding of the state-of-the-art in the C3S context and hence justify their proposed solution. The description of the technical solution shall include:

- A review the current provision of (I)CDRs within the CDS and their performance against requirements (e.g. from existing TR-GADs developed during C3S_312b contracts and/or with reference to GCOS requirements, GCOS-IP 2016)
- Identify those CDRs which are meeting requirements (or are close) and propose to continue the time series as-is
- Identify those where the bidders can make significant improvements and propose updates to the processing (or where new data is available)
- Identify those that should not continue to be developed for justified reasons (e.g. no data source, poor performance, complete state-of-the-art data set already available in the CDS).
- Identify those products that can be consolidated (e.g. where several different products are provided for one ECV).

The Tenderer shall present an analysis of fitness for purpose of each CDR (in terms of quality, uniqueness, etc.) and present options in line with the available budget. Where brokered ECV products are proposed as part of the technical solution, their inclusion shall be justified and the agreement of the third-party supplier shall be detailed.

This section shall also provide a statement of compliance for each requirement formulated throughout this document, describing how the proposed solution maps to the requirements. Additionally, where equivalent data products are also available through other Copernicus services or major research programmes, the bidder should detail the differences that justifies the production in C3S.

4 Additional information

4.1 References

GCOS-SR 2015: Status of the Global Observing System for Climate. GCOS-195. Available at https://library.wmo.int/doc_num.php?explnum_id=7213

GCOS-IP 2016: GCOS Implementation Plan 2016. GCOS-200. Available at https://library.wmo.int/opac/doc_num.php?explnum_id=3417

Raoult, B., C. Bergeron, A. López Alós, J-N. Thépaut, D. Dee, 2017: Climate service develops user-friendly data store. ECMWF Newsletter No. 151, 22-27. Available at https://www.ecmwf.int/sites/default/files/elibrary/2017/17181-newsletter-no-151-spring-2017.pdf

4.2 Acronyms

ATBD	Algorithm Theoretical Basis Document
API	Application Programming Interface
CCI	Climate Change Initiative
CDR	Climate Data Record
CDS	Climate Data Store
CMS	Content Management System
C3S	Copernicus Climate Change Service
CUS	Copernicus User Support
DR	Dataset Registration
ECMWF	European Centre for Medium-Range Weather Forecasts
ECV	Essential Climate Variable
EQC	Evaluation & Quality Control
ESOTC	European State of The Climate
EU	European Union

FAQ	Frequently Asked Questions
FDDP	Final Dataset & Documentation Package
GCOS	Global Climate Observing System
GCOS-IP	GCOS Implementation Plan
GCOS-SR	GCOS Status Report
GRIB	General Regularly-distributed Information in Binary form
HTML	Hyper Text Markup Language
ICDR	Interim Climate Data Record
ITT	Invitation to tender
JSON	JavaScript Object Notation
KPI	Key Performance Indicator
NetCDF	Network Common Data Form
NetCDF CF	NetCDF Climate and Forecast metadata conventions
PDDP	Preliminary Dataset Documentation Package
PDF	Portable Document Format
PQAD	Product Quality Assurance Document
PQAR	Product Quality Assessment Report
PUGS	Product User Guide and Specification
QAT	Quality Assurance Template
QIR	Quarterly Implementation Report
SQAD	System Quality Assurance Document
TR-GAD	Target Requirement – Gap Analysis Document
UR	User Resources
WMO	World Meteorological Organisation
WP	Work Package

Appendix 1

Quality Assurance Template for Satellite ECVs

<table>
<tr><td colspan="3" style="background-color:#8B0000; color:white;">INTRODUCTION</td></tr>
<tr><td colspan="3" style="background-color:#5a7684; color:white;">DATASET OVERVIEW</td></tr>
<tr><td>Dataset name*</td><td>Free text</td><td>According to selection in CDS catalogue, in future it might become a drop-down box</td></tr>
<tr><td>Data format*</td><td>Drop-down box of GRIB; NetCDF-4, NetCDF-3, ASCII, csv, txt, HDF, other (with area to write their other option)

(Allow multiple options to be selected, data can come in a few formats)</td><td></td></tr>
<tr><td>Physical Quantity Name*</td><td>Free text</td><td>There is a table on the CDS website overview tab containing this information, if possible feed automatically here with value reported there, otherwise it will be free text</td></tr>
<tr><td>Physical Quantity Unit*</td><td>Free text</td><td>There is a table on the CDS website overview tab containing this information, if possible feed automatically here with value reported there, otherwise it will be free text</td></tr>
<tr><td>Definition of physical quantity</td><td>Free text</td><td>There is a table on the CDS website overview tab containing This information, if possible feed automatically here with value reported there, otherwise it will be free text</td></tr>
<tr><td>Summary description of the dataset (max 200 words limit)</td><td>Free text</td><td></td></tr>
<tr><td>How to cite this product?</td><td>Free text</td><td></td></tr>
<tr><td>Product type</td><td>Drop-down list of: climate projections, reanalysis, satellite observations, seasonal forecasts, in-situ observations, sectoral climate indices, other

(with area to write their other option)</td><td>If data already in the CDS, possibly take it automatically from the CDS portal left bar</td></tr>
<tr><td>Product type description</td><td>Free text</td><td>Description of product type defined in the previous row, if it is not in the common vocabulary, then free text</td></tr>
<tr><td>Variable domain</td><td>Drop-down list of: atmosphere (composition),</td><td>If data already in the CDS, possibly take it automatically from the CDS portal left bar</td></tr>
</table>

	atmosphere (surface), atmosphere (upper air), land (biosphere), land (cryosphere), land (hydrology), ocean (physics), other(with area to write their other option)	
Main spectral regions of interest	Drop down list of : Microwave, Infrared, Near-infrared, Thermal infrared, Visible, UV, Other.	
Spectral band covered	Free text	
Remote sensing technique	Drop down list of : Active, passive or combined	
Platform	Free text	
Orbit type	Free text	
Sensor	Free text	
Sensor type	Free text	

TEMPORAL AND SPATIAL COVERAGE AND RESOLUTION

Temporal coverage	Drop-down list of: past, present, future (Allow multiple options to be selected)	If data already in the CDS, possibly take it automatically from the CDS portal left bar
Record start date*	Date	
Record end date*	Date (Also tick-box option for "ongoing")	
Temporal resolution*	Free text	E.g. monthly, daily, hourly. It will become a drop-down list in future
Spatial coverage	Drop-down list of: Global, Europe, North America, South America, Australasia, Asia, Africa, Global land mass, Global oceans, Global except polar regions, polar regions, other (with area to write their other option)	If dataset already in the CDS, possibly take it automatically from the CDS portal left bar
Horizontal coverage* (degrees)	Free text	Lat/lon degrees
Vertical coverage*	Free text	E.g. troposphere, stratosphere. It will become a drop-down list in future
Horizontal resolution*	Free text (when possible in degrees)	

Vertical resolution*	Free text	
Grid description*	Free text	
Coordinate system	Free text	
Description of any gaps in spatial and temporal coverage	Free text	

PROVIDERS

Organisation*	Free text	
Point of contact*	Free text (name@organization.eu)	In the end it might be just C3S, for the moment we keep the contact of the provider
Broker	Y/N	Specify if a brokering component schedules and forwards data and compute requests to an appropriate data repository or compute layer

DATASET VERSION

Version*		Free text	
Has the dataset DOI associated?		Y/N	
If yes ->	Report DOI	Free text	
Processing level*		Free text	The description of processing level is provided in the common vocabulary (e.g. level 2 data)

RECORD UPDATE

Product status*		Drop-down box with these fields: operational, completed, experimental, in development or OTHER (with area to write their other option)	
Date product last update*		Date	
Date product made available*		Date	
Is there a future update planned?			
If yes ->	please define future update plan	Free text	
If no ->	please state why no future update planned	Free text	

USER DOCUMENTATION

DATASET DESCRIPTION

Is there a product user guide (PUG)?*	Y/N		
If yes ->	Link to PUG:	Title + link + contact point + free text box (in case of multiple PUGs)	
If yes ->	Date PUG last updated	Date	
Quality Flags available for dataset?		Y/N	
If yes ->	Flag names	Free text	
If yes ->	Flag descriptions (100 words)	Free text ["Describe the purpose of the flag, how it was derived and how it should be used"]	
If yes ->	Flag derivation justifications and references (100 words)	Free text	
If yes ->	link to documentation of Quality Flags	Free text	
Is cloud masking applied to measurement (input) data?		Y/N	
If yes ->	Describe method used	Free text	
If yes ->	Give justification for method used	Free text	

SCIENTIFIC METHODOLOGY

Is there a documentation describing processing of dataset?*	Y/N	E.g. Algorithm Theoretical Basis Document (ATBD), or any equivalent document describing the product generation	
If yes ->	Link to documentation	Link(s)	
Short description of the Algorithm (max 200 words)	Free text	Short description of processing algorithm used in the product retrieval, including key assumptions and main processing steps	
Is there a product Traceability Chain (TC)?	Y/N		
If yes->	Link to documentation	Link	

UNCERTAINTY QUANTIFICATION

Has an uncertainty characterization been completed?*		Y/N		
If yes ->	Uncertainty Characterization Report	Link(s)		
If yes ->	Description of uncertainty analysis (200 words)	Free text		
Global Uncertainty*		Free text	Include values/ranges and units of total uncertainty, resulting from the characterization of all estimated uncertainty contributions, with spatial and temporal ranges to which total uncertainty refers.	
Summary justification		Free text	Justify the above values (e.g. combination method or formula of the different uncertainty contributions)	

VALIDATION

Is there a validation report?		Y/N	
If yes ->	Link to key references or documents related to the product validation performed by the product producer or others.	Link(s) (multiple links can be added)	

INTER-COMPARISON

Has an inter-comparison activity been completed for this product version?		Y/N	
If yes ->	Link to key references or documents related to inter-comparison activities performed by the product producer or others.	Link(s) (multiple links can be added)	

ACCESS

DOWNLOADING

Which services are available for this dataset?	Free text	Subsetting, ftp, ….

TOOLBOX COMPATIBILITY

	Is the dataset compatible with the toolbox?	Y/N
If no ->	Please specify the reason	Free text

ARCHIVE

	Is the dataset completely in CDS or not?	Y/N
If no ->	Is (part of) it available somewhere else?	Free text
	Is (part of) the code of processing algorithm/model available?	Y/N
If yes ->	Description	Free text (short description of the code and language)
If yes ->	Access location	Link or website URL
If yes ->	Code License	Free text