ECMWF Copernicus Procurement

Invitation to Tender

Copernicus Climate Change Service

Maintenance and Evolution of the European Climate Data Explorer

Volume II: Specification of Requirements

ITT Ref: C3S2_430a_bis
ISSUED BY: ECMWF Administration Department Procurement Section
Date: 15 April 2026
Version: Final

Funded by the European Union

Implemented by ECMWF

Table of Contents

1 Introduction

Copernicus is the European Union's flagship Earth-observation programme created to achieve operational monitoring of the atmosphere, oceans, and continental surfaces. It aims to provide reliable, validated information services for a range of environmental and security applications. The Copernicus Climate Change Service (C3S) responds to environmental and societal challenges associated with climate change. The service gives access to information for monitoring and predicting climate change and thus helps support adaptation and mitigation. C3S produces and brokers a wide range of data and products describing the past, present, and future of the climate system. This includes global and regional reanalysis, Essential Climate Variables (ECVs), near-term climate predictions, climate projections and a variety of sectoral climate information. The data are offered to users through the C3S Climate Data Store (CDS) and the Atmosphere Data Store (ADS).

2 Context

During the initial phase of Copernicus (COP1), C3S focused on meeting the requirements of various sector-specific activities. Through the Sectoral Information System (SIS) initiatives, C3S catered to the needs of users across different sectors, serving not only Europe but also extending its support to a global user base. This involved providing tailored climate-related information and services that were valuable and relevant to users in diverse fields and regions, ensuring a broader reach and impact beyond Europe's borders. During COP1, ECMWF and EEA signed an MOU to enhance the working relationship and included activities to provide climate hazard information to the European Environment Agency's[1] Climate Adapt Portal[2]. Climate-ADAPT is the European Climate Adaptation Platform, a partnership between the European Commission and the European Environment Agency (EEA). It acts as a comprehensive knowledge-sharing portal designed to help policymakers and experts access data, case studies, and tools to build climate resilience across Europe.

The European Climate Data Explorer (ECDE) is a key climate-information platform jointly operated by the Copernicus Climate Change Service (C3S) and the European Environment Agency (EEA). It serves as a bridge between high-quality climate data in the Climate Data Store (CDS) and the needs of European climate-adaptation practitioners.

During COP2, a second activity was procured by ECMWF to further develop the ECDE and, importantly, update the application interface to align with the modernisation of the infrastructure that is utilised by C3S in addition to producing and publishing new datasets to address gaps. This modernisation allowed the ECDE to provide easier, user-friendly access to Sectoral Climate Impact Indicators (SCIIs)—datasets and visual tools from C3S to support governments, planners, and organisations assess climate hazards across Europe.

2.1 The Climate Data Store (CDS)

The backbone of the C3S is the cloud-based CDS (https://cds.climate.copernicus.eu/) that provides users with a single point of access to quality assured climate and meteorology data. The datasets may be stored in different data centres worldwide or in remote servers, but this complexity is transparent to CDS users. C3S data is offered with open access and is free to use under the Copernicus data licence. Data are properly documented and enriched by appropriate quality attributes provided by the EQC (Evaluation & Quality Control). All CDS data and tools are accessible from the C3S website as well as via open Application Programming Interfaces (APIs).

The CDS data catalogue provides access to climate datasets via a searchable catalogue. Categories of data include Climate Data Records (CDRs) and Interim Climate Data Records (ICDRs), quality-controlled archives

[1] https://www.eea.europa.eu/en

[2] https://climate-adapt.eea.europa.eu/en

of in-situ climate observations, reprocessed satellite data records, data from climate reanalysis, seasonal forecasts, climate model simulations, and a variety of derived climate impact indicators. Multiple datasets are available in each category, e.g., for the majority of Global Climate Observing System (GCOS) Essential Climate Variables (ECVs), on global or regional domains, with varying spatial resolutions and temporal coverage, from different data providers, based on different methodologies, etc. Several entry catalogues are relevant in the context of this tender, including: Global and regional reanalysis, CMIP6 global and CORDEX regional climate model data, climate projection dataset underpinning the C3S Climate Atlas, Climate indicators for Europe derived from reanalysis and climate projections. Additionally, the CDS shares an API with the Atmosphere Data Store (ADS), hence all the CAMS datasets can be accessed in a single workflow, succinctly.

2.2 earthkit

earthkit is an open-source python (https://earthkit.ecmwf.int) project led by ECMWF, providing powerful and easy-to-use tools for working with Earth system data. Earthkit is designed to accelerate weather and climate science workflows by simplifying tasks such as data access, processing, analysis, and visualisation. It offers a modular suite of interoperable components built on trusted Python libraries such as NumPy, Xarray, and Matplotlib, while also integrating smoothly with ECMWF's operational software stack and the wider scientific Python ecosystem. Earthkit provides easy access to ECMWF data services including CDS and ADS datasets, along with a range of tools to process, analyse and visualise them. The development design of earthkit is modular and open source to encourage contributions from the wider community and contracted partners. The packages are well documented and available for the whole world to use. Introductory documentation is available in the following link https://earthkit.readthedocs.io/en/latest/index.html.

3 Technical requirements

3.1 Scope of service

This ITT aims to maintain and further develop the European Climate Data Explorer[3] (ECDE) service to provide the Climate-ADAPT and C3S user communities access to additional relevant climate information, whilst addressing the needs of key users in the assessment of climate change impacts across Europe. As a starting point this will be achieved by ensuring operational access to high priority indicators as identified by the EEA.

At present, the ECDE is based on the datasets published in the C3S Climate Data Store (CDS), earthkit workflows, and the application is hosted on the ECMWF infrastructure, and published in the EEA's Climate-ADAPT platform and in the Copernicus Data Stores Applications Catalogue[4]. The Successful Tenderer will ensure the current ECDE service is 1) maintained, 2) periodically updated to reflect emerging requirements related to a) application functionality, and b) workflows as new datasets become accessible in the Climate Data Store (for example, new ERA6 reanalysis, updated CORDEX, …).

The current version of the ECDE is underpinned by a dedicated catalogue entry[5] in the CDS. This entry is designed to support data users. A second catalogue entry, providing access to derived (aggregated and multi-model) products that underpin the European Climate Data Explorer is in preparation (expected to be published in the CDS Q2 2026). This dataset provides a series of climate indicators derived products (anomalies, climatology, ensemble statistics, etc.) that correspond to the post processed data displayed in ECDE visualisation application. It is expected that these datasets will be maintained and

[3] https://climate-adapt.eea.europa.eu/en/knowledge/european-climate-data-explorer

[4] https://apps.climate.copernicus.eu/

[5] https://cds.climate.copernicus.eu/datasets/sis-ecde-climate-indicators?tab=overview

updated throughout the contract in line with the ECDE application.

ECMWF proposes the Agile methodology reported in Annex 4 of the Framework Agreement template included in Volume V of this ITT but welcomes suggestions from the Tenderer on what methodology they propose to apply for the different phases of the project based on their knowledge and experience with projects of a similar nature. The Tenderer must provide examples of how they have applied this approach in similar projects they have previously worked on.

The methodologies proposed by the Tenderer must ensure that final deliverables are fit for purpose, aligned with the project vision and remain within project cost and schedule.

3.1.1 Maintenance of the ECDE

This activity will focus on the management and evolution of the ECDE front end and the brokering of the Climate Impact Indicators that are available from the CDS public catalogue, including those published in the CDS dataset catalogue, or from those derived from bespoke workflows implemented by the incumbent contractor. This contract will continue the development of the service, through the following activities:

1) The Successful Tenderer shall adapt proactively to the emerging user requirements from the EEA, ECMWF and the EC that inform ECDE service evolution. Note that the EEA is responsible for the representation of their Member States, and therefore the requirements should be consolidated via EEA and represent the pan-European needs and aspirations for the development, implementation and monitoring of climate adaptation policies and actions.

2) The Successful Tenderer will ensure quality of all workflows used to publish C3S datasets in the ECDE. The proposal must clearly demonstrate the envisaged internal quality control procedure that will be implemented to maintain the (highest) quality of the workflows and documentation published within the ECDE.

3) The Successful Tenderer will work with the existing support mechanisms in place, specifically Copernicus User Support and Climate-ADAPT teams to ensure seamless user support function for the growing ECDE user community (such as local communities and regions included in various EU programmes, actions and policies). The Successful Tenderer will be required to:

    a) Provide Level-2 support through the Copernicus User Support (operating a Jira ticketing system) with agreed Key Performance Indicators (KPIs; for example, 85% of Level-2 tickets should be resolved within 15-working days). The Successful Tenderer shall provide an email address which acts as the single contact point.
    b) Transfer knowledge to user support by making contributions to the knowledge base. This will include creating and updating user documentation and FAQs (based on user feedback and queries). Such documentation should be available in HTML format.
    c) Provide support to users through the user forum upon request.
    d) Pass relevant user support queries on to EEA as appropriate utilising the Jira channel.

4) All applications developed by the Successful Tenderer will need to be compliant with the standards of the CDS. To be published, an application needs to be scientifically robust, meaningful, UX (user experience) optimised, usable, working and bug free and have undertaken a comprehensive review process.

5) All applications are to be delivered through the ECMWF's Jira system, with the Successful Tenderer or an assigned person in charge of making the publication request and acting as the responsible part to ensure that the material provided is fit for the purpose. The delivery of an application or set of applications does not grant the publication itself. Applications which are aimed to be published via the ECDE interface should have undergone extensive internal review by the Successful Tenderer to ensure delivery of quality applications which are optimised in terms of performance prior to final review and publication by technical teams at ECMWF. This review process will cover many aspects including evaluation of

adequateness of the application in terms of usability, accuracy, description of input and output variables, appearance, coding standards and style, functionality, and scientific quality. The Tenderer shall ensure that a sufficient provision is made to cover this activity.

6) De-bugging and updating existing published workflows, implemented as python scripts, calling libraries developed within the earthkit and data within the CDS.

7) The Successful Tenderer shall systematically monitor published workflows (existing and newly implemented) that underpin the ECDE climate indicators, ensuring that service is not impaired by system changes, and update software to new libraries and environments as appropriate.

3.1.2 Evolution of the ECDE

The Successful Tenderer shall be responsible for the evolution of the ECDE service, which will include:

1) Ensure that annual updates to ECDE (dataset and application) take advantage of the ERA5/6 reanalysis from the previous year. These updates should be completed no later than March the following year.

2) Update the workflows to include ERA 6 and CORDEX 6 data as they become available in the CDS.

3) Ensure synergies with C3S climate projections strategy, which includes activities that periodically updates the C3S Climate Atlas and a future C3S activity to define a reference set of projections for Europe.

4) Broker critical hydrological indicators from C3S Water Service into the ECDE as they become available in the CDS. This is a critical requirement to align the ECDE hydrological indicators with the requirement to update the ECDE indicators on a yearly basis.

5) Define Assessment of the requirement for bias corrected climate projections - including anomalies and absolute values.

6) Ensure consistency and synergies between the ECDE outputs and other ECMWF led C3S activities, notably activities supporting the European Investment Bank, interfaces with the European Integrated Framework for Climate Resilience (EIFCR) and the C3S Climate Atlas, taking advantages, where appropriate, of shared workflows, data selection, methodologies, etc.

7) Support EEA maximise the value of ECDE data and applications throughout the EEA's reporting process. For example, the Successful Tenderer will implement ECDE application updates to allow URL to change map selection. Such a flexible approach will permit ECDE data to be used in many EEA products, allowing users to be guided to appropriate plots, maps and charts.

8) Assess the requirements for the integration of socio-economic data into the ECDE – for example population, land use etc, to ensure alignment with EEA requirements and the role the ECDE plays in supporting climate adaptation users. Note, that C3S will be procuring an activity for the development of ECMWF software components enabling the integration of non-climate data with climate and weather data within downstream workflows. The result of that activity will provide the tools to support such integrations. By using such tools, selected integrations will be delivered in this contract. This contract should ensure that any approach adopted within the ECDE is consistent.

9) Assess requirements, gaps and priorities from high quality climate information to implement climate adaptation policy arising from EEA Member States (via the EEA), and Horizon Europe Activities that support the evolution of Climate Adapt.

10) Support ECMWF contribution to the European Climate Risk Assessment 2 (EUCRA-2). The first European Climate Risk Assessment (EUCRA), published in 2024, is an important part of the evidence base for the integrated framework for European climate resilience and risk management. The EEA has now started work on the second edition (EUCRA-2), due for publication in 2028. EUCRA-2 will strengthen quantitative risk analysis, expand the policy scope, deepen adaptation insights, and increase stakeholder involvement. C3S data, including that from the ECDE will make a valuable contribution to the EUCRA report. Therefore,

the contract needs to assess the requirement and timeframes to support the EUCRA implementation in their planning and respond accordingly.

3.1.3 Common principles

The following principles are common to both sets of activities described 3.1.1 &3.1.2:

1) The Successful Tenderer is responsible for implementing version control and a source code content management system, including management of the repository. This will ensure code is available during and after the contract.

2) For each indicator published in the ECDE, the Successful Tenderer must ensure suitable user guidance (according to agreed templates) is provided. This may include overviews, links to the C3S CDS catalogue entry (or underpinning application workflow) as well any published EQC materials and notebooks. This process may involve harvesting of machine-readable metadata from associated CDS entries.

3) The Successful Tenderer is required to support Copernicus User Engagement activities on training and 'Use Cases'. These activities are aimed to develop, together with the EEA and relevant stakeholders, training materials / modules and use cases to demonstrate the added value of C3S data and the ECDE for the development and implementation of national adaption strategies and plans. It is a requirement that the Successful Tenderer will support the external activities with visualisations, access to code etc.

4) The Successful Tenderer is expected to support ECMWF led communication efforts, providing in advance opportunities for articles, social media posts etc. These may include join communication between ECMWF and the EEA and related to dataset or application updates. The Successful Tenderer may be asked to support with text or graphics (derived from ECDE data).

5) The Successful Tenderer is required to keep abreast of new functionality in the earthkit to implement improvements to ECDE workflows and meet priority user requirements. The Successful Tenderer shall periodically liaise with the ECMWF technical teams to plan and implement priority updates over the duration of the contract.

6) The Tenderer should plan for two updates per year or incremental updates of the ECDE hosted by the EEA. The releases should consider introduction of new Climate Impact Indicators, updated user support resources, documentation and workflows. The Successful Tenderer will be responsible for migration from the test / development environment to the operational infrastructure hosted by the EEA and C3S.

3.2 Specification of work

3.2.1 Work package 1: Data gap analysis and definition of the scope

The Successful Tenderer will engage with the EEA and C3S, to define the requirements for the evolution of the service. The Successful Tenderer will undertake a thorough assessment of current EDCE functionality and emerging user / service requirements and assess how these be met. The requirements gathering process shall determine the priorities of EEA, which must include the identification of the climate, and non-climate data sources and their associated quality. The gap process shall consider the C3S data pipeline as well as 'soon to be available' data in the CDS and current and planned earthkit functionality.

The Successful Tenderer will perform activities that will lead to a systematic and thorough analysis of requirements. The resultant Project Initiation Report shall clearly articulate new data, service and system requirements and provide a considered synthesis of the gathered requirements – leading to a set of functional requirements and finalised work plan for the duration of the contract. The requirements will include elements such as new indicators, new statistics, new functionalities of the applications, different embedding of the information into climate ADAPT, among others. This report shall provide a detailed description of the requirements that shall be considered in this contract, clearly articulating the gap filling

potential. This work package will clearly document how the identified gaps will be bridged within the timeframe of the contract.

Deliverables required:

- A summary report providing an assessment of user requirements from the user engagement activities with ECMWF, EEA and their stakeholders, with key findings outlined in Sections 3.1.1 and 3.1.2. This report will include an analysis of the requirements to define the system and service requirements. The report will clearly define the gaps in current service provision. The Successful Tenderer will also record all gathered requirements in a User Requirement Database (URDB) template (note that the Successful Tenderer is responsible for the recording and analysis of the requirements gathered within this contract). A separate activity (procured outside this tender) is responsible for the management of the URDB. This first version of this report will be completed by month KO+2, with quarterly updates provided thereafter to monitor evolving user requirements.
- At month KO+2 the Successful Tenderer will deliver a Project Initiation Document that clearly outlines the implementation schedule covering the duration of the contract. The Project Initiation Document will include all requirements stated in Volume V Terms and Conditions, clause 2.1 of Annex 4 as well as an assessment of the associated resources, development schedule, reviews, deliverables (which will include climate impact indicators and associated workflows), documentation and user guides, risk identification and management, and acceptance criteria. Where elements of the service require ongoing support (i.e., production of new workflow to implement additional climate impact indicators), the Successful Tenderer will need to determine the feasibility of adding new climate impact indicators and include this in the implementation schedule. The Project Initiation Document should justify which user requirements will be addressed within the duration of the contract and those that can be met by (potential) future developments. To achieve this the Successful Tenderer will need to assess the impact, cost / effort and time required to address the requirements. As with the requirements document, quarterly updates to the Project Plan, developed as part of the Project Initiation Document, are expected to reflect the incorporation of new high priority functionality or climate impact indicators into the ECDE.

3.2.2 Work package 2: Service Maintenance and Service Development

This work package deals with the maintenance and development of the ECDE front end, including the development of workflows to broker the climate impact indicators available from CDS public catalogue into the ECDE, (including those developed in WP3).

An overview of the technical requirements is detailed in 3.1.1. The Successful Tenderer is required to maintain the performance, functionality and useability of the ECDE, including monitoring the ECDE to pro-actively identify issues and maximise user experience.

Using the WP1 'Project Initiation Document' , the Successful Tenderer will develop workflows, and associated documentation, to provide relevant climate impact indicators from the CDS to the ECDE.

Deliverables required:

- At KO + 2, the Successful Tenderer will deliver a Quality assurance procedure that details the internal quality control procedure to ensure all material and information presented in the ECDE is of scientific merit and fit for purpose, having been reviewed and checked internally.
- 'Action and issues' log must be maintained over the duration of the contract to inform all stakeholders of progress, required developments and monitor progress.
- Completion of user material, overviews, and user guides associated with the climate impact indicators and published in the ECDE with new functionality introduced (according to the WP1 Project Initiation Document).
- Support C3S Evaluation and Quality Contract activities (EQC) with their assessment of ECDE application and datasets.

Milestones:

- User Support framework implemented.
- Quarterly design and implementation review meetings with teams ECMWF / EEA to define issues, support and ongoing priorities.

3.2.3 Work Package 3: Prototyping & Indicator Development

According to the Project Initiation Document (WP1 output), the Successful Tenderer will implement and publish scientifically sound and high-quality applications as well as perform those activities defined in section 3.1.1 and 3.1.2.

The Successful Tenderer will also contribute to the development of the ECDE through the publication of identified climate impact indicators that were previously unavailable in the C3S offering.

Deliverables required:

- Updates to the ECDE application and underpinning datasets / libraries / code.
- Product user guides for each application updates and associated workflows.
- Example workflows for any code / libraries developed.

3.2.4 Work package 4: Support and Help Development

The ECDE service (and interface) needs to be supported with excellent quality documentation and support. This work package will ensure ECDE users are provided with all required guidance and relevant technical information.

Deliverables required:

- Periodical but regular updates of the ECDE user manual and general training materials.
- Provide high quality user guides, tutorials and FAQs to support the application published in the CDS and those in the ECDE.
- User oriented materials are to be consistent with requirements of the Copernicus user support team, C3S product user guides providing tools and applications.

4 General requirements

4.1 Implementation Schedule

ECMWF intends to award a single Framework Agreement, with a maximum duration of 24 months, which shall be implemented via a single multi-annual Service Contract, expected to commence in Q4 2026. Tenderers are expected to provide a detailed time plan and schedule as part of the tender response. The proposed time plan and schedule shall address the main tasks, inputs, outputs, intermediate review steps, milestones, deliverables and dates. Regular progress meetings will be held with ECMWF during the contract to assess project status, risks and actions.

4.2 WP0: Management and Coordination

This work package includes overall responsibility for day-to-day service management and coordination. The following contract management aspects shall be considered and as needed briefly described in the proposal:

Meetings:

- Kick off meeting (by videoconference)
- Payment Milestone Progress Review Meetings (by videoconference)
- Monthly technical contract meetings.

- ECMWF organises the annual C3S General Assembly. The Successful Tenderer is expected to attend these meetings with maximum two contract team members and contribute to discussions related to the topic of this ITT.
- In addition, the Successful Tenderer shall participate in one technical collocated meeting per year. This will involve other stakeholders relevant to the ECDE contract - including C3S and relevant collaborators. Additional discussions will be convened at semi-regular intervals and will take place by remote participation.
- **Travel Prices:** Travel prices for physical meetings should be based on the European Commission's calculator[6] [Table 3: Unit cost per distance band for air or combined air/rail travel, Commission Decision C(2024)5405], and consider a daily subsistence allowance not to exceed €300. Travel prices must reflect estimated actual costs and must not include any profit margin. If the proposed travel prices deviate from these reference values, a clear justification must be provided.

Quality assurance and control: the quality of reports and Deliverables shall be equivalent to the standard of peer-reviewed publications. The timely delivery as well as final quality check of the deliverables shall be ensured by the Successful Tenderer (in terms of content, use of ECMWF reporting templates for deliverables and reports (Microsoft Word), format, deliverable numbering and naming, typos…); all reports in this project shall be provided in English. Unless otherwise specified the specific contract Deliverables shall be made available to ECMWF in electronic format, via the relevant deliverable repository system.

Communication management (incl. external and internal communication). Any external communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively, communication planning, branding and visual style, media outreach, website and social media activity, externally facing text and graphical content and events. Agreed activity would also need to be evaluated and reported on once complete so that success measures and KPIs could be provided to the European Commission (cf. Clause 2.4.6 of the Framework Agreement).

Set of Key Performance Indicators (KPIs) suitable for monitor contract performance. The proposed KPIs shall be SMART (specific, measurable, actionable, realistic and time bound). The Successful Tenderer shall report to ECMWF on these KPIs as part of the Quarterly and Annual Implementation Reports. The proposed set of KPIs may need to be updated regularly with ECMWF during the contract. The template to be used by the Tenderers to describe the KPIs is included in Volume IIIB of the ITT "Template for Tenderers". Further details are provided in Section 4.4 of this document.

Risk Management: The proposal shall include a risk register that describes identified risks for each work package, along with a mitigation strategy for each of the identified risks. This mitigation strategy shall be composed by both preventive and corrective measures. The risk register shall be updated regularly by the Successful Tenderer, and any update (related to new risks, likelihood or impact) shall be reported during the progress review meeting, as well as part of the quarterly and annual implementation reports.

Resources planning and tracking using the appropriate tools.

Subcontractor management, including conflict resolution, e.g. the prime contractor is responsible for settling disagreements, although advice/approval from ECMWF may be sought on the subject. A list of subcontractors describing their contribution and key personnel shall be provided, as well as backup names for all key positions in the contract. Tenderers shall describe how the Framework Agreement; in particular Clause 2.9 on Sub-contracting has been flowed down to all their subcontractors.

Management of personal data and how this meets the requirements of Clause 2.8 on Personal Data Protection and Annex 6 of the Framework Agreement.

[6] https://commission.europa.eu/funding-tenders/procedures-guidelines-tenders/information-contractors-and-beneficiaries/calculate-unit-costs-eligible-travel-costs_en

List of minimum deliverables and milestones required as part of WP0, covering the contractual and financial reporting obligations towards ECMWF in line with the Terms and Conditions of the Framework Agreement (cf. Clause 2.3 and Annex 5):

WP0 Deliverables				
#	*Responsible*	*Nature*	*Title*	*Due*
D0.y.z-YYYYQQ	Tenderer	Report	Quarterly Implementation Report QQ YYYY *QQ YYYY being the previous quarter*	Quarterly on 15/04, 15/07 and 15/10
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report Part 1 YYYY *YYYY being the Year n-1. Shall include:* • *Quarterly Implementation Report Q4 YYYY; YYYY being the Year n-1* • *Preliminary financial information YYYY; YYYY being the Year n-1*	Annually on 15/01
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report Part 2 YYYY *YYYY being the Year n-1*	Annually on 28/02
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Plan YYYY *YYYY being the Year n+1*	Annually on 30/09
D0.y.z-YYYY	Tenderer	Other	Copy of prime contractor's general financial statements and audit report YYYY *YYYY being the Year n-1*	Annually, not later than on 15/12[(1)]
D0.y.z	Tenderer	Report	Final report	By the end of the Framework Agreement

Table 1: WP0 Deliverables

WP0 Milestones				
#	*Responsible*	*Title*	*Means of verification*	*Due*
M0.1.1.MX	Tenderer	Kick-Off meeting	Minutes of meeting	30 days after start of the contract
M0.1.2.MX	Tenderer	Progress Review Meeting with ECMWF	Minutes of meeting	~ as a minimum linked to the Payment Milestones
M0.1.3.MX	Tenderer	Monthly Technical Meetings	Minutes of meeting	to be included as one milestone with a due date at the end of the contract
M0.1.4.MX	Tenderer	C3S General Assembly YYYY	Attendance/Technical Note	Due one month after the meeting

Table 2: WP0 Milestones

4.3 Deliverables

The aim of this contract is to lead the evolution of the ECDE, and the climate impact indicators offered by the open-source python framework; earthkit. As this a service-oriented contract, thought and consideration to maximise the use and value of the submitted deliverable is required. The Successful Tenderer is requested to focus on delivery of service-oriented deliverables (e.g., applications and associated product user guides, completed software tests) rather than those expected in a research contract. A deliverable is a substantial, tangible or intangible good or service produced as a result of the contract. In other words, a deliverable is an outcome produced in response to the specific objectives of the contract and is subject to acceptance by the technical contract officers at ECMWF. When defining deliverables please consolidate their numbers against a specific single deadline where possible. The required top-level deliverables are outlined in Section 3. These

can be in the form of documents or reports, data sets or databases, services and user support. Requirements for each type are described in the following subsections.

Each Deliverable shall have an associated fixed price and resource allocation (person-months and financial budget). The total of these allocated resources shall amount to the requested budget associated with payroll/personnel cost.

Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery, as applicable. They should not duplicate deliverables. Tenderers shall complete the relevant table in Volume IIIA as part of their Tender, which includes the details of deliverables and milestones for all work packages and the schedules for each work package. Volume IIIA will be used by Tenderers to describe the complete list of deliverables, milestones, and schedules for each work package. All milestones and deliverables shall be numbered as indicated. All document deliverables shall be periodically updated and versioned as described in the tables.

ECMWF will provide the templates for reports and plans at the beginning of the contract. Reporting documents should be short and factual, following the guidance which will be provided by ECMWF during negotiations with the Successful Tenderer.

The effort allocated to Contract management and technical coordination (WP0) is expected to amount to approx. 7-10% of the planned use of the resources.

4.3.1 Documents and reports

All contractual deliverables, reports and documentation for this contract shall be produced in English. The quality of reports and deliverables shall be equivalent to the standard of peer-reviewed publications and practice. The final quality check of the deliverables should be made by the prime contractor (content, use of ECMWF reporting templates, format, deliverable numbering and naming, typos, etc.). Unless otherwise specified in the specific contract, deliverables shall be made available to ECMWF in electronic format (PDF/Microsoft Word/Microsoft Excel or HTML) via the Copernicus Deliverables Repository portal.

4.3.2 Data and IPR

It is a condition of EU funding for C3S that ownership of any datasets, code, software 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, code, software (deliverable). In return, the suppliers will be granted a non-exclusive licence to use the deliverable which they have provided to C3S for any purpose except any which conflicts with the aims of C3S.

All software and products used by the contractor will remain the property of the contractor, 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 contractors' production system. The identity and ownership of such exceptional components will be passed to the European Union via ECMWF annually, but in return the contractor will be granted a non-exclusive licence to use them for any purpose except any which conflicts with the aims of C3S.

4.3.3 Web services & Communications

All communication activity must be agreed with the ECMWF Copernicus Communication team in advance. This includes, but not exhaustively, communication planning, branding and visual style, media outreach, website and social media activity, externally facing written and graphic content and events. Agreed activity would also need to be evaluated and reported on once completed so that success measures and KPIs could be provided to the European Commission.

In addition to the development of the ECDE, the Successful Tenderer will be required to develop for each climate impact indicator a C3S landing page (static content hosted at www.climate.copernicus.eu). The guidelines for the C3S static landing page are as follows:

Activity	*Guidance*
Design	The existing templates and styles for the main C3S service website (https://climate.copernicus.eu) must be used. The ECMWF Copernicus web officer will provide these on request. Likewise, the ECDE will follow those templates provided by the EEA.
User journey	The user journey must start on the main C3S website and the contract web-presence will be fully integrated in the main C3S content management system.
Content	All contract content will be following templates and guidelines provided by ECMWF and published on the main service website.
Navigation	A home button should take users to the main websites' homepage.
Logos	There will be a page on the service main website that reflects the contribution of suppliers.

Table 3: Web services

4.3.4 User support

The objective of this task is to provide specialised support to users of the delivered products and services.

ECMWF has a well-established centralised User Support to provide multi-tiered technical support to all users of C3S data, products, tools and services. A service desk system is used for ticketing user requests and distributing these requests to specialists as needed. Dedicated staff at ECMWF promote and maintain self-help facilities (Copernicus Knowledge Base (CKB), user forum, FAQs and tutorials, etc.) and provide individualised support on technical queries related to the CDS, data formats, data access, etc. In addition, ECMWF staff members 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 Tenderer shall provide expert (Level-2) support through a) the Jira ticketing system with agreed KPIs (for example, 85% of Level-2 tickets should be resolved within 15-business days), and/or b) the user forum[7] by monitoring topics and providing responses. The Successful Tenderer shall provide an email address which acts as the single contact point.

4.3.5 User Engagement and Training Activities

Activities related to the use of data from the ECDE in adaptation planning and dedicated training will be implement by Copernicus User Engagement (CUS) and are not part of the scope of this ITT (these will be procured separately). Nevertheless, the Tenderer shall accommodate for eventual needs in providing technical and scientific expertise in support of these activities. The Tenderer shall specify in their Tender the resources intended to be allocated to provide this support.

Requests to support activities may be raised on, for example:

- Contribute with content specific input to training, education and capacity building material: development of learning resources in the domain of the contract, participation in train-the-trainer events and MOOCs (massive open online course).
- Provide technical advice on the use of indicators and how the workflows can be re-used.
- Adapt workflows for specific audiences and use-cases.
- Provide ECMWF with feedback on its service that are relevant to this contract and where required, provide input to the URDB (use requirements database), as well as sharing needs and aspirations as raised by potential new user communities.
- Provide input to conceptional assessments and developments of specific user engagement plans and actions as launched by ECMWF.

[7] https://forum.ecmwf.int/

An indicative maximum of 5% of the overall budget shall be allocated in the pricing table to accommodate for these needs. This shall be paid as a fixed price. Details on the expected activities and the budget shall be refined at the end of Work Package 1 activities and accounted for in the work plan.

4.4 Key Performance Indicators

As part of the Tender, the Tenderer shall propose a set of Key Performance Indicators (KPIs) appropriate for the service. The KPIs shall be designed to quantify different aspects of quality of service against the requirements described in this document. These initial specifications shall be refined together with ECMWF during the negotiation of the contract, but the Tenderer in expected to propose a set of KPI's at the tender stage covering the categories below.

Contractors shall report to ECMWF on a set of SMART (specific, measurable, achievable, relevant and time bound) KPIs suitable for monitoring various aspect of service performance, including (but not limited to):

- Code quality (performance, output etc. linked to the Tenderer's QA process and C3S EQC)
- Operational service implementation and management
- Requirements management
- Issue and action tracking
- Contract management
- User support (see Section 4.3.4)
- Copernicus User Engagement interactions

The KPIs will be reported in the Quarterly and Annual reports.

4.5 Payment Plan

Tenderers can propose a Payment Plan in ITT Volume IIIA "Pricing and deliverables" (cf. Excel spreadsheet "Payment Plan preparation"):

- The Payment Milestones should relate to the deliverables and milestones delivered during the corresponding Payment Milestone period (e.g. the payment covering the period January-June would only relate to the deliverables and milestones whose due dates are part of the same period).
- The frequency and due dates of Progress Review Meetings might be adapted to synchronise with the anticipated date of completion of each Payment Milestone.
- In case of request for a payment at contract signature, please note that this should be duly substantiated (e.g. in terms of necessary investment prior to implementation or during first weeks/months for ensuring the initial set up of the project). It is necessary to relate this payment to activities subject to other Payment Milestones.

5 Tender format and content

General guidelines for the Tender are described in Volume IIIB of this ITT. 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.

5.1 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	30 (Table 2 in Volume IIIB, the section on references, publications, patents and any pre-existing IPR are excluded from the page limit and have no page limit)
Management and Implementation	10 (excluding Table 4, and Table 5 in Volume IIIB) + 2 per each Work package description (Table 3 in Volume IIIB)
Pricing Table and Deliverable List	No limitation

Table 4: Page limits

5.2 Specific additional instructions for the Tenderer's response

The following is a guide to the minimum content expected to be included in each section, 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.

5.2.1 Executive Summary

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

5.2.2 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.

5.2.3 Quality of resources to be deployed

The Tenderer shall propose an experienced team to support an operational service according to the technical requirements set out in section 1.

This team should include technical staff who have a track record in the maintenance of an operational reference climate service, together with demonstrable experience of:

- developing in Python in complex libraries such as, or similar to, earthkit, and front end application expertise;
- implementing scientific best practice and peer reviewed methodologies, whilst ensuring the delivered applications are optimised in terms of user experience;
- implementing scientific best practice and peer reviewed methodologies, whilst ensuring the delivered applications are optimised in terms of user experience.

The team shall also 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 of the technical team in performing activities related to the various aspects of this tender.

5.2.4 Technical solution proposed

The Tenderer shall describe in detail the mechanisms that have been adopted to ensure the user requirements are fully accounted for in the implementation of the service.

The Tenderer shall give a short background to the proposed solution to demonstrate understanding of that solution and of the C3S context. This section shall also include information on any other third-party suppliers

that are used as part of the technical solution, and a statement of compliance for each requirement formulated throughout this document, describing how the proposed solution maps to the requirements.

5.2.5 Management and Implementation

As part of the general project management description, and in addition to the guidance provided in Volume IIIB, Tenderers shall consider the elements described in Section 4.2 above.

6 Additional Information

6.1 Acronyms

ADS	Atmosphere Data Store
API	Application Programming Interface
C3S	Copernicus Climate Change Service
CDR	Climate Data Record
CDS	Climate Data Store
CKB	Copernicus Knowledge Base
CMIP6	Coupled Model Intercomparison Project – Phase 6
COP1	Copernicus Phase 1
COP2	Copernicus Phase 2
CORDEX	Coordinated Regional Climate Downscaling Experiment
CUS	Copernicus User Engagement
EC	European Commission
ECDE	European Climate Data Explorer
ECMWF	European Centre for Medium Range Weather Forecasts
ECV	Essential Climate Variable
EEA	European Environment Agency
EIFCR	European Integrated Framework for Climate Resilience
EQC	Evaluation & Quality Control
ERA5 / ERA6	ECMWF Reanalysis version 5 / version 6
EU	European Union
EUCRA	European Climate Risk Assessment
EUCRA 2	European Climate Risk Assessment – Second Edition
FAQ	Frequently Asked Questions
GCOS	Global Climate Observing System
ICDR	Interim Climate Data Record
IPR	Intellectual Property Rights
ITT	Invitation to Tender
KO	Contract Kick Off
KPI	Key Performance Indicator
MOOC	Massive Open Online Course
MOU	Memorandum of Understanding
QA	Quality Assurance
SIS	Sectoral Information System
SMART	Specific, Measurable, Achievable, Relevant, Time bound
SCIIs	Sectoral Climate Impact Indicators
URDB	User Requirements DataBase
UX	User Experience
WP	Work Package