ECMWF Copernicus Procurement

Invitation to Tender



Copernicus Climate Change Service

Volume II

C3S Demo Cases

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1 Introduction to the Contract

Some of the biggest challenges our society faces are related to climate change and the impact this will have on the environment and on our own activities. The increasing concentration of the greenhouse gases is a prominent driver of a changing climate, but the extent of their impacts is sector dependent and generally more difficult to characterise. In order to build a climate proof society, we need to improve the way in which climate datasets are process and used to inform decisions in different businesses and societal sectors.

The Copernicus Climate Change Service (C3S) has been developed to meet these needs, aiming at supporting policymakers, businesses and citizens through the provision of high-quality usable information.

The Service consolidates many years of preparatory research and development and delivers through the Climate Data Store (CDS) a long list of quality-controlled and operationally-produced climate relevant datasets including (or in the process of including):

- a) Reanalyses (ERA5) providing consistent multi-annual global datasets of atmospheric, ocean and land surfaces variables with a frozen model/assimilation system and provided with short delays (1 week).
- b) Hi-resolution (5km) regional reanalysis for Europe (in development).
- c) Global land reanalysis based on ERA5 at 9km resolution.
- d) Monthly production of global multi-model seasonal forecasts (month 1-7).
- e) Global (CMIP5 subset) and regional climate projections (EURO-CORDEX).
- f) Gridded observations for Europe.
- g) Historical climate data records for 22 of the Essential Climate Variables (ECVs) as defined by GCOS.
- h) Products to support users in the environmental and climate policy sector, adding value to "raw" data in order to deliver information products in a form adapted to policy applications and policy-relevant work.

All the products can be (or soon will be) found on the C3S website at http://cds.climate.copernicus.eu using the catalogue search tool.

This ITT is about setting up and demonstrating downstream applications, known as "Demo-Cases", using one or more of the C3S products as input.

This is an open ITT for C3S "Demo Cases" and aims at demonstrating the full potential of the C3S infrastructure, including the diverse set of datasets in the CDS catalogue and the CDS toolbox. This ITT will facilitate the creation of indicators, tools and visualisations that do not necessarily have a sustainable business case, but are excellent communication tools and will show-case the CDS and, hence, increase uptake. It is a rolling 12 month ITT, and proposals may be submitted at any time during that period. These will then be evaluated every three months on the basis of the proposals that have been received up to that point.

1.1 Definitions

General definitions can be found in Volume I. Definitions specific for this ITT are defined below.

C3S products: All the products available in the C3S catalogue https://cds.climate.copernicus.eu/#!/home

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Application: an information product, software or service (including consultancy) which makes use of one or more C3S as an input.

2 The Climate Data Store and Toolbox

The purpose of this section is to clarify the context of this tender and to briefly describe the relevant outcomes of current activities to implement the Climate Data Store (CDS) and Toolbox initiated by C3S. Specific technical requirements for the additional work to be carried out under this tender are described in Section 4 of this document.

The backbone of the C3S is a cloud-based Climate Data Store (CDS) that provides users with a single point of access to quality-assured data on climate. The datasets may be physically located at various data centres around the world, or they may be distributed in the cloud, but this will be transparent to users of the CDS. All data procured by Copernicus will be open and free, and can be used by anyone for any purpose. Copernicus will also provide access to third party data with different data license. To facilitate the transformation of data into tailored information products, the CDS features a toolbox for creating workflows and applications on-line. All CDS data and tools will be accessible from the C3S website as well as via open Application Programming Interfaces (APIs). The CDS was publicly released on 14 June 2018.

The SIS (Sectoral Information System) is the part of the programme devoted to development of sectoral applications which illustrate how the CDS and the toolbox could be used to address specific users' needs.

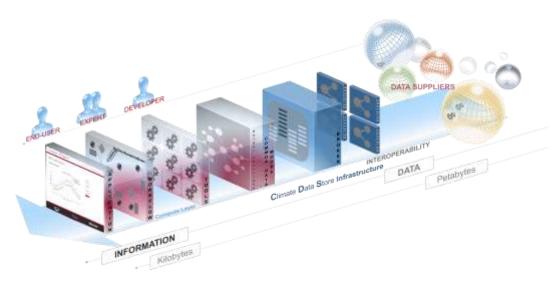


Figure 1. Conceptual overview of the Climate Data Store (CDS) / Toolbox environment. The CDS facilitates access to climate data from multiple providers via one unified access point. The CDS toolbox is an applications environment providing C3S expert users (which includes SIS developers) access to a suite of tools to explore, postprocess climate data and, potentially, develop user relevant applications. The CDS environment permits the processing next to the data to increase computational efficiencies and uses 'orchestrated python workflows', making use of library of tools whilst the JavaScript framework facilitates the SIS contractors to implement customized applications.

CDS DATA CATALOGUE. The CDS provides access to climate datasets via a searchable catalogue. Categories of data include: Climate Data Records (CDRs) and Interim Climate Data Records (ICDRs),

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quality-controlled archives of in-situ climate observations, reprocessed satellite data records, data from climate reanalyses, seasonal forecast data, output from climate model simulations, and a variety of derived climate impact indicators. Multiple datasets will be available in each category, e.g. for 22 of the 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.

EQC EVALUATION AND QUALITY CONTROL. All datasets available on the CDS will be quality controlled by an independent activity. Such a step serves two main purposes. Firstly the activity has been designed to ensure that each and every record on the catalogue is of a sufficient quality to be used for applications. Secondly the EQC function will ensure that all entry will be supported by a sufficient number of EQC attribute to allow any user who would want to do so to define their own quality control metrics.

CDS TOOLBOX. The CDS Toolbox provides users with the ability to create interactive web applications tailored to their needs using CDS datasets. The Toolbox contains a variety of software tools for combining CDS datasets and performing basic operations on the data, including functions for interpolation and re-gridding, simple statistical calculations, visualisation, text manipulation, etc. The Toolbox is designed to be extendable. The Toolbox uses a Common Data Model to represent different types of datasets available in the CDS catalogue. This allows data and tools to be combined into workflows that can be executed on-line. An Application Editor is available to parametrise workflows using widgets to create interactive web applications on the CDS. The Toolbox includes a mechanism for tracking the provenance of information products created in workflows and applications.

URDB USER REQUIREMENTS DATA BASE. Users play a central role in the implementation of the programme. All user-facing contracts are asked to contribute to a systematic collection of user requirements. These are organised in a database whose analysis (also known as URAD User Requirement Analysis Document) will be one of the key instruments to inform the service evolutions.

3 Contract Summary

This ITT is for "Demo Case" contracts that, will develop and demonstrate applications based on C3S products and/or the tools provided by the CDS infrastructure. The objective of such contracts is to stimulate innovative ideas to show-case the potential of the CDS and to support the development of downstream applications based on C3S data and associated infrastructure.

The criteria for selection will be the innovative use of one or more C3S products, demonstrate the potential of C3S infrastructure leading to increased visibility of the service in terms of broadening user audience and reaching out to wider communities. The proposals will be assessed on quality and demonstration of the exploitation potential of the CDS and toolbox.

ECMWF expects that individual bids in the range between 50 000 and 150 000 euros will be adequate to achieve the objectives of this call, depending on the scope of the proposed demo case. Nevertheless, ECMWF may consider bids outside of that range if duly justified by the bidder.

The ITT call is open to all demo-cases addressing any societal sector and C3S products. Notwithstanding the above, ECMWF is looking forward selecting a number of proposals related to data visualization and scientific communication through the arts, as they offer a strong potential to enhance the uptake of the C3S service with wide communities.

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4 Technical Specification

The ITT targets contractors who are aiming at developing public or commercial Applications using C3S products. While each successful bid will have a single prime contractor, the bid may involve other subcontracted entities to deliver the activities. Each "Demo Case" will focus on a single Application.

4.1 General Requirements

The proposed technical solution shall contain a technical description of the Application, as well as a description of the activities foreseen for the two phases of the contract:

- Design and development (duration between 3 and 6 months);
- implementation (duration around 6 months).

In order to be eligible:

- the proposal must cover a single Application (tenderers may submit other separate proposals covering other Applications);
- the Application must make use of one or more C3S products and the CDS infrastructure.

There is no preferred geographical target for the application; the bidder is free to propose the geographic scope and extent of the demo. Applications making use of C3S global line of products (reanalyses, seasonal forecasts, climate projections, climate data records and Earth Observation based ECV products) are especially welcomed, as well as those that will encourage visibility of the C3S service outside Europe.

4.2 Technical Description

The proposal must provide a technical description of the "Demo Case". The description shall cover, as a minimum, the following aspects:

- General description of the Application C3S product(s) used and use of CDS infrastructure
- Other input data (if applicable)
- Target geographical area
- Outline technical design including information flow
- Publicity and communication method(s)

4.3 Demo Case

It is required that the bidder addresses the following aspects:

- Target audience(s) for the Application; this is to include an assessment of the audience and their needs. Any expression(s) of interest from potential users/stakeholders (optional, to be put in annex);
- Gap assessment; detail similar applications / demonstrators (if applicable), and the added value of the demonstrator
- Outreach and engagement strategies, competitive assessment and differentiators,
- Impact assessment; the bidder will detail the expected impact on the audience and user community

Tenderers shall describe their background (audience, products) in end-users and/or down-stream applications development and exploitation, as well as within environmental services provision.

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Tenderers shall also mention any other past or ongoing developments for the same or similar Application. In that case, evidence should be provided as an attachment to your response. Other funding solicited (or potential future funding) but not secured at the time of writing of the proposal need NOT be mentioned as part of the tender, but the tenderer must note and comply with Clause 7.4 of the terms and conditions in Volume V of this ITT.

The table below provides a template to be used by the contractor to describe the complete list of deliverables and delivery schedules for this work package. All deliverables shall be numbered as indicated in the table. All document deliverables shall be periodically updated and versioned as described in the table. Tenderers shall provide a preliminary version of the completed table as part of their bid.

WP1 Delive	erables Temp	plate	
#	Туре	Title	Due
D1.1.1	Report	Application Architecture	
D1.1.2	Report		
D1.2.1			
D1.2.1	Report	Communication and user uptake strategy	
D1.2.1			

4.4 Work package 1: Design phase

The successful Tenderer will describe the demonstrator in sufficient detail to allow ECMWF to evaluate the design. The contractor is expected to clearly define the user, system and functional requirements of the demo, provide the architecture and outline how user interactions will be managed. This phase will also define how the tenderer will assess the impact of the demo. This phase must have a total duration between 3 and 6 months. The tasks will be organised into a single work package, with tasks, milestones, deliverables and a Gantt chart.

Deliverables must be "public" A "communication and user uptake strategy" document must form part of the deliverables.

A milestone meeting at the end of this phase will take place at ECMWF's premises (Reading, UK).

4.5 Work package 2: Implementation phase

The successful Tenderer will develop the demo case as detailed in work package 1. This phase must have a maximum total duration of 6 months. The tasks will be organised into a single work package, with tasks, milestones, deliverables and a Gantt chart. Deliverables must be "public".

Deliverables must include:

- A 2-page document about the final application; the report is to include an overview of users, intended and actual impact assessment of the developed application and how C3S inputs were utilised. This report is intended for general publication (print and web);
- Participation to and presentation of the "Demo Case" at one C3S events (user day, general assembly...) as required by ECMWF. Venue will be in Europe and participation is expected for one day;

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- A final report assessing status at the end of the contract, including the 'impact' the development has had on the user community. This report will also provide an outlook on continued operation of the application.
- The final application product.
- Demonstrator code

WP2 Deliverables Template				
#	Туре	Title	Due	
D2.1.1. v1, 2,		Quarterly report about the use and user uptake of the Application and the business case outcomes		
D2.1.2	Report	2-page document about the Application, its users and how C3S input is used for publication (print and web);		
D2.1.3		Presentation of the application at C3S events.		
D2.1.4		Final Report		
D2.1.5	Code	Final application product		
D2.1.5-v	1			

4.6 Work package 0: Management and Implementation

The Tenderer shall provide a detailed implementation plan of proposed activities for the duration of the framework contract. Deliverables should be consistent with the technical requirements specified in Section 4.8.3.

Milestones should be designed as markers of demonstrable progress in service development and/or quality of service delivery.

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.

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.

A list of subcontractors describing their contribution and key personnel, legal name and address shall be provided.

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

- Monthly teleconferences with ECMWF and a proposal for involvement of ECMWF in major project reviews.
- Proposal for payment milestones (linked to major project reviews/milestones).

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4.7 Specific Requirements

4.7.1 Publicity and communications

The fact that the Application uses Copernicus data must be clearly acknowledged for all publication/dissemination channels. Communications guidelines will be provided by ECMWF to the Successful Tenderer at the start of the contract.

4.7.2 User feedback and user support

As a user of C3S products, the successful tenderer will be required to provide feedback on the use of C3S data and on its evolving needs and requirements.

As for all C3S users, the successful tenderer will have access to the C3S Service Desk, providing technical support on all the products provided by C3S. However, C3S Service Desk cannot be used to support the users of the Application; the Application will not form part of the C3S "core service" portfolio.

4.8 Performance Requirements

4.8.1 Schedule/timetable

The execution of tasks detailed in Work packages 1 and 2 will follow the implementation plan outlined in your bid. Please complete the work package table template in Volume IIIB for this purpose.

This ITT spans a total period of 9 to 12 months and the Tenderer is expected to provide an implementation plan of the proposed activities for the full duration of the contract.

4.8.2 Deliverables

Based on the Work Package 1 and 2 descriptions of this ITT the Tenderer shall define a set of Deliverables and Milestones for each work package. Each Deliverable shall have an associated resource allocation. The total of these allocated resources shall amount to the entire requested budget.

During the contract duration, the Successful Tenderer will be required to provide input to the quarterly and annual reporting to the European Commission. These reports shall be defined as Deliverables as part of an overall management work package (Work Package 0). Each quarterly report shall provide information on the performed activities for the previous period, list the achieved Deliverables and Milestones, and provide reasons for deviation from the implementation plan, where relevant.

All reports in this project shall be 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 specific contract Deliverables shall be made available to ECMWF in electronic format using the Microsoft Word template provided at the start of the contract.

ECMWF will organise a monthly follow-up meeting (by teleconference, except for one "physical" meeting at the end of the design and development phase). The Project Manager appointed by the Successful Tenderer (see 5.2.2) will represent the Successful Tenderer in such meetings.

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4.8.3 Data delivery and IPR requirements

It is a condition of EU funding for C3S that ownership of the contract outputs, in this case the Deliverables must pass from the Contractor (the Tenderer who wins the contract) to the European Commission, via ECMWF. In return, the Contractor is granted a licence to use the Deliverables, for any purpose except one which conflicts with the aims of C3S.

In this case and in order for Work Package 2 (Implementation Phase) to be successful, the Contractor's licence to use the Deliverables will be an exclusive licence for the corresponding duration of 12 to 24 months. During that same period, all revenue generated by the Application may be kept entirely by the Contractor (and associated entities, if applicable). After the end of the exclusive licence period (and of the contract), ECMWF, on behalf of the European Commission will release the Application, under a permissive open source licence and the Contractor may choose whether or not to continue to develop and/or exploit the Application.

All pre-existing technology, **used by the Contractor or its sub-contractors** to deliver the Application will remain owned by them, but has to be fully licensed to ECMWF and the European Commission to the extent necessary to make unbridled use of the Deliverables. The identity and ownership of those components which are acquired or created specifically for the purpose of this contract, with C3S funding and which are separable and useable in isolation from the rest of the Contractor/Sub-contractor's production system will be passed to the European Commission, via ECMWF annually. In return, the Contractor will be granted a non-exclusive licence to use them for any purpose except one which conflicts with the aims of C3S. The Contractor may grant a sub-licence to the relevant Sub-contractor.

Detailed contractual terms, including terms to give effect to the arrangements described above are set out in Volume V of this ITT.

4.8.4 Key Performance Indicators and Performance Targets

The Tenderer shall provide a set of Key Performance Indicators (KPI) and Performance Targets for the activities covered by this ITT and taking the requirements described above into account.

5 Tender Format

General guidelines and templates for the Tender are described in Volume IIIB. Specific requirements for this particular ITT are described in the next few sub-sections.

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
Technical Description	4
Target audience, rational for	6
development and expected impact	
Resources Applied	1 (excl. CVs with a maximum length of 2 pages each)
WPO – Management and Implementation	3
WP1 – Design Phase	3

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WP2 – Implementation Phase	3
Annexes (Letters, commitments,	No limitation
expression of user needs)	
Pricing Table (Volume IIIA)	No limitation

Table 1: Page limits

5.2 Specific additional instructions for the Tender

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 Quality of Resources Applied

The Tenderer shall propose a project team and appoint a Project Manager with more than 2 years' experience in managing activities of the same nature as the ones proposed. A CV, in the standard 'europass' format, must be provided for all personnel involved (http://europass.cedefop.europa.eu/).

The Project Manager will be its primary contact for contractual delivery and performance aspects.

5.2.3 Management and Implementation

The Tenderer shall provide a detailed implementation plan of proposed activities using the activity table in Volume IIIB as a template. The Tenderer shall provide a table for each work package describing the main objectives, the respective proposed activities and a set of Deliverables and Milestones. The number of Deliverables and Milestones shall be restricted to less than ten per work package. While financial information can be omitted from this table, a specification of the required staff resources is required. Adjustments to the proposed implementation plan can be made during the course of the contract subject to approval by ECMWF.

6 Schedule

This is a rolling Invitation to Tender, whereby bids will be evaluated on a quarterly basis, with closing dates every three months (14 September 2018, 14 December 2018, 14 March 2019, 14 June 2019), when bids submitted during the previous calendar quarter will be evaluated. Bidders will be informed about the outcome of the evaluation within six weeks following each closing date.

Reminders on the evaluation dates will be posted on the C3S website (https://climate.copernicus.eu/) at regular points in time.

As an outcome of each quarterly evaluation, bids will be either selected for negotiations in that round, rejected, or included in a reserve list for future consideration.

Six weeks upon each evaluation date, ECMWF will update the C3S website with an overview of the sectors and C3S products for which a demo-case has been selected.

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