

# ECMWF Copernicus Procurement

## Invitation to Tender



## Copernicus Climate Change Service Volume II

Sectoral Information System to support  
infrastructure, transport and associated  
standards

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## 1 Introduction

ECMWF as the Entrusted Entity for the Copernicus Climate Change Service (C3S) invites tenders for services related to operational service provision.

C3S aims to provide information to support the development of a climate resilient society. Through the Sectoral Information System (SIS), C3S has already completed 7 Proof of Concept elements (POCs), addressing the needs of sectoral users in water, energy, insurance, agriculture and urban-management sectors in Europe. In addition, in 2017 ECMWF built upon the experience gained from the POC contracts, and initiated a further 7 operational services that will address user requirements in the following areas; European health, coasts, fisheries (marine) and tourism, as well as global services addressing hydrology, agriculture and shipping. At present, the SIS for Biodiversity and Disaster Risk Reduction are under procurement. The SIS elements are developing datasets and tools based on the Climate Data Store (CDS) infrastructure, outputs include Global, European and regional CII (Climate Impact Indicators), ECVs (essential climate variables) and tools, Python scripts built using the CDS python libraries that run on the CDS Toolbox, to develop user driven, sector specific services.

The SIS contracts are expected to fulfil the following three top level requirements:

1. To provide a working example of how the data and the tools available on the Climate Data Store (CDS) could be used in specific user relevant contexts.
2. To engage with the users to scope out and document what they need.
3. To provide examples of good practice in the development of climate services.

This Invitation to Tender (ITT) is designed to support the development of a prototype service able to provide relevant climate inputs into the standards that underpin civil engineering assets and transport infrastructure. Given the scope and considering the requirements - within existing standard - for very localised climate information, the Tenderer shall prioritise the development of generic methodologies, consistent with the three objectives above, over the provision of detailed datasets to be used directly within standards. The ITT shall also develop at least five case studies showing a changing climate could impact existing critical, or iconic infrastructure.

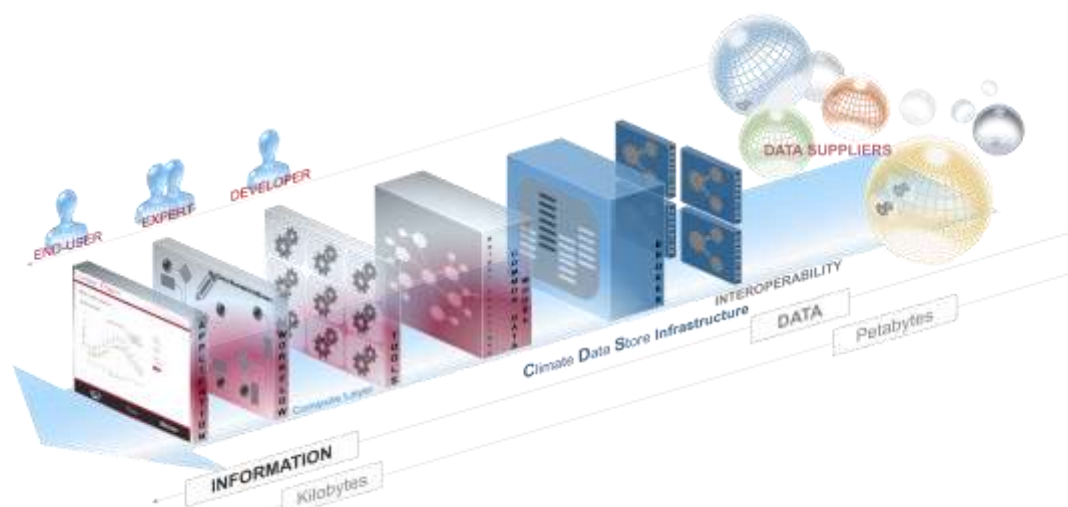
Specific objectives and technical requirements are described in section 3 of this document. General performance requirements are presented in section 4 and information about the tender format and content is in section 5.

## 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 CDS and Toolbox initiated by C3S. Specific technical requirements for the additional work to be carried out under this tender are described in Section 3 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 and toolbox can be accessed via <https://cds.climate.copernicus.eu/>.



*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 CDS 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), 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 are 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. On the one hand, the activity has been designed to ensure that each record on the catalogue is of a sufficient quality to be used for applications. On the other hand, the EQC function will ensure that all entries will be supported by a sufficient number of EQC attributes 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.

**USER REQUIREMENTS DATA BASE (URDB).** 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 Technical requirements

### 3.1 Scope of service

The scope of the service is to showcase how C3S data and toolbox can be used to support the assessment of climate change impacts on European infrastructure and define a realistic, traceable and robust methodology to assist with risk assessments and the definition of standards. This work shall support the development of infrastructure across various sectors, including transport.

Trusted and traceable climate information can inform civil engineering practices and the development of standards. Standards are technical definitions, guidelines and instructions used by designers, manufacturers and users to promote safety, reliability and efficiency. They are commonly used in almost every industry that relies on engineering solutions. Some of the standards explicitly consider environmental conditions (e.g. flooding levels, max temperature, wind gusts, etc) and provide guidelines on how to characterise the associated risks. Most of the standards currently adopted in Europe have been developed under the explicit or implicit assumption of a stationary climate but climate change and climate variability have the potential to alter the frequency, intensity and the spatiotemporal characteristics of extreme weather phenomena. This may lead to risks which differ from those assumed in the relevant standards.

Various bodies within the EU such as CEN-CENELEC and associated entities have been considering ways in which the relevant standards<sup>1</sup> should be modified to account for the evolving levels of risk.

The large uncertainty that exists in the future projections of extreme events, the inherent limitations and inadequacies of climate models, and the need for very high-resolution data often limit the possibility to use climate model data directly into standards. This means that the quantification of extremes with given probability levels is not yet feasible for design parameters with an adequate level of credibility.

In the estimation of likelihood of occurrence of extreme events for standard purposes a mean return period of 50 years is often used. This definition of the characteristic value given in EN 1990 was

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<sup>1</sup> EN 1990 Eurocode 0: Basis of structural design, 2002

EN 1991-1-3 Eurocode 1: Actions on structures - Part 1-3: General actions – Snow loads, 2003

EN 1991-1-4 Eurocode 1: Actions on structures - Part 1-4: General actions – Wind actions, 2005

EN 1991-1-5 Eurocode 1: Actions on structures - Part 1-5: General actions - Thermal actions, 2003

EN 1991-1-7 Eurocode 1: Actions on structures - Part 1-7: General actions - Accidental actions, 2006

ISO 2394 General principles on reliability for structures, 2015

ISO 13823 General principles on the design of structures for durability, 2008

ISO 21650 Actions from waves and currents on coastal structures, 2007

EN 12056-3 Gravity drainage systems inside buildings. Roof drainage, layout and calculation

CSN 73 6503 Basis of design and actions on hydrotechnical construction works, ÚNMZ, 2011

CSN 73 1901 Designing of roofs – Basic provisions, ÚNMZ, 2013

accepted in relevant Parts of EN 1991 dealing with climate phenomena. Eurocode EN 1990 also suggests the use of a partial factor to account for the uncertainties in the estimation of the risks.

The lifetime and performances of infrastructural assets can also be affected by non-extreme weather events. Architects and engineers often use a “design year” to represent the possibility of a realistic sequence of weather events likely to negatively affect the performances of the assets.

Building upon the outcomes of an assessment of requirements from the standards-writers community, commissioned by ECMWF in 2017, the following tasks have been identified:

- Using observations, reanalyses, and climate model output as required, the Tenderer shall characterise the magnitude of the 1 in 50 years event the variables<sup>2</sup> listed in Table 1 below. During the first 6 months of the contract, the Tenderer, in consultation with ECMWF, shall define those variables that will be developed within the second phase of the contract. The selection of the variables will be based on relevance and impact to the sectors and the selection shall be underpinned by user requirements.

Variable	Temporal resolution / scale	Spatial resolution	Comments
Temperature	Higher or equal to daily	Higher or equal to 25 km <sup>2</sup>	Both positive and negative extreme shall be considered
Rainfall	Higher or equal to daily	Higher or equal to 25 km <sup>2</sup>	Both accumulation and intensity shall be considered
Snow	Higher or equal to daily	Higher or equal to 25 km <sup>2</sup>	Both accumulation and intensity shall be considered
Hail	Higher or equal to daily	Higher or equal to 100 km <sup>2</sup>	Accumulation and event duration should be considered
Humidity	Higher or equal to daily	Higher or equal to 100 km <sup>2</sup>	
Total solar radiation at ground level	Higher or equal to daily	Higher or equal to 25 km <sup>2</sup>	
Wind speed @ 10 meters	Higher or equal to daily	Higher or equal to 100 km <sup>2</sup>	
Wind gust @ 10 meters	3 second	Higher or equal to 100 km <sup>2</sup>	This shall be linked to what is being done within the operational insurance contract on wind storms

*Table 1: List of climate variables of relevance and the associated spatial and temporal resolutions.*

- In addition to those in Table 1, the Tenderer can propose variables which are directly relevant to the user community. The proposed variables are to be based on the user requirements gathered from user engagement activities scheduled within the first 6 months of the contract.

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<sup>2</sup> The Tenderer can define and calculate other return periods in response to user requirements

- For the same variables selected in the previous task the Tenderer shall characterise physically plausible “design years”<sup>3</sup> relevant for a number of specific infrastructures. This “design year” shall be provided with a temporal discretisation equal or better than daily and a spatial resolution equal or better than NUTS3 (related to small regions for specific diagnoses). The NUTS classification (Nomenclature of territorial units for statistics) is a hierarchical system for dividing up the economic territory of the EU<sup>4</sup>.
- For each of the selected variables, the Tenderer shall identify a series of physically plausible scenarios that could lead to significant variation (e.g. greater than 20%) in the magnitude of the 1/50 years events.
- For each of the variables selected and using climate model outputs, observations and expert knowledge as required, the Tenderer shall define a procedure to identify a “reasonably pessimistic” “design-year”, with the same spatial-temporal characteristics of the present-day design year, for each remaining decade of the 21<sup>st</sup> century.
- The Tenderer shall propose, define and implement a set of sector specific climate impact indicators, tools and workflows based on CDS datasets, CDS toolbox and infrastructure. Like all SIS products, these shall be designed to a high standard with the assumption that it could be used by third parties as an example of best practice.
- The Tenderer shall develop a graphical user interface based on the CDS/toolbox to present the results.
- The Tenderer shall document the procedure followed and develop appropriate training and supporting material as appropriate to support C3S training and user support activities.

## 3.2 Specification of work

### *Work package 0: management and coordination activities*

This work package will focus on contract management, including internal controls and coordination of subcontractors, risk management and tracking of the key performance indicators.

#### *Deliverables expected:*

Deliverables covering the contractual and financial reporting obligations towards ECMWF in line with the Terms and Conditions of the Framework Agreement shall be covered under WPO:

- Quarterly Implementation Reports, due 15 days after the end of each calendar quarter;
- Annual Implementation Reports, due annually on 28 February;
- Preliminary financial information, due annually on 15 January;
- Draft and final Implementation Plans for the year N+1, due respectively in February and October of the year N;
- Letter from the auditors referred to in Clause 2.3.1.3 of the Framework Agreement;
- Final report, due 60 days after the end of the Framework Agreement.

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

The successful Tenderer will engage with the user community, which could include standardisation agencies, standards writing representatives, as well as owners, managers of critical infrastructure and those intermediaries and agencies which provide data services, to define and refine the scope of the

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<sup>3</sup> This is likely to depend on the specific standard and infrastructure under consideration.

<sup>4</sup> <https://ec.europa.eu/eurostat/web/nuts/background>



service. The work package will also evaluate the user requirements from the transport infrastructure sector which have been gathered under the activities of the C3S\_52 Lot 2 (SECTEUR) contract.

The successful Tenderer will provide a detailed description of the service to be developed in this contract.

*Deliverables expected:*

- User requirements analysis, based on interactions within this contract and an assessment of relevant external activities. The contractor 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 independently), is responsible for the management of the URDB.
- A gap analysis of the user requirements and the CDS datasets and capabilities.
- A detailed description of the service to be developed and implemented during the contract. The report will include the system architecture and the service and system requirements, together with an assessment of the associated resources, implementation schedule, reviews, deliverables (which may include reports, datasets and software), risk identification and management and acceptance criteria. This report will also include the 'Data management plan', detailing how the data will adhere to the C3S common data model.
- A report describing the mechanisms that will be used to promote the uptake of the service within the infrastructure and standardisation community with the explicit aim of going beyond the users /stakeholders who have been directly involved in the definition of the service.
- A description of the case studies to be implemented within the contract and the associated user-champions.

*Work package 2: Extreme Events: service development and prototyping*

Based on the initial scope as undertaken in work package 1, and subject to ECMWF approval, the successful Tenderer will develop an initial prototype of the service. In close interaction with user-champions identified in work package 1 the contract will iteratively improve and modify the prototype before its final release. One or more intermediate releases of the prototype are to be expected during this work package to expose the service as early as possible to a wider user community. The successful Tenderer shall implement the mechanisms defined in work package 1 to promote the uptake of the service by the user community and respond to their needs.

The developed workflows need to be usable and extensible to users of the CDS and provide a basis for vulnerability assessments.

*Deliverables expected:*

- A prototype service to be discussed, validated and endorsed by ECMWF after the initial scoping phase is completed at month 6 of the contract.
- A series of datasets with the magnitude of the 1/50 year return period event for at least 5 of the variables identified in Table 1.
- A document describing the methodology to be followed for identifying events, processes and phenomena able to significantly alter the magnitude of extreme event in the future.
- A document describing the methodology for assessing the likelihood of occurrence of the abovementioned scenario within the next few decades. This assessment can be based on model outputs but can also rely on physical principles and well documented expert judgment. The datasets will be provided alongside the CDS-based algorithms used to calculate them. The datasets



will be ingested into the CDS catalogue and will become accessible through the CDS once fully validated and documented.

- The contract will deliver a graphical interface, based on the toolbox, to display both present day risk and possible future changes whilst giving also access to the underpinning data, in addition to a web presence which will need to interface with the C3S web content management system and ultimately become an integral part of it.

#### *Work package 3: Design Year: service prototyping and development*

As per the requirements of WP2, the successful Tenderer shall define and develop an initial prototype service based on the user requirements defined in WP1 and interaction with champion users.

#### *Deliverables expected:*

- A prototype service to be discussed, validated and endorsed by ECMWF after the initial scoping phase is completed at month 6 of the contract.
- A document describing the methodology to be followed in the calculation of the extreme events and the “design year” in present day climate.
- Datasets containing “design year” at present for each of the variables selected and for each of the applications considered.
- A document describing the methodology for identifying a pessimistic “design year” in future decades. This methodology can be based on model outputs but can also rely on physical principles and well documented expert judgment.
- The datasets will be provided alongside the CDS-based algorithms used to calculate them. The datasets will be ingested into the CDS catalogue and will become accessible through the CDS once fully validated and documented.
- A dataset containing “design year” for each of the variable selected and for each of the applications identified, for each of the remaining decades of the 21st century.
- As stated in WP2, the graphical interface developed within this contract will need to be based on the CDS toolbox and associated technologies. It is not expected to develop a stand-alone graphic interface for WP2 and 3 outputs, however, the contract should ensure the user journey is optimised.

#### *Work package 4: Case Studies*

Develop a set of case studies, which use the developed datasets and workflows from work package 2 & 3 to assess the impact of climate change on key infrastructure.

At least five case studies should be developed with European stakeholders and cover the following three sectors: (1) transport, (2) urban infrastructure and (3) other critical or otherwise iconic infrastructures in Europe. The case studies are a mechanism to showcase the value of the CDS and communicate the added value of C3S data and associated infrastructure, including toolbox workflows, to address user, stakeholder or societal needs. The case studies can be user or location specific (i.e. for a region, portfolio of assets, or for a specific infrastructure (bridges, ports, buildings, dams, power stations, etc.) and address how the user specific information can be derived from C3S data. These case studies will be published on the C3S website, based on pre-defined C3S templates, and will showcase how C3S can be used to address key user needs. Therefore, it is foreseen that the case studies can include details of how climate information can be used in offline (non C3S) workflows, i.e. in-house GIS or models.

#### *Deliverables expected:*

- A set of case studies that showcase how data and / or tools, produced by the successful Tenderer can be used to assess the possible changes in the climate risk associated with existing critical or otherwise iconic infrastructure in Europe.

#### *Work package 5: support and help development*

In order to maximise user uptake, the service needs to be provided with good quality documentation, support and examples. The successful Tenderer will provide all the information necessary to enable ECMWF to support the users of this service after the duration of the contract.

#### *Deliverables expected:*

- A full documentation of the system design and implementation. This should allow any capable user of the CDS to reproduce any aspect of the service, should they want to do so, without the need of using proprietary software or inaccessible datasets.
- Provide user guides, tutorials and FAQs developed to be consistent with requirements of the Copernicus user support team and those produced in other C3S SIS contracts.
- Software code.
- A user manual for the service operation.

### 3.3 Contract Schedule

The contract will be implemented in two-phases: Phase One, will be completed within 6 months, and will define the scope of the prototype Standardisation SIS service. Phase 1 activities include the collation and synthesis of user requirements, gap analysis and definition of the prototype Standardisation SIS system. Working with target users, the case studies that are to be implemented in Phase 2 will also be defined. The second phase of no more than 18 months in duration, will implement and demonstrate the prototype Standardisation SIS service. User feedback mechanisms should also be included within Phase 2 planning. The second phase will commence after satisfactory completion of the first phase following a Baseline Design Review (BDR).

The timeframe for the completion of the proposed service is expected to be no more than 24 months. The Tenderer shall provide in their bid a contract schedule with the duration of each activity and their interactions, as well as all contractual milestones and deliverables, which will be refined during contract negotiations.

Activities shall be performed in the context of two service contracts. The first service contract covers Phase One and is expected to commence in February 2019 and last 6 months.

## 4 General requirements

### 4.1 Implementation Schedule

The successful Tenderer is 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.

ECMWF has to prepare annual Implementation Plans, which must be approved by the European Commission before they can enter into force. The implementation plans will take full stock of service

reviews, performed thoroughly on an annual basis, as well as of the continuously evolving user requirements and corresponding service specifications. The successful Tenderer shall therefore provide each year for ECMWF approval an updated detailed plan of proposed activities including Deliverables and Milestones, using the Work Package table template in Volume IIIB, which will form part of this Implementation Plan. The successful Tenderer has to report on a quarterly and annual basis (for more details please see Volume V Framework Agreement for this ITT).

## 4.2 Meetings

ECMWF will organise annual meetings to bring together all C3S service providers. The successful Tenderer is expected to attend these meetings. The successful Tenderer is also expected to attend monthly teleconference meetings to discuss C3S service provision, service evolution and other topics that cut across different aspects of C3S. The cost of attending these meetings shall be covered by the successful Tenderer and shall be included in the tendered price. The cost of organising and attending any additional meetings specific to the service provision shall also be covered by the successful Tenderer and shall be included in the tendered price.

In addition, the Standardisation SIS is expected to participate in technical working meetings with the CDS development team – which will also include C3S and relevant collaborators. These discussions will be convened at regular intervals, and most of them will take place by remote participation. In-person meetings organised for this sole purpose are not anticipated to take place more than once a year.

## 4.3 Deliverables

Expected 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.

### 4.3.1 Documents and reports

All project 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 specific contract, deliverables shall be made available to ECMWF in electronic format (PDF/Microsoft Word/Microsoft Excel or compatible).

### 4.3.2 Data sets

It is expected that data sets (including databases) generated or acquired by the successful Tenderer will be delivered via the Climate Data Store. The section below indicates generic requirements for these datasets in terms of standards and conformity.

*Provision of data and products:* Suppliers will make the output of their work available to C3S users via the CDS, by one of two methods:

- a) uploading their data and products to a designated server,
- b) providing them via web services.

In the case of (a), suppliers will have to agree with ECMWF on the data formats to be used. ECMWF will only accept data in formats that follow internationally recognised standards. Such standards must be open (i.e. non-proprietary), managed by a recognised international standardisation body (e.g. ISO, WMO, OGC, etc.), or any de-facto standard. Open source software should also exist that can read and

write files of these standards. Serialisation formats (e.g. NetCDF, XML, JSON) should be supported by standard schemas and conventions. All text-based formats should be encoded in UTF-8. ECMWF will implement tools to check the compliance of the provided data and products to the agreed standards before they are added to the CDS.

Examples of case (a) are data uploaded to the CDS in WMO GRIB edition 1 and 2, NetCDF files conforming to CF-1.6, or greater.

In the case of (b), suppliers will have to agree with ECMWF on the protocols to be used to invoke the web services. ECMWF will only accept protocols that follow internationally recognised standards. Such standards must be open (i.e. non-proprietary), managed by a recognised international standardisation process (e.g. ISO, WMO, OGC, etc), or be a de-facto standard such as OpenDAP. ECMWF will consider using bespoke web-based APIs to access the data and products if they implement very simple protocols (e.g. REST), as long as the results returned by these APIs are compatible with (a). It should be noted that requests for these web services will mostly originate from the Climate Data Store itself, 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. ECMWF will nevertheless collect usage statistics for all aspects of C3S.

Examples of case (b) are OGC standards (WMS, WCF, WFS, etc), OpenDAP, etc. Other protocols could be considered as the system evolves.

Every dataset and/or service provided shall be documented using the appropriate metadata standards (e.g. ISO 19115).

*Provision of processing capabilities:* Suppliers will (when appropriate) implement specific web-service-based data manipulation facilities. These will make it possible to run some agreed reduction and/or analysis algorithms directly on the data and products located on the suppliers' systems, and to return the results of said algorithms.

As for data retrievals, invocation of these web services will originate from the Climate Data Store itself as part of a workflow run on behalf of an end user, and ECMWF will need to have the necessary end-user credentials to invoke these services. ECMWF will not provide information on the end user's identity when invoking the web services. ECMWF will nevertheless collect usage statistics.

ECMWF will ensure that these services are invoked in a controlled fashion, to prevent any misuse of the system. This web services will be implemented with OGC's WPS standards or will be based on simple web-based REST API or equivalent. The results returned by these services will have to be in formats compatible with options (a) or (b) described above.

*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 EC, via ECMWF. Ownership will pass on delivery of the datasets. In return, the suppliers will be granted a non-exclusive licence to use the datasets which they have provided to C3S for any purpose except one which conflicts with the aims of C3S.

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 Tenderers' production system. The identity and ownership of such exceptional components will be passed to the EC via ECMWF annually, but in return the successful Tenderer will be granted a non-exclusive licence to use them for any purpose except one which conflicts with the aims of C3S.

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).

#### 4.3.3 Web services

Web services and/or portals developed under contract with C3S shall be fully integrated in the C3S web portal following the guidance provided in the table below.

<i>Activity</i>	<i>Guidance</i>
<i>Design</i>	The existing templates and styles for the main service website ( <a href="http://climate.copernicus.eu">http://climate.copernicus.eu</a> ) must be used. The ECMWF Copernicus web officer will provide these on request.
<i>Domain</i>	The web-presence will be integrated in the main C3S website.
<i>User journey</i>	The user journey must start on the main C3S website via a dedicated landing page for the project. The sub sub-domain URL should point to this page.
<i>Content</i>	Web content shall follow a template provided by C3S web team.
<i>Navigation</i>	A home button should take users to the main websites' homepage.
<i>Logos</i>	Supplier logos should not appear on the microsites. There will be a page on the service main website that reflects the contribution of suppliers.

*Table 2: Web services*

#### 4.3.4 User support

ECMWF has established a centralised Service Desk to provide multi-tiered technical support to all users of C3S data, products, tools and services. The C3S Service Desk is used for ticketing user requests and distributing these requests to specialists as needed. Dedicated staff at ECMWF provide 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 will 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. Such specialised user support shall take the form of direct response to individual user queries via the C3S Service Desk facility, as well as contributions to FAQs, user guides and knowledge bases.

As part of the bid, Tenderers shall describe the level of user support service on C3S Service Desk tickets (for example, 90% of Tier-2 requests answered within 5 working days), with sufficient flexibility to be improved depending on user requirements. Tenderers shall also address development of user guides and any other form of user support, such as video tutorials, user workshops, etc.

### 4.4 Key Performance Indicators

As part of the bid, the Tenderer shall specify a proposed 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 first 6 months of the contract. Contractors shall report to ECMWF on a set of KPIs suitable for monitoring various aspect of service performance, including (but not limited to):

- Data quality
- Service delivery
- Contract management
- User support

The KPIs will be reported in the Quarterly and Annual reports. At the end of each year, a service readiness review shall take place that will include assessment of performance against the set of KPIs.

## 5 Tender format and content

General guidelines for the tender are described in Volume IIIB. Specific requirements to prepare the bid for this particular tender are described in the next 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.

<i>Section</i>	<i>Page Limit</i>
<i>Track Record</i>	2 (for general) and 2 (per entity)
<i>Quality of resources to be Deployed</i>	2 (excluding Table 1 in Volume IIIB and CVs with a maximum length of 2 pages each)
<i>Technical Solution Proposed</i>	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)
<i>Management and Implementation</i>	10 (excluding Table 3, Table 5 and Table 6 in Volume IIIB) + 2 per each Work package description (Table 4 in Volume IIIB)
<i>Pricing Table</i>	No limitation

**Table 3:** 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 a team providing the skills required for providing operational services that meet the technical requirements set out in section 3. 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.

### 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 plan

The Tenderer shall provide a detailed implementation plan of proposed activities for the duration of the framework agreement. Deliverables should be consistent with the technical requirements specified in section 3.

The Tenderer is requested to include management and implementation activities within a dedicated work package (WP 0). The number of milestones is not restricted, but they 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.

As part of the general project management description the Tenderer shall consider the following elements (this is not an exhaustive list):

- Quarterly, annual and final reports shall be provided in accordance with the Framework Agreement Article 2.3.
- An implementation plan for the year N+1 shall be provided in February of the year N for ECMWF approval.
- Monthly teleconferences with ECMWF and a bid for involvement of ECMWF in major project reviews shall be provided as part of the management plan.
- A proposed payment plan shall be provided as part of the bid. The payment plan shall be based on quarterly payments for routine services work packages and shall be based on milestones completion and associated deliverables for development related activities.
- If relevant, a list of sub-contractors and details of their contribution, key personnel, legal names and addresses shall be provided. The Tenderer shall describe how the Framework Agreement, in particular Clause 2.9, has been communicated down to all their sub-contractors.

The table below provides the template 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. All document deliverables shall be periodically updated and versioned as



described in the table. Tenderers shall provide preliminary versions of the completed tables as part of their bid.

Deliverables for this work package shall include the following reports:

<b>WP0 Contractual Obligations Template</b>				
#	Responsible	Nature	Title	Due
D0.y.z-YYYYQQ	Tenderer	Report	Quarterly Implementation Report QQ YYYY <i>QQ YYYY being the previous quarter</i>	Quarterly on 15/01, 15/04, 15/07 and 15/10
D0.y.z-YYYY	Tenderer	Report	Annual Implementation Report YYYY <i>YYYY being the Year n-1</i>	Annually on 28/02
D0.y.z	Tenderer	Report	Final report	60 days after end of contract
D0.y.z-YYYY	Tenderer	Other	Preliminary financial information YYYY <i>YYYY being the Year n-1</i>	Annually on 15/01
D0.y.z-YYYY	Tenderer	Report	Draft Implementation plan YYYY <i>YYYY being the Year n+1</i>	Annually on 28/02
D0.y.z-YYYY	Tenderer	Report	Finalised Implementation plan YYYY <i>YYYY being the Year n+1</i>	Annually on 31/10
D0.y.z-YYYY	Tenderer	Other	Copy of prime contractor's general financial statements and audit report YYYY <i>YYYY being the Year n-1</i>	Annually
D0.y.z-YYYY	Tenderer	Other	Letter from auditor specific to C3S contract YYYY <i>YYYY being the Year n-1</i>	Annually