

ECMWF Copernicus Procurement

Invitation to Tender



Copernicus Climate Change Service

Volume II

Prototype extreme events and attribution service

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1 Introduction

ECMWF invites tenders for implementation of a prototype extreme events and attribution service for the Copernicus Climate Change Service (C3S). The long-term vision for this service is to provide a wide range of users with timely and reliable information about extreme weather events and how they relate (or not) to anthropogenic climate change. Key user groups include the National Meteorological Services (NMS) in Europe, intergovernmental organisations and other public bodies concerned with impacts of climate change on society, as well as commercial entities e.g. in the legal, health and insurance sectors. C3S also intends to eventually use the service for outreach to the general public, either directly via the media or indirectly via national service providers.

The main objective for the present Invitation to Tender (ITT), which aims to fund one single contract running until the end of June 2021, is to develop a prototype with the initial building blocks needed to implement an operational set of extreme events and attribution service elements, with a particular focus on communication, during the next phase of the Copernicus programme expected to start sometime in 2021. The scope of this tender includes: effective communication on extreme events; development of attribution capabilities; development of relevant data and tools; independent quality control.

2 Background

This Invitation to Tender reflects the outcomes of various consultations and activities previously undertaken by C3S. In October 2017, a workshop was held in Prague with representatives of the attribution science community to survey the current state of attribution science and share lessons learned from initial experiences with operational fast-track attribution, in particular from the World Weather Attribution (WWA) initiative (<https://www.worldweatherattribution.org/>). The workshop delivered several recommendations to C3S:

- Restrict fast-track attribution to certain predefined classes of extreme events, for which the science is sufficiently mature;
- Follow a standardised and continuously reviewed protocol for the entire service chain, addressing event selection, data collection, choice of method, synthesis and communication of results;
- For attribution of specific events, provide coordination and support for local experts whose knowledge and participation is critical;
- Provide access to data and tools to enable downstream development of tailored attribution services, e.g. by national service providers.

On the basis of these recommendations, ECMWF issued a Request For Proposals in April 2018 for a study to help C3S develop detailed requirements and a viable roadmap for implementation of a pilot attribution service. Such a study was carried out between June and December 2018 by the Royal Netherlands Meteorological Institute (KNMI) together with the Environmental Change Institute (ECI) at the University of Oxford and the Laboratoire des Sciences du Climat et de l'Environnement (LSCE). The study involved extensive consultation with potential users and stakeholders via workshops and other means, in particular with National Meteorological Services in Europe that are currently developing attribution services for their local audiences.

The main outcomes of the study have been presented in four report deliverables. Two of the reports describe the proposed scientific foundation for future operational attribution activities and have been submitted to open-access journals for peer review and publication:

- A description of current methods and practices in probabilistic extreme event attribution and lessons learned from WWA experience (COP_039_D1a);
- A proposed protocol for operational extreme event attribution service (COP_039_D1b).

Copies of the submitted reports can be made available, in confidence, by completing Annex 1 attached to this Volume II of the ITT, and sending it via the Messaging Board on the eProcurement Portal.

Two additional reports were produced that contain detailed proposals and recommendations for C3S on implementation of a viable pilot service:

- A description of data and tools needed to enable operational attribution service elements (COP_039_D2; available in Volume II Annex 2);
- A roadmap for implementation of a viable pilot service with recommendations for future service evolution (COP_039_D3; available in Volume II Annex 3).

The latter two reports contain essential background information that has been used by ECMWF to formulate the requirements specified in this ITT. The reports are available to bidders for information only; they do **not** contain binding requirements for tender.

The following section presents **minimum** technical requirements for tender; bidders are encouraged to respond based on their own views, ideas and interpretation.

3 Technical Requirements

The successful Tenderer shall develop and implement a prototype extreme events and attribution service that provides products and services in the following four areas: communication, event attribution; data and tools; quality control. The development of communication protocols and tools suitable for operational services is a prime focus for this ITT.

All elements of the service shall:

- Provide a pan-European and/or global perspective on extreme weather events and their relation to climate change;
- Represent mature science and best practices;
- Follow well-defined protocols and procedures;
- Operate and deliver on predictable timescales;
- Cater to the key user groups described in Section 1;
- Be subject to continuous review and quality control by independent experts;
- Maintain consistency with the C3S vision, objectives and infrastructure;
- Implement safeguards to reputational risks where possible.

In addition, the service shall be designed to:

- Provide a platform ready to accommodate future service evolution;
- Make use of relevant information from other Copernicus services, in particular the Emergency Management Service;
- Adapt to new science and emerging user requirements.

The following subsections list additional implementation requirements for four work packages, with indicative time lines for deliverables.

3.1 Work package 620 – Contract management and technical coordination

Contract management, planning, quality control and risk management shall be covered under Work Package 620. If relevant, this shall also include subcontractor management, including quality checks and controls for a timely delivery.

Besides this, the Tenderer shall specify planned activities related to technical coordination of the work package leaders and include regular review meetings with ECMWF as specified under section 4.3.

The table below provides the template to be used by the contractor to describe the minimum list of contractual deliverables to be submitted in line with the Terms and Conditions (cf. Volume V). All 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 at least the following reports:

Contract management deliverables (not limited):				
#	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

3.2 Work package 621 - Communication

The main objective for this area of work is to provide C3S with the means to communicate science-based information about extreme weather events in the context of climate change, including information on specific events as they occur and what, if anything, can be said about their relation to climate change. Subject to the general requirements listed in Section 3, the successful Tenderer shall:

- Develop information for multiple audiences (ranging from scientists to the general public) on a broad variety of extreme weather events and their impacts (e.g. hydrological), in the form of fact sheets, web content, educational material etc.;
- Ensure that all communication material is coherent in form and appearance, up-to-date and fully consistent in the use of climate information;

- Support all communication aspects of the attribution activities undertaken in this ITT (Section 3.3), including support needed by the receivers of attribution statements;
- Contribute to the development of an extreme events database (Section 3.4) and ensure that all communication material accurately links to the content of the database.
- Develop a communications protocol involving C3S and other stakeholders, such as National Meteorological Services.

Deliverables shall include:

- Fact sheets, web content, educational material (starting M3);
- Attribution statements and result summaries, first demonstrating capacity for past events and subsequently for real-time events dependent on review - see WP 623 (starting M12).
- Communications protocol (M18)

3.3 Work package 622 - Attribution

The main objective for this area of work is to develop the ability for C3S to provide timely and reliable statements on the relationship between actual extreme weather events and climate change. Subject to the general requirements listed in Section 3, the successful Tenderer shall:

- Implement and refine an end-to-end protocol covering all aspects of rapid attribution of extreme weather events;
- Develop and organise the workflows, staffing and coordination needed to implement the protocol in an operational environment;
- Demonstrate reliability and performance of the protocol by simulating rapid attribution studies on past extreme weather events;
- Conduct a number of real-time rapid attribution studies focused on selected extreme weather events with demonstrated reliability.

Deliverables shall include:

- Documentation of the protocol and operational workflows (starting M3);
- Periodic reports on protocol reliability and performance (starting M6);
- Specification of criteria for selection of extreme events for real-time attribution (M9);
- Periodic reports on individual attribution studies, first demonstrating capacity for past events and subsequently for real-time events dependent on review - see WP 623 (starting M12).

3.4 Work package 623 - Data and tools

The main objective for this area of work is to provide data and tools in the C3S Climate Data Store (CDS) needed to support attribution studies, with a particular focus on communication. Subject to the general requirements listed in Section 3, the successful Tenderer shall:

- Develop, in agreement with ECMWF, a long-term strategy for utilising the CDS to support extreme events attribution, including a roadmap outlining initial steps to be implemented for the prototype service;
- Develop, and publish in the CDS, an extreme events database providing data and information needed to support the communication activities in this ITT (Section 3.1);
- Develop CDS tools and applications that utilise the extreme events database to support production of the communication material developed in this ITT (Section 3.1);
- Support integration of essential data and tools for attribution studies in the CDS catalogue, possibly including user support.

Deliverables shall include:

- Long-term strategy for CDS utilisation (M3);
- Plan for CDS data, tools and applications for the prototype service, including a protocol for their ingestion into the CDS following CDS requirements (M3);
- Extreme events catalogue (initial CDS version M9);
- CDS tools and applications for communication (starting M9).

3.5 Work package 624 - Quality control

The main objective for this area of work is to ensure that the C3S extreme events and attribution service is transparent and consistent with the best available science and practices. Subject to the general requirements listed in Section 3, the successful Tenderer shall:

- Appoint, in agreement with ECMWF, an independent Advisory Board charged with:
 - conducting periodic assessments of the prototype service and providing guidance on attribution science and communication;
 - providing independent reviews of all communication material developed in this service (in addition to the routine reviews done by ECMWF as part of contract management);
- Organise a workshop on attribution science and services involving the scientific research community as well as users of attribution services (M13 or M14);
- Submit a journal article describing the scientific basis of the service for peer review and publication (in time for publication by M18).

The Tenderer shall provide the names and a resume of the CV of all members proposed for the Advisory Board. The members of the Advisory Board shall be independent from the prime and subcontractors and should not be involved in the implementation of the contract. The size of the Advisory Board shall be determined based on availability and needs but shall at least include two experts from different entities.

At least 3 Advisory Board meetings (via teleconference or physical meetings) shall be organised by the successful Tenderer and planning shall be aligned according to the key milestones of the contract. ECMWF shall be invited to all Advisory Board meetings and shall be included in all communications. The Tenderer shall allocate travel and subsistence costs for Advisory Board members as appropriate. Advisory Board members shall not receive fees from the contract budget.

Deliverables shall include:

- Distribution to ECMWF of output from the Advisory Board (e.g. assessment reports) (starting M6);
- Workshop report with recommendations (M15);
- Peer-reviewed journal article published (M18);
- Service Evolution Strategy (SES) document (M18)

4 Other Tender Requirements

4.1 Schedule

ECMWF intends to award a framework contract for a duration of 21 months. A detailed time plan and schedule (Pert and Gantt charts) shall be included in the tender response. The proposed time plan and schedule shall address the main tasks, inputs, outputs, intermediate review steps, milestones, deliverables and dates. It is encouraged to provide some checkpoints in the project plan, where after

discussion with the C3S team decisions can be made on the further way forward. It would possibly lead to such optional work packages, which can be already anticipated at this phase of the project.

4.2 Reporting

Regular (monthly) progress meetings will be held with ECMWF during the contract to assess project status, risks and actions. The successful Tenderer has to report on a quarterly and annual basis and add contribution to C3S reporting for past and future activities (for more details please see Volume V Framework Agreement for this ITT).

4.3 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 required 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 each successful Tenderer and shall be included in the tendered price. The cost of organising and attending any additional meetings required to carry out the contracted activities shall also be covered by the successful Tenderer and shall be included in the tendered price.

5 Tender Format

General guidelines for the tender are described in Volume IIIB. Specific requirements to prepare the proposal 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>Executive Summary</i>	2
<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 is excluded from the page limit and has no page limit)
<i>Management and Implementation</i>	10 (excluding Table 4 and Table 5 in Volume IIIB) + 2 per each Work package description (Table 3 in Volume IIIB)
<i>Pricing Table</i>	No limitation

Table 1: 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. The Tenderer shall describe the experience of the Service Manager and of the technical project team in performing activities related to the various aspects of this tender.

5.2.4 Technical Solution Proposed

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

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 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 may be requested, depending on needs for service evolution, or changed user requirements, as agreed between the European Commission and ECMWF.

Contract management, quality control and risk management shall be specified in the tender. If relevant, a list of sub-contractors describing their contribution and key personnel, legal name and address shall be provided. The Tenderer shall describe how the Framework Agreement (in particular Clause 2.9) has flowed down to all their sub-contractors and how responsibilities and roles are distributed.

5.2.6 Price and payment specifications

The tendered price shall be based on expected efforts in terms personnel, travel and other direct costs for all work packages, tasks and deliverables as detailed in the Pricing Tables.

Payments shall be conducted on a 'firm fixed price' basis as agreed upon during a negotiation phase. Payment milestones shall be aligned with the implementation milestones as proposed in the implementation plan.