Senior Scientist or Scientist (2 positions) - Data Assimilation for atmospheric composition emissions

1. Position information

Vacancy No.: VN21-36	**Department:** Copernicus
Grade: A3 or A2	**Section:** Copernicus Atmospheric Monitoring Service Development
Job Ref. No.: STF-PL/21-36	**Reports to:** Head of Section
Publication Date: 13 July 2021	**Closing Date:** 30 August 2021
Location: Bonn, Germany	

2. About ECMWF

ECMWF is the European Centre for Medium-Range Weather Forecasts. It is an intergovernmental organisation created in 1975 by a group of European nations and is today supported by 34 Member and Co-operating States, mostly in Europe. The Centre's mission is to serve and support its Member and Co-operating States and the wider community by developing and providing world-leading global numerical weather prediction. ECMWF functions as a 24/7 research and operational centre with a focus on medium and long-range predictions and holds one of the largest meteorological archives in the world. The success of its activities relies primarily on the talent of its scientists, strong partnerships with its Member and Co-operating States and the international community, some of the most powerful supercomputers in the world, and the use of innovative technologies such as machine learning across its operations.

Over the years, ECMWF has also developed a strong partnership with the European Union, and for the past seven years has been an entrusted entity for the implementation and operation of the Climate and the Atmosphere Monitoring Services of the EU Copernicus Programme, as well as a contributor to the Copernicus Emergency Management Service. The collaboration does not stop there and includes other areas of work, including High Performance Computing and the development of digital tools. It is enabling ECMWF to now provide data and products covering weather, climate, air quality, fire and flood prediction and monitoring.

ECMWF has recently become a multi-site organisation, with its headquarters based since its creation in Reading, UK, its new data centre opening in 2021 in Bologna, Italy, and new offices, also opening in 2021 in Bonn, Germany.

For details, see **www.ecmwf.int/**.

Copernicus is the European Union (EU) flagship Earth-observation programme. The Copernicus programme ensures operational monitoring of the atmosphere, oceans, and continental surfaces and provides reliable, validated information services for a range of environmental and security applications. Based on the exploitation of space based and in situ observations and models, Copernicus provides information services for land, marine, atmospheric and climate monitoring, as well as emergency management and security.

For details, see **www.copernicus.eu/.**

The Copernicus Atmosphere Monitoring Service (CAMS) service provides consistent and quality-controlled information related to air pollution and health, solar energy, greenhouse gases and climate forcing, everywhere in the world.

For details, see **atmosphere.copernicus.eu/**

The Copernicus Climate Change Service (C3S) service provides authoritative information about the past, present and future climate, as well as tools to enable climate change mitigation and adaptation strategies by policy makers and businesses.

For details, see **www.climate.copernicus.eu/**

3. Summary of the role

As part of the second phase of the CAMS programme, ECMWF is leading the development and implementation of exciting new Earth monitoring services to monitor anthropogenic emissions of CO_2, CH_4 and various atmospheric pollutants. Using satellite-based observations (retrievals) of atmospheric concentrations for deriving emission estimates requires the development, implementation, and testing of novel data assimilation techniques to extend the capabilities of the current ECMWF data assimilation system. Monitoring emissions is important by itself, but better observation-based emission estimates will also improve the CAMS atmospheric composition forecasts. It is thus a very important aspect for CAMS going forward.

A small team has been established, especially in the context of the Horizon2020 **CHE** and **CoCO2** projects, to develop the prototype system for a new emission monitoring capacity within ECMWF's Integrated Forecasting System (IFS). While the main focus of those two research projects is on CO_2, the development is being extended to also include CH_4 and pollutants that can be measured from space, such as NO_2, CO, SO_2, and aerosol.

To expand and strengthen the team, we are looking to fill two position by individuals who are keen to apply their scientific expertise to develop and deliver new operational services.

The Scientist (Grade A2) role will support the further development and testing of these new emission estimation capabilities as well as the technical efforts towards their seamless implementation in the ECMWF data assimilation system. The developments will partly rely on efforts and developments carried out at ECMWF and partly on externally procured contributions, which need to be contractually managed and integrated in the IFS. In addition, the successful applicant will support the implementation and monitoring of new satellite instruments in the CAMS operational forecasting system as well as related data assimilation developments. The successful applicant will work as part of a dedicated team that also collaborates with other teams at ECMWF as well as at partner institutes and contractors.

The Senior Scientist (Grade A3) role will, in addition to the tasks described above, support the Head of Section with the coordination and planning of the relevant activities. For this purpose, the successful applicant shall bring proven scientific leadership in the area of data assimilation and/or inverse modelling for greenhouse gases and/or air quality applications.

Candidates may be considered for the A3 Senior Scientist position where they demonstrate how their knowledge, skills and expertise meet the role requirements.

Both positions are in the CAMS Development Section of the Copernicus Department.

4. Main duties and key responsibilities

For both positions:

- Contributing to the technical developments required for the implementation in the ECMWF IFS of new algorithms for the estimation of natural surface fluxes and anthropogenic emissions of atmospheric composition species

- Contributing to the assessment and testing of emission and flux estimation algorithms in the framework of the IFS, with a view to their operational implementation

- Implementing and testing of new satellite data streams of atmospheric composition in the IFS

- Contributing to the further development of the general data assimilation methodology for atmospheric composition observations

- Providing technical input into the contractual management of external CAMS contracts that are within the expertise of the successful applicant

Senior Scientist position, Grade A3

In addition to the above:

- Providing support to the Head of Section with the coordination and planning of the activities related to estimating emissions and surface fluxes of atmospheric composition in the IFS

5. Personal attributes

- Excellent analytical and problem-solving skills with a proactive approach, together with an interest in identifying, investigating and solving technical challenges

- Dedication, passion and enthusiasm to succeed both individually and as a fully integrated member of the team

- Good interpersonal and communication skills, particularly listening to and respecting the views of others

- Ability and willingness to collaborate with internal and external experts on related aspects of IFS data assimilation system development

- High level of organisation with the capability to work efficiently and complete diverse tasks to tight deadlines

6. Qualifications and experience required

Education	**Scientist, Grade A2:** A university degree (EQF Level 6) or equivalent, in a discipline related to atmospheric science, physics, or computational sciences. **Senior scientist, Grade A3:** An advanced degree (EQF Level 8) or equivalent, in a discipline related to atmospheric science, physics, or computational sciences.

Experience	Demonstrated experience of several years in data assimilation or inversion problems in geosciences is essential.
	Experience with developing and maintaining large scientific codes in Fortran and/or C++ in High Performance Computing environments.
	Experience in atmospheric data assimilation and modelling of greenhouse gases and/or air quality would be an advantage.
	Senior Scientist:
	Demonstrated scientific leadership and extensive track record in the area of atmospheric composition (greenhouse gases and/or air quality) data assimilation and inverse modelling.
Knowledge and skills (including language)	Ability to work in a Linux-based environment.
	Candidates must be able to work effectively in English and interviews will be conducted in English.
	A good knowledge of one of the Centre's other working languages (French or German) would be an advantage.

7. Other information

Scientist, Grade A2:

The successful candidate will be recruited at the **A2** grade, according to the scales of the Co-ordinated Organisations and the annual salary will be **EUR 75,178.92** net of tax.

Senior Scientist, Grade A3:

The successful candidate will be recruited at the **A3** grade, according to the scales of the Co-ordinated Organisations and the annual salary will be **EUR 92,770.32** net of tax.

These positions are assigned to the employment category **STF-PL** as defined in the Staff Regulations.

Full details of salary scales and allowances are available on the ECMWF website at **www.ecmwf.int/en/about/jobs**, including the Centre's Staff Regulations regarding the terms and conditions of employment.

Starting date: 1 November 2021, or as soon as possible thereafter.

Length of contract: Four years with the possibility of extension.

Location: The roles will be based in Bonn, Germany.

Successful applicants and members of their family forming part of their households will be exempt from immigration restrictions.

8. How to apply

Please apply by completing the online application form available at **www.ecmwf.int/en/about/jobs.**

To contact the ECMWF Recruitment Team, please email **jobs@ecmwf.int.**

Please refer to the ECMWF Privacy Statement. For details of how we will handle your personal data for this purpose, see: https://www.ecmwf.int/en/privacy.

At ECMWF, we consider an inclusive environment as key for our success. We are dedicated to ensuring a workplace that embraces diversity and provides equal opportunities for all, without distinction as to race, gender, age, marital status, social status, disability, sexual orientation, religion, personality, ethnicity and culture. We value the benefits derived from a diverse workforce and are committed to having staff that reflect the diversity of the countries that are part of our community, in an environment that nurtures equality and inclusion.

Applications are invited from nationals from ECMWF Member States and Co-operating States, listed and all EU Member States:

Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Hungary, Germany, Greece, Iceland, Ireland, Israel, Italy, Latvia, Lithuania, Luxembourg, Montenegro, Morocco, the Netherlands, Norway, North Macedonia, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Applications from nationals from other countries may be considered in exceptional cases.