**Job Title**

Research position for a climate forecaster – R2

#### **About the host institute - BSC**

BSC-CNS (Barcelona Supercomputing Center – Centro Nacional de Supercomputación) combines unique high performance computing facilities and in-house research departments on computer, life, and Earth sciences, and computational applications, counting more than 400 researchers and students from more than 40 different countries. BSC-CNS has been accredited as one of the first eight Severo Ochoa Centers of Excellence. This award is given by the Spanish Government as recognition for leading research centers in Spain that are internationally well known institutions in their respective areas. BSC-CNS is the National Supercomputing Facility in Spain and manages MareNostrum, one of the most powerful supercomputers in Europe. The mission of BSC-CNS is to investigate, develop and manage information technology in order to facilitate scientific progress. To get an idea of what it is like to work at the BSC take a look at this video:<https://www.youtube.com/watch?v=VRkEii7OzRE>

#### **Context**

Within the Earth Sciences Department of Barcelona Supercomputing Center (BSC-ES), led by Prof Francisco Doblas-Reyes, the climate prediction group, led Dr. Pablo Ortega and Dr. Markus Donat, aims at developing climate prediction capability for time scales ranging from a few weeks to a few decades (sub-seasonal to decadal climate prediction) and from regional to global scales. This objective relies on a deep analysis of the strengths and weaknesses of state-of-the-art climate forecast systems, via a thorough comparison with the most up-to-date observational datasets, and on exploiting these detailed analyses to refine the representation of processes relevant to climate in our forecast systems and their initialization. The group activities focus both on understanding climate variability and the sources of predictability and improving forecast quality.

Positioned at the cutting-edge of climate prediction research, the climate prediction group is composed of nearly 20 scientists, most of which are early-career scientists, and combines a large variety of expertise on climate processes from the stratosphere down to the deep ocean and from tropical to polar latitudes, together with expertise in climate modelling and data assimilation.

The group can rely on a team of more than 15 engineers and technicians to support the computer infrastructure in place, improve the computational performance of the climate model and develop new tools required by the scientific team. It also collaborates closely with the climate services group within the department, providing top-notch climate information to a large variety of stakeholders. Finally, the group is part of the development team and a key user of the EC-Earth European global climate model and as such collaborates closely with all the members of the EC-Earth consortium.

Particular attention is paid to the career path of the scientists, who are given gradually increasing responsibilities within the group and in the context of both national and international projects. Outstanding opportunities exist for establishing links with other international climate research institutions and, if interested, to participate in the tutoring and monitoring of master students and early-career scientists.

#### **Key duties**

The position offered is funded by the European H2020 project **EUCP**, which will develop an innovative European regional ensemble climate prediction system based on a new generation of improved and typically higher-resolution climate models, covering timescales from seasons to decades initialised with observations, and designed to support practical and strategic climate adaptation and mitigation decision-taking on local, national and global scales.

The successful applicant will be responsible for the development and analysis of seasonal-to-decadal climate forecast system based on the EC-Earth climate model, which includes the BSC contribution to the DCPP CMIP6. The job will involve the realisation of the following tasks:

* Support the production of atmospheric initial conditions using openIFS
* Contribute to performing ensemble decadal predictions following the [component A of the DCPP experiment](https://www.wcrp-climate.org/dcp-overview) with EC-Earth.
* Develop alternative initialisation approaches using coupled data assimilation (full-field nudging) and perform the corresponding set of decadal predictions.
* Assess the ability of the climate forecast system to simulate unprecedented and extreme events, as well as trends, in particular over the Arctic region, and to reproduce the main variability modes (AMV, IPO, AO, El Niño–Southern Oscillation (ENSO)).
* Evaluate forecast quality (both skill and reliability) on a range of time (seasonal to decadal) and spatial (local to global) scales.
* Produce a process-based analysis of forecast drift and initial shock in the DCPP multi-model ensemble
* Compare the skill in initialised and non-initialised global predictions for overlapping prediction time scales and estimate their relative merits.

The candidate will work closely with scientists within the Earth System Service group of the Earth Science Department, and other partners within the EC-Earth consortium EUCP and the DCPP initiative.

**Requirements**

Education

* PhD in atmospheric science, applied mathematics, engineering, fluid dynamics or in a related discipline

Essential Knowledge and Professional Experience

* Proven ability to prepare and submit manuscripts to peer-review journals
* A demonstrated ability to develop experimental set ups that address specific climate modeling problems
* Experience in ocean/atmosphere modelling (or environmental modelling) and in handling climate model output
* Programming skills: scripting (e.g. bash, python), data analysis and visualization software (e.g. CDO, NCO, R, Python, NCL)
* Experience in handling large datasets, and a minimum knowledge of NetCDF encoding
* Experience in HPC and parallel computing (multi-threaded applications)

Additional Knowledge

* Interest and capacity in participating in the writing and, when possible, leading the preparation of research and computing proposals
* Knowledge of version control systems (git, svn, cvs…)
* Interest in tutoring and/or advising master and PhD students

Competences

* Fluency in spoken and written English, while fluency in other European languages will be also valued
* Highly collaborative spirit and ability to work as part of a large, strongly-coordinated team and to continuously share both knowledge and tools
* Ability to work as an active and collaborative team member to help in the delivery of shared objectives and to efficiently communicate results

#### **Conditions**

* The contract will be for one year initially, with the possibility of renewal for 2 years depending on performance
* A competitive salary will be offered, matched to the cost of living in Barcelona, and commensurate with the value and experience of the candidate
* The applicant will work at the BSC (Barcelona, Spain) within the Earth Sciences Department
* The position will start as soon as possible

#### **Application procedure**

All applications must be uploaded before October 1st (2018) to XXXX, including:

1. A motivation letter.
2. A full CV including contact details.
3. Two reference contacts.