### **Job Title**

Research scientist position on global ground-breaking high resolution ocean-atmosphere modelling

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

BSC-CNS (Barcelona Supercomputing Center – Centro Nacional de Supercomputación) is the National Supercomputing Facility in Spain and was officially constituted in April 2005. BSC-CNS manages MareNostrum, one of the most powerful supercomputers in Europe, located at the Torre Girona chapel. The mission of BSC-CNS is to investigate, develop and manage information technology in order to facilitate scientific progress. BSC combines HPC service provision and R&D into both computer and computational science (life, earth and engineering sciences) under one roof and currently has over 400 staff from 41 countries. To get an idea of what it’s like to work at the BSC take a look at this video: https://www.youtube.com/watch?v=VRkEii7OzRE

#### **Context and Mission**

Within the Earth Sciences Department of Barcelona Supercomputing Center (BSC-ES), led by Prof Francisco Doblas-Reyes, the climate prediction group, led by Virginie Guemas and Pablo Ortega, aims at developing a climate prediction capability for time scales ranging from a few weeks to a few decades into the future (sub-seasonal to decadal climate prediction) and from regional to global scales. This objective relies on expanding our understanding of the climate processes responsible for the predictable part of the climate variability through a deep analysis of the strengths and weaknesses of state-of-the-art climate forecast systems in comparison with the most up-to-date observational datasets, and on exploiting these detailed analyses to refine the representation of these climate processes in our climate forecast systems and their correct initialization. We use the EC-Earth European global climate model (http://www.ec-earth.org) for our developments and collaborate closely with all the members from the EC-Earth consortium. EC-Earth couples IFS (atmosphere), NEMO (ocean) and LIM (sea ice) through OASIS. Standard resolution (~100km) and high resolution (~25km) versions are routinely used and a ground-breaking (~15km globally) resolution version has recently been developed at BSC.

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. Achieving our objectives rely on the combination of a large variety of expertise on climate processes within our group from the stratosphere down to the deep ocean and from tropical to polar latitudes, together with expertise on climate modelling and data assimilation.

Particular attention is paid to the career path of the group members, 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 early-career scientists. This position requires participation in the PRIMAVERA project funded by the European commission (https://www.primavera-h2020.eu/). PRIMAVERA aims at improving the representation of climate processes in climate models through the use of ground-breaking resolutions, novel approaches to represent physical processes and their uncertainties and original sensitivity experiments to diagnose strengths and weaknesses of state-of-the-art climate models. This position presents an opportunity to work alongside a wide range of leading, international climate specialists delivering innovative climate science research. The incumbent will enjoy joining one of the leading and most dynamic European groups in the field of climate predictions.

### **Key Duties**

The successful applicant will calibrate and test the T1279 / ORCA12 ground-breaking resolution version of EC-Earth, improve the online postprocessing of its outputs and run simulations following the HighResMIP protocol with this version, to assess its added-value compared to standard and high resolution. This objective lies in the forefront of the current race toward a more realistic representation of small scale features and their non-linear interactions with large-scale ocean and atmosphere circulations. The performance assessment of this new configuration will rely on the tools already developed by the group members and on the implementation of new process-based diagnostics to be included in these tools. The applicant will be involved in collaborative work with other partners within the EC-Earth consortium, NOCS, MERCATOR and PRIMAVERA partners.

### **Requirements**

* Applicants must have a PhD in physical oceanography, atmospheric physics, fluid dynamics, applied mathematics or in a related discipline. Ideal candidates will have several of the following attributes:
* A specific interest in numerical mathematics and scientific computing would be advantageous.
* A demonstrated ability to develop experimental set ups that address specific climate modeling problems.
* Extended knowledge of bash, R, cdo, nco and Python.
* Knowledge of version control systems (git, svn, cvs…)
* Experience in handling large databases, and a minimum knowledge of NetCDF encoding.
* Proven ability to prepare and submit manuscripts to peer-review journals.
* Interest and capacity in participating in the writing in and, when possible, leading the preparation of research and computing proposals.
* Fluency in spoken and written English, while fluency in other European languages will be also valued.
* Capacity to interact and build strong relations with both climate and computer scientists.
* Experience in HPC and parallel computing (multi-threaded applications)

This position implies becoming part of dynamic, multi-national research group that performs cutting-edge, highly-demanding climate prediction experiments. The candidate should be able to work as an active and collaborative team member to help in the delivery of shared objectives ant to efficiently communicate results. Hence, the ability to work as part of a large, strongly-coordinated team and to continuously share both knowledge and tools is an essential aspect required.

#### **Conditions**

* The contract will be for two years initially, with the possibility of renewal 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.

#### **Applications Procedure**

All applications must be uploaded before September 24th to XXXX, including:

1. A motivation letter.

2. A full CV including contact details.

3. Two reference contacts.