SPECS/PREFACE/WCRP Workshop on Initial Shock, Drift, and Bias Adjustment in Climate Prediction

Barcelona, 10-11 May 2016

Guidance document

Workshop description

Coupled general circulation models used to produce climate forecasts exhibit strong climate biases, which can induce forecast drift toward the model attractor when these climate models are initialized from an estimate of the observed climate state. The drift occurs most of the times in the presence of a certain degree of initial shock, which is the result of fast and slow adjustments of the model dynamics to the perturbations introduced in the initial conditions. The drift is pervasively present in all climate prediction systems and is expected to be responsible of a large part of the systematic errors and an unknown part of the random errors found in the forecasts. Hence, it is unknown to a large extent how initial shock and the drift affect the forecast quality. In spite of this, little has been done to reduce it.

Some solutions have been considered, although they are not widely used yet. For instance, coupled initialisation aims at testing initialisation approaches looking for a compromise between the best estimate of the state of the system, which will be obtained with the current tools of data assimilation applied to each model component, and an initial condition that eliminates the initial shock and controls the impact of the drift on the model dynamics.

The main goal of this workshop is putting in common the current strategies to understand the physical processes behind the initial shock and drift in dynamical climate prediction for all time scales and to formulate recommendations that will guide international future research activities. The question of bias adjustment will be considered as a necessary tool to engage with the users of the resulting climate information.

This workshop builds on the ideas already explored in FP7 projects like SPECS (www.specs-fp7.eu) and PREFACE (preface.b.uib.no) where the drift of operational and quasi-operational climate forecast systems have been analysed. It also aims at presenting the initiative of the World Climate Research Project Working Group on Seasonal to Interannual Prediction (WGSIP) to characterise the initial shock and drift of sub-seasonal to decadal prediction experiments and to analyse their causes. This initiative is also known as transpose-CMIP.

The workshop is structured in sessions with scientific talks and breakout group (BOG) sessions addressing three scientific topics

- Strategies to reduce the initial shock

- Forecast drift and stationary systematic error
- Bias adjustment

The outcome of the workshop will be a brief report addressed to the scientific community and the main funding bodies with a set of recommendations of what are the most urgent actions to make progress in this rapidly-evolving field. This will also help WCRP, international and national initiatives in its own reflection on future activities and the major areas where efforts in research, modelling, analysis and observations are needed.

Workshop participants are expected to provide their views on debates held on the three topics chosen, which are considered as essential for the progress in dealing with this pervasive problem in climate prediction. Existing scientific material and challenges will be briefly described at the beginning of the workshop.

Workshop structure

Presentations

There will be presentations of 15 minutes plus questions covering the three topics, which will set the scene. Material from the presentations will be made available from the workshop web site bsc.es/earth-sciences/events/specsprefacewcrp-workshop.

Breakout groups

A substantial part of the workshop will be devoted to the BOG sessions. All BOGs will report back during a plenary session.

Each BOG will have one or two chairs selected among those volunteering. The chair has freedom to organise the session and could schedule presentations during the BOG session. One of the chairs will act as rapporteur. An agenda will be prepared in consultation with the scientific organising committee. Chairs are particularly encouraged to engage with early-career scientists during the BOGs. More specifically, the role of the chair is to:

- Prepare a loose agenda for the BOG
- Guide the discussions, keep the discussions focused, avoid too large distractions
- Address different views and maintain balance
- Steer the group towards a set of agreed key points (available a priori from the workshop web site), which will be presented to the plenary
- Provide input to the workshop report

As for the BOG rapporteur, his/her role will be to:

- Take notes of the discussions
- Prepare the bullet list to be presented to the plenary
- Prepare a 1-2 page summary of the discussions together with the BOG chair

BOG chairs have prepared a few slides as impulse to start the discussion, which have at least a question to answer. The objective of the BOG is provided in short sentence examples (i.e. experiences from your project work, approaches, particular methods, etc.) for the present

situation and future (recommendations). For instance, you might want to consider the following questions “Do you have identifiable gaps?” “Which methods or techniques would be ideal to have?” “What are your visions?”.

The rooms will be equipped with a laptop where you will be able to display Powerpoint or pdf files. All the material shown during the discussions should be saved on the desktop.