



Understanding and Representing Atmospheric Convection across Scales

Announcement of Workshop: call for participants

The Met Office, Exeter – 2 February 2015

The Met Office and Natural Environment Research Council (NERC) invite applications to attend a one day workshop for researchers, to contribute ideas which will be used to develop a programme of research. The goal of this programme is to make significant improvements in the representation of convection in the UK's weather, climate and Earth system models across a range of spatial scales. Although the detailed scope and structure of the programme will be determined on the basis of ideas developed at this workshop, the science objectives must be clearly routed towards the overarching aim outlined above. The programme will not involve making new observations.

This is a new programme funded through the NERC Joint Strategic Response process. NERC is making a £5M investment over 5 years. The Met Office will be committing matched resources to this programme.

The deadline for applications is 4pm on 15 December 2014.

Approach

The programme will be commissioned in two calls.

- a) This first call invites individuals to a workshop which will determine focus areas of the programme.
- b) A second call will invite consortia to bid for funding. The details of this call will be determined after the workshop.

Workshop attendees will be permitted to apply for funding as part of a research programme, in response to a competitive call for proposals. Absence from the workshop does not preclude bidding into the call that will follow the workshop.

The Research Challenge

Weather and climate models are critical to society's ability to reduce the impacts of hazardous weather and inform decisions regarding mitigation of and adaptation to climate change. The representation of convection remains the key error in weather and climate models, which limits our confidence in predictions and thus their value for decision-making on timescales from days to decades.

The key issue in representing convection in global models is that the resolutions of these models are too coarse to represent individual convective systems. Instead, models rely on physically based parametrizations of convection. However, these parametrizations are based on paradigms developed 30-40 years ago in which convection was represented as a one dimensional, balanced problem between atmospheric instability and the convection required to remove that instability. Much more is now known about convection, how it is intimately related to the local dynamics and how it is organized on a range of space and timescales from the diurnal cycle of precipitation to synoptic scales such as tropical storms or the Madden-Julian Oscillation. These outdated paradigms have been identified as a major blockage to more skillful and reliable weather forecasts and climate predictions, in which realistic simulations of convection and the regional water cycle are of fundamental importance.

The goal of this programme is to significantly improve the representation of convection across a range of scales (primarily 1 to 100 km grid lengths) in the UK's weather, climate and Earth system modelling systems. The programme aims to deliver better understanding of convective processes and their interactions with atmospheric flows and the translation of this understanding into new convection parameterization schemes.

The new approaches are likely to include an improved representation of:

- (a) the fluid dynamics of convection itself, including entrainment, downdraughts, cold pools, and gravity waves;
- (b) the temporal and spatial scales of convection;
- (c) the role of additional processes in controlling the organization and location of convection;
- (d) the interaction of convection with the larger-scale atmospheric flow; and
- (e) the way in which new convection parametrizations interact with the model dynamics, in particular within the Met Office Unified Model.

These are therefore likely key topics in the science programme. However, the exact scope of the research will be determined through consultation with the science community at the workshop.

This programme seeks to bring together expertise from both the NERC and Met Office community to deliver strategic, world-leading research aimed at making a step change in our ability to predict weather and climate impacts.

Workshop Details

The workshop will run over one day on **2 February 2015**.

Our aim is to bring together the leaders in the field of atmospheric convection to scope out the programme and decide on some key work package topics.

The agenda of the workshop will include:

- Introduction
- The science challenge
- Defining the scope of the programme
- Identifying the structure of the programme
- Discussing implementation of the programme and ensuring successful integration between partners which is critical to the delivery of this programme.

The outcome of the meeting will be a defined programme of research informed by members of the science community. It is anticipated that this will also be a good opportunity for researchers to discuss forming consortia to apply for the next stage.

Location and Date

The workshop will take place at the Met Office, Exeter, on 2 February 2015.

An application will be taken to mean availability for this date, and a definite commitment to attend. Full details of the venue, agenda etc. will be provided to all participants.

Travel and hotel expenses where required for attendees will be covered by NERC in line with the NERC policy on recovering travel and subsistence.

Application Procedure

To attend the workshop you must complete the expression of interest ("Eoi") proforma, following the instructions provided on the form. The proforma, together with a CV of no greater than 2 sides of A4, should be sent to Simon Howe (atmospheric@nerc.ac.uk) by 4pm on 15 December 2014. Invited participants will be notified in the week commencing 5 January 2015.

Assessment Criteria

Applications will be considered by a joint NERC and Met Office panel. The final decision on the selection of delegates lies with this panel.

Overall, the selection panel will seek to ensure that a balance of expertise and representation from different institutes is present at the workshop; their assessment will be based on the following criteria:

- specific expertise relevant to the topic of the workshop;
- the potential to contribute to the improvement of the representation of convection in weather and climate models;
- the ability to develop new and highly original research ideas;

Please ensure you fully complete the application form, as this is the information, together with your CV, on which potential workshop attendees will be selected.

Contact details

For further information please contact:

NERC: Simon Howe
Email: atmospheric@nerc.ac.uk
Tel: 01793 418015

Met Office: Jemma Gornall
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