

**FINAL, version 2**

**Response to MOSAC**

1. Computer requirements.

MOSAC noted that no discussion of computer requirements had been presented in 2007. They also suggested that insufficient consideration had been given to model efficiency on massively parallel computers.

*Response:* Additional resources have been allocated in FY08/09 (and beyond) to seek improved efficiency of code on the supercomputer. At the next MOSAC meeting, we will provide a presentation on computer resources and on how we plan to optimise their use. This will cover different scenarios for long-term plans and aspirations for supercomputer power.

2. Seamless prediction strategy.

MOSAC considered that there was a gap in the strategy for forecasting from 15 days to longer scales, including the role played by ECMWF products. They noted the increasing interest in “seamless prediction” and listed several science issues which should be carefully considered as part of such a strategy.

*Response:* One of the main strengths of the Met Office's R&D is the use of the same basic prediction model for weather and climate, over timescales from hours to centuries. This gives us a strong potential for seamless prediction shared by few other centres. Nevertheless we agree that our strategy for forecasting capability at ranges from 15 days up to seasonal has not been thoroughly articulated internally, nor has it been presented to MOSAC. We will develop such a strategy in preparation for the next MOSAC meeting. We propose to present it in two parts:

- our strategy for generation of a “seamless” set of forecast products, from the medium-range to seasonal, including our use of ECMWF products and our plans for the use of multi-model ensembles,
- the science strategy required to deliver these products, including the status of and plans for our operational seasonal forecasting system (based on the HadGEM3 coupled modelling system) and discussion of the key scientific issues raised by MOSAC, i.e. the extent to which ocean coupling is needed on the shorter timescales, the upper “lid(s)” for weather and climate models, new parametrisation developments, the effect of the middle atmosphere on forecasting beyond the first week, and NAO and blocking.

We are also planning to establish a new group, based in the Hadley Centre but working closely with Met R&D, on “Scale Independent Model Assessment”. This group will help address some of the scientific issues in using models of different resolutions and complexities as part of a “seamless prediction” process.

3. Collaborations.

Whilst welcoming the extent of collaboration listed by the Met Office, in particular the collaboration with other NMSs using the UM, MOSAC commented that they would like to improve their understanding of how the Met Office sees itself as part of the global meteorological community. They also reflected concerns that increased collaborations would provide constraints on the development of the UM system and

that wider use of the UM within the UK could be overlooked in the enthusiasm for new relationships.

*Response.* We agree that there is a risk that the advantages of collaboration could be outweighed by the additional costs and constraints. We have experience of this problem through the tensions involved in developing the UM simultaneously to meet imperatives of weather and climate programmes. Nevertheless, we will attempt to learn lessons from other centres involved in similar partnerships (e.g. ECMWF/Meteo-France, HIRLAM partnership). Concerning collaboration within the UK, discussion with NERC is ongoing, and the joint supercomputer procurement will facilitate enhanced collaboration. We will report to the next MOSAC meeting on the progress of our UM collaborations and the approach to handling these tensions, and we will provide a clear statement on our international relationships.

#### 4. Boundary layer R&D.

MOSAC noted that the top priority reported by the Head of Forecasting was for improvements in boundary layer representation and prediction, and they asked to see the development of a coherent plan in this area.

*Response.* Our plans will be revised to take account of this concern. At the next MOSAC meeting, we will provide a presentation on boundary layer R&D.

#### 5. Observation-Based Research.

MOSAC suggested that, with a new leader of the OBR theme, it would be opportune for a new strategy to be developed. It accepted the offer of a presentation at the next meeting.

*Response.* This will be prepared.

#### 6. Land surface R&D.

MOSAC welcomed the formation of a Land Surface Development Group. It noted short-term developments to cope with immediate problems and looked forward to seeing a prioritised programme providing the necessary longer-term solutions.

*Response.* We are devoting more resources to this area internally, and we also expect to benefit from enhanced external collaborations.

#### 7. Kilometre-scale modelling.

MOSAC noted plans to integrate kilometre-scale modelling into other R&D themes, when the 1.5 km model became the basic model for forecasting UK weather.

However they cautioned that it would be wise to retain within the programme an overview mechanism for R&D at this scale.

*Response.* We accept this guidance. Kilometre-scale NWP will continue to be the focus of work at JCMM, where close collaboration occurs naturally. However, we will need to create an overview mechanism for work at this scale between Reading and Exeter, and between different groups/themes in Exeter. To this end, we will consider the creation of an appropriate steering group.

#### 8. Observational capability in support of kilometre-scale NWP.

MOSAC suggested that other operational observation systems may be required in support of NWP at this scale, and suggested that collaboration with NERC/academia should be sought now in the technical development of innovative observational capability.

*Response.* The Observation Programme is actively considering the evolution of the

UK observing network for the coming decade. In doing so they are paying attention both to increasing demands of NWP, in response to the increasing resolution of NWP models, and also to the need to have cost-effective systems. We will continue to assess the capabilities of known technologies and keep under review the gaps in the observational requirements that are not met by these technologies. We will also improve our dialogue with the NERC/academic community on these issues in order to stimulate research to fill identified gaps.

9. Paperwork and presentations for MOSAC.

MOSAC commented on improvements in the paperwork for the meeting but noted that quality of some figures still needed attention. They also reminded presenters that they should assume that MOSAC members had read all the papers provided; presentations need not repeat them but should highlight major points and issues, allowing ample time for discussion.

*Response.* We will remind all authors/presenters of this guidance.