

13th Met Office Scientific Advisory Committee Meeting (13-14 November 2008)

The 13th meeting of MOSAC was attended by 9 committee members, 7 Chief Scientist equivalents from other meteorological services (2 of whom are UM users) and 2 from UK Universities/NERC. As last year, the context for the discussions was provided by the Corporate Strategy and the service requirements of the primary government customers, and this was aided by the involvement of the Head of Forecasting and the PWS Manager.

The overall view of the committee on the forecasting performance of the Met Office, the plans for NWP R&D and the parts of this research that it discussed in detail was very positive. The Committee were very pleased to note that comments it had made in previous meetings were well reflected in aspects of the Programme. It was noted that the MetO global NWP scores continued to be second only to ECMWF and the changes made to the forecast suite this year appeared to have a significant positive impact. On the UK scale recent changes in index have been small as the focus has moved to km-scale modelling which holds great promise for the future.

The continuing relevance of the R&D Programme was supported by measures of its pull through with 86% of the projects estimated as having led to positive impact on the forecast scores within 5 years, including 48% with significant impact. 73 journal papers had been published so far this year, comparable with last year and probably just adequate for the 250 scientists involved. More impressively, 126 papers in the last 10 years have had more than 15 citations.

The low UK precipitation scores for some recent months were seen to be largely due to general problems in representing convective rainfall in north-western UK islands, allied to a strong sensitivity of the score used to such errors. Short-term measures to improve the scores should not detract from long-term solutions to the model problem. They also cautioned that great care was needed in setting achievable targets for the accuracy KPT so as to avoid forcing the Met Office into implementing unscientific fixes.

A more significant problem for forecasters that has defied many years of research aimed at its amelioration is the prediction of the occurrence of boundary layer stratus cloud, particularly in an easterly flow. Stratus cloud prediction is an important problem from weather to climate time-scales. The Cardington balloon facility has gathered an unmatched set of observed data over many years describing the boundary layer in such situations. The possibility was raised that this might be the time to propose a coordinated, collaborative attack on this problem. The Committee would like to hear about progress in this area again next year and would like to see a clearer focus on this topic in next year's plan.

Allied to the giving of severe weather warnings based on the ensemble prediction system is the problem of false alarms. Too many false alarms act to decrease the value of, and attention paid to, severe weather warnings. The calibration of the system for deriving warnings from the numerical forecasts can only be done properly through a programme of reforecasting many situations in the past in which such severe weather did and did not occur. However, the extent of such reforecasting needs careful consideration as it is expensive on computer time, particularly as in theory it should be repeated whenever significant changes are made to the forecast system.

The fruitful discussion that took place in the MOSAC meeting raised the question whether the Met Office should arrange regular occasions in which the dialogue between senior forecasters and R&D personnel could occur.

MOSAC was impressed with a document that showed the extent of the UK and international scientific collaborations, many involving use of the Met Office models. They considered that this was extremely beneficial for both the Met Office and the collaborators. They suggested that mechanisms should be put in place to handle the tensions that will occur between wanting to make internal progress, such as rapid inclusion of improvements into prediction models, and the support overheads and inertia implied by having this larger community of users. The documentation of each part of the R&D Programme should include references to significant collaborations as well as having them in the summary document.

The fact that the Met Office are in a superb, and probably unique, position to exploit the increasingly discussed seamless nature of the weather-climate prediction problem, but that this was not occurring to the extent that it should, had been highlighted previously by the Committee. However it was delighted to find that it was now clear that the situation has been recognised and that relevant actions were being taken. This sharing of R&D advances will have major benefit to the prediction on all time-scales from days to decades. It will also lead to major institutional benefits, acting to create a more unified Met Office R&D, involving both the Hadley Centre and NWP scientists, and creating more opportunity for staff movement between them.

The Committee noted, however, that more effort would be needed in coupled ocean-atmosphere data assimilation. They reiterated previous advice that the Met Office should look at the benefits of ocean-atmosphere coupling for short-range forecasting, especially in the Tropics. They were also disappointed to note that there was as yet no corresponding seamless observing strategy.

The Committee heard about the R&D observational programme that includes the aircraft jointly owned with NERC and the Cardington balloon facility. It felt that the case for the aircraft was rather under-played as it is in reality an extremely strong one, and would like to see an information paper prepared for the Board on its operation and benefits. It was pleased to hear that there are negotiations with NERC to enhance collaboration of the Cardington facility, and that a draft joint science plan exists, and that it includes a proposal for NERC-funded staff at Cardington. The Committee thought that it was timely to produce a strategy for the whole of the Met Office R&D observational programme, whilst recognising that advantage has to be taken of the opportunities for synergy with other observational platforms in international observational experiments.

As in previous years, the Committee stressed the importance of extra observational information for gaining the maximum benefit out of the 1.5km UK model, and that continuing effort will be required to obtain and assimilate additional data.

The Committee welcomed the announcement of the new supercomputer system, with the enhancement of factors of 6 in 2009 and a further 3 in 2011. It appreciated all the work that had gone into the procurement process and that will be needed for its successful installation. Thinking ahead for the case for further future enhancement, aspects such as the scalability of the code and the algorithms required to take advantage of the massively parallel systems that are likely to be available cannot be left for major consideration at some date nearer the time. It suggested that

discussion should take place as soon as possible with the Research Councils concerning possible programmes that they might develop to open these topics to the wide academic community.

In addition to requesting to hear about any initiatives aimed at solving the stratus problem and progress on a strategy for the Met Office R&D observational programme, the Committee should also like to have satellite sensors on the agenda for next year.