WGNE assessment of Quantitative Precipitation Forecasts from Operational Numerical Weather Prediction Models over the U.K.

Paul Earnshaw*, Marion Mittermaier and Clive Wilson
Met Office, FitzRoy Road, Exeter, EX1 3PB, UK.

The forecasts of daily precipitation accumulation from the 12 UTC run of 7 global, operational numerical weather prediction models were verified over the U.K. While the exercise has been in progress since 2000, we show results from January 2003 to June 2005 (slightly different samples between models because of transmission problems). The model data were up/down-scaled by box-averaging to a common resolution of $96 \times 96\ km^2$. The forecasts were compared against upscaled daily accumulations derived from quality controlled and corrected radar observations ([1]) comprising the British Isles and adjacent waters.

The statistics of daily accumulations reaching a set of thresholds has been computed on the basis of monthly and total contingency tables. Plots of Frequency Bias, Odds Ratio and Equitable Threat Score (ETS) are presented.

Figure 1 shows that at the lower end of the threshold range ($\leq\ 2mm\ day^{-1}$), all bar one model overforecasts the number of events. However, all models show the highest accuracy at these thresholds (from maximum ETS). At the higher thresholds, the tendency for over and underforecasting events is split equally amongst the models. The skill of forecasting the events and the accuracy of the forecasts shows a degree of variation amongst the centres. The models with the higher resolutions and more sophisticated assimilation systems appear to be the better performers in this respect.

While it is not shown, the monthly timeseries of these scores shows a high degree of variability, of which some can be attributed to the seasonal cycle of precipitation over the U.K. The seasonal cycle in the scores shows better forecasting of precipitation during winter than during summer. This is explained by the difference in the type of weather experienced in these seasons, winter is characterised by the more predictable large-scale cyclonic depressions and the summer by less predictable small-scale convective showers. The latter of these two cases is not particularly well forecast by any of the global models where the grid scale is much larger than the convective scale.

References

[1] D.L. Harrison, S.J. Driscoll, and M. Kitchen. Improving precipitation estimates from weather radar using quality control and correction techniques. *Meteorol. Appl.*, 6:135–144, 2000.

 email: paul.earnshaw@metoffice.gov.uk

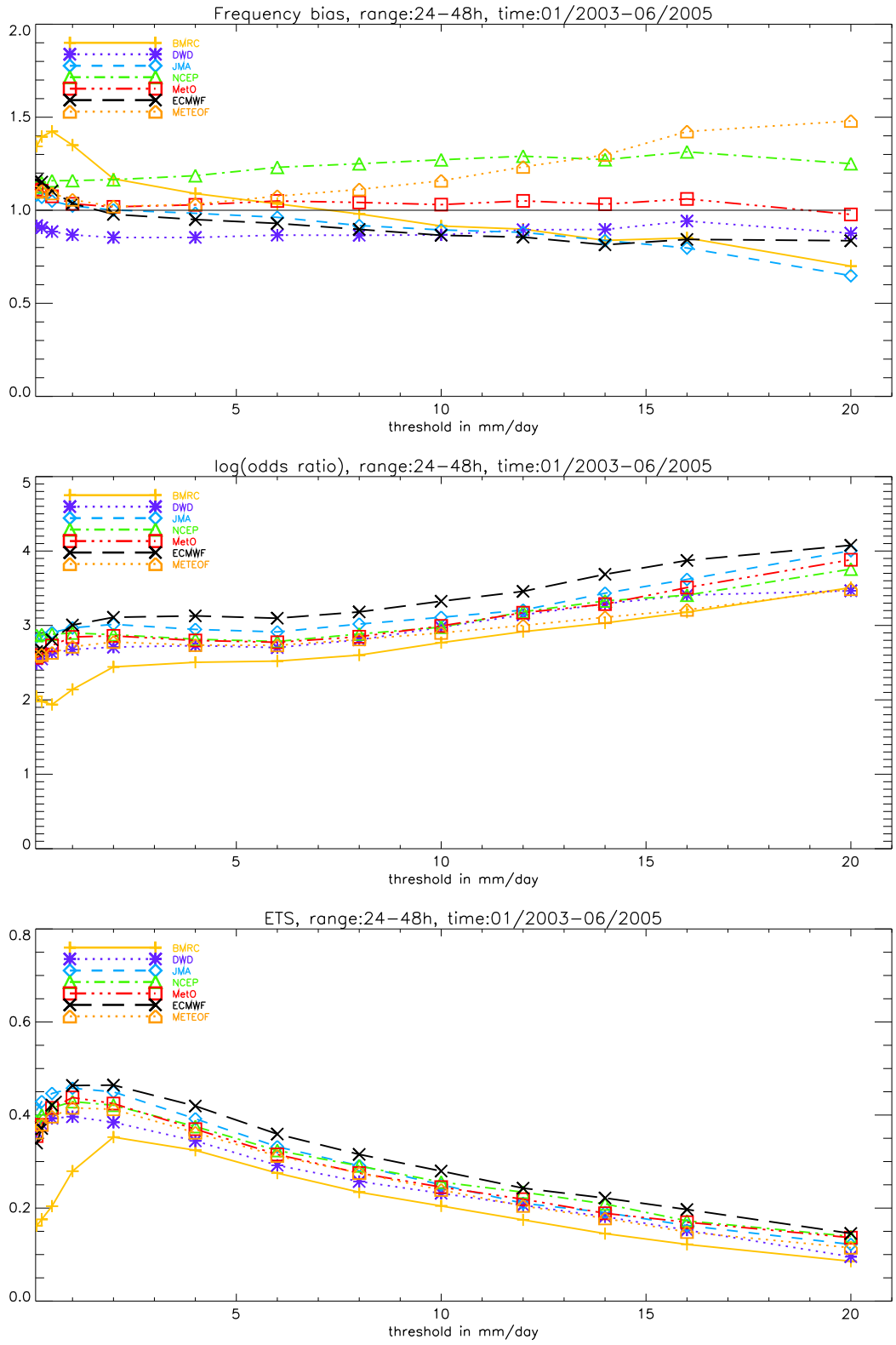

Figure 1: Frequency bias, Log(Odds Ratio) and ETS for the 7 participating centres. The forecast is an accumulation from 24 to 48 hours averaged over the period Jan 2003 to June 2005.