

Assessment of precipitation forecasts from operational NWP models over the UK

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During 2004 an European model intercomparison of precipitation forecasts was begun, with the 10 km ALADIN (Meteo France), the 7 km Lokall Model (LM) from the DWD, the 22 km reference HIRLAM (FMI) and the 12 km mesoscale Unified Model (MES). Early in 2005 the 7 km MeteoSwiss version of the LM, aLMo was also added to the comparison. The aLMo is different to the LM as it uses ECMWF boundary and initial conditions. The contributing weather services have password-protected access to a web page hosted by the Met Office where the monthly results are posted. The intercomparison aims to verify the daily accumulations produced by the various models against the UK NIMROD radar-rainfall composite over a large part of the UK. At present the 00Z runs are compared. All the models as well as the 5 km by 5 km radar composites are upscaled to the 22 km HIRLAM grid.

Figure 1(a) shows model-forecast performance using the log-odds ratio with error bars (Stephenson, 2000) as a function of threshold for the entire time series, and (b) shows the same in terms of the equitable threat score (ETS). The monthly time series of the log-odds ratio at 0.2 mm and 12 mm are shown in Fig. 2(a) and (b). Although the time series are still too short to identify trends it clearly shows the variation in skill at intra-seasonal, seasonal and inter-seasonal time scales.

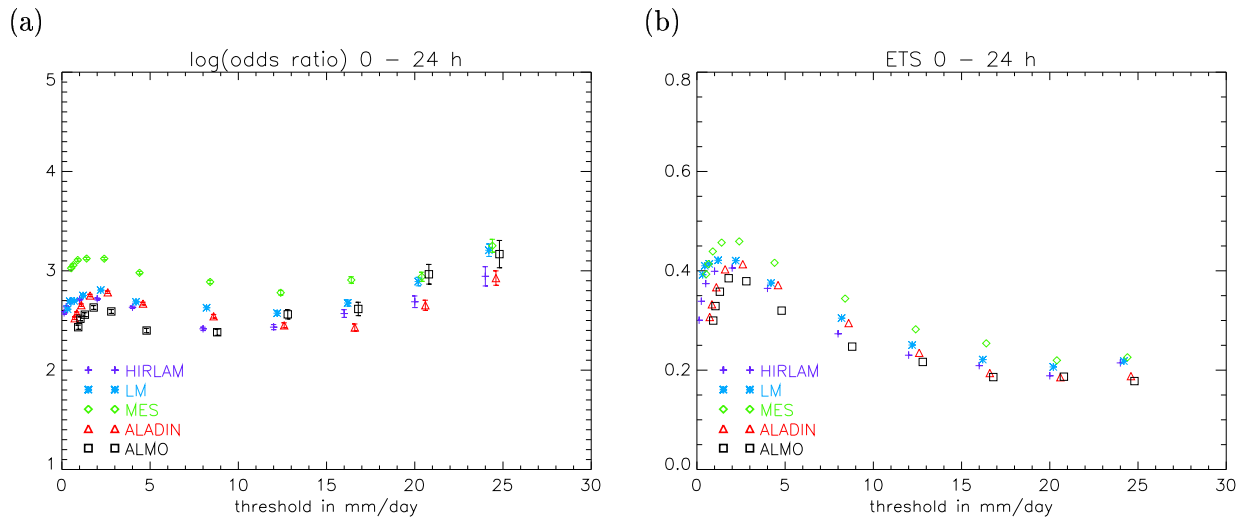


Figure 1: Scores as a function of threshold: (a) log-odds ratio and (b) equitable threat score (ETS) for the period January 2004 to June 2005.

Heavy rainfall between 6–8 January 2005 resulted in accumulations between 40 and 150 mm which led to flooding in north-western England (Carlisle). Figure 3 shows the daily accumulations from various European models (to indicate the coverage) along with the radar accumulation. On the 7th the dry conditions in the south-east are only captured by the UM and the ALADIN. The others show signs of showery outbreaks (aLMo) or more uniform rain. Orographic enhancement is over-estimated by the LM, aLMo and ALADIN (grey areas with > 128 mm).

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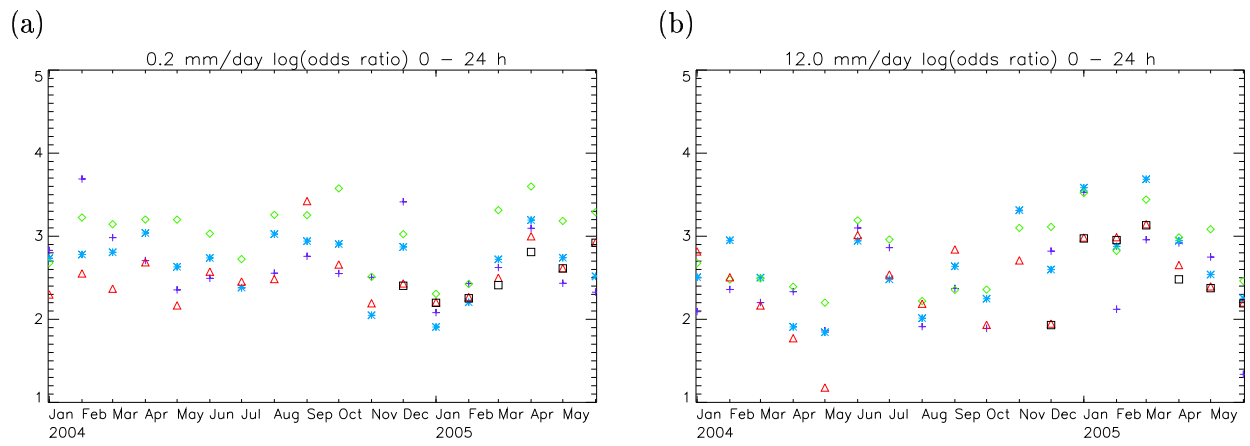


Figure 2: The time series of monthly log-odds ratios: (a) 0.2 mm and (b) 12 mm.

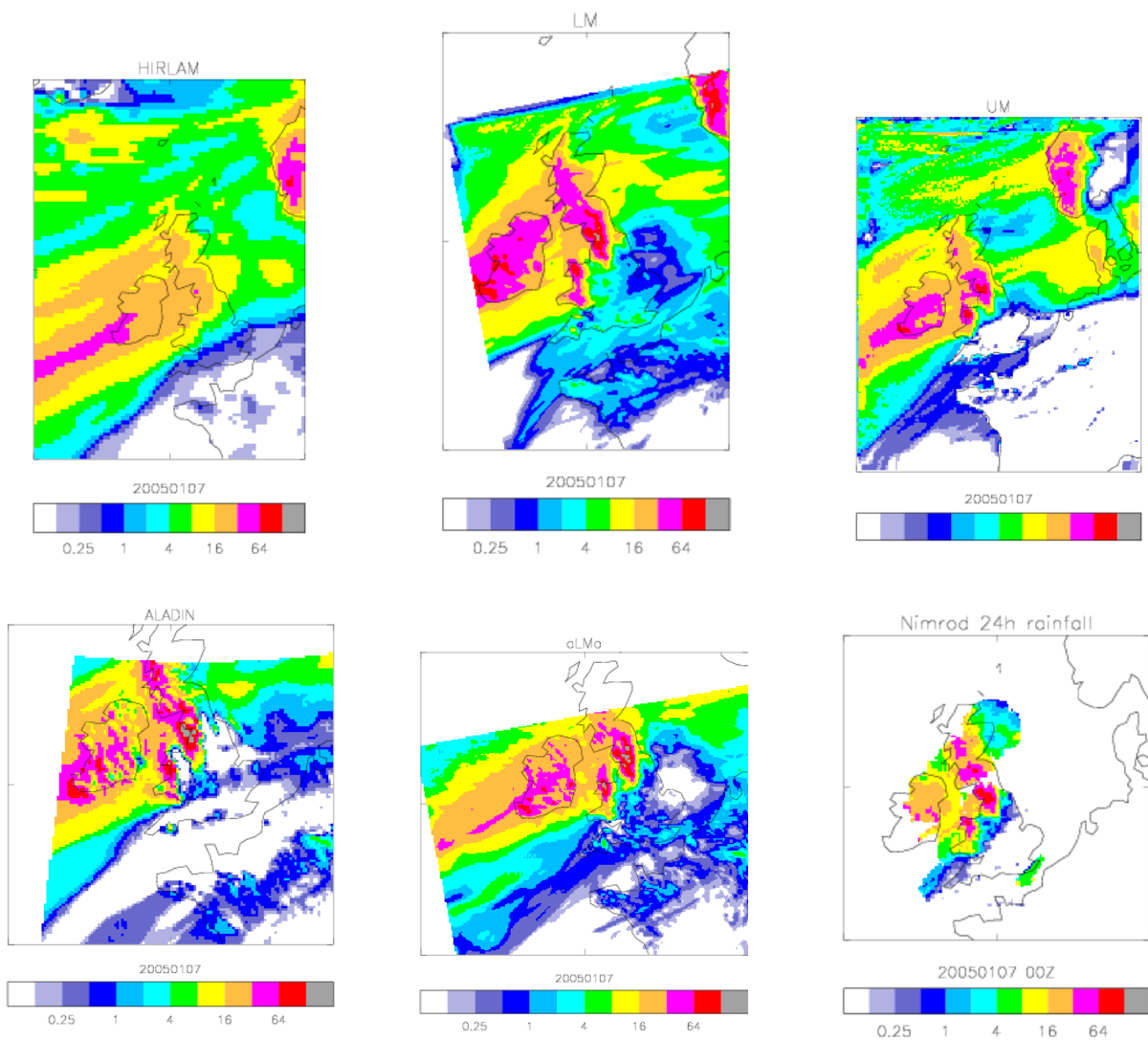


Figure 3: Twenty-four hour accumulations from five European limited-area models for 7 January 2005 along with the verifying radar accumulation.

References

Stephenson, D. B. (2000). Use of the "odds ratio" for diagnosing forecast skill. *Weather and Forecasting*, **15**, 221–232.