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**Geoscientific
Model Development
Discussions**

Interactive comment on "Forecasts covering one month using a cut cell model" *by* J. Steppeler et al.

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Answer to Referee2: 1 The following text to be included at appropriate places: Steppeler et al (2011) did a similar study using a much smaller area. The present study does a further step towards investigating the effect of cut cells for forecasts longer than one day. In Steppeler et al. (2011) the differences between the two model versions were partly due to different reactions of the models to lateral boundaries. The larger area used now make the solution less dependent on lateral boundaries. This is therefore a further step towards a test of cut cells for five-day forecasts and climate. For the final test it will be aimed at 100 cases using meso-scale resolution and an area of a similar size as in the present paper. 2 The technique of cell combination is not described in the 2006 paper. Information on cell merging will be given here in section 2. The technique is the same as used by Yamakasi and Satomura (2008), though we apply it in the horizontal only. This technique goes back to a private communication of

Toro (2001). Toro at this time gave a lecture course of one week. Unfortunately there are no published lecture notes. Cell values of the combined cells are obtained by averaging. The time derivatives are then obtained for the small cells using large cell values. 3 The slope angle is smaller than 45 degrees. The LM is unstable for higher slopes. With realistic orography slopes higher than 45 typically occur with resolutions of about 1 km. Our orography with 25 km must be steeper than that of Sundquist (1976). In fact many idealized computations show good accuracy, when using the reference profile of the model identical to that of the actual atmosphere (Yamakasi and Satomura ,2008; Steppeler et al., 2002). This choice is not available for realistic models on large areas. With realistic orography and coarse mesh modelling the error is given by Sundquist (1976). For fine mesh models the steepness becomes larger. Therefore a higher error may be expected. For the 1 km scale the LM would become unstable with unfiltered orography. Even after filtering a considerable remains. The idealised tests of Steppeler et al. (2006) used a rather smooth mountain. The inclusion of the technical error corrections is obvious.

Interactive comment on Geosci. Model Dev. Discuss., 6, 625, 2013.