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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Technical Note: Description and assessment of a nudged version of the new dynamics Unified Model" *by* P. J. Telford et al.

Anonymous Referee #1

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The authors describe the implementation of the nudging technique in the "New Dynamics UM" general circulation model in grid-point representation and analyse its impact. Not surprisingly they find that with the nudging of ERA-40 reanalysis data into their model, the resulting model meteorology better represents the ERA-40 data compared to without nudging. The analysis is overall clear and sound and I recommend to publish the manuscript in ACP after some minor revisions:

1. The term "ERA-40 analysis data", which is used throughout the text is somehow misleading or inconsistent. Usually the dataset is called "ERA-40 reanalysis data", but simply "ERA-40 data" is also sufficient.

2. p. 17263 line 2; p. 17275 lines 13 and 17: I recommend to replace "validate" by "evaluate" or "evaluation", since it will never be possible to validate a model.

3. p. 17264 lines 12-14, "The different orographies ... result in errors ...": Please explain this statement in more detail for those readers who might not be experts in interpolation techniques.

4. Figure 1: most of the axes labels are unreadable; it would be nice to have a approximate altitude axis (as in Fig.2) which I think was intended anyway.

5. p. 17268 lines 24-26; "The increase below ... is a result of errors ...": Please explain this in more detail and/or provide an example.

6. p. 17269 lines 3-5; "The low values of ... sea surface temperatures.": If I understand correctly you prescribe the same sst in both the nudged and the non-nudged simulation? Doesn't this low RMSE then simply imply that there is already a high consistency between the HADISST and the ERA-40 data? And that the influence of nudging is here negligible?

7. p. 17269 lines 7-9; "These differences probably ... between the UM and ECMWF models.": Please explain in more detail what you mean here.

8. p. 17269 lines 16-18; "The RMSE of p_s shows a small decrease ... it is unaffected by nudging.": Either I do not understand this sentence at all, or it contains a contradiction; does it decrease or is it unaffected? Please reformulate this sentence.

9. p. 17270 lines 23-24; "In the stratosphere the unadjusted model is slightly better at reproducing the variablity." Compared to what? Certainly not compared to the "nudged model" as would be a contradiction to the figure. Do you mean that in the stratosphere the unadjusted model is better than in the troposphere? Please clarify.

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Interactive Comment

10. Fig. 4: Should the isotherms (as mentioned in the caption) not be the same in both panels ?

11. Fig. 10 and page 17272 lines 19 ff: Can you explain the zig-zag curvature between 8 and 46 km altitude, especially in October and January?

12. page 17273 lines 25-27: For this statement - which is only partly true - the wrong reference has been chosen. In Lelieveld et al. (2007) the maximum altitude of nudging was not varied (it was at 200 hPa), however, in Jöckel et al. (Atmos. Chem. Phys., 6, 5067-5104, 2006) the maximum nudging altitude has been changed from 100 hPa to 200 hPa.

13. Fig. 11: Just for completeness. What are the dotted lines in the figure?

Interactive comment on Atmos. Chem. Phys. Discuss., 7, 17261, 2007.