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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Assimilation of stratospheric and mesospheric temperatures from MLS and SABER into a global NWP model" *by* K. W. Hoppel et al.

Anonymous Referee #3

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General Comments

The paper describes an extension of the NOGAPS forecast model for the middle atmosphere that now assimilates satellite data from the stratosphere and mesosphere. The paper discusses a specific case in NH winter during a period of high dynamic activity. Although this article reports on a large and ambitious research project, the paper itself reads more like a progress report than a completed scientific study. For example, the study uses outdated SABER data, considers only a single case, and does not track down other sources of middle atmosphere data for validating the analyses.

Specific comments

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Discussion Paper

1. The inclusion of the vibrational exchange in the SABER non-LTE temperature retrieval, as discussed in Section 3.3 and in the comment by Feofilov (8 May) and the authors' response (13 May), is not the only difference between version 1.06 (used here) and the current version of SABER temperature (version 1.07). Other differences are described in the paper mentioned in the authors' response that has been submitted by Ellis Remsberg and colleagues to Journal of Geophysical Research. An expansion of Section 3.3 to summarize these differences would be appropriate.

2. (p. 8461; l. 12) The infrequent (two hour) update of the heating can affect the forcing of tides in the stratosphere which, in turn, will lead to temperature errors in the model upper mesosphere, particularly in the tropics.

3. (section 4.2) As the authors note, there are few other temperature measurement for the mesosphere for validating the model. However, there are other fields that would be effective for assessing the model performance. For example, both SABER and MLS measure ozone, which is also simulated by the model. In addition, and perhaps more valuable for evaluating model dynamical forecasts, wind data for the upper mesosphere are available from the TIDI instrument on TIMED. There are also ground-based radars that collect near-continuous horizontal wind data at a number of sites, most in the Northern Hemisphere.

4. It was not clear what is happening in the lower atmosphere during the middle atmosphere assimilation run. It seems from Section 3.1 that other measurements are assimilated below 50 hPa just as in the normal NWP model but this is not explicitly stated. One of the stated goals of the middle atmosphere data assimilation is to improve extended-range weather forecasts; can the authors comment on whether this happens in the present case?

5. (caption to Figure 7) typo? "Global average" in three different latitude bands.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8455, 2008.

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Interactive Comment