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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Nitric acid in the stratosphere based on Odin observations from 2001 to 2007 – Part 1: A global climatology" *by* J. Urban et al.

Anonymous Referee #3

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The authors show an interesting results of the spatial and seasonal variation of stratospheric HNO3 from Odin/SMR observations from 2001 to 2007 as well as comparing with UARS/MLS HNO3 climatology. These observations should be very useful to evaluate the atmospheric chemistry models (ie. CCMs and CTMs) later on. The objective of the paper is quite clear. In general, I find that this is an interesting study, and the issue has a wider interest to the scientific community for the validation of the measurements and the models. My major concern is that the authors did not emphasis the importance of this study to improve our scientific understanding about HNO3 related processes and also usefulness of the Odin/SMR stratospheric HNO3 climatology compare to UARS/MLS. The manuscript should be published in ACP after revision.

1) It should be better to emphasis and focus on the motivation in the last paragraph after line 25 in Page 9571.

2) The authors need to discuss more about HNO3 retrieval for Odin/SMR in Section 2.1.

3) Is there any improvement for the HNO3 retrieval in Chalmers version 2.0? What has changed compared with previous version(s)? It is worth to mention what major progress in the version 2.0 retrieval.

4) In Fig.1, Can you explain why the observed HNO3 at 520K is so low in late Winter/early spring for the Antarctic winters 2006 and 2007 but relative high in 2002 and 2004? What caused the low HNO3 values in the middle stratosphere (ie.1200K) in Antarctic winter 2006 compared to other Antarctic winters?

5) The definition of HNO3 anomaly calculation in Fig.2 and 3 is unclear. The authors mentioned that it is "the differences from the average profile", but I am not sure how to get "average profile". Does "average" here mean that you get daily HNO3 means over the available period from 2001-2007 or calculate it in another way?

6) Is it necessary to use the new term "reversed tape-recorder effect"? It maybe make readers confused. Actualy it is the descent effect.

7) Can you explain why tropical HNO3 from Odin is 1-2ppbv higher than UARS/MLS?

8) It would be better to add some implication of using Odin/SMR climatology in the section "summary and conclusion" rather than just summary the results.

Minor comment:

1) Abstract: Page 9570, line 15-19 is very long and confusing, need to reword it.

2) Page 9570 Line 6:

Change (˜1.5-60hPa) to (˜75-1.5 hPa)

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3) Page 9570 Line 53: add "+2Cl2O2" ClOx=Cl+ClO+2Cl2O2

4) Page 9571 Line 23-25. What is the precision of HNO3 above 30 Km.

5) Consistent expression,

Sometimes it shows Odin, while it shows Odin/SMR. Similarly, the authors say "UARS climatology" but then say "MLS climatology". I think that term should be consistent in the whole paper.

6)Page 9572: Figure 1:

Colour bar should be from 0 to 3 ppbv at 1200 K. 7) Page 9572, line 18-19,

what is "similar magnitude"?

8) Page 9575 Line 23:

Change "profile" to "profiles"

9) P5576 Line 25. It need to change "excellent" to "better". In the SH, there is still ~ 3ppbv difference from September to November at 40S-60S.

10) Page 9577, Line 7-10,

need to rewrite the sentences about "slightly large minumum values" and "systematically slightly lower by....".

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 9569, 2008.

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