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Comment

Interactive comment on “Odin stratospheric proxy NO_y measurements and climatology” by S. Brohede et al.

Anonymous Referee #2

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1 General comments

The paper introduces a proxy data set of stratospheric NO_y based on 5 years of satellite data with good coverage and a photochemical box model. Different methods for estimating missing species are evaluated by comparison with simultaneous satellite measurements of the most important nitrogen species. The dataset is proposed to be useful for validation of chemical circulation models. Unfortunately it is not possible to find it on the given website. Is it at the Chalmers link?

The paper appears to be a useful contribution to ACP after some revision for clarifications on effects of polar stratospheric clouds, the vertical coordinate system, and more

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consistency between text and figures.

2 Specific comments

In the abstract the remark on the flaws in the Antarctic vortex of CMAM is not necessary. Like it is written now it is misleading.

Page 5851, line 18: It might be added: “, however, perturbed by a major volcanic eruption”.

Page 5855, section 2.3: Add at the beginning: “If NO_y should be derived from ODIN data only;”. Does the box model consider heterogeneous reactions on PSCs and aerosol? A short remark on this would be useful. The introduction of ‘pressure altitude’ in UARS-style is confusing here. I suppose, the satellite data are given on altitude. This is also in contradiction to the text on page 5865 where ECMWF temperature data are used for conversion. Please clarify, messing the different definitions of pressure up can introduce large errors.

Page 5856, line 25f: In a CCM the expression “well-mixed greenhouse gases”, a slang word of tropospheric climate modellers, is not useful. Future scenarios are not of interest here but ‘REF2’ was used because for the period to 2005 no ‘REF1’ data were available. The text might be modified here.

Page 5858, line 2: The lifetime of NO_2 against photolysis is in the order of 100 s. Figure 3 gives the impression that O_3 needed in Eqn. R10 is taken from OSIRIS, it would be useful to repeat this after Eqn. R10. Also it should be repeated that total chlorine in the model is constrained by tracer correlations to N_2O (from SMR?).

Page 5864, line 12f: What means F-M northern latitudes? The region 30N to 90N? Please clarify. I suppose differences in that region are again related to PSCs and/or

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NO_x from the upper atmosphere.

Page 5864, line 20: Is pressure taken from this estimate or calculated as described on the next page?

Page 5868, line 18 to page 5869, line 7: The neglect of sedimentation of PSC particles (and NO_y in the form of NAT) is not state of the art (see page 5556, line 15ff) and is the main reason for the differences of CMAM to the satellite data in Figure 11. This was visible and stated in the draft version, now the interpretation is rather fuzzy. The text should be shortened here using a clear statement. Then it is OK to grey out the region where the model is far off.

Page 5869, line 8ff: Showing results on equivalent latitude might reduce differences in Arctic winter considerably. Did you look on that?

Page 5871, line 9f: Is there something missing, I don't understand the meaning of this sentence.

Page 5871, line 14f: There are publications based on MIPAS data showing an enhancement of HNO₃.

Page 5872, line 6: Address neglect of sedimentation of solid particles, modify also at the end of the section.

Page 5875, line 11: Reference missing.

Page 5885: Which mean? At the fixed local times of observations?

Page 5886: A typical line or range in the lower right panel would be a helpful addition to the numbers in the caption.

Page 5890: Caption appears to be inconsistent with text. Is the upper row with or without F-M-30N-90N? Please define more clearly.

Page 5895: Numerical problems!

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3 Technical corrections

Page 5859, Eqns. 2-5: The subscript in $\text{NO}_\alpha^{\text{Odin}}$ (and the following variables) should be replaced because it is difficult to distinguish from σ . Something like NO_{Rest} would reflect more the meaning. Also parentheses around the ratio in Eqn. 2 would be helpful for understanding.

Page 5860, line 6: Typo.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 5847, 2008.

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