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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Interaction of chemical and transport processes during the formation of the Arctic stratospheric polar vortex" *by* D. Blessmann et al.

D. Blessmann et al.

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Dear reviewer,
thank you for reviewing our paper and your helpful comments!

Specific comments

- Page 32284, lines 5–6: We have rewritten the sentence.
- Page 32284, line 12: Changed as suggested.
- Abstract: We have added some sentences to the introduction.

- Page 32287, line 10: Changed as suggested. In response to another reviewer, we have also made clear that the parameterization only refers to liquid particles.
- Page 32287, line 19: The restriction to a single winter is due to computational constraints. We assume here that the basic conclusions from our paper will not be invalidated by the interannual variability in temperature, NOx levels and transport, since the latitudinal, vertical and temporal gradients in the lifetime of ozone will mainly be determined by the solar insolation. We have now added some discussion of this to the paper. In addition, we performed some simple sensitivity runs to estimate the effect of interannual variability in temperature and NOx. These runs show that interannual changes in temperature or NOx are of second importance for the lifetime of the signal.
- Equivalent latitude: Equivalent latitude is first mentioned on page 32288, line 6. We have added a short explanation there and the suggested reference.
- Page 32290, lines 5–8: We have rewritten the sentence. It is hopefully much clearer now.

Grammar and typographical errors

- Page 32284, line 17: Corrected.
- Page 32285, line 20: Changed as suggested.
- Page 32286, line 2: Changed as suggested.
- Page 32286, line 3: Corrected.
- Page 32288, line 3: Corrected.
- Page 32288, line 4: Corrected.

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- Page 32288, line 19: Corrected.
- Page 32288, line 26: Corrected.
- Page 32289, line 9: Changed as suggested.
- Page 32289, line 15: Deleted “potential temperature level”.
- Page 32290, line 5: Corrected (see also 32290, lines 5–8 above).
- Page 32290, line 25: Corrected.
- Page 32291, line 15: Corrected.
- Page 32292, line 4 and 8: We have skipped some of the sentences advertising the model here, since it didn’t really seem to be appropriate.

Additional changes by us

- The figures and discussion were restricted to levels below 750 K. Above 750 K, the passive ozone tracer in Figure 1b is not reliable. Since air masses which are above 750 K at the end of the model run were above the upper model boundary at the time of initialization (1 August), the passive ozone tracer cannot be initialized properly there.
- A paragraph discussing the effect of changing the date of the perturbation was added.
- In addition to the changes in grammar, style etc. suggested by you and the other reviewers, some paragraphs, including parts of the introduction and the conclusions and the figure captions were rewritten for more clarity (without changes in content). Some references were added or updated.

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- A paragraph discussing the effect of changing the magnitude of the initial perturbation was added due to the request of reviewer 3.
- The title and some sentences were changed due to the request of reviewer 2 to avoid confusion about the word “interaction”.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 32283, 2011.

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Interactive Comment