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Interactive comment on "Update of the SWIFT model for polar stratospheric ozone loss (SWIFT version 2)" *by* Ingo Wohltmann et al.

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

Comments

- Abstract: As the author and maintainer of ATLAS, I prefer to give ATLAS just as a name and not as an acronym. SWIFT originally meant "Semi-empirical Weighted Iterative Fit Technique", but just this fitting approach has been discarded in the current version. Therefore, I would suggest to use SWIFT just as a name here and not to use the outdated acronym.

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- P1, L3: We think it is justifiable to stay at the current formulation. Looking e.g. at Eyring et al., 2013, only 9 out of 46 CMIP5 models have an interactive ozone scheme, of which several are CCMs and don't use a fast parameterization like Cariolle. The current formulation does not want to imply that there are no GCMs with fast ozone chemistry.

- P2, L1: We have extended the discussion in the introduction and mentioned that there is a growing number of models incorporating stratospheric ozone chemistry. We have also added a reference for CCMVal and a reference for an overview paper of the ozone schemes in the CMIP5 models (Eyring et al., 2010, 2013).

- P2, L30: In fact, there exists an independent Extrapolar SWIFT model. Unfortunately, this was not mentioned in the manuscript. This omission was caused by a delay of the submission of this paper by about 2 years and not checking for this again. While the extrapolar model was not ready for use 2 years ago, we are in the process of publishing a paper on the Extrapolar SWIFT model in the moment. We have now changed the name of the model from "SWIFT" to "Polar SWIFT" in the manuscript, and added a reference to the Extrapolar SWIFT model in the introduction. Added "(in combination with the Extrapolar SWIFT model)" to the sentence at P2, L30.

- P5, L5: The cited paper and this manuscript were submitted as companion papers at the same time. Hence, we were not able to give a reference at the time of submission. We have now added the reference to the dicussion paper in Atmos. Chem. Phys.

- P5, L20: We have rounded the values in the text now, but kept the exact values in the Table 3. We give all information in the paper that is needed to implement the SWIFT model, which includes the exact pressure values.

- P7: We agree that it does not hurt to give the full equation with the covari-

ance here. It is however not really relevant for the discussion in the paper, in particular since it cannot be applied to the more complex equations 8/10/11/12. We checked in all cases where it is mentioned in the text how well $\langle X_1 X_2 \rangle$ and $\langle X_1 \rangle \langle X_2 \rangle$ agree, but did not use a formal criterion for the allowed magnitude of the "intensity of segregation". In all cases, the values for $\langle X_1 X_2 \rangle$ and $\langle X_1 \rangle \langle X_2 \rangle$ were either almost identical or largely different, so that the decision was clear without a formal criterion. As discussed in the text, we then judged the quality of the approximation by looking at the goodness of the fit of the parameterized term to the term obtained from ATLAS.

- P7, L26: Changed.
- P11, L11: Changed to "the spatial distributions of ClO and NO are very different".
- P29, L4: Rephrased to "Both the magnitude and the interannual variability of the MLS measurements are reproduced well by the SWIFT model runs in the northern hemisphere. The interannual variability is larger and reproduced better in the northern hemisphere than in the southern hemisphere."
- P31, L21–22: Deleted.

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