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Interactive comment on "Combining Bayesian methods and aircraft observations to constrain the HO[.] + NO₂ reaction rate" *by* B. H. Henderson et al.

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We thank the referee for their suggestions and comments on the paper.

Referee 1:"Section 2.2: page 24197 line 20-23. What is assumed for the heterogeneous uptake of N2O5? Given its relevance to the NO2/HNO3 ratio it would be useful to have a bit more detail beyond referring to "GEOS-Chem model version 9-01-01" which is a very opaque reference for most readers."

Regarding the assumed uptake of N_2O_5, we use gamma values described by Evans and Jacob (2005) with corrections described in Davis et al. (2008). We have added a sentence detailing the heterogeneous reaction of N_2O_5 in the methods section as

follows:

> This includes heterogeneous formation of HNO_3 from N_2O_5 following Evans and Jacob (2005) (with sign correction detailed in, Davis et al., 2008).

Referee 1: "Are all the observations always between 8-10 km? If would be useful to mention this again in the figure caption of figure 2 as well as in Tables A1-3. Similarly it would be useful to reiterate the criteria used to choose the 'initial conditions' in Table A1."

We have added the altitude filters (", from 8 to 10 km,") to Figure 2 and Tables A1-3. We have also reiterated the "initial" selection criteria ("(initial, i.e., samples with the highest 12.5% XNO_2 to HNO_3 ratios)") to Table A1.

REFERENCES:

Davis, J. M., Bhave, P. V., and Foley, K. M.: Parameterization of N2O5 reaction probabilities on the surface of particles containing ammonium, sulfate, and nitrate, Atmos. Chem. Phys., 8, 5295–5311, doi:10.5194/acp-8-5295-2008, 2008.

Evans, M. J. and Jacob, D. J.: Impact of new laboratory studies of N2O5 hydrolysis on global model budgets of tropospheric nitrogen oxides, ozone and OH, Geophys. Res. Lett., 32, L09813, doi:10.1029/2005GL022469, 2005.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 24191, 2011.