

***Interactive comment on* “Technical note: A stratospheric climatology for O₃, H₂O and CH₄ derived from HALOE measurements” by J.-U. Grooß and J. M. Russell III**

Anonymous Referee #2

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General comments

The Halogen Occultation Experiment (HALOE) has observed stratospheric trace gases now for more than 13 years. The length of this data set together with the excellent instrument stability makes the HALOE observations an ideal basis for deriving a climatology of these trace gases. In this technical note, Grooß and Russell present climatologies of ozone, water vapor and methane, derived from HALOE observations. The introduction of the paper emphasizes the importance of trace gas climatologies for radiative transfer calculations in global atmospheric models. In addition, climatologies of O₃,

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H₂O and CH₄ may be very useful for other purposes as well, such as initialization and validation of models. The climatology presented here may thus be very useful for a relatively wide audience and the availability of the data sets as an electronic supplement to this paper is certainly appealing.

However, as the authors acknowledge, similar climatologies have been derived before. In particular within the UARS Reference Atmosphere Project (URAP, see <http://code916.gsfc.nasa.gov/Public/Analysis/UARS/urap/home.html>) a very similar approach has been applied to produce climatologies of O₃, H₂O, and CH₄ (among others) from HALOE observations (this is probably the same climatology as used by Randel et al. (1998)). The URAP HALOE climatologies of O₃, H₂O, and CH₄ already have the advantages highlighted in the present technical note: The use of observations from a single instrument (HALOE) and the technique of averaging in equivalent latitude. The authors should thus make a bit clearer how their climatology compares with others (e.g. URAP) and what the specific advantages of their climatology are.

In general the paper is well written and provides the necessary background and references to previous work.

Specific comments

Many of my specific comments given here are really more like a wish list:

1) In addition to O₃, H₂O, and CH₄, HALOE also measures NO and NO₂. The combination of NO and NO₂ would allow to construct a climatology of NO_x that is to the best of my knowledge not available so far. Unless there are serious problems associated with the task of deriving a NO_x climatology from HALOE observations, I would encourage the authors to make a NO_x climatology available as well. Of course this does not have to be within the present technical note, but including it here would strengthen this paper.

2) It would be nice to have the standard deviations also available as ASCII files in the

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supplement.

3) The plots in Figures 3 to 6 go down to 215 or even 316 hPa. It would be nice to have these data available in the ASCII files as well. Even if part of the data at the low altitudes are then marked as missing numbers.

4) On page 2975, lines 28/29 the statement is made that the use of equivalent latitude extends the latitudinal range to higher latitudes "especially during polar winter". This was to be expected. However, comparison of Figures 1 and 2 shows that the improvement in the southern hemisphere is largest during summer, not winter. Also during northern hemisphere summer, there is a large improvement in latitudinal coverage. Is this improvement realistic or an artefact due to the weak PV gradients in the summer hemisphere? In other words: how useful is the concept of equivalent latitude during summer?

Technical corrections

p.2978, l. 3: "The experiment has been especially stable..." Do you mean: "very stable" or "unusually stable"? Or do you mean it is not stable any more after the first 13 years?

p.2978, l.18: "...examples if the compiled climatology..." -> "... examples of..."

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 2973, 2005.

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