

Review of Straub et al.:

General comments:

This paper is of interest as it provides a different observational viewpoint for the major warming that occurred in January 2010, namely comparison between satellite and ground-based views. However, the paper still needs some work before it is suitable for ACP. In particular, the authors need to provide more information to support statements made (e.g. references to other work); provide details of the errors in the observations used; make sure the comparison between observations (satellite and ground-based data) takes account of their spatial characteristics; and quantify statements made in the paper. Examples where this should be done are detailed in the specific comments below.

Specific comments:

P. 32812

L. 8: Introduce acronym for ppmv.

L. 25: Quantify this agreement.

P. 32813

L. 9: References should be provided to support the statements made.

L. 16: Do you mean “mesosphere” instead of “atmosphere”?

L. 22: References should be provided to support the statements made.

P. 32814

L. 8: References should be provided of the studies mentioned.

L. 10: Does the vortex disappear completely? Or is it just very distorted during this period?

L. 23: Are there other studies regarding estimate of the descent rates in the USLM? If so, references should be made to them.

P. 32816

L. 19: What are the errors in the MIAWARA-C data?

P. 32817

L. 3: What are the errors in the Aura MLS data?

P. 32819

L. 5: Provide a reference for ECMWF operational data.

L. 7: Provide a reference supporting your statement regarding the inaccuracy of the wind fields.

L. 8: Mention here for how long the backward trajectories are run.

P. 32820

L. 3: Provide a reference for the statement made.

P. 32822

L. 22: Why is this expected?

P. 32823

L. 6: Are you taking account of the different spatial resolutions (e.g. in the vertical) when making this “direct” comparison? If not, you should. Same for P. 32824, L. 1, and following.

P. 32827

L. 7: Provide a reference to support the statement made.

P. 32829

L. 1: Quantify the “good agreement”.

L. 4: Explain why this is consistent with what is shown in Fig. 2.

P. 32830

L. 6: Provide more details of what is being mentioned: examples of consistency; examples of the exchange processes.

Technical/style comments:

P. 32812

L. 11: I suggest you write “...0.1 hPa and 0.03 hPa”.

L. 19: “...March and the equinox”.

P. 32813

L. 11: Should be “Solomon”.

L. 24: I think you should write “25°C” or “25 K”.

P. 32815

L. 8: Should be “Arctic” and “Antarctic” here and elsewhere.

L. 22: Indicate that Sect. 7 shows conclusions.

P. 32817

L. 8: “...are used...”.

P. 32818

L. 14: “...is interpolated...”

P. 32819

L. 16: This phrase should be rewritten as it does not make sense.

P. 32820

L. 4: “For the analysis presented in this paper the daily...”.

P. 32824

L. 1: “On the right panel...”.

P. 32826

L. 23: “...than 6 ppmv to less than 4 ppmv...”.

P. 32827

L. 3: “...than 6 ppmv to less than 5 ppmv”.

L. 4: “At the stratopause...”.

P. 32328

L. 17: “...isopleth descends from 0.06 hPa to 0.6 hPa...”.

P. 32835 and following

Captions for Figs. 1-6, 8, 11: Identify what colours indicate (e.g. red relatively higher values; blue relatively lower values for Fig. 1).

P. 32837

Fig. 3 caption. Indicate this figure follows loosely the style in Fig. 1 of Manney et al. (2009b).

P. 32840

Fig. 6 caption: Introduce first the panel at the top of the figure.

P. 32841

Fig. 7 caption: Indicate in the caption the line styles for MIAWARA and MLS.

P. 32842

Fig. 8: Lines are difficult to distinguish on the right-hand panels. Please consider changing the plotting style.

P. 32844

Fig. 10 caption: Indicate how the starting point of the trajectory is marked.

P. 32846

Fig. 12 caption: Indicate how the positive/negative values of Δz relate to descent/ascent.