Atmos. Meas. Tech. Discuss., 7, C2531–C2532, 2014
www.atmos-meas-tech-discuss.net/7/C2531/2014/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Retrieval of three-dimensional small scale structures in upper tropospheric/lower stratospheric composition as measured by GLORIA" *by* M. Kaufmann et al.

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Received and published: 8 September 2014

We thank the reviewer for carefully reading the manuscript, the positive feedback, and his/ her constructive and helpful comments and suggestions. We considered them point by point as illustrated below.

COMMENT: While the figure quality is generally very good, some of them, like Figure 9, 14, 16-18 are very small such that they are rather hard to read. I suggest to spend a bit more space and enlarge them in the final version.

REPLY: Done, we enlarged the figures

COMMENT: The authors have provided a nice and appropriate discussion of the error budget of their level 2 data, but then they show retrieved parameters without error bars. In my opinion, error bars should be plotted on each profile which would make it much easier to appreciate the significance (or not) of the retrieved small scale structures.

REPLY: We agree and included error bars on the single profile retrieval results. We omitted error bars for the averaged profiles, because we did not investigate the temporal and spatial correlation length of the uncertainties in required depth. The error bars of an averaged profile will be somewhat smaller than the uncertainties of an individual profile, but larger than a single profile error scaled with the inverse square root of the number of measurements.

COMMENT: The final two sentences on the satellite version which was studied for the PREMIER mission appear to be out of context. Either this needs more explanation and discussion or it should be removed from the manuscript. In its current form the statements are barely comprehensible for readers not aware of that mission proposal.

REPLY: We changed the wording to: "Although the observational mode of the satellite instrument is somewhat different from the airborne version, trace gas fields can be obtained with a similar horizontal resolution as for the tomographic reconstruction of airborne GLORIA dynamics mode data as presented in this study."

Interactive comment on Atmos. Meas. Tech. Discuss., 7, 4229, 2014.