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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.

Anonymous Referee #2

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In the current manuscript the authors describe the first application of the novel Gimballed Limb Observer for Radiance Imaging of the Atmosphere (GLORIA) in the frame of the Geophysica mission ESSenCe and the HALO mission TACTS/ESMVAL. The manuscript starts with a concise description of the GLORIA instrument and continues with a rather detailed description of the data processing. Importantly, the authors provide sufficient detail to follow (and understand) the text but they do not unnecessarily duplicate material which is described in the companion papers by Friedl-Vallon et al. and Kleinert et al. (which are also both under consideration by AMT). They present overviews of the ESSenCe and TACT/ESMVAL-campaigns and then show some initial

results. During this presentation important aspects such as the error budget of selected level 2 products are thoroughly discussed. While the discussion of the presented results is not yet up to what would be expected for a full scientific paper focussing on the atmospheric results, the presentation is fully appropriate for the purpose of introducing initial retrieval results in AMT.

In all, this is an excellent paper (and overall work) for which the authors need to be congratulated! I am happy to see that this impressive new instrument is performing well and that already these initial results demonstrate the large potential coming along with the high spatial resolution and the tomographic 3d retrievals that the authors are describing.

This manuscript clearly deserves publication in AMT and I only have some truly minor comments which the authors should address for their final version:

- 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.

-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.

- 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.

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