

Interactive comment on “Airborne limb-imaging measurements of temperature, HNO₃, O₃, ClONO₂, H₂O and CFC-12 during the Arctic winter 2015/16: characterization, in-situ validation and comparison to Aura/MLS” by Sören Johansson et al.

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We thank referee 1 for valuable comments and suggestions. Our answers are given below. The original referee comment is repeated in **bold**, changes in the manuscript text are printed in *italic*.

TECHNICAL CORRECTIONS:

C1

The statement "Space-borne measurements provide global coverage" (pag. 2, line 9) is not necessarily true. Geostationary satellites do not provide global coverage. I suggest the following modification: "Space-borne measurements can provide global coverage"

We changed the manuscript according to the referee's suggestion.

The detailed description of the results from a single flight from the PGS campaign was performed by selecting flight PGS-19. Is that the result of a purely random choice or of a selection based on pre-established criteria? A short statement providing this information to the reader might be of help.

We added the following sentence in Sec. 4, to briefly motivate the selection of flight PGS19 for detailed analysis: *Flight PGS19 is selected as an example of continuous measurements in high spectral resolution mode, and as an example of an illustrative amount of atmospheric variability within the measured air masses.*

The term "combination" (suggesting a synergistic use of data) referred to the link established between GLORIA and MLS data does not appear the most appropriate. The extent to which the two datasets were jointly used to build the results reported in the manuscript appears to be rather limited. The term "comparison" might still be more appropriate to represent the actual exercise conducted using both data sets. I leave to the authors to decide on this point.

We changed the term to *comparison* according to the referee's suggestion.

If available from the diagnostics of GLORIA measurements during the PGS campaign (or the PGS-19 flight): which is the typical amount of bad pixels filtered out (per row or per image)? Is that affecting the quality of the measurements in a significant manner with margins for future improvements?

The amount of bad pixels is in the order of 5 to 10%. The bad pixel filtering should

C2

not significantly degrade the retrieval result, as the noise error only plays a minor role (see Fig. 4). We change the text in Sec. 2.1 to: *For noise reduction, the pixels of each detector row are averaged after filtering of bad pixels (typically 5 to 10%).*

In the statement "Another important quantity for a retrieval is the degrees of freedom" (pag.9, line 26), the correct expression to use is "the number of degrees of freedom".

We changed the manuscript according to the referee's suggestion.

The statement "... since the diagonal element of each averaging kernel row is a measure ... retrieval results" (pag. 9, line 27) shall be formulated in a different manner, to avoid using the expression "diagonal element of a row".

We change the formulation to: *... since the diagonal elements of the averaging kernel are measures of how much measurement information is contained in the retrieval result per level.*

We also thank referee 1 for the detailed language corrections, which helped us to further improve the manuscript.

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