

Atmos. Meas. Tech. Discuss., referee comment RC2
<https://doi.org/10.5194/amt-2021-293-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on amt-2021-293

Anonymous Referee #2

Referee comment on "Quantification and mitigation of the instrument effects and uncertainties of the airborne limb imaging FTIR GLORIA" by Jörn Ungermann et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-293-RC2>, 2021

General comments

The manuscript by Ungermann et al. provides a comprehensive and detailed characterization of the airborne limb-imaging infrared Fourier transform spectrometer GLORIA, discussing a number of instrumental effects from radiometric and spectral calibration, to correction of detector non-linearity, outer window emission, parasitic images, and to the analysis of a critical subsystem of limb sounders such as the pointing unit.

The authors report the results of a performance assessment they conducted to obtain an estimate of NESR, gain and offset accuracy and spectral accuracy, along with instrument point spread function. They demonstrate full compliance with the initial instrument requirements.

The impact of the various level-1 error sources on level-2 products is then estimated, by focusing on the key targets of Temperature and Ozone retrievals, showing that the dominating effects are associated with the line of sight calibration and the uncertainty in total gain and offset.

The paper is well written and organised. There is a clear added value in the results of the effort made by the by authors to make available in one document a synopsis of instrument characteristics for the GLORIA limb sounder primarily based on data acquired in ten years of flight operation from eight measurement campaigns onboard two different aircrafts. It is worth stressing the fact that this is even more noticeable, as GLORIA measurements represent a key term of reference for investigations to be carried out in the framework of the phase-0 study for the candidate ESA Earth Explorer mission 11 CAIRT (Changing-Atmosphere InfraRed Tomography).

The article is acceptable for publication after implementing the few technical correction listed below.

Technical Corrections

In the abstract and in other sections of the manuscript, the authors report information on the number of campaigns, total flight track and flight hours of operation of the GLORIA instrument. It would be useful to complement these pieces of information with the total number of flights performed during the eight campaigns.

Line 57-60 – the statement “this study collects all relevant processing information for GLORIA in one place, thus forming a reference for further geophysical interpretation of the data or derivative satellite-borne instruments” is repeated twice.

Line 163 – add comma after “effect”

Line 179- Please, consider to define the acronym VMR at its first occurrence in the paper, i.e. Line 90

(“ ... trace gas volume mixing ratios, and ancillary information, ...”).

Line 223 – add comma after “behaviour”,

Line 402 - change "an" to "and"

Line 403 - add comma after "Therefore"

Line 420 - add comma after "KIT"

Line 467 – add comma after “processing”.

Line 495 – change “an NESR” to “a NESR”.

Line 497 – change “an NESR” to “a NESR”.

Line 504 – add comma after “clouds”.

Line 537 – add comma after “range”.

Line 595 – add comma after “pixels”.

Line 713 – add comma after “spectra” and after “measurements”.

Line 714 – add comma after “offset”.

Line 728 – replace “<” with a space

Line 733 – add comma after “CH₄”.

Line 767 – remove comma after “means”

Line 772 – add comma after “measurements”.

Line 793 – remove comma after “fact”

Line 830 – add comma after “mode”

Line 867 – add comma after “(DI)”

