

**Author response to comments by Anonymous Referee #2 to:  
“Technical note: Lowermost-stratospheric moist bias in ECMWF IFS  
model diagnosed from airborne GLORIA observations during  
winter/spring 2016”**

Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2020-367>, in review, 2020  
Woiwode et al.

We thank Referee #2 for his/her time and valuable comments to improve the manuscript. In the following, we provide the original referee comments (italic letters), followed by our responses.

*The paper by Woiwode et al. evaluates the lowermost stratospheric moist bias in ECMWF analyses and 12h forecasts using high spatial resolved water vapor mixing ratios from the airborne GLORIA observations. A systematic moist peaking at +50% at potential vorticity levels of 6-10 PVU is diagnosed. By model sensitivity experiments, the authors further show that the diagnosed moist bias is insensitive to model grid resolution for short-term forecasts and is present already in the initial conditions. The study is interesting and provides import information for model simulations with respect to lowermost stratospheric water vapor. The paper is well written and organized. I recommend the publication of it subject to the technical corrections suggested below.*

We appreciate the positive statement by Referee #2.

*L51-52: ‘too moist analysis’ is unclear to me.*

We agree that clarification is required and rephrased to “... from too moist conditions in the analysis ...”

*L56-57: How can ‘small-scale stratospheric intrusions’ affect LMS water vapor? Maybe you mean troposphere-to-stratosphere transport?*

We thank Referee #2 for pointing out this mistake. We rephrased to “... small scale tropospheric intrusions ...”

*L84: Please check the value and unit for ‘0.0625 cm<sup>-1</sup>’.*

We verified this value, it corresponds to the unapodized spectral sampling in wave numbers, which is associated with an optical path difference of the interferometer of 8 cm in the “chemistry mode” (Friedl-Vallon et al., 2014). Note, application of the Norton-Beer “strong” apodization in level 1 processing results in an effective spectral resolution of 0.121 cm<sup>-1</sup> in this specific measurement mode.

*L106-107: There seems to be a grammatical problem for the phrase ‘from a 12 h deterministic forecasts in between the analysis cycles’.*

We corrected the phrase by removing “a”.