

***Interactive comment on* “Characterizing Sampling and Quality Screening Biases in Infrared and Microwave Limb Sounding” by Luis F. Millán et al.**

Anonymous Referee #2

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The paper is dedicated to the characterization of sampling biases in infrared and microwave limb sounding instruments, with MIPAS and MLS taken as examples. The paper is a continuation of a series of publications on characterization of sampling biases. The new aspect is analyzing the influence of quality screening on data representativeness.

MAJOR COMMENTS

1) It is stated in the abstract that “analysis of long-term time series reveals that these additional quality screening biases may affect the ability to accurately detect upper tropospheric long-term changes using such data” (similar statements are on page 6 and in conclusions) However, the performed analyses are insufficient for such statement. It is rather expected that the screening of cloudy conditions results in biased estimates,

and that the variability might not be represented properly. However, biased estimates, not perfect correlation coefficient with the full time series and R^2 do not necessarily imply that the long-term trends are inaccurate. Furthermore, if the sampling patterns do not change over time, a large part of sampling uncertainty can be removed in the trend analysis by consideration of deseasonalized anomalies. In order to make such statement on ability of accurate trend detection, the authors should perform trend analysis using the full and sub-sampled datasets and support their statements by quantitative estimates. Another, a simpler solution, is to remove these abovementioned statements on ability to accurately detect trends from the manuscript.

If the authors will decide to extend the analyses, it would be also interesting to investigate the influence of sampling patterns on ability to reproduce the natural cycles.

2) The value of the paper will be increased significantly, if the presented analyses of sampling biases using the modelled data are enhanced with comparison of real experimental data from MIPAS and MLS. Such analyses would illustrate whether the observed biases are explained by sampling patterns.

MINOR COMMENTS

1) P.4, L.5 : Please write the version of the IMK/IAA processor

2) P.2 L.11: The sampling uncertainty has been also discussed in (Sofieva et al., 2014). In this paper, the authors analysed the sampling biases for 6 satellite instruments and proposed a parameterization of sampling uncertainty in monthly zonal mean data.

Sofieva, V. F., Kalakoski, N., Päivärinta, S.-M., Tamminen, J., Laine, M. and Froidevaux, L.: On sampling uncertainty of satellite ozone profile measurements, *Atmos. Meas. Tech.*, 7(6), 1891–1900, doi:10.5194/amt-7-1891-2014, 2014.

3) Figure 5: Please use more distinct colors in scatter plots.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-691>,

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