Dear Reviewer,

Thank you very much for your positive comments on our paper "On sampling uncertainty of satellite ozone profile measurements". Below we present the replies to your comments.

Reviewer #2.

Comments

1) I would suggest to add a sentence to an abstract to explain that the method does not correct data for the sampling inhomogeneity, it rather improves the error estimate for more comprehensive comparisons between different datasets.

Authors:
In the revised version, we added in the abstract: "The estimates of sampling uncertainty improve the uncertainty quantification and can be used in comprehensive data analyses."

Reviewer #2:
2) It will be good to mention the application for the method for determining the special sampling inhomogeneity in comparisons between the ground-based station and the "overpass" satellite data, which may not be ideally "centered" on the station location.

Authors:
In the revised version, in introduction, we have added this suggested note: "A special sampling inhomogeneity may appear also in comparisons of data measured by different methods, e.g., in comparisons of satellite and ground-based observations."

Reviewer #2:
3) Is it possible to have a model output on a fine spatial scale and then have the sub-grids of the model averaged to "simulate" the footprint of the satellite to provide uncertainty for spatial averaging of the data? Does it make any impact in the assessment of the sampling errors?

Authors:
In our simulations, we used the resolution of FinROSE the same as in the meteorological data (ERA Interim). Simulations with a finer grid are possible, but they would require fine-resolution meteorological data. The spatial resolution of FINROSE is "compatible" (similar) with the effective horizontal resolution of the considered ozone profile measured in the limb-viewing geometry.
The spatio-temporal resolution of FinROSE is sufficient to capture most of the ozone variability. For a smooth ozone field, the horizontal integration by satellite measurements (~300-400 km) introduces uncertainty, which is significantly smaller than the variability discussed in our paper. Small-scale ozone variability (e.g., perturbations due to gravity waves) is not characterized in this analysis, neither in the model due to its resolution nor in the data due to horizontal averaging. To estimate realistically the effect of horizontal averaging by limb-viewing satellites, the fine-resolution (and realistic, with correct representation of the gravity wave field) meteorological data are needed. This is a separate and rather complicated problem.
In the revised version, we note that the spatio-temporal resolution of FinROSE is sufficient to capture most of the ozone variability, that it is similar to the effective resolution of the considered satellite ozone profiles and that the small-scale ozone variability is not considered in our analysis (neither in the model nor in the data).

Reviewer #2:
4) It will be good to give information on the temporal resolution of the model used in this analysis (it can be important for comparisons in regions with strong diurnal cycle).

Authors:
For our analysis, we ran FinROSE with 30 min time step. In the revised version, we added this information and the note that this temporal resolution is sufficient to capture most of the ozone variability, and therefore well suited for this study.