

Interactive
Comment

Interactive comment on “On sampling uncertainty of satellite ozone profile measurements” by V. F. Sofieva et al.

Anonymous Referee #2

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Comment on the AMTD manuscript “On sampling uncertainty of satellite ozone profile measurements” by Sofieva et al. The paper addresses the notorious issue of comparisons between datasets of different temporal and spatial sampling frequencies. The resulting biases in the averaged values can be found in monthly or zonal-mean values, which can complicate comparisons of ozone fields, especially at high latitudes where ozone fields are naturally perturbed. Therefore, the unequally spaced sampling can result in misleading features of a particular dataset that can complicate the process of combining it with other datasets. It can affect the consequent analysis of the combined data for trends and interannual variability. Authors provide method to estimate the sampling uncertainty in the ozone vertical distribution that can be used in estimates of the total error of the dataset. The method is based on comparisons of the limb-viewing

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satellite data with the ozone field from the FinROSE chemistry-transport model. Authors also suggest that similar approach can be developed for the temporal sampling that can be used in comparisons of satellite profiles. The main problem with unequal temporal sampling is the high day-to-day variability in ozone in troposphere and lower stratosphere, and therefore the insufficient sampling can result in the time-dependent offsets of monthly mean values, which in turn can affect drift assessment and trend analysis. This is well written and easy to follow paper. 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. 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. 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? 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). I recommend this paper for publication after minor revisions.

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