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Comment

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

### **Anonymous Referee #1**

Received and published: 3 April 2014

### **General comments**

This paper addresses the important issue of sampling uncertainty of satellite measurements. The authors propose to characterize the spatio-temporal inhomogeneity of atmospheric measurements (ozone profiles) by a linear combination of asymmetry and entropy of a sampling distribution. The sampling uncertainty is then parameterized in terms of the product of the standard deviation of natural variations and the proposed inhomogeneity measure. It is used to estimate the total uncertainty of monthly zonal mean ozone profiles.

The paper is an important contribution for targeting to create reliable average estimates of atmospheric parameters measured by satellites. In particular, sampling uncertainty

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could be taken into account in case of combining measurements from different instruments. Furthermore, an analysis of sampling uncertainty is useful for comparative studies (e.g. models vs. measurements). The paper is clearly written and well organized. Its subject is appropriate for AMT and I recommend publication after minor revisions.

### Specific comments

p.2386, Section 2.2: What is the temporal resolution of the FinROSE model ? Please add a short comment on the model resolution in comparison to the resolution of the satellite data. Is the model resolution well suited (i.e. fine enough) for this study ?

p.2389, lines 8–10: The difference between collocated GOMOS and MIPAS ozone data is  $\approx 4\%$  (shown in the bottom panel of Fig.2, green and magenta lines). Why are the differences for strict and more relaxed collocation criteria similar ? I would expect to see smaller differences in case of the tight collocation criteria. Do you have an explanation ?

p.2390, last paragraph: I would suggest to reformulate the sentence "... indeed, the same periods are observed in the inhomogeneity values" and to explain Fig. 1d in more detail. Please give a short explanation of  $H_{lat}$  and  $H_{time}$  here.

p.2393, line 10: The LLM climatology is based on satellite data (and balloon sondes). Is the climatology affected by sampling uncertainty ? Is the climatology publicly accessible ?

### Technical corrections

p.2383, line 18: Define "SPARC".

p.2384, line 9: Remove "(http://www.esa-ozone-cci.org/?q=node/166)" (see p.2393, line 24)

p.2390, line 9: change "anisotropy" to "asymmetry"

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p.2391, line 1: change "(1)" to "Eq. (1)"

p.2402, Fig.4, caption: I would suggest to mention in the caption, that the estimated sampling error is based on model data only (sub-sampled to the satellite locations).

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Interactive comment on Atmos. Meas. Tech. Discuss., 7, 2381, 2014.

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