

1 Reply to reviewer #1

We are grateful for the helpful comments on our paper draft. Our point-by-point reply is in italic.

Reviewer 2:

Review of *amt*2017463, Dorrestijn et al.

Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-463-RC2, 2018 Author(s) 2018. This work is distributed under the Creative Commons Attribution 4.0 License. Interactive comment on Instantaneous variance scaling of AIRS profiles using a circular area Monte Carlo approach by Jesse Dorrestijn et al. Anonymous Referee #2

Received and published: 6 February 2018

Overall / general comments

The paper presents a circular area Monte Carlo approach to assess scale invariance properties and scale breaks from AIRS measurements. Overall the paper is very well written but the statistics and correlations showed here are not always convincing. This is a promising technique but it needs to be apply to more data and to acknowledge the poor correlations observed in section 4.5 (and more data will help with correlations). Also, why sometime the authors use α and sometime β ? Is generally more known, especially when its concerns the well-known $-5/3$ value. There is no such reference for α . I suggest using through the whole manuscript for consistency reasons.

We admit that the datasets used for the correlation analysis are relatively small. We remove the three weakest correlations from the figure (Fig. 10). The strongest correlations are sufficiently strong to believe that it adds some value to the paper.

The variance scaling exponents that we calculate are α values, also used by KT09, therefore we choose to show them. Omitting the β values would devalue the paper, since as you write these are better known.

Minor comments: Abstract Line 2: 13.5km is not really what I call high spatial resolution. May be higher is better for the comparison with 45 km.

We agree.

Introduction: Line 18: Please add also the reference: Kolmogorov, A. N.: Dissipation of Energy in the Locally Isotropic Turbulence, Proceedings of the USSR Academy of Sciences (Russian), translated into English by Kolmogorov, Andrey Nikolaevich (8 July 1991), 23, 1618, 1941.

We omit the Kolmogorov cascade from the paper, so the reference is not necessary anymore.

2.2 Line 9: Why Retrieval System have their first letter in capital?

We made them small now.

Figure 3: Please increase text/label font size It would be interesting to highlight (using arrow, line, marker, etc) the position of the scale break for each case. It would be more easy for the reader to see if there is a common off-set between the AIRS-xxx in the 4 locations.

We agree and changed the sizes.

Scale-breaks are introduced later in the paper and it would be to much information to put them into these figures.

Figure 4c: The large decreasing of standard deviation as a function of the length scale in the case AIRS-OE need to be more developed. This slope catches the eye directly when looking at the figure. This is probably

due to small scale processes that are resolved with the higher resolutions but it should be mentioned.

Thanks for mentioning, we added a comment to the manuscript.

4.5 Line 13: To me well-correlated is above 0.80, we can argue that the fig 10a is close to this value but then the correlation decrease. It becomes dangerous to me to talk about correlation below 0.7. This is especially true for water vapor where the values are too low. I can be simpler to remove WV from this plot and keep temperature only.

We removed the three lowest correlations from the paper. We believe that the six shown figures have some additional value for the paper.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2017-463, 2018.