

Interactive comment on “Intermittent turbulence in the heliosheath and the magneto sheath plasmas based on Voyager and THEMIS data” by Wiesław M. Macek et al.

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Thank you for your detailed report with 8 comments, which have certainly been useful to improve the presentation of our results in a more self-consistent way. We have taken into consideration all your points in the revised manuscript `npg-2017-41_cor.pdf`, where the changes are marked in bold typeface. Please also find the responses to each point of your report.

Ad. 1. In order to explain more clearly that within a given scaling range the power-law dependence of Equation (4) is satisfied several specifications are inserted on page 4 (lines 2 – 4, 9 – 10) and 6 (lines 10 – 11).

C1

Ad. 2. As requested the periodic dependence of the degree of multifractality (parameter Delta) on the solar cycles are now added in Figure 5, taken from (Macek et al. 2011) and are thoroughly discussed on pages 6 and 7 what does the periodic dependence means.

Ad 3. The periodic function in question is now shown in Figure 5 (left panel). By the way, a sudden change of the this parameters to zero after crossing the heliopause is now also indicated on the right panel (which is a somewhat improved version of Figure 3 of Macek et. 2014 paper), as now discussed on page 7, in lines 4 – 8.

Ad. 4. Beside the weighted two scale Cantor model or the p-model one can take simple parabolic or cubic fits as used by Burlaga et al. (1993). Admittedly, this could result in somewhat different width of the multifractal spectrum, which is the parameter Delta in Figure 6. Because, contrary to the models discussed in this review, the polynomial fits have any clear theoretical interpretations, this values are not anymore given in Figure 6. By the way, this problem has already been discussed by Macek et al. (2014, first paragraph on page 2).

Ad. 5. Because the plasma in the magnetosheath is clearly anisotropic, following the suggestions of another referee, in the revised version we have analysed the fluctuations of the components of the Elsasser variables in the plane perpendicular to the scale-dependent background magnetic fields and along the local average ambient magnetic fields. The obtained results are shown in Figures 9 – 11, as thoroughly discussed in subsection 4.2, where the modified text is marked in bold. The abstract and the conclusions are also consequently improved.

Ad. 6. Because of the anisotropic turbulence (see the reply to comment 5) the previous Figure 11 is replaced by Figure 14 and 15, as discussed in the revised manuscript on page 20.

Ad. 7. The main conclusion that multifractality falls steadily with the distance from the Sun is now clearly seen in Figure 5 (left panel), see reply to point 3.

C2

Ad. 8. The scaling region of fluctuations is now discussed throughout the paper (pages 4 and 6), see reply to point 1.

Please also note the supplement to this comment:

<https://www.nonlin-processes-geophys-discuss.net/npg-2017-41/npg-2017-41-AC3-supplement.pdf>

Interactive comment on Nonlin. Processes Geophys. Discuss., <https://doi.org/10.5194/npg-2017-41>, 2017.