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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 competent report with four comments, which have certainly been useful to improve the presentation of our results. These recommendations have been fully taken into consideration for a revision of the review. Please find the revised manuscript npg-2017-41_cor.pdf, with changes marked in bold typeface together with our response to points of your report.

Ad 1. The main aim of our Voyager studies is to look at the measure of multifractal scaling in the heliosheath. Till now only Voyager 1 has crossed the heliopause, the ultimate heliospheric boundary (see comment inserted on page 4 lines 18 – 21), but the

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plasma data are not available on that spacecraft. Because in the distant heliosphere the magnetic fields have mainly azimuthal components one can use the magnitude of the magnetic fields to estimate the probability measure and using straight lines according to Equation (4) in a certain scale range similarly, as those seen in Figure 1 and 2 of the paper by Macek et al. (2014), and in this way we can calculate the multifractal spectrum, as shown in Figure 4 of the review. The proper explanations have also been inserted on page 4 lines 10 and 23ff of the revised manuscript. Naturally, as is now presented in Figure 5, the measure of multifractality is modulated by the solar activity as now clearly explained on page 6 lines 9 − 11.

Ad. 2. Thank you very much for this suggestion. We have added new Table 1 with chi-squares for the fits of the weighted two-scale Cantor set and the classical p-models. As we see these values are much lower for the two-scale model, which means that our model is substantially better than the p-model (see comments added on page 6, lines 1 − 6).

Ad. 3. Thank you very much for this important comment. Because the plasma in the magnetosheath is clearly anisotropic in the revised version we have analysed the fluctuations of the components of the Elsaesser 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 − 15, 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. 4. Admittedly the Taylor hypothesis is used for solar wind data to relate the time scale to space scale needed to obtain the multifractal spectrum in the entire heliosphere according to Equation (4), see comment on page 4, lines 2 − 4. Because this approach is somewhat less certain in the magnetosheath (see our comment on page 10, lines 8 − 9 and page 12 lines 1 − 4), to obtain kurtosis by using THEMIS data in this region we analyze directly time samples.

Please also note the supplement to this comment:
https://www.nonlin-processes-geophys-discuss.net/npg-2017-41/npg-2017-41-AC2-supplement.pdf

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