Nonlinear Processes
in Geophysics

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Discussions

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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.

Anonymous Referee #2

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The manuscript is concerned with the analysis of intermittency of turbulent plasmas in two different environments, namely, the Heliosheath and the Earth's Magnetosheath. The authors have analysed data sets taken by various spacecrafts: Voyager 1 and 2 for the Heliosheath analysis, THEMIS for the Magnetosheath analysis. The main purpose of the paper is to evaluate the degree of intermittency. This is done using two different techniques. In the case of Heliosheath data, the predictions of a multifractal model (Two-scale weighted Cantor set) are fitted on Voyager data, thus deriving a measure (Delta) of intermittency. In the case of Magnetosheath the kurtosis of Elsasser variables is calculated finding that the level of intermittency is higher for higher Alfvenic Mach number. The paper is well written, the employed methods appear to be sound and

adequate, and the results are interesting. However, there are few points which the authors should consider before publication:

1) The analysis of Voyager data seems to be concerned with magnetic field magnitude data. This is not explicitly stated in the text, but it can be deduced from the legend of Fig. 4. Why do the authors use |B| data, instead of considering the behaviour of single magnetic field components? Is their analysis somehow related to the presence of compressive fluctuations (where |B| is modulated)? The authors should comment on that point.

2) From Fig. 4 it seems that the Two-scale weighted Cantor set model fits to the data better than the classical p-model. It would be interesting to support this result in a more quantitative way, by giving some measure of the fit quality in the two cases. Could the authors consider this suggestion?

3) In the analysis of THEMIS data, the authors have considered the magnitude of Elsasser variables, instead of single components. Which is the reason for this choice? Could the authors comment on this? (see point 1))

4) In turbulence the dependence of statistical moments (like kurtosis) on spatial scales is generally considered. When spacecraft measured are used, it is possible to "translate" time dependence into space dependence by using the Taylor hypothesis (like, for instance, in the solar wind). Could the author comment on how well the Taylor hypothesis is satisfied in the considered magnetosheath data set ?