

Interactive comment on “Turbulent Processes in the Earth’s Magnetotail: Spectral and Statistical Research” by Liudmyla Kozak et al.

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Report on "Turbulent Processes in the Earth’s Magnetotail: Spectral and Statistical Research" by Kozak et al.

This manuscript reports a detailed analysis of magnetic fluctuations in the Earth’s magnetotail, on occasion of Cluster spacecraft observations of three dipolarization events. Several techniques are used to assess the turbulence properties, like the computation of the power spectral density, the wavelet spectra, the structure functions and the computation of the kurtosis. It is found that turbulence is much stronger after the dipolarization events, and that both a direct and an inverse turbulent cascade are possible. The manuscript is interesting and potentially appropriate for publication on Annales

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Geophysicae, but the following points should be taken into account:

1. In Figure 1, only the magnitude of the magnetic field is given, however, to better appreciate what is seen by spacecraft, it would be better to give also the components of B in the GSM system, at least for the Cluster spacecraft closer to the current sheet center.
2. On page 7, line 20, the authors refer to the effect of heavy ions on the power spectral break. Can they show the presence of heavy ions in the plasma data, e.g., from the CIS instrument?
3. In the middle left panel of Figure 3, the PSD measured by C2 is more than 1 order of magnitude larger than that measured at the other spacecraft. Why? This is not seen after dipolarization: why?
4. Page 15: is the Holder exponent h the same as the Hurst exponent?
5. I presume that, in Eq. (6), $B(\tau)$ should be $B(t)$.
6. The discussion of superdiffusion on pages 16-17 is not very clear: superdiffusion of what, plasma? energetic particles? fluid particles? The most reliable model of superdiffusion is based on Levy walks, see the recent review by Zaburdaev et al., Rev. Mod. Phys., 2015.
7. For many calls to references, the names appear out of the parentheses when they would be expected to be inside the parentheses. In LaTeX, this amounts to changing from `\citet` to `\citep`. On the other hand, some reference calls are correct as they are.
8. The English is good but not perfect. Proof reading by someone more fluent in English is suggested.

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