

Reply to referee comments

Manuscript ID: angeo-2019-69
Scaling laws in Hall-inertial range turbulence
Y. Narita et al.

Referee 1

1. *I find that the authors have reasonably addressed my previous comments and that the manuscript has improved as a result of the revisions. However, I do have several minor comments which I think should be addressed.*

Line 11 of page 1: I wonder if the statement that the model presented in this study is the likely explanation for the steepening of the magnetic spectrum is a bit strong, given that there are several discrepancies pointed out (for example different power laws, different behavior of the density, etc.). Perhaps noting that the Hall inertial range is a possible explanation would be better.

Line 30 of page 12: “extends the the inclusion” should be “extends to the inclusion”

Line 1 of page 13: The authors state that a flattening of the density spectrum is present in Figure 3 of Breuillard et al. 2018 above 10 Hz, implying that this may relate to the expected increase due to hall physics. However, I believe that this flattening is more likely associated with the Poisson noise in the FPI measurements, as was also noted by Breuillard et al.

Reply:

- Thank you very much for taking time to carefully check the revised manuscript. We gladly work on the minor comments and deliver herewith the manuscript in a hope of being forwarded to production.
- Line 11 of page 1. Agreed. We change the sentence “Our model...” (in the abstract field) as follows (page 1, line 10–12 in the second revision).

“Our model for the Hall-turbulence gives a possible explanation for the steepening of the magnetic energy spectra in the solar wind neither as indication of the dissipation range nor the dispersive range but as the Hall-inertial range.”
- Line 30 of page 12. Done (page 12, line 30 in the second revision).
- Line 1 of page 13. Agreed. We change the sentence “Figure 3...” as follow (page 12, line 31 to page 13, line 3 in the second revision).

“Figure 3 in Breuillard et al. (2018) shows a flattening of the density

spectrum at spacecraft-frame frequencies of 10 Hz or higher, but this flattening is more likely associated with the Poisson noise in the particle measurements, indicating that clean, proper density spectrum measurements will be an important future task in the observational study of the Hall-domain physics.”

Referee 2

1. *accepted as is.*

Reply:

- Thank you.