

Interactive comment on “Statistical survey of day-side magnetospheric current flow using Cluster observations: Bow shock” by Evelyn Liebert et al.

Anonymous Referee #2

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This manuscript presents observations of the Earth's bow shock with Cluster and the calculation of the shock electric current on more than 300 events. Statistics of the currents with their direction and strength has been performed and in particular the distinction between quasi-parallel and quasi-perpendicular bow shocks.

The manuscript is well written, the data are well presented and the conclusions are clear.

One main comment is how accurate is the current calculated for quasi-parallel shocks. Quasi-parallel shocks are more variable and “noisy” than quasi-perpendicular shocks which may make their current more difficult to measure. An example of crossing for

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quasi-perp and quasi-para and their respective computation of current could be shown in a figure to introduce these differences.

Detailed comments:

p2 l30: it would be good to specify if the accuracies are on the current calculation.

p2 l38: 30s seems quite long, did you try if lower numbers changed the results?

p2 l50: database instead of data basis

p2 l75: what is the reason to rotate Xgse to have the IMFyz pointing in +Z direction? Just to have a coordinate system where the IMF is all in the same direction? Any reason why choosing point in the +Z direction?

p3 l4: I would add a comma after IMF

p3 l33: Is it Jz or Jyz

p3 l48: the sentence “A weakening ..” is not clear

p3 l51: is “allocate” the right word? “are located” may be better.

p3 l60: northward and southward in one word.

p4 l5: it may be worst to investigate if a fit could be obtained from these points and how does it compare to Tang et al. and theory/simulations.

p5 l25: any idea why quasi para shocks are observed only at low latitude? In principle their observation should be similar to quasi-perp.

p5 l35: could some of the quasi-para shock be quasi-perp shock due to inaccuracy of IMF measurements or quick changes of IMF?

Figure 3 and 5: instead of adding the quasi-perp and quasi-para on top of each other, I would put them side by side in the same bin (to see more clearly the distribution for quasi-para shocks).

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