

angeo-2018-90 reply to referee1

In this revised version, we have tried to respond to the referee's constructive suggestions.

angeo-2018-90-RC1:

*Line 185: "correctness of the break point"*

The analysis is insensitive to the precise value for the breakpoint and for the events we found, the populations are quite distinct so any additional precision would add anything significant. Also, it is perhaps worth pointing out that the events shown in this paper are the only ones that we were able to find—foreshock events in burst mode data are not very numerous.

*Sections 4.2 and 4.3: authors just refer to other papers for the shock normal determination method and for the energization method. Since these techniques are extensively used in the analysis, I recommend to describe them with more detail.*

Reviewing the method described in Paschmann 1980 would require a lengthy and complicated insertion that would merely reproduce elements of the 1980 paper. The technique is not particularly new, so we feel that the interested reader can glean the necessary details directly from the referenced paper.

*Regarding the estimation of the pitch angle spread, what is the time window over which you compute the average magnetic field?*

4 sec, i.e., one spin.

*The text around line 415 has been rewritten.*

*Figure 2: Please delete from the header 'Full, Strahl'. In the caption change '0.09 eV' with '0.09 cm<sup>-3</sup>'.*

Fixed

*Please discuss in Section 5.4 how all the sources of errors can influence the main.*

The errors in the analysis are primarily statistical and the conclusions will not be substantially affected by those errors. More events would, of course, help, but there are no more events in the Cluster data. Perhaps future analyses using data from MMS will provide more insights.

*Line 423: please add here references to simulations, as the already quoted.*

Done