Ann. Geophys. Discuss.,
https://doi.org/10.5194/angeo-2020-54-RC2, 2020

Annales Geophysicae Discussions
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Interactive comment on "Evidence of the Nonstationarity of the Terrestrial Bow Shock from Multi-Spacecraft Observations: Methodology, Results and Quantitative Comparison with PIC Simulations" *by* Christian Mazelle and Bertrand Lembege

Anonymous Referee #2

Received and published: 19 November 2020

The article by C. Mazelle and B. Lembege focuses on the analysis of the terrestrial bow-shock, specifically focusing on its non-stationarity through data analysis of 96 shock crossings and their substructure (ramp, foot), PIC simulations and comparison with past observations and relevant publications.

The analysis and discussion of the results (whether from data analysis or the particle simulations) is very comprehensive, certainly the authors leave no stone unturned. The

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paper can be treated both as a review and as an original research manuscript. I agree with the review from Referee #1 that this would be a significant contribution for researchers who focus on the physics of shocks. The limitations of data analysis are also nicely highlighted, certainly a caution for researchers who investigate detailed shock structures at other planetary bodies and under different upstream solar wind regimes through single spacecraft measurements. Given the length of the manuscript, I didn't find typos/language errors as critical - there was enough information to back-up information lost in some confusing sentences, but I of course agree that extra proofreading could benefit the quality of the manuscript.

What I see as a potential problem is what, at the same time, is described as a unique aspect of this article, ie that the manuscript contains both review and original research elements. The reader has too process a wealth of new information (data analysis simulation results & methodology, as well as extensive review elements of past works). The article in most parts seems too verbose and its very tiring to read. Its very easy to miss key points reading through, I had to go through certain sections multiple times to absorb critical or necessary information. I leave to the authors' discretion whether to review which parts of their manuscript can be shortened - but I definitely urge them to consider this to improve the manuscript's readability and for it to reach to a larger audience. Bulleted lists describing conclusions or methodology steps can also help a bit with organising the text, as an alternative to long paragraphs. I especially think that the section where results are compared with separate investigations in detail can reduced considerably. I will not object if the authors decide to maintain the lengthy text, however - this is only a recommendation with little or no impact on the scientific quality of the work.

Finally, I think that the quality of Figures is quite variable. Few figures have good contrast and sharp lines, most are quite blurred and difficult to read. Not sure if this is an issue with PDF conversion of the manuscript, but better Figure quality could benefit readability (especially figures 5, 6, 11, 12).

Overall, I recommend publication of the manuscript in An. Geoph., but would urge the authors to first consider the presentation issues highlighted above.

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