Article Review

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Title: How much solar wind data are sufficient for accurate fluxgate magnetometer offset determinations?
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This paper is a very interesting work which introduce the accuracy of a method for in-orbit offset calibration by means of the Alfvénic fluctuations in the solar wind.

The work is based on the data provided by the MMS NASA's mission and a statistical method to answer the question of how much solar wind data is sufficient for in-orbit calibration of space magnetometers offsets. This work is supported by the high resolution of the MMS instrument data and the comparison of these results with the NASA's OMNI database.

I found this work a worth it publication paper, as it is supported by a very well described method and conclusions, and a well selected set of references.

I would like to highlight only one comment on an aspect of the reliability criteria of the MMS data:

Although the spacecrafts are not three axis stabilized, the MMS satelites spin and the axis are introduced in the work (page 3, lines 11-12): "In this coordinate system, the major principal axis of inertia (i.e., the spin axis) points in the z-direction and the spacecraft-Sun vector lies in the x-z plane". In page 4 it is mentioned that "magnetic field fluctuations in Bx are slightly weaker than in the other components, so that Nx < Ny < Nz". It would be useful for the reader to have a more detailed explanation of how the axis of the spacecraft are aligned with the spacecraft-sun direction in the orbit, as intuitively the magnetic field fluctuations in the z–x and y-z planes should be the shame.

In page 3 it is mentioned that ", any additional offsets determined from these data should ideally vanish". I found this a compromised comment as it is well known the high dependence of the magnetic response of the fluxgate magnetometer with temperature. Russell et al. (Space Sci Rev (2016) 199: 189. https://doi.org/10.1007/s11214-014-0057-3) introduce the offset drift with sensor temperature as < 10pT/^{0}C. Variations of tens of Celsius degrees (easily reachable in orbit) could lead, without the proper thermal stabilization, to a source of error bigger than the Alfvénic fluctuations in the worst case.

Other revisions:

Page 4, line 28: "The offset ~~estimates~~ estimated from any particular selected interval are almost certainly not accurate, but a sample of those intervals can yield an accurate offset"

Page 5, line 9: "The more offset estimates W from one-minute~~s~~ intervals are used"