Ann. Geophys. Discuss.,
https://doi.org/10.5194/angeo-2019-113-AC3, 2019

Annales Geophysicae Discussions
Open Access
EGU

Interactive comment on "AMPERE Polar Cap Boundaries" *by* Angeline G. Burrell et al.

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Received and published: 13 November 2019

The authors would like to thank the reviewer for their response. We have addressed the reviewers comments as detailed below.

1 Major Comments

1. (Section 2.1) We moved the discussion of the R1/R2 FAC current boundaries from Section 3 to Section 2.1.
2. (Section 2.2) As the reviewer notes, this is discussed later in the paper when the data is used. We do not believe it makes sense to include it here, since we are discussing only the CRBs in this section and not the pairing and comparison.

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3. (Section 3, L11) This portion of the paper is presenting a well established data set, as noted on p4, Line 26. We refer the reviewer to Milan et al. (2015) for a detailed answer to this question, as all of these concerns were considered when this method was developed.

4. (Section 3, L16) The justification for the 10 minute timescale has to do with the AMPERE processing. We refer the reviewer back to Section 2.1, which states that the AMPERE FAC patters are calculated from 10 minute averages. However, not much of the data has time differences of 10 minutes. Figure 1 in this response shows the histograms of the time differences for DMSP and AMPERE pairs in each hemisphere. To allay the concerns of any readers, we have added the following statements to the text: *The 10 min window for pairing boundaries was chosen because of the 10 min averaging performed on the AMPERE FAC maps (see Section 2.1). However, over 90% of northern hemisphere pairs and over 80% of southern hemisphere pairs have a temporal difference of 1 min or less.*

5. (Figure 1). We experimented with several visualisions for this figure. Adding the medians/quartiles of the DMSP boundaries made the figure too busy unless the scatter points were removed. However, removing the scatter points also removed the information about the limits of the satellite boundaries. In the interest of providing a clear visual representation, we prefer to leave the figure as is. Especially since Figure 2 and Table 1 provide detailed hourly data about the median paired differences.

6. (P8, L2) As stated in lines 1 and 2 on page 8, the mean difference between the northern and southern MLT medians (when both hemispheres have data) is -0.3° and the mean difference between the northern and southern MLT smoothed Gaussian peaks (when both hemispheres have data) is 0.23°. This is related to the differences in the statistics rather than a hemispheric asymmetry. In fact, it shows that there is no significant interhemispheric asymmetry between the

DMSP SSJ and AMPERE R1/R2 FAC boundary differences. This is stated on the next line: *This difference is small enough to justify combining the northern and southern hemispheric $\Delta\phi$, since it is much smaller than the mean standard deviation of the MLT distributions ($\bar{\sigma} = 2.66°$ for the overlapping MLT bins).*

7. (P9, L6) We refer the reviewer to Milan et al. (2015) for the reasons behind fitting a circle to the AMPERE data.

8. (P9, L11) Added the SciPy version number to the reference.

9. (P10, L11) We refer the reviewer back to Figure 1 in this response.

2 Minor Comments

1. (Abstract L15) Added.

2. (Section 1, L2) This paragraph was changed at the request of Reviewer 1, and this sentence was removed.

3. (P9, L11) Because this is the standard reference provided by SciPy. However, we have removed this dash as requested.

4. (P10, L11) When "OCBs" is used with no qualifier, it applies to all OCBs. Every instance that refers to a specific OCB is prefaced by either 'AMPERE' or 'IMAGE'.

Interactive comment on Ann. Geophys. Discuss., https://doi.org/10.5194/angeo-2019-113, 2019.

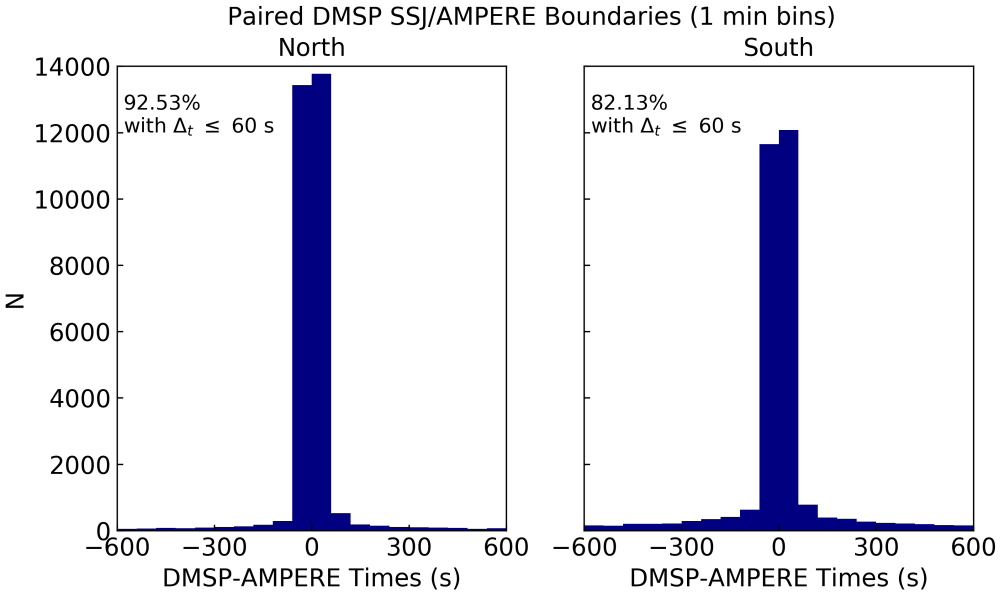

Fig. 1. Time difference in seconds between paired DMSP SSJ and AMPERE R1/R2 FAC boundaries.

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