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Supporting Information for

The Martian Ionospheric Response to the Co-Rotating Interaction Region that Caused the Disappearing Solar Wind Event at Mars.

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Introduction

The following supporting information provides examples of ICB and IMB detections along inbound and outbound orbit segments that are discussed in the main body of this work. Figures S1-S4 show where the ICB were determined along with the datasets used to make this identification. Figures S5-S8 show the same for the IMB determination.

Table S1 gives the amu mass ranges that were used to determine the counts and energy flux values from STATIC for specific ion species.

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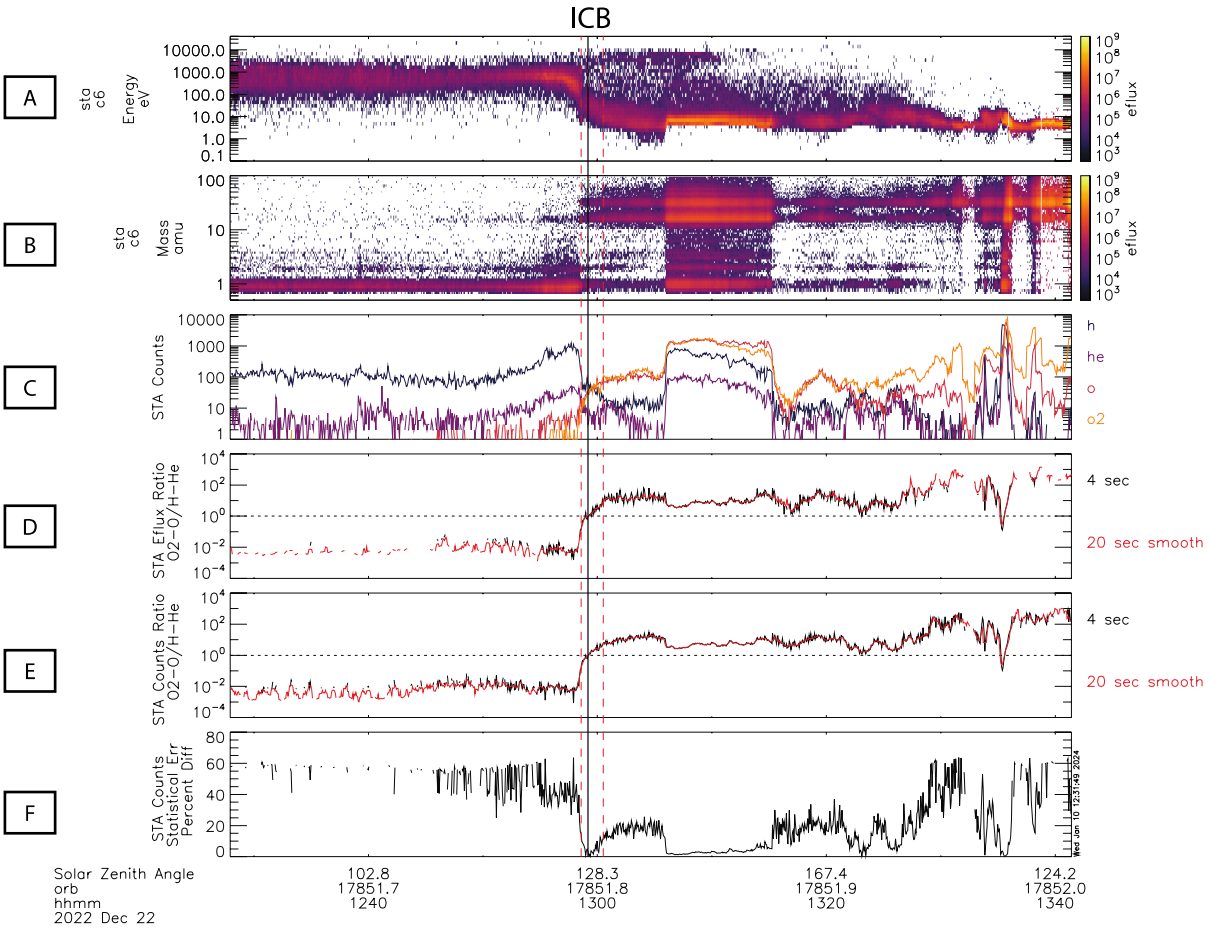

Figure S1. Example ICB determination along the inbound segment of orbit 17851, on December 22, 2022. The vertical black line represents the determined ICB, and the vertical red dashed line represents the error on the ICB determination. Panel A shows the STATIC ion energy fluxes, panel B the STATIC mass energy fluxes, panel C shows STATIC counts associated with H+ (black), He+ (purple), O+ (red), and O2+(orange). Panel D depicts the energy flux ratio between heavy and light ion species in black and the 20 second smoothed ratio in red. Panel E depicts the count ratio between heavy and light species in black and 20 second smoothed ratio in red. Panel F shows the largest percent difference in the STATIC counts ratio due to statistical error. From top to bottom, the x-

axis values represent the SZA location of the spacecraft, MAVEN orbit number, and the time of measurement.

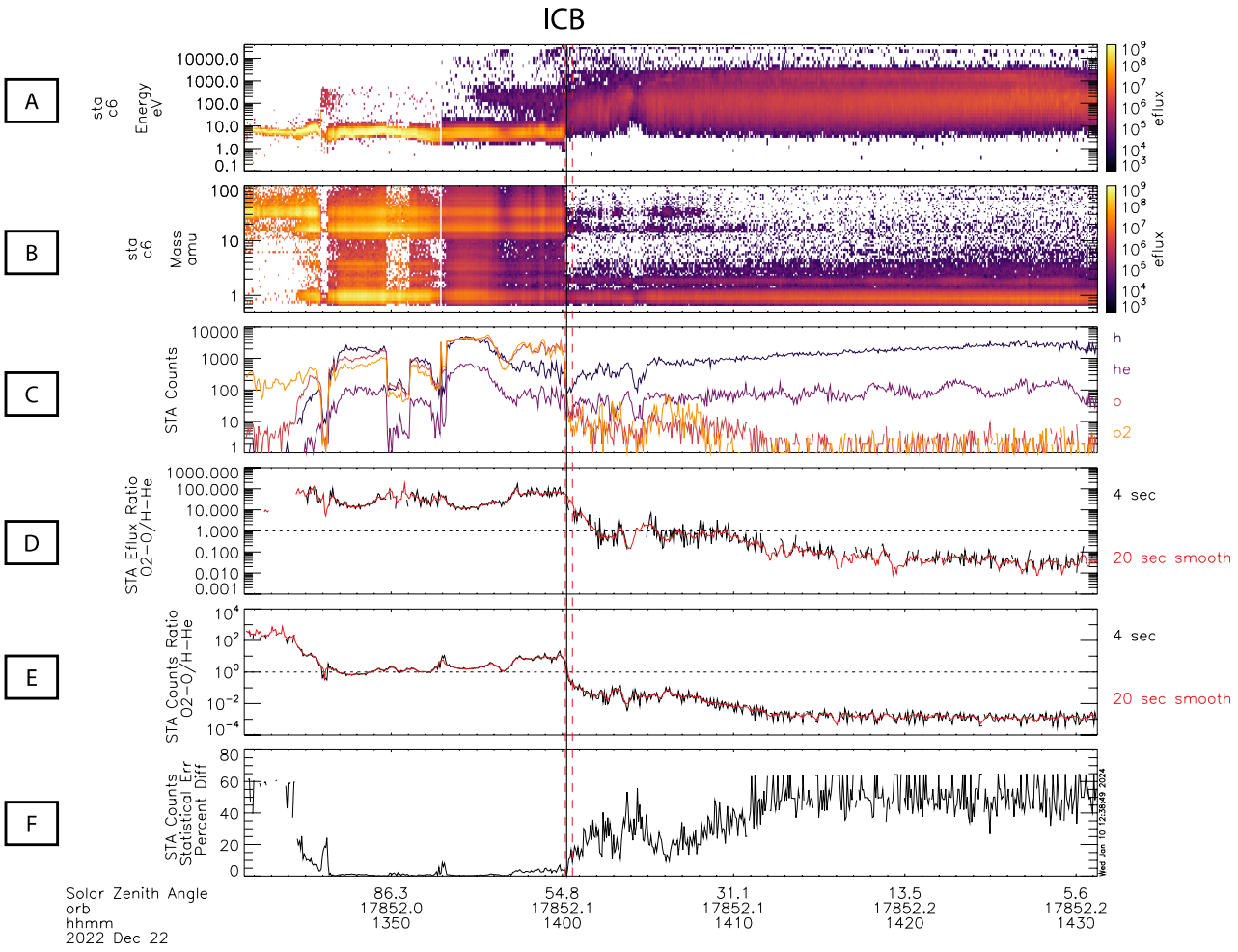

Figure S2. Example ICB determination along the outbound (dayside) segment of orbit 17852, on December 22, 2022. Panels are set up in the same configuration as Figure S1.

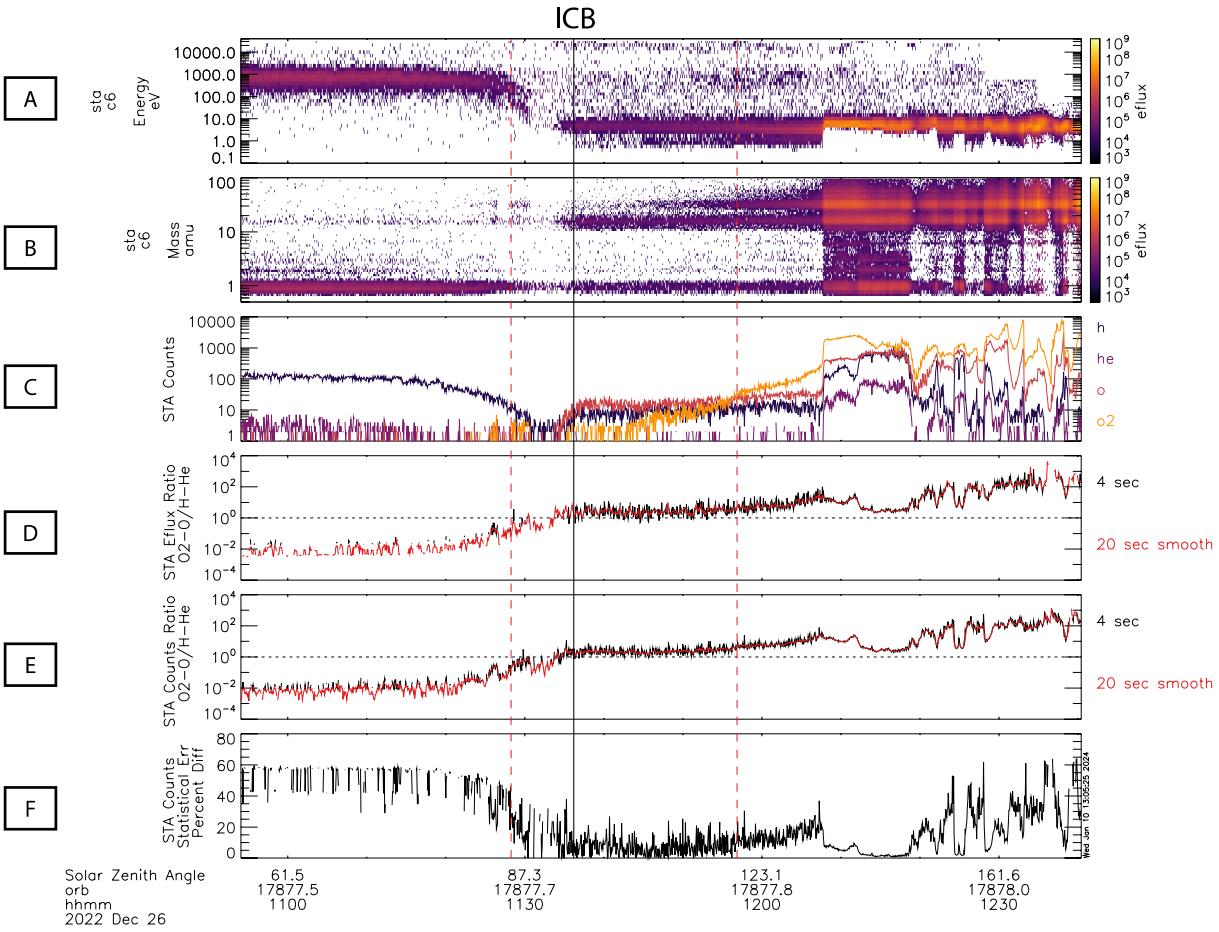

Figure S3. Example ICB determination along the inbound (flank) segment of orbit 17877, on December 26, 2022. This is one of the orbits examined during the DSW event. Panels are set up in the same configuration as Figure S1 and S2.

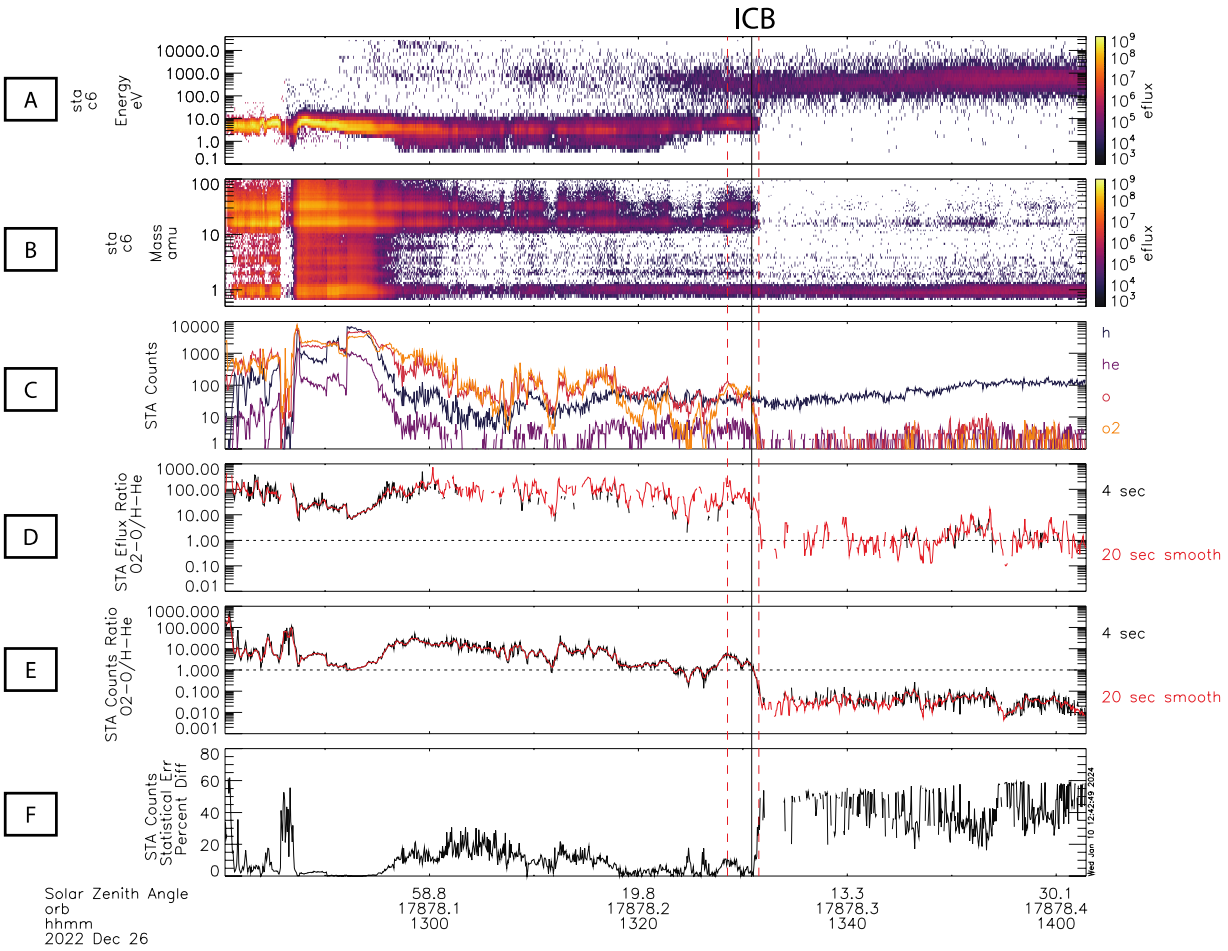

Figure S4. Example ICB determination along the outbound (dayside) segment of orbit 17878, on December 26, 2022. This is one of the orbits examined during the DSW event. Panels are set up in the same configuration as Figure S1, S2, and S3.

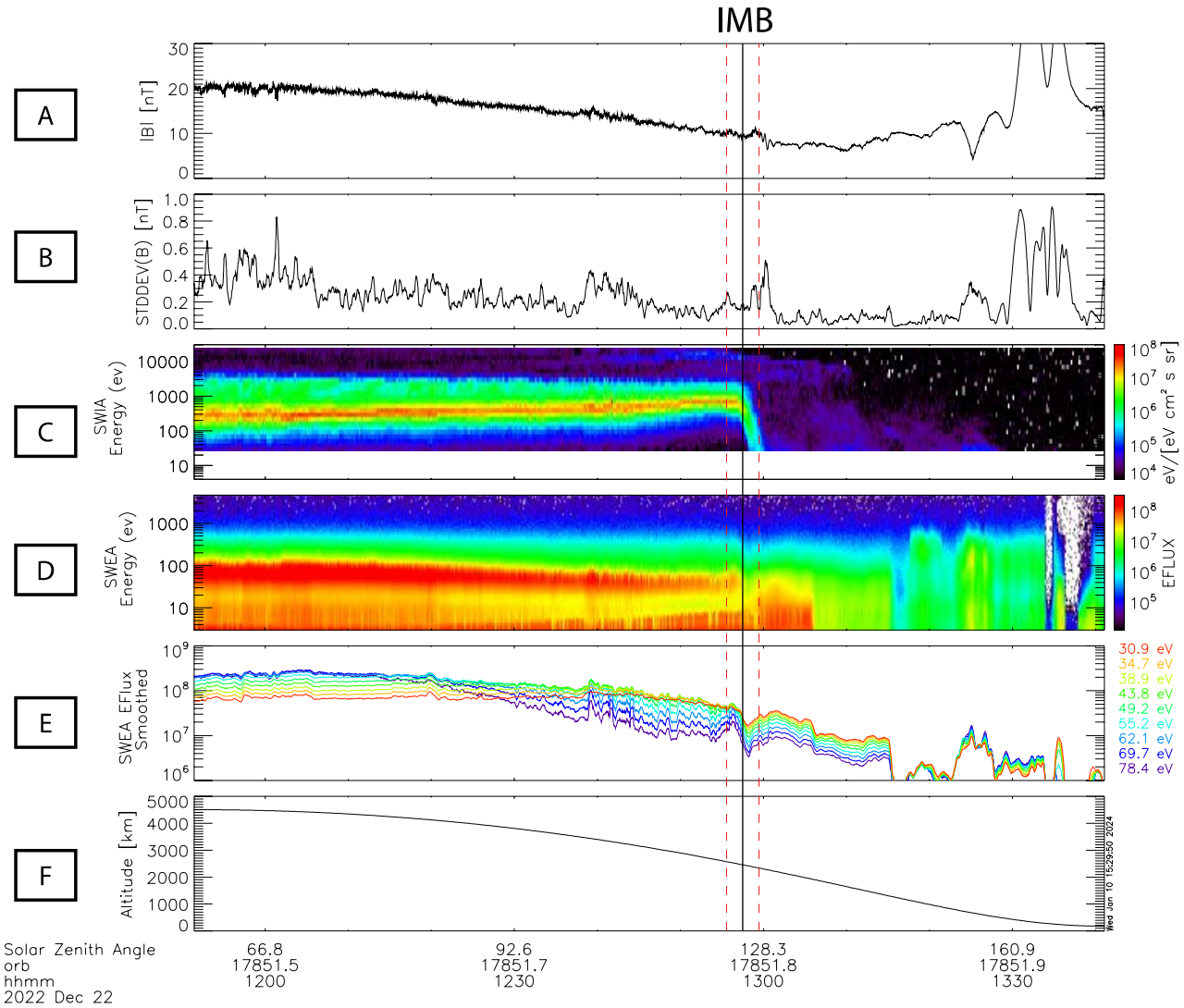

Figure S5. Example IMB determination along the inbound (flank) segment of orbit 17851, on December 22, 2022. The black line depicts the determined IMB location, whereas the red dashed lines give the error on this determined boundary. Panel A shows the total magnetic field strength. Panel B depicts the standard deviation in magnetic field strength over 8 second increments. Panel C shows the SWIA ion energy fluxes. Panel D the SWEA omnidirectional electron energy fluxes. Panel E depicts SWEA energy fluxes for specific energy bins between 30.9 to 78.4 eV. Panel F shows the altitude of the spacecraft. The x-axis values from top to bottom give the SZA, MAVEN orbit number, and time of the measurement.

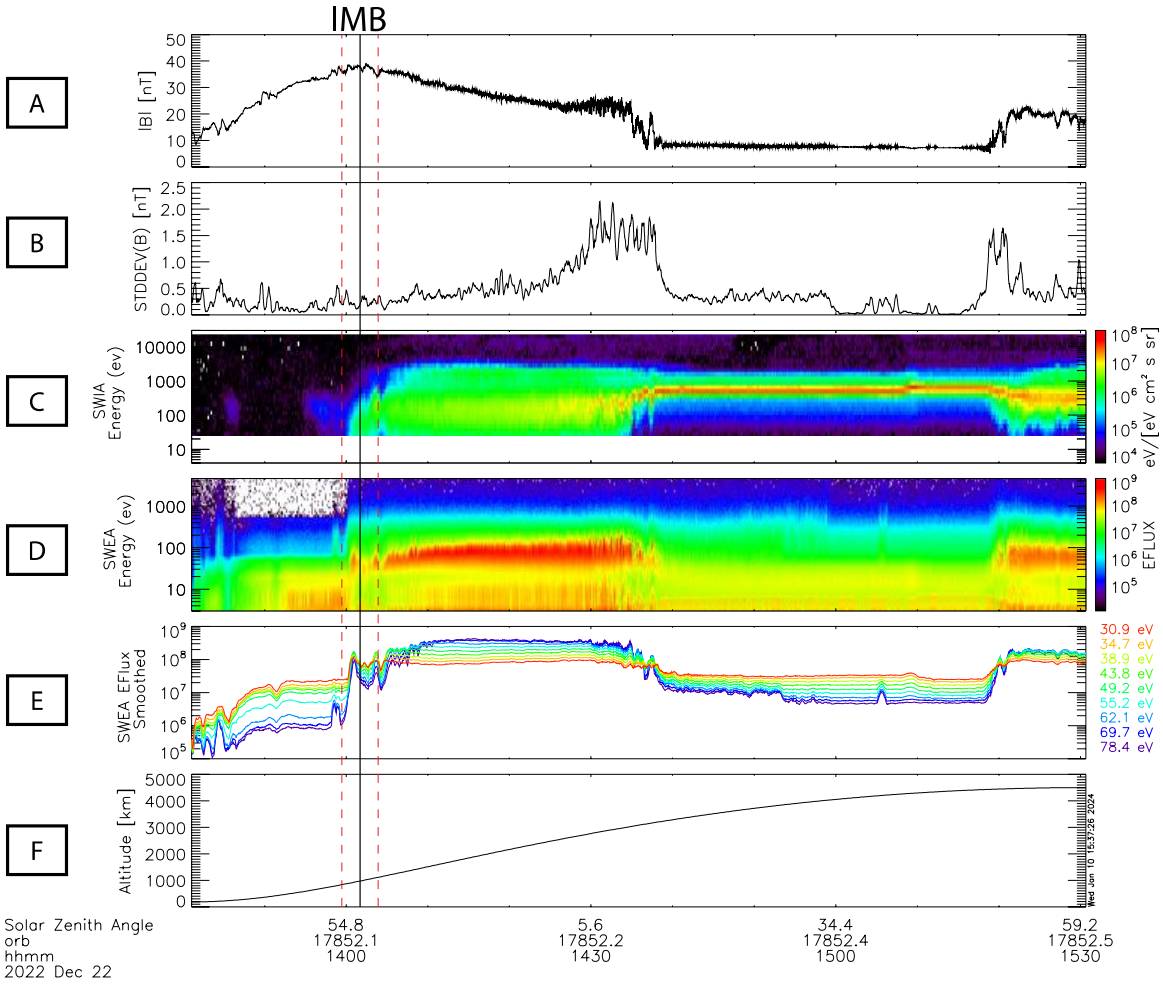

Figure S6. Example IMB determination along the outbound (dayside) segment of orbit 17852, on December 22, 2022. Panels are set up in the same configuration as Figure S5.

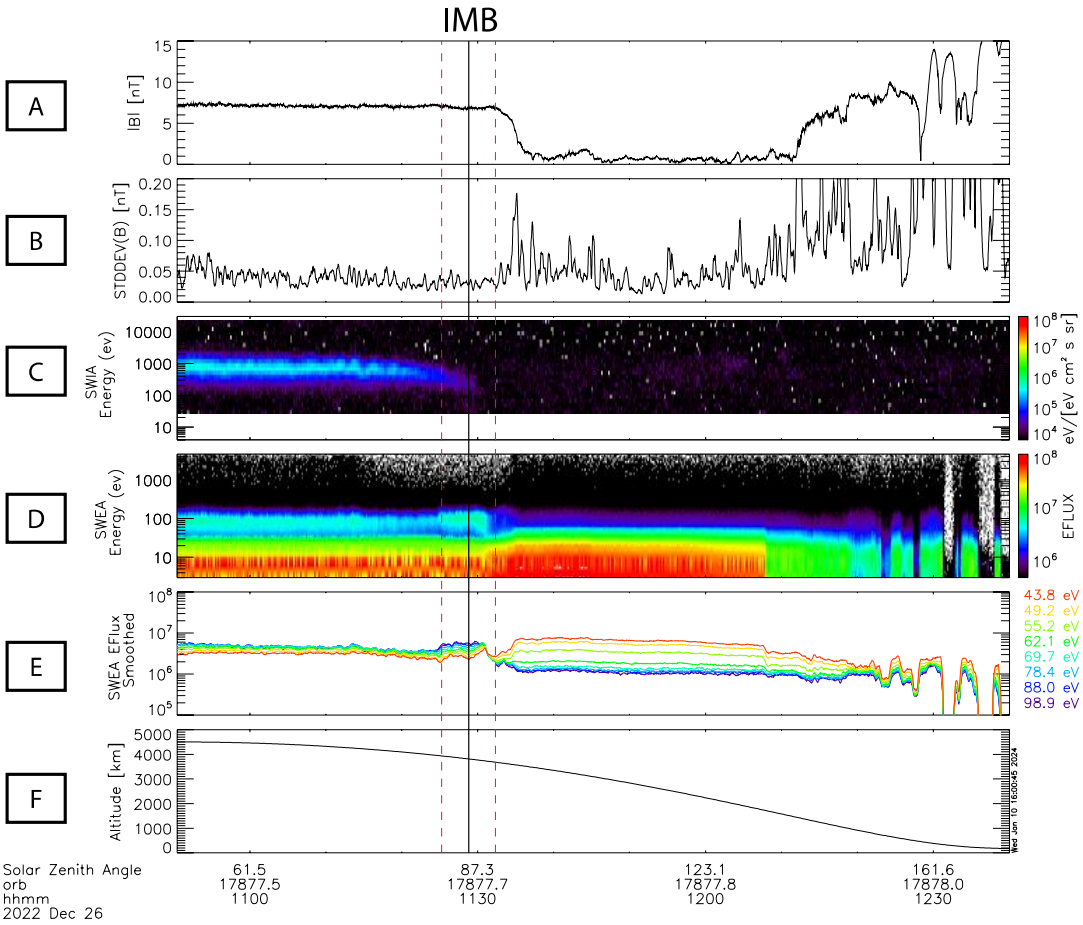

Figure S7. Example IMB determination along the inbound (flank) segment of orbit 17877, on December 26, 2022. This is one of the orbits examined during the DSW event. Panels are set up in the same configuration as Figure S5 and S6.

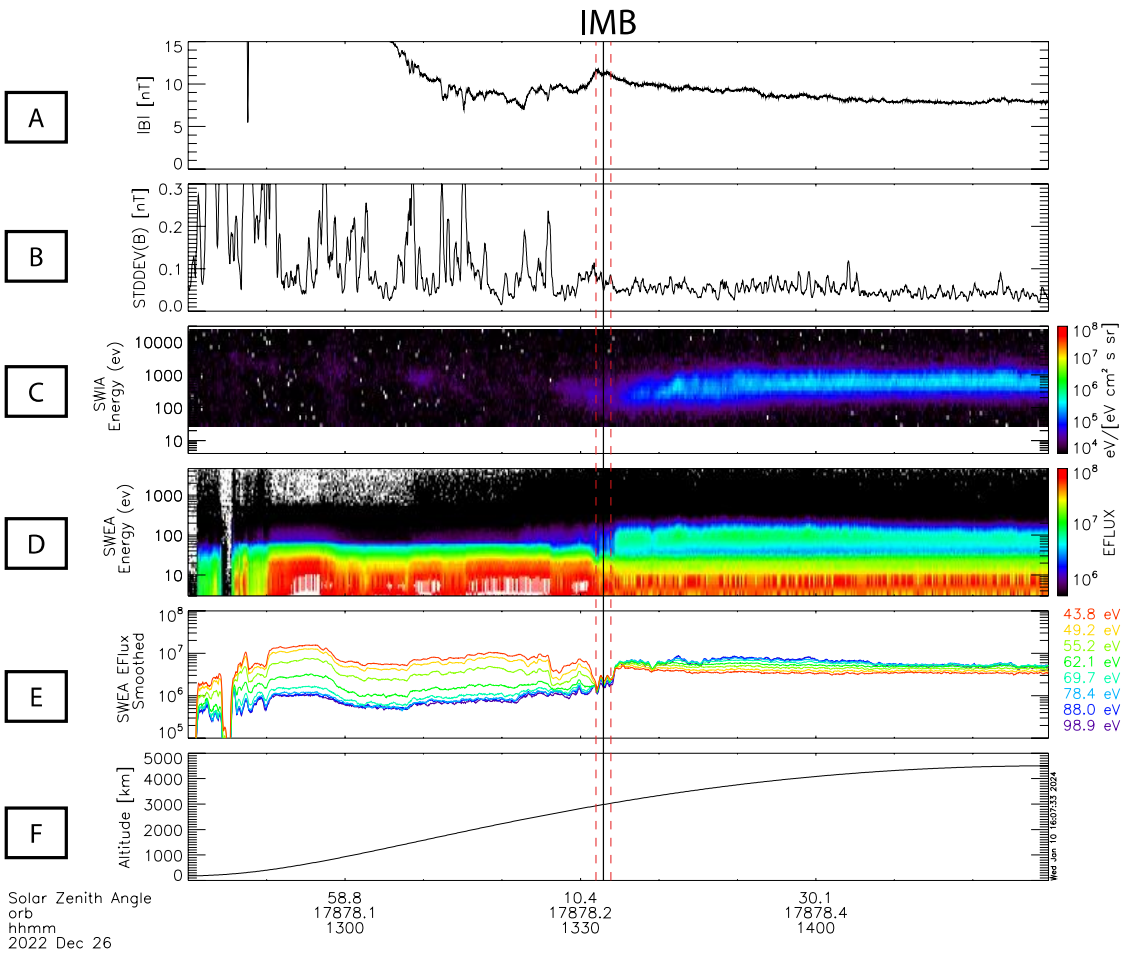

Figure S8. Example IMB determination along the outbound (dayside) segment of orbit 17878, on December 26, 2022. This is one of the orbits examined during the DSW event. Panels are set up in the same configuration as Figure S5, S6, and S7.

Ion Species	AMU Mass Range Used
H+	0 - 1.55
He2+	1.55 - 2.7
O+	14 - 20
O_2+	24 - 40

Table S1. AMU mass ranges used to determine a particular species energy flux and counts to be used in finding the ICB location.