Supporting Information for "Modelling the climatology of low- and mid-latitude F-region ionospheric currents using the Swarm constellation"

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Introduction

The supporting information provides five complementary figures and three movies. The figures present results obtained with Swarm Charlie which, for the most part, were not shown in the article. The three movies provide a dynamic view of the radial poloidal current density predicted by Model A, B and C during three days in summer. In these movies, one can observe the eastward drift of low- and mid-latitude interhemispheric field-aligned currents as highlighted in section 6.3.3 of the article.

Figure S1.

Figure S2.

Figure S3.

Figure S4.

Figure S5.

Figure S6.

Movie S1. Movie showing the radial poloidal current density predicted by Model A on a map during three days in summer - July 15, 16 and 17, 2016 -. The quasi dipole magnetic equator is shown with a black plain line, and the ±35°and ±60°quasi dipole parallels with dashed lines. The image is always centered on the local noon.

Movie S2. Movie showing the radial poloidal current density predicted by Model B on a map during three days in summer - July 15, 16 and 17, 2016 -. The quasi dipole magnetic equator is shown with a black plain line, and the ±35°and ±60°quasi dipole parallels with dashed lines. The image is always centered on the local noon.

Movie S3. Movie showing the radial poloidal current density predicted by Model C on a map during three days in summer - July 15, 16 and 17, 2016 -. The quasi dipole magnetic equator is shown with a black plain line, and the ±35°and ±60°quasi dipole parallels with dashed lines. The image is always centered on the local noon.

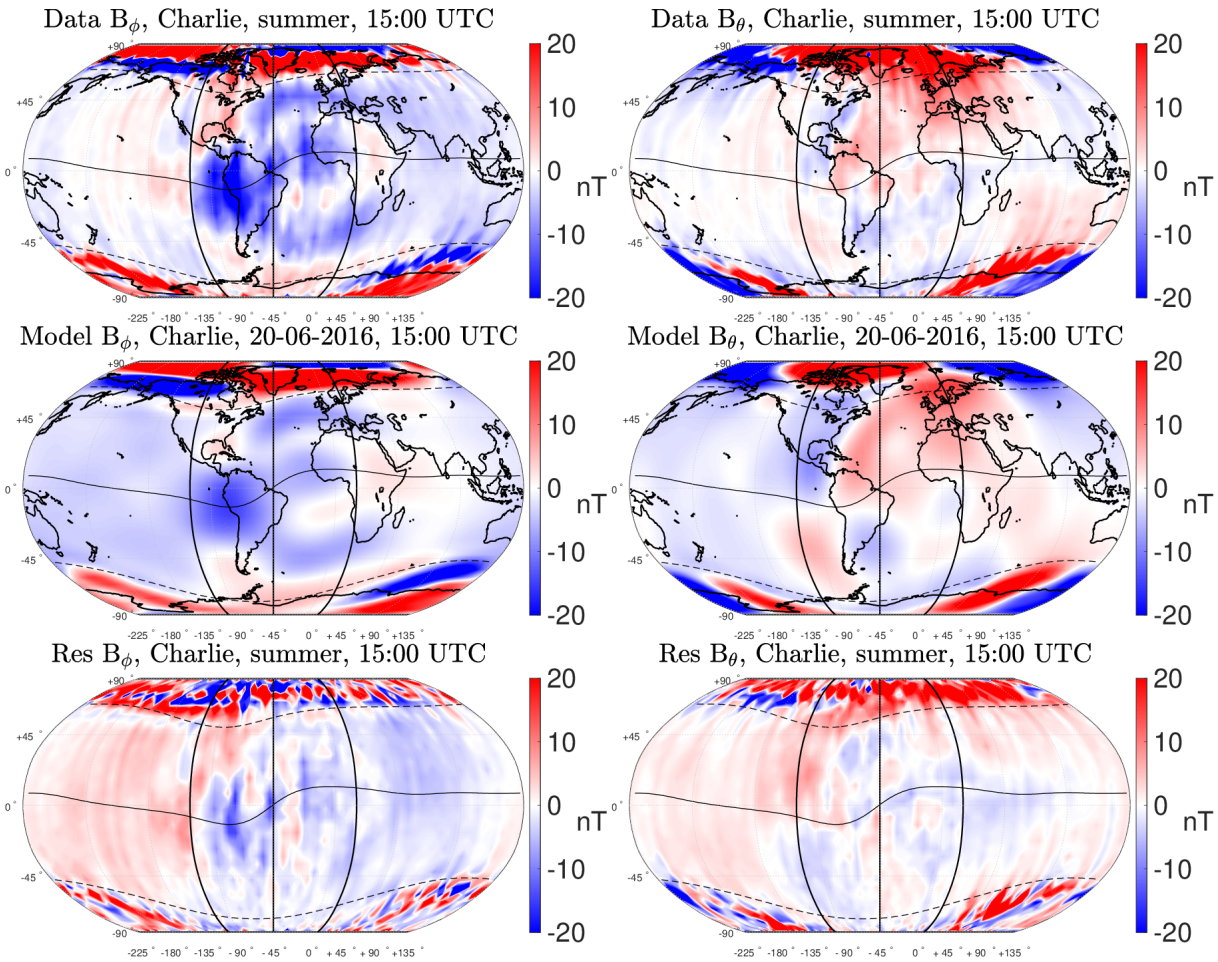

Figure S1. Maps of the east component (left column) and south component (right column) of the data (first row), model prediction (second row) and residuals between the model and the data (third row) for Swarm Charlie. The data and residuals maps are derived using data at 15:00 UTC in summer. The model prediction map is derived using model prediction on a grid on June 20, 2016 at 15:00 UTC. This figure is provided as a complementary figure to Figure 4 and 5.

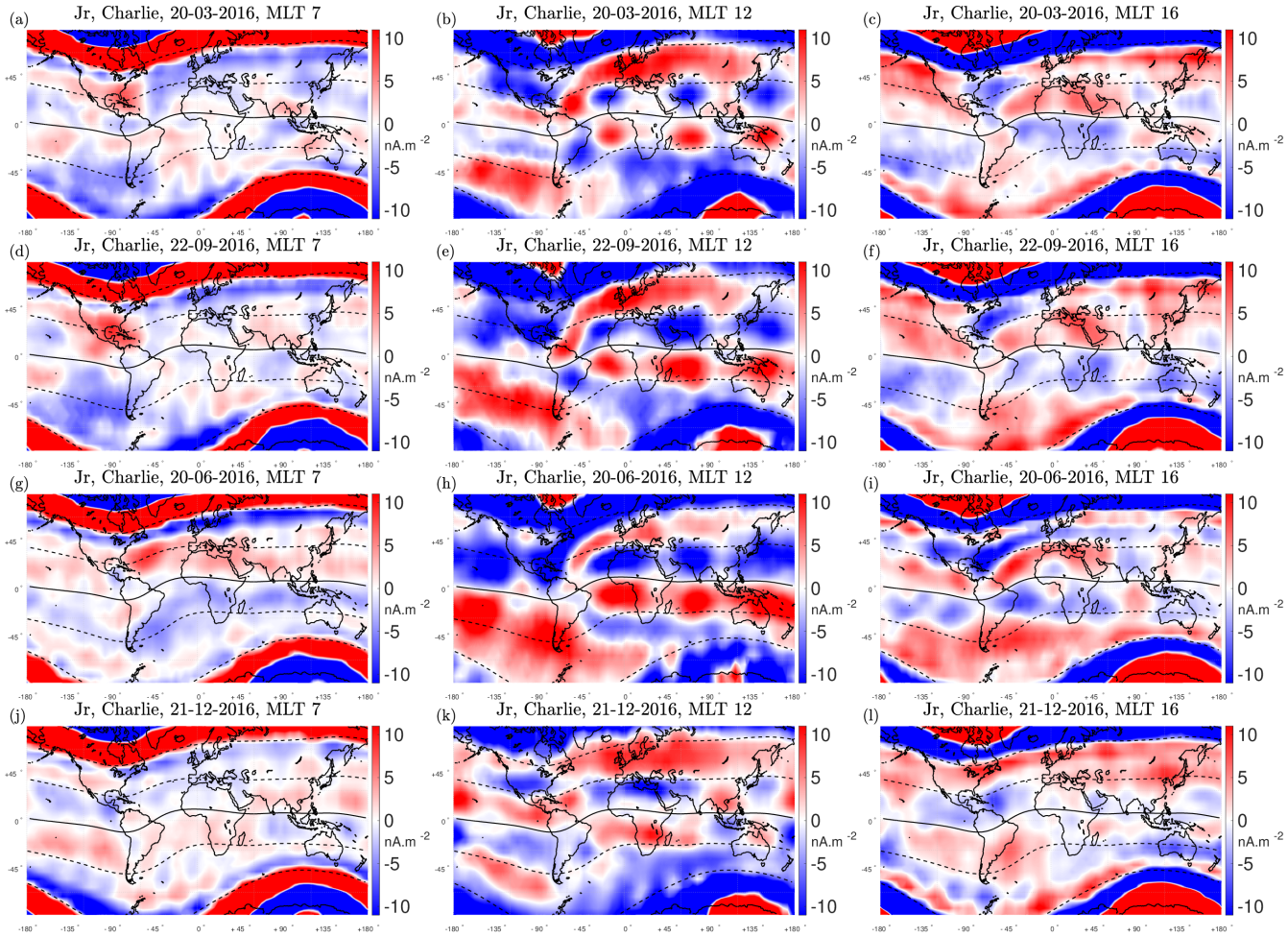

Figure S2. Maps of the radial poloidal current density predicted by Model C at 7:00 MLT (first column), 12:00 MLT (second column) and 16:00 MLT (third column) on March 20, 2016 (first row), September 22, 2016 (second row), June 20, 2016 (third row) and December 21, 2016 (fourth row). The quasi dipole magnetic equator is shown with a black plain line, and the ±35°and ±60°quasi dipole parallels with dashed lines. This figure is provided as a complementary figure to Figure 6 and 7.

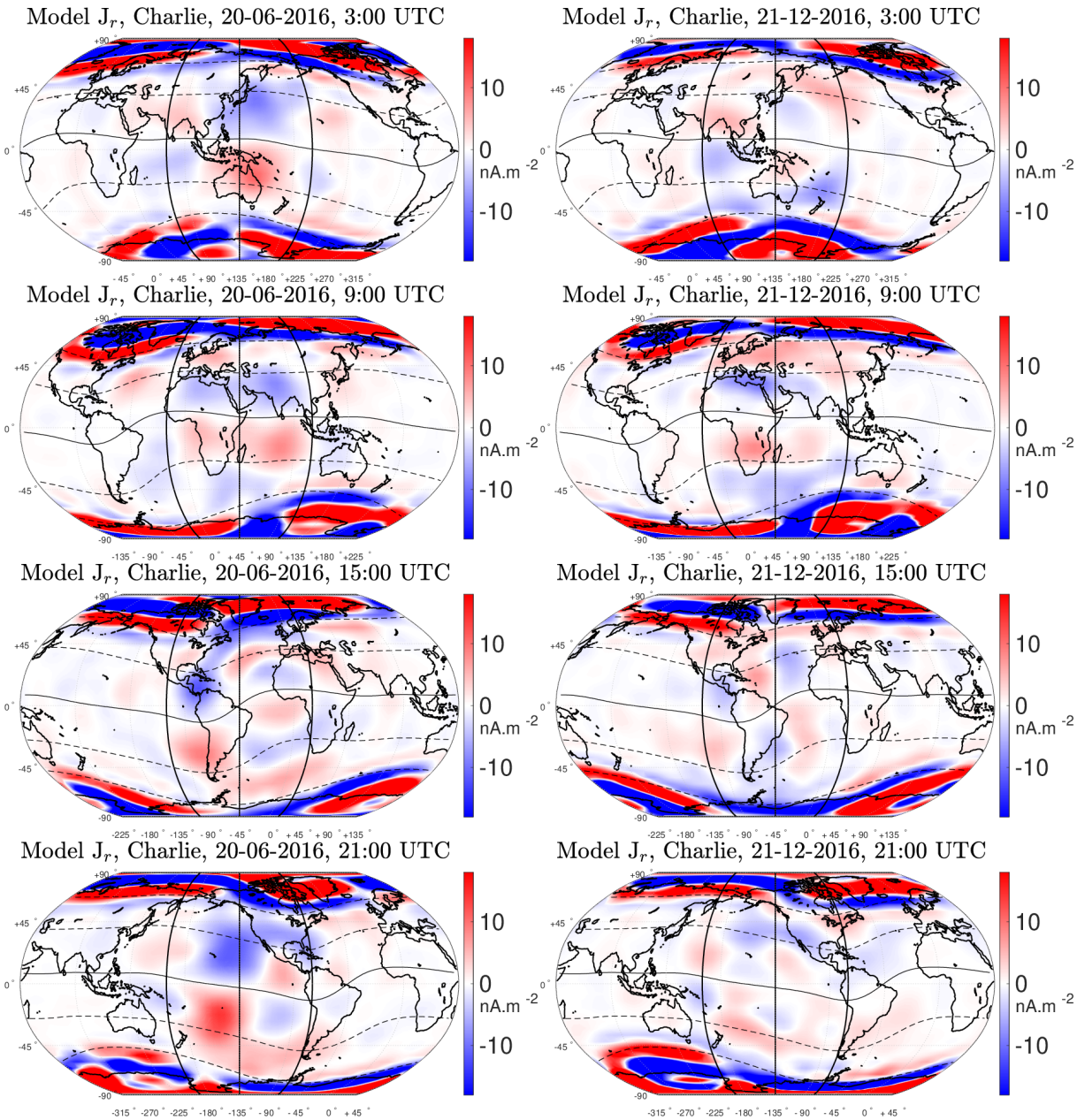

Figure S3. Maps of the radial poloidal current density predicted by Model C on June 20, 2016 - which corresponds to the summer solstice - (first column) and December 21, 2016 - which corresponds to the winter solstice - (second column) at 3:00 UTC (first row), 9:00 UTC (second row), 15:00 UTC (third row) and 21:00 UTC (fourth row). The quasi dipole magnetic equator is shown with a black plain line, and the ±60°and ±35°quasi dipole parallels with dashed lines. This figure is provided as a complementary figure to Figure 8 and 9.

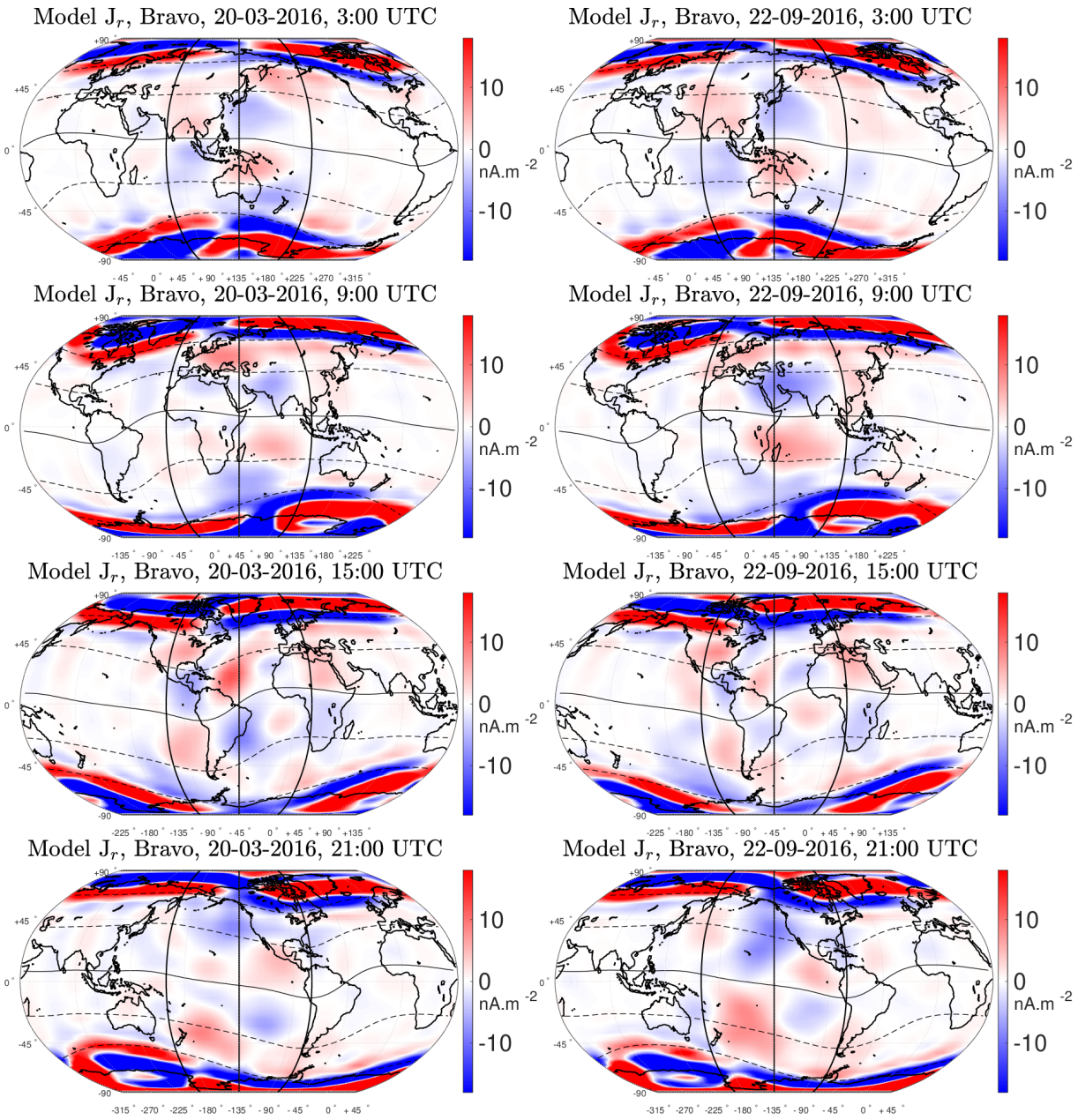

Figure S4. Maps of the radial poloidal current density predicted by Model B on March 20, 2016 - which corresponds to the spring equinox - (first column) and September 22, 2016 - which corresponds to the fall equinox - (second column) at 3:00 UTC (first row), 9:00 UTC (second row), 15:00 UTC (third row) and 21:00 UTC (fourth row). The quasi dipole magnetic equator is shown with a black plain line, and the ±60°and ±35°quasi dipole parallels with dashed lines. This figure is provided as a complementary figure to Figure 10 and 11.

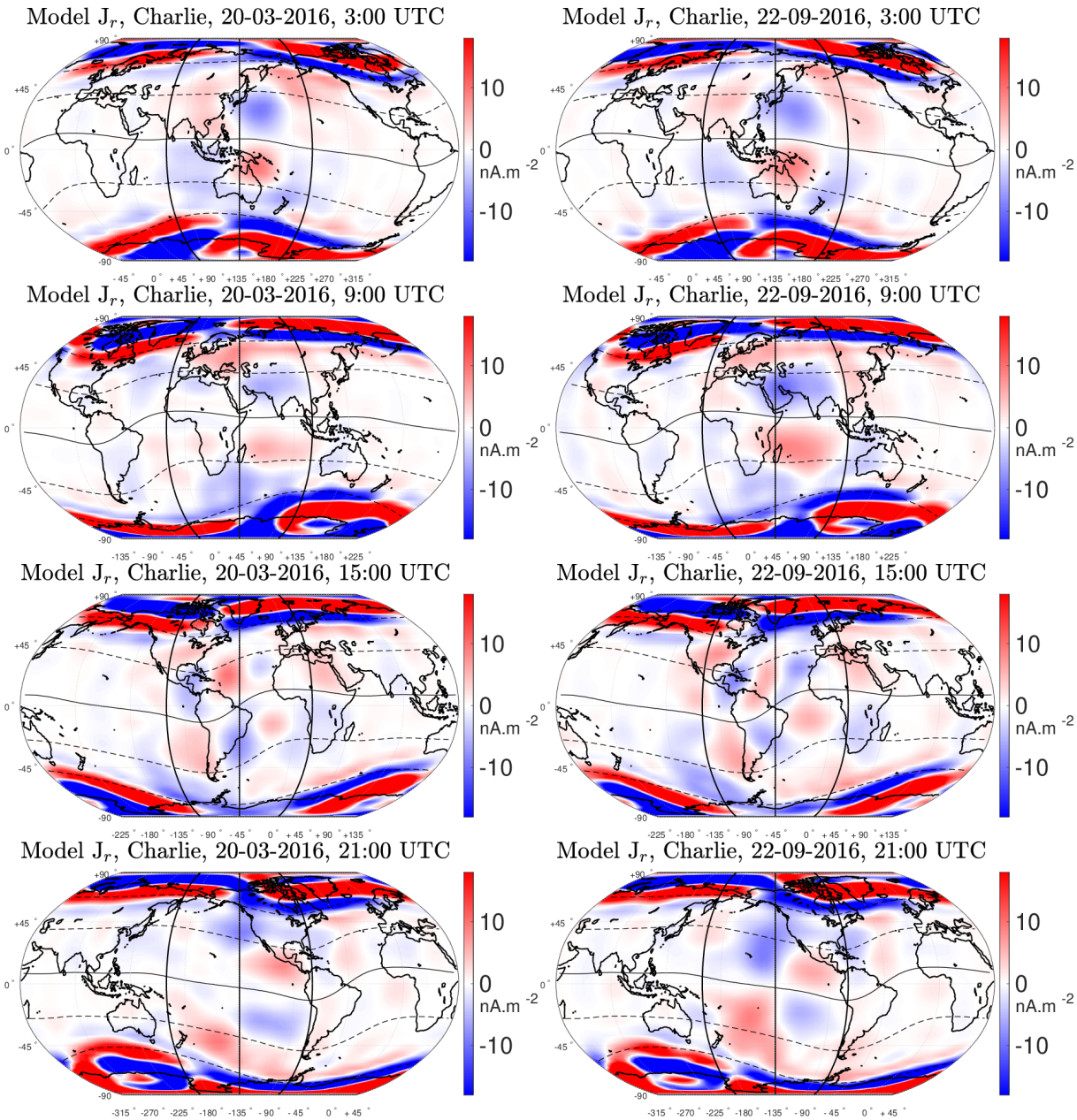

Figure S5. Maps of the radial poloidal current density predicted by Model C on March 20, 2016 - which corresponds to the spring equinox - (first column) and September 22, 2016 - which corresponds to the fall equinox - (second column) at 3:00 UTC (first row), 9:00 UTC (second row), 15:00 UTC (third row) and 21:00 UTC (fourth row). The quasi dipole magnetic equator is shown with a black plain line, and the ±60°and ±35°quasi dipole parallels with dashed lines. This figure is provided as a complementary figure to Figure 10 and 11.

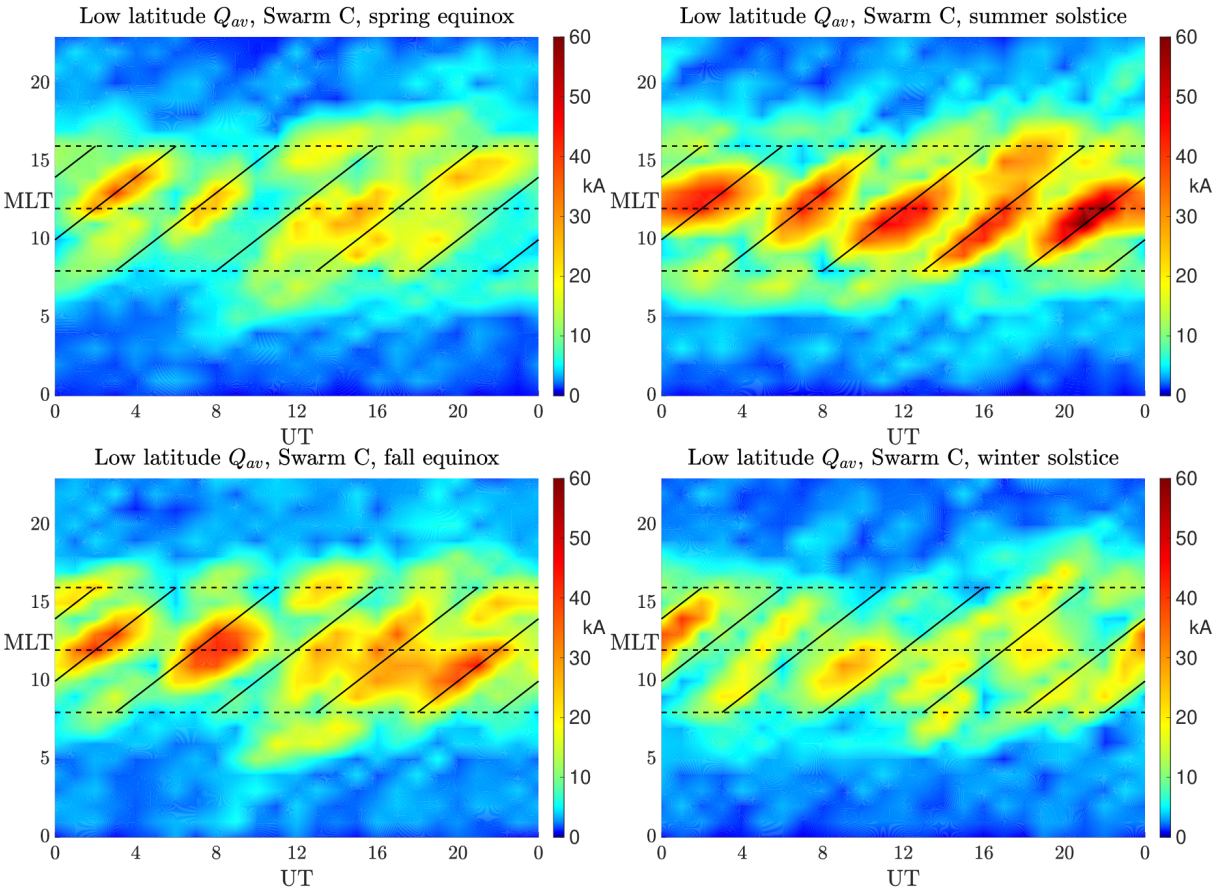

Figure S6. Q_{av} estimated in one hour MLT bands and at low latitudes (between ±35 degrees of quasi dipole latitude) as a function of UTC and MLT, at the spring equinox (March 20, upper left), summer solstice (June 20, upper right), fall equinox (September 22, bottom left) and winter solstice (December 21, bottom right) for Model C. The values of Q_{av} are represented with a logarithmic color scale. The three horizontal dashed lines mark a MLT of 8:00 (bottom), noon (center) and 16:00 (upper). Five transversal black plain lines with a slope of 1 MLT.UTC^{-1} are shown at regular intervals of 5:00 UTC. This figure is provided as a complementary figure to Figure 14.