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Dependence of Global Poynting Flux on IMF By

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In this study we present the dependence of the global Poynting flux on the IMF By orientation. The amount of energy that enters the near Earth system from the solar wind and IMF interacting with the geomagnetic field is a function of the solar wind speed and pressure and the IMF orientation. All the various published coupling models show that the polarity of the IMF By component does not change the energy input. In contrast the global convection patterns and thus the ionospheric Pedersen currents depends on the IMF By polarity. This apparent contrast between input (from the solar wind) and output (energy dissipating Pedersen currents) raises to the question: To what extend is the global Poynting flux dependent on the IMF By polarity. We have performed a large statistical study using abrupt transitions in the IMF By component (polarity changes) as measured by the ACE spacecraft. The effect of other solar wind parameters such as the solar wind pressure is minimized by selecting events where these are nearly constant. We use electric field distribution from SuperDARN and field-aligned current distributions from AMPERE to calculate the global distribution of the Poynting Flux. We show events as well statistical results to answer the science objective. The study emphasizes the global dynamic behavior of the ionosphere in its response to changes in the external driver (IMF).