Geophysical Research Abstracts
Vol. 14, EGU2012-7731, 2012
EGU General Assembly 2012

Can magnetic connectivity be used to interpret Venus Express photoelectron observations? - A global hybrid modelling study

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We present a preliminary study of the magnetic connection in the Venusian induced magnetosphere during events when the electron spectrometer (ELS/ASPERA-4) on Venus Express (VEX) has observed photoelectrons outside of the Venus dayside ionosphere. We use the global HYB-Venus hybrid simulation to model the Venus-solar wind interaction for the selected VEX orbits when these events have occurred. The upstream conditions in the simulation runs for the solar wind density and velocity are determined from the VEX/ASPERA-4 ion measurements and the upstream magnetic field is determined from the VEX/MAG magnetometer measurements. Using the simulation solution we trace the magnetic connection to the orbit of the spacecraft. Further, we compare the intervals when the magnetic field connects the orbit and the Venus dayside ionosphere to the intervals when the ELS electron energy spectrum shows the signature of photoelectrons.