



The Influence of Corotating Interaction Regions and High Speed Streams on Electrons in the Martian Magnetosheath and Ionosphere

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From late 2007 to early 2008, a pair of coronal holes lasted for many solar rotations while Earth and Mars were aligned. The wind emanating from coronal holes is fast (typically 500-850 km/s) and forms Corotating Interaction Regions (CIRs) as the fast wind runs into slower wind emitted at an earlier time. Therefore, this time frame provides a good opportunity to examine the impact high speed streams (HSS) and CIRs on the electron populations at Mars. Specifically, we compare solar wind observations collected near Earth to electron measurements collected at Mars with the Analyzer of Space Plasma and Energetic Atoms (ASPERA-3) electron sensor (ELS) on the Mars Express (MEx) spacecraft. In order to examine magnetosheath and ionospheric regions separately, we used a combination of energy and altitude criteria. For the magnetosheath we took all the electron measurements between 154-1000 eV at altitudes above 4000 km. Likewise, for the ionosphere we examined the electrons with energies less than 145 eV at altitudes below 2000 km. We found that the magnetosheath fluxes are enhanced during the CIRs and HSS. In the ionosphere there is no electron flux response to the CIRs and HSS although the average electron energy is increased. In March of 2012 there was another radial alignment of Earth and Mars when STEREO spacecraft had a view of several CMEs headed towards Earth and Mars. The 2012 alignment is an ideal timeframe to examine the response of the Mars environment to CMEs.