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Mars Ionospheric and Magnetospheric Response to Solar Wind Variability

Hermann Opgenoorth (1,2,4), Niklas Edberg (1), Mark Lester (3), Anthony Williams (3), Markus Fränz (4), David Morgan (5), and Olivier Witasse (6)

(1) Swedish Institute of Space Physics, Uppsala Division, Uppsala, Sweden (opg@irfu.se), (2) International Space Science Institute, ISSI, 3012 Bern, Switzerland, (3) Dept. of Physics and Astronomy, University of Leicester, Leicester LE1 7RH, UK , (4) MPS, Katlenburg-Lindau, Germany, (5) Dept. of Physics, University of Iowa, Iowa, USA, (6) RSSD, ESTEC, Noordwijk, NL

At planets with induced magnetospheres the coupling between the ionosphere, the small draped magnetosphere and the solar wind is in several ways much more direct than at Earth. On the other hand it is also much more complicated, as the magnetosphere itself is created and in its total shape and strength dynamically depending on the prevailing Solar wind conditions.
In early 2010 Mars was located behind Earth in the Solar wind. In this study we have utilized coordinated data from multiple near-Earth spacecraft (Stereo, ACE, Cluster, and even Earth ground-based data) to evaluate what kind of Solar wind disturbances have passed by Earth and might hit Mars consecutively (and when). We use plasma data from the ESA Mars-Express mission (mainly from the ASPERA particle instrument and the MARSIS topside ionospheric sounder) to investigate what kind of ionospheric and magnetospheric response is triggered at Mars in response to Solar wind variability in the magnetic field, density and velocity for a number of isolated events in March and April 2010.