



Morphology and possible Causes of magnetic Disturbances near Mars

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Accurate mapping and interpretation of crustal magnetic sources at Mars requires methods for elimination/minimization of the externally generated magnetic disturbances. However, the solar wind interaction with Mars has revealed a complexity that is unique in the solar system and so far largely unexplored. The most extensive set of magnetic field observations near Mars comes from more than 8 years of operation of the Mars Global Surveyor MAG/ER measurements. These reveal both magnetic disturbances generated in the direct interaction between the solar wind and the atmosphere as well as significant perturbations associated with interaction between the solar wind and the crustal fields. The direct interaction with the atmosphere creates strong horizontal fields in the pile-up region at the dayside and more radial fields associated with a tail current at the night-side. In addition solar wind pick-up of planetary ions is associated with hemispherically asymmetric disturbances observed both at the day- and night-side being strongest near the terminator. While the disturbances in the pile-up region are closely associated with the upstream solar wind parameters, the perturbations close to the magnetic anomalies are more complex, indicating direct interaction between the solar wind and the crustal field, and formation of currents analogous with the Chapman-Ferraro currents at the Earth.