



Effects of Crustal Field Rotation on the Solar Wind Plasma Interaction with Mars

Yingjuan Ma (1), Xiaohua Fang (2), Christopher Russell (1), Dave Brain (2), Andrew Nagy (3), Gabor Toth (3), Janet Luhmann (4), and Chuanfei Dong (3)

(1) ESS, IGPP, UCLA, 6877 Slichter Hall, Los Angeles, CA 90025, United States (yingjuan@igpp.ucla.edu), (2) LASP, University of Colorado, CO 80309-0392, United States, (3) AOSS, University of Michigan, 2455 Hayward St., Ann Arbor, MI 48109, United States, (4) SSL, University of California Berkeley, Berkeley, CA 94720, United States

The crustal field on Mars rotates constantly with the planet at a period of 24 h 37 min. In this study, we include the rotation of the crustal field in the multi-species single fluid MHD model of Mars and simulated one entire day of May 15, 2005 using normal solar wind condition to investigate how this rotation affects the solar wind plasma interaction. The MHD model results are compared with MGS magnetic field observations and show remarkably good agreement along almost all of the 12 orbits on that day. Model results also show that the ion escape fluxes vary slowly with rotation, anti-correlating with the strength of subsolar magnetic crustal sources. It is also found that near intense crustal field regions, the densities of the heavy ion components increase significantly, implying a strong influence of the crustal field on the low-altitude ionosphere.