

## The formation of the Martian magnetic pile-up boundary using a new high-resolution 3-D MHD model

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The global magnetic field of Mars is known to be very weak like Venus. Recent observations have revealed the existence of the magnetic pile-up boundary in the inner Martian magnetosheath, while such a structure has not been observed at Venus. Jin et al. [2006] examined the effects of charge exchange reactions and electron impact ionizations by using a developed 2-D MHD model. The MHD simulation results suggest that a decrease of pressure due to the charge exchange reactions and electron impact ionizations causes an enhancement of magnetic field magnitude in the inner magnetosheath. But 2-D MHD simulation does not reproduce actual magnetic field, temperature and velocity in the inner magnetosheath. To investigate more quantitatively the effects of charge exchange reactions and electron impact ionizations, 3-D MHD simulation is required. We developed a high-resolution 3-D MHD model and investigated the effects of charge exchange reactions and electron impact ionizations.