

## CIR 構造通過中の火星電離圏付近における重イオン観測の統計解析研究

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## A statistical study of heavy ion flux enhancement in the vicinity of the Martian ionosphere during CIR passages

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The solar wind can directly interact with the Martian upper atmosphere, because Mars doesn't possess a global intrinsic magnetic field. Several spacecraft missions, e.g., Phobos-2, MGS, and recently Mars Express have carried out observations of the Martian plasma environment. However, the responses of the various escape processes of the Martian upper atmosphere to variation of the solar wind conditions are still far from understood.

In this study, we investigated planetary heavy ion dynamics during passages of the corotating interaction region (CIR) structures in the solar wind. We statistically analyzed data obtained by the IMA/ASPERA-3 onboard the Mars Express (MEX) from July 2007 to September 2009, i.e., about one Martian year. We compared the solar wind velocity at Mars derived from a shifted Maxwellian fitting to the IMA data with time-shifted ACE satellite data taken at about 1 AU to Martian orbit. Coinciding with the CIR passages, MEX observed heavy ion flux enhancement in the vicinity of the Martian ionosphere. The heavy ion energies reach greater than 100 eV and sometimes up to about several keV. Observed ion velocity distribution functions show that they are mainly precipitating toward the Martian ionosphere. While the precipitating flux level is consistent with a previous model prediction of sputtering ions [Chaufray *et al.*, 2007, *JGR*], the intermittent occurrence of the heavy ion precipitation differs from conventional expectation of constant precipitation. In the presentation, we will discuss a possible scenario to explain the signatures of the heavy ion precipitation.