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# On the Martian Induced Magnetosphere Boundary: MAVEN Observations

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The magnetic structure of the martian induced magnetosphere boundary (IMB) had been observed and studied by earlier missions to Mars, such as Phobos-2, Mars Global Surveyor (MGS) and Mars Express (MEX). The IMB (also known as the magnetic pileup boundary or MPB) is a well-defined plasma boundary that separates the magnetosheath and the induced magnetosphere (IM) which are regions of high and low magnetic field fluctuations, respectively. The crossing of the IMB from the magnetosheath into the IM is characterized by (1) a sharp increase in magnetic field intensity as the magnetosheath field lines "pileup" and drape around Mars, (2) decrease in magnetic field intensity fluctuations, and (3) a correlated decrease in electron flux with energies greater than 10 eV. Many questions about the nature and dynamics of this plasma boundary at both macroscopic and sub-ion inertial scale length remain unanswered. Here, we present an analysis of the martian IMB using plasma and fields measurements obtained by the Mars Atmosphere and Volatile EvolutioN (MAVEN) spacecraft during the first year of its mission. Preliminary statistical survey of Mars' IMB shows that the decrease in electron fluxes and magnetic field fluctuations does not always corresponds to an increase in magnetic field intensity, suggesting that the field lines do not pileup at the IMB in these IMB crossings. This is very different from our conventional understanding of the IMB, where the magnetic field lines are expected to slow down, "pileup" and drape around Mars. To further investigate this result, we performed correlation analysis between the x and r (radial cylindrical) component of the magnetic field. Since the draping and pileup of magnetosheath field lines are likely to be driven by solar wind conditions, we also perform correlation studies to establish any relationship between occurrence (and absence) of magnetic field pileup at the IMB and solar wind parameters, such as solar wind dynamic pressure and Mach number.