

A survey of the possible influence of magnetic anomalies on ions near Mars

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We present a survey of the possible influence of magnetic anomalies on ions near Mars. The presence and characteristics of ions are investigated for cases where the electron data indicates magnetic anomalies. The location of heavy ion beam events and other ion signatures are compared with the expected location of magnetic anomalies based on the Cain Mars crustal magnetic field model. This is done both as case studies and in a statistical study. We also extend studies of heavy ion beams observed in the vicinity of Mars by the Mars Express ASPERA-3 ion mass analyzer by investigating the direction of the ion flow. It is discussed whether any of the spatial characteristics including the flow direction indicate an influence of magnetic anomalies. The ion events concern heated/accelerated ions with energies above 300 eV so the gyro radii of the ions are mostly large compared to the size of magnetic anomalies. Therefore phenomena such as bending of the ion path or heating up to some threshold energy after which the ions are lost from the anomaly due to gyro radii effects are good candidates for observable effects.