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Ionospheric magnetic fields and currents at Mars and Venus. Perspectives from MEX and VEX observations.

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Abstract

Mars Express and Venus Express spacecrafts have provided us a wealth of in-situ observations of characteristics of induced magnetospheres of Mars and Venus at low altitudes during solar minimum conditions. At such conditions large-scale magnetic fields are observed deeply in the ionospheres (magnetized ionospheres). The observations again raise a long-standing question about the origin of these fields. The problem is intimately related to issue of electric current system and their closure. Analysis of ASPERA-3, ASPERA-4, MARSIS and MAG data reveals a lot of features which require a more sophisticated view at the origin and topology of the ionospheric magnetic fields. Differing perspectives at this problem are widely discussed.