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Induced magnetic fields at Venus and their effect on ion escape

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For the first time Venus Express have provided us a wealth of in-situ observations of the characteristics of induced magnetosphere at low altitudes (down to 180 km) during solar minimum conditions. At such conditions large-scale magnetic fields are observed deep in the ionosphere (magnetized ionosphere). The observations again raise a lon-standing question about origin of the induced magnetic fields. The motional and Faraday electric foelds as drivers of the induced electrical currents produce a different magnetic field topology at close distances to the planet. Analysis of the MAG data complemented by ASPERA-4 measurements shows that both mechanisms operate simultaneously resulting a rather complicated interaction pattern with a small induced dipole immersed into the ionosphere. Another limiting case when Faraday induction clearly operates is displayed is when the IMF is aligned with solar wind velocity. Then solar wind interacts with the induced dipole whose axis is antiparallel to the IMF. Such types of induced effects may significantly influence the escape of ionospheric ions forced by solar wind.