



## **Solar cycle dynamic of the Martian induced magnetosphere. The difference between the calm and CME perturbed solar wind**

Andrey Fedorov (1), Nicolas Andre (1), Ronan Modolo (2), Riku Jarvinen (3), and Stas Barabash (4)

(1) IRAP UPS CNRS, Toulouse, France (andrei.fedorov@irap.omp.eu), (2) LTMOs CNRS, Paris, France, (3) FMI, Helsinki, Finland, (4) IRF, Kiruna, Sweden

This work presents a massive statistical analysis of the ion flows in the Martian induced magnetosphere. We performed this analysis using Mars Express ion mass spectrometer data taken during 2008 - 2013 time interval. This data allows to make an enhanced study of the induced magnetosphere variations as a response of the solar activity level. Since Mars Express has no onboard magnetometer, we used the hybrid models of the Martian plasma environment to get a proper frame to make an adequate statistics of the magnetospheric response. In this paper we present a spatial distribution of the planetary plasma properties in the planetary wake as well as the ionospheric escape as a function of the solar activity. We show that there is a very strong difference between the Martian induced tail contents during solar minimum and solar maximum, probably, because of the different scale of planetary origin ions acceleration. However the total escape rate for the quiet solar wind time interval is similar for solar minimum and solar maximum. At the same time the escape rate statistics obtained during CME time intervals show the very intensive (almost factor 10) enhancement of the planetary ions escape rate.