EPSC Abstracts
Vol. 5, EPSC2010-832, 2010
European Planetary Science Congress 2010

On the role of diurnal and seasonal effects in the regulation of Saturn's radio emissions

P. Louarn
Centre d'Etudes Spatiales des Rayonnements, CNRS/Université Paul-Sabatier, Toulouse, France (philippe.louarn@cesr.fr)

Abstract

In the fast rotating magnetosphere of Saturn, the plasma of the equatorial regions (the disc/torus) is forced to co-rotation by a system of currents that couples the equatorial plane of the magnetosphere to the auroral zones of Saturn. The efficiency of this coupling is linked to the ionospheric conductivity, a quantity that varies with the solar illumination and, thus, the local time and the season. Using a simplified model of the ionosphere/magnetosphere coupling, we explore the consequences of the diurnal/seasonal variations of the conductivity in the regulation of the co-rotation, the efficiency of the coupling, the generation of parallel currents and, thus, the control of the auroral activity and the radio wave generation. It is shown that the model may contribute to understand why the morning sector of the magnetosphere is generally the most active and why the radio emissions are modulated. Taking into account the radial plasma transport, the model is further developed to explain that the periodicity of the emissions slightly varies in time and is different when seen from the northern/southern hemispheres.