



Distribution of EMIC wave event locations depending on their distance from the magnetopause

Benjamin Grison (1), Miroslav Hanzelka (1), Marek Basovnik (1), Maria Usanova (2), Jan Soucek (1), and Ondrej Santolik (1)

(1) IAP, Space Physics, Prague 4, Czech Republic (grison@ufa.cas.cz), (2) LASP, University of Colorado Boulder, CO, USA

Wave particle interactions play an important role in the magnetosphere dynamics. ElectroMagnetic ion cyclotron (EMIC) waves are one of the kind of plasma waves involved in these interactions. After the first in situ observations of EMIC waves close to the plasmopause, many statistical studies pointed out that the dayside magnetosphere region close to the magnetopause is the place where the EMIC occurrence rate is the highest. In this region the EMIC wave occurrence is related to magnetosphere compression events, in relation with solar wind kinetic pressure increases.

The presentation of the EMIC occurrence rate is usually made with respect to the L-shell value of the observations (the L-shell value of a location in the magnetosphere being the distance to the Earth (in Earth radii), in the magnetic equatorial plane, of the magnetic field line passing through this location). The L-shell value of the region adjacent to the magnetopause can vary by few Earth radii in respect with the solar pressure.

In the present study we propose to represent the EMIC wave occurrence in the dayside magnetosphere with respect to the distance from the magnetopause. This provides a new insight of the EMIC wave distribution in this region and a better understanding of the magnetosphere compression influence on the EMIC wave onset.

The THEMIS mission offers the best data set for this: THEMIS instruments observed EMIC emissions in this region and the orbits of the spacecraft (THEMIS/C, D, E and to a lower extent A) often cross the region of interest, including the magnetopause. The magnetopause position is estimated with the Shue et al. model (1998) and compared to the observed position, when possible.

We propose here to present in detail our method and the first results of the EMIC occurrence rate in function of their distance to the magnetopause. Our study is based on EMIC waves events by Usanova et al. (2012) based on Flux Gate Magnetometers measurements onboard THEMIS spacecraft. The influence of the solar wind pressure is also discussed.