



Systematic analysis of fine spectral structures of equatorial noise

Z. Hrbáčková (1,2), O. Santolík (1,2), J. S. Pickett (3), D. A. Gurnett (3), and N. Cornilleau-Wehrin (4)

(1) Charles University in Prague, Czech Republic, (2) Institute of Atmospheric Physics, Prague, Czech Republic, (3) University of Iowa, Iowa City, IA, (4) LPP/CNRS, Vélizy, France

Equatorial noise is an intense wave emission generated by unstable ion distributions. It occurs in the inner magnetosphere and propagates close to the geomagnetic equator at frequencies between the local proton cyclotron and local lower hybrid frequencies. Recent studies have shown that these waves could be capable of contributing to the local acceleration of energetic electrons in the outer Van Allen belts. We use data obtained by the onboard-analyzed STAFF-SA and high-resolution WBD instruments recorded by the four Cluster spacecraft during the years 2002-2007. Systematic analysis of six years of STAFF-SA data shows that equatorial noise is present at all magnetic local times. The average occurrence rate is approximately 60%. We also present results obtained by the systematic analysis of fine spectral structures in the equatorial noise emissions observed by the WBD instrument. We show the probability density function (PDF) of frequencies of emission peaks, which have been visually chosen from high-resolution spectrograms, and the PDF of frequency intervals between the spectral lines. We match these results with the ion cyclotron frequency as a function of the radial distance.