Geophysical Research Abstracts, Vol. 7, 02023, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02023

Ground accessibility, divergence and convergence of chorus ray trajectories

J. Chum (1), O. Santolik (1,2)

(1) Institute of Atmospheric Physics, Bocni II/1401, 14131 Praha 4, Czech Republic, (jch@ufa.cas.cz), (2) Charles University, V Holesovickach, 18000 Praha 8, Czech Republic

We investigate the ray trajectories of nonductedly propagating lower-band chorus waves with respect to their initial angle q0, between wave vector and ambient magnetic field. Although we consider wide range of initial angles q0, in order to be consistent with recent satellite observations, we pay special attention to the intervals of initial angles q0, for which the waves propagate along the field lines in the source region. That means we mainly focus on waves generated with q0 within an interval close to 0o and on waves generated within an interval close to Gendrin angle. We demonstrate that at the frequencies typical for the lower band chorus, the ray trajectories of waves generated within an interval close to the Gendrin angle with wave vector directed towards the Earth significantly diverge. Some of these diverging trajectories reach the topside ionosphere having q close to 0o; thus a part of energy may leak to the ground. In opposite to that, the waves generated with other initial angles undergo magneto-spherical reflection. Although our approach is rather theoretical, based on the ray tracing simulation, we show that the initial angle q0 of the waves reaching the ionosphere (possibly ground) is surprisingly close - differs just by several degrees from the initial angles which fit the observation of magneto-spherical reflected chorus revealed by CLUSTER satellites.