Strom time ESCH waves observed in the equatorial region of the plasmasphere

Masayuki Ohashi[1], # Takayuki Ono[2], Masahide Iizima[3], Atsushi Kumamoto[4]

[1] Geophys Sci,Tohoku Univ, [2] Department of Astronomy and Geophysics, Tohoku Univ., [3] Geophysical Inst., Tohoku Univ., [4] Tohoku Univ.

Intense electrostatic electron cyclotron harmonic waves are observed in the plasmasphere within the recovery phase of the magnetic storm in the equatorial region by using the plasma waves and sounder experiment (PWS) on-board the Akebono satellite. The strong ESCH waves belong to the (n+1/2)fc frequency band with a diffuse spectral features. The present phenomena shows different nature with the storm time ESCH waves reported by Oya (1991) in their intensity, observable region, and covering frequency range of the emissions. Namely, the storm time ESCH waves previously found were; the intensity of the emission was very weak; the emission covered a entire region of the plasmasphere. The occurrence region for the present phenomena is strictly limited near the equator within the magnetic latitude range of +/- 10 deg. Especially majority of the wave occurrence is confined in the range within +/- 3 deg. The analysis of the dispersion relation of the ESCH waved under the multi component plasma model of plasmasphere electrons with supra-thermal electrons as the hot component. The sufficient growth rate is obtained for the ESCH waves propagating almost perpendicular to the magnetic fields (the k-vector is located in the direction 84-88 deg. to the magnetic field) for the energy range of the hot plasma ranging in 10 - 2 keV. The required temperature anisotropy Tperp/Tpara is very high ratios (6 - 35) for the present ESCH wave instability, however, this ratio is almost consistent with the pitch angle character of the high energy electrons expected by the unique character of their observation regions; namely, the present storm time ESCH waves are strictly confined in the equatorial region of +/- 3 degree of the magnetic latitude regions.