Relationship between electromagnetic energy and precipitating particle energy in the polar ionosphere (iii)

Hiroshi Handa[1]; # Ryoichi Fujii[2]; Yasunobu Ogawa[3]; Satonori Nozawa[2]; Shin-ichiro Oyama[4]

[1] Particle and Astrophysical Sci.,Nagoya Univ; [2] STEL, Nagoya Univ; [3] NIPR; [4] STEL

http://www.stelab.nagoya-u.ac.jp/~eiscat/

The final goal of this study is to understand further the M-I coupling in terms of the exchange of particle and electromagnetic energies between the magnetosphere and the ionosphere and their dependence on the ionosphere, particularly on the difference of the sunlit and dark ionospheres. We have determined statistically the relationship between the electromagnetic energy and the kinetic energy of precipitating particles, using EISCAT CP-1 data obtained between January 1987 and November 2004. Since ionospheric electrons from which density we derive the particle energy deposition are produced not only by particle precipitation but also by solar irradiation, in order to obtain the electron density only due to particle precipitation in a sunlit region, we need to know the electron density due to the solar irradiation. We have hence modeled quiet time ionospheric electron density distributions as a function of the solar zenith angle. For the first time, modeling quiet time ionospheric electron density distributions as a function of the solar zenith angle, we have succeeded on the estimation of the precipitating particle energy deposition when the ionosphere is sunlit.

In the presentation, we will show three results; (1)the average of the electromagnetic energy is larger than that of the precipitating particle energy in both morning and evening ionosphere

; (2) the average of the precipitating particle energy in the morning is larger than that in the evening in both sunlit and dark ionosphere cases;

(3) the average of the precipitating particle energy when the ionosphere is dark is larger than that when the ionosphere is sunlit.