IONOSPHERIC-MAGNETOSPHERIC DYNAMICS AND PLASMASPHERE

Ashok K. Singh[1] and R. P. Singh[2]

[1]*Physics Department, Bundelkhand University, Jhansi – 284128; aksphys_bu@yahoo.com*

[2]*Physics Department, Banaras Hindu University, Varanasi-221005; rampal@bhu.ac.in*

INTRODUCTION

Interests in the plasmasphere has recently surged with the development of new or more refined remote sensing tools and with an associated increase in awareness of the regions of geophysical importance. Whistlers also made possible study of the interchange of plasma between the ionosphere and plasmasphere [1], providing measures of the rate at which upward fluxes from the ionosphere refill depleted overlying regions [2]. Observations have shown the direct connection of the outer plasmasphere to mid latitude ionospheric density enhancements and ring current loss. Movement and redistribution of plasma occurs both through diffusion and advection. In the present paper, storm/quiet period ULF whistler data recorded on ground station Varanasi (L=1.07) have been analyzed and attempt has been made to look at plasmasphere response on ionospheric and magnetospheric dynamics. (Fig. 1)

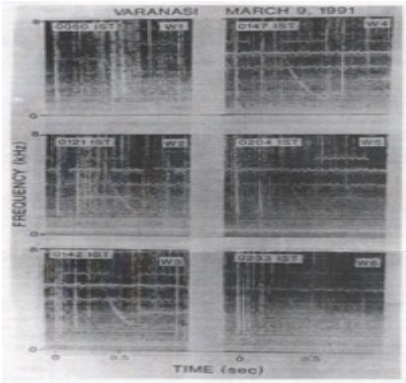

Fig. 1: Sonograms of whistlers observed at Varanasi

IONOSPHERE – MAGNETOSPHERE COUPLING AND PLASMASPHERE

Large scale electric fields produced by interaction between the solar wind and the magnetosphere and acceleration by magnetic field aligned electric fields above the aurora are major processes that are responsible for energization of plasma sheet particle. Magnetic topology of geomagnetic tail also enhances the ion acceleration. The electric field produce in the interaction penetrate the geocentric distances of about four to six earth radii in the equatorial plane, depending on the level of magnetic activity [2].

CONCLUSIONS

We have only rudimentary knowledge of the coupling of plasma sphere to the ionosphere. The electric field is an important parameter in the study of the coupling of the ionosphere and the plasma sphere. Out of various techniques developed to measure plasmaspheric electric fields, the whistler wave technique based on crossed- L plasma drifts in the equatorial plane, has been widely used to evaluate the East-West component of electric fields. Electric fields extending deep into the magnetosphere link the dynamics of the magnetosphere and the ionosphere.

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REFERENCES

[1] C.G. Park,``A morphological study of substorm associated disturbances in the ionosphere,” Journal *of Geophysical Research*, **79**, 2821-2827, 1974.

[2] R. P. Singh, Ashok K. Singh, and D. K. Singh, ``Plasmaspheric parameters as determined from whistler spectrograms: a review,” *Journal of Atmospheric and Solar Terrestrial Physics*, **60**, 495-508, 1998.