

A Study of the Distribution of High Latitude Absorption

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Since September 1994 IRIS (Imaging Riometer for Ionospheric Studies) has been operating at high latitude (Kilpisjarvi, Finland, 69.05° N) providing measurements of cosmic radio absorption in the D layer of the Ionosphere. This paper presents some results of modelling absorption based on the statistical distribution of data taken by IRIS (at 38.2 MHz) in different Magnetic Local Time (MLT) sectors. A high latitude absorption model based on solar wind parameters will be discussed and compared with previous models based on the Kp index. The results of our study indicate:

-Distribution of absorption in the zenithal beam of IRIS (epoch 1995-2001) for different magnetic local time sectors (e.g. Fig.1) follows the Log-Normal distribution as suggested by Foppiano and Bradley (Journal of Atmospheric and Terrestrial Physics, Vol.46, No.8 pp.689-696, 1984).

-Distribution of solar wind pressure (nPa) from 1995 to 2001 inclusive (Fig.2) and the distribution of solar wind speed (km/s) at 10-minute resolution (Fig.3) are also best fit by a Log-Normal distribution.

-Distribution of the 3-hour Kp in the same epoch as well as the occurrence of Kp in the four individual seasons is best modelled with a Weibull distribution.

Key Words:

High Latitude Absorption, Kp index, Solar Wind Parameters, Log-Normal Distribution and Weibull Distribution

