

Spectral index of absorption measured by two-frequency imaging riometers at the time of solar proton event

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We have been monitoring spacial distribution of energetic particle precipitation at Syowa Station, Antarctica (69.0S, 36.6E, L=6.1), using two imaging riometers operated at 30.0 and 38.2 MHz. Spectral index of absorption 'n', obtained from $A_{30}/A_{38}=(30/38.2)^n$, where A_{38} and A_{30} are absorption rate observed at 38.2MHz and 30MHz, usually equals to 2 when the absorption layer is formed above 85 km where collisional effect between neutral atom and electron is relatively small. However, if the energy spectrum of precipitation is very hard, absorption layer can be formed below 85 km and n becomes smaller than 2 due to increased collisional effect in this altitude range. The spectral index is therefore useful to detect very energetic precipitations such as those observed at solar proton events.