

Relativistic electron precipitations in association with diffuse aurora: Conjugate observation of SAMPEX and all sky TV camera at Syowa station

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It has been widely thought that the diffuse aurora are caused by electron precipitations in the energy range from a few keV to tens keV. Recent simulation results based on the quasi-linear theory showed that the scattering by whistler-mode waves plays an important role in the production of precipitating electrons responsible for diffuse auroras. The test particle simulation on electron-whistler interactions shows that relativistic electrons can be scattered into the loss cone simultaneously with the electrons in the energy range from a few keV to tens keV. Thus, it is expected that relativistic electrons precipitate into the atmosphere in association with diffuse aurora if whistler-mode waves contribute to generation of diffuse auroras. To examine this hypothesis, we investigated conjugate observations of SAMPEX and all sky TV camera (ATV) at Syowa station on the dawn side, where diffuse auroras are frequently observed. In this study, we show a case study that relativistic electron (> 1 MeV) precipitations observed by SAMPEX are associated with the diffuse aurora observed by ATV at Syowa station. The SAMPEX observation shows that the enhancement of precipitating relativistic electrons are well correlated with that of precipitating >150 keV electrons, indicating that electrons in the energy range from a few keV to 1 MeV precipitate into the atmosphere simultaneously. We suggest that the result is an observational evidence that whistler mode waves contribute to generation of the diffuse aurora.