

Sub-relativistic electron precipitation associated with the diffuse aurora; EISCAT observations

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The diffuse/pulsating aurora are caused by precipitations of tens keV electrons, and the whistler chorus wave-particle interactions have been expected to be a possible candidate for the pitch angle scattering. The numerical simulation on the wave-particle interactions predicts that sub-relativistic electrons of more than 100 keV should precipitate simultaneously with tens keV electrons because the whistler mode waves can resonate with higher energy electrons at high-latitude along the magnetic field line. Therefore, if precipitations of sub-relativistic electrons are confirmed associated with the diffuse/pulsating aurora, it is evidence that whistler mode chorus cause diffuse/pulsating aurora. In November 2012, we conducted the European Incoherent Scatter (EISCAT) observations at Tromso, Norway to measure the electron density above 60 km associated with the diffuse/pulsating aurora. The EISCAT VHF radar observations confirmed that the electron density enhancements at 80 km due to ~200 keV electron precipitations. The pulsating aurora was observed in the equatorward side of the EISCAT. In this presentation, we will compare the electron density profile measured by EISCAT with the computer simulation on the precipitated electrons by whistler mode chorus and discuss the possible mechanism of the density enhancement at 80 km.

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