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# Possible loss mechanism of inner plasma sheet electrons in the morning side: Analysis based on THEMIS statistical survey

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One of the dominant loss processes of electrons in the inner magnetosphere is pitch angle scattering by plasma waves. Electrons scattered into the loss cone precipitate into the atmosphere and contribute to diffuse auroral emissions. However, there is still much controversy on dominant scattering mechanism of plasma sheet electrons because the electrons resonate with both electrostatic electron cyclotron harmonic (ECH) waves and whistler-mode waves. The purpose of this study is to investigate what waves are mainly responsible for the loss of the plasma sheet electrons. We estimated loss time scales of the plasma sheet electrons from the THEMIS electron observations, and compared them with the theoretical loss time scales due to the pitch angle scattering by whistler-mode chorus. We have derived global distributions of the average phase space density (PSD) in the first adiabatic invariant range from 30 to 100 eV/nT, using the electron data obtained from the electrostatic analyzer (ESA) on board the THEMIS satellites for 2 years. The electron loss time scales were estimated, based on the PSD distributions, from spatial gradients of the PSD along the drift paths that are calculated from the UNH-IMEF electric field and T04S magnetic field models. The theoretical loss time scales were evaluated from the pitch angle diffusion coefficients using a typical chorus wave model. We also estimated the required wave amplitudes that can explain the loss time scales based on the PSD distributions and compared them with the average chorus wave amplitudes obtained from the CRRES statistical survey of chorus wave amplitudes. The result showed that the required wave amplitudes are roughly consistent with the observed chorus amplitudes. These investigations strongly suggest that whistler-mode chorus is responsible for the loss of the plasma sheet electrons and contributes to the generation of diffuse auroras in the morning side.