

Energetic electron acceleration and precipitations associated with chorus waves; Arase observations

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The whistler mode chorus waves work dual role for the acceleration and precipitation of energetic electrons. The Arase satellite that was launched in December, 2016 has obtained comprehensive data sets for plasma/particles and fields/waves. In March and April, 2017, the Arase satellite observed several magnetic disturbances driven by CIR and subsequent coronal hole streams. During the period, the Arase satellite observed continuous chorus activities for a few days associated with the high-speed solar wind. During this period, comprehensive observations from the Arase satellite and ground-based observations are realized. EISCAT at Tromsø, Norway observed strong ionization at the low altitude, indicating sub-relativistic electrons of the radiation belts precipitate into the atmosphere. During the period, the Arase satellite successfully observed intense chorus waves outside the plasmapause, indicating the resonance with chorus waves causes the pitch angle scattering of energetic electrons. Simultaneously, large flux enhancement of the outer belt electrons was observed with enhancement of chorus waves. We discuss the dual role that chorus waves play in controlling the dynamics of the radiation belts.

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