

Akebono observations of EMIC waves in the slot region of the radiation belts

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We present a unique observation of electromagnetic ion cyclotron (EMIC) waves in the deep inner magnetosphere at $L = 2.5-5$ made by the Akebono satellite at altitudes of 3,300-8,700 km. The mode conversion, i.e., L mode (He⁺ band)→R mode (He⁺ band)→L mode (O⁺ band) was clearly identified from the equator to high latitudes. In addition, we found rising tone structures, recently identified as EMIC triggered emissions, which could lead to bursty precipitation of relativistic electrons. First, we estimated the ion composition ratio (H⁺, He⁺, O⁺) = (83%, 16%, 1%) from polarization analysis. Second, we estimated minimum resonant electron energies with the observed EMIC waves and triggered emissions to be 1-10 MeV. The satellite trajectory during the wave observation was primarily through the slot region of electron radiation belts. The collocation implies possible contribution of EMIC waves to formation of the slot region of radiation belts after a magnetic storm.

Keywords: EMIC wave, slot region of the radiation belt, mode conversion, triggered emission, ion composition ratio, Akebono satellite