[구SS-17] Prediction model for whistler chorus waves responsible for energetic electron acceleration and scattering

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Whistler mode chorus waves, which are observed outside the plasmasphere of the Earth's magnetosphere, play a major role in accelerating and scattering energetic electrons in the radiation belts. In this study we developed a predicting scheme of the global distribution of chorus by using the Time History of Events and Macroscale Interactions during Substorms (THEMIS) satellite data. First, we determined global spatial distributions of chorus activity, and identified fit functions that best represent chorus intensities in specific L-MLT zones. Second, we determined the specific dependence of average chorus intensity on preceding solar wind conditions (e.g., solar wind speed, IMF Bz, energy coupling degree) as well as preceding geomagnetic states (as represented by AE, for example). Finally, we combined these results to develop the predicting functions for the global distribution and intensity of chorus. Implementing these results in the radiation belt models should improve the local acceleration effect by chorus waves.

[구SS-18] Statistical characteristics of electron precipitation into the atmosphere

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We studied the precipitation of magnetospheric energetic electrons into the Earth's atmosphere during magnetic storm times using precipitating electron flux data from the MEPED on board the NOAA Polar Orbiting Environmental Satellites (POES) low-altitude satellite, NOAA-16. We identified a total of 84 storm events between 2001 and 2012 using SYM-H index. We have done a superposition of precipitating electron fluxes for each of three energy ranges (i.e., e1: > 30 keV, e2: > 100 keV, e3: > 300 keV) for the identified storm times. The results show that the fluxes start to increase before the main phase of storm for all energy ranges and reach a maximum level just before the time of SYM-H minimum value. The precipitation timescales are energy-dependent, being shorter for lower energy, ~4.67 hours for e1, ~7.93 hours for e2 and ~26.5 hours for e3. The precipitating fluxes decline during the recovery phase of the storms. We examined the L shell dependence of the precipitating electron flux during the main phase. We found that statistically the precipitation fluxes are dominantly seen at L of ~ 3-4 or higher. This L value roughly corresponds to the plasmapause location during the main phase. Thus the results imply that the electron precipitation mainly occurs outside of the plasmapause. In addition, we classified the storm events by their strength and examined the dependence of precipitation on storm intensity. We found that the electron precipitation occurs on a faster time scale and penetrate into inner L shell region for a stronger storm.