Construction of global chorus wave intensity distribution from precipitating electron flux measurement and its application

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Whistler-mode chorus emissions are frequently observed in the inner magnetosphere during geomagnetically disturbed periods on the dawn and noon side magnetosphere. The waves have been considered as an important driver of the dynamics of inner magnetosphere. Resonant interactions of energetic electrons with chorus emissions result in flux enhancement of relativistic electrons in the outer radiation belt. On the other hand, the waves responsible for pitch angle scattering of electrons in the wide energy range from keV up to MeV range via pitch angle scattering. Previous studies show that chorus wave activities are correlated well with amount of energetic electron precipitations at low altitudes [Lam et al., 2010], and derive global intensity distributions of chorus waves during some events [Li et al., 2014; Chen et al., 2014]. It is possible that chorus wave intensity is constructed in global sense from the global map of precipitating electron fluxes. In this study we statistically investigate global distributions of > 30 keV precipitating electron fluxes observed by low-altitude POES satellites as a function of L, MLT, and Kp index. The distributions are compared with those of chorus wave intensity derived from the THEMIS satellites, and relationship between chorus wave intensity is parameterized as a function of L, MLT, and Kp index. Based on the parameterization, we successively construct global distributions of chorus wave intensity, and prediction of global chorus wave intensity variations is possible in cooperation with forecast of Kp index. In this presentation, we show the methodology of our analysis, obtained results, their performance to construct global distributions of chorus wave intensity, and its application to future research in the inner magnetosphere.

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