Spatiotemporal evolution of energetic electron precipitation and VLF emissions associated with sudden impulses at Syowa Station

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We examine the spatiotemporal evolution of Cosmic Noise Absorption (CNA) and VLF emissions observed at Syowa Station (-69.00 S, 39.58 E, and L = 6.1) in Antarctica, and the electron temperature anisotropies obtained from the Los Alamos National Laboratory (LANL) geosynchronous orbiting satellites associated with sudden impulses. Enhancements of temperature anisotropy, VLF intensity measured on the ground, and CNA are observed to be associated with the sudden impulses, caused by increases in solar wind dynamic pressure. The enhanced region is limited to the noon side, and the typical duration of the enhancements is tens of minutes. The results indicate that the compression of the dayside magnetosphere due to the enhancement of the solar wind dynamic pressure cause the enhancement of temperature anisotropy of hot electrons in the dayside and the enhanced whistler mode waves cause pitch angle scattering of energetic electrons into the atmosphere. It is suggested that resonance at the off-equator contributes to the electron precipitation at several tens of keV, which can be observed as the intensification of CNA, while the resonance near the magnetic equator likely produces the enhancement of the dayside aurora by the precipitation of several keV electrons.