Characteristics of the horizontal motion of the intense low-energy electron precipitation near the nightside polar cap boundary

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Intense low-energy electron precipitation produces discrete red aurora. This electron precipitation is interpreted as the electrons having been accelerated by Alfven waves, which could contribute to rapid temporal motion of the electron precipitation. Satellite observations have shown the detailed energy distribution of that low-energy electron precipitation and its general spatial properties. However, the characteristics of temporal variation shorter than the satellite orbital period and the local spatial structures are still unclear. In this study, we derived a method to determine the 2-D distribution of the low-energy electron flux by combining 630-nm auroral image data derived from an all-sky imager (located at Longyearbyen, Svalbard) and the Global Airglow model calculating 630-nm auroral distributions. By applying this method to the 630-nm image data of the aurora observed near the nightside polar cap boundary at intervals of about 10 seconds, we obtained the characteristics of the horizontal motion of the intense low-energy electron precipitation. We discuss what the features imply for the electron acceleration by Alfvén waves near the nightside polar cap boundary.

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