Spatiotemporal variations of the electron precipitation producing moving cusp aurora

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A moving mesoscale aurora at a wavelength of 630.0 nm (red line) is a typical phenomenon in the dayside cusp of the high-latitude ionosphere and is thought to be caused by enhanced fluxes of soft magnetosheath electrons in the moving flux tube driven by intermittent reconnection. In this paper we examine the spatiotemporal variations of the electron precipitation in the moving reconnected flux tube by analyzing red-line aurora image data from a ground-based all-sky imager. An analysis taking into account a long radiative time of red-line emission was performed. The long radiative time is the dominant cause of the difference between the extent of the moving red-line aurora and that of the moving electron precipitation. Estimating this difference quantitatively in the aurora image obtained at a time resolution of approximately 10 s reveals the dynamic features of the electron precipitation in the moving reconnected flux tube.

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