Investigation of precipitating electrons of the Omega-Band Aurora

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The Omega band auroras are a type of aurora that occur after auroral breakups, characterized by a structure resembling an inverted Greek letter Omega (Ω). These auroras drift eastward from midnight towards dawn. Also, it has also been revealed that Omega band auroras are composed of various types of auroras, including diffuse, pulsating, and discrete auroras within the torch structures. Previous studies on Omega band auroras have proposed several hypotheses regarding their origins. It is suggested that Omega band is caused by velocity shear resulting from a hybrid of Kelvin-Helmholtz and Rayleigh-Taylor instabilities. Another model, the streamer model, proposes that the poleward auroral streamer directly evolves into the Omega band torch. However, the magnetospheric mechanisms responsible for Omega band auroras remain unclear due to a lack of simultaneous observations in the magnetosphere. This study aims to clarify the dynamics of plasma and waves in the magnetosphere associated with the auroral structures in the Omega band. We analyze ground-based observations at two wavelengths (427.8 nm and 844.6 nm), using two EMCCD cameras installed in Tromsø, Norway, along with conjugate observations by low-altitude satellite as well as the Arase satellite data. In this presentation, we will report on the spatial characteristics of precipitating electrons within the Omega band auroras and their correspondence with phenomena observed Omega band events.

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