Observations of the omega-band from ground-based multi wavelength optical measurement and the MMS satellite

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The Omega-band aurora is auroral phenomenon that often occurs from the late expansion to recovery phases of substorm. The Omega-band aurora tends to drift eastward, from midnight to dawn. The Omega-band aurora has a latitudinal structure with discrete auroras appearing on the polar side and pulsating auroras on the equator side. According to previous studies on the Omega-band aurora, the western side is clearly divided into two parts by pulsating aurora and diffuse aurora [Oguti et al., 1981]. In this study, we have observed the Omega-band aurora simultaneously at two wavelengths, 427.8 nm and 844.6 nm, by two EMCCD cameras located in Tromsø, Norway (69.6˚N in geographic coordinates, 66.7˚N in geomagnetic coordinates). From the intensity ratio of the two wavelengths, the characteristic energy of precipitating electrons and downward energy fluxes are estimated. The Omega-band aurora is observed on March 2, 2017 from 01:30-2:30 UT (around 04:00-05:00 MLT). The significant differences of the downward energy flux between east and west sides of the Omega-band are detected. During this time interval, the footprint of MMS 1-3 satellites crossed the Omega-band, including the aurora arcs and pulsating aurora region. The MMS satellites detected variations of the magnetic field, suggesting the existence of FACs associated with the aurora arcs. In this presentation, we will report spatial distributions of precipitating electron energy flux estimated from the optical data and relationship to the magnetospheric phenomena observed by the MMS satellites.

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