



The Field-aligned currents coupling with MMS and Swarm Observations

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In this study, we found some field-aligned currents (FAC) events by Swarm and the related waves by Magnetospheric Multiscale (MMS) satellites. The waves before the DF observed by MMS propagate to the ionosphere over the polar region along the magnetic field lines. Although DFs usually stop before reaching the geosynchronous orbit (GEO), they may still transfer some portion of their energy into the high latitudes ionosphere by ULF waves. We determine the field-aligned currents in the DF, using the curlometer technique, to have been 10 nA m^{-2} . When projected into the ionosphere, these currents give ionospheric field-aligned currents of $18 \mu\text{A m}^{-2}$ which is comparable with Swarm observations.