

Conjugate observations of ENA signals and proton auroral spot with IMAGE spacecraft

Shin Suzuki[1]; Satoshi Taguchi[2]; Keisuke Hosokawa[2]; Michael R. Collier[3]; Thomas E. Moore[3]

[1] Univ. of Electro-Communications; [2] Univ. of Electro-Communications; [3] NASA GSFC

Dayside proton auroral spots in the ionosphere are frequently observed by the Far Ultraviolet Instrument (FUV) onboard the Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) spacecraft. On 28 April 2001 (0500-0630 UT), when the solar wind density is about 10 cm^{-3} and IMF is northward except for a few short periods, FUV observed proton auroral spots in the ionospheric cusp. In concurrence with the intensification of the proton auroral spot the Low Energy Neutral Atom (LENA) imager on IMAGE observed ENA emission in the direction of the high-altitude cusp. Since the primary source of the LENA cusp signal is the proton injection caused by reconnection, the LENA signal in the high-altitude cusp and the FUV spot in the low-altitude cusp have a common source. The magnetic field line tracing with the Tsyganenko-96 model shows that the possible source location of the LENA cusp signal is mapped on the proton auroral spot. The temporal variations of both intensities also show a correlative manner. Moreover, we have found an interval in which the proton aurora moves toward the prenoon side. Considering the correlative variations of the solar wind, the LENA cusp signal, and the proton auroral spot, we have interpreted this motion as the one of the detached reconnected flux tube created by a brief southward tilting of IMF, not the shift of the reconnection point, which is often invoked for the motion of the FUV spot in the cusp. Detailed characteristics about the correspondence between the FUV spot and the LENA signal are presented, and the field line geometry for the detached reconnected flux tube will be discussed.