

Simultaneous ground-satellite optical observations of dayside shock aurora in the Southern Hemisphere

Tetsuo Motoba[1]; Akira Kadokura[1]; Yusuke Ebihara[2]; H.U. Frey[3]; A. T. Weatherwax[4]; Natsuo Sato[1]

[1] NIPR; [2] Nagoua Univ., IAR; [3] U.C.Berkeley; [4] Univ. of Maryland

On 14 June 2005, a transient dayside shock aurora, induced by an interplanetary (IP) shock, was observed simultaneously with the FUV-WIC imager on board on the IMAGE satellite and the all-sky imager (ASI) at the South Pole Station (-74.3 magnetic latitude (MLAT), ~15 magnetic local time (MLT)). The global evolution of the shock aurora was identified by the FUV-WIC, whereas the detailed spatial-temporal structure by the ASI. Both optical emissions for the dayside shock aurora showed a reasonable agreement in a common field-of-view. During the transient auroral brightenings in the dayside oval detected by the FUV-WIC, both diffuse and discrete auroral forms were observed by the ASI in the afternoon sector of the oval. After the IP shock, only the 557.7 nm ASI first observed the diffuse auroral form appearing at latitudes of -70 to -73 MLAT on the noon side of the field-of-view and then expanding duskward in the latitude range. About 5 minute after the initial brightening of the diffuse-type shock aurora, both 557.7 nm and 630.0 nm ASI images indicated a strongly intensified discrete auroral form appearing at latitudes of -73 to -76 MLAT in the auroral oval. The major activation of the discrete-type shock aurora gradually moved duskward and finally the intensity decayed within 13 minutes. The temporal and spatial evolution of the discrete-type shock aurora for particular case study may be interpreted as a possible signature of upward field-aligned current associated with the main impulse of geomagnetic sudden commencement.