

Dayside auroral response to a geomagnetic sudden commencement observed at the South Pole Station

Tetsuo Motoba[1]; Akira Kadokura[1]; Yusuke Ebihara[2]; Natsuo Sato[1]
[1] NIPR; [2] Nagoua Univ., IAR

We present the detailed features of dayside auroral response to a geomagnetic sudden commencement (SC) on 17 August 2003, using a ground-based all-sky imager (ASI) at the South Pole Station (SPA, geomagnetic latitude (GMLat) = -74.3, magnetic local time (MLT) = UT-3.5 h). At 1341 UT, the ACE satellite recorded an interplanetary (IP) shock with the following characteristics: solar wind velocity increasing from 430 km/s to 510 km/s; density increasing from 10.0 to 17.0 /cc; and IMF strength increasing from 9.0 to 21.0 nT. For this event the IMF was strongly northward both before and after the passage of the IP shock. The IP shock arrived to the magnetosphere in about 40 min causing SC ground magnetic disturbance at 1421 UT. At 1421:45 UT just after the SC onset, the ASI at SPA detected a sudden enhancement of the 557.7 nm emissions. The initial 557.7 nm emissions were characterized by two types; one is longitudinally aligned aurora poleward of SPA (-75 to -76 GMLat) in the 09~12 MLT sector, the other weaker diffuse aurora at lower latitudes (-70 to -75 GMLat). The SC-related 557.7 nm emissions reached peak intensity about 2.5 minutes after the SC onset (in the main impulse phase of SC). In addition to the longitudinally aligned aurora, an isolated auroral intensification with patch-like structure was noticeable at latitudes of -73 to -75 GMLat close to local noon. After 1427 UT, the isolated aurora emissions in the pre-noon disappeared from the field of view of the ASI, while the longitudinally aligned aurora poleward of SPA remained higher intensity than the pre-SC level. We will discuss generation mechanism for the SC-related dayside aurora, by comparing with other ground-based observations as well as space-borne observations.