

Simultaneous Observation of Optical Aurora and SuperDARN HF Radar Echoes associated with the Solar Wind Negative Pressure Impulse (SI-)

*Natsuo Sato[1], Yozo Murata [2], Hisao Yamagishi [1], Akira Sessai Yukimatu [1]
Masayuki Kikuchi [1], Masakazu Watanabe [1], Kazuo Makita [3]
Yang Huiguen [4], Liu Ruiyuan [4], Frederick J. Rich [5]

SuperDARN PIs

National Institute of Polar Research[1]

The graduate university for advanced studies[2]

Takusyoku university[3]

Polar Research Institute of China[4]

USAF Research Laboratory[5]

A negative sudden impulse (SI-) occurred at ~ 1432 UT on 3 August 1997 associated with the solar wind negative pressure impulse. We examined this event in detail using the data obtained by all-sky TV cameras at Zhongshan Station in Antarctica, SuperDARN HF radars over the northern and southern polar regions, magnetometer networks at IMAGE and Greenland, by referring insitu satellite data located in the solar wind (WIND), magnetosheath (GEOTAIL), magnetosphere (LANL-1, GOES-8) and ionosphere (DMSP F13).

Following interesting characteristics are found; 1) Sudden enhancement of east-west aligned band type aurora occurred associated with the SI-. 2) Quasi-periodic (8-10 minutes) damping variations were found in optical intensity, HF radar power and magnetic variations. 3) Upward field-aligned current and inverted 'V' electron precipitation corresponded to the region of optical aurora. 4) From SuperDARN data, convection reversal boundary stood out clearly at ~ 80 MLAT of 16-18 MLT associated with the SI-. This boundary should be the dusk cleft region. 5) It is found that the boundary moved to poleward associated with the development of SI-. 6) The spatial and temporal variations of the convection boundary could consistently explain the signature of magnetic variation at IMAGE network (poleward movement of the H-component).