



Optical, radar and magnetic observations of the magnetosheath plasma capturing during a positive impulse in the IMF Bz-component

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We present multi-instrument study of the ionospheric response to IMF turning northward. The observations were made in the near-noon (11 MLT) sector on Svalbard (at 75 MLAT). The data set includes auroral observations, ionospheric flows obtained from EISCAT and CUTLASS radars, spectral width of the HF radar backscatter, particle precipitation and plasma flow data from the DMSP F13 satellite, and Pc1 frequency band pulsations observed by fluxgate magnetometers. Careful collocation of all the observations has been made with the HF radar backscatter located by the ray-tracing procedure utilizing the elevation angle of signal arrival, the ionospheric plasma density profile, and the radio-wave phase speed. Prior the IMF turning to northward, three auroral arcs existed at the poleward boundary of closed l1bl, inside the l1bl, and in the equatorward part of the l1bl, respectively. The northward IMF turning was accompanied by the enhanced HF radar return with broad Doppler spectrum collocated with the arcs. The backscatter region and auroral arcs moved poleward, which is consistent with reconnection beyond the cusp and capturing the magnetosheath plasma during the northward IMF. Magnetic noise enhancement in the Pc1 frequency band occurred simultaneously with the anomalous radar backscatter, and the absence of signal at remote magnetic observatories indicates local generation of the Pc1 turbulence collocated with the radar backscatter.