1999年2月18日に中低緯度～赤道で観測されたSCの緯度特性

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Latitudinal feature of the SC at mid and equatorial latitudes observed on February 18, 1999

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The SC beginning at 0246UT:30s on February 18, 1999 is preceded by the PPI (preliminary positive impulse) at noon-time mid latitude, Memambetsu and by the PRI (preliminary reverse impulse) at the dip equator, Yap in the same local time sector. With a reference of a steplike SC at low latitude, Okinawa, it is found that the mid latitude SC is superimposed by a positive magnetic impulse with a time scale of less than 1min, followed by a negative magnetic change (several min). These mid latitude magnetic changes correspond to the PRI and DP (MI) of the equatorial SC, respectively. Both the positive impulse and the following magnetic decrease of the mid latitude SC decrease their amplitude with decreasing latitude. The HF Doppler observation shows that the mid latitude SC accompanies an impulsive westward electric field followed by an eastward electric field in the ionosphere, in consistent with the dusk-to-dawn and dawn-to-dusk electric fields responsible for the PRI and DP (MI) at the equator, respectively. It is suggested that the positive magnetic impulse and the following negative magnetic change of the mid latitude SC are ground magnetic effects of the field-aligned currents associated with the Alfven wave generated by the enhanced Chapman-Ferraro current, and of the Region-1 field-aligned current enhanced during the compression of the magnetosphere.