

Formation and propagation of sudden geomagnetic impulse depending on orientation of the interplanetary magnetic field

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On the basis of global geomagnetic observational data analysis the properties of 14 SI events during periods of sharp growth of dynamic solar wind pressure generated at positive values of IMF Bz ($B_z > 0$) - 7 events, and at negative values ($B_z < 0$). In a number of events the magnitude of a $|B_y/B_z|$ ratio was more than 1, at values of IMF B_y, both it is more, and it is less 0.

The following results are obtained:

1. It is established, that independent on a sign of IMF Bz the ionospheric electric currents which are responsible for SI, westward (eastward) in afternoon (prenoon) sector at $\geq 70-75^\circ$ latitudes and eastward in both sectors at lower latitudes. However for separate SI events during periods of $B_z < 0$ the westward currents at morning hours at $\sim 65-70^\circ$ latitudes can amplify.
2. It is obtained, that the sudden impulses are shifted to the pole with a velocity of the order of some degrees/minutes, beginning from the $\sim 65^\circ$ latitudes, both at $B_y > 0$ and at $B_y < 0$ and during periods of $B_z > 0$, at propagation most noticeable in afternoon-evening sector. During periods of $B_z < 0$ effects of SI propagation to the pole is badly expressed or is absent.
3. It is shown that during periods when the magnitude of $|B_y/B_z| \leq 1$, SI is propagated on an azimuth from the dayside to the nightside at $75-80^\circ$ latitudes westward (eastward) in prenoon (afternoon) sector. During periods of $|B_y/B_z| > 1$ the azimuth propagation of SI at $\sim 75^\circ$ latitudes occurs in 1600-0900 MLT sector in one direction - westward (eastward) at $B_y > 0$ ($B_y < 0$). The work is supported by RFBR grant 03-05-39011-GFEN.