## Behavior of the magnetosphere-ionosphere compound system during a northward turn of the interplanetary magnetic field revealed from a global MHD simulation

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We investigate transient behavior of the magnetosphere-ionosphere compound system during a northward turn of the interplanetary magnetic field (IMF) based on a self-consistent global MHD simulation. The overshielding effect is interpreted in the context of the magnetosphere-ionosphere compound system. Namely, as for the ionospheric side, a peculiar Region 2 field-aligned current (R2 FAC) caused by a transient dynamo is enhanced and, consequently, overshielding of the convection field appears in the ionosphere during deformation of the magnetosphere after a northward turn of the IMF. On the other hand, as for the magnetospheric side, the transient dynamo is caused by pressure enhancement in the dayside magnetosphere due to blocking of the sunward convection which is enhanced in the southward IMF condition after the northward turn. At the same time, an anti-clockwise vortex on a sphere of r=8Re (a clockwise vortex in the equatorial plane) in the afternoon sector appears in the magnetosphere. Consequently, the overshielding potential due to the R2 FAC in the ionosphere is a counterpart of the flow vortex in the magnetosphere.

Keywords: magnetosphere-ionosphere compound system, solar wind-magnetosphere interaction, MHD simulation, overshielding.