Evaluation of geometry of GIC-related current systems

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To learn about the geometry and magnetospheric sources of the ionospheric current systems which are dangerous in generating strong induction currents, we categorize differential current systems (DEC) for events with strong dB/dt by decomposing them into the contributions of electrojet-type and vortex-type elementary systems. By solving the inverse problem we get amplitudes and locations of these elementary current systems. One-minute differences of the geomagnetic field values at the IMAGE magnetometer network in 1996-2000 are analysed to study the diurnal, seasonal and spatial distributions of large dB/dt events taking into account the relative contributions of two components. Particularly we found that majority of the strongest dB/dt events (100-1000 nT/min) appeared to be produced by the vortex-type current structures. Some events are compared with UVI images from the Polar satellite. Statistics of the solar wind conditions which are responsible for the largest dB/dt events will also be shown.