

Daily variation of geomagnetic field Z component during geomagnetic storm

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It is well known that the geomagnetic field disturbances during storm time observed on the ground, especially north-south (H) component of the field is produced by the ring current around the earth's equator. The D component of the field is also disturbed by the asymmetric distribution of current system during storm time PRC (Partial Ring Current). However there is few report how the global distribution of Z component response during storm time.

By using the geomagnetic field data obtained from MAGDAS/CPMN network [K.Yumoto et al., 2006 and 2007], we investigated the Z-component distributions during storm-time, and found that there is almost no difference between the Z components of Sq in the quiet time and the storm time at the observatories located in inland area like Kuju observatory. It is well known that the horizontal component, especially H component, of Sq disappear during the storm time as we mentioned above but it is possible that there is no relationship between the intensity of the Sq current and the geomagnetic storm according to the result of the Sq Z component indifferent to the storm.

On the other hand, there is disturbance on the Z component at some observatories during the main phase of the storm, for example the observatories near the coast or located in island, which indicates that these disturbances on the Z component is caused by GIC effect so-called the coast effect [Parkinson, 1959; Parkinson and Jones, 1979]. It is consistent with the feature of ground-induced current, which the vertical component is enhanced by the geomagnetic field whose high frequency change near the coast, as reported by Mason, [1962]; Greenhouse, [1972], etc. that the disturbance on the Z component of the geomagnetic field near the coast area can be observed during only the main phase of the geomagnetic storm.