

Estimation of geomagnetically induced current (GIC) using the global MHD simulation of the magnetosphere 2

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We reported our preliminary study on the prediction of geomagnetically induced current (GIC) using the NICT magnetosphere MHD simulation by the REPPU (REProduce Plasma Universe) code in the previous report. In the high latitude region where the effect of the geomagnetic variation by the aurora electrojet current is a dominant source of GIC, it was shown that geomagnetic variation obtained by the simulation has a good agreement with observation data. For middle and low latitude geomagnetic variation, we showed a method to estimate geomagnetic variation due to ring current using cross polar cap potential calculated from the magnetosphere simulation.

In this study, we compared the geomagnetic variation calculated from the magnetosphere simulation with the observed data for relatively long time period. The contribution of the ring current to the geomagnetic variation at several magnetic latitudes is also analyzed. In addition, we examined the calculation method of the electric field using the geomagnetic field variation and the effect of the configuration of the power grid using the GIC observation data. We report these results.

Keywords: global MHD simulation of the magnetosphere, geomagnetically induced current (GIC), aurora electrojet, ring current, cross polar cap potential, power grid