Three components analysis of ground magnetometer network data toward understanding GIC excited by space weather disturbances

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The aim of this study is to make hazard maps of induced electric field from geomagnetic disturbances for estimating possible GIC (Geomagnetically Induced Current) effects from space weather events in mid- and low- latitude region, including Japan. As a first step, we performed frequency analyses to three components of 10 ground magnetometers data all over Japan. 5 magnetometers belongs to MAGDAS project managed by International Center for Space Weather Science and Education, Kyushu University, 3 magnetometers belongs to Japan Meteorological Agency, and 2 magnetometers belongs to Geospatial Information Authority of Japan. The analysis period is one month (July, 2012). In this study, we put a focus to not only H- and D-components, reflecting global space weather disturbances, but also Z-component, reflecting local electromagnetic structure around an observation point. The analysis methods are as follows: 1) Comparison of similarities between H- and D-component (global effect) and Z-component (local effect) at each station, 2) Frequency analysis using above data set, 3) Pre-estimation of GIC effect using time derivative data. As a result, we found that the Z-component shows very complex changes because of the difference of underground structure at each station. In this presentation, we will introduce detailed results of our analyses and future plans.

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