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Importance of long term geoelectromagnetic data obtained at Kakioka geomagnetic observatory

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First, The time variation of the amplitude of geomagnetic Sq field was examined for each month in a long period of more than 75 years at Kakioka. It was found that the amplitude is strongly controlled by the solar activity, and the difference between solar cycles including their fine structures reflected in the Sq amplitude, but the seasonal variation of the amplitude in response to the solar activity cannot be simply explained by the conductivity effect. Although most of the effect of solar activity on the amplitude can be explained by the variation of the ionospheric conductivity. Next, long-term variation, including seasonal and local time variations, of the atmospheric potential gradient (PG) was investigated. PG was observed in all seasons to have decreased steadily since 1980, but the decrease was accelerated after 1997. On the other hand, seasonal variation of winter maximum was found through the period probably caused by the regional conductivity variation.

These long term variation is possible by the continuous geoelectromagnetic data of good quality such as provided by Kakioka magnetic observatory. Furthermore, continuous observation is important for the effect of a sporadic event such as the 2011 off the Pacific coast of Tohoku Earthquake.

Keywords: geomagnetism, daily variation, potential gradient, long term variation, seasonal dependence