

## An analysis of daily geomagnetic variations by using method of wavelet multiresolution decomposition

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Daily geomagnetic variations were analyzed on geomagnetic hourly data (1980-2006) from the Kakioka Magnetic Observatory Japan Meteorological Agency by using method of wavelet multiresolution decomposition. The method was adopted by taking the Daubechies discrete wavelet transform adapted to imaging processing for edge extraction. The multiresolution decomposition was carried out on two-dimensional data array of time and day coordinate. Daily geomagnetic variations were reproduced from only low frequency component of the original data by the method. Following results were obtained from all the cases of the analysis.

1. The reproduced geomagnetic amplitude constantly experience daily variations and seasonal variation of the observation data. In addition, a quasi 27-day variation of the daily amplitude is also well reproduced.

2. The reproduced geomagnetic amplitude has the fractal characteristic of the geomagnetic disturbance morphology in the winter season when the amplitude shrank from the summer.

3. The monthly average for the reproduced geomagnetic amplitude was compared with monthly average for all days in a month and for five international quiet days. As a result, the monthly average for the reproduced geomagnetic amplitude was correlated with that for all days. In addition, the amplitude of the monthly average for international five days was most significant among them.

4. By using cross-correlation analysis [Xu and Kamide, 2004], we examined the residual Sq for the analysis data and monthly average for five international quiet days. As a result, it was suggested that a deviation from the residual Sq for the analysis data was more insignificant than that for the monthly average for international five days.

The results show that the reproduced geomagnetic amplitude represents the solar quiet daily variation, Sq. In future, we will investigate characteristics of the Sq current system through a statistical analysis.