



A peculiarity of the Sq variation at middle latitudes

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A common peculiarity of geomagnetic field measurements is the regular daily variation that is clearly observed during geomagnetic quiet time periods. The observed regular daily variations are often referred to as the geomagnetic daily variation or the solar quiet (Sq) variation. Geomagnetic disturbances associated with storms and substorms can easily mask underlying Sq variation. Despite the small amplitude, studies on Sq variation have been important for understanding the ionospheric electrodynamics and its coupling to the magnetosphere and lower atmosphere; for determining a base level for geomagnetic indices.

In this research we used the results of instrumental observations of geomagnetic field, carried out at middle latitudes: at Geophysical Observatory "Mikhnevo" of Institute of Geosphere Dynamics of Russian Academy of Sciences, Russia, Moscow Region, Mikhnevo settlement (coordinates: 54.96° N, 37.77° E) and at Geophysical Observatory "Borok" of the Institute of Physics of the Earth of Russian Academy of Sciences, Russia, Yaroslavl Region, Borok settlement (58.03° N, 38.14° E).

The analysis shows that the regular daily variation of the geomagnetic field at middle latitudes is about a few tens of nanoteslas. The spectral analysis and wavelet analysis of the hourly mean values of the components of the geomagnetic field demonstrate the presence of variations with periods equal to 6, 8, 12 and 24 hours. The results of the analysis confirm the influence of the lunar-solar tides (the action of the forces of attraction of the Moon and the Sun and thermogravitational solar tides) on geomagnetic variations in the semidiurnal and diurnal ranges.