



Effect of the non-dipole field in the seasonal variation of the geomagnetic Sq(Y)

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It is well known that the solar quiet daily geomagnetic variation (Sq) primarily originated from the dayside ionospheric E-region dynamo and showed a remarkable dependence on season. In this study, seasonal variations of the daily amplitude of the geomagnetic Y component (Sq(Y)) at mid-low latitudes were analyzed, and their relationship with the non-dipole field was investigated. As a result, Sq(Y) exhibits a remarkable longitudinal inequality and hemispheric asymmetry. Fourier analysis method was used to separate the annual mean (Sq0), annual (Sq1) and semiannual (Sq2) components from Sq(Y). It is shown that Sq1(Y) is much stronger in Eurasia and Australia anomaly zones and weaker in Africa and South Atlantic Ocean anomaly zones. The semiannual component Sq2(Y) is very weak in the northern hemisphere and prominent in the southern hemisphere. The correlation analysis suggests that the geomagnetic vertical component Z plays a key role in controlling Sq0(Y) and the geomagnetic horizontal component H predominantly influence Sq1(Y). On the other hand, the semiannual variation of Sq(Y) shows a strong dependence on the geographic latitude and the geomagnetic horizontal component H.