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Contributions from the data samples in NOC technique on the extracting of the Sq variation

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The solar quiet daily variation, Sq, a rather regular variation is usually observed at mid-low latitudes on magnetic quiet days or less-disturbed days. It is mainly resulted from the dynamo currents in the ionospheric E region, which are driven by the atmospheric tidal wind and different processes and flow as two current whorls in each of the northern and southern hemispheres[1].
The Sq exhibits a conspicuous day-to-day (DTD) variability in daily range (or strength), shape (or phase) and its current focus. This variability is mainly attributed to changes in the ionospheric conductivity and tidal winds, varying with solar radiation and ionospheric conditions. Furthermore, it presents a seasonal variation and solar cycle variation[2-4].
In generally, Sq is expressed with the average value of the five international magnetic quiet days. Using data from global magnetic stations, equivalent current system of daily variation can be constructed to reveal characteristics of the currents[5]. In addition, using the differences of H component at two stations on north and south side of the Sq currents of focus, Sq is extracted much better[6]. Recently, the method of Natural Orthoganal Components (NOC) is used to decompose the magnetic daily variation and express it as the summation of eigenmodes, and indicate the first NOC eigenmode as the solar quiet daily variation, the second as the disturbance daily variation[7-9].
As we know, the NOC technique can help reveal simpler patterns within a complex set of variables, without designed basic-functions such as FFT technique. But the physical explanation of the NOC eigenmodes is greatly depends on the number of data samples and data regular-quality. Using the NOC method, we focus our present study on the analysis of the hourly means of the H component at BMT observatory in China from 2001 to 2008. The contributions of the number and the regular-quality of the data samples on which eigenmode corresponds to the Sq are analyzed, by using different number of data sample from 5 to 365. The result shows the first eigenmode expresses the Sq in most cases.
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