Functional dependence of the local K indices on the planetary Kp index

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Using the planetary Kp index and the local K indices of midlatitude magnetic observatories at Ulaanbaatar (UB), Mongolia and at Hurbanovo, Hungary for the period 1979-1980, we compared the local and the global characteristics of magnetic activity. To determine the relationship between the indices, we solved a regression equation $Kp=a+b*K$ and determined the coefficients a and b by McWard's method for a year, winter, summer and equinox seasons, respectively. The value of K-index at the Ulaanbaatar observatory was greater than the Kp index in the magnetically quiet day. However, the difference between K-index at the Hurbanovo observatory and the global Kp index was small. On the other hand, these coefficients of the regression equation had diurnal variation by the local time. Therefore, we made harmonic analyses for these coefficients using Fourier series by three harmonics. The result shows that only first harmonic dominates while two other harmonics were fallen into error range. Analysis of the diurnal behavior of K-index allowed us to draw conclusions that in the latitude of Ulaanbaatar an influence of ionospheric physical processes is rather significant than the polar magnetic activity in the local morning and noon sector and that the local K-index allows defining a condition of the magnetic activity not only in the vicinity of this observatory but also on the vast area where no observatory exists.