Connection of geomagnetic activity with orientation of the solar wind electric field concerning the terrestrial magnetic moment

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Connection of geomagnetic activity with parameter VBs (Bs = 0, under condition Bz > 0 and Bs = -Bz, under condition Bz < 0, where Bz – vertical component of interplanetary magnetic field vector (IMF), V – Solar wind flow velocity) which is recognized in the literature as the most geoeffective is examined. Many authors understand this parameter as Solar wind electric field during time, when vertical component of IMF vector Bz < 0, directed to the south, is present.

In work the analysis of dynamics for classical correlation factor at studying of influence of an electric field E=VBs on index of global geomagnetic activity Kp depending on field presentation in different coordinates systems for 6 years (1999-2004) is executed. In addition at the same time variants of classical and multifactorial correlation dependences of an Kp index are considered for components of electric field vector $E_{|}=(VBs)_{|}$ and $E_{\perp}=(VBs)_{\perp}$ directed along and perpendicularly terrestrial magnetic dipole, accordingly.

In the most cases the classical correlation factor calculated in form R(Kp, VBs) yields the maximal results for all considered variants is established. Estimation of influence of electric field components on global index Kp was carried out by comparison of results for calculations of multifactorial correlations in form $F(Kp, E_{\perp}, E_{|})$, where in second case Kp «was preliminary cleared» of VBs contribution. This research has

shown absence of correlation between «cleared» index Kp and electric field components $E_\perp$ and $E_{\parallel}$. It speaks that correlation in form $F(Kp, E_\perp, E_{\parallel})$ with full Kp quite takes into account participation of an electric field in creation of global geomagnetic activity level.

The seasonal correlations course marked during research is evidence of influence of Solar wind electric field orientation concerning the terrestrial magnetic moment on a geomagnetic activity level. The received results of correlation distribution on seasons are most distinctly shown at calculation of an electric field in Solar-Magnetosphere and Solar-magnetic coordinate systems which are connected to geomagnetic dipole. However this effect appears weakened within the Solar activity period, that is caused by presence of a plenty correlated extreme values.