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PC index as a ground-based proxy of the solar wind energy incoming into the magnetosphere: Means for space weather monitoring

Oleg Troshichev
Arctic and Antarctic Research Institute, Russia

The space weather monitoring basically rests on the solar wind measurements outside the magnetosphere. The ground-based index of the polar cap magnetic activity (*PC*) is regarded as index characterizing the energy that entered into the magnetosphere. The following relationship between the *PC*-index and the solar wind parameters, on one hand, and relation between the *PC* evolution and the magnetospheric substorms (*AL* index) and magnetic storms (*Dst* index) development, on the other hand, provides the concept of: The *PC* index perfectly correlates with the interplanetary electric field (EKL); delay time ΔT in response of *PC* index to EKL variations is controlled by the E_{KL} field growth rate (*dEKL/dt*) and does not depend on such solar wind parameters, as solar wind speed VX and IMF BZ component; magnetic storms and substorms are always preceded and accompanied by PC index growth; substorms and magnetic storms start to develop as soon as the *PC* index steadily exceeds the threshold level of 1.5 mV/m; the substorm sudden onsets are commonly associated with a sharp increase in the *PC* (and E_{KL}) growth rate; linear correlation between the *PC* and AL values is typical for all classes of the substorms; maximal depression of magnetic field responds to maximal *PC* value with a delay of ~1 hour, and the storm intensity (*Dstmin*) being linearly depending on *PCmax* value. The *PC* index can be used as a reliable ground-based means for exploration of short-term changes in space weather and magnetosphere state.

Biography

Oleg Troshichev graduated from Leningrad University, USSR. He has completed his PhD in Physics at the Siberian Institute of Earth Magnetism, Ionosphere, and Radiowave Propagation (SibIZMIR, Irkutsk, 1969). He takes charge of Department of Geophysics in AARI from 1985. The main subject of his investigations is Physics of the Earth's magnetosphere and solar-terrestrial relations. He is the author of the polar cap magnetic activity (*PC*) index that has been endorsed by the IAGA (2013) as a proxy of the solar wind energy that entered into the magnetosphere. He has published more than 250 papers in reputed journals.

olegtro@aari.ru

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