



The Polar Cap (PC) index. A critical review of methods and a new approach.

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The Polar Cap (PC) index introduced by Troshichev and Andrezen (1985) is derived from polar magnetic variations and is mainly a measure of the intensity of the transpolar ionospheric currents. These currents relate to the polar cap antisunward ionospheric plasma convection driven by the dawn-dusk electric field, which in turn is generated by the interaction of the solar wind with the Earth's magnetosphere. Coefficients to calculate PCN and PCS index values from polar magnetic variations recorded at Thule and Vostok, respectively, have been derived by several different procedures in the past. Approval of a final PC index procedure is pending at the International Association for Geomagnetism and Aeronomy (IAGA) for a decision possibly at the General Assembly in 2013. The presentation discusses the principal differences between the various PC index procedures and provides comparisons between coefficient and index values derived using the different procedures. It will be demonstrated that depending on the procedure, PC index values derived in the past, and used in many publications, may differ substantially although the same basic geomagnetic data were used. Finally, a new approach to define a unified PC index procedure, built from the best elements of the three different current versions, is outlined.