

ISOTROPIC BOUNDARY AS A PROXY FOR TAIL CURRENT CONTRIBUTION TO THE DST/DCX INDEX

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The corrected Dst index, Dcx, is supposed to represent the intensity of the ring current alone. It is well known that, in addition to the ring current, also other current systems like the magnetopause currents and the tail current have a significant contribution to the Dst/Dcx index. While the effect of the magnetopause currents are typically removed by correcting for the solar wind pressure, the effects of the tail current are less well understood and have received less attention. Still, some recent studies have shown that the tail current can have a significant and even a dominant contribution to the Dst (Dcx) index at least during the main phase of moderate storms.

Here we show that the tail current can be conveniently monitored by measuring the latitude of the nightside isotropic boundary using the energetic particle measurements by the MEPED instrument onboard the NOAA/POES satellites. This is based on the fact that the latitude of the isotropic boundary has been shown to be directly proportional to the magnetic field curvature in the tail current sheet which in turn is directly proportional to the tail current intensity. Here we present a semi-empirical model based on a modified version of the Burton equation. We will discuss the ring current dynamics and especially the contribution of the tail current to the Dst/Dcx index.

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