



Correcting the Dst Index: Consequences for Absolute Level and Correlations

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The Dst index has been shown to include an excessive, seasonally varying quiet-time level, so called "non-storm component" which is unrelated to the intensity of the ring current or magnetic storms. We have recently proposed a corrected and extended version of the Dst index, the so called Dcx index. Here we discuss the properties of the Dcx index, and the consequences of replacing the Dst index by the more correct Dcx index. We show that this correction can raise the Dst values by up to 44 nT for individual storms. The average increase of the Dst index is 6.0 nT for all SSC storms in 1932-2002 (5.7 nT in 1932-1956 and 6.1 nT in 1957-2002), implying a correction of about 23% to the average 7-day storm level, and a 14% correction to the average minimum-Dst value of 42.3 nT for all SSC storms. This correction is large enough to affect most previous storm studies and even the classification of storms to the different intensity levels. The correction has a strong seasonal variation with maxima around the equinoxes, especially in the vernal equinox. The largest monthly correction of about 12 nT is found for March. We also verify that the main phase of an average storm is less intense and the recovery phase is longer in the early period (1932-1956) than in the later period (1957-2002), supporting the idea that storms in the early period were more typically driven by high-speed streams rather than by strong CMEs. Moreover, we show that the correction of the Dst index improves its correlation with both sunspots and geomagnetic indices. Thus, conclusions based on correlating Dst with sunspots or geomagnetic indices need to be revised using the Dcx index.