

Solar Cycle variations in Earth's open flux content measured by the SuperDARN radar network

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Abstract

We present a long term study, from 1996 - 2012, of the latitude of the Heppner-Maynard Boundary (HMB) determined using the northern hemisphere SuperDARN radars. The HMB represents the equatorward extent of ionospheric convection and is here used as a proxy for the amount of open flux in the polar cap. The mean HMB latitude (measured at midnight) is found to be at 64 degrees during the entire period, with secondary peaks at lower latitudes during the solar maximum of 2003, and at higher latitudes during the recent extreme solar minimum of 2008-2011. We associate these large scale statistical variations in open flux content with solar cycle variations in the solar wind parameters leading to changes in the intensity of the coupling between the solar wind and the magnetosphere.