



## **Effect of the proximity of the Heliospheric Current Sheet on the heliospheric magnetic flux density**

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In recent work (Erdős & Balogh, *ApJ.*, 781, 50, 2014) it has been shown that the magnetic flux density measured by the Ulysses probe around its solar polar orbit from 1990 to 2009 matches that calculated from the OMNI in-ecliptic, 1 AU data set over the same interval. This result has shown that the sun's magnetic flux is generally distributed uniformly in the heliosphere and depends only on the total open magnetic flux of the sun. We have nevertheless examined those two intervals in the nearly 20-year long observations, when the flux density measured at Ulysses appears to be greater than that observed at 1 AU. The two intervals are near the minima in solar activity in 1995-96 and 2007-08, with the difference in the first interval noticeably larger than in the second. We show that the difference between the Ulysses and the OMNI results are strongly correlated to the distance between the Heliospheric Current Sheet (HCC) and the 1 AU observation point, with the flux density smaller at the in ecliptic observation point than at Ulysses which during those intervals was generally well north or south of the HCC. A corresponding result can also be identified as a longitude dependence in the magnetic flux density when comparing the observations by the STEREO-A and -B spacecraft which are close to 1 AU in the ecliptic, but are widely separated in heliolongitude. We discuss possible causes of the reduced flux density near the HCC in terms of the geometric effects on the uniform spreading of the solar magnetic flux and the possible effect of magnetic reconnection associated with the HCC and the properties of the slow wind in which it is embedded.