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Magnetic flux density in the heliosphere

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Recently it was shown that the evaluation of the open magnetic flux in the heliosphere is strongly affected by the fluctuations of the field. A new method of data analysis has been developed which effectively reduces the bias introduced by the fluctuations (Erdős, G., & Balogh, A., Ap. J. 753:130, 2012). As a result, the magnetic flux density has been shown to be highly uniform in the heliosphere with respect to latitude and longitude. Also, a regular R-2 form decay by heliospheric distance of the flux density was established. In the present paper these results are further investigated by analysing magnetic field measurements by spacecraft in various heliospheric locations. The main data sources are from observations by ACE, STEREO A and B, and Ulysses; these observations cover a large range of latitude and longitude in location and almost two complete solar cycles in time. Special focus is devoted to the search for any possible longitudinal variations of the magnetic flux density in the ecliptic, in particular as related to CIRs and CMEs and the way these affect the observed relationship between the open solar magnetic field and the heliospheric flux density.