Heliomagnetic Latitude Dependence of the Heliospheric Magnetic Field

M E Burton, E J Smith (Both at Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA911 09)
A. Balogh (Imperial College of Science and Technology, Blackett Laboratory, Prince Consort Road, London, SW/ 2BZ, UK)

Previous studies have revealed systematic variations of the interplanetary magnetic field with heliographic latitude. Luhmann et al. (1987) modeled Pioneer Venus (PVC)) and ISEE-3 observations by assuming an asymmetric dependence on heliolatitude with stronger fields in the northern hemisphere. In a subsequent study, using data from ISEE-3/ICE and IMP-8, Burton et al. (1990) found evidence for a similar asymmetry. However, neither model has been completely successful. The model derived from PVO/ICE observations agrees quite well near solar maximum but shows significant discrepancies during the. descending phase of the solar cycle. The model derived from the. ICE/IMP-8 comparison suffers from significant phase delays between the difference in field magnitude at the two spacecraft and their latitude difference. In an attempt to account for these phase shifts, the IMP-8 and ICE data have been reexamined in heliomagnetic coordinates which are defined by the orientation of the solar magnetic dipole. The latitude and longitude of the dipole inferred from the data have then been compared with those implicit in source surface calculations. The IMP/ICE correlations have been extended into the recent solar maximum and descending phase. Comparisons have also been carried out between IMP-8 and Ulysses as it traveled to -30 ^{0}south heliographic latitude.

1. M E Burton, Jet Propulsion Laboratory, California Institute of Technology, MS 169-506,4800 Oak Grove Drive, Pasadena, CA 91109, phone: 818354-7375, fax: 818354-8895, email: mburton@jplsp.jpl.nasa.gov

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