



The formation of magnetic decreases (MDs) in interplanetary space: Ulysses

B.T. Tsurutani (1), F.L. Guarnieri (2), E.E. Echer (3), G.S. Lakhina (4) and O.P. Verkhoglyadova (5)

(1) Jet Propulsion Laboratory, Calif Inst. Tech., Pasadena, CA 91109, (2) UNIVAP, Sao Jose dos Campos, SP Brazil, (3) INPE, Sao Jose dos Campos, SP, Brazil, (4) India Institute for Geomagnetism, Mumbai, India, (5) University of California, Riverside, CA

Magnetic Decreases are decreases in the magnitude of the ambient magnetic field with $\Delta|B|/|B| < 0.5$. The displaced magnetic pressure is supplanted by anisotropic ($T_{perp}/T_{par} > 1$) plasma pressure such that there is pressure balance across the MD structures. We use a newly developed code to unbiasedly identify MDs of arbitrary length. Regions of highly anisotropic MD occurrence are noted and studied. We examine the interplanetary plasma conditions during which MDs are detected, and conclude that MDs are being formed in interplanetary space far from the Sun. Mechanisms for MD formation that have been proposed in the literature are: 1) mirror instability, 2) soliton formation, 3) wave-wave interactions, and 4) Alfvén wave phase-steepening. We will discuss our findings in light of these possible mechanisms.