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Comparative Solar Wind Properties at 9AU between the maximum and late declining phases of the Solar Cycle and possible implications for the magnetospheric dynamics of Saturn

D. R. Went (1), C. M. Jackman (1), R. J. Forsyth (1), M. K. Dougherty (1), and F. J. Crary (2)

(1) Space & Atmospheric Physics, Blackett Laboratory, Imperial College London, London, UK, (2) Southwest Research Institute, San Antonio, TX 78238, USA

We compare and contrast the general plasma and magnetic field properties of the solar wind upstream of Saturn (8.5-9.5 AU) at solar maximum (Pioneer-11 encounter) and the late-declining (Cassini approach) phase of the solar cycle. In both cases we find a highly structured solar wind dominated by co-rotating interaction regions (CIRs), merged interaction regions (MIRs) and Interplanetary Coronal Mass Ejections (ICMEs) that temporarily disrupt an otherwise clear two sector interplanetary magnetic field structure. Solar rotations generally contain two CIR compressions with embedded crossings of the heliospheric current sheet. There is no conclusive evidence for (persistent) departures from the Parker Spiral IMF model in this region of the heliosphere at either phase of the solar cycle, consistent with previous analyses (Thomas and Smith 1980, Jackman et al. 2008). However it is clear that average plasma properties vary significantly between the maximum and late declining phases of the cycle and there are a number of small but notable deviations. In particular, the average dynamic pressure of the solar wind varies by a factor of roughly two between solar maximum and solar minimum with potentially important consequences for the dynamics of Saturn's magnetosphere. These consequences should become apparent as Cassini enters its extended Equinox Mission which should encompass the rising phase and eventually maximum of Solar Cycle 24. They will be discussed and predictions will be made for future Cassini observations.