Geophysical Research Abstracts
Vol. 12, EGU2010-13880, 2010
EGU General Assembly 2010

Magnetic sector structure, Corotating Interaction Regions and heliospheric magnetic topology from Solar Cycle 22 to 23

Andre Balogh (1,2) and Géza Erdõs (3)

(1) Imperial College, The Blackett Laboratory, London, United Kingdom (a.balogh@imperial.ac.uk), (2) ISSI, Bern, Switzerland, (3) RMKI/KFKI, Budapest, Hungary

The interaction of fast and slow solar wind streams generate large-scale magnetic structures that evolve and affect the propagation of energetic particles in the heliosphere. Corotating Interaction Regions (CIRs) are associated with long-lived coronal structures around solar minimum and their dynamic evolution is affected by the way the global solar magnetic field evolves from one solar cycle to the next. In this paper we examine the evolution of CIRs and the magnetic sector structure from the declining phase of Cycle 22 to the long minimum concluding Cycle 23. The sector structure was characterised by a periodicity slower than the equatorial rotation of the sun in the declining phase of Cycle 22 and a periodicity commensurate with the equatorial rotation rate through the minimum of Cycle 23. This effect was primarily caused by the very different solar polar field strengths but the consequences for magnetic field structures, sectors and CIRs affected the heliosphere as a whole at all heliolatitudes. The comparison between the two epochs presented here is based first on the two relevant polar orbits of Ulysses but includes also observations from in-ecliptic spacecraft, primarily ACE. The observations are also associated with the solar sources of the large-scale structures and the differences in their evolutions through the two solar activity minima.