Geophysical Research Abstracts
Vol. 13, EGU2011-2313, 2011
EGU General Assembly 2011

Variations of the residual energy parameter in the solar wind on different scales and in different types of heliospheric flows observed by Ulysses

André Balogh (1,2) and Silvia Perri (2)

(1) Imperial College, Space and Atmospheric Physics Group, Blackett Lab., London SW7 2BZ, United Kingdom (a.balogh@imperial.ac.uk, +44 20 7594-7772), (2) International Space Science Institute, Bern, Switzerland

The development and evolution of turbulence in the heliospheric medium are driven by both Alfvénic fluctuations and by gradients in the solar wind flow on scales from minutes to many hours in the frame of an interplanetary observer. Many aspects of heliospheric turbulence are well documented; however, the variability of many basic parameters that describe the fluctuations is less well understood. The balance between fluctuations that arise from structures convected by the solar wind and those associated to Alvénic turbulence has been measured by the related parameters: residual energy and normalised cross-helicity. While the measured normalised cross-helicity generally corresponds to the observed Alfvénicity of the fluctuations, the residual energy appears to be less sensitive, in general, to the different types of solar wind regimes. In this work, we present observations from a range of solar wind regimes observed by the Ulysses solar polar probe to study the behaviour of the residual energy parameter timescales from $\sim$ 1 hour to $\sim$ 1 day. We relate these observations to different types of solar wind flows: high heliolatitude uniform high speed wind, mixed wind speed regimes with interaction regions, flows associated with Coronal Mass Ejections. We find that variations in the residual energy parameter can be correlated to some of the flows with strong gradients in the flow but that in the more uniform flows from polar coronal holes the parameter remains negative and indicates a significant and relatively constant contribution of convected structures to the observed fluctuations.