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Spectral analysis of the solar wind turbulence in the vicinity of Venus

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In this study we analyze magnetic field data provided by Venus Express (VEX) between 2007 and 2008. During each of the probe's eccentric polar orbit around Venus, VEX performs plasma and magnetic field measurements in the environment around the planet both in Venus induced magnetosphere and in the solar wind at several tens of thousands of kilometers away from the magnetosphere. This latter data set has a unique scientific value as it provides observations of magnetic turbulence in the solar wind around 0.72 AU, in the vicinity of Venus.
We discuss a semi-automated method to select solar wind magnetic field data at 1 Hz from Venus Express Magnetometer (MAG) data by using plasma data from the Analyser of Space Plasma and Energetic Atoms (ASPERA). The time intervals when VEX is in the solar wind are automatically determined for 2007 and 2008. We apply a Fourier transform on the selected data and calculate the power spectral densities (PSD) of the turbulent magnetic field through Welch's algorithm. We compute the PSD of the three components of the magnetic field for the time intervals when both MAG and ASPERA were operating in the solar wind, for each VEX orbit between 1st of January 2007 and 31st of December 2008. The data base includes a number of 374 individual spectra. We discuss the spectral properties of turbulence and illustrate similarities between fast and slow wind during the minimum phase of the solar cycle for each of VEX's orbit which satisfies the selection criteria for a period of two years.
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