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Evolution of solar wind turbulence and intermittency over the solar cycle

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Solar wind is a natural, near-by plasma physics laboratory, which offers possibilities to study plasma physical phenomena over a wide range of parameter values that are difficult to reach in ground-based laboratories. Accordingly, the solar wind is subject of many studies of, e.g., intermittency, turbulence and other nonlinear space plasma phenomena. Turbulence is an important feature of the solar wind dynamics, e.g., for the energy transfer mechanisms and their scale invariance, the solar wind evolution, the structure of the heliospheric magnetic field (HMF), the particle energization and heating, and for phenomena related to solar wind interaction with the planetary plasma systems. Here we analyse high resolution measurements of the solar wind and the heliospheric magnetic field provided by several ESA and NASA satellites, including ACE, STEREO, Ulysses and Cluster. This collection of satellites allows us to compile and study nearly 20 years of high-resolution solar wind and HMF measurements from the start of solar cycle 23 to the current declining phase of solar cycle 24. Long-term studies require homogeneity and, therefore, we pay great attention to the reliability and consistency of the data, in particular to instrumental defects like spin harmonics, the purity of the solar wind and its possible contamination in the foreshock by magnetospheric ions. We study how the different key-descriptors of turbulence like the slope of the power law of power spectral density and the kurtosis of the fluctuations of the heliospheric magnetic field vary over the solar cycle.