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Reconnection exhausts associated boundary turbulence in the solar wind

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Recent analytical calculations on the Riemannian decay of currents sheets involving magnetic reconnection with skewed magnetic fields in the solar wind have shown that, large fractions of reconnection exhausts boundaries are tangential discontinuities, which can occasionally be Kelvin-Helmholtz (KH) unstable (Sasunov et al., 2012). In such cases, instead of a sharp Riemannian discontinuity, K-H instability associated multi-scale turbulence develops, leading to increased temperature, density and entropy across the boundary region. The goal of the present study is to investigate the statistical properties of K-H instability driven boundary turbulence and to connect the observed turbulent features to small-scale dissipation processes over kinetic scales. To this end we will use magnetic and plasma data from the WIND spacecraft for several cases of K-H unstable turbulent outflow boundaries in the solar wind. The relationship between second- and higher-order statistics obtained over the inertial range of turbulence and the occurrence of kinetic effects, such as plasma heating and temperature anisotropy, will be investigated. The obtained picture of turbulent boundary dissipation will be compared to the turbulent dissipation processes occurring in the pristine solar wind.