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The spatio-temporal characteristics of magnetohydrodynamic turbulence seen in quiescent solar prominences by HINODE/SOT

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Hinode SOT provides observations (images) of the solar corona at simultaneous high spatial and temporal resolution which span several decades in both spatial and temporal scales. We focus on specific Calcium II H-line observations of solar quiescent prominences with small-scale flows which exhibit a high degree of variability over extended intervals in time. We analyze these images from the perspective of a finite sized turbulent flow. A key property of turbulence is that it can be characterized in a robust and reproducible way in terms of the ensemble averaged statistical properties of fluctuations. Importantly, fluctuations associated with a turbulent field show similarity or scaling in their non- Gaussian statistics. We verify the non- Gaussian nature of these fluctuations and test for scaling with both power spectra and Generalized Structure Functions. Realizations of turbulence that are finite sized are known to exhibit a generalized or extended similarity (ESS). We find that the SOT images show evidence of ESS in the spatial variation of fluctuations in the flow. We recover scaling with ESS for fluctuations both longitudinal and transverse to the bulk (driving) flow and, consistent with a turbulent flow, find the most extensive signature of scaling in the longitudinal direction. We compare these observations with theoretical predictions of finite sized corrections to turbulence.