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Quantification of the spatial evolution of Eulerian and Lagrangian timescales within a turbulent jet BIANCA VIGGIANO, Portland State University, THOMAS BASSET, cole Normale Suprieure de Lyon, JOHN EATON, Stanford University, STEPHEN SOLOVITZ, Washington State University Vancouver, LAURENT CHEVILLARD, ROMAIN VOLK, MICKAEL BOURGOIN, cole Normale Suprieure de Lyon, RAL BAYON CAL, Portland State University — An experimental study of an axisymmetric jet was conducted to determine the dependence of statistical parameters and timescales on the axial and radial location. Particle tracking velocimetry techniques were implemented to create three component trajectories in three dimensional space. With the interrogation volume, ranging from the exit of the jet up to 50 diameters downstream in the axial direction, characterization of important parameters as the plume develops is achievable. Examination of the second-order structure function at various locations reveals strong dependence of the universal scaling constant on the axial and radial position within the jet. Analysis of the spatial and temporal velocity correlations provide the Eulerian and Lagrangian integral timescales, both of which are also functions of location. Further, these scales differ from one another, implying that the advecting flow affects the spatial and temporal large scale coherence in unique manners. Insight into these characteristics of the flow is relevant to the dispersion and transport phenomenon of the large scale dynamics within the jet.

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