Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Exploring the anisotropy of a jet in cross-flow GREG SAKRADSE, GRAHAM FREEDLAND, Portland State University, STEPHEN SOLOVITZ, Washington State University Vancouver, RAUL CAL, Portland State University — Motivated by difficulties in accurately modeling volcanic plumes in the atmosphere, the anisotropic characteristics of an experimental scale jet in cross-flow are examined. Experiments were conduced on a round jet of air exiting a wind tunnel floor, varying the jet to cross-flow velocity ratio. Data are collected using a stereo PIV system allowing access to three components of velocity on a vertical plane oriented streamwise to the cross-flow, centered on the jet exit. Two data sets are collected with either a passive or active grid present at the wind tunnel inlet allowing for the effect of cross-flow turbulence intensity to be examined in two distinct regimes. With an aim towards informing model selection and flow specific parameter tuning, the anisotropy parameter F is examined on radial profiles along the centerline. Identified areas of increased anisotropy are further explored via Anisotropy Invariant Mapping, which allows for the anisotropy tensor to be characterized by its invariants. The development in space of the state of anisotropy is used to refine coefficients in both linear and non-linear return to anisotropy models for the transport of anisotropy tensor.

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Date submitted: 10 Aug 2020 Electronic form version 1.4