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Influence of cross-flow on the entrainment of bending plumes GRAHAM FREEDLAND, Portland State University, LARRY MASTIN, United States Geological Survey, SOLOVITZ STEVEN, Washington State Univerity, RAUL CAL, Portland State University — Volcanic eruption columns inject high concentrations of ash into the atmosphere. Some of this ash is carried downwind forming ash clouds in the atmosphere that are hazardous for private and commercial aviation. Current models rely on inputs such as plume height, duration, eruption rate, and meteorological wind fields. Eruption rate is estimated from plume height using relations that depend on the rate of air entrainment into the plume, which is not well quantified. A wind tunnel experiment has been designed to investigate these models by injecting a vertical air jet into a cross-flow. The ratio of the cross-flow and jet velocities is varied to simulate a weak plume, and flow response is measured using particle image velocimetry. The plumes are characterized and profile data is examined to measure the growth of weak plumes and the entrainment velocity along its trajectory. This allows for the study of the flow field, mean, and second order moments, and obtain information to improve models of volcanic ash concentrations in the atmosphere.

Graham Freedland
Portland State University

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