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Punctuated changes in plant pathogen populations associated with passage of atmospheric Lagrangian coherent structures[1] SHANE ROSS, PHANINDRA TALLAPRAGADA, DAVID SCHMALE, Virginia Tech — The atmospheric transport of airborne microorganisms (e.g., plant pathogens) is poorly understood, yet necessary to assess their ecological roles in agricultural ecosystems and to evaluate risks posed by invasive species. The atmospheric transport of plant pathogens can be roughly divided into three phases: liberation of pathogen spores, drift (transport in the atmosphere) and deposition. If liberated spores escape into the planetary boundary layer, they could be transported over thousands of kilometers before being deposited. The drift phase is poorly understood, due to the complex nature of atmospheric transport and relative lack of observational data. In this talk, we present a framework of Lagrangian coherent structures to determine the important atmospheric transport barriers (ATBs) that partition the atmosphere and systematically organize the mesoscale transport problem. Using autonomous unmanned aerial vehicles, we measure the concentration of spores of a plant pathogenic fungus (*Fusarium*) sampled in the atmosphere above Virginia Tech's Kentland Farm. We report correlations between concentrations of *Fusarium* with the local movement of ATBs determined from archived meteorological data.

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