Abstract Submitted
for the DFD20 Meeting of
The American Physical Society

Unmanned Aircraft for Mapping Atmospheric Boundary Layer Induced Geomorphological Changes VICTORIA NATALIE, JAMEY JACOB, Oklahoma State University-Stillwater — The process of acquiring lower atmospheric measurements onboard unmanned aircraft systems (UAS) is becoming a widely available solution. This study is a continuation of data collection that combines atmospheric observations using UAS with photogrammetrically mapped rapid geomorphology also using UAS to observe and relate the terrain induced effects on lower atmospheric phenomena and vice versa. Through a series of flights, lower atmospheric boundary conditions are characterized through wind velocity direction measurements onboard. During the date of atmospheric measurement collection, images are taken at the site and a photogrammetric technique called Structure from Motion (SfM) is used to reconstruct high fidelity models of the topography. The atmospheric data collection systems include 3D and 2D anemometers evaluated in both body and earth fixed configurations. Additional testing has been done to characterize the flow of air around the sensor while in flight ensuring the calibration and validation of the windspeed and direction data. The results of photogrammetry and wind observations both analyzed and related to compare the coupled effects. Wind induced terrain variations are compared through multiple terrain models taken over the past 2 years at the Little Sahara State Park.

Victoria Natalie
Oklahoma State University-Stillwater

Date submitted: 10 Aug 2020 Electronic form version 1.4