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Using Airborne Doppler Wind lidar data collected over mountainous terrain for precision airdrop planning

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In 2012, several US agencies conducted a month long mountain meteorology field campaign (MATERHORN) in the state of Utah. The primary purpose of that experiment was to improve model predicted complex terrain surface flows using rawinsondes, drones, towers, ground based lidars and an airborne Doppler Wind Lidar (ADWL). This presentation will focus upon the ADWL observations and evaluation of numerical model (WRF) predictions of flow on the scales of a few 100 meters. While those ADWL observations were designed to map the winds over an isolated mountain (Granite Mountain in Utah), they have become useful in addressing questions related to precision airdrops in complex terrain as well as micro siting of wind turbines in mountainous terrain.
Results of a non-MATERHORN project to investigate model predictions of winds in complex terrain will be presented. This Precision Airdrop project raised issues regarding the confidence mission planners should have in model predicted flows under differing synoptic weather patterns. Direct wind soundings to a few 1000 meters AGL appear to be critical to meeting the precision goals of hitting the target for a demanding set of missions.
The same MATERHORN ADWL data set has been used to demonstrate the value of combining towers, models and lidars in identifying exact ($\sim$ 50 meters) locations for installing wind turbines. The challenges of interpreting ADWL sampling in complex terrain will be discussed. A mobile trailer mounted wind lidar for wind energy prospecting will be described along with data from recent ridgeline road trips.