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Slope and Valley Flow Interactions in MATERHORN-1[1]
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— In the fall 2012, the **M**ount**a**in **Ter**rain Atmosp**h**eric M**o**deling and Obse**r**vatio**n**s Program (MATERHORN) conducted its first extensive field experiment at the Granite Mountain Atmospheric Science Testbed (GMAST), US Army Dugway Proving Grounds (DPG), Utah. Of particular interest to MATERHORN-1 were the complex multi-scale interactions between thermally driven meso-scale up/down valley flows and up/downslope flows. To capture these phenomena, a suite of advanced instrumentation was used, which could identify and educe salient physical processes. LiDAR observations were particularly useful, showing the collision of the downslope flow with the valley flow, forming intense turbulent regions, intrusions and instabilities. To further investigate these intriguing interactions and identify meso-scale model shortcomings, WRF simulations have been conducted. In addition to the field measurements and computations, slope and valley flow interactions are the focus of an on-going laboratory study. The goal is to determine the nature of the interactions, determine if there are flow instabilities, examine the turbulence near the region of interaction, and develop a simple scaling in the flow destruction region.

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