MATERHORN U of U Summary

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MATERHORN Annual Investigator Meeting – V

October 7-8, 2014
University of Notre Dame

This research is supported by
Office of Naval Research
Award # N00014-11-1-0709
BLM Special Issue Papers


AMS Special Issue


ACP BLLAST Special Issue


Other

The analysis provide a way implement an MOST improvement

![Graph showing mean lag times as a function of the late afternoon (LA) ratio of the gradient (term II) to buoyant production (term IV) terms in the heat-flux tendency equation (Eq. 6) for all heights at the Playa and Sagebrush sites. The solid black lines are a best, linear fit of the data.]

**Fig. 16** Mean lag times as a function of the late afternoon (LA) ratio of the gradient (term II) to buoyant production (term IV) terms in the heat-flux tendency equation (Eq. 6) for all heights at the Playa and Sagebrush sites. The solid black lines are a best, linear fit of the data.
Key Findings

- Playa soil moisture is very heterogeneous – particularly during dry periods
- Strong temporal variability, particularly after rain events
  - Very short drying time scale
  - Substantial impact on the energy balance
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Key Findings

• May was “wet” - total precipitation (25 mm) exceeded cumulative evaporation (19 mm)
• Nocturnal evaporation is important (up to 30%)
Evening Transition Dynamics on the East Slope

Non-local Front  "Sliding Slab" Transition (Local)

From Fernando et al. 2013 BLM
Large Scale Influence? Meso vs synoptic

10 Cases from Fall 2012
- 4 Frontal
- 4 Slab
- 2 Synoptic
Evening Transition Dynamics on the East Slope

- Cluster Analysis (DBSCAN) was used to identify different patterns in the data (e.g. slab vs front transition)
- Data from MATERHORN campaign and 4 years of PWIDS
- The most successful clustering occurred when using the following inputs
  - range-scale pressure gradients
  - the time delay of the two-point velocity structure function minimum ($t_{min}$) on towers along the East Slope
Evening Transition Dynamics on the East Slope

Identified Clusters
Evening Transition Dynamics on the East Slope

Front

Group 2 Sunset Normalized

Median Time Series

Wind Direction

Time Relative to Sunset (0.05 = 72 Minutes)

PWID 72 Histogram

PWID 90 Histogram

Counts

Counts
Evening Transition Dynamics on the East Slope

Sliding-Slab

Group3 Sunset Normalized

Median Time Series

Wind Direction

Time Relative to Sunset (0.05 = 72 Minutes)

PWID 72

PWID 90

Counts

PWID 72 Histogram

PWID 90 Histogram

E.R. Pardyjak et al. MATERHORN Investigator Meeting 2015
Planned Scientific Activities

• Derek
  • Understanding the role of soil moisture on slope flow transition and evolution dynamics

• Chao
  • Temporal evolution of scalar variances
  • Understanding the role of the turbulence in the evolution of the fog

• Eric/Dave/Sebastian/Nipun
  • Evening Transition Dynamics
  • Modeling sensible heat fluxes using thermal imagery