



Surface Atmosphere Integrated field Laboratory (SAIL) Campaign Overview

**2020 ARM/ASR PI Meeting Warm Boundary Layer Processes Breakout Session
June 26, 2020**

Dan Feldman¹

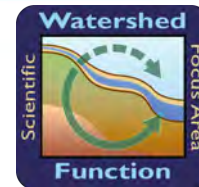
Allison Aiken², William Boos^{1,3}, Rosemary Carroll⁴, V. Chandrasekhar⁵, William Collins^{1,3}, Scott Collis⁶, Jeff Deems⁷, Paul DeMott⁵, Jiwen Fan⁸, Alejandro Flores⁹, David Gochis¹⁰, Jerry Harrington¹¹, Matt Kumjian¹¹, L. Ruby Leung⁸, Travis O'Brien¹², Mark Raleigh¹³, Alan Rhoades¹, McKenzie Skiles¹⁴, Jim Smith¹⁵, Ryan Sullivan⁶, Paul Ullrich^{1,16}, Adam Varble⁸, Ken Williams¹

1 Lawrence Berkeley National Laboratory; 2 Los Alamos National Laboratory; 3 University of California-Berkeley; 4 Desert Research Institute; 5 Colorado State University; 6 Argonne National Laboratory; 7 NSIDC; 8 Pacific Northwest National Laboratory; 9 Boise State University; 10 NCAR; 11 Pennsylvania State University; 12 Indiana University; 13 Oregon State; 14 University of Utah; 15 University of California-Irvine; 16 University of California-Davis

SAIL: The Surface Atmosphere Integrated Field Laboratory



- Uncertainties in atmospheric inputs to watersheds complicate mountainous hydrology research.
- SAIL will directly address these uncertainties by working closely with SBR's Watershed Function SFA to achieve atmosphere-through-bedrock observations.
- SAIL will deploy the AMF2 to the East River Watershed near Crested Butte, Colorado from 09/2021 – 06/2023.
- Goal: characterize atmospheric processes that impact energy and mass budgets of Upper Colorado River watersheds.



SAIL Instruments



- SAIL will have ~34 AMF instruments, including MAOS, Ceilometer, TSI, radiometers and an X-band scanning precipitation radar.

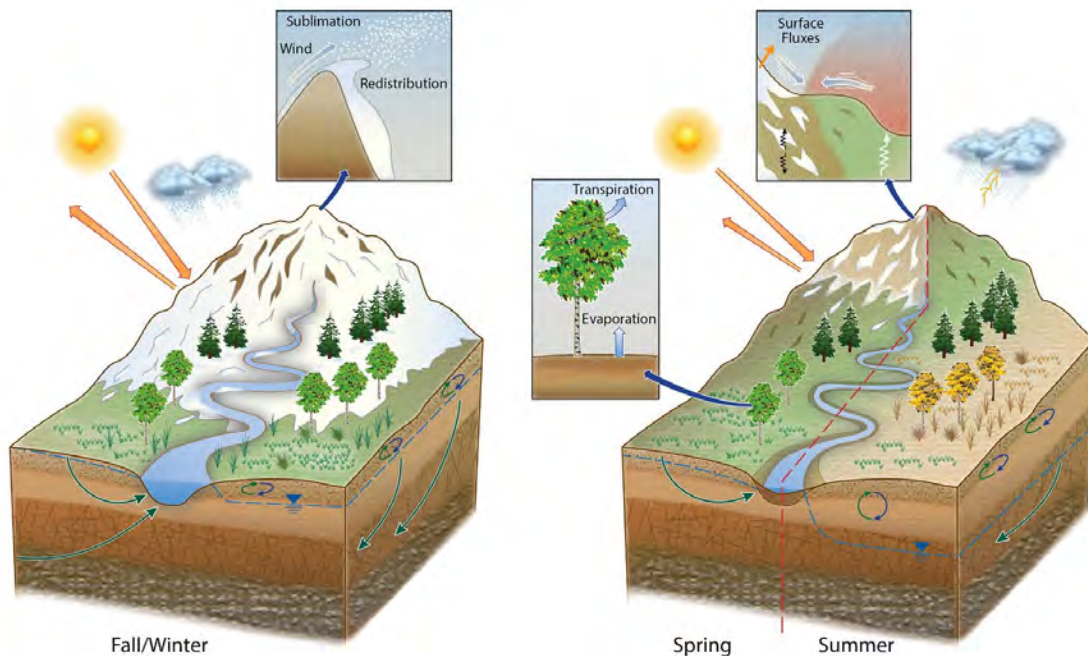


SAIL Science Objectives

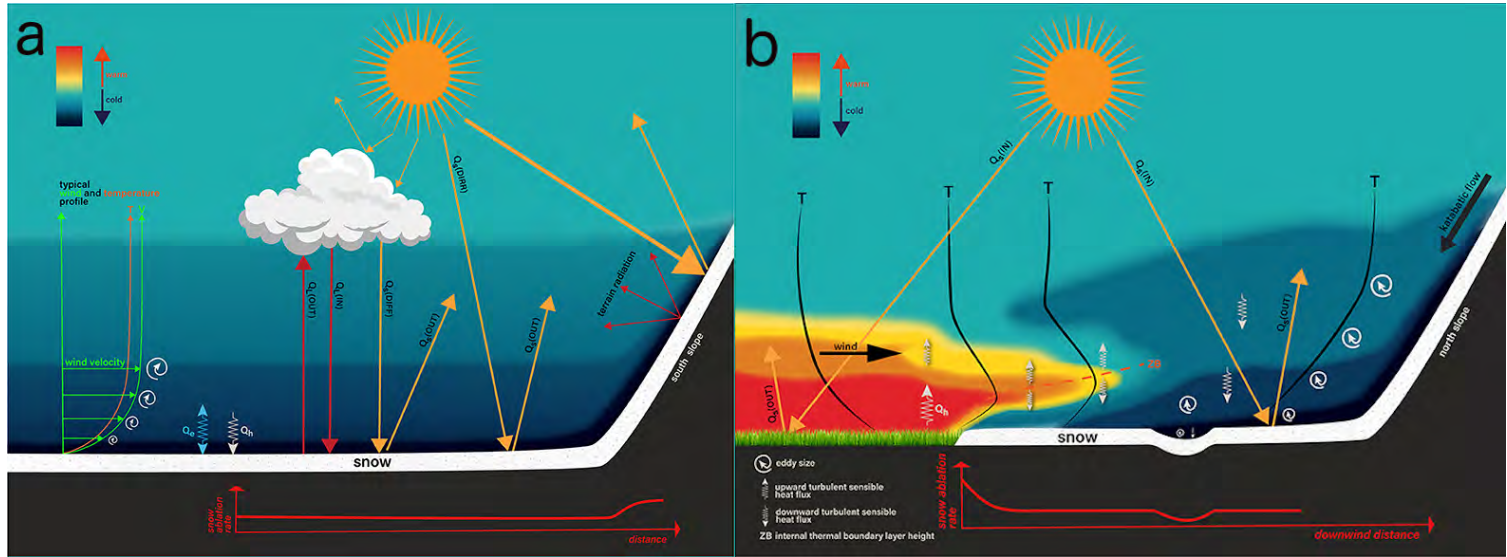


SAIL will characterize processes across seasons.

1. **Precipitation: how and how much.**
2. Winds: sublimation and snow redistribution.
3. Aerosols: surface and atmosphere radiative impacts
4. Aerosols: interactions with precipitation.
5. **Controls on surface fluxes and the surface energy balance.**



WBL Process Studies and SAIL Science



Surface fluxes change dramatically across seasons.

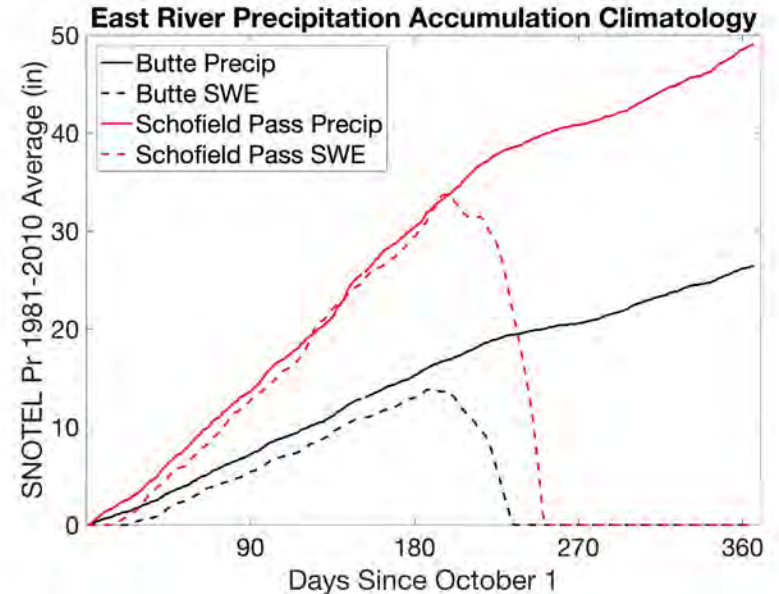
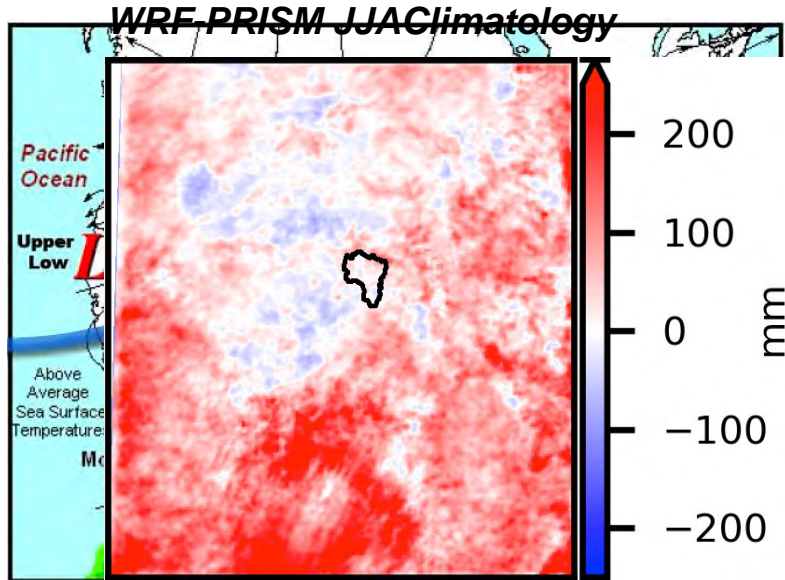
Springtime evolution of the surface layer, with land-atmosphere and advective fluxes, strongly governs snow-melt dynamics.

WBL Process Studies and SAIL Science



Controls on monsoonal precipitation at the northern edge of the North American Monsoon are understudied.

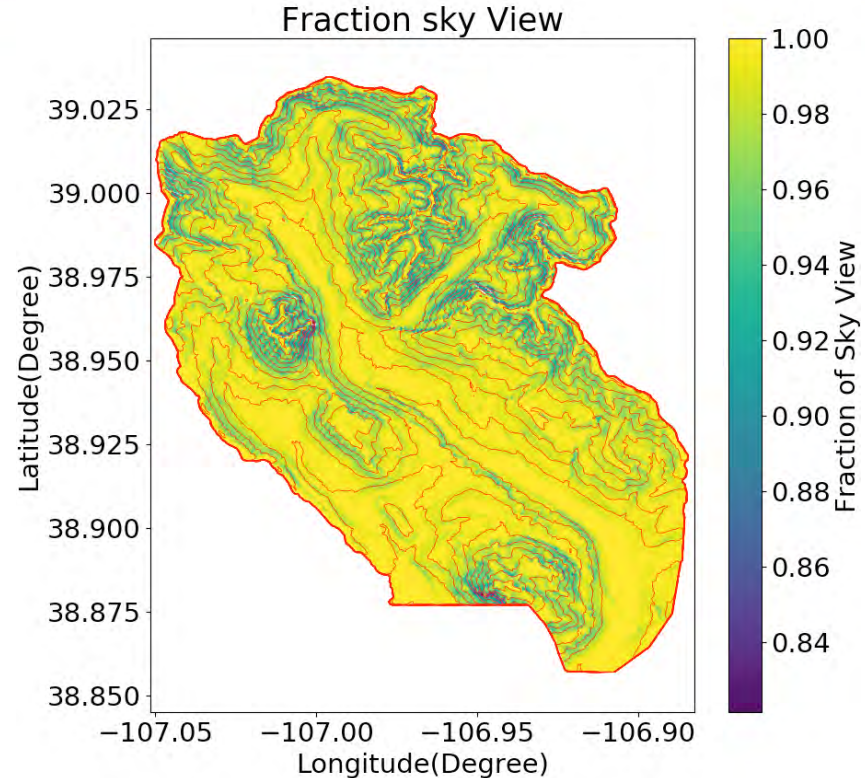
Summer precipitation has outsized impact on Watershed hydrology and gross primary productivity.



SW and LW Radiation in Complex Terrain



The sky-view is limited by complex terrain, with implications for SW and LW radiation. These effects generally are not included in process and earth-system models.



For Discussion



1. What are your science interests in working with SAIL data?
2. Will spatiotemporal heterogeneity impact your science interests? Have you considered how to address heterogeneity?
3. Would you like to do research in spring or summer? What should an IOP include?

For more info, visit <https://sail.lbl.gov> or email me (drfeldman@lbl.gov)