



Surface Atmosphere Integrated field Laboratory (SAIL) Campaign Overview

2020 ARM/ASR PI Meeting Aerosol Processes Breakout Session

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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.

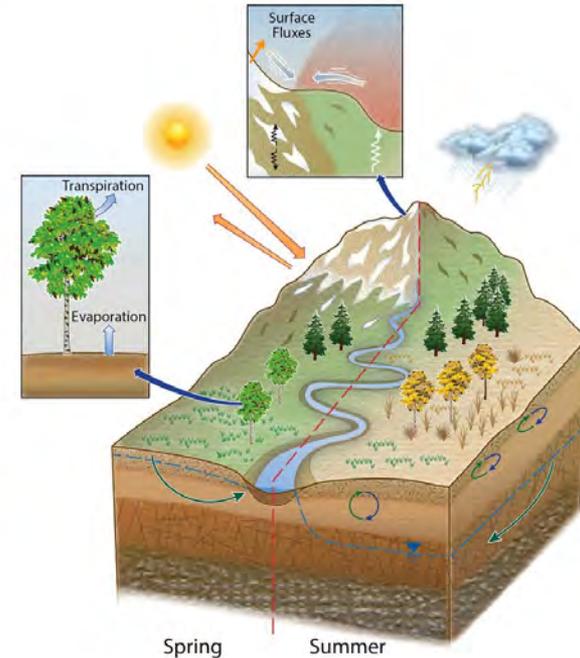
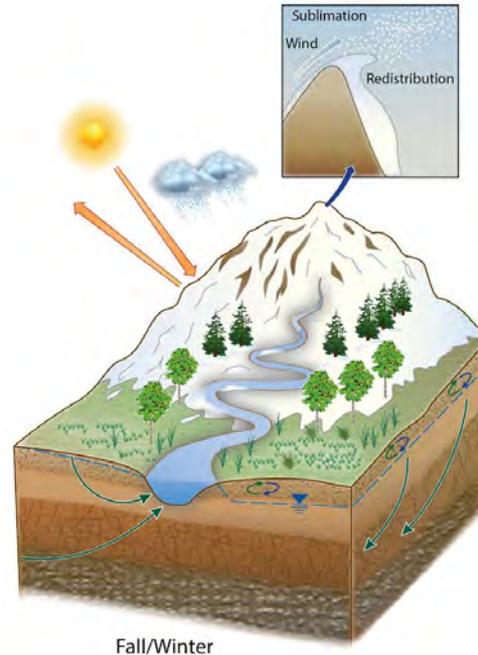


SAIL Science Objectives



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.



SAIL Instruments



- SAIL will have ~34 AMF instruments, including MAOS + an X-band scanning precipitation radar.



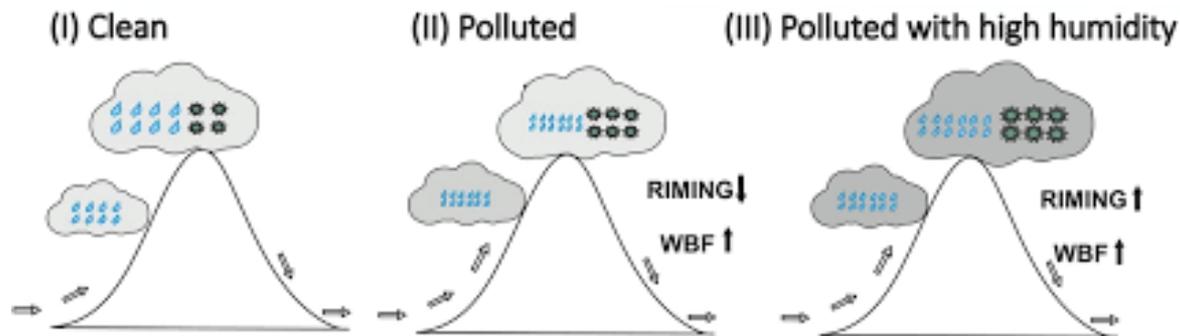
Aerosols: Regimes and Radiation



Local and non-local aerosols impact atmospheric and surface radiation in the East River Watershed, sometimes in opposing ways.

SAIL will use the AMF2 AOS and collaborative resources to characterize aerosol regimes and radiative impacts.

Aerosols: Precipitation Interactions



Choudhury et al, 2019, Atmos. Env.

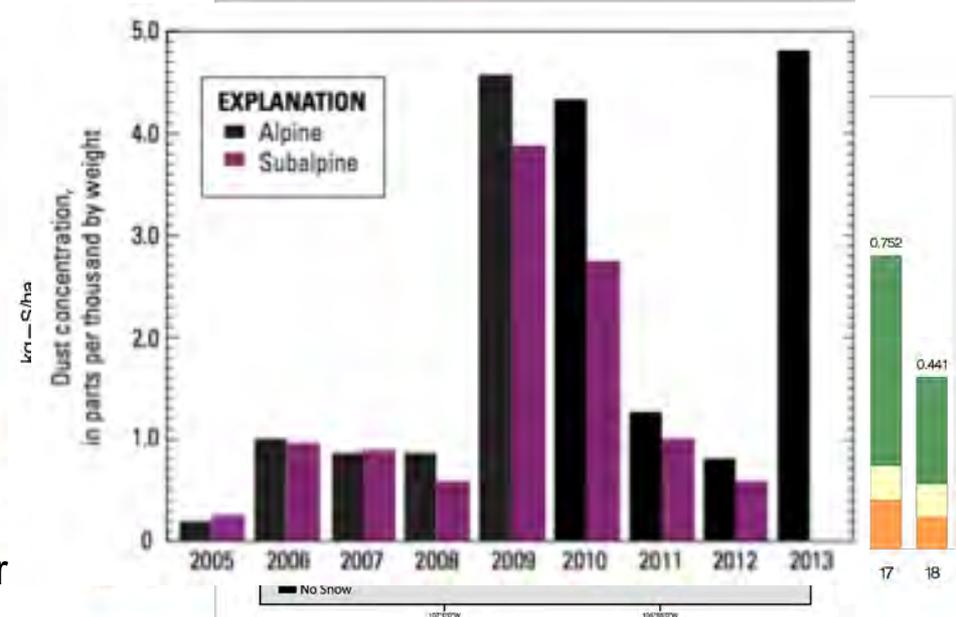
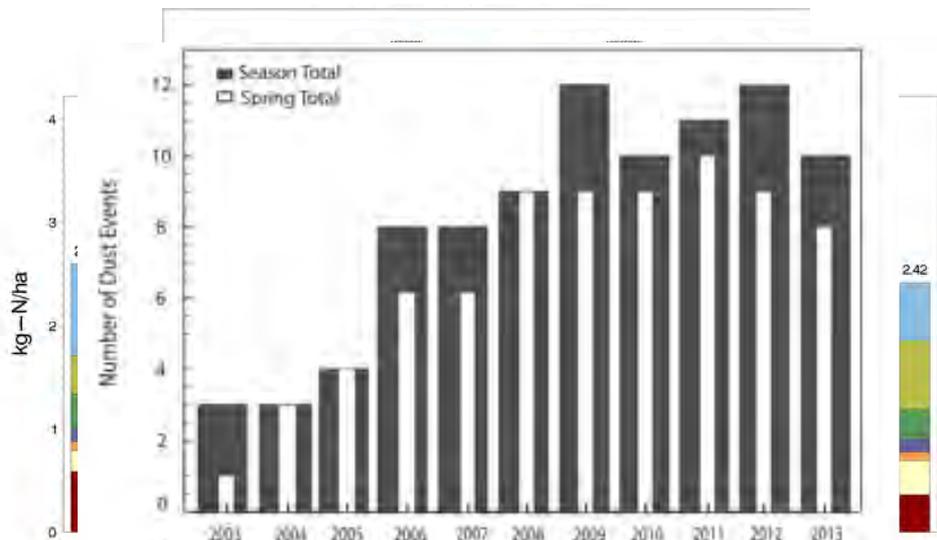
Aerosols may impact orographic precipitation by serving as cloud-condensation nuclei (CCN) and ice-nucleating particles (INPs).

SAIL will characterize many aspects of how aerosols impact orographic precipitation by using numerous ARM datastreams to measure precipitation, aerosols, and boundary layer evolution.

Aerosols in the East River Watershed



- From an EPA Castnet monitoring site at RMBL, there is ~30 years of aerosol data.
- Surveys of dust on snow have been conducted across the East River and at nearby locations.



Ten years of dust-on-snow events from Senator Beck Basin, near East River Watershed

For Discussion



1. What are your science interests in working with SAIL data? What would you like to see in a winter, spring, or summer IOP?
2. For SAIL, AOS can be collocated with other instruments or separated from it. What location(s) make the most sense?
3. What general or specific instrumentation would you like to use? Could those be accomplished without an ACSM?

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