SAIL is a field campaign that will deploy the AMF2 and an X-band scanning radar to the Upper Colorado River Basin from 09/21 to 06/23.

SAIL is collocated with the Berkeley Lab’s Watershed Function SFA to achieve atmosphere-through-bedrock observations.

The goal of SAIL is to establish the minimum-but-sufficient information from the atmosphere through the bedrock to accurately predict fluxes of water from mountainous watersheds.
Introduction, Background, and Motivation

• Water resources are threatened in the Colorado Rockies.

• The processes that impact hydrology in the Mountain West vary dramatically across seasons.

• Changing precipitation and evapotranspiration are thought to dominate historical water losses.

• Measurements of both of these quantities are highly limited, which challenges traditional model-observation intercomparisons.

Carroll et al, GRL, 2020
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Lundquist et al, BAMS, 2020
SAIL Observations of Precipitation and Evapotranspiration

• SAIL + partners seeks to establish the minimum-but-sufficient process understanding to enable unbiased prediction of the processes that impact water resources. The warm-season is critical!
• X-band radar will measure convective precipitation within 40 km of the AMF2.
• Two eddy-covariance systems will enable estimates of ET near the AMF2.
• Atmospheric profiling capabilities e.g. from sondes, AERI, MPL, HSRL, DL, and TBS(?)

Gochis et al, 2020
NOAA is launching a simultaneous collocated campaign: SPLASH.

- Distributed, complementary measurements of precipitation, evapotranspiration, surface and boundary layer processes.
- Sub-alpine, montane, and riparian end-members will be sampled simultaneously.
- SPLASH brings additional atmospheric profiling capabilities.

Existing Infrastructure
- SNOTEL
- Existing surface Met
- DOE AMF-2
- DOE-funded X-band

Sep 2021-May 2023 (SAIL)
- DOE-funded X-band
- Snow Level Radar
- Surface Flux Stations
- CLAMPS
- UAS Operations Areas
- Surface precip gauges
- Disdrometers
Connections to the Large-Scale

• SAIL is at the bleeding edge of the North American Monsoon.

• Monsoonal precipitation has collapsed in recent years with interseasonal impacts on timing and amount of watershed discharge.

• Targeted observations of SAIL, SPLASH and Watershed Function SFA reveal where, when, and how much convection in the East River and its impact on discharge.

• Integrated process studies that include modeling atmospheric, surface, and subsurface processes can use these data to guide investigations into the source(s) of model biases.
Summary and Acknowledgements

• Data from the SAIL campaign are imminent. Go to ARM Data discovery in September, 2021.

• SAIL seeks to nucleate exciting science opportunities to advance atmosphere and land-atmosphere interaction studies in complex terrain to study water resources. Studies of connections between the boundary layer and convection in this area support SAIL Science!


• Consider joining/presenting at biweekly SAIL/SPLASH teleconference. Email drfeldman@lbl.gov for details.

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