

SnowEx ALPINES

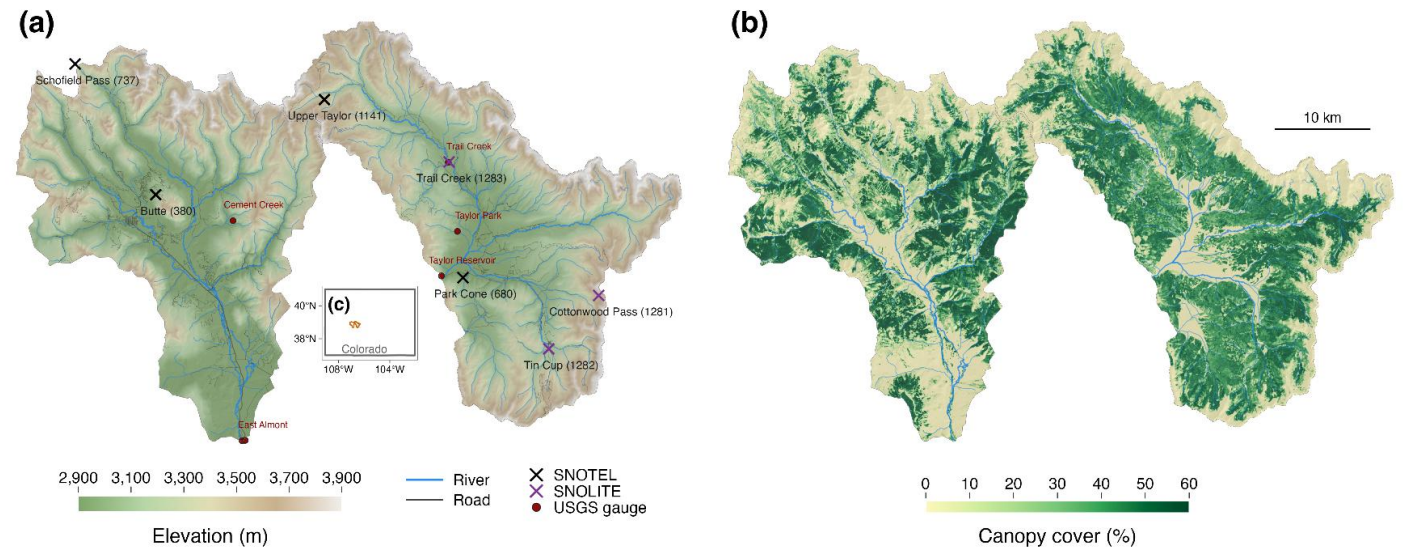
Advancing Land-surface Prediction through INtegrated Earth observations of Snow

NASA Earth Science Division (ESD) will fund a 2027–2028 winter field campaign in the East & Taylor River Basins in Colorado.

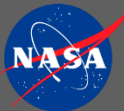
ALPINES Goal: *A watershed-scale, multi-sensor field and airborne campaign to improve snow hydrologic prediction and evaluate NISAR snow water equivalent retrievals (PI: Carrie Vuyovich; DPI: Jack Tarricone)*

Campaign Objectives:

1. Quantify accuracy of NISAR Δ SWE and total SWE retrievals across a mountain watershed
2. Test multi-sensor observing strategies in combination with models to produce accurate SWE and snow depth data
3. Demonstrate the hydrologic value of remotely sensed snow data at the watershed scale
4. Assess the effectiveness of integrating land surface models and RS data in the campaign design



The East & Taylor River Basins in Colorado will be the site of the 2027-28 SnowEx ALPINES campaign, leveraging ongoing work and infrastructure, a reliable (dry, deep) snowpack and gradients in terms of topography, forest cover and snow spatial variability to test NISAR SWE retrievals



NASA Hydrosphere Investigator Meeting
1-3 September 2026, Washington DC



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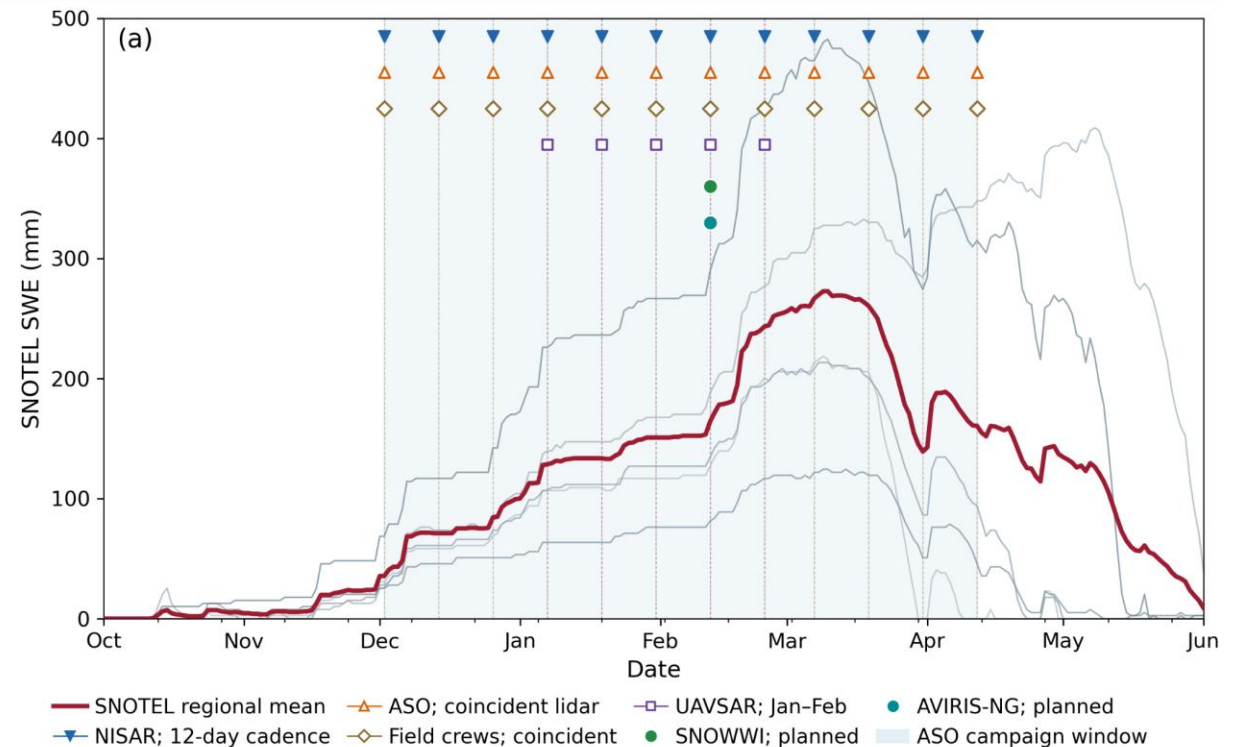
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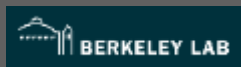
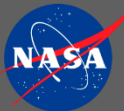
Campaign Design:

- A time series watershed-scale lidar snow depth measurements coincident with NISAR 12-day overpasses (weather permitting) throughout the snow accumulation season
- Ground-based snow measurements, including in situ stations and manual snow measurements
- Additional airborne sensors under consideration:
 - L-/P-band SAR/InSAR (UAVSAR/AirSAR-NG)
 - Ku-high/Ku-low/C-band SAR/InSAR (SNOWWI)
 - Hyperspectral (AVIRIS-5)

Additional observations (including the airborne sensors above) can be requested by justifying their integral role in multi-frequency snow retrieval science in a response to the A.17 solicitation.



Note: The 12-day NISAR acquisition dates shown are real; dates for lidar and other airborne sensors are illustrative only and do not represent scheduled or committed observations. Investigators should not assume the availability of the illustrated airborne observations when preparing proposals.



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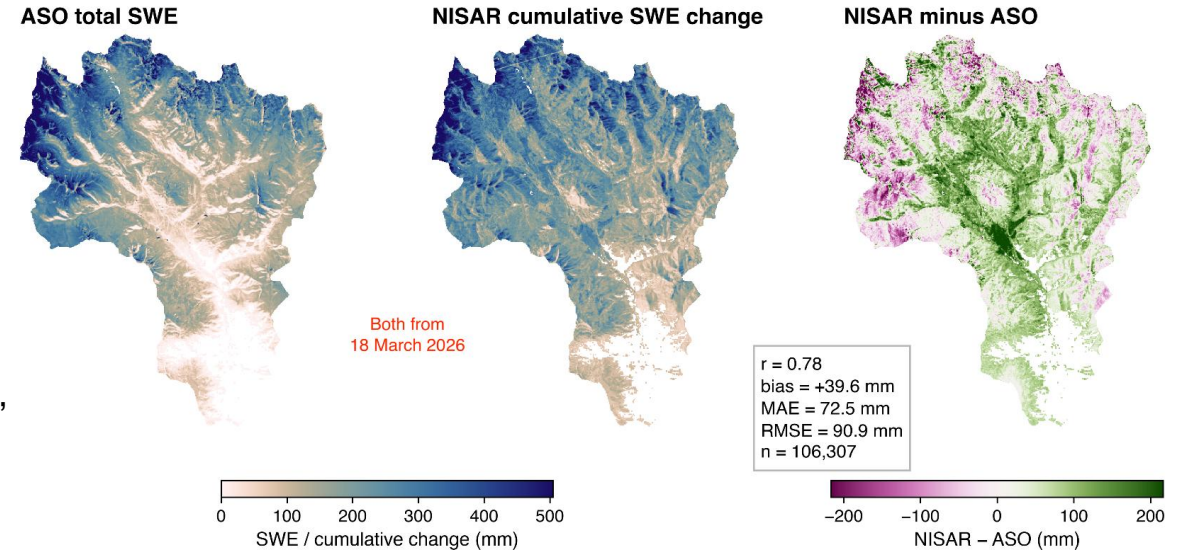
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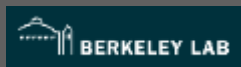
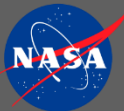
Site: East (and Taylor) River Basins, CO

After considering various basins across the WUS the East and Taylor (top) were selected for the characteristics below:

- Highest April 1 snow-zone SWE among evaluated basins:
 - Median ~400 mm; dry-year ~250 mm; persistent snow, high elevation, cold temperatures; mitigate against low snowpack risk
- Complex terrain, spatially heterogeneous snowpack, and mixed forest cover provide varied conditions for retrieval testing
- Community Watershed: “Multi-disciplinary research in complex terrain”
 - Ongoing efforts from 3 national labs, 6 federal & state agencies; 3 local stakeholders, multiple universities, SAIL/SPLASH/SoS legacy, existing ASO history, RMBL as base for research operations and lodging, strong local knowledge of safe winter travel
- Hydrological Impact: Feeds into the Upper Colorado River Basin which is critical for water supply in the Western US
 - 40 million people rely on water from the Colorado River Basin
 - 90% of the water originates above Lake Powell, most of it as snow



Preliminary NISAR results in the East River Basin indicate strong spatial correlation ($r = 0.78$) and coherent InSAR data across much of the accumulation season



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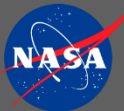
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Links of interest:

- A.17 Hydrosphere solicitation: <https://nspires.nasaprs.com/external/solicitations/summary.do?solNum=NNH25ZDA001N-HYDRO>
- AirSAR-NG: https://airbornescience.nasa.gov/instrument/Airborne_Synthetic_Aperture_Radar_Next_Generation
- SNOWWI: <https://www.umass.edu/microwave-remote-sensing/research/instruments/snowwi>
- AVIRIS-5: <https://avirisng.jpl.nasa.gov/>

More detailed information on the campaign design is in development and will be released later this year

Want to join our field campaign? An interest form will be available in early 2027. In the meantime, if you have any questions please reach out to Carrie or Jack. carrie.m.vuyovich@nasa.gov, jack.tarricone@nasa.gov



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