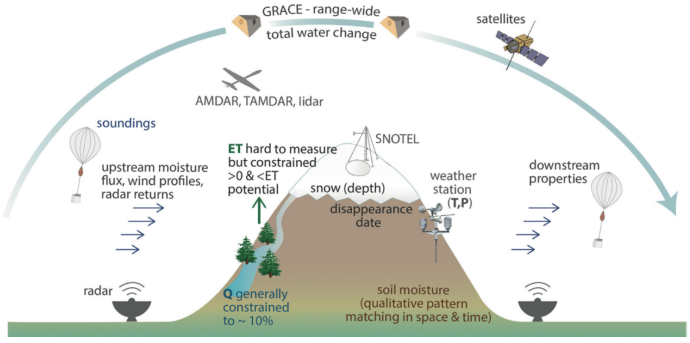
A 21st Century Collaborative Test Bed for Mountain Hydrology

Designing how to improve scientific understanding of mountain hydrology critical to a rapidly changing world

As technologies advance and relationships between science and society evolve, new opportunities emerge to innovate how we understand terrestrial hydrology and apply this knowledge. To harness this potential, a new NASA project began in September 2021: the Headwaters Hydrologic Test Bed (H2TB). This project connects scientists, practitioners, and decision makers to develop more efficient and effective approaches for understanding hydrology in the Colorado River Headwaters, a resource relied on by over 40 million people. With increasing water demand and climate-driven changes to water supplies, there is an urgent need to advance decision-relevant hydrologic research in this region.

Goals for the H2TB:

- Accelerate understanding of mountain terrestrial water cycles
- Leverage long-term monitoring to improve calibration and validation of satellite data and land surface models
- Cultivate a network for learning and community-building among scientists, institutions, and stakeholders



Improving the skill of our observational networks will require combining lots of measurements, along with understating strengths and limitations, as we evaluate models (figure from Lundquist et al. 2019, used with permission).

The H2TB project will be highly participatory, including outreach to strategic stakeholder partners, a workshop, a series of community meetings, and surveys for the Earth science community. We will engage many disciplines to explore pathways to connect *in situ* monitoring of hydrology and ecology; land surface, hydrologic, and snow modeling; data science; and community science. Engagements will inform the generation of a white paper that highlights both the efforts underway and the untapped potential that exists to improve mountain hydrology research and its relevance to practice. Throughout the process, emphasis will be placed on developing evidence-based, informed ideas for next steps in data collection and application. As mountain and downstream communities continue to face increased natural and anthropogenic stressors to their water supplies, this work seeks to uncover what is most needed to support and further develop the science that can help us better manage our vital water and ecological resources.

Project Team:
Julie Vano (PI), *Aspen Global Change Institute*
Elise Osenga, James Arnott, John Katzenberger, *Aspen Global Change Institute*
Jeffrey Deems (PI), *National Snow and Ice Data Center*
Joseph Hamman, Ethan Gutmann, *National Center for Atmospheric Research*
Mark Raleigh, *Peak to Stream, LLC*

Contact for Questions: Elise Osenga, eliseo@agci.org 970-925-7376