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Microclimate studies with microsensors

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Climatic variations in complex topography are strongly influenced by altitude, aspect, ground cover, and atmospheric flow. With limited observations in mountainous regions, deductions about variability on small scales often are limited to statistical assumptions (e.g., constant lapse rate). Now, however, inexpensive, accurate, commercially available coin-sized temperature sensors are available and have been deployed in mountainous areas of the American West. They can record hourly temperatures over a period of one year, and can be deployed in abundance to document spatiotemporal variability at unprecedented scales. When placed at or below ground level they also indicate periods of snow cover, deduced from a much-reduced diurnal cycle. These results can then be used to improve statistical models of microscale climate for hydrologic modeling, ecological studies, and paleoclimate reconstructions, to name a few applications.