

Snowpack Monitoring System Improves Water Resource Planning

Environment

Competitive Advantages

- ☑ Wireless sensor-based system offers low-cost, robust snow water equivalence monitoring.
- ☑ Sensors resist localized influences such as snow bridging.
- ☑ Small nodes are easily installed in challenging terrain.
- ☑ Local and remote data collection options are available.

Snowpack studies are essential for water planning and provide critical data for fields such as agriculture, recreation, and city planning. Until now, the predominant ground-based techniques used for these studies have been manual measurement of snow cores and deployment of large, potentially hazardous antifreeze-filled bladders.

The high cost and snowpack damage associated with both techniques have limited their deployment, especially in complex, challenging, or widespread terrain. This limited deployment can reduce the accuracy of runoff forecasts, as variations in wind, terrain, vegetation, and other localized factors exert strong influences on snow distribution.

High Resolution & Low Cost

A new water equivalence system can be installed easily in large areas of diverse terrain. Compared to current technologies, it offers higher temporal and spatial resolution, lower deployment costs, and greater resistance to local influences such as vegetation cover and snow bridging.

Small, Reliable Sensors

The system is based on a wireless sensor network with programmable nodes capable of remote data communication.

The sensors, which measure the attenuation of electromagnetic radiation, are

inexpensive, immune to snow bridging, reliable in harsh winter environments, and small enough to be easily deployed in a variety of terrain.

Convenient Data Collection

On-site methods for data collection include logging and retrieval through an Ethernet-connected or transceiver-equipped laptop computer. In addition, remote data acquisition can be achieved through a radio modem or cellular modem connection.

Next Steps

A second-generation prototype system, installed at the base of Mt. Mansfield, is now in testing. Reliability will be further optimized through ongoing platform enhancements, and validity studies will be conducted on the sensing methodologies.

Patent/Licensing Status

Patent pending. Exclusive rights available.

Learn More

Snow water equivalence monitoring website
www.cems.uvm.edu/research/cems/snow/swe.php

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