Determining Water Content in Snow-Packs Through Gamma Radiation Measurements

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In many regions where annual rainfall is minimal, melting snow provides the majority of water needed to sustain a population and agriculture. On the other end of the spectrum regions that get high amounts of precipitation can experience flooding and erosion during snowmelts. In both scenarios it is important to know the Snow-Water Equivalence (SWE) of the snowpack to accurately gauge the amount of water that is contained so one can determine the release and melt rate of the snow pack.

This study was used to determine the potential use of low cost gamma radiation sensing for accurate SWE measurements across a wide spectrum of snow and weather conditions. In utilizing naturally occurring cosmic gamma radiation, and it's known attenuation properties caused by water, an accurate model of water content based on the density of snow can be achieved.

The study area includes lab calibration and data mapping as well as field-testing to confirm lab accuracy in field results.