

Snow Depth Variability and Sampling

Steven R. Fassnacht¹

ESS-Watershed Science, Colorado State University, Fort Collins, CO 80523-1476 USA

Juan Ignacio López-Moreno

Pyrenean Institute of Ecology (Spanish Research Council), Zaragoza, Spain

Graham A. Sexstone

EASC-Watershed Science, Colorado State University, Fort Collins, Colorado, US 80523-1482

Evan J. Blumberg

Geosciences, Colorado State University, Fort Collins, Colorado, US 80523-1482

Amir H. Kashipazha

ESS-Watershed Science, Colorado State University, Fort Collins, CO 80523-1476 USA

Abstract. The variability of snow depth at a measurement location is uncertain. We collected snow depth data across a five 1 km² areas over four years. At one of these locations we collected data annually on May 1st. Approximately 200 sets of measurements were taken during each survey, and each set contained 11 to 21 individual measurements and was assumed to represent a single digital elevation model (DEM) pixel (30-m resolution). Using terrain variables derived from the DEM and vegetation-type spatial data, we assessed the main drivers of the distribution of snow depth and variability, specifically, standard deviation and coefficient of variation. The main terrain and vegetation drivers were similar across the locations and over time. However, these were different for the snow depth compared to the variability. The variability was used to define how many samples should be collected at each location to yield a representative sample.

¹ steven.fassnacht@colostate.edu