

The Spatial Distribution of Fine Resolution Snow Surface Roughness

Eric S. Thomas and Steven R. Fassnacht

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

Abstract. Variability in snow surface roughness is rarely incorporated into climate or hydrological models, yet it has the potential to have a large impact on both latent and sensible heat for a snow dominated system. We looked at the spatial variability of snow surface roughness using the data collected by the NASA Cold Land Processes Experiment (CLPX) during the winters of 2002 and 2003 for nine 1 km² study sites across northern Colorado. Black boards were placed perpendicularly into the snow to create a contrast so that pictures could be taken of the surface. The surfaces were digitally extracted and the surfaces were detrended to remove random data acquisition biases. The datasets for each board within a study site were then assigned a value based on variability in the surface, standard deviation and categorized based on location. These roughness metrics were then analyzed geospatially to understand their spatial variability and the driving processes