

## MEASUREMENTS OF SNOW STRAIN COMBINED WITH FINITE ELEMENT SIMULATIONS

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**ABSTRACT:** The rheological properties of snow are not well understood, however accurate constitutive relationships are necessary for various fields including vehicular movement over snow, calculating snow loads on structures, avalanche studies and military applications (Shapiro et al., 1997). Accurate strain measurements combined with finite element modeling may help to improve constitutive models of snow under load. Measurements of displacement under band loading of snow samples of varying densities and crystal type were performed in the laboratory. The strain caused by the loading was calculated using particle image velocimetry (PIV), in which particle paths are traced with a rapid sequence of digital photographs. PIV software allows accurate calculation of the strain field in the snow sample. These experiments are compared to a non-linear finite element model with interface elements (Marshall, 2002, Fall AGU: C11B-0996). Model parameters describing the constitutive properties of the snow sample are adjusted to provide the best fit to the measurements of deformation, which may lead to an improved understanding of the behavior of snow under a band load.

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