

## Investigations of Melt Induced Deformation in an Isothermal Snowpack

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### *Abstract*

Bridger Bowl Ski Area outside of Bozeman, MT, USA, has encountered annual problems forecasting large, wet loose avalanches that occur during warming events in the spring. These avalanches terminate within the ski area boundary and create a potential hazard to skiers and equipment alike. A study is being conducted at Montana State University in order to further understand wet snow processes the Intermountain Climate Zone and their relation to melt induced avalanche activity. It is possible that creep plays a significant role in wet avalanche events. This poster will discuss methods employed in the documentation of creep in the Bridger Range, as well as the timing and rate of deformation in late March of 2004.

During the spring of 2003, sawdust filled boreholes showed accelerated down-slope movement near the surface of the snowpack. The depth of accelerated motion was similar to the depth of melt-water accumulation and surficial instability. In March of 2004 we used an array of string potentiometers in an attempt to quantitatively document creep during melt events. Preliminary results show snow moving differentially at three levels in the snowpack, with the highest velocities being near the surface, and the lowest being near the ground. The maximum velocity logged throughout the period is ~1.0 cm/day, while glide rates ranged from 0-3mm/day. Borehole excavations show that in an isothermal snowpack, surficial melt layers deform at rates higher than in underlying snow and that stratigraphic boundaries such as ice layers can control local rates of deformation.