

## THE EFFECTS OF DUST ON AVALANCHE FORMATION

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**ABSTRACT:** Dust layers deposited in the snow pack are common occurrences in several mountain ranges of the world. In the USA these layers are seen each winter in the Wasatch, the San Juans, and the mountains of southern Utah. An ongoing study in the San Juan Mountains has shown that the presence of dust in the snow pack significantly and frequently decreases the albedo. However, the effects that these dust layers have on avalanche formation is poorly understood. This work aims to quantify the influence dust has on weak layer formation and avalanche occurrence in dry and wet cycles.

When the dust layer is deposited and buried shallowly (10-30cm) during a cold period, the layer can facilitate facet growth by absorbing more radiation and concentrating vapor pressure gradients around the dust layer. These facets represent weak layers that could easily be activated by skier or subsequent snow loading. In the case of wet slabs, the crust that a dust layer creates is a less permeable layer in the snowpack. When melt water reaches this layer, it stops traveling vertically through the snow pack and moves horizontally along this layer providing a lubricated bed surface for the snow above to slide on. Anecdotal evidence supports these hypotheses.

This study analyzes a series of detailed snow pits in southwest Colorado taken from the time of deposition of the dust layers until the snow melts in the spring to track grain metamorphism that happens near the dust layer and determine the degree of faceting near that layer. The pits were located next to full energy balance and detailed radiation instrumentation towers. We will try to establish a correlation between albedo and wet slide cycles in this area to determine if dust can make a snow pack more prone to wet slab instabilities.

**KEYWORDS:** Dust, Avalanche, Metamorphism, Snow

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