Water Movement And Capillary Barriers In A Stratified and Inclined Snowpack

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Most avalanche fatalities occur due to dry slab avalanches. However, wet snow avalanches are also dangerous and can be particularly difficult to predict. The rate of change from safe snow conditions to dangerous snow conditions occurs rapidly in a wet snowpack, often in response to water production and movement. This research focuses on the relationship between snow stratigraphy and water movement in an inclined snowpack. Concentrating on the capillary barrier effect and flow finger formation within the snowpack, dye tracer was mixed with water and applied to a stratified snowpack to observe and measure the movement of water in various snow grain types, sizes, densities, and temperatures. Experiments show that even a slight textural change within dry snow grains produce a capillary barrier. The amount of water needed to produce flow fingers depends on the snow structure. Both capillary barriers and flow finger formation may play a large role in wet slab avalanche formation. Increasing global mean temperatures may increase the frequency of wet snow avalanches of all types, so a better understanding of the processes involved is important.