Wet Slab Instability at the Arapahoe Basin Ski Area

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Empirical evidence gathered at the onset of ablation on a ski slope where a wet slab avalanche claimed the life of a skier indicates a chance of snowpack fracture. Wetting fronts which fully penetrate the basal layer of depth hoar in response to the first episode of excessive diurnal melt result in a softening of ice-to-ice contact points and a significant change in cup-shaped ice particle geometry. The authors believe that wet slab instability reaches a maximum within this transient period. Quantitative studies consist of dielectric measurements that show wetting front speeds of 1.5 millimeters per second in the vertical direction and integrated ram penetrometer scores of 66 ± 22 Joules. Finally, probable indicators of wet slab instability including air temperatures that effect rapid melt rates, snowpack characteristics conducive to brisk water transmission and stream discharge trends are identified.