



Simulated artificial ablation control of snow and ice

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This snow modeling study investigates different methods to artificially reduce ablation of snow and ice on Alpine glacier skiing resorts. Measurements at a glacierized reference site (2640m a.s.l.) indicate that under natural conditions an amount of 2.6 m of ice is lost during the period of investigation (Oct 2003 - Aug 2004), which is well reproduced by a reference simulation using the physically based snow cover model SNTHERM89. A first set of sensitivity studies focuses on the potential effects of artificial compaction of snow during winter. By systematically increasing the density of each new snow fall up to 500 kg/m^3 , no more than 0.17 m of ice can be saved compared to the reference run. Further studies consider the effect of covering the snow pack with different materials. The physical properties and the energetic processes at the model's surface node were parameterized accordingly. The results show that an appreciable amount of the winter snow cover (0.3m) as well as the whole amount of the underlying glacier ice can thus be saved. This indicates a comparatively high potential of the latter measures, which is well confirmed by preliminary field measurements, too. These results are valuable for designing specific field studies and material improvements.