



Scenario Calculations for Alpine Snow Cover and Runoff

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The snow cover in the Alps is heavily affected by climate change. Recent data show that at altitudes below 1200 m a.s.l. a time-continuous winter snow cover is becoming an exception rather than the rule. This will also change the timing and characteristics of river runoff in Alpine catchments. A numerical study of the impact of climate change on snow cover and runoff has been conducted using ALPINE3D, a model for the high resolution simulation of alpine surface processes, in particular snow, soil and vegetation processes. We present here an assessment of future snow and runoff in two Alpine catchments, the larger Inn catchment (1945 km²) and the smaller Dischma catchment (43 km²), based on two common climate change scenarios (IPCC A2 and B2). The predicted changes in snow and runoff are drastic. While the current climate still supports permanent snow and ice at the altitudes of the highest peaks above 3000 m a.s.l., this zone will disappear under the future climate. The changes in snow cover can be summarized by approximately shifting the elevation zones down by 900 m. The corresponding changes in runoff are also severe: While the current climate shows a significant contribution from snow melt until mid to late summer, future climate will feature a much narrower snow melt runoff peak in spring. A further observation is that heavy precipitation events in the fall will change from mainly snow to mainly rain and will have a higher probability to produce flooding.