An artificial snow climatology for Austria

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The operation of skiing resorts is intrinsically tied to snow reliability. Production of artificial snow has become increasingly important in the last decades. Within the scope of climate change, it is sketchy how meteorological boundary conditions for production of artificial snow vary in time and space. This holds particularly, since the production potential depends as well on the temperature and on the relative humidity of the surrounding air.

In order to assess the evolution of wet-bulb temperature in the last decades, temperature and humidity data of 14 Austrian stations located between 585 m a.s.l. and 3105 m a.s.l. were analyzed, combining climatologically and hourly measured data, back to 1948. A mean threshold value of wet-bulb temperature for artificial snowmaking and its relation to the production potential in m^3/h was derived using additional data from snowmaking manufacturers.

Results show that wet-bulb temperature increased by up to 1.8˚C in the last 45 years. Statistical significance of these trends is inhomogeneous in time and space. The number of days which allow the production of snow decreased especially in altitudes of around 2000 m a.s.l.. However, most changes at low altitude stations are statistically not significant. In high altitudes, changes are small. The production potential of artificial snow in m^3/h shows no trend, as interseasonal variability dominates greatly in the last 25 years of available hourly data.