

## **Technical snow production in skiing areas: conditions, practice, monitoring and modelling. A case study in Mayrhofen/Austria**

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The production of technical snow today is a self-evident feature of modern alpine skiing resort management. Millions of Euros are invested every year for the technical infrastructure and its operation to produce a homogeneous and continuing snow cover on the skiing slopes for the winter season in almost every larger destination in the Alps. In Austria, skiing tourism is a significant factor of the national economic structure.

We present the framing conditions of technical snow production in the mid-size skiing resort of Mayrhofen (Zillertal Alps/Austria, 136 km slopes, elevation range 630 – 2.500 m a.s.l.). Production conditions are defined by the availability of water, the planned date for the season opening, and the climatic conditions in the weeks before. By means of an adapted snow production strategy an attempt is made to ecologically and economically optimize the use of water and energy resources. Monitoring of the snow cover is supported by a network of low-cost sensors and mobile snow depth recordings. Finally, technical snow production is simulated with the spatially distributed, physically based hydroclimatological model AMUNDSEN. The model explicitly considers individual snow guns and distributes the produced snow along the slopes. The amount of simulated snow produced by each device is a function of its type, of actual wet-bulb temperature at the location, of ski area infrastructure (in terms of water supply and pumping capacity), and of snow demand.