



## **Simulating snow conditions in ski resorts with the physically based snowpack models AMUNDSEN, Crocus, and SNOWPACK/Alpine3D**

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Physically based snowpack models are commonly used for the simulation of the snow cover in mountain regions in a high level of detail and process representation. Beyond the simulation of natural snow conditions only, for the application of these models in ski resorts recently much progress has been made regarding the inclusion of snow management practices while explicitly resolving the underlying processes. This includes the physical description of the snowmaking and grooming processes under consideration of the ambient conditions (e.g. wet-bulb temperature and wind speed) and ski resort infrastructure (snow gun locations and efficiency, water availability, pumping capacity, etc.), but also the associated socioeconomic decisions (when and where to produce snow and to groom). In the frame of the H2020 project PROSNOW, the snowpack models AMUNDSEN, Crocus, and SNOWPACK/Alpine3D are being applied in nine pilot ski resorts across the European Alps for forecasting snow conditions in time scales from days to several months ahead. In our contribution, we present an overview and comparison of the three models while focusing on the individual approaches for the simulation of snowmaking and grooming, and show how individual ski resorts, their infrastructure, and management practices are represented. Finally, we demonstrate how different snow management configurations are considered in the operational model runs and show preliminary simulation results for the PROSNOW pilot ski resorts.