



Towards a seamless modelling chain to simulate snow conditions in ski resorts

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Ski resorts management is strongly affected by meteorological conditions, in particular natural snowfall and conditions favourable for technical snowmaking (sufficiently low wet-bulb temperatures and wind speeds). Therefore, improved anticipation capabilities at all time scales, spanning from “weather forecast” (up to 5 days typically) to “climate prediction” at the seasonal scale (up to several months) hold significant potential to improve the real-time adaptation of ski resorts to upcoming meteorological conditions.

In this context, the H2020 PROSNOW project will build a demonstrator of a meteorological, climate and snow management prediction system from few days to several months ahead, with a seamless approach specifically tailored to the needs of the ski industry. Numerical weather prediction (NWP) data will feed numerical snowpack modelling, allowing to generate an ensemble of possible realizations of the unfolding of the snow season.

This work will present the first results achieved within PROSNOW using the French reanalysis SAFRAN and the detailed snowpack model SURFEX/ISBA-Crocus. Ensembles of snow height simulations, carried out at different altitudes in 2 French ski resorts, will be shown and several improvements in the ability to better forecast the observed snow height on the ski slopes will be discussed. In particular, we will highlight the impact of:

- using NWP forcing data against mere climatology,
- initializing the snowpack simulations with local observations,
- adding a description of processes accounting for different snowmaking and grooming practices.

Overall, these results will show the great potential of the PROSNOW modelling framework as a decision-making tool for ski resort managers.