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A new methodology for positioning and dimensioning snow fences in alpine terrain

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Snow fences are used as permanent protection measures to accumulate snow in defined areas. However, the snow cover distribution in alpine terrain is known to be highly influenced by the local wind field. Therefore positioning and dimensioning of snow fences is -contrarily to flat terrain- a difficult matter. In this study a new methodology is presented for this goal and case studies are provided for potential avalanche release zones.
The methodology contains the following steps: 1) Statistical analyses of wind data from permanent meteorological measurement stations in close proximity to the test area. 2) Additional automated wind measurements within test area. 3) Creation of snow height maps using terrestrial laser scanning technology and analysis of photographs. 4) Three-dimensional wind field modelling using the atmospheric model ARPS (Advanced Regional Prediction System). Very high resolution wind fields (5 m horizontal resolution) were simulated using the measured wind data and data from lower resolution atmospheric modelling (INCA) as input. 5) Computing activity areas of potential snow fences using Tabler recommendations for classified snow drift events.
The results of case studies are presented and discussed. According to the results of this research, new snow fences and adjustments to old measures have been built by authorities. The functionality of the new and modified structures was evaluated using the given methodology. Finally, the reliability of the presented methodology for positioning and dimensioning snow fences in alpine terrain is discussed.