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Snow-avalanche hazard forecasting in the Krkonoše Mountains, Czechia

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The Krkonoše Mts., with the highest peak at 1602 m, are the highest mountains in the Czech Republic. This middle-mountain range covers an area of 454 km2 and includes 53 permanent avalanche paths. Despite its low altitude Krkonoše experience considerably high avalanche activity, even causing fatalities. Unfortunately, and so far, the local authorities do not have a professional tool for avalanche forecasting available. Within the framework of a project devoted to preparation of a tool for snow avalanche hazard forecasting an analysis of historical datasets was performed including weather and snow condition data covering more than 1100 avalanche events in the last 50 years.

HR-DEM from airborne LiDAR was used to get accurate slope and terrain characteristics, which were used for calculation of a release susceptibility map using ANN method. Afterwards and regional runout susceptibility was calculated employing Flow-R code (http://www.flow-r.org) and information from the regression analysis of avalanche runout length. This ”static“ information about avalanche hazard is then being coupled with snow distribution and stability models in order to assess the snow-avalanche hazard in near-real time. For the snow distribution modelling are being tested two models – Alpine 3D and newly developed spatial distributed HBV-ETH model.

It is planned that the forecasting system will be employed as a public avalanche alert system for the Krkonoše Mts. and consequently will be extended for the whole Czechia under the patronage of the Mountain Rescue Service, an organization responsible for the public snow-avalanche hazard forecasting. The system will use forecasted ALADIN weather data.