



## **Downslope windstorm in Slovakia simulated with high resolution numerical models**

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Downslope windstorms occur in the vicinity of the highest mountains of Slovakia. Wind accelerating along their lee sides can reach a speed of 50 m/s and sometimes causes large damage to the forest. The study evaluated one of the most severe case, which happened on 19 November 2004 and affected the southern slopes of High and Low Tatras (situated at central and northern part of Slovakia). Numerical simulations were provided with atmospheric model ALADIN at 2.5 km horizontal resolution using both hydrostatic and non-hydrostatic dynamics. The results show generation of a deep amplitude mountain wave at lee side of the High Tatras that is a typical feature of downslope windstorm. Predicted wind gusts of almost 60 m/s and the character of the wind field agree with available observations and information from damage survey. It is concluded that windstorms of this kind can be forecasted by numerical models of 2.5 km resolution with higher precision than by using the current operational models. It is shown that computationally effective hydrostatic models based on dynamical adaptation approach can be sufficient in forecasting extreme non-convective wind, similar to the evaluated event. Nevertheless, the results are strongly dependent on the physical parameterisation of the model (turbulence, orographic drag, etc.). Hence, future versions of both hydrostatic and non-hydrostatic numerical models should be carefully examined and tested to keep the performance of forecasting severe downslope windstorms.