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Topography induced Heterogeneities of drifting Snow

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Using the model system Alpine3D snowdrift processes above complex and very steep topographies are investigated by means of parallelized finite element simulations. The intrinsically complex interplay between wind fields and precipitation, erosion mechanisms and snow cover, near-surface transport and transport of suspended snow is considerably simplified by treating theses processes independently: The three dimensional transport of suspended snow is modeled as a stationary advection-diffusion process of passive tracers in a stationary wind field, which is generated in advance by mesoscale wind field simulations. These wind fields determine the erosion of snow particles from the snow cover and thereby the near-surface snow concentration of saltating particles which in turn serves as the lower boundary condition for the advection-diffusion equation of suspended snow. Results for simulations in domains with idealized as well as realistic topographies are presented and a comparison to limited experimental data is shown.