Supplementary Material to
SNOWstorm - a deep-learning based model for near-surface winds and drifting snow in mountain environments

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Table S1: Hyperparameters for individual U-Nets for near-surface winds (NSW), snow mass change rate (DSM), vertically integrated sublimation rate (SUBL_VI) and vertically integrated snow transport rate (SNOW_VI)

	NSW	DSM	SUBL_VI	SNOW_VI
loss function	MSE	MSE	MSE	MAE
batch size	4	12	12	12
initial learning rate	0.01	0.001	0.001	0.01
learning rate reduction	True	True	True	True
weight initialization	Xavier uni	Xavier uni	Xavier uni	Xavier uni
optimizer	SGD	SGD	SGD	SGD

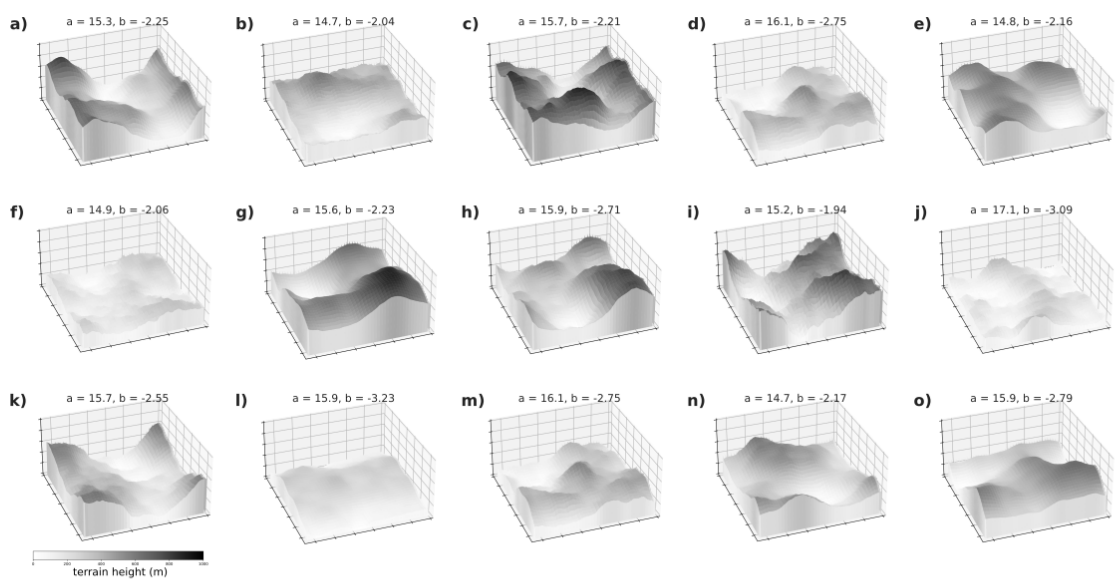

Figure S1: Examples for synthetic topographies with different spectral slope settings a and b (see Eq. 1).

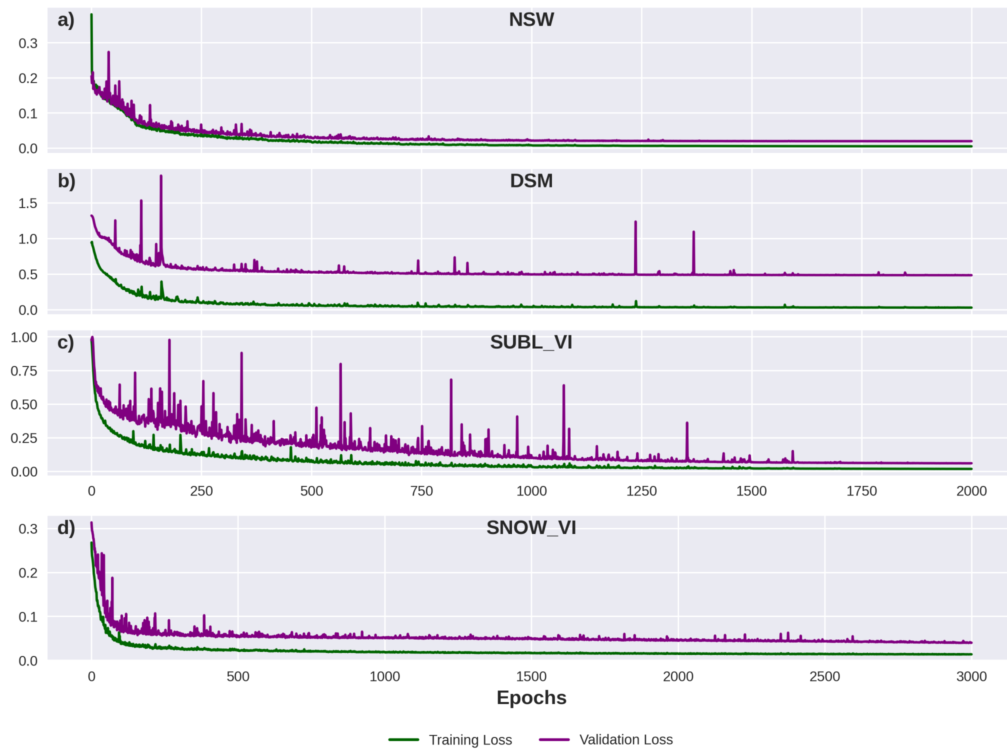

Figure S2: Loss curves for the training of individual U-Nets for near-surface winds (NSW, a), snow mass change rate (DSM, b), vertically integrated sublimation rate (SUBL_VI, c) and vertically integrated snow transport rate (SNOW_VI, d)

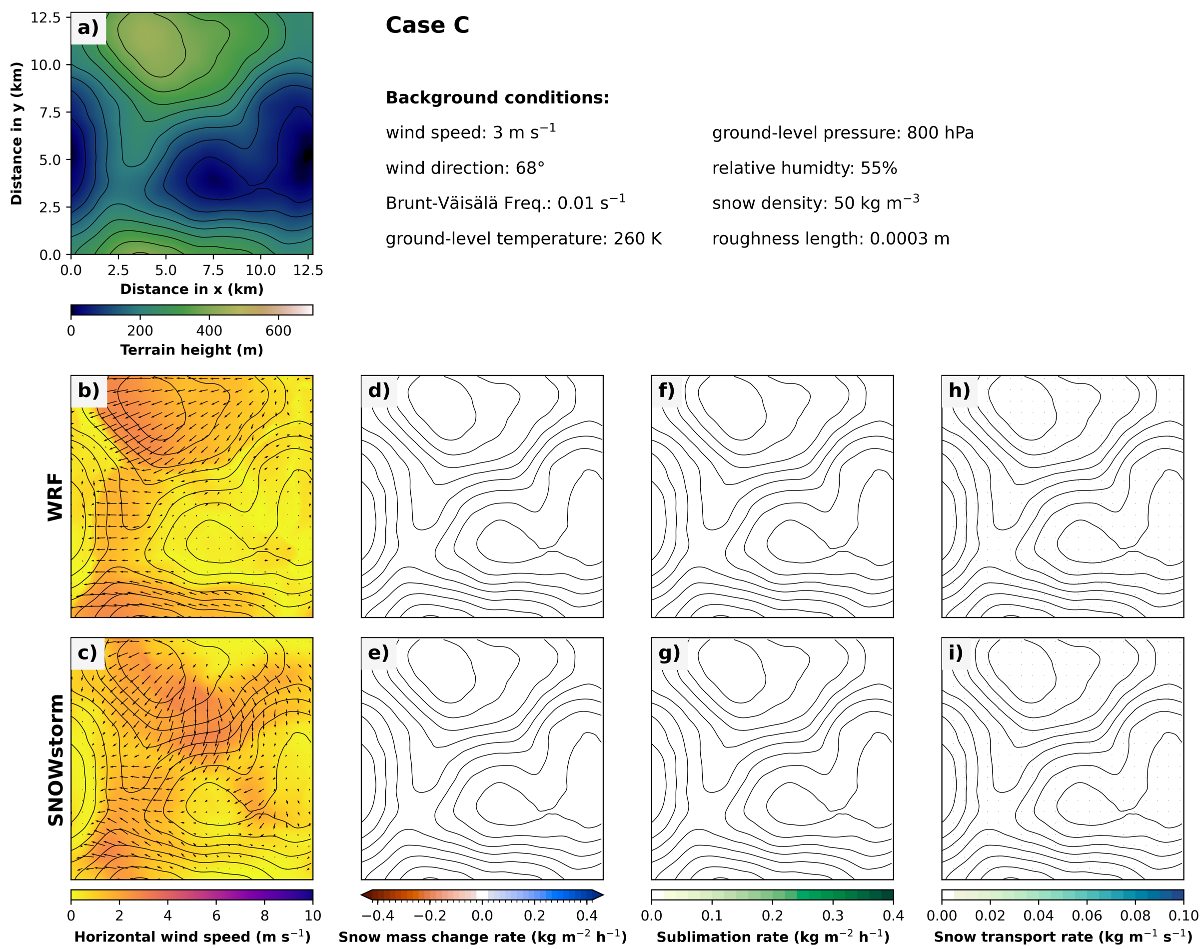

Figure S3: Similar to Fig. 5, but for case C.

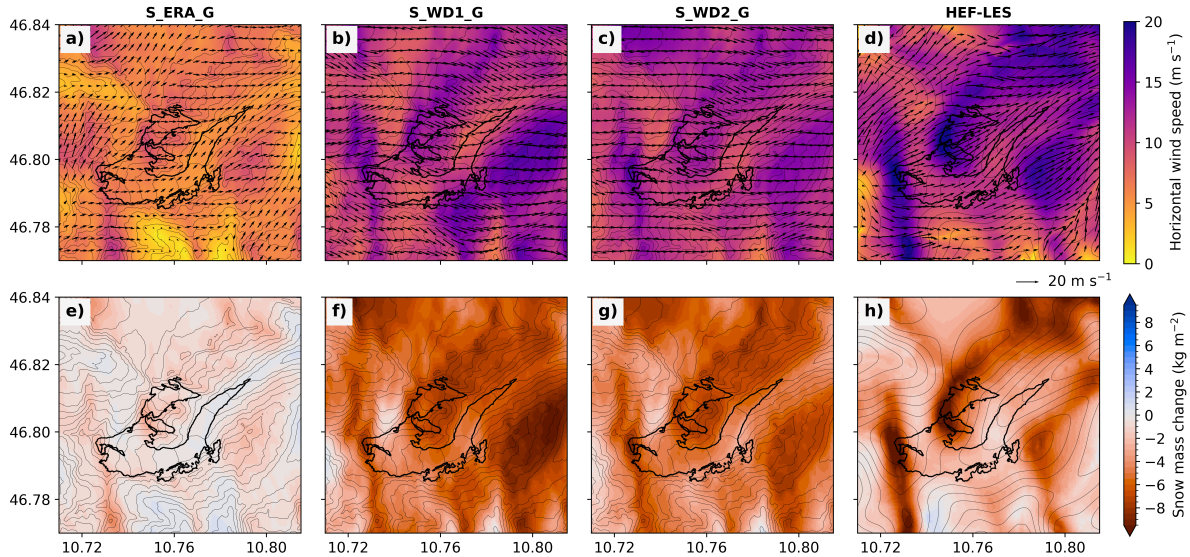

Figure S4: Similar to Fig. 9, but with SNOWstorm driven on GLO-30 topography

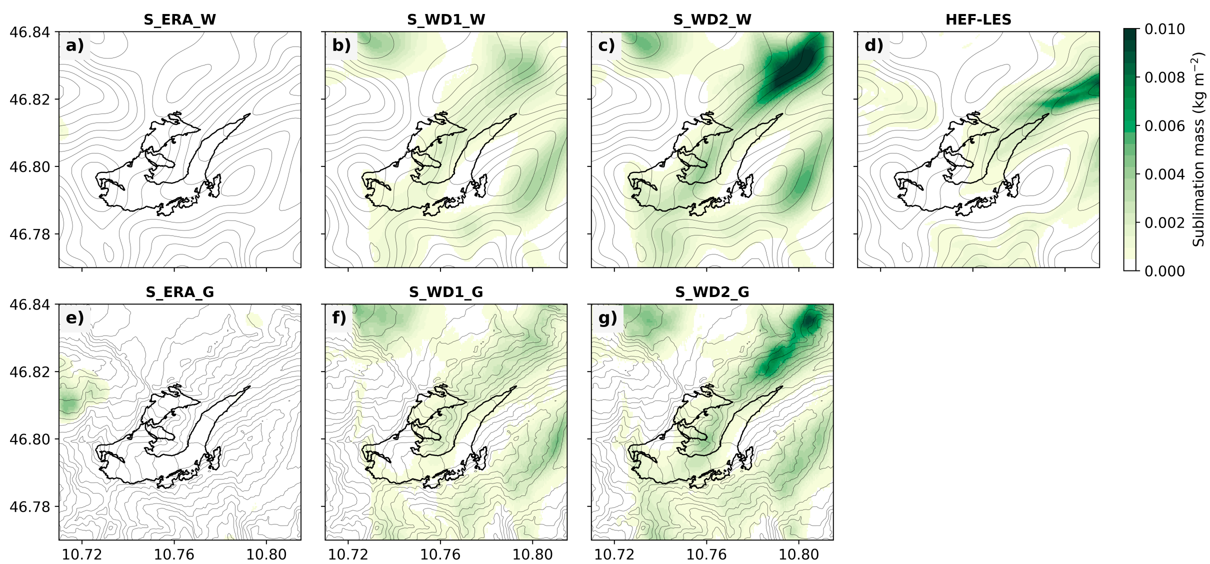

Figure S5: Drifting snow sublimation accumulated for 08 February 2021 predicted by SNOWstorm (a–c, e–g) for experiments with various input data sets and HEF-LES (d). SNOWstorm predictions use HEF-LES topography in a–c and GLO-30 topography in e–g. Model topography and glacier outlines are simlar to Fig. 9