Supplementary Figures to Hamm and Frampton (2021): "Impact of lateral groundwater flow on hydrothermal conditions of the active layer in a high arctic hillslope setting"



Figure S1: Daily values of the forcing dataset averaged over the 2013–2019 period (DOY-average). Precipitation in (g) was adjusted by defining a rain period (air temperature > 0 °) and a snow period (air temperature \leq 0 °) and equally distributing the by for each day in the respective period.



Figure S2: Surface snow depth during the last year of the simulation representative for each column of the model domain of all three steepness cases (flat, medium, steep slope).



Figure S3: Evaporative flux at the surface at the uphill location (a) and the downhill location (b). Blue, cyan and yellow represent the steep, medium and flat case, respectively.



Figure S4: Daily values of mass flux through the faces of the control volume (CV; 7-day moving average) at the uphill (solid) and downhill (dashed) CV locations. Colors represent the steep (blue), medium (yellow) and flat (green) case, respectively. The sign convention adopted is positive values represent heat entering the CV and negative values leaving the CV. Due to the definition of the CV boundaries, lateral fluxes only occur on the right face for CV up and on the left side for CV down.



Figure S5: Representation of active layer thickness in the **S0R0** scenario compared between the steep (blue), medium (cyan) and flat case (yellow). (a) shows daily, spatially averaged thaw depth averaged over a 5-day window from May to December in the last year of the simulation. Note that thaw depth is defined as cells within the model domain that exceed 0 °C). (b) shows snapshots of the developing thaw depth throughout the transect (defined as the 0 °C isotherm, vertically interpolated). Solid, dashed and dotted lines represent the three chosen points in time July 10 (thaw), September 7 (max. active layer thickness), and November 18 (freeze-up), respectively.



Figure S6: Representation of active layer thickness in the **S2R2** scenario compared between the steep (blue), medium (cyan) and flat case (yellow). (a) shows daily, spatially averaged thaw depth averaged over a 5-day window from May to December in the last year of the simulation. Note that thaw depth is defined as cells within the model domain that exceed 0 °C). (b) shows snapshots of the developing thaw depth throughout the transect (defined as the 0 °C isotherm, vertically interpolated). Solid, dashed and dotted lines represent the three chosen points in time July 20 (thaw), August 22 (max. active layer thickness), and November 18 (freeze-up), respectively.