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Modeled sensitivity of two alpine permafrost sites to RCM-based climate scenarios.

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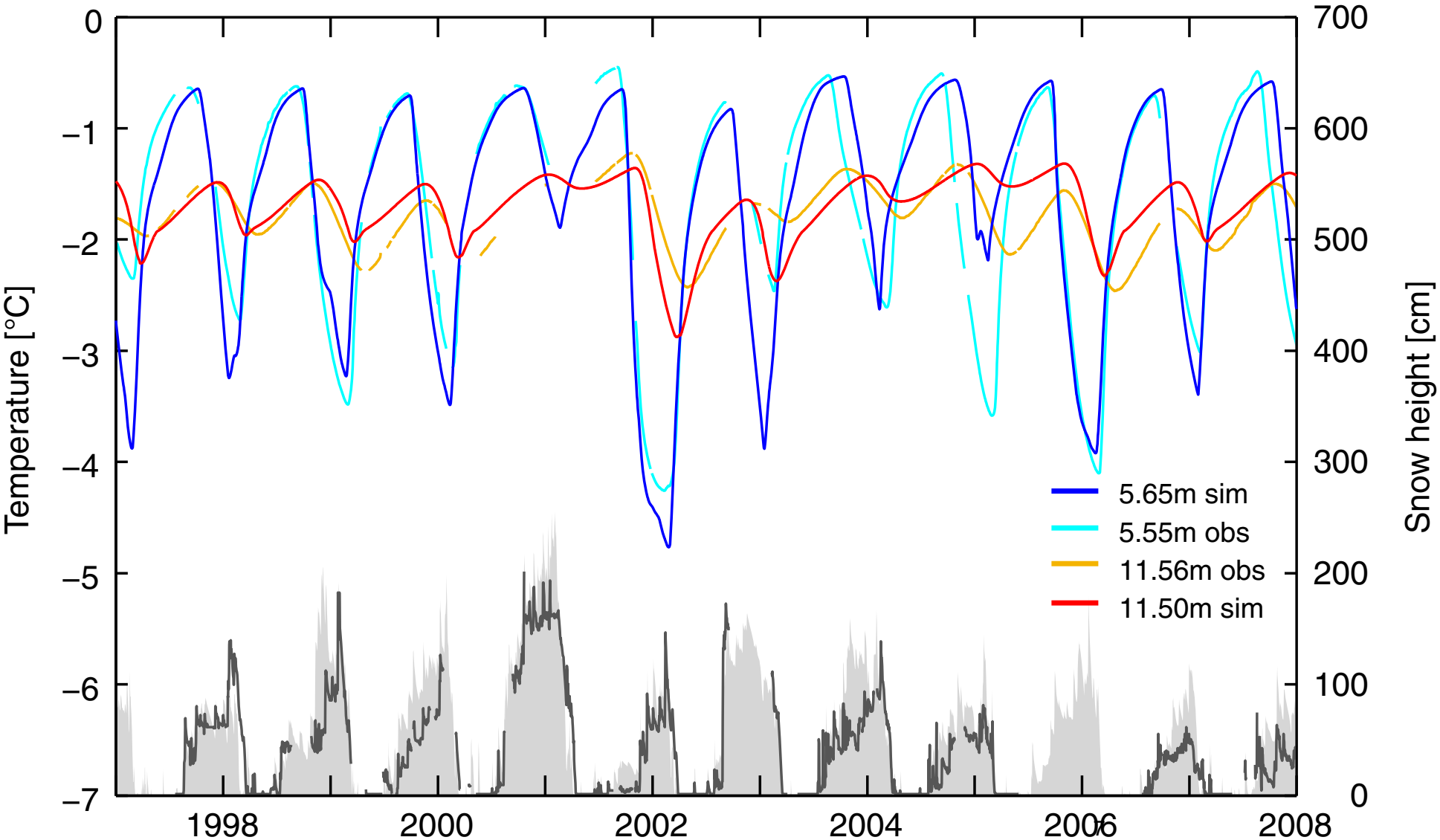
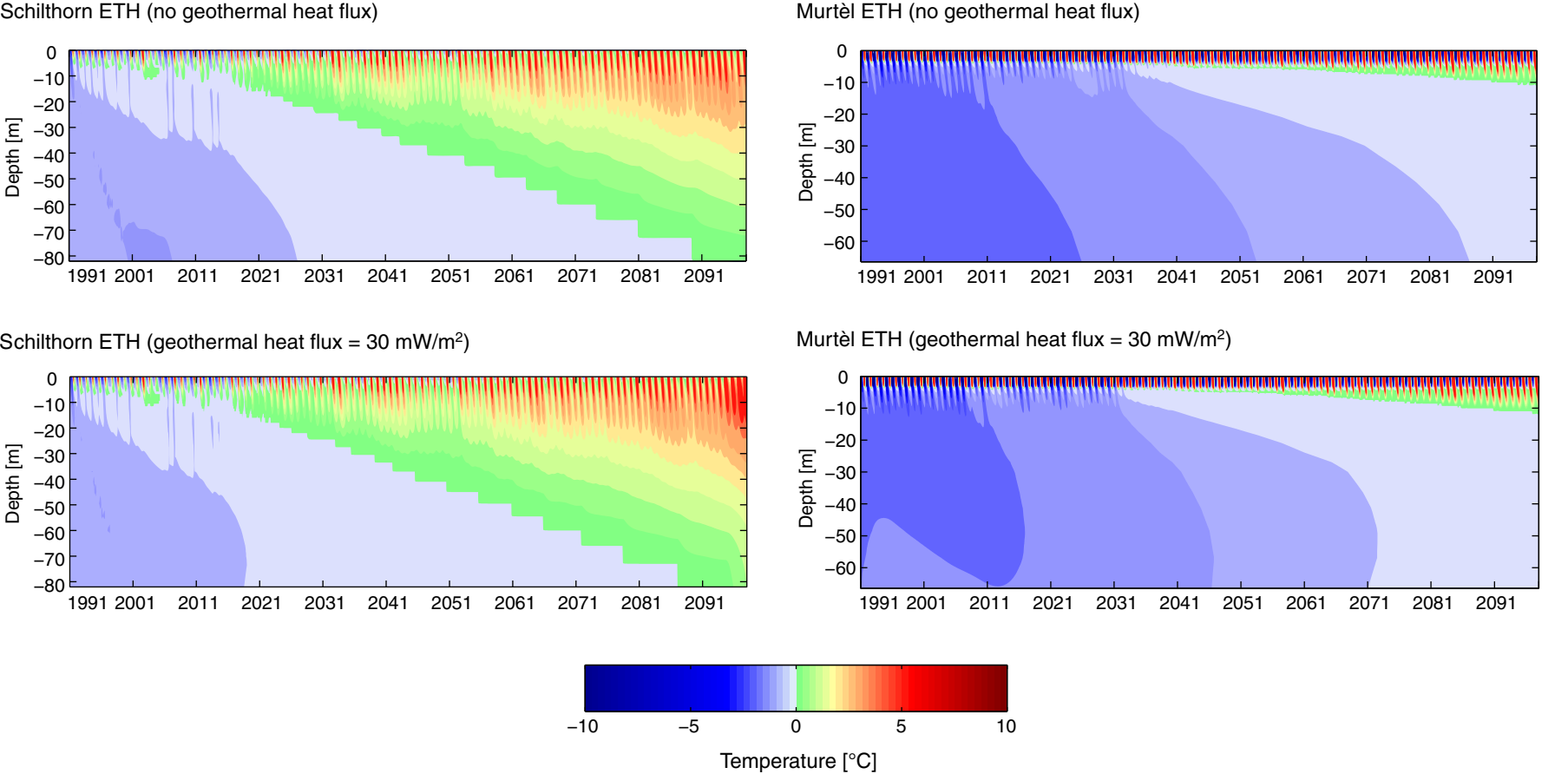
This data set contains an appendix describing the mathematical treatment of the physical processes of heat transfer, soil freezing and snow cover in the CoupModel (currently attached at the end of the manuscript). Figure 1 "Figure1supporting.eps" shows the temperatures and the snow cover as simulated with the CoupModel using a different soil parametrization with an ice content of 40% in the permafrost. Figure 2 "Figure2supporting.eps" shows the evolution of the hydrothermal regime at Schilthorn and Murtèl as simulated with the CoupModel using climate forcing of one regional climate model (ETH) for a situation with and without geothermal heat flow of 0.03W/m^2. Figure 3 "Figure3supporting.eps" shows the soil temperature (T) as a function of heat content (E) for different degrees of freezing-point depression in the CoupModel. Figure 4 “Figure4supporting.eps” shows the unfrozen water contents at the two study sites during the late 20th and the 21st century.

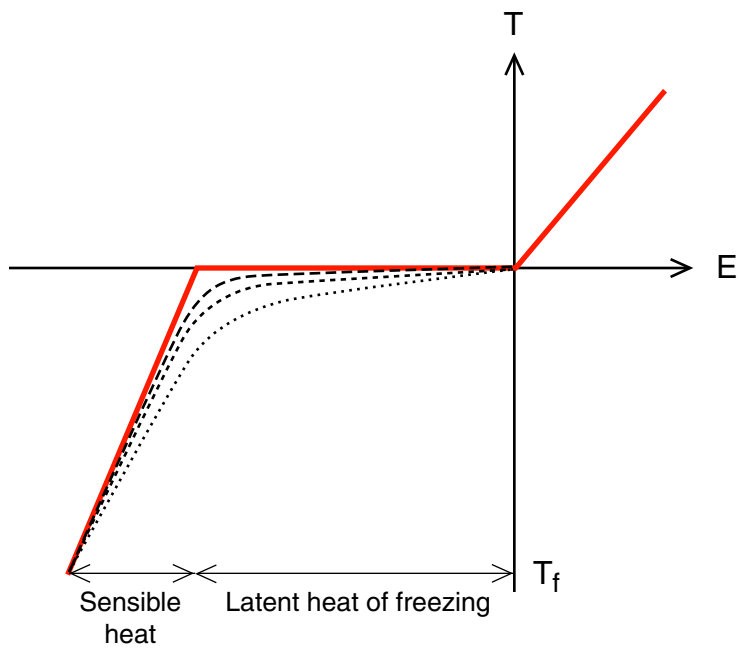
1. Figure1supporting.eps (Figure 1) Simulated and measured snow heights and ground temperatures
for two different depths at rock glacier Murtel for the calibration
period from 1997 to 2008 using lower ice content (40%) in the
permafrost.
2. Figure2supporting.eps (Figure 2) Simulated thermal regime at Schilthorn and Murtel during the late 20th and the entire 21st century without (top) and with (bottom) a geotherrmal heat flux
of 30 mW/m^2.
3. Figure3supporting.eps (Figure 3) Soil temperature (T) as a function of heat content (E) for different degrees of freezing-point depression. The soil is considered to be completely frozen below Tf.
4. Figure4supporting.eps (Figure 4) Unfrozen water content at the Schilthorn and at rock glacier Murtèl-Corvatsch during the late 20th and the entire 21st century based on RCM output driven permafrost model simulations.



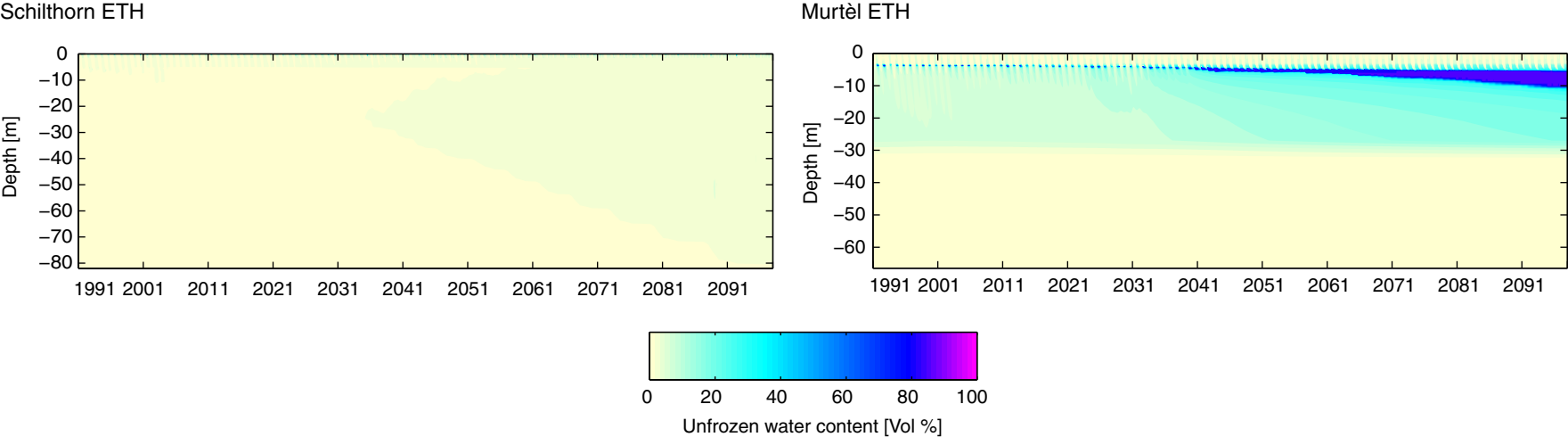
Simulated and measured snow heights and ground temperatures for two different depths at rock glacier Murtèl for the calibration period from 1997 to 2008 using lower ice content (40%) in the permafrost.



Simulated thermal regime at Schilthorn and Murtèl during the late 20th and the entire 21st century without (top) and with (bottom) a geotherrmal heat flux of 30 mW/m^2



Soil temperature (T) as a function of heat content (E) for different degrees of freezing-point depression. The soil is considered to be completely frozen below T_f.



Unfrozen water content at the Schilthorn and at rock glacier Murtèl-Corvatsch during the late 20th and the entire 21st century based on RCM output driven permafrost model simulations.