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Supplement of

Evaluating integrated surface/subsurface permafrost thermal hydrology models in ATS (v0.88) against observations from a polygonal tundra site

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Table S1. Quantitative measures of model performance to observed soil temperatures for the period 2012-2014. Notation: NSE (Nash–Sutcliffe model efficiency coefficient), RMSE (Root Mean Squared Error), and $R^2$ (Coefficient of determination). Warm (or cold) bias in the model is represented by positive (or negative) bias

| Depth [m] | Location | Efficiency metrics |
|-----------|----------|--------------------|
|           |          | NSE    | RMSE | $R^2$ | Bias |
| 0.05      | Center   | 0.94   | 1.88 | 0.94  | -0.48|
| 0.5       | Center   | 0.94   | 1.38 | 0.95  | -0.06|
| 1.5       | Center   | 0.95   | 0.88 | 0.95  | 0.27 |
| 0.05      | Rim      | 0.94   | 2.03 | 0.95  | -0.44|
| 0.5       | Rim      | 0.88   | 1.86 | 0.93  | -0.36|
| 1.5       | Rim      | 0.96   | 0.88 | 0.94  | -0.12|
| 0.05      | Trough   | 0.94   | 1.79 | 0.95  | -0.38|
| 0.5       | Trough   | 0.95   | 1.25 | 0.95  | -0.08|
| 1.5       | Trough   | 0.96   | 0.79 | 0.95  | 0.15 |

Figure S1: Daily averaged air temperature and precipitation at the study area for years 2012-2015.
Figure S2: Shown in the observed and simulated water tables from different boundary conditions. Results demonstrate that run-off is important during snowmelt run-on to polygon is important during dry summer periods.
Figure S3: Simulated evaporation versus time for trough, center, and rim microtopographic positions.