**Supplementary methods**

For two sites (Inuvik & Svalbard) the soil temperature was recorded at depths that differed from where the soils were sampled. Therefore, we performed an additional linear regression excluding these two sites from the analysis to evaluate whether obtained results were robust. Exclusion of the two sites from the original linear regression (SM Table 1) differed less than 2% in the estimate slope coefficient and intercept (SM Table 2)

**SM Table 1.** Linear regression on the relationship between Topt and warmest daily soil temperature across all 11 sites

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | t value | Pr(>|t|) |  |
| Intercept | 21.3386 | 1.7018 | 12.539 | 1.93E-07 | \*\*\* |
| Slope Coefficient | 0.6286 | 0.1412 | 4.453 | 0.00123 | \*\* |
| --- |  |  |  |  |  |
| Adj. R2 | 0.6312 |  |  |  |  |

**SM Table 2.** Linear regression on the relationship between Topt and warmest daily soil temperature across all 9 sites

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Estimate | Std. Error | t value | Pr(>|t|) |  |
| Intercept | 21.353 | 1.6953 | 12.595 | 4.59E-06 | \*\*\* |
| Slope Coefficient | 0.6753 | 0.1418 | 4.761 | 0.00206 | \*\* |
| --- |  |  |  |  |  |
| Adj. R2 | 0.7304 |  |  |  |  |