

Figure S1. Bias (stippling) and Root Mean Square Error (RMSE) (solid colour) for the cold season (blue) $\leq 2^{\circ}\text{C}$ and the warm season (red) $> -2^{\circ}\text{C}$ over the permafrost zone (right panels) and the zone with little-to-no permafrost (left panels). The top panels display the bias and RMSE for the near surface (0cm - 30cm) layer, while the bottom panel displays the bias and RMSE at depth (30cm - 300cm). Models are ordered based on cold season RMSE (from the smallest to largest). The ensemble mean is shown beside for comparison.

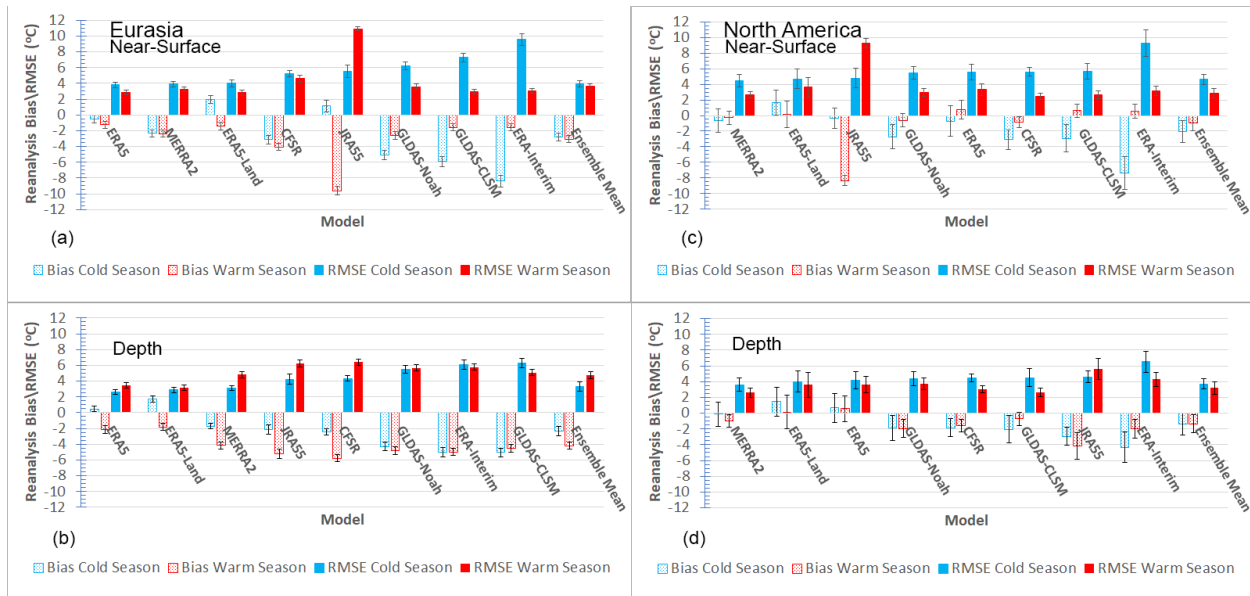


Figure S2. Bias (stippling) and Root Mean Square Error (RMSE) (solid colour) for the cold season (blue) $\leq 2^{\circ}\text{C}$ and the warm season (red) $> -2^{\circ}\text{C}$ over Eurasia and North America (left panels). Panels A and B display the bias and RMSE for the near surface (0cm - 30cm) layer, while panels C and D display the bias and RMSE at depth (30cm - 300cm). Models are ordered based on cold season RMSE (from the smallest to largest). The ensemble mean is shown beside for comparison. The 95% confidence intervals are included as error bars for reference.

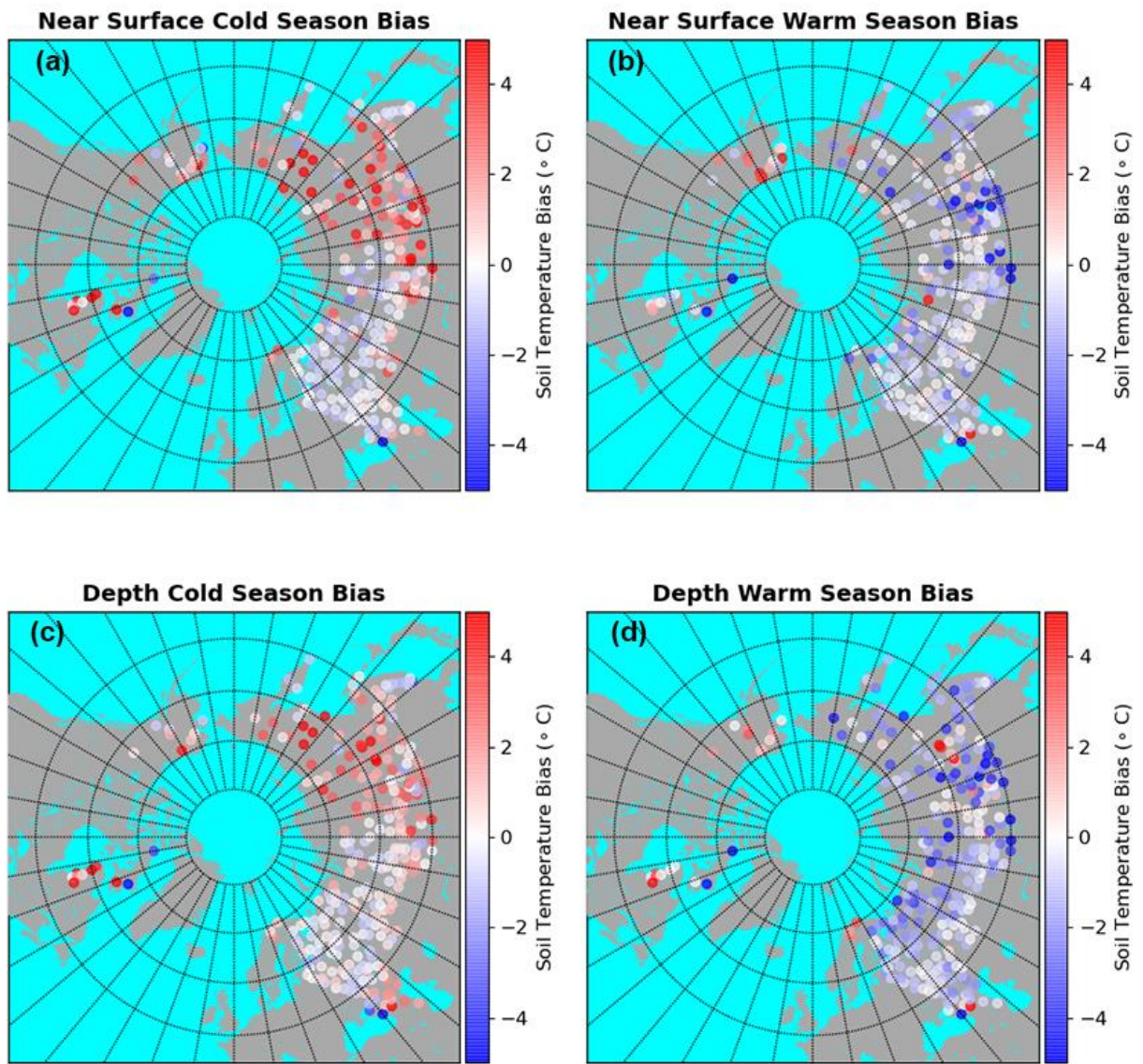


Figure S3. Spatial map of bias for ERA5-Land. Panels A and B show the near surface biases, while panels C and D show the biases at depth.