



Supplement of

A method for quantifying uncertainty in spatially interpolated meteorological data with application to daily maximum air temperature

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Supplement

- 5 Figures S1A-D show semi-variograms for days of year (DOY) 1, 91, 182, and 207, respectively. These are the same DOY for which Tmax and uncertainty maps are shown in Fig. 6 in the main manuscript. Binned empirical semi-variogram values are shown as black dots. Fitted theoretical pentaspherical models, which are used throughout the analysis, are shown as red lines. For comparison, fitted exponential models are shown as blue lines. The nugget values (the value of the semi-variogram as the distance between points approaches zero) for each fitted model is printed in the lower left of each plot. Note that the nugget
- 10 values do not have well-defined units associated with them, given that they are computed using the normal scored data. DOY 182 (Fig. S1C) was selected for the conditional Gaussian simulation (CGS) case study because it has the smallest nugget of the four days (i.e., the highest spatial correlation at short distances). Figure 8 in the main manuscript shows how conditioning a prediction using additional information (e.g., "new" measurements from a nearby station) to filter the CGS ensemble reduces prediction variance but does not necessarily improve the accuracy of point predictions. In the CGS case study, this occurred
- 15 because conditioning on information from station 2 "pulled" the estimate for station 1 too close to observation from station 2, which differed from the true value at station 1. For this particular example, the problem is exacerbated when using an exponential semi-variogram model because the nugget of the fitted model is smaller (implying stronger correlation), which forces the estimate even closer to the observation at station 2 and further away from the true value at station 1.



20 Figure S1: Empirical and theoretical semi-variograms for four different days. Panels A-D correspond to days of year 1, 91, 182, and 207, respectively. The semi-variograms are computed using detrended and normal scored data.