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## Supplemental Material

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The Use of Serially Complete Station Data to Improve the Temporal Continuity of Gridded  
Precipitation and Temperature Estimates  
<https://doi.org/10.1175/JHM-D-20-0313.1>

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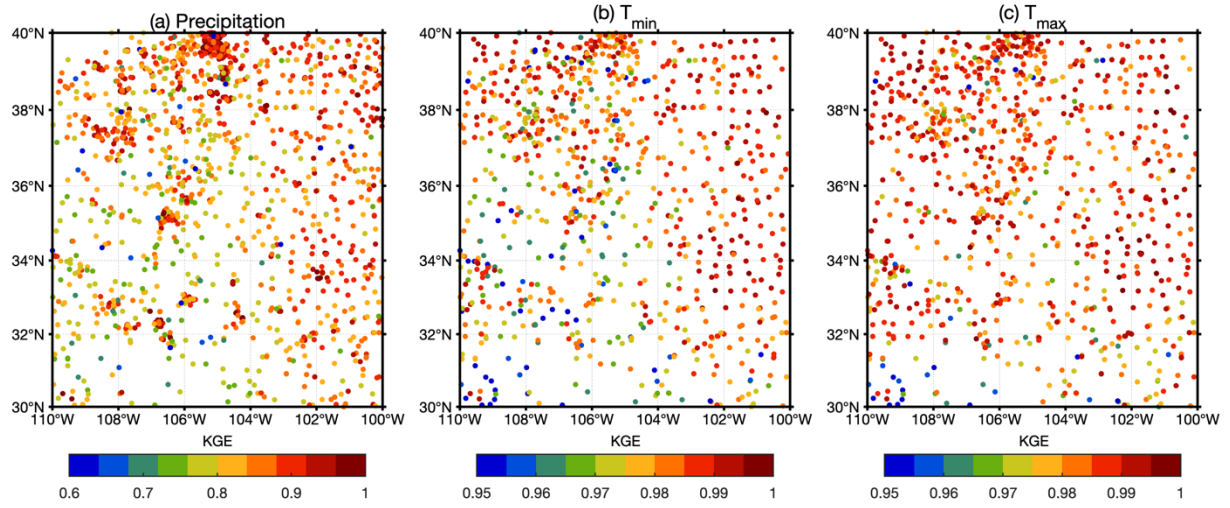


Figure S1. Spatial distributions of KGE' of SCDNA (a) precipitation, (b)  $T_{min}$ , and (c)  $T_{max}$  stations.

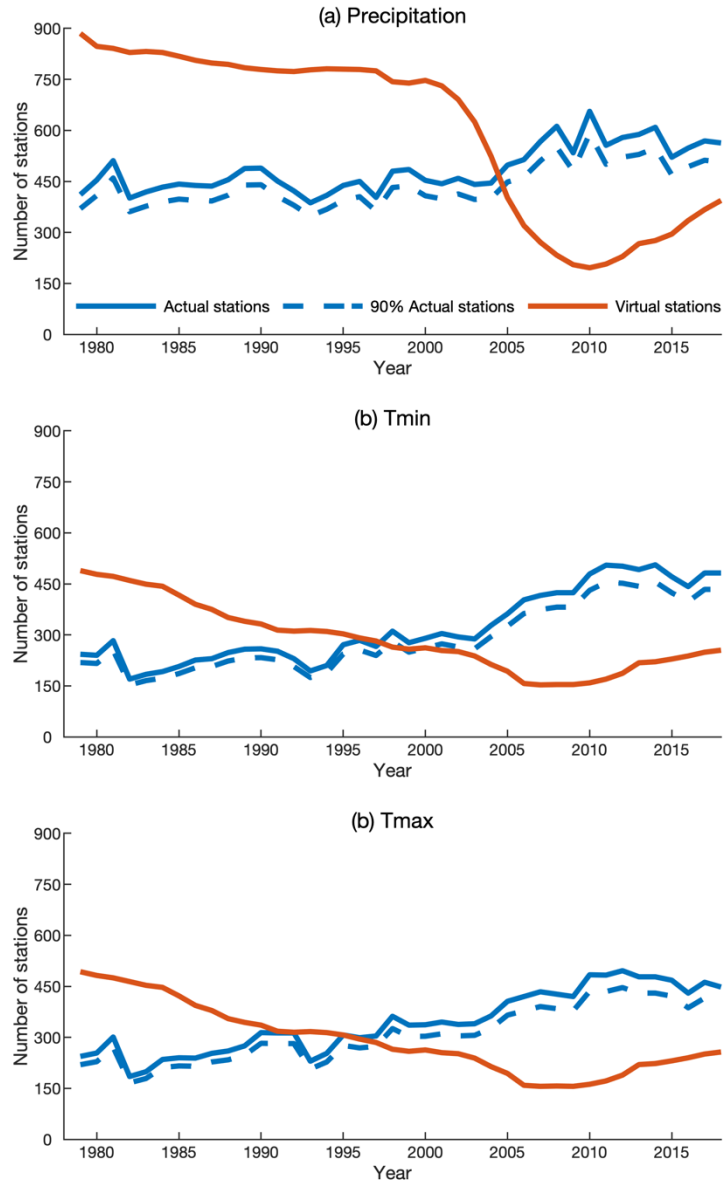


Figure S2. The numbers of actual and virtual stations from 1979 to 2018 for (a) precipitation, (b) Tmin, and (c) Tmax.

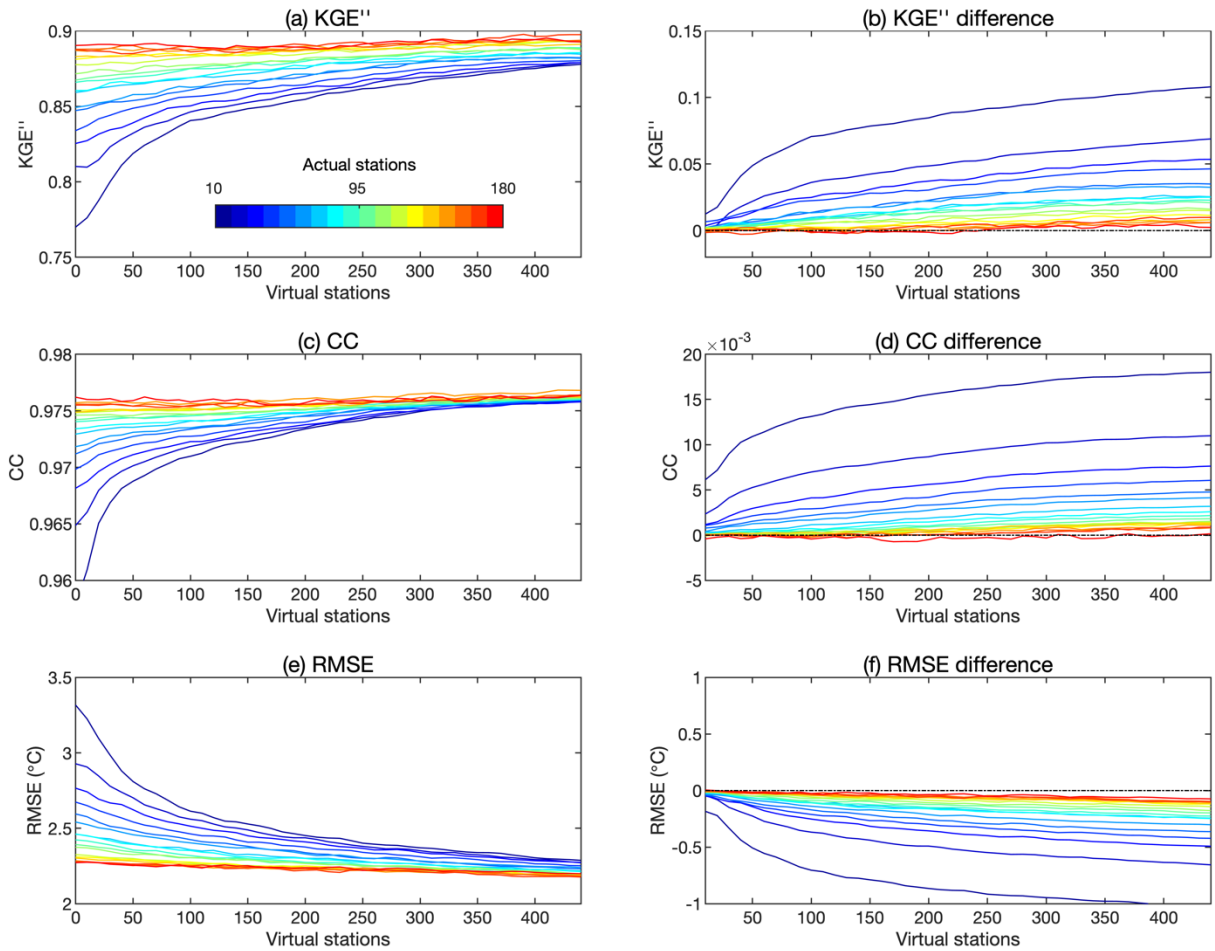


Figure S3. (a) KGE, (c) CC, and (e) RMSE of interpolated Tmin estimates in 1984 using IDW for different combinations of actual and virtual stations. (b), (d) and (f) are the metric differences between positive virtual stations and no virtual station.

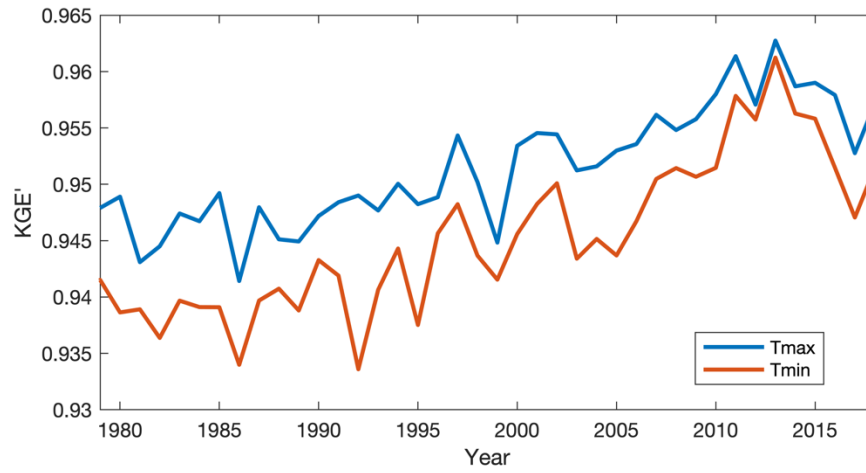


Figure S4. The KGE' of SCDNA Tmin and Tmax estimates for every year from 1979 to 2018 in the experimental area.

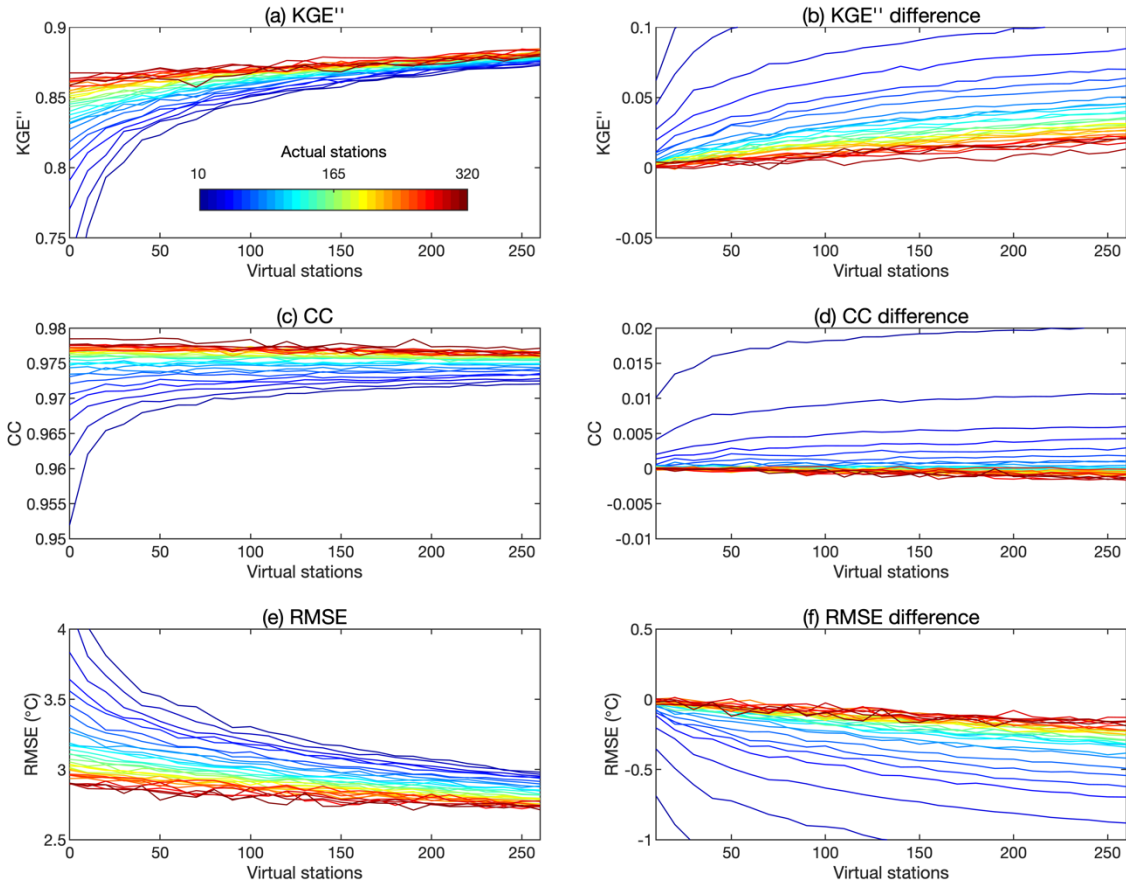


Figure S5. Same with Figure 5, but for a different year (2000).



Figure S6.  $KGE''$ , CC and RMSE for interpolated precipitation, Tmin and Tmax estimates from 1979 to 2018. Median values of all stations are used for every year. The interpolation method is IDW.

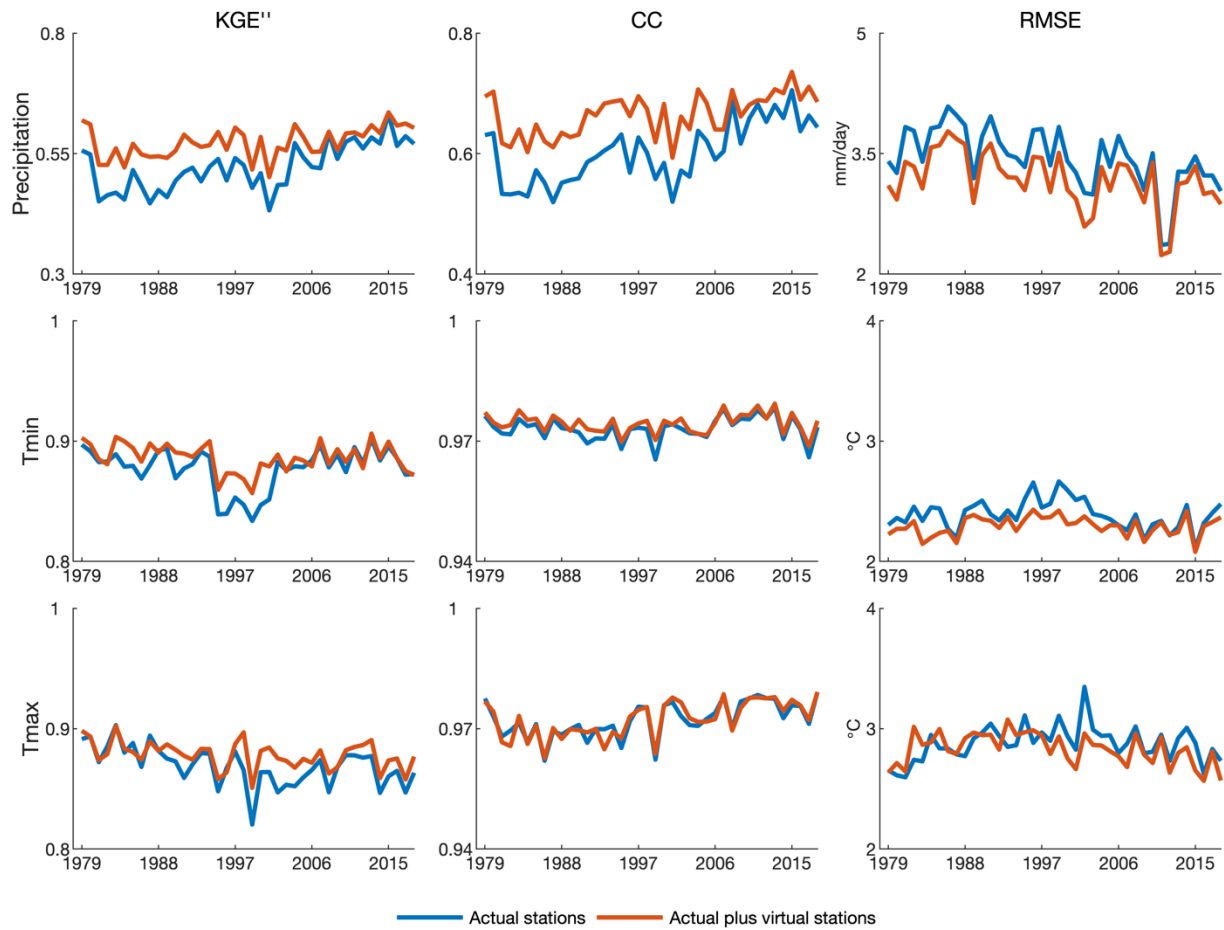


Figure S7. Same with Figure S6 but the interpolation method is bilinear.



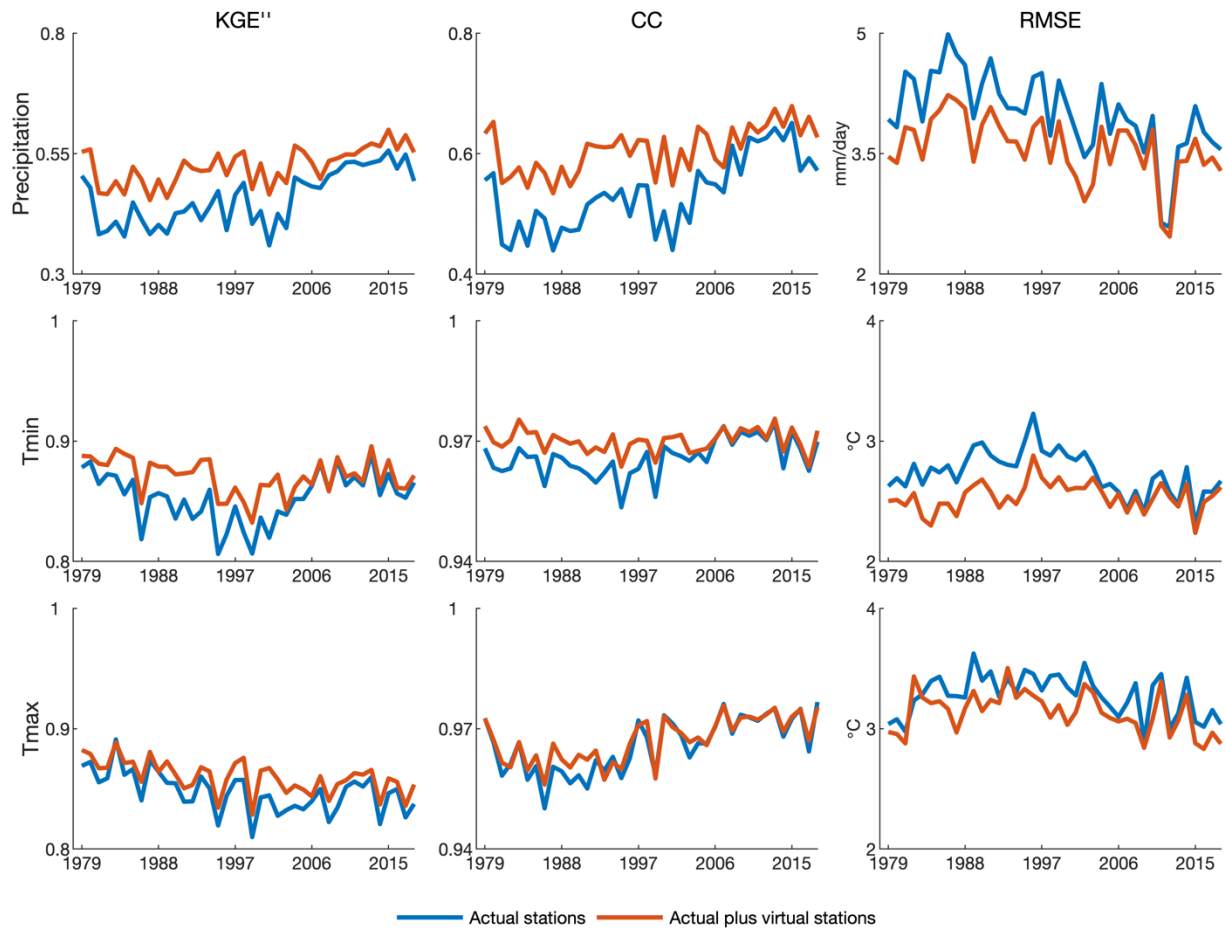


Figure S8. Same with Figure S6 but the interpolation method is nearest neighbor.

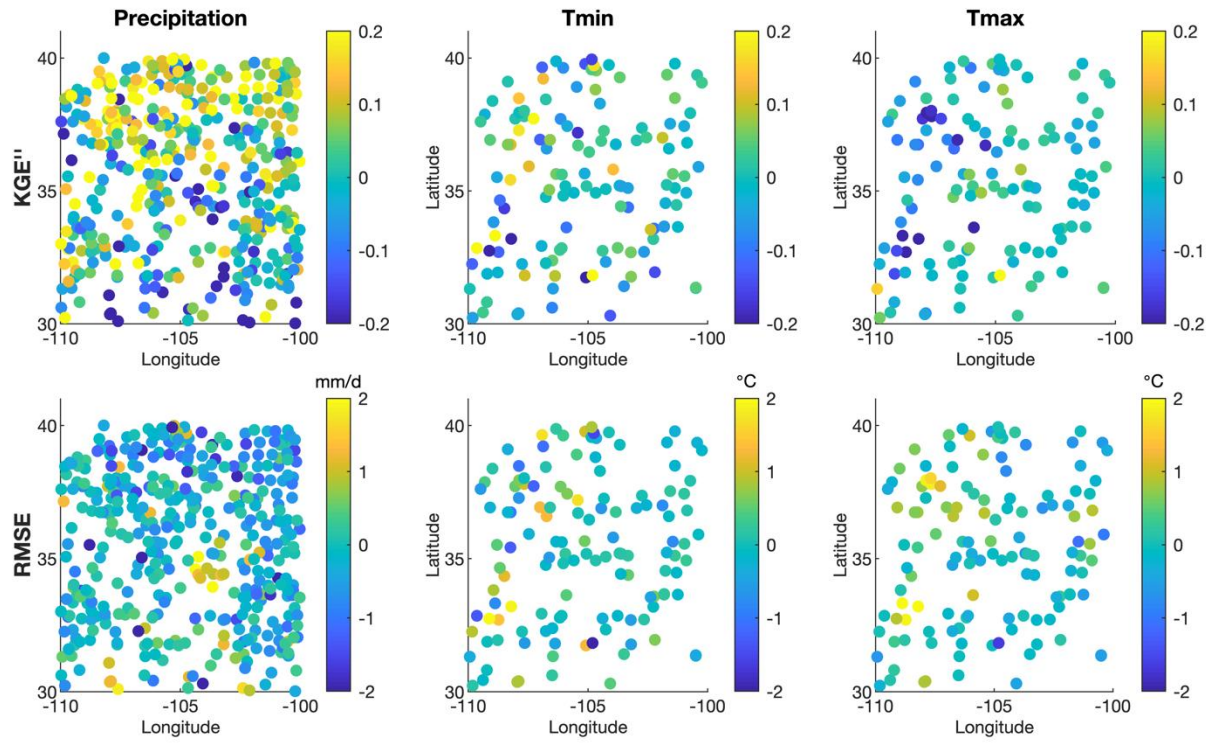


Figure S9. The differences of KGE'' and RMSE based interpolated precipitation and temperature estimates using virtual plus actual stations and only actual stations. The interpolation method is TIER and the period is 1984.

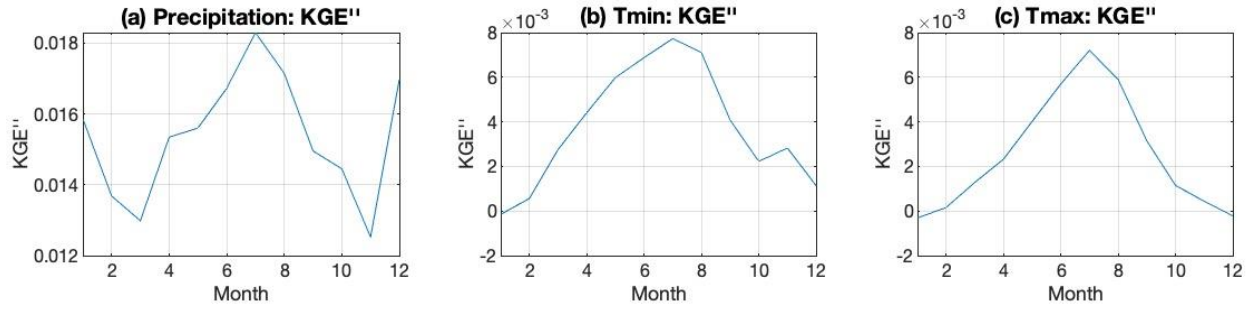


Figure S10. KGE'' difference between INT-SCDNA estimates and INT-OBS estimates by averaging daily metrics in Figure 9 from 1979 to 2018 for every month.

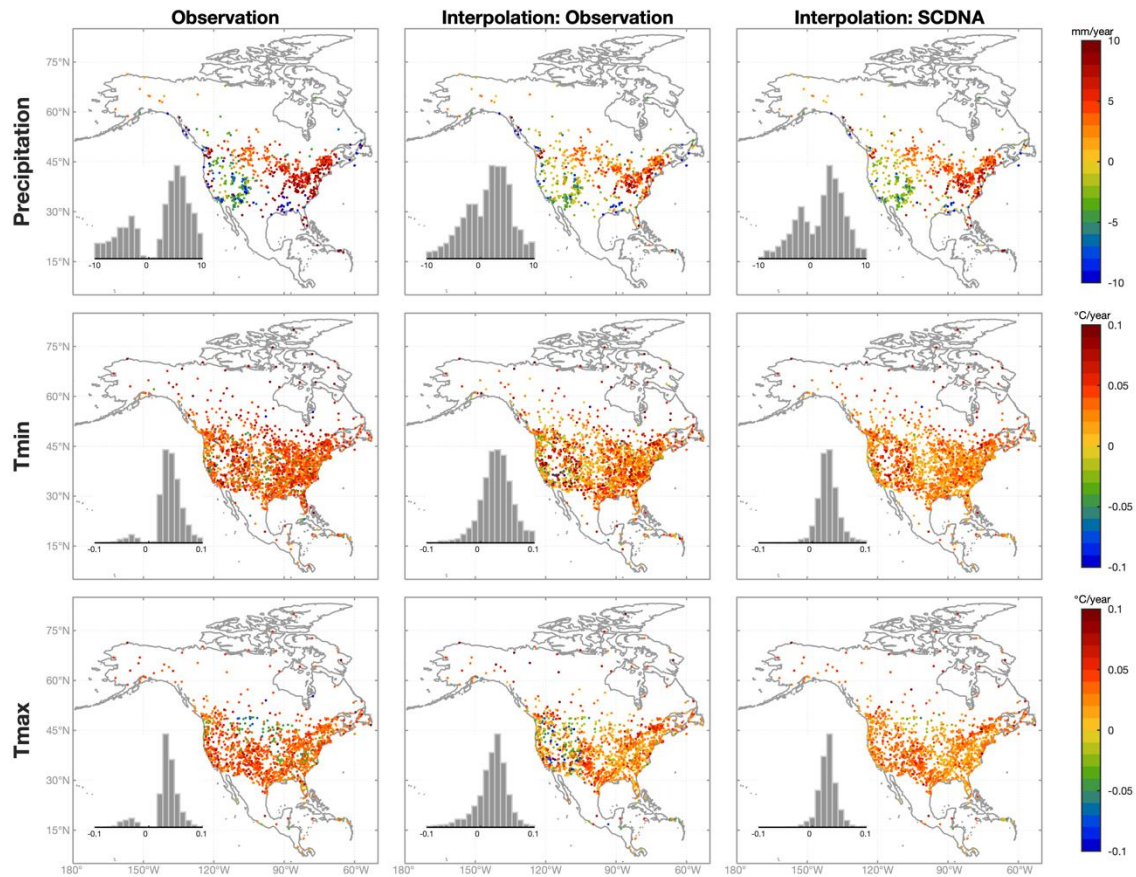


Figure S11. The distributions and histograms of linear trends based on station observations (at least 35 years, first column), interpolation based on observations (at least 20 years, second column), and interpolation based on SCDNA (third column). The interpolation method is IDW. Only stations that are significant at the 0.05 level (according to observations in the first column) are shown, which means many stations with trends close to zero are not included in this figure.