Evaluation of S2S Model Performance for Forecasting US Extreme Precipitation Events

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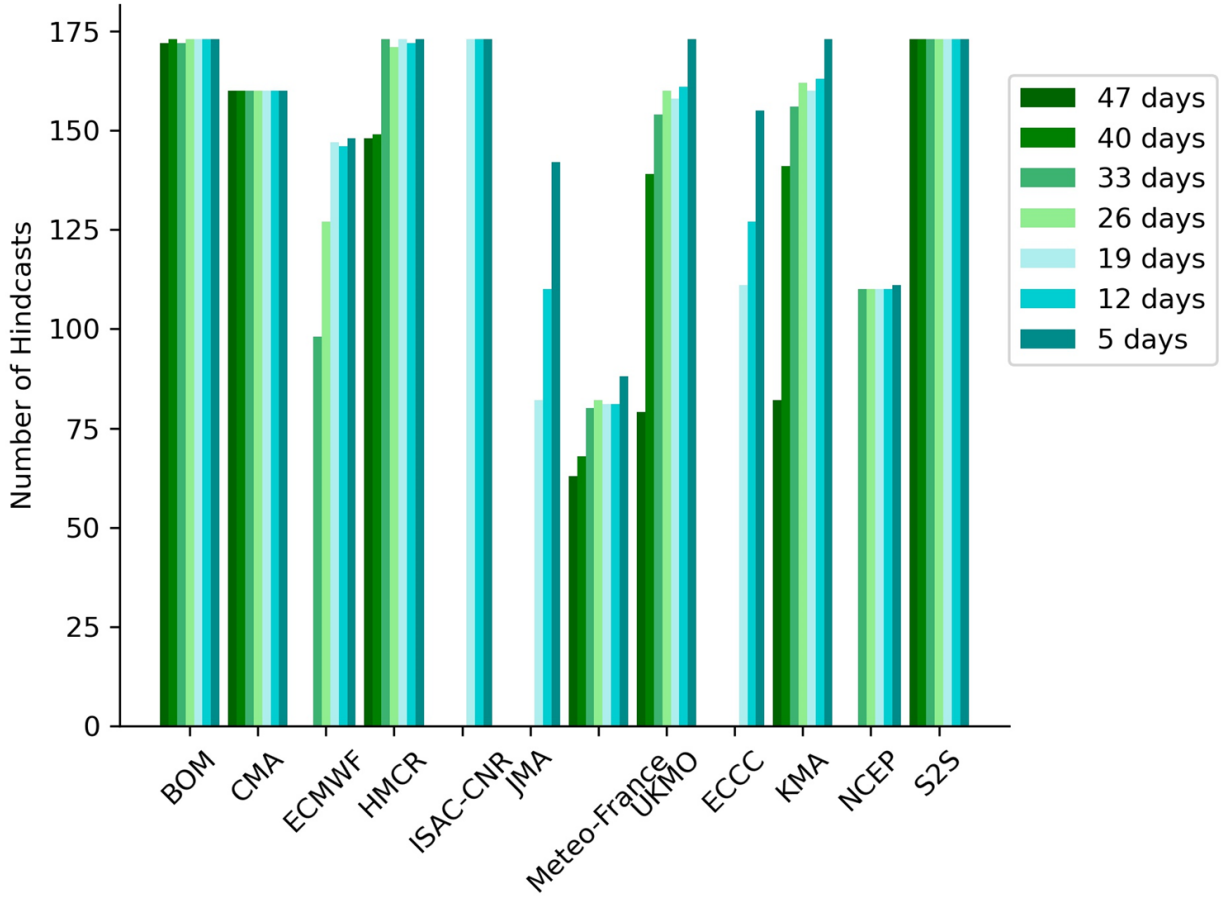
Extreme Events

- Extreme event database (Dickinson et al., 2021).
- Analyzed model performance across 173 events from 1993 to 2010.

Data and Methods

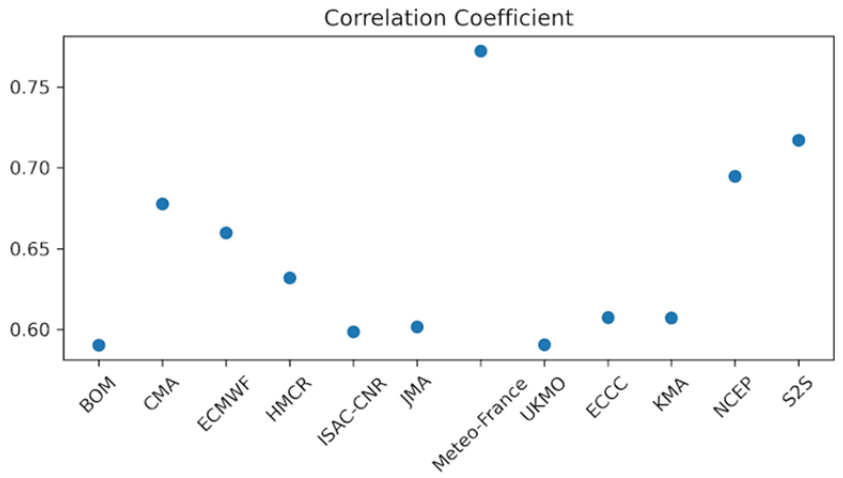
- Livneh
- S2S Prediction Project reforecast ensemble:
  - Pointwise linear regression
  - Lead times (+-4 days) from start of each event: 5, 12, 19, 26, 33, 40, and 47 days.

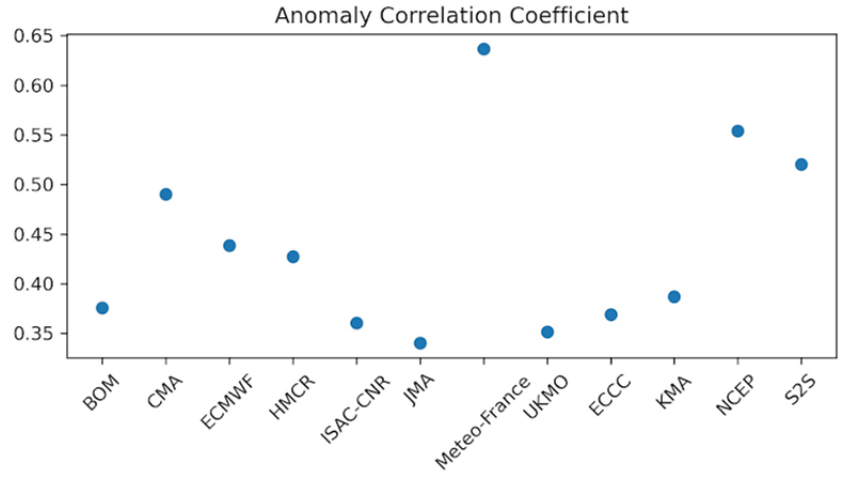


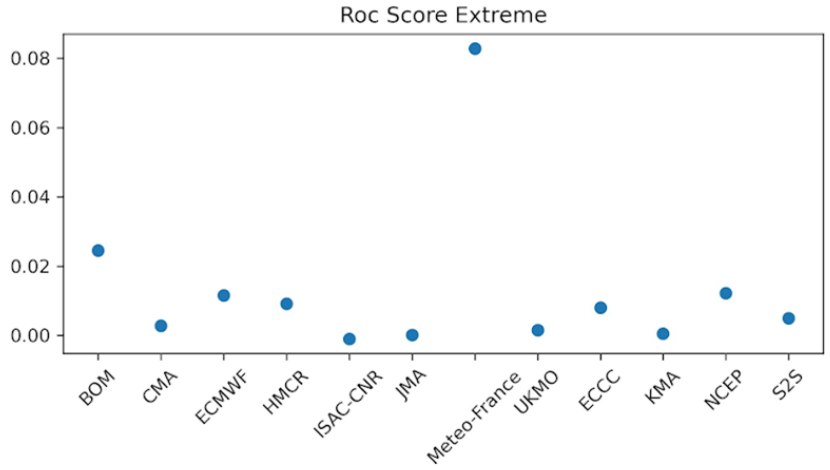
Number of analyzed hindcasts at each target lead time

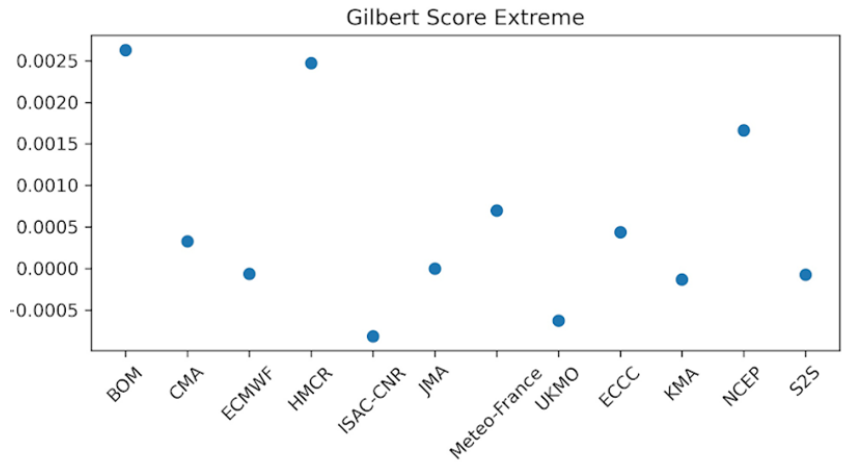
Model Comparisons

- Météo-France performed strongest, followed by ensemble-mean precip.
- Negligible skill in identifying extreme points across ensemble.



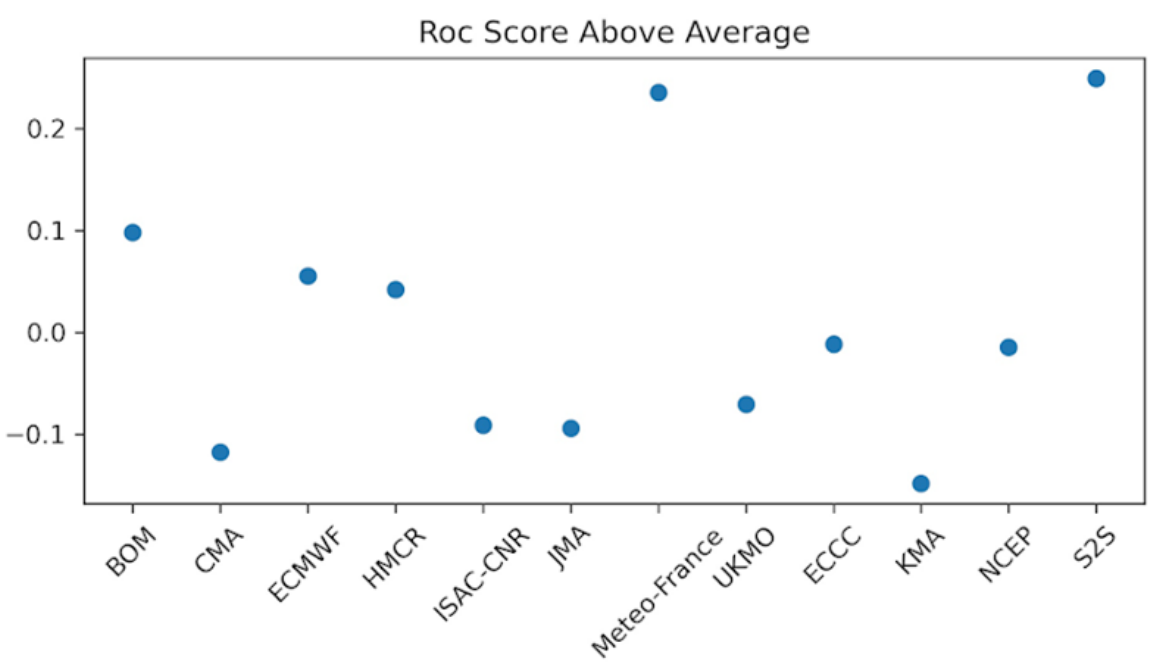


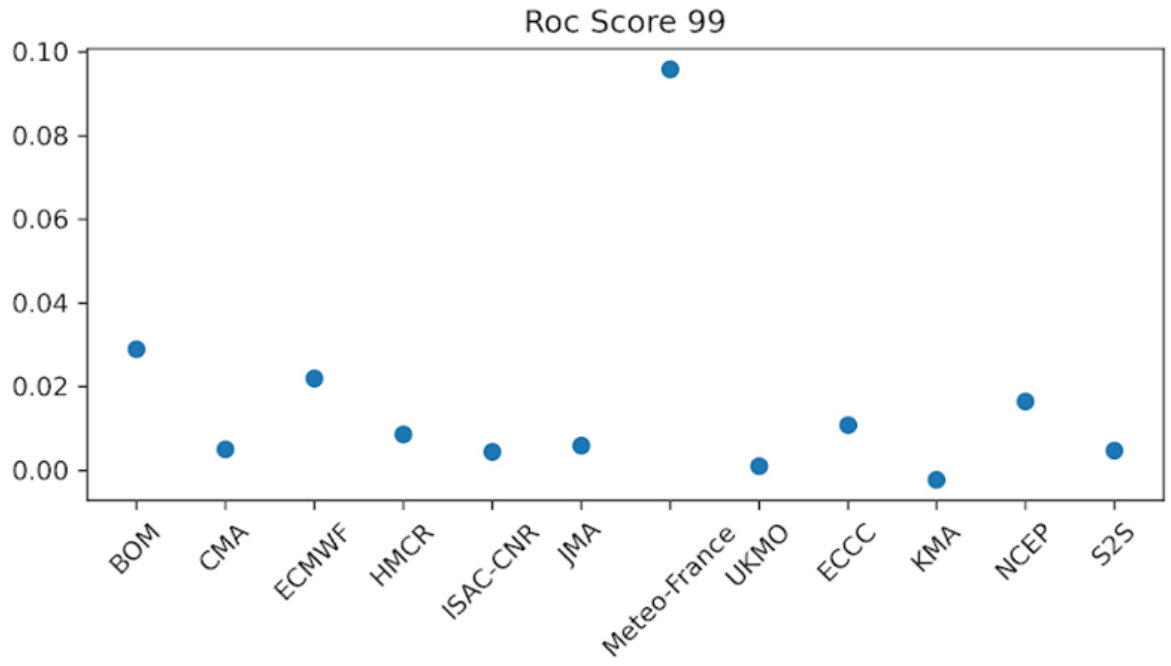




18.5-to-53.5-day-target-lead-time means

Model Comparisons

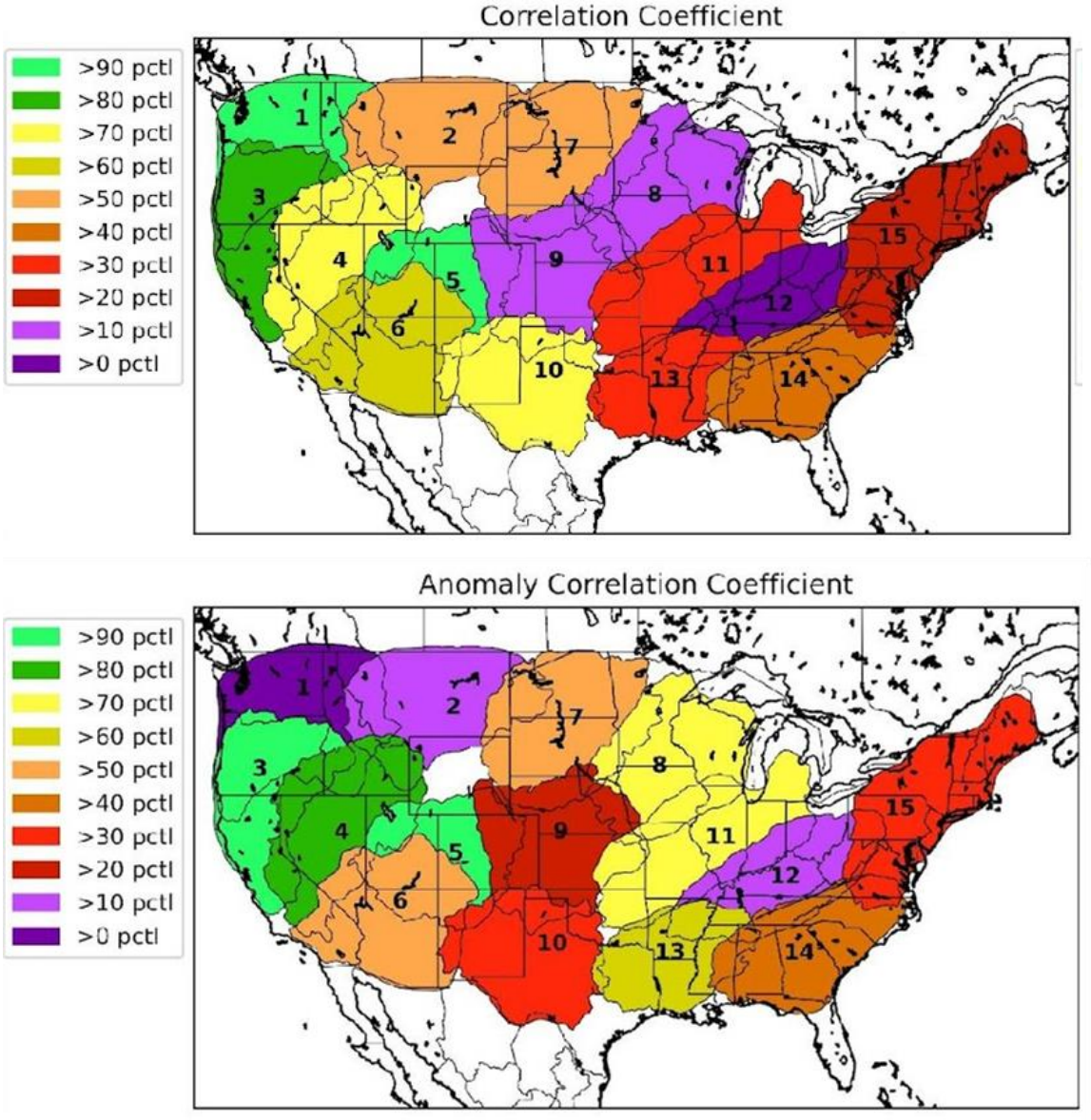




18.5-to-53.5-day-target-lead-time means

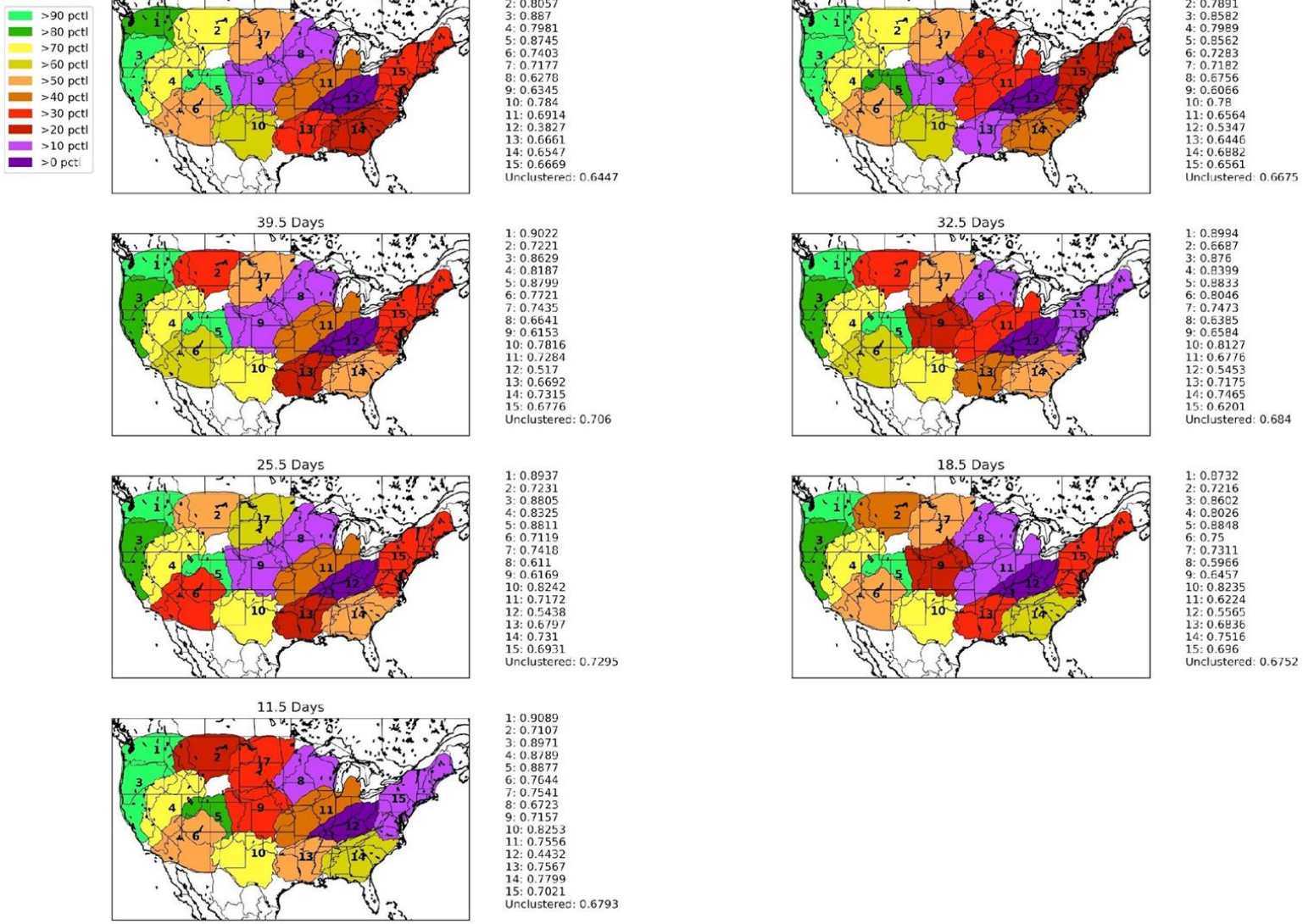
Spatial Skill Distribution

- Correlation and anomaly correlation coefficient strongest for West.
- No regional pattern in extreme point prediction skill.



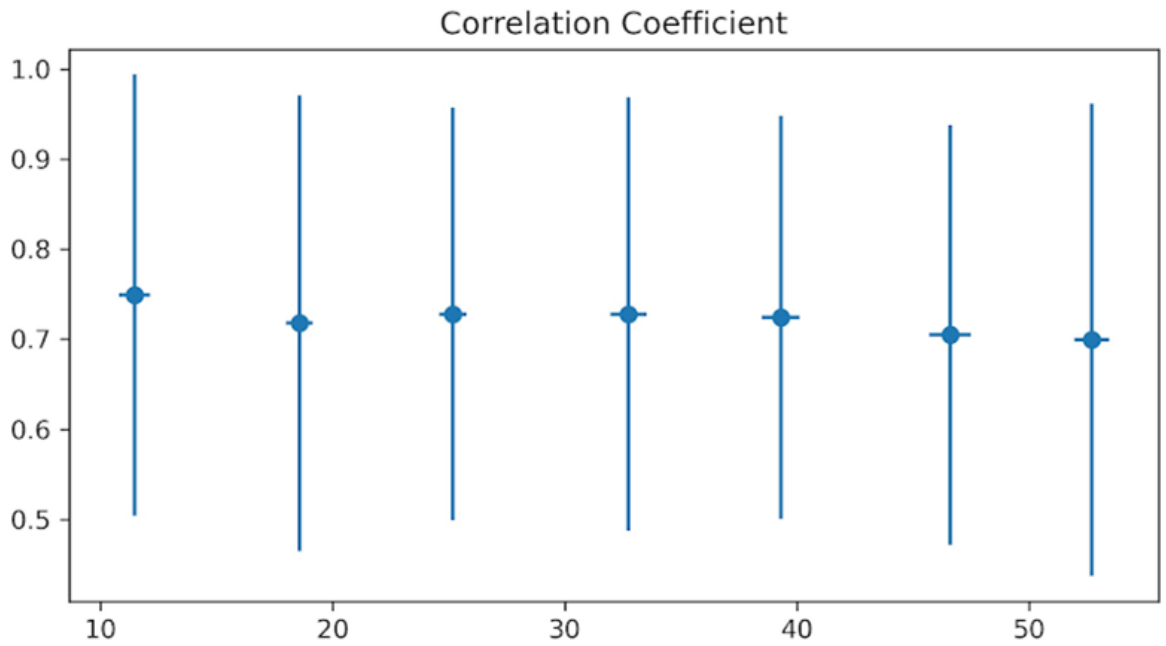
18.5-to-53.5-day-target-lead-time cluster means for ensemble-mean precip

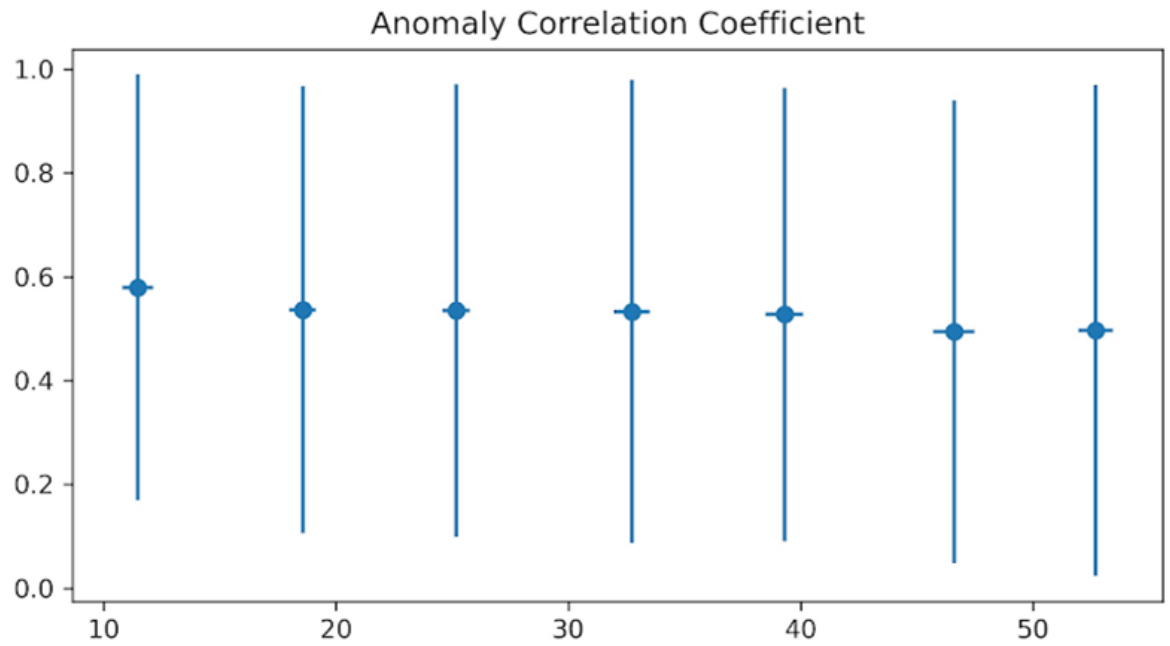
Spatial Skill Distribution



Cluster-averaged correlation coefficient for ensemble-mean precip

Lead Time Skill Distribution





Event-averaged correlation coefficient and anomaly correlation coefficient for ensemble-mean precip

Conclusions and Next Steps

- High correlation, particularly in western clusters.
- Insignificant skill in detecting extreme points.
- Quantile mapping post-processing.
- Wet vs. dry season.

References

Daly, C., Neilson, R. P., & Phillips, D. L. (1994). A Statistical-Topographic Model for Mapping Climatological Precipitation over Mountainous Terrain, *Journal of Applied Meteorology and Climatology*, *33*(2), 140-158.

Dickinson, Ty & Richman, Michael & Furtado, Jason. (2021). Subseasonal to Seasonal Extreme Precipitation Events in the Contiguous United States: Generation of a Database and Climatology. Journal of Climate. 34. 1-47. 10.1175/JCLI-D-20-0580.1

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