Supplemental Material

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A Data Assimilation Approach to Last Millennium Temperature Field Reconstruction Using a Limited High-Sensitivity Proxy Network
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Supplemental Information for 'A data assimilation approach to last millennium temperature field reconstruction using a limited high-sensitivity proxy network'

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TABLE S1. Pseudo-proxy localization radii and split-sample validation metrics. As in Table 2, but using climate model output as the target field.

Target	Prior	Localization Radius (km)	Correlation	RMSE (°C)	σ Ratio	Mean Bias (°C)
CESM	CESM	∞	0.73	0.18	0.76	0.02
CESM	MPI	∞	0.72	0.19	0.91	0.02
MPI	CESM	∞	0.74	0.21	0.62	0.09
MPI	MPI	∞	0.75	0.20	0.75	0.07

TABLE S2. Skill metrics for pseudo-proxy reconstructions of mean extratropical May-August time series. DA reconstructions use the realistic biased-model, noisy-proxy, time-attrition experimental design. PPR time series and target time series are calculated using only the grid cells for which RE>0 in each reconstructed time step.

Target Field	Reconstruction Method	Correlation	RMSE (°C)	σ Ratio	Mean Bias (°C)
CESM	DA, MPI Prior	0.67	0.20	0.84	-0.03
	PPR	0.68	0.25	0.96	0.03
MPI	DA, CESM Prior	0.74	0.41	0.66	0.35
	PPR	0.73	0.46	0.84	0.37

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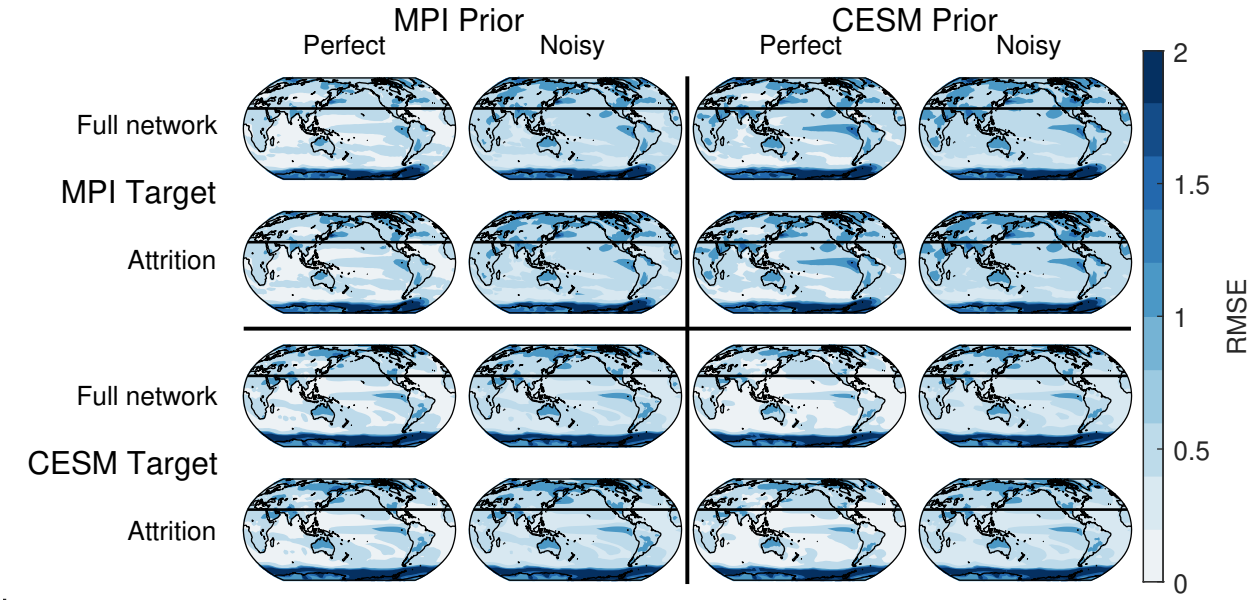

FIG. S1. As in Figure 2, but for RMSE (°C).

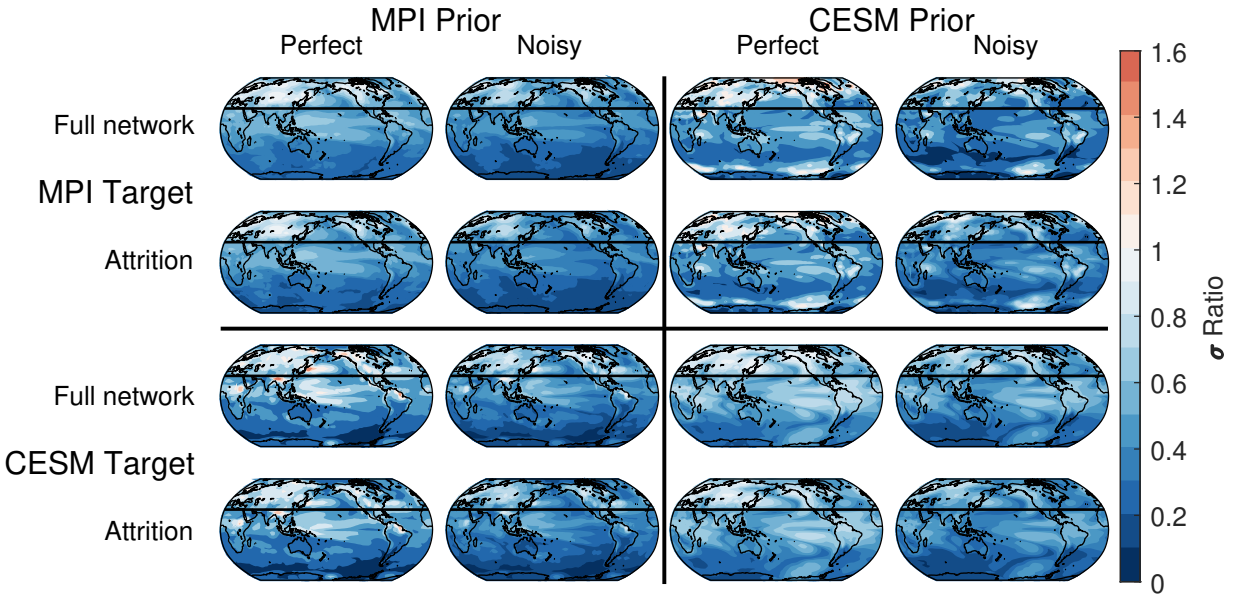

FIG. S2. As in Figure 2, but for σ ratios.

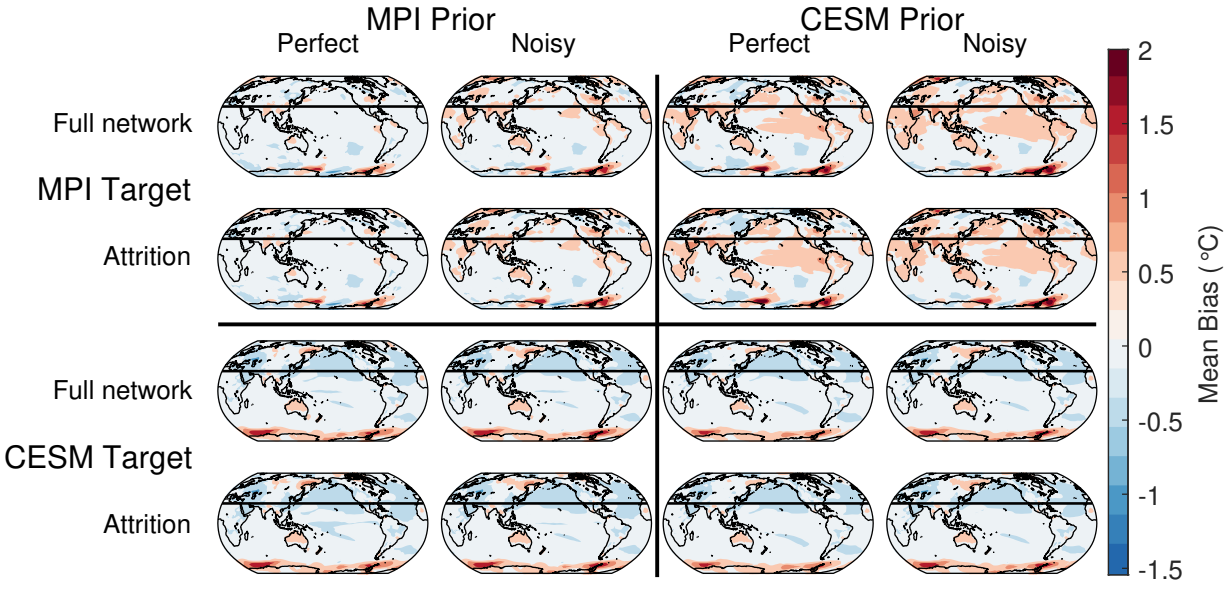

FIG. S3. As in Figure 2, but for mean biases (°C).

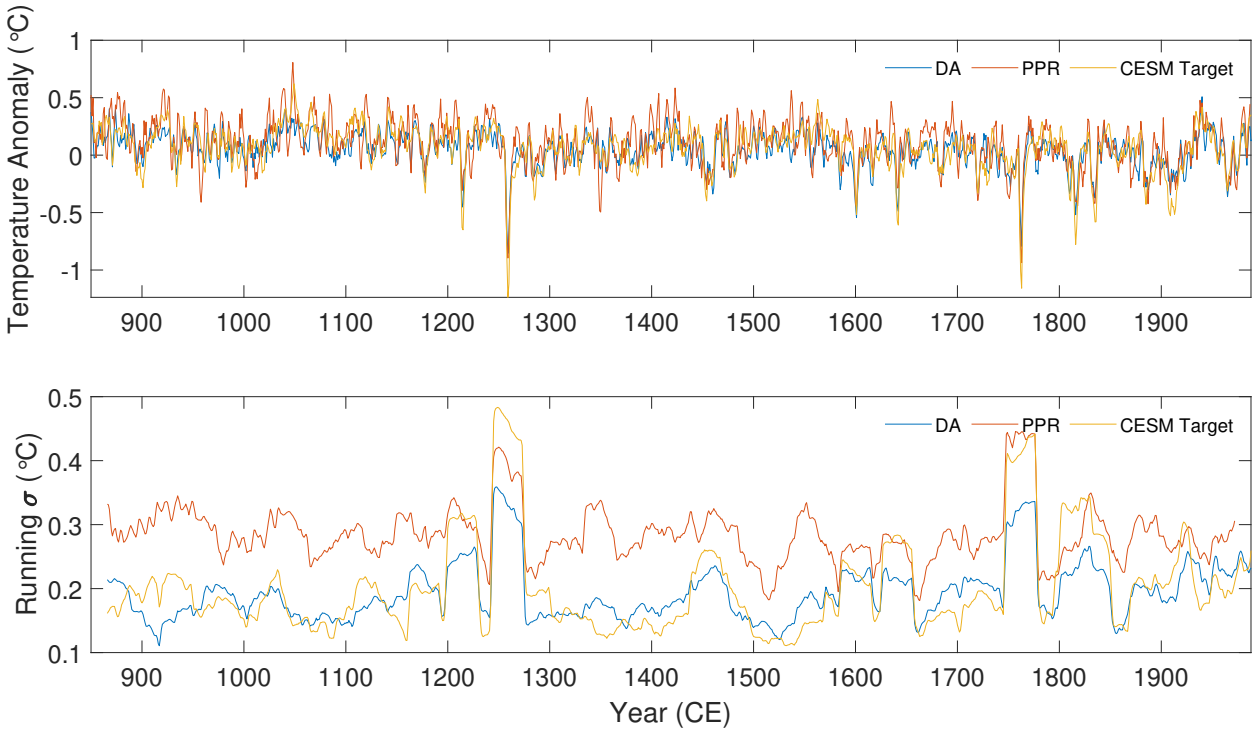

FIG. S4. Extratropical MJJA time series for the pseudo-proxy experiments with a CESM target. Reconstructed temperature anomalies are shown in Celsius (top) for the DA reconstruction (blue) and PPR reconstruction (red) along with the reconstruction target (yellow). The bottom panel displays a 31 year running standard deviation for each time series. A three year moving average has been applied to all time series.

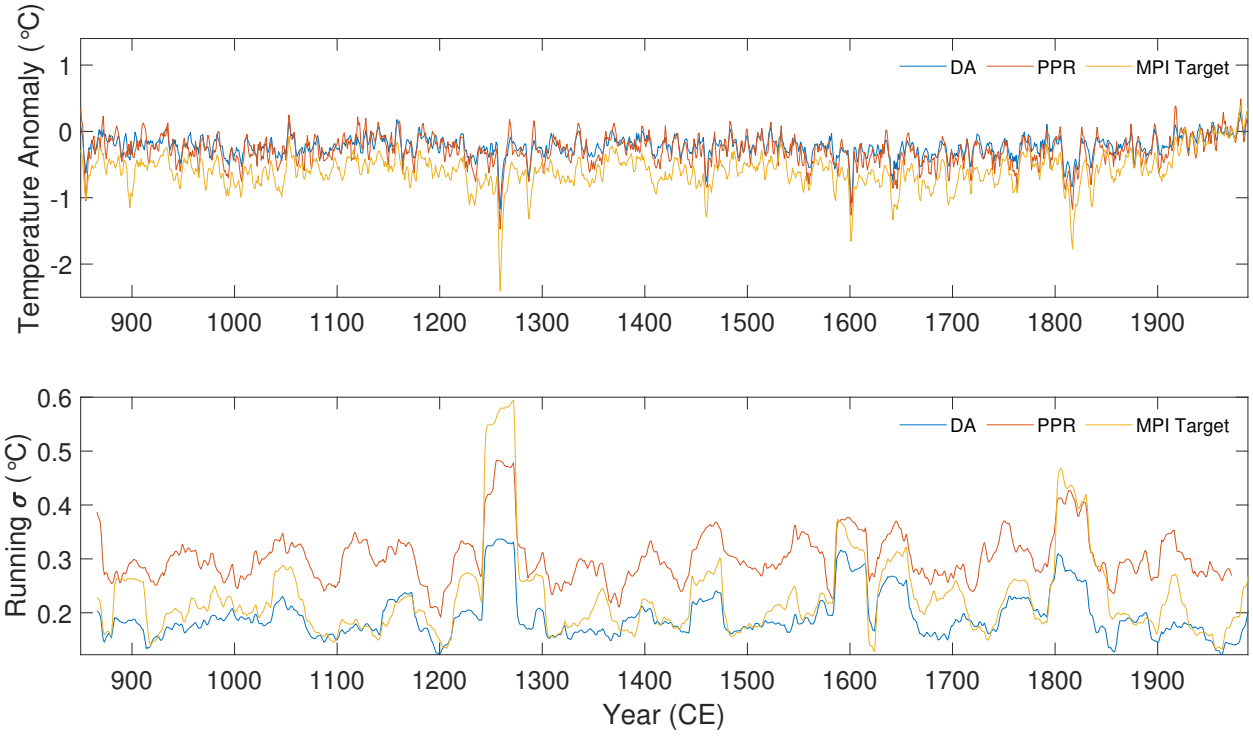

FIG. S5. As in Supplemental Figure 4, but for an MPI target.

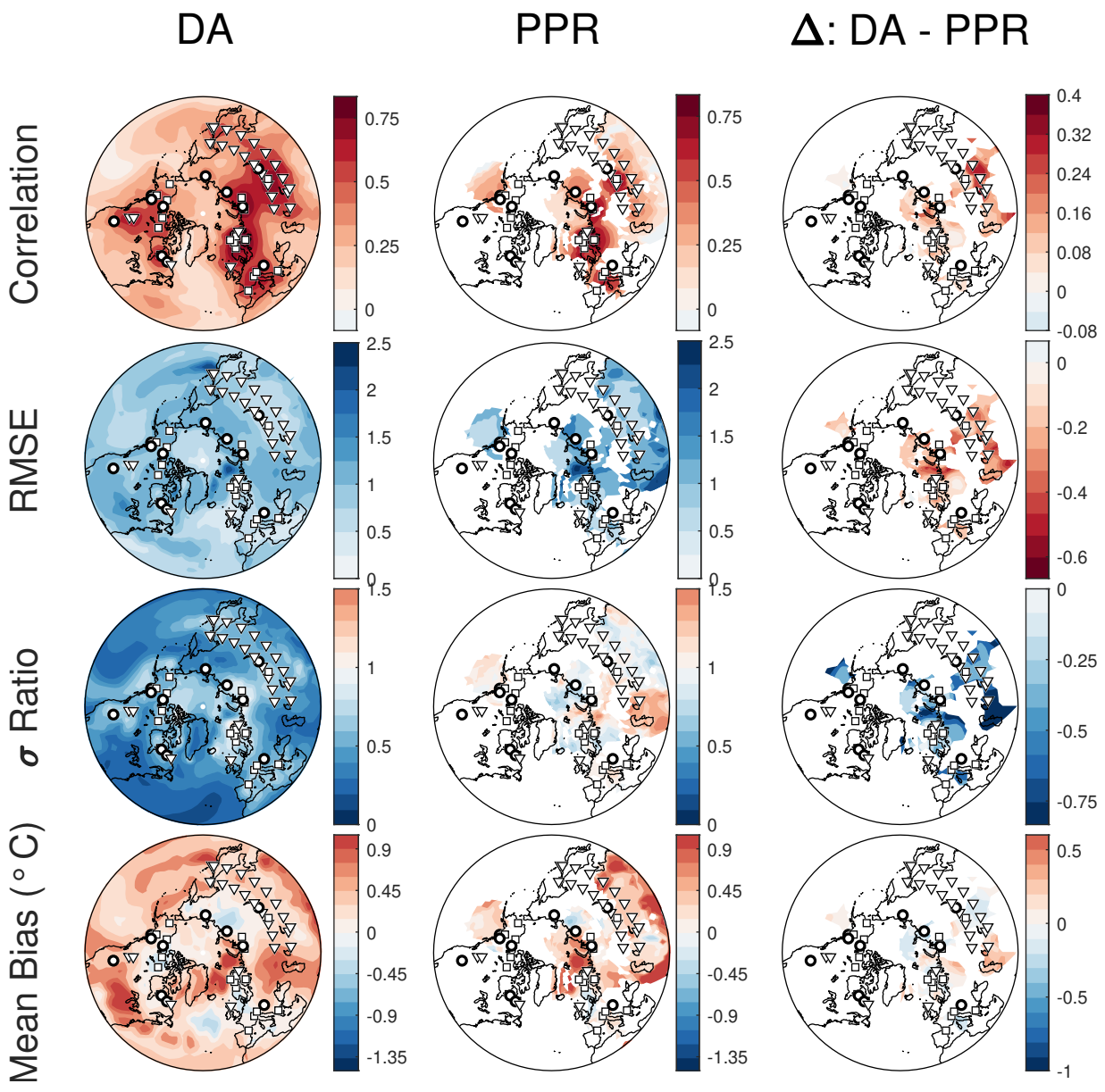

FIG. S6. As in Figure 3, but for a MPI target field. Here, the DA reconstructions use a CESM prior.

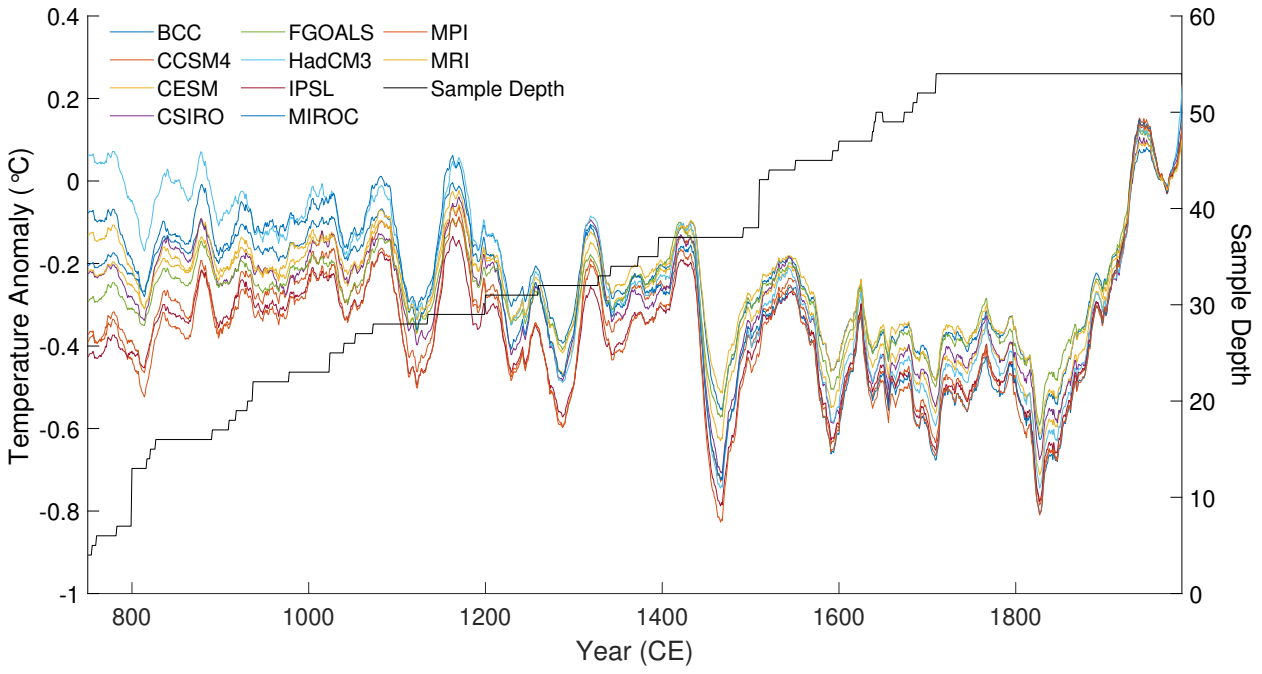

FIG. S7. Extratropical MJJA time series for the individual DA reconstructions. Each time series shows the results for a particular model prior. A 31 year moving average has been applied to each time series.