

I. Setting the stage

Lack of long instrumental records, uncertainty in reconstructions and insufficient skill in model simulations hamper our understanding of past precipitation changes.

We describe distributional properties for extended spring season (March, April, May, June, July, MAMJJ) precipitation in England and Wales since about CE1650 in two reconstructions (East Anglia, SW-England), the observational England-Wales data, a regional simulation (with CCLM, forced by Pre-PMIP3-GCM), and the PMIP3 multi-model ensemble.

Moving 51-year-window Weibull-distribution-fits to the various data sets highlight changes in the quantiles for severe and extreme dry or wet conditions and in the standard deviations.

II. Variability, Percentiles, Probabilities

Weibull standard deviations do generally lack commonalities among data sets (Fig. 1, top). Only observations and regional simulation are visually similar. Percentiles for dry (6.7%), average (50%) and wet (93.3%) conditions appear to evolve oppositely between the regional simulation and the reconstructions, but also possibly between observations and reconstructions (Fig. 1, middle row).

The PMIP3 data is all over the place (Fig. 2). Relative to a reference period centered on the year 1815, probabilities for certain precipitation amount vary hugely for the reconstructions (Fig. 1, bottom).

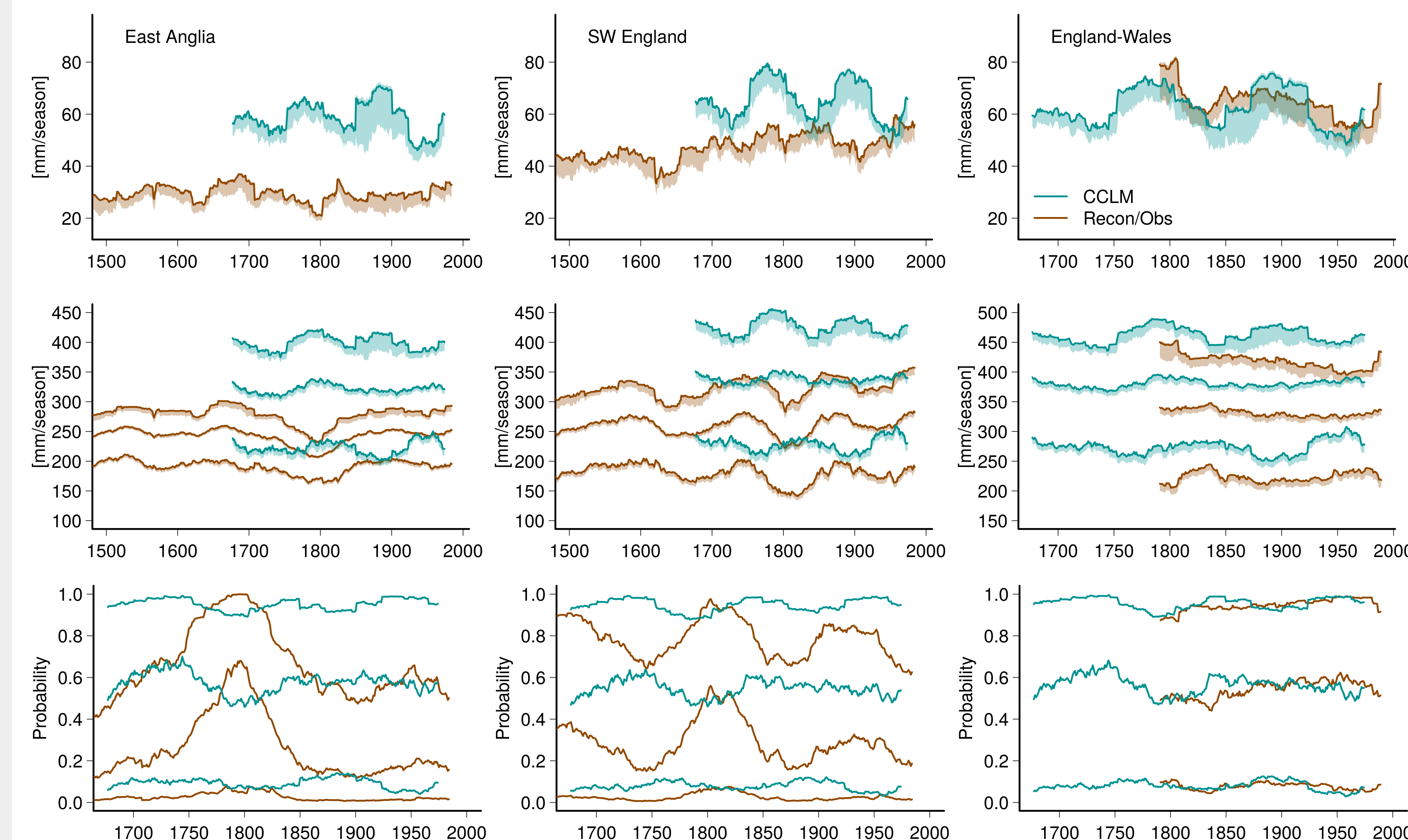
IV. Correlations

Moving correlations with running mean regional temperatures differ between reconstructions and observations (Fig. 3, top). Some properties seemingly have comparable temperature-correlations between regional simulation and observation.

V. Conclusions

Reconstructed distributions **shift as a whole**. Regionally simulated and observed ones **change shape**. Regional simulation and reconstructions show **opposite** behavior. Observations and reconstructions **differ** in their relation to regional temperature. Regional simulated and observed data **agree** to some extent.

Figure 1: Reconstruction, observation, RCM

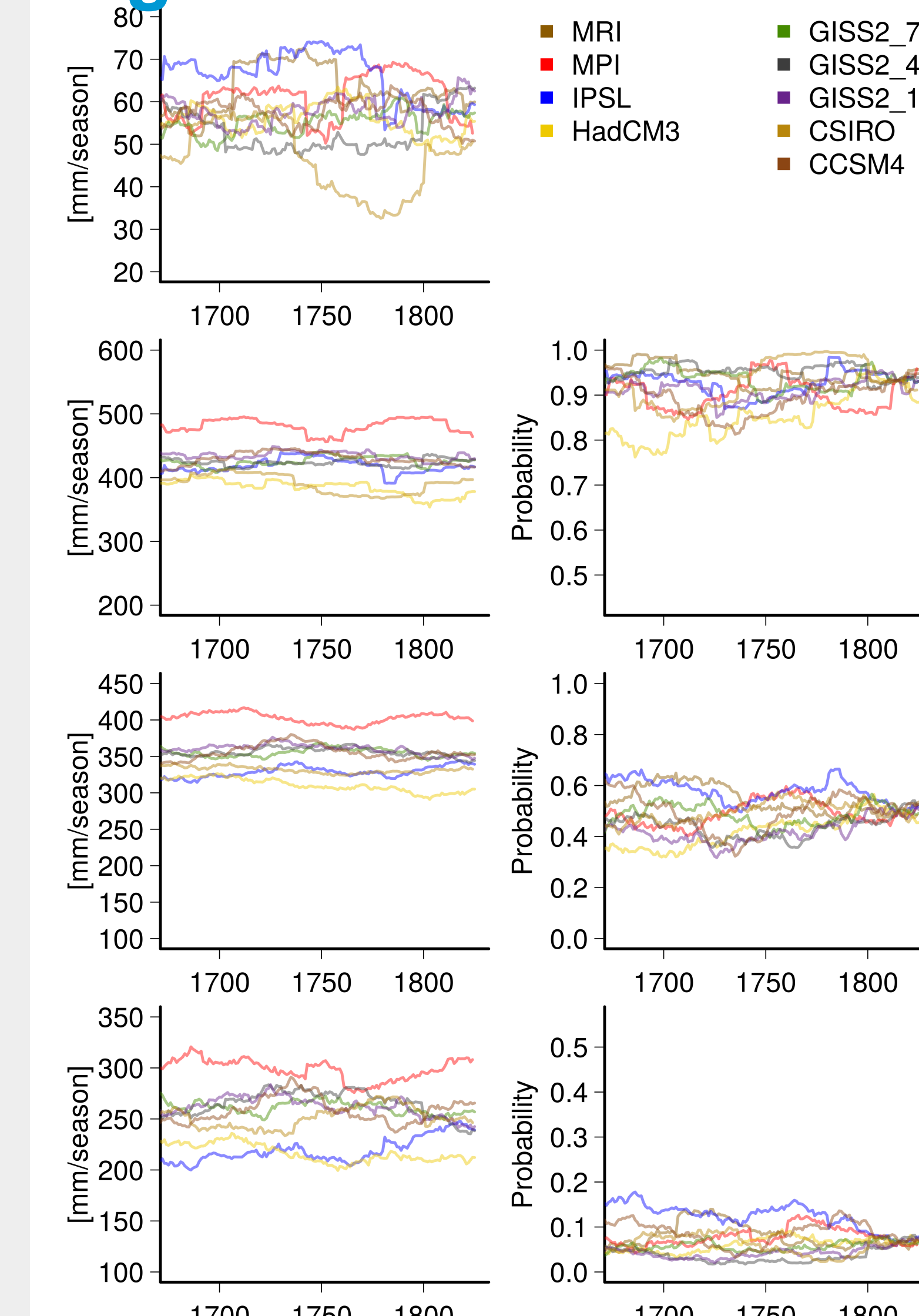


Top: Weibull Standard deviations and sampling variability estimates

Middle: Precipitation amounts for 6.7, 50 and 93.3 percentiles and sampling variability estimates

Bottom: Probabilities in reference to year 1815 6.7, 50 and 93.3 percentile precipitation amounts

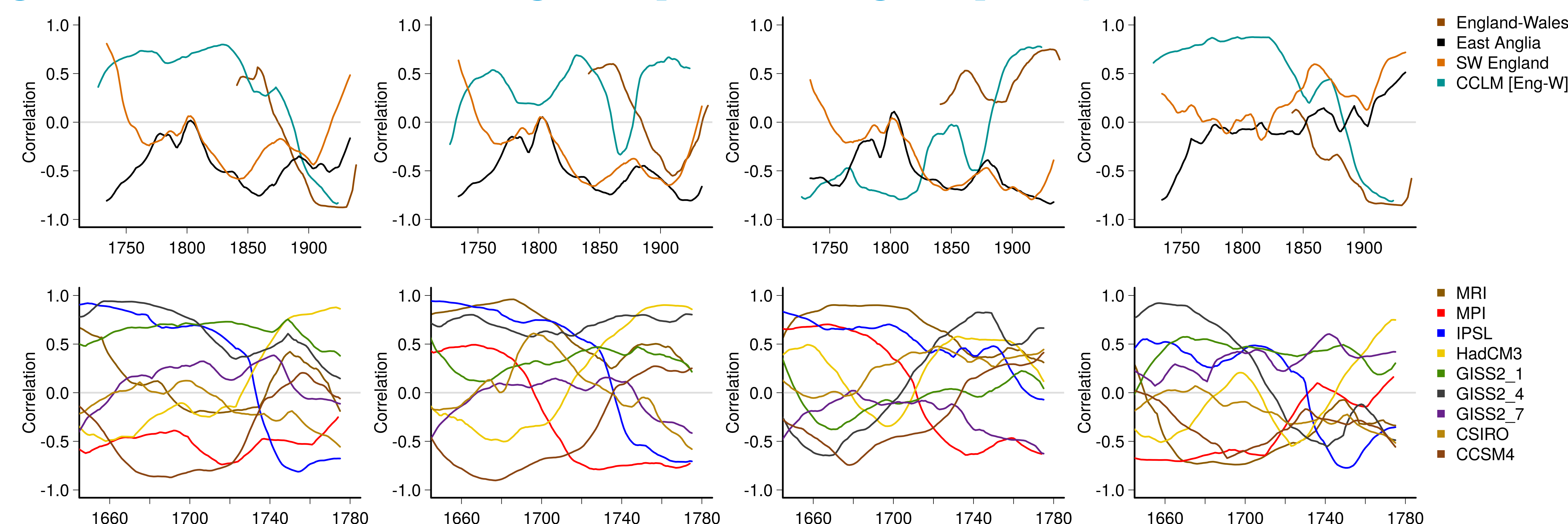
Figure 2: Sim. ensemble



Left, from top: SD, 93.3, 50, 6.7 percentiles.

Right, from top: Probabilities in reference to CE1815 for 93.3, 50, 6.7 percentiles

Figure 3: Correlations with regional [Central-England] Temperature



Top: Reconstructions, observations and regional simulation. Bottom: PMIP3 ensemble. From left, 101 year moving correlations between 51 yr mean Central England temperature and moving 93.3, 50, 6.7 percentiles and standard deviation of precipitation.