Figure S1. Monthly skill of the exp_R experiment from October to March. The correlation differences and RE values of the precipitation, temperature and sea-level pressure reconstructions are shown.
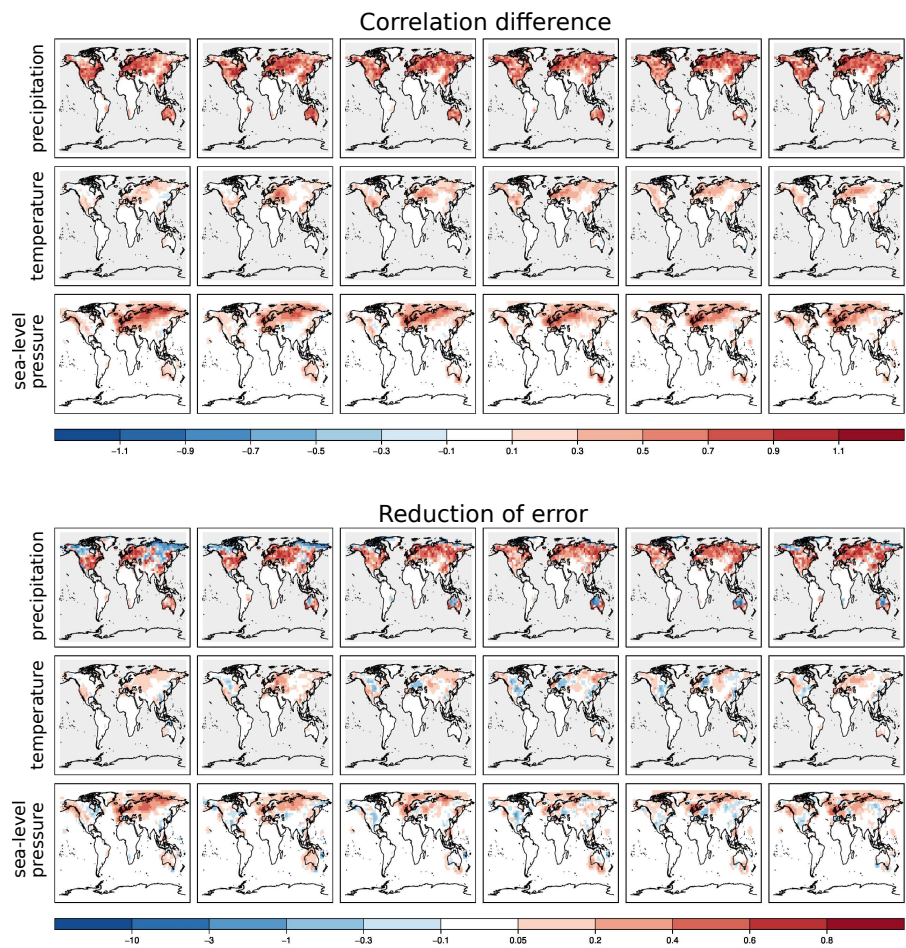
Figure S2. Monthly skill of the exp_R experiment from April to September. The correlation differences and RE values of the precipitation, temperature and sea-level pressure reconstructions are shown.
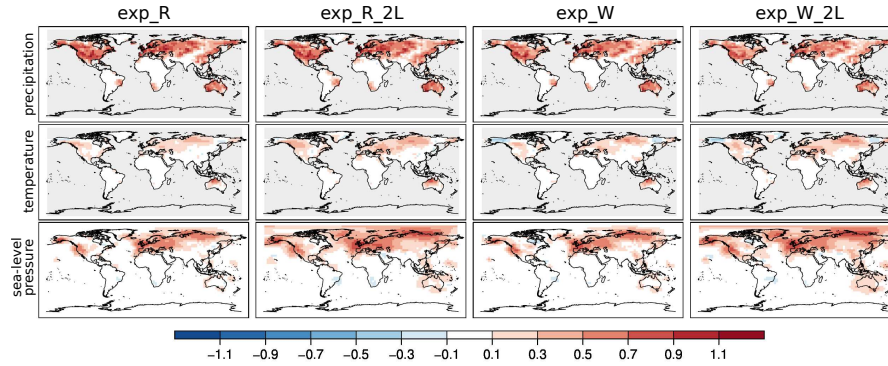
Figure S3. Winter season correlation differences of precipitation, of temperature, and of sea-level pressure between the analyses and the CCC400 model simulation ensemble means by assimilating only precipitation amounts, only precipitation amounts with doubled localization length scale parameter, only number of wet days, and only number of wet days with doubled localization length scale parameter.
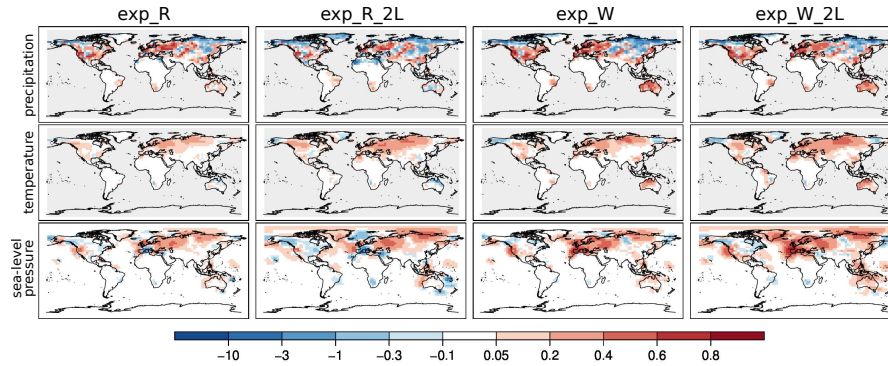
Figure S4. Winter season RE values of precipitation, of temperature , and of sea-level pressure by assimilating only precipitation amounts, only precipitation amounts with doubled localization length scale parameter, only number of wet days, and only number of wet days with doubled localization length scale parameter.
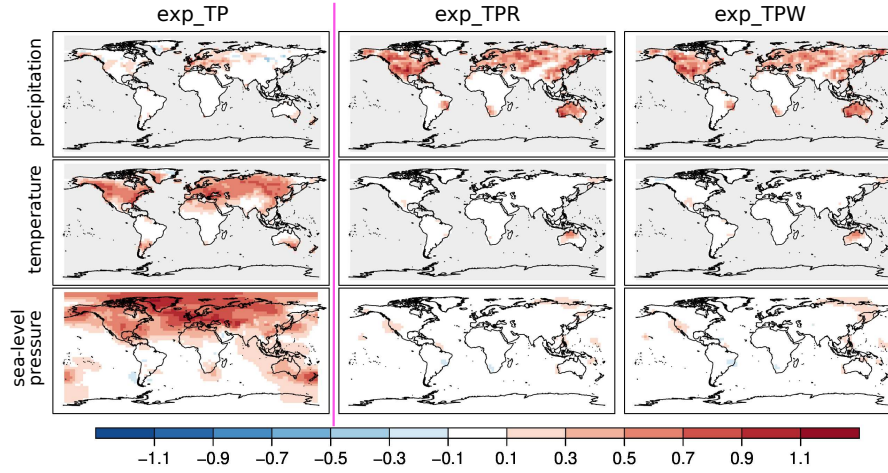
Figure S5. Winter season correlation differences between the analysis of exp_TP and the CCC400 model simulation ensemble means. In the middle column the correlation differences between the analyses ensemble mean of the exp_TPR and exp_TP are shown; while in the right column the correlation differences between the exp_TPR and exp_TP analyses ensemble mean are depicted.
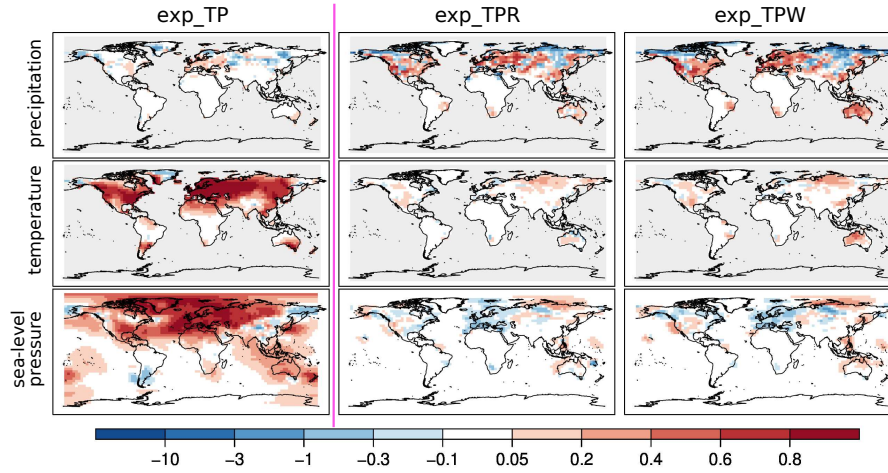
Figure S6. Winter season RE values of exp_TP, exp_TPR and exp_TPW. x^f is the ensemble mean of the CCC400 model simulations when the RE values calculated for the exp_TP experiment, while x^f was replaced with the analysis mean of the exp_TP for the other two experiments.
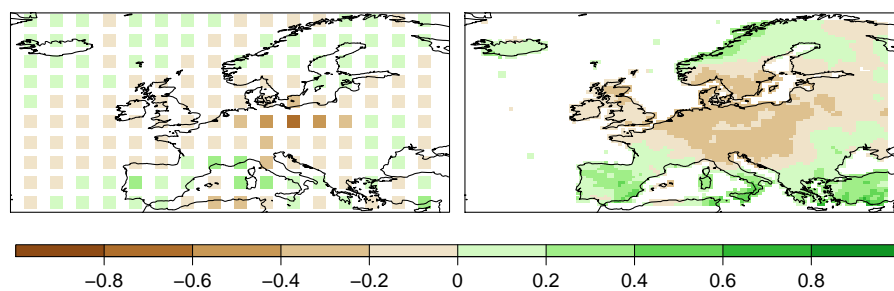
Figure S7. Relative precipitation anomaly over Europe in June–July–August, in exp_R (left) and the reconstruction made by Pauling et al. (2006) (right).