SUPPLEMENTARY INFORMATION

Reduction of uncertainty in near-term climate forecast by combining observations and decadal predictions

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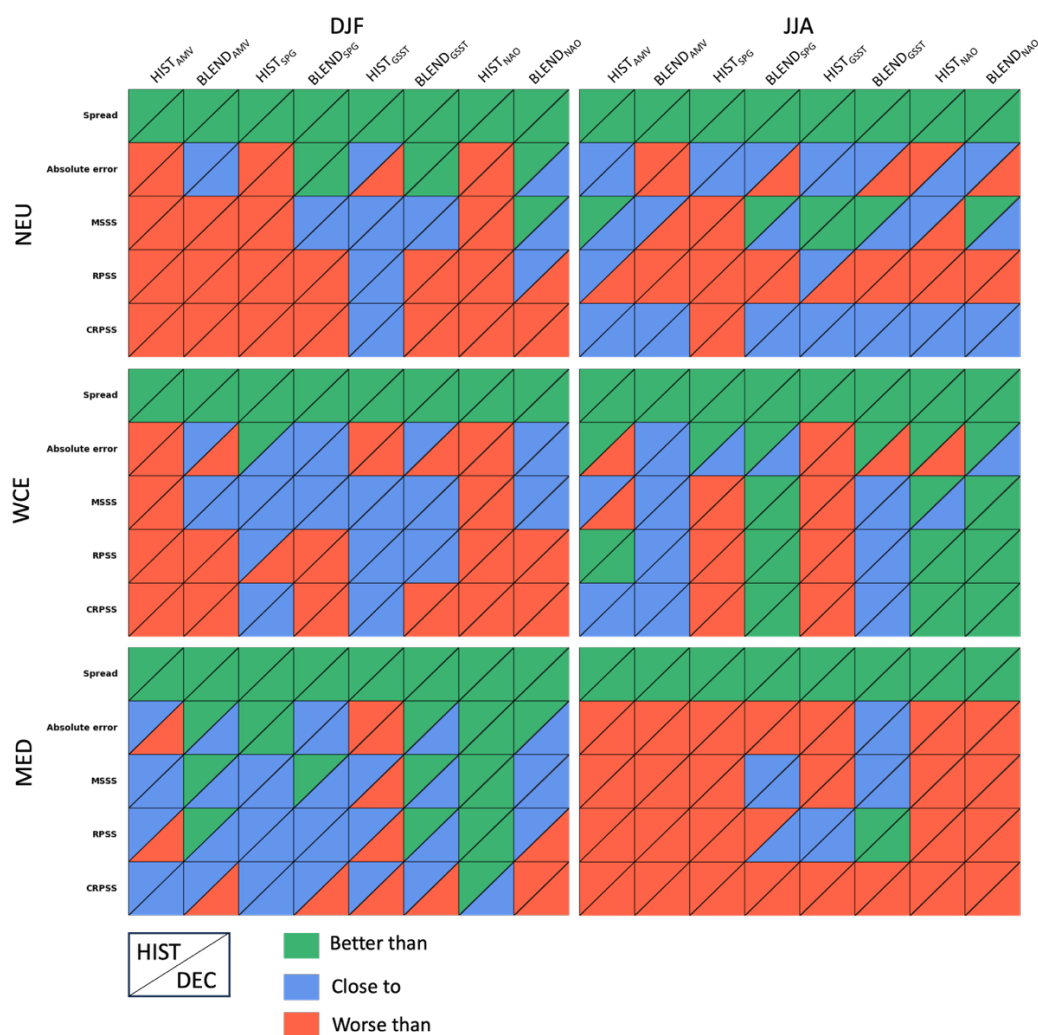
Additional Supplementary Figures S1 to S4

Figure S1: Summary of the scores used for the evaluation to assess 5yr temperature forecasts of HIST_OBS and BLEND_OBS for NEU (top row), WCE (middle row) and MED (bottom row) in DJF (left column) and JJA (right column). Each rectangle shows the assessment for one score of one subset derived from the method against HIST (top left triangle) and DEC (bottom right triangle). In green, the subsets are better than HIST or DEC; for the spread and the absolute error: BLEND 75th percentile < HIST or DEC 75th and 50th percentile; for MSSS, RPSS and CRPSS: BLEND > (HIST or DEC)+0.05. In blue, the subsets are close to HIST or DEC; for the spread and the absolute error: BLEND 50th percentile < HIST or DEC 50th percentile or BLEND 75th percentile < HIST or DEC 75th percentile; for MSSS, RPSS and CRPSS: (HIST or DEC)-0.05 < BLEND < (HIST or DEC)+0.05. In red, the subsets are worse than HIST or DEC; for the spread and the absolute error: BLEND 75th percentile > HIST or DEC 75th percentile and BLEND 50th percentile > HIST or DEC 50th percentile; for MSSS, RPSS and CRPSS: BLEND < (HIST or DEC)-0.05.
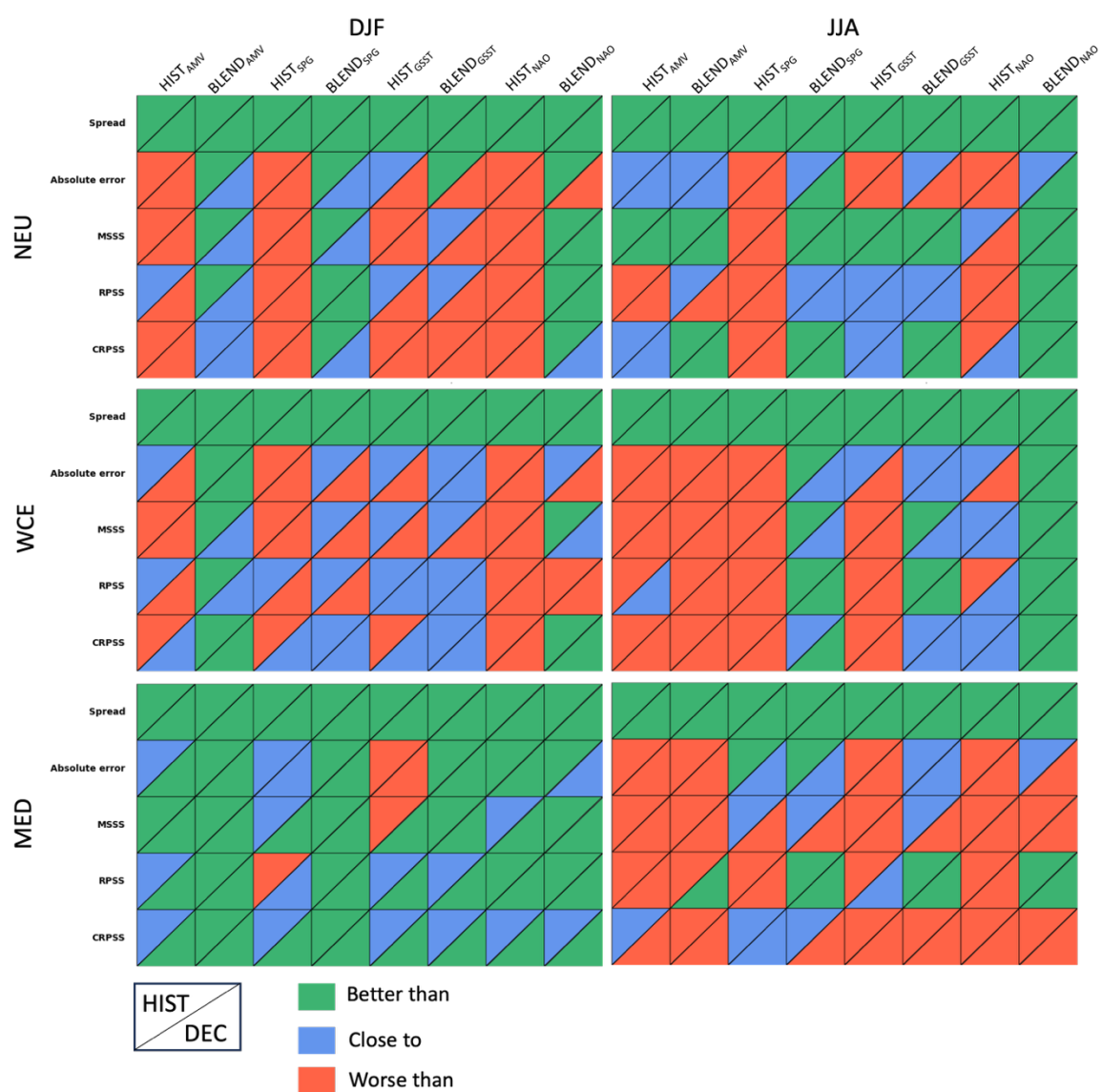
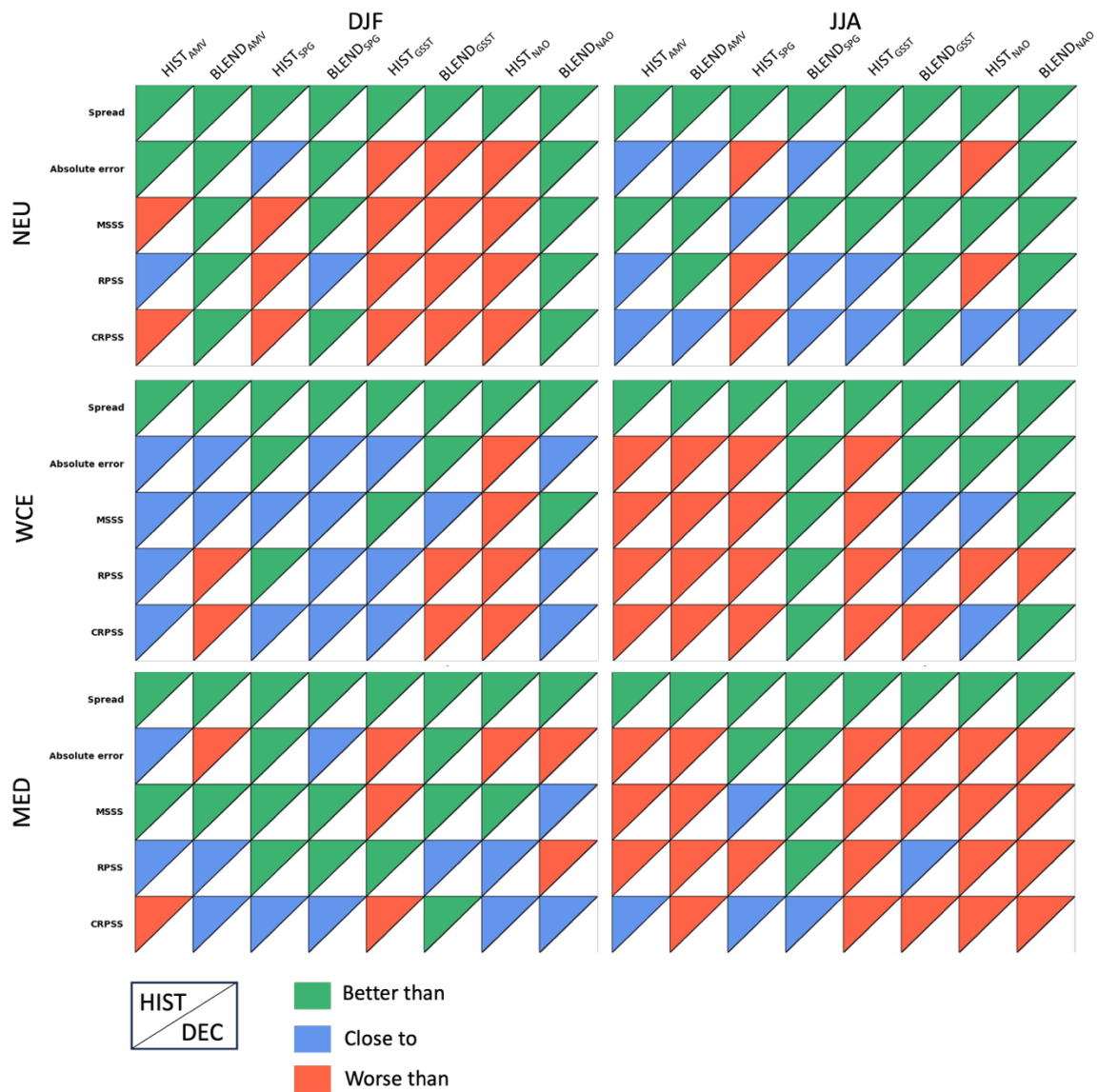**Figure S2: As Figure S1 but for 10yr temperature forecasts.**

Figure S3: As Figure S1 but for 15yr temperature forecasts. In that case, there is no value for DEC, as the hindcasts are limited to 10 years maximum.
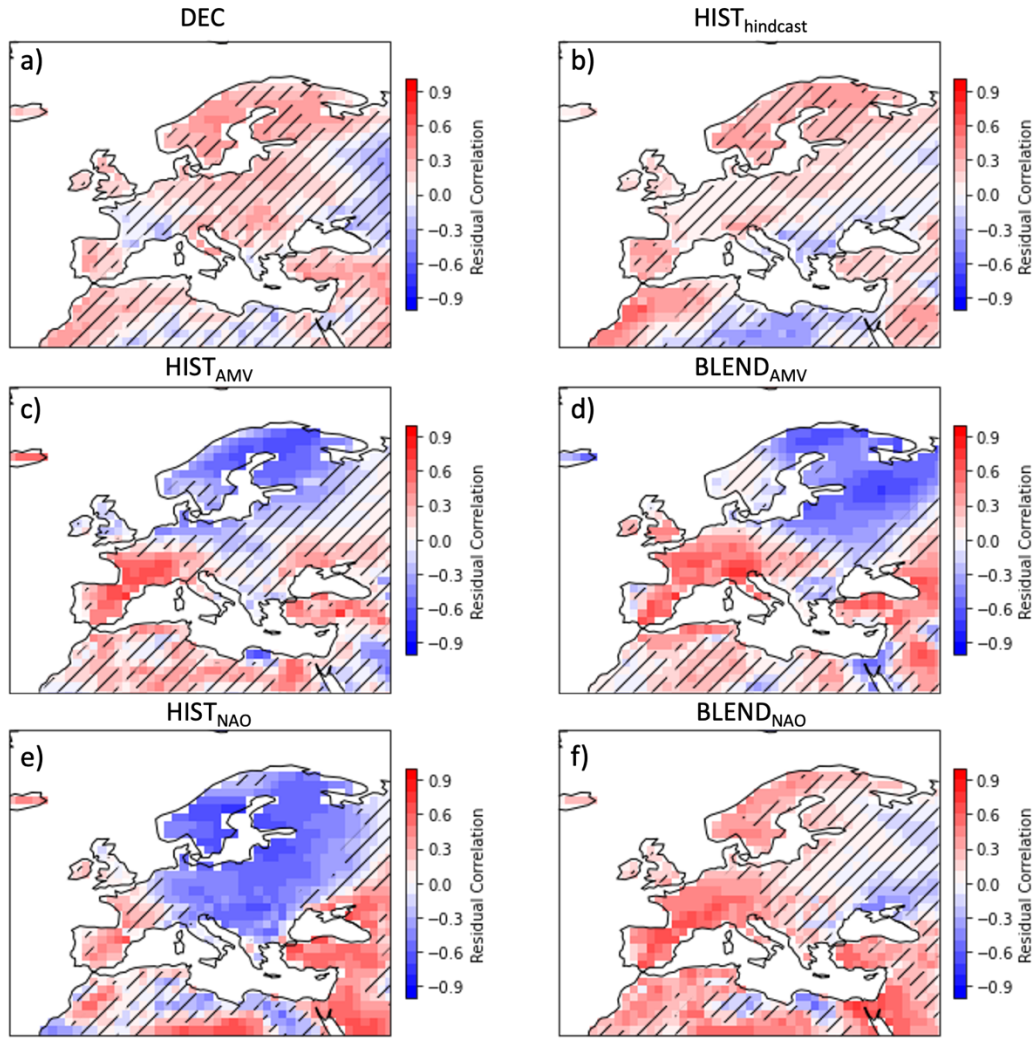
Figure S4: Residual Anomaly Correlation Coefficient (Smith et al. 2019) calculated from the time series of 10 years forecast of surface temperature over the evaluation period (1967-2000) for (a) the hindcasts dataset (see section 2.1), (b) HIST$_{Hindcast}$, (c) HIST$_{AMV}$, (d) BLEND$_{AMV}$, (e) HIST$_{NAO}$ and (f) BLEND$_{NAO}$. The surface temperature averaged over the Mediterranean region is used for the second step selection in BLEND$_{AMV}$ and BLEND$_{NAO}$. The hatched regions indicate statistically non-significant values ($p < 0.05$) using a two-sided permutation test (1,000 permutations), with p-values estimated as the proportion of permuted correlations exceeding the observed correlation in absolute value.