

Supplementary material for “A novel initialization technique for decadal climate predictions”

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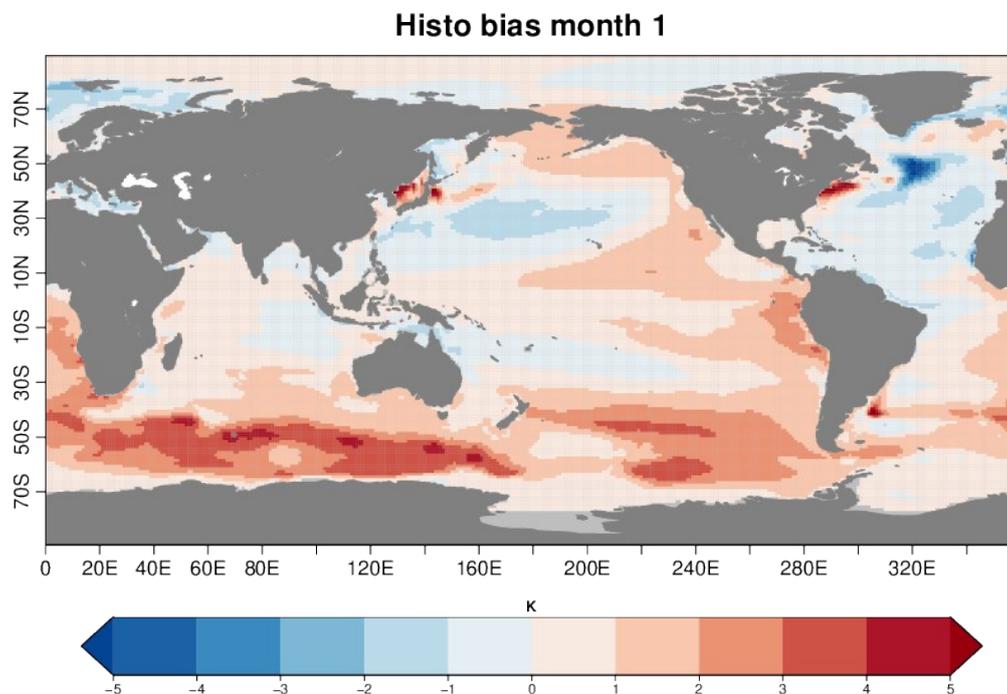


Figure S1: SST bias of the EC-Earth3 Histo simulations for the month of November (corresponding to the first forecast month of the decadal experiments) calculated against NEMOVAR-ORAS4 reanalysis.

Figure S1 shows the bias of the month of November (corresponding to the first forecast month of the decadal predictions) for the sea surface temperature of Histo simulations. The model displays a warm bias over the Tropical Pacific extending toward the extratropics in the eastern basin. An even more pronounced warm bias appears in the Southern Ocean, while the Subpolar North Atlantic region presents an intense cold bias.

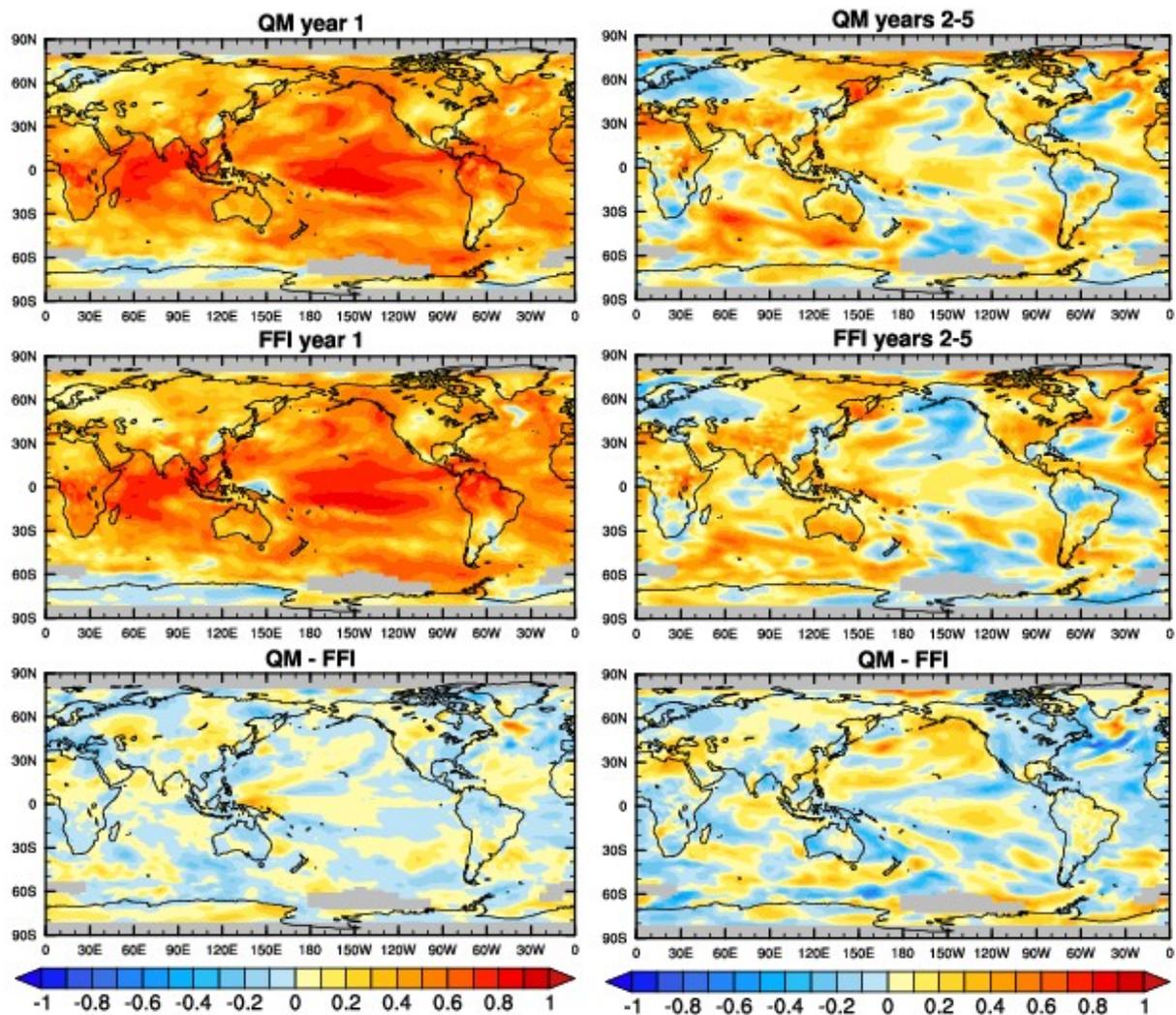


Figure S2: Correlation for the surface temperature residuals computed according to Smith et al (2019) against the GISTEMPv4 dataset. Results for QM (upper row), FFI (middle row) and the difference between the two (lower row).

Following the methodology of Smith et al., 2019, an estimate of the forced response was removed from both QM and FFI ensemble mean anomalies and the observed anomalies by removing their respective linear fits with Histo ensemble mean anomaly. Figure S2 shows the correlations between the observed and the QM/FFI residuals (respectively top and middle row). The difference of the two is shown in the bottom row. The left column represents forecast year 1, while the right column shows the average of the years 2-5. The residual correlation differences between QM and FFI (shown in the bottom panels) are consistent with the AC difference shown in the right column of Figure 4 of the manuscript: the regions with the highest improvements of QM over FFI for the first forecast year is the North Atlantic subpolar region and the western Tropical Pacific. For the forecast years 2-5, in addition to the North Atlantic subpolar region, the residual correlations highlight the North Pacific as a region with high improvements of QM over FFI, as well as part of the Mediterranean Sea and the North East Africa, which we did not detect in the AC maps.