

Supplementary Material

1 SUPPLEMENTARY FIGURES

1.1 Figures

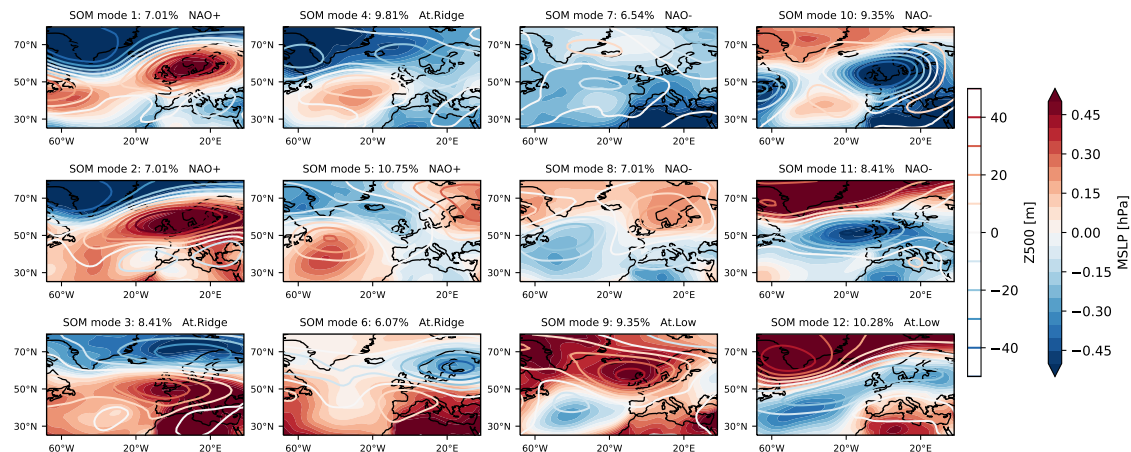


Figure S1. Original SOM map representing the dominant summer atmospheric teleconnections in the North Atlantic European sector during 1902 - 2008, trained with ERA-20C July and August sea level pressure (SLP).

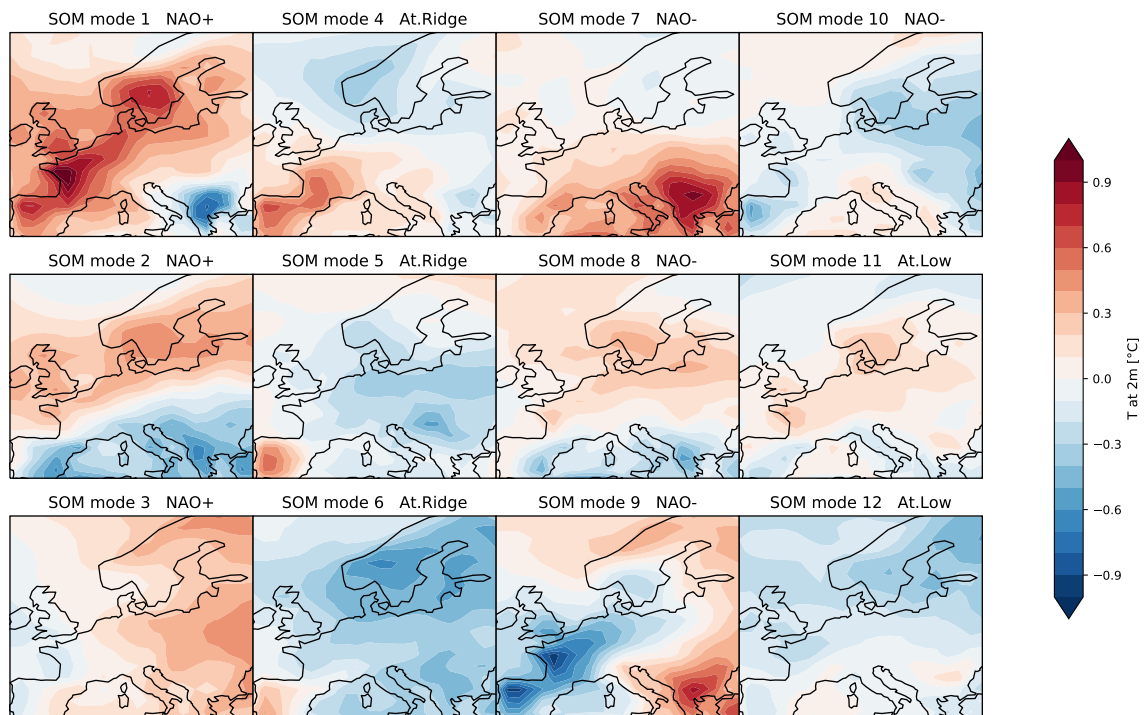


Figure S2. Composite of air temperature at 2 metre in the reanalysis w.r.t. the SOM master (Fig.2), for the period 1902-2008.

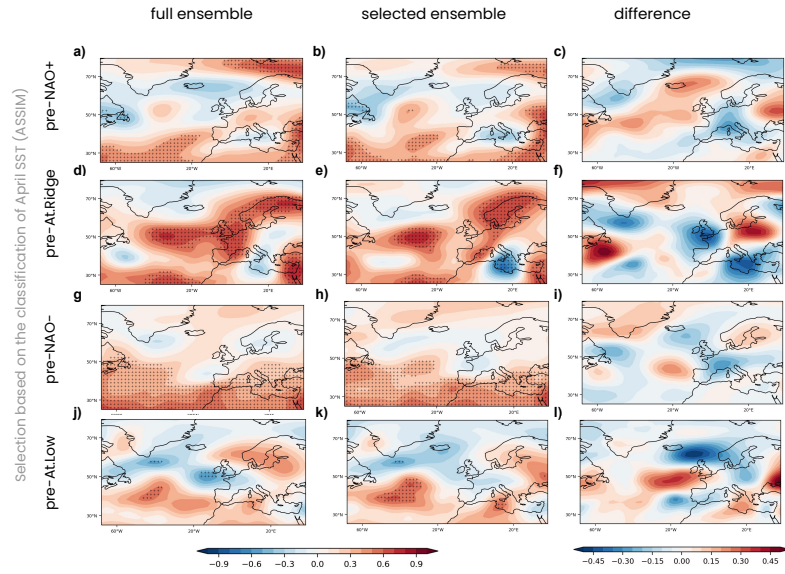


Figure S3. Evaluation of SST as predictor in the test ensemble. Anomaly correlation coefficients (ACC) for geopotential height at 500 hPa (Z500), comparing the test ensemble to the reanalysis in 1902-2008. On the first row (uppermost) ACCs are calculated for years where April SST months in the pre-forecast data are classified as preceding NAO+, i.e. pre-NAO+. Similarly, the remaining three rows show ACCs for the case of pre-Atl. Ridge, pre-NAO- and pre-At. Low, respectively. Column-wise, ACCs are presented as follows: a), d), g), j) the ensemble mean is taken over the full ensemble; b), e), h), k) the ensemble mean is taken over the selected ensemble; c), f), i), l) differences in ACC between full and selected ensemble mean. The criteria for the selected ensemble is explained in Stippling represents correlation significant at the 95% level.

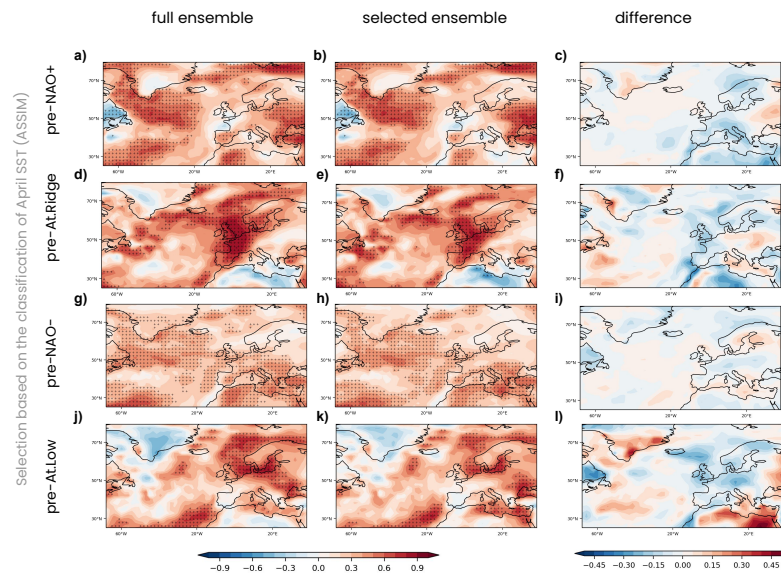


Figure S4. As Fig.S3, for air temperature at 2 metre.

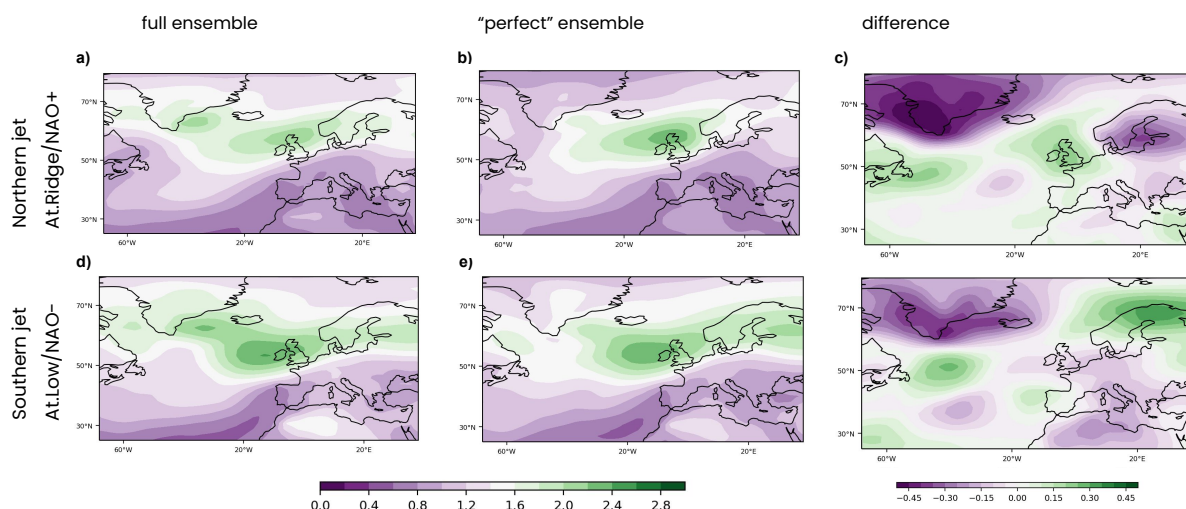


Figure S5. "Perfect" model approach. Root mean square error (RMSE) for sea level pressure (SLP), comparing the test ensemble to the reanalysis in 1902-2008. On the upper row RMSE is calculated for years where the observed dominant summer atmospheric teleconnection is classified as either At.Ridge or NAO+. Conversely, in the lower row RMSE is calculated for At. Low or NAO- cases. RMSEs are presented as follows: a) and d) the ensemble mean is taken over the full ensemble; b) and e) only members whose classification matches the observed are selected to calculate the ensemble mean; c) and f) differences in RMSE between full and selected ensemble mean.

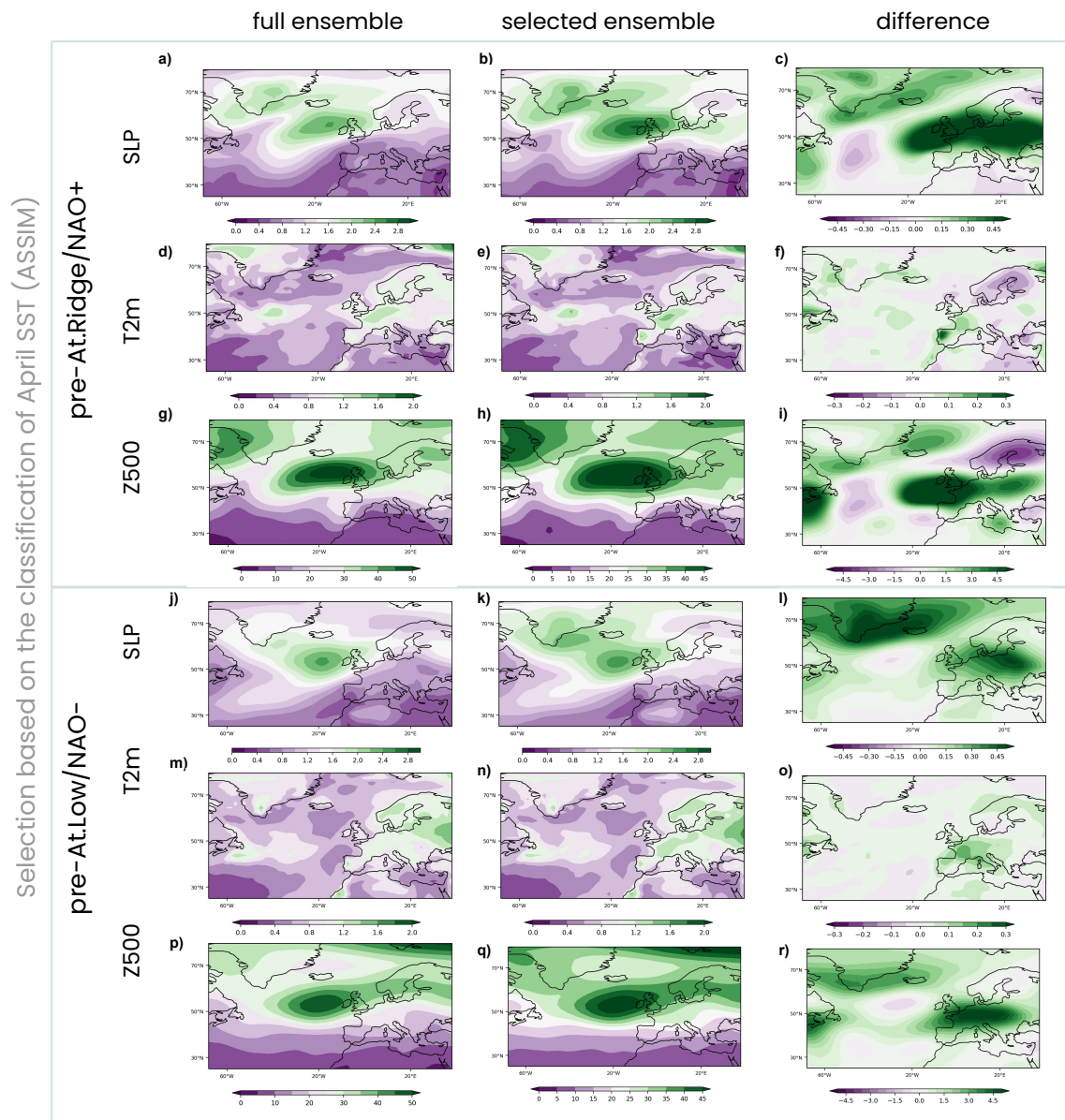


Figure S6. Evaluation of SST as predictor in the independent ensemble. Root mean square error (RMSE) for sea level pressure (SLP), temperature at 2 m height (T2m) and geopotential height at 500 hPa (Z500), as labelled, comparing the independent ensemble to Era-Interim in 1980-2016. On the upper three rows RMSE is calculated for years where April SST months in the pre-forecast data are classified as preceding either At.Ridge or NAO+, i.e. pre-At.Ridge/NAO+. Conversely, the lower three rows show RMSE for the case of pre-At.Low/NAO-. Column-wise, RMSEs are presented as follows: a), d), g), j), m), p) the ensemble mean is taken over the full ensemble; b), e), h), k), n), q) the ensemble mean is taken over the selected ensemble; c), f), i), l), o), r) differences in RMSE between full and selected ensemble mean.