Dominant mode of Antarctic sea ice concentration (SIC) variability

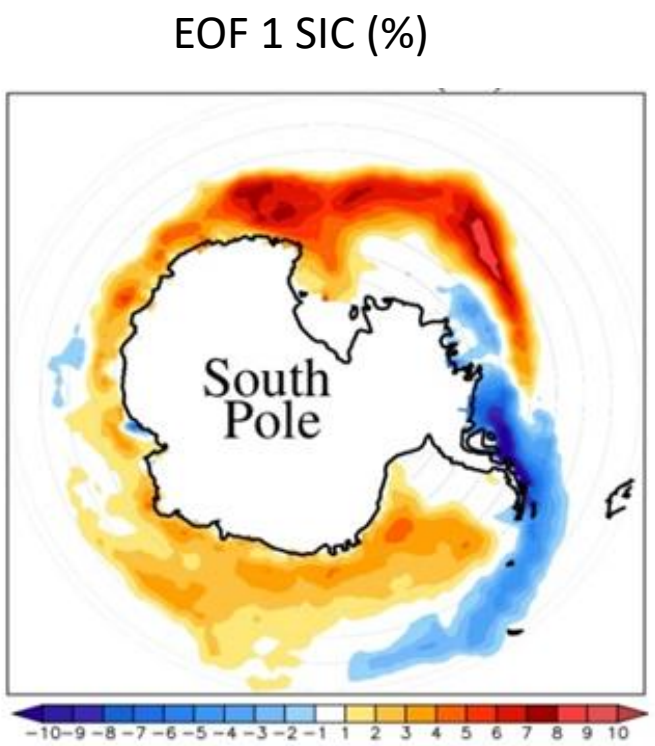

Figure 1 | ***The leading empirical orthogonal function (EOF1) of the National Snow and Ice Data Center (NSIDC) sea ice concentration (SIC) anomalies extending over the 1979-2022 period.***

Comparison between observed and simulated footprint of Atlantic Meridional Overturning Circulation (AMOC) on global sea ice evolution

ERA5 Reanalysis (adjusted with observations)

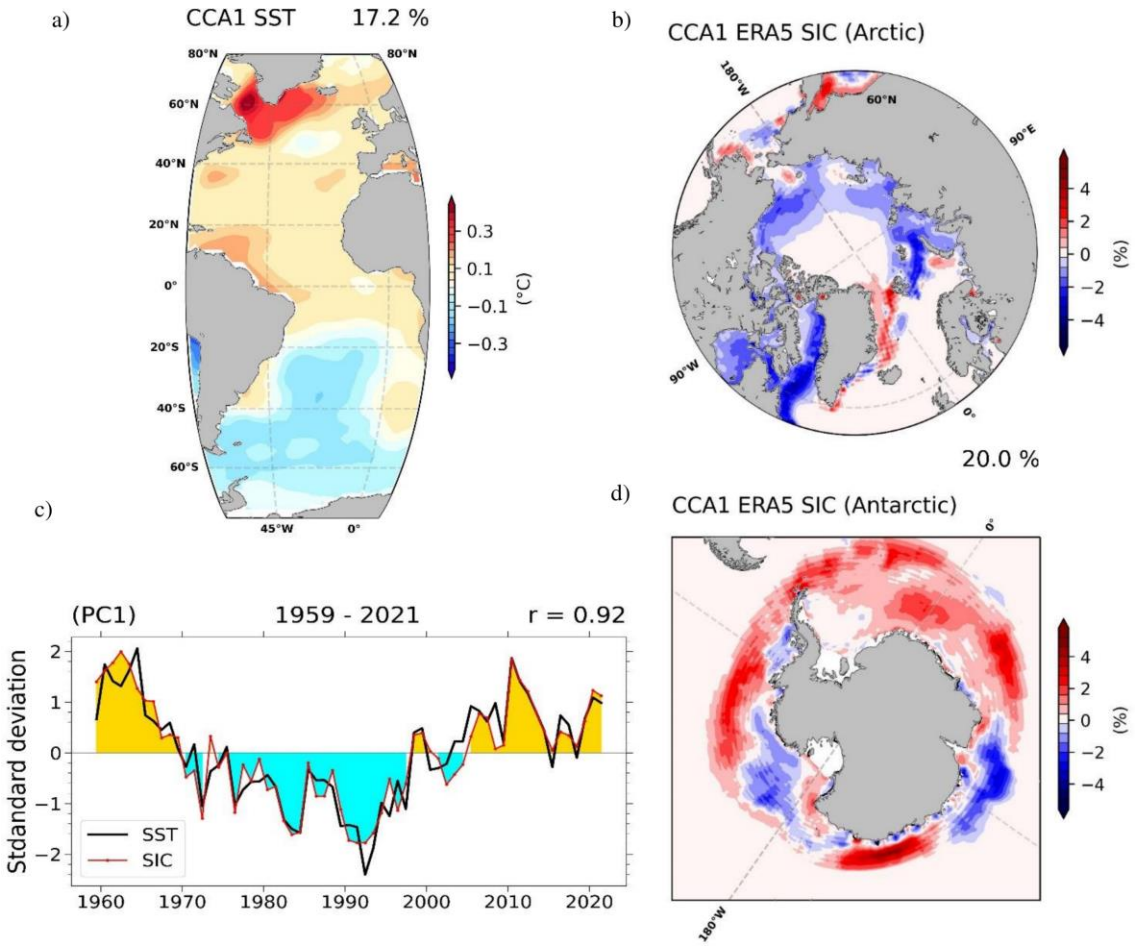

Figure 2 | The first coupled Atlantic Sea surface temperature (SST) - Global sea ice concentration (SIC) patterns identified through Canonical Correlation Analysis (CCA) between the corresponding ErSSTv5 and ERA5 Reanalysis annual detrended anomalies extending over the 1959 - 2021 period..

(Vaideanu et al. 2023, PlosOne, https://doi.org/10.1371/journal.pone.0290437)

AWI-ESM2.1 climate model

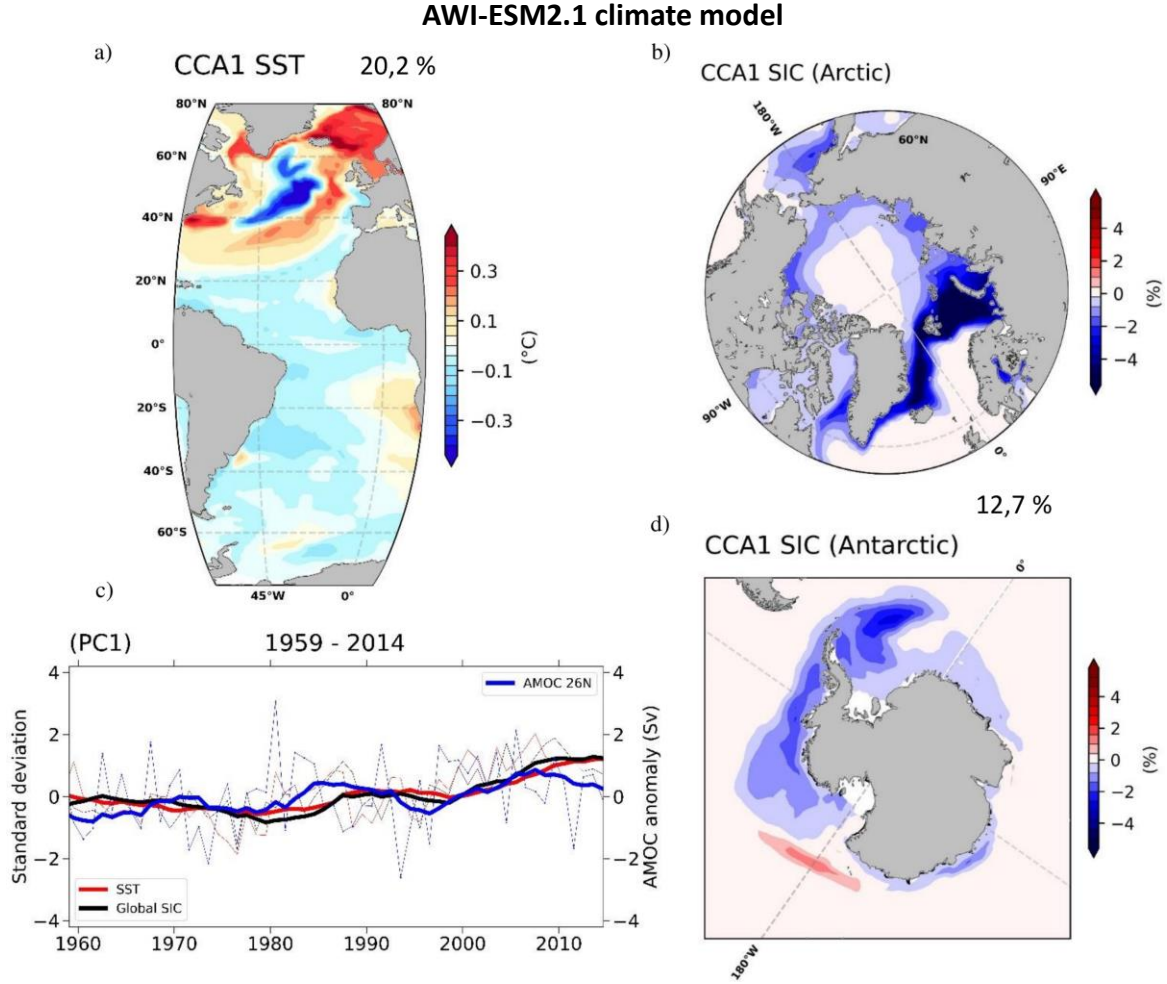

Figure 3 | The first coupled Atlantic SST - global SIC pair identified through CCA between the corresponding AWIESM2.1 "historical" annual fields from 1959- 2014. Their associated time series (c) with SIC (red line), SST (black line), have a correlation of ~ 0.41 with the simulated AMOC index, defined as the time series of annual-mean anomaly of maximum volume transport streamfunction at 26.5°N (Sv) (blue line).

Simulated footprint of Atlantic Meridional Overturning Circulation (AMOC) on global sea ice evolution

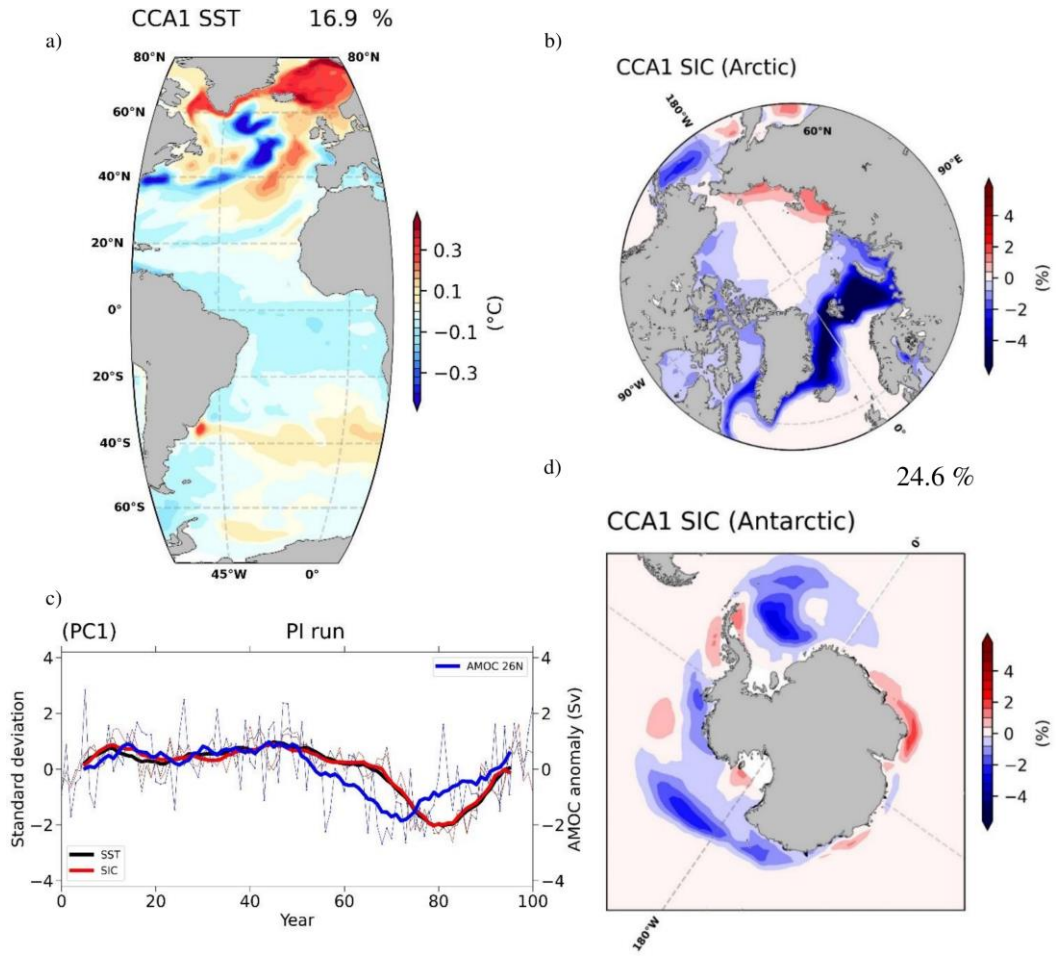

Figure 4 | The first simulated coupled Atlantic SST - Global SIC patterns identified through CCA between the corresponding AWIESM2.1 "Pre Industrial" annual anomalies extending over 100 years. Pattern of SST (°C) (a) and of the Arctic (b) and Antarctic (d) SIC (%) from the first coupled CCA pair. Their associated time series (c) with SIC (red line), SST (black line) are plotted with an 11yr running mean and have a correlation with the simulated AMOC Index, defined as the time series of annual-mean anomaly of the maximum volume transport streamfunction at 26.5°N (Sv) (blue line) of 0.37 (95% significance level).

(Vaideanu et al. 2023, PlosOne, https://doi.org/10.1371/journal.pone.0290437)