

Supplementary Material

1 SUPPLEMENTARY FIGURES

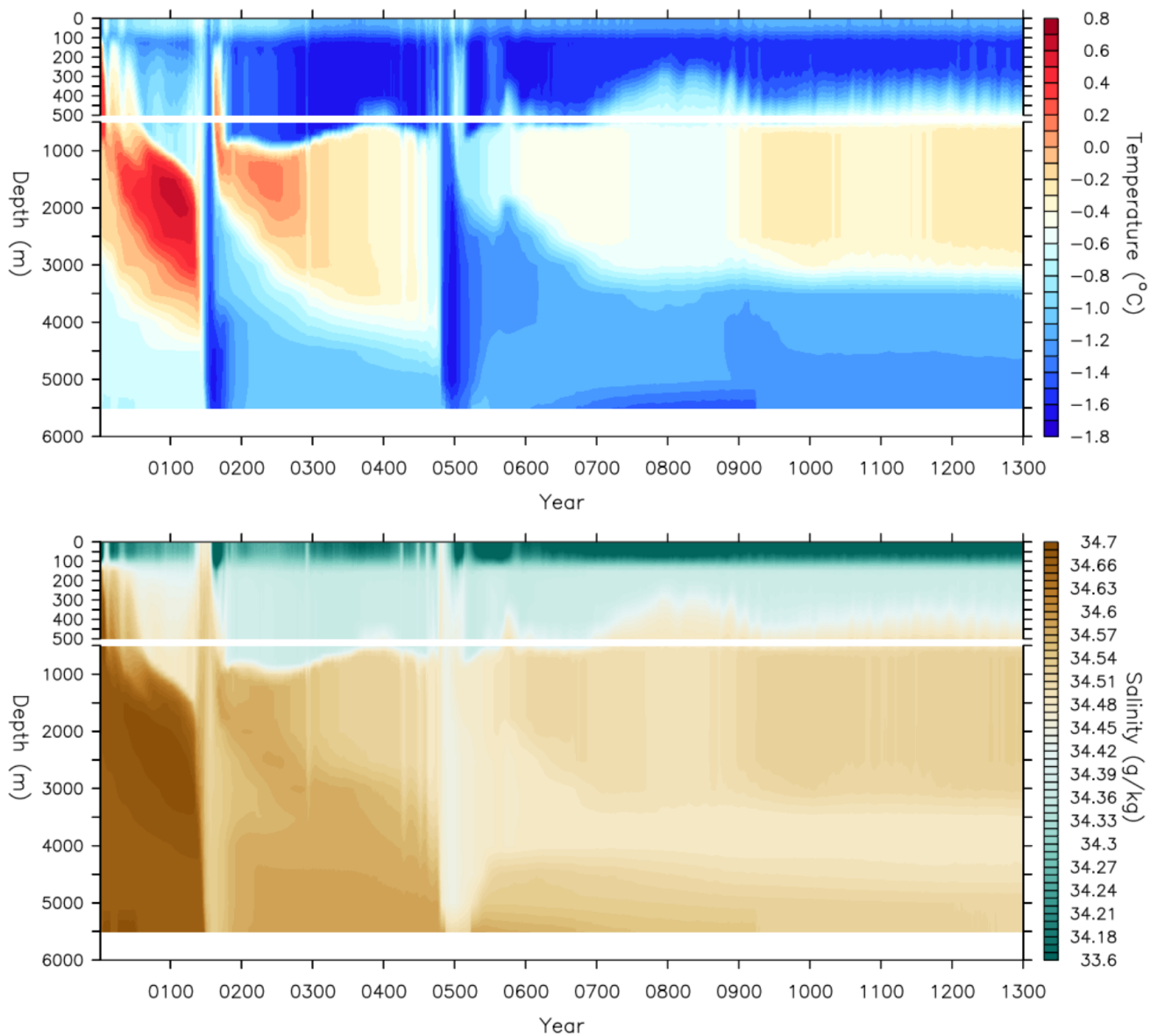


Figure S1. Time series of the vertical profiles of (A) potential temperature ($^{\circ}\text{C}$) and (B) salinity (g/kg) averaged over the polynya region ($23^{\circ} - 5^{\circ}\text{W}$, $60^{\circ} - 65^{\circ}\text{S}$) for the full length of the simulation (1300 years).

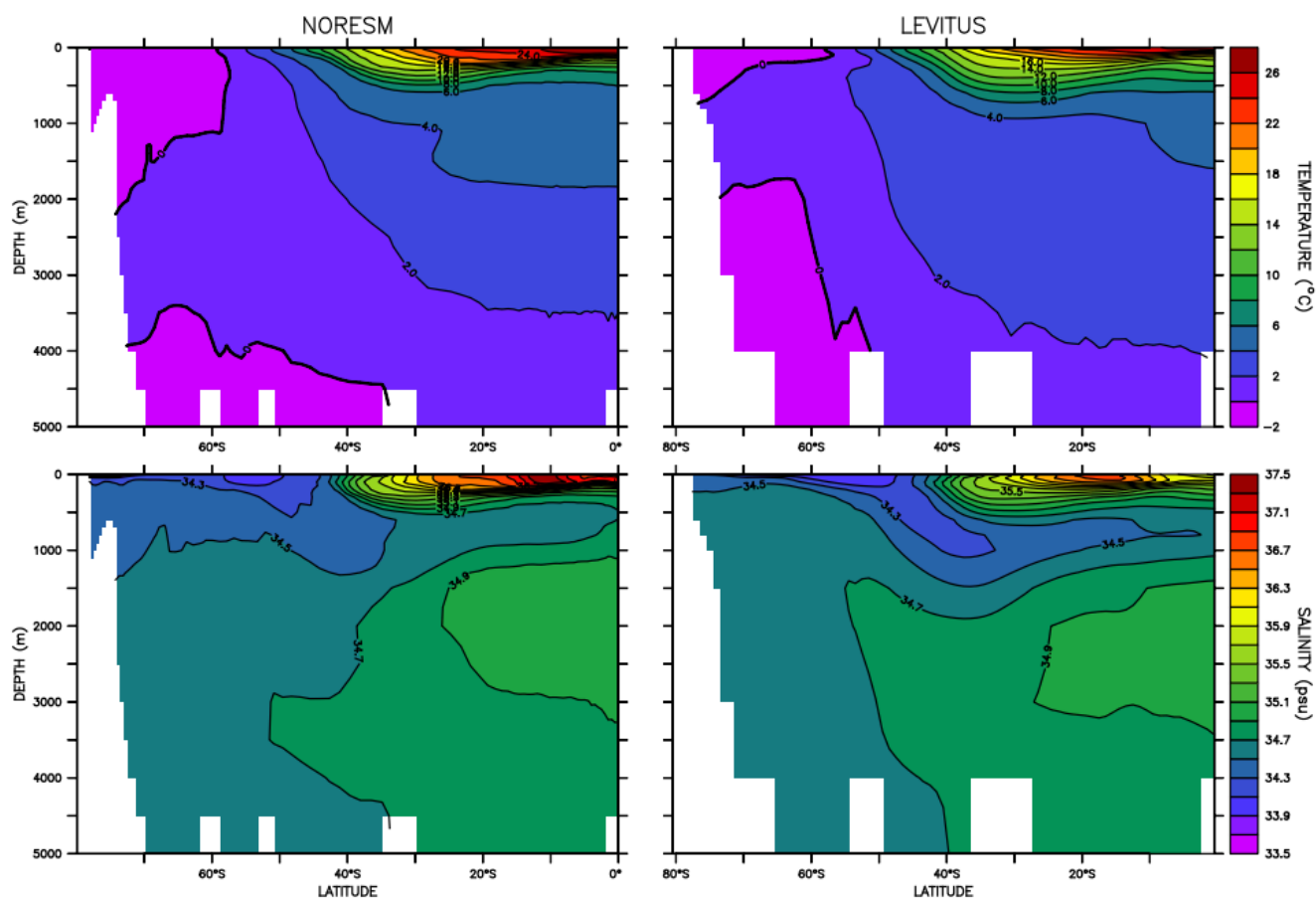


Figure S2. Zonal mean potential temperature (°C) and salinity (psu) in the Atlantic (60°W-10°E) for (left) NorESM-OC1.2 (10-yr mean over year 90 and 100) and (right) observations (Climatological Atlas of the World Ocean, Levitus (1983)).

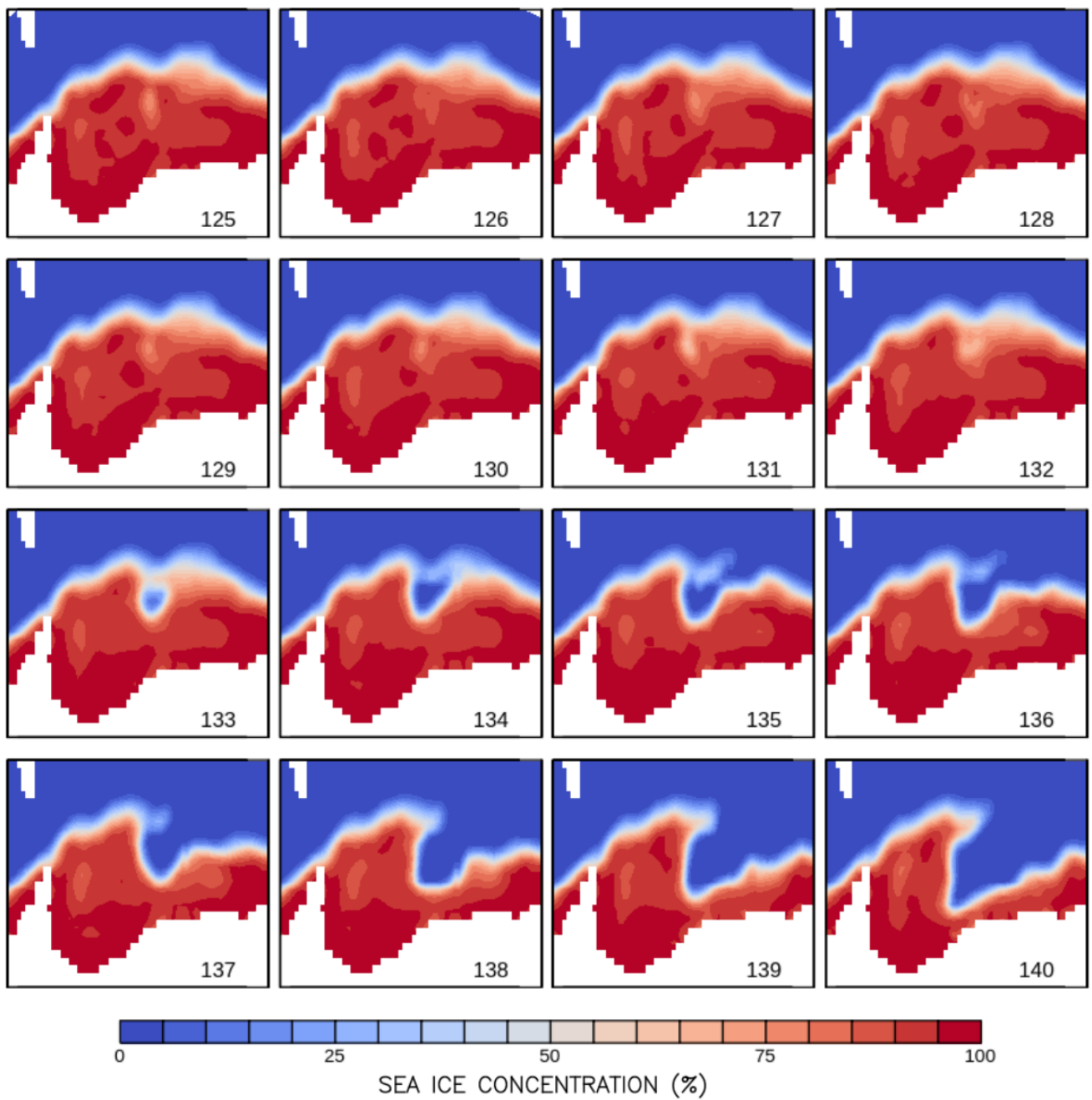


Figure S3. Horizontal distributions of winter-mean sea ice concentration (%) in the Weddell Sea from year 125 to 140.

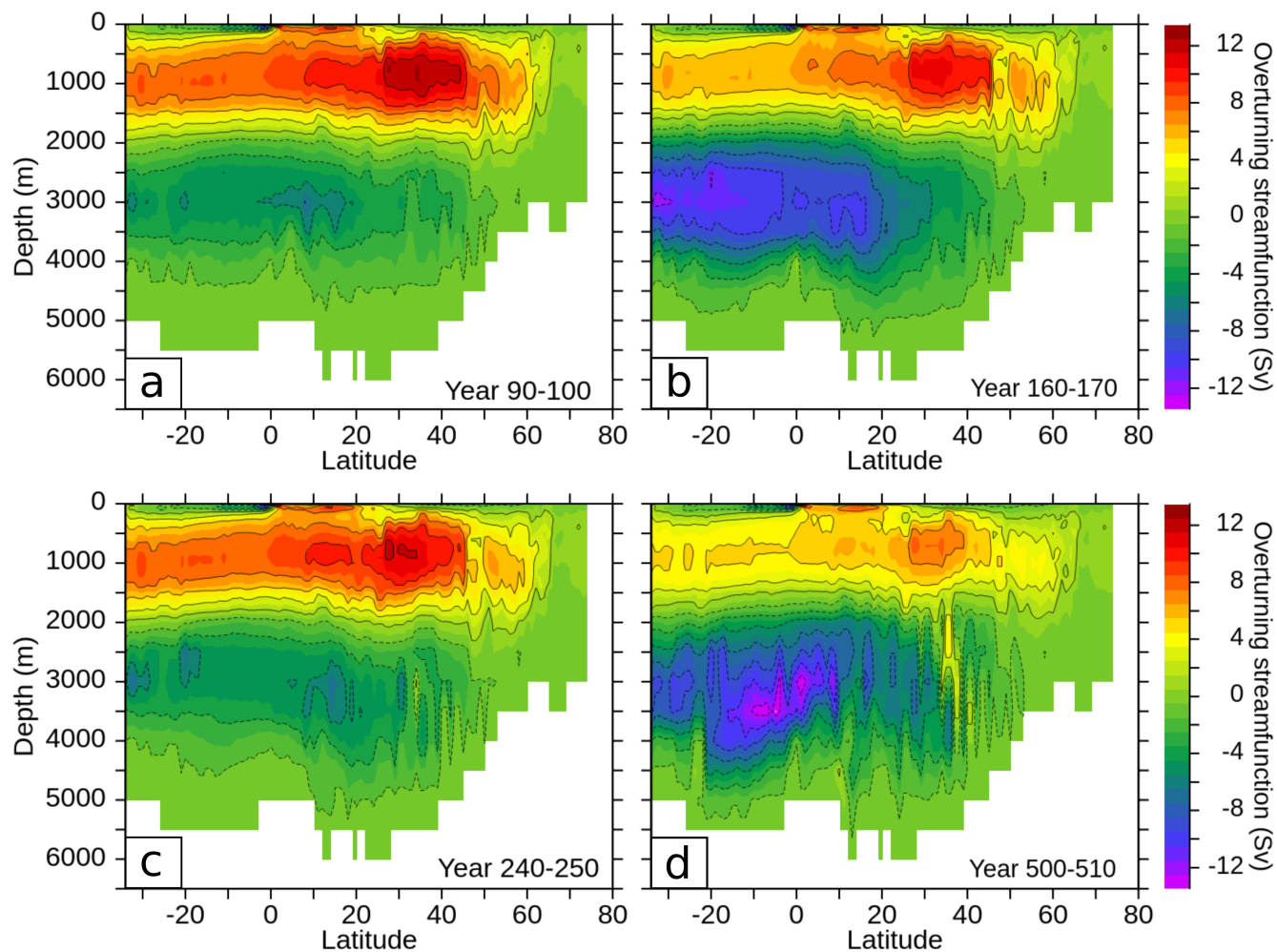


Figure S4. Atlantic meridional streamfunction in Sverdrups ($1 \text{ Sv} = 10^6 \text{ m}^3 \text{ s}^{-1}$) before and after deep convection associated with the first (A and B) and second (C and D) polynya event. Contours are given in 2 Sv intervals, where solid (dashed) lines correspond to clockwise (counterclockwise) circulation.

REFERENCES

Levitus, S. (1983). Climatological Atlas of the World Ocean. *Eos, Transactions American Geophysical Union* 64, 962. doi:10.1029/EO064i049p00962-02