Supplementary information for:

Mesozoic to Cenozoic bathymetric and gateway changes reduced Atlantic Ocean sensitivity to deoxygenation

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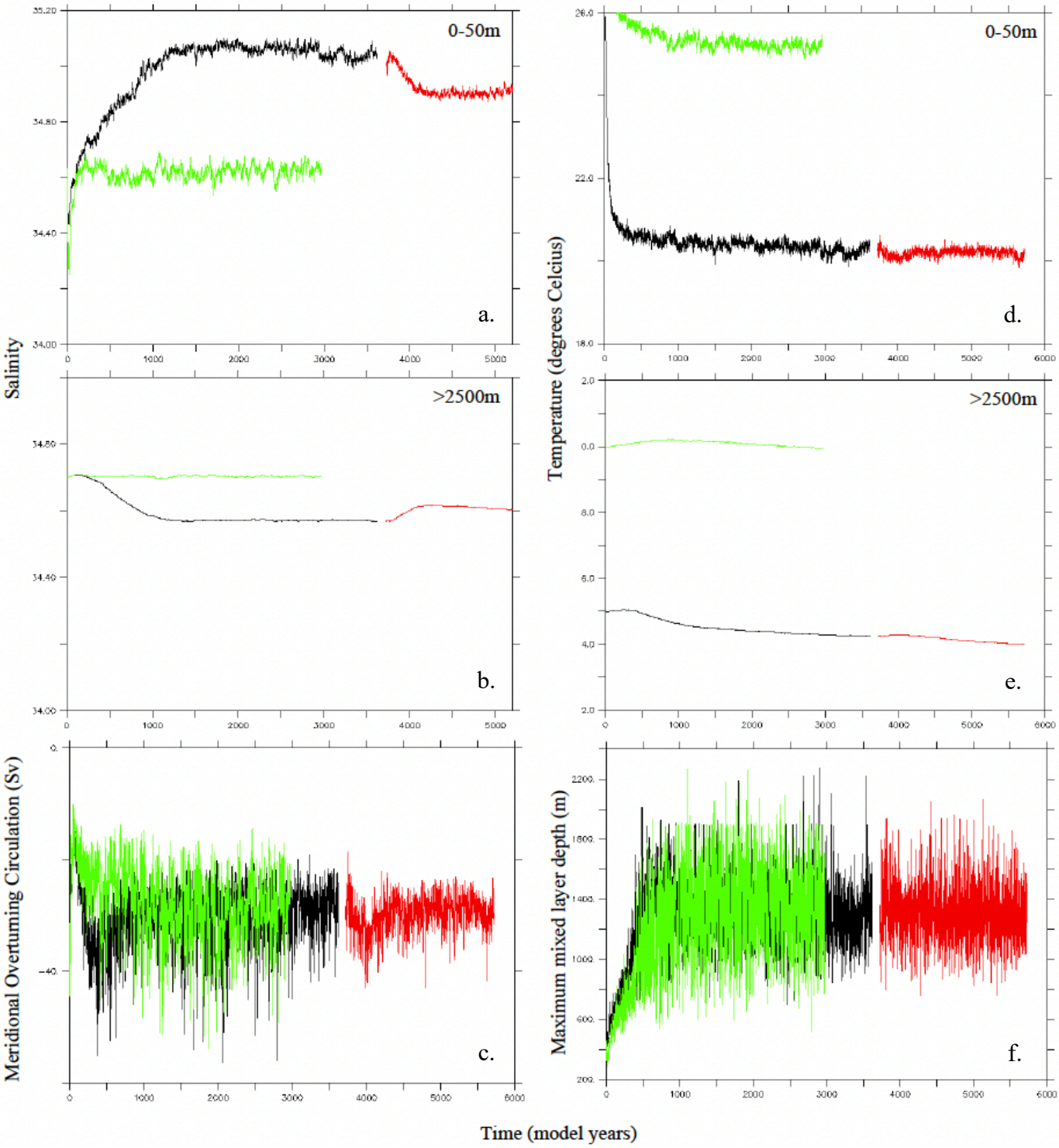

Figure S1. Time series for (a) sea surface salinity (top 50m of ocean), (b) deep ocean salinity (below 2500 meters of water depth), (c) maximum intensity of the meridional stream function (negative for counterclockwise motion), (d) sea surface temperature (top 50m), (e) deep ocean temperatures (below 2500m) and (f) maximum (winter) mixed layer depth.

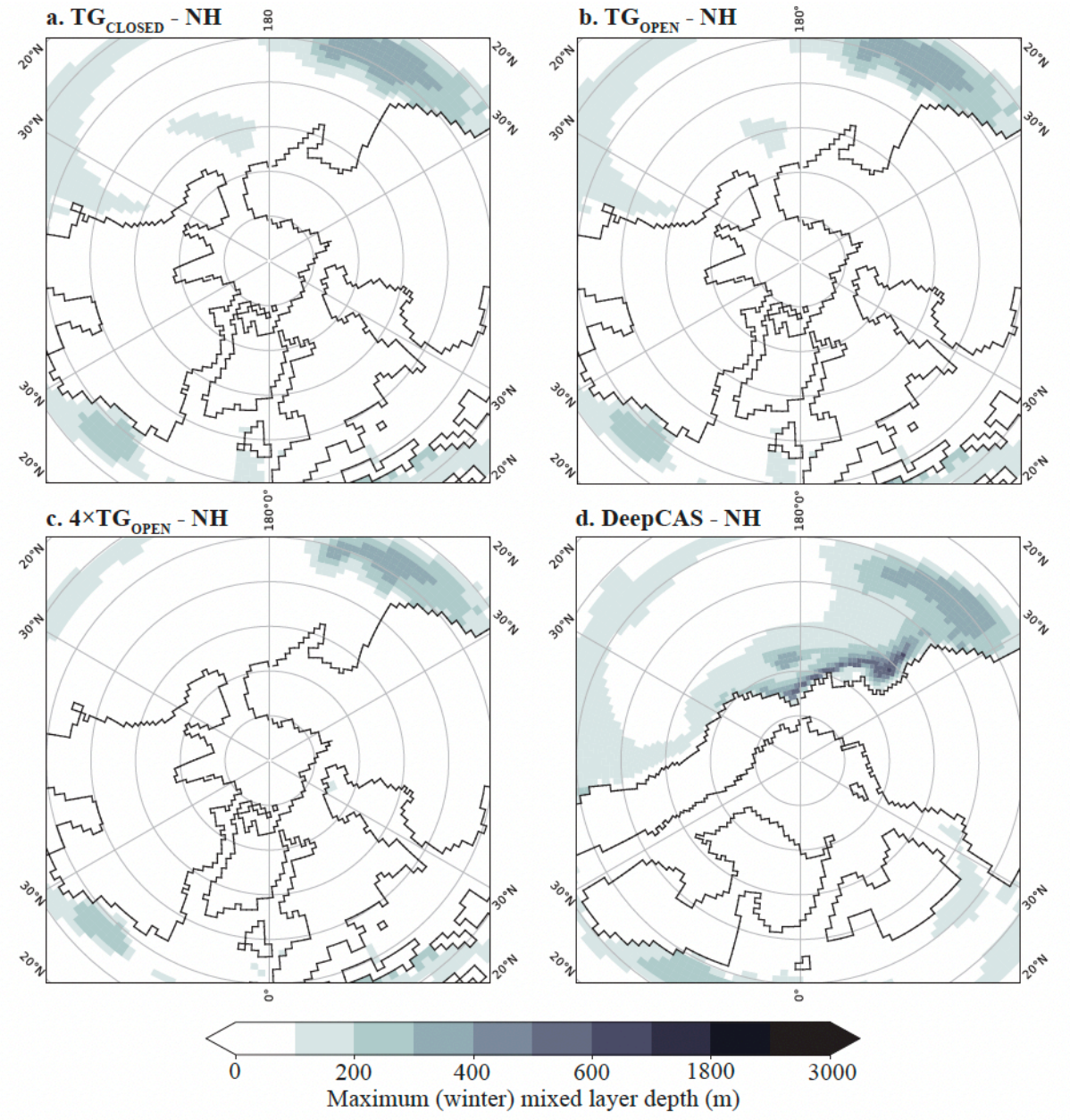

Figure S2. Maximum (winter) mixed layer depth (m) in the Southern Hemisphere. *DeepCAS* results from (Laugié et al., 2021).

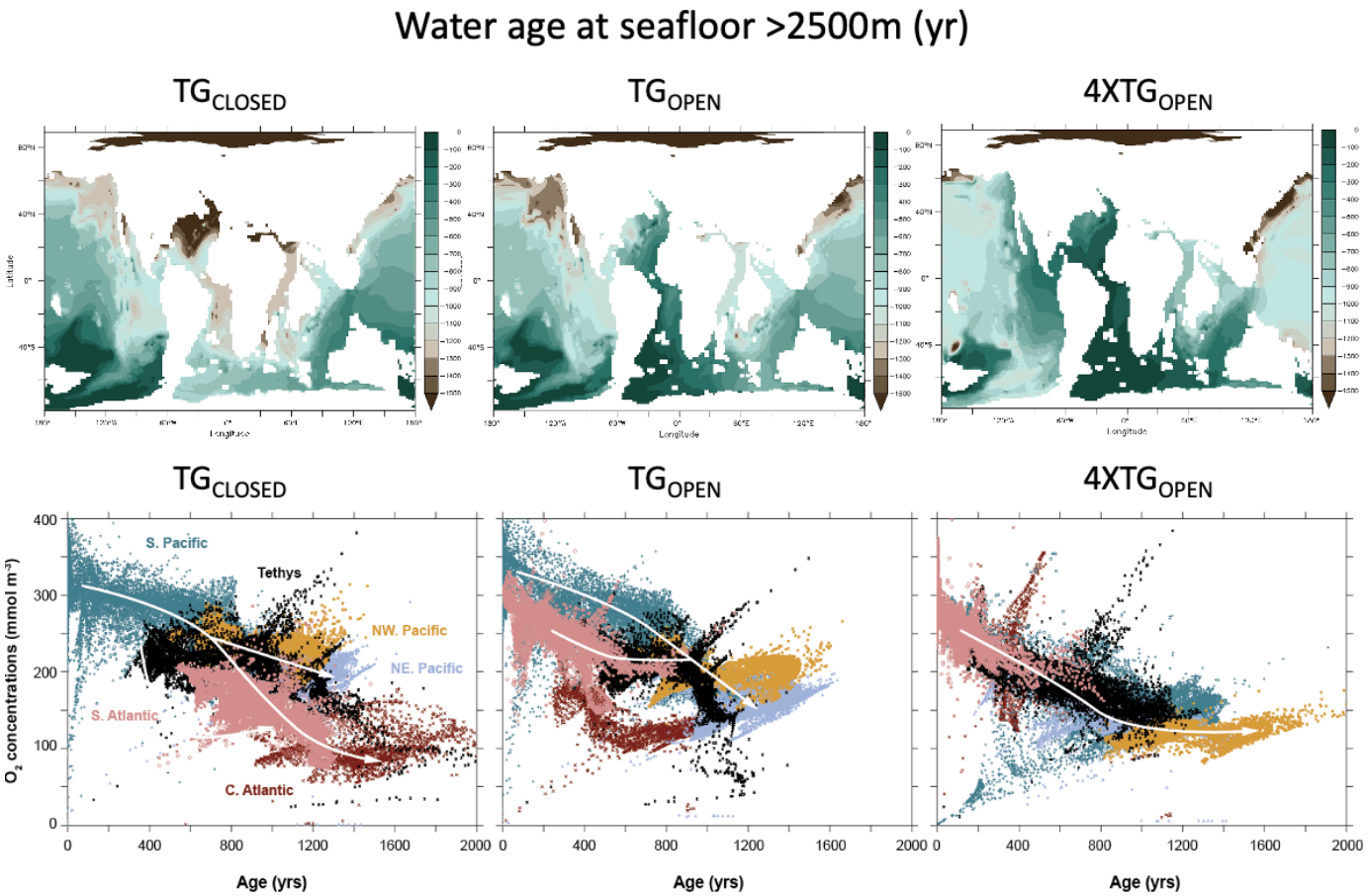

Figure S3. Ideal age (top row) and age versus oxygen concentrations for each of the major basins (bottom row), at 60Ma.

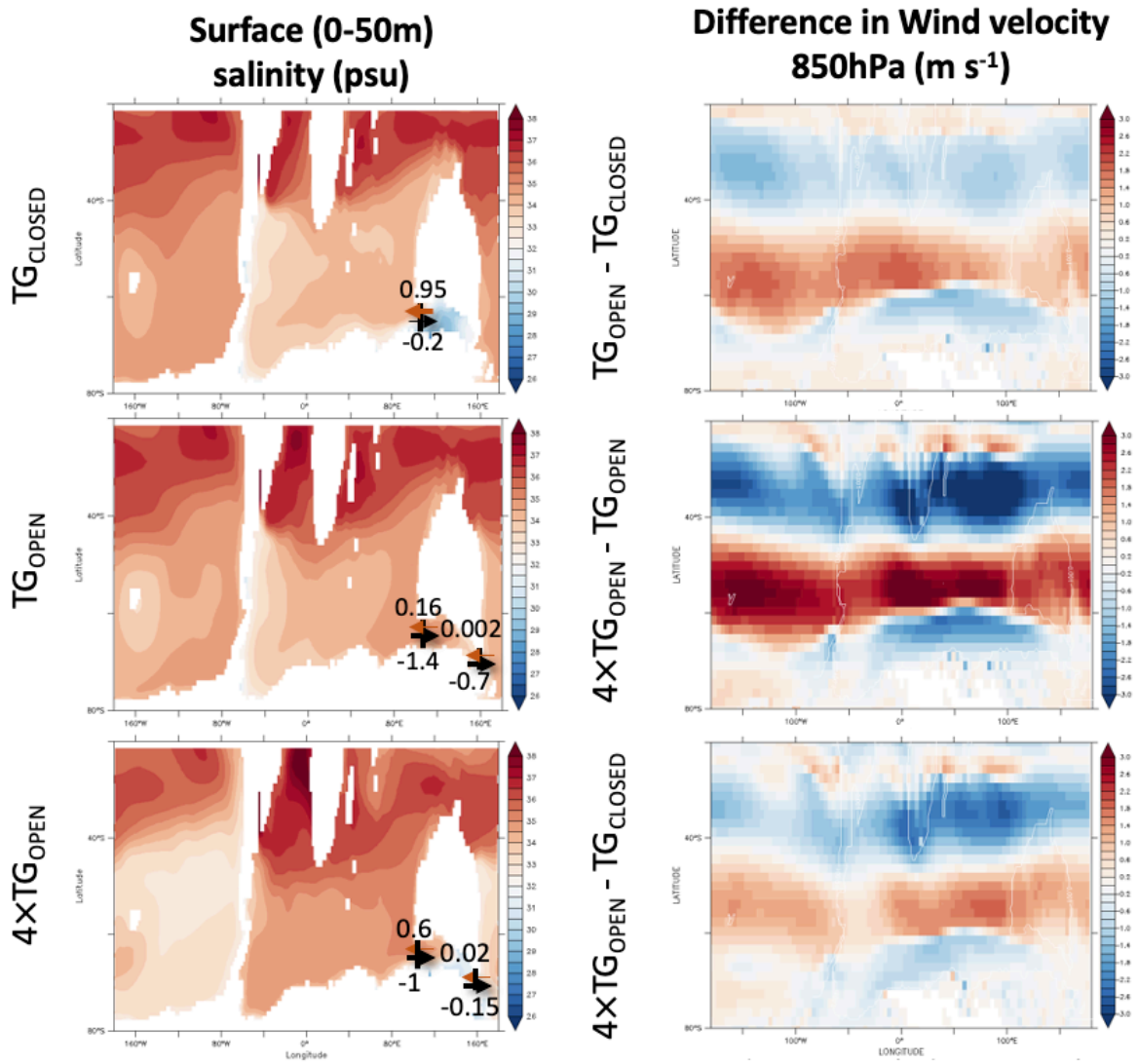

Figure S3. Surface salinity (psu) (left column) and changes 850hPa wind velocity (m s^{-1}) (right column) in the Southern Ocean. From top to bottom, salinity is shown for *TG_{CLOSED}*, *TG_{OPEN}* and *$4\times TG_{OPEN}$*. Differences in wind velocity are shown as a difference between *TG_{OPEN}* and *TG_{CLOSED}*, *$4\times TG_{OPEN}$* and *TG_{OPEN}*, and *$4\times TG_{OPEN}$* and *TG_{CLOSED}*.

Table S1. Freshwater Flux (Sv) into the Southern Ocean sectors and corresponding average salinity values for the top 50m of these sectors. Italics indicate the sector where deep-waters form.

Simulation	Southern ocean sector	Freshwater Flux (Sv)	Average salinity (0-50m)
TG_{CLOSED}	Atlantic/Indian	0.5927	33.82
	Pacific	*0.5668*	*34.67*
TG_{OPEN}	Atlantic/Indian	*0.6059*	*34.41*
	Pacific	*0.6071*	*34.51*
$4 \times TG_{OPEN}$	Atlantic/Indian	*0.7417*	*35.08*
	Pacific	0.8031	33.22

References

Laugié, M., Donnadieu, Y., Ladant, J. B., Bopp, L., Ethé, C., and Raisson, F.: Exploring the impact of Cenomanian paleogeography and marine gateways on oceanic oxygen, Paleoceanography and Paleoclimatology, 36, e2020PA004202, 2021.