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Supplement of

Southern Ocean polynyas and dense water formation in a high-resolution, coupled Earth system model

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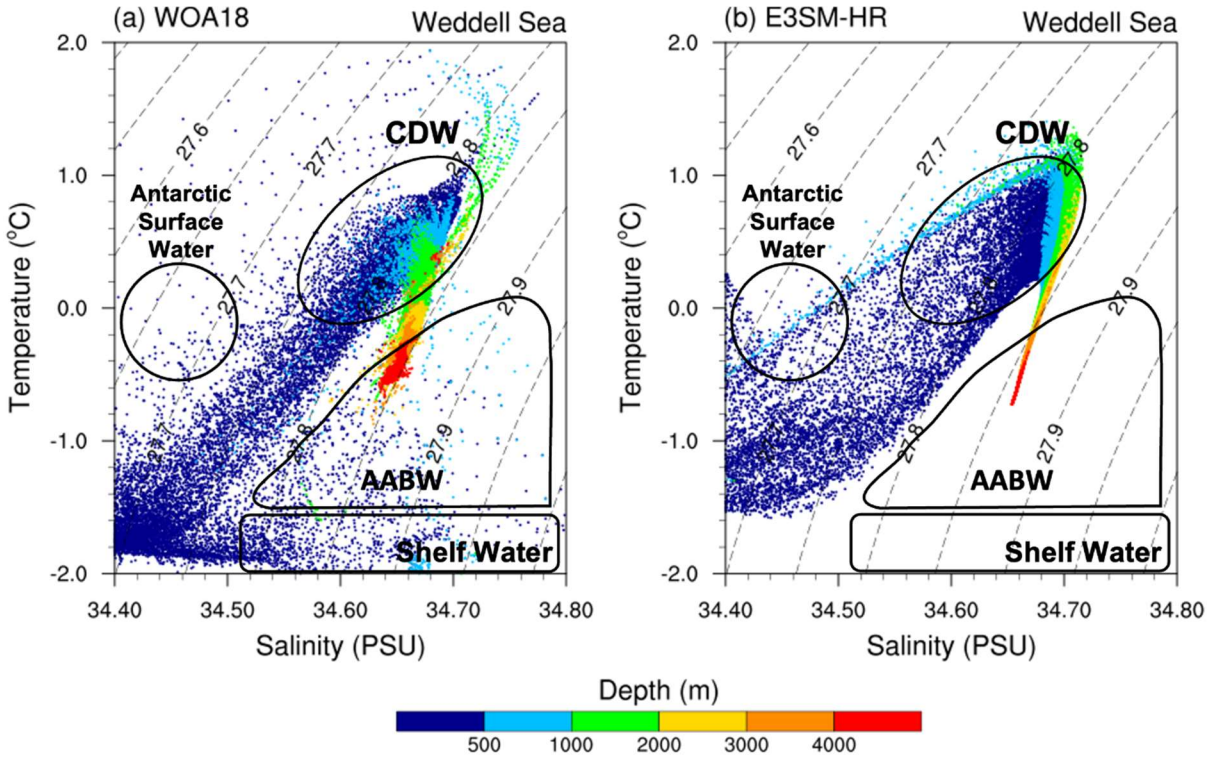

Figure S1. Potential temperature/salinity (TS) diagrams in the Weddell Sea (south of 60°S and within longitudes 60°W-0°, full depth range) for **(a)** WOA18 and **(b)** E3SM-HR. Color coding indicates depth (m). Boxes show definition of main Southern Ocean water masses, as seen in Fig. 1a of Whitworth et al. (1998).

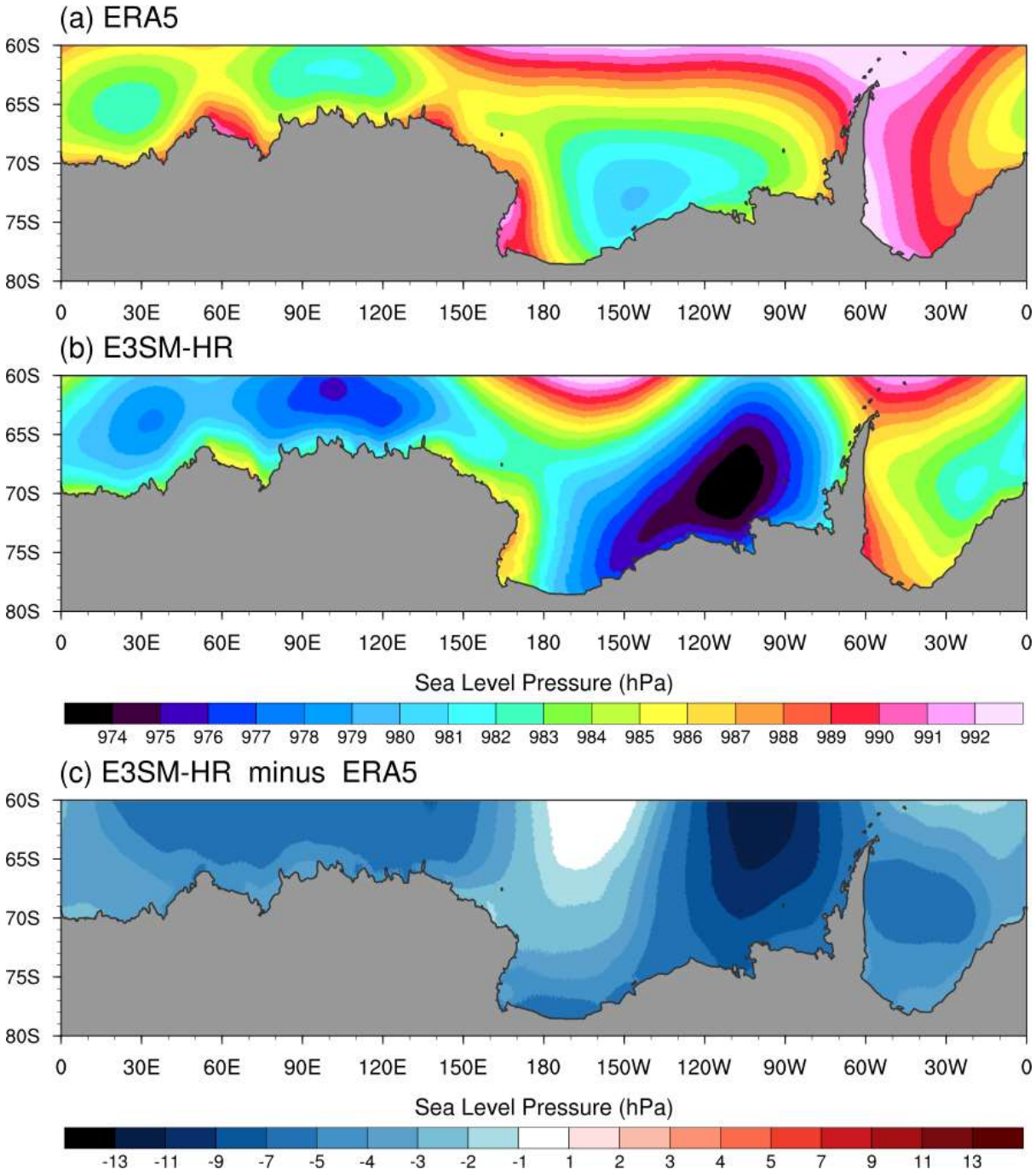

Figure S2. Climatological sea level pressure (hPa) in the winter (from March to October) for **(a)** ERA5 and **(b)** E3SM-HR. **(c)** Difference between E3SM-HR and ERA5 results.

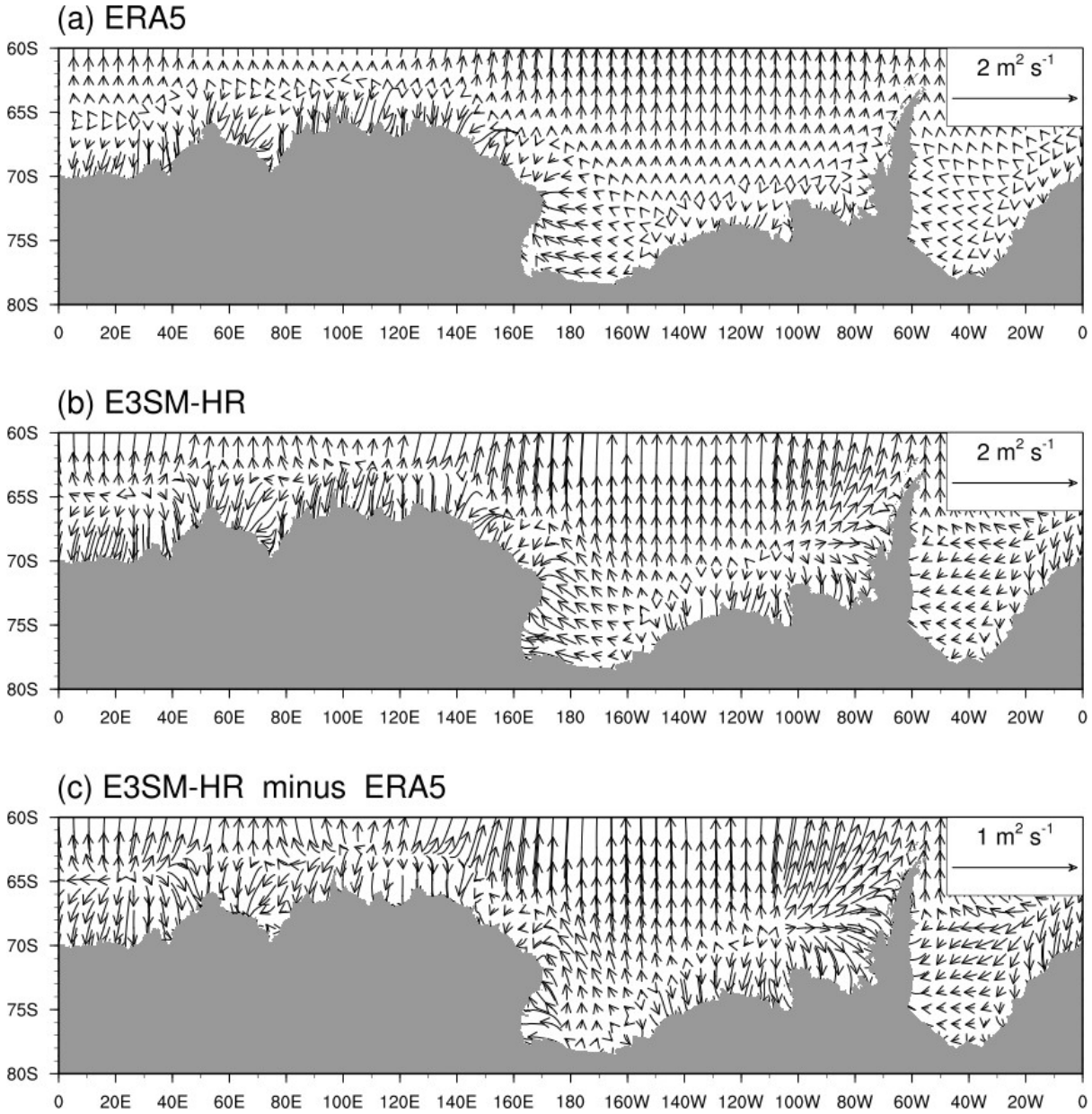

Figure S3. Ekman transport from **(a)** ERA5 and **(b)** E3SM-HR. **(c)** Difference between E3SM-HR and ERA5 Ekman transport.

References

Whitworth, III, T., Orsi, A. H., Kim, S.-J., Nowlin Jr., W. D., and Locarnini, R. A.: Water Masses and Mixing Near the Antarctic Slope Front, vol. 75, pp. 1–27, American Geophysical Union (AGU), https://doi.org/10.1029/AR075p0001, 1998.