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Supplement of

Major sources of North Atlantic Deep Water in the subpolar North Atlantic from Lagrangian analyses in an eddy-rich ocean model

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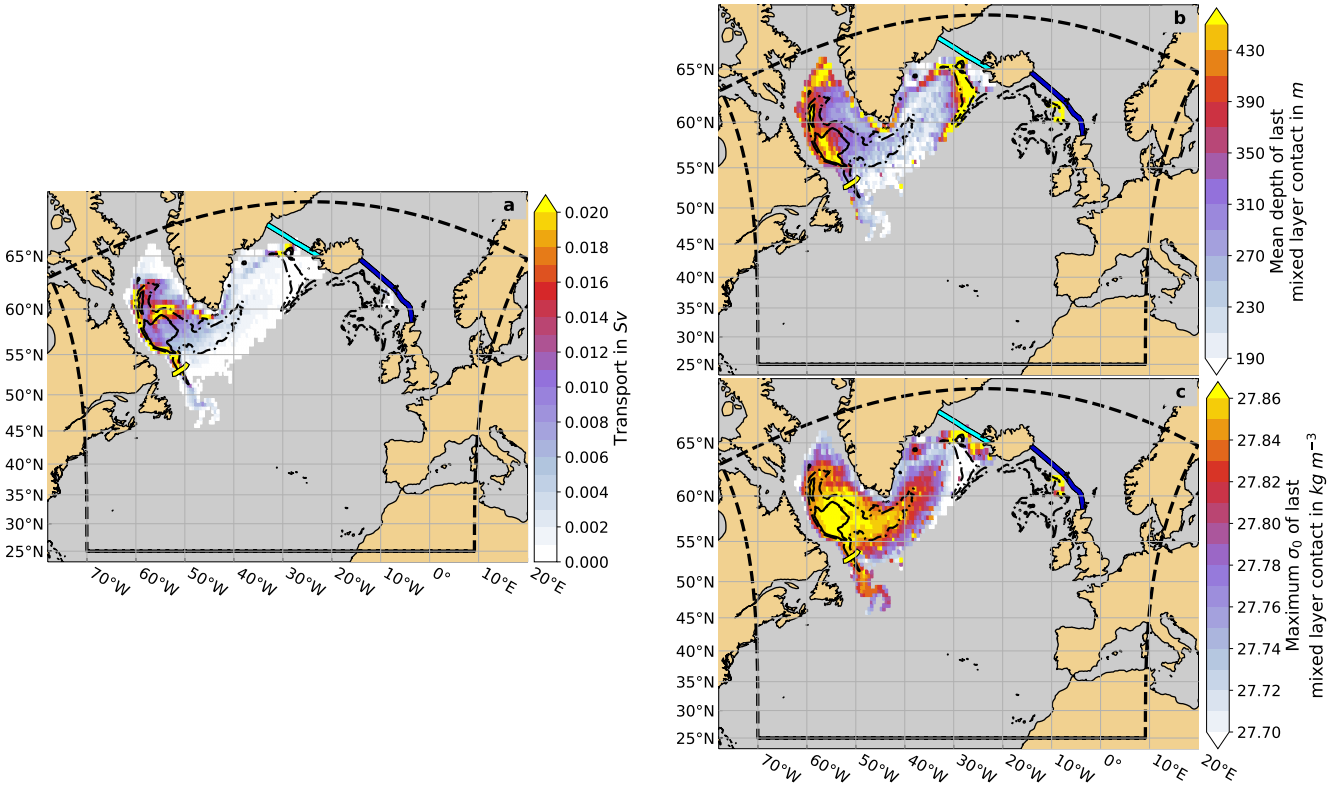

Figure S1. (a) Locations of origin, calculated as mean transport in Sv (shading, $1/2^\circ \times 1/2^\circ$ bins) for ML_P (see section 2.1.3 for details of the definitions). (b-c) Transport–weighted mean depth in m (b) and maximum σ_0 in $kg\ m^{-3}$ (c) of last mixed layer contact per $1/2^\circ \times 1/2^\circ$ bin for ML_P. The black solid contour marks the 2000-2019 mean DJFM mixed layer depth of $500\ m$. The black dash–dotted contour marks the 2000-2019 mean of the annual maximum mixed layer depth of $500\ m$. The period 2000-2019 is chosen to capture the period where the vast majority of ML_P are circulating. The yellow line marks the $53^\circ N$ section, the light and dark blue lines mark the Denmark Strait and Iceland–Scotland Ridge sections, respectively. The black dashed line indicates the boundary of the experiment domain.

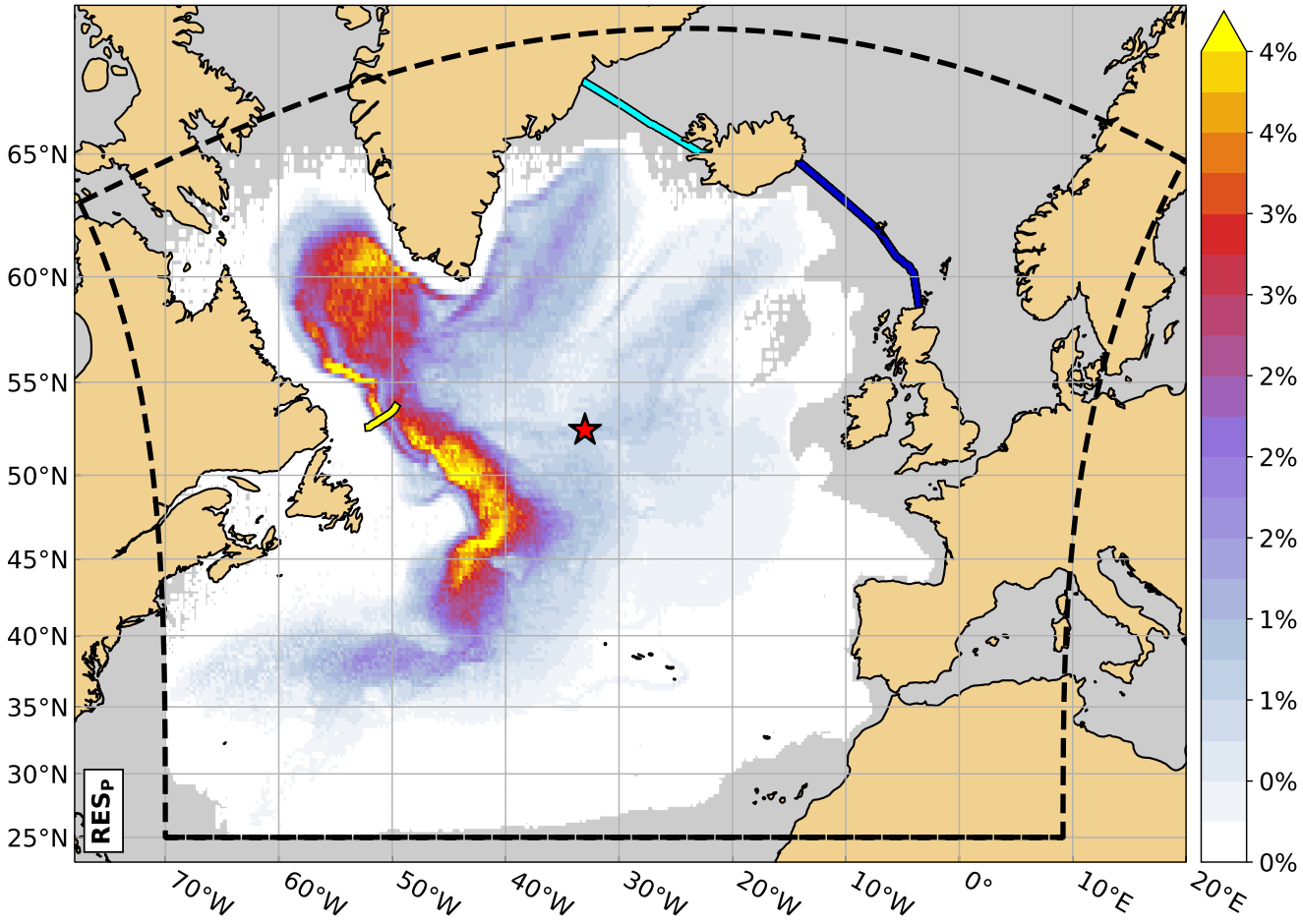

Figure S2. As in Figure 3, but for RES_P (see section 2.1.3 for details of the definition).

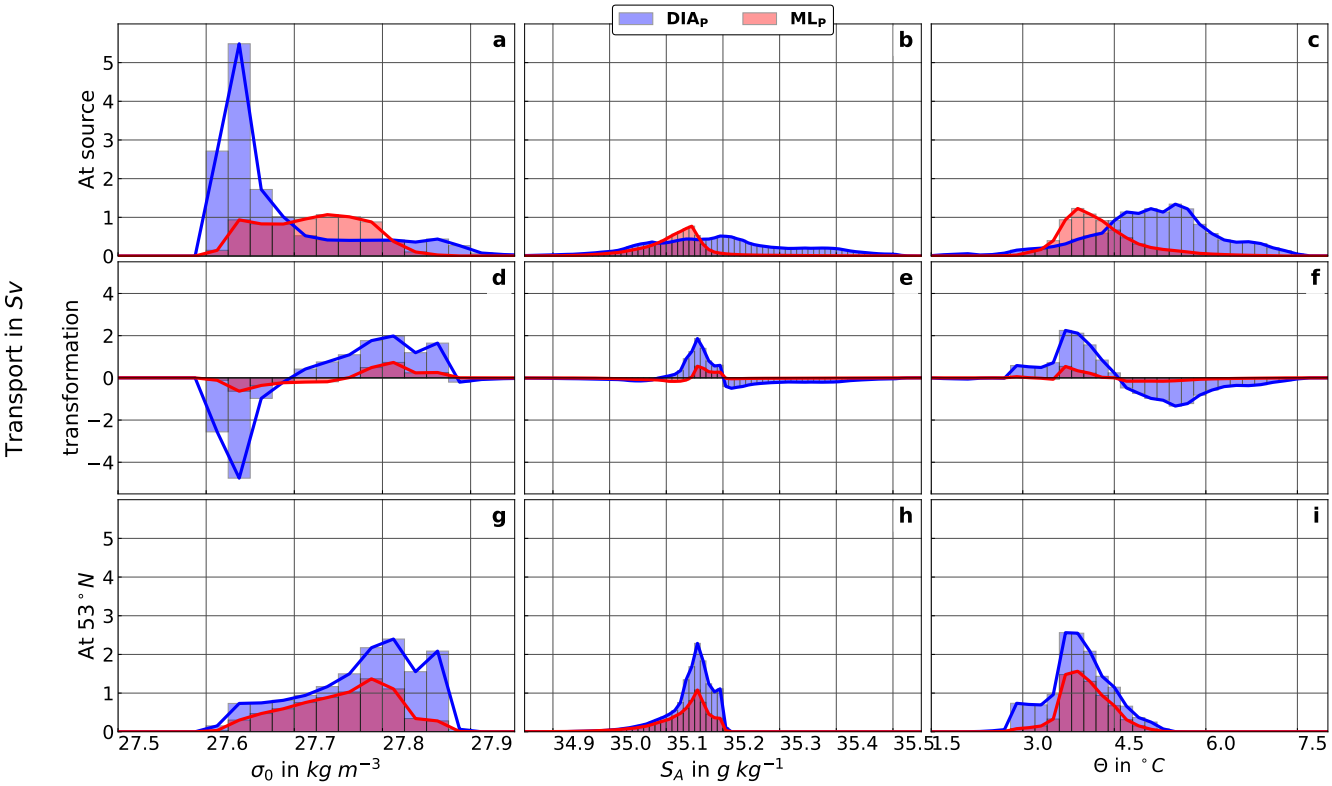

Figure S3. Mean water mass property modifications for DIA_P (blue) and ML_P (red) (see section 2.1.3 for details of the definitions). Shown are mean volume transport in Sv per potential density (referenced to 0 $dbar$, σ_0, (a, d, g), 0.025 $kg\ m^{-3}$ bins), absolute salinity (S_A, (b, e, h), 0.01 $g\ kg^{-1}$ bins) and conservative temperature (Θ, (c, f, i), 0.2°C bins) class at their source region (a to c) and at 53°N (g to i), as well as the volumetric property transformation (d to f).

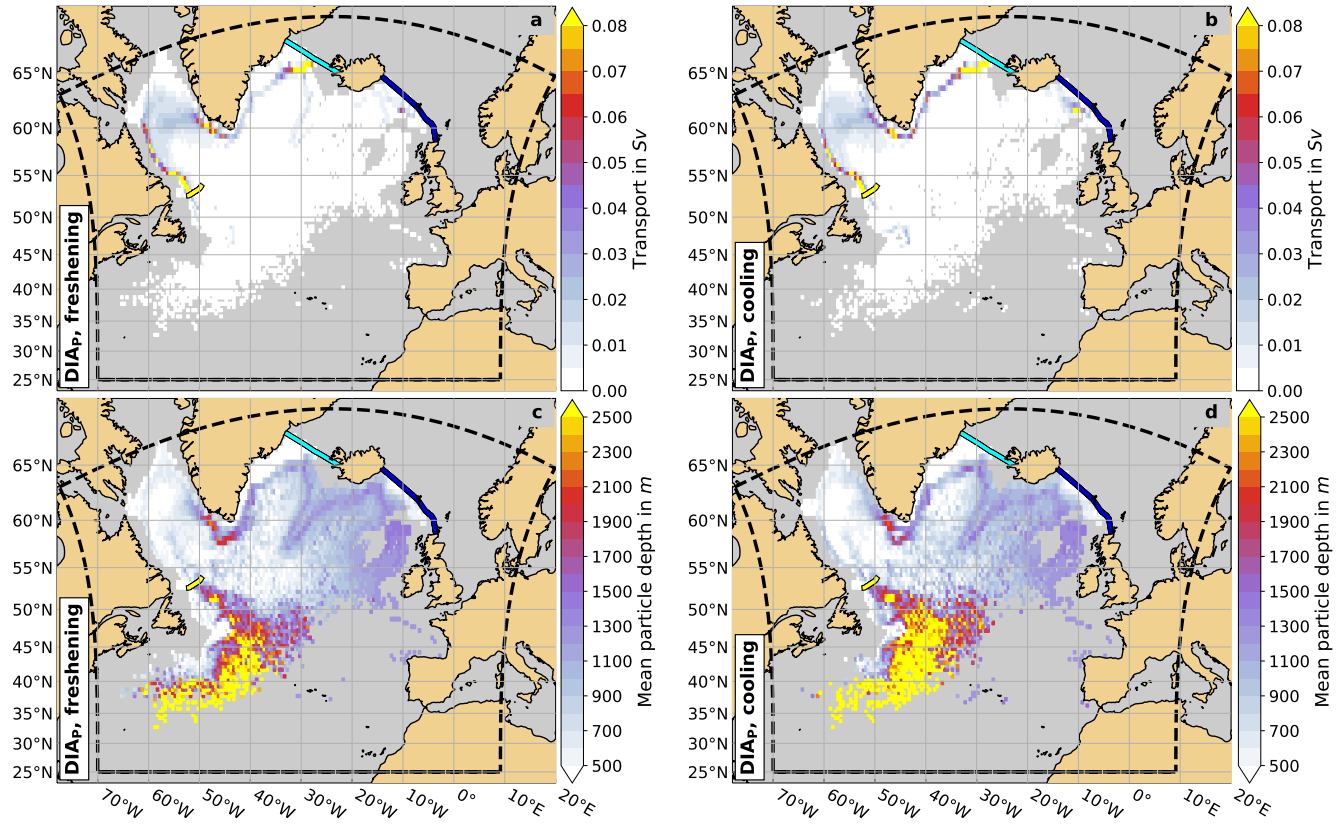

Figure S4. (a-b) Locations associated with most transport in Sv and (c-d) mean particle depth in m per $1/2^\circ \times 1/2^\circ$ bin for $\mathrm{DIA_P}$. The particle locations are chosen as the locations where the difference in salinity between the particle's salinity minimum and its source is halved (a, c) and where the difference in temperature between the particle's temperature minimum and its source is halved (b, d). The yellow line marks the $53^\circ N$ section, the light and dark blue lines mark the Denmark Strait and Iceland–Scotland Ridge sections, respectively. The black dashed line indicates the boundary of the experiment domain.

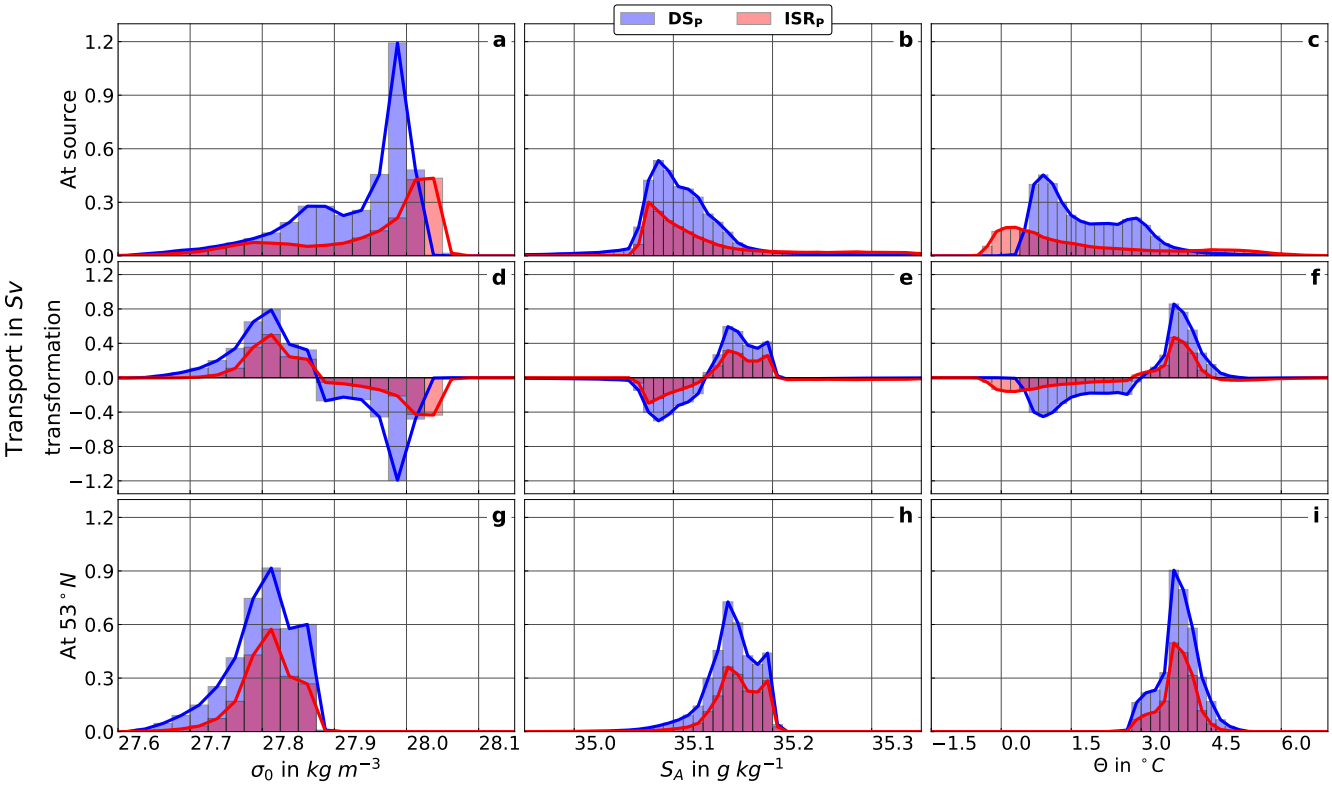

Figure S5. As in Figure S3, but for DS_P (blue) and ISR_P (red) (see section 2.1.3 for details of the definitions).

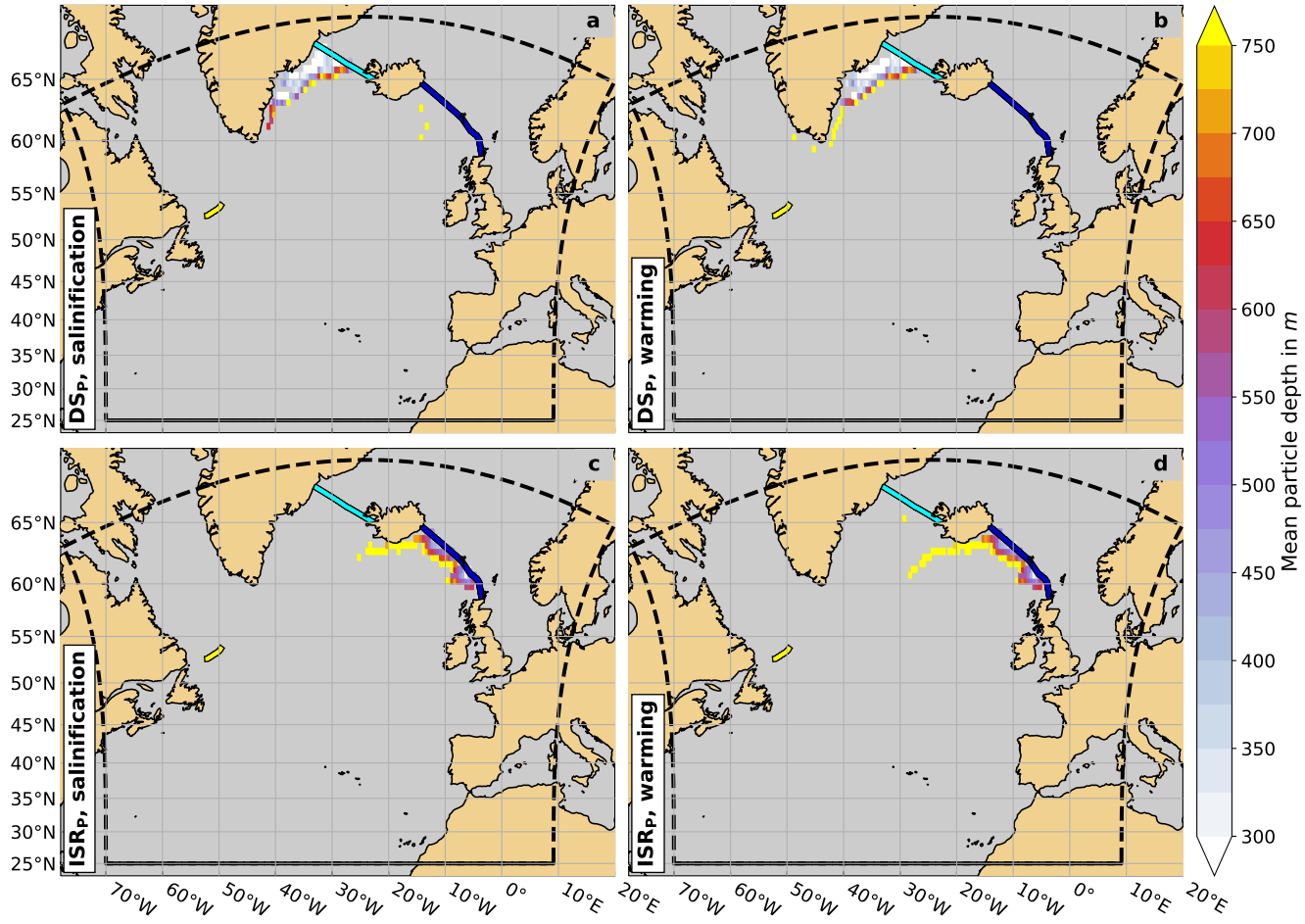

Figure S6. Mean depth of major (a, c) salinity and (b, d) temperature increase for DS_P (a, b) and ISR_P (c, d), calculated as the transport–weighted mean particle depth in m per $1/2^\circ \times 1/2^\circ$ bin. The particle locations are chosen as the locations where the difference in salinity between the particle's salinity maximum and its source is halved (a, c) and where the difference in temperature between the particle's temperature maximum and its source is halved (b, d). The yellow line marks the $53^\circ N$ section, the light and dark blue lines mark the Denmark Strait and Iceland–Scotland Ridge sections, respectively. The black dashed line indicates the boundary of the experiment domain.

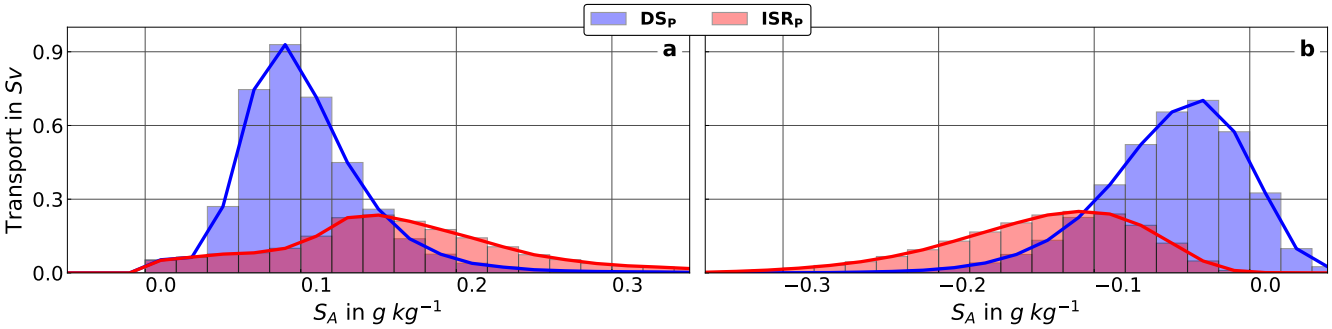

Figure S7. Difference in absolute salinity in $g\ kg^{-1}$ per $0.02\ g\ kg^{-1}$ bin for DS_P (blue) and ISR_P (red) (see section 2.1.3 for details of the definitions). Differences are calculated (a) between the location where the difference in salinity between a particle's salinity maximum and the source is halved and the source, i.e. the change in salinity from the source to the location where 50% of the salinity increase occurs (see Figure S6 a, c). Furthermore, the differences are calculated (b) between particle release and the location where the difference in salinity between a particle's salinity maximum and the source is halved, i.e. the change of salinity from the location where 50% of the salinity increase occurs (see Figure S6 a, c) to $53^\circ N$.

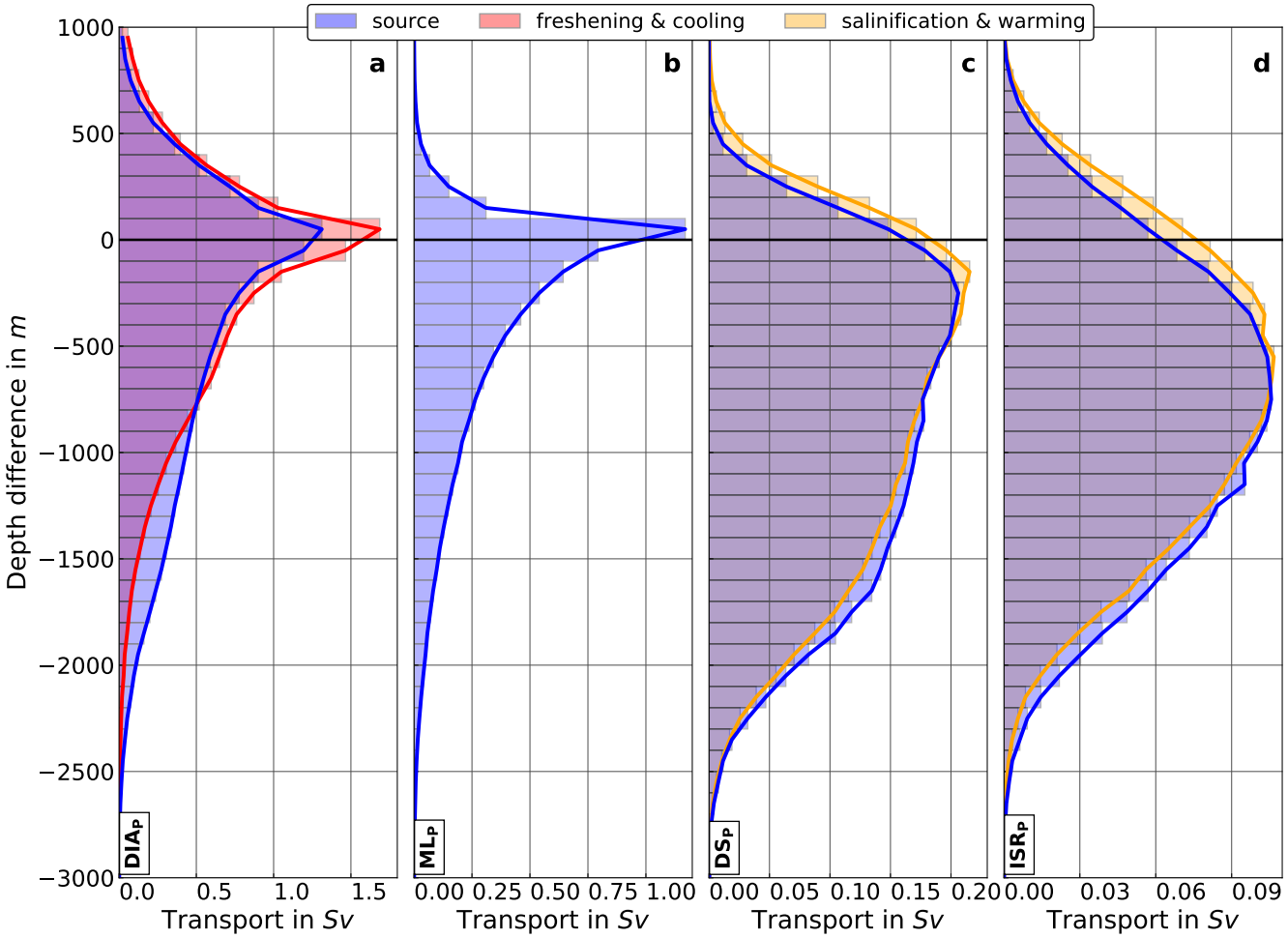

Figure S8. Evolution of particle depth between the particle source (blue) and $53°N$, as well as between the location where the major salinity and temperature decrease (red) or increase (orange) occurs and $53°N$ calculated as the mean transport per depth difference bin ($100\,m$) in Sv for (a) DIA_P, (b) ML_P, (c) DS_P and (d) ISR_P (see section 2.1.3 for details of the definitions).