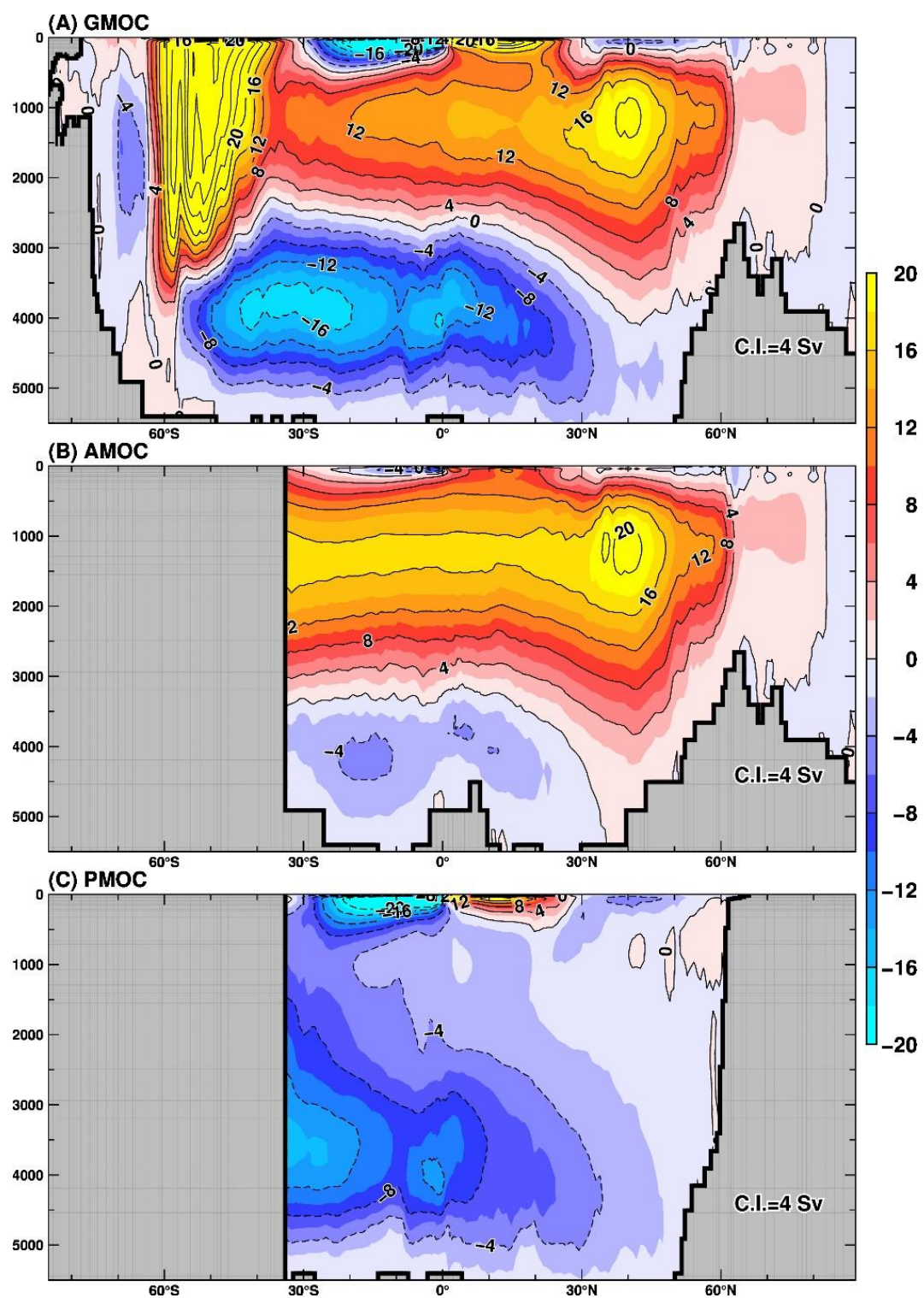
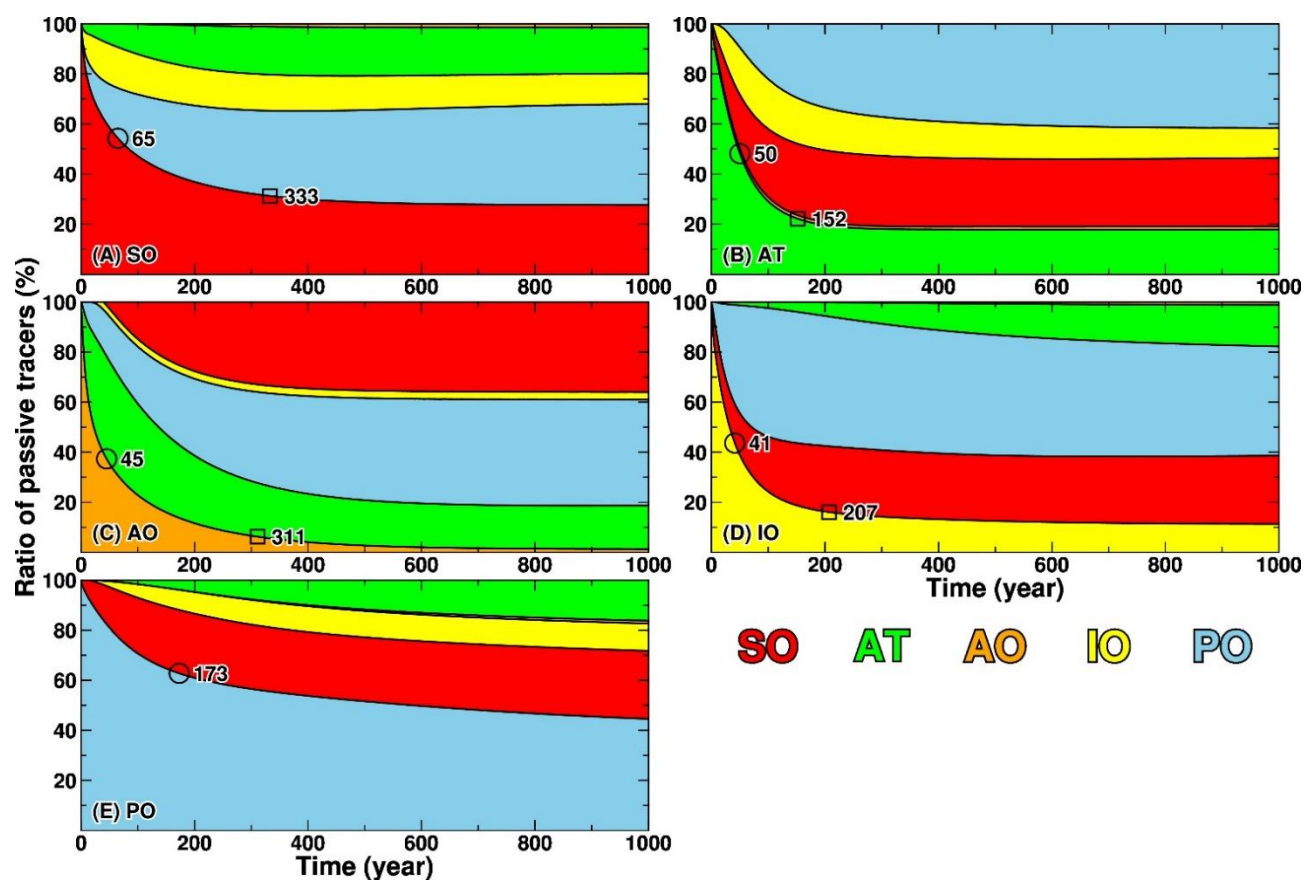


Supplementary Material

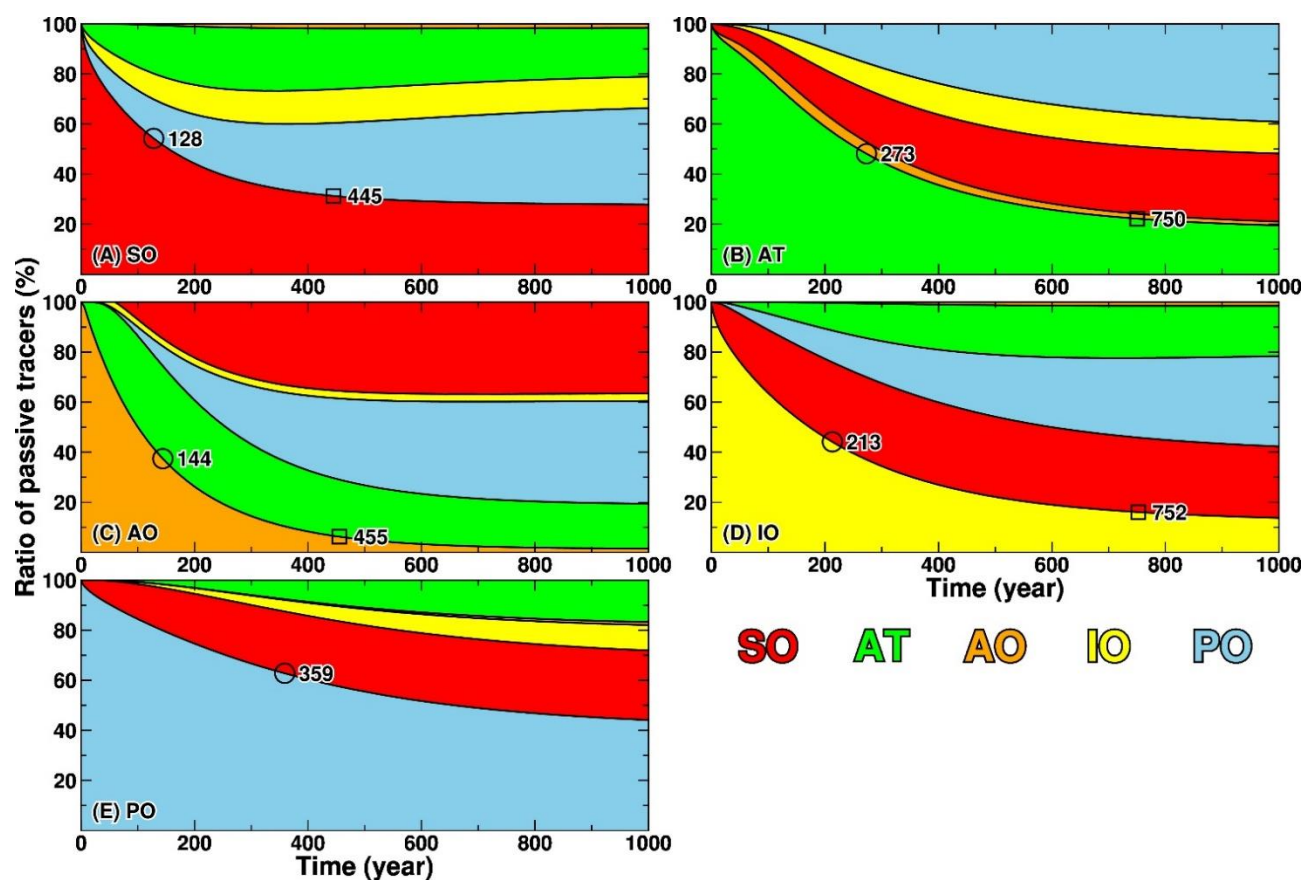
This Supplementary Material includes three figures (Supplementary Figures 1–3) and five MP4 animations (Supplementary Movies 1–5) to further support the findings presented in the main manuscript.



Supplementary Figure 1: Stream functions of vertically-integrated transport (A: global, B: Atlantic sector, and C: Pacific-Indian sector). The plots are based on averages for the last 100 years.



Supplementary Figure 2: Time evolution of the ratio of the five tracers in the surface layer of 0–500 m (A: SO, B: AT, C: AO, D: IO, and E: PO) for 1000 years. See Figure 1B for the colors of the source regions.



Supplementary Figure 3: As for Supplementary Fig.2, but for the intermediate/deep layer below 1000 m to the seafloor.

Supplementary Movie 1: Animation of the normalized concentration for the SO tracer for the first 300 years (A: 0–500 m average, B: 2500–3500 m average, and C:3500–4500 m average). The red contours represent 1.0 of the normalized concentration.

Supplementary Movie 2: As for Supplementary Movie 1, but for the AT tracer.

Supplementary Movie 3: As for Supplementary Movie 1, but for the AO tracer.

Supplementary Movie 4: As for Supplementary Movie 1, but for the IO tracer.

Supplementary Movie 5: As for Supplementary Movie 1, but for the PO tracer.