

Water mass transports and pathways in the North Brazil - Equatorial Undercurrent retroflection

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Introduction

The supporting information provides Figures S1 to S6 that add information regarding the MOC2 oceanographic cruise. Concretely, Figure S1 is a zoom of the inset axes of Figure 1 in the main article, where we show the geographical positions of the sample stations used in this study. The locations are shown together with the April-mean velocity field from the GLY reanalysis on the 18°C isothermal. Figure S2 shows distance-depth plots of temperature and salinity observations along the perimeter of the MOC2 box region. Figures S3 and S4 are a GLY validation that consists in the comparison of the meridional velocity time-series at [23°W-0°N] in the upper 200 m of the water column, as obtained with the model and as observed with the PIRATA subsurface mooring. Figure S5 shows a salinity-temperature diagram that includes both the observations and GLY reanalysis data. Finally, Figure S6 is equivalent to Figure 2 in the main article but with vertically integrated mass transports in panel (c).

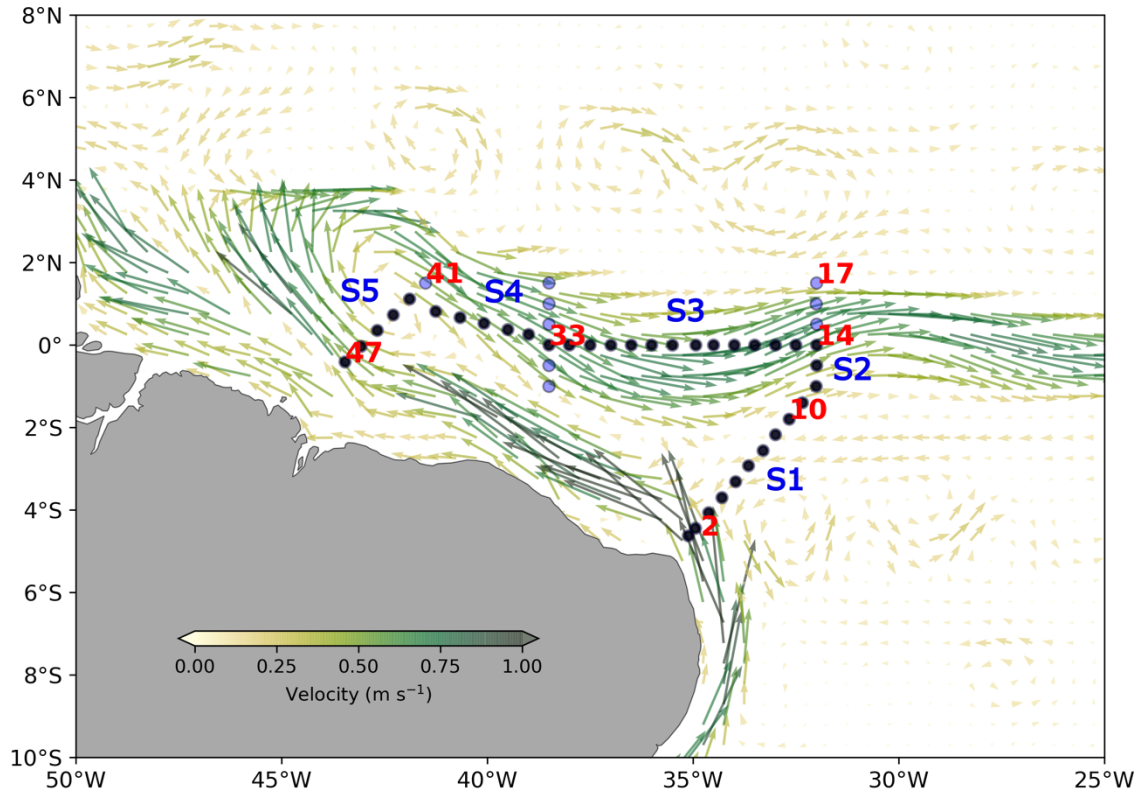


Figure S1. Mean ocean currents (vectors) on the 18°C isothermal during April 2010 as predicted by GLY. The locations of the MOC2 cruise stations are shown (dots) and five referenced sections (labeled in blue).

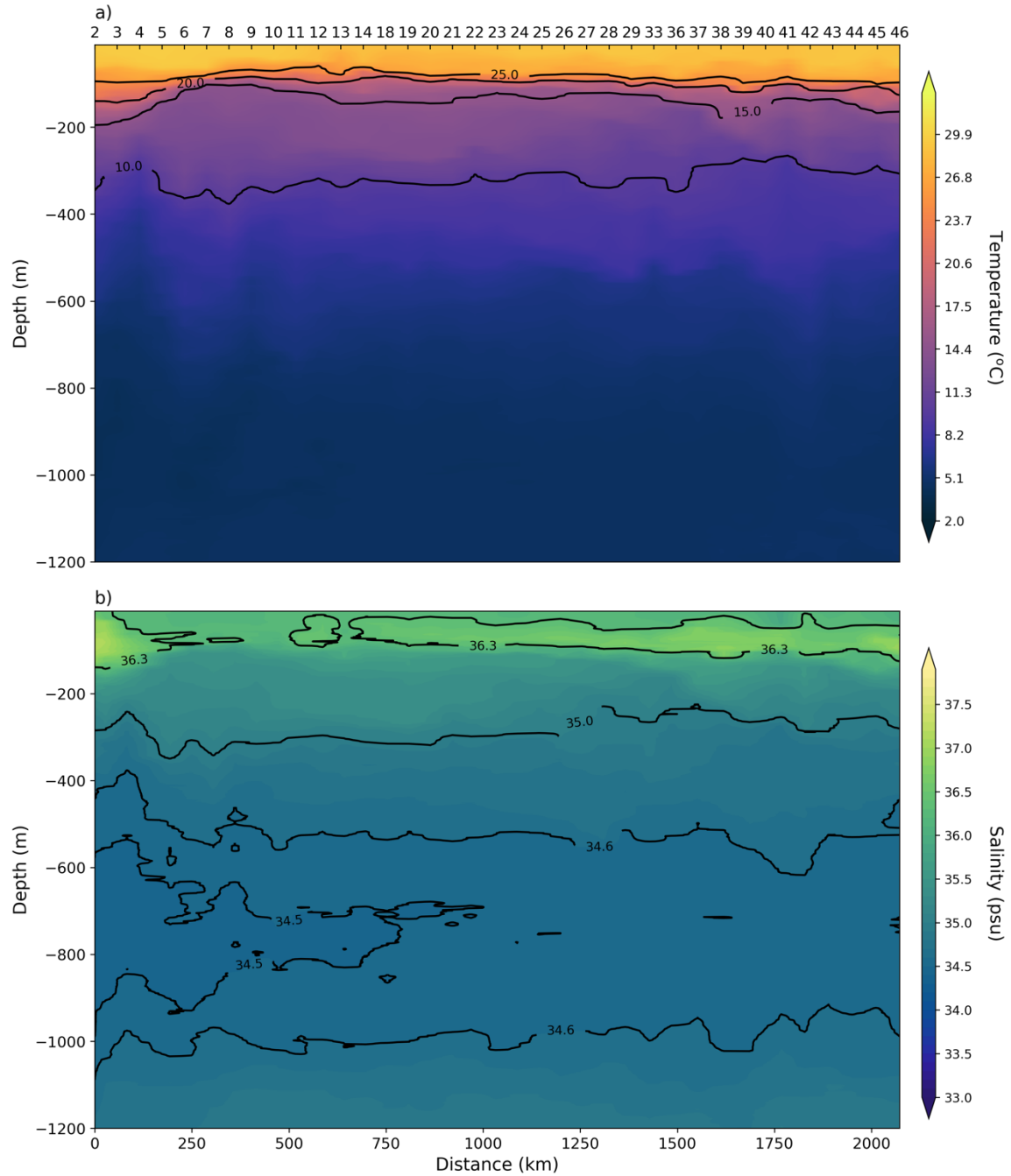


Figure S2. (a) Temperature and (b) salinity distributions as derived from CTD observations between the sea surface and 1200 m, along the perimeter of the MOC2 box region, which correspond to those stations marked with black dots in Figure S1.

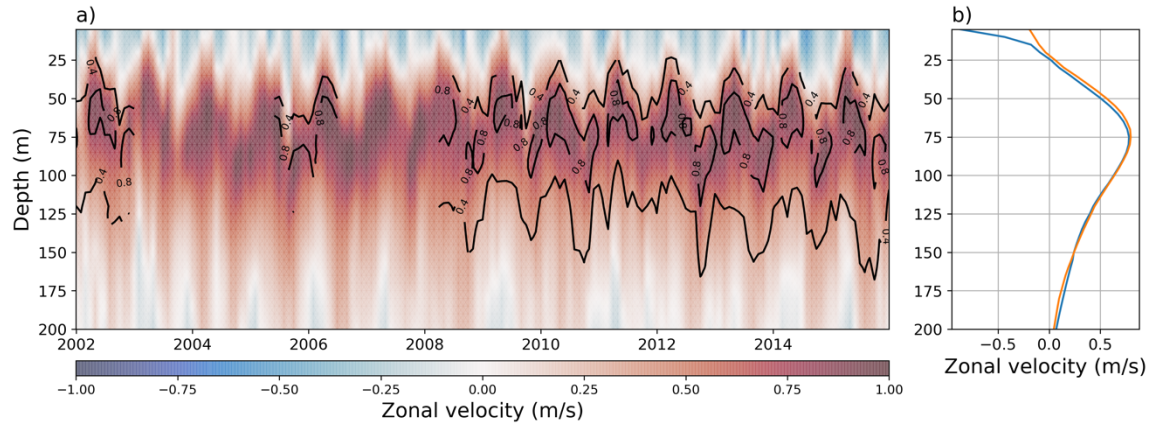


Figure S3. (a) Zonal velocity at [23°W-0°N] as observed with the PIRATA subsurface mooring (black contours) and as derived from the GLY reanalysis, linearly interpolated at the same time and location (shaded). (b) Time-mean zonal velocity observed (blue) against modeled (orange) for the whole time series shown in a). The observations have important gaps at deep layers between 2003 and 2008.

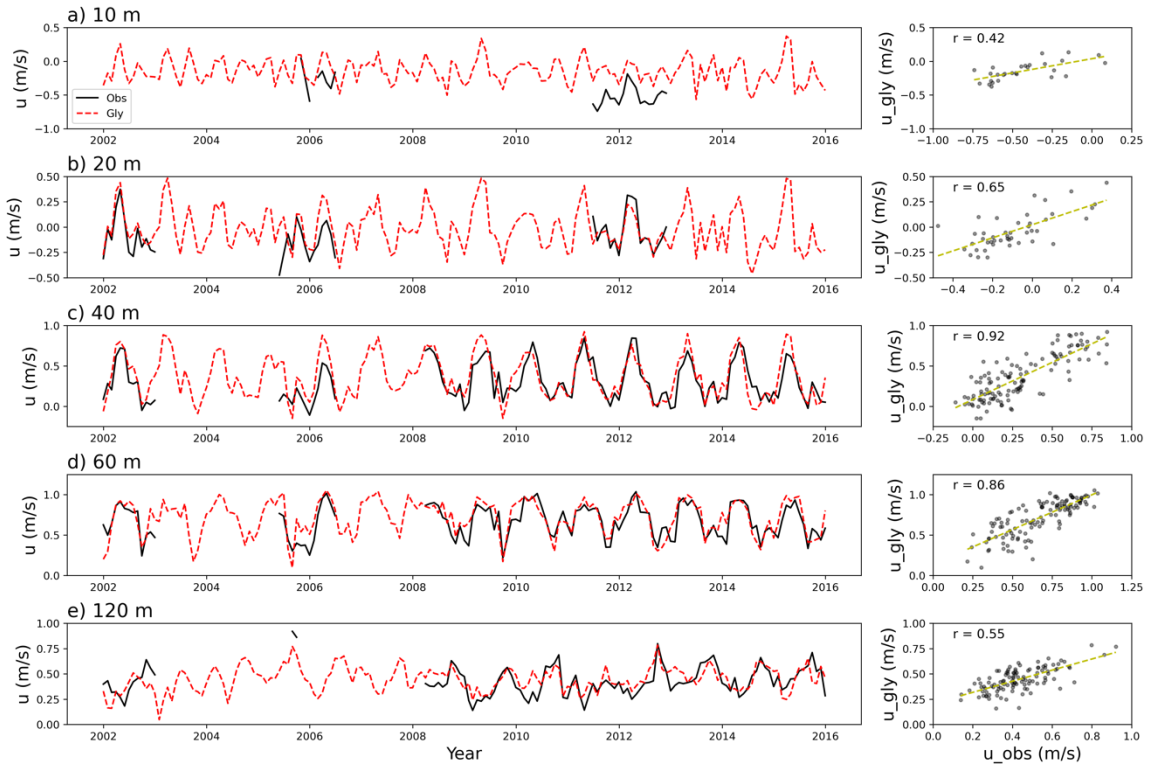


Figure S4. Monthly zonal velocities at [23°W-0°N] as observed with the PIRATA buoy (black curve) and as derived from the GLY reanalysis, linearly interpolated at the same time and location (red curve). The zonal velocity is shown at 10, 20, 40, 60 and 120 m depth (panels a, b, c, d and e, respectively). The observations against the reanalysis data are also presented as scatter plots in the right column, with a regression line (yellow dashed line) and the corresponding regression coefficient.

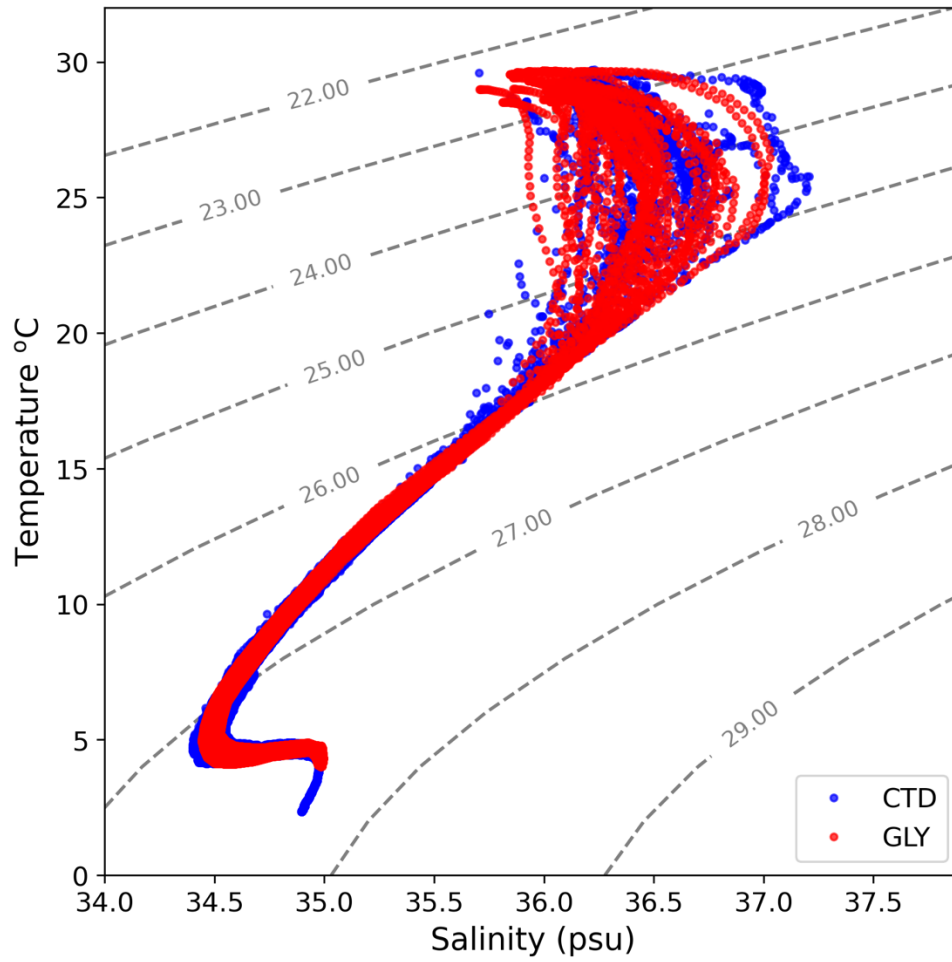


Figure S5. Salinity versus potential-temperature diagram as derived from the observations (blue dots) and the GLY reanalysis (red dots). The dashed contour lines in grey represent the potential density levels in kg m⁻³.

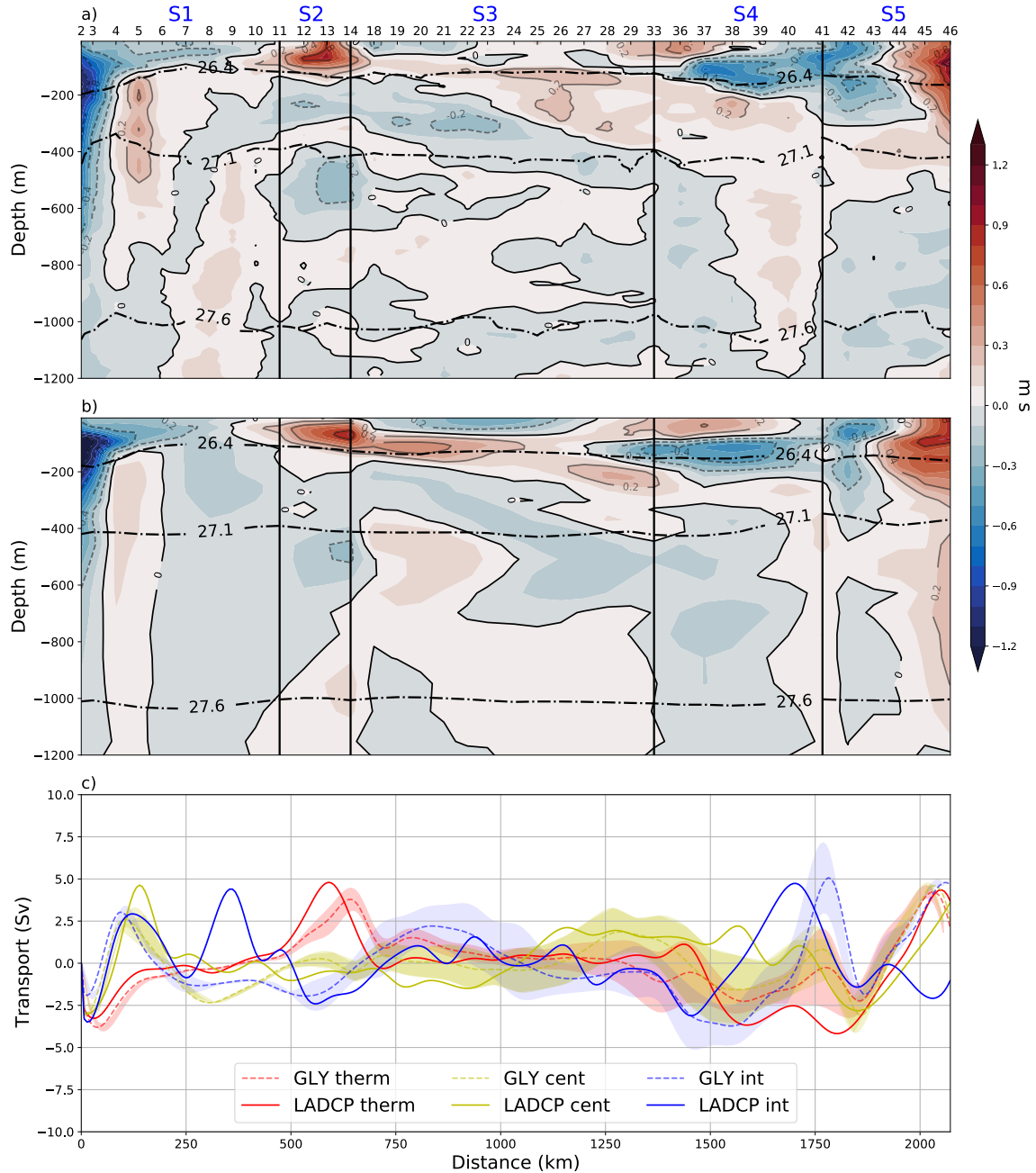


Figure S6. (a) Distribution of the normal-to section ADCP velocity, between the sea surface and 1100 m, along the perimeter of the reference section in Figure 1, as if seen from outside the reference box; negative and positive values represent flow into and out of the reference box. The potential density surfaces 26.4, 27.1 and 27.6 kg m^{-3} are drawn as black dashed-dot contours. (b) Same as panel (a) but using the interpolated values from GLY. (c) Vertically integrated mass transports calculated every two stations for the surface-thermocline (red), central (yellow) and intermediate (blue) waters. The solid lines represent the observed transports while the dashed lines denote the transports as deduced from GLY; shaded colors show the corresponding standard deviation. The vertical lines in all panels denote the limits of the S1 through S5 portions of the reference section, as shown in the inset of Figure 1.