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An updated analysis of the Freshwater Transport by the Atlantic Meridional Overturning Circulation at nominally 34.5ºS

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The freshwater transport (Mov) by the Atlantic Meridional Overturning Circulation (AMOC) across 34.5ºS is computed using observations from 49 eXpendable BathyThermograph (XBT) AX18-lines between 2002-2019. The Mov is used as an indicator of the AMOC stability at 34.5ºS. XBT data present a negative Mov mean of -0.15±0.09 Sv, indicating a bi-stable AMOC regime. Results are complemented with data from Argo floats, numerical ocean models, and coupled models. The Mov estimation is very sensitive to the dataset used, with some coupled models estimating positive Mov. To clarify the causes of the opposite sign of the Mov, we have investigated the differences in the vertical profiles obtaining fresher upper and saltier deep waters in models with positive Mov. Moreover, we have investigated the time variability and correlation between Mov, MOC, and meridional heat transport (MHT), estimating a strong linear relationship between them. Finally, we have studied the seasonal variability of the South Atlantic Meridional Fluxes from all the datasets used, suggesting a more negative Mov and a stronger MOC and MHT from April to August at 34.5ºS in the South Atlantic Ocean.

Topic

Value of AMOC observing –what have we learned?

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