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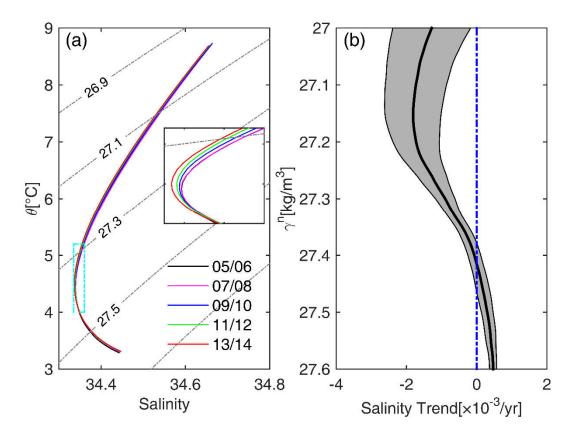
## Supplement of

## Freshening of Antarctic Intermediate Water in the South Atlantic Ocean in 2005–2014

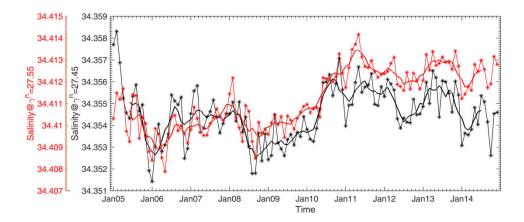
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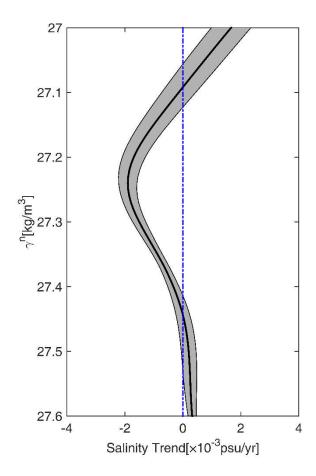
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Supplementary 1 (a) Biennial mean  $\theta$ -S diagram averaged over Region A for JAMSTEC data with  $\gamma^n$  surfaces superimposed (grey solid-dotted lines). The inserted figure is the magnification of the area delineated by cyan solid-dotted box. The corresponding time for each  $\theta$ -S curve is listed in the bottom-right corner (i.e. 05/06 for 2005-2006). (b) Salinity trend along  $\gamma^n$  surfaces for period Jan 2005 - Dec 2014 is displayed by the thick black line, and the 95% confidence intervals (F-test) are represented by the light grey shadings, calculated from the JAMSTEC data.



Supplementary 2 Time series of monthly salinity on the  $27.45\gamma^n$  (black) and  $27.55\gamma^n$  (red) surfaces, calculated from the IPRC data and averaged over the Region A shown in Fig. 2. Thin star lines and thick lines represent monthly and 13-month running mean values, respectively.



Supplementary 3 Salinity trend along  $\gamma^n$  surfaces for period Jan 2005 - Dec 2014 is displayed by the thick black line, and the 95% confidence intervals (*F*-test) are represented by the light grey shadings, calculated from the SODA data.