The connection between Southern Ocean Winds, Atlantic Meridional Overturning, and Indo-Pacific Upwelling.

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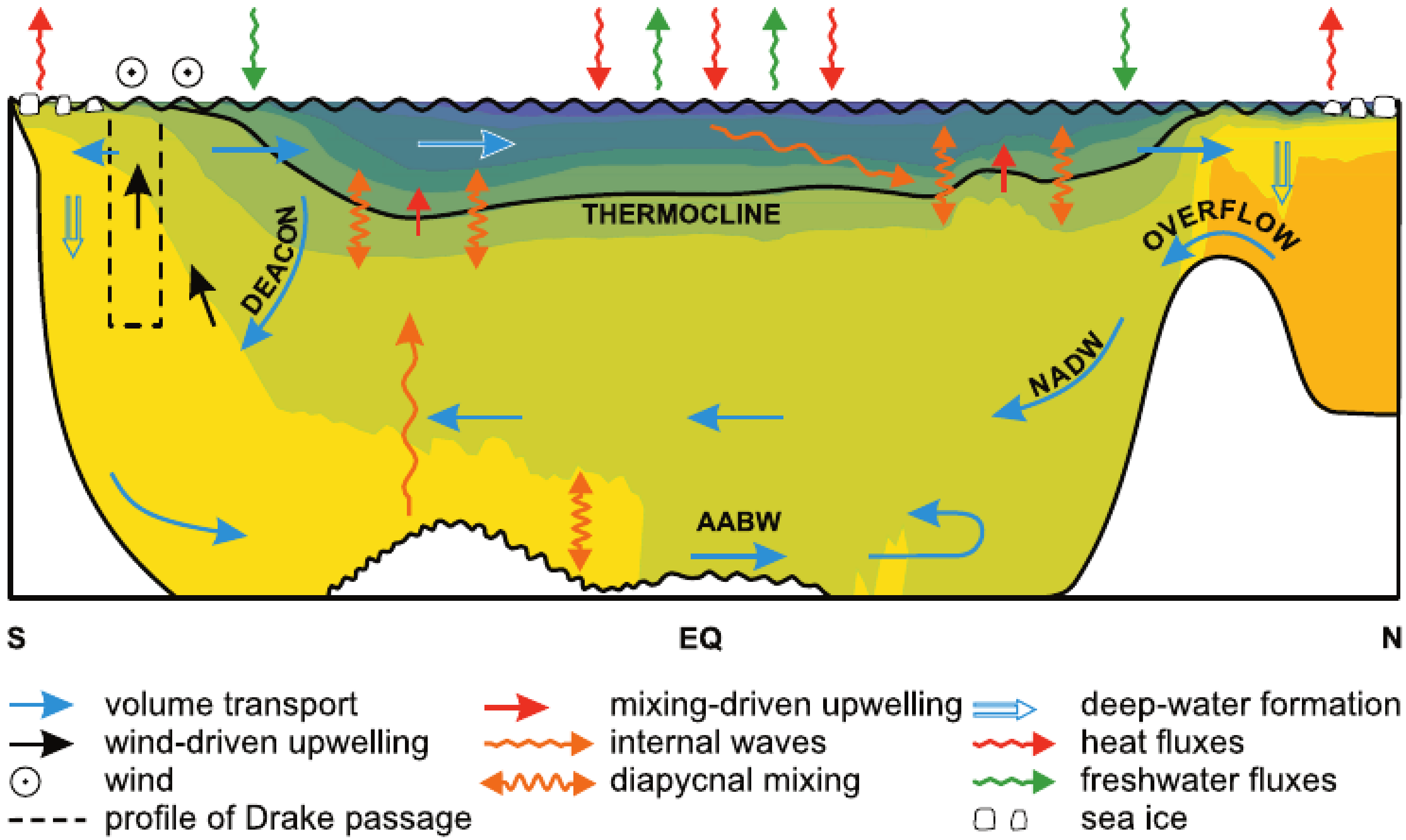
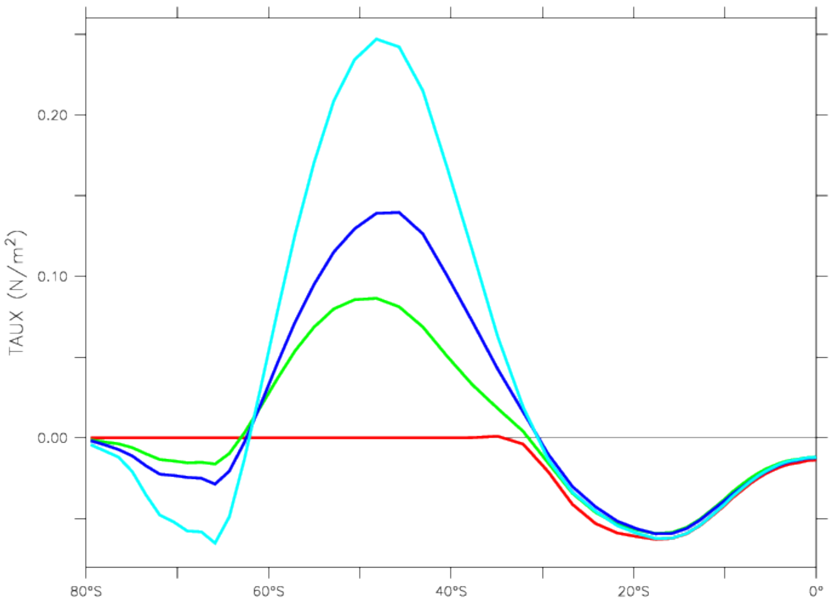
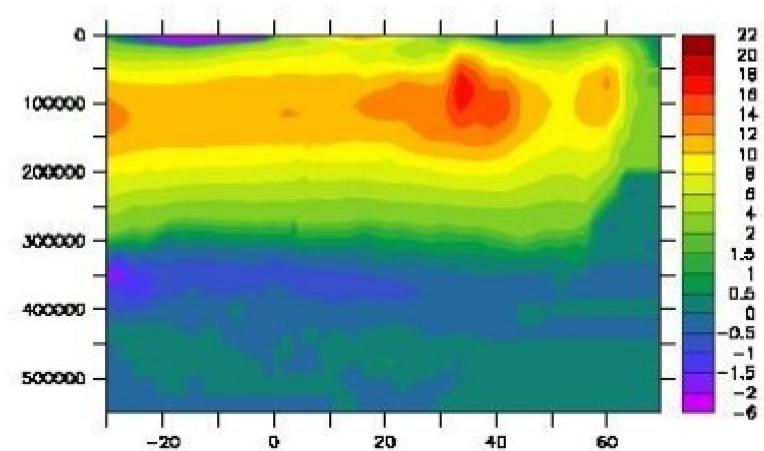


Kuhlbrodt et al. 2007

zonally averaged wind stress



NULL, HALF, CONT, TWO

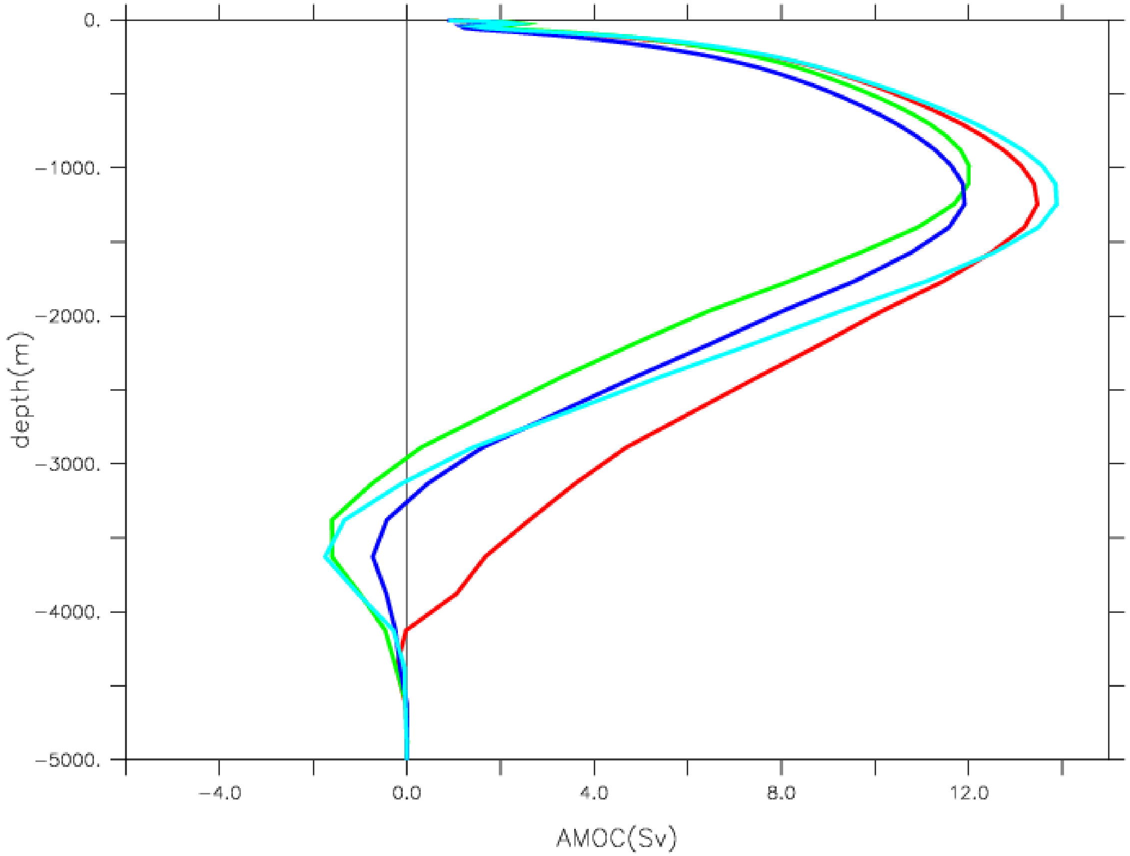


Residual Atlantic Overturning, CONT

Shields et al. 2012

The GCM: CCSM4 in its T31x3 configuration:
3.75 x 3.75 degree, 26 levels in the atmosphere
0.6 - 3 degree, 60 levels in the ocean
Danabasoglu & Marshall the Elder (2007) version
of stratification dependent isopycnal and thickness diffusion

Residual Overturning at the Equator



NULL, HALF, CONT, TWO

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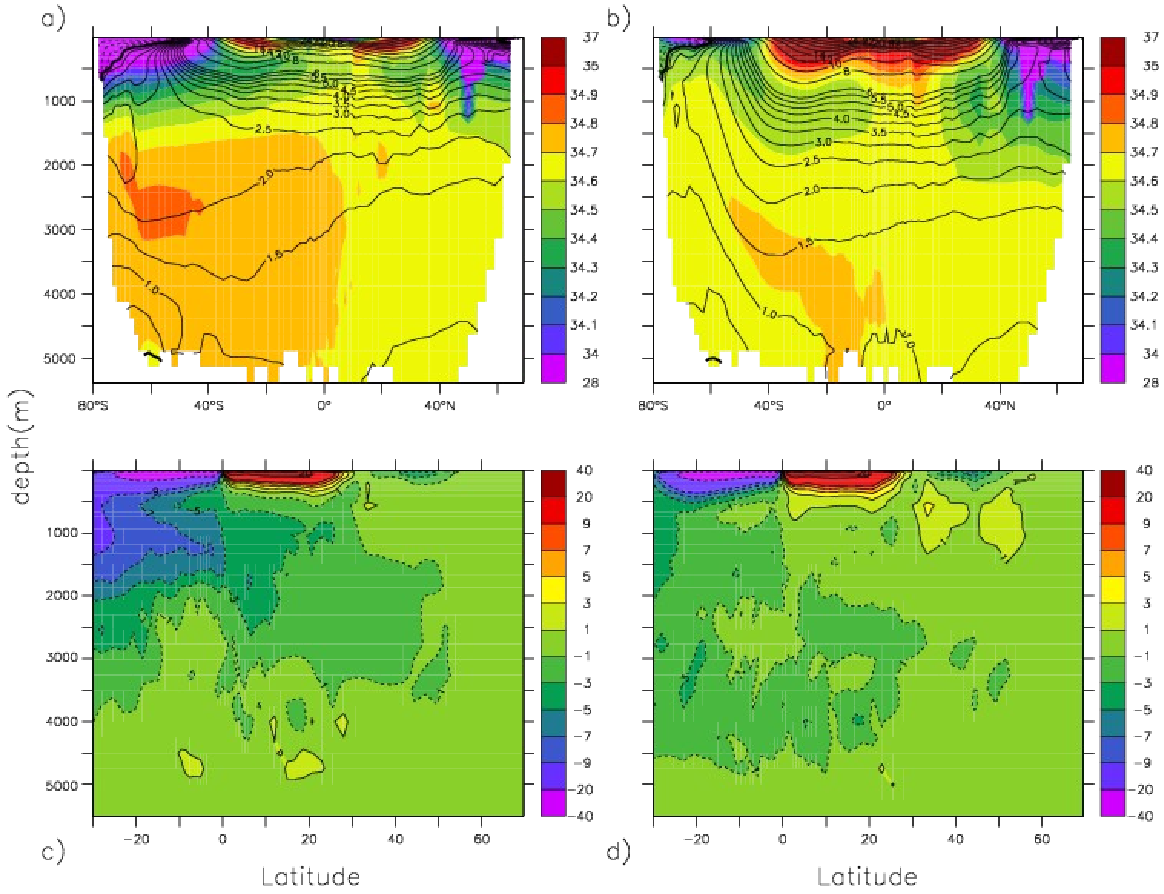
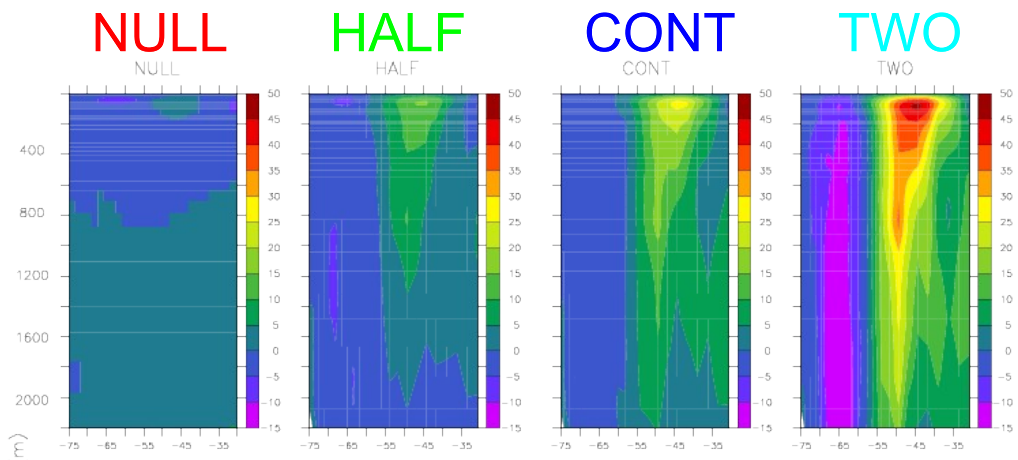
Indo-Pacific Salinity and Temperature

NULL

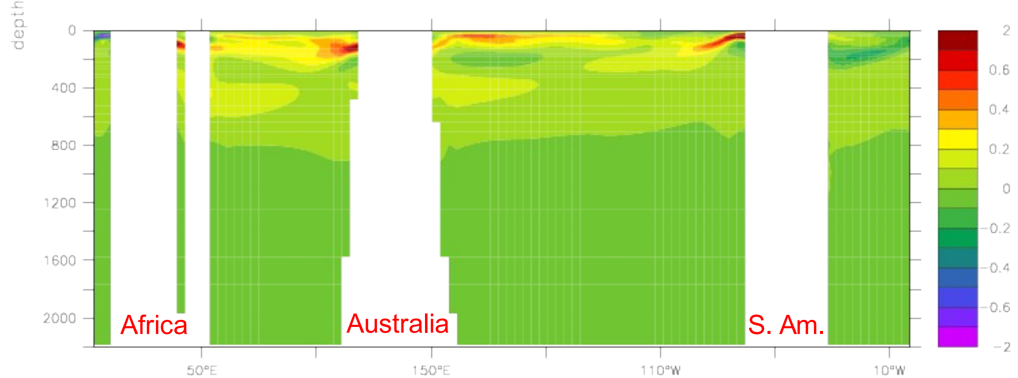


CONT

Indo-Pacific residual overturning



Southern Ocean
Residual overturning



Stratification along 20S

NULL - TWO

Exp.	$taux_{ave}$	$taux_{DP}$	$DPtr.$	$AMOC_{eq}$	$Upwelling$	$Overturning$	κ_{GM}
NULL	0	0	0	13	4 / 9	5 / -7 / 4	500
HALF	0.9	0.6	110	12	5 / 7	20 / -11 / 15	570
CONT	1.4	0.6	100	12	9 / 3	35 / -15 / 26	610
TWO	2.5	1.4	180	14	13 / 1	60 / -22 / 42	700

Conclusions

- in CESM there is no eddy compensation or saturation

- in a fully coupled GCM Southern Ocean winds do not affect the Atlantic overturning

- future work to investigate the AMOC should not focus on eddies, but on NADW formation and diapycnal mixing (see Warren 1981 ;-)