MyScience Cruise

Water Masses from Africa to South America

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Introduction

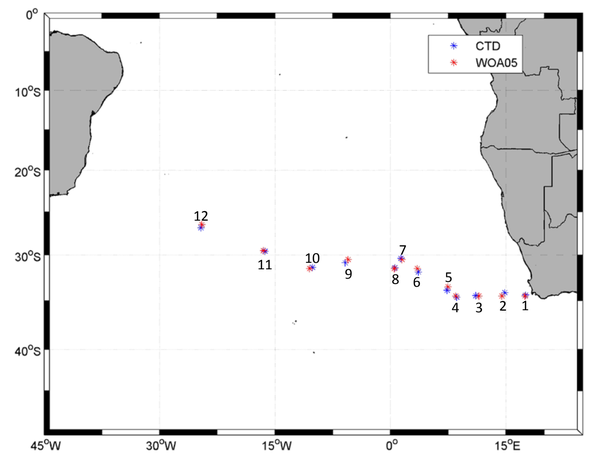
The South Atlantic Ocean plays an important role on the climate system since it's the only ocean with an equatorward net heat transport (TOMCZAK; GODFREY, 1994). It is influenced by fluxes from the adjacent basins such as the North Atlantic, South Pacific and Indian Oceans (CAMPOS *et al*., 1999). Thus, investigating the water masses and its paths within this ocean is essential for climate and climate change studies. This work made use of in situ data from a meteoceanographic cruise through the South Atlantic Ocean to evaluate changes on the temperature and salinity index of the South Atlantic Central Water and the Antarctic Intermediate Water between the African and South American continents.

Methodology

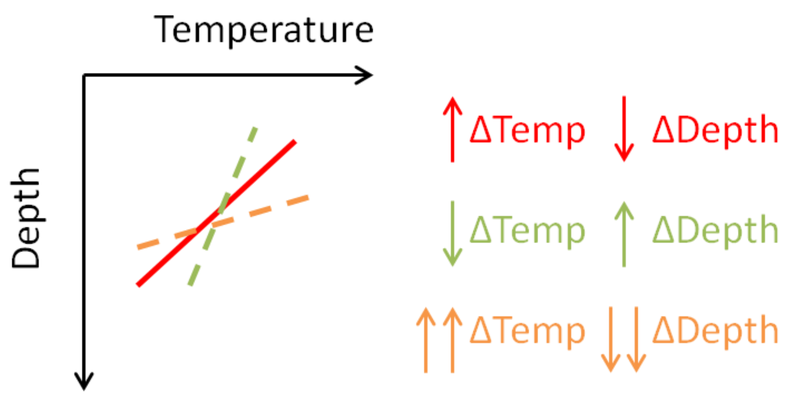
✓12 CTD profiles were conducted on board of the RV Meteor on the M124 cruise from South Africa to Brazil.
✓Comparison with WOA (2005) climatology
✓Focus on the South Atlantic Central Water (SACW) and Antarctic Intermediate Water (AAIW) thermohaline index changes through the South Atlantic basin

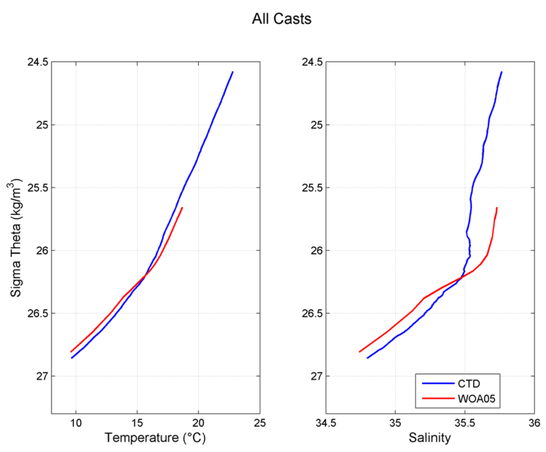
Feature	1	2	3	4	5	6	7	8	9	10	11	12
C		■		■		■			■			
A					■		■			■		■
E-A								■				
E-C			■									
E-CAC											■	
BC	■											

C → Cyclone
A → Anticyclone
E-A → Edge between anticyclones
E-C → Edge between cyclones
E-AC → Edge between an anticyclone and a cyclone
BC → Benguela Current



South Atlantic Central Water

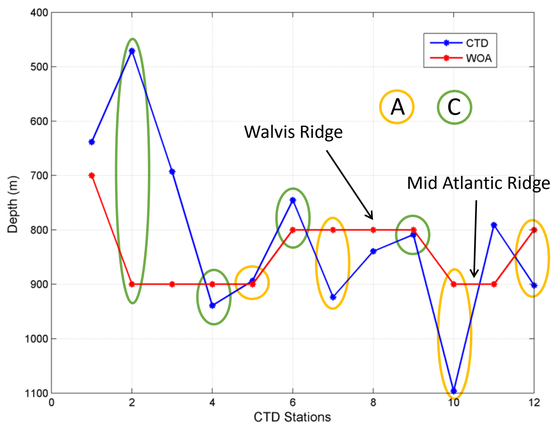




Figures:
Up – Scheme of changes of the thermocline position.

Down – Temperature and Salinity profiles of central levels from all casts.

Antarctic Intermediate Water

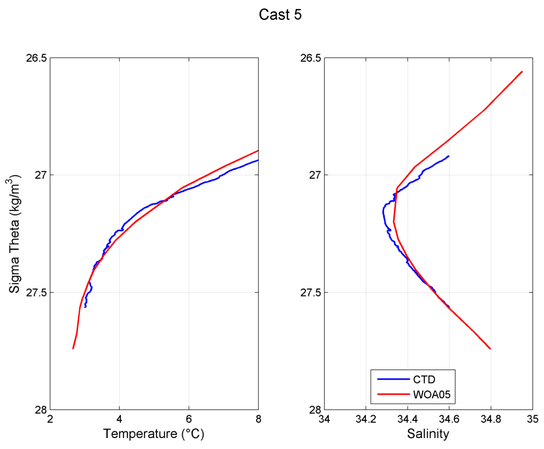


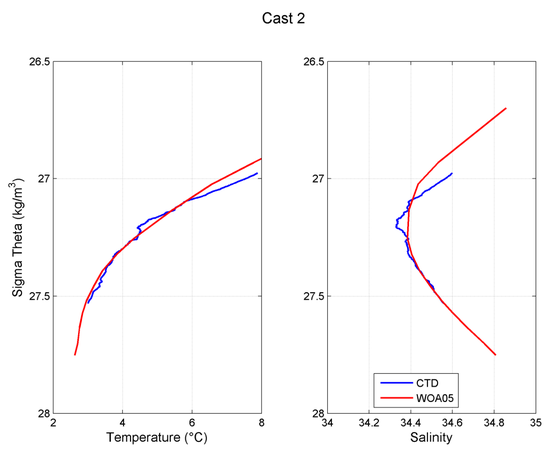
East West

Figures:
Left – Depth of CTD and WOA minimum salinity for each CTD station.

Down left – Temperature and Salinity profiles of intermediate levels from a anticyclone station.

Down right – Temperature and Salinity profiles of intermediate levels from a cyclone station.





Summary

✓On intermediate levels, for most of the stations, cyclones are associated with shallower intermediate waters while anticyclones are associated with deeper intermediate waters. This behavior is a direct consequence of a divergence (convergence) of a cyclone (anticyclone).
✓On central levels, all the stations showed a steeper thermocline which means that less temperature change over depth and a mean of all casts showed the same behavior which may be associated with a seasonal cycle or changes in the thermohaline properties.

References:

TOMCZAK, M.; GODFREY, J.S. Regional Oceanography: an introduction. England, Elsevier Science Ltd. 1994.
CAMPOS, E.; BUSALACCHI, A.; GARZOLI, S.; LUTJEHARMS, J.; MATANO, R.; NOBRE, P.; OLSON, D.; PIOLA, A.; TANAJURA, C.; WAINER, I. The South Atlantic and climate In: THE OCEAN OBSERVING SYSTEM FOR CLIMATE, 1999, St. Raphael, France. OCEANOBS99, 1999.