CLIVAR Exchanges

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CLIVAR is an international research programme dealing with climate variability and predictability on time-sales from months to centuries. CLIVAR is a component of the World Climate Research Programme (WCRP). WCRP is sponsored by the World Meteorological Organization,the International Council for Science and the Intergovernmental Oceanographic Commission of UNESCO.

Editorial

Catherine Beswick

This thematic edition of CLIVAR Exchanges is devoted to CLIVAR's ocean basin panels; the Pacific Ocean panel, the Atlantic implementation panel, the Southern Ocean panel, and the Indian Ocean panel. The issue has provided an opportunity for these panels to communicate recent projects related to panel activities. Pulling in the paleo perspective, we also have a contribution from members (and co-authors) of the CLIVAR/PAGES working group, highlighting the Ocean2k initiative.

At the end of January the International CLIVAR Project Office (ICPO) bid farewell to Bob Molinari, as he embarked on his retirement. I am sure I am not alone in thanking Bob for all of the hard work dedicated to the ICPO and the wider CLIVAR community. We wish him and his wife Pat all the very best during their final weeks in the UK and on their journey back to the US.

In the hunt to find a suitable replacement for Bob, I have stepped into the role of acting director, and will endeavour to serve the ICPO and CLIVAR well during this temporary term. Otherwise the project office continues with its activities, including the launch of a new CLIVAR bulletin earlier this month to keep our community more informed of activities of CLIVAR, WCRP, and other related programmes (to sign up to the monthly bulletin, see the CLIVAR website www.clivar.org).

We also had a presence at the recent 2012 Ocean Sciences Meeting, 21 February, Salt Lake City USA. Martin Visbeck, CLIVAR SSG co-chair, kicked off the evening event with a brief overview of CLIVAR objectives and organisation. He emphasised that international CLIVAR focused on problems that require international coordination or cooperation and outlined how CLIVAR fits into the bigger scheme of WCRP and the other international Global Change programmes. He then invited comments from the audience on what a future WCRP programme that focuses on the ocean-atmosphere component of the climate system should encompass. Suggestions from the floor can be viewed here on the CLIVAR website (http://www.clivar.org/resources/news/clivar-town-hall-meeting).

Front Cover Image: Courtesy of Weldong Yu

South Atlantic Meridional Overturning Circulation (SAMOC) - Fourth Workshop

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7 BU (Spain)
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10 Oceans and Coasts (South Africa)
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The fourth workshop of the South Atlantic Meridional Overturning Circulation (SAMOC 4) took place in Simons Town, South Africa, on 27-29 September 2011. The main objectives of the workshop were to: highlight recent modeling results related to the importance of observing the South Atlantic components of the Atlantic Meridional Overturning Circulation (AMOC); provide an overview of results from ongoing pilot arrays and related observational programs; discuss the status of proposals submitted for observations and modeling; and coordinate new proposals aimed at SAMOC goals. Discussions on ship time availability to support the proposed fieldwork in the region, and on developing new agreements for sharing these resources, also took place.

In the morning of the first day several scientists made short presentations on science relevant to the SAMOC goals. These presentations focused on role of Agulhas eddies in the South Atlantic and highlighted the significance of recent changes in surface temperature, wind stress and wind stress curl associated with southward displacement of zonal winds. Brief presentations were made on new modeling results and

observations, followed by plenary discussions on current and future plans. A review of recent results from ongoing modeling experiments demonstrated that 30-35°S was the best latitude to monitor the MOC variability, confirming previous results derived from the analysis of numerical and theoretical modeling studies conducted in the United States, the United Kingdom, Brazil and the Netherlands. Firstly, higher latitudes provide stronger density gradients and a larger Coriolis parameter, leading to improved signal-to-noise characteristics for geostrophic velocity calculations. Secondly, the strongest signals are more tightly confined to the boundaries at higher latitudes, particularly at the eastern boundary, indicating that a more limited portion of the trans-basin array would require more intense horizontal resolution. Thirdly, estimation of the stability of the MOC – a crucial factor in attribution of observed signals – is more favorable at higher latitudes. Finally, ocean model studies indicate that at higher latitudes it is possible to utilize less expensive mooring technologies (i.e. pressure-equipped inverted echo sounders – PIES), reducing the cost of the overall system and its maintenance.

The status of and future plans for existing observing programs were discussed. Details of funded, submitted and to be submitted projects are given in the attached Table 1.

One crucial component of the overall SAMOC observing system, the proposed trans-basin array at 34.5°S, was thoroughly discussed; the comments from the US-NSF proposal were also reviewed. The consensus of the workshop attendees was that the proposal should be resubmitted with modifications. The array will be proposed with approximately 20 ocean moorings, a combination of tall 'dynamic height' moorings and PIES, coupled with several shorter direct velocity moorings on the shelf on either side of the basin.

Measurements at the boundaries were considered crucial to close the budgets. A group of North and South American countries operating through the Inter-American Institute for Global Change Research (IAI) has a large shelf-monitoring program funded for the western boundary that would fit well with the western end of the recommended trans-basin array. In addition, a Brazilian proposal to augment the shallow array close to the current US-funded PIES deployed at 34.5°S was funded. At the eastern boundary, South African scientists at the Centre for Operational Oceanography were funded to deploy an array of 5 ADCP moorings from the coast out to the French array of CPIES.

The group was in agreement that attribution of the observed signals at 30-35°S will require both the continuation and augmentation of the existing concurrent interocean exchange observing systems: the GoodHope array and the Drake Passage programs. Observations along the GoodHope transect will, in conjunction with the German array of PIES/CPIES and altimetry, help quantify the Agulhas rings shed at the retroflection, while the Drake Passage observations will aid in determining flow via the cold-water route. The group also agreed it was important to analyze the products of different ocean general circulation models to study the different branches of the Deep Western Boundary Current in the South Atlantic.

Crucial to the success of the program will be the availability of an impressive research fleet. South Africa is building a new global class ship that will become operational in 2012. The University of Sao Paulo (Brazil) has purchased a regional class ship that will also be available in 2012. Brazilian scientists have also obtained funds to buy new oceanographic equipment and refurbish the Brazilian Navy vessel Cruzeiro do Sul. In Argentina, in addition to the currently available R/V Puerto Deseado, a 40 foot catamaran will be available for near shore mooring services.

One action item from the workshop is the preparation of a SAMOC implementation plan to be submitted to International CLIVAR for endorsement. The SAMOC V workshop will take place in Miami, US. The local organizers are Renellys Perez and Chris Meinen.

The SAMOC IV workshop was hosted by Isabelle Ansorge and Chris Reason (University of Cape Town). It was chaired by Silvia L. Garzoli (AOML, USA), Sabrina Speich (LPO, France), and Alberto Piola (SHN, Argentina). The workshop was attended by 43 scientists and students from eight countries (Argentina, Brazil, France, Germany, Spain, South Africa, the United Kingdom, and the United States). Support for the workshop came from the South African National Antarctic Programme (SANAP) Development Grant and the Johann Lutjeharms NRF rated researchers award. The meeting was dedicated to the memory of Johann Lutjerhams, UCT's Professor, one of Southern Africa's leading marine scientists and the foremost authority on the Agulhas Current, who died on 8 June 2011.

Component	Funding Agency	Principal Investigators	Country	Status
Western boundary pilot measurements (4 PIES, 1 spare)	NOAA	C. Meinen, S. Garzoli, M. Baringer, G. Goni	USA	Funded
Quarterly AX18 XBT transect + Argo floats	NOAA	G. Goni, M. Baringer, S. Garzoli	USA	Funded
Twice a year transect AX25 + Argo floats	NOAA/UCT	Garzoli, Goni, Ansorge	US/South Africa	Funded
Eastern boundary pilot measurements (4 CPIES)	IFREMER/CPER	S. Speich	France	Funded
Eastern boundary ADCPs (5)	South Africa, IFREMER	M. Roberts,		
S. Speich	South Africa, France	Funded		
GoodHope PIES (7), CPIES (7)	Germany	A. Macrander, O. Boebel	Germany	Funded
Western boundary ADCP (1), BPR (1), western boundary hydrographic, turn-around, recovery cruises	CNPq/INCT	E. Campos, F. Niencheski	Brazil	Funded
The CALSA Project (Numerical Modeling)	FAPESP	E. Campos	Brazil	Funded
The ATLAS-B, the NAP-MC and FAPESP-MC Projects (Atlas mooring, currentmetry and cruises in the Santos Bight, ~23-28S)	FAPESP, CNPq-INCT &USP	E.Campos	Brazil	Funded
The South Atlantic Climate Change Consortium (SACC):.Shelf/slope observations and models	IAI	A. Piola, E.Campos/R. Matano/K.Brink/M. Barreiro	Argentina/ Brazil/US/ Uruguay	Funded
Drake Passage, XBT and CTD SADCP lines	NOAA, Shirshov , NOCS	J. Sprintal, S. Gladyshev, B. King	US, Russia, UK	Funded
CTD section in the South Atlantic 40°S (can be moved north)	Univ. of Barcelona	J.L. Pelegri	Spain	Funded
Western boundary CPIES (3), western boundary hydrographic, turn-around, recovery cruises	FAPESP/FACEPE	E. Campos, A. Fetter	Brazil	Funded
(1) Eastern boundary CPIES (6), (2) Goodhope PIES (7), (3) Marisonde buoys (5)	ANR	S. Speich	France	Funded
Western boundary PIES (4), interior PIES-DP (4)	NOAA	R. Perez, S. Dong, C. Meinen, G. Goni, S. Garzoli, M. Baringer	USA	Proposed
Shelf circulation along altimeter line near 40S	France Argentina MOU	A. Piola, C. Provost	Argentina/ France	Proposed
(1) Dynamic height moorings (8) (2) Deployment and trans-basin hydrographic cruise	NSF	S. Dong, R. Perez, J. Sprintall, R. Fine, G. Flierl, S. Baker-Yeboah	USA	To be proposed
24ffiS western boundary moorings, trans-basin hydrographic cruise	NERC	E. McDonagh	UK	To be proposed
Western boundary instrumentation, western boundary hydrographic, turn-around, recovery cruises	Argentina	A. Piola, A. Triosi	Argentina	To be proposed
Western boundary (possibly trans-basin) hydrographic cruise	Spain	J. Pelegri	Spain	To be proposed
Eastern boundary hydrographic, turn-around, recovery cruises	SANAP	I. Ansorge, C. Reason	South Africa	To be proposed
Goodhope hydrographic, deployment, recovery cruises	Russian Acad. Sci.	S. Gladyshev, A. Sokov	Russia	To be proposed
SAMOC RELATED PROGRAMS				
The INCT-Mar-CARBOM and INCT-Mar-COI Projects			Brazil	Funded
OOI	NSF	WHOI/SIO	USA	Funded

Table 1: List of funded, proposed, and to-be-proposed projects related to the goals of SAMOC. Projects highlighted in gray are funded.