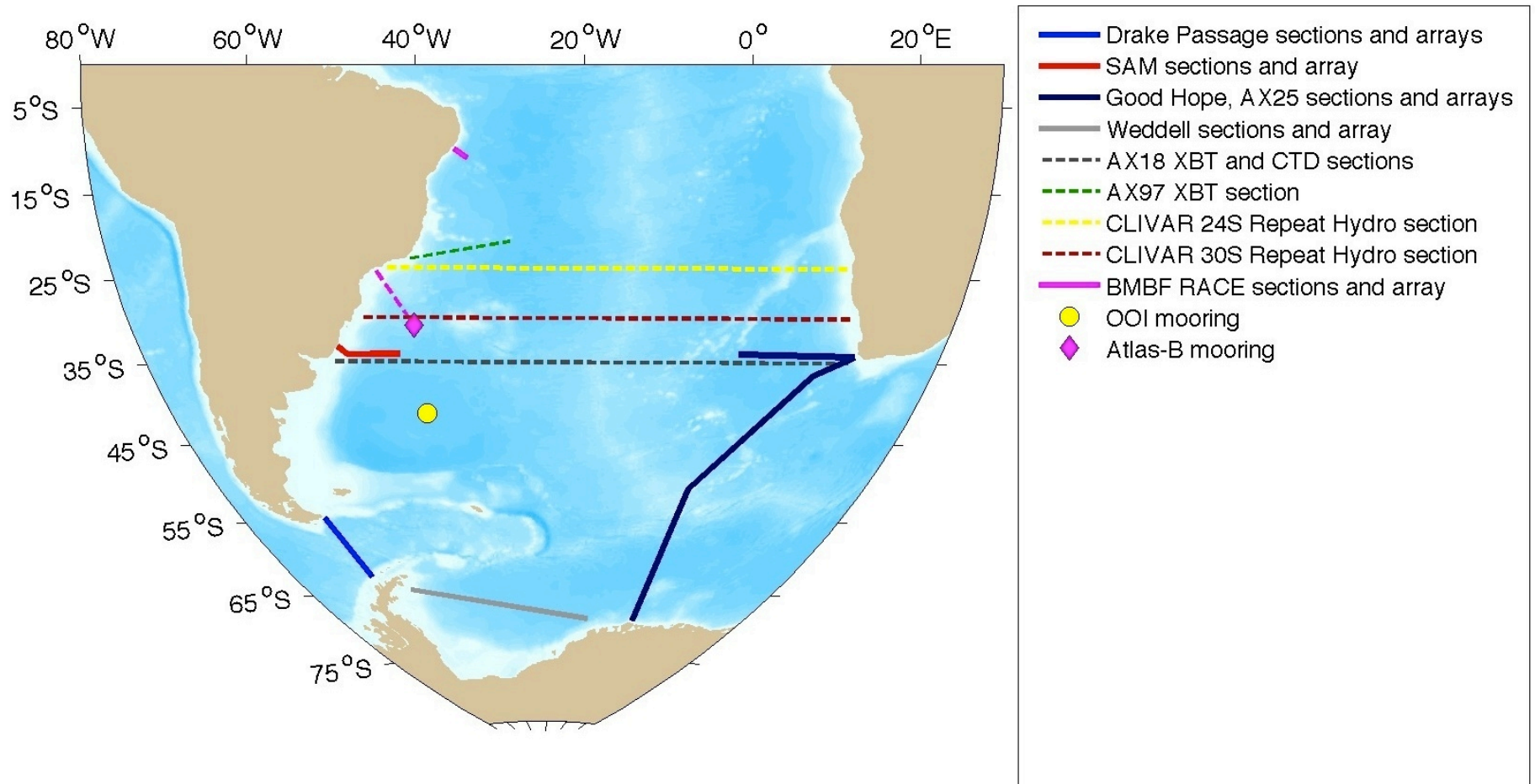


SAMOC: South Atlantic Meridional Overturning Circulation

The overarching goal is to observe and understand the mechanisms that control the MOC in the South Atlantic and the interocean exchanges.

Executive Committee: Silvia Garzoli, Alberto Piola, and Sabrina Speich

SAMOC has been endorsed by the CLIVAR SSG in May 2012



SAMOC: Motivation

- The South Atlantic (SA) is unique and is the only basin extending to high latitudes in which the heat transport is equatorward.
- Observations and models have shown that many of the components of the MOC in the SA are highly variable, and this variability is further complicated by the active transformation of water masses.
- Numerical models and observations demonstrated that the SA is not just a passive conduit for NADW and other deep water-masses formed in the North Atlantic and Southern Ocean, but instead actively participates in their formation.
- To determine the SA export of thermocline water, the SA circulation needs to be known, because the circulation and interoceanic fluxes are inter-dependent.

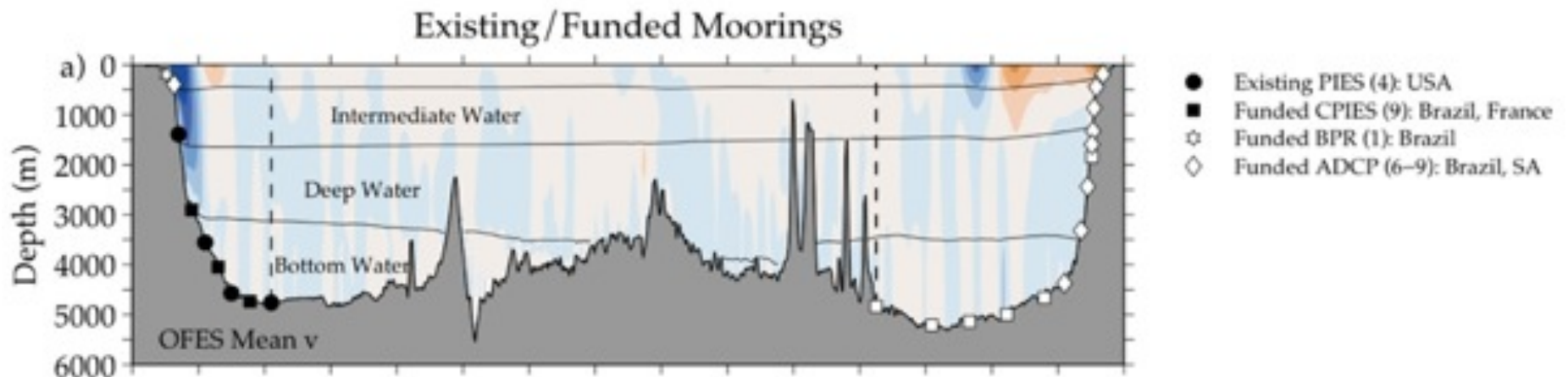
SAMOC: What needs to be measured

- it is critically necessary to obtain MOC estimates at a very high sampling rate
- geostrophic-style mooring arrays, i.e., those which provide estimates of full-water-column density profiles, are likely to provide very accurate transport estimates
- care must be taken to design an array that is not so zonally sparse that it will provide insufficient heat and salt information for calculating meridional transports of those quantities
- in addition to a moored time-series array, it will also be important to collect trans-basin hydrographic sections for aid in the analysis and attribution of the moored observations

SAMOC: What is measured

The community recommendations:

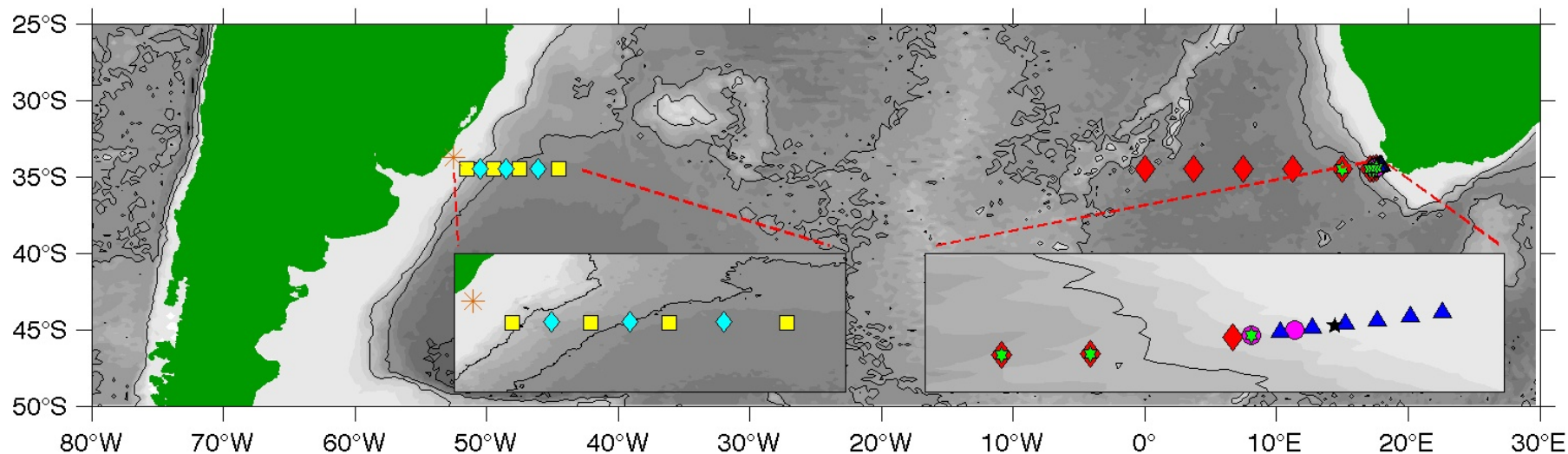
- SAMOC monitoring array be located between 32-35°S
- It involves 10-20 deep ocean moorings, a combination of tall moorings and pressure-equipped inverted echo sounders (PIES) + direct velocity moorings on the shelf on either side of the basin.
- Attribution of the observed signals at 32-35°S will require concurrent observations from Drake Passage and in the passage between Africa and Antarctica.



Schematic of the existing/funded moorings along 34.5S. Funded moorings on eastern boundary to be deployed in July 2003.

Status of the array along 34.5°S

- PIES - NOAA - In place since March 2009
- ◆ CPIES - Brazil - In place since December 2012
- * Bottom ADCP & BPR - Brazil - To be deployed in mid 2013
- ◆ CPIES - France - To be deployed in late 2013
- Bottom ADCP - France - To be deployed in late 2013
- ▲ Short mooring - South Africa - To be deployed in late 2013
- ★ Thermister mooring - South Africa - To be deployed in late 2013
- ★ Tall mooring - South Africa - To be deployed in late 2013



The SAMOC workshops:

SAMOC I (Buenos Aires, Argentina, May 2007)

SAMOC II (Paris, France, July 2009)

SAMOC III (Rio de Janeiro, Brazil, May 2010)

SAMOC IV (Simons Town, South Africa, September 2011)

Several components of SAMOC have been funded through national agencies.

| 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 | USA/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), current meter (5)" | 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, current meter 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. Sprintall, S. Gladyshev, B. King | US, Russia, UK | Funded |
| Western boundary CPIES (3), western boundary hydrographic, turn-around, recovery cruises | FAPESP/FACEPE | E. Campos A. Fetter | Brazil | Funded |

| Component | Funding Agency | Principal Investigators | Country | Status |
|--|----------------------|--|------------------|----------------|
| Eastern boundary CPIES (6), Goodhope PIES (7), Marisonde buoys (5) | ANR | S. Speich | France | Funded |
| Eastern boundary hydrographic, turn-around, recovery cruises | SANAP | I. Ansorge, C. Reason | South Africa | Funded |
| CTD section in the South Atlantic 40°S (can be moved north) | Univ. of Barcelona | J.L. Pelegri | Spain | Funded |
| 11°S western boundary current meter array | BMBF | P. Brandt, M. Dengler, J. Fischer | Germany | Funded |
| Dynamic height moorings (8), BPRs (17), western boundary PIES (2), interior PIES-DP (4) | NSF | S. Dong, R. Perez, J. Sprintall, R. Fine | USA | Proposed |
| Goodhope 2-D array of CPIES | NSF | G. Flierl, S. Baker-Yeboah | USA | Proposed |
| Shelf circulation along altimeter line near 40°S | France Argentina MOU | A. Piola, C. Provost | Argentina/France | Proposed |
| 24°S 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 |
| 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 |
| Weddell Sea current meters (8) and BPRs | Germany/UK | AWI/BAS | Germany/UK | Funded |