

Argo National Report – South Africa

Report to Argo Steering Team Meeting: March 2013

Tamaryn Morris¹, Isabelle Ansorge², Katherine Hutchinson², Gerda du Plessis², Sandy Thomalla³, Sebastiaan Swart³, Thomas Mtontsi⁴, Tommy Bornman^{4,5}, Juliet Hermes⁴ and Mthuthuzeli Gulekana⁶

The South African Argo Program presently is one of deployment opportunities and educational outreach as opposed to procuring of floats and seeding the global Argo array. However, we are striving to develop projects and funding opportunities in that direction. Given South Africa's unique position geographically of bordering three oceans – The Atlantic, Indian and Southern Oceans – we are able to provide numerous deployment opportunities for Argo floats to the global array. We are also working on dynamic research programs and experiments using Argo floats to a) study physical forcing dynamics and b) contribute to the development of biogeochemical floats particularly in the Southern Ocean. The research groups currently involved in the South African Argo program are: The South African Weather Services (SAWS), University of Cape Town (UCT)², The South African Environmental Observation Network (SAEON)⁴, Bayworld Centre for Research and Education (BCRE)¹, The Council for Scientific and Industrial Research (CSIR)³, The Department of Environmental Affairs (DEA)⁶ and the Agulhas Somali Current Large Marine Ecosystem program (ASCLME)⁵.

1. Status of implementation / Deployments undertaken in 2012:

Southern Ocean:

Gough Island Cruise – September 2012

3 floats: University of Brest with UCT (#'s: 5816, 5817, 5818)

4 floats: UK Met Office with UCT (#'s: 6262, 6256, 6257, 6263)

SANAE Cruise – December 2012-January 2013

15 floats: University of Brest with UCT (WMO #'s: 6901422, 6901423, 6901424, 6901425, 6901426, 6901427, 6901428, 6901429, 6901444, 6901431, 6901432, 6901433, 6901434, 6901435, 6901436)

Indian Ocean:

ASCLME Alliance Cruise – January-March 2012

4 floats: NOAA with ASCLME (#'s: 1901604, 1901605, 1901606, 1901607)

Atlantic Ocean:

None

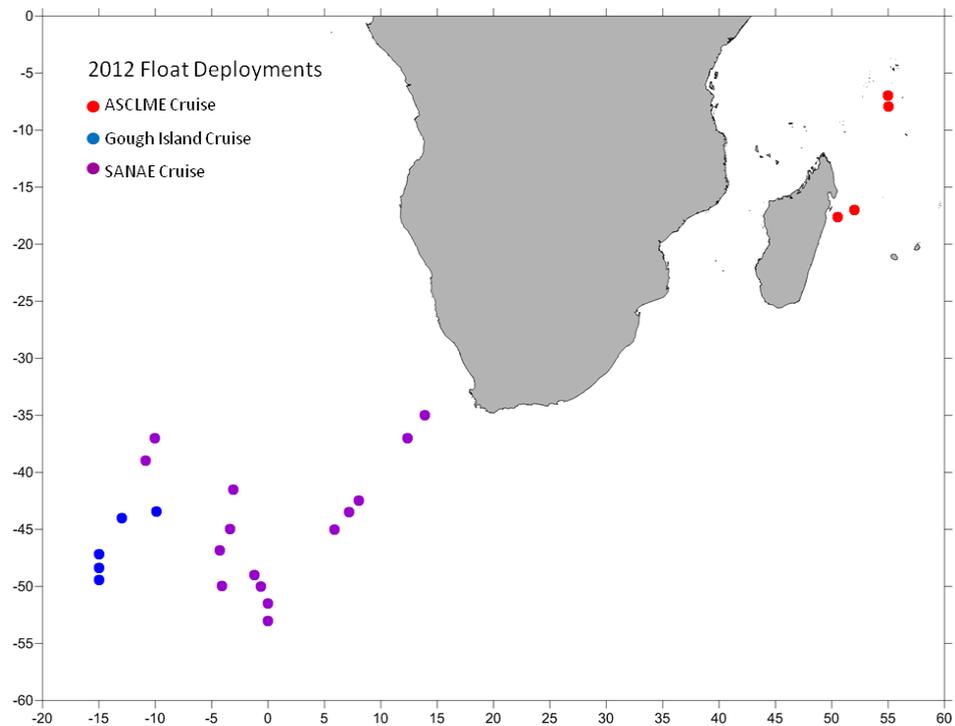


Figure 1: 2012 deployment positions of Argo floats.

Technical issues encountered and resolved:

Two floats on the Gough Island Cruise (#'s 5817 and 6263) were not deployed as the floats could not be switched on magnetically.

2. Present level of (and future prospects for) national funding for Argo including summary of human resources devoted to Argo:

Dedicated Argo funding to procure new floats to seed the global array is not currently available in South Africa, but it is a goal for the South African Argo group to work towards. Individuals from organisations (listed above) work on different projects involving Argo floats and have come together under the auspices of the South African Argo program to share knowledge, resources, cruise time where applicable and information regarding Argo.

3. Summary of deployment plans for 2013:

Southern Ocean:

Marion Island Cruise – April/May 2013

7 floats: DEA (if ready for deployment)

Gough Island Cruise – September 2013

8 floats: UK Met Office with UCT

SANAE Cruise – December / January 2013

18 floats: University of Brest with UCT

SOSCEX Cruise – To be confirmed

2 floats: CSIR. Carbon flux biogeochemical floats developed in conjunction with Provor (France). Details of experiment below.

Indian Ocean:

ASCLME Cruise – April/May 2013

5 floats: WHOI with BCRE

~ 4 floats: NOAA with ASCLME

ACEP Cruise – July 2013

2 (4) floats: UK Met Office with BCRE

Meteor Cruise – December 2013

5 floats: CSIRO with BCRE

Atlantic Ocean:

SAMBA Mooring Array – July or October 2013

4 floats: NOAA or University of Brest with UCT/BCRE

West Coast South Africa – to be confirmed

3 floats: DEA (if ready for deployment)

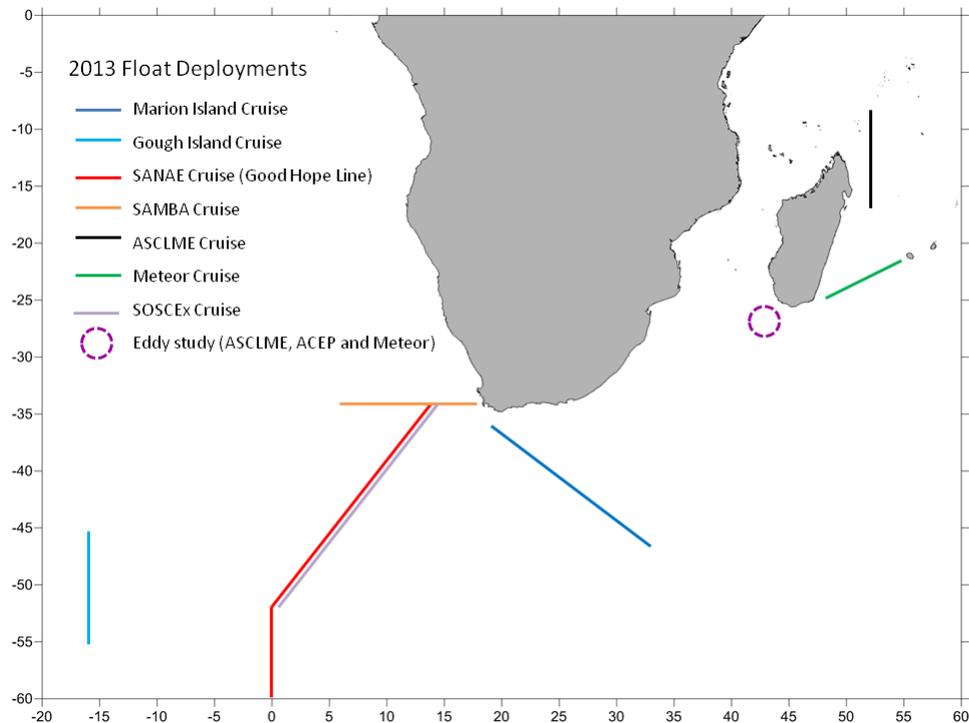


Figure 2: Proposed deployment positions / cruises for 2013.

4. Summary of national research and operational uses of Argo data:

Three research and one outreach project are noted below:

a) SOBOM:

The Centre for Southern Ocean Biogeochemical Observations and Modeling (SOBOM) are a focused group developing a new ocean observing system for carbon, nutrients and oxygen that will complement the already established observing system for heat and freshwater. To this end, 150-200 profiling floats equipped with biogeochemical sensors will be deployed throughout the Southern Ocean and the cruises run by UCT (Dr. Ansorge) in this region (i.e. SANAE and Gough Island) will be used as a platform for deployments in 2014. For more information:

<http://sobom.princeton.edu/content/deployment-opportunities>

b) SOSCEx:

The Southern Ocean Carbon-Climate Observatory (SOCCO) group of the CSIR have developed a program to study carbon flux dynamics in the Southern Ocean through the SOSCEx experiment. Three carbon-flux biogeochemical floats were developed by Provor specifically for the CSIR and two will be deployed on the Good Hope Line for this project in 2013. For more information:

www.csir.co.za/nre/coasts_and_oceans/osc.html

SOSCEx 2012

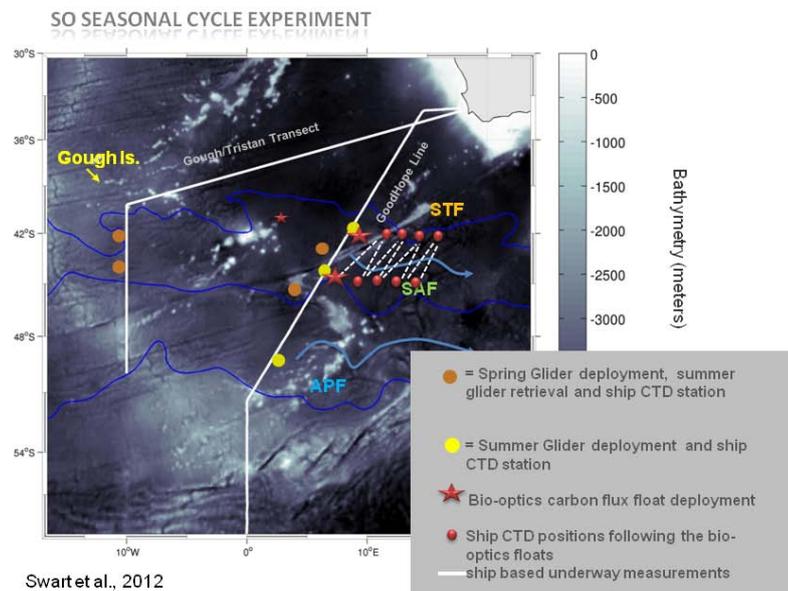


Figure 3: Complete SOSCEx experiment configuration.

c) Eddy Aging Dynamics:

Mesoscale eddy dynamics in the Mozambique Channel have been investigated over a number of years. However, the understanding of how these eddies age over time and space, and how this affects the upper-trophic levels, has yet to be determined. This project will use floats deployed off the Madagascan coast on a daily profile basis to sample the water column within an eddy to monitor its “collapse” as it progresses across the Mozambique Channel mouth. Three experiments are planned for 2013 and will look at both cyclones and anti-cyclones if possible.

Float data from the daily profiles collected on these eddy experiments will also be used by the educational outreach program (detailed below) for training of secondary school children on Argo and the oceans.

d) Educational Outreach – The Argo Floats Program by SAEON Egagasini:

Five secondary schools have been identified in the Western Cape region to track changes at sea from data collected on floats 1901469 and 1901470 purchased by SAEON/SANAP with support from SAWS and deployed in 2009.

In 2012 school monitoring teams were encouraged to do schools science projects on:

1. The Identification of deep water masses and their direction using temperature
2. Relationships between salinity and depth
3. Relations of temperature, pressure and salinity

The overall focus of the SAEON Egagasini education programme is to:

- primarily encourage awareness of science skills to learners
- to create a platform where Marine Science Research can be integrated into School Sciences curriculum by encouraging interactions between learners, educators and scientists
- to promote an understanding of, create awareness and generate an interest about our oceans

An article will be published this year (2013) on the Argo Floats Educational Program in a popular scientific magazine in South Africa:

Mtsonti, T. and Ansorge, I. 2013. Robots in the Ocean. *Quest* 9(1). 50-53.

Copies can be made available to anyone who is interested.

A request to the Argo community is for any old, used or damaged floats or float models for the outreach program for educational display purposes. Only one is available in South Africa and is used for both educational and science displays, hence heavily in demand.

5. Issues that your country wishes to be considered (and resolved) by the Argo Steering Team regarding the international operation of Argo:

None at this stage.

6. CTD data to be added for data quality comparisons:

All CTD, certainly from the eddy experiments and areas where CTD data is particularly rare, will be sent for uploading to the data quality centres.

7. Bibliography:

None for 2012.