Large arrays of moored instruments collecting in situ ocean current, temperature, salinity and dissolved oxygen data are the most effective way of providing long term, continuous observations and monitoring changes on daily to interannual time scales. Such arrays are able to resolve mesoscale dynamics, transport variability and the impact key oceanographic features such as the Agulhas Current and the Benguela Jet (Figure 1); have on the Meridional Overturning Circulation (MOC) in the Atlantic Ocean (Figure 2), which is a fundamental driving force of the Earth’s climate systems.

Two arrays have been developed and partially deployed thus far. The first, the South Atlantic Mooed Buoy Array (SAMBA), has been deployed from the west coast of South Africa into the South Atlantic as part of the South Atlantic Meridional Overturning Circulation (SAMOC) initiative (Ansgore et al. 2014). This array has been designed to answer the following scientific objectives:

- To characterize the time-mean and time-varying components of the MOC, as well as the heat and salt carried by the MOC
- To provide a means to observe the changes in the ventilation characteristics and relative contributions of different water masses to the MOC

The SAMBA array encompasses four full-depth moorings of 75 kHz Acoustic Doppler Current Proﬁlers (ADCPs) and Sea-Bird Electronics (SBE) MicroCATs, two shelf moorings and eight Current- and Pressure-Inverted Echo Sounders (CPIES) installations (Figure 4 and 6). The four tall and two shelf moorings will have been deployed for one year when the maintenance cruise takes place in October 2015. The CPIES, which extend to the 0° longitude were serviced in July 2015 along with those deployed along the Good Hope Line (Figure 3) extending southwards.

The key scientific objective of the second array deployed into the Agulhas Current off the east coast of South Africa, the Agulhas Stream System Array (Figure 4), is to provide long term observations of Agulhas Current volume, heat and salt transport and its variability from mesoscale (eddies), through seasonal to interannual timescales, and critically, its contribution in terms of heat and salt to the Thermohaline Circulation and thus its impacts on climate variability and climate change. The array currently has four of its seven tall moorings deployed thus far encompassing 75 kHz ADCPs, single point current meters and SBE MicroCATs (Figure 5), along with two shelf moorings deployed in 2015, a maintenance cruise will service the existing array and deploy a further three tall moorings and the five CPIES installations.

SAMCO follows on from the successful 3-year installation of moorings in the same region known as the Agulhas Current Time-series experiment (Beal et al. 2015). Through this work they showed the Eullerian mean of the Agulhas Current to be 219 km wide, 3000 m deep and with peak surface speeds of 1.8 m s⁻¹. Through new measurements (described further in Beal et al. 2015), a volume transport poleward of 84 Sv (± 2 Sv) was calculated. When using traditional methods, a volume transport poleward of 77 Sv (± 5 Sv) was calculated, which did not accurately take in to account meanders occurring within the Agulhas Current.

The SAMBA array builds on to key results obtained from the GoodHope line, which has been occupied since 2004 by various countries able to do repeat hydrographic and XBT surveys, along with autonomous sampler deployments. Results included redefined pathways of Indian waters to the South Atlantic (Speich et al. 2007), quantification of regional dynamics and variability of the Antarctic Circumpolar Current for the upper 2500 m (Swart et al 2008) and reﬁning the mesoscale ﬂows of deep and bottom waters (Gladysew et al. 2008).

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