

South Africa

South African scientists are now on par with their international peers with the completion of the first ‘Trace and Experimental Biogeochemistry Clean Lab’ on the African continent at Stellenbosch University (SU). With this world-class facility now up and running, scientists are able to participate in long term international observational programs such as GEOTRACES, which aims to improve the understanding of biogeochemical cycles and large-scale distribution of trace elements and their isotopes in all the major ocean basins over the next.



Figure 16. New Class-10 trace clean laboratory at Stellenbosch University fitted with Pico-trace laminar flow benches

The R2.2 million laboratory was funded by the SU Rector’s strategic fund and the Department of Science and Technology through the CSIR’s [Southern Ocean Carbon-Climate Observatory](#) (SOCCO) program. This facility is part of an integrated research infrastructure development strategy, which also includes new analytical equipment and ultra-clean container labs for ocean sampling in the new research ship SA Agulhas II, managed by the Department of Environmental Affairs.

Activities of Interest and Personnel Training

Raimund Rentel and Dr Thato Mtshali visited Maeve Lohan’s lab at the University of Plymouth to trouble-shoot the FIA set-up for measurement of dissolved iron. Riana Rossouw, trained on ICP-MS to measure Fe and other bioactive elements at Bill Landing’s lab (FSU). Dr Mtshali participated in the training of FRRF system set-up, data collection and analysis (Ocean Business exhibition) at Southampton National Oceanographic Center under supervision of Dr. Kevin Oxborough (Chelsea technology).



Conferences

- Satish Myneni, Alakendra Roychoudhury, Tolek Tyliczszak, Gustavo Martinez, Bjorn van der Heyden (2012) Speciation of colloidal Fe in terrestrial and marine environments using synchrotron X-ray spectroscopy and microscopy. 22nd Annual V M Goldschmidt Conference, Montreal, Canada June 24-29, 2012.

Publications

- B.P. von der Heyden, A.N. Roychoudhury, T.N. Mtshali, T. Tylliszczak and S.C.B. Myneni. Chemically and Geographically Distinct Solid-Phase Iron Pools in the Southern Ocean. *Science*. Vol. 338. No. 1199 – 1201.
- A. Tagliabue, T. Mtshali, O. Aumont, A. R. Bowie, M. B. Klunder, A. N. Roychoudhury, and S. Swart. A Global compilation of DFe measurements: Focus on distribution and processes in the Southern Ocean. *Biogeosciences*, 9, 2333–2349, 2012.
- Sebastiaan Swart, Nicolette Chang, Nicolas Fauchereau, Warren Joubert, Mike Lucas, Thato Mtshali, Alakendra Roychoudhury, Alessandro Tagliabue, Sandy Thomalla, Howard Waldron, Pedro M.S. Monteiro (2012) Southern Ocean Seasonal Cycle Experiment – 2012 (SOSCEX2012): Coupling of Climate and Carbon Cycling at the Seasonal Scale, *South African Journal of Science*. 189(3/4), pp 1-3.

Cruises

SOSCEX cruise was conducted along the Bonus Good Hole line to 55 °S between 15/02/2013 and 11/03/2013. Samples were collected along the 'transect' and during a Lagrangian 'process' studies.

Onboard, two bioassay Fe and light incubation experiments were conducted for a period of 6 days as part of the SOSCEX program. The aim was to understand how southern ocean phytoplankton physiology adapts to Fe and light deprivation.

Samples were also collected to look at the spatial distribution of Fe pools (DFe, TDFe, SFe and PFe) along the transect and during the lagrangian study.

New Funding

- Roychoudhury, AN (2012 – 2014) Bioactive trace metals in the Southern Ocean: Capacity development and an integrated measurement-modeling approach to understand ocean primary productivity, SANAP, R 1,200,000.
- Roychoudhury, AN (2012) Building of a class 100 clean laboratory at Earth Sciences, Stellenbosch University Strategic funds and co-funding from DST, R 2,200,000.

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