

Sebastiaan Swart

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Career Profile

My research interests are focused on understanding the physical circulation and dynamics in the open ocean, particularly in the Southern Ocean. As a Wallenberg Academy Fellow in Marine Sciences, I am researching the processes of the upper ocean and how these impact both regional and global climate. I employ remotely sensed satellite data and in situ observations from gliders, ships and profiling floats in remote & harsh ocean environments to test novel hypotheses related to upper ocean stratification and mixed layer processes. I was head of a national facility called the South African Marine Engineering & Robotics Centre between 2013-2016. This position spurred my activities in pioneering cutting-edge technology, namely gliders, to obtain high-resolution ocean observations that continue to this day. I am currently the Co-Chair of the international Southern Ocean Observing System (SOOS).

Education

- 2005 – 2009 **Ph.D. in Oceanography**, jointly - U. Cape Town, S. Africa & U. Bretagne, France
2004 **B.Sc. Honours in Oceanography**, U. Cape Town, S. Africa
Graduated with Cum Laude
- 2001 – 2003 **B.Sc.** with majors in Ocean & Atmospheric Science, Environmental & Geographic Science, Archaeology, U. Cape Town, S. Africa

Professional Experience

- 2016 – present **Assistant Professor**, University of Gothenburg, Sweden
2015 – 2016 **Principal Scientist**, Council for Scientific & Industrial Research, S. Africa
2013 – 2015 **Senior Scientist**, Council for Scientific & Industrial Research, S. Africa
2012 – present **Honorary Research Associate**, Marine Research Institute, U. Cape Town, S. Africa
2012 – 2013 **Scientist**, Council for Scientific & Industrial Research, S. Africa
2010 – 2012 **Post Doctoral Research Fellow**, jointly – U. Cape Town & Council for Scientific & Industrial Research, S. Africa

Scientific publications (those arising from formal student supervision are marked ©)

©40. Schmidt, K., **Swart, S.**, Reason, C., Nicholson, S. Evaluation of satellite and reanalysis wind products with in situ Wave Glider wind observations in the Southern Ocean. *J. Ocean Atm. Tech.* in press.

©39. du Plessis, M., **Swart, S.**, Anson, I. J. and Mahadevan, A. Submesoscale processes accelerate seasonal restratification in the Subantarctic Ocean. *J. Geophys. Res.* doi:10.1002/2016JC012494. 2017

38. Thomalla SJ, Ogunkoya AG, Vichi M and **Swart S.** Using Optical Sensors on Gliders to Estimate Phytoplankton Carbon Concentrations and Chlorophyll-to-Carbon Ratios in the Southern Ocean. *Front. Mar. Sci.* 4:34. doi: 10.3389/fmars.2017.00034. 2017

37. Krug, M., **S. Swart**, and J. Gula, Submesoscale cyclones in the Agulhas current. *Geophys. Res. Lett.*, 44, 346–354, doi:10.1002/2016GL071006. 2017

36. Mazloff, MR, Sallée J-B, Menezes VV, Macdonald AM, Meredith MP, Newman L, Pellichero V, Roquet F, **Swart S**, Wählin A. Southern Ocean [in “State of the Climate in 2016”]. *Bull. Amer. Meteor. Soc.*. 98(8). 2017

35. Anson IJ, Skelton P, **Swart, S et al.** Exploring South Africa’s southern frontier: A 20-year vision for polar research through the South African National Antarctic Programme. *S Afr J Sci.* 2017;113(5/6), <http://dx.doi.org/10.17159/sajs.2017/a0205>

©34. Nicholson, S., Monteiro, PMS., Levy, M., **Swart, S.** Investigation into the impact of storms on sustaining summer primary productivity in the Sub-Antarctic Ocean. *Geophys. Res. Lett.*, 43, doi:10.1002/2016GL069973, 2016.

- 33. Swart, S.,** JJ. Zietsman, J. Coetzee, D.G. Goslett, A. Hoek, D. Needham and P.M.S. Monteiro. Ocean robotics in support of fisheries research and management, *Afr. J. Marine Science*. doi: 10.2989/1814232X.2016.1251971. 2016
- 32.** Gille, S., S. Josey, and **S. Swart**. New approaches for air-sea fluxes in the Southern Ocean, *Eos*, 97, doi:10.1029/2016EO052243. 2016.
- 31.** Salle, J-B., **Swart, S.**, et al. Southern Ocean [in "State of the Climate in 2015"]. *Bull. Amer. Meteor. Soc.*, S157–S160. 2016.
- 30.** Schofield, O., Newman, L., Bricher, P., Constable, A., **Swart, S.**, Wählin, A. Moving Towards Implementation of a Southern Ocean Observing System. *Marine Technology Society Journal*, Vol. 50, No. 3, pp. 63-68(6). DOI: doi.org/10.4031/MTSJ.50.3.8. 2016
- ©**29.** Hutchinson, K., **Swart, S.**, Meijers, A., Anson, IJ., Speich, S. Decadal-scale thermohaline variability in the Atlantic sector of the Southern Ocean, 121, 3171–3189, doi:10.1002/2015JC011491. *J. Geophys. Res.*, 2016.
- 28.** Monteiro, P.M.S., Gregor, L., Lévy, M., Maener, S., Sabine, C.L., **Swart, S.** Seasonal-scale robotics experiment reveals the contribution made by fine scale dynamics to the uncertainties and biases in the mean seasonal CO₂ flux in the Southern Ocean. *Geophys. Res. Lett.*, 42, doi:10.1002/2015GL066009, 2015.
- 27.** Messenger, C., **Swart, S.** Significant Atmospheric Boundary Layer Change Observed above an Agulhas Current Warm Cored Eddy. *Advances in Meteorology*, doi.org/10.1155/2016/3659657. 2016
- 26.** Thomalla, S. J., Racault, M-F., **Swart, S.**, and Monteiro, P. M. S. High-resolution view of the spring bloom initiation and net community production in the Subantarctic Southern Ocean using glider data. – ICES Journal of Marine Science, doi: 10.1093/icesjms/fsv105. 2015
- 25.** Meredith, M., **Swart, S.**, et al. Southern Ocean [in "State of the Climate in 2014"]. *Bull. Amer. Meteor. Soc.*, 96 (7), S157–S160. 2015.
- 24.** Weeber, A., Swart, S., and Monteiro, P. M. S. Seasonality of sea ice controls interannual variability of summertime Ω_A at the ice shelf in the Eastern Weddell Sea – an ocean acidification sensitivity study, *Biogeosciences Discuss.*, 12, 1653-1687, doi:10.5194/bgd-12-1653-2015, 2015.
- 23.** **Swart, S.**, S. J. Thomalla, P. M. S. Monteiro. The seasonal cycle of mixed layer characteristics and phytoplankton biomass in the Sub-Antarctic Zone: a high-resolution glider experiment. *J. Marine Systems*. doi: 10.1016/j.jmarsys.2014.06.002. 2015
- 22.** Newman, L., O Schofield, A Wählin, A Constable, **S Swart**, M Williams. Understanding the Southern Ocean through sustained Observations. *Bull. Australian Meteorological Ocean. Soc.*, 28, 170. 2015.
- 21.** Anson, I. J., J.M. Jackson, **Swart, S.**, J.V. Durgadoo, S. Eberenz. Evidence of a southward eddy corridor in the South-West Indian Ocean. *Deep Sea Res. II*, doi.org/10.1016/j.dsr2.2014.05.012i, 2014.
- 20.** **Swart, S.**, J. Liu, P. Bhaskar, L. Newman, K. Finney, M. Meredith, O. Schofield. The SOOS-Asia Workshop: Exploring possibilities for collaboration. *Advances Polar Sci.*, 2014, 25:138-145, doi: 10.1016/j.advps.2014.2.00000, 2014.
- 19.** Liu, J, **Swart, S.**, P. Bhaskar, L. Newman, M. Meredith, O. Schofield. A report on the SOOS-Asia Workshop. *Advances Polar Sci.*, 2014, 25:121-125, doi: 10.1016/j.advps.2014.2.00121, 2014.
- 18.** Tagliabue, A., J-B Sallée, A. R. Bowie, M. Lévy, **Swart, S.** and P. W. Boyd, Surface water iron supplies in the Southern Ocean sustained by deep winter mixing, *Nature Geoscience*, doi:10.1038/ngeo2101, 2014.
- 17.** Domingues, R., G. Goni, **Swart S.**, and S. Dong. Wind forced variability of the Antarctic Circumpolar Current south of Africa between 1993 and 2010, *J. Geophys. Res. Oceans*, 119, 1123–1145, doi:10.1002/2013JC008908, 2014.
- 16.** Joubert, W. R., **Swart, S.**, Tagliabue, A., Thomalla, S. J., and Monteiro, P. M. S.: The sensitivity of primary productivity to intra-seasonal mixed layer variability in the sub-Antarctic Zone of the Atlantic Ocean, *Biogeosciences Discuss.* 11, 4335-4358, doi:10.5194/bgd-11-4335-2014, 2014.

- ©15. Hutchinson, K., **Swart, S.**, I. J. Ansorge and G. Goni. Exposing XBT bias in the Atlantic sector of the Southern Ocean. *Deep Sea Res. II.*, 80, 11-22, doi:10.1016/j.dsr.2013.06.01, 2013.
- ©14. Giddy, I. S., **Swart, S.** and A. Tagliabue. Drivers of non-Redfield nutrient utilization in the Atlantic sector of the Southern Ocean. *Geophys. Res. Lett.*, vol. 39, doi:10.1029/2012GL052454, 2012.
13. **Swart, S.**, S. J. Thomalla, I. J. Ansorge and P. M. S. Monteiro. Mesoscale features and phytoplankton biomass at the GoodHope transect in the Southern Ocean during austral summer. *Afr. J. Mar. Sci.*, 32(4), 2012.
12. **Swart S.**, Chang N, Fauchereau, W. Joubert, M. Lucas, T. Mtshali, A. Roychoudhury, A. Tagliabue, S. Thomalla, H. Waldron, P.M.S. Monteiro. Southern Ocean Seasonal Cycle Experiment 2012: Seasonal scale climate and carbon cycle links. *S. Afr. J. Sci.*, 108(3/4), doi.org/10.4102/sajs.v108i3/4.1089, 2012.
11. Tagliabue, A., Mtshali, T., Aumont, O., Bowie, A. R., Klunder, M. B., Roychoudhury, A. N., **Swart, S.** A global compilation of over 13,000 dissolved iron measurements: focus on distributions & processes in the S. Ocean. *Biogeosciences*, 8, 11489-11527, doi:10.5194/bg-8-11489-2011. 2012.
10. Loveday B. R., **Swart S.**, and Storkey D. Capturing convection in the Northwest Mediterranean Sea: Using underwater gliders to assess the performance of regional forecast models. *Int. J. Soc. Underw. Tech.*, 30:3, 1-15, doi:10.3723/ut.30.071. 2012.
9. Thomalla, S. J., N. Fauchereau, **Swart S.**, and P. M. S. Monteiro. Regional scale characteristics of the seasonal cycle of chlorophyll in the Southern Ocean, *Biogeosciences*, 8, 2849-2866, doi:10.5194/bg-8-2849-2011. 2011.
8. Goni, G, D. **Swart S.**, et al. The Ship of Opportunity Program. In OceanObs09: Sustained Ocean Observations and Information for Society (Volume 2), J. Hall, D.E. Harrison, and D. Stammer (eds.). *European Space Agency Pub.*, WPP-306, 19 pp. 2010.
- ©7. Billany, W., **Swart S.**, J. Hermes, C. J. C. Reason. Variability of the Southern Ocean fronts at the Greenwich Meridian. *J. Mar. Sys.*, 82, 4: 304-310, doi:10.1016/j.jmarsys.2010.06.005. 2010.
6. **Swart, S.**, S. Speich, I. J. Ansorge, and J. R. E. Lutjeharms. An altimetry-based gravest empirical mode south of Africa: 1. Development and validation, *J. Geophys. Res.*, 115, C03002, doi:10.1029/2009JC005299. 2010.
5. **Swart, S.**, and S. Speich. An altimetry-based gravest empirical mode south of Africa: 2. Dynamic nature of the Antarctic Circumpolar Current fronts, *J. Geophys. Res.*, 115, C03003, doi:10.1029/2009JC005300. 2010.
4. **Swart, S.**, S. Speich, I. J. Ansorge, G. J. Goni, S. Gladyshev, and J. R. E. Lutjeharms. Transport and variability of the Antarctic Circumpolar Current south of Africa, *J. Geophys. Res.*, 113, C09014, doi:10.1029/2007JC004223. 2008.
3. **Swart, S.**, H. N. Waldron, L. Hutchings. Evidence of carbon transport between shelf and slope waters in the Benguela upwelling system, *Afr. J. Mar. Sci.*, 29(1): 137–139. 2007.
2. Backeberg, B., **Swart S.**, et al. The vulnerable coastline of Table Bay: Natural consequences and impacts of development, *J. Nat. Resources Life Sci. Educ.*, 2004.
1. Ansorge IJ., **Swart S.** et al. An Interdisciplinary cruise dedicated to understanding ocean eddies upstream of the Prince Edward Islands, *S. Afr. J. Sci.*, 100, 319-322. 2004.

Supervision (*those awarded with distinction are marked **)

Post-Doctoral	Louise Biddle (U. Gothenburg, 2017 – present)
Doctoral	Marcel du Plessis (U. Cape Town, WHOI, 2015 – present) Tshikana Rasehlomi (U. Cape Town, 2016 – present) Sarah Nicholson (U. Paris, U. Cape Town, 2012 – 2016)
Master of Science	Kevin Schmidt (U. Cape Town, 2015 - 2016) Hazel Little* (U. Cape Town, 2015 - 2016) Charles Caulet (U. Bretagne – Brest, U. Cape Town, 2015) Senam Tsei (U. Cape Town, 2014 - 2015)

Marcel du Plessis (U. Cape Town, WHOI, 2013 – 2014)
 Katherine Hutchinson* (U. Bretagne – Brest, U. Cape Town, 2012 – 2013)
 Delphine Lobelle (U. Cape Town, 2012)
 Lauren Bierman* (U. Cape Town, 2010 – 2011)
 Patrick Vianello (U. Cape Town, 2009 – 2010)
 William Billany* (U. Cape Town, 2008 – 2009)
 Adelaide Missault* (U. Bretagne – Brest, U. Cape Town, 2014)

B.Sc. Honours 7 completed Honours dissertations (4 with distinction) between 2011-2014

Funded Research Grants (*only those > US\$ 25 000 shown*)

2017	Royal Swedish Academy of Sciences (KVA) – TING (PI – US\$ 250,000)
2017	Climate Fund (GU) (Co-PI – US\$ 50, 000)
2015 – 2021	Wallenberg Academy Fellow, K&A Wallenberg Foundation (PI – US\$ 1,800,000)
2015 – 2016	Shelf Agulhas Glider Experiment (SAGE), SAEON-CSIR (co-PI – US\$ 25,000)
2015 – 2017	South African National Antarctic Programme Research Grant “Surface ocean physical dynamics of the Southern Ocean” (PI – US\$ 180,000)
2014 – 2018	DST Research Infrastructure Grant “Southern Ocean observational infrastructure for oceanography and climate research” (co-PI – US\$ 2,800,000)
2013 – 2015	CSIR Young Researchers Fund Grant (PI – US\$ 60,000)
2012 – 2014	National Research Foundation Young Researchers Incentive Grant (PI – US\$ 25,000)
2012 – 2014	South African National Antarctic Programme Research Grant “South Atlantic Meridional Overturning Circulation (SAMOC)” (Co-I – US\$ 360,000)
2007 – 2009	Ocean Tools Manipulation and Analysis Grant (Co-I – US\$ 30,000)

Other Research Activities & Community Recognition

Convener ‘Air-sea fluxes and mixed layer processes’, Ocean Sciences, USA, 2018
 ‘Polar Oceans and Atmosphere’, IAPSO Conference, RSA, 2017
 ‘Gliders in Polar Oceans’, EGO Conference, UK, 2016
 ‘Natural Sciences Conference – CSIR’ - Lead organizer, RSA, 2016
 ‘Submesoscale processes’, Liege Colloquium, Belgium, 2016
 ‘Observing Antarctica & Southern Ocean’, SCAR Conference, USA, 2012

Scientific Committees - Co-Chair (elected) of SOOS (2017 – present)
 - Vice-Chair (elected) of SOOS (2014 – 2017)
 - Co-chair of the Southern Ocean Air-Sea Flux Working Group & lead of Task Team 1 (2015-present)
 - Member of the POGO-SOOS Under Ice Working Group (2015-present)
 - Invited member of the international ‘Scientific Steering Committee’ of the Southern Ocean Observing System (SOOS) (2012 – 2014)
 - Invited member of the international ‘Management Committee’ of the EU COST Action on Ocean Gliders (EGO) (2011 – present)
 - Scientific Council for Antarctic Research (SCAR) S. African National Delegate (2012 – 2013)
 - Member of the Association of Polar Early Career Scientists (2010 – 2012)

Journal Reviewer Nature, Journal of Geophysical Research, Deep-Sea Research, Journal of Oceanography, Nature - Scientific Data, Ocean Science, etc.

Funding Reviewer German Research Foundation, Italian Scientific Committee on Antarctic Research, Chilean National Science & Technology Commission, SA National Research Foundation, Scientific Council for Antarctic Research (SCAR), European Glider Observatory

Cruise Experience Extensive research cruise experience having undertaken 14 scientific voyages of which 7 where to the Southern Ocean and Antarctica and 3 have involved complex operations using gliders and ship observation capabilities. Chief Scientist position on 3 expeditions to the Antarctic (2010, 2012, 2013)

Teaching Convener & lecturer - Advances in Matlab – Postgraduate: 2007-2008, 2010
 Convener: Introduction to Python and analysis – Postgraduate: 2010
 2nd year Ocean Systems – Southern Ocean circulation & sea ice: 2008, 2010
 Southern Ocean dynamics and variability – Postgraduate, 2011
 Southern Ocean dynamics and field experimentation – Undergraduate: 2013

Coastal Oceanography – Masters in Landscape architecture: 2013, 2014
Organizer: Training Internationally on Gliders (TING) – Postgraduate, 2017
Pedagogic education: Basic teaching - HPE101 & Supervision- HPE202

Outreach

Numerous presentations, exhibitions or mentoring related to Antarctic & Southern Ocean research, science, technology and climate, such as: National Marine Week 2011, 2014, 2015, Habitable Planet Summer School 2010, Herzlia High School Career Exhibition 2009 & 2010, Nansen Tutu Summer School 2014, at-sea training of school learners. Multiple newspaper articles and TV productions articulating pioneering ocean robotics achievements to the broader public.

Major awards

Wallenberg Academy Fellow – 2015-2021
National Research Foundation Y1 Award – 2011
The Netherlands Research Fellowship Award – 2008
START/Norwegian Agency for Development (NORAD) Award – 2007
