

Curriculum Vitae

Fabien Roquet

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1 General informations

Date of birth: 27 December 1982

Position: Post-Doc at the Meteorological Institute of the Stockholm University

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2 Higher education degree

2006: Master degree in oceanography, meteorology and environmental sciences at the University Paris 6 (Paris, France), obtained with honors.

2001 - 2004: Physical Engineer in computer science, statistics and image processing, graduated from Institut National des Telecommunications (now Telecom SudParis, Evry, France).

1999 - 2001: 2-year preparation school to the entrance examination of top engineering institutions (“classes prepa”), majors: maths and physics, at Michel de Montaigne school (Bordeaux, France).

3 Doctoral degree

I started my PhD in physical oceanography in September 2006 at Universite Pierre et Marie Curie (Paris, France). The title was: *Circulation around the Kerguelen Plateau: from observations to modelling*, supervised by Prof. Y.-H. Park (MNHN) and Prof. G. Madec (LOCEAN), and obtained in October 2009 with honors. I obtained a 3-year doctoral scholarship from the French ministry of science to carry out my PhD.

My PhD work mainly consisted in:

- the archiving, calibration, validation of hydrographic data obtained with instrumented elephant seals. I worked especially on data obtained from deployments at the Kerguelen Islands.
- the analysis of data collected by elephant seals and during KEOPS and TRACK cruises to build an updated picture of the circulation over and around the Kerguelen Plateau
- model-data comparisons in the Southern Indian Ocean to assess the realism of an eddy-permitting simulation (DRAKKAR-G70 configuration based on NEMO)
- the set-up of an eddy-permitting configuration of the Southern Indian Ocean
- the analysis of model pathways, transport and transformations of water-masses crossing the Kerguelen Plateau using the lagrangian diagnostic tool ARIANE

4 Postdoctoral work

4.1 Post-Doc at MIT

I started a post-doctoral position with Prof. Carl Wunsch (MIT, Cambridge, US) in December 2009. I was funded through the Estimating the Circulation and Climate of the Ocean (ECCO) consortium which is directed at making the best possible estimates of ocean circulation, using inverse methods to adjust a global configuration of the MITgcm model to a wide variety of available observations. I contributed to ECCO by analyzing ocean estimates in the framework of my work on the description of energy pathways induced by Ekman pumping.

I also contributed to ECCO through my work on the “Southern Elephant Seals as Oceanographic Samplers” project, by providing and preparing hydrographic data obtained by instrumented elephant seals for use in the ECCO model. I published a technical paper on the calibration of CTD loggers used on seals. I started a comprehensive effort to produce a global validated dataset containing all the available hydrographic data sampled in the Southern Ocean since 2004, and to add them to the hydrographic database assimilated in the ECCO model. So far, I quality-controlled and calibrated more than 180.000 profiles. I am currently assessing the contribution of seal data to the global observing system, using the framework of ECCO state estimates.

4.2 Post-Doc at the Stockholm University

I am currently doing a second post-doct with Pr. Jonas Nycander (Stockholm University, Sweden), which started in March 2012. I am funded by the Swedish

Institute of Research for a 2-year long period. I started to work on a budget of energy in the NEMO ocean model, in collaboration with J. Nycander and G. Madec (LOCEAN, Paris). I am also collaborating with T. McDougall to implement the new standard TEOS-10 equation of state in the NEMO model.

5 Publication list

1. **Roquet F.** and co-authors, 2013. Estimates of the Southern Ocean General Circulation Improved by Animal-Borne Instruments. Submitted.
2. Ohshima K. I. et al. (including **Roquet F.**), 2013. Antarctic Bottom Water production by intense sea-ice formation in the Cape Darnley polynya. *Nature Geosci.* 6:235-240.
3. **Roquet F.**, 2013. Dynamical Potential Energy: a new approach to Ocean Energetics. *J. Phys. Oc.*, 43:457-476.
4. **Roquet F.**, Wunsch C., and G. Madec, 2011. On the Patterns of Wind-Power Input to the Ocean Circulation. *J. Phys. Oc.*, 41:2328-2342.
5. **Roquet F.**, Charrassin J.-B., Marchand S., Boehme L., Fedak M., Reverdin G., and Guinet C., 2011. Validating hydrographic data obtained from seal-borne satellite-relayed data loggers. *J. Atmosph. And Ocean. Tech.*, 28:787-801.
6. Bailleul F., Authier M., Ducatez S., **Roquet F.**, Charrassin J.-B., Cherel Y., and Guinet, C., 2010. Looking at the unseen: combining animal bio-logging and stable isotopes to reveal a shift in the ecological niche of a deep diving predator. *Ecography*, 33(4):709-719.
7. Charrassin J.-B., **Roquet F.**, and Co-Authors, 2010. “New Insights Into Southern Ocean Physical and Biological Processes Revealed by Instrumented Elephant Seals” in *Proceedings of OceanObs’09: Sustained Ocean Observations and Information for Society (Vol. 2)*, Venice, Italy, 21-25 September 2009, Hall J., Harrison D.E. and Stammer D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.cwp.15
8. Boehme L., and Co-Authors (including **Roquet F.**), 2010. “Biologging in the Global Ocean Observing System” in *Proceedings of OceanObs’09: Sustained Ocean Observations and Information for Society (Vol. 2)*, Venice, Italy, 21-25 September 2009, Hall J., Harrison D.E. and Stammer D., Eds., ESA Publication WPP-306, doi:10.5270/OceanObs09.cwp.06

9. **Roquet F.**, Park Y.-H., Guinet C., Bailleul F., and Charrassin J.-B., 2009. Observations of the Fawn Trough Current over the Kerguelen Plateau from instrumented elephant seals. *Journal of Marine Systems*, 78:377-393.
10. Park Y.-H., Vivier F., **Roquet F.**, and Kestenare E., 2009. Direct observations of the ACC transport across the Kerguelen Plateau. *Geoph. Res. Letts.*, 36, L18603.
11. Boehme L., Lovell P., Biuw M., **Roquet F.**, Nicholson J., Thorpe S. E., Meredith M. P., and Fedak M., 2009. Technical Note: Animal-borne CTD-Satellite Relay Data Loggers for real-time oceanographic data collection. *Ocean Sci.*, 5:685-695.
12. Charrassin J.-B., Hindell M., Rintoul S. R., **Roquet F.**, Sokolov S., Biuw M., Costa D., Boehme L., Lovell P., Coleman R., Timmermann R., Meijers A., Meredith M., Park Y.-H., Bailleul F., Goebel M., Tremblay Y., Bost C.-A., McMahon C. R., Field I. C., Fedak M. A., and Guinet C., 2008. Southern Ocean frontal structure and sea-ice formation rates revealed by elephant seals. *Proc. Nat. Acad. Sc.*, 105:11634-11639.
13. Park Y.-H., **Roquet F.**, Durand I., and Fuda J.-L., 2008. Large scale circulation over and around the northern Kerguelen Plateau. *Deep-Sea Res. II*, 55:566-581.
14. Bailleul F., Charrassin J.-B., Monestiez P., **Roquet F.**, Biuw M., and Guinet C., 2007. Successful foraging zones of southern elephant seals from Kerguelen Islands in relation to oceanographic conditions. *Phil. Trans. Roy. Soc. B: Biological Sciences*, 362:2169-2181.
15. Biuw M., Boehme L., Guinet C., Hindell M., Costa D., Charrassin J.-B., **Roquet F.**, Bailleul F., Meredith M., Thorpe S., Tremblay Y., McDonald B., Park Y.-H., Rintoul S. R., Bindoff N., Goebel M., Crocker D., Lovell P., Nicholson J., Monks F., and Fedak M. A., 2007. Variations in behaviour and condition of a Southern Ocean top predator in relation to in situ oceanographic conditions. *Proc. Nat. Acad. Sci.*, 104:13705-13710.
16. Park Y.-H., **Roquet F.**, and Vivier F., 2004. Quasi-stationary ENSO wave signals versus the Antarctic Circumpolar Wave scenario. *Geophys. Res. Letts.*, 31, L09315.

6 Grants and fellowships

2006 3-year doctoral scholarship from the French ministry of science to carry out my PhD

- 2011** Fellowship for a 2-year post-doctoral position at the Stockholm University, funded by the Vetenskapspradet (Swedish Institute of Science)
- 2011** Marie-Curie fellowship for a 2-year post-doctoral position at the Stockholm University, not taken.
- 2013** Post-doctoral fellowship for a 2-year post-doctoral position at the Stockholm University, funded by the Department of Meteorology of the Stockholm University.

7 Lab and Field work

- July 2011 (10 days)** Water sampling, CTD casts and LADCP between Cape Cod and Bermuda Islands on board the R/V Oceanus.
- Mar. 2011 (12 days)** Water sampling and XBT launching between Iceland and Newfoundland on board the merchant vessel Reykjafoss
- Feb. - Mar. 2009 (5 weeks)** TRACK oceanographic cruise on board the French R/V Marion Dufresne, over the Kerguelen Plateau in the Southern Indian Ocean (40 days of field work): deployment of three mooring lines, intensive CTD-O₂ cast survey (60 casts), deployment of 7 ARGO profiling floats. During the cruise, I was responsible for salinity and oxygen sampling on the 0-4 CTD watch, for oxygen titration and calibration, and for the deployment of the profiling floats.
- Jan. 2008 (1 week)** DOCONUG oceanographic cruise on board R/V Tethys, in the Gulf of Lyon, Mediterranean Sea, working on the 4-8 CTD watch.
- Jan. - Apr. 2006 (3 months 1/2)** Deployment of loggers on elephant seals and fur seals at the Kerguelen Islands (Southern Indian Ocean).
- Dec. 2005 (1 week)** Calibration of 12 seal loggers at the SHOM calibration facility (Brest, France)
- June 2005 (1 week)** COSMOS oceanographic cruise on board R/V Cote de la Manche, in the Bay of Biscay, Atlantic Ocean, participating to an intensive CTD cast survey and testing 6 seal loggers.

8 Teaching and Supervision Experience

- June 2012 - present** Co-supervision of a PhD student (Saeed Falahat) in collaboration with Jonas Nycander.
- April 2013** Supervision of a Master student (Friederika Pollmann) for a 1-month internship in physical oceanography.

2012 Lectures to Master students in the Department of Meteorology of Stockholm University (24h). Introduction to Dynamic Meteorology.

2008-2012 Training and supervision of engineers (S. Marchand and B. Picard) for the calibration and validation of miniaturized CTD loggers.

March 2009 Publication of a popular science article in the monthly journal of the Palais de la Decouverte (Museum of Science of Paris). “Les dessous de l’Ocean Antarctique vus par des elephants de mer”.

2009 Participation to an outreach project, consisting in the conception and deployment of an ocean surface drifter by students of secondary school. Funded by the French Spatial Agency (CNES).

2006-2009 Lecturer at the Palais de la Decouverte (Museum of Science of Paris), on climate and meteorology, for school classes and general public (60 hours per year).

9 Presentations in International Meetings

1. **Roquet F.**, 2011. The impact of animal platform data on polar ocean observation. Oral presentation in the 19th Biennial Conference on the Biology of Marine Mammals (Tampa, FL).
2. **Roquet F.**, 2010. On the energetics of Ekman pumping. Oral presentation during the workshop on small-scale variability in the general circulation of the atmosphere and oceans, organized by D. Stammer (Hamburg, DE).
3. **Roquet F.**, 2010. The Fawn Trough across the Kerguelen Plateau: a major pathway for the ACC. Poster at the Ocean Science Meeting (Portland, OR).
4. **Roquet F.**, Park Y.-H., Madec G., 2008. The Fawn Trough Current across the Kerguelen Plateau: a bottleneck for the Antarctic Circumpolar flow. Oral presentation at EGU General Assembly (Vienna, Austria).
5. **Roquet F.**, Charrassin J.-B., Park Y.-H., Bailleul F., Guinet C., 2008. Validating hydrographic data obtained from Satellite-Relayed Data Loggers deployed on seals. Oral presentation at the Bio-logging Science Symposium (Monterey, CA).