

Scientific Resume of Prof. Dr. Arne Biastoch

Objective Physical Oceanographer with a strong interest to use numerical models to research the mesoscale and large-scale ocean circulation and to work interdisciplinary on geosphere and biological interactions.

Employment History

Since October 2001: Scientist, GEOMAR Helmholtz Centre for Ocean Research Kiel (before 2004 Institut für Meereskunde, 2004-2011 IFM-GEOMAR), Research Unit Theoretical Oceanography

- Investigating the variability in the Agulhas system and its effect on the large-scale circulation (P. I. in DFG and BMBF projects), also with paleo-oceanographic focus (P. I. in the EU Initial Training Network GATEWAYS); Co-chair of the SCOR Working Group No. 136 „Climatic Importance of the Greater Agulhas System"
- Exploring the role of seafloor warming and the fate of Arctic gas hydrates (interdisciplinary collaboration within the Kiel Cluster of Excellence "Future Ocean")
- Studying the Atlantic Ocean circulation variability (P. I. in the EU Integrated Project THOR; P. I. in the BMBF collaborative projects "Nordatlantik-2" and "RACE")
- Exploring the spreading of drifting organisms (e.g., larvae) using Lagrangian models (interdisciplinary collaboration within the Kiel Cluster of Excellence "Future Ocean")
- Simulating past and future ocean dynamics using a suite of global ocean/sea-ice models with high-resolution nests based on the NEMO code (joint work in the European modeling initiative DRAKKAR)
- Investigated the effect of mesoscale processes on the uptake and distribution of anthropogenic trace gases (German climate program DEKLIM)
- Teaching of bachelor and master students; official advisor of PhD students; member of faculty board „Meereskunde“ and examination board MSc program „Climate Physics“
- Performing outreach at GEOMAR and the Kiel Cluster of Excellence "Future Ocean"

1999 to 2001: Postgraduate Researcher, Scripps Institution of Oceanography, La Jolla, U.S.A.

- Researched the physics of exchange over the Greenland Scotland Ridge and the circulation in the subpolar North Atlantic

- Studied the effectiveness of observing networks using high resolution regional and global models
- Organized a weekly department seminar series

January 1999: Guest Scientist, University of Cape Town, South Africa

- Installed Agulhas region model on a local computer and trained Ph.D. student
- Completed Agulhas analyses and wrote paper in collaboration with local scientists

1998 to 1999: Research Assistant, Institut für Meereskunde (IfM) Kiel

- Designed a model of the North Sea and Baltic Sea
- Studied the salt balance of the Gulf Stream in a regional model

1994 to 1998: Ph.D. Student, IfM Kiel, Dept. Theoretical Oceanography

- Designed an ocean general circulation model of the Agulhas region and researched the dynamics of the Agulhas Current system
- Programmed open boundary conditions for general use in the GFDL Modular Ocean Model (MOM₂ and MOM₃)
- Collected real ocean data (CTD, drifter) in the Irminger Sea and the Baltic Sea
- Taught undergraduate students (exercises, talks)

1991 to 1992: Student Job, IfM Kiel, Dept. Marine Physics

- Rewrote program of water mass formation analysis for global use, first publication (Speer, Isemer, and Biastoch, 1995, *J. Phys. Oceanogr.*, **25**, 2444-2457)
- Collected real ocean data (CTD, moorings) in the South Atlantic

University

March 2013: Adjunct (apl.) Professor at the Christian-Albrechts-Universität Kiel

January 2009: Venia legendi at the Christian-Albrechts-Universität Kiel, title 'Privatdozent' since then

November 2008: Habilitation at the Christian-Albrechts-Universität Kiel

- Thesis: "The Agulhas Leakage: Role of Mesoscale Processes and Impact on the Atlantic Meridional Overturning Circulation"

June 2000: WOCE Young Investigator Workshop, Boulder, U.S.A.

June 1998: Ph.D., Physical Oceanography, Christian-Albrechts-Universität Kiel

- Dissertation (in German): "Circulation and Dynamics of the Agulhas Region According to a Numerical Model", advisor: W. Krauß

February 1995: NATO ASI Workshop "Decadal Climate Variability", Les Houches, France

August 1994: Diploma, Physical Oceanography, Christian-Albrechts-Universität Kiel

- Thesis (in German): "The Influence of Atmospheric Fresh Water Fluxes and the Large-scale Density Field on the Circulation in the North Atlantic", advisor: W. Krauß

1988 to 1994: Study of Physical Oceanography, Christian-Albrechts-Universität Kiel

Awards

October 2010: Golden Spike Award for High-Performance Computing at HLRS, Stuttgart

December 2009: IFM-GEOMAR publication price

Committees and Memberships

Co-chair of SCOR Working Group No. 136 „Climatic Importance of the Greater Agulhas System"

Member of the Kiel Cluster of Excellence "Future Ocean" and the DFG

Sonderforschungsbereich 754 "Climate - Biogeochemistry Interactions in the Tropical Ocean"

Scientific Output

As of today 50+ manuscripts in international journals and books were published (45 in peer-review, among 2 letters and 1 review paper in *Nature*). My current Web of Science based h-index is 16. My five most important publications were:

- Biastoch, A., C. W. Böning, F. U. Schwarzkopf, and J. R. E. Lutjeharms, 2009: Increase in Agulhas leakage due to poleward shift in the southern hemisphere westerlies, *Nature*, **462**, doi: 10.1038/nature08519, 495-498
- Biastoch, A., C. W. Böning, and J. R. E. Lutjeharms, 2008: Agulhas leakage dynamics affects decadal variability in Atlantic overturning circulation, *Nature*, **456**, doi: 10.1038/nature07426, 489-492.
- Biastoch, A., T. Treude, L. H. Rüpke, U. Riebesell, C. Roth, E. B. Burwicz, W. Park, C. W. Böning, M. Latif, G. Madec, and K. Wallmann, 2011: Rising Arctic Ocean temperatures cause gas hydrate destabilization and ocean acidification, *Geophys. Res. Lett.*, doi: 10.1029/2011GL047222, , L08602, doi: 10.1029/2011GL047222.

- Biastoch, A., C. W. Böning, J. Getzlaff, J.-M. Molines, and G. Madec, 2008: Mechanisms of interannual - decadal variability in the meridional overturning circulation of the mid-latitude North Atlantic Ocean, *J. Climate*, **21**, doi: 10.1175/2008JCLI2404.1, 6599–6615.
- Beal, L. M., W. P. M. de Ruijter, A. Biastoch, and R. Zahn, and the members of SCOR/WCRP/IAPSO Working Group 136, 2011: On the role of the Agulhas system in global climate (review article), *Nature*, **472**, 429–436, doi: 10.1038/nature09983.

Several (invited) talks and presentations were given at international conferences, workshops and institutes. At the 2010 Ocean Sciences Meeting in Portland a session in "The greater Agulhas Current System" was proposed and chaired. In 2012 a keynote presentation at the "10th International Conference on Southern Hemisphere Meteorology and Oceanography" in Noumea and a prestigious lecture on ocean and climate change at the College de France in Paris were held. As one of the leading conveners an AGU Chapman Conference on "The Agulhas System and its Role in Changing Ocean Circulation, Climate, and Marine Ecosystems", was proposed, organized and held in October 2012 in the Western Cape, South Africa

Review of scientific manuscripts for international journals (*Nature*, *Science*, several topical journals) and proposals (U.S.A., U.K., Netherlands, South Africa), external and internal examiner of PhD theses.

Conception, application and realization of scientific projects (DFG, BMBF, EU). Contribution to proposals of joint research activities (SFB, Cluster of Excellence).

Teaching

Since 2002 lectures and exercises at the Christian-Albrechts-Universität Kiel covering all aspects of Theoretical and Physical Oceanography were taught. These courses were part of the diploma, bachelor and master programs.

Supervision of master, bachelor and PhD theses (current candidates: Jonathan Durgadoo and Christina Roth, co-supervision of Till Mackert).

References

Prof. Dr. Claus Böning, Theory and Modelling, GEOMAR Helmholtz Centre for Ocean Research Kiel, Düsternbrooker Weg 20, 24105 Kiel, Germany, email: cboening@geomar.de

Prof. Dr. Rainer Zahn, Institució Catalana de Recerca i Estudis Avançats (ICREA) i Universitat Autònoma de Barcelona, Campus UAB, E-08193 Bellaterra, Spain, email: rainer.zahn@uab.cat.

Prof. Dr. Bernard Barnier, Laboratoire des écoulements géophysiques et industriels (LEGI), Université Joseph Fourier Grenoble I, BP53, 38041 Grenoble Cedex 9, France, email: Bernard.Barnier@hmg.inpg.fr

Prof. Dr. Susan Lozier, Nicholas School of the Environment, Duke University, Box 90227,
Durham, NC, 22708-0227, U.S.A., email: s.lozier@duke.edu

Arne Biastoch, abiastoch@geomar.de, Kiel, March 2013