

Scientific Resume Prof. Dr. Arne Biastoch

Objective: Physical oceanographer with a strong interest in using numerical models to research the mesoscale and large-scale ocean circulation and to work interdisciplinary on solid earth and biological interactions.

Employment History and Research Experience

Since December 2018: Professor for Ocean Dynamics (W3) at Kiel University (Christian-Albrechts-Universität zu Kiel, CAU) and GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany, research unit Ocean Dynamics (OD)

2001 to 2018: Scientist, GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany (2004-2011 IFM-GEOMAR, before 2004 Institute for Marine Sciences), research unit Theory and Modelling

- Investigating Indian-Atlantic basin interaction through the Agulhas Current system (P. I. in DFG and EU projects, coordinator of BMBF framework projects); co-chair of the SCOR Working Group No. 136 “Climatic Importance of the Greater Agulhas System” (2010-2012)
- Studying the Atlantic Ocean circulation variability, with particular emphasis on northern and southern influences on the Atlantic Meridional Overturning Circulation (P. I. in EU and BMBF projects, e.g. PalMod)
- Simulating ocean and climate dynamics using a suite of global ocean/sea-ice models, also with high-resolution nests and coupled to an active atmosphere, based on the NEMO code (joint work in the European modelling initiative Drakkar and development of the Flexible Ocean and Climate Infrastructure (FOCI) together with other research units at GEOMAR)
- Exploring the role of seafloor warming and the fate of Arctic gas hydrates (interdisciplinary collaboration within the Kiel excellence cluster Future Ocean)
- Applying ocean model data to study the dispersal and Lagrangian connectivity of drifting organisms (glass eels, juvenile turtles, foraminifera, larvae, marine snow) and particles (MH370) (interdisciplinary collaboration at GEOMAR and in EU projects)
- Leading as chair of the GEOMAR Scientific Council and member of the Consultatory Board of Directors (2014-2017)
- Coordinating information & data science in the Helmholtz School for Marine Data Science (MarDATA, as speaker) and ocean system modelling in the Helmholtz framework program Earth System Modelling (ESM, as GEOMAR representative)
- Teaching bachelor and master students; official advisor of doctoral students
- Performing outreach at GEOMAR and the Kiel excellence cluster Future Ocean (e.g., public talks, radio and TV broadcasts)

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 (ARGO) using high resolution regional and global models
- Organized the weekly Physical Oceanography Research Division seminar series

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

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

1998 to 1999: Research Assistant, Institute for Marine Sciences 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: Doctoral candidate, Institute for Marine Sciences 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 ocean data (CTD, drifter) in the Irminger Sea (RV Poseidon) and the Baltic Sea (RV Alkor)
- Taught undergraduate students (exercises, talks)

1991 to 1992: Student Job, Institute for Marine Sciences 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 ocean data (CTD, moorings) in the South Atlantic (RV Meteor)

University

2018: Appointment to a professorship (W3) in Ocean Dynamics at Kiel University (Christian-Albrechts-Universität zu Kiel, CAU)

2017: Appointment to a professorship in Hydrospheric Geophysics at University of Helsinki, Finland (declined)

2013: Appointment to a professorship in the South African Research Chair Initiative (SARChI) at University of Cape Town, South Africa (declined)

March 2013: Adjunct (“außerplanmäßiger”) Professor, Kiel University

January 2009: Venia legendi, Kiel University

November 2008: Habilitation in Physical Oceanography, Kiel University

- 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: Doctoral degree in Physical Oceanography, Kiel University

- Thesis (in German): “Circulation and Dynamics of the Agulhas Region According to a Numerical Model”, advisor: W. Krauß, cum laude

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

August 1994: Diploma in Oceanography, Kiel University

- 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, mark “sehr gut”

1988 to 1994: Study of Physical Oceanography, Kiel University

Awards

October 2010: Golden Spike Award for High-Performance Computing at HPC Center Stuttgart

December 2009: IFM-GEOMAR publication price

Committees and Memberships

Since 2017: German correspondent for the “International Association for the Physical Sciences of the Oceans” (IAPSO) and delegate in the National Committee for the “International Union of Geodesy and Geophysics” (IUGG)

2010 to 2012: 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 of the DFG Sonderforschungsbereich 754 Climate - Biogeochemistry Interactions in the Tropical Ocean

Member of the American Geophysical Union (AGU, since 1995) and of the German Meteorological Society (DMG, since 2018)

Scientific Output

As of today, 95 manuscripts in international peer-reviewed journals and books were published (among 8 contributions to *Nature* journals). My current Web of Science based h-index is 30. 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., J. V. Durgadoo, A. K. Morrison, E. van Sebille, W. Weijer, S. M. Griffies, 2015: Atlantic Multi-decadal Oscillation covaries with Agulhas leakage, *Nat. Commun.*, 6:10082 doi: 10.1038/ncomms10082.
- 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.*, 38, 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, 6599–6615, doi: 10.1175/2008JCLI2404.1.
- Böning, C. W., E. Behrens, A. Biastoch, K. Getzlaff, and J. L. Bamber, 2016: Emerging impact of Greenland meltwater on deepwater formation in the North Atlantic Ocean, *Nat. Geosci.*, 9, 523-527, doi: 10.1038/ngeo2740.

My ISI-based publication record can be found at <http://www.researcherid.com/rid/B-5219-2014>.

Several (invited) talks and presentations were given at international conferences, workshops and institutes. This include a keynote presentation at the 10th International Conference on Southern Hemisphere Meteorology and Oceanography (ICSHMO12) in Nouméa, New Caledonia, a prestigious lecture on ocean and climate change at the College de France, Paris (2012), and an invited talk at the Wolfgang H. Berger symposium at Scripps Institution of Oceanography, La Jolla, U.S.A. (2018).

Examples for conference contributions: At the 2010 Ocean Sciences Meeting in Portland, the session “The greater Agulhas Current System” was proposed and chaired. 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. Served on scientific planning committees of international conferences.

Review of scientific manuscripts for international journals (*Nature*, *Science*, topical journals) and research proposals (U.S. NOAA and NSF, U.K., Sweden, The Netherlands, South Africa).

Conception, application and realization of scientific projects (DFG, BMBF, EU). Coordination of framework projects (BMBF SPACES and Helmholtz ESM). Contribution to proposals of joint research activities (SFB754, Cluster of Excellence).

Supervision and Teaching

Currently, supervision includes three postdocs (Franziska Schwarzkopf, BMBF project SPACES-CAISISAC), paleo modelling (Torge Martin, BMBF project PalMod) and atmosphere-ocean modelling (Jan Harlaß, Helmholtz project ESM), plus permanent personnel of the research unit Ocean Dynamics.

Since 2009 (officially allowed by the German Habilitation), the following doctoral theses are/were successfully supervised at Kiel University:

- Rene Schubert: Submesoscale Ocean Dynamics in Numerical Model Simulations (since 10/2016)
- Siren Rühls: Lagrangian connectivity of the upper limb of the overturning circulation studied with high-resolution ocean models (graduation in 2018)
- Jonathan Durgadoo: Controls and impact of Agulhas leakage (graduation in 2013)

Further doctoral candidates are/were co-supervised, currently six at GEOMAR. National and international doctoral and PhD theses were reviewed, PhD committees were served as an examiner (Germany, The Netherlands, France, U.S.A.) or opponent (U.K.). Theses from the bachelor and master programs at the Kiel University are regularly supervised and reviewed.

Since 2002, lectures and exercises at Kiel University were taught, covering all aspects of Theoretical Physical Oceanography and Ocean General Circulation Modelling. These courses were part of the diploma, bachelor program “Physik des Erdsystems” and master program “Climate Physics” at Kiel University. Modules at international summer schools (e.g., WE-Heraeus Summer School on Physics of the Ocean) were designed and held.

Strategies for the fair and cooperative contact with students were developed through an individual coaching provided by Kiel University (2011-2012). Participation in a course on university didactic at Kiel University (“Hochschuldidaktik-Premium”) in November 2017.

Kiel, December 2018

