

# DR. FLORIAN BÖRGEL

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please see <https://florianboergel.github.io/>

## PROFESSIONAL EMPLOYMENT

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### **Leibniz Institute for Baltic Sea Research Warnemünde**

*Dynamics of regional climate systems*

Rostock, Germany

*January 2021 - Present*

Tenure-track researcher

- Analysis of the remote connection between the North Atlantic and the Baltic Sea using global and regional climate models
- Forecasting of river runoff into the Baltic Sea using Recurrent Neural Networks
- Deployment of a regional climate model (NEMO4) for the Baltic Sea
- Analysis of oxygen variability in the Baltic Sea during the last 1,000 years

### **Leibniz Institute for Baltic Sea Research Warnemünde**

*Dynamics of regional climate systems*

Rostock, Germany

*September 2017 - December 2020*

Research Scientist

- numerical modeling of the Baltic Sea using different models such as MOM, NEMO and ERGOM
- statistical analysis of long-term climate variability on regional and global scales
- analysis of ensemble simulations (past and future)
- visualization and scientific evaluation of large amounts of data: data pre- and post-processing of large model output ( $> TB$ )
- parallel computation on super computers (HLRN)

### **Parental Leave**

*My son Leo was born.*

Berlin, Germany

*August 2019 - October 2020*

### **Leibniz Institute for Baltic Sea Research Warnemünde**

*Supervision by Dr. Thomas Neumann*

Rostock, Germany

*January 2016 - August 2017*

Research assistant

- application and development of a sea-ice model
- numerical modeling of the Baltic Sea
- statistical analysis of big data sets
- model validation with measurement data

### **Fraunhofer Institute for Manufacturing Technology and Applied Materials Research**

*Energy Systems Analysis*

Bremen, Germany

*2014 - 2015*

Research assistant

- co-development of a tool to estimate the energy usage of a smart home system

**EWE Baskets Oldenburg***Technical support*

Oldenburg, Germany

2014 - 2015

Technical assistant

- camera work
- control of the advertising boards

**energielenker GmbH (formerly infas enermetric)***Planning Group*

Greven, Germany

2013 - 2014

Student assistant

- planning of environment and climate concepts for cities
- organization of events that deal with  $CO_2$ -reduction, energy management and the future use of renewable energies
- planning of a local area heating system in the historic city of Warendorf

**ExKern GmbH***12 week internship as prerequisite for my bachelor studies*

Münster, Germany

2010 - 2011

Intern

- gutting and reconstruction of buildings

**EDUCATION**

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**Ph.D Physics**

Leibniz Institute for Baltic Sea Research Warnemünde

Department of physical oceanography

Thesis: *Long-term climate variability of the Baltic Sea*

Supervisor: Prof. Dr. H. E. Markus Meier

*September 2017 - December 2020*

Grade: with honors (summa cum laude)

**Master of Science**

University of Oldenburg

Engineering physics

Thesis: *The influence of sea ice on Baltic inflows**October 2014 - September 2017*

Grade: 1.2

**Bachelor of Engineering**

Münster University of Applied Sciences

Energy engineering

Thesis: *Planning of a local area heating system in the historic city of Warendorf**September 2010 - February 2014*

Grade: 2.0

**HONORS & SCHOLARSHIPS**

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**Fulbright Scholarship**Full scholarship to study in the United States for one year  
(not attended for personal reasons)

2014

**SUPERVISING**

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**PhD student Leonie Barghorn**

Co-supervisor

Thesis: Understanding Baltic Sea saltwater inflow dynamics under changing climate

*since 2022*

## SOFTWARE DEVELOPMENT

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**pyTEF** is a python package that can be used to apply the total exchange analysis framework to analyze the exchange flow of an estuary.

<https://github.com/florianboergel/pyTEF>

**Twitter bot @ozeanforscher** was built using the Twitter API and posts job offers related to marine science. The bot was created for a talk at the Forum Science Communication where the participants were introduced to the bot infrastructure on Twitter. During the session all participants were able to use the bot via jupyter notebooks.

for more see [https://florianboergel.github.io/outreach/forum\\_wisskomm\\_2018](https://florianboergel.github.io/outreach/forum_wisskomm_2018)

## RELEVANT COURSES

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### Core courses

Computational intelligence, computational fluid dynamics I + II, computeroriented physics, advanced computerphysics, theoretical oceanography

### Online Courses (Coursera)

Neural Networks and Deep Learning

Improving Deep Neural Networks: Hyperparameter Tuning Regularization and Optimization

## COMPUTER SKILLS

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**Expert:** python, Matlab, Linux/Unix, git, climate data operators (cdo)

**Advanced:** R, Fortran, Pytorch, julia, HPC computing, docker, Twitter API, LaTeX

**Basic:** Django, C, HTML, Java, Tensorflow, Scikit-learn, Content Management Systems

## TEACHING

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### Baltic Earth Winter School

*WS 2021/22*

University of Rostock, (Master level)

Interactive lecture about wavelet analysis and statistics

### Climate of the ocean

*WS 2021/22*

University of Rostock (Master level)

Co-Instructor

### Climate of the ocean

*WS 2020/21*

University of Rostock (Master level)

Co-Instructor

### Baltic Earth Winter School

*WS 2018/19*

University of Rostock, (Master level)

Interactive lecture about wavelet analysis

### Climate of the ocean

*WS 2018/19*

University of Rostock (Master level)

Teaching assistant

## PUBLICATIONS IN PEER-REVIEWED JOURNALS

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- [10] Dutheil, C., Meier, H. E. M., Gröger M. and Börgel F.: Warming of Baltic Sea water masses since 1850, *Journal of Climate*, submitted
- [9] Börgel, F., Meier, H. E. M., Gröger, M., Rhein, M., Dutheil, C., and Kaiser, J. M.: Atlantic Multi-decadal Variability and the Implications for North European Precipitation, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/ac5ca1>, 2022
- [8] Meier, H. E. M., Kniebusch, M., Dieterich, C., Gröger, M., Zorita, E., Elmgren, R., Myrberg, K., Ahola, M., Bartosova, A., Bonsdorff, E., Börgel, F., Capell, R., Carlén, I., Carlund, T., Carstensen, J., Christensen, O. B., Dierschke, V., Frauen, C., Frederiksen, M., Gaget, E., Galatius, A., Haapala, J. J., Halkka, A., Hugelius, G., Hünicke, B., Jaagus, J., Jüssi, M., Käyhkö, J., Kirchner, N., Kjellström, E., Kulinski, K., Lehmann, A., Lindström, G., May, W., Miller, P., Mohrholz, V., Müller-Karulis, B., Pavón-Jordán, D., Quante, M., Reckermann, M., Rutgersson, A., Savchuk, O. P., Stendel, M., Tuomi, L., Viitasalo, M., Weisse, R., and Zhang, W.: Climate Change in the Baltic Sea Region: A Summary, *Earth Syst. Dynam. Discuss.*, <https://doi.org/10.5194/esd-2021-67>, <https://doi.org/10.5194/esd-13-457-2022>, 2022.
- [7] H. E. Markus Meier, Christian Dieterich, Matthias Gröger, Cyril Dutheil, Florian Börgel, Kseniia Safonova, Ole B. Christensen, Erik Kjellström: Oceanographic regional climate projections for the Baltic Sea until 2100, <https://doi.org/10.5194/esd-13-159-2022>, 2022
- [6] Dutheil, C., Meier, H.E.M., Gröger, M. and Börgel, F. Understanding past and future sea surface temperature trends in the Baltic Sea. *Clim Dyn* (2021). <https://doi.org/10.1007/s00382-021-06084-1>, 2021
- [5] Börgel, F., C. Frauen, T. Neumann, and H. E. M. Meier., The Atlantic Multidecadal Oscillation controls the impact of the North Atlantic Oscillation on North European climate, *Environmental Research Letters*, <https://doi.org/10.1088/1748-9326/aba925>. 2020
- [4] Meier H. E. M., Börgel F., Frauen C., Radtke H., Commentary: Lake or Sea? The Unknown Future of Central Baltic Sea Herring , *Frontiers in Ecology and Evolution*, <https://doi.org/10.3389/fevo.2020.00055>. 2020
- [3] Kniebusch, M., Meier, H. E. M., Neumann, T., and Börgel, F., Temperature variability of the Baltic Sea since 1850 and attribution to atmospheric forcing variables, *Journal of Geophysical Research: Oceans*, <https://doi.org/10.1029/2018JC013948>. 2019
- [2] Radtke, H, Börgel, F, Brunnabend, S-E, Eggert, A, Kniebusch, M, Meier, H E M, Neumann, D, Neumann, T and Placke, M, Validator a Web-Based Interactive Tool for Validation of Ocean Models at Oceanographic Stations., *Journal of Open Research Software*, <https://doi.org/10.5334/jors.259>. 2019
- [1] Börgel, F., C. Frauen, T. Neumann, S. Schimanke, and H. E. M. Meier., Impact of the Atlantic Multidecadal Oscillation on Baltic Sea variability, *Geophysical Research Letters*, 45., <https://doi.org/10.1029/2018GL078943>. 2018

## SCIENTIFIC PRESENTATIONS

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**University of Bremen, physics seminar**

*December 2021*

*Speaker*

Atlantic Multidecadal Variability  
and the implications for North European Climate

**EGU General Assembly**

*June 2021*

*Speaker*

The Atlantic Multidecadal Oscillation controls the impact  
of the North Atlantic Oscillation on North European climate

**EGU General Assembly**

*April 2019*

*Poster Session*

The impact of the Atlantic Multidecadal Oscillation on Baltic Sea variability

**Baltic Earth Conference**

*June 2018*

*Speaker*

The impact of the Atlantic Multidecadal Oscillation on Baltic Sea variability

**Baltic Sea Science Congress**

*June 2017*

*Poster Session*

The influence of sea ice on Baltic Inflows

## OUTREACH

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**Visit of Dr. Ingrid Nestle (MdB)**

*2020*

I invited Ingrid Nestle and organized her visit to the Leibniz Institute for Baltic Sea Research.

I presented recent results of our working group.

**Coastal Research on Tour**

*2019*

Presenting my research to a broad audience, organized by Helmholtz-Zentrum Geesthacht

**Warnemünder Abender**

*2019*

Presenting my research to a broad audience, organized by Leibniz-Institute for Baltic Sea Research

**Rostock's Eleven, science communication challenge**

*2019*

Nominee for the Leibniz Institute of Baltic Sea Research

**Create your own #Scicomm bot**

*2018*

Host of an interactive session at Forum Wissenschaftskommunikation

(German forum science communication)

## LANGUAGES

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German (*native*)

English (*C1*)

French (*basic knowledge*)

## VOLUNTEER WORK

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Board member of Bündnis 90/Die Grünen in Rostock

*since 2021*

Member of the committee for urban development

of the city of Rostock

*2021*

Bündnis 90/Die Grünen

Deputy speaker of the state working group Energy and Climate

*since 2020*

Bündnis 90/Die Grünen

Candidate for the local election in Rostock

*2019*

Bündnis 90/Die Grünen

Member of Radentscheid Rostock

*since 2018*

Citizen-initiated cycling referendum for the City of Rostock

Co-organization of the young scientists event

*2018*

Baltic Earth conference

Co-organization of an art exhibition

*2014*

'Ferdast - A journey through Iceland' in the Geological Museum in Münster