



Dr. rer. nat. Jacqueline Behncke

Postdoctoral Researcher, Climate Scientist

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https://jacbeh.github.io/index.html

Hamburg, Germany

jacqueline-behncke

SUMMARY

I am a marine carbon cycle scientist combining in situ and satellite observations, model data, and machine learning to study air-sea CO₂ exchange and surface ocean carbonate dynamics.

WORK EXPERIENCE

Wissenschaftliche Mitarbeiterin | Helmholtz-Zentrum Hereon

08/2026 – est. 08/2030

Geesthacht, Germany

Assessing marine carbon dioxide removal (mCDR) approaches through analysis of air-sea CO₂ exchange measurements and evaluation of feasibility, efficiency, environmental impacts, and monitoring, reporting, and verification (MRV) strategies within the MAR-CO₂ project at Hereon. 50% employment until 12/2026 (parallel to GEOMAR postdoc), then full-time.

Postdoctoral Researcher | GEOMAR Helmholtz Centre for Ocean Research

01/2026 – 12/2026

Kiel, Germany

Developing and evaluating ocean carbon observing strategies for the Southern Ocean carbon sink using observing system simulation experiments (OSSEs) within the EU-funded TRICUSO project (Three Research Infrastructures Together: Carbon Uptake Southern Ocean).

Postdoctoral Researcher | Max Planck Institute for Meteorology

10/2025 – 12/2025

Hamburg, Germany

Observing system simulation experiments using the HAMOCC ocean biogeochemistry model to reduce air-sea CO₂ flux uncertainties (Work group: Modeling the carbon cycle in the Earth system)

PhD Researcher | Max Planck Institute for Meteorology

04/2022 – 10/2025

Hamburg, Germany

Investigating the role of novel citizen science sailboats in advancing our understanding of the ocean carbon sink, including uncertainty quantification of air-sea CO₂ flux estimates and evaluation of high-frequency pCO₂ observations

Data visualization & analysis, machine learning, participation in international conferences, scientific writing & presentations, peer review, mentoring & supervision

Research Assistant | Max Planck Institute for Meteorology

04/2021 – 02/2022

Hamburg, Germany

Analysis of three years of global sailing-yacht observations to investigate regional variability in surface ocean carbon, including the effects of temperature and phytoplankton activity

Research / Student Assistant | GEOMAR Helmholtz Centre for Ocean Research

2019 – 2020

Peru / Gran Canaria / Kiel

Laboratory and field experiments, including sample preparation, analytical methods, data processing, statistical analysis, and quality control within an interdisciplinary research environment

- 02/2020 – 04/2020 in Callao, Peru – Field work; Stable isotope incubations to quantify phytoplankton productivity under varying light and nutrient conditions in the Humboldt Upwelling System (Project CUSCO).
- 09/2019 – 10/2019 in Gran Canaria, Spain – Field work; Investigation of artificial upwelling impacts on ocean productivity, carbon export, and fish production (Project *Ocean artUp*).
- 03/2019 – 04/2019 in Kiel, Germany – Independent design and implementation of an experiment on the sensitivity of fluorescent dissolved organic matter (DOM) to oxygen conditions, including advanced laboratory analysis.

Voluntary Ecological Year | BUND Natur-, Umwelt- und Abfallberatungsstelle

08/2015 – 07/2016

Preetz, Germany

Public relations in environmental consulting; supervising children's groups and supporting a wildlife shelter; planning and coordination of exhibitions and group events

EDUCATION

PhD in Earth System Sciences | International Max Planck Research School on Earth System Modelling, Max Planck Institute for Meteorology

2022 – 2025

Hamburg, Germany

Grade: magna cum laude

Thesis: The Role of Sailboats in Advancing Our Understanding of the Ocean Carbon Sink (Grade: 1.0, magna cum laude)

M.Sc. Marine Umweltwissenschaften | Carl von Ossietzky Universität Oldenburg

2019 – 2022

Oldenburg, Germany

Grade: 1.2

Thesis: Effect of Light and Upwelling Intensity on the Phytoplankton Community Composition in the Peruvian Upwelling System (Grade: 1.3)

B.Sc. Geoökologie | Universität Potsdam

2016 – 2019

Potsdam, Germany

Grade: 1.6

Thesis: Identification of Biogeochemical Processes in Long-term Monitoring Data in Coastal Waters of Mecklenburg-Vorpommern (Grade: 1.1)

PUBLICATIONS

Behncke, J. et al. Opportunistic sampling from fisheries improves Southern Ocean carbon flux estimates (in preparation).

Behncke, J., Neukermans, G., Landschützer, P. Phytoplankton bloom type controls small-scale fCO_2 variability in high-frequency sailboat observations. (in preparation).

Behncke, J., et al. Effect of light and upwelling intensity on the phytoplankton community composition in the Peruvian upwelling system. (under review in Deep-Sea Research Part II: Topical Studies in Oceanography “Eastern Boundary Upwelling Systems (EBUS): Past, Present and Future)

Behncke, J., Ilyina, T., Chegini, F. & Landschützer, P. (2026). Improved air-sea CO₂ flux estimates from sailboat measurements. *Science Advances*, 12(2), eadz1502..

Behncke, J. (2025). The role of sailboats in advancing our understanding of the ocean carbon sink. [PhD Thesis] *Berichte zur Erdsystemforschung*, 293.

Thielecke et al. (including **Behncke, J.**) (2025). Disentangling upwelling: how light and nutrient supply shape primary producers and stoichiometry in the Humboldt upwelling system. *Deep-Sea Research Part II: Topical Studies in Oceanography*, 223: 105522

Behncke, J., Landschützer, P., Tanhua, T. (2024). A detectable change in the air-sea CO₂ flux estimate from sailboat measurements. *Scientific Reports*, 14(1):3345.

Landschützer, P., Tanhua, T., **Behncke, J.** & Keppler, L. (2023). Sailing through the southern seas of air-sea CO₂ flux uncertainty. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 381 (2249), 20220064.

SELECTED PRESENTATIONS

05/2026 – Invited speaker at DOOS Annual Meeting - Building a Global Ocean Carbon Observatory
Improved air-sea CO₂ flux estimates by adding sailboat measurements

10/2024 – Invited speaker at SOCCO | Southern Ocean Carbon & Climate Observatory
How sailboat measurements affect air-sea CO₂ flux estimates

11/2023 – Invited speaker at Workshop on surface ocean pCO₂ observations, synthesis and data products, Oostend, Belgium
A detectable change in the air-sea CO₂ flux estimate from sailboat measurements

05/2023 – 54th International Liège Colloquium on Ocean Dynamics - Machine Learning and Data Analysis in Oceanography, Liège, Belgium
Quantifying the added value of underway pCO₂ data from sailboats

05/2022 – European Geosciences Union General Assembly (EGU), Vienna, Austria
Effect of Light and Upwelling Intensity on the Phytoplankton Community Composition in the Peruvian Upwelling System

VOLUNTEERING & SCIENCE OUTREACH

- Invited speaker at several events (see presentations)
- Editor & author of the EGU Ocean Sciences blog: <https://blogs.egu.eu/divisions/os/> (since July 2024)
- Science communication via social media: coordinator of the Max Planck Phdnet Social Media Group and editor of the MPI-M Social Media Team (2022–2025)
- Interviewee in the ARD TV documentary “Boris Herrmann - Das Rennen” as a scientific expert
- Open Science engagement as Open Science Ambassador at the MPI-M (Sep 2023–Sep 2024) and member of the Phdnet Open Science Working Group (May 2023–Mar 2024)

GRANTS, FUNDING & AWARDS

- GEOMAR Postdoctoral Activities Call 2026 — Co-Applicant (awarded, €14,700)
- FYORD Travel Grant — Recipient
- Best Twitter Post Award, SOLAS Summer School 2023, Mindelo, Cabo Verde

TECH SKILLS

Programming: Python, MATLAB, R

Data Analysis: Statistics, Machine Learning, Time-Series Analysis, Uncertainty Quantification, OSSEs

Tools: LaTeX, QGIS, ArcGIS, MS Office, GIMP

SOFT SKILLS

Communication: Science Communication, Science Outreach, Scientific Writing

Personal Management: Time & Stress Management, Motivation & Enthusiasm

Collaboration: Teamwork, Strategic Planning

LANGUAGES

German: Native

English: Fluent

Hamburg, August 2026