# Maurice F. Huguenin, PhD

Postdoctoral research associate · Biogeochemical Modelling Research Unit

*GEOMAR Helmholtz Centre for Ocean Research, 24148 Kiel, Germany*

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## Executive summary


As a **climate scientist** and ocean modeller, I specialise in physical and biogeochemical **oceanography** and interactions within the climate system. My research uses high-resolution **climate and ocean models**, large datasets, and advanced diagnostics to study **ocean heat and carbon uptake**, climate variability, and their links to the large-scale ocean circulation. I earned my PhD in Climate Science from the University of New South Wales and graduated in Earth, Atmospheric and Climate Sciences from ETH Zurich. I am currently a postdoctoral researcher at the GEOMAR Helmholtz Centre for Ocean Research Kiel, where my work aims to improve our understanding and projections of the ocean's role in the Earth's climate system.


## Professional experience

### GEOMAR Helmholtz Centre for Ocean Research Kiel

*Kiel, SH, Germany*

Postdoctoral research associate, Biogeochemical Modelling Research Unit — *Oct. 2025 - **present** · **6 mos***

- Investigating how mesoscale ocean eddies affect ocean heat and carbon uptake under future climate scenarios
- Setting up, compiling, running and analysing output from the Earth System Model FOCI-MOPS in 1/2° horizontal resolution

### Swiss Federal Institute of Technology Zurich

*Zurich, ZH, Switzerland*

Visiting Scientist, Environmental Physics Group — *Jun. 2025 - Aug. 2025 · **3 mos***

- Continuing my postdoctoral work at the University of New South Wales and ongoing collaborations at the Woods Hole Oceanographic Institution:
  - Understanding the link between shifts in the Interdecadal Pacific Oscillation and Antarctic margin dense shelf water formation
  - Investigating the variability of Patagonian shelf conditions and their impacts on albatross breeding success
- Lecture assistant for the UNSW course CLIM1001 Introduction to Climate Change (20% workload)

### Woods Hole Oceanographic Institution

*Woods Hole, MA, United States*

Visiting Scientist, Climate Variability and Change Lab — *Aug. 2024 - Jun. 2025 · **11 mos***

- Continuing my postdoctoral work at the University of New South Wales with collaborations at the Woods Hole Oceanographic Institution
- Writing a National Science Foundation grant proposal as a co-principal investigator

### University of New South Wales

*Sydney, NSW, Australia*

Postdoctoral research associate, Centre for Marine Science and Innovation (CMSI) & Australian Centre for Excellence in Antarctic Science (ACEAS) — *Jun. 2023 - Aug. 2025 · **2 yrs 3 mos***

- Investigating the impact of interannual to decadal natural climate variability on Antarctic dense shelf water formation
- Running sensitivity simulations in the 1/10° configuration of ACCESS-OM2 (which combines the MOM5.1 ocean model with the CICE5.1.2 sea ice model)

### University of New South Wales

*Sydney, NSW, Australia*

PhD candidate, Climate Change Research Centre (CCRC) & Australian Centre of Excellence in Climate Extremes (CLEX) — *Jun. 2019 - May 2023 · **4 yrs***

- Setting up, preparing, running and analysing output from ACCESS-OM2 in all three horizontal configurations (1°, 1/4° and 1/10°)
- Publishing PhD thesis chapters in high-impact scientific journals
- Presenting research outcomes at national and international workshops, seminars and conferences
- Contributing to proposals for computational time and storage on the Gadi supercomputer through the annual Australian National Computational Merit Allocation Scheme (2018 - present)

### MeteoSwiss/Swiss Federal Institute of Technology Zurich

*Zurich, ZH, Switzerland*

Research assistant — *Sep. 2018 - Apr. 2019 · **8 mos***

- Organising, running and planning meetings as the research project lead
- Analysing coupled climate simulation output from the single large ensemble CESM12-LE and CMIP5 models
- Scientific manuscript writing
- Publication #2 (see below) resulted from this work

**University of New South Wales** *Sydney, NSW, Australia*

Research intern, Climate Change Research Centre (CCRC) & Australian Centre of Excellence in Climate Extremes (CLEX) *Sep. 2017 - Jul. 2018 · **11 mos***

- Self-organising and self-funding a research stay in Sydney to complete my Master's thesis abroad
- Designing, running and analysing sensitivity simulations in the global ocean-sea ice model MOM-SIS-025
- Giving seminar and workshop presentations
- Thesis writing in LaTeX

# Education

**University of New South Wales** *Sydney, NSW, Australia*

PhD in Climate Science *Jun. 2019 - May 2023*

- Thesis title: Processes and Dynamics of Global to Regional Ocean Heat Uptake and Variability
- Web link to my thesis: https://doi.org/10.26190/unsworks/25224
- Two-page summary on github
- Supervisors: Dr. Ryan M. Holmes & Prof. Matthew H. England

**Swiss Federal Institute of Technology Zurich** *Zurich, ZH, Switzerland*

Msc ETH in Atmospheric and Climate Science *Sep. 2016 - Jun. 2018*

- Thesis title: Mechanisms Driving Ocean Heat Uptake and Warm Water Volume Variability During Idealized ENSO Events
- PDF on github
- Supervisors: : Dr. Ryan M. Holmes, Prof. Matthew H. England, Dr. Iselin Medhaug & Prof. Reto Knutti
- Grade: 6. Grading scale: 6 is the highest, 1 is the lowest grade; pass mark is 4

**Swiss Federal Institute of Technology Zurich** *Zurich, ZH, Switzerland*

BSc ETH in Earth Sciences *Sep. 2013 - Jun. 2016*

- Thesis title: Ocean Heat Storage and Implications on Sea Level Rise Using CCSM4 Model Output for 1993-2016
- PDF on github
- Supervisors: Dr. Iselin Medhaug & Prof. Reto Knutti
- Grade: 5.5

Additional scientific training

**Australian Research Council Centre for Excellence in Antarctic Science** *Triabunna, TAS, Australia*

Winter school on sea level change *17 - 24 Jun. 2024*

**Australian Research Council Centre for Excellence in Antarctic Science** *Kioloa, NSW, Australia*

Autumn school on sea ice - biology to physics *22 – 26 May 2023*

**University of Tasmania, Institute for Marine and Antarctic Studies** *Hobart, TAS, Australia*

Quantitative Marine Science Physical Oceanography Course *31 Jan. – 4 Feb. 2022*

**Australian Research Council Centre of Excellence for Climate Extremes** *Melbourne, VIC, Australia*

Winter school on climate modelling *24 - 28 Jun. 2019*

# Sea-going experience

***R/V Alkor* · Biogeochemical Oceanographer** *Kiel, SH, Germany*

GEOMAR Helmholtz Centre for Ocean Research Kiel *11 Nov. 2025 · **1 day***

- One-day voyage to the western Baltic Sea
- CTD sampling, including alkalinity, nutrients and ammonia

***R/V Investigator* · Physical Oceanographer** *Hobart, TAS, Australia*

Commonwealth Scientific and Industrial Research Organisation *May 2021 - June 2021 · **28 days***

- IN2021_V03 voyage to the Tasman Sea
- Recovering and re-deploying moorings at 27°S to measure property transports in the East Australian Current
- Operating, sampling and analysing Conductivity, Temperature and Depth (CTD) measurements
- Deploying Argo, Biogeochemical Argo floats and XBT probes

# Engagement, Impact and Leadership

**Grant Reviewer** — *Woods Hole, MA, United States*

For Polar Science Early Career Community Office (PSECCO) Conference Travel Grant Applications — *Jun. 2025*

**Session Co-convener** — *Vienna, Austria*

Organising the European Geophysical Union 2025 session OS1.6 - The Southern Ocean in a changing climate: physical, biogeochemical, and ecosystem processes — *Nov. 2024 - May 2025*

**ECR Participant** — *Sydney, NSW, Australia*

Giving input for the Australian Antarctic Science Decadal Plan (2023 - 2033) in workshops, seminars and surveys — *Jun. 2023 - Jun. 2024*

**Workshop Organising Committee Member** — *Hobart, TAS, Australia*

Planning the annual Australian Centre for Excellence in Antarctic Science (ACEAS) workshop — *Oct. - Nov. 2023*

**Seminar Committee Member** — *Sydney, NSW, Australia*

Running the monthly ACEAS and CCRC research centre seminars — *2022 - 2023*

**Reviewer** — *Sydney, NSW, Australia*

Geophysical Research Letters — *Jul. - Aug. 2022*

**PhD Student Representative** — *Sydney, NSW, Australia*

Climate Change Research Centre — *May 2020 - Apr. 2021*

- Finding buddies for new PhD students
- Organising practise talks for centre-wide formal PhD reviews
- Forwarding administrative information
- Organising student meetings

# Media and outreach

A full list of my outreach activities can be seen on my homepage.

- WHOI PO News: Experiencing an International Geophysics Conference as a Postdoc.
- The Conversation: Heat from El Niño can warm oceans off West Antarctica – and melt floating ice shelves from below. This article reached over 18,000 readers worldwide.
- The Academic Minute Podcast: Southern Ocean Takes on the Heat of Climate Change.
- ABC Radio Illawarra. I was live on the 8th of Sep. 2022 to talk about my heat uptake project and its implications
- UNSW Newsroom: Southern Ocean takes on the heat of climate change.
- The Conversation: The Southern Ocean absorbs more heat than any other ocean on Earth, and the impacts will be felt for generations. This article reached over 46,000 readers worldwide, and was featured in The Guardian and Science Alert.
- CLEX Newsletter: Towards an increased understanding of the East Australian Current – My voyage abord RV Investigator .
- CLEX Research Brief: Current climate models do not project a more persistent Central European weather.

# Publications

I have a profile on Google Scholar.

In progress:

8. *Huguenin, M. F.*, & Frenger, I. (2026) On the impact of different mesoscale eddy parameterisations on future ocean heat and carbon uptake. *In preparation*.

7. *Huguenin, M. F.*, Ryan, S., Ummenhofer, C. C., & England, M. H. (2024) Linking the recent decrease in Weddell Sea dense shelf water formation to shifts in the Interdecadal Pacific Oscillation. *In preparation*.

Peer-reviewed and published:

6. England, M. H., Li, Z., *Huguenin, M. F.*, Kiss, A. E., Sen Gupta, A., Holmes, R. M., & Rahmstorf, S. (2024) Drivers of the largest ever recorded marine heat wave in the North Atlantic. **Nature**. https://doi.org/10.1038/s41586-025-08903-5.

5. *Huguenin, M. F.*, Holmes, R. M., Spence, P., & England, M. H. (2024). Subsurface warming of the West Antarctic continental shelf linked to El Niño-Southern Oscillation. **Geophysical Research Letters**, 51, e2023GL104518. https://doi.org/10.1029/2023GL104518.

4. *Huguenin, M. F.*, Holmes, R. M., & England, M. H. (2022). Drivers and distribution of global ocean heat uptake over the last half century. **Nature Communications**. 13, 4921. https://doi.org/10.1038/s41467-022-32540-5.

3. *Huguenin, M. F.*, Holmes, R. M., & England, M. H. (2020). Key Role of Diabatic Processes in Regulating Warm Water Volume Variability Over ENSO Events. **Journal of Climate**. 33, 9945–9964. https://doi.org/10.1175/JCLI-D-20-0198.1.

2. *Huguenin, M. F.*, Fischer, E. M., Kotlarski, S., Scherrer, S. C., Schwierz, C., & Knutti, R. (2020). Lack of Change in the Projected Frequency and Persistence of Atmospheric Circulation Types Over Central Europe. **Geophysical Research Letters**, 47. https://doi.org/10.1029/2019GL086132.

1. Santoso, et al. (2019). Dynamics and Predictability of El Niño-Southern Oscillation: An Australian Perspective on Progress and Challenges. **Bulletin of the American Meteorological Society**, 100, 403-420. https://doi.org/10.1175/BAMS-D-18-0057.1.

# Data sets and analysis code

6. *Huguenin, M. F.*, Holmes, R. H., Spence, P. & England, M. H. (2024). ENSO-Antarctica_data (Version 20240118) [Data set]. **Zenodo**. https://doi.org/10.5281/zenodo.10526062.

5. *Huguenin, M. F.*, Holmes, R. H., Spence, P. & England, M. H. (2024). ENSO-Antarctica_scripts (20240126_v2) [Analysis code]. **Zenodo**. https://doi.org/10.5281/zenodo.10570459.

4. *Huguenin, M. F.*, Holmes, R. H. & England, M. H. (2023). ACCESS-OM2 1° resolution global repeat decade full forcing interannual simulation data for 1972-2018 (1.0) [Data set]. **Zenodo**. https://doi.org/10.5281/zenodo.8343648.

3. *Huguenin, M. F.*, Holmes, R. H. & England, M. H. (2023). ACCESS-OM2 1° resolution global repeat decade forcing control simulation data for 1972-2018 (1.0) [Data set]. **Zenodo**. https://doi.org/10.5281/zenodo.8339578.

2. *Huguenin, M. F.*, Holmes, R. H. & England, M. H. (2022). Data and analysis scripts for Huguenin et al. (2022), Nature Communications (20220721_v2) [Analysis code]. **Zenodo**. https://doi.org/10.5281/zenodo.6873094.

1. *Huguenin, M. F.*, Fischer, E. M., Kotlarski, S., Scherrer, S. C., Schwierz, C., & Knutti, R. (2020) maurice-huguenin/europe_circulation_types: Analysis Scripts and Data (20240628_v2) [Analysis scripts and data]. **Zenodo**. https://doi.org/10.5281/zenodo.12578019.

## Selected conference presentations and seminars

I have presented my research at more than 12 international conferences and various domestic/international workshops and seminars. A full list of my presentations can be seen on my homepage.

**Rhode Island Physical Oceanography Seminar Series** — *Kingston, RI, USA*
Invited speaker — *28 Feb. 2025*

**Physical Oceanography Dissertations Symposium - PODS XIII** — *Līhu'e, HI, United States*
Invited participant — *21 Oct. 2024*

**Woods Hole Oceanographic Institution Physical Oceanography Seminar** — *Woods Hole, MA, United States*
Invited speaker — *1 Oct. 2024*

**Ocean Circulation and Climate Dynamics Colloquium** — *GEOMAR Kiel, online*
Invited speaker — *26 Jun. 2023*

**Scripps Institution of Oceanography Climate, Atmospheric Sciences, and Physical Oceanography Seminar** — *La Jolla, CA, United States*
Invited speaker — *6 Dec. 2022*

**College of Oceanic and Atmospheric Sciences Seminar** — *Oregon State University, online*
Invited speaker — *17 Nov. 2020*

**Australian Meteorological and Oceanographic Society Annual Meeting** — *Darwin, NT, Australia*
Poster & oral presentation — *11 - 14 Jun. 2019*

**European Geophysical Union Annual Meeting** — *Vienna, Austria*
Poster presentation — *9 - 12 Apr. 2019*

## Research proposals

**NSF Office of Polar Programs** — *United States*
Svenja Ryan, Maurice F. Huguenin & Caroline C. Ummenhofer — *12 Dec. 2024*

- Title: Variability and Trends in Southern Hemisphere Subpolar Gyres in High-Resolution Ocean and Climate Models: Implications for Dense Water Formation and Major Antarctic Ice Shelves
- Amount of request: USD 312,862
- Project not funded.

**National Computational Merit Allocation Scheme** — *Australia*
Matthew H. England et al. — *2019 – 2024*

- Title: Past, present and future climate variability and change in the Southern Ocean
- Annual call to submit proposals for computational walltime and storage on Australia's Gadi National Computational Infrastructure
- Amount of request: typically 15 Million Service Units & 60 TB storage, varying with group size

## Teaching experience

**Lecture assistant** — *Sydney, NSW, Australia*
CLIM1001-GENS0401 Course Introduction to Climate Change — *Jun. - Aug. 2025*

- Moderation of online forum discussions for 70 students for the full course period
- Marking of student's online performance over the duration of the course
- 20% workload

**A Fun Introduction to LaTeX** — *Sydney, NSW, Australia*
Climate Change Research Centre Fun Seminar Series — *25 Mar. 2024*

- Lecture material available at https://github.com/mauricehuguenin/introduction_latex

**Graduate teaching assistant** — *Sydney, NSW, Australia*
CLIM1001-GENS0401 Course Introduction to Climate Change — *2019 & 2023*

- Moderation of online forum discussions for week 7: Global circulation and climate variability
- Marking of individual student and group reports

## Memberships and communities

| | | |
|---|---|---|
| FYORD | **Foster Young Ocean Researcher Development**, Community member | *2025 – **present*** |
| APECS | **Association of Polar Early Career Scientists**, Community member | *2022 – **present*** |
| AGU | **American Geophysical Union**, Full member | *2019 – **present*** |
| EGU | **European Geophysical Union**, Full member | *2018 – **present*** |
| ACEAS | **Australian Research Council Australian Centre for Excellence in Antarctic Science**, PhD student and Postdoctoral research associate | *2022 – 2025* |
| CLEX | **Australian Research Council Centre of Excellence for Climate Extremes**, PhD student and Associate investigator | *2018 – 2024* |
| AMOS | **Australian Meteorological and Oceanographic Society**, Full member | *2017 – 2022* |

## Honours & Awards

### Foster Young Ocean Researcher Development (FYORD) Travel Grant
*Kiel, Germany*

Towards visiting the American Geophysical Union's Ocean Sciences Meeting 2026 — *12 Nov. 2025*

- EUR 500

### Selected participant
*Scex Rouge, VD, Switzerland*

Glacier 3000 Excursion by APECS Switzerland and the Swiss Polar Institute — *19 Jul. 2024*

- Event to explore one of Switzerland's iconic Alpine sites while connecting with fellow early-career polar and alpine researchers

### Early Career Scientist's Travel Support
*Vienna, Austria*

Towards attending the European Geophysical Union Annual Meeting in 2025 — *10 Jan. 2025*

- EUR 575 conference registration fee waiver + refund of abstract processing charge

### Polar Science Early Career Community Office (PSECCO) Conference Travel Grant
*Boulder, CO, United States*

Towards attending the European Geophysical Union Annual Meeting in 2025 — *2 Oct. 2024*

- USD 700

### Selected participant
*Līhu'e, HI, United States*

Physical Oceanography Dissertation Symposium (PODS) XIII — *19 Jul. 2024*

- Selected as one of 25 global PhD graduates of 2022/23 to present my science in front of my peers and representatives from the major US federal agencies funding physical oceanographic research
- Boston - Līhu'e return flights and accommodation, meals & incidentals during the week-long workshop in Hawai'i
- Meeting website
- Article in Kaua'i Now, the local news website

### Best lightning presentation
*Canberra, ACT, Australia*

Annual COSIMA ocean modelling workshop — *8 Sep. 2023*

- Choice of pottery

### Best PhD Student Paper published in the centre in 2022
*Lorne, VIC, Australia*

ARC Centre of Excellence for Climate Extremes (CLEX) — *17 Nov. 2022*

- AUD 500

### Best PhD Student Presentation
*Sydney, NSW, Australia*

Climate Change Research Centre Postgraduate Reviews — *13 May 2022*

- AUD 100 gift voucher

### Scientia PhD Scholarship
*Sydney, NSW, Australia*

University of New South Wales — *29 Nov. 2018*

- Awarded to PhD candidates who have shown exceptional research quality, and is valued at over AUD 200,000 across four years

## Skills

**Operating Systems**

Unix-based high-performance computing at
- NHR-Nord: National High-performance Computing Center, University of Göttingen, GER
- CAU nesh: Christian-Albrechts-Universität, Kiel, GER
- NCI: National Computational Infrastructure, Canberra, AUS

**Numerical modelling**

- FOCI-MOPS (NEMO + ECHAM + MOPS, coupled via OASIS3-MCT): setting up the model via gitlab and esm_tools, running sensitivity experiments and analysing model output
- MOM-SIS (MOM4 + SIS) and ACCESS-OM2 (MOM5 + CICE5 coupled via OASIS3-MCT): setting up the model via github and payu, performing spin-ups, creating input, running sensitivity experiments and analysing model output
- CESM12-LE and CMIP5: analysing coupled large ensemble and multi-model output

**Programming languages** Python, MATLAB, R, LaTeX

**Tools and software** Jupyter kernels, emacs, vim, bash, version control systems like git, github, climate data operators (CDO)

**Web** Rmd, HTML

**Languages**

- German (Switzerland): native
- English: full professional proficiency, IELTS 8.5 ⇔ CEFR Level C2
- French: limited professional proficiency
- Spanish: limited professional proficiency