

Maurice F. Huguenin

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Guest Investigator

- Woods Hole Oceanographic Institution
Woods Hole, MA, United States

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Postdoctoral research associate

- Centre for Marine Science and Innovation & ARC
Australian Centre for Excellence in Antarctic Science
University of New South Wales, NSW, Australia

Research interests:

- Large-scale physical oceanography from the tropics to the Antarctic margin
- Ocean-sea ice modelling
- Internal climate variability and its atmospheric teleconnections
- Ocean heat content
- Central European atmospheric circulation

In the near future, I envision myself stepping onto Antarctica as a scientist and as part of a research voyage.

Context of current employment:

The University of New South Wales (UNSW) in Sydney, Australia (<https://www.unsw.edu.au/>), is a public higher-degree research institution that employs around 7500 regular staff and more than 66'000 students (as of 2024). In my current position, I am independently working on research projects that include

- setting up, running and analysing climate model simulations,
- writing scientific manuscripts and outreach articles,
- giving seminar talks on my research and attending conferences to present my research to a wider audience.

I am also actively scheduling time into my week to improve my management and leadership skills, primarily through the self-study of resources from the *Harvard Business Review*. I am part of the physical oceanography group of ten early career researchers, led by Prof. Matthew England. I also am collaborating with international partners at the Woods Hole Oceanographic Institution and applying for research grants to the US National Science Foundation's Office of Polar Programs.

Woods Hole Oceanographic Institution (WHOI) in Woods Hole, United States (<https://www.whoi.edu/>), is the world's premier independent organization dedicated exclusively to ocean research, technology, and education. Founded in 1930, it employs approximately 950 employees, including more than 500 scientists, engineers, ship's crew, and technicians. As a guest investigator at WHOI, I am continuing my work started at UNSW Sydney, and bringing a unique perspective of Southern Hemisphere and Antarctic science to the Physical Oceanography department at WHOI to foster the exchange of ideas and collaborations across different ocean science disciplines.

Work experience:

Woods Hole Oceanographic Institution (WHOI)

Guest Investigator in the Climate Variability and Change Lab

Woods Hole, MA, United States

August 2024 – **present**

University of New South Wales (UNSW)

Postdoctoral research associate at the Centre for Marine Science and Innovation and the Australian Centre for Excellence in Antarctic Science

Sydney, NSW, Australia

June 2023 – **present**

University of New South Wales (UNSW)

PhD candidate at the Climate Change Research Centre (CCRC) and the Australian Centre of Excellence in Climate Extremes

Sydney, NSW, Australia

June 2019 – May 2023

Commonwealth Scientific and Industrial Research Organisation (CSIRO) Scientific Voyage Participant on <i>RV Investigator</i> from Hobart to Brisbane (30 days) Recovering and re-deploying six ocean moorings across the shelf at 27°S to monitor East Australian Current properties in a changing climate	Hobart, TAS, Australia May 2021 – June 2021
MeteoSwiss/Swiss Federal Institute of Technology Zurich (ETH Zürich) Research Assistant	Zurich, ZH, Switzerland September 2018 – April 2019
University of New South Wales (UNSW) Research internship to write my Master's thesis	Sydney, NSW, Australia September 2017 – July 2018

Education:

University of New South Wales (UNSW) PhD at the Climate Change Research Centre Thesis title: Processes and Dynamics of Global to Regional Ocean Heat Uptake and Variability, https://doi.org/10.26190/unsworks/25224 . Supervisors: Ryan M. Holmes & Matthew H. England	Sydney, NSW, Australia June 2019 – May 2023
Swiss Federal Institute of Technology Zurich (ETH Zürich) Master's degree in Atmospheric and Climate Science Thesis title: Mechanisms Driving Ocean Heat Uptake and Warm Water Volume Variability During Idealized ENSO Events, pdf . Supervisors: Dr. Ryan M. Holmes, Matthew H. England, Iselin Medhaug & Reto Knutti Grade: 6. Grading scale: 6 is the highest, 1 is the lowest grade; pass mark is 4.	Zurich, ZH, Switzerland September 2016 – April 2018
Swiss Federal Institute of Technology Zurich (ETH Zürich) Bachelor's degree in Earth Sciences Thesis title: Ocean Heat Storage and Implications on Sea Level Rise Using CCSM4 Model Output for 1993-2016, pdf . Supervisors: Iselin Medhaug & Reto Knutti Grade 5.5	Zurich, ZH, Switzerland September 2013 – September 2016

Additional scientific training

Australian Research Council Centre for Excellence in Antarctic Science Winter school on sea level change	Triabunna, TAS, Australia 17 – 20 June 2024
Australian Research Council Centre for Excellence in Antarctic Science Winter school on sea ice changes in a warming climate	Kioloa, NSW, Australia 22 – 26 May 2023
University of Tasmania, Institute for Marine and Antarctic Studies Quantitative Marine Science Physical Oceanography Course	Hobart, TAS, Australia 31 January – 4 February 2022
Australian Research Council Centre of Excellence for Climate Extremes Winter school on climate modelling	Melbourne, VIC, Australia 24 June – 28 June 2019

Publications:

I have a profile on [Google Scholar](#). My scientific publications include **4** as first-author and **1** as a co-author.

In progress:

- 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*.

6. England, M. H., Li, Z., **Huguenin, M. F.**, Kiss, A. E., Sen Gupta, A. & Rahmstorf, S. (2024) Drivers of the largest ever recorded marine heat wave in the North Atlantic. *In preparation*.

Peer-reviewed and published:

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) mauricehuguenin/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 invited seminars:

I have presented my research at more than **10** international conferences and various national/international workshops. A full list of my presentations can be seen on my [homepage](#).

- 2023, December 11. Science in Antarctica, Presentation with PhD candidate Hannah Dawson on the **USCGC Polar Star**, Sydney, Australia (oral presentation)
- 2023, June 26. Drivers and distribution of global ocean heat uptake over the last half century, Ocean Circulation and Climate Dynamics Colloquium, **GEOMAR Kiel**, online (oral presentation)

- 2022, December 12-16. Subsurface warming of West Antarctica during El Niño, **AGU Fall Meeting**, Chicago, Illinois, United States of America (poster presentations)
- 2022, December 6. Understanding the Drivers of Interannual to Multi-decadal Global and Regional Ocean Temperature Change. Invited speaker for the Climate, Atmospheric Sciences, and Physical Oceanography Seminar, **Scripps Institution of Oceanography**, La Jolla, California, United States of America (oral presentation)
- 2020, November 17. Key Role of Diabatic Processes in Changing Warm Water Volume Variability during ENSO Events, Invited speaker for the College of Oceanic and Atmospheric Sciences Seminar, **Oregon State University**, online (oral presentation)
- 2020, February 16-21. Diabatic Contribution to Ocean Heat Variability during ENSO Events, **Ocean Sciences Meeting**, San Diego, California, United States of America (poster presentation)
- 2019, June 11-14. Diabatic Contributions to Warm Water Volume Variability During ENSO Events, **Australian Meteorological and Oceanographic Society Annual Meeting**, Darwin, Northern Territory, Australia (poster + oral presentation)
- 2019, April 09-12. Changes in the Frequency and Persistence of Central European Circulation Types, **European Geophysical Union Annual Meeting**, Vienna, Austria (poster presentation)

Awards:

- 2024, July 19. Invited Participant, Physical Oceanography Dissertation Symposium (PODS) XIII in Lihue, Hawaii, United States
- 2023, September 12. Best lightning presentation at the annual COSIMA workshop of ocean-sea ice modellers in Australia, Canberra, Australia
- 2022, November 19. ARC Centre of Excellence for Climate Extremes (CLEX) Best Student Paper published in the centre in 2022, Lorne, Australia
- 2022, May 13. CCRC Best Student Presentation at the semi-annual Postgraduate Reviews, Sydney, Australia
- 2018, November 8. University of New South Wales Scientia PhD Scholarship (living stipend + USD 6'480 per year) for career development activities, Sydney, Australia. The additional funding opened opportunities to present my scientific results at nine international conferences and various national and international workshops, and to volunteer onboard the Australian government-funded research vessel *RV Investigator* on a voyage from Hobart to Brisbane to monitor East Australian Current properties.

Selected media and outreach:

A full list of my outreach activities can be found on my [homepage](#).

- The Conversation: [Heat from El Niño can warm oceans off West Antarctica – and melt floating ice shelves from below](#). This article reached over 17,300 readers worldwide.
- The Academic Minute: [Southern Ocean Takes on the Heat of Climate Change](#)
- 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 aboard RV Investigator](#)
- CLEX research brief: [Current climate models do not project a more persistent Central European weather](#)

Teaching and Mentoring:

- 2024, March 25. A fun introduction to LaTeX, CCRC Fun Seminar Series, UNSW Sydney, NSW, Australia, material on [github](#).
- 2021 & 2022, October. Casual marking for the Introduction to Climate Change (CLIM1001) undergraduate course at the University of New South Wales.
- 2021-2022: Support and guidance for Honours student Matt Pudig (now Graduate student and teaching assistant at New York University).
- 2020-2021: Climate Change Research Centre PhD student Representative. Connecting with new students and helping them fit into the university environment by giving them tips and advice for their studies.
 - Finding buddies for new PhD students
 - Organising practise talks for centre-wide formal PhD reviews
 - Forwarding administrative information
 - Organising student meetings

IT-Knowledge:

Linux, bash, emacs, git, [github](#), python (4 years experience) > MATLAB (3 years) > R (1 year), CDO, LaTeX

ACCESS-OM2 & MOM-SIS:	<p>Global ocean-sea ice models</p> <p>This global ocean-sea ice model has been extensively used in my PhD research. It is based on MOM5.1 and CICE5.1.2 and comes in three configurations (1°, 1/4° and 1/10° horizontal resolution). My experience includes spinning up the model using a novel approach developed in my research (Huguenin et al. 2022, <i>Nature Communication</i>), running perturbation simulations using idealised and realistic derived forcings (for example, using Principal Component analysis to isolate modes of ENSO variability, Huguenin et al. 2020, <i>J. Climate</i>) and analysing the output in all three configurations.</p>
CMIP5 & CESM:	<p>Coupled climate models</p> <p>I have analysed atmospheric simulation data from CMIP5 and a large ensemble-initial condition configuration of CESM for a MeteoSwiss/ETHZ research project</p>
JRA55-do & CORE-NYF:	<p>I have used these two atmospheric data sets to force the ACCESS-OM2 and MOM-SIS global ocean-sea ice models and to complement the analysis of the model output.</p>
ERA-Interim:	<p>This reanalysis data set has been used to derive the model input for my MOM-SIS simulations during my Master's thesis and I have also used this data set to analyse changes in the atmospheric circulation over Central Europe</p>
Argo, SOSE:	<p>I have used gridded Argo and Southern State Estimate (SOSE) products to validate model output against observational estimates</p>

Other professional experience:

July 2022

Reviewer for *Geophysical Research Letters* (ISSN: 1944-8007)

- May 2021 – June 2021: Physical oceanography scientist onboard *RV Investigator* on a voyage from Hobart to Brisbane to monitor East Australian Current properties
- Assistance with recovery and re-deployment of moorings from the continental slope to the abyssal waters
 - Operation, sampling and analysis of CTD
 - Deployment of Argo, BGC Argo and XBT instruments
- Jan. 2020 – Jan. 2021 Climate Change Research Centre Student Representative
- Finding buddies for new PhD students
 - Organising practise talks for centre-wide formal PhD reviews
 - Forwarding administrative information
- Committee member for the Geophysical Fluid Dynamics Meeting, Gerringong, Australia (3 days, 25 attendees)
 - Committee member for the ARC Australian Centre of Excellence in Antarctic Science (ACEAS) annual workshop, Hobart, Australia (3 days, ~100 attendees)
 - Committee member for the monthly ACEAS seminars and weekly CCRC seminars for the year 2023

Memberships and Communities:

CLEX	Australian Research Council (ARC) Centre of Excellence for Climate Extremes – Associate Investigator (2018 – present)
ACEAS	Australian Research Council (ARC) Australian Centre for Excellence in Antarctic Science – Research associate (2021 – present)
AGU	American Geophysical Union – Full member (2018 – present)
EGU	European Geophysical Union – Full member (2018 – present)
AMOS	Australian Meteorological and Oceanographic Society – Full member (2017-2022)
APECS	Association of Polar Early Career Scientists – Community member (2022 – present)

Professional references:

Matthew H. England	PhD supervisor, Scientia Professor at UNSW, and co-director of the Australian Research Council Australian Centre for Excellence in Antarctic Science (ACEAS) E-mail: m.england@unsw.edu.au
Ryan M. Holmes	PhD supervisor, Climate Scientist at the Australian Bureau of Meteorology E-mail: Ryan.Holmes@bom.gov.au
Paul Spence	Collaborator on the project <i>Subsurface warming of West Antarctic continental shelf linked to ENSO events</i> and Associate Professor at the University of Tasmania E-mail: paul.spence@utas.edu.au

Languages:

German: Native language

English: Full professional proficiency (IELTS C2)

French & Spanish: Limited professional proficiency

Last updated: 14 August 2024