

# Maurice F. Huguenin

POSTDOCTORAL RESEARCH ASSOCIATE · PHYSICAL OCEANOGRAPHY

Woods Hole Oceanographic Institution, Woods Hole 02543, Massachusetts, USA

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## Executive summary

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As a physical oceanographer, I use high-resolution ocean-sea ice and coupled climate models to investigate the impact of natural climate variability and its teleconnections on ocean heat content over the past fifty years. My primary research focuses on the dynamics of the Southern Ocean and the Antarctic margin. I enjoy presenting my science to others and explaining the direct impacts of my work on our society. In the near future, I also envision myself stepping onto the Antarctic continent as part of a ship-based research effort.

## Work experience

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### Woods Hole Oceanographic Institution

Woods Hole, MA, United States

VISITING SCIENTIST, CLIMATE VARIABILITY AND CHANGE LAB

Aug. 2024 - **present**

- Continuing my postdoctoral work at the University of New South Wales
- 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

Jun. 2023 - **present**

CENTRE FOR EXCELLENCE IN ANTARCTIC SCIENCE (ACEAS)

- 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

Jun. 2019 - May 2023

EXTREMES (CLEX)

- 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**)

### Commonwealth Scientific and Industrial Research Organisation

Hobart, TAS, Australia

PHYSICAL OCEANOGRAPHY VOYAGE PARTICIPANT ON *RV Investigator*

May 2021 - June 2021

- 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

### MeteoSwiss/Swiss Federal Institute of Technology Zurich

Zurich, ZH, Switzerland

RESEARCH ASSISTANT

Sep. 2018 - Apr. 2019

- 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

### University of New South Wales

Sydney, NSW, Australia

RESEARCH INTERN, CLIMATE CHANGE RESEARCH CENTRE (CCRC) & AUSTRALIAN CENTRE OF EXCELLENCE IN

Sep. 2017 - Jul. 2018

CLIMATE EXTREMES (CLEX)

- 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
- Writing of the thesis in  $\LaTeX$

## Education

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### 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

## Engagement, Impact and Leadership

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### Session Co-convenor

Vienna, Austria

#### ORGANISING THE EUROPEAN GEOPHYSICAL UNION 2025 SESSION OS1.6 - THE SOUTHERN OCEAN IN A CHANGING

Nov. 2023 - **present**

#### CLIMATE: PHYSICAL, BIOGEOCHEMICAL, AND ECOSYSTEM PROCESSES

### ECR Participant

Sydney, NSW, Australia

#### GIVING INPUT FOR THE AUSTRALIAN ANTARCTIC SCIENCE DECADAL PLAN (2023 - 2033) IN WORKSHOPS, SEMINARS

Jun. 2023 - **present**

#### AND SURVEYS

### 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

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

## Publications

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

In progress:

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*.
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. *In press at Nature*.

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) 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

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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](#).

### Invited speaker for the University of Rhode Island Physical Oceanography Seminar Series

*Kingston, RI, USA*

PROCESSES AND DYNAMICS OF GLOBAL TO REGIONAL OCEAN HEAT UPTAKE AND VARIABILITY

*28 Feb. 2025*

### Invited participant for the Physical Oceanography Dissertations Symposium

*Lihu'e, HI, United States*

PROCESSES AND DYNAMICS OF GLOBAL TO REGIONAL OCEAN HEAT UPTAKE AND VARIABILITY

*21 Oct. 2024*

### Woods Hole Oceanographic Institution Physical Oceanography Seminar

*Woods Hole, MA, United States*

PROCESSES AND DYNAMICS OF GLOBAL TO REGIONAL OCEAN HEAT UPTAKE AND VARIABILITY

*1 Oct. 2024*

### Invited speaker for the Ocean Circulation and Climate Dynamics Colloquium

*GEOMAR Kiel, online*

DRIVERS AND DISTRIBUTION OF GLOBAL OCEAN HEAT UPTAKE OVER THE LAST HALF CENTURY

*26 Jun. 2023*

### Invited speaker for the Scripps Institution of Oceanography Climate, Atmospheric Sciences, and Physical Oceanography Seminar

*La Jolla, CA, United States*

UNDERSTANDING THE DRIVERS OF INTERANNUAL TO MULTI-DECADAL GLOBAL AND REGIONAL OCEAN TEMPERATURE CHANGE

*6 Dec. 2022*

### Invited speaker for the College of Oceanic and Atmospheric Sciences Seminar

*Oregon State University, online*

KEY ROLE OF DIABATIC PROCESSES IN CHANGING WARM WATER VOLUME VARIABILITY DURING ENSO EVENTS

*17 Nov. 2020*

### Australian Meteorological and Oceanographic Society Annual Meeting

*Darwin, NT, Australia*

DIABATIC CONTRIBUTION TO OCEAN HEAT VARIABILITY DURING ENSO EVENTS, OCEAN SCIENCES MEETING (POSTER & ORAL PRESENTATION)

*11 - 14 Jun. 2019*

### European Geophysical Union Annual Meeting

*Vienna, Austria*

CHANGES IN THE FREQUENCY AND PERSISTENCE OF CENTRAL EUROPEAN CIRCULATION TYPES (POSTER PRESENTATION)

*9 - 12 Apr. 2019*

## Research proposals

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### NSF Office of Polar Programs

*United States*

SVENJA RYAN, MAURICE F. HUGUENIN & CAROLINE C. UMMENHOFER

*Submitted 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

### National Computational Merit Allocation Scheme

*Australia*

MATTHEW H. ENGLAND ET AL.

*2022 – present*

- 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

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### A Fun Introduction to LaTeX

*Sydney, NSW, Australia*

CLIMATE CHANGE RESEARCH CENTRE FUN SEMINAR SERIES

*25 Mar. 2024*

### Graduate teaching assistant

*Sydney, NSW, Australia*

FOR THE UNSW COURSE INTRODUCTION TO CLIMATE CHANGE (CLIM1001)

*2019 & 2023*

- marking of individual student and group reports
- moderation of online forum discussions

## Memberships and communities

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APECS	<b>Association of Polar Early Career Scientists</b> , Community member	2022 – <i>present</i>
ACEAS	<b>Australian Research Council Australian Centre for Excellence in Antarctic Science</b> , PhD student and Postdoctoral research associate	2022 – <i>present</i>
EGU	<b>European Geophysical Union</b> , Full member	2018 – <i>present</i>
CLEX	<b>Australian Research Council Centre of Excellence for Climate Extremes</b> , PhD student and Associate investigator	2018 – 2024
AGU	<b>American Geophysical Union</b> , Full member	2019 – 2022
AMOS	<b>Australian Meteorological and Oceanographic Society</b> , Full member	2017 – 2022

## Honours & Awards

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### Early Career Scientist's Travel Support

*Vienna, Austria*

TOWARDS ATTENDING THE EUROPEAN GEOPHYSICAL UNION ANNUAL MEETING IN 2025

*10 Jan. 2025*

- 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*

- Boston - Līhu'e return flights and accommodation, meals & incidentals during the week-long workshop in Hawai'i

### 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

## Media and outreach

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A full list of my outreach activities can be seen 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 18,000 readers worldwide.
- The Academic Minute Podcast: [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](#).

# Skills

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**Operating Systems**    Unix-based high-performance computing at the National Computational Infrastructure, Canberra, AU

**Numerical modelling**

- [MOM-SIS](#) and [ACCESS-OM2](#): setting up the model via github, performing spin-up, creating input, running sensitivity experiments and analysing model output
- CESM12-LE and CMIP5: analysing coupled large ensemble and multi-model output

**Programming languages**

Python (5.5 years full-time working experience), MATLAB (3 years), R (1 year),  $\text{\LaTeX}$ , bash

**Tools and software**

Jupyter kernels, emacs, version control systems like git, github, Climate Data Operators (CDO)

**Web**

Rmd, HTML

**Languages**

- German (native)
- English (full professional proficiency, IELTS C2)
- French & Spanish (limited professional proficiency)