

# Maurice F. Huguenin

POSTDOCTORAL RESEARCH ASSOCIATE · PHYSICAL OCEANOGRAPHY

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

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## 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
- 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

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

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

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

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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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### Lecture assistant

*Sydney, NSW, Australia*

CLIM1001-GENS0401 COURSE INTRODUCTION TO CLIMATE CHANGE

*Teaching term 2 2025*

- moderation of online forum discussions for 70 students
- marking of summary reports

### 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

APECS	<b>Association of Polar Early Career Scientists</b> , Community member	2022 – <b>present</b>
ACEAS	<b>Australian Research Council Australian Centre for Excellence in Antarctic Science</b> , PhD student and Postdoctoral research associate	2022 – <b>present</b>
EGU	<b>European Geophysical Union</b> , Full member	2018 – <b>present</b>
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

### 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

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](#).
- 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, MATLAB, R,  $\LaTeX$ , bash

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

**Web** Rmd, HTML

- German (native)
- English (full professional proficiency, IELTS 8.5  $\equiv$  CEFR Level C2)
- French & Spanish (limited professional proficiency)