

# Christoph Renkl | Postdoctoral Investigator

Physical Oceanography Department – Woods Hole Oceanographic Institution

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## EDUCATION

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### Dalhousie University

*Ph.D. Oceanography*

THESIS TITLE: Ocean Model Validation and Downscaling for Subseasonal-to-Seasonal Prediction

ADVISOR: Keith R. Thompson

Halifax NS, Canada

2014–2020

### Rheinische Friedrich-Wilhelms-Universität Bonn

*M.Sc. Physics of the Earth and Atmosphere (Specialization in Meteorology)*

THESIS TITLE: The Vertical Structure of the Atmosphere in COSMO-DE-EPS: Multivariate Ensemble Postprocessing in the Space of Vertical Normal Modes

ADVISOR: Petra Friederichs

Bonn, Germany

2011–2013

### Universitetet i Bergen

*ERASMUS Exchange Programme*

Courses in meteorology, oceanography, computer science, and Norwegian language

Bergen, Norway

2009–2010

### Freie Universität Berlin

*B.Sc. Meteorology*

THESIS TITLE: Untersuchung der Vorhersagbarkeit europäischer Winterstürme in den Ensemblevorhersagen des EZMW in Abhängigkeit von der Vorlaufzeit [Analysis of the Predictability of European Winter Storms in ECMWF Ensemble Predictions as a Function of Lead Time]

ADVISORS: Uwe Ulbrich and Philip Lorenz

Berlin, Germany

2007–2011

## EXPERIENCE

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### Woods Hole Oceanographic Institution

*Postdoctoral Investigator*

ADVISOR: Hyodae Seo

Woods Hole, MA, USA

2023–present

### Dalhousie University

*Postdoctoral Fellow*

ADVISOR: Eric C. J. Oliver

Halifax NS, Canada

2021–2022

### Nansen Environmental and Remote Sensing Center

*Research Assistant*

ADVISORS: Laurent Bertino and François Counillon

Bergen, Norway

2014

### Dalhousie University

*Visiting Researcher*

ADVISOR: Katja Fennel

Halifax NS, Canada

2013

### University of Leicester

*IAESTE/SURE Summer Intern*

ADVISOR: Robert Fear

Leicester, UK

2012

### Leibniz-Institute of Atmospheric Physics e.V.

*Summer Intern*

ADVISOR: Christoph Zülicke

Kühlungsborn, Germany

2010

## PUBLICATIONS

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### SUBMITTED/IN PREPARATION.....

- [4] **Renkl, C.** and Oliver, E. C. J. “Bias Correction for Downscaling CMIP6 Simulations of Northwest Atlantic Circulation and Sea Ice”. Manuscript in preparation.
- [3] **Renkl, C.**, Seo, H., and Miller, A. J. “Marine Heatwave Impacts on Landfalling Atmospheric Rivers on the U.S. West Coast”. Manuscript in preparation.
- [2] Richaud, B., Dowd, M., **Renkl, C.**, and Oliver, E. C. J. “Sea Ice Non-Linearities Act to Rectify and Filter Oceanic and Atmospheric Forcing”. Manuscript submitted to Journal of Climate.
- [1] Seo, H., Sauvage, C., **Renkl, C.**, Kirincich, A., and Lundquist, J. K. “Air-Sea Coupled Effects of Offshore Wind Farms”. Manuscript in preparation.

### JOURNAL ARTICLES.....

- [5] Ohashi, K., Laurent, A., **Renkl, C.**, Sheng, J., Fennel, K., and Oliver, E. “DALROMS-NWA12 v1.0, a Coupled Circulation-Ice-Biogeochemistry Modelling System for the Northwest Atlantic Ocean: Development and Validation”. In: *EGUsphere* (in review). DOI: 10.5194/egusphere-2024-1372.
- [4] **Renkl, C.**, Oliver, E. C. J., and Thompson, K. R. “The Alongshore Tilt of Mean Dynamic Topography and Its Implications for Model Validation and Ocean Monitoring”. In: *Ocean Science* (in review), preprint available. DOI: 10.5194/egusphere-2024-1489.
- [3] **Renkl, C.**, Oliver, E. C. J., and Thompson, K. R. “Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic and Adjacent Shelf Seas”. In: *Climate Dynamics* (2024). DOI: 10.1007/s00382-024-07233-y.
- [2] **Renkl, C.** and Thompson, K. R. “Validation of Ocean Model Predictions of Mean Dynamic Topography in Shallow, Tidally Dominated Regions Using Observations of Overtides”. In: *Journal of Geophysical Research: Oceans* 127.3 (2022), e2021JC018095. DOI: 10.1029/2021JC018095.
- [1] Merryfield, W. J. et al. incl. **Renkl, C.** “Current and Emerging Developments in Subseasonal to Decadal Prediction”. In: *Bulletin of the American Meteorological Society* 101.6 (2020), E869–E896. DOI: 10.1175/BAMS-D-19-0037.1.

### REPORTS.....

- [2] Krastel, S. et al. incl. **Renkl, C.** *Geomorphology, Processes and Geohazards of Giant Submarine Landslides and Tsunami Generation Capacity, as Recorded in the Sedimentary Record of the Only Historic Slide of This Kind: The 1929 Grand Banks Landslide of the Canadian Atlantic Continental Margin - Cruise No. MSM47 - September 30 - October 30, 2015 - St. John's (Canada) - Ponta Delgada, Azores (Portugal)*. MARIA S. MERIAN-Berichte MSM47. DFG-Senatskommission für Ozeanographie, 2016, p. 55. DOI: 10.2312/cr\_msm47.
- [1] **Renkl, C.**, Counillon, F., and Bertino, L. *Validation of the 20-Year TOPAZ Reanalysis*. Bergen, Norway: Nansen Environmental and Remote Sensing Center, 2014, p. 67.

## GRANTS AND SCHOLARSHIPS

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2023	<b>US CLIVAR Travel Grant</b> to attend the Mesoscale and Frontal-Scale Air-Sea Interactions Workshop in Boulder, CO, USA.	
2021–2022	<b>MEOPAR Postdoctoral Fellowship Award</b> for research project “Future Projections of Northwest Atlantic Circulation and Sea Ice”.	CAD\$40,000
2018	<b>World Meteorological Organization (WMO) Travel Grant</b> to attend the International Conferences of Subseasonal to Decadal Prediction in Boulder, CO, USA.	US\$2,000
2017	<b>MEOPAR Travel Grant</b> to attend the Annual Scientific and Training Meetings in Montreal QC, Canada.	
2014–2017	<b>Nova Scotia Scholarship, International Award</b>	CAD\$30,000

## AWARDS AND HONORS

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2021	<b>Invited Participant, Physical Oceanography Dissertation Symposium (PODS) XI</b> in Lihue, HI, USA.
2016	<b>Outstanding Student Poster and PICO (OSPP) Award</b> at the European Geosciences Union (EGU) General Assembly 2016 in Vienna, Austria.
2012	<b>IAESTE Internship/Summer Undergraduate Research Experience (SURE)</b> at the University of Leicester, UK.

## TEACHING EXPERIENCE

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<b>Ocean Dynamics (OCEA 5221)</b> <i>Guest Lecturer</i>	<b>Dalhousie University</b> <i>Winter 2022</i>
Guest lecture on the Stommel (1961) box model of the thermohaline circulation for a class of 5 graduate students.	
<b>Oceanography Honours Class (OCEA 4201)</b> <i>Guest Lecturer</i>	<b>Dalhousie University</b> <i>Fall 2021, 2022</i>
Two guest lectures per term on effective data visualization for Honours students in Oceanography.	
<b>Introduction to Programming with R and Python</b> <i>Lecturer</i>	<b>Dalhousie University</b> <i>Fall 2018</i>
Co-organized an informal lecture series to introduce basic concepts of programming in R and Python languages to 10–15 senior undergraduate and early graduate students. Designed curriculum and delivered weekly tutorials on programming with Python.	
<b>The Blue Planet (OCEA 2001/2002)</b> <i>Teaching Assistant</i>	<b>Dalhousie University</b> <i>Fall 2016, 2017 and Winter 2017, 2018</i>
Prepared and delivered short presentations linking class materials to recent research and events that appeared in newspaper articles for a class of 150 students. Assisted in exam preparation and provided one-on-one assistance for students registered in course. Prepared and held some of the main lectures as substitute for the lecturer.	
<b>Synoptic Meteorology</b> <i>Teaching Assistant</i>	<b>Freie Universität Berlin</b> <i>Fall 2010</i>
Prepared and conducted weekly tutorials for a class of 30 students. Designed and marked weekly assignments, mid-term, and final exams.	

## MENTORING

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2023–2024	Co-Advisor	Yoo-Jun Kim, University of Tokyo, visiting Ph.D. Student at WHOI
2023	Unofficial Mentor	Anthony Meza, WHOI/MIT Joint Program, Ph.D. General Exam Project
2022	Co-Advisor	Alexa MacIsaac, Dalhousie Interdisciplinary Science Program Project
2022	Co-Advisor	Kaitlyn Quinn, Dalhousie Interdisciplinary Science Program Project
2022	Co-Advisor	Lilian Musselman, Dalhousie Interdisciplinary Science Program Project
2022	Co-Advisor	Peter MacGregor, Dalhousie Interdisciplinary Science Program Project

## SERVICE

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- Reviewer: Communications Earth and Environment, Journal of the Atmospheric Sciences, Journal of Climate, Weather and Climate Dynamics, National Science Foundation Physical Oceanography (ad hoc).
- Member of the space committee, Woods Hole Oceanographic Institution, Woods Hole, MA, USA (2023–present).
- Co-organizer of a scientific retreat for graduate students in ocean-related disciplines, Brigadoon Village, Aylesford NS, Canada (2018).
- President of the Dalhousie Oceanography Students Association (DOSA), Dalhousie University, Halifax NS, Canada (2016–2018).
- Co-organizer and presenter of Methods in Ten Minutes (MTM) seminar series, Dalhousie University, Halifax NS, Canada (2016–2022).
- Member of the executive of the student society, Meteorological Institute, University of Bonn, Germany (2012–2013).
- Student representative at the internal assembly and master studies examination board, Meteorological Institute, University of Bonn, Germany (2011–2013).
- Member of the organizing committee of “Studentische Meteorologentagung” (annual meeting of meteorology students from Germany, Austria, and Switzerland) at Freie Universität Berlin, Germany (2011).
- Member of the executive of the student society, Institute of Meteorology, Freie Universität Berlin, Germany (2008–2011).

## Public Science Engagement

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- Interview with San Francisco Chronicle about the impact of marine heatwaves on atmospheric rivers (2024) [[link to article](#)]
- Q&A sessions about weather, ocean, and climate with 3rd graders at the Lina-Morgenstern-Schule, Bochum, Germany (2016, 2022).
- Guided tours of the weather observatory at the Institute of Meteorology at Freie Universität Berlin, Germany (2010–2011).

## SEA TIME

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Sep–Oct 2015 (30 days) **R/V Maria S. Merian - MSM47:** Seismic mapping and coring transects to identify the sedimentary record of the 1929 Grand Banks landslide along the Canadian Atlantic continental margin.

## PRESENTATIONS

### Invited Seminars.....

- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. U.S. Naval Research Laboratory, Monterey, CA, USA (virtual), February 2022.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. National Oceanography Centre, Liverpool, UK (virtual), February 2022.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Woods Hole Oceanographic Institution, Woods Hole, MA, USA (virtual), February 2022.
- *Ocean Model Validation and Downscaling for Subseasonal-to-Seasonal Prediction*. Physical Oceanography Dissertation Symposium XI, Kaua'i, HI, USA, October 2021.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Bedford Institute of Oceanography, Dartmouth NS, Canada, February 2021.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Department of Oceanography, Dalhousie University, Halifax NS, Canada, January 2021.
- *Tilt, Tides, and Turbulence: Real-Life Struggles of an Ocean Modeller*. Amec Foster Wheeler Environment & Infrastructure, Dartmouth NS, Canada, April 2017.
- *The Alongshore Tilt of Mean Dynamic Topography and Implications for Nearshore Circulation*. Bedford Institute of Oceanography, Dartmouth NS, Canada, October 2016.

### Conference Presentations (First Author).....

#### 2024

- *Diabatic Amplification of Atmospheric River Intensity by Marine Heatwaves*. Oral presentation at the International Atmospheric Rivers Conference 2024, La Jolla, CA, USA, June 2024.
- *Diabatic Amplification of Atmospheric River Intensity by Marine Heatwaves*. Oral presentation at the EGU General Assembly 2024, Vienna, Austria, April 2024.
- *Diabatic Amplification of Atmospheric River Intensity by Marine Heatwaves*. Oral presentation at the 2024 Ocean Sciences Meeting (OSM), New Orleans, LA, USA, February 2024.
- *Impact of Marine Heatwaves on Atmospheric Rivers along the U.S. West Coast*. Oral presentation at the WHOI Postdoctoral Symposium 2024, Falmouth, MA, USA, January 2024.

#### 2023

- *Impact of Marine Heatwaves on Atmospheric Rivers along the Coast of California*. Poster presentation at the WCRP Open Science Conference 2023, virtual, October 2023.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Poster presentation at the WCRP Open Science Conference 2023, virtual, October 2023.
- *Impact of Marine Heatwaves on Atmospheric Rivers along the Coast of California*. Oral presentation at the Eastern Pacific Ocean Conference 2023, Fallen Leaf Lake, CA, USA, September 2023.
- *Downscaling Climate Projections of Northwest Atlantic Circulation and Sea Ice: Importance of Bias Correction and Spatiotemporal Scales*. Oral presentation at the 57th Canadian Meteorological and Oceanographic Society (CMOS) Congress, St. John's NL, Canada, May/June 2023.
- *Coastal Mean Dynamic Topography and Implications for Model Validation and Ocean Monitoring*. Oral presentation at the 57th Canadian Meteorological and Oceanographic Society (CMOS) Congress, St. John's NL, Canada, May/June 2023.
- *Impact of Marine Heatwaves on Atmospheric Rivers along the Coast of California*. Poster presentation at the 57th Canadian Meteorological and Oceanographic Society (CMOS) Congress, St. John's NL, Canada, May/June 2023.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Poster presentation at the Mesoscale and Frontal-Scale Interactions Workshop, Boulder, CO, USA, March 2023.

#### 2022

- *Bias Correction and Spatiotemporal Scales for Downscaling Future Projections of Northwest Atlantic*

*Circulation and Sea Ice*. Oral presentation at the 56th Canadian Meteorological and Oceanographic Society (CMOS) Congress, virtual, June 2022.

- *Bias Correction and Spatiotemporal Scales for Downscaling Future Projections of Northwest Atlantic Circulation and Sea Ice*. Oral presentation at the EGU General Assembly 2022, Vienna, Austria, May 2022.
- *Bias Correction and Spatiotemporal Scales for Downscaling Future Projections of Northwest Atlantic Circulation and Sea Ice*. Poster presentation at the Ocean Frontier 2022, Halifax NS, Canada, May 2022.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Oral presentation at the 2022 Ocean Sciences Meeting (OSM), virtual, February/March 2022.

#### 2021

- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Oral presentation at the 55th Canadian Meteorological and Oceanographic Society (CMOS) Congress, virtual, May/June 2021.

#### 2019

- *The Madden-Julian Oscillation as a Source of S2S Predictability of North Atlantic Sea Surface Temperature*. Oral presentation at the 27th General Assembly of the International Union of Geodesy and Geophysics (IUGG), Montreal QC, Canada, July 2019.
- *The Madden-Julian Oscillation as a Source of S2S Predictability of North Atlantic Sea Surface Temperature*. Oral presentation at the Conference of Dalhousie Oceanography Graduate Students (CDOGS), Halifax NS, Canada, March 2019.

#### 2018

- *Downscaling Subseasonal Predictions of Ocean Extremes*. Poster presentation at the International Conference on Subseasonal to Seasonal (S2S) Prediction, Boulder, CO, USA, September 2018.
- *Using Overtides to Evaluate Ocean Model Predictions of Mean Dynamic Topography in Shallow, Tidally-Dominated Regions*. Oral presentation at the 52nd Canadian Meteorological and Oceanographic Society (CMOS) Congress, Halifax NS, Canada, June 2018.
- *A First Step Toward Downscaling Subseasonal Predictions of Ocean Extremes*. Oral presentation at the Conference of Dalhousie Oceanography Graduate Students (CDOGS), Halifax NS, Canada, March 2018.
- *Using Overtides to Evaluate Ocean Model Predictions of Mean Dynamic Topography in Shallow, Tidally-Dominated Regions*. Poster presentation at the 2018 Ocean Sciences Meeting (OSM), Portland, OR, USA, February 2018.

#### 2017

- *The Mean Tilt of Coastal Sea Level in Shallow, Tidally-Dominated Regions*. Oral presentation at the 51st Canadian Meteorological and Oceanographic Society (CMOS) Congress, Toronto ON, Canada, June 2017.
- *Tilt, Tides, and Turbulence: Real-Life Struggles of an Ocean Modeller*. Oral presentation at the Conference of Dalhousie Oceanography Graduate Students (CDOGS), Halifax NS, Canada, March 2017.

#### 2016

- *The Alongshore Tilt of Mean Dynamic Topography and Implications for Nearshore Circulation and Regional Vorticity Balance*. Oral presentation at the 50th Canadian Meteorological and Oceanographic Society (CMOS) Congress, Fredericton NB, Canada, May/June 2016.
- *The Alongshore Tilt of Mean Dynamic Topography and Implications for Nearshore Circulation and Regional Vorticity Balance*. Poster presentation at the EGU General Assembly 2016, Vienna, Austria, April 2016.
- *The Alongshore Tilt of Mean Dynamic Topography and Implications for Nearshore Circulation*. Oral presentation at the Conference of Dalhousie Oceanography Graduate Students (CDOGS), Halifax NS, Canada, March 2016.

#### 2013

- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Poster presentation at the Workshop "Evaluating Probabilistic Forecasts of Multivariate Quantities", Heidelberg,

Germany, October 2013.

- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Oral presentation at the EGU General Assembly 2013, Vienna, Austria, April 2013.
- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Poster presentation at the COSMO User Seminar, Offenbach, Germany, March 2013.
- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Poster presentation at the Symposium “Extreme Events: Modeling, Analysis and Prediction”, Hanover, Germany, February 2013.