

# 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*

**Halifax, NS, Canada**

2014–2020

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

ADVISOR: Keith R. Thompson

### Rheinische Friedrich-Willhelms-Universität

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

**Bonn, Germany**

2011–2013

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

ADVISOR: Petra Friedrichs

### Universitetet i Bergen

*ERASMUS Exchange Programme*

**Bergen, Norway**

2009–2010

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

### Freie Universität Berlin

*B.Sc. Meteorology*

**Berlin, Germany**

2007–2011

THESIS TITLE: Untersuchung der Vorhersagbarkeit europäischer Winterstürme in den Ensembledvorhersagen 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

## EXPERIENCE

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### Woods Hole Oceanographic Institution

*Postdoctoral Investigator*

**Woods Hole, MA, USA**

2023–present

### Dalhousie University

*Postdoctoral Fellow*

**Halifax, NS, Canada**

2021–2022

### Nansen Environmental and Remote Sensing Center

*Research Assistant*

**Bergen, Norway**

2014

### Department of Oceanography, Dalhousie University

*Visiting Researcher*

**Halifax, NS, Canada**

2013

### Department of Physics and Astronomy, University of Leicester

*IAESTE/SURE Summer Intern*

**Leicester, UK**

2012

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

*Summer Intern*

**Kühlungsborn, Germany**

2010

## PUBLICATIONS

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### IN PREPARATION.....

- [1] K. Ohashi, A. Laurent, **C. Renkl**, F. Dilmahamod, K. Fennel, E. C. J. Oliver, J. Sheng, “Development and validation of a coupled circulation-ice-biogeochemistry modelling system for the northwestern Atlantic Ocean”. Manuscript in preparation. 2023.
- [2] **C. Renkl**, K. R. Thompson, “Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic and Adjacent Shelf Seas”. Manuscript in preparation. 2023.
- [3] **C. Renkl**, E. C. Oliver, “Downscaling Future Projections of Northwest Atlantic Circulation and Sea Ice: Importance of Bias Correction and Spatiotemporal Scales”. 2023.
- [4] **C. Renkl**, K. R. Thompson, “Coastal Mean Dynamic Topography and Implications for Model Validation and Ocean Monitoring”. Manuscript in preparation. 2023.

### JOURNAL ARTICLES.....

- [1] **C. Renkl**, K. R. Thompson, “Validation of Ocean Model Predictions of Mean Dynamic Topography in Shallow, Tidally Dominated Regions Using Observations of Overtides”. en. In: *Journal of Geophysical Research: Oceans* 127.3 (2022), e2021JC018095. DOI: 10.1029/2021JC018095.
- [2] W. J. Merryfield, J. Baehr, L. Batté, E. J. Becker, A. H. Butler, C. A. S. Coelho, G. Danabasoglu, P. A. Dirmeyer, F. J. Doblas-Reyes, D. I. V. Domeisen, L. Ferranti, T. Ilynia, A. Kumar, W. A. Müller, M. Rixen, A. W. Robertson, D. M. Smith, Y. Takaya, M. Tuma, F. Vitart, C. J. White, M. S. Alvarez, C. Ardilouze, H. Attard, C. Baggett, M. A. Balmaseda, A. F. Beraki, P. S. Bhattacharjee, R. Bilbao, F. M. Andrade, M. J. DeFlorio, L. B. Díaz, M. A. Ehsan, G. Fragkoulidis, S. Grainger, B. W. Green, M. C. Hell, J. M. Infanti, K. Isensee, T. Kataoka, B. P. Kirtman, N. P. Klingaman, J.-Y. Lee, K. Mayer, R. McKay, J. V. Mecking, D. E. Miller, N. Neddermann, C. H. Justin Ng, A. Ossó, K. Pankatz, S. Peatman, K. Pegion, J. Perlwitz, G. C. Recalde-Coronel, A. Reintges, **C. Renkl**, B. Solaraju-Murali, A. Spring, C. Stan, Y. Q. Sun, C. R. Tozer, N. Vigaud, S. Woolnough, S. Yeager, “Current and Emerging Developments in Subseasonal to Decadal Prediction”. en. In: *Bulletin of the American Meteorological Society* 101.6 (2020). publisher: American Meteorological Society, E869–E896. DOI: 10.1175/BAMS-D-19-0037.1.
- [3] W. J. Merryfield, J. Baehr, L. Batté, E. J. Becker, A. H. Butler, C. A. S. Coelho, G. Danabasoglu, P. A. Dirmeyer, F. J. Doblas-Reyes, D. I. V. Domeisen, L. Ferranti, T. Ilynia, A. Kumar, W. A. Müller, M. Rixen, A. W. Robertson, D. M. Smith, Y. Takaya, M. Tuma, F. Vitart, C. J. White, M. S. Alvarez, C. Ardilouze, H. Attard, C. Baggett, M. A. Balmaseda, A. F. Beraki, P. S. Bhattacharjee, R. Bilbao, F. M. d. Andrade, M. J. DeFlorio, L. B. Díaz, M. A. Ehsan, G. Fragkoulidis, S. Grainger, B. W. Green, M. C. Hell, J. M. Infanti, K. Isensee, T. Kataoka, B. P. Kirtman, N. P. Klingaman, J.-Y. Lee, K. Mayer, R. McKay, J. V. Mecking, D. E. Miller, N. Neddermann, C. H. J. Ng, A. Ossó, K. Pankatz, S. Peatman, K. Pegion, J. Perlwitz, G. C. Recalde-Coronel, A. Reintges, **C. Renkl**, B. Solaraju-Murali, A. Spring, C. Stan, Y. Q. Sun, C. R. Tozer, N. Vigaud, S. Woolnough, S. Yeager, “Subseasonal to Decadal Prediction: Filling the Weather–Climate Gap”. EN. In: *Bulletin of the American Meteorological Society* 101.9 (2020). Publisher: American Meteorological Society Section: Bulletin of the American Meteorological Society, pp. 767–770. DOI: 10.1175/BAMS-D-19-0037.A.

### REPORTS.....

- [1] S. Krastel, A. Braeunig, P. Feldens, A. Georgiopolou, H. Jaehmlich, M. Lange, K. Lindhorst, J. Llopart, S. Mader, L. Mehringer, M. Merl, I. Muecke, **C. Renkl**, R. Roskoden, M. Schoenke, I. Schulten, J.-P. Schwarz, C. Stevenson, M. Vallee, B. Wegener, L. Wiesenberger, *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).* Tech. rep. ISSN: 2195-8483 Num Pages: 55. Bremen, 2016, p. 55. DOI: 10.2312/cr\_msm47.

- [2] **C. Renkl**, F. Counillon, L. Bertino, *Validation of the 20-year TOPAZ Reanalysis*. Tech. rep. 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 on “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 HONOURS

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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> Guest lecture on the Stommel (1961) box model of the thermohaline circulation.	<b>Dalhousie University</b> <i>Winter 2022</i>
<b>Oceanography Honours Class (OCEA 4201)</b> <i>Guest Lecturer</i> Two guest lectures on effective data visualization.	<b>Dalhousie University</b> <i>Fall 2021</i>
<b>Introduction to Programming with R and Python</b> <i>Lecturer</i> Co-organized informal lecture series to introduce basic concepts of programming in R and Python languages to senior undergraduate and early graduate students. Designed curriculum and delivered weekly tutorials on programming with Python.	<b>Dalhousie University</b> <i>Fall 2018</i>
<b>The Blue Planet (OCEA 2001/2002)</b> <i>Teaching Assistant</i> Prepared and delivered short presentations which linked the class materials to recent research and events which appeared in newspaper articles. Assisted in exam preparation as well as provided one-on-one assistance for students registered in course. Occasionally substituted for the instructor to deliver the lecture.	<b>Dalhousie University</b> <i>Fall 2016, 2017 and Winter 2017, 2018</i>
<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. Prepared as well as marked weekly assignments and exams.

## MENTORING

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2023	Inofficial 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 for Journal of the Atmospheric Sciences, Weather and Climate Dynamics.
- Co-organizer of a scientific retreat for graduate students in ocean-related disciplines at Brigadoon Village, Aylesford NS, Canada (2018).
- President of the Dalhousie Oceanography Students Association (DOSA) at 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 at the Meteorological Institute, University of Bonn, Germany (2012–2013).
- Student representative at the internal assembly and master studies examination board at the Meteorological Institute, University of Bonn, Germany (2011–2013).
- Member of the organizing committee of “Studentische Meteorologentagung”, the annual meeting of meteorology students from Germany, Austria and Switzerland at Freie Universität Berlin, Germany (2011).
- Member of the executive of the student society at the Institute of Meteorology, Freie Universität Berlin, Germany (2008–2011).

## Outreach

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- 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

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### 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 10, 2022.

- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. National Oceanography Centre, Liverpool, UK (virtual), February 2, 2022.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Woods Hole Oceanographic Institution, Woods Hole MA, USA (virtual), February 1, 2022.
- *Ocean Model Validation and Downscaling for Subseasonal-to-Seasonal Prediction*. Physical Oceanography Dissertation Symposium XI, Kaua'i, HI, USA, October 17–21, 2021.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Bedford Institute of Oceanography, Dartmouth, NS, Canada, February 5, 2021.
- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Department of Oceanography, Dalhousie University, Halifax NS, Canada, January 26, 2021.
- *Tilt, Tides, and Turbulence: Real-Life Struggles of an Ocean Modeller*. Amec Foster Wheeler Environment & Infrastructure, Dartmouth, NS, Canada, April 19, 2017.
- *The Alongshore Tilt of Mean Dynamic Topography and Implications for Nearshore Circulation*. Bedford Institute of Oceanography, Dartmouth, NS, Canada, October 14, 2016.

### Conference Presentations.....

- *Downscaling the Ocean Response to the Madden-Julian Oscillation in the Northwest Atlantic*. Oral presentation at the 57th Canadian Meteorological and Oceanographic Society (CMOS) Congress, St. John's NL, Canada, May 28–June 1, 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 28–June 1, 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 28–June 1, 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 6–March 8, 2023.
- *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 1–8, 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 23–27, 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 18, 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 24–March 4, 2022.
- *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 31–June 11, 2021.
- *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 8–18, 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 22, 2019.
- *Downscaling Subseasonal Predictions of Ocean Extremes*. Poster presentation at the International Conference on Subseasonal to Seasonal (S2S) Prediction, Boulder CO, USA, September

17–21, 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 10–14, 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 23, 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 11–16, 2018.
- *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 4–8, 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 24, 2017.
- *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 29–June 2, 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 17–22, 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 18, 2016.
- *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 30, 2013.
- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Oral presentation at the EGU General Assembly 2013, Vienna, Austria, April 7–12, 2013.
- *Ensemble Postprocessing and Verification of the Vertical Structure of the Atmosphere*. Poster presentation at the COSMO User Seminar, Offenbach, Germany, March 5–7, 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 13–15, 2013.