

Dr. Christoph Renkl | *Curriculum Vitae*

Postdoctoral Investigator – Woods Hole Oceanographic Institution

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EDUCATION

Ph.D. Oceanography 2020

Dalhousie University, Halifax NS, Canada

M.Sc. Physics of the Earth and Atmosphere (Specialization in Meteorology) 2013

Rheinische Friedrich-Wilhelms-Universität Bonn, Germany

B.Sc. Meteorology 2011

Freie Universität Berlin, Germany

ACADEMIC EXPERIENCE

Postdoctoral Investigator 2023–present

Physical Oceanography Department, Woods Hole Oceanographic Institution Woods Hole, MA, USA

MENTORS: Prof. Dr. Hyodae Seo and Dr. Anthony Kirincich

Postdoctoral Fellow 2021–2022

Department of Oceanography, Dalhousie University Halifax NS, Canada

MENTOR: Prof. Dr. Eric C. J. Oliver

Graduate Student Researcher 2014–2020

Department of Oceanography, Dalhousie University Halifax NS, Canada

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

ADVISOR: Prof. Dr. Keith R. Thompson

Research Assistant 2014

Nansen Environmental and Remote Sensing Center Bergen, Norway

ADVISORS: Dr. Laurent Bertino and Dr. François Counillon

Visiting Researcher 2013

Department of Oceanography, Dalhousie University Halifax NS, Canada

ADVISOR: Prof. Dr. Katja Fennel

Master Student Researcher 2012–2013

Meteorological Institute, Rheinische Friedrich-Wilhelms-Universität Bonn Bonn, Germany

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

ADVISOR: PD Dr. Petra Friederichs

IAESTE/SURE Research Intern 2012

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

ADVISOR: Dr. Robert Fear

Undergraduate Student Researcher 2011

Institute of Meteorology, Freie Universität Berlin Berlin, Germany

BACHELOR THESIS: 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: Prof. Dr. Uwe Ulbrich and Dr. Philip Lorenz

Research Intern**2010**

Leibniz-Institute of Atmospheric Physics e.V.

Kühlungsborn, Germany

ADVISOR: Dr. Christoph Zülicke

ERASMUS Exchange Programme**2009–2010**

Universitetet i Bergen

Bergen Norway

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

PUBLICATIONS**SUBMITTED/IN PREPARATION**

- [4] 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 under review in *Journal of Climate*.
- [3] **Renkl, C.** and Oliver, E. C. J. “Bias Correction for Downscaling CMIP6 Simulations of Northwest Atlantic Circulation and Sea Ice”. Manuscript in Preparation.
- [2] **Renkl, C.**, Seo, H., and Miller, A. J. “Marine Heatwave Impacts on Landfalling Atmospheric Rivers on the U.S. West Coast”. Manuscript in Preparation.
- [1] Seo, H., Sauvage, C., **Renkl, C.**, Kirincich, A., and Lundquist, J. K. “Anomalous Sea Surface Warming and Ocean-to-Atmosphere Feedback Driven by Large-Scale Offshore Wind Farms”. Manuscript in Preparation.

PEER-REVIEWED 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: *Geoscientific Model Development* (accepted), preprint available. 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* (accepted, selected as highlight paper), 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* 62.7 (2024), pp. 6719–6744. 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*. Tech. rep. Bergen, Norway: Nansen Environmental and Remote Sensing Center, 2014, p. 67.

GRANTS AND SCHOLARSHIPS

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

AWARDS AND HONORS

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

TEACHING EXPERIENCE

Climate Variability and Diagnostics (12.860) <i>Guest Lecturer</i> Guest lecture on atmospheric rivers for a class of 8 graduate students.	Massachusetts Institute of Technology <i>Fall 2024</i>
Ocean Dynamics (OCEA 5221) <i>Guest Lecturer</i> Guest lecture on the Stommel (1961) box model of the thermohaline circulation for a class of 5 graduate students.	Dalhousie University <i>Winter 2022</i>
Oceanography Honours Class (OCEA 4201) <i>Guest Lecturer</i> Two guest lectures per term on effective data visualization for Honours students in Oceanography.	Dalhousie University <i>Fall 2021, 2022</i>
Introduction to Programming with R and Python <i>Lecturer</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 five weekly tutorials on programming with Python.	Dalhousie University <i>Fall 2018</i>
The Blue Planet (OCEA 2001/2002) <i>Teaching Assistant</i> Prepared and delivered weekly 15-minute presentations linking class materials to recent research and events that appeared in newspaper articles. 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 for a class of 150 students.	Dalhousie University <i>Fall 2016, 2017 and Winter 2017, 2018</i>
Synoptic Meteorology <i>Teaching Assistant</i> Prepared and conducted weekly tutorials for a class of 30 students. Designed and marked weekly assignments, mid-term, and final exams.	Freie Universität Berlin <i>Fall 2010</i>

MENTORING

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

- **Reviewer** for Communications Earth and Environment (2), Journal of the Atmospheric Sciences, Journal of Climate, Journal of Physical Oceanography, 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

- 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 AND FIELD WORK EXPERIENCE

2024	Wind Forecast Improvement Project 3 Field Campaign: Atmospheric soundings at Woods Hole weather station to better understand characteristics of lower atmospheric winds and boundary layer clouds in the nearshore and offshore region.
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 (Presenting Author).....

2024

- *Marine Heatwaves and Atmospheric Rivers: Implications for Offshore Wind Energy at the US West Coast*. Oral presentation at NAWEA/WindTech 2024, New Brunswick, NJ, USA, October 2024.
- *Intensification of Atmospheric Rivers by Marine Heatwaves*. Oral presentation at the Eastern Pacific Ocean Conference 2024, Timberline Lodge, OR, USA, September 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.