

Old Dominion University

ODU Digital Commons

CCPO Circulation

Center for Coastal Physical Oceanography

Spring 2022

Circulation, Volume 27, No. 2

Center for Coastal Physical Oceanography, Old Dominion University

Follow this and additional works at: https://digitalcommons.odu.edu/ccpo_circulation



Part of the **Oceanography Commons**

CCPO CIRCULATION

A publication of
The Center for
Coastal Physical
Oceanography

Volume 27, No. 2 | Spring 2022

LOOKING BACK WHILE MOVING FORWARD

By Sönke Dangendorf

By the end of 2021, my wife, Lengxi, and I moved to New Orleans, starting a new chapter at Tulane University. Leaving the office at 4111 Monarch Way was not an easy step. Over the past two years, the CCPO family has become a home to us in which we found caring colleagues, mentors, and friends. Particularly important to me has been **John Klinck**, whose mentorship has gone far beyond scientific discussions and has shaped my personal and professional development significantly.

As some of you might remember, my educational background lies in civil and coastal engineering, and it was only during my Diploma and Doctoral theses that I slowly started drifting into the field of oceanography. My first research position was at the Research Institute for Water and Environment (fwu) at the University of Siegen, Germany. The institute has a long-existing expertise in coastal engineering with a particular emphasis on designing water levels for coastal structures, primarily for dikes that protect the German North Sea coastline against surging seas. I remember the early discussions with my supervisor, Jürgen Jensen, and colleagues, Thomas Wahl and Christoph Mundersbach, who emphasized the need of a better common understanding of the sea-level variations for coastal design purposes. This actually awakened my motivation to dive deeper into the causes of sea-level variability and change. I quickly realized that my educational focus on hydraulic engineering was only suitable to a limited extent and that much more knowledge about the open ocean was required to understand the variations that we observe at the coast. Therefore, I started poring over the typical oceanographic books: *Atmosphere-Ocean Dynamics* by Adrian Gill, and Richard Thompson and William Emery's *Data Analysis Methods in Physical Oceanography*; however, after a while I realized that my independent oceanographic endeavors at that time were not enough.

With our move to Norfolk in December 2019, I got the chance to gain first-hand experience in a well-established oceanography department. My daily discussions with CCPO colleagues over the past two years have indeed provided me the opportunity to sharpen my view of the coast and

Article continued on page 2

Sönke Dangendorf poses on the campus of Tulane University.



OLD DOMINION
UNIVERSITY

Inside

- Alumna Update 3
- Student Spotlight 4
- In the Heights 5
- Waters Rising 6
- Just the Facts 7

Contact

Dr. John Klinck
CCPO Director
4111 Monarch Way, Ste. 301
Norfolk, VA 23508

PH: 757.683.6005
newsletter@ccpo.odu.edu

f facebook.com/ccpo.odu
t @ODUCCPO



LOOKING BACK | Cont.

look at it from a more oceanographic perspective. I recall with great pleasure my many discussions with **Tal Ezer** about the Gulf Stream and its connection to the coastal sea level along the US east coast, learning from **Eileen Hofmann** about the great usefulness of surfclams and ocean quahogs for reconstructing past climatic changes on the Mid-Atlantic continental shelf, and discussing the links between ocean gyres and sea level with John. I also enjoyed sharing my experiences with students and building up a team of young and talented people: students **Kayla Washington, Noah Hendricks, and Francesco Lane** (now with Sophie Clayton in the Ocean and Earth Sciences Department, OES), and postdoc **Qiang Sun**, who followed us to New Orleans. Our research has been funded within the framework of the NASA Sea Level Science Team and is currently dedicated to the understanding of the drivers of interannual to decadal variations in high-tide flooding along US coastlines with the ultimate goal to provide more robust future predictions. High-tide flooding is a phenomenon that is unique to the largely un-diked US coastlines and unknown to most people in my home country of Germany. Consecutively residing in close proximity to two of the major flooding hotspots of Norfolk (Llewellyn Avenue and Hampton Boulevard) has made us aware of daily challenges that come along with tidal flooding. Here in Norfolk, the impacts of rising seas already affect almost all aspects of people's lives that go far beyond obstructing their commute to work. This illustrates the interdisciplinary nature of the problem and emphasizes the need of working across disciplinary boundaries to find common solutions.

With our move to New Orleans, we are returning behind the dikes, or levees as they are called here in the US. At Tulane University, I am joining the newly founded Department of

River-Coastal Science and Engineering. The department is envisioned to be a unique educational enterprise that will focus on the world's river, deltaic, and coastal systems, using the combined science and engineering approach pioneered by the School of Science and Engineering. By fusing civil, environmental, and coastal ocean engineering disciplines with elements of the geosciences and ecological sciences, the goal is to educate a new generation and novel breed of scientists, engineers, planners, and decision-makers that can address the complex, interdisciplinary problems in river-coastal systems associated with changing climate, sea-level rise, and the human overprints on the natural landscape. I am grateful for the opportunity to join a department that managed overcoming the usual departmental and faculty boundaries that hamper interdisciplinarity, particularly in teaching. It also allows me to combine the engineering and oceanography skills that I gained at my former institutions in Siegen and Norfolk. As of now, we are five colleagues, and we just submitted our new graduate program which will hopefully be approved by the end of 2022.

While being excited about this new adventure in New Orleans, we are leaving CCPO with very heavy hearts. CCPO has become a family for us, and we are grateful for the unconditional support everyone provided us over the last two years. In this regard, I would like to say special thanks to **Julie Morgan, Mike Dinniman**, and the other CCPO and OES colleagues, who welcomed us with open arms from the very beginning and helped us a lot with the daily challenges that emerge when settling in a new country. Despite our relocation to Louisiana, the CCPO spirit will certainly always accompany us.

See you later, alligator!



Oceanography, and environmental science in general, spans a wide variety of disciplines, which is intellectually engaging to some scientists. Much of the research and teaching in an oceanography department requires understanding of processes outside of our narrow specialties. A perplexing question for me is why coastal engineering and physical oceanography are in separate departments (and colleges).

The oddity of this separation was made clear recently with the arrival of Sönke Dangendorf at ODU with his background in engineering. He found many common interests with students and faculty at CCPO. In many ways, he already spans the gulf between these two academic specialties. I find it interesting that his new position at Tulane University is in a newly developing department that combines ocean and engineering topics. It seems to me that this is an important example of a possible new collaboration for other oceanography, environmental science, and engineering departments to consider.

There is an added benefit to this collaboration in that engineers are trained to engage the general public in their pursuit of building structures of various sorts. A traditional oceanographic department could benefit from this engineering expertise to reach a public that may be interested in rising sea level, marine heat waves, and other ocean processes that have a direct impact on society and its decisions. The future is out there. We need to see the possibilities and take advantage of them.

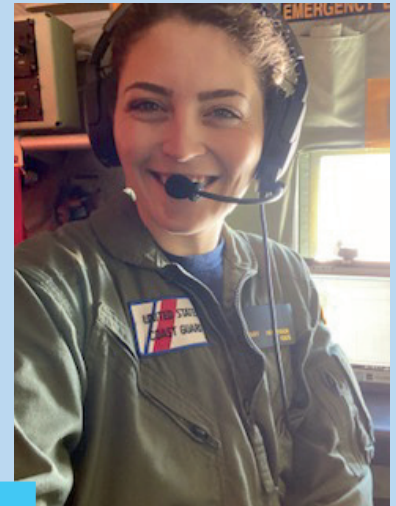
— Dr. John Klinck, Director of CCPO & Professor of Oceanography

Update From Recent M.S. Graduate, LT Shelby K. Griswold (née Henderson), USCG

At the end of May 2021, I flew with the International Ice Patrol (IIP) on an Ice Reconnaissance Detachment (IRD) out of St. John's, Newfoundland to conduct reconnaissance patrols of the North Atlantic. IIP designates a daily "iceberg limit," depicting the location of icebergs that may imminently impact the transatlantic shipping lanes. The IIP was established as a direct result of the tragic sinking of the RMS Titanic in 1912. These patrols fly every two weeks during the ice season, which occurs from February to July. Reconnaissance flights are flown in the Coast Guard's HC-130J (Hercules) aircraft and fly between 5-9 hours each day, when the weather allows. Patrols cover the eastern, southern, and western iceberg limits along the 1,000 m depth contour and up to 55°N in search of icebergs, covering an expanse of water about 30,000 square miles. The location, size, and type of iceberg are logged by ice observers (people observing them visually out of the windows of the aircraft), as well as by radar and aircrew who operate FLIR cameras. This data is added to a computer model at the IIP Operations Center that tracks the position, drift, and melt of the icebergs with given wind, current, and SST data. This information is disseminated to mariners so they can safely transit the North Atlantic, but it is also used for flight planning purposes so the iceberg limits can accurately be logged.

I started working at the IIP in August 2021 as the Satellite Reconnaissance Branch Chief. It is an interesting time to be joining

the IIP, as the use of higher resolution satellites is both changing and improving how operations are conducted. Except for the years during the two World Wars, the Ice Patrol has been active in the North Atlantic since 1913 and iceberg data has primarily come from ship reports and aircraft reconnaissance flights. Increased use of satellite data will not only aid in identifying the position and size of icebergs, but also create a more thorough and accurate record of iceberg numbers in the North Atlantic compared to previous methods. My time at ODU, specifically with regard to physical oceanography and ocean modeling, has already been invaluable to starting my work here at the IIP. For more information regarding the IIP or to check out the daily products we publish, visit our webpage at: <https://www.navcen.uscg.gov/?pageName=iipProducts> or email me at Shelby.k.henderson@uscg.mil.



A selfie taken in Newfoundland, Canada.



Broken sea ice as seen from the window of the C-130 aircraft.



Looking outside the window of a C-130 aircraft, a large non-tabular iceberg surrounded by chunks of sea ice, seen from an altitude of 1000 feet.

Photo credit: International Ice Patrol

CCPO Student Profile

NOAH HENDRICKS

When I first started at ODU in the fall of 2019, I had an interest in studying oceanography but did not have plans beyond completing a bachelor's degree. I chose to follow the physical oceanography track in the Ocean and Earth Sciences program, and **John Klinck** was assigned as my academic advisor. He has been a tremendous help in my academic pursuits since then, whether that be suggesting classes that would be beneficial or interesting to take, or advice on searching for opportunities in research or graduate school. After doing a research paper on the impact of the Atlantic meridional overturning circulation (AMOC) on flooding along the U.S. East Coast in one of my courses, I decided to try to find an opportunity to do some research outside of my coursework. John put me into contact with **Sönke Dangendorf** in December 2020, and over the next few months, we developed some ideas for a research project, along with **Tal Ezer**, that I could work on at CCPO.

In May 2021, I began working in the student office at CCPO. My first goal was to investigate how different components of the AMOC affected sea levels in the North Atlantic Ocean. With the guidance of Sönke, as well as some input from Tal and John, I was able to find some interesting patterns, most notably a strong correlation between the Florida Current and sea levels along the American East Coast. This led to a focus on the factors affecting coastal sea levels, including the Florida Current strength, position of the Gulf Stream, and surface

winds. Over the course of the summer and fall, Sönke and I have developed and tested many ideas in our research on this subject. This will hopefully result in a publication on how the strength and position of the Gulf Stream affects sea level rise in different areas along the East and Gulf Coasts.

In addition to gaining valuable research and coding experience through my project with Sönke, I have had the pleasure of getting to know some of the graduate students in the student office, like **Mauricio González**, **Kayla Washington**, and **Claudio Iturra**, among others. They have all been welcoming and friendly, and have shared their experiences in their academic careers and offered some helpful advice. My experiences and conversations with the professors and students at CCPO have led me to decide to continue studying physical oceanography in graduate school, after completing my bachelor's degree. I plan to graduate from ODU in the next two years with a major in physical oceanography and minors in applied mathematics and physics.



Noah Hendricks.

LARRY P. ATKINSON ENDOWED SCHOLARSHIP

We would like to remind you about the **Larry P. Atkinson Endowed Scholarship** in the Department of Ocean and Earth Sciences at Old Dominion University (ODU). If you are interested in contributing to the scholarship, you may make a donation online by:

- Go to the secure giving website: <https://secure.acceptiva.com/?cst=1c0e01>
- Enter dollar amount and frequency that you'd like to give, select that you'd like your gift to support scholarships, type in "**Larry Atkinson Scholarship**" under scholarship name.
- Follow the prompts and provide your card and address information and press submit!

MY GLOBAL WIND ORGANIZATION BASIC SAFETY TRAINING

By Rema McManus

Imagine being over 500 feet above the sea surface (equivalent to being at the top of the Washington Monument), with just one other technician assisting you, and you're counting on each other's training in a moment of life or death. This article will describe what I learned about the safety training needed to be an Offshore Wind Service Technician.

With funding support from the state energy office (formerly DMME, now branded "Virginia Energy"), I was given the opportunity to be the first (and thus far, only) Old Dominion University Research Foundation (ODURF) employee to obtain Global Wind Organization (GWO) Basic Safety Training (BST). In January 2020, I traveled to the New College Institute (NCI) in Martinsville, VA, where I earned four of the five BST modules needed: working at heights, manual handling, fire safety, and first aid and CPR. In the near future, NCI plans to offer the fifth and final module, sea survival, which I hope to take then. This would then give me the minimum training needed to place a meteorological or oceanographic instrument on one of the Coastal Virginia Offshore Wind pilot turbines off Virginia Beach.

In the fall of 2019, thanks to the ODURF's tuition reimbursement benefit, I also took an offshore wind graduate-level class, offered by the University of Massachusetts, Amherst, as part of its Offshore Wind Professional Certificate program. This provided an engineering and science perspective that has definitely been useful in my role as ODU's Offshore Wind Program Specialist at CCPO, but I really wanted to experience first-hand what technicians face in the field.

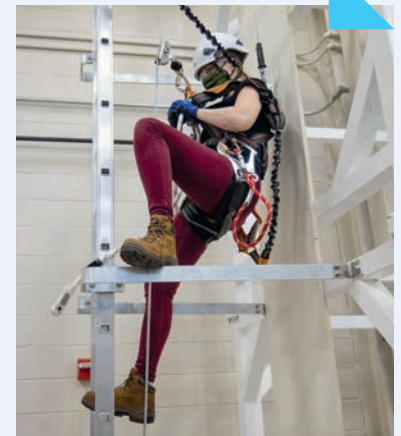
Growing up with a single mother who would find a way to fix most anything—be it a broken bicycle, a wonky couch leg, or even building a kitchen counter from scratch—was an incredible example of a "CAN DO" attitude, and I'm grateful it's something she passed on to me. I love understanding how a machine works, diagnosing a problem, and then repairing it, which I've experienced as a part-time

mechanic for the past four years at D&J Auto in Portsmouth. So, I leapt at the chance to obtain GWO certification and look forward to obtaining my sea survival module.



Photos: David Kidd | Governing.com

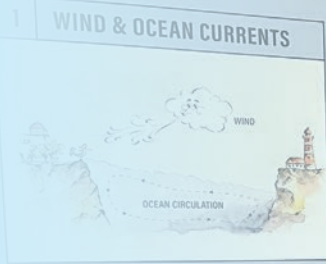
Above: Rema McManus. **Below left:** Rema demonstrates fire safety training in case of an emergency on a turbine. The NCI training facility is across the street from the Martinsville Fire Department, which provided the fuel (propane) and ignition source (a flare) and offered additional training tips. **Below right:** Rema practices First Aid and Rescue for a technician while working at heights. **At bottom:** Fall protection equipment for the GWO Working at Heights module.



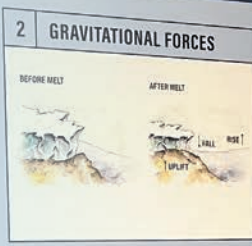
BST Working at Heights

- Ear Protection
- Fall Arrest Lanyard 'Skylotec Pro Flex Y'
- Harness 'Skylotec Offshore Master'
- Vertical Fall Arrestor 'Söll Universal II Wind' - Glider
- Fall Restraint Lanyard 'Skylotec Ergogrip Alu'
- Safety Helmet
- Safety Glasses
- Mask
- Work Gloves
- Fall Restraint Lanyard 'Miller adjustable lanyard'
- Vertical Fall Arrestor 'Skylotec Claw'
- Steel Toe Boots

WATERS RISING: A View From Our Backyard



Changes in ocean circulation and weather patterns lead to local sea-level variations. For instance, the long-term slowing of the Gulf Stream, which transports warm water from the Gulf of Mexico into the North Atlantic, has contributed to increased sea-level rise along the Atlantic Coast. A rapidly slowing Gulf Stream in effect carries water away from the U.S. East Coast. As the current has slowed over the past few years, warm seawater has accumulated along the shores of the Eastern Seaboard. The weakening flow of the Gulf Stream offshore has contributed to increased coastal sea levels and prolonged flooding during high tides.



Massive polar ice sheets have strong gravitational pulls on surrounding water. As land-based ice melts, it loses mass, decreasing its pull and causing water to flow away from the ice sheets. The loss of mass in sea levels along nearby coastlines but increases in sea levels at low latitudes. The continued melting of glaciers and ice sheets in Greenland and Antarctica, and the accompanying decrease in their gravitational pull will trigger major future sea-level changes, as the escaping seawater flows to areas like the U.S. East Coast. The decreasing mass load also leads to rebound (uplift) of the ground beneath.



Regional and local sea level changes are the result of vertical land motion in the ocean surface. This vertical land motion results from natural geological tectonic plates and associated processes. It can also be induced by human activities and all production, such as the extraction of groundwater will cause sea levels to rise. The extraction of groundwater will cause sea levels to rise. The extraction of groundwater will cause sea levels to rise.

The Blue Line Project

The Blue Line Project brought the future to the understanding of the and sea-level rise. The project uses satellite data, the heights water levels in University of City and County of Denver. The project is a joint effort about the future of the city.

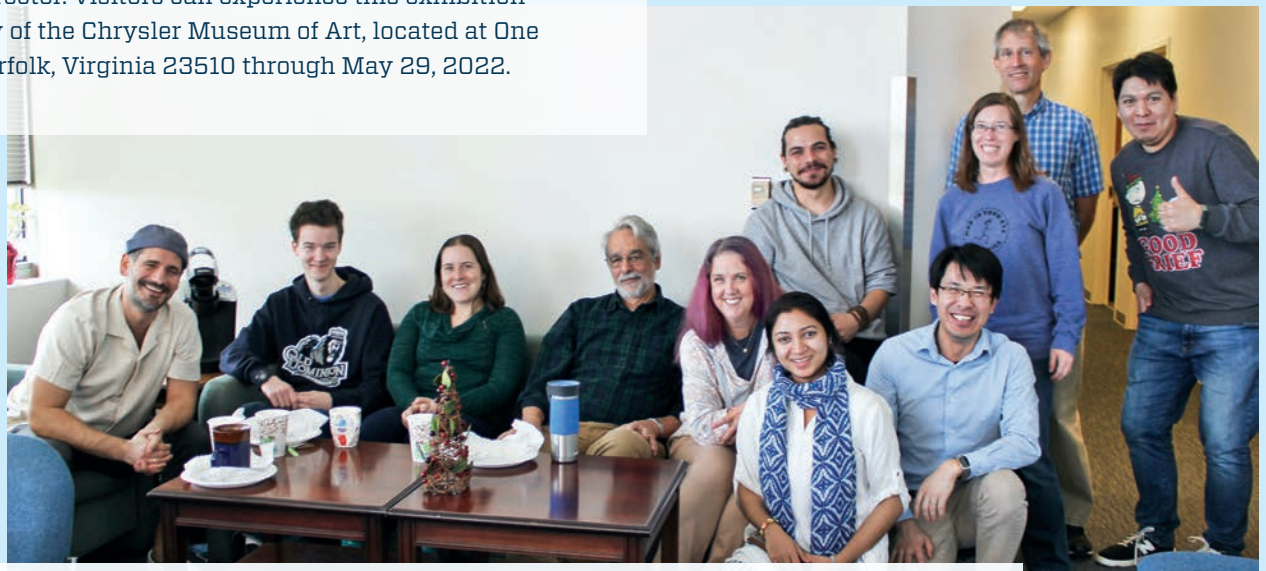


Sönke and Lengxi Dangendorf stand beside the research and illustrations they provided for the exhibition.

Old Dominion University's Institute for Coastal Adaptation & Resilience (ICAR) is partnering with the Chrysler Museum of Art to host a special exhibition focusing on the impacts of and mitigation strategies for climate change and sea level rise. CCPO is represented by **Sönke** and **Lengxi Dangendorf** and **Tal Ezer**, with several

other ODU personnel contributing to the exhibit. *Waters Rising: A View From Our Backyard* is dedicated to **Larry P. Atkinson**, CCPO's founding director. Visitors can experience this exhibition in the Focus Gallery of the Chrysler Museum of Art, located at One Memorial Place, Norfolk, Virginia 23510 through May 29, 2022.

Photo: Lengxi Dangendorf



Sönke and Lengxi Dangendorf hosted a farewell breakfast at CCPO before departing for New Orleans. Attendees were (left to right) Sönke, Noah Hendricks, Lauren Sommers, John Klinck, Julie Morgan, Mauricio González, Teresa Updyke, Mike Dinniman, Claudio Iturra, and Marufa Ishaque and Qiang Sun (both kneeling).



JUST THE FACTS

Presentations

Dangendorf, S., Probabilistic reanalysis of global and regional sea-level rise and individual contributors over the 20th century, University of Texas, Austin, TX (virtual), October 2021.

Dinniman, M., E. Hofmann, P. St-Laurent, K. Arrigo, and G. van Dijken, Sensitivity of the Relationship Between Antarctic Ice Shelves and Iron Supply to Projected Changes in the Atmospheric Forcing, U.S. Antarctic Science Meeting (virtual), July 2021.

Dinniman, M., P. St-Laurent, K. Arrigo, **E. Hofmann**, and G. van Dijken, Sensitivity of the relationship between Antarctic ice shelves and iron supply to projected changes in the atmospheric forcing, West Antarctic Ice Sheet Workshop 2021, Sterling, VA, September 2021.

Ezer, T., Air-sea interaction and modeling of hurricanes, typhoons and cyclones, The 10th training course on Regional Application of Coupled Climate Models, UNESCO/IOC Ocean Dynamics and Climate (ODC) Center, Qingdao, China (virtual), July 7, 2021.

Ezer, T., Climate change, sea level rise and links to changes in ocean dynamics, The 10th training course on Regional Application of Coupled Climate Models, UNESCO/IOC Ocean Dynamics and Climate (ODC) Center, Qingdao, China (virtual), July 8, 2021.

Ezer, T., Past and projections of sea level rise in the Hampton Roads region, Coastal Resilience and Adaptation Economy Consortium: Local Best Practices Workshop, ODU, Norfolk, VA, December 2, 2021.

Ezer, T., Sea level rise, hurricanes, and the Gulf Stream, NASA/GISS Sea Level Rise Seminar Series (virtual), December 21, 2021.

Hofmann, E.E., Understanding Controls on *Margalefidinium polykrikoides* Blooms in the Lower Chesapeake Bay, Department of Ocean & Earth Sciences Fall Seminar Series, Old Dominion University, Norfolk, VA, October 21, 2021.

Hofmann, E.E., D. Munroe, A. Scheld, J. Beckensteiner, E. Powell, L. Solinger, **J. Klinck**, and **M. González Díaz**, Assessing econom-

Publications

Ashford, J., **M. Dinniman**, C. Brooks, L. Wei, and G. Zhu. 2022. Tying policy to system: Does the Ross Sea region marine reserve protect transport pathways connecting the life history of Antarctic toothfish? *Marine Policy*, 136, 104903, doi:10.1016/j.marpol.2021.104903.

Ezer, T., 2021. Editorial: On the 20th Anniversary of Ocean Dynamics and farewell to Jörg-Olaf Wolff, *Ocean Dynamics*, Vol. 71, July 2021, <https://www.springer.com/journal/10236/updates/19278284>.

Ezer, T. and **S. Dangendorf**. 2021. Variability and upward trend in the kinetic energy of Western Boundary Currents over the last century: impacts from barostatic and dynamic sea level change, *Climate Dynamics*, 57(9-10), 2351-2373, doi:10.1007/s00382-021-05808-7.

Ezer, T. and **S. Dangendorf**. 2022. Spatiotemporal variability of the ocean since 1900: Testing a new approach using global sea level reconstruction, *Ocean Dynamics*, 72(1), 79-97, doi:10.1007/s10236-021-01494-5.

Hofmann, E.E., J.M. Klinck, M.R. Mulholland, K.C. Filippino, T.

ic impacts to the U.S. commercial surfclam fishing industry from offshore wind energy development, IMBeR IMBIZO 6 (virtual oral presentation), October 18-22, 2021.

Hofmann, E.E., J.M.

Klinck, K.C. Filippino, T. Egerton, L.B. Davis, M. Echevarria, E. Pérez-Vega, and M.R. Mulholland, Understanding Controls on *Margalefidinium polykrikoides* Blooms in the Lower Chesapeake Bay, CERF 2021 Conference (virtual oral presentation), November 8-12, 2021.

Hofmann, E.E., M.S. Dinniman, P. St-Laurent, K.R. Arrigo, and G. van Dijken, Sensitivity of the Relationship Between Antarctic Ice Shelves and Iron Supply to Projected Changes in Atmospheric Forcing, 2021 Fall AGU Meeting, New Orleans, LA, December 13-17, 2021.

Knutson, T., M. Bender, **R. Tuleya**, and B.A. Schenkel, Dynamical Downscaling Projections of Late Twenty-First-Century U.S. Land-falling Hurricane Activity, AMS Annual Meeting-20th Symposium on the Coastal Environment, Houston, TX, January 24, 2022.

Pochini, E., F. Colleoni, A. Bergamasco, M. Bensi, V. Kovacevic, P. Castagno, G. Budillon, P. Falco, **M. Dinniman**, S. Mack, E. Forte, and R. Farneti, Characterizing the Basal Melting Spatio-Temporal Variability of the Ross Ice Shelf using a Regional Ocean Model, 2021 Fall AGU Meeting, New Orleans, LA, December 2021.

Schwans, E., B.R. Parizek, R.B. Alley, M. Morlighem, S. Anandakrishnan, D. Pollard, and **P. St-Laurent**, Data-driven dynamics on Thwaites Glacier, West Antarctica, 2021 Fall AGU meeting, New Orleans, LA, December 2021.

Egerton, L.B. Davis, M. Echevarria, and E. Perez-Vega. 2021. Understanding controls on *Margalefidinium polykrikoides* blooms in the lower Chesapeake Bay, *Harmful Algae*, doi:10.1016/j.hal.2021.102064.

Hudson, K., M.J. Oliver, J. Kohut, **M.S. Dinniman, J.M. Klinck, C. Moffat**, H. Statscewich, K. Bernard, and W. Fraser. 2021. A recirculating eddy promotes subsurface particle retention in an Arctic biological hotspot, *Journal of Geophysical Research*, 126, e2021JC017304, doi:10.1029/2021JC017304.

Murphy, E.J., N.M. Johnston, **E.E. Hofmann**, R.A. Phillips, J.A. Jackson, A. Constable, S.F. Henley, J. Melbourne-Thomas, R. Trebilco, R.D. Cavanagh, G. Tarling, R. Saunders, D.K.A. Barnes, D.P. Costa, S. Corney, C.I. Fraser, J. Hofer, K. Hughes, C. Sands, S. Thorpe, P. Trathan, and J. Xavier. 2021. Global connectivity of Southern Ocean ecosystems. *Frontiers Ecology and Evolution*, doi:10.3389/fevo.2021.624451.

Qiao, F., **T. Ezer**, K. Fennel, I. Ginis, and J. McWilliams (Editors). 2021. Coupled Models, Special Issue of *Ocean Modelling*, <https://www.sciencedirect.com/journal/ocean-modelling/special-issue/109681JX5X0>.

Graduations

Henderson, S.K., M.S., "CODAR's Surface Flow at the Mouth of Chesapeake Bay: Relation to Bay's and Atlantic's Forcing", August 2021, Advisor: **T. Ezer**. (*Shelby is now a Satellite Reconnaissance Branch Chief at U.S. Coast Guard International Ice Patrol, Alexandria, VA.*)

Jones, K., M.S., "Estimating the Risk of Future Marine Debris Resulting from the Coastal Built Environment", December 2021, Advisor: **H-P. Plag**.



Center for Coastal
Physical Oceanography

6CN05
CCPO CIRCULATION
4111 Monarch Way, Suite 301
Norfolk, VA 23508 USA
(757) 683-4945

Dr. John Klinck
CCPO Director

Julie Morgan
CCPO Circulation Editor



Send address updates or comments to newsletter@ccpo.odu.edu, as well as preference for electronic distribution.

Center For Coastal Physical Oceanography (CCPO) and Institute for Coastal Adaptation & Resilience (ICAR) Virtual Seminar Series

SPRING 2022 SCHEDULE

January 24	Kyle Hinson , <i>Virginia Institute of Marine Science</i>
January 31	Claire Knox , <i>University of Central Florida</i>
February 7	Holly Gaff , <i>Old Dominion University</i>
February 14	Tal Ezer , <i>CCPO</i>
February 28	Antonio Rodriguez , <i>University of North Carolina at Chapel Hill</i>
March 14	Louis Bowers , <i>Avangrid Renewables</i>
March 21	Deserai Crow , <i>University of Colorado Denver</i>
March 28	Olga Wilhelmi , <i>UCAR</i>
April 4	Piero Mazzini , <i>Virginia Institute of Marine Science</i>
April 11	Daniel Sternlicht , <i>U.S. Naval Surface Warfare Center, Panama City Division</i>

MONDAYS
at 3:30 PM EST

Streaming at:
[www.ccpo.odu.edu/
seminar.html](http://www.ccpo.odu.edu/seminar.html)