SUMMER CCPO CIRCULATION

VOL. 20, NO. 3 SUMMER 2015

ODU-European Collaborations on Climate Change & Sea Level Rise Research

Dr. Tal Ezer

Less than five years ago, Old Dominion University started the Climate Change and Sea Level Rise Initiative (CCSLRI), which led to the recently established Mitigation and Adaptation Research Institute (MARI) and the Hampton Roads Sea Level Rise Preparedness & Resilience Intergovernmental Planning Pilot Project. This interdisciplinary area of research also has a long history in many European countries. Direct measurements of sea level started more than 200 years ago and flood mitigation measures have been in effect for a long time in London, the Netherlands and many other places. Today, reports on flooding in Norfolk, UK, by the BBC or reports on flooding in Norfolk, Va., USA, by the Washington Post, are eerily similar. Therefore, studies of sea level rise (SLR) and associated flooding must be a collaborative effort across oceanic boundaries.

As part of my research leave from ODU during the fall semester, 2014, I spent three months in Europe, visiting various research and academic institutions involved in climate change research. This article is a report on what I learned during those visits.

Steart Marshes in the background was a farmland that has been converted recently into a wetland nature reserve to mitigate sea level rise and flooding. Scientists from the National Oceanography Centre, Southampton, UK, conduct research in the marsh.

From left to right: *Ph.D. student Clementine Chirol, who is studying the marsh for her dissertation; Dr. Ivan Haigh, a lecturer in coastal oceanography and co-director of the Engineering in the Coastal Environment program at the University of Southampton, UK; and Tal Ezer, an oceanography professor at CCPO.*

I had two main goals in mind: First, introducing the European audience to the new research done at CCSLRI and MARI; this was achieved by giving six invited seminars in the UK, Germany and Italy, and participating in various workshops and discussions. Second, learning about the latest research and data sources and developing collaborations with European scientists. Of particular interest to my research is the international project named RAPID that has monitored the Atlantic Meridional Overturning Circulation (AMOC) since 2004 (I attended a workshop in London that celebrated and summarized the first 10 years of continuous observations). Periods with weakening AMOC have shown to be related to increased sea level rise and flooding along the U.S. East Coast (Ezer et al., 2013; Ezer and Atkinson, 2014; Ezer, 2015; Goddard et al., 2015), so I have used the RAPID data in my research to connect climatic changes in ocean circulation with coastal sea level issues. Numerical modeling of the climate system is also an area of great interest to me, and in particular, learning more about the European climate model NEMO, and its distinction from other climate models that are more common in the U.S.

(Continued on page 2)

OLD DOMINION UNIVERSITY
Center for Coastal Physical Oceanography
IDEA FUSION

Letter from the Director

I am often struck by the international nature of ocean science. I take it for granted that I have friends and colleagues in many countries, while being surprised that my local friends and family do not have a similar global exposure. CCPO now has students from India and Korea, postdocs from Canada, UK and China, and faculty from Germany and Israel. CCPO is proud to have these international connections. Visits by CPPO faculty to other institutions keep these connections alive as do visits to CPPO by colleagues for collaboration and seminars.

Our outreach programs bring this international perspective to our local schools and organizations like the Boy Scouts and Girl Scouts of America. We talk to the students about ocean science and we share stories about our travel to various countries with different cultures, languages and attitudes. We hope to interest students of all ages in the global environment. The diversity of exposure gives us all a context to understand and appreciate our country and others.

John Klinck
Professor of Oceanography
Director, CCPO

ODU-European Collaborations on Climate Change & Sea Level Rise Research

(Cont'd. from page 1)

Learning from the European experience with SLR was enhanced by visits to Amsterdam, the Netherlands, and Venice, Italy, two cities that have felt the impact of SLR in the past and must prepare for the impact of future SLR, as we will need to do here at Norfolk, VA. I also visited Steart Marshes in Somerset, southern England (Fig. 1)- this £20M project is one of UK's largest man-made saltwater/freshwater wetland reserves. It was created from farmland as a mitigation action against sea level rise and flooding, whereas rising waters are tunneled into this marsh during high tide or storm surges to prevent flooding of surrounding villages and farms. It will also become a new nature reserve with habitats for birds and marine life. It is a large-scale engineering/environmental flood mitigation experiment (created not without controversy) that requires research on its environmental impact and final design.

While in Europe, I visited the following centers involved in climate change research:

1. The National Oceanography Centre (NOC) at the University of Southampton, UK. As a visiting professor there, I spent most of my time interacting with three research groups: (a) the coastal engineering and the environment group, (b) the RAPID observational group and (c) the climate modeling (NEMO) group. NOC in Southampton is the center for archiving the RAPID observations and the NOC branch in Liverpool is the center for archiving and maintaining the historical data of the Permanent Service for Mean Sea Level (PSMSL). These two data sets are vital for many climate studies.

2. Helmholtz Centre for Ocean Research (GEOMAR), which is affiliated with Kiel University, Germany. The institute leads research in oceanography and climate change. Their studies on numerical modeling of past and future climates are especially noted and relate to my own research.

3. Euro-Mediterranean Center for Climate Change (CMCC) is a research consortium consisting of several Italian research institutions, led by the "Istituto Nazionale di Geofisica e Vulcanologia" (INGV) and the University of Bologna, Italy. CMCC leads efforts to develop operational weather and climate models for the Mediterranean region as well as developing global ocean reanalysis system. Future collaboration with this center will connect my research on climate change in the Atlantic Ocean with climate variability in the Mediterranean region; data from the reanalysis system they developed have already been used in my research on AMOC reconstruction (Ezer, 2015). (*Cont'd. on next page)*

(Ezer Continued)

In summary, there are numerous opportunities for more collaboration between researchers at ODU's CCPO, CCSLRI and MARI and European research groups. For example, my research on the connection between ocean circulation and sea level rise along the U.S. coast (Ezer et al., 2013) has now been extended to the western European coasts (Ezer et al., 2015). The study shows that both sides of the Atlantic Ocean experience accelerated sea level, but with different dynamics. While variations of sea level on the U.S. East Coast are dominated by the Gulf Stream, sea level variations on European coasts are more complex and regional, affected by local coastal dynamics as well as large-scale influence from the North Atlantic Oscillations.

References:

Ezer T., **L. P. Atkinson**, W. B. Corlett and J. L. Blanco (2013), Gulf Stream's induced sea level rise and variability along the U.S. mid-Atlantic coast. *J. Geophys. Res.*, 118, 685-697. doi:10.1002/jgrc.20091.

Ezer, T. and **L. P. Atkinson** (2014), Accelerated flooding along the U. S. East Coast: On the impact of sea level rise, tides, storms, the Gulf Stream and the North Atlantic Oscillations. *Earth's Future*, 2(8), 362-382, doi:10.1002/2014EF000252.

Ezer T., (2015), Detecting changes in the transport of the Gulf Stream and the Atlantic overturning circulation from coastal sea level data: The extreme decline in 2009-2010 and estimated variations for 1935-2012. *Glob. Planet. Change*, 129, 23-36. doi:10.1016/j.gloplacha.2015.03.002.

Ezer, T., I. D. Haigh and P. L. Woodworth (2015), New analysis of non-linear sea level trends, acceleration and long-term variability on the UK and western European coasts. *Ocean Dynamics*, submitted.

Goddard, P. B., J. Yin, S. M. Griffies and S. Zhang (2015), An extreme event of sea-level rise along the Northeast coast of North America in 2009-2010. *Nature comm.*, 6, 6346, doi:10.1038/ncomms7346.

Websites:

odu.edu/research/inititatives/ccslri
mari.odu.edu
centerforsealevelrise.org
rapid.ac.uk
nemoocean.eu
steart.wwt.org.uk
noc.ac.uk
geomar.de.en
cmcc.it

ohjustswimmingly.com

Just Swimmingly: Top 3 Blog Posts of Spring

Stefanie Mack Presents: Tales of grad student life in oceanography. A mix of science and survival skills.

1.

When it comes to climate change, many people feel helpless - like they aren't making enough of a difference. Check out some suggestions on how to approach this problem, as an individual.

2. Always back up data, always!

Data storage is an issue for many graduate students. We often work with large sets of data, and even when we don't, our entire graduate lives can be compressed into a handful papers in progress. It is very important to properly back up your data as a graduate student. Any loss may set back your graduation by months, or even years. Use the tips I describe to make sure it doesn't happen to you.

3. Starting the job search early

As graduate students, we are often very focused on finishing our degrees, without much thought about what comes next. However, I've found that starting the job search early can make a grad student's life much easier. By slowly signing up for job boards and email lists, you avoid the frantic search for a job. Along the way, you get an instinctive idea of how long the job process will take, when to actually start applying, and what options are available in your field.

Read my full blogs at ohjustswimmingly.com

CCPO SPOTLIGHT

Dr. Yongcun Cheng

Postdoctoral Research Associate

Dr. Yongcun Cheng joined MARI/CCPO at ODU as a postdoctoral research associate in September 2014. The central theme of his research is sea level changes at inter-annual to multi-decal time scales, which will be helpful for studying the regional hazards and the potential disasters related to global sea level rise. He holds a PhD in physical oceanography from the Ocean University of China. His PhD dissertation deals with the development of a new wind wave spectrum model for deep water and its application of retrieving altimeter wind speed. In recognition for this work and the ocean tide simulation in coastal waters, he received outstanding graduate awards from Ocean University of China.

Before relocating to Norfolk, he worked on regional sea level changes (including the Baltic Sea, China Seas and Arctic Ocean) at the Technical University of Denmark. He reprocessed the satellite altimeter data for studying the climate change in the Arctic Ocean and developed a global ocean tide model to improve the tide accuracy in shallow waters and high

Education
Research
Outreach

A Brief History of CCPO'S Outreach

Julie Morgan
Program Specialist, CCPO

CCPO Outreach programs have introduced students to marine science for more than a decade. We have actively participated in a variety of educational outreach opportunities for local students and Boy and Girl Scouts. As the coordinator for these events, I have established partnerships locally and regionally to provide the community with access to hands-on, engaging programs that incorporate STEM studies to encourage environmental awareness and to promote oceanography as a possible career choice.

The Boy Scout Oceanography Merit Badge program is a biannual event in May and September that includes a classroom presentation to address badge requirements and a cruise onboard the R/V Fay Slover, the Department of Earth, Ocean and Atmospheric Sciences' research vessel, which includes three sampling activities. Over 500 Boy Scouts have earned this badge as a result of our program, which began in 2004. Troops come from all over Virginia, as well as Maryland and Pennsylvania, to take advantage of this opportunity. We have a lengthy waiting list and most troops sign up again as soon as they finish their scheduled event because they enjoy it so much. In 2008, we were invited to the Girl Scouts of America Jamboree, where 350+ girls had the chance to complete the Saltwater Try-It (Brownies), the Saltwater Badge (Juniors), and the Makin' Waves focus program (Cadettes). We served as consultants for the development of a Boy Scout

Oceanography Merit Badge program at the NOAA Center for Operational Oceanographic Products and Services (CO-OPS) office in Chesapeake, Va. and continue to participate in each annual event they offer.

From 2004-2011, we hosted an "Oceanography Day" program each spring at Christ The King School in Norfolk, VA. Teachers assigned projects, with each grade focusing on a different aspect of marine science, leading up to the event. Students from preschool through grade 8 visited stations manned by a team of professors, staff, postdoctoral researchers, and graduate students. Younger students marveled at the size of a juvenile orca skull model, while older students used refractometers to learn about salinity. An expert speaker would present a seminar to the school community on subjects that varied from penguins to whales to fish to seals and even to shellfish. An aquarium filled with oysters allowed students to see how important these creatures are to our waterways. Being able to touch snails and various local fauna creates a sense of responsibility in caring for our local waters. We also took 8th grade students out on the Slover from 2005-2011 to engage in sampling activities much like the ones done by the Scouts. A middle school science club was formed to promote participation in the Tidewater Science Fair from 2007 to 2011. Students developed research projects under the guidance of CCPO faculty advisors and demonstrated credible ranking at the fair each year.

CCPO faculty and staff have participated in numerous career day events at local public and private schools. Professors have served as speakers for Cooperating Hampton Roads Organizations for Minorities in Engineering (CHROME) club meetings and local community college conferences to promote Science, Technology, Engineering and Mathematics (STEM) careers for females. Hands-on, interactive activities have been developed for elementary school students to engage them in Antarctic research and studies of the Chesapeake Bay. Campers at the Virginia Science, Technology, Engineering and Applied Mathematics (STEAM) Academy have learned about Chesapeake Bay ecology through presentations made by CCPO professors. A recent partnership with the Roadstead Montessori High School in Norfolk has provided students with a research vessel cruise and the opportunity to work with CCPO researchers. A new request has just come in to create a program similar to the Oceanography Day at St. John the Apostle School in Virginia Beach.

latitude. Dr. Cheng cares about other environment issues in coastal waters. He studied oil spill detection and its trajectory simulation in the Gulf of Mexico six months before the Deepwater Horizon oil spill occurred. After that, he investigated other serious oil spill disasters using remote sensing images and Lagrangian transport models in the Gulf of Mexico, the North Sea and the China Bohai Sea.

In the last decade, he has enjoyed living in seaside cities, from Qingdao, China, to Copenhagen, Denmark. He is getting to know Norfolk. He works with other MARI/CCPO members to contribute to the research focuses on practice-relevant knowledge to cope with climate change mitigation and adaptation, such as in Hampton Roads.

CCPO SPOTLIGHT

Praveen Kumar

Graduate Student

Praveen Kumar, who joined CCPO in August 2014, is a graduate student pursuing his PhD in oceanography at ODU under the guidance of Dr. Eileen E. Hofmann and Dr. Hans-Peter Plag.

Praveen was born and raised in Goa, which is a coastal state on the west coast of India. In 2012, he earned his master's degree in marine sciences from the Goa University. It was while pursuing his master's degree that he became fascinated with the biogeochemical processes in the Arabian Sea (north-western Indian Ocean).

Subsequently, he joined the CSIR-National Institute of Oceanography (CSIR-NIO, Goa) as a Junior Research Fellow to help understand and study the Arabian Sea. However, due to his limited expertise in ocean/biogeochemical modeling, he realized that pursuing a PhD would help equip him with the necessary tools required for his research.

This led him to apply for the PhD program at ODU. Praveen's research interest is focused on the impact of human-induced changes in the coastal water quality in the Chesapeake Bay and its effects on the marine life, namely oysters and surf clams. His research will involve simulations using oyster and surf clam models.

Not a week goes by that someone interested in one of our programs does not contact me. Educational outreach is an exciting part of my job that allows me to inform others about the important research being done here at CCPO. We might introduce a curious student to a new area of interest through one of our events or even influence a future oceanographer. We hope to expand our outreach opportunities to reach as many students and Scouts as possible.

Setting-up a CTD/Rosette system for water sampling is one of the hands-on activities done by Boy Scouts as part of the Oceanography Merit Badge program.

JUST THE FACTS *(continued on page 7)*

Spring '15 Graduate

Boll, William D., M.S., Thesis Title: Doppler Shifted Internal Waves in A Shallow Water Region, May 2015, Advisor: Chester E. Grosch.

Scholarship Award & Recognition

The Department of Ocean, Earth & Atmospheric Sciences awarded **Eric Jabs** the 2014-2015 Dorothy Brow Smith Scholarship. This paid for his tuition at William & Mary Law School to attend the Virginia Coastal Policy Clinic for the spring semester. Eric Jabs is the first ODU student to attend.

A study co-authored by two of CCPO's faculty members, a former Physical Oceanography undergraduate student, and a former CCPO researcher became the No. 1 most accessed and most cited paper among 1500+ papers published in the *Journal of the American Geophysical Union*. See recognized paper below:

Ezer, T., L.P. Atkinson, W.B. Corlett, and J.L. Blanco, 2013. Gulf Stream's induced sea level rise and variability along the U.S. mid-atlantic coast, *Journal of Geophysical Research*, 118(2), 685-697, doi:10.1003/jgrc.20091.

Publications

Cheng, Y.C., O. B. Andersen, and P. Knudsen, 2015. Evaluation of gridded and along-track altimetric data in the Arctic Ocean for climate research, *Marine Geodesy*, 38(2), 146-162. doi:10.1080/01490419.2014.954087.

Cheng, Y.C., Q. Xu, and Y. Zhang, 2015. Tidal estimation from TOPEX/Poseidon, Jason primary and interleaved missions in the Bohai, Yellow and East China Seas, *Journal of Coastal Research*. In press.

Ezer, T., 2015. Detecting changes in the transport of the Gulf Stream and the Atlantic overturning circulation from coastal sea level data: The extreme decline in 2009-2010 and estimated variations for 1935-2012, *Global Planetary Change*, 129,23-36,doi:10.1016/j.gloplacha.2015.03.002.

Ezer, T. and **L.P. Atkinson**, 2015. Accelerated flooding along the U.S. East Coast: On the impact of sea-level rise, tides, storms, the Gulf Stream, and the North Atlantic Oscillations, *Earth's Future*, 2(8), 362-382, doi:10.1002/2014EF000252.

Marsay, C.M., P.N. Sedwick, **M.S. Dinniman**, P.M. Barrett, **S.L. Mack** and D.J. McGillicuddy, Estimating the benthic efflux of dissolved iron on the Ross Sea continental shelf, *Geophysical Research Letters*, 41, 7576-7583, doi:10.1002/2014GL061684, 2014.

Stammer, D., R.D. Ray, O.B. Anderson, B.K. Arbic, W. Bosch, L. Carrere, **Y.C. Cheng**, B.D. Dushaw, G.D. Egbert, S.Y. Erofeeva, H.S. Fok, S. Griffiths, M. Green, M.A. King, F.G. Lemoine, S.B. Luthcke, F. Lyard, M. Müller, L. Padman, J.G. Richman, J.F. Shriver, C. K. Shum, E. Taguchi, 2014. Accuracy assessment of global barotropic ocean tide models, *Reviews of Geophysics*, 52, 243-282, doi:10.1002/2014RG000450.

West Antarctic Glacier-Ocean Model Project

Mike Dinniman, CCPO Research Scientist

Probably the most uncertain aspect of future sea level change over the next century or two has to do with the behavior of the marine-based (where the bottom of the ice sheet rests on bedrock that is below sea level) ice sheets, particularly the West Antarctic Ice Sheet (WAIS). Despite the importance of these ice sheets, the current generation of global climate models does not simulate sea level change resulting from glacier-ocean interaction. In order to help change this, a workshop was held at the New York University Abu Dhabi campus Oct. 27-29, 2014, bringing together an international group of more than 30 scientists to discuss the advancement of state-of-the-art regional-scale simulations of glacier-ocean interactions.

The goal of the workshop was to improve the physically based estimates of sea level change coming from the WAIS over the present century and beyond. The hope is that such regional-scale modeling research will lay the groundwork to include glacier-ocean interaction in global scale models.

The primary result of the workshop was a plan for a series of community activities, progressing from intercomparisons of separate ice sheet and ocean components toward comparing coupled models. A previously planned activity focused on stand-alone ice sheet models, the third Marine Ice Sheet Model Intercomparison Project (MISMIP+), was used as the basis for two new proposed projects. One project, the second Ice Shelf Ocean Model Intercomparison Project (ISOMIP+), will be focused on comparing stand-alone ocean models that include the floating portion of the ice sheets (ice shelves). The other project, the first Marine Ice Sheet-Ocean Model Intercomparison Project (MISOMIP), will essentially couple MISMIP+ and ISOMIP+. Design of these three projects has continued since the workshop with input from both workshop participants and the broader ice sheet-ocean modeling community. CCPO was a participant in the original ISOMIP project and intends to participate in ISOMIP+ and MISOMIP.

For more information on the West Antarctic Glacier-Ocean Model Project, visit: www.climate-cryosphere.org/activities/targeted/misomip.

ODU SPOTLIGHT

REU Students to Research Climate Change & Sea Level Rise

Katherine Filippino
OEAS Research Assistant & REU Director

This summer, the Ocean, Earth and Atmospheric Sciences Department is once again hosting 10 undergraduate students as part of the Research Experience for Undergraduates (REU) program, funded by the National Science Foundation (NSF). Through a competitive grant process, NSF funds select sites throughout the country in a variety of scientific disciplines.

The REU site at OEAS, currently in its second year, is unique as students will focus their research around the timely and relevant topics of climate change and sea level rise in a coastal, urban environment. The 10 students, all with backgrounds in biology, meteorology, or environmental science, hail from U.S. colleges and universities: Penn State University, Bowling Green State University, Bloomsburg University, University of South Carolina, Wesleyan University, Harvard, Flagler College, University of New Hampshire, and the University of North Carolina at Wilmington.

Through a competitive application process, these students were selected to work one-on-one with experts in the field of oceanography, exposing them to in-depth research focused on climate change and sea level rise.

CCPO & MARI will host three REU students to focus on sea level changes: Virginia local change, global change, and Antarctic glacial melt.

Dr. Benjamin Hamlington
Sara Doermann, REU Student
Calculating true global sea level from satellite altimetry and tide gauges while analyzing decadal scale regional variability

Dr. Hans-Peter Plag
Jin-Si Over, REU Student
Analyzing trends in local relative sea level along the Virginia coast from tide gauges, GPS and satellite altimetry

Dr. John Klinck
Zachary Wolff, REU Student
Calculating the size of mesoscale eddies in the Ross Sea from ship observations and profiling instruments

The primary element of the REU experience at ODU will allow undergraduates to experience research while being mentored by research-active faculty members. This will expose each participant to several sub-disciplines in ocean sciences, climate modeling and other fields related to the impact of localized climate change.

OEAS faculty who are currently serving as mentors include Fred Dobbs, Rodger Harvey, Dreux Chappel, Margie Mulholland, David Burdige and Richard Zimmerman. K.C. Filippino, a research assistant professor in the OEAS department, is the program director and serves as co-principal investigator along with Rodger Harvey, chair of the OEAS department.

Students live on campus and receive room and board, and a stipend for the 10-week program. In addition to their research duties, students will attend weekly science seminars that will focus on climate change and sea level rise as well as our weekly workshops. In these workshops, they will learn skills in scientific writing and communication, discuss scientific ethics, attend a career panel, and learn about graduate school life in an informal panel with our graduate students. Additionally, students will be included in service events promoting environmental stewardship and attend field trips including a kayaking excursion to Goodwin Island, Clean the Bay Day activities for the Chesapeake Bay Program, a Bio Blitz at a local nature park, a tour of a certified laboratory at a Hampton Roads Sanitation District facility, and a tour of the NOAA facilities in Chesapeake. The students will benefit from ODU's commitment in OEAS to climate-change research, outreach and education; from a faculty with high standing in numerous oceanography disciplines; and from ODU's proximity to the ocean and bay.

JUST THE FACTS *(continued on back)*

Publications Cont'd.

Xu, Q., **Y.C. Cheng**, B.Q. Liu, and Y.L. Wei, 2015. Modeling of oil spill beaching along the coast of the Bohai Sea, China, *Frontiers of Earth Science*. In press.

Xu, Q., **Y.C. Cheng**, **H.-P. Plag**, and B. Zhang, 2015. Investigation of sea level variability in the Baltic Sea from tide gauge, satellite altimetric data and model reanalysis, *International Journal of Remote Sensing*, 36(10), 2548-2568. doi: 10.1080/01431161.2015.1043405.

Zhang, H., Q. Xu, **Y.C. Cheng**, and J. Zuo, 2015. Comparison of monitoring Ulva prolifera blooms in the Yellow Sea by various satellite data, *Frontiers of Earth Science*. In press.

Presentations

Cheng, Y.C., "Global/regional multi-time scales of sea level variations in satellite altimetry era," MARI & CCPO Seminar, Norfolk, VA, April 6, 2015.

Dinniman, M., "Ocean melting of Antarctic ice shelves: Why do we care and the tricky business of modeling how it might change," Seminar, University of Arizona Department of Geosciences, May 2015.

Dinniman, M., "The Length Scale of Physical Processes on the Antarctic Continental Shelves and Implications of this for Modeling Biogeochemical Cycles," Southern Ocean Dynamics and Biogeochemistry Workshop, Pasadena, CA, February 2015.

Dinniman, M., **J.M. Klinck**, L.-S. Bai, D. Bromwich, K. Hines and D. Holland, "Sensitivity of modeled ice shelf basal melt around the Antarctic to the resolution of the atmospheric forcing and the ocean model," Climate and Cryosphere's West Antarctica Glacier-Ocean Modeling (CliC-WAGOM) Workshop, Abu Dhabi, UAE, October 2014.

ODU
IDEA FUSION
Center for Coastal
Physical Oceanography

6CN05
CCPO Circulation
4111 Monarch Way, Suite 301
Norfolk, VA 23508 USA

John Klinck, Director
Miasia Osbey, Chief Editor
Julie Morgan, Content Editor

JUST THE FACTS

Presentations Cont'd.

Ezer, T., "Climate Change, Ocean Dynamics and Sea Level Rise: A Comparison Between the Two Sides of the North Atlantic Ocean," 2015 International Workshop on Modeling the Ocean, Canberra, Australia, June 2015.

Ezer, T. and **L.P. Atkinson**, Sea Level Rise in Virginia-Causes, Effects, and Response, State of Virginia's Environment Symposium of the Virginia Academy of Science, James Madison University, Harrisonburg, VA, May 2015.

Ezer, T., "Climate Chnages in Atlantic Ocean Circulation and Uneven Sea Level Rise," Euro-Mediterranean Center for Climate Change (CMCC), Bologna, Italy, November 2014.

Ezer, T., "Accelerated Coastal Sea Level and Flooding Along the U.S. East Coast and their Relation to Climate-Driven Changes in the Atlantic Ocean Circulation," National Oceanography Center, Southampton, UK, November 2014.

Ezer, T., New Statistical Methods to Detect Acceleration in Sea Level: Examples from the US and UK Coasts, Coastal Seminar Series, University of Southampton, UK, Novemeber 2014.

Ezer, T., "Recent Findings of the Relation Between Coastal Sea Level Rise," Climate Change and Ocean Dynamics, GEOMAR, Kiel, Germany, October 2014.

Ezer, T., "Climate Change, Sea Level Rise and Accelerated Flooding Along the U.S. East Coast," Department of Geography, Birkbeck College, University of London, October 2014.

Gatski, T.B., L. Thais, and G. Mompean, "DNS of Turbulent Viscoelastic Channel Flow: Drag Reduction Mechanism and Dynamics", Whither Turbulence and Big Data, Corsica, France, April 20-24, 2015.

Haluska, J., "Comparison of Shoreline Movements for Two Barrier Islands," Old Dominion University Graduate Research Appreciation Day, Norfolk, VA, April 16, 2015.

Haluska, J., "Shoreline Changes on Virginia's Barrier Islands," Hampton Roads User Group, February 13, 2015.

Jabs, E., "Collaboration Conundrum: The Hampton Roads Sea Level Rise Preparedness and Resilience Intergovermental Planning Pilot Project," Old Dominion University Graduate Research Appreciation Day, Norfolk, VA, April 16, 2015.

Jabs, E., "The Department of Defense Approach to Climate Change," Southern Association of Marine Laboratories Meeting, Virginia Institute of Marine Science, Gloucester, VA, May 4th, 2015.

Klinck, J.M., "Warm Water and Ice Shelf Basal Melt in the Antarctic Coastal Ocean," Norwegian Meteorological Institute, Oslo, Norway, May 7, 2015.

Klinck, J., **M. Dinniman**, D. Bromwich, D. Holland, "Effect of Atmospheric Forcing Resolution on Delivery of Ocean Heat to the Antarctic Floating Ice Shelves," 2014 Fall AGU Meeting, San Francisco, CA, December 2014.