



*Old Dominion University
Climate Change and Sea Level
Rise Initiative*

Winter 2013



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Old Dominion University Climate Change and Sea Level Rise Initiative

Winter 2013

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Hurricane Sandy, Larchmont neighborhood of Norfolk on October 29, 2012 at 0915.

<http://www.breakingnews.com/item/ahZzfmJyZWFraW5nbmV3cy13d3ctaHJkcgOLEgRTZWVkJGLGDnwsM/2012/10/29/flooding-from-hurricane-sandy-in-norfolk-virginia-martinmmc>

Thoughts from the Director

By Larry Atkinson, Slover Professor of Oceanography, Department of Ocean, Earth and Atmospheric Sciences

This fourth newsletter shows how the Initiative is progressing. The heart of the Initiative is, of course, ODU faculty and students getting involved in the many aspects of understanding climate change and sea level rise in their own way. Much of what CCSLRI is about is informing faculty, staff and students about the issues and facilitating a network for them to form new collaborations for their work.

There is an amazingly diverse group of people here at ODU interested in this topic. Consider that one group working on a proposal now includes the following departments: Communications and Theatre Arts, Political Science and Geography, Urban Studies and Public Administration, Ocean, Earth and Atmospheric Sciences, and Engineering Management and Systems Engineering. Since August, seven interdisciplinary proposals related to climate change and SLR have been submitted (or will soon be submitted) by ODU faculty (pg 6).

Recently an opportunity for funding from a FEMA program called the Community Resilience Innovation Challenge (<http://www.resiliencechallenge.org/>) became available. Proposals were required to have community partners and, thanks to the networking we have done in the past two years, linking ODU faculty to community partners was relatively easy. The result was that four proposals were submitted involving eight ODU faculty members from 6 departments who were working with such community partners as the City of Virginia Beach, the Elizabeth River Project and the Larchmont Civic League.

Hurricane/Superstorm Sandy caught everyone's attention. As the events unfolded, I noticed the following progression of events: Weather predictions → Early warnings and preparations → Last minute evacuations and positioning of material for rescue and recovery → Enduring the storm → Rescue → Recovery of essential infrastructure, i.e., electrical, water, transportation, fuel → Talk about how to prevent this from 'ever happening again' → Long term disaster relief → Preparation for the next northeaster or hurricane!

Here at ODU we are focusing to a large extent on the 'prevent this from ever happening again' phase or as we put it ADAPTATION.

Sandy impacted a budding ODU CCSLRI collaboration with Virginia Sea Grant and the Hampton Roads Planning District Commission to coalesce a Forum of local government officials, planners, emergency managers to tackle issues associated with flooding adaptation and share and capture best practices. The first meeting of this Forum, a Sea Grant-funded initiative, was to take place on October 30th but was postponed due to Sandy. It is ironic that a meeting to discuss impacts of recurrent flooding had to be postponed because of.....a coastal flood advisory! When the Forum finally did convene on November 16th, an encouraging discussion took place about our "readiness" for Sandy. There was unanimous agreement among Hampton Roads officials -- the gauntlet of storms our region has faced since 2003 *has* made us more resilient. Hampton Roads localities were ready for Sandy. See below for more information about the Hampton Roads SLR/Flooding Adaptation Forum.

Recent CCSLRI Activities



ODU Oceanographer Publishes Research on SLR Acceleration

Tal Ezer, ODU Professor of Oceanography (with a joint appointment at VMASC), is spearheading research to study and better understand how fast and how much the sea levels are rising in the Hampton Roads region. Published in Geophysical Research Letters in October 2012, Ezer's paper, co-authored with W. B. Corlett, is entitled, ***"Is sea level rise accelerating in the Chesapeake Bay? A demonstration of a novel new approach for analyzing sea level data."*** Their results show that an additional contribution to SLR from climatic changes in ocean circulation is

affecting the region, and causing an acceleration in the rate of SLR in the region. Corlett was an undergraduate here at ODU who just received a double major in physical oceanography and civil engineering. He is now working on an MSc at Southampton University in the UK with the world's leaders in coastal adaptation. http://www.ccpo.odu.edu/~tezer/PAPERS/2012_GRL_SLR.pdf

ODU CCSLRI and the Department of Engineering Management and Systems Engineering Partners with Virginia Sea Grant and the Hampton Roads Planning District Commission on SLR Adaptation Forum

The Hampton Roads Sea Level Rise/Flooding Adaptation Forum, a partnership among ODU CCSLRI (PI – Larry Atkinson), ODU Department of Engineering Management and Systems Engineering (PI – Ariel Pinto), VA Sea Grant and the Hampton Roads Planning District Commission, is a regional dialogue among municipalities committed to adopting effective adaptation designs and plans, tailored to meet the needs of our communities in the face of rising sea levels due to climate change. ODU CCSLRI's Liz Smith is the coordinator of the project. The Forum is composed of academic institutions and local, regional, state, and Federal agency officials with authority and responsibility for critical infrastructure and facilities in Hampton Roads (e.g., engineers, planners, facility managers, administrators, etc.). Through regular Forum meetings, and public conversations, we will build a professional network that shares information and adaptation lessons learned through communication and information management. The first

meeting of the Forum took place at VMASC on November 16, 2012 and was attended by about 50 officials from almost all Hampton Roads localities. The agenda for the Forum, and presentations, can be found here: http://ww2.odu.edu/ao/research/ccslri/hr_forum.shtml

“Climate in the Classroom” Networking Luncheon

The focus of the first faculty networking luncheon of the academic year, sponsored by CCSLRI, and held in the atrium of the Gordon Art Galleries on September 20th, was on courses taught at ODU that contain climate change and/or sustainability content. The following faculty gave brief talks about the courses they teach:

David Basco	Coastal Engineering Certificate Program (delivered worldwide)
David Burdige	OEAS 108N: Global Environmental Change
Tom Chapman	GEOG 408/508: Cartography
Carol Considine	Sustainable Construction Practices
Mujde Erten-Unal	CEE 458/558: Sustainable Development CEE 650: Pollution Prevention
Tal Ezer	OEAS 405/505: Physical Oceanography OEAS 415/515: Waves and Tides OEAS 605: Introduction to Ocean Modeling and Prediction
Joyce Hoffman	ENG 486: Media, Law and Ethics ENG 438W: Advanced News Reporting
Jane Rowe	Environmental Communication
Cindy Tomovic	STEM 495/595: Special Topics Course. Creating Public Discourse on Adaptation to Climate Change and Sea Level Rise STEM 370T: Technology and Society
Pete Sedwick	OEAS 310: Earth System Science (OEAS)
Wie Yusuf	PADM 701: Public Policy Analysis

A new course is under development by **Erika Marsillac, Assistant Professor of Decision Sciences in the College of Business and Public Administration (CBPA)**, called Supply Chains and Reverse Logistics Systems (PORT 616). This course explores how Supply Chains and Reverse Logistics systems are evolving in today's rapidly changing global climate, and the impacts of changing business and environmental trends. Fundamental tools and techniques will be used to provide insights on how to best organize, manage, and optimize such systems.

CCSLRI Faculty and Students a Strong Presence at Oceans’12 Marine Technology Society Hampton Roads Conference: Papers, Workshops, Exhibits

Researchers affiliated with CCSLRI were key participants in "OCEANS '12, Harnessing the Power of the Ocean," an international meeting sponsored by the Marine Technology Society and the IEEE, which drew 2,500 engineers and scientists to Virginia Beach in October. Presenting papers were:

- Todd Egerton, Department of Biology: **Integration of microscopy and underway chlorophyll mapping for monitoring algal bloom development**
- Tal Ezer, Department of Ocean, Earth and Atmospheric Sciences, Center for Coastal Physical Oceanography, **Analysis of relative sea level variations and trends in the Chesapeake Bay: Is there evidence for acceleration in sea level rise?**

- Katherine Filippino, Department of Ocean, Earth and Atmospheric Sciences: **Storm chasing: Nutrient dynamics in the tidal James River before, during, and after Hurricane Irene and Tropical Storm Lee**
- Harold Marshall, Department of Biology: **Bloom and toxin producing algae in Virginia tidal Rivers**

Liz Smith, CCSLRI Coordinator, presented a ½-day workshop, which was open to the public, entitled: **"Sea Level Rise and Inundation Workshop: What? So What? Now What?"** that attracted 60 participants. Presentations from the workshop will be available on ODU's CCSLRI webpage. A description of the workshop can be found: <http://www.oceans12mtsieehamptonroads.org/docs/WS4-Description.pdf> and the workshop agenda is available here: <http://www.oceans12mtsieehamptonroads.org/docs/WS4-Agenda.pdf>

ODU also had a presence in the Exhibition, with 300 square feet of exhibition space devoted to showcasing projects and programs of the Department of Ocean, Earth and Atmospheric Sciences, the Center for Coastal Physical Oceanography and the Climate Change and SLR Initiative.

More about ODU's participation in the Oceans'12 Conference can be found here:

- http://www.odu.edu/news/2012/8/sea_level_rise_initi
- http://www.odu.edu/news/2012/10/oceans_12

CCSLRI Featured by Public Radio

In the wake of Superstorm Sandy, Hampton Roads has come under the microscope for its vulnerability to such an event. As an urban, coastal nexus for national security, the maritime industry, tourism and coastal development, our region has much expertise to offer and many stories to tell. The following stories were produced this fall by local and national news outlets:

- **PBS NewsHour** (December 6, 2012) - Battleground Dispatches: Norfolk Readies for Future Storms, Sea Level Rise w/Larry Atkinson (OEAS) http://www.pbs.org/newshour/bb/politics/july-dec12/norfolk_12-06.html
- **WHRO HearSay** (November 19, 2012) – The Rising Tide w/ Larry Atkinson (OEAS), Skip Stiles (Wetlands Watch) and Molly Mitchell (VIMS) <http://hearsay.org/>
- **NPR All Things Considered** (November 5, 2012) – Norfolk, VA, Puts Flooding Survival Plan to the Test w/ Larry Atkinson (OEAS), Poornima Madhavan (Psychology) and Jenifer Alonzo (Communication and Theater Arts): <http://www.npr.org/2012/11/06/164362276/norfolk-va-puts-flooding-survival-plan-to-the-test>

Proposals Funded

Victoria Hill, Assistant Research Professor and Graduate Student Coordinator in the Department of Ocean, Earth and Atmospheric Sciences

Project Title: **Warming and irradiance measurements in the Arctic: Determining the link between solar energy absorption and surface warming through long-term observations**

Funding Agency: National Science Foundation, Polar Programs

Award Period: 01 Sept 2012 to 31 Aug 2015



The objectives of Dr. Hill’s research are to quantify the connection between seasonal warming of arctic surface waters and the absorption of solar energy, and additionally to identify the presence and seasonal cycling of materials responsible for this absorption.

Pictured: Dr. Hill and OEAS colleague, David Ruble at Catlin Arctic Survey ice camp.

Regina C. Karp, Associate Professor and Director of the Graduate Program in International Studies

Project Title: AccessEU: Transatlantic Best Practices

Funding Agency: United Nations “Getting to Know Europe” Grants Competition

Award Period: 01 January 2013 to 30 June 2014

ACCESSEU is a program dedicated to relationship building between our region and Europe, and is centered on the themes of education, community awareness and local networking. In the Fall of 2013, in collaboration with the CCSLRI, AccessEU will present the project’s signature conference entitled, “Rising Sea Levels – Moving Beyond the Threat. Transatlantic Regional Initiatives and Best Practices.”



Regina Karp, Associate Professor of International Studies

Proposals Submitted or In Preparation

When CCSLRI started, two years ago, there were few, if any, proposals being submitted especially in the disciplines of human behavior and socio-economic impact of SLR. This fall, a plethora of proposals have been submitted, or are planned, by multi-disciplinary teams from around the University. Proposals have been submitted to FEMA (see pg 2), NASA, and the NOAA Climate Program Office. In preparation for submission are proposals to the NSF Coastal Science, Engineering and Education for Sustainability (SEES) Program and to the Belmont Forum (<http://igfagcr.org/index.php/coastal-vulnerability-call>). The Belmont Forum proposal is a collaboration among ODU and a group of leaders on SLR adaptation and urban coasts from the UK, and Germany.

Upcoming Events – Local

- **Tuesday, December 11, 2012 from 0900-1100** - *Quantifying Risks of Climate Change and Sea Level Rise to Naval Station Norfolk* (SERDP RC 1701 Project) Authors: Ms. Kelly A. Burks-Copes & Dr. Edmond J. Russo, USACOE, Vicksburg, MS. This briefing will take place in the Old Dominion University Webb Center Board of Visitor's Room and is being presented by the ODU Climate Change and Sea Level Rise Initiative, Wetlands Watch and the Hampton Roads Planning District Commission. Registration is required:

<https://docs.google.com/spreadsheet/viewform?formkey=dG1aUWlleldLYzVyOGtuYUI6RW94MUE6MQ#gid=0>

- **Accelerating Sea Level Rise Workshop**– a small workshop focusing on the physics of accelerating sea level rise and how to communicate it to decision makers is being planned for Spring 2013
- **AccessEU SLR Workshop in October 2013** – see page 6.
- **Local flooding meetings** – there are many local meetings regarding various aspects of flooding. Specific events will be announced over the CCLRI email list. Norfolk has joined forces with several regional and national partners to expand the conversation and resources that will lead to positive flooding mitigation techniques for Norfolk and the Hampton Roads area.
<http://www.norfolk.gov/flooding/partners.asp>

Upcoming Events – National

There are many relevant national meetings. Here are a few upcoming:

- *Preparing for the Rising Tide: Adapting to Climate Change in the Mid-Atlantic*: December 10-11, 2012 in Wilmington, DE
- *13th National Conference on Science, Policy and the Environment – Disasters and the Environment – Science, Preparedness and Resilience*. January 15-17, 2013, Washington DC
<http://www.environmentaldisasters.net/>
- *Coastal GeoTools*, March 25-28, 2013, Myrtle Beach, SC
<http://geotools.csc.noaa.gov/default.aspx>

And a couple of events which just took place but which are relevant to Hampton Roads:

- *4th Annual Southeast Florida Regional Climate Leadership Summit Agenda*: Dec 6-7, 2012 – Jupiter, FL <http://southeastfloridaclimatecompact.org/pdf/PBC%20Agenda.pdf>
- *2012 Virginia Coastal Partners Workshop: Engaging Stakeholders in Coastal Management*: Dec 5-6, 2012 – Richmond, VA
<http://www.deq.virginia.gov/programs/coastalzonemanagement/2012virginiacoastalpartnersworkshopagenda.aspx>

ODU Faculty Papers/Talks/Interviews/Book Chapters

Larry Atkinson, CCLRI Director, has given more than a dozen presentations and seminars about the work of the Initiative since August. Groups include: Law and Climate Change Workshop at Washington and Lee University, Geologic Society of America, Mid-Atlantic Regional Association for Coastal Ocean Observing Systems, Norfolk Rotary Club, Commercial Real Estate Women, Virginia Beach City Council, Larchmont United Methodist Church, EPA Workshop on Extreme Events. Slide sets are available if you are asked to present to local groups.

George McLeod, a PhD student in the Department of Ocean, Earth and Atmospheric Sciences co-authored a book chapter entitled, "Visualization for Hurricane Storm Surge Risk Awareness and Emergency Communication" in the book, "Approaches to Disaster Management - Examining the Implications of Hazards, Emergencies and Disasters." Editor: John Tiefenbacher Publisher: InTech. Publication is scheduled for January 2013.

Erika Marsillac, Assistant Professor of Decision Sciences in the College of Business and Public Administration (CBPA), was featured Sept. 5 on the national website Inside Higher Ed, in connection with her research into green supply chain management. Marsillac, whose research interests also include sustainable manufacturing and international partnerships, was featured in The Academic Minute, a daily feature produced by public radio station WAMC for Inside Higher Ed. In her piece, she spoke about how going green is helping keep some companies in the black.
(<http://blue.odu.edu/ao/ia/insideodu/20120910/morenews2.php>)

Faculty Focus – Dr. Dennis Darby

One of the main impacts of CCLRI is to get faculty to otherwise would not know each other meet and share their interests. In this issue we feature one faculty member who has and is doing outstanding research on climate change in the Arctic. Dr. Dennis Darby is a Professor of Oceanography in the Department of Ocean, Earth and Atmospheric Sciences. Dr. Darby recently chaired a Special Session at Geological Society of America Annual Meeting in Charlotte, NC entitled: Biotracers, mineralogical and geochemical properties of circum-Arctic sediment sources and runoff towards the Arctic Ocean." Following are a sampling of his papers:



- Stärz, M., Gong, X., Lohmann, G., Stein, R., **Darby, D. A.**, Kauker, F., 2012, Implications of a non-static sea-ice cover in the glacial Arctic Ocean. *Earth & Planetary Science Letters*. In press
- **Darby, D. A.**, Ortiz, J. D., Grosch, C., and Lund, S., 2012, 1,500 year cycle in the Arctic Oscillation identified in Holocene Arctic sea-ice drift. *Nature Geoscience*, doi: 10.1038/NCEO1629.
- Ortiz, J. D., Nof, D., Polyak, L., St-Onge, G., Lisé-Pronovost, A., Naidu, S., **Darby, D. A.**, Brachfeld, S., 2012, Inter-hemispheric control of the Atlantic Meridional Overturning during the last 12,000 years. *Jour. Phy. Ocean.* doi:org/10.1175/JPO-D-11-0167.1.
- **Darby, D. A.**, W. B. Myers, M. Jakobsson, and I. Rigor, 2011, Modern dirty sea ice characteristics and sources: The role of anchor ice, *J. Geophys. Res.*, 116, C09008, doi:10.1029/2010JC006675.