



# Making Waves

Fall 2011



SSEC

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## Greetings from the Chair

Jonathan Martin



After a rainy June, the summer and fall weather have been very generous to southern Wisconsin with the generosity extending, thus far, into the middle of November. Despite the rather benign physical environment, it has been a tumultuous year here in Madison with waves of protests at the Capitol and still unsettled political turbulence building to a possible crescendo this fall. Amidst this dramatic backdrop, the past year represented a period of tremendous growth for our Department as three of our outstanding young faculty earned tenure during the past year and we injected new energy into our enterprise by hiring a new Assistant Professor colleague (the details of all this news are contained within).

Continued budget pressures at both the state and national level are circling ominously around the University like so many vultures eager for the leavings of a once thriving entity. Against this backdrop, we maintain our commitment to meeting the challenge of continuing to fund outstanding graduate students as federal research dollars become increasingly difficult to find. We remain committed to giving our undergraduates the very best, broadest education in this science that is offered anywhere. We remain committed to engaging in campus-wide initiatives to enhance the profile and educational offerings in climate change science and environmental studies as we serve as the College of Letters and Science administrative home for the new Environmental Sciences major rolled out in September. It is in the face of these challenges that we appeal to you, our alumni, for your continued support of our exceptional department and its research, teaching, and outreach missions that have influenced so many lives throughout the more than 60 years of our existence.

In this edition of our annual newsletter we will introduce our new faces to you and describe the numerous activities and accomplishments of our faculty, staff, and students in the past year. We are pleased to extend to all of you an invitation to join us at our Annual Alumni Reunion at the AMS Annual Meeting in New Orleans in late January. In spite of the many challenges we face, we find ourselves, as always, looking forward to an exciting future from the perspective of an illustrious past. We are pleased to include you in that future as we stay updated with you; our Past, our Future, our Alumni.





## Faculty News

### Introducing Tristan L'Ecuyer



As the newest member of the faculty, it is great to have this opportunity to introduce myself to the entire AOS family. This department enjoys an excellent reputation and it is a pleasure to be able to add my name to the long list of successful colleagues with connections to UW! I grew up in eastern Canada and began my scientific career in physics obtaining a B.S. degree from Dalhousie University in Halifax, Nova Scotia in the mid-90s. My subsequent Master's degree specialized in quantum mechanics as I sought explanations for the then hotly debated atmospheric absorption anomaly. After two years of calculating the quantum energy states of individual water dimer molecules (two water molecules attached by a hydrogen bond), however, I decided to shift my focus to a more applied field and atmospheric science was a natural fit. This led me to Colorado State University where I worked with Professor Graeme Stephens exploring the extent to which we can estimate atmospheric diabatic heating from satellite measurements, earning a PhD in 2001.

Over the past decade my research has evolved to incorporate innovative combinations of satellite observations and numerical models to examine energy exchanges and cycling of water in the Earth-atmosphere system. I continue to develop and refine global, multi-sensor, radiative heating, rainfall, and snowfall datasets for the Tropical Rainfall Measuring Mission and CloudSat and apply these datasets to explore interactions and feedbacks between clouds, aerosols, precipitation, and radiation in the global climate system. As part of the ongoing challenge of evaluating these datasets, I am also actively involved in a number of field campaigns and recently led an experiment in Finland to identify the major sources of error in satellite precipitation estimates at high latitudes. I also believe it is important to foster more direct working relationships between the observation and modeling communities and have engaged modeling groups to use observed relationships between key components of the energy and water cycles to evaluate the representation of physical processes in climate models. Through this combination of remote sensing, observational analysis, and model evaluation my new research group at UW will seek a better understanding of the climate system and improve our ability to predict its evolution. I am excited about the prospects of working with all of my new colleagues in AOS and SSEC to progress toward this goal!

More information can be found at my new website:  
[www.aos.wisc.edu/~tristan](http://www.aos.wisc.edu/~tristan).

### Newly Tenured Faculty

During the academic year 2010-2011, three of our Assistant Professors - Professor Daniel J. Vimont, Professor Galen A. McKinley, and Professor Ankur Desai earned promotion to the rank of Associate Professor with tenure.



*Professor Vimont's* work focuses on the three major themes; mechanisms of climate variability and change, interactions between weather and climate, and global and regional impacts of climate change. Dan has been a leading figure in the development of the successful interagency Wisconsin Initiative on Climate Change Impacts (WICCI) which brings UW and Wisconsin DNR scientists together with other state agencies and institutions to assess impacts of climate change on the state.



*Professor McKinley's* work focuses on carbon cycling in the global oceans and the Great Lakes – specifically, how carbon enters and exits aquatic systems and how it is processed while contained therein. Her work involves an interdisciplinary approach across a range of fields: from fluid dynamics to aquatic chemistry to ecology and employs both historical datasets and numerical models to learn about carbon cycling. Currently, she is leading a variety of projects with foci in the North Atlantic and Lake Superior.



*Professor Desai's* work involves observing and modeling micrometeorological, ecological, and biogeochemical interactions of the surface with the atmosphere at regional to global scales, with a focus on anthropogenic influences on these interactions. Current projects center on several themes focused on understanding emergent ecosystem and atmospheric phenomena at regional spatial scales in spatially heterogeneous or complex systems.

These three newly tenured colleagues provide incredible energy to our department and we are thrilled to welcome them to the ranks of the tenured faculty at Wisconsin. We look forward to many more years of collegiality!

### Desai leads Course with Menominee Nation

In September, Professor Ankur Desai, his graduate students, and participants from several Universities and labs conducted a field course, Forest and Climate Leaders in Menominee and the Environment, with Native American students from the College of Menominee Nation in Keshena, Wisconsin. The course was centered on understanding biosphere/atmosphere interactions and employed high-tech methods of monitoring carbon flux in and out of plants, water and soil.

The course was based at the UW-Madison Kemp Natural Resources Station in Woodruff, Wisconsin using data collected on-site at a number of Professor Desai's field research sites around northern Wisconsin. More information about this innovative collaboration can be found at UW Madison Communications (<http://www.news.wisc.edu/slideshows/59/slides/447>).



Professor Desai in front of the 27 m Willow Creek flux tower just west of Minocqua during his fall field course.



Students and staff measuring carbon dioxide escaping from the forest soil at Willow Creek.



### Ackerman Inducted as Fellow in Wisconsin Academy of Science, Arts, and Letters

On Sunday, November 6, 2011, *Professor Steve Ackerman* was inducted as a fellow in the Wisconsin Academy of Science, Arts, and Letters along with six other inductees. The Academy was founded in 1870 to “bring context, civilized discussion, and meaningful action to the most important issues and ideas of today.” The Academy is also featuring Professor Ackerman in their Member Spotlight (<http://www.wisconsinacademy.org/contributor/steve-ackerman>).



### Professor Liu Selected as AMS Fellow

Professor *Zhengyu Liu* has been selected as a new Fellow of the American Meteorological Society. He and the other new Fellows will be inducted at a ceremony at the AMS Annual Meeting in New Orleans on Sunday, January 22, 2012.



### Emeritus Professor Donald Johnson Receives Award

AOS Emeritus *Professor Donald Johnson* received the 2010 Excellence in Geophysical Education Award from the American Geophysical Union! The award was presented at the Honor Ceremony during the AGU Fall Meeting in December 2010.



### Alumni News



### Dr. Louis Uccellini New AMS President-elect

*Dr. Louis Uccellini*, Director of the National Weather Service, and UW-Madison AOS alumnus is the new AMS President-elect. Louis received his B.S. (1971), M. S. (1972) and Ph.D. (1977) from our department and has been a major figure in both research and operations throughout his career. Louis will take over as President in January 2012, at the Annual Meeting in New Orleans. He joins Professor Don Johnson, Professor David Houghton, and Dr. Rick Anthes as AMS Presidents with a UW-Madison AOS pedigree. Stop by our Alumni Reception to personally congratulate Louis on this outstanding achievement.

### New Positions for Recent Graduates

Three of our recent graduates have taken positions at universities around the country this year. *Dr. Timothy Wagner* (not pictured) (PhD 2011) began as an Assistant Professor in the Department of Atmospheric Sciences at Creighton University in Omaha, NE this fall. Tim was also a contestant on Jeopardy and part of his welcome to Creighton involved a Viewing Party! He and his wife, Erin, also an AOS graduate, just welcomed their new son, Joseph Raymond, to the family on November 29. Congratulations, Tim and Erin!



*Dr. Derek Posselt* (left) (BS 1997, MS 2001) began as an Assistant Professor in the Department of Atmospheric, Oceanic and Space Sciences at the University of Michigan this fall after several years on the research faculty at Michigan. Congratulations, Derek!



*Dr. Andrea Lopez Lang* (bottom left) (BS 2004, MS 2007, PhD 2011) will begin as an Assistant Professor in the Department of Atmospheric and Environmental Sciences at the University at Albany where she is currently a postdoctoral research associate working with Lance Bosart and Dan Keyser. Congratulations, Andrea!



## Department Events

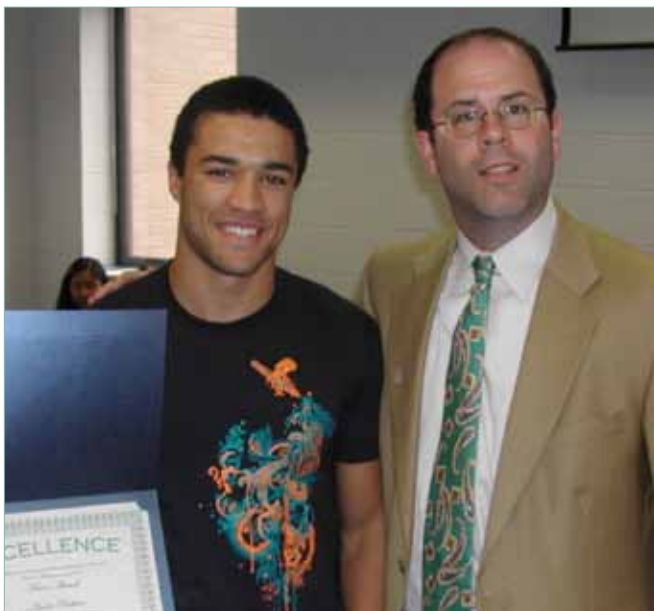
### Third Annual Robock Lecture Discusses Arctic Sea-Ice



Dr. Mark Serreze, Professor at the University of Colorado and Director of the National Snow and Ice Data Center, delivered the third Annual Robock Lecture on Thursday September 8, 2011. An audience of more than 60 people composed of students, faculty, staff, and interested citizens enjoyed Mark's fascinating presentation entitled "The Arctic's Shrinking Ice Cover: Why Should I Care?" Mark described how Arctic sea ice extent at the end of the summer melt season has declined sharply over the past 30 years and is projected to largely disappear well within this century, perhaps as early as 2030. He emphasized that ice loss is already contributing to increased wave action and coastal erosion (as evidenced in the recent Bering Sea "bomb" that devastated Nome) and is resulting in strong rises in Arctic air temperature during autumn, not just at the surface, but extending through a considerable depth of the atmosphere. This strong warming, termed Arctic amplification, is starting to extend beyond areas of ice loss to influence Arctic land areas. He suggested that continued loss of the ice cover is in turn likely to impact on patterns of atmospheric circulation and precipitation not just within the Arctic, but into middle latitudes; there is growing evidence that this is already occurring.

### Student Awards Day 2011

Our annual Department Student Awards Day was held on Wednesday April 20, 2011. We gathered to honor excellence in both our undergraduate and graduate student's performances.



*Andre Perkins accepts the Horn Award for comprehensive excellence as a junior undergraduate.*



*Tim Wagner receives the Wabl Award for outstanding performance as a teaching assistant in our program.*



*Matt Rydzik received the Schwerdtfeger Award for best performance as a first year graduate student.*



*Brent Maddux (left) and John Sears (right) receive the Colloquium Student Service Award for their outstanding contributions to the organization and execution of our weekly Department Colloquium.*



*Zachary Gruskin receives the Sunkel Award as the undergraduate whose scholarly potential is considered exceptional.*



*Hester Leung receives the Lettau Award for the best M.S. thesis for her thesis "Potential Reduction of Uncertainty in Passive Microwave Precipitation by the Inclusion of Dynamical and Thermodynamical Constraints and Radiation Database Approach" under the guidance of Professor Gregory Tripoli.*

## AOS Alumni Reunion Reception

The fifth annual UW-Madison Alumni Reception was attended by over 100 people at the Annual Meeting in Seattle in January 2011. The next installment of this fabulous event will take place at the AMS Annual Meeting in New Orleans, LA on Tuesday January 24 from 6:00 PM– 9:00 PM. As you may know, Tuesday night is reception night at the AMS Meeting where a number of schools host reunions for their alums. Ours has been, by far, the most heartily attended affair of all for three years running. We hope to see you on January 24 and don't forget to pick up your Bucky Badger pin when you stop by for food, drinks, and reminiscing

with old friends and current colleagues – and the new President of the AMS, Dr. Louis Uccellini.



## Graduate Program Report Graduate Students Sitkowski and Roubert Join Hurricane Hunter Mission

Graduate students Matthew Sitkowski and Lisha Roubert, along with CIMSS Researcher Chris Rozoff joined the NOAA Hurricane Hunter to fly into the eye of Hurricane Irene on August 23-24 and wrote an article about their experiences that day (<http://research-matters.noaa.gov/news/Pages/ireneflight.aspx>).

Personally, I have flown in research flights through a number of extratropical storms and was never particularly keen on doing so at night. These scientists flew into a Category 2 hurricane at night! The story is exciting, to say the least.



*Matthew Sitkowski (left) and researcher Chris Rozoff fly through Hurricane Irene on a NOAA Hurricane Hunter flight on August 24, 2011.*



*Lisha Roubert on board the "Hurricane Hunter" August 24, 2011.*

## Master of Science Degrees

### Fall 2010 Master of Science Recipients

*Fay, Amanda R.*, “Estimated Global Carbon Trends Using In-Situ pCO<sub>2</sub> Observations.” (McKinley)

*Henz, Daniel R.*, “A Modeling Study of the Tropical Tropopause.” (Tripoli)

*Moberg, Claus C.*, “The Impact of Model Resolution on Simulations of Extreme Ozone Air Pollution Events Over the Western United States.” (Holloway)

*Mozer, Kathryn W.*, “Interannual and Seasonal Variations in Marine Boundary Layer Cloud Fraction and Lower Tropospheric Static Stability Using Satellite Observations and Global Climate Model Output.” (Ackerman)

### Spring 2011 Master of Science Recipients

*Bauer, Jace*, “A Fresh Look at the Type A/Type B Cyclogenesis Paradigm: The Partitioned Quasi-Geostrophic Omega Perspective.” (Martin)

*Behnke, Ruben*, “The Role of Elevation on Temperature Trends in the Western U.S.: A comparison of Two Statistical Methods.” (Desai)

*Leung, Hester Wing Yee*, “Potential Reduction of Uncertainty in Passive Microwave Precipitation by the Inclusion of Dynamical and Thermodynamical Constraints and Radiation Database Approach.” (Tripoli)

*Monette, Sarah*, “Tropical Applications of a Satellite-Based Over-shooting Top Detection Algorithm.” (Ackerman)

*Russ, Karen* – Non Thesis option (Liu) Spring 2011

*Smalley, Mark*, “Effects of Spectral Response Function Differences on CO<sub>2</sub> Slicing with an Application to Cloud Climatologies.” (Ackerman)

*Vinson, Kenneth*, “Validation of methane products from the atmospheric infrared sounder (AIRS) during the arctic research of the composition of the troposphere from aircraft and satellites (ARCTAS) mission.” (Ackerman)

*Welbouse, Lee*, “Composite Analysis of El Niño – Southern Oscillation Teleconnections in Antarctica.” (Tripoli)

## PhD Degrees

### Fall 2010 PhD Recipients

*Bennington, Valerie S.*, “Carbon Cycle Variability of the North Atlantic Ocean and Lake Superior.” (McKinley)

*Hoover, Brett T.*, “Dynamical Sensitivity Analysis of Tropical Cyclone Steering and Genesis Using an Adjoint Model.” (Morgan)

### Spring 2011 PhD Recipients

*Feng He*, “Simulating Transient Climate Evolution of the Last Deglaciation with CCSM3.” (Liu)

*Andrea Lopez Lang*, “The Structure and Evolution of Lower Stratospheric Frontal Zones.” (Martin)

*Timothy Wagner*, “A Method for Retrieving the Cumulus Entainment Rate From Ground-Based Observations.” (Turner)



## Undergraduate Program Report Undergraduate Degrees

### Spring 2011 Bachelor of Science Degrees

*Croix Christenson, Christopher Colose, Calla DeGroot, Zachary Gruskin, William Line, Jacola Roman, Amanda Schulz, Andrew Winters*

## ☆ Alumni Contributors ☆

Received November 2010 through November 2011

Barton J. Adrian, Richard K. Albrecht, James F. Andrus, Thomas J. Balousek, John J. Bates, Dan A. and Stacy E. S. Baumgardt, James S. Berman, Christopher T. Bovitz, David H. Bromwich, Larry H. Bruss, Melissa K. Carr, William W. and Felicia H. Chen, David B. Clarke, Alan C. Czarnetzki, Jon B. Davis, Steven G. Decker, Stephen G. Dehner, David M. Demeuse, Thomas E. Dillon, Claude E. Duchon, Gerald E. English, Monique M. Gamache-Venne, Colonel John P. Geis II, Thomas J. Greenwald, Mary B. Hagedorn, Brian V. Hahn, Douglas G. Hahn, Stefan Hastenrath, Leon E. Heller, Doris Hood, David D. and Barbara C. Houghton, Dale N. Hovland, William J. Hurlin, Edward C. Johnston, Anton F. Kapela, Peter R. Keehn, Linda Keller, James F. Kimpel, Gary Scott Kirst, Richard W. Knight, William R. Knuth, Thomas R. Knutson, Mark S. and Teresa I. Kulie, Gisela and John E. Kutzbach, Thomas H. Kyle, Daphne Sue LaDue, Peter J. Lamb, Dennis A. and Marilyn B. Lawler, Matthew A. Lazzara, Thomas J. and Anne M. LeBlanc, Laurence G. Lee, Cecil Sy-Sheu Lo, Craig S. Long, Barrett C. Ludlow, David W. and Linda L. Martin, Edward J. Metzger, Mark G. Moede, Shaima L. Nasiri, Eric D. Nelson, Jeffrey L. Nelson, John C. Osborn, Jr., Byron A. Paulson, Jeffrey S. Penner, Brian A. and Heide M. Petermann, Thomas J. Phillips, Terrance Robert Rahman, James E. Ramer, Ellis E. Remsberg, Stephen J. Rigney, Barbara Rotter, Jason P. Samenow, Perry J. Samson, David A. Santek, Douglas H. and Karen I. Sargeant, Kurt R. Schmitz, Siegfried D. Schubert, Joseph H. Shinn, Christopher C. and Karen L. Smallcomb, Phillip J. Smith, William J. Smith, Alfred J. and Mary V. Stamm, Mark Steinberg, John E. Stout, Norton D. Strommen, Dennis W. Thomson, William E. and Ruth M. Togstad, John C. and Ruby M. Turner, Louis W. and Susan Uccellini, Ryan W. Walbrun, Russell E. and Dianne Welsh, George A. Weidner and Marilyn Yeates, William E. B. Welsh, Donald E. Wuerch, John A. Young

*Thank You!*



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*On Jan. 30, 2009, the winter sun sets behind "Ice & Snow Furniture Raised From Lake Mendota," an art project by University of Wisconsin-Madison art student Hongtao Zhou. Zhou created the icy furniture on frozen Lake Mendota near the Memorial Union Terrace shoreline. Photos by Jeff Miller/UW-Madison Communications.*



Department of Atmospheric & Oceanic Sciences  
 1225 West Dayton Street, Room 849  
 University of Wisconsin-Madison  
 Madison, WI 53706-1695

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Chair: Jonathan Martin, Telephone: 608/262-0178  
 FAX: 608/262-0166, e-mail: jmart1@wisc.edu  
 Published for alumni and friends of the Department.  
 Alumni should send address changes to:  
 Below Alumni Center, 650 North Lake St., Madison, WI 53706,  
 or e-mail: [alumnichanges@uwalumni.com](mailto:alumnichanges@uwalumni.com)

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