



AOML Keynotes

ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

AOML is an environmental laboratory of NOAA's Office of Oceanic and Atmospheric Research located on Virginia Key in Miami, Florida

Dr. Robert Atlas Retires

Dr. Robert (Bob) Atlas, the director of AOML for close to 14 years, retired from federal service on March 2, 2019 after a distinguished science career spanning more than five decades.

Bob began his career in the atmospheric sciences at a relatively young age, serving first as an apprentice forecaster for the US Weather Bureau while still just a teenager. His federal career began in 1970 after joining the US Air Force as a weather officer where he maintained a forecast accuracy of greater than 95 percent. Bob earned a PhD in Meteorology and Oceanography in 1976 from New York University.

He joined the staff of NASA in 1973 to perform studies focused on assessing and improving the impact of satellite data on numerical weather prediction. From 1998 to 2003 he led NASA's Data Assimilation Office before assuming the role of Chief Meteorologist at NASA's Goddard Space Flight Center from 2003 to 2005. While at NASA, Bob was a key member of the team that first demonstrated the significant impact of quantitative satellite data on weather prediction.

Bob joined AOML in August 2005 during the most active Atlantic hurricane season on record. As director, he guided AOML in achieving the goals of NOAA's Hurricane Forecast Improvement Project and in developing NOAA's high-resolution Hurricane Weather Research and Forecasting (HWRF) model, resulting in greatly improved hurricane track and intensity forecast guidance.

Bob's scientific pursuits included the assimilation of satellite surface wind data, observing system simulation experiments, ocean modeling, and numerical modeling aimed at heat waves, droughts, and hurricanes. Over the course of his 43-year federal career he authored more than 140 peer-reviewed papers. Bob leaves behind a legacy marked by both leadership and a commitment to scientific excellence.

To all of the employees at AOML:

I want to express what a distinct honor and privilege it has been to serve as your director for the last nearly 14 years. I've had a very full career, having worked as an operational meteorologist performing both aviation and hurricane forecasting, a research scientist, an educator, and a manager that dealt with a variety of atmospheric and oceanographic applications.



As the Director of AOML, I've strived to create a friendly, creative workplace—one in which all employees are treated with respect and where they can achieve their maximum potential. I believe strongly that people achieve their potential and accomplish the most when they enjoy their work, are happy and respected in the workplace, and are appreciated by both their colleagues and their leadership. I believe that this is the way we have functioned at AOML, and this has enabled us to increase AOML's publications and our transitions of research to operations and applications by more than 100%.

A major part of our success has been in maintaining a workplace without walls around it—one in which we form teams and collaborations with other OAR labs, NOAA's operational line offices, academia, and private industry. I am confident that AOML and NOAA will remain strong and continue to contribute significantly to saving lives, protecting the environment, and advancing scientific knowledge.

In my retirement, I plan to continue learning, doing a modest amount of research, and occasionally teaching, in addition to spending more time with family, exercising, and playing tennis. Always feel free to contact me if I can be of help and, of course, to share new findings and advances.

There are a few people not currently at AOML that I would like to thank. First, Kristina Katsaros for encouraging me to apply to the AOML Director position and for her excellent leadership of AOML before me. Next, Rick Rosen for hiring me and for the excellent example he set as a NOAA senior leader, and Judy Gray (former AOML deputy director) for helping me to transition from NASA to NOAA. Finally, I'd like to thank all of you for being such an outstanding part of the AOML family.

Bob Atlas

AOML Director Honored by the US House of Representatives

On Tuesday, February 19, south Florida Congresswoman Debbie Wasserman Schultz honored AOML Director Dr. Bob Atlas on the floor of the US House of Representatives. Congresswoman Wasserman Schultz took a few moments to recognize Bob's distinguished career of service to the nation. Here is what she had to say:

"Madam Speaker, it is with great pleasure that I honor the distinguished career and retirement of Dr. Robert Atlas. Dr. Atlas has served our nation for more than 40 years as a federal employee. He retires as the Director of NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML), where he has transformed AOML into a world class scientific organization focused on NOAA's mission and national needs.

Dr. Atlas received his PhD in Meteorology and Oceanography in 1976 from New York University. Throughout his career, he has served our nation as head of the NASA Data Assimilation Office and as Chief Meteorologist at NASA's Goddard Space Flight Center. He was also a key member of the team that first demonstrated the significant impact of quantitative satellite data on numerical weather prediction.

Dr. Atlas has been committed to diversity, inclusion, and equal opportunity. Under his leadership, AOML has received several NOAA awards and is the most diverse of all NOAA laboratories.

I have had the pleasure of working directly with Dr. Atlas to inform the public of the upcoming hurricane season each year. His professionalism is unmatched, and I am grateful for his unwavering commitment to keeping Americans safe.

I am proud today to honor his leadership and wish him and his family well on his retirement."

National Hurricane Center Honors Dr. Bob Atlas

Colleagues at NOAA's National Hurricane Center (NHC) hosted a farewell tribute for Dr. Bob Atlas on February 21. NHC leadership—Ken Graham and Ed Rappaport—lauded the improved relationship and close connection between research and operations under Bob's tenure as the AOML director. They also thanked Bob for his collaborative support in keeping the south Florida community informed of NOAA's efforts to better prepare vulnerable communities for severe weather.



NHC deputy director Ed Rappaport recognizes Bob Atlas for "enduring contributions to the Nation's hurricane forecast and warning program."

Bob, Congratulations...
and thank you from your NHC friends and colleagues for your many contributions and collaborations!



University of Miami Hosts Research Symposium in Celebration of Dr. Bob Atlas

Dr. Ben Kirtman, director of the University of Miami's Cooperative Institute for Marine and Atmospheric Studies and a former student of AOML Director Dr. Bob Atlas, hosted a science symposium on February 26 in his honor. The event on the campus of the Rosenstiel School celebrated Bob's legacy of "service, scientific research, and leadership" over the course of his 43-year federal career with NOAA, NASA, and the US Air Force.

Presentations were made by former and current colleagues, friends, and students—Drs. Louis Uccellini, Frank Marks, Jagadish Shukla, Eugenia Kalnay, Shian-Jiann Lin, Ross Hoffman, Milt Halem, and Ben Kirtman—who discussed past and current research challenges, advances made in using satellite data to improve weather forecasts, and Bob's contributions to these and other research areas.

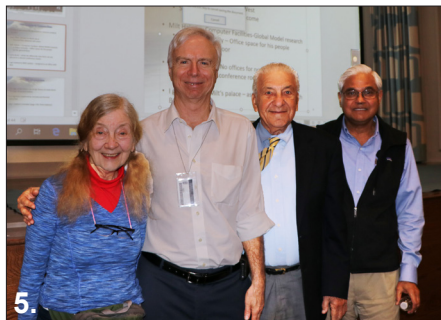
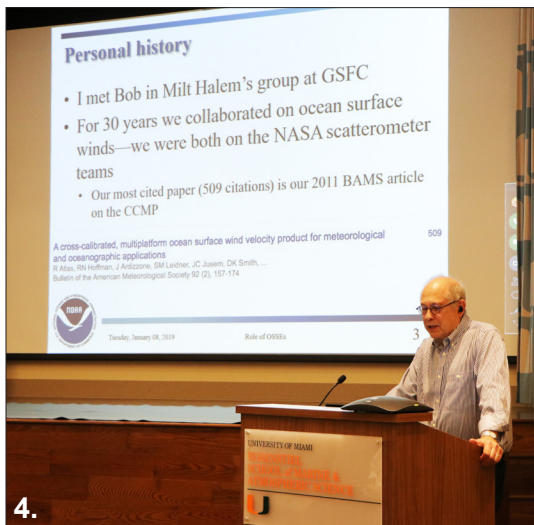
The symposium was followed by a catered reception where friends and colleagues gathered to share stories and memories of Bob's career, as well as present him with gifts and other tokens of appreciation (photos from the symposium and reception appear on pages 3 and 4).



Dr. Bob Atlas, front and center, surrounded by attendees of the research symposium hosted in his honor.

DR. ROBERT ATLAS RESEARCH SYMPOSIUM

Celebrating 43 years of Service, Scientific Research, and Leadership



On February 26, the University of Miami hosted a research symposium on the campus of the Rosenstiel School in celebration of AOML Director Dr. Bob Atlas' 43-year federal career. Friends and colleagues from near and far gathered for a retrospective on Bob's roles as researcher, coworker, and educator. A few highlights from the event included: **1.** Rosenstiel School Dean Roni Avissar welcomes attendees; **2.** Dr. Shian-Jiann Lin reviews Bob's impact on climate modeling and the National Weather Program; **3.** Bob Atlas addresses and thanks attendees; **4.** Ross Hoffman speaks of his research collaborations with Bob that have spanned more than 30 years; **5.** Former NASA coworkers Eugenia Kalnay, Bob Atlas, Milt Halem, and Jagadish Shukla reunite; **6.** Frank Marks discusses future directions for hurricane research; **7.** Louis Uccellini revisits his early years as a researcher working with Bob; and **8.** Ben Kirtman reflects on having been a graduate student with Bob as his synoptic meteorology professor. All eight presentations from the symposium were recorded. The morning sessions can be viewed at <https://youtu.be/oGabQGozCWI>, while the afternoon sessions can be found at <https://youtu.be/5fqPXTgiisE>.

BOB ATLAS RECEPTION AT THE ROSENSTIEL SCHOOL COMMONS



Following the Dr. Robert Atlas Research Symposium on the campus of the University of Miami's Rosenstiel School on February 26, friends and colleagues gathered for an informal reception to thank Bob for his science contributions to the nation and for his many years of federal service and leadership. Gifts and accolades were presented, along with an assortment of good will and congratulatory messages from current and former associates. Best wishes to Bob for a well-deserved retirement to spend with family and friends, with a bit science on the side.

On Friday, March 1, AOML hosted a farewell party to thank AOML Director Dr. Bob Atlas for his able leadership and to wish him all the best in his retirement from federal service. Staff were encouraged to "wear the uniform," i.e., Bob's standard day-to-day work attire—a white shirt and navy blue pants. Pictured are many of the AOML staffers who supported the cause and reported to work wearing their version of Bob's favorite garb (a few additional photos from the party appear on page 5).





After almost 14 years as the Director of AOML, staff bid farewell to Dr. Bob Atlas on March 1. In addition to receiving a Plank Owner's certificate, Bob was also presented with the chance to ride aboard a hurricane hunter mission during the upcoming 2019 hurricane season. He was also proclaimed the Director Emeritus of AOML (see right). All the best to Bob as he transitions into retirement.



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Silver Spring, MD 20910
OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

NOAA Atlantic Oceanographic and Meteorological Laboratory
4301 Rickenbacker Causeway
Miami, FL 33149

Dear Bob:

Your retirement marks the end of an era here at OAR. I know we will all come to appreciate you even more when we try to fill the void that you will leave. In your nearly 15 years here you have been a strong, loyal leader for your lab as well as a kind, avuncular mentor to both your team and young scientists discovering their careers. You have ably led AOML, earning respect as a prized gem of scientific organizations worthy of global respect and admiration. Thanks to your leadership in setting a positive work environment that fostered creativity and partnerships, AOML is better for having had your leadership at the helm.

By your hand and leadership, our organization and the Nation have witnessed fantastic gains from cost-effective research directly contributing to saving lives, protecting property, and understanding global systems. Thanks to you, satellite data now accounts for nearly 100% of all data incorporated into computer weather models, and scientists are able to determine the value of new observing systems prior to funding. Hurricane forecast tracks and intensity forecast guidance are vastly improved from aviation based and ocean glider based observations. Your own employees best reflect your influence and success from your caring leadership.

I credit and appreciate your passion in performing mission-crucial work in support of this Nation and to the future of earth's observation and prediction. I also thank you for your collegiality with partners, loyalty to mission, and support for leadership's priorities. You will be well missed here at NOAA. I bid you a fond farewell, and wish you and Shirley all the best, fair winds and following seas.

Sincerely,

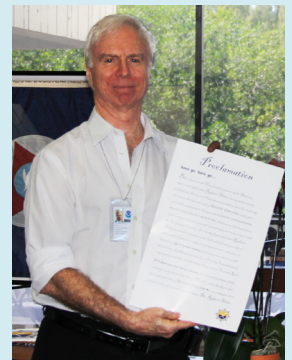
Craig N. McLean

Assistant Administrator

Dr. Robert Atlas Declared Director Emeritus of AOML

As a parting tribute to Dr. Bob Atlas on March 1, his last working day before retirement, Bob was "officially" proclaimed the Director Emeritus of AOML. Below is the verbiage for this special honor.

Be it known to all Mortals and creatures of the Universe, vapors, and depths that Rober Atlas, having meritoriously fulfilled the Duties and Tribulations incumbent upon him, is hereby elevated to the esteemed rank of Director Emeritus of that fair and fertile establishment known as the Atlantic Oceanographic and Meteorological Laboratory. Inherent in this bestowal are rights and privileges now granted in perpetuity and in accordance with the Denizens of Eternity. It is hereby bequeathed that Robert Atlas be entitled visitation to the halls and hallowed grounds of said establishment unencumbered and impervious to restriction or limitation. Be it further known that forevermore he is accorded the privilege of gobbling gratuitously at Feasting Festivals and of congregating with like-minded entities for purposes True and Real. For these just and honest reasons, the honored members of this scientific body do, on this date of March 1, 2019, hereby confer the venerated title of Director Emeritus to our boss, colleague, friend, leader, and scientist extraordinare, Dr. Robert Atlas.



Dr. Bob Atas with an "official" proclamation making him the Director Emeritus of AOML.

Bring Your Child To Work Day



AOML welcomed a large group of children to the lab on Friday, February 1, in celebration of Bring your Child to Work Day. Over the years, the lab has had a great tradition of participating in this national event, created to give girls and boys the chance to experience the working world. More than 20 children from AOML and NOAA's Southeast Fisheries Science Center participated in this year's program of activities that included a tour of AOML's facilities and laboratories, plus a scavenger hunt. During the tour, the group learned about coral reefs, pathogens lurking in the ocean that compromise water quality, and the various fish species that live in south Florida's Biscayne Bay. They also learned how oceanographers use an assortment of instruments to measure the ocean's temperature, salinity, and other properties, as well as how currents can transport debris to distant locations. The group ate lunch on the campus of the University of Miami's Rosenstiel School and then spent the afternoon learning about the interesting ways their parents support NOAA's mission of environmental stewardship.

Shutdown!

Due to a lapse in congressional appropriations for fiscal year 2019, portions of the U.S. federal government, including the Department of Commerce, were closed for business on December 22, 2018. As the majority of AOML's federal staff conduct work that is deemed non-essential during a lapse in appropriations, employees were given furlough notices and told not to work, becoming part of an estimated 800,000 federal employees—about one-fourth of the federal workforce—impacted by the partial shutdown. Contract employees were sent home due to closure of the AOML facility, while University of Miami-Cooperative Institute employees were able to continue working at off-site locations. On January 25, 2019, Congress agreed on a short-term continuing resolution, and the federal government reopened. AOML staff returned to work on January 28, 2019. The 35-day shutdown is currently the longest in US history.

2019 Federal Holidays

New Year's Day
Tuesday, January 2

Martin Luther King, Jr. Day
Monday, January 21

Washington's Birthday
Monday, February 18

Memorial Day
Monday, May 27

Independence Day
Thursday, July 4

Labor Day
Monday, September 2

Columbus Day
Monday, October 14

Veterans Day
Monday, November 11

Thanksgiving Day
Thursday, November 28

Christmas
Wednesday, December 25

Welcome Aboard

Dr. David Bates joined the staff of AOML's Hurricane Research Division (HRD) in January as a University of Miami-Cooperative Institute assistant scientist. David will work with HRD's Observing System Simulation Experiments (OSSEs) team on the simulation of satellite observations from current and proposed observing technologies. He will also lead development work on the simulation and assimilation of all-sky-satellite radiances to improve global and regional weather forecasts. David holds a PhD from the University of Miami.



Andres Vidal joined the staff of AOML's Hurricane Research Division in February as a University of Miami-Cooperative Institute software engineer. Andres will work with HRD's Observing System Simulation Experiments (OSSEs) team in support of NOAA's Quantitative Observing System Assessment Program. His main responsibility will be to improve the software architecture and efficiency of the observation simulator package used to conduct OSSEs, enabling the simulation of new observation types flexible enough to include regional and global OSSE capabilities.



Congratulations

In January, friends and coworkers gathered to celebrate the 90th birthday of George Berberian, a former long-term federal employee at AOML and currently a University of Miami-Cooperative Institute research associate with the Ocean Chemistry and Ecosystems Division (OCED). George is one of the few surviving members of the original group of researchers and support staff that moved to Miami from Silver Spring, Maryland in the late 1960s with Dr. Harris Stewart, the founder of AOML. Through their steadfast efforts, this group of men and women succeeded in establishing AOML on Virginia Key as a respected center for environmental research. George served as the deputy director of OCED for many years, mentoring younger generations of scientists and guiding the division's research, before retiring from federal service in 1995. Always ready with a story and generous with his time and knowledge, George is a part of the very fabric of AOML.



Manuel Fraga, AOML's facility operations specialist, received NOAA's Order of Sherman's Lagoon award in January. The Order of Sherman's Lagoon award honors NOAA employees who excel at their jobs, achieve a milestone that contributes significantly or critically toward a particular program's goal, or demonstrate leadership toward process improvement of a significant magnitude. AOML director Dr. Bob Atlas and deputy director Dr. Molly Baringer presented Manny with the award to recognize his many years of dedicated service in rising to the challenge of keeping the aging AOML facility in good working order. Specifically, the citation reads "for exemplary service, long-term commitment, and consistent efforts towards maintaining AOML's aging facility, including the repair of AOML's 30-year old chiller, electrical generators, and air handlers, while continuing to improve the quality of the facility including laboratory renovation, lighting retrofits, flooring replacement, and more." As further testament to Manny's dedication, during the 35-day partial shutdown of the federal government (December 22, 2018 to January 25, 2019), he visited the lab daily to ensure electrical systems, air chillers, and other building-wide equipment were operational and functioning properly.



AOML Director Dr. Bob Atlas, Acting Associate Director LTJG Alyssa Thompsen, Manny Fraga, and Deputy Director Dr. Molly Baringer.



U.S. Department of Commerce

Mr. Wilbur L. Ross, Jr.
Secretary of Commerce
www.doc.gov



National Oceanic and Atmospheric Administration

Dr. Neil Jacobs
Acting Undersecretary of Commerce
for Oceans and Atmosphere
and NOAA Administrator
www.noaa.gov

Office of Oceanic and Atmospheric Research

Mr. Craig N. McLean
Assistant Administrator
www.oar.noaa.gov



Atlantic Oceanographic and Meteorological Laboratory

Dr. Robert M. Atlas
Director Emeritus

Dr. Molly O. Baringer
Deputy Director

LTJG Alyssa N. Thompson
Acting Associate Director

Dr. Frank D. Marks
Hurricane Research Division Director

Dr. James C. Hendee
Ocean Chemistry and Ecosystems
Division Director

Dr. Gustavo J. Goni
Physical Oceanography Division Director

4301 Rickenbacker Causeway
Miami, FL 33149
www.aoml.noaa.gov

Keynotes is published bimonthly to
highlight AOML's recent research
activities and staff accomplishments.

Keynotes publishing editor: Gail Derr

Recent Publications (AOML authors are denoted by bolded capital letters)

ANNANE, B., B. McNoldy, S.M. Leidner, R. HOFFMAN, R. ATLAS, and S.J. Majumdar, 2018: A study of the HWRF analysis and forecast impact of realistically simulated CYGNSS observations assimilated as scalar wind speeds and as VAM wind vectors. *Monthly Weather Review*, 146(7):2221-2236.

Archer, M.R., S.R. Keating, M. Roughan, W.E. Johns, R. LUMPKIN, F. Beron-Vera, and L.K. Shay, 2018: The kinematic similarity of two western boundary currents revealed by sustained high-resolution observations. *Geophysical Research Letters*, 45(12):6176-6185.

Beron-Vera, F.J., M.J. Olascoaga, Y. Wang, J. TRINANES, and P. Perez-Brunius, 2018: Enduring Lagrangian coherence of a Loop Current ring assessed using independent observations. *Scientific Reports*, 8:11275.

CHRISTOPHERSEN, H., A. AKSOY, J. DUNION, and S. ABERSON, 2018: Composite impact of Global Hawk unmanned aircraft dropwindsondes on tropical cyclone analyses and forecasts. *Monthly Weather Review*, 146(7):2297-2314.

CHRISTOPHERSEN, H., R. ATLAS, A. AKSOY, and J. DUNION, 2018: Combined use of satellite observations and Global Hawk unmanned aircraft dropwindsondes for improved tropical cyclone analyses and forecasts. *Weather and Forecasting*, 33(4):1021-1031.

Didlake, A.C., P.D. REASOR, R.F. ROGERS, and W.-C. Lee, 2018: Dynamics of the transition from spiral rainbands to a secondary eyewall in Hurricane Earl (2010). *Journal of the Atmospheric Sciences*, 75(9):2909-2929.

Guimond, S.R., J.A. ZHANG, J.W. Sapp, and S.J. Frasier, 2018: Coherent turbulence in the boundary layer of Hurricane Rita (2005) during an eyewall replacement cycle. *Journal of the Atmospheric Sciences*, 75(9):3071-3093.

Illig, S., E. Cadier, M.-L. Bachelery, and M. KERSALE, 2018: Subseasonal coastal-trapped wave propagations in the southeastern Pacific and Atlantic oceans: 1. A new approach to estimate wave amplitude. *Journal of Geophysical Research-Oceans*, 123(6):3915-3941.

Leidner, S.M., B. ANNANE, B. McNoldy, R. HOFFMAN, and R. ATLAS, 2018: Variational analysis of simulated ocean surface winds from the Cyclone Global Navigation Satellite System (CYGNSS) and evaluation using a regional OSSE. *Journal of Atmospheric and Oceanic Technology*, 35(8):1571-1584.

MILLETTE, N.C., J. Grosse, W.M. Johnson, M.J. Jungbluth, and E.A. Suter, 2018: Hidden in plain sight: The importance of cryptic interactions in marine plankton. *Limnology and Oceanography Letters*, 3(4):341-356.

Ming, J., and J.A. ZHANG, 2018: Direct measurements of momentum flux and dissipative heating in the surface layer of tropical cyclones during landfalls. *Journal of Geophysical Research-Atmospheres*, 123(10):4926-4938.

Morzfeld, M., D. Hodyss, and J. POTERJOY, 2018: Variational particle smoothers and their localization. *Quarterly Journal of the Royal Meteorological Society*, 144(712):806-825.

Reverdin, G., H. Valdimarsson, G. Alory, D. Diverres, F. BRINGAS, G. GONI, L. Heilmann, L. Chafik, T. Szekely, and A.R. Friedman, 2018: North Atlantic subpolar gyre along predetermined ship tracks since 1993: A monthly data set of surface temperature, salinity, and density. *Earth System Science Data*, 10(3):1403-1415.

RUDKO, M.V., I.V. Kamenkovich, M. Iskadarani, and A.J. Mariano, 2018: Zonally elongated transient flows: Phenomenology and sensitivity analysis. *Journal of Geophysical Research-Oceans*, 123(6):3982-4002.

Steward, J.L., J.E. Roman, A. Lamas Davina, and A. AKSOY, 2018: Parallel direct solution of the covariance-localized ensemble square root Kalman filter equations with matrix functions. *Monthly Weather Review*, 146(9):2819-2836.

Tang, J., J.A. ZHANG, S.D. ABERSON, F.D. MARKS, and X. Lei, 2018: Multilevel tower observations of vertical eddy diffusivity and mixing length in the tropical cyclone boundary layer during landfalls. *Journal of the Atmospheric Sciences*, 75(9):3159-3168.

Valla, D., A.R. Piola, C.S. MEINEN, and E. Campos, 2018: Strong mixing and recirculation in the northwestern Argentine Basin. *Journal of Geophysical Research-Oceans*, 123(7):4624-4648.

Venugopal, T., M.M. Ali, M.A. Bourassa, Y. Zheng, G.J. GONI, G.R. FOLTZ, and M. Rajeevan, 2018: Statistical evidence for the role of southwestern Indian Ocean heat content in the Indian summer monsoon rainfall. *Scientific Reports*, 8:12092.

Wick, G.A., T.F. Hock, P.J. Neiman, H. Vomel, M.L. BLACK, and J.R. Spackman, 2018: The NCAR-NOAA Global Hawk dropsonde system. *Journal of Atmospheric and Oceanic Technology*, 35(8):1585-1604.

Xue, L., W.-J. Cai, T. Takahashi, L. Gao, R. WANNINKHOF, M. Wei, K. Li, L. Feng, and W. Yu, 2018: Climatic modulation of surface acidification rates through summertime wind forcing in the Southern Ocean. *Nature Communications*, 9:3240.

www.aoml.noaa.gov/keynotes/