



FLORIDA STATE UNIVERSITY Center for Ocean-Atmospheric Prediction Studies

Study: Rapid weather swings increase flu risk

New research from COAPS scientists Dr. **Zhaohua Wu** and Dr. **Jie Sun** shows that rapid weather variability as a result of climate change could increase the risk of a flu epidemic in some highly populated regions in the late 21st century. The research was published in the journal [Environmental Research Letters](#).

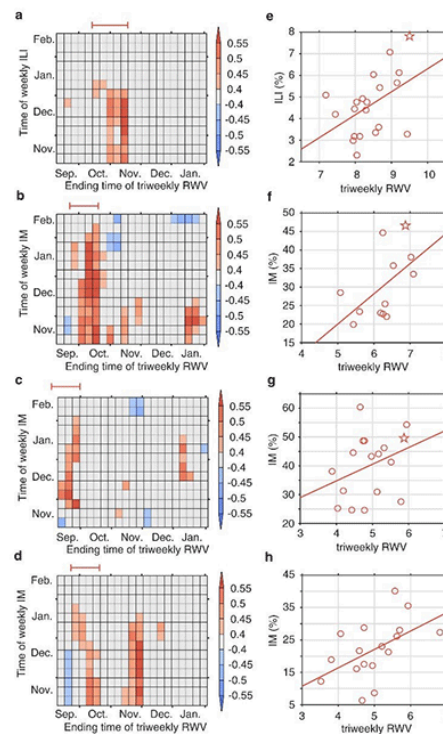
Using surface air temperatures from Jan. 1, 1997 to Feb. 28, 2018, researchers analyzed weather patterns and average temperatures over 7,729 days. Simultaneously, they conducted statistical analysis on influenza data sets from the four countries over the same time period.

“The historical flu data from different parts of the world showed that the spread of flu epidemic has been more closely tied to rapid weather variability, implying that the lapsed human immune system in winter caused by rapidly changing weather makes a person more susceptible to flu virus,” Wu said.

In addition to Wu and Sun, the research team included scientists Qi Liu, Zhe-Min Tan, Yayi Hou and Congbin Fu from Nanjing University in China. Liu was a visiting student to FSU under the guidance of Wu.

[READ the full article on FSU NEWS.](#)

Pictured at right: Long-term ILI/IM changes with respect to RWV.



Rolling Deck to Repository (R2R) Program Awarded NSF Grant

The Marine Data Center (MDC) at FSU COAPS has received a five-year NSF award to continue the the Center's contributions to the Rolling Deck to Repository project (rvdata.us). The Rolling Deck to Repository (R2R) Program has been in operation since 2009 as a four-way partnership between geoinformatics groups at Lamont-Doherty Earth Observatory (LDEO), Woods Hole Oceanographic Institution (WHOI), Scripps Institution of Oceanography (SIO), and Florida State University (FSU).



R2R

ROLLING DECK TO REPOSITORY

The focus of the MDC contribution to R2R is the operational quality assessment (QA) and quality control (QC) of underway meteorological (MET) and surface ocean (TSG) measurements provided in real-time (RT) by NSF-funded academic research vessels to the Shipboard Automated Meteorological and

Oceanographic System (SAMOS) initiative (<https://samoss.coaps.fsu.edu>). The SAMOS data center was established in 2005 at FSU by the NOAA Ocean Observing and Monitoring Division in the Climate Program Office. Recruited vessels transmit daily emails containing one-minute averaged MET and TSG data to FSU via satellite broadband technology. Preliminary data are placed in a common data format, augmented with vessel- and instrument-specific metadata, undergo automated QA and QC, and are published to the web. Multiple preliminary files for a single day are merged to produce an intermediate product nominally distributed with a 10-day delay from the original data collection date. Data from academic fleet vessels are linked to R2R cruise identifiers and distributed free of charge and proprietary holds via http://samoss.coaps.fsu.edu/html/cruise_data_availability.php. Long-term archival occurs at the U.S. National Centers for Environmental Information.

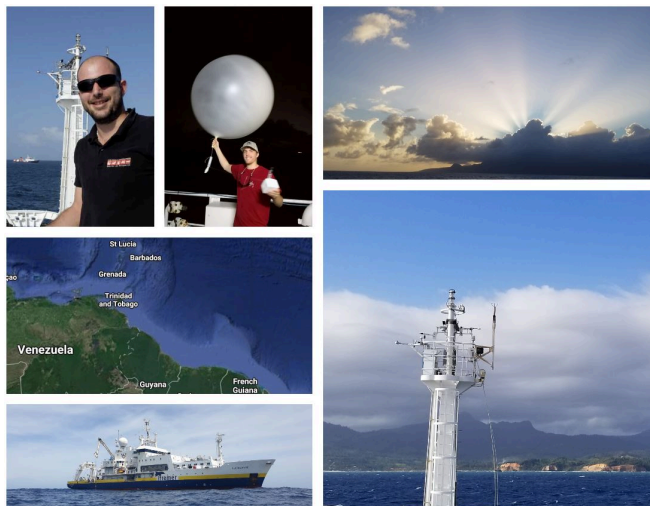
Recent Activities & Accomplishments

Ocean Sciences 2020



COAPS researchers and students were well-represented at this year's [Ocean Sciences Meeting \(OSM\)](#) in San Diego, CA. The meeting is the flagship conference for the ocean sciences and the larger ocean-connected community.

EUREC4A the Field Study, aims at advancing understanding of the interplay between clouds, convection and circulation and their role in climate change. As part of this large field campaign, COAPS scientist Remi Laxenaire and graduate student, Ethan Wright (meteorology), were at sea from January 19 to February 19, starting in Guadelupe and traveling offshore of Barbados and French Guiana. Laxenaire and Wright were part of a team measuring air-sea interactions and subsurface properties associated with mesoscale ocean eddies that may have a role in the organization of tropical clouds in this region.



OceanObs'19 — Connecting Science and Society



As part of the decadal conference series, [OceanObs'19](#) galvanized the ocean observing community ranging from scientists to end users, including many researchers and students from COAPS (pictured above). OceanObs'19 outcomes and actions seeks to improve response to scientific and societal needs of a fit-for-purpose integrated ocean observing system, for better understanding the environment of the Earth, monitoring climate, and informing adaptation strategies as well as the sustainable use of ocean resources.

[Marine Data Center](#)

Director **Shawn Smith** attended NOAA's Ocean Observing and Monitoring Division (OOMB) Community Workshop. The goal of the workshop was to frame the strategic plan for OOMB over the next five to ten years.



Workshop on Surface Currents in the Coupled Ocean-Atmosphere System

In February, the Workshop on Surface Currents in the Coupled Ocean-Atmosphere System brought together members of the physics and applications communities in the field of ocean surface currents. The workshop was organized by COAPS and sponsored by US CLIVAR, NOAA, NASA, and NSF. The overarching aims were to:

1. Develop a practical definition for “surface current”, including the measurement and model depths and accuracies needed for different applications;
2. Summarize the ways in which surface currents modify air-sea coupling and how they respond to air-sea coupling, and the extent to which this coupling can affect processes and applications;
3. Quantify uncertainties in estimates of transport of pollutants, particles, sea ice, etc. resulting from misrepresentation of surface currents in models and observations, the impacts on climate prediction resulting from these uncertainties, and how new measurement strategies (e.g., from satellites) can help in this.

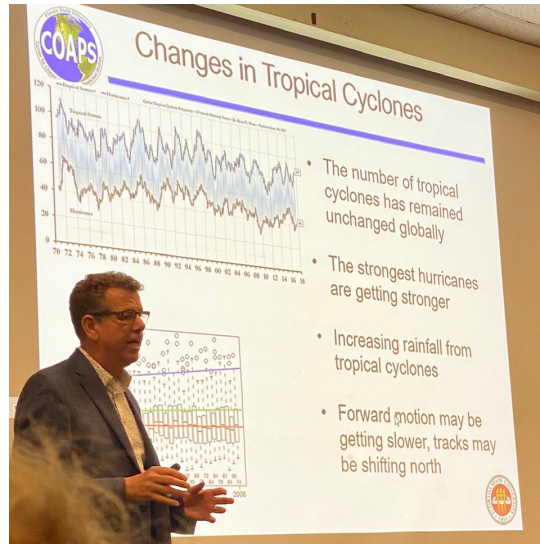
A major objective of this workshop was to develop plans for improved modelling and observations of surface currents with the goal of understanding different processes. A second objective was to improve the interdisciplinary collaboration between the physical oceanography, atmospheric science, and biological and chemical oceanography communities, as well as the surface currents "applications" communities. For more information about the workshop, go to: <https://usclivar.org/meetings/surface-currents-workshop>



Assessing climate change impacts at a regional level is of great importance to local communities and industries as it helps in understanding and identifying ways in which people can adapt to meet the risks of that geographical area. A changing climate in Florida

affects ambient temperature, rainfall, as well as extreme weather events such as tropical cyclones. **Dr. Vasu Misra** recently discussed future climate projections and the potential impacts that a changing climate could have on the agricultural industry, especially as it relates to heat-related illness and extreme weather events. [View the recording.](#)

COAPS researchers Mark Bourassa and Steve Cocke spoke at the recent [Workshop on Energy Security and Hurricane Disaster Resilience for Florida's Power System](#). The subject of Bourassa's presentation was "Reassessing the Accuracy of Wind Measurement from Extreme Conditions." Cocke presented on "Catastrophe Modeling for Assessing Damage Risk Due to Hurricanes."



David Zierden is used to fielding climate questions from reporters, farmers, water and forestry managers, public-health officials, and many others, having served since 2006 as our state climatologist at the [Florida Climate Center](#). On January 29, Zierden addressed students, faculty, and visitors at the UF College of Journalism and the Graham Center. The talk, entitled "**Climate Change in Florida: What We Know (and don't know)**" was recorded and can be viewed at <https://www.facebook.com/UFJSchool/videos/538902266981398/>

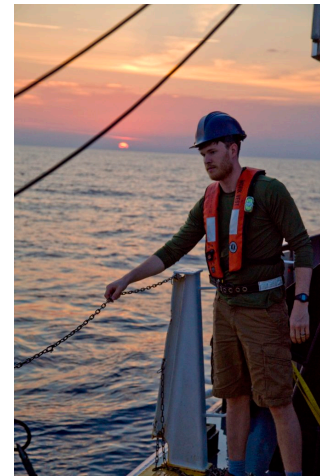
A paper co-authored by **Dr. M M. Ali, M.A. Bourassa, Y. Zheng**, T. Venugopal, G.R. Foltz, and G J.Goni was selected for the Best Paper Presentation Award during 4th Indian Society of Systems for Science & Engineering (ISSE) National Conference: INAC. The paper is titled "Need for a better Indian summer monsoon rainfall prediction in planning for a sustainable development."

Student Achievements

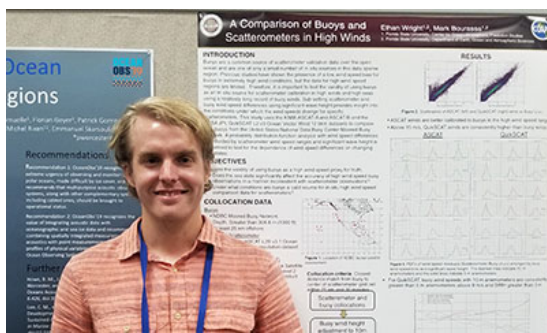
Oceanography PhD students **Thomas Kelly** and **Natalie Yingling** spent time at sea in late December, January and early February conducting research aboard the RV Laurence M Gould. The research cruise focused on understanding long-term changes in the marine ecosystem off of the Western Antarctic Peninsula. Kelly and Yingling are affiliated with the [FSU Zooplankton Ecology and Biogeochemistry Lab](#) directed by Dr. **Mike Stukel**. They were measuring biogeochemical properties for the Palmer LTER (Long Term Ecological Research) site, including $\delta^{18}O$ (using in water mass identification and freshwater sources), particulate organic matter, and Thorium-234. This research is part of a multi-decade collaboration to understand how marine biogeochemistry and ecology are changing in one of the fastest warming parts of our planet.



As a part of his Masters' dissertation research, oceanography PhD student **Taylor Shropshire** (pictured at right) used MITgcm to perform three-dimensional models of ocean circulation and plankton dynamics to understand the impact of a changing climate on key commercial fish species in the Gulf of Mexico. Taylor's work was featured in the Massachusetts Institute of Technology General Circulation Model's blog post entitled [Exploring Zooplankton Dynamics in the Gulf of Mexico](#).



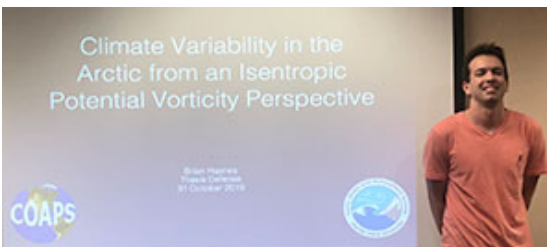
Congratulations to **Heather Roman-Stork**, former COAPS graduate student and FSU alum, for being selected for the 2020 Breakthrough Scholar award from the University of South Carolina (USC). This is the highest honor for graduate students at USC. Heather had eight publications (four first authored and four co-authored publications) and two are in preparation!



Look who moved their tassels!



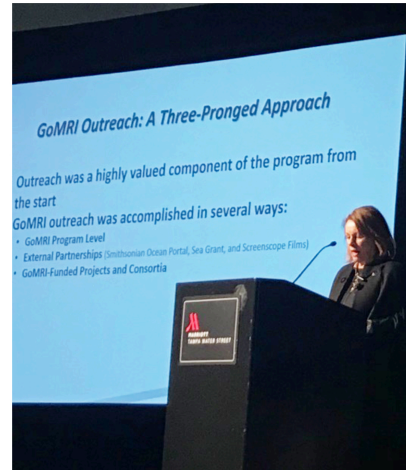
Ethan Wright (top left) graduated in December with a master's in meteorology. He successfully defended his master's project "Characterizing buoy wind speed error in extreme conditions through a comparison with scatterometers and era5 Reanalysis." Next, Ethan will be pursuing a Ph.D in Oceanography at FSU under the advisement of **Dr. Mark Bourassa**.



Brian Haynes (bottom left) also graduated in December with a master's in meteorology. He successfully defended his master's project "Climate variability in the Arctic from an isentropic potential vorticity perspective."

Outreach Perspectives Panel

COAPS Director **Eric Chassignet** and Communication/Special Projects Coordinator **Tracy Ippolito** were part of an Outreach Perspectives Panel at the Gulf of Mexico Research Initiative's 2020 meeting. The discussion focused on highlights and lessons learned as part of implementing the GoMRI funded consortia, Deep-C and CSOMIO.



Experiential Learning



Student Research Symposium

- A professional meeting experience where students gave talks and got constructive feedback from peers and senior scientists in a non-threatening environment
- Short talks on "Responsible Conduct in Research," "Stewardship of Scientific Datasets," and "Put Your Degree to Work: Planning for a Successful Career"
- A "speed-dating" style open Q&A session with senior scientists



Lessons Learned

- Assess your resources (people, topics, materials)
- Find out what interests your scientists
- Involve your graduate students
- Engage and collaborate with stakeholders
- Use your website and social media
- Promote, promote, promote
- And above all... HAVE FUN!!!



Partnering with Local Schools to Share Fun with Science



STEM Night at Pineview Elementary School in Tallahassee, FL was an amazing success, and COAPS was pleased to be a part of it. Pineview Elementary is a Title 1 school, which means it has large concentrations of low-income students.

During recent a visit to George Munroe Elementary School in Quincy, FL, COAPS outreach representative **Karolyn Burns** used an empathy-building activity (pictured at right) to learn about the impact of plastic pollution on sea turtles. Getting enough jellyfish to eat is challenging when there are plastic bags and fishing line floating around! students learned about how their actions can impact ocean creatures.



Podcast: Climate Modeling and Skepticism

During a recent episode of the "NO PLANET B" podcast, **Dr. Vasu Misra** discussed climate change skepticism and how to address it. Misra helped listeners understand weather forecasts, climate modeling, and what is predictable. NO PLANET B is on the iTunes New and Noteworthy list and Misra's episode had one of the podcast's highest number of listens! Listen to it [HERE](#).

Recent Publications

- Ahern, K. K. (2019). [Hurricane boundary layer structure during intensity change: An observational and numerical analysis](#). Florida State University College of Arts and Sciences, PhD Dissertation.
- Bashmachnikov, I. L., Fedorov, A. M., Vesman, A. V., Belonenko, T. V., & Dukhovskoy, D. S. (2019). [Thermohaline convection in the subpolar seas of the North Atlantic from satellite and in situ observations. Part 2: indices of intensity of deep convection](#). *16*(1), 191–201.
- Bhardwaj, A., & Misra, V. (2019). [The role of air-sea coupling in the downscaled hydroclimate projection over Peninsular Florida and the West Florida Shelf](#). *Clim Dyn*, *53*(5-6), 2931–2947.
- Bruno-Piverger, R. E. (2019). [Applying Neural Networks to Simulate Visual Inspection of Observational Weather Data](#), Florida State University College of Arts and Sciences, Master's Thesis.
- Davidson, F., Alvera-Azcárate, A., Barth, A., Brassington, G. B., Chassignet, E. P., Clementi, E., et al. (2019). [Synergies in Operational Oceanography: The Intrinsic Need for Sustained Ocean Observations](#). *Front. Mar. Sci.*, *6*.
- Fender, C. K., Kelly, T. B., Guidi, L., Ohman, M. D., Smith, M. C., & Stukel, M. R. (2019). [Investigating Particle Size-Flux Relationships and the Biological Pump Across a Range of Plankton Ecosystem States From Coastal to Oligotrophic](#). *Front. Mar. Sci.*, *6*.
- Groenen, D. E. (2019). [Diagnosing the Atmospheric Phenomena Associated with the Onset and Demise of the Rainy Season in Mesoamerica](#), Florida State University College of Arts and Sciences, PhD Dissertation.
- Jackson, L. C., Dubois, C., Forget, G., Haines, K., Harrison, M., Iovino, D., et al. (2019). [The Mean State and Variability of the North Atlantic Circulation: A Perspective From Ocean Reanalyses](#). *J. Geophys. Res. Oceans*, *124*(12), 8969–9003.
- Karmakar, N., & Misra, V. (2019). [Differences in Northward Propagation of Convection Over the Arabian Sea and Bay of Bengal During Boreal Summer](#). *J. Geophys. Res. Atmos.*, *125*(3).
- Kelly, T. B., Davison, P. C., Goericke, R., Landry, M. R., Ohman, M. D., & Stukel, M., R. (2019). [The Importance of Mesozooplankton Diel Vertical Migration for Sustaining a Mesopelagic Food Web](#). *Frontiers in Marine Science*, *6*.
- Laxenaire, R., Speich, S., & Alexandre S. (2019). [Evolution of the thermohaline structure of one Agulhas Ring reconstructed from satellite altimetry and Argo floats](#). *Journal of Geophysical Research. Oceans*, *124*(12), 8969-9003.
- Liu, Q., Tan, Z. - M., Sun, J., Hou, Y., Fu, C., & Wu, Z. (2020). [Changing rapid weather variability increases influenza epidemic risk in a warming climate](#). *Environmental Research Letters*, .
- Magar, V., Godínez, V. M., Gross, M. S., López-Mariscal, M., Bermúdez-Romero, A., Candela, J., et al. (2020). [In-stream Energy by Tidal and Wind-driven Currents: An Analysis for the Gulf of California](#).
- Maloney, E. D., Gettelman, A., Ming, Y., Neelin, J. D., Barrie, D., Mariotti, A., et al. (2019). [Process-Oriented Evaluation of Climate and Weather Forecasting Models](#). *Bull. Amer. Meteor. Soc.*, *100*(9), 1665–1686.
- Misra, V., & Bhardwaj, A. (2019). [Understanding the seasonal variations of Peninsular Florida](#). *Clim Dyn*, *54*(3-4), 1873–1885.
- Misra, V., & Bhardwaj, A. (2020). [The impact of varying seasonal lengths of the rainy seasons of India on its teleconnections with tropical sea surface temperatures](#). *Atmos Sci Lett*, *124*(12), 9658-9689 .
- Nelson, A. D., Arbic, B. K., Zaron, E. D., Savage, A. C., Richman, J. G., Buijsman, M. C., et al. (2019). [Toward Realistic Nonstationarity of Semidiurnal Baroclinic Tides in a Hydrodynamic Model](#). *J. Geophys. Res. Oceans*, *124*(9), 6632–6641.
- Proshutinsky, A., Krishfield, R., Toole, J. M., Timmermans, M. - L., Williams, W., Zimmermann, S., et al. (2019). [Analysis of the Beaufort Gyre Freshwater Content in 2003-2018](#). *J Geophys Res Oceans*, *124*(12), 9658–9689.
- Rahaman, H., Srinivasu, U., Panickal, S., Durgadoo, J. V., Griffies, S. M., Ravichandran, M., et al. (2020). [An assessment of the Indian Ocean mean state and seasonal cycle in a suite of interannual CORE-II simulations](#). *Ocean Modelling*, *145*.

Shropshire, T., Morey, S. L., Chassignet, E. P., Bozec, A., Coles, V. J., Landry, M. R., et al. (2019). [Quantifying spatiotemporal variability in zooplankton dynamics in the Gulf of Mexico with a physical-biogeochemical model](#).

Sun, J., & Wu, Z. (2019). [Isolating spatiotemporally local mixed Rossby-gravity waves using multi-dimensional ensemble empirical mode decomposition](#). *Clim Dyn*, (3-4), 1383–1405.

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