



DIRECTOR'S MESSAGE

As many of you have noticed, for the first time in several years we did not have our usual Science Meeting. The reason is that this year we are fully committed to preparing a new proposal to continue our partnership with NOAA. The current cooperative agreement with NOAA (CICS) is nearing its end, and we will have to re-compete in order to continue with our collaborations. Although a re-competition may bring uncertainties, it is also an opportunity to re-think what kind of institute we want to have. With the help of many of our senior scientists, we are working on a proposal that adheres to best practices in research, education and business administration. It is an immense challenge, but one worth having. I look forward to many more years of productive work with our partners at NOAA.

I take this opportunity to recognize several of our colleagues that received awards for the quality of their research. The citations for the awards are presented in <https://cicsmd.umd.edu/people-awards/>. Congratulations to them for the well-deserved honors.

It has been a pleasure to work with you this year, happy holidays!

Hugo

2018 CICS Award Recipients



*Gang Liu,
December NOAA
Employee of the
Month*



*James Reagan,
2018 NESDIS
Outstanding
Science and
Research Employee*



*Yong Chen,
Letter of
Recognition
for Excellence*



*Katherine Lukens,
Burger Symposium
Best CMNS Poster*



*Patrick Meyers,
GOES-R
Outstanding
Communications
Award*



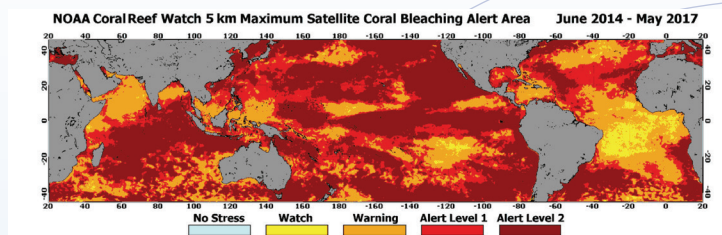
*Huan Meng,
2018 NESDIS
Outstanding
Science and
Research Employee*

Monitoring and Predicting Coral Bleaching Heat Stress around the Global Ocean

(Contributed by Gang Liu)

CICS is now supporting NOAA Coral Reef Watch (CRW), a program that uses remote sensing and in situ tools for near real-time and long-term monitoring, modeling and reporting of physical environmental conditions of coral reef ecosystems. CRW has been providing satellite-based near real-time coral bleaching heat stress morning products to the U.S. and global coral reef communities for strategic planning, management practice, bleaching event response, research activities, and public outreach, since 1997. CRW's satellite monitoring has successfully identified and monitored all the three global coral bleaching events on record: the 1998, 2010, and 2014-2017 events, among various regional-scale mass coral bleaching events. CRW's next-generation satellite monitoring products, fully developed and implemented in 2014 at a 5km spatial resolution and updated daily, provide service at or near reef-scales, allowing direct monitoring of almost all the global coral reefs. Meanwhile, CRW developed and implemented its first statistical global subseasonal-to-seasonal coral bleaching outlook system in 2008 and its first probabilistic global subseasonal-to-seasonal coral bleaching outlook system in 2012. The next-generation satellite products and a new version of the outlook system were implemented on time to predict, identify, and monitor the onset and development of the third global coral bleaching event lasting from June 2014 to May 2017, guide bleaching surveys and management and research activities during

the event, and assist in the assessment of global reef damage caused by the event. A maximum composite map of CRW's satellite Bleaching Alert Area product is provided below to show the extent of heat stress responsible for this longest, most widespread, and probably the most destructive global bleaching event ever recorded. CRW also conducts research to investigate the historical changes in bleaching heat stress and their potential impacts on coral reef ecosystems of today and the future, among other activities.



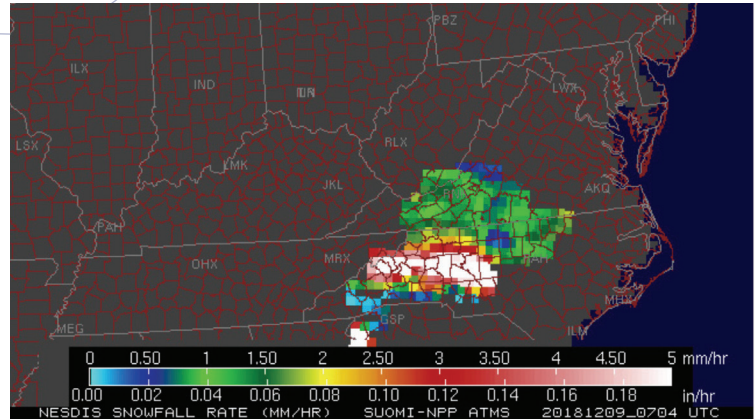
NOAA Coral Reef Watch's satellite Coral Bleaching Alert Area showing the maximum heat stress during the Third Global Coral Bleaching Event lasting from June 2014 to May 2017. More than 70% of coral reefs around the world experienced the heat stress that can cause bleaching and/or mortality during the three-year long global event. (Alert Level 2 heat stress indicates potential widespread coral bleaching and significant mortality. Alert Level 1 heat stress indicates potential significant coral bleaching. Lower levels of stress may cause some bleaching as well.)

Development of NOAA Operational Snowfall Rate Product from S-NPP and NOAA-20

(Contributed by Jun-Dong and Cezar Kongoli)

CICS and NOAA NESDIS scientists have developed a Snowfall-Rate (SFR) product for the Advanced Technology Microwave Sounder (ATMS) aboard the Suomi NPP (S-NPP) satellite. The new product builds upon the existing operational AMSU/MHS SFR product at NOAA/NESDIS. Advancement in algorithm and sensor lead to superior performance from ATMS SFR compared to its predecessor. The S-NPP SFR combines two independent algorithms: a statistical snowfall detection algorithm that relies on both satellite and numerical weather prediction model data, and a physical, 1DVAR-based snowfall rate estimation algorithm. A comprehensive validation study was conducted to compare S-NPP SFR with in situ and radar snowfall rate measurements and estimates. The results demonstrate that the product meets all JPSS baseline requirements. This product, along with the SFR products from other satellites, has also undergone official assessment at NWS Weather Forecast Offices during the last few winters. Forecaster feedback indicates that SFR is a useful product for weather forecasting in an operational environment. The S-NPP SFR product has been integrated in the operational NESDIS Microwave Integrated Retrieval System (MIRS) version 11.3. The new MIRS system has been successfully tested in the NPP Data Exploitation (NDE) system and is scheduled to start operational production in January 2019.

Currently, the SFR development team is focusing on the calibration and validation of the NOAA-20 SFR algorithm. The latter is scheduled to be transitioned to operation in FY19.



S-NPP SFR image from December 9, 2018 at 0704Z. The image shows intense snowfall in North Carolina at the time of the S-NPP overpass. The SFR product was retrieved using Direct Broadcast data from University of Wisconsin, Madison. The image is in AWIPS-like format, courtesy of Frank LaFontaine of NASA SPOrT.

From satellite ocean data products to information and applications:

CICS scientists contribute to the NOAA CoastWatch/OceanWatch/PolarWatch Program

(Contributed by Veronica Lance)

In 1987, satellite sea surface temperature images were mailed to the NOAA Beaufort Laboratory to aid in tracking a harmful algal bloom along the North Carolina coast. That was the beginning of NOAA CoastWatch. Today, the NOAA CoastWatch/OceanWatch/PolarWatch Program (still called “CoastWatch” for short) has a dramatically expanded scope of activities, products and stakeholders to facilitate the transition from ocean satellite Environmental Data Record (EDR) products to information, applications and knowledge (i.e., decision-making) in the ocean environment. CICS scientists Sinéad Farrell, Veronica Lance, Emily Smail, Ron Vogel, Guangming Zheng, and current UMD graduate student intern Zach Paolillo are contributing in several capacities involving basic research, algorithm and product development, applications and services development, training and outreach, and mentoring students in support of the overall CoastWatch mission.

We do this by engaging with our stakeholders, including NOAA missions and external government entities, academia, commercial and general public users, by developing value-added products and services and by providing ready access to data through the web with visualization, monitoring and download tools. Our products cover multiple ocean/aquatic satellite-derived parameters, including: sea surface temperature; ocean color, sea surface height; ocean winds; sea surface salinity, sea surface roughness, sea ice and visible imagery, with global and regional

coverage, and both near real-time and delayed-mode products along with consistent time series datasets. For more on NOAA CoastWatch/OceanWatch/PolarWatch, go to: <https://coastwatch.noaa.gov/>.



Ron Vogel, who serves as CoastWatch East Coast Node operations manager, teaching at an ocean satellite data course to NOAA fisheries researchers, University of Rhode Island students and others in the summer of 2018 in Narragansett, RI. Photo credit, Dale Robinson.

CICS-MD BACKGROUND

The Cooperative Institute for Climate and Satellites-Maryland (CICS-MD) is engaged in collaborative research with several NOAA Centers and Laboratories. CICS-MD has grown to about 100 scientists that implement the Institute’s mission of supporting NOAA’s ability to use satellite observations and Earth System models to advance the national climate mission. Full information, including our research topics, is available at cicsmd.umd.edu.

NOAA SPONSORS

- Center for Satellite Applications and Research (STAR)/National Environmental Satellite, Data and Information Service (NESDIS)
- Climate Prediction Center/National Centers for Environmental Prediction/National Weather Service
- National Centers for Environmental Information/NESDIS (NCEI)
- Air Resources Laboratory/Office of Oceanic and Atmospheric Research