

# **CIMAS, NOAA research conduct innovative investigations to study Hurricane Earl**

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As Hurricane Earl threatened the east coast of the United States, hurricane scientists from NOAA Research's Atlantic Oceanographic and Meteorological Laboratory and colleagues from the University of Miami's Cooperative Institute for Marine and Atmospheric Studies conducted 18 hurricane hunter research flights. These included the first-ever flight by the unmanned NASA Global Hawk over a hurricane. Credit: NOAA

Over the last week, as Hurricane Earl threatened the east coast of the United States, hurricane scientists from NOAA Research's Atlantic Oceanographic and Meteorological Laboratory (AOML) and colleagues from the University of Miami's Cooperative Institute for Marine and Atmospheric Studies (CIMAS) conducted a total of 18 hurricane hunter research flights, including the first ever flight by the unmanned NASA Global Hawk over a hurricane.

They did so to better understand how hurricanes intensify — or get stronger — as part of an ongoing field called IFEX, the Intensity Forecast Experiment. IFEX will not only incorporate data collected by the Global Hawk, but also by NOAA's P-3 and G-IV "[Hurricane Hunter](#)" airplanes, which captured almost continuous coverage of the storm's evolution, including a period of rapid intensification when surface wind speeds increased from a tropical storm to a category 2 hurricane in just 18 hours. IFEX is being coordinated with two other federal research efforts: the NSF-sponsored PREDICT study and NASA's GRIP mission.

CIMAS, AOML and NASA, shared the mission scientist role to advise the Global Hawk pilots — who operate the unmanned aircraft remotely from Edwards AFB — of the real-time aircraft track changes and conditions expected for its flying altitude of about 60,000 feet. The scientists used a combination of NOAA and NASA real-time [satellite](#) products superimposed with past, current, and future positions of the [Global Hawk](#) to decide where it should head to obtain the best possible data.

"The CIMAS scientists at AOML are a valuable asset to NOAA's hurricane program, collaborating with and supporting our federal scientists in every aspect of our research program," said Frank Marks, Director of AOML's Hurricane Research Division. "Our ability to conduct cutting-edge science to improve hurricane predictions is greatly enhanced through this longstanding partnership."

CIMAS scientists (Kevin Yeh and Xuejin Zhang) have also been developing and running next generation high resolution models that scientists hope will produce even more accurate forecast guidance. One such example is the experimental version of the Hurricane Weather Research and Forecast (HWRF) model, called HWRFX, which performed well in its analysis and prediction of [Hurricane Earl](#). Experimental products from this system, called HWRFV3.2-HRD, will

be made available on AOML's website

<https://storm.aoml.noaa.gov/hwrfx>



The eye of Hurricane Earl was captured by scientists at NOAA Research's Atlantic Oceanographic and Meteorological Laboratory and colleagues from the University of Miami's Cooperative Institute for Marine and Atmospheric Studies while aboard "Hurricane Hunter" research flights. Credit: NOAA

In June 2010, NOAA Research selected UM's Rosenstiel School of Marine & Atmospheric Science to continue this federal/academic partnership through a competitive application process. Newly added university partners in CIMAS include: Florida Atlantic University, Florida International University (FIU), Florida State University, Nova Southeastern University, University of Puerto Rico, University of Florida (UF), University of South Florida and University of the Virgin Islands. The expanded regional partnership brings additional capabilities to CIMAS hurricane research.

"For decades NOAA and UM's Rosenstiel School of Marine & Atmospheric Science have collaboratively conducted hurricane research through CIMAS, with excellent results," said Peter Ortner, UM

professor and director of CIMAS. "In recent years, we have been worked together to expand the scope of the science we are conducting, ensuring that the science remains fresh and relevant. The addition of these new partners will allow us to explore exciting new areas of hurricane science."

Examples of projects underway include storm surge modeling and the Florida Coastal Monitoring Program (FCMP) at UF, as well as the complementary capacities of the Wall of Wind at FIU. The new SUSTAIN (SURge-STructure-Atmosphere INteraction) research facility to be constructed at UM is part of a U.S. Department of Commerce/National Institute of Standards and Technology award to the university. This will be the only facility worldwide with a wind-wave-storm surge simulator capable of generating hurricane force winds in a 3D test environment. An innovative experimental test bed, these investigations will help to further enhance the development of hi-resolution coupled wind-wave-surge models for hurricane impacts.

Provided by University of Miami Rosenstiel School of Marine & Atmospheric Science

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