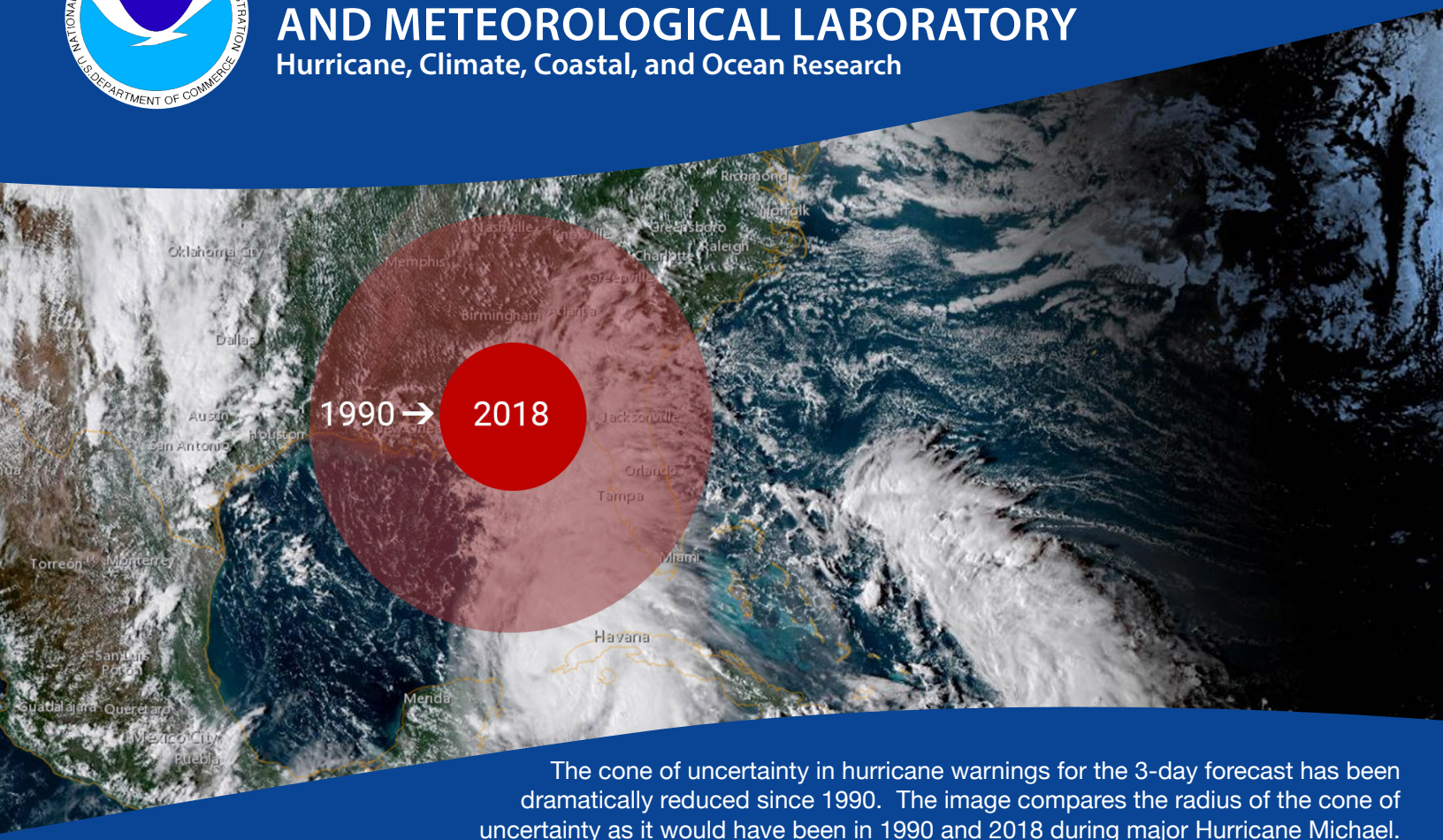
NOAA'S ATLANTIC OCEANOGRAPHIC AND METEOROLOGICAL LABORATORY

Hurricane, Climate, Coastal, and Ocean Research



The cone of uncertainty in hurricane warnings for the 3-day forecast has been dramatically reduced since 1990. The image compares the radius of the cone of uncertainty as it would have been in 1990 and 2018 during major Hurricane Michael.

Photo Credit: NOAA GOES 16

The Value of Investment in Hurricane Research

Investment in new data, improved models, and other upgrades to products and services through NOAA's Hurricane Forecast Improvement Program have led to improved NOAA forecasts as measured by reductions in the hurricane track error and hurricane intensity (in terms of wind speed). The graphic above shows the impact of improvements to track errors, which determine the size of the cone of uncertaintly in the 3-day forecast and the number of miles for which coastal communities must be warned. Notice the dramatic reduction in the potential number of people who had to prepare and potentially evacuate in 2018 as compared to 1990. The 5-day track forecast in 2018 improved to the point that it was as good as the 24-hour forecast three decades ago.

Supporting the Weather Research and Forecasting Innovation Act

AOML Research has also improved NOAA's hurricane intensity forecasts, but predicting the strength of a storm remains an active area of research. A noticible reduction in intensity errors began with dedicated support through the Hurricane Forecast Improvement Program. The Weather Research and Forecasting Innovation Act further supports improvements to intensity forecasts by mandating specific goals and improvements to the products and information we convey to the public through the National Hurricane Center.

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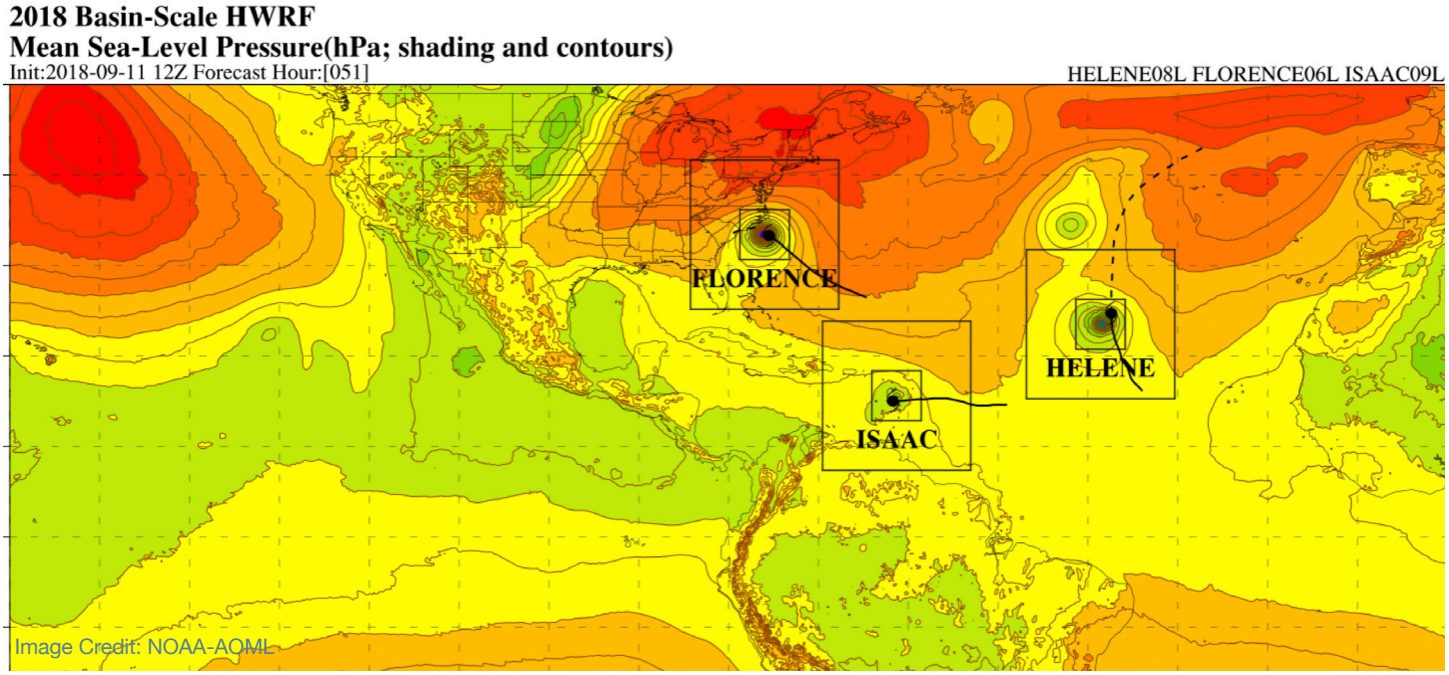
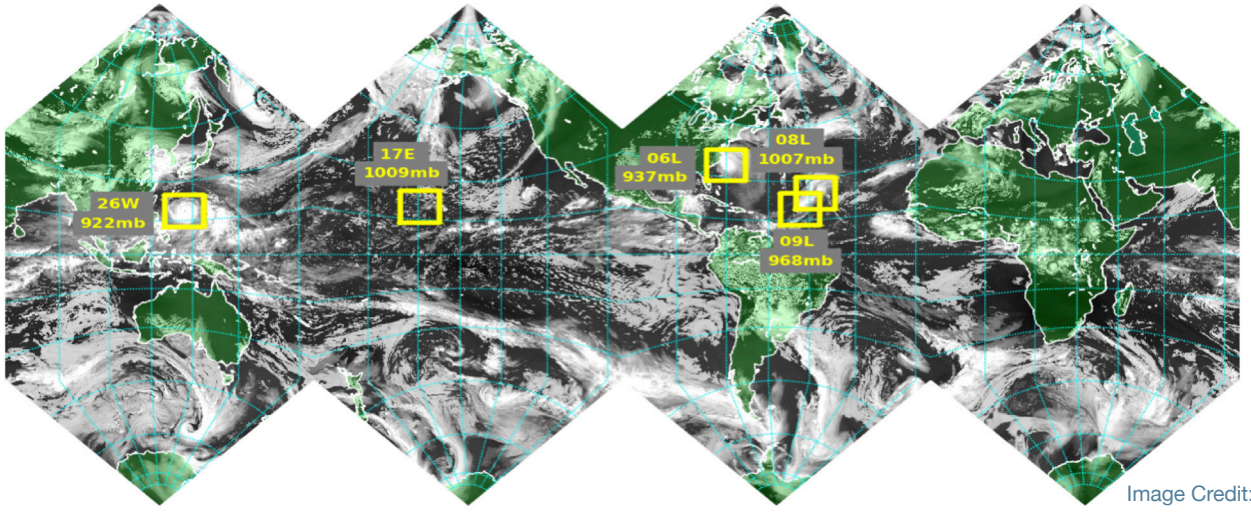
Moving Nests - the Key to the Future of Hurricane Modeling

AOML contributed to the development of the basin-scale Hurricane Weather Research and Forecasting (HWRF) model to allow for simultaneous modeling of multiple storms. This allows forecasts of storm-to-storm interactions and the results, such as changes in storm strength. The system uses state-of-the-art spatial scales of increasing model resolution nested within one another surrounding each active storm, to more accurately predict changes in the storm's core. In 2018, this basin-scale model was the best performing NOAA Research model, and the only model to predict Isaac's weakening. For 2019, the basin-scale HWRF model has been transitioned to run in a fully operational environment for testing and validation purposes.



Hurricane Analysis and Forecast System

AOML also contributes to the development of the next generation of hurricane modeling, NOAA's Hurricane Analysis and Forecast System. This Hurricane Analysis and Forecast System is based upon NOAA's flagship weather model, the Global Forecast System, known as the GFS, and will incorporate the multiple moving nest approach from the basin-scale HWRF model. AOML is leveraging hurricane supplemental funding to accelerate this development to improve tropical cyclone track and intensity forecasts.



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