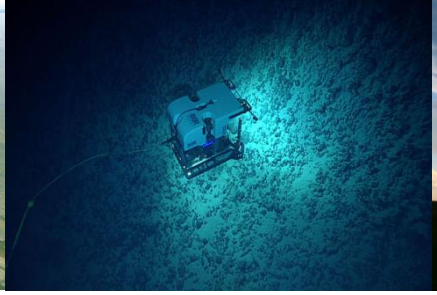




NOAA's Office of Oceanic and Atmospheric Research

Meeting the Mission: Serving Society Through Science

OAR's Vision Is To Deliver NOAA's Future

The Office of Oceanic and Atmospheric Research (OAR) is NOAA's research engine, and is essential to meeting the agency's goals and objectives. OAR delivers the mission-aligned research that the other line offices depend on to produce their operational products, which protect life and property and promote science-informed decision-making and a robust economy. OAR supports laboratories and programs across the United States and collaborates with both internal and external partners, including 16 NOAA-Funded Cooperative Institutes and 33 Sea Grant Institutions. OAR research empowers people, communities, businesses, and all levels of government to interpret and manage risks from weather, water, and climate events. OAR research contributes to accurate weather forecasts, improves our Nation's capability to plan for and respond to climate events, and enhances protection and management of coastal and ocean resources.

OAR Supports R&D Efforts Within The Following Areas

- Climate Research
- Weather and Air Chemistry Research
- Ocean, Coastal, and Great Lakes Research
- Research Technology and Transition

Climate Research

Individuals, businesses, and communities turn to NOAA as a trusted source for science and information to help them understand and prepare for changes to our planet's climate. NOAA's regional climate tools, which develop and utilize new information about the impacts of climate on natural and managed resources, infrastructure, and public health, are supported by our global climate observation and monitoring networks, world-renowned scientists, and state-of-the-art climate models.

An ozonesonde balloon is launched from the South Pole. Ozonesondes are tools scientist use to obtain meteorological data for studying atmospheric ozone change.

Weather and Air Chemistry Research

NOAA not only works to improve current weather forecasting, but also works to anticipate and address the needs of the future. For example, OAR is developing innovative techniques for earlier detection of tornadoes and other severe weather to provide more advanced forecasts to the public.

Research meteorologists take their instruments to the storms outside of Utica, Kansas as part of the *Rivers of Vorticity in Supercells* project. Studying near surface conditions of thunderstorms and tornadoes will advance prediction of extreme weather events.

Ocean, Coastal, and Great Lakes Research

NOAA, in collaboration with its research partners, explores and investigates ocean, coastal, and Great Lakes habitats and resources. We provide scientific results to help manage and understand fisheries, conserve and restore our coasts, and build a stronger economy.

Aerial photography of Lake Erie helps scientists map out the general scope of Harmful Algal Blooms (HABs) in the Great Lakes, which improves our understanding of how to map and detect HABs. This leads to better water quality forecasting and ecosystem health.

Research Technology and Transition

NOAA's research technology and transition efforts are critical for accelerating the adoption and transition of advanced computing and technology. Computational resources, such as High Performance Computing (HPC), support advances in research and modeling to improve our understanding of the Earth system.

Gaea, located at Oak Ridge National Laboratory in Oak Ridge, Tennessee, is one of three NOAA-operated R&D HPC Systems.

For more information, please visit [OAR's website](https://research.noaa.gov/) (https://research.noaa.gov/).

Recent Mission Highlights

NOAA Improves Subseasonal to Seasonal Forecasts

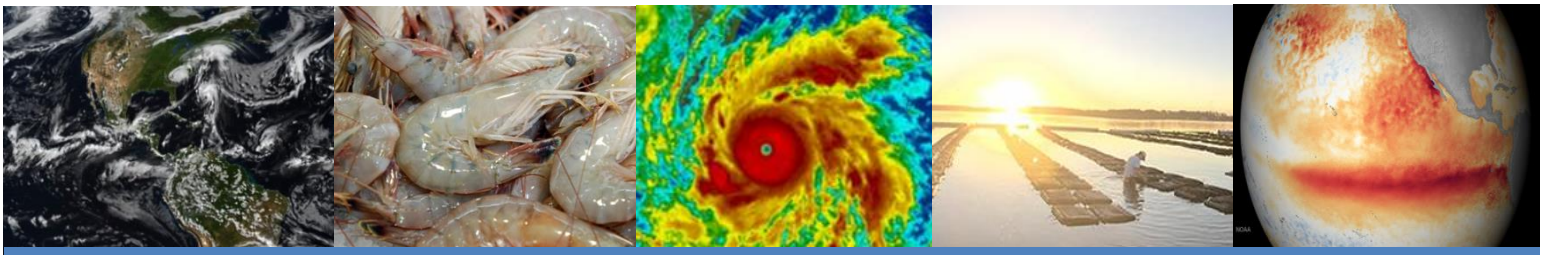
NOAA is working to bridge the forecast gap between existing two-week predictions to the seasonal time range, providing wide swaths of users, including transportation, commerce, public utilities and tourism industries with potential for long term weather information needed to anticipate the months ahead. The North American Multi-Model Ensemble (NMME) seasonal forecast system, transitioned to operational use in 2016, is used to support the NOAA Climate Prediction Center's (CPC) monthly and seasonal temperature and precipitation outlooks. NOAA developed the joint SubX research initiative (Subseasonal Prediction Experiment), with other agencies to test the skill of research models at the subseasonal range time scale (weeks 3 to 4). SubX combines North American global models from NOAA, NASA, Environment Canada, the U.S. Navy, and the National Center for Atmospheric Research to produce experimental forecasts looking three to four weeks ahead. Farmers and ranchers, public health officials and water resource managers find value in seasonal forecasts, such as drought outlooks or El Niño Southern Oscillation (ENSO) predictions.

NOAA Invests in Aquaculture to Create Jobs and Feed America

In 2016, NOAA Sea Grant funded 32 projects to increase aquaculture production and address impediments to aquaculture business growth. The research is intended to spur the development and growth of shellfish, finfish and seaweed aquaculture businesses. The projects include basic and applied research to improve efficient production of seafood, permitting of new businesses, management of environmental health issues and economic success of aquaculture businesses. All projects are public-private partnerships led by university-based Sea Grant programs. Every two federal dollars of funding is matched by non-federal funds, bringing the total investment in these research projects to $13.9 million. Between February 2016 and January 2017, Sea Grant invested $9 million in aquaculture research, technology transfer, and outreach and reported $90 million in economic impacts, including support of 900 businesses and 1,800 jobs.

Promising Experimental Next Generation Weather Models

Experimental models being developed at NOAA research labs were tested during the relentless 2017 hurricane season. NOAA's Hurricane Weather Research and Forecasting (HWRF) model proved to be the best numerical hurricane forecasting model for the strongest winds, providing key predictions of rapidly intensifying winds in Harvey, Irma and Maria. Another big performer this year was the experimental Global Forecast System or fvGFS. The model is powered by the Finite-Volume Cubed-Sphere Dynamical Core or FV-3, which was developed at NOAA's Geophysical Fluid Dynamics Laboratory. The fvGFS brings unprecedented accuracy to weather forecasts, and exceeds all models in forecasting the track of Hurricane Maria. The experimental High-Resolution Rapid Refresh or HRRRX showed great promise for future improvements to NOAA's only high resolution, hourly updating forecast model. HRRRX can resolve weather down to the level of individual thunderstorms and extends these forecasts 18 hours beyond the current HRRR operational model (up to twice the lead time for some hazards). Preliminary evaluations showed that HRRRX, developed by NOAA's Earth System Research Lab Global Systems Division, showed accurate 36h landfall, intensity, and rainfall forecasts for Hurricanes Irma and Maria, demonstrating its strong capability for short-range hurricane landfall forecasts for US areas. HRRRX also continued to produce predictions of the movement, winds, precipitation, and path of Hurricane Maria after the loss of the San Juan National Weather Service radar.



National Oceanic and Atmospheric Administration

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