NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Physical Sciences Laboratory

Combining Observations, Modeling and Understanding to Advance Prediction

The **Physical Sciences Laboratory (PSL)** analyzes and interprets weather and climate processes influencing water availability and extremes from hours to decades to provide scientific information in support of NOAA's mission.

A major effort is to improve prediction from days to decades by identifying early warning indicators in atmosphere and ocean patterns that lead to floods, droughts, wildfires and other extreme events.

Visit us at: https://psl.noaa.gov

Vision

An informed society that uses science-based environmental intelligence to effectively anticipate and respond to the challenges of too much and too little water and other extremes.

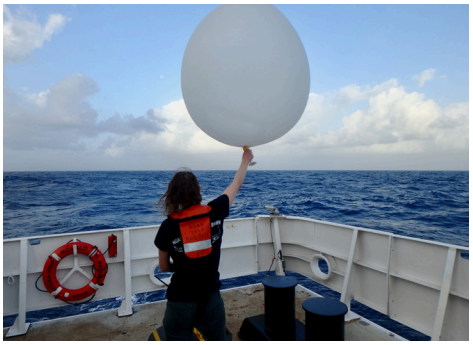
Mission

To conduct weather, climate, and hydrologic research to advance the prediction of water availability and extremes.

Research Themes

WATER: Too much, or too little can have devastating consequences. PSL scientists perform research to improve observations, understand causes, and advance prediction of weather and climate phenomena that lead to floods and droughts.

EXPERIMENTAL PRODUCTS: PSL develops and makes available online a number of experimental research products. One example is a sea ice forecasting model, which is being used to understand atmosphere-ocean-sea ice processes that impact ice formation.



OBSERVATIONS: During the winter of 2020, PSL participated in the ATOMIC* field campaign in the Tropical North Atlantic east of Barbados. Researchers were investigating cloud and air-sea interaction processes with the goal of advancing understanding and prediction of U.S. weather and climate.

What We Do

Lead field programs to advance observation-based process understanding of atmospheric and oceanic behavior influencing water availability and extremes.

Develop observing technologies, data analyses, modeling, and applications that support decision-making for water resource management and mitigate cascading hazards.

Identify early warning indicators in the Earth System that can help improve predictions of water availability and extremes.

Advance numerical representations of physical processes in computer models and apply models to predict water availability and extremes.

Transform research advances into actionable scientific information to support operations, applications and decision making for healthy, resilient ecosystems, communities and economies.

In-House Partners

PSL hosts the National Integrated Drought Information System (NIDIS) Program Office and collaborates with local partners from the University of Colorado and Colorado State University. PSL leads the NOAA Drought Task Force and NOAA's Hydrometeorology Testbed. These co-located activities motivate and link water research (predictions of too much or too little water) to societal needs.

* Atlantic Tradewind Ocean–Atmosphere Mesoscale Interaction Campaign

Other Partners

Bureau of Reclamation • California Department of Water Resources • DOE/National Renewable Energy Laboratory • NASA • National Drought Mitigation Center • NOAA National Marine Fisheries Service/Fisheries Science Centers • NOAA National Weather Service/National Water Center and National Centers for Environmental Prediction (Environmental Modeling Center, Climate Prediction Center) • Scripps Institution of Oceanography • Sonoma County Water Agency • U.S. Army Corps of Engineers • U.S. Geological Survey • Western States Water Council

What's Next for PSL

During the next five to ten years, PSL will support NOAA priorities to implement the Weather Research and Forecasting Innovation Act, and to advance the Blue Economy through a focus on three use-inspired research themes:

Enhance targeted observations, observation-based understanding, and modeling capabilities to predict hydrologic extremes (too much or too little water) critical to managing water resources.

Characterize and advance prediction of subseasonal-to-seasonal (S2S) extreme weather and climate to improve the prediction of water availability, extremes and their impacts.

Increase targeted observations, process understanding and prediction of environmental conditions impacting marine resources.

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