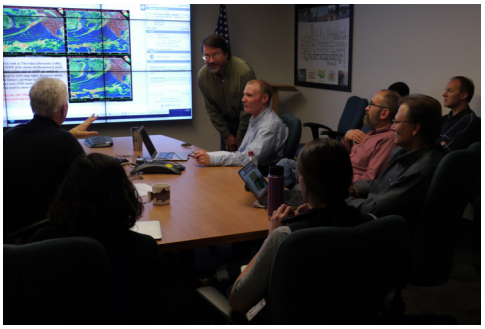
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

PHYSICAL SCIENCES LABORATORY



ADVANCING PREDICTIONS

WHO WE ARE...

The **Physical Sciences Laboratory (PSL)** analyzes and interprets physical processes that influence weather and climate from hours to decades to provide scientific information to support NOAA's mission. A major effort is to improve predictions on weather-to-climate time scales (days to decades) by identifying early warning indicators in atmosphere and ocean patterns that cause extreme events (such as floods, droughts, and heat waves). To do this we conduct research to improve observations, understanding, modeling and predictions of weather, water and climate variations and extremes, and their related impacts.

WHAT WE DO...

- Lead national and international field programs to observe and understand the behavior of the atmosphere over land, oceans, ice, and snow.
- Study physical processes underlying extreme events, short-term climate variations and long-term trends to improve the skill and reliability of weather forecasts and climate predictions.
- Identify early warning indicators in the Earth system that can help improve predictions at weather and climate time scales.
- Pioneer research to explain weather, water, and climate extreme events and to assess their predictability.
- Lead an innovative effort to reconstruct the Earth's atmospheric weather and climate patterns using only surface pressure data back to 1870 that puts today's weather, water, and climate extremes in the context of the past.
- Develop observing technologies, data analyses, modeling, and applications that support decision making for water resource management and for wind energy production.
- Advance numerical representations of physical processes in computer models and evaluate the performance of these models across weather and climate time scales.
- Improve observation, understanding, and modeling of physical processes in polar regions, especially related to predicting Arctic weather, sea ice, and climate variations and extremes.
- Develop regionally-specific experimental weather and climate information and forecast products to protecting lives and property, and inform preparedness.

Visit us online at: psl.noaa.gov

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.

OTHER PARTNERS...

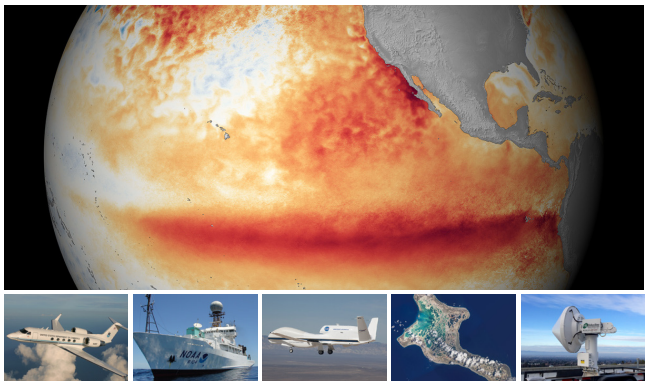
- Bureau of Reclamation
- California Department of Water Resources
- Department of Energy/National Renewable Energy Laboratory
- NASA
- National Drought Mitigation Center
- NOAA National Marine Fisheries Service/Fisheries Science Centers
- NOAA National Weather Service/National Water Center and National 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:

- Characterizing and advancing prediction of subseasonal-to-seasonal (S2S) extreme weather and climate to improve forecasting.
- Enhancing targeted observations, observation-based understanding, and modeling capabilities to forecast hydrologic extremes (too much or too little water) critical to manage water resources.
- Increasing targeted observations, process understanding and prediction of environmental conditions impacting the marine resources.

WATER: Too much of it, or too little can have devastating consequences. PSL scientists perform research to improve observations, understand causes, and advance predictions of weather and climate extremes.



EL NIÑO RAPID RESPONSE FIELD CAMPAIGN: PSL led a land, sea, and airborne research effort from the tropical Pacific to the U.S. West Coast to better observe and understand how El Niño influences U.S. weather. Researchers gathered never-before collected observations of the initial interaction between the ocean and atmosphere during one of the strongest El Niños in the last century.

EXPERIMENTAL PRODUCTS: PSL has developed and made available online a number of experimental research products. One example is a new experimental sea ice forecasting model, which is being used to understand the atmospheric, oceanic, and sea ice processes that impact formation.

For more information, contact:

Mackenzie Solomon
Office of Legislative and Intergovernmental Affairs
National Oceanic and Atmospheric Administration
14th Street & Constitution Ave. NW, Room A100
Washington, DC 20230
Email: Mackenzie.Solomon@noaa.gov
Phone: 202.482.2497