

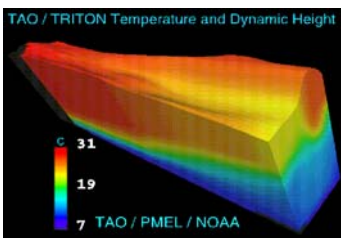


# Pacific Marine Environmental Laboratory

*A leader in developing ocean observation systems to address NOAA's mission*



Moored buoy that measures ocean changes and retransmits data in real time to forecast El Niños



Display of temperature and dynamic height from 70 buoy El Niño monitoring array



Tsunami detection instrumentation

## What does the Pacific Marine Environmental Laboratory do for the nation?

The Pacific Marine Environmental Laboratory (PMEL) carries out interdisciplinary scientific investigations in oceanography and atmospheric science. Current PMEL programs focus on open ocean observations in support of long-term monitoring and prediction of the ocean environment on time scales from hours to decades. Studies are conducted to improve our understanding of the complex physical and geochemical processes operating in the world oceans, to define the forcing functions and the processes driving ocean circulation and the global climate system, and to improve environmental forecasting capabilities and other supporting services for marine commerce and fisheries. Results from PMEL research activities contribute to NOAA's mission goals #1: Protect, restore, and manage the use of coastal and ocean resources through ecosystem-based management, #2: understand climate variability and change to enhance society's ability to plan and respond, and #3: serve society's needs for weather and water information. PMEL provides sound, state of the art research that underpins NOAA's environmental assessment, prediction, and ecosystem management missions and contributes to the development of an integrated global environmental observation and data management system.

## Recent Accomplishments:

- Observations of oceanic and atmospheric conditions in the tropical Pacific are essential for the prediction of El Niño and La Niña events. To provide these data, PMEL completed the Pacific Tropical Atmosphere Ocean (TAO) Array, the world's largest number of instrumented buoys comprising a single ocean climate observing system. **Payoffs: Demonstrates that an ocean observational system can be designed, built, and maintained to support NOAA and the scientific community simultaneously.**
- PMEL pioneered the development of a deep-ocean real-time tsunami (huge sea wave) monitoring network and the methodology for producing tsunami inundation maps to assist coastal communities in development and emergency management planning. PMEL currently leads the National Tsunami Hazard Mitigation Program. **Payoffs: Tsunami evacuation maps are now available in the five west coast states and the real-time deep ocean detectors are providing more accurate forecasts of warnings to reduce false alarms. Responsibility for the network of early-warning buoys developed by PMEL to improve NOAA's tsunami warnings has been transferred to the NWS/National Data Buoy Center.**
- PMEL studies the impact of underwater volcanoes on the ocean's heat content and chemistry. This research has led to the first ever real-time detection of an underwater volcanic eruption and the discovery of new microbial life forms that are ejected from deep within the volcano. **Payoffs: Several new microbial life forms have been incubated that have valuable biological properties, relevant to the biotechnology industry.**

1315 East West  
Highway  
Silver Spring, MD 20910  
(301) 713-1671  
[www.oar.noaa.gov](http://www.oar.noaa.gov)

- PMEL, along with the National Marine Fisheries Service (NMFS), studies the complex interactions between commercially important fish species and their environment. ***Payoffs: This understanding, along with monitoring the environment throughout the life cycle of the fish, will assist decision-makers and improve forecasts of the abundance of these species. Forecasts of pollock abundance in Alaska have improved over the past ten years.***
- PMEL scientists are internationally recognized leaders in the measurement of oceanic carbon inventories and have a major role in the ten-year-long repeat hydrography observation program begun in 2003 to determine uptake of carbon from the atmosphere. ***Payoffs: The role of the oceans in the global carbon cycle is not well understood, yet is recognized as a key component in the global carbon balance and climate change. Measurement of carbon in the ocean over long timescales will improve our understanding of the oceans' contribution to the global carbon budget and quantify the oceans' capacity to absorb this important greenhouse gas.***

### **What's next for PMEL?**

PMEL conducts complex oceanographic experiments. Laboratory strength lies in the experience and knowledge of its scientific and engineering staff and their ability to obtain, process, analyze, and distribute high-quality oceanographic measurements. This capability requires a modern, well-maintained infrastructure of scientific instruments, computing and networking resources, oceanographic research ships, and a continuous engineering development capability. For the future, PMEL needs to maintain and enhance its proven observational and analysis capabilities and increase emphasis on numerical modeling techniques, information technology, and engineering as tools to aid in observing system design, experiment planning, implementation, data interpretation, and dissemination. PMEL will continue to conduct research that improves the services and products that NOAA's line offices offer to the general public.

### **Research Partnerships:**

PMEL has partnerships with the Cooperative Institute for Arctic Research (University of Alaska); the Cooperative Institute for Marine Resources Studies (Oregon State University); the Joint Institute for Marine and Atmospheric Research (University of Hawaii); and the Joint Institute for the Study of the Atmosphere and Ocean (University of Washington); and the office of emergency services for Alaska, California, Hawaii, Oregon, and Washington. Federal partners include other NOAA line offices, the National Science Foundation, the U.S. Geological Survey, the Federal Emergency Management Agency, the National Aeronautics and Space Administration, and the Office of Naval Research.

### **Budget and Staff**

The FY 2003 enacted budget for the PMEL budget lines totaled \$16.2M, and its request for FY 2004 totaled \$17.5M. PMEL has a staff of 174, including 85 federal employees, 21 contract employees, and 68 university employees.



### **For more information, contact:**

**Dr. Eddie N. Bernard, Director**  
**7600 Sand Point Way, NE, Building 3**  
**Seattle, WA 98115-6349**  
**Phone: (206) 526-6810**  
<http://www.pmel.noaa.gov>

---