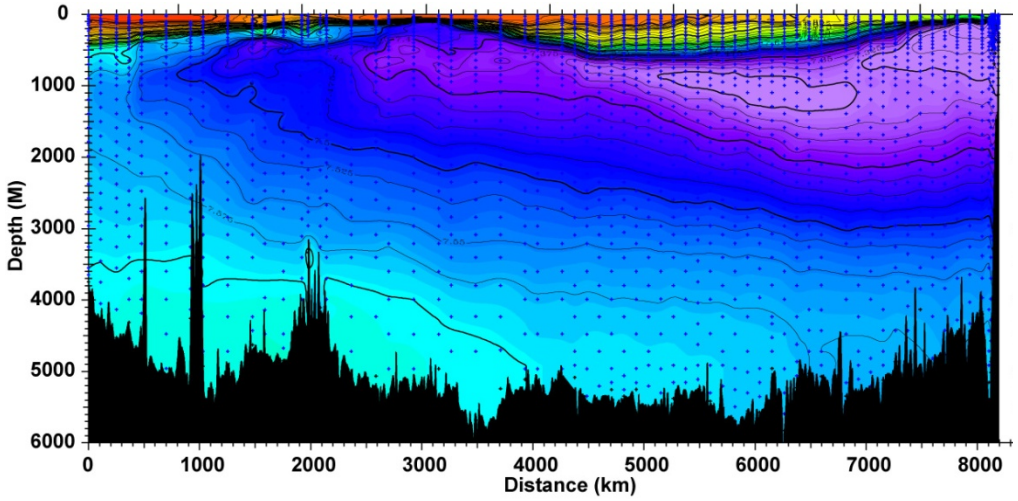
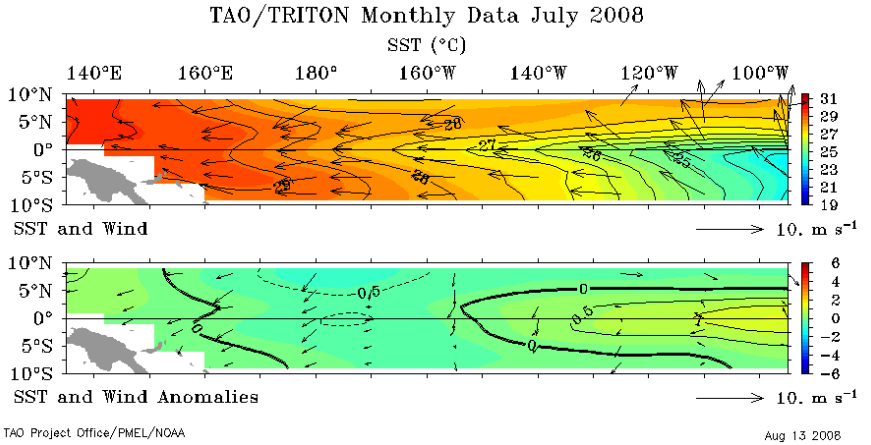
PMEL Ocean Climate Research Division

Who we are and what we do.





NOAA's Mission

To understand and predict changes in the Earth's environment and conserve and mange coastal and marine resources to meet the Nation's economic, social and environmental needs.

NOAA's Climate Mission Goal

To understand and describe climate variability and change to enhance society's ability to plan and respond.

Ocean Climate Research Division:

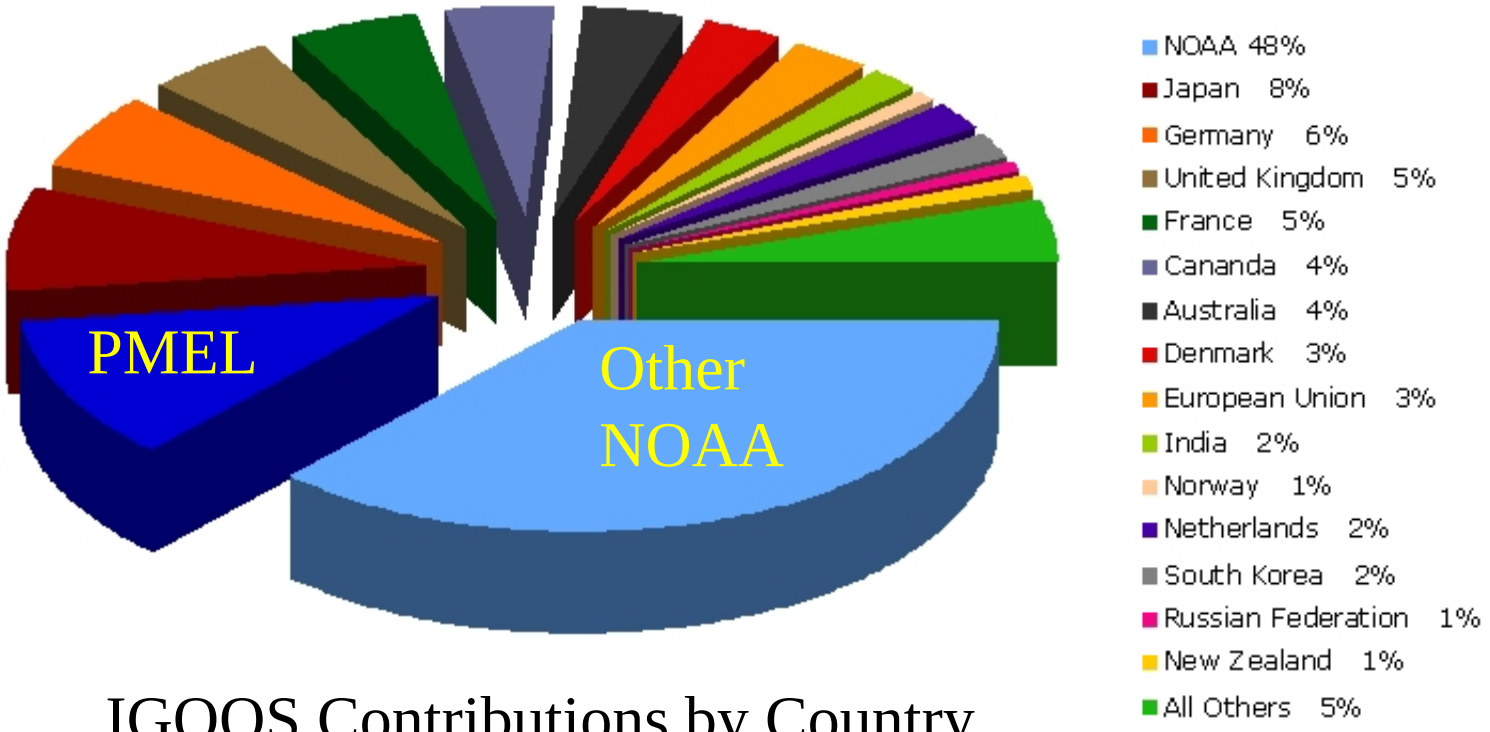
- focuses on open ocean observations on time scales from minutes to decades in support of NOAAs Climate Mission
- 75 employees (30 feds and 45 contractors and joint institute)
- 14 federal PIs and 6 PhD joint institute researchers
- During 2004-2007 the federal PIs managed:

  - 199 NOAA funded projects totaling $43.8 M,
  - 34 non-NOAA funded projects totaling another $4.0M.

- During 2004-2007 the federal PIs published:

  -159 peer reviewed journal articles,
  - 10 book chapters and
  - 29 government reports

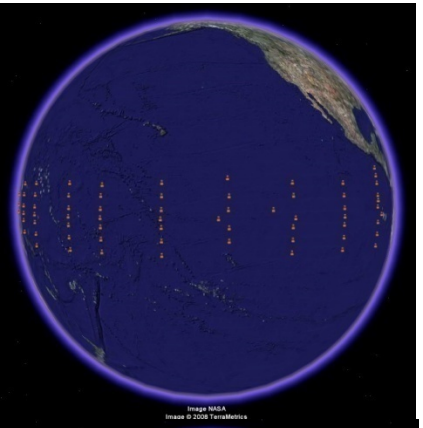
The bulk of the NOAA funding to OCRD comes from the Climate Program Office (CPO). Most of this support is for the International Global Ocean Observing System(IGOOS)

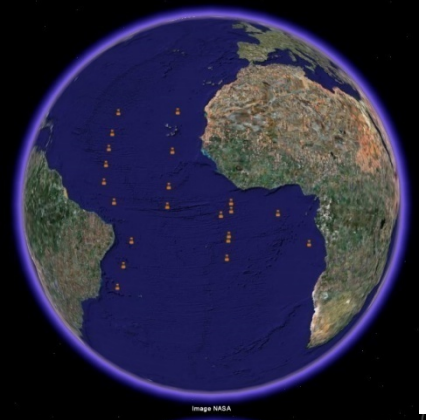


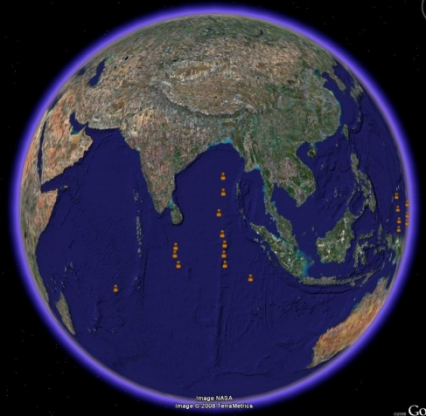
IGOOS Contributions by Country

PMEL OCRD comprises 23% of the NOAA contribution to IGOOS or 11% of the total network (greater than any non-US country)

Today you will hear from 7 OCRD Projects:







M. McPhaden – Tropical Moored Buoy Arrays

C. Sabine – Ocean Carbon Program

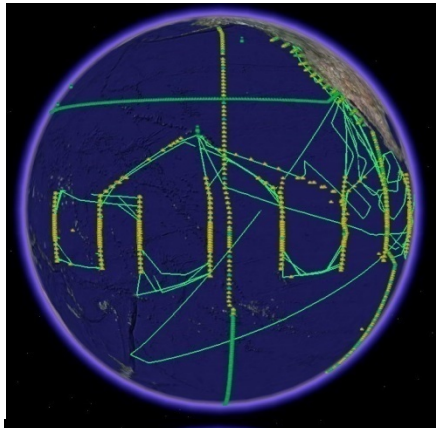
R. Feely – Ocean Acidification

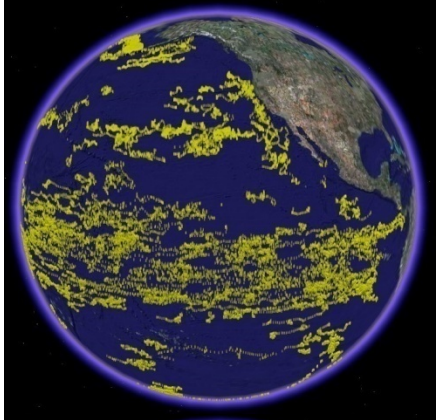
B. Kessler – Glider Studies of Ocean Circulation

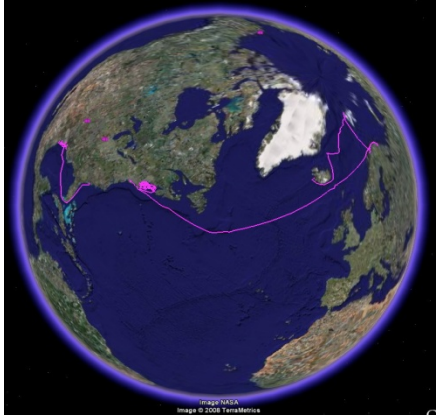
M. Cronin – Extra Tropical Moored Buoy Arrays

G. Johnson – PMEL ARGO Program

T. Bates/T. Quinn – Atmospheric Chemistry







CARBON DIOXIDE/OCEAN ACIDIFICATION

CARBON DIOXIDE AND OCEAN ACIDIFICATION

Accomplishment:
From our carbon dioxide survey studies we determine that absorption of carbon dioxide from the atmosphere is causing Ocean Acidification on a global scale.

Impact:
Ocean Acidification can cause global scale changes to marine ecosystems with potential impact on fisheries resources.

ELNIÑO/LA NIÑA PREDICTION

Accomplishment:
The 2006-08 El Niño and La Niña events observed by TAO/TRITON highlighted the role of seasonal variations in the upper ocean heat content as the source of predictability for ENSO. At the same time, TAO data demonstrated that higher frequency episodic wind forcing significantly affected the amplitude, onset and demise of these events, such that their predictability was limited to only one or two seasons.

Impact:
Much of the high frequency forcing that effects the ENSO cycle originates over the Indian Ocean, where observations are sparse.
A new moored buoy program called RAMA is being implemented to address Indian Ocean-atmosphere interactions that influence both Asian monsoon dynamics and the source of high frequency wind variability that remotely impacts ENSO.

CHANGES IN OCEAN HEAT CONTENT

Accomplishment:
We have quantified statistically significant warming of Antarctic-influenced bottom waters in the Atlantic, Indian and Pacific Oceans by comparing 2000's CLIVAR/CO_2 Repeat Hydrography Data to 1990's WOCE data.

Impact:
The deep ocean may store 10-20% of the Earth's anthropogenic heating, with implications for climate model sensitivity estimates, sea level rise budgets, and ocean circulation changes. These results also imply that the global observing system must better sample the 52% of the ocean volume that lies below the 2000 meter Argo profiling depth.

CLOSING THE TROPICAL/SUBTROPICAL CIRCULATION

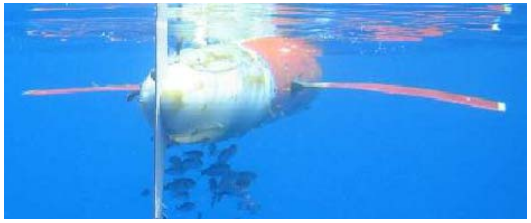
Accomplishment:
We have demonstrated the capability of ocean gliders to measure the low latitude western boundary currents in the tropical Pacific. This provides the basis for establishing a sustained monitoring of this piece of the climate system.

Impact:
These currents are the major unmeasured piece of the communication between the equatorial and higher latitudes, contributing to large uncertainties in the heat and property fluxes, including carbon, to the equatorial cold tongue.

New Technologies and Observational Capabilities

Since 2004 the following capabilities have been added.

- We now supply about 20% of the US ARGO floats, or 10% of the total array.
- Ocean sites moorings have been established in the Kuroshio Extension region and at ocean station PAPA. These include moored measurements of both atmospheric and oceanic pCO_2 measurement.
- The production of moored and underway pCO_2 systems is being transitioned to industry.
- An ongoing autonomous glider section program to study South Pacific Low Latitude Western Boundary Currents has been established.
- The Atmospheric Chemistry group has obtained and is instrumenting an unmanned autonomous aircraft for atmosphere chemistry work at sea.



The development of these new technologies increases our ability to monitor climate variables autonomously, decreasing our dependence on research vessels.