



Innovate, Incubate, Integrate
noaa research

NOAA's OFFICE OF OCEANIC AND ATMOSPHERIC RESEARCH

NOAA/OAR Observing Systems



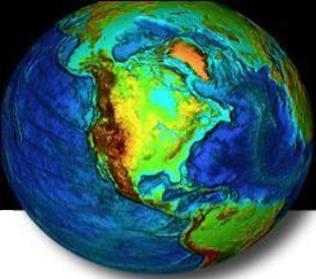
Dr. Christopher L. Sabine

Director

NOAA's Pacific Marine Environmental Laboratory



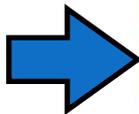
Workshop on Hydroclimate Monitoring
Systems and Measurement Needs
June, 2014



Global Ocean Observing System for Climate

OAR Component: Climate Program Office

The system is designed to meet Climate requirements, but it also supports:



- Weather prediction
- Global and coastal ocean prediction
- Marine hazards warning
- Transportation
- Marine environment and ecosystem monitoring
- Naval applications



International System -- all data is publicly available

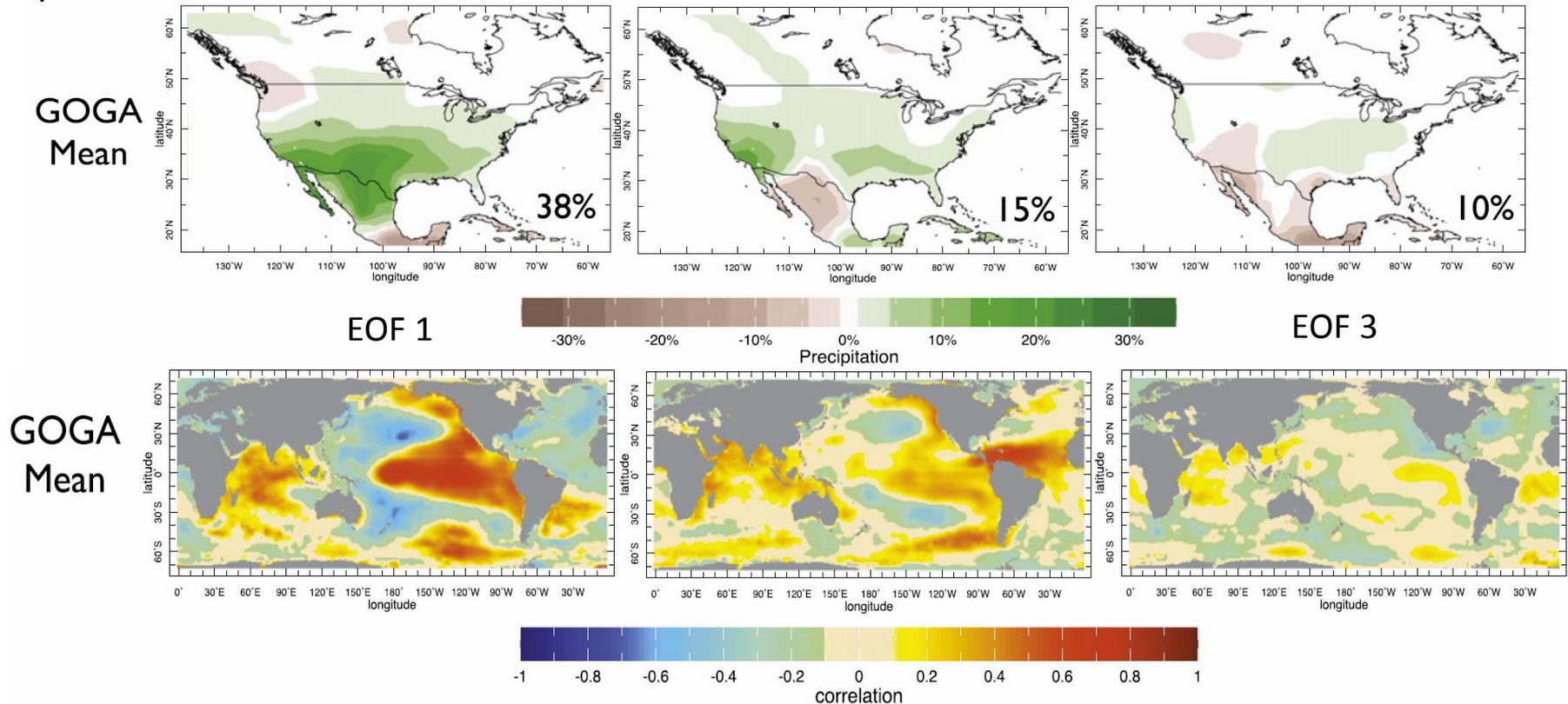
- A total of 8132 platforms are presently maintained globally.
- Of these, 4062 are sponsored by NOAA.

- ▲ Tide gauge stations
- ➔ Drifting Buoys
- Tropical Moored Buoys
- Profiling Floats
- ▭ Ships of Opportunity
- ◆ Ocean Reference Stations
- ▣ Ocean Carbon Networks
- Arctic Observing Network
- ▣▣ Dedicated Ship Support
- Data & Assimilation Subsystems
- Management and Product Delivery
- Satellites -- SST, Surface Topography, Wind, Color, Sea Ice



Seager and Hoerling (2014)
Atmosphere and Ocean Origins of North American Droughts
J. of Climate, 27, 4581-4606

Observations and models indicate robust tropical Pacific and tropical North Atlantic forcing of annual mean precipitation and soil moisture with the most heavily influenced areas being in southwestern North America and the southern Great Plains. In these regions, individual wet and dry years, droughts, and decadal variations are well reproduced in atmosphere models forced by observed SSTs.

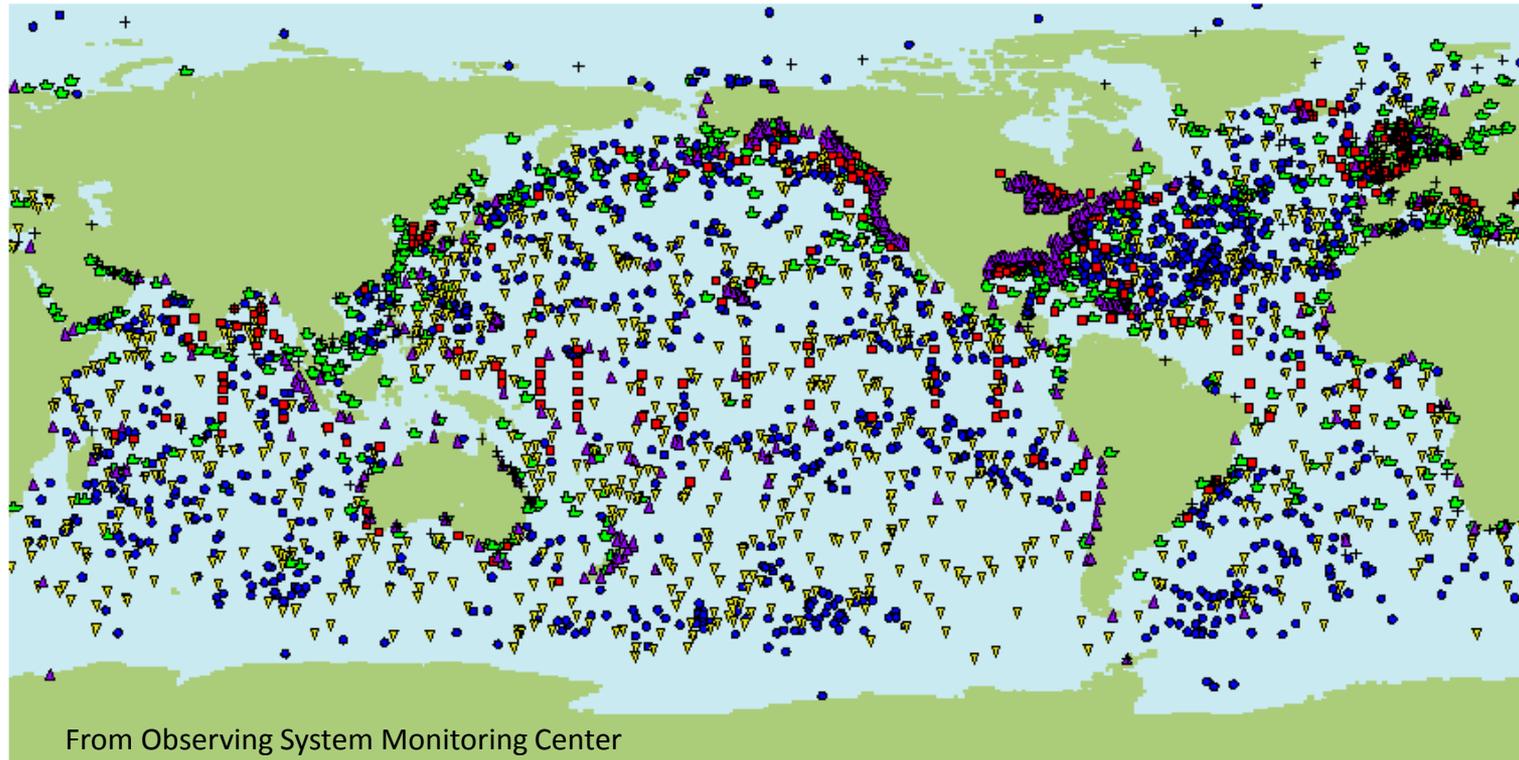


OAR Sustained Ocean Observing Program

Date: 15-Jun-2014 to 18-Jun-2014

Platforms: 4177

Observations: 2404340



Suppressing ship observations for most recent 48 hours

www.osmc.info

www.jcommops.org

Argo: 34 countries

Oceansites: 20 countries

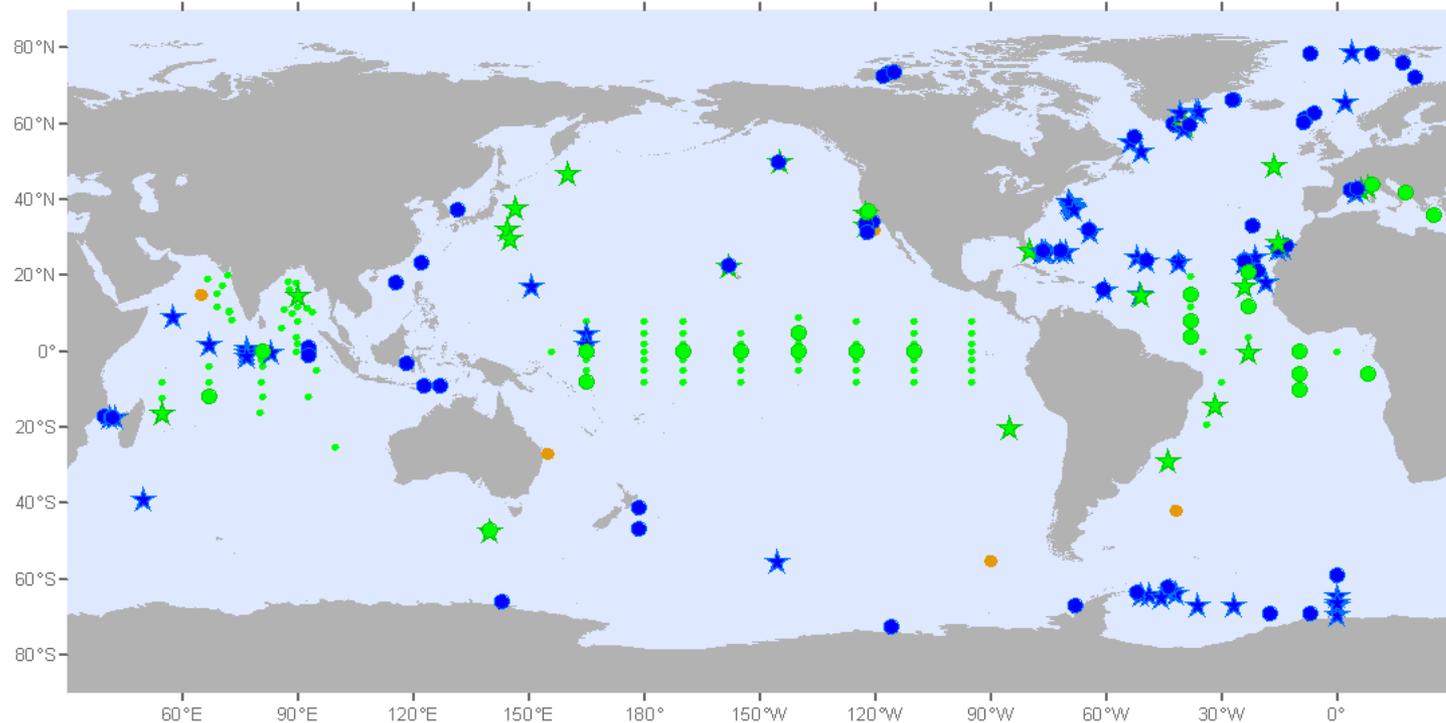
Global Sea-Level System: 57 countries

Surface Drifters: 14 countries

Tropical Moored Buoy Arrays:

RAMA (15) and PIRATA (3)

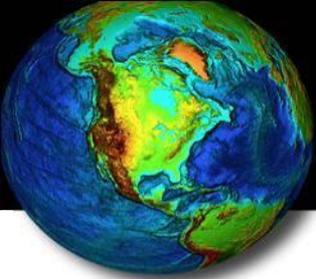
OAR Sustained Ocean Observing Program OceanSITES Network



- Real-Time (52)
- Delayed Mode (141)
- Planned (8)
- Standard Meteorological Buoy (91)
- ★ Deep-Ocean T/S Sensor (89)



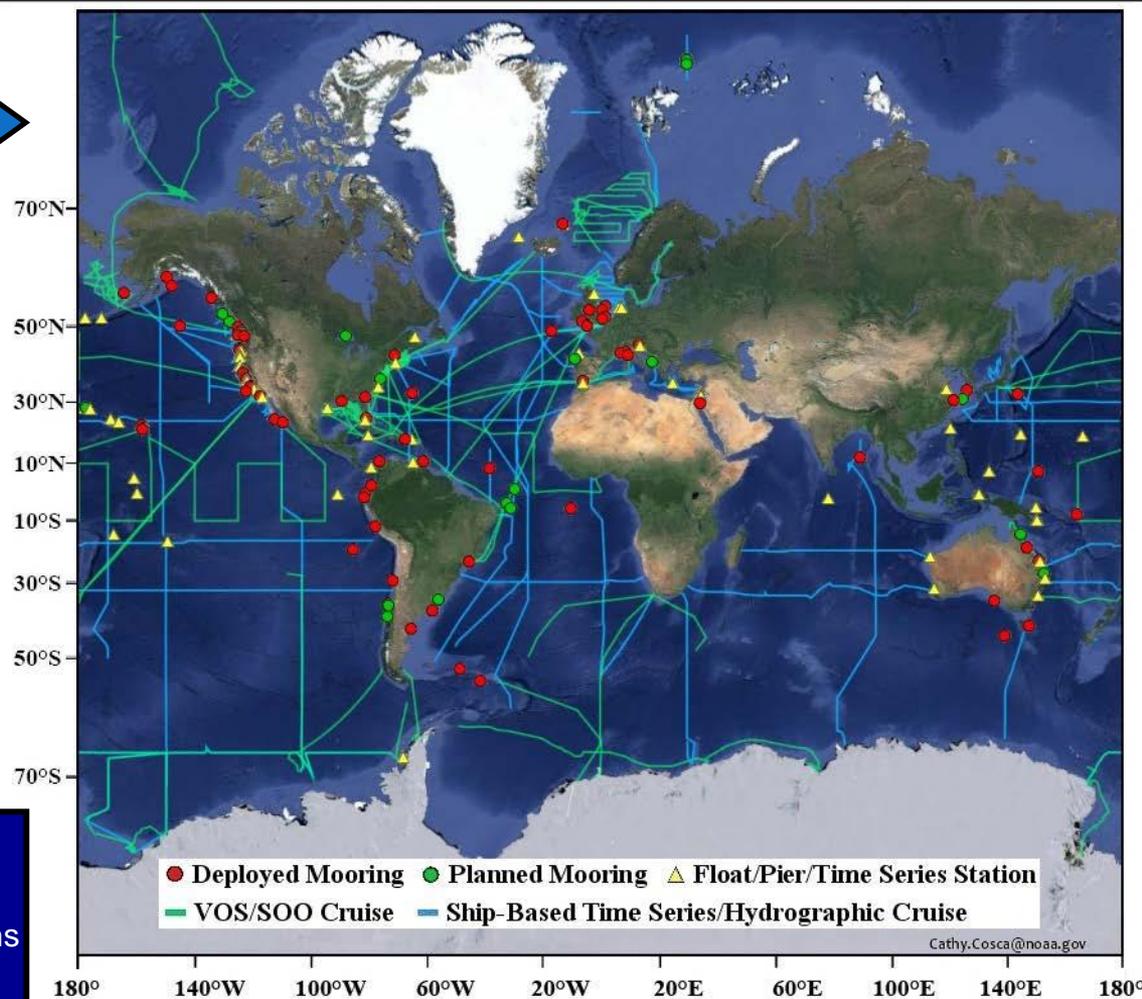
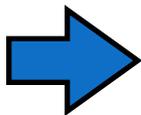
OceanSITES is a worldwide system of long-term, open-ocean reference stations measuring dozens of variables and monitoring the full depth of the ocean from air-sea interactions down to the seafloor.



Global Ocean Acidification Network

OAR Component: Ocean Acidification Program

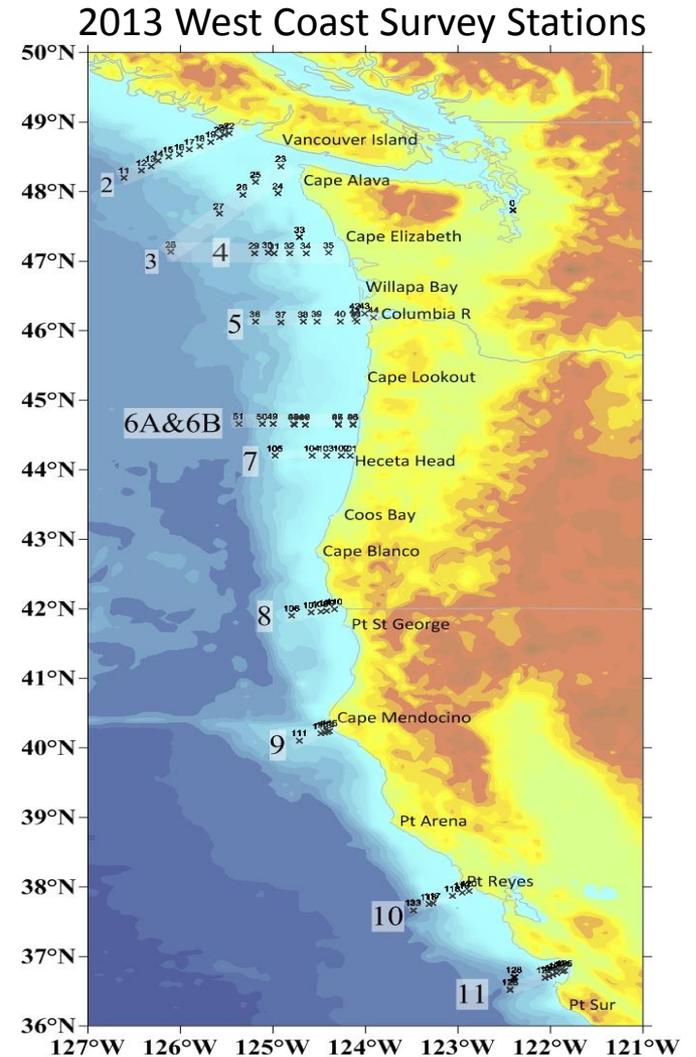
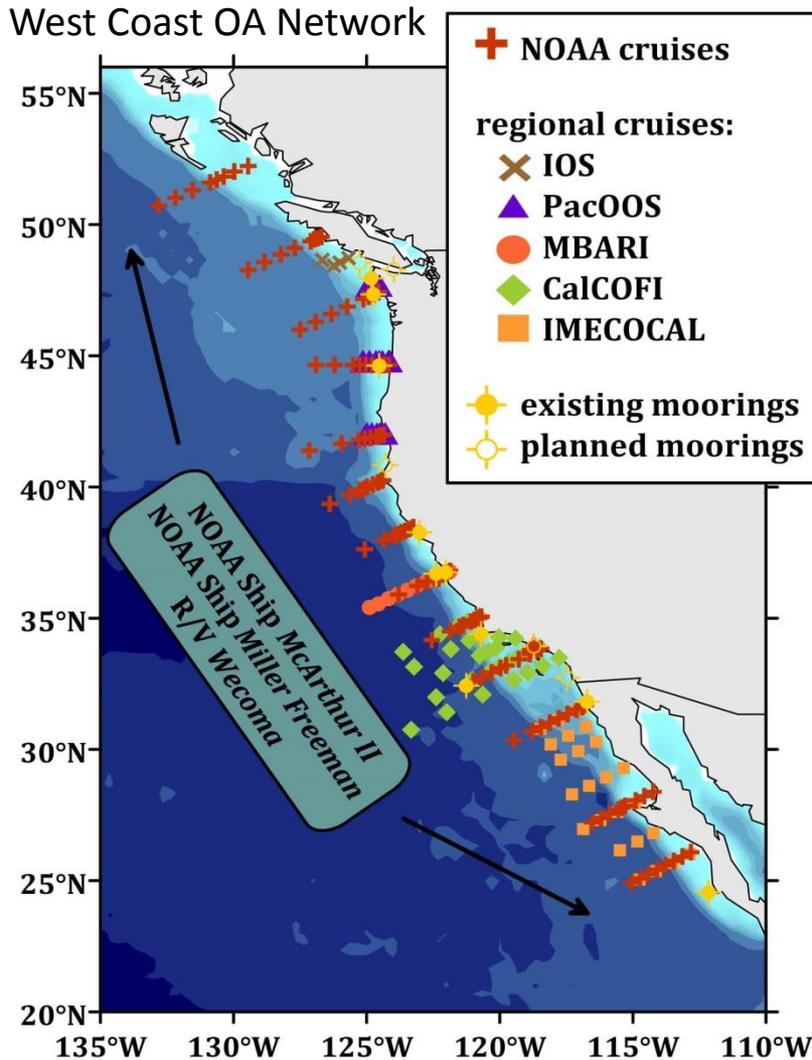
The system is designed to study ocean biogeochemistry, but can also support many other data needs.



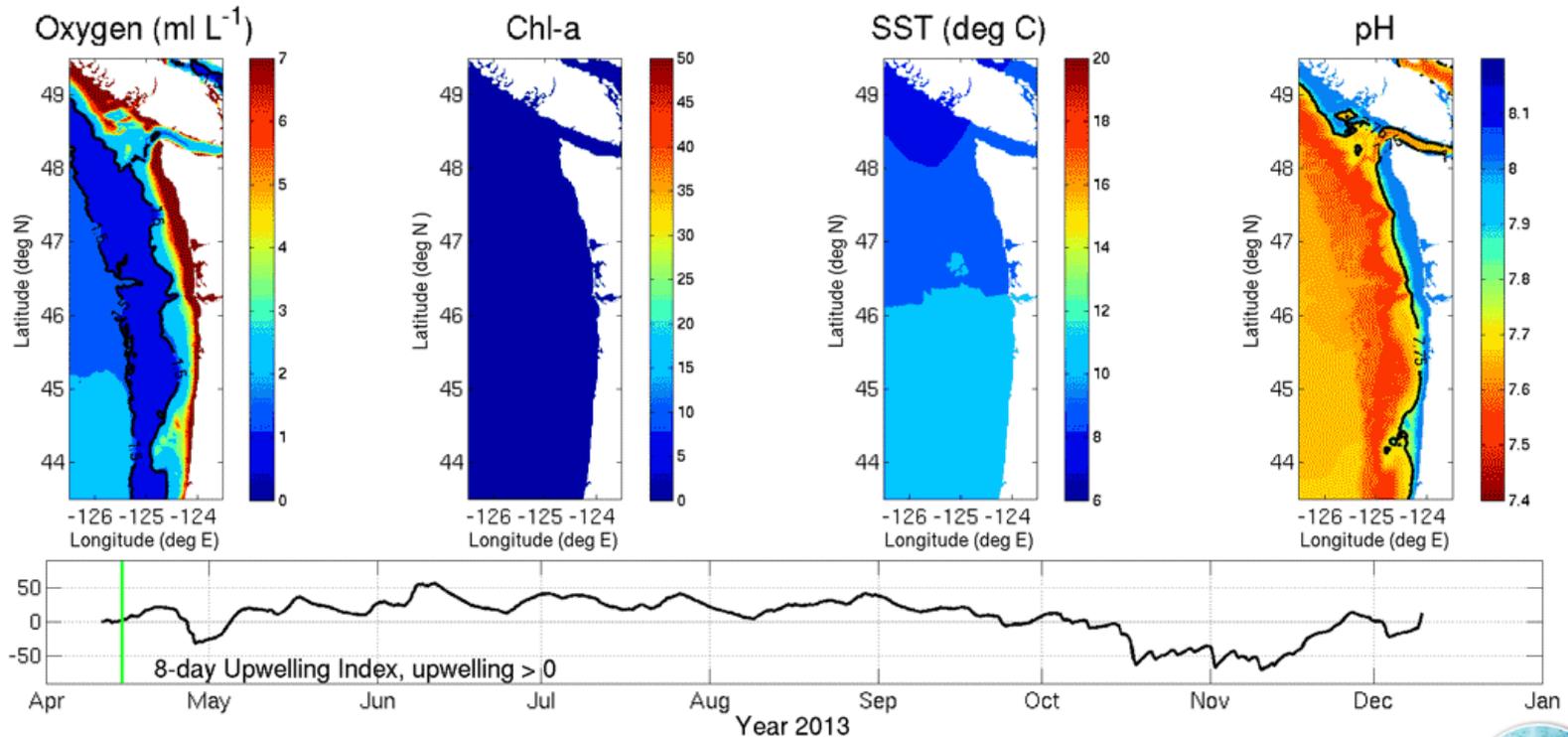
International System -- all data is publicly available

NOAA is largest supporter of OA monitoring systems

West coast ocean acidification cruises and moorings can provide valuable information on California Current System



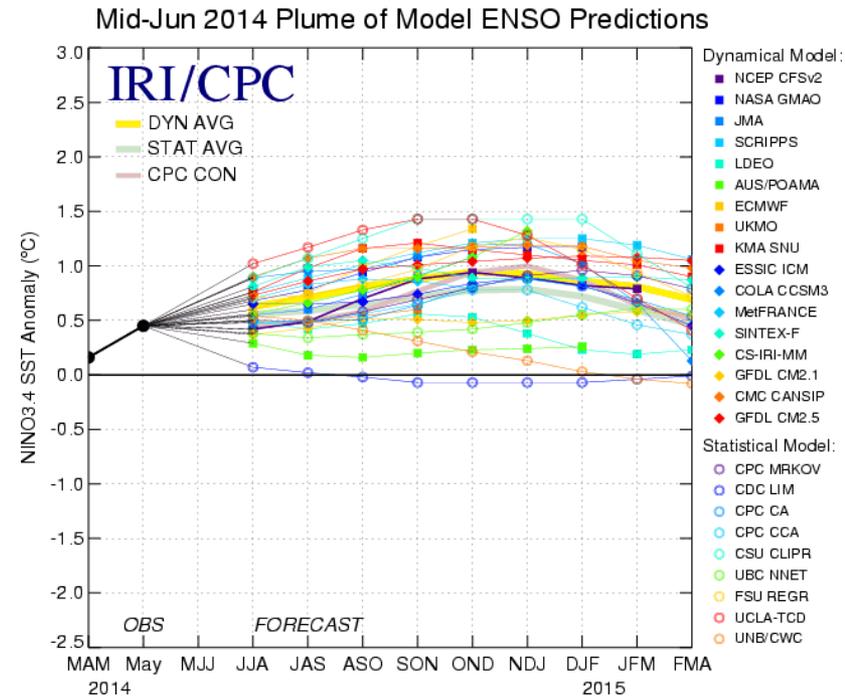
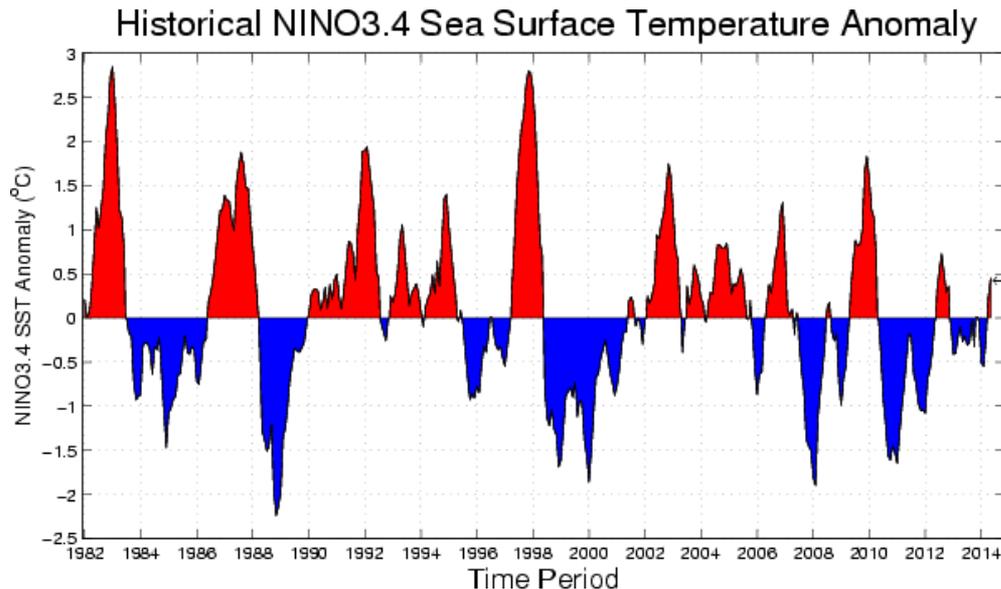
J-SCOPE (JISAO's Seasonal Coastal Ocean Prediction of the Ecosystem) is a FATE (Fisheries And The Environment) project, funded by NOAA and presented by NANOOS.



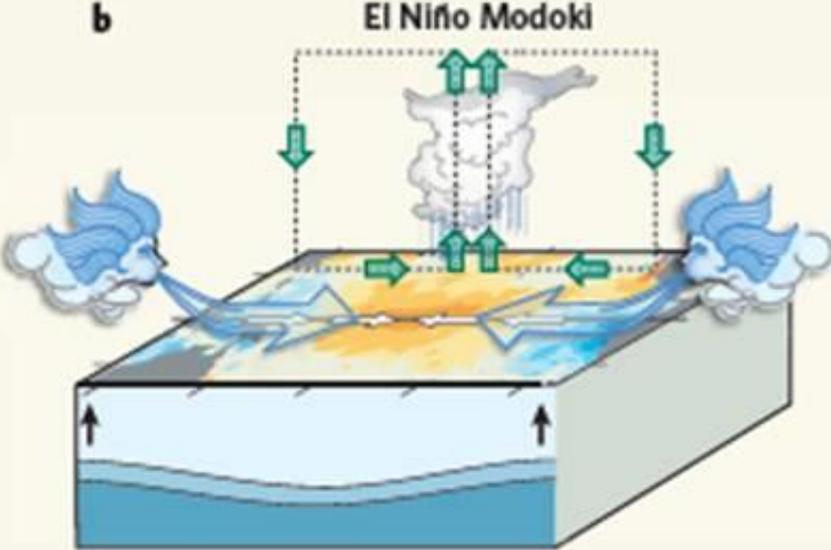
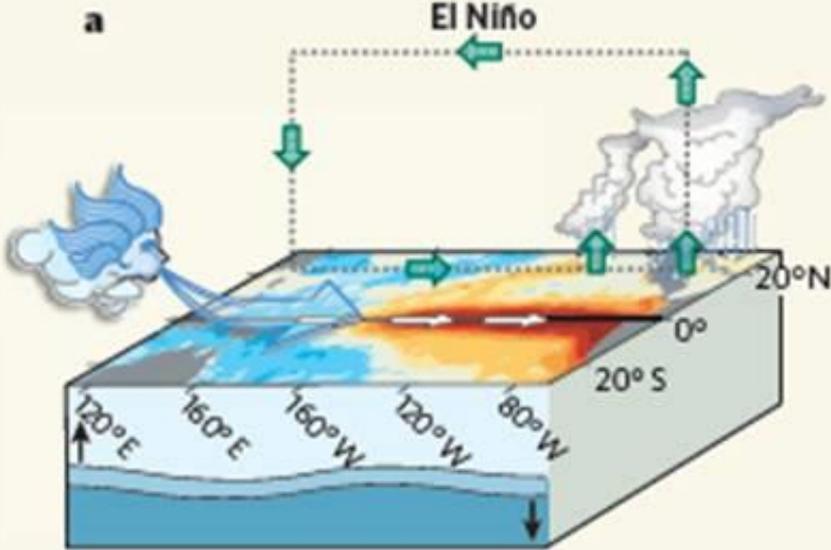
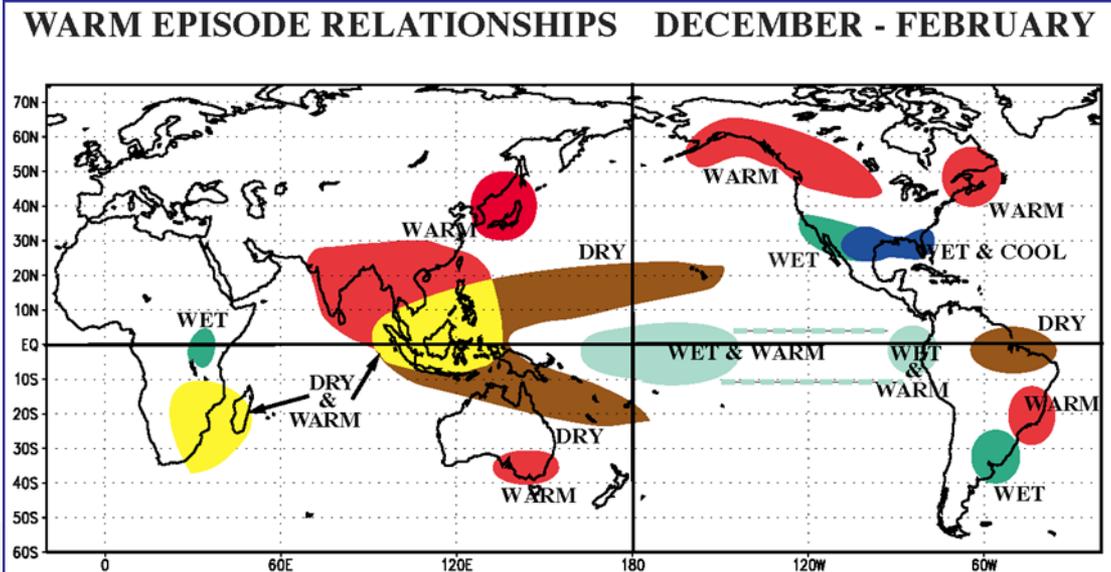
OAR conducts research on ENSO and observing systems for prediction

For the first time, in a research article published January 19 in *Nature Climate Change*, PMEL's Dr. Michael McPhaden and a team of international scientists provide robust and convincing evidence that greenhouse warming will double the chance of extreme El Niño events in the coming decades.

PMEL's Dr. Ed Harrison and JISAO's Dr. Andy Chiodi co-authored a paper published online on February 7 in the *Journal of Climate* that finds a new way to identify which El Niño events will have the biggest impact on U.S. winter weather. They examined an indicator known as outgoing long-wave radiation (OLR) and found that El Niño events with drops in OLR were most likely to be associated with winter weather.



Question: Will this developing El Niño produce the “typical” weather patterns?



Tropical Pacific Observing System 2020 Goals

TPOS Workshop January 2014

Monitor, observe, define the state of **ENSO** and advance scientific understanding of its causes;

Advance/refine the degree to which the **tropical Pacific (physical and biogeochemical)** and its climate impacts are **predictable**;

Determine the most efficient and effective method to **support observation and prediction systems for ocean and weather and climate services** of high societal and economic utility, including underpinning research; and

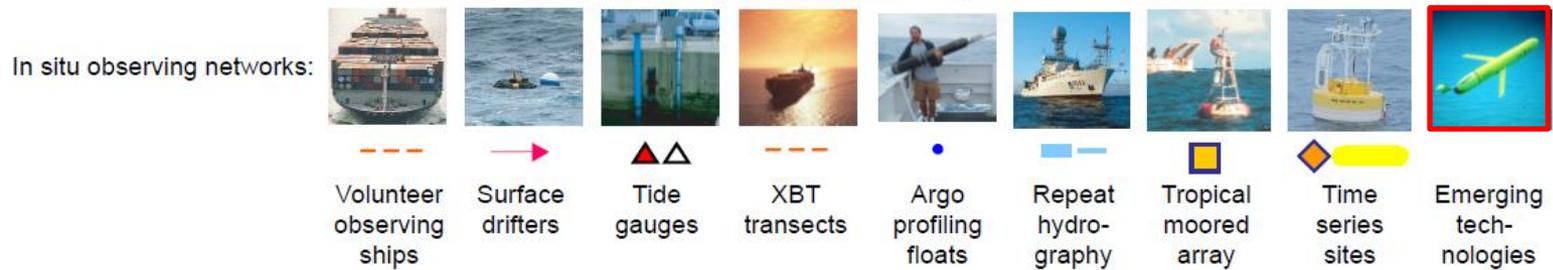
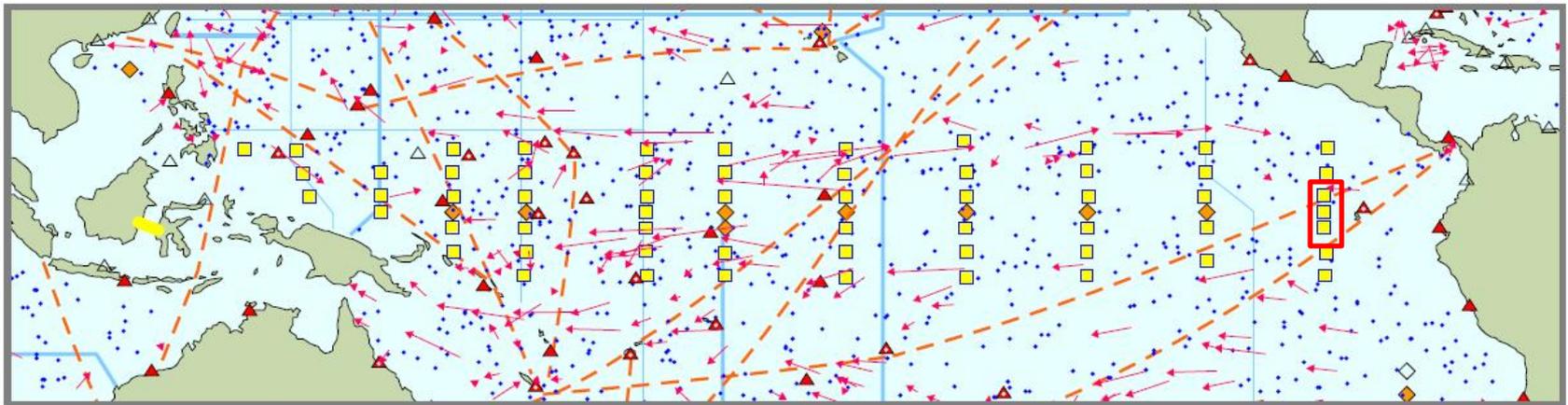
Determine how inter-annual to multi-decadal **variability and human activities impact the relation between marine biogeochemistry and biology to carbon budgets, food security and biodiversity**

Increased international support

Evolving the observing system

More effective and strategic coordination/planning

OAR is considering options for using new technologies to address TPOS goals



Тяжело!