Advances in the Global Ocean Observing System

Office of Climate Observation

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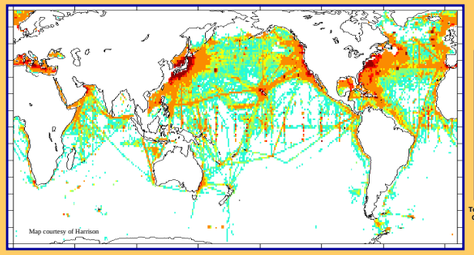
Observations Programme Area
Services Programme Area
Data Management Programme Area
Capacity Building Programme Area

The First 150 Years of Ocean Observation -- Research --



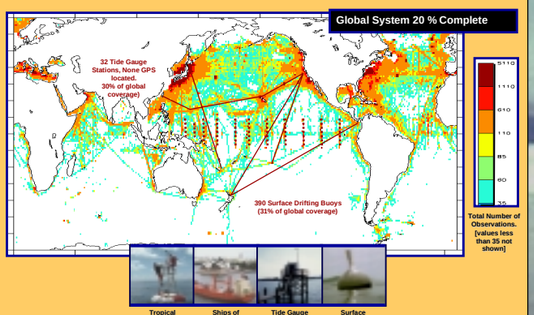
Example: Ocean Temperature Observations @ 200m Depth.

Total Number of Measurements for the 150-Year History of Instrumental Records: World Ocean Atlas 1998

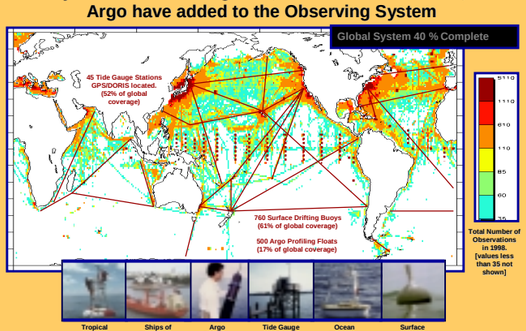
Shown for 1°x 1° grid boxes

1998 - The International Year of the Ocean

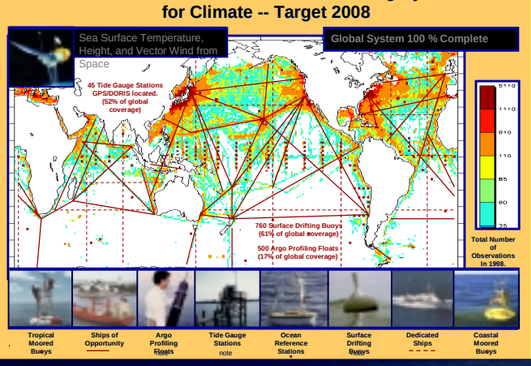
In 1998 the ENSO Observing System was Operationalized



Today the Research Programs, International Partners, and Argo have added to the Observing System

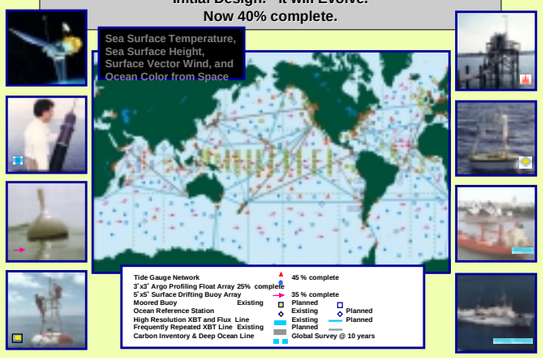


The Future Sustained Ocean Observing System for Climate -- Target 2008

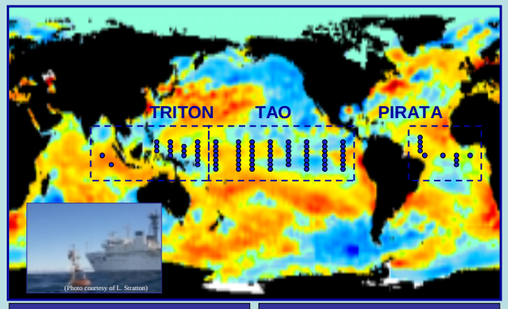


Background photo courtesy of Meteo France)

A System of Complementary Networks. Initial Design. It will Evolve. Now 40% complete.

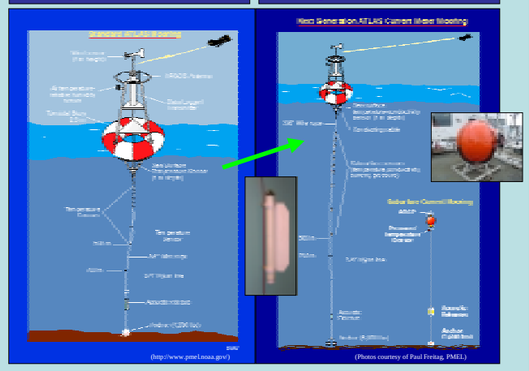


Status of the Tropical Moored Buoy Network



Standard ATLAS Buoy Mooring, 1994- 1996

Next Generation ATLAS Buoy Mooring, 1996 - present



Global Sea Level Stations

The Global Sea Level Observing System (GLOSS) is an international programme conducted under the auspices of the JCOMM of the World Meteorological Organisation (WMO) and the Intergovernmental Oceanographic Commission (IOC). GLOSS aims to establish high quality global and regional sea level networks for application to climate, oceanographic and coastal sea level research. The main component of GLOSS is the 'Global Core Network' (GCN) of 290 sea level stations to help monitor long term climate change and oceanographic

OVERVIEW

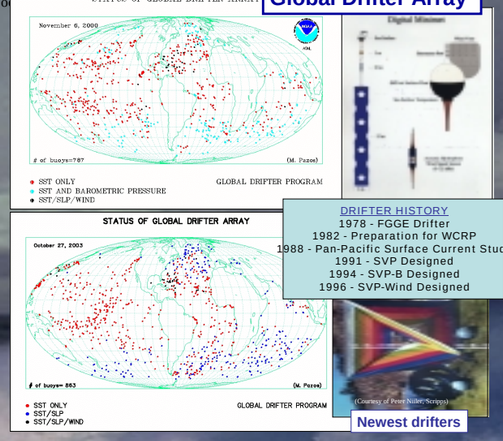
Central to describing, understanding, and predicting the Earth's climate system is observation. The NOAA Office of Climate Observation supports oceanic and marine meteorology projects designed to contribute to the implementation of a global climate observing system that is needed to satisfy the long-term requirements of operational forecast centers, international research programs, and the major scientific assessments, and to effectively plan for and manage responses to climate change. NOAA has worked with national and international partners to begin building a sustained global ocean system for climate, focusing first on the Pacific Ocean, expanding to the Atlantic, and promoting future research in the Indian Ocean. Sponsored projects are primarily U.S. contributions to global networks coordinated through international science and implementation panels, and managed in cooperation with the Joint WMO/IOC Technical Commission for Oceanography and Marine Meteorology. The Office of Climate Observation seeks maximum efficiency by promoting the utilization of platform and data infrastructure for several objectives, including understanding the Earth's climate system, and the global carbon and water cycles. Although the focus of the Office of Climate Observation is to support projects that deploy autonomous *in situ* platforms, the underlying objective is to foster a "system" approach to effective international organization of complementary *in situ*, satellite, data, and modeling components of climate observation. This poster provides a view of advances made in the last two decades in the global ocean observing system and the predicted evolution of the system in the near future to develop a more robust understanding of sea level, carbon, heat, salinity, and air-sea exchange parameters. With the initial system design nearly 40% complete, the Office of Climate Observation's goal includes enhancing each of the eleven complementary *in situ*, space based, data and assimilation subsystems including addition of new tide gauges, Argo profilers, drifting buoys, moored buoys, expendable ba[illegible]ons, and o[illegible]

Phased Implementation Plan, Including International Contributions

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Tide Gauges	40	40	45	45	55	80	86	86	86	86	86	Operational GPS/DORIS Stations
Surface Drifting Buoys	807	671	810	810	1050	1250	1250	1250	1250	1250	1250	Number of buoys
Tropical Moored Buoys	77	77	79	79	83	87	90	90	90	90	90	Number of moorings
Ships of Opportunity	23	24	26	26	29	32	36	41	41	41	41	High resolution and frequently repeated lines occupied
Argo Floats	200	310	1100	2000	3000	3000	3000	3000	3000	3000	3000	Number of floats
Reference Stations	1	2	3	4	6	14	16	29	29	29	29	Number of flux moorings
Coastal Moorings	0	0	0	0	15	40	80	120	150	150	150	Moorings with climate sensors
Ocean Carbon Network	0	2	4	4	12	20	30	38	40	40	40	Number of flux sites/lines, One inventory per 10 years
Dedicated Ship Time	250	250	250	250	430	670	700	760	820	820	820	Days at sea
Satellite Altimeter	0	0	0	0	0	25	50	75	100	100	100	Percent transition to Sustained operations
Total System	30	34	40	44	56	78	89	94	99	100	100	System % Complete

Initial Ocean Observing System Milestones

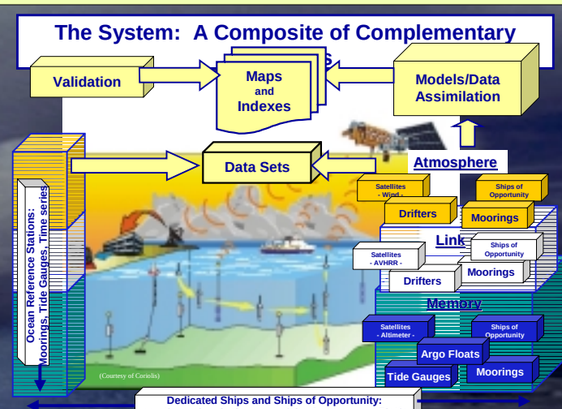
Global Drifter Array



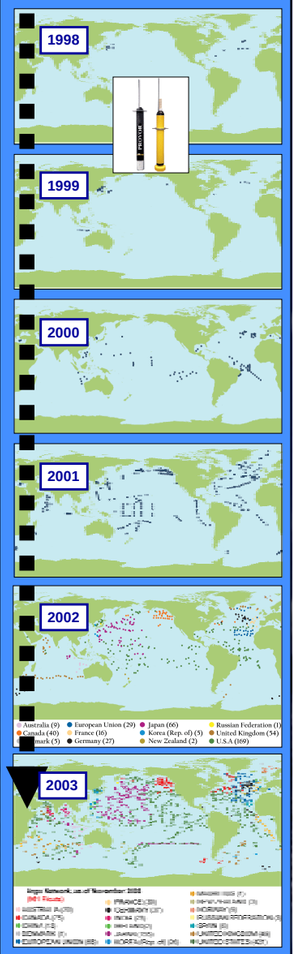
DRIFTER HISTORY
1979 – FGGE Drifter
1982 - Preparation for WCRP
1988 - Pan-Pacific Surface Current Study
1991 - SVP Designed
1994 - SVP-B Designed
1996 - SVP-Wind Designed

Newest drifters

The System: A Composite of Complementary

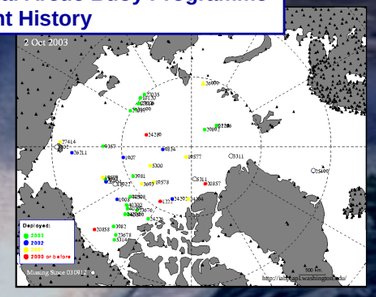


Argo Float Status 1998 - 2003

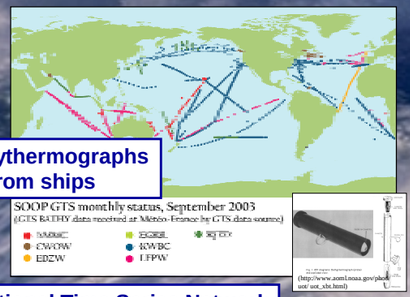


Argo uses profiling floats to gather temperature and salinity data from the upper 2000 meters of the deep ocean. The number of Argo floats should reach 3,000 by 2006 which will provide 100,000 temperature/salinity profiles per year.

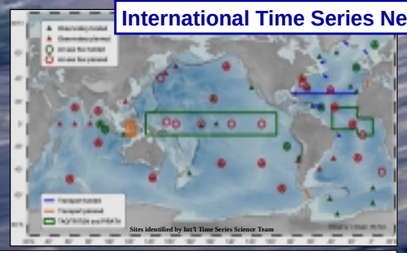
International Arctic Buoy Programme Deployment History



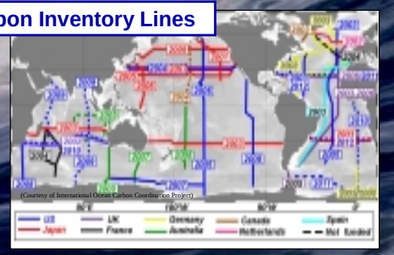
Expendable Bathythermographs (XBTs) dropped from ships



International Time Series Network



Carbon Inventory Lines



The Glider is the next generation profiling float. It is an autonomous vehicle which moves up and down in the ocean by changing buoyancy. Wings allow steerable gliding and horizontal propulsion. This vehicle will trace a sawtooth profile while observing temperature, conductivity, etc. versus depth, fix position at the surface via GPS, and communicate through satellite communication.

Unless otherwise noted, maps on this poster were accessed via the JCOMM WMO/IOC COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM) web site:
http://www.wmo.ch/web/aom/marprog/index.htm

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