Status of Pacific Islands Ocean Observing Networks

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Outline

• Overview of DBCP
• Services provided
• Observing networks available
• Array status in Pacific Islands area
Background

- DBCP is an international program coordinating the use of autonomous data buoys to observe atmospheric and oceanographic conditions, over ocean areas where few other measurements are taken.
- Formed in 1985, as a joint body of the World Meteorological Organization (WMO) and Intergovernmental Oceanographic Commission (IOC) of UNESCO
- DBCP aims to provide **international coordination** and assist those providing and using observations from data buoys, within the meteorological and oceanographic communities.
DBCP Aims to;

• Review and **analyze** requirements for buoy data
• **Coordinate** and facilitate deployment programs to meet network requirements
• **Support** information exchange and technology development
• **Improve** quantity and quality of buoy data distributed on the Global Telecommunication System (GTS)
• Initiate and support **action groups** and
• **Liaise** with relevant international/national bodies and programs.
Observing Networks/Action Groups

GDP: Global Drifter Programme (http://www.aoml.noaa.gov/phod/dac/gdp.html, was SVP, Surface Velocity Programme)

Networks Operate in the Region

- **TAO – Tropical Atmosphere/Ocean Array** (renamed the TAO/TRITON array on 1 January 2000. TAO array consists of approximately 70 moorings in the Tropical Pacific Ocean, telemetering oceanographic and meteorological data to shore in real-time via the Argos satellite system.
- **TRITON – Triangle Trans Ocean Buoy Network** (Mooring array in the tropical Western Pacific and Eastern Indian Ocean. Deployed since 1998)
- **GDP – Global Drifter array** (adopted in 1996. Maintain a global 5x5 degree array of 1250 satellite-tracked surface drifting buoys to meet the need for an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure, winds and salinity)
- **OceanSITES** (collect, deliver and promote the use of high-quality data from long-term, high-frequency observations at fixed locations in the open ocean)
- **Meteorological moored buoys**
Networks Operate in the Region

• **ARGO profilers** (a global array of more than 3,000 free-drifting profiling floats that measures temperature and salinity of the upper 2000 m of the ocean)

• **VOS – Voluntary Observing Ships** (an international program comprising member countries of the World Meteorological Organization (WMO) that recruit ships to take, record and transmit weather observations whilst at sea)

• **GO-SHIP – Global Ocean Ship Based Hydrological Investigations Program** (provides approximately decadal resolution of the changes in inventories of heat, freshwater, carbon, oxygen, nutrients and transient tracers, covering the ocean basins from coast to coast and full depth (top to bottom), with global measurements of the highest required accuracy to detect these changes)

• **SOOP – Ship of Opportunity program** (International effort that support the implementation of a network of cargo vessels, cruise ships and research vessels to deploy scientific instruments that collect oceanographic Observations most importantly Expandable Bathythermographs-XBT)
TAO/TRITON Array
(April 2015)
TAO/TRITON Array

• Designed for the study of year-to-year climate variations related to El Niño and the Southern Oscillation (ENSO),

• Consists of approximately 70 moored ocean buoys in the tropical Pacific Ocean.

• Array is supported by a multi-national partnership of institutions and is a major component of global ocean and global climate observing systems.
Global Drifter array

- Maintain a global 5x5 degree array of 1250 satellite-tracked surface drifting buoys
- Meet the need for an accurate and globally dense set of in-situ observations of mixed layer
- Measures, velocity, sea surface temperature, air temperature, air pressure, winds
- Operational partners are from many countries and programs across the globe.
Moored platforms

- Moored Buoys
- Fixed Platforms
- Tsunami Buoy Stations
Moored Buoys

• Over 400 moored buoys from various global regional and national networks

• The variables measured by the data buoys generally include one or more of the following elements:
  – Atmospheric pressure (and tendency),
  – Wind speed and direction,
  – Air temperature,
  – Sea-surface and sub-surface temperature,
  – Sea-surface and sub-surface salinity,
  – Rainfall
  – Wave period and height (and wave spectra)

• Some also carry a range of oceanographic sensors below the buoy or on the mooring line
Tsunameter buoys

- To ensure early detection of tsunamis and to acquire data critical to real-time forecasts.
OceanSITES

• Collect, deliver and promote the use of high-quality data from long-term, high-frequency observations at fixed locations in the open ocean

• Aim to collect multidisciplinary data worldwide from the full-depth water column as well as the overlying atmosphere

• Currently 300 stations across the globe and growing

• http://www.oceansites.org
Argo Program

• A revolutionary achievement for subsurface observations
• An unprecedented cooperative effort in the history of oceanography
• A crucial mechanism to better understand the warming of the upper ocean
• An essential dataset for the new generation of numerical models, allowing seasonal forecasts
A 10 days standard cycle

150-200 cycles (4-5 years) for each float

Temperature / Salinity / + Oxygen, Nitrates, pH, etc.

Telecommunications via Argos and Iridium
SOT-Ship Observations Team

Panels: Voluntary Observing Ships Scheme (VOS), Automated Shipboard Aerological Programme (ASAP), Ship of Opportunity Programme (SOOP),

• ~3k registered VOS with ~2M observations yearly/globally. Parameters:
  Air pressure
  Wind speed and direction,
  Air humidity and temperature,
  Sea surface temperature
  Visual Observations

• ~25 ASAP ships establishing ~6k upper air measurements yearly/globally with balloons
XBT - eXpandable Bathy Thermographs

• A probe that is dropped from a ship and measures the temperature as it falls through the water
• XBT network consists of transects across all ocean basins to collect temperature observations of the upper 1km of the ocean
• Deployed from research vessels and ships of the Ship of Opportunity Program (SOOP)

• ~100 SOOP deploying ~15k eXpandable Bathy Thermographs (XBT) yearly/globally to measure Upper Ocean Temperature (repeat lines)
Global Ocean Ship-based Hydrographic Investigations Program (GO-SHIP)

Repeat international Hydrography Program establishing cruises on repeat lines with clear data policy
- Full Depth
- Full Density
- Full Parameters
- Timely Data Delivery
- Decadal Surveys
- Globally 53 Lines

http://www.go-ship.org/DatReq.html
Platforms in the area (April 2015)
Thank You

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http://www.jcommops.org/dbcp