Vandalism on data buoys

Table of contents:

1. Background information

1.1. The DBCP

The Data Buoy Co-operation Panel[1] (DBCP) was established in 1985, jointly by the World Meteorological Organization (WMO and the Intergovernmental Oceanographic Commission (IOC) of UNESCO, as a means of enhancing cooperation, coordination and information exchange among the operators and users of drifting buoys, meteorological and oceanographic, research and operational.

The DBCP is the primary international mechanism for the global coordination of environmental data buoy deployments. It is a component of the newly established Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM).

It aims at improving both the quantity and quality of buoy data available in real-time in support of requirements from major programmes of WMO and IOC such as the World Weather Watch (WWW), the World Climate Research Programme (WCRP), the Global Ocean Observing System (GOOS), and the Global Climate Observing System (GCOS). In this context, the DBCP regularly reviews and analyses such requirements, coordinates and facilitates deployment programmes to meet the requirements, Initiates and supports regional action groups, developed mechanisms to control the quality of the data in real-time and deferred time, and facilitates real-time distribution of the data particularly via the Global Telecommunication System (GTS).

Thanks to the commitments from the participating countries, the Panel is served by a full time Technical Coordinator. His job is essentially to assist in the achievement of its aims and to act as a focal point between buoy users. The Technical Coordinator is presently located in Toulouse, France, with CLS, Service Argos.

Action Groups focus on deployment of buoys in a particular ocean area (e.g. International South Atlantic Buoy Programme) or for a particular application (e.g. Global Drifter Programme). This permits to satisfy national interests but also to integrate buoy programmes in a regional and then global perspective. Deployment opportunities are more easily managed at the regional level and coordination is made easier.

They agree to exchange good quality basic meteorological and/or oceanographic data in real time over the GTS. They also agree on exchange of information on data buoy activities and development and transfer of appropriate technology. Regional Action Groups usually engage their own coordinators, who work closely with the Technical Coordinator of the DBCP.

Present DBCP Action Groups are:

- E-SURFMAR: EUCOS Surface Marine Programme (focus on the North Atlantic)
- IABP: International Arctic Buoy Programme
- IPAB: WCRP-SCAR International Programme for Antarctic Buoys

1 When created in 1985, the DBCP was actually named "**Drifting** Buoy Cooperation Panel". In 1992 its terms of reference were widened and its name changed to "**Data** Buoy Co-operation Panel" to reflect its work in coordinating all forms of ocean buoy deployments in the open ocean such as the TAO array moorings in the Tropical Pacific Ocean.

- ISABP: International South Atlantic Buoy Programme
- IBPIO: International Buoy Programme for the Indian Ocean
- GDP: Global Drifter Programme (was SVP, Surface Velocity Programme)
- TIP: TAO Implementation Panel (operational since 1997, when operational funds were made available to support the array).
- NPDBAP: DBCP-PICES North Pacific Data Buoy Advisory Panel
- OceanSITES: Deep ocean time series reference stations.

During the 20 years of its existence, the panel has achieved great success in achieving its initial objectives. At the same time, this period has also seen remarkable advances in both buoy and communications technology, as well greatly enhanced and expanded requirements for buoy data, in particular in support of global climate studies. Major global experiments such as TOGA and WOCE have clearly demonstrated the value of buoy data for this purpose, and at the same time established and refined the buoy networks needed to fulfil the scientific requirements. One of the major challenges now facing the panel and buoy operators is to convert the buoy networks established for these experiments into long-term operational programmes.

Details about the DBCP and its activities can be found on its web site at http://www.dbcp.noaa.gov/dbcp/

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1.2. Current status of data buoy programmes

In April 2006, data from more than 1140 buoys from more than 20 countries were exchanged in real time through the Global Telecommunication System of the World Weather Watch. These include more than 100 moored buoys deployed in the equatorial Pacific, Atlantic, and Indian Oceans which measure wind speed and direction, air temperature, air relative humidity, and sub-surface temperatures down to as deep as 500 meters. All drifting buoys measure Sea Surface Temperature, and about 310 do measure atmospheric pressure. A small number of drifting buoys measure wind speed and direction. Precise status regarding buoy programmes can be found on the JCOMMOPS web site at http://www.jcommops.org. Status maps which show approximate location of drifting and moored buoys are indicated in Annex I.

1.3. Vandalism on data buoys

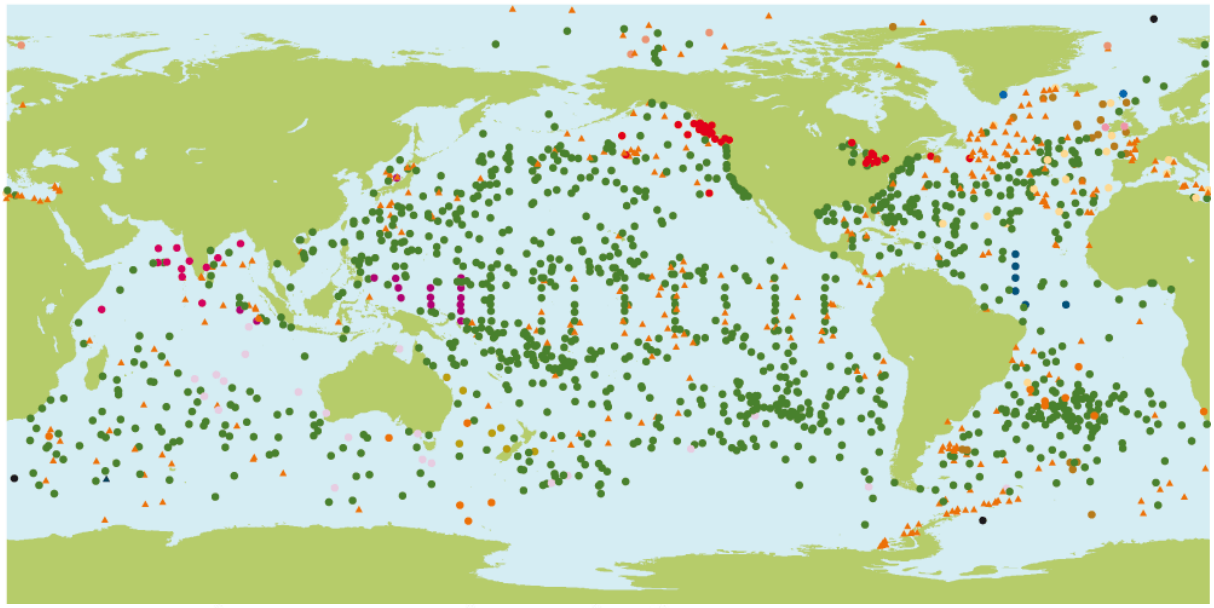
Unfortunately, despite success of the DBCP to encourage deployments of increased number of drifting and moored buoys, vandalism of these valuable ocean data buoys has been, and remains, a significant problem in many ocean areas. This is particularly the case for the large moored platforms in the tropical Pacific, Eastern tropical Indian, and equatorial Atlantic Oceans.

The vandalism can be both deliberate (theft of equipment and buoy parts, severing and theft of moorings) and inadvertent (primarily due to fishermen working too close to moorings, which are known to aggregate fish).

Considerable efforts have been made by operators over several years to address this problem, in particular in sensitising fishing communities to the existence, application and importance of these data buoys, through direct discussions, the distribution of multi-lingual brochures, etc. These efforts are ongoing, but have met with only limited success.

The DBCP noted with concern the persistence of this vandalism problem, particularly in the Indian Ocean. For example, NIOT (India) reported serious losses through vandalism to their moored buoys in the Arabian Sea and Bay of Bengal, but that efforts are continuing to rebuild the network. In this regard, the Panel considered that it would be valuable if the International Hydrographic Organization could assist WMO, IOC and operators in efforts to further inform mariners to the important application and value of ocean data buoys, particularly in support of maritime safety services as noted above. This assistance might initially comprise the inclusion of appropriate information on ocean data buoys in broadcasts under the World Wide Navigational Warning Service and/or Notices to Mariners, together with other means of communication as might be proposed. Such information is proposed in Annex II to this document.

Annex I: Status maps for drifting and moored buoys (April 2006).



DBCP status by country, April 2006 (data buoys reporting on GTS)

Drifting buoys: 1144 Moored buoys: 182

- AUSTRALIA (21)
- EUROPEAN UNION (46)
- GERMANY (3)
- JAPAN (1, 15)
- NORWAY (6)
- UNITED STATES (1000, 118)
- BRAZIL/FRANCE/USA (6)
- FINLAND (1)
- INDIA (6, 6)
- NETHERLANDS (2)
- SOUTH AFRICA (12, 1)
- MOORINGS
- CANADA (4, 26)
- FRANCE (19, 1)
- IRELAND (2)
- NEW ZEALAND (7)
- UNITED KINGDOM (16, 7)
- UNKNOWN

Note: Data received from GTS at JCOMMOPS via Météo-France; number of drifting and moored buoys in brackets respectively

Annex II : Proposed text for promulgation to mariners

Meteorological and oceanographic data buoys

Thanks to internationally coordinated efforts, the Data Buoy Cooperation Panel working under the auspices of the World Meteorological Organization and the Intergovernmental Oceanographic Commission maintains arrays of instrumented drifting and moored buoys in the world oceans. These automated buoys make routine measurements and transmit their data in real-time through satellites. Such measurements include wind speed and direction, air temperature, air humidity, atmospheric pressure, currents, sea surface temperature, but also water temperatures at various depths to 500 meters below the surface for certain types of moored buoys. All buoys routinely transmit their positions along with the data.

What are the buoys used for?

There are numerous applications for collected data which complement data collected through other means such as satellites:

- **Weather forecasts**. Meteorological models routinely assimilate observational data from various sources including satellites, weather balloons, land stations, ships, and data buoys. Most of the models are global and assimilate observational data from all sources around the planet to make their national forecasts. Distribution of meteorological data world-wide is coordinated through the World Weather Watch. Buoy data are crucial because deployed in data sparse ocean area where no other source of valuable data are available.
- **Marine forecast**. For similar reasons, buoy data are essential for producing improved marine forecasts.
- **Assistance to fisheries**. Sea surface temperature is an important tool to find many different species of fish. The buoys provide this information to weather centres daily. These centres, in turn, produce charts of sea surface temperature and distribute them via radiofax broadcasts to fishermen at sea or to your home office. Knowing where to look for fish saves both fuel and time. Also, using data buoys and other instruments such as sub-surface floats, many advanced oceanographic models now can be used to predict El Niño events and other ocean disturbances. Such information can help fishermen plan their operations in advance.
- **Safety at sea**. Several nations have successfully used surface wind and ocean current information from the buoys to help locate missing or overdue boats.
- **Climate prediction, meteorological and oceanographic research**. For example, researchers use the data from the equatorial Pacific moorings (TAO) to learn how to predict future changes in the world's climate. The buoys were first deployed to learn how to predict the El Niño / Southern Oscillation phenomenon. El Niño events involve disruptions in the ocean surface winds and the upper ocean temperature pattern. These disruptions lead to seasonal climate variations and changes in fish migration patterns in many areas of the world ocean including the tropics.

Advice to fishermen and mariners

Do not pick up drifting buoys. Buoy operators do not refurbish the drifting buoys once deployed. They would continue to transmit their position along with erroneous meteorological and oceanographic data from the deck of the ship.

DO keep watch for the moored buoys at sea; they should be visible on radar and can be avoided. Always keep off your fishing operations from the buoys in order to avoid entanglement of your net with the buoy.

DON'T moor to, damage, or destroy any part of the buoys.

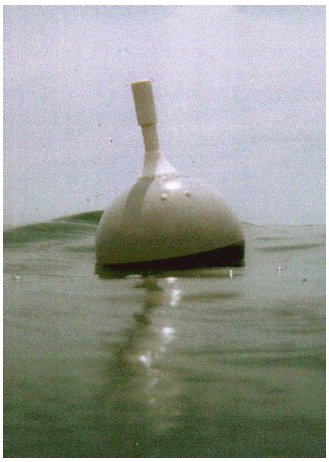
Do educate your fellow community about the use of data buoys.

The buoys may attract fish: although it may be tempting, DON'T deploy gear around or near to the buoys. If your gear tangles with the buoy, DON'T damage or cut the buoy to retrieve your gear.

Both drifting and moored buoys provide valuable information to many communities, including fishermen and mariners.

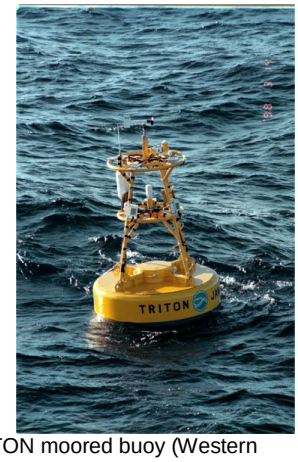
Longline fishing gear entangled in a TAO mooring.

Wind measuring meteorological drifting buoy
http://www.dbcp.noaa.gov/dbcp/fggewind.html



Oceanographic drifter
http://www.aoml.noaa.gov/phod/dac/gdc.html

PIRATA (Atlantic Ocean) or TAO array moored buoy (equatorial Pacfic).
http://www.pmel.noaa.gov/toga-tao/
http://satelite.cptec.inpe.br/imagens/dadospcd/pirata/
http://www.brest.ird.fr/pirata/piratafr.html



TRITON moored buoy (Western equatorial Pacific)
http://www.jamstec.go.jp/jamstec/TRITON/

E-SURFMAR moored buoy (North Atlantic)
http://esurfmar.meteo.fr/

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