

## **Observing System Data Access**

### **Global Drifter Program** Rick Lumpkin, NOAA/AOML

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#### 1. Program Definition

The Global Drifter Program (GDP) is the principal component of the Global Surface Drifting Buoy Array, a branch of NOAA's Global Ocean Observing System (GOOS) and Global Climate Observing System (GCOS) and a scientific project of the Data Buoy Cooperation Panel. Its objectives are to (a) maintain a global 5°x5° array of Argos-tracked Lagrangian surface drifters to meet the need for an accurate and globally dense set of in-situ observations of mixed layer currents, sea surface temperature, atmospheric pressure and winds; and (b) provide a data processing system for scientific use of these data. These data support short-term (seasonal-to-interannual) climate predictions as well as climate research and monitoring. The surface drifting buoys ("drifters") were developed during the Surface Velocity Program (SVP) and consist of a surface float with SST thermistor and transmitter tethered to a holey-sock drogue centered at a depth of 15 m for measuring mixed-layer currents.

The GDP is managed with close cooperation between: manufacturers in private industry, who build the drifters according to closely monitored specifications; NOAA's Atlantic Oceanographic and Meteorological Laboratory (AOML), which coordinates deployments, processes the data, archives data at AOML and at the Marine Environmental Data Services (MEDS), maintains META files describing each drifter deployed, develops and distributes data-based products, and maintains the GDP website; and NOAA's Joint Institute of Marine Observations (JIMO), which supervises the industry, upgrades the technology, purchases the drifters, develops enhanced data sets, and maintains liaison with individual research programs that deploy drifters. Additional information on the GDP can be found at <http://www.aoml.noaa.gov/phod/dac/gdp.html>.

#### 2. Data Flow and Quality Control

Drifting buoy data are transmitted in real-time via Service Argos. A pilot project has been established by the Data Buoy Cooperation Panel to evaluate Iridium transmission. Each drifter's positions are visually inspected at NOAA/AOML's drifting buoy Data Assembly Center (DAC) to verify that the drifter has been deployed and is successfully transmitting data. Once this is verified, the DAC assigns a WMO number and informs Argos that the data is ready to be placed on the GTS for distribution to operational forecasting centers.

In delayed mode, typically at a lag of two to three months, these data are quality controlled and interpolated at NOAA/AOML's DAC. The DAC performs quality control including identifying when/if drifters have run aground, been picked up, ceased transmitting or lost their drogues and removing bad SST and location fixes. Drogue loss dates and the dates of final good data transmission are maintained for all drifters in META files available at the GDP website (URL above). The DAC also interpolates the data to regular 1/4-day intervals and freely distributes this processed database via a graphical user interface. These quality control and

interpolation algorithms are described in Hansen and Poulain (1996, *J. Atmos. Ocean. Techn.* **13**, 900-909). Raw, quality controlled and interpolated data are archived at the DAC and at the Marine Environmental Data Services ([http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog\\_Int/CLIVAR/SVP/SVP\\_e.htm](http://www.meds-sdmm.dfo-mpo.gc.ca/meds/Prog_Int/CLIVAR/SVP/SVP_e.htm)).

Twice per year, the drifter velocities are corrected for wind-driven slip using the formalism developed in Pazan and Niiler (2001, *J. Atm. Ocean. Technol.* **18**(3), 476-498). This improved data set is available from Peter Niiler ([pniiler@ucsd.edu](mailto:pniiler@ucsd.edu)).

### 3. Timeliness of Distribution

All of the Global Drifter Program data go on GTS in real time once drifter deployment has been verified by NOAA/AOML's DAC. Users can view the GTS buoy data at <http://www.meteo.shom.fr/qctools/>, maintained by Pierre Blouch (Meteo France) and updated at 1200 UTC with all data received before 0000 UTC. Users can download the GTS data at <http://www.aoml.noaa.gov/phod/trinanes/xbt.html>, maintained from the AOML database, or from any other GTS server.

GTS lags are due to the frequency of satellite overpasses and Service Argos processing time (less than 24h), and were significantly reduced in 2005 with the addition of multisatellite processing for the entire global drifter array (December 2004 Joint Tariff Agreement). With multisatellite Argos processing, the median interval between position fixes and data acquisition is 1.2 hours.

Delayed mode data are typically distributed every two to three months, and span the entire Global Drifter Array dataset from the earliest deployments of drifters with holey-sock drogues centered at a depth of 15 m (February 1979) to the most recent quality-controlled, interpolated observations.