ITOP DATA: USAF-C130 Lagrangian Float Data

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1.0 Overview

This dataset includes data from 7 Lagrangian floats air-deployed ahead of Typhoons Fanapi and Megi as part of ITOP. Each float was deployed with an EM-APEX float, described in a separate data release. Figure 1 show the tracks of these floats in both storms along with the storm tracks and a wind field.

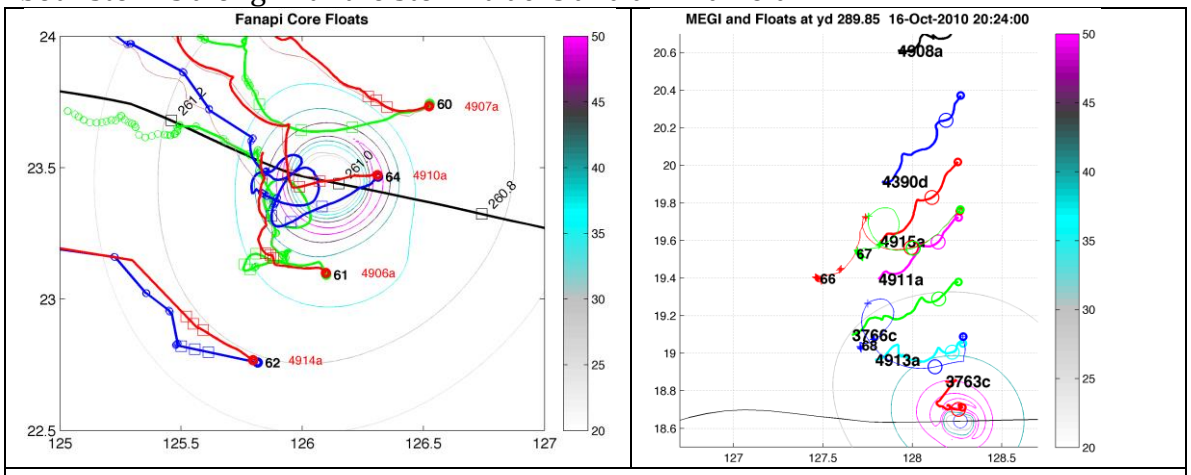

Figure 1. Lagrangian and EM-APEX floats deployed in Typhoons Fanapi (left) and Megi (right). Storm track (black) and a wind field (contours) are shown for reference. Fanapi Lagrangian floats are 60, 61, 62 and 64. Megi Lagrangian floats are 66, 67 and 68. Other floats are EM-APEX. Estimated tracks of each float are shown; heavy circle is deployment site. Yeardays of 2010 are indicated on both figures.

2.0 INSTRUMENT DESCRIPTION:

Lagrangian floats are built at the University of Washington, Applied Physics Laboratory and are similar to that described in D'Asaro (2003). Unlike Argo floats, which are designed to efficiently profile, these floats are primarily designed to accurately follow the three-dimensional motion of water parcels within the mixed layer, through a combination of neutral buoyancy and high drag provided by an ~1-m^2 drogue. Typical buoyancies of a few grams result in vertical velocities relative to the water of a few millimeters per second, small compared to the many centimeter per second turbulent velocities in the mixed layer. The Lagrangian floats are air-deployed ahead of the storm, slowly sink to ~150m for 12 hours, then move upward into the mixed layer for 36 hours of turbulence measurements, surfacing briefly

after about 17 hours to get a GPS fix. After the storm has passed the floats do additional profiles for a few days, depending on their battery state and recovery options. All of these ITOP floats were recovered by ship.

3.0 DATA COLLECTION AND PROCESSING:

Table 1 shows the data collected by these floats and its status at time of submission.

Measurement	Sensor	Sampling	Accuracy	Status
Pressure	Druck/APL	30 sec	10 cm	released
Salinity	Seabird 41	30 sec	0.005 psu	Released, some noise spikes remain in #66
Temperature	Seabird 41	30 sec	0.002 C	released
Oxygen (Megi only)	Seabird 43	30 sec	2 uMol/kg	Released

Pressure was calibrated at APL using a deadweight calibrator. Although not released separately here, each float had 2 pressure sensors independently sampled and calibrated. Temperature and salinity values were calibrated at Seabird and released using this calibration. Oxygen sensors were calibrated as described in D'Asaro and McNeil (2013).

Float position is estimated from GPS fixes at time of deployment, at the one storm surfacing and after the storm has passed. Interpolation between these is done by integrating the EM-APEX velocities at the float depth and adjusting this curve to fit the GPS points.

4.0 DATA FORMAT

Data is released as Matlab binary files with the following variables:

- yd – yearday of 2010. 01-Jan-2010 is yearday 1
- T,S,P – temperature, salinity, pressure
- Lat,Lon – latitude and longitude
- O2 – (Megi only) – dissolved oxygen uMol/kg

Plots of each float's data are included for reference in '.png' format.

5.0 DATA REMARKS:

Salinity has some bad points.

6.0 REFERENCES:

D'Asaro, E.A. (2003), Performance of autonomous Lagrangian floats, *J. Atmos. Oceanic Tech.*, 20, 6, 896-911

D'Asaro, Eric A., Craig McNeil, 2013: Calibration and Stability of Oxygen Sensors on Autonomous Floats. *J. Atmos. Oceanic Technol.*, **30**, 1896–1906