

Drifter Studies of the Western Pacific, Indian Ocean and Arabian Sea

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LONG-TERM GOALS

The overarching objective of the proposed Lagrangian drifter effort is to collect in-situ Lagrangian observations of surface currents over the Mariana trench/ridge system between Palau and Guam, in the Indian Ocean and in the Arabian Sea to improve the dynamical knowledge and predictability of the near-surface circulation in these regions and to provide an independent dataset for the validation of numerical models.

OBJECTIVES

Specific objectives of this effort include addressing the following science questions:

- 1) What does the existing drifter dataset that contains Lagrangian current observations from the early 80's reveal about interactions of the large-scale currents with the regional topography? Where are additional observations of surface currents particularly needed?
- 2) What is the effect of the meridionally sheared horizontal currents of the westward NEC and eastward NECC on the generation of mesoscale eddies? Are there interactions/energy transfers between the mean flow and eddies? Do recently identified mesoscale features such as the Micronesian Eddy have an impact on the boundary current observed on the east side of Palau?
- 3) Can the island rule provide a plausible explanation for observations of currents near abrupt topography, particularly near Palau? Or, are the local forcing mechanisms providing a dynamically sound explanation? Are there other sites in the FLEAT region where flow intensification near steep topography is observed?
- 4) What is the seasonal variability of the near-surface circulation? Is the seasonality modulated by longer-term phenomena such as ENSO? Are there regional differences in the response of the currents to changes in the wind field?

The technical objective is to fabricate and deploy the drifters needed to support the experimental componentt of this effort.

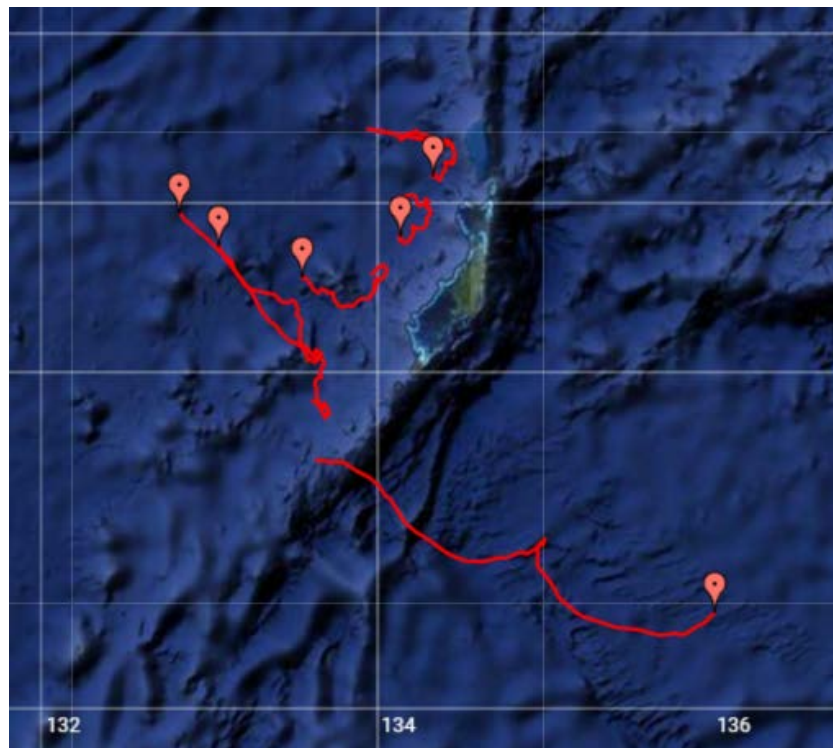
APPROACH

In this study, we propose to deploy Surface Velocity Program (SVP) drifters drogued at 15 m. The drifters will be fabricated by the Lagrangian Drifter Laboratory at SIO, with ruggedized battery packs to extend the drifter’s lifetime, an Iridium transmitter, and a GPS receiver.

The expected lifetime of the drifters is approximately two years. The drifters will measure sea surface temperature (SST) and will be registered under the Global Drifter Program (GDP) that, in turn, will be financially responsible of the satellite transmission costs. In exchange, the drifter data will be made publicly available in real time through the Global Telecommunication System (GTS) of the World Weather Watch (WWW). Therefore, the drifter data will be easily accessible in real time by all the major forecast centers, including the US Navy.

WORK COMPLETED AND RESULTS

The fabrication of the drifters is underway. The first six drifters were east of Palau by Dr. Shaun Johnston during cruise RR1515 on 10/17/2015. The track of the drifters is shown below.



Tracks of 6 SVP drifters deployed from the R/V Roger Revelle on 10/17/2015

IMPACT/APPLICATIONS

The Navy has a continuing need for improvement of the accuracy of the observations of circulation, and the development of more realistic physical representations of the dynamics of ocean surface currents and mesoscale resolving sound velocity structures related to the currents in the study region, a strategically important littoral area of PACFLEET operations. The proposed observations are intended toward meeting this Navy need of improved datasets on ocean circulation.

RELATED PROJECTS

The Global Drifter Program

PUBLICATIONS

None