



University of Hawaii at Manoa

School of Ocean and Earth Science and Technology
Department of Oceanography
1000 Pope road • Honolulu, Hawaii 96822
Telephone: (808) 956 7633 • Telefax: (808) 956 9225

13 July 1996

From: Pierre Flament
To: John Sibert, Program Manager, Pelagic Fisheries Project
Subject: third annual report
"Physical oceanography environment of pelagic fishes"
Cc: Thomas Schroeder, JIMAR
Bo ~~Qu~~, Oceanography
Lorenz Maggaard, SOEST
Peter Garrod, University Research Council

Please find below my report for the third year of this project (1 August 1995 to 31 July 1996). A separate text summarizes our scientific findings to this date. The main activities are summarized below.

1. Deployment, tracking and data management

- (a) we completed the deployment of all buoys procured for this project (70), using a cruise on the R/V Cromwell contributed by NMFS (April 1996), small boat deployments by the Hawaii Natural Energy Laboratory (May 1996), and by two yachts in transit from Hawaii to Tahiti (June and July 1996). The buoys were deployed in the immediate lee of Maui, Hawaii and Oahu, to maximize their residence time in the Hawaiian EEZ, and to fill previously poorly sampled areas.
- (b) we have compiled preliminary survival characteristics for the buoys. The modification of the standard WOCE-SVP design, to increase the resistance to fish bites by shielding all steel wire with hydraulic hoses, proved beneficial, since the average buoy life is around 440 days, exceeding the life observed by any other drifting buoys project.
- (c) we procured and installed at Snug Harbor an ARGOS precision reference platform, to increase the precision of our positions using a differential technique. Service ARGOS

has agreed to let us operate this platform at no cost in exchange for them being able to use the data.

- (d) we have continued delivering plots and movies in real time over the Internet, through ftp and http access to <http://satftp.soest.hawaii.edu/satlab/drifters.html>. The yearly number of anonymous accesses of drifter plots and data is now reaching about 14,000.

2. Scientific collaborations and student supervision

- (e) I participated in a summer workshop (July-August 1995) on upwelling and fisheries at the University of Gran Canarias, with funding from the European Union at no cost to Pelagic Fisheries program. I interacted with Profs. Aristegui on the ocean circulation around the Canary islands, which displays many characteristics similar to those found around Hawaii.
- (f) I attended the Fall 1995 Pelagic Fisheries conference in Honolulu, and presented preliminary results of this project.
- (g) I worked with B. Qiu on the mean circulation around the Hawaiian islands. To examine the formation mechanisms for the North Hawaiian Ridge Current, we used a 2.5-layer reduced-gravity model with variable resolution, forced using Hellerman and Rosenstein's monthly climatological winds. The model successfully simulated the mean NHRC, which appears to be due primarily to the mean rather than to the time-varying wind forcing. This work is submitted to the Journal of Physical Oceanography.
- (h) I interacted with other investigators in the Pelagic Fisheries program, by providing digital drifter tracks (Polvina), advise on archival tag design (Boggs), advise on ARGOS tracking (Block) and joint work on the mean Pacific surface temperatures (Bigelow)
- (i) I initiated collaborations with French scientists in the "Piccolo" program, studying the relationship between physics, biology and fisheries in the eastern tropical Atlantic. I will join and contribute hydrographic equipment one of their cruise in Spring 1997.
- (j) I kept a close contact with WOCE-SVP (Surface Velocity Project) scientists, by attending the 7th annual international working group meeting, held in May 1996 in Toulouse, France, and presenting two lectures on our results in the Pacific. Contacts made at the meeting will probably result in additional drifters provided by NOAA for deployment and testing off Hawaii, which will augment our database at no cost to this project.

- (k) I supervised Rick Lumpkin, who successfully past his PhD qualifying examination last April, proposing to base his dissertation on a combined analysis of drifter and model data for the Hawaii EEZ.

4. Publications

- (l) I wrote, in collaboration with other participants in the PFRP, the "Ocean Atlas of Hawaii", a general public presentation of the physical oceanography of Hawaii waters. This text has been on the world-wide-web at <http://satftp.soest.hawaii.edu/atlas/> since January 1996, encountering about 80 hits/day. It will be published in the UH Press' new edition of the Atlas of Hawaii, and separately as a poster that will be distributed to fishermen, marine stores etc... thorough the State.
- (m) with Rick Lumpkin, we are preparing a manuscript to be submitted to Science and Nature, on our discovery of the Hawaii Lee Counter-Current. Once this manuscript is submitted next Fall, we will prepare two additional papers based on this data set, once on case studies of eddy formation in the lee of Hawaiian islands, the other on statistics inferred from the drifter array.

I apologize for having been unable to attend the Lake Arrowhead conference, which conflicted with the WOCE_SVP meeting. However I attended the Fall meeting in Hawaii, and will again attend the Fall meeting this year.

This third year concludes the preparation and deployment phase of this project. The remaining funding will be used to maintain the drifters array for one additional year, and to support graduate student Rick Lumpkin to analyze the data and publish the results as part of his doctoral dissertation, expected in Fall of 1998.