

Evaluation of Remote Sensing Technologies for the Identification of Oceanographic Features Critical to Pelagic Fish Distribution Around the Hawaiian Archipelago

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Funding Agency: NOAA (PFRP)

Purpose of the Project:

The purpose of the project is to use remote sensing, in conjunction with ocean models, in situ data from research vessels and catch data obtained from the commercial fisheries, to identify and characterize the oceanographic environment that is important to the spatial and temporal dynamics of pelagic fishes and fish catches around Hawaii. The project focuses on data from two satellite sensors: the altimeter aboard TOPEX/POSEIDON and SeaWiFs ocean color to examine the coupled relationship of the environment and fishery resources at the major fronts associated with the Subtropical Frontal Zone (STFZ) and the Transition Zone Chlorophyll Front (TZCF).

Progress during FY 2000

The STFZ typically serves as the fishing grounds for the Hawaii-based longline fishery targeting swordfish, *Xiphias gladius*. A detailed oceanographic re-characterization of the STFZ has been completed and we continue to examine the relationship between swordfish catch rates and changes in sea level height (SLH). Seasonal and interannual variation in SLH shows a high (inverse) coherence with CPUE; a drop (rise) in SLH corresponds to a rise (fall) in swordfish CPUE.

Global ocean color is used to study the dynamics of the basin-scale TZCF, located at the boundary between the low chlorophyll subtropical and the high chlorophyll subarctic gyres, and the links between the interannual dynamics of this feature, specifically its position and persistence, and ecosystem impacts, including trophic transfer and migration routes. Loggerhead turtles, *Caretta caretta*, and albacore tuna, *Thunnus alalunga*, exhibit strong affinity to and migration along the TZCF.

Results from this work were presented in at the January 2000 AGU Ocean Sciences Meeting in San Antonio and at the Beyond El Niño Conference in March 2000.

Plans for the next fiscal year: Project completed in FY 1999.

List of Papers published in refereed journals during FY 2000:

Polovina, J. J., D. R. Kobayashi, D. M. Ellis, M. P. Seki, and G. H. Balazs.

2000. Turtles on the edge: movement of loggerhead turtles (*Caretta caretta*) along oceanic fronts in the central North Pacific, 1997-1998. *Fish. Oceanogr.* 9(1):71-82.

Other papers:

Seki, M. P., J. J. Polovina, D. R. Kobayashi, R. R. Bidigare, and G. T. Mitchum.

In review. An oceanographic characterization of swordfish longline fishing grounds in the Subtropical North Pacific. *Fish. Oceanogr.*

Polovina, J. J., E. Howell, and M. P. Seki.

In review. Satellite ocean color sensors detect biological change in mid-latitude North Pacific, 1997-2000. *EOS, The American Geophysical Union.*

Polovina, J. J., E. Howell, D. R. Kobayashi, and M. P. Seki.

In review. The transition zone chlorophyll front, a dynamic global feature defining migration and forage habitat for marine resources. *Progress in oceanography.*