Chlorophyll and Primary Production in a Cyclonic Eddy off the Island of Hawaii

Carrie L. Leonard and Robert R. Bidigare

Department of Oceanography
1000 Pope Rd.
University of Hawaii
Honolulu, HI 96822 USA
carrie@soest.hawaii.edu; bidigare@soest.hawaii.edu

Abstracts

Both cyclonic and anti-cyclonic eddies formation are a common occurrence in the lee of the Island of Hawaii due to disruption of the trade winds between Maui and Hawaii to the north and the Kilauea volcano to the south. Recently, these eddies have been successfully tracked using GOES satellite imagery of sea surface temperature (SST). During an eddy spin up in March 1999, an increase in SeaWiFS surface chlorophyll was associated with cooler SSTs as recorded by GOES.

Estimates of primary production inside and outside of the eddy were computed using a full-spectral depth-dependant primary production model with the satellite chlorophyll as input. New production was also estimated using field data from a similar eddy sampled in a previous year. New production increased 10-fold inside the eddy, while total primary production simply doubles and surface chlorophyll was only 2.5 times the outside values. It appears that eddies off the Big Island may contribute substantially to local new production rates, and that ocean color can be successfully used to track and calculate production due to these eddies.