

# **oc1507b Cruise Plan**

## **Science Objectives**

The objectives originally proposed were two-fold: to describe conditions influencing the accumulation of surface organic matter and to identify regions of enhanced benthic boundary exchange of the trace metal iron. To carry out these objectives we covered regions extending from Points Arguello and Conception to the CCE-2 Mooring (near CalCOFI Station 08.0 055.0), southward around the Channel Islands and eastward into the Santa Barbara basin (see Appendix 1 for map). Over 40 CTD casts were launched to collect surface water from several depths and to identify the benthic boundary layer by beam transmittance. Additional work was set out to measure surface pCO<sub>2</sub> concentrations by pumping flow-through water into a system developed by Kylee Chang (Martz lab), and two transects surrounding the CCE-2 Mooring provided context to the stationary time series. Further, several incubations were conducted on board to quantify zooplankton grazing, describe the chemical characteristics of fecal pellets produced by zooplankton, and to quantify the microbial degradation of surface organic matter as a function of micro- (iron) and macro-nutrient (nitrate) limitation. Finally, benthic organisms were collected via otter trawl to assess the relative biological impacts of varying dissolved oxygen concentrations; however, unfortunately, the trawl was lost during its second deployment thereby removing further opportunities to collect benthic organisms.

## **Overview of the Science Plan**

Our study region primarily focused on the coastal regions surrounding Points Conception and Arguello as well as the benthic region surrounding the Channel Islands. We have selected these locations primarily due to relatively high levels of primary production associated with coastal upwelling in this region, where we hypothesized that the benthic region is likely a significant source of micronutrient iron to the surface ocean here. Further, we hypothesized that this region serves as a laterally transportable source of nutrients and accumulating organic matter.

We began the cruise by transiting from the 10<sup>th</sup> Ave. Terminal in San Diego to Point Conception, a transit requiring 22 hours. The following 24 hours comprised of a near- to offshore transect, covering four stations from Point Conception to the CCE2 Mooring. Twelve-hour shifts were then alternated over the following cruise three days between benthic boundary trace metal work during the day (Barbeau Lab) and surface organic matter, zooplankton experiments and hydrographic assessment during the night (Aluwihare, Mitchell and Landry Labs). With the extra free time due to the loss of the otter trawl, the study area and number of CTD casts increased for both the benthic boundary layer and surface biogeochemical work (see Appendix 1 for map of CTDs and pages 9-11 for a list of Daily Activities).