

CCE Moorings

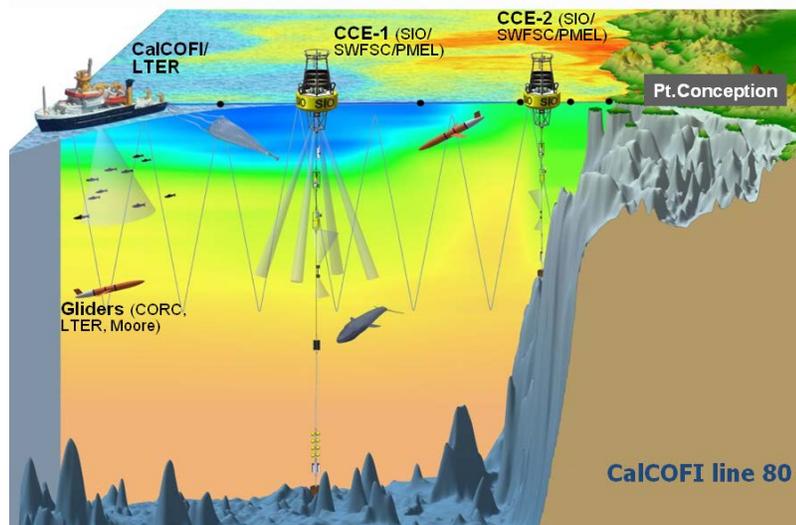
Moored Climate, Carbon, Biogeochemical, and Ecosystem Observations in the Southern California Current

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Project Summary

The California Current is a region of large ecological significance and known sensitivity to climate forcing. Climate processes, complex physical systems, carbon and nutrient chemistry, and ecosystem dynamics all interact to create a rich, societally important, and scientifically fascinating ocean environment off the west coast of the US. The CCE mooring project has established a unique highly multidisciplinary timeseries presence in the southern California Current, complementing ship-board observations from LTER and CalCOFI, glider observations, satellite remote sensing, and the flow and transport monitoring system that has been initiated under CORC, and has initiated a comprehensive continuous real-time monitoring system for this region.



The two moorings now operating, called CCE(California Current Ecosystem)-1 and CCE-2 are located in the offshore core California Current and the coastal upwelling regime, respectively, along CalCOFI line 80, and measure

- **atmospheric conditions** ($x(\text{CO}_2)$, wind, temperature, humidity, precipitation, irradiance),
- **upper ocean conditions** (temperature, salinity, $p(\text{CO}_2)$, O_2 , pH, currents, point and integrated measures of phytoplankton chlorophyll content over the euphotic zone, and nitrate concentration),
- **two-frequency active-acoustic observations** of zooplankton and fish biomass.

Most of the data are telemetered in real-time and publicized via websites to other researchers and agencies.

The CCE moorings are intended to serve as an example and nucleus for enhanced autonomous observations of the California Current climate system, carbon cycle, ocean acidification processes, and ecosystem changes. They also represent a real step towards a recognized need in the sustained ocean climate observing system – techniques and implementation of observing infrastructure that address the societal challenges motivating the climate, biogeochemistry, and ecosystem community. This type of integration was clearly identified as a major need at the OceanObs09 conference in Venice. The merging of many new technologies, the highly collaborative nature, and merging of different funding sources, is a promising example of how to enable such observations in the future. CCE1 and 2 are possibly the first sustained US sites which are aimed at filling this gap in the global ocean observing system.

The supported activities include operation of the two highly instrumented real-time moorings along CalCOFI line 80 and processing of the data. This includes construction of moorings, execution of cruises, servicing and calibration of sensors, upgrading of technology, and participation in west coast wide ocean acidification research.

The developing products and outcomes include:

- long records of the processes and variability in the physical, biogeochemical, and ecosystem conditions in the southern California Current
- data sets to develop and validate biogeochemical models
- integration of the data with other OA and ecosystem programs along the US west coast.

The users/applications include the carbon, OA, ecosystem, and fisheries research community and agencies, modeling centers, and fisheries management programs. The data complement and add value to the existing ecosystem and stock assessment ship surveys along the west coast.