

**Coastal Ocean Currents Monitoring Program (COCMP)
in Southern California
Grant # 04-078**

**1st Quarter Report 2007
Period of Performance: 1 January 2007 – 31 March 2007**



**Submitted to the State Coastal Conservancy by the
Southern California Coastal Ocean Observing System (SCCOOS)**

INTRODUCTION

The Southern California Coastal Ocean Observing System (SCCOOS) continues the implementation of the Coastal Ocean Currents Monitoring Program (COCMP) for Southern California.

COCMP is a significant component of SCCOOS's efforts to build ocean observing and monitoring capacity for the region. This effort is being augmented with federal funding to serve user needs and contribute to the evolution of a comprehensive ocean observational system for both the region and State. SCCOOS continues to coordinate with the Central and Northern California Ocean Observing System (CeNCOOS) to ensure a unified statewide system.

Program tasks include:

- A. Surface Current Mapping (SCM) Array
- B. Nearshore and Surfzone Observations
- C. Subsurface Observations
- D. Regional Ocean Modeling
- E. Data Distribution and Management

This report describes first quarter activities and progress that took place in these task areas. A major activity early in the first quarter was the preparation and conduct of the COCMP External Review.

COCMP EXTERNAL REVIEW

A significant activity of the first quarter was conduct of the COCMP External Review by the Coastal Conservancy. This review was held 24-25 January 2007 at the Ocean Institute in Dana Point, California. The purpose of the external review is to review the status of instrument installation, learn about and discuss program-supported demonstration projects, and guide program implementation and delivery of products. Principal Investigators (PIs) and staff members from SCCOOS and CeNCOOS provided the review team with updates on the progress and status of the installation of HF radar in their regions. PIs Eric Terrill, Bob Guza, Russ Davis, and Yi Chao gave presentations on HF radar installation, Huntington Beach 2006 demonstration, glider observations of the ocean, and modeling activities. Other SCCOOS PIs and staff attending were Mark Moline, UC Santa Barbara, Lisa Hazard, and Stephanie Peck.

SCCOOS prepared a comprehensive COCMP 2006 Annual Report that was submitted to the Coastal Conservancy and presented its 2007 Annual Work Plan for approval.

PROGRESS REPORT BY TASK

Task A. ESTABLISH SCM ARRAY FOR MAPPING OCEAN CURRENTS

Task A.1 SCM Site Assessment

CalPoly, UCSB, USC, and SIO continued efforts on surface current mapping site permissions and installations throughout the first quarter of 2007.

Throughout this quarter, efforts focused on continuing site permissions with the USCG as there are five USCG owned property locations that are ideal for seamless coverage within Southern California. Permissions at USCG facilities had been stalled due to frequency modulation assessment internal to the USCG. At the Coast Guard's request, the Joint Spectrum Center recently completed an EMC analysis of CODAR and interference potential with Coast Guard HF systems. The study recommended antenna separation and filters to ensure no interference with operational USCG equipment. All but one of the sites requested on USCG property within Southern California do not have operational equipment. Although the study was primarily focused on a site in Venice, Florida, the conclusions aided West Coast decisions. COCOMP is now able to continue with Coast Guard permissions. The USCG did allow a temporary installation at Point Fermin prior to conclusions from the study, which allowed for coverage of HB06.

Task A.2 Site Permissions

The permissions process proves variable for each location, depending particularly on site owner and land situation. SCCOOS representatives from Cal Poly received approval for a co-located standard- and long-range site at Diablo Canyon from Pacific Gas and Electric (PG&E). Although, the two systems are located at a power plant facility, PG&E required standalone operation and solar powered systems. The systems are installed and are waiting for the solar power units.

Early in this program, examination of likely coverage indicated that Pt. Dume would be an excellent SCM site. Coverage from the site could include much of Santa Monica Bay and coastal waters west of the Point. However, discussions between SCCOOS personnel indicated that sites on either side of Point Dume should be pursued rather than Point Dume itself. Because of the aesthetics of the site, a request to place a SCM site at the Point would likely face strong opposition from the surrounding community and local agencies. Consequently, the UCSB group searched an area west of the Point for a site and the USC group searched for a site east of the Point. The UCSB group has submitted proposals to the Los Angeles County Department of Beaches and Harbors for sites at Zuma Beach and Nicholas Canyon Beach.

The site at Newport Beach is nearing permissions process completion and SCCOOS engineers are finalizing the installation specifications. The City of Newport is supportive of the system deployment at the end of the Newport pier. USC field engineers have coordinated the installation of conduit necessary for cable runs under the pier in conjunction with previously scheduled pier maintenance. The system is scheduled to be fully operational in the second quarter 2007.

SCCOOS personnel pursued permissions at the Headlands Harbor Point Park at Dana Point and were denied approval by the City of Dana Point. Field engineers sought an alternate location at the Ocean Institute just south of the point. Early in January, SIO conducted a field test on location to determine feasibility of the site. The coverage from Ocean Institute proved acceptable and, therefore, SCCOOS obtained permission to install a surface current mapping system.

Task A.3 Frequency Allocation

There were no activities to report in this subtask during the quarter.

Task A.4 Site Preparation and Equipment Order

Reliant Energy installed a new electric circuit at our Mandalay Generating System SCM site which has greatly increased its reliability. Based on previous experience, the value of this electrical installation is about \$10,000.

SCCOOS is currently on schedule with delivery of HF radar systems. CODAROS has delivered thirteen to date, and ten systems have been installed. There are currently two 25MHz systems waiting for installation at Newport Pier and the Point Loma Wastewater Treatment Plant. SCCOOS staff anticipates continued on schedule delivery and installation.

Task A.5 Standard Operating Practices

SCCOOS personnel completed antenna calibrations at Coal Oil Point (COP), the Summerland Sanitary District (SSD), and the Mandalay Generating Station (MGS). These calibrations improved coverage to the east of COP, and improved angular coverage at MGS. The calibration at SSD had a significantly higher signal-to-noise ratio (SNR) than was previously obtained. Higher SNR should result in higher quality current measurement, and UCSB personnel are in the process of quantifying the results

Representatives from the SCCOOS HF radar task have collaborated on a Standard Operating Practices draft document. This document details best practices for HF radar related tasks such as: locating a site, power requirements, communications, enclosure specifications, supporting equipment (UPS, backup drives, etc.), antenna tuning, antenna pattern measurement, software configuration, site maintenance, data management, and quality control. This working document will be iterated upon throughout the community and will provide and outline of management practices learned through experience. A meeting of the task force is being planned for early April 2007.

TASK B. ESTABLISH NEARSHORE AND SURFZONE OBSERVATIONS (HB06)

Task B.1 Wave and Current Observations

Post-demonstration QA/QC of Huntington Beach 2006 wave and currents data is continuing to be conducted.

Task B.2 Transition Zone Observations – AUV, Drifter and Mooring Deployment

Data QA/QC of Huntington Beach data collection effort.

Task B.3 Modeling wave evolution & currents to nowcast surfzone currents

Assigned model prediction points for Ventura and Santa Barbara Counties. This

extension completes the Southern California Bight.

Task B.4 Northern and Central Nearshore Data

A site was selected for a new local wave buoy off Monterey Bay. Initial wave model calculations were performed for several test sites in southern Monterey Bay and along Ocean Beach in San Francisco.

SCCOOS/CDIP personnel planned future model validation efforts with the Naval Postgraduate School and the USGS.

C. ESTABLISH SUBSURFACE OBSERVATIONS

Task C.1 Underway CTD

Continued operation of the underway CTD in Southern California.

Task C.2 Bight-Scale Monitoring

Glider operations on legs in Southern California and on a newly begun transect offshore Monterey in collaboration with scientists from CENCOOS.

D. ESTABLISH REGIONAL OCEAN MODELING

Task D.1 Model Research and Development

Continued Model development, with focus on the assimilation of HF radar data into the ocean modeling system.

Task D.2 Wind Product for use by ROMS

Continued wind model operation at UCLA.

Task D.3.1 Covariance and Objective Mapping using COCOMP observations

Continued mapping efforts of HF radar data, examining the decomposition of forcing functions of the surface currents, and developing uncertainties of HF radar data. Objective mapping of radial data in all of Southern California is underway, with emphasis towards algorithms for near-real time objective

Task D.3.2 Synthesis of SCCOOS Data and Prediction of Fields

Efforts are underway to release an operational model this summer for evaluation by SCCOOS scientists.

E. DATA DISTRIBUTION AND MANAGEMENT

Task E.1 Information Technology Development

Planned data collection and dissemination efforts continue within the SCCOOS program. As the network of HF radar systems grows within California, programmers update and incorporate new data streams into the mapping system. An HF-Radar Network Node was sent to JPL in May 2006 for dissemination of measurements made by HF-Radar systems throughout California. These data are processed to produce surface current velocities at variable resolution (nominally 1, 2 & 6km) along the West Coast of the United States and will be assimilated into the Regional Ocean Modeling System (ROMS-DAS) in near-real time at JPL.

SCCOOS representatives provided feedback into the newly created IOOS Regional Observations Registry following a request for input from Regional Associations. SCCOOS programmers provided an XML document designed to conform to meet minimum FGDC required fields (CSDGM core requirements), while meeting the IOOS registry requirements as best as possible still conforming to the FGDC metadata standard. Programmers also detailed a best fit 1-to-1 relationship between the IOOS registry specification and the FGDC specification. SCCOOS's registration of its regional observations, which will be completed in April 2007, will include all radars in operation for COCMP.

Task E.2 Product Development

SIO programmers are working with Ocean Institute staff to develop a basic mapping display web portal for visitors to view data. This activity will foster community outreach and provide an interactive utility for the Ocean Institute. The Ocean Institute plans to use this modified portal for education and outreach activities.

Both CeNCOOS and SCCOOS now have a seamless portal to the surface current data through an interactive google maps interface. This interface is updated in near real-time not only with surface current data, but also with system diagnostics. Field engineers utilize these diagnostics pages for troubleshooting system status, temperatures, signal levels, coverage area, and range statistics.

SCCOOS has initiated a targeted outreach effort to the maritime safety community, beginning with a focus on lifeguard agencies. SCCOOS will raise awareness with this user group of potential public safety applications and seek directed input on user needs and on development of data products. Early in the next quarter, SCCOOS will attend and make a presentation to the California Surf Lifesaving Association Board of Directors Spring meeting in Redondo Beach.