

# AVAILABILITY OF MOORED DATASETS FROM THE SANTA BARBARA CHANNEL-SANTA MARIA BASIN CIRCULATION STUDY

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## ABSTRACT

Moored datasets including ocean current, temperature, salinity, and bottom pressure measurements have been collected and archived in the Santa Barbara Channel and Santa Maria Basin areas since 1992. This extensive dataset has undergone quality control and is now available on the Internet. Near-real-time data is also available over the Internet, and sample applications of that accessibility are presented in the context of coastal monitoring and oil spill response. Maps of the data are presented here. Information on dataset availability, format, and instructions for accessing the data are presented. Future plans for data formats and web delivery are also discussed.

**Keywords:** Moorings, currents, temperature, salinity, bottom pressure, Santa Barbara, monitoring, oil spill.

## INTRODUCTION

In this paper, moored data collected during the Santa Barbara Channel-Santa Maria Basin Circulation Study since 1992 will be presented. The phrase *moored data* is used here to describe several datasets which are collected from a set of instruments moored at various depths. These datasets include vector measured currents, temperature, salinity, and pressure data. The collection, processing, and archiving methods are explained, and public access to the datasets is discussed.

### Study Location

The mooring sites are located within the Santa Barbara Channel (SBC) and the Santa Maria Basin (SMB), between the 30 m (meter) and 200 m isobaths (Figure 1). The moorings have four-letter names, in which the first two letters represent a nearby geographical landmark (e.g. "AN" for the island of Anacapa), and the last two letters indicate whether the mooring is inshore ("IN"), offshore ("OF"), or in the middle ("MI").

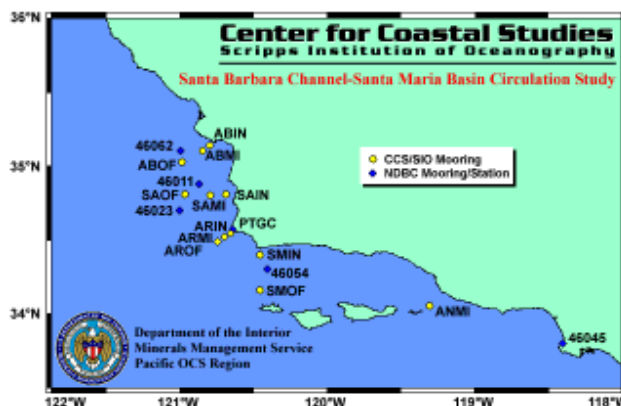


Figure 1. Study region, showing location of moorings and their names. Also shown, as a reference, are the locations of five NDBC meteorological platforms.

## MOORED DATASET

### Introduction

The moored array consists of a total of twelve moorings deployed over the shelf along the 30 m, 100 m, and 200 m isobaths. Our standard mooring (Figure 2) consists of a surface buoy with ARGOS transmitter and temperature logger at 1 m depth, current meters at 5 m and 45 m which also record temperature and conductivity, additional temperature loggers at 25 m and 65 m depth, and a bottom anchor which houses a pressure sensor that additionally records temperature and conductivity. Individual deployments of moorings are on the order of 8 to 10 months.

### Instrumentation

Ocean current is measured by vector measuring current meters (VMCM) which internally record north and east components of currents, temperature, and conductivity. The conductivity data is fed into the VMCM from an externally mounted SeaBird Conductivity Sensor SBE 4. The temperature logging instruments found at 1 m, 25 m, and 65 m depths were developed in-house. The bottom pressure sensor instrument measures both pressure and temperature directly and is fed conductivity from an external SeaBird Conductivity Sensor. The VMCMs are outfitted with an

## Standard 100m Mooring

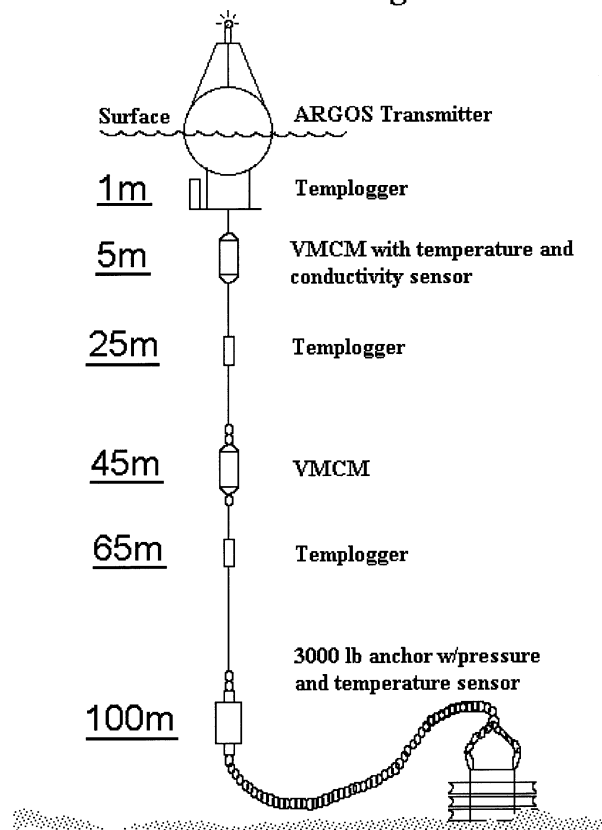


Figure 2. This diagram shows the standard layout of our 100 m mooring. In addition to the notes listed on the diagram, conductivity measurements are taken at 45 m and at 100 m.

external serial dataport, and the top-most 5 m instrument is connected via cable to the buoy mounted ARGOS transmitter to allow for near real-time transmission of data. Data received through ARGOS includes two-hour averaged data from the 5 m instrument, as well as latitude and longitude coordinates of the mooring which is used to monitor its location.

Calibration of the instruments is performed before and after deployments. The suite of calibrations includes compass, temperature, flow, and pressure calibrations. The manufacturer performs conductivity calibrations.

### Data Processing

The data from the various instruments are processed in similar manners. Each instrument records the data internally on standard PC flash memory cards. The data retrieved from these cards is processed with a suite of programs that apply the calibration information in order to convert the data from instrument values to standard engineering units. A sample plot of data collected from the inshore Avila Beach mooring (ABIN) 5 m current meter is shown in Figure 3.

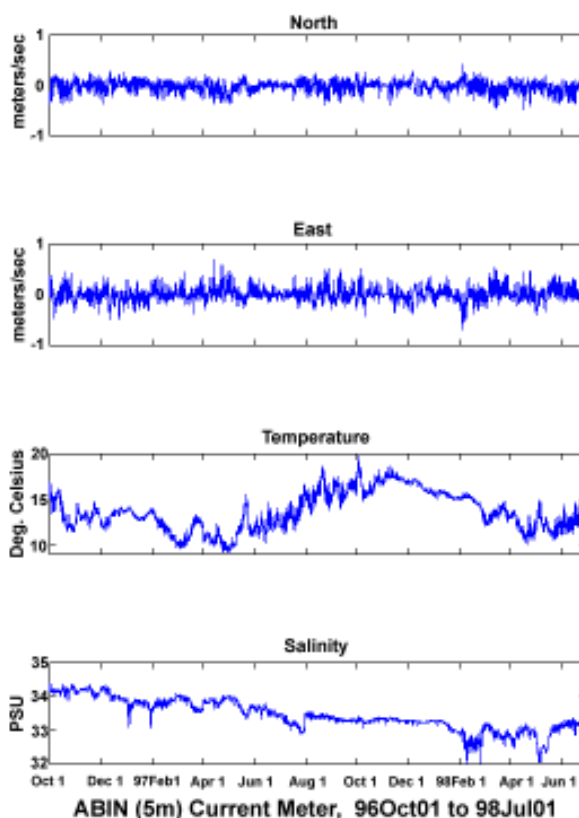


Figure 3. This plot shows sample data from the 5 m VMCM at the Avila Beach Inshore (ABIN) mooring. The data behind this particular plot has not completed quality control. This can be seen in the salinity plot around August 1, 1997, where the merge point of two deployments is still visible and a correction must be applied.

### Quality Control, Averaging, and Data Format

Data is recorded in four minute averages and remains at this sample interval as it undergoes further quality control measures to remove erroneous data. Once processed, the data is converted to hourly averages before being published on-line.

The moored data from this project are currently archived in an ASCII format called CSA. This is a columnar format, with five lines of header information (Figure 4). We are currently in the process of converting the data to netCDF, a binary format that is quickly becoming the oceanographic standard.

start_time	npts	samp_interv	depth	lat	lon
yyymmddhhmmss	#_pts	seconds	meters	deg	deg
960320020000	19966	3600	5.00	35.1388	-120.7960
north	east	temp	salinity		
m/s	m/s	deg_C	psu		
-0.0127	-0.0051	12.6077	33.4051		
0.0057	-0.0382	12.6171	33.4125		
-0.0625	-0.0592	12.1619	33.4695		
-0.0572	-0.1125	12.0829	33.4852		
-0.0144	-0.1457	12.2183	33.4602		
0.0002	-0.1341	12.1127	33.4635		
0.0367	-0.1779	12.4955	33.4187		
0.0777	-0.1945	12.8005	33.3811		
0.1095	-0.1809	13.0036	33.3465		
0.1611	-0.1290	13.1215	33.3616		
...	...	...	...		

**Figure 4. Sample CSA format file.** This is our ASCII data archival format, consisting of five header lines. The first three header lines contain static data about the file, including start time, number of points, sample interval, latitude, and longitude. The next two lines contain header names and units of dynamic variable, such as north and east components of currents, temperature, and salinity. Next, the data itself is listed in columnar format.

## WORLD WIDE WEB ACCESS

All of these datasets, as well as many other datasets, are available via the World Wide Web. The URL for the SBC-SMB Circulation Study is:

**[www.ccs.ucsd.edu/research/sbcsmb](http://www.ccs.ucsd.edu/research/sbcsmb)**

From here, users can access information about all of the moored data, as well as other datasets, which comprise this study. The data itself can be downloaded from the Center for Coastal Studies' (CCS) Data Zoo, which can be accessed from the above starting point.

The near real-time delivery of the top-most current meter data is also available as part of oil spill response web site. The URL for this page is:

**[www.ccs.ucsd.edu/oilspill](http://www.ccs.ucsd.edu/oilspill)**

From the Oil Spill Response Web Page users will find data and links to near real-time datasets of Advanced Very High Resolution Radiometer (AVHRR) satellite images, drifter trajectories, surface currents, surface winds, wave conditions, and swell height. The availability of this data over the web is part of a growing effort to provide high-quality environmental data that can be used in coastal monitoring and emergency response programs.

## SOURCES OF UNPUBLISHED MATERIALS

Winant, Clinton D. Scripps Institution of Oceanography, UCSD, Mail Code 0209, La Jolla, CA 92093.