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# Gulf of Mexico Physical Oceanography Program Final Report: Year 5

## Volume III: Data Products Summary



U.S. Department of the Interior
Minerals Management Service
Gulf of Mexico OCS Region

# Gulf of Mexico
# Physical Oceanography Program
# Final Report: Year 5

## Volume III: Data Products Summary

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# GULF OF MEXICO PHYSICAL OCEANOGRAPHY STUDY
# DATA PRODUCTS SUMMARY

## 1.0 Introduction

In October 1982, MMS initiated a multi-year, regionally phased physical oceanographic field program with the long-term goal of developing an improved understanding of the characteristics and influence of circulation patterns and processes in and adjacent to the deeper regions of the Gulf of Mexico. In keeping with this objective the majority of measurements have been made offshore of or proximate to the shelf break.

The multivariate observational data base has been and should continue to be used by oceanographers to describe current patterns and where possible to relate these to causative mechanisms. Three general areas of the Gulf of Mexico have been studied. During Years 1, 2 and 4, consecutive and continuous measurements were made in the eastern Gulf, primarily from the middle of the west Florida shelf, seaward across the slope and into and under the Loop Current (LC) and in the deep Gulf. A key objective was to understand better the slope and rise circulation patterns and the influence these had on the adjacent shelf. To resolve Loop Current effects required an evaluation of other mechanisms forcing water motion on the middle and outer shelf.

Measurements, analysis and interpretation in Program Year 3 emphasized the western Gulf of Mexico with particular attention given to major anticyclonic eddies which separate from the Loop Current and move westward to interact eventually with the western Gulf slope. These eddies appear to be a primary influence on circulation and conditions in deeper portions of the central and western Gulf, over the adjacent slope, and in some cases the outer shelf.

In Program Year 5, the objectives were to look at physical oceanographic conditions along 92°W extending from the inner shelf to the deep Gulf offshore of Louisiana.

## 1.1 Report Objective

Material contained in this microfiche report are data products created during the five program years of the MMS-funded Gulf of Mexico Physical Oceanography Study conducted by Science Applications International Corporation under contracts 14-12-0001-29158 and 14-12-0001-30289. The report has been created to make available many of those data products which were not presented in the various Final Reports. As can be imagined, these measurement and analysis efforts created a large number of data products which provided the program principals with analysis results. In turn, the PI's chose to incorporate only selected or representative graphics in the Final Reports. In addition some data products were intermediate in the analysis continua.

The same final and intermediate products were not created during each program year as a result of differing measurements and PI requests. In addition, the internal SAIC processing procedures were continuously updated and optimized throughout the study so that the number of intermediate "hard" plots was reduced. Finally, while most products were located, we are sure that during the various sorting and removal for reports, presentations and papers, some figures and analyses have been misplaced.

## 1.2 Material Organization

In this microfiche report, SAIC has attempted to maintain a fairly consistent presentation which is illustrated in the outline of this report. Generally, the material is divided by year and within years by data type, analysis type, and time. The report outline should allow the reader to identify easily the individual microfiche page where the desired data might be expected. When no data products are included for a particular outline topic, a "No Data Products Available" page has been inserted to indicate this.

In addition, for each program year we have included overview material which includes the Executive Summary for the Final Report as well as figures and tables showing timelines and major program cruise identifiers. This will help provide the reader with a general overview

of activities, tasks and key personnel for that year. Most graphics should have the necessary information needed to identify what the figure represents. Most data products have been reviewed for data quality. However, some are intermediate products (e.g. raw data plots and some 3-HLP time series plots) and may have had corrections or adjustments applied. Final products such as spectra and 40-HLP data should reflect data which has been quality controlled.

## 1.3 Types of Field Data Taken

The data included in this summary consists of four basic types (1) moored instrument Data; (2) hydrographic station data; (3) Lagrangian drifter data; and, (4) ancillary data. The first category (moored instrument data) consists of all current meter, transmissometer (Year 5 only) and inverted echo sounder (IES) (Year 5 only) data collected during the program. The current meter data sets represent u- and v-components of the current field, temperature and where available pressure (instrument depth). The transmissometer data consists of percent light transmission, while the IES returns travel time information. The hydrographic station data consists of XBT, AXBT, CTD and water chemistry (bottle samples) profiles of the water column during each respective cruise. The third category (Lagrangian drifter data) consists of all drifting buoys deployed and tracked through Service ARGOS during the program. Since the duration of a given buoy deployment is highly variable, a drifter deployed in Program Year 1 may overlap into the next program year. In this situation, all the data products are archived in the initial program year. The final category, Ancillary Data, is representative of all the National Weather Service (NWS), National Ocean Service (NOS) and National Data Buoy Center (NDBC) information which was obtained in conjunction with the Program. Primarily, these data consist of land-based meteorological data, water level information and Coastal-Marine Automated Network (C-MAN) data, respectively.

## 1.4 Current Meter Identification Scheme

In identifying individual instruments for the time series and spectral plots, SAIC has

instituted the following nomenclature. The time series identifier (ID) is generally either a four or five character word. The initial character is the Program Identifier, which is "M" for this study. The next two characters are reserved for identifying the individual mooring. In Program Years 1, 2 and 4, moorings "A" through "H" were deployed, while in Year 3, moorings "P" through "T" were deployed. For these four years, the mooring letter (i.e. "A") was preceded by a zero. However, during Year 5 of the program, moorings "AA" through "GG" were deployed and no preceding zero was required.

When a four-character ID is used, the fourth and final character represents the placing of the instrument in the vertical on a particular mooring, with 1 being closest to the surface and "N" being closest to the bottom. For example, the ID for the third instrument down on Mooring A for Year 4 would be listed as follows M0A3. Similarly, the ID for the third instrument down on Mooring C for Year 5 would be listed as follows MCC3. When a five-character ID is used, then the fourth character represents the individual deployment of the instrument and the fifth and final character represents the vertical placing as described above. For example, the ID for the third instrument down during the first deployment of Mooring C for Year 1 would be listed as follows M0C13. For more details on nomenclature, the user is referred to the individual Final Reports for each program year.

## 1.5 Station Data Identification Scheme

For each individual Ship-of-Opportunity Program (SOOP) and major program cruise a unique cruise identifier has been created. The identifier contains two pieces of information (1) vessel name, and, (2) consecutive annual cruise number. For example, the third cruise in 1983 by the SOOP vessel, M/V EDGAR M. QUEENY, would be listed as QUEENY 83-03. The major exception to this nomenclature is for Program Years 1 and 2, where the three major cruises were labeled as (1) MMS/SAI/SKIO CRUISE 1; (2) MMS/SAI/SKIO CRUISE 2; and, (3) MMS/SAI/SKIO CRUISE 3. Again, for more specific information regarding the individual cruises, the user is referred to the Final Reports for each program year.

## 1.6 Lagrangian Data Identification Scheme

Each drifting buoy contained in this report can be identified by a four digit identifier (e.g. 3345).

# GULF OF MEXICO PHYSICAL OCEANOGRAPHY STUDY
# DATA PRODUCTS SUMMARY


**The Department of the Interior Mission**

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.


**The Minerals Management Service Mission**

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.