

DATA ANALYSIS PRODUCT

NO. 21

Jan. 6, 1986

EXPENDABLE BATHY THERMOGRAPH OBSERVATIONS

FROM THE NMFS/MARAD SHIP OF OPPORTUNITY PROGRAM

FOR 1985

by

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CONTENTS

| | PAGE |
|--------------------------------------|------|
| Abstract..... | 1 |
| Introduction..... | 1 |
| Areas of Study..... | 2 |
| Operational Procedures..... | 2 |
| Data Acquisition and Processing..... | 3 |
| Acknowledgment..... | 4 |

SECTIONS

| | |
|-------------------------------|-------------|
| Gulf of Maine Portrayal..... | Section I |
| New York Bight Portrayal..... | Section II |
| Gulf of Mexico Portrayal..... | Section III |

Expendable Bathythermograph Observations from
the NMFS/MARAD Ship of Opportunity Program for 1985

Robert L. Benway

ABSTRACT

Results of the 16th year of operation of the NMFS/MARAD Ship of Opportunity Program are presented in the form of sample vertical sections of water column temperature and lists of data available. Operational procedures and data management also are discussed.

INTRODUCTION

In midyear of 1970 a cooperative expendable bathythermograph (XBT) program was initiated between the National Marine Fisheries Service (NMFS) and the Maritime Administration (MARAD) of the U.S. Department of Commerce. The program conducted in support of the MARMAP (Marine Resources Monitoring Assessment and Prediction) Program of NMFS, involved the use of Maritime Cadets from the Kings Point Maritime Academy to gather XBT data on board various merchant ships along the east and Gulf coasts of the United States. The objective of this cooperative program was to identify and describe seasonal and year-to-year variations of temperature and circulation in major currents of the Gulf of Mexico, and western North Atlantic, utilizing merchant ships as relatively inexpensive platforms for the collection of data. In the mid-70's the program objectives were revised to concentrate on water

masses and circulation of the Gulf of Maine, Middle Atlantic Bight and northeastern Gulf of Mexico with particular interest in the continental shelf and slope waters in the Middle Atlantic Bight

AREAS OF STUDY

Ship routes (fig. 1, 2, & 3) were selected to obtain regular sampling in the most dynamic or diagnostic areas. Repeated coverage is important for comparative analysis, so ships with the most regular schedules have been chosen whenever possible.

OPERATIONAL PROCEDURES

Expendable bathythermograph (XBT) and meteorological data were collected on board the vessels Oleander, Edgar M. Queeny and Yankee Clipper. The Oleander and E.M. Queeny data were handled using the Bathy Systems data acquisition system. This system consists of Sippican XBT probes, a Hewlett Packard desk top computer, a Synergetics Geostationary Operational Environmental Satellite (GOES) data transmitter and antenna, and software from Bathy Systems. The XBT and meteorologic data were sent via GOES transmitter to the Command and Data Acquisition System (CDA) ground station at Wallops Island VA and relayed to the National Environmental Satellite, Data, and Information Service (NESDIS) computer in Washington D.C. for distribution to outside users. Temperature data transmitted via GOES is considered "real time" as it only takes minutes from the time an XBT is launched until the data reach the NESDIS computer for distribution.

The E.M. Queeny collects XBT and weather data in the Gulf of Mexico. A usual cruise track is from Dry Tortugas to 90°W (fig.3). On occasion this track may be reversed. Probes are launched hourly along this track and the data are sent via GOES every three hours.

The Oleander transits from Newark to Bermuda on a weekly basis, collecting XBT data with hourly drops between Ambrose Light and the vicinity of the Gulf Stream's North Wall in either an easterly or westerly direction (fig. 2). These and weather data also are transmitted via GOES for distribution to other users.

The Yankee Clipper transits between Boston and Halifax, Nova Scotia dropping XBT probes hourly from approximately the 20 fm line off Boston to Cape Sable (fig. 1). These data are collected by use of a Sippican XBT Analog System and probes. Analog traces are then quality controlled by NMFS personnel and are available upon request.

DATA ACQUISITION AND PROCESSING

At the time of each XBT drop, surface water samples were collected with buckets for later analysis, to determine salinity using an Autosol model 8400 Salinometer. Temperature/depth data collected on either analog traces or HP 85 cassette tapes were processed and quality controlled by NMFS personnel. Sample vertical sections presented in Sections I, II and III were produced under contract by Applied Science Associates, Inc. in Wakefield, Rhode Island.

ACKNOWLEDGEMENTS

Appreciation is extended to the Maritime Academy Training Representative in New York, Captain Arthur Finley, for his diligent effort in placing cadets aboard the E.M. Queeny. In addition, thanks to the officers and crews of the Oleander, Bermuda Container Lines, Yankee Clipper, Claus Spect, Hamburg Germany, and Edgar M. Queeny, Keystone Shipping Co, for their courteous cooperation in this program, whose success is dependent on them.

SECTION

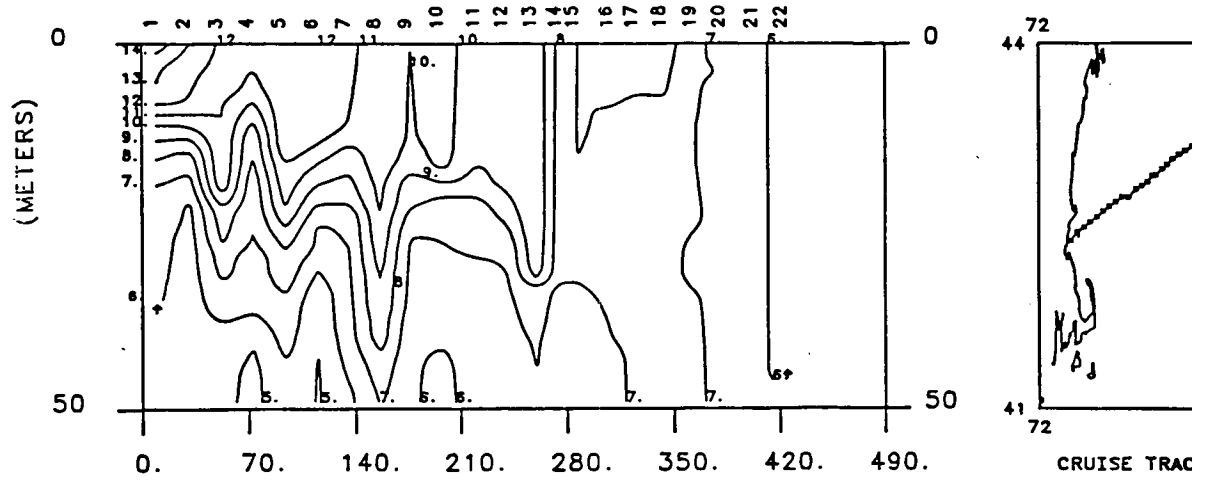
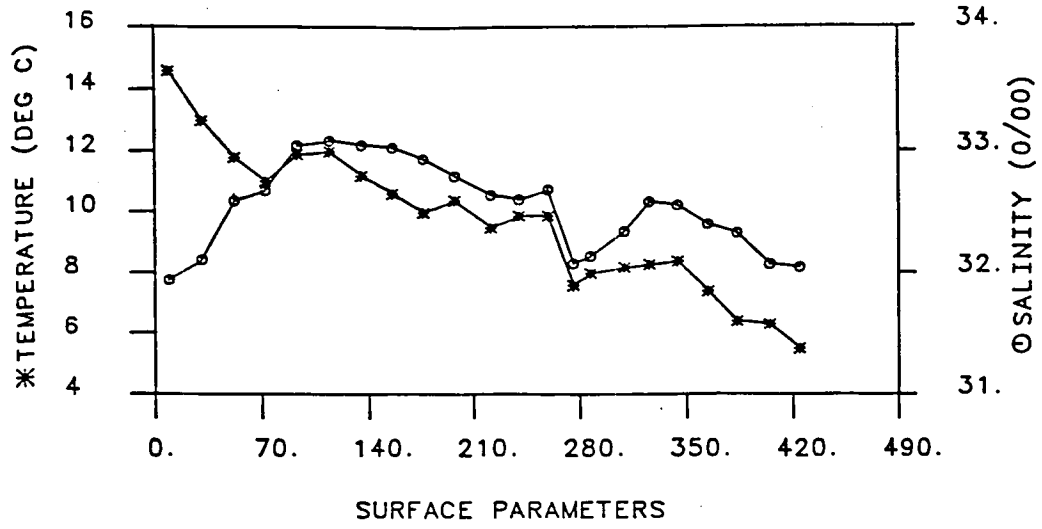
I

GULF OF MAINE

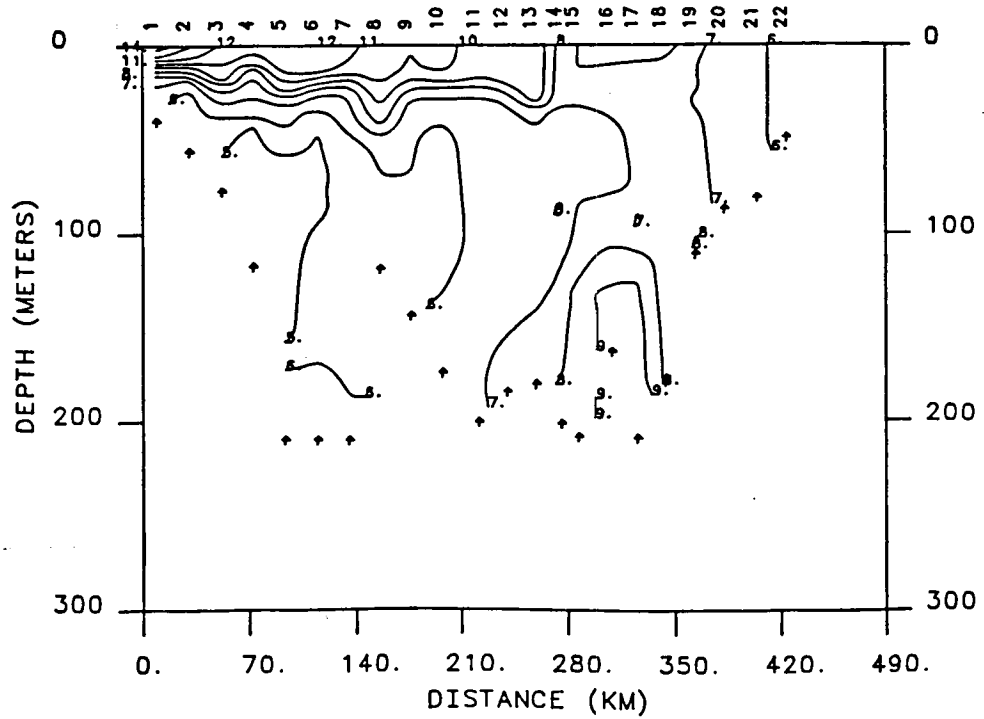
This section contains a sample vertical section and surface parameter plot of observations made from the Yankee Clipper during 1985. Each transect is identified by a cruise number and date of collection. Data for any transect are available from NODC in a variety of forms. Requests for, or inquires about Ship of Opportunity XBT data held by NODC, or data products should be directed to: National Oceanographic Data Center

(0761)

Environmental Data
and Information Service, NOAA
Washington, DC 20235



YANKEE CLIPPER 8510 06/07-08/85



YANKEE CLIPPER 8510 06/07-08/85

Table 1. 1985 NMFS/SOOP XBT Gulf of Maine Transect Data available at NODC.

NAME OF SHIP: Yankee Clipper

| <u>Cruise Number</u> | <u>Dates</u> |
|----------------------|-------------------|
| 85-02 | January 19 |
| 85-03 | February 02 |
| 85-05 | March 12 |
| 85-06 | March 16 |
| 85-07 | April 09 - 10 |
| 85-08 | May 11 |
| 85-10 | June 07 - 08 |
| 85-12 | July 19 - 20 |
| 85-13 | August 13 - 14 |
| 85-14 | September 07 - 08 |
| 85-15 | October 05 |
| 85-16 | November 02 |
| 85-18 | December 17 |

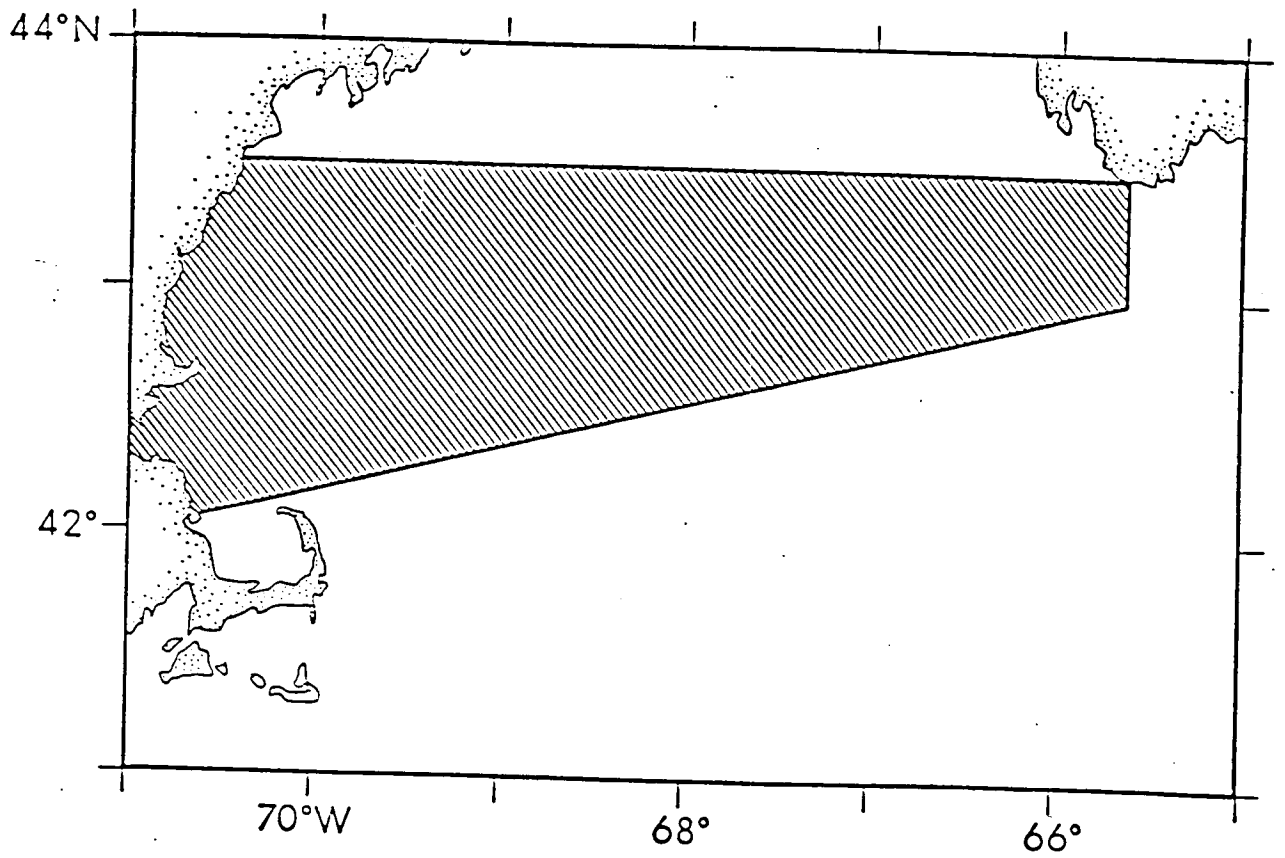


Figure 1. M/V Yankee Clipper Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MC (Gulf of Maine) 1977 to present.

SECTION

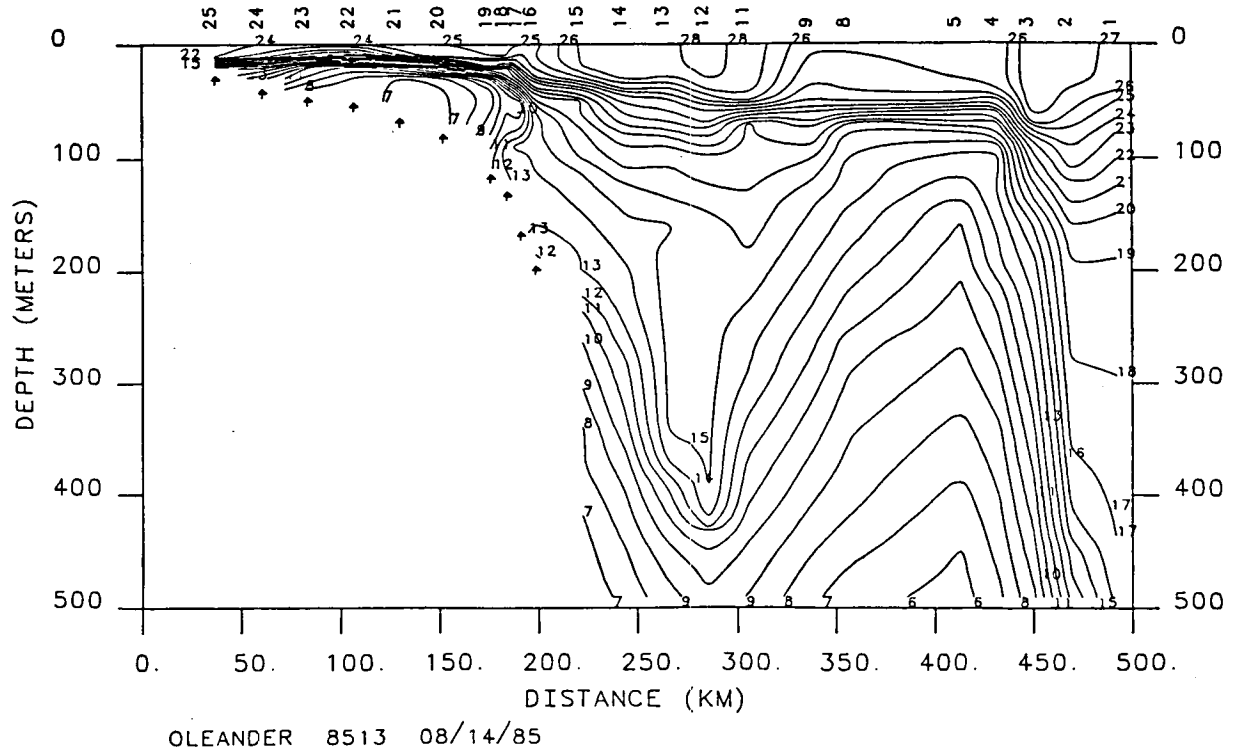
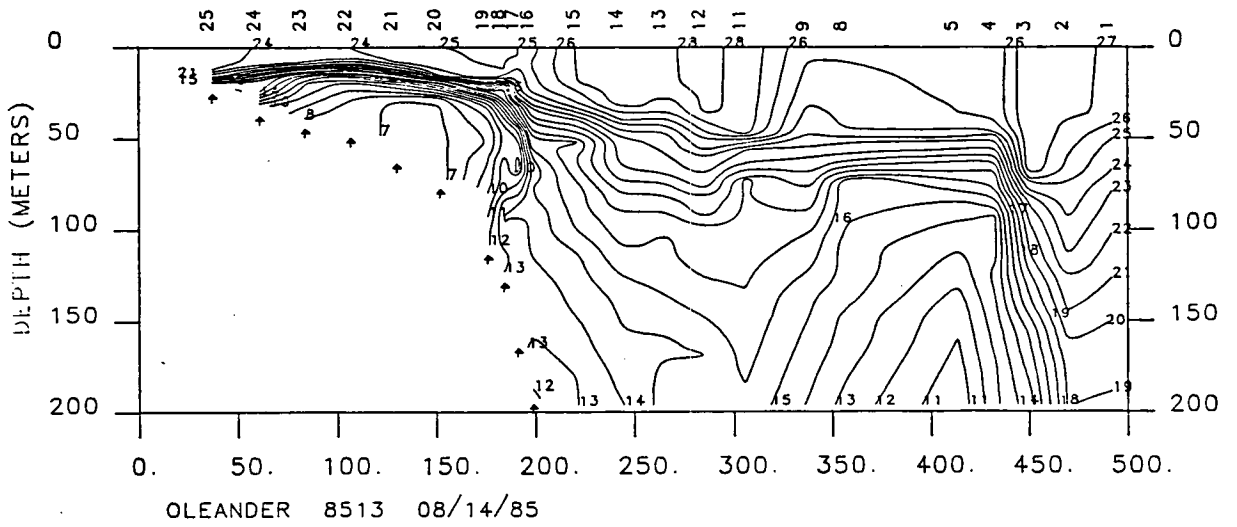
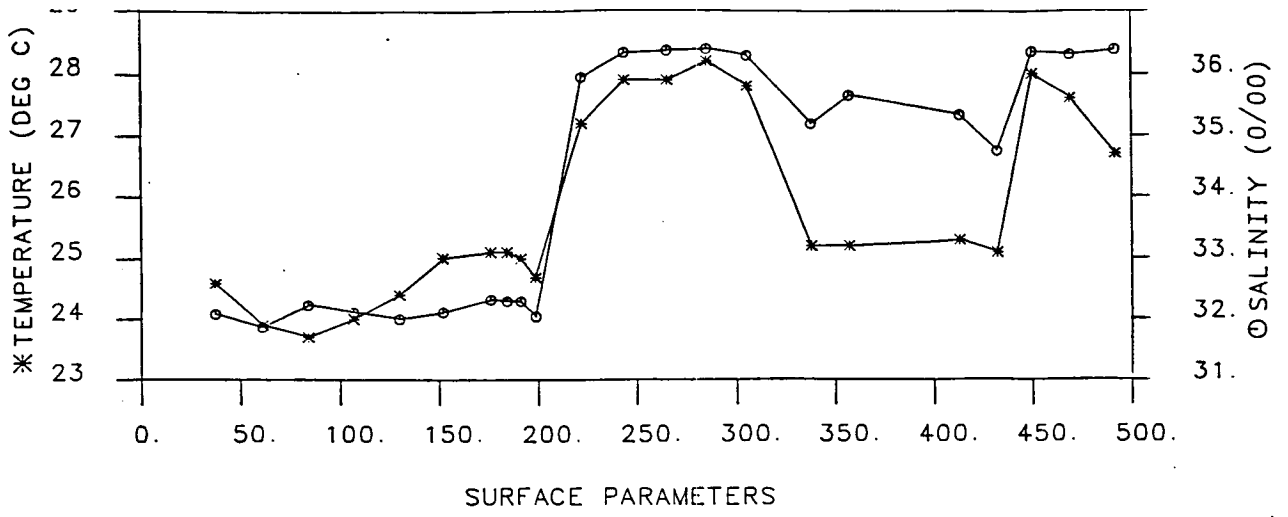
II

NEW YORK BIGHT

This section contains a sample vertical section and surface parameter plot of observations made from the Oleander during 1985. Each transect is identified by a cruise number and date of collection. Data for any transect are available from NODC in a variety of forms. Requests for, or inquires about Ship of Opportunity XBT data held by NODC, or data products should be directed to: National Oceanographic Data Center

(D761)

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and Information Service, NOAA
Washington, DC 20235



Sample of XBT computer generated transect-plot graphic.

Table 2. 1985 NMFS/SOOP XBT New York Bight Transect Data available at NODC.

NAME OF SHIP: Oleander

| <u>Cruise Number</u> | <u>Dates</u> |
|----------------------|-------------------|
| 85-02 | January 30 - 31 |
| 85-03 | February 15 - 16 |
| 85-04 | February 20 - 21 |
| 85-05 | March 23 |
| 85-06 | April 26 - 27 |
| 85-07 | May 01 - 02 |
| 85-08 | May 17 |
| 85-09 | June 06 |
| 85-11 | July 12 |
| 85-12 | August 09 - 10 |
| 85-13 | August 14 - 15 |
| 85-14 | September 06 |
| 85-15 | September 11 - 12 |
| 85-18 | October 16 - 17 |
| 85-19 | November 08 - 09 |
| 85-21 | December 07 - 08 |

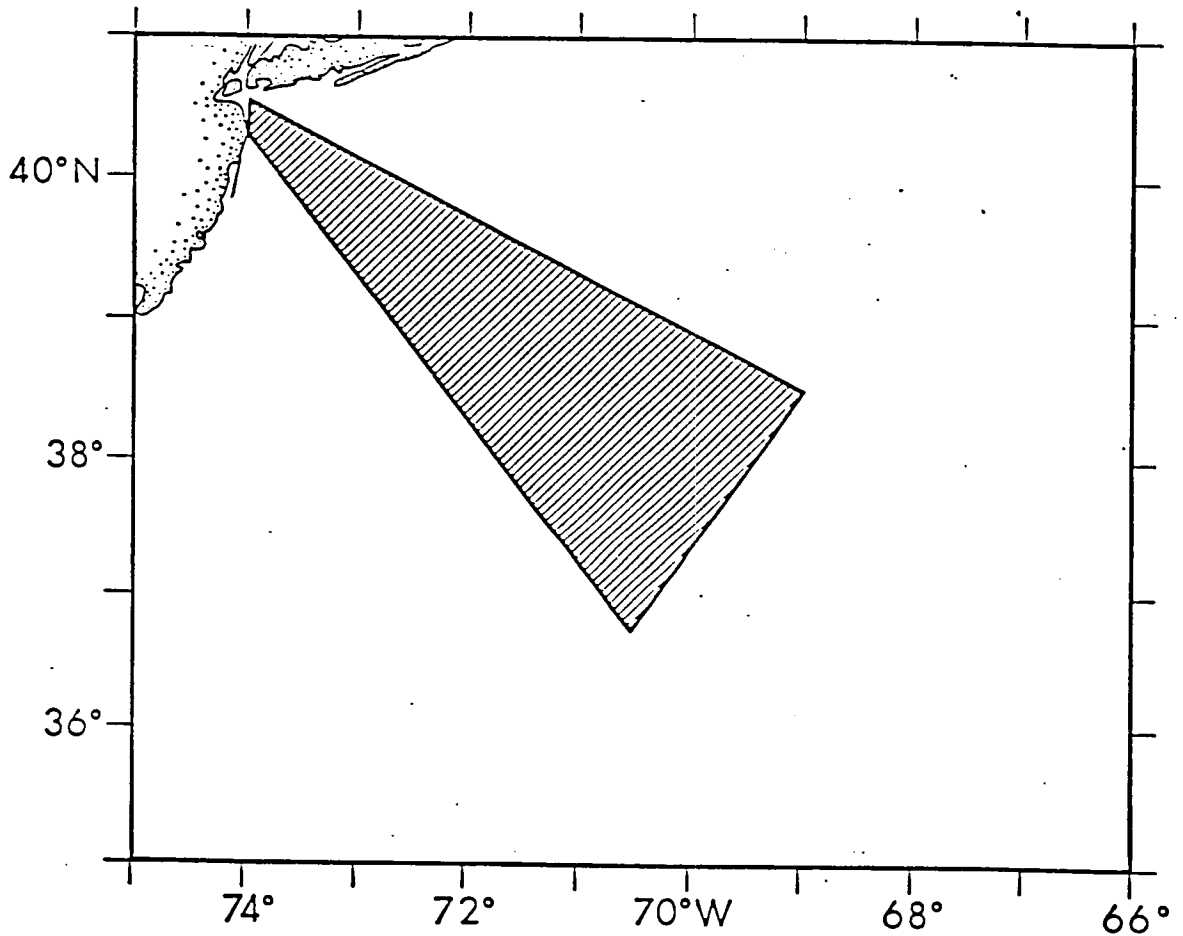


Figure 2. M/V Oleander Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MB (New York Bight) 1971 to present.

SECTION

III

GULF OF MEXICO

This section contains a sample vertical section and surface parameter plot of observations made from the Edgar M. Queeny during 1985. Each transect is identified by a cruise number and date of collection. Data for any transect are available from NODC in a variety of forms. Requests for, or inquires about Ship of Opportunity XBT data held by NODC or data products should be directed to:

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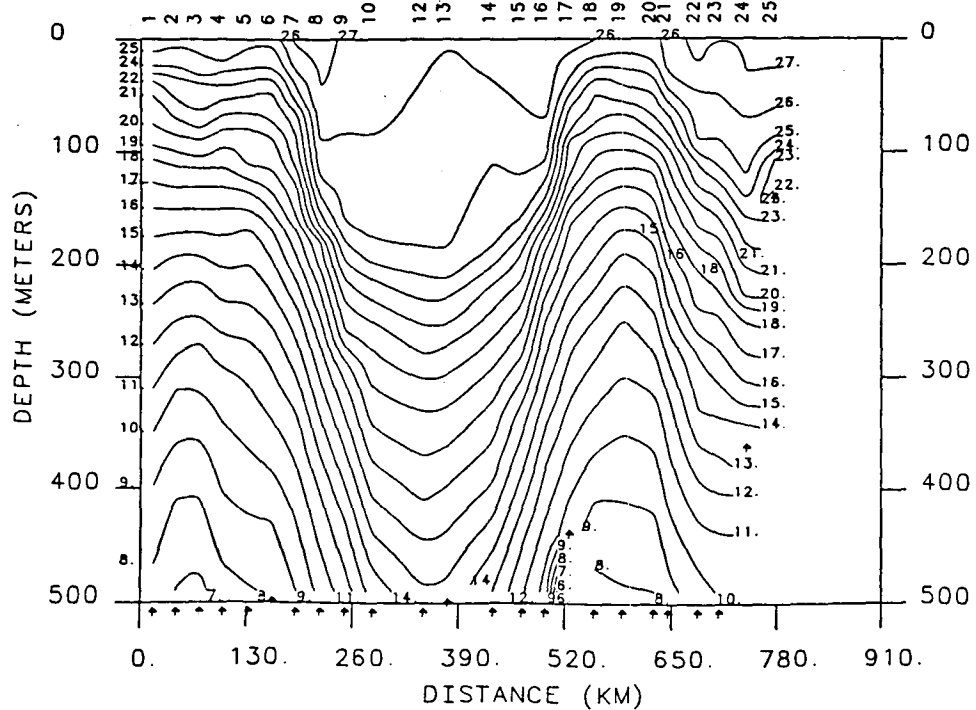
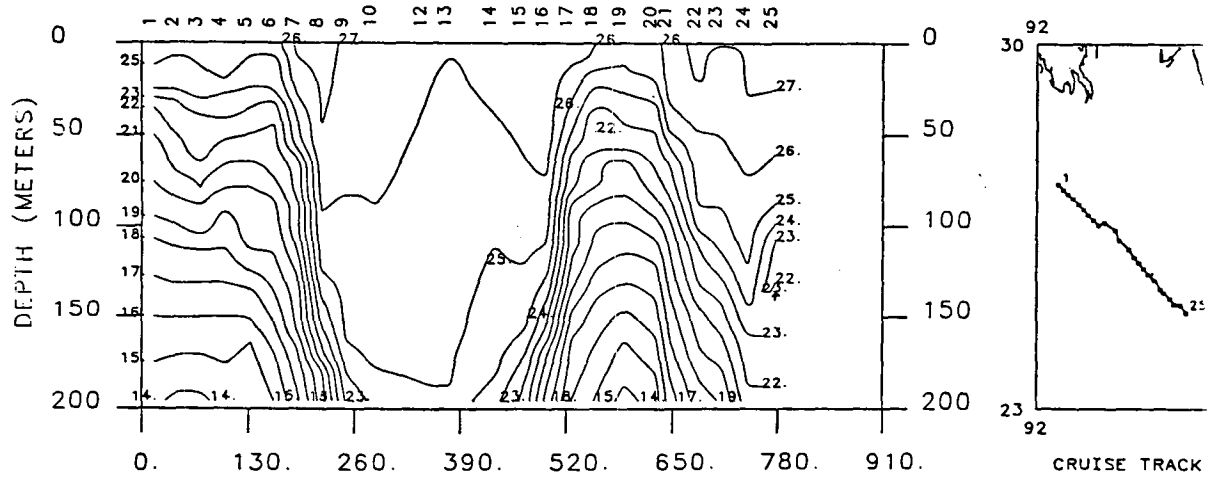
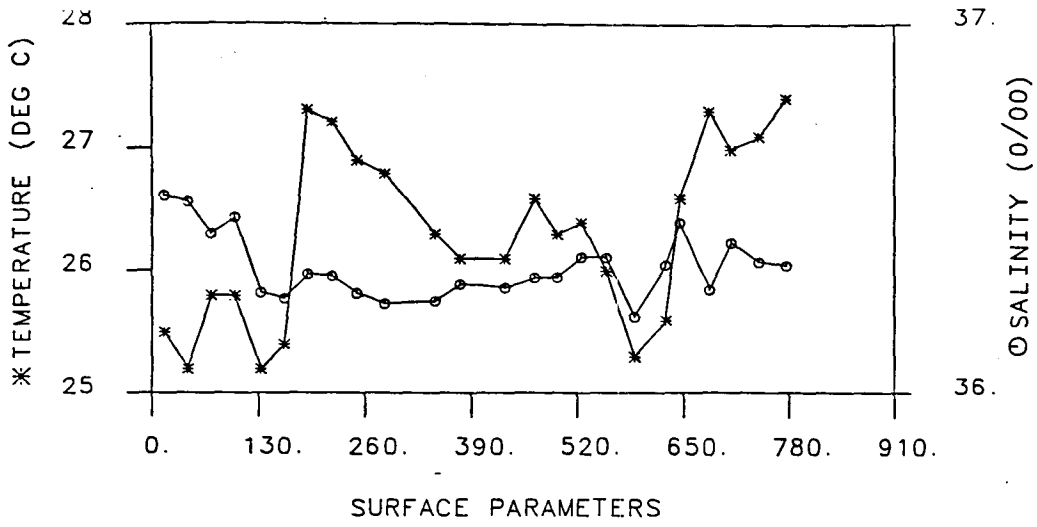


Table 3. 1985 NMFS/SOOP XBT Gulf of Mexico Transect Data available at NODC.

NAME OF SHIP: Edgar M Queeny

| <u>Cruise Number</u> | <u>Dates</u> |
|----------------------|------------------------|
| 85-01 | January 17 - 19 |
| 85-02 | February 07 - 08 |
| 85-03 | February 28 - March 01 |
| 85-04 | April 18 - 19 |
| 85-05 | May 07 - 08 |
| 85-06 | May 26 - 27 |
| 85-07 | June 07 - 08 |
| 85-08 | June 13 - 14 |
| 85-09 | July 01 - 02 |
| 85-10 | August 02 |
| 85-11 | November 10 - 11 |
| 85-12 | November 24 - 25 |
| 85-13 | December 13 - 14 |
| 85-14 | December 21 - 22 |

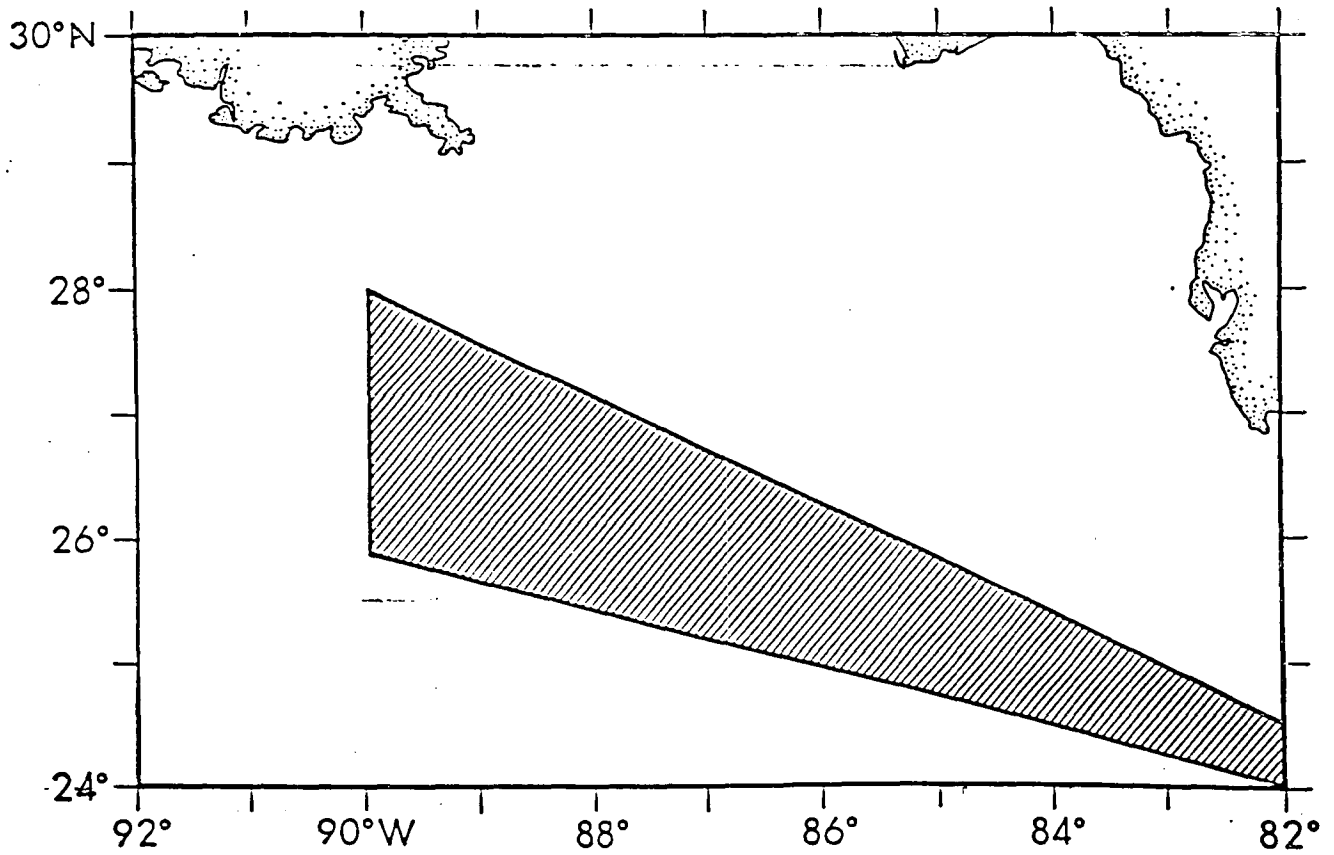


Figure 3. M/V Edgar M. Queeny Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MI (Gulf of Mexico) 1980 to present.



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.