REPORT NO. 20

June 27, 1985

EXPENDABLE BATHYTHERMOGRAPH OBSERVATIONS FROM THE NMFS/MARAD SHIP OF OPPORTUNITY PROGRAM FOR 1983

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Expendable Bathythermograph Observations from the NMFS/MARAD Ship of Opportunity Program for 1983

Robert L. Benway

ABSTRACT

Results of the 14th year of operation of the NMFS/MARAD Ship of Opportunity Program are presented in the form of horizontal and vertical distributions of temperature. 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 comparitive 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 between Ambrose Light and the vicinity of the Gulf Stream's North Wall in both an easterly and 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 surveying 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 salinty using a Autosal model 8400 Salinometer. Temperature/depth data collected on either analog traces or HP 85 casette tapes were processed and quality controlled by NMFS personnel. 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

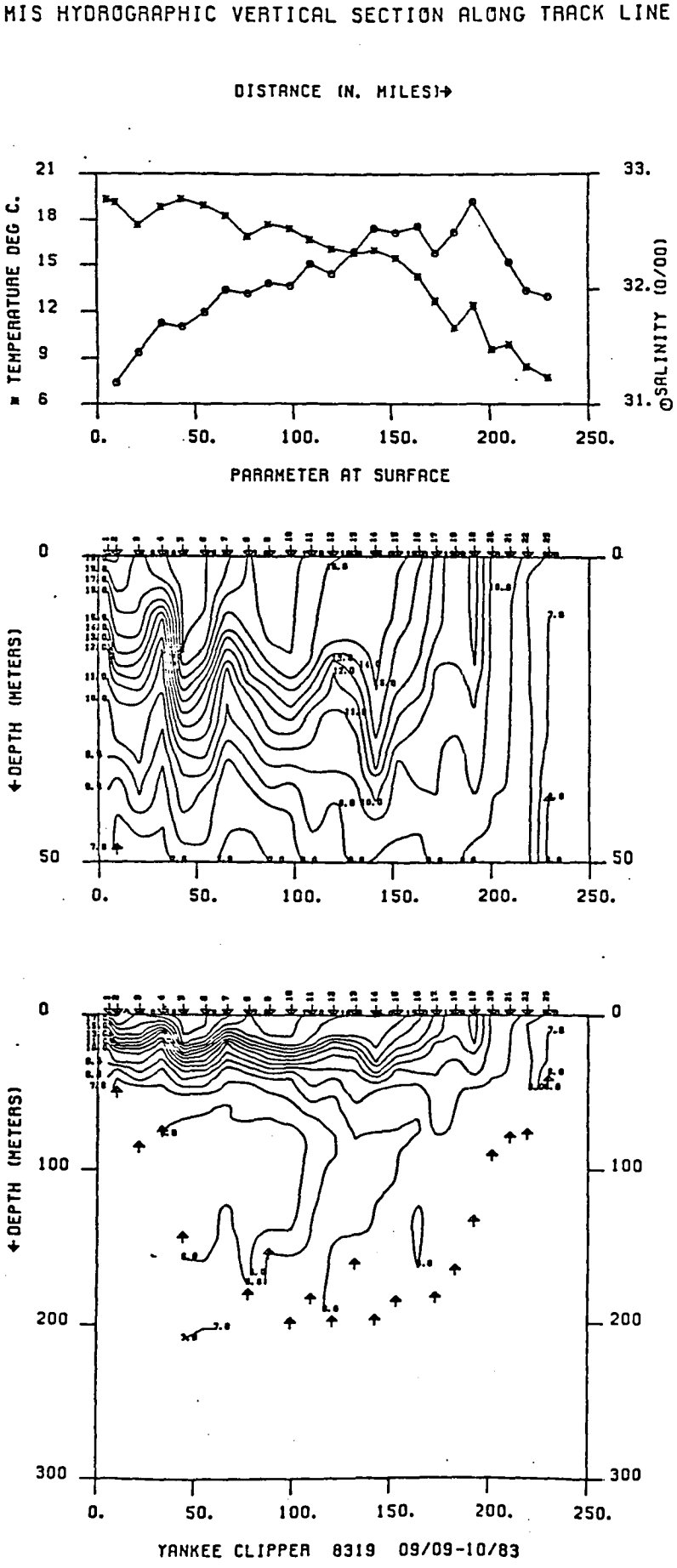
This section contains a vertical section, and surface parameter plot of the Yankee Clipper within calendar year 1983. Each transect is identified by a cruise number and date of collection. Data for any transect are available from NODC in a variety of forms. Request for, or inquires about NODC held Ship of Opportunity XBT data or data products should be directed to: National Oceanographic Data Center

(D761)

Environmental Data

and Information Service, NOAA

Washington, DC 20235



Sample of XBT transect-plot graphic

Table 1. 1983 NMFS/SOOP XBT Gulf of Maine Transect Data available at NODC.

NAME OF SHIP: Yankee Clipper

Cruise Number	Dates
83-03	January 29
83-06	March 15 - 16
83-07	April 05 - 06
83-08	April 12 - 13
83-10	April 09 - 10
83-12	April 25 - 26
83-13	June 11
83-14	June 20 - 21
83-15	July 08 - 09
83-16	July 23 - 24
83-17	August 03 - 04
83-18	August 20 - 21
83-19	September 09 - 10
83-20	October 08 - 09
83-21	October 15 - 16
83-22	October 26
83-24	November 24
83-25	December 08 - 10
83-26	December 17

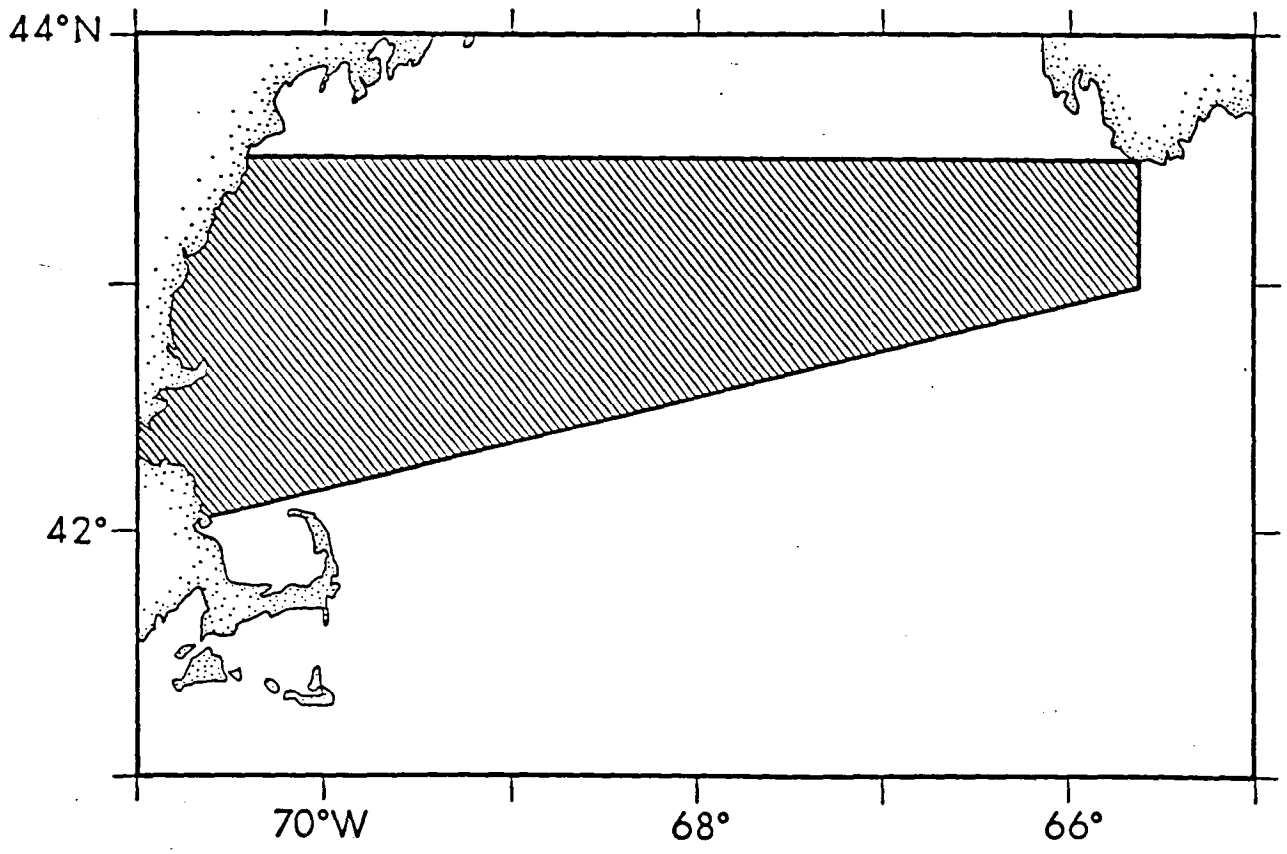


Figure 1. M/V Yankee Clipper Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MC (Gulf of Maine) 1977 to present.

SECTION

II

NEW YORK BIGHT

This section contains a vertical section, and surface parameter plot of the Oleander within calendar year 1983. 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. Request for, or inquires about NODC held Ship of Opportunity XBT data or data products should be directed to: National Oceanographic Data Center

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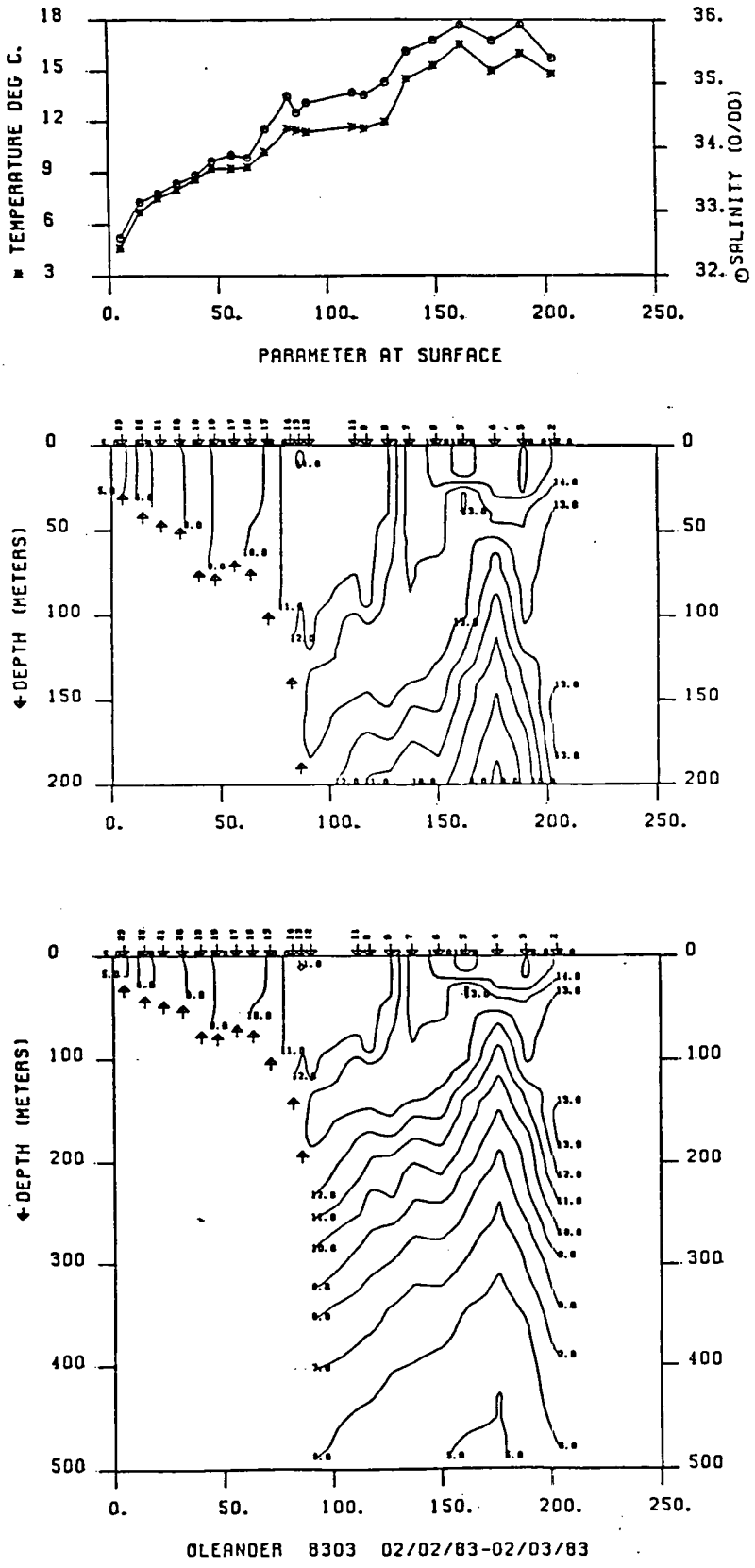


Sample of XBT transect-plot graphic

Table 2. 1983 NMFS/SOOP XBT New York Bight Transect Data available at NODC.

NAME OF SHIP: Oleander

Cruise Number	Dates
83-01	January 15 - 16
83-02	January 28
83-03	February 02 - 03
83-04	February 18 - 19
83-05	March 11 - 12
83-06	March 16 - 17
83-07	April 16 - 17
83-08	May 14 - 15
83-09	May 19 - 20
83-10	June 10 - 11
83-11	June 15 - 16
83-13	July 08 - 09
83-14	August 04 - 05
83-15	August 10 - 11
83-16	September 23 - 24
83-17	October 14 - 15
83-18	October 19 - 20
83-19	November 18 - 19
83-20	November 22 - 23
83-21	December 02 - 03
83-22	December 07 - 08

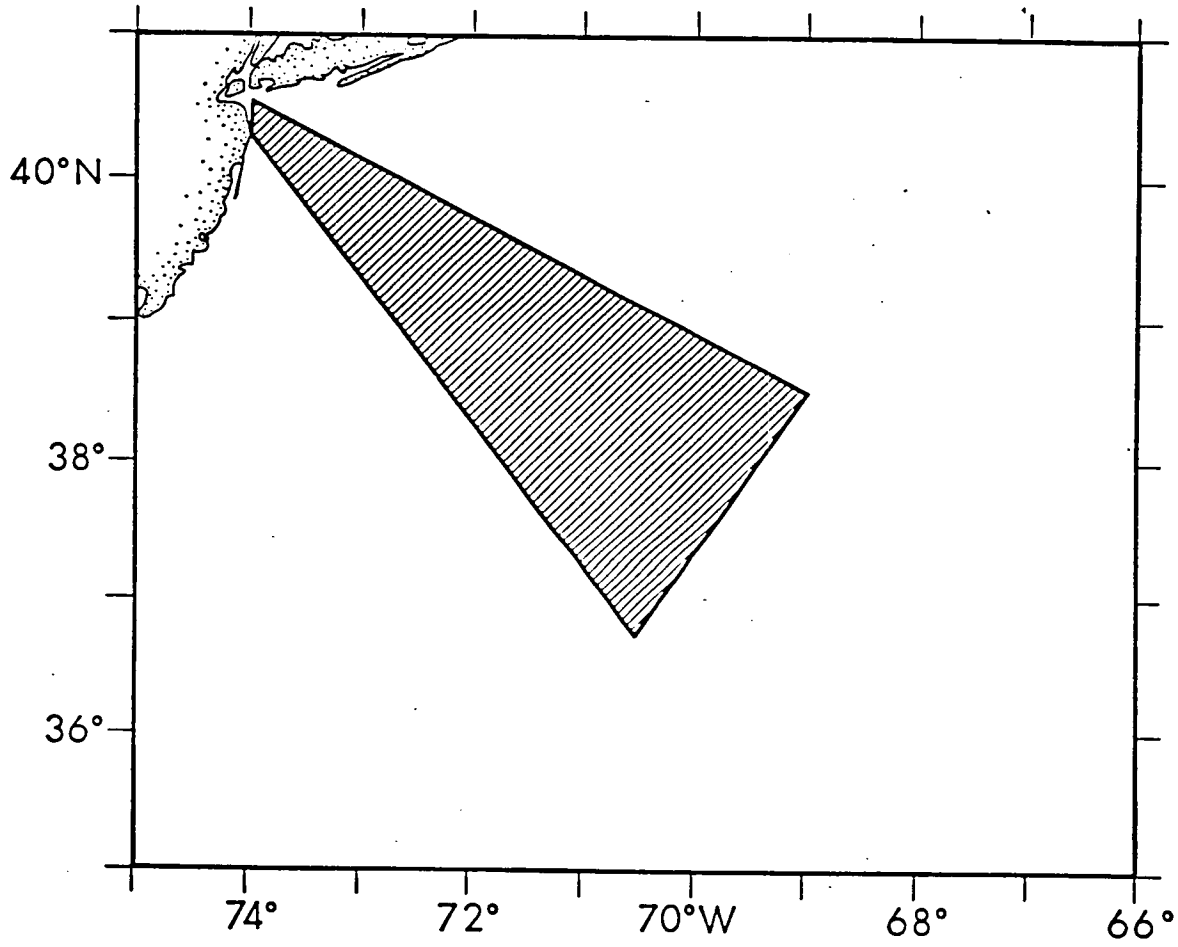


Figure 2. M/V Oleander Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MB (New York Bight) 1971 to present.

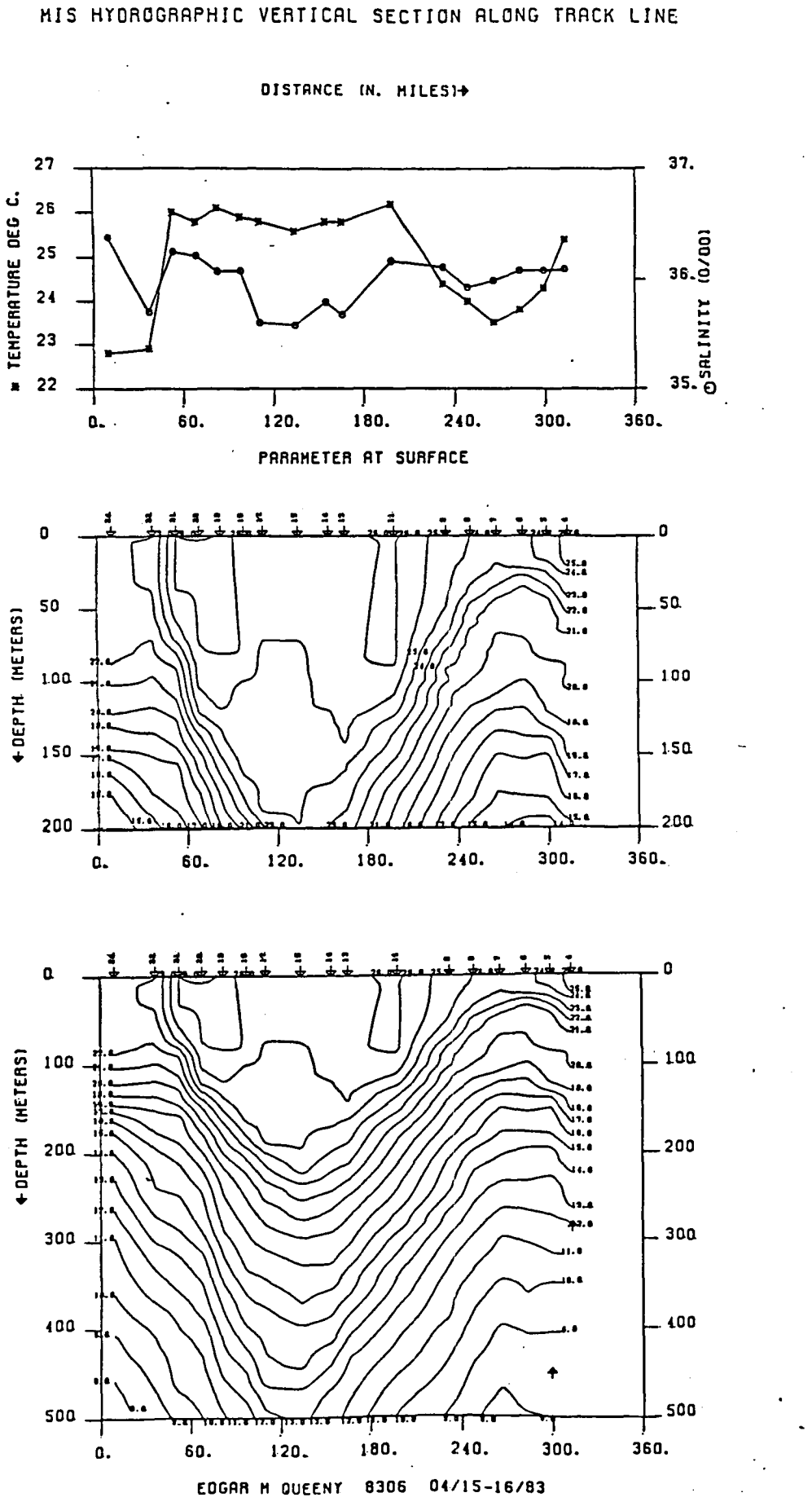
SECTION

III

GULF OF MEXICO

This section contains a vertical section and surface parameter plot of the Edgar M. Queeny within calendar year 1983. 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. Request for, or inquires about NODC held Ship of Opportunity XBT data or data products should be directed to:

National Oceanographic Data Center
(D761)
Environmental Data
and Information Servcice, NOAA
Washington, DC 20235



Sample of XBT transect plot graphic

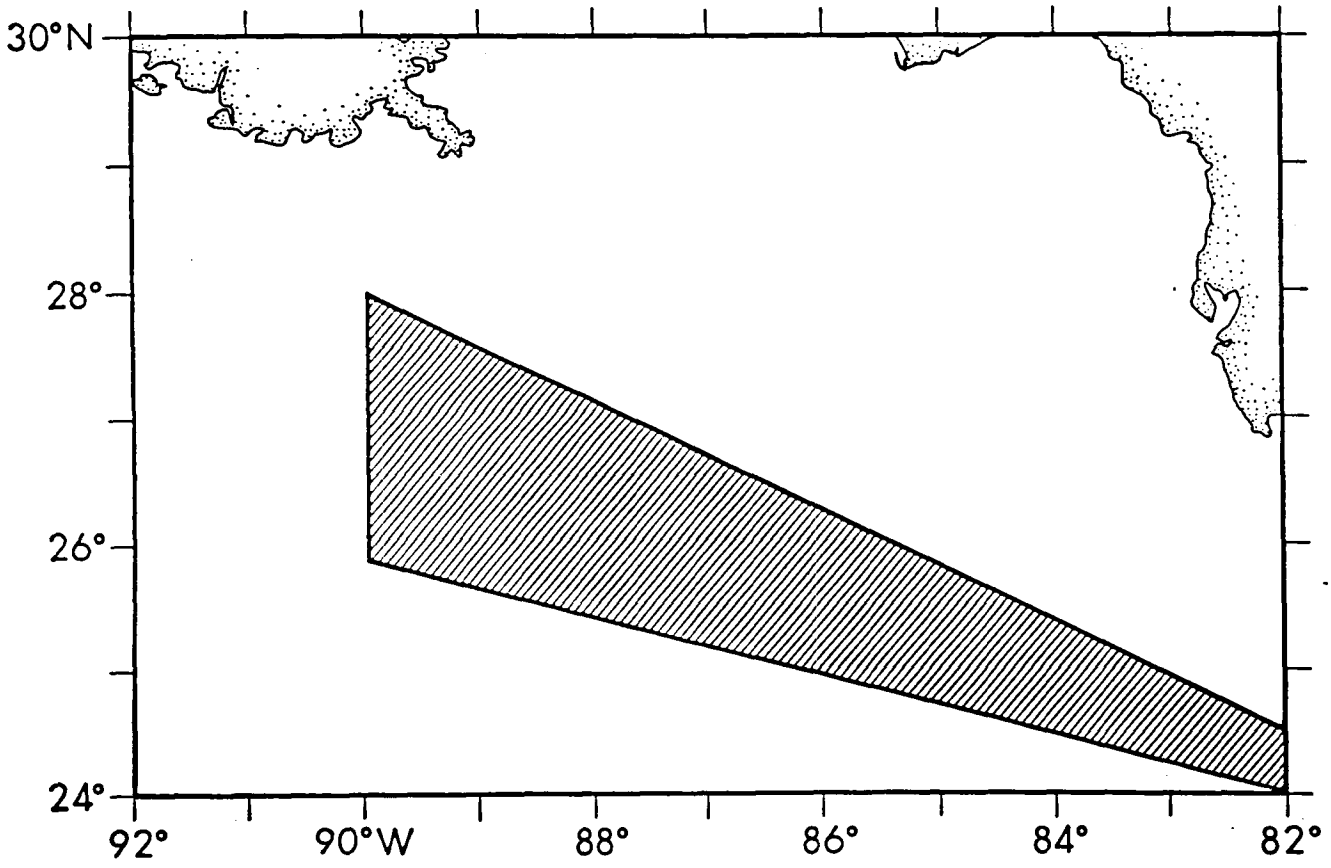


Figure 3. M/V Edgar M. Queeny Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MI (Gulf of Mexico) 1980 to present.

Table 3. 1983 NMFS/SOOP XBT Gulf of Mexico Transect Data available at NODC.

NAME OF SHIP: Edgar M Queeny

Cruise Number	Dates
83-01	January 07 - 08
83-02	January 24 - 25
83-04	March 07 - 08
83-05	March 26 - 27
83-06	April 15 - 16
83-07	April 30 - May 01
83-08	May 05 - 06
83-09	May 26 - 27
83-10	June 03 - 04
83-11	September 28 - 29
83-12	October 13 - 14
83-13	October 24 - 25
83-14	November 06 - 07
83-15	November 26 - 27
83-16	December 14 - 15

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.