DATA ANALYSIS PRODUCT

NO. 25

March 15 1988

EXPENDABLE BATHYTHERMOGRAPH OBSERVATIONS FROM THE NMFS/MARAD SHIP OF OPPORTUNITY PROGRAM FOR 1987

by

Robert L. Benway[1] and Jack W. Jossi[2]

[1] Marine Climatology Investigation
Environmental Processes Division

[2] Plankton Ecology Investigation
Fisheries Ecology Division

National Marine Fisheries Service
South Ferry Road
Narragansett, Rhode Island 02882

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Marine Climatology Investigation
South Ferry Road
Narragansett, RI 02882

Date: June 2, 1988

To: Distribution

From: Reed Armstrong
Marine Climatology Investigation

Subject: Data Analysis Product No. 25

Attached for your information is a copy of Report No. 25 "Expendable Bathythermograph Observations from the NMFS/MARAD Ship of Opportunity Program for 1987".

The report is a description of data collected in the Ship of Opportunity Program during 1987 from our operations along the east coast and in the Gulf of Mexico.

RSA:jd
Attachments

Distribution:

M. Ingham
D. Mountain
F. Aikmen (SUNY)
R. Schlitz
J. Brucks
E. Gould
W. Phoel
W. Smith
B. Reid
F. Steimle
V. Zegowitz (NWS)
J. Jossi
R. Murchelano
S. Cook (NOS)
D. Smith
G. Wood
J. Casey
A. Finley (MARAD)
A. Studholme
J. O'Reilly
M. Grosslein
M. Brown (10)
J. Gibson
J. Manning
C. Fairfield
S. Richardson (NOS)
H. Thurm (NWS)
J. Green

CONTENTS

SECTIONS

Expendable Bathythermograph Observations from the NMFS/MARAD Ship of Opportunity Program for 1987

Robert L. Benway

and

Jack W. Jossi

ABSTRACT

Results of the 18th 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, using 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 Middle Atlantic Bight, Gulf of Maine, and eastern 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, 3 & 5) were selected to obtain regular sampling in the most dynamic or diagnostic areas. Repeated coverage is important for comparative analyses, 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 the Yankee Clipper. On all the vessels XBT and weather 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 Oleander transits from Newark, NJ to Bermuda on a weekly basis, with approximately monthly collections of XBT data from hourly drops between Ambrose Light and the vicinity of the Gulf Stream's North Wall in either an easterly or westerly direction (Fig. 1). Temperature and weather data are transmitted via GOES every three hours for distribution to other users.

The E.M. Queeny collects XBT and weather data on a monthly, or more frequent schedule in the Gulf of Mexico. A usual cruise track is from Dry Tortugas, FL to 90°W longitude (Fig. 2). On occasion this track may be reversed. Probes are launched hourly along this track and the data are sent hourly via GOES. The last year for SOOP data collection in the Gulf of Mexico will be 1987. Also, due to an extended yard period by the E.M Queeny, data collection for 1987 ceased in June.

The Yankee Clipper collects XBT and weather data monthly, while transiting between Boston, MA and Halifax, Nova Scotia, dropping XBT probes every 2 hours from approximately the 20 fm line off Boston to Cape Sable (Fig. 3). Temperature and weather data are transmitted via GOES every three hours for distribution to other users.

DATA ACQUISITION AND PROCESSING

At the time of each XBT drop, surface water samples were collected with buckets for later analysis to determine salinity. (An Autosal model 8400 Salinometer was used for salinity determinations.) Temperature/depth data collected on HP 85 casette tapes were processed and quality controlled by NMFS personnel. Sample vertical sections presented in Sections I, II, and III were also produced by NMFS personnel.

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. Appreciation is also extended to Harvey Thurm of the National Weather Service whose volunteers ride monthly on board the Oleander collecting data. Support for the Gulf of Mexico SOOP monitoring was provided by the Minerals Management Service, U. S. Department of Interior.

SECTION

I

NEW YORK BIGHT

Sample vertical section and surface parameter plot (Fig. 2) of observations made from the Oleander during 1987 are presented. 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 inquiries about Ship of Opportunity XBT data held by NODC, or data products should be directed to:

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

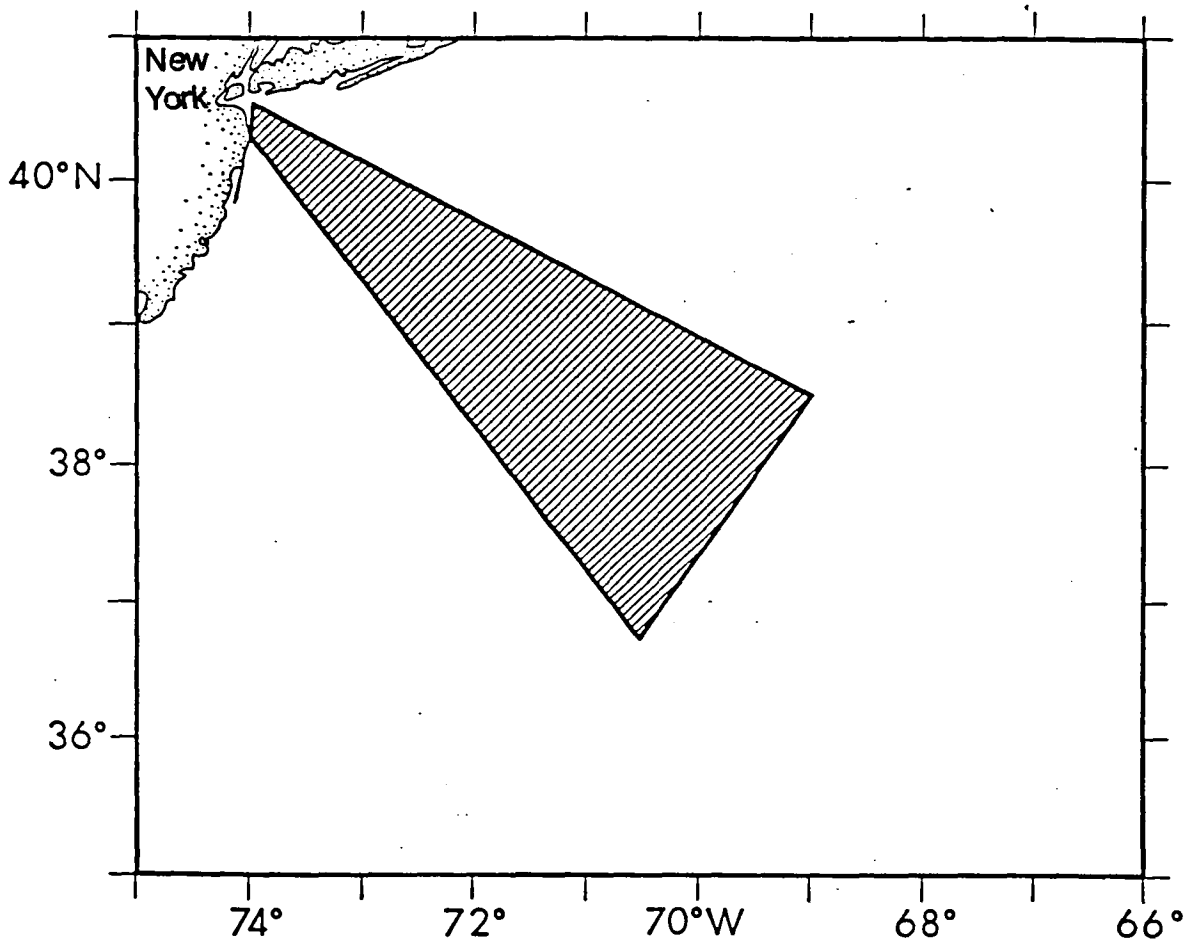
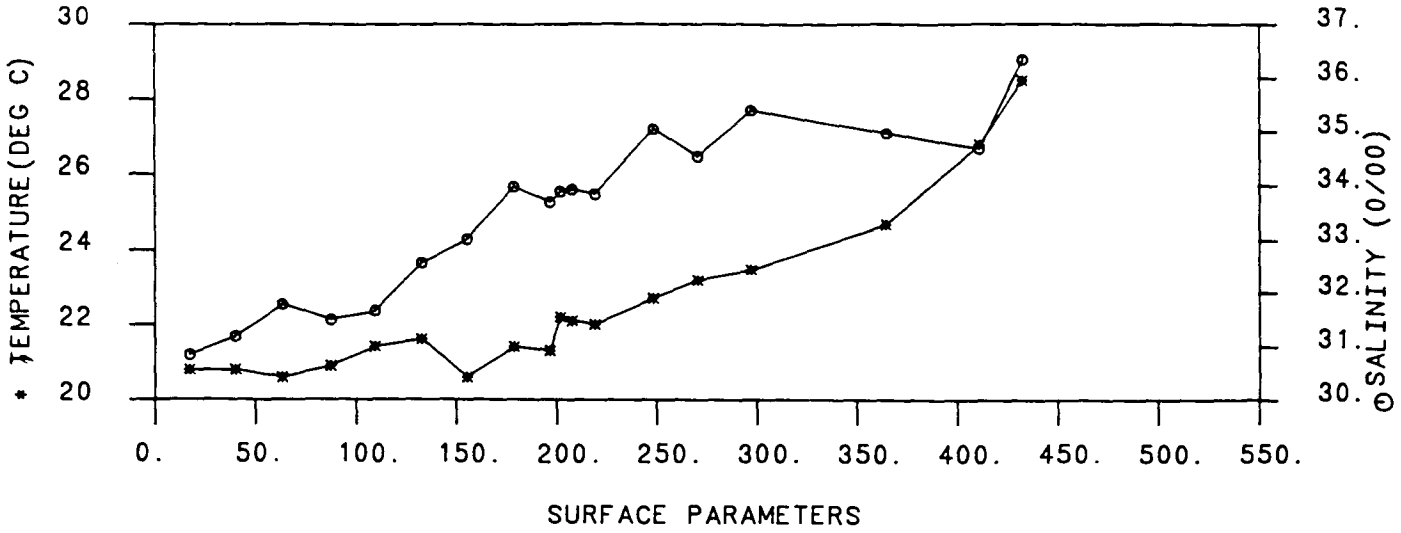
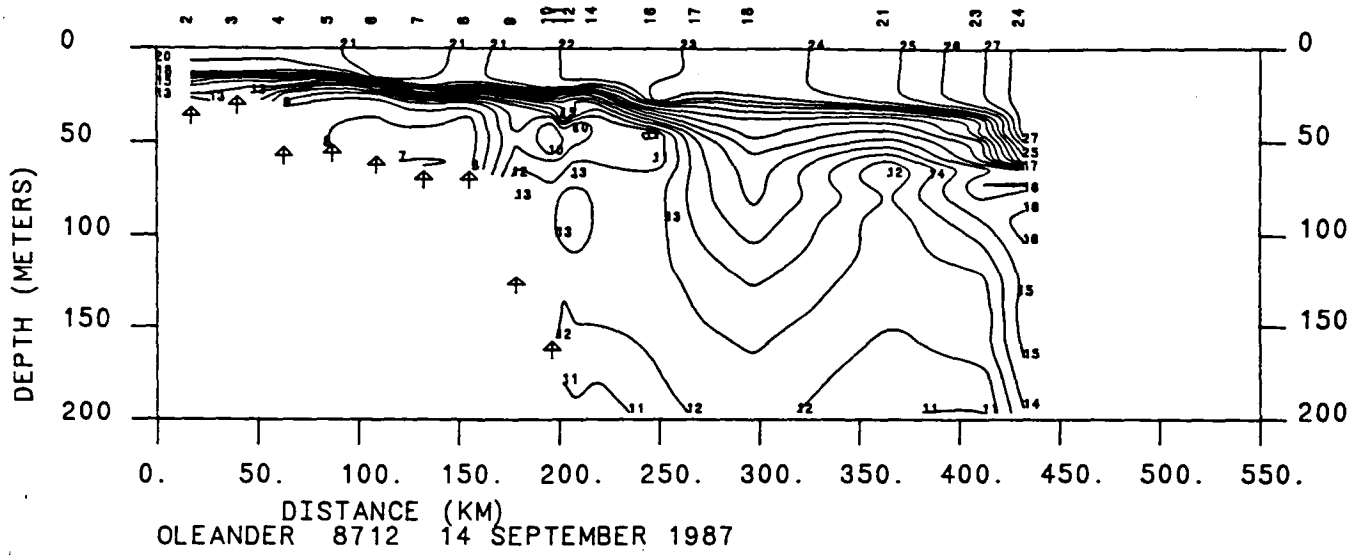


Figure 1. M/V Oleander Transect Envelope for the Ship of Opportunity Ocean Monitoring Program, Route MB (New York Bight) 1971 to present.





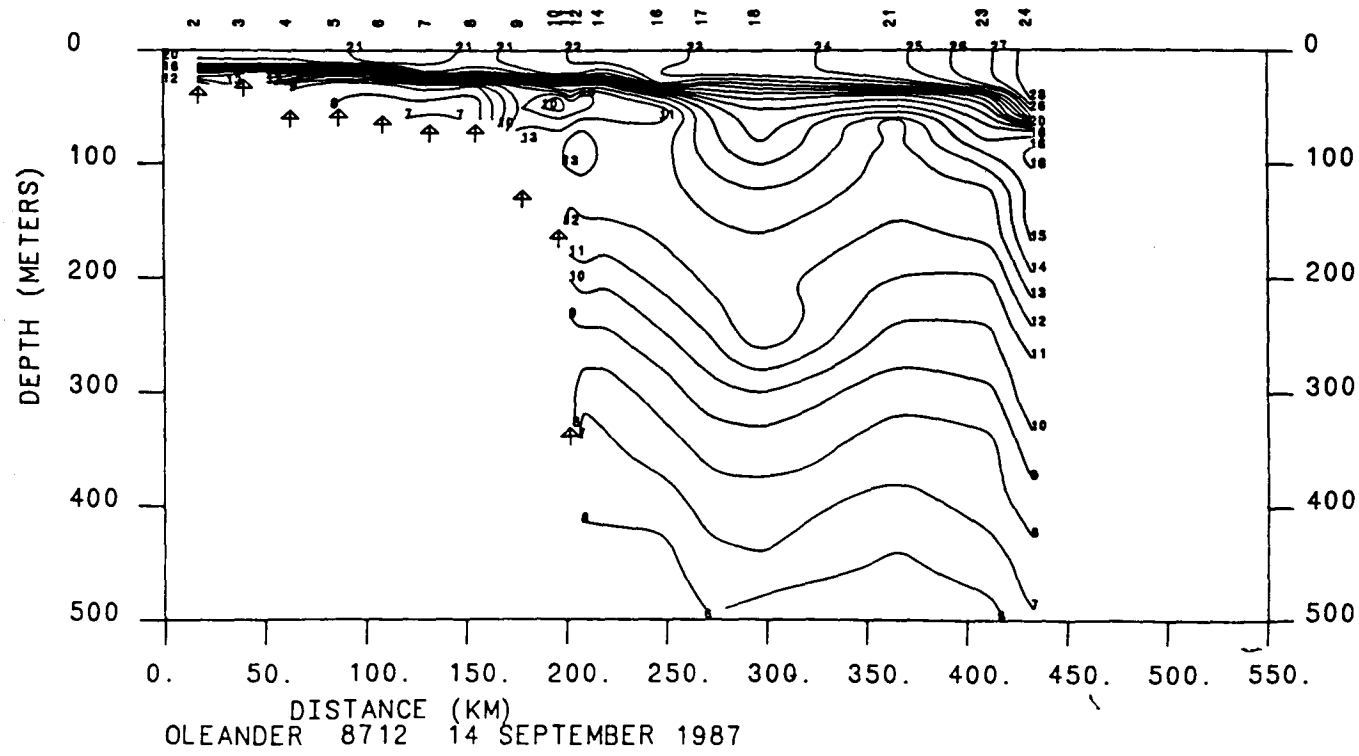


Figure 2. Sample of computer generated transect plot graphic

Table 1. 1987 NMFS/MARAD XBT New York Bight Transect Data available at NODC.

NAME OF SHIP: Oleander

Cruise Number	Dates
87-01	January 09
87-02	February 06 - 07
87-03	March 06 - 07
87-04	April 10 - 11
87-05	May 08 - 09
87-06	May 13 - 14
87-07	June 05 - 07
87-08	July 09 - 10
87-09	July 15
87-11	August 19 - 20
87-12	September 04
87-13	October 02 - 03
87-14	October 23
87-15	October 28 - 29
87-16	November 13 - 14
87-17	December 05
87-18	December 09 - 10

SECTION

II

GULF OF MEXICO

Sample vertical section and surface parameter plot (Fig. 4) of observations made from the Edgar M. Queeny during 1987 are presented. 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 inquiries about Ship of Opportunity XBT data held by NODC or data products should be directed to:

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

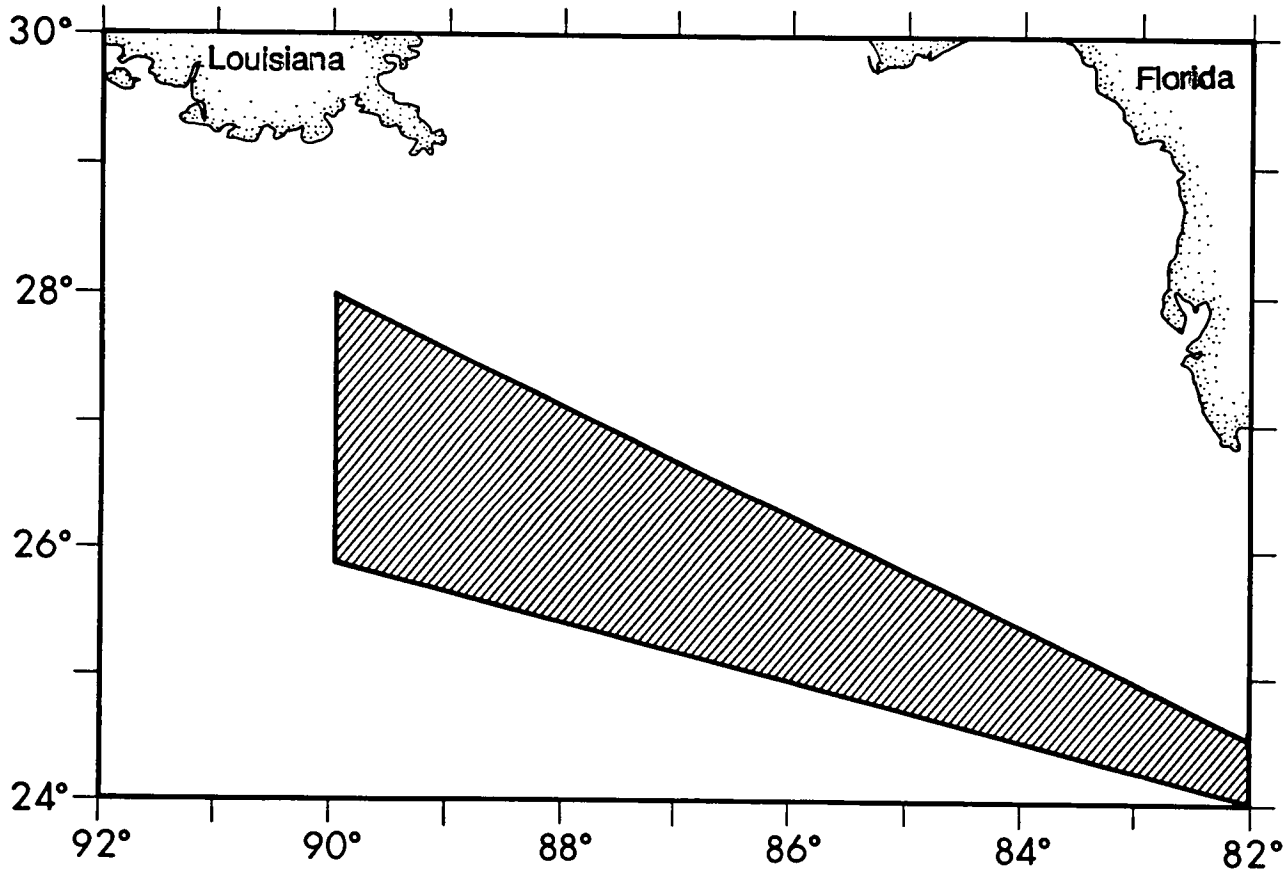
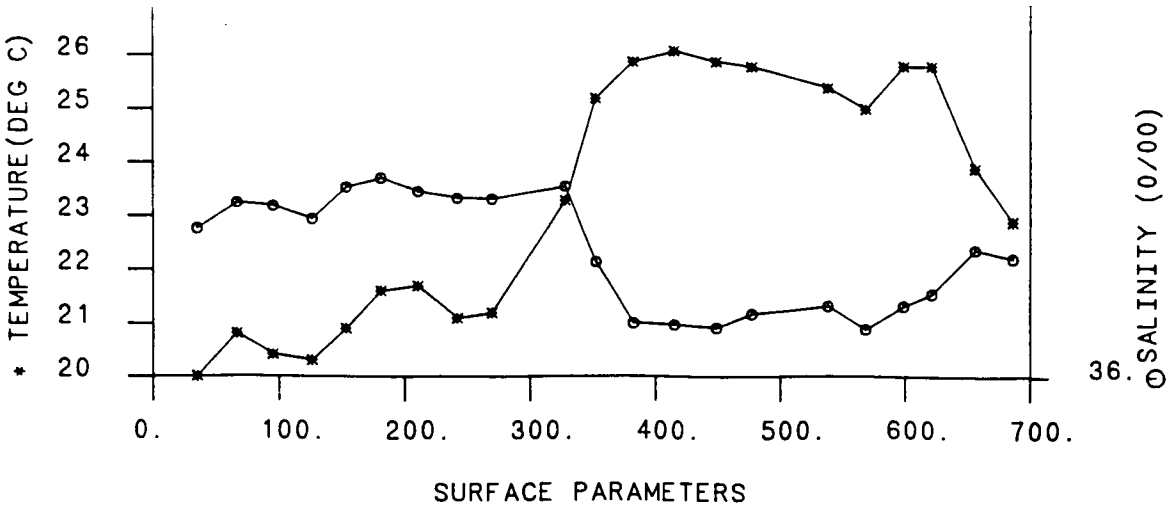
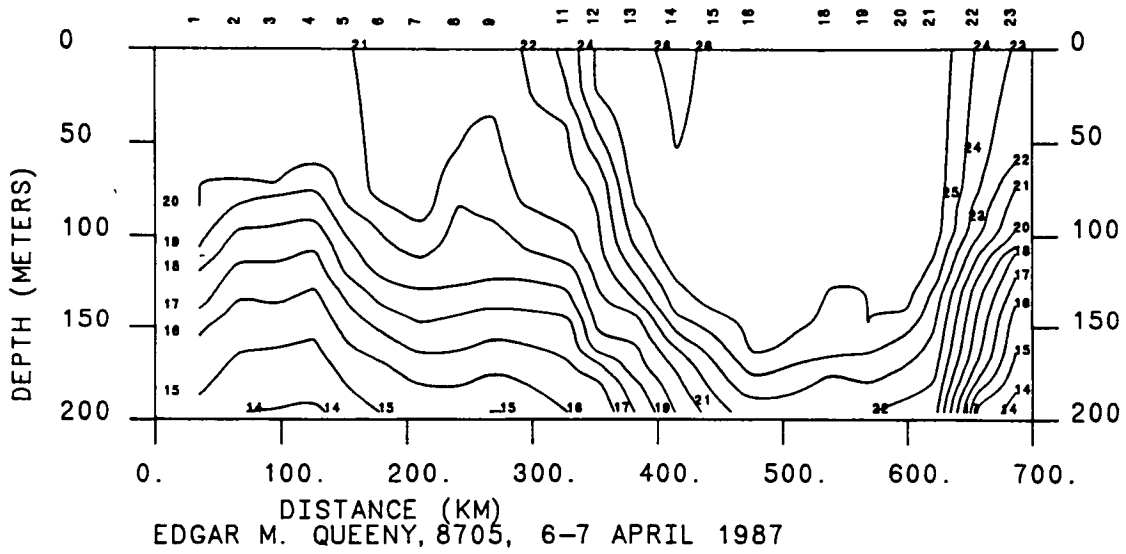


Figure 3. M/V Edgar M. Queeny Transect Envelope for the NMFS/MARAD Ship of Opportunity Program in the Gulf of Mexico, 1980 to June 1987.





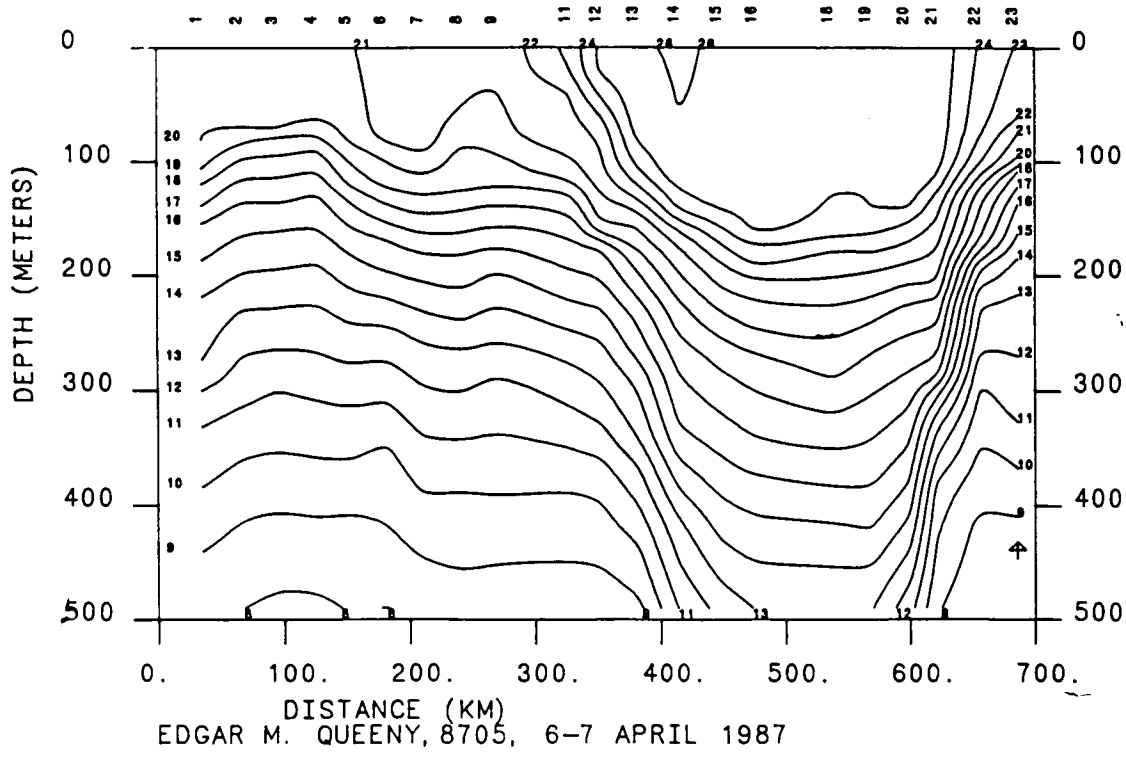


Figure 4. Sample of XBT computer generated transect plot graphic

Table 2. 1987 NMFS/MARAD XBT Gulf of Mexico Transect Data available at NODC.

NAME OF SHIP: Edgar M Queeny

Cruise Number	Dates
87-01	January 04 - 05
87 02	January 19 - 20
87-03	February 09 - 10
87-04	March 27 - 28
87-05	April 06 - 07
87-06	April 20 - 21
87-07	May 11 - 12
87-08	May 19 - 20
87-09	June 12 - 13

SECTION

III

GULF OF MAINE

This section contains a sample vertical section and surface parameter plot (Fig. 6) of observations made from the Yankee Clipper during 1987. 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)
National Environmental Satellite,
Data and Information Service, NOAA
Washington, DC 20235

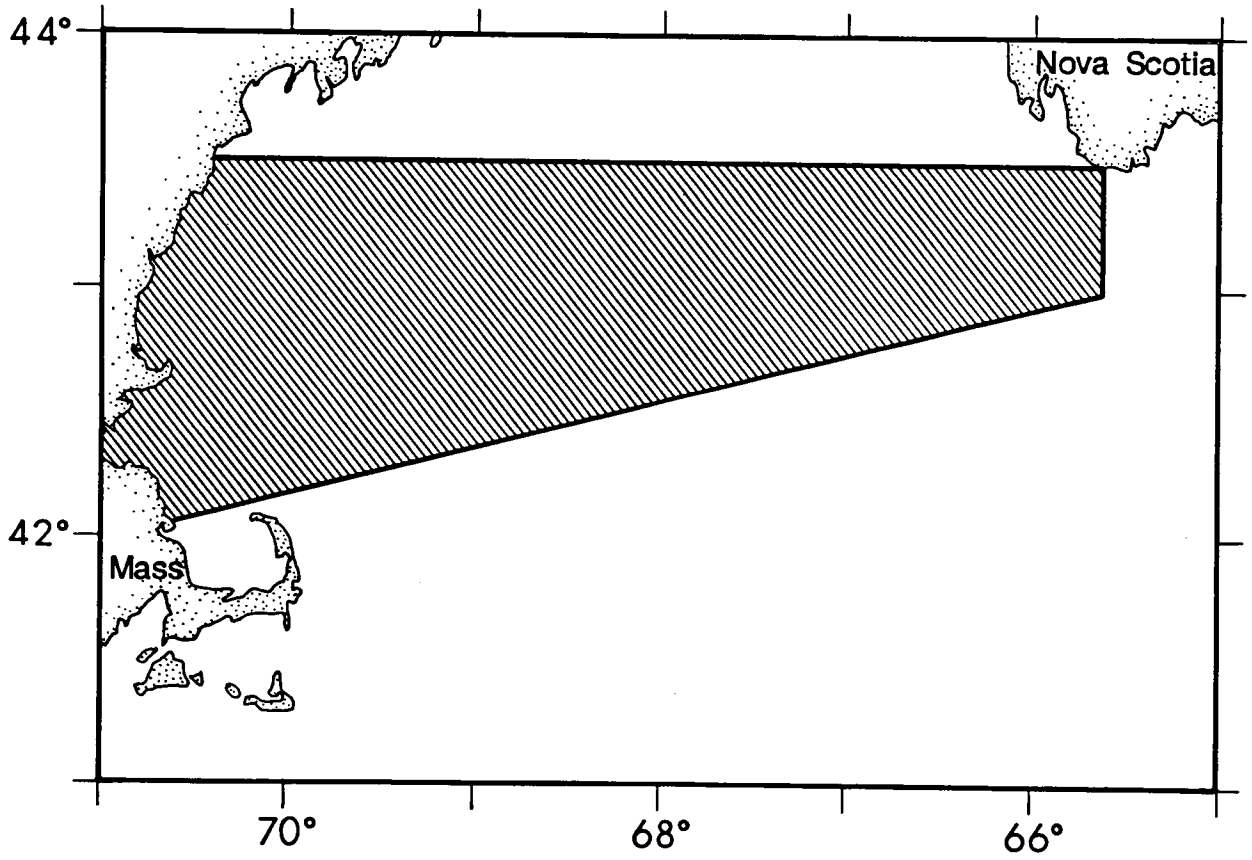


Figure 5. M/V Yankee Clipper Transect Envelope for the NMFS/MARAD Ship of Opportunity Program, in the Gulf of Maine, 1977 to present.

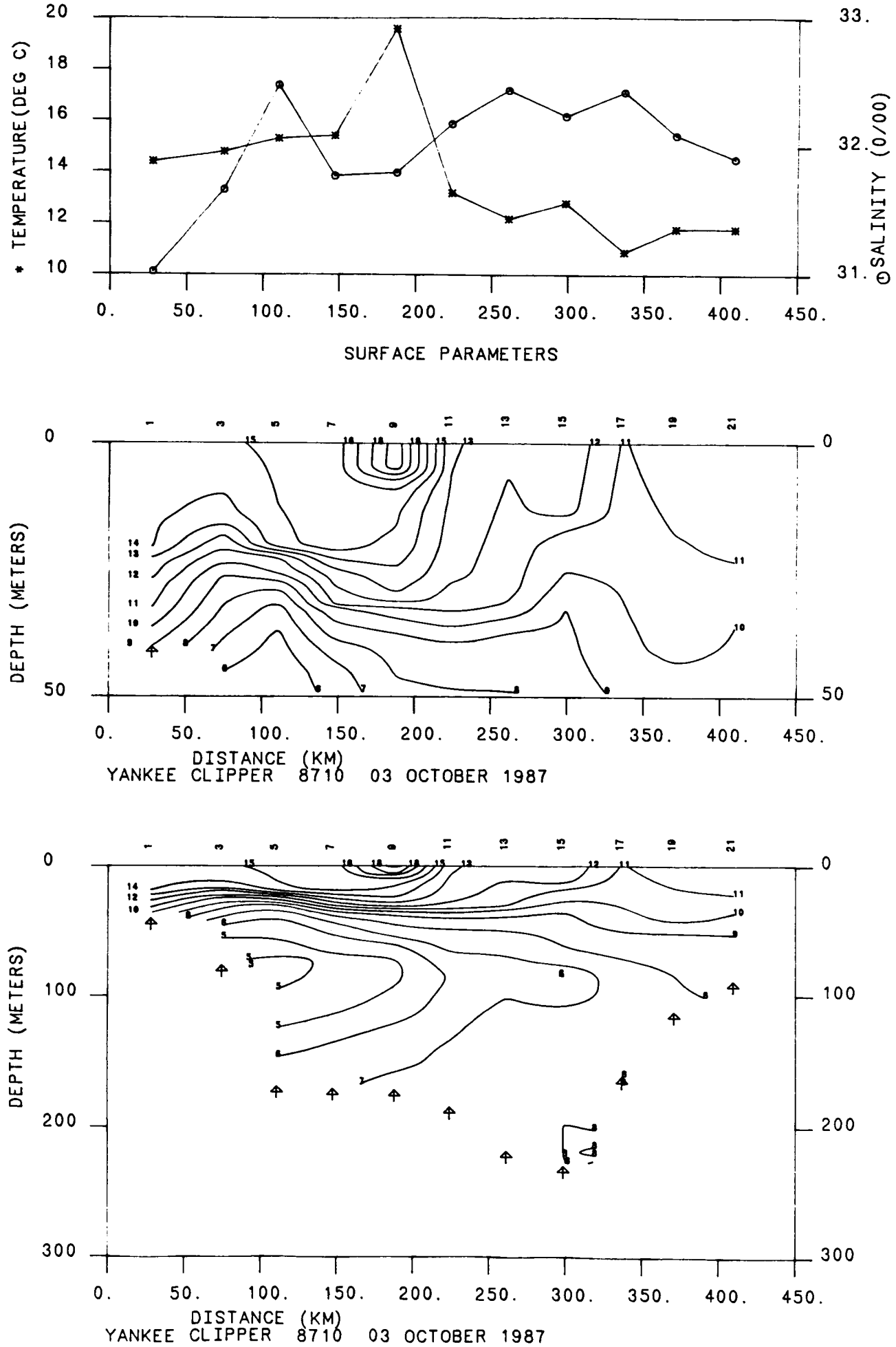


Figure 6. Sample of computer generated transect plot graphic

Table 3. 1987 NMFS/SOOP XBT Gulf of Maine Transect Data available at NODC.

NAME OF SHIP: Yankeer Clipper

Cruise Number	Dates
87-04	April 11
87-05	May 09
87-06	June 06
87-07	July 11
87-08	August 08
87-09	September 12
87-10	October 03
87-11	November 14
87-12	December 12

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.