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The A. & M. College of Texas

DEPARTMENT OF OCEANOGRAPHY

**SUMMARY OF NORTH ATLANTIC
WEATHER STATION BATHYTHERMOGRAPH DATA
1946 - 1950**

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Technical Report No. 3

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and Project Staff

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The Agricultural and Mechanical College of Texas
Department of Oceanography
College Station, Texas

Texas A. and M. Research Foundation
Project 29

SUMMARY OF NORTH ATLANTIC
WEATHER STATION BATHYTHERMOGRAPH DATA
1946-1950

(Technical Report No. 3)

Project 29 is a study of the atmospheric influence on the thermal structure of the oceans, sponsored by the Office of Naval Research (Project NR 083-061, Contract N7onr-487, Task Order 3).

September, 1952

Dale F. Leipper, Richard M. Adams
and
Project Staff

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2, 3, 4	A	62°00'N, 33°00'W	July 1946 - June 1947
5, 6, 7	A	62°00'N, 33°00'W	July 1947 - June 1948
8, 9, 10	A	62°00'N, 33°00'W	July 1948 - June 1949
11, 12, 13	A	62°00'N, 33°00'W	July 1949 - June 1950
14, 15, 16	B	56°30'N, 51°00'W	July 1949 - June 1950
17, 18, 19	C	52°45'N, 35°30'W	July 1946 - June 1947
20, 21, 22	C	52°45'N, 35°30'W	July 1947 - June 1948
23, 24, 25	C	52°45'N, 35°30'W	July 1948 - June 1949
26, 27, 28	C	52°45'N, 35°30'W	July 1949 - June 1950
29, 30, 31	D	44°00'N, 41°00'W	July 1949 - June 1950
32, 33, 34	E	35°00'N, 48°00'W	July 1949 - June 1950
35, 36, 37	E	34°00'N, 52°00'W	July 1948 - June 1949
38, 39, 40	H	36°00'N, 70°00'W	July 1949 - June 1950

INTRODUCTION

The information in this report was obtained from BT(bathythermograph) data collected at or near the assigned positions of North Atlantic Weather Ships. The observations are on file at the Woods Hole Oceanographic Institution and were loaned to Texas A. & M. for this study. The methods of handling these data were given in detail in Technical Report No. 1 of this project, Some Methods Used in Representing Bathythermograph Data, but will be restated briefly here.

For each year in which there are sufficient data at a given station to warrant this type of study, three time graphs have been drawn. These are:

- 1) Depth of mixed layer and of water 2°F colder than the mixed layer;
- 2) Temperatures at selected depths; and
- 3) Depths of selected differences from sea surface temperature.

To obtain these time graphs of BT data, a procedure involving four separate steps was employed:

1. Selection of cards. Only one card was used to represent a particular day. This card was one selected as being typical for that day, factors considered being sea surface temperature, depth of mixed layer, depth and nature of the thermocline, time of observation and general character of the curve. When possible, the observation made nearest to 1200 hours (GCT) was chosen.

2. Reading of cards. A team of two people was used for all card reading, each reading being checked to assure accuracy. Temperatures at ten chosen depths (0, 25, 50, 75, 100, 150, 200, 250, 350, and 450 feet) were read, with an agreement between readers of $\pm 0.1^\circ\text{F}$ being required for each depth. The depth of the mixed layer (this depth being defined as the depth to a $\pm 0.3^\circ\text{F}$ change from the temperature of the sea surface) and the depth of water 2°F colder than the mixed layer were then read, the required agreement in these cases being ± 3 feet. Finally the depths of selected differences from sea surface temperature were read, agreement again being ± 3 feet.

3. Smoothing of data. A running five day average was determined to make a picture showing the nature of gradual changes with time. The value for a particular day was obtained by averaging the value for that day with the two immediately preceeding and the two following days. Exceptions occurred at the beginning or end of a series of days or at places where for one or two days there were no data available. In these cases four day or, in a few cases,

three day averages were used. It should be noted that all curves are five day running mean curves, although only the temperatures at selected depths are so marked.

4. Plotting of data. The final step consisted of plotting the data in the form which appears in this report. It should be noted that only the values for the surface, 100, 200, and 350 foot depths have been plotted for temperatures at selected depths. In those cases where isothermal conditions exist, only the temperature for the lowest depth has been plotted. Thus when the curve for a particular depth does not appear on the graph, the temperature at this depth is the same as the temperature of the next lower curve which does appear. On all graphs the days for which no observations were available are indicated as are the days on which shallow (150 foot) bathythermographs were used.

The years for which data for the various weather stations have been plotted and reproduced in this report appear in the List of Figures, page ii.

A similar report will be made for the weather ship data of the Pacific Ocean upon completion of the study for that area.

Data in this report appear only in the final plotted form. However, copies of the data in either preliminary form are on file in the Department of Oceanography.

In addition to the project supervisor, Dr. Dale F. Leipper, the following people took part in the work: Richard M. Adams, in charge of processing, worked out the detailed procedure. Mrs. Jeanne Burja drafted the charts. Edward R. Ibert, Albert B. Turner, William S. Dixon, Talmage Y. Hicks, Donald E. Pickart, Thomas G. Roetzel, Ernest A. Prochaska, Mrs. Merle Cobb, and Mrs. Ella Frances Spears read BT cards and processed the data. Robert A. Gilcrest was in charge of the organization and reproduction of this report.

LOCATION OF WEATHER STATIONS

FIGURE 1

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 2

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 3

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 4

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 5

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 6

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 7

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 8

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 9

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 10

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 11

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 12

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 13

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG 14

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG 15

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG 16

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 17

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 18

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 19

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 20

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 21

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 22

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 23

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 24

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 25

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 26

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 27

LAT 52° 45' N LONG 35° 30' W
 1 JULY 1949 - 30 JUNE 1950
 D₁ - DEPTH TO A 1°F CHANGE FROM
 D₀ - TEMPERATURE OF SEA SURFACE
 D₂ - DEPTH TO A 1°C CHANGE, ETC.
 * NO OBSERVATION
 * SHALLOW BT'S

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DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 29

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 30

1949 JULY 1950
 DEPT. M. FEET
 450
 400
 350
 300
 250
 200
 150
 100
 50
 0

SEPTEMBER
 OCTOBER
 NOVEMBER
 DECEMBER
 JANUARY
 FEBRUARY
 MARCH
 APRIL
 MAY
 JUNE

STATION D
 LAT. 44°00'N LONG. 4°00'W
 1 JULY 1949 - 30 JUNE 1950
 D₁ - DEPTH TO A 1°F CHANGE FROM
 TEMPERATURE OF SEA SURFACE
 D₂ - DEPTH TO A 2°F CHANGE, ETC.
 * NO OBSERVATION

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D₁
 D₂
 D₃

F.G. 31

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 32

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 33

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 34

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 35

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 36

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 37

DEPTH OF MIXED LAYER AND OF WATER 2°F COLDER THAN MIXED LAYER

FIG. 38

TEMPERATURES AT SELECTED DEPTHS (CURVES SMOOTHED)

FIG. 39

DEPTHS TO SELECTED DIFFERENCES FROM SEA SURFACE TEMPERATURE

FIG. 40

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