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THE TEMPERATURE STRUCTURE IN THE UPPER LAYERS OF THE
LIGURIAN SEA AND ITS SEASONAL VARIATIONS

by
Dr. A. Dahme
May, 1962

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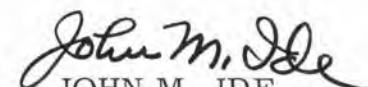
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THE TEMPERATURE STRUCTURE IN THE UPPER LAYERS OF THE LIGURIAN SEA AND ITS SEASONAL VARIATIONS

by
Dr. A. Dahme

Abstract

Water temperature measurements in the Ligurian Sea down to depths of 150 meters and meteorological data connected with these measurements for the period July 1960 to October 1961 are presented in the form of graphs and tables.

* * * *

In July 1960 the Center started a survey of the Ligurian Sea to study the thermal behaviour and seasonal variation of the water in the area to depths of 150 meters. After some preparatory measurements, it was decided to survey regularly the following routes (see Fig. 1).

Isola del Tino	Isola della Giraglia
Isola della Giraglia	Isola Capraia
Capo Mele	Isola della Giraglia
Cap Ferrat	Punta Revellata
Isle du Levant	Punta Revellata

Measurements on other routes also were made occasionally.

The parameters of interest were measured in the following ways:

(1) Water Temperature: This was measured with a 450 ft bathythermograph (Spilhaus, 1938). The Center's research vessel ARAGONESE normally maintained a speed of 10 knots en route, and the BT was lowered every 15 or 20 minutes. Simultaneous bucket samples were taken to measure surface temperature. The correction to the bathythermograms were made according to La Fond (1951).

A device has been developed at the Center in which a BT slide can be placed over its corresponding grid and the La Fond correction mechanically inserted. While in the corrected position, the resultant graph is photographed and enlarged for convenient evaluation. The isotherms in Figs. 2 to 46 were drawn from these photographs.

(2) Ship's Position: Within 20 miles of the coast, radar, corrected by an occasional visual bearing, was used to establish the ship's position. Dead reckoning and radar were used in the open sea. The accuracy of radar was dubious because of the impossibility of establishing the exact geographical position of reflected land images; however, it aided dead reckoning in that it permitted some compensation for set and drift. The distances of the ship from the shore line evaluated from these fixes were plotted against time and, assuming a con-

stant speed, connected by a straight line. The distances taken from this graph were used for Figs. 2 to 46.

(3) Air Temperature: This was measured by an Assman psychrometer which has a spring driven aspirator. This instrument was installed in the bow about 2 meters above the deck and about 10 meters above the waterline. It contained wet and dry bulb thermometers.

(4) Wind Speed and Direction: The speed of the relative wind was measured by an anemometer installed about 3 meters above the flying deck and 14 meters above the waterline. The relative direction was estimated. Relative wind was converted to true wind for all readings.

(5) Sea State: Sea state was estimated in accordance with U. S. Navy Hydrographic Office (USN H.O.) Pub. No. 606-e.

The water temperatures in degrees centigrade down to 150 meters are shown in the form of isotherms in Figs. 2 to 46. The meteorological data are contained in Table I which gives the hours in GMT, the air temperature for both the dry and the wet bulb in degrees centigrade, the air pressure in millibars, the wind direction according to the WMO Code 23 (see USN H.O. Pub. No. 607, p. 188) at 10° intervals, the wind speed in knots, and the sea state according to the WMO Code 75 (see USN H.O. Pub. No. 607, p. 189).

The assistance of the Master and Officers of the ARAGONESE in collecting the data and the help given by Miss C. Pedenovi in evaluating it are gratefully acknowledged.

* * * *

References

- 1) La Fond, E. C.: Processing oceanographic data, USN H.O. Pub. 614, Washington, D.C., 1951, pp. 1 - 3.
- 2) Spilhaus, A. F.: A Bathythermograph, Journ. Mar. Res. 1, 95-100, 1938.
- 3) USN H.O. Pub. No. 606-e: Sea and Swell observations, Washington, D. C., 1950.
- 4) USN H.O. Pub. No. 607: Instruction Manual for Oceanographic Observations, 2nd Edition, Washington, D. C., 1955.

Explanatory Note

Figure 1, which follows, presents graphically the survey routes covered in this report.

Figures 2 through 46 show the plotted isotherms arranged in date order for each route. The scales at the top of each figure represent the Greenwich Mean Time, the observation station number, and the distance in nautical miles along the track. Depths are given in meters, temperatures in degrees centigrade.

Meteorological data are tabulated in Table I, which follows Figure 46. This table is arranged in date order irrespective of survey routes.

Example: Figure 2 represents the isotherms of 3 November 1960 along the track Isola del Tino to Isola della Giraglia. Observation number 1 (Station Nr. 1) was made at 0820 GMT at approximately 5 miles from TINO. To find corresponding meteorological data enter Table I for 3 November 1960 on page 46.

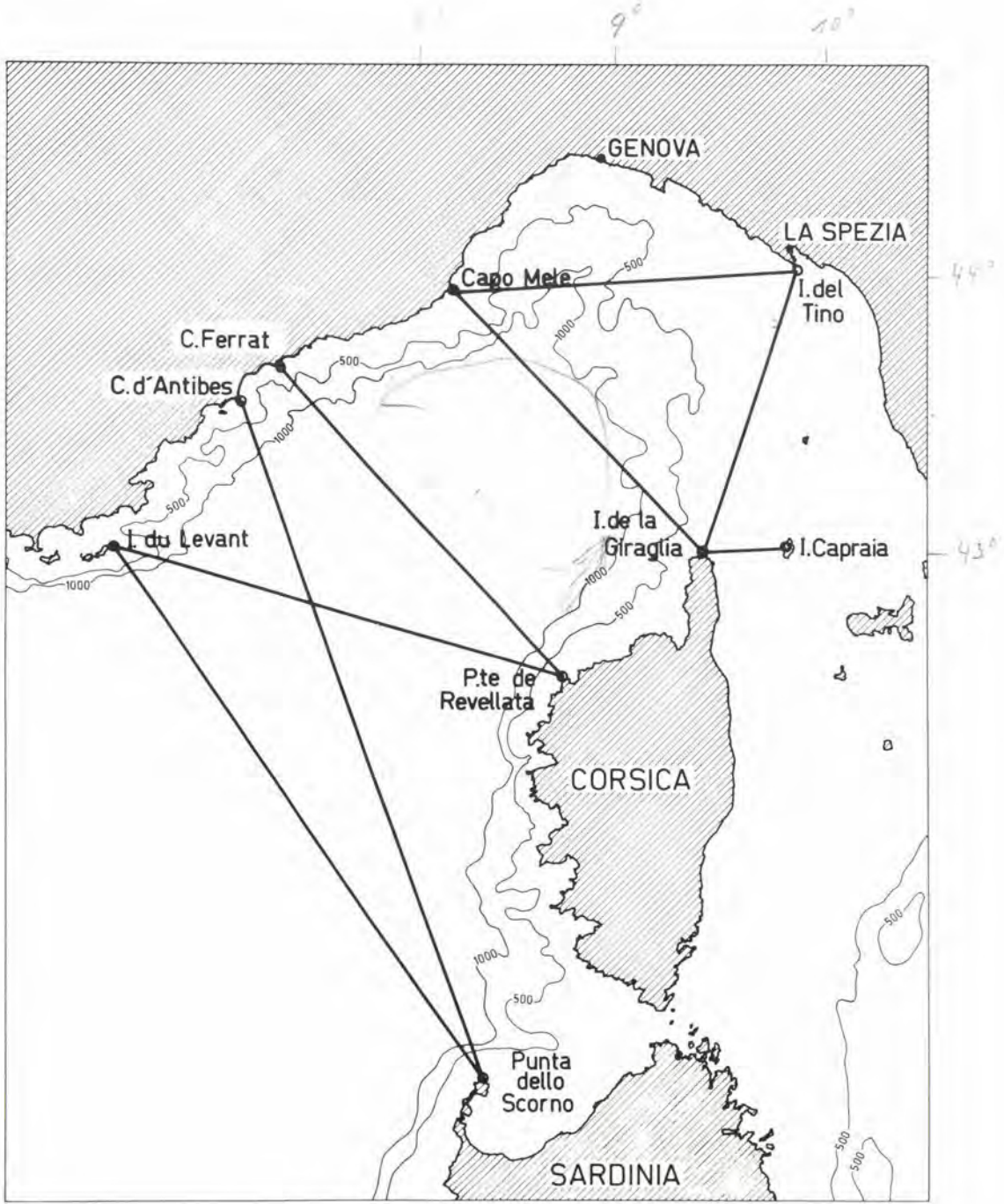


Fig. 1. Depths in Fathoms

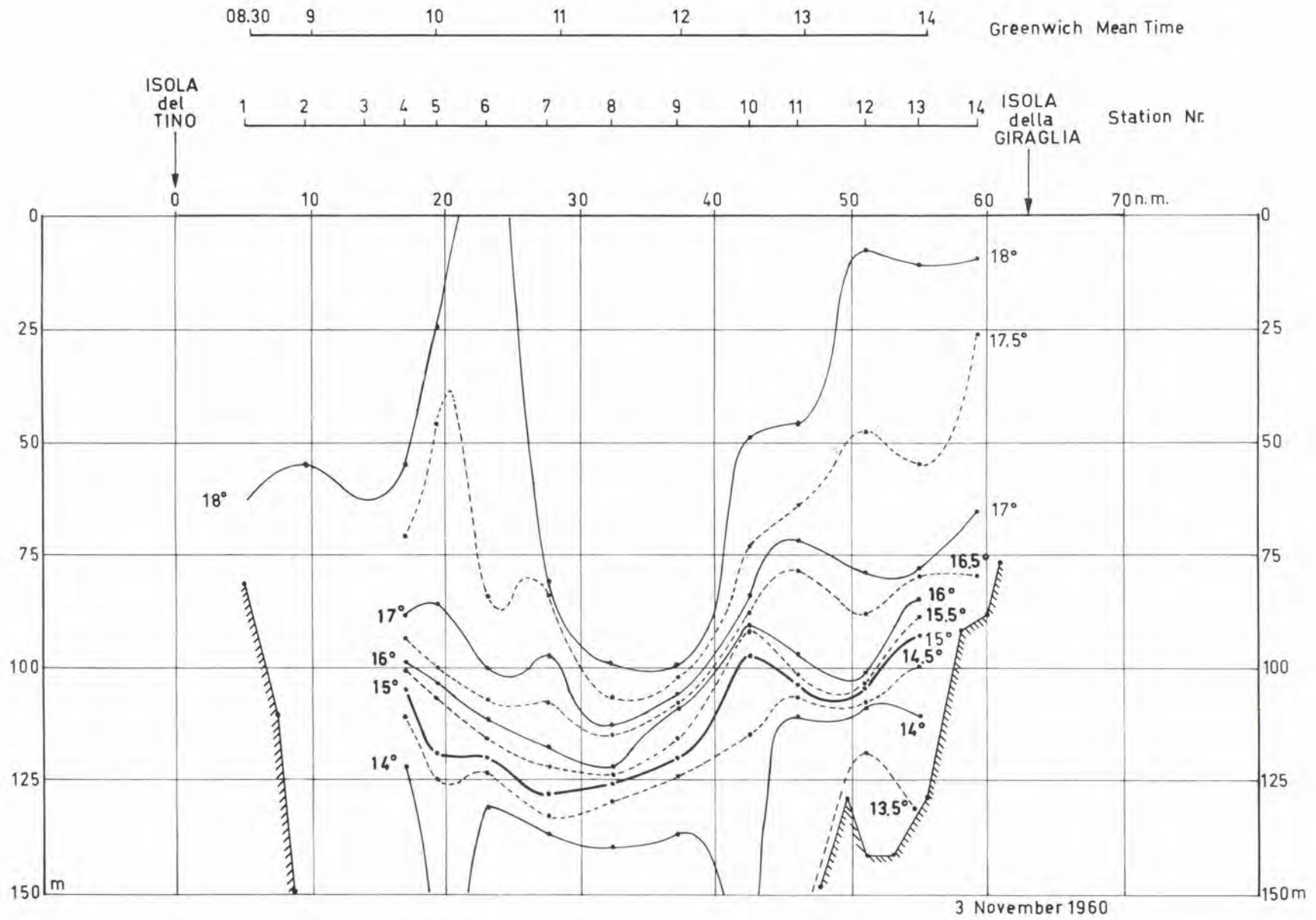


Fig. 2

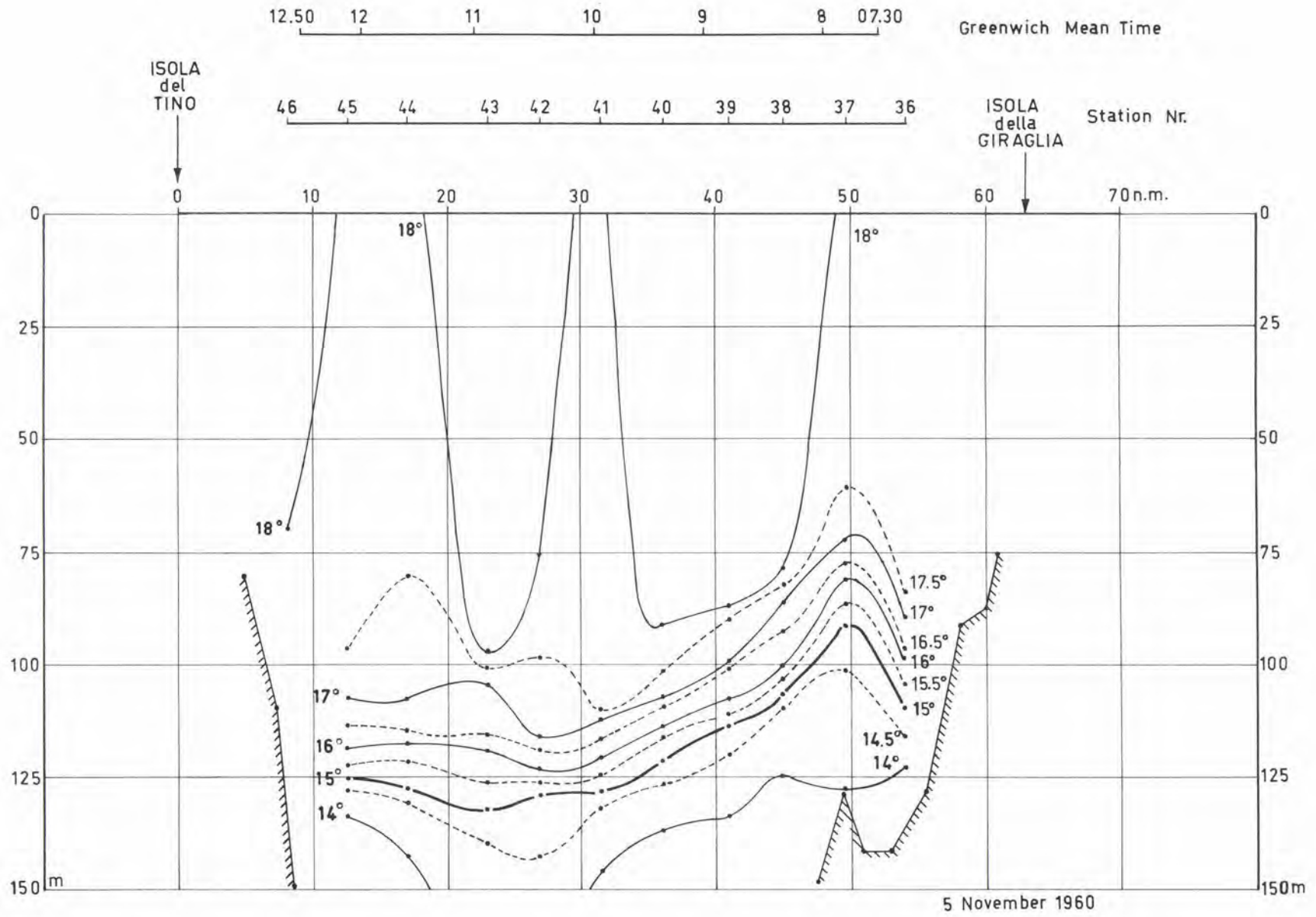


Fig. 3

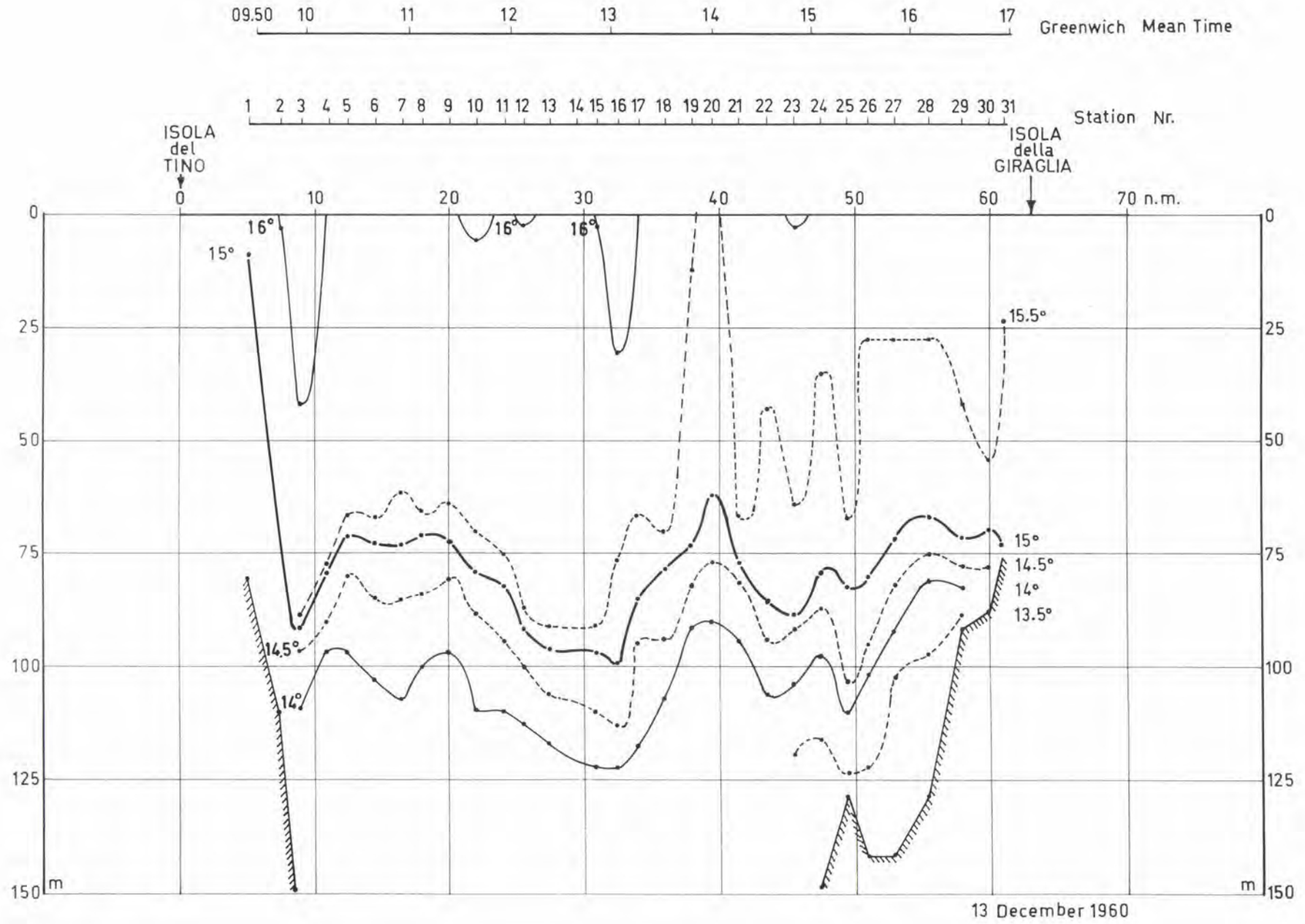


Fig. 4

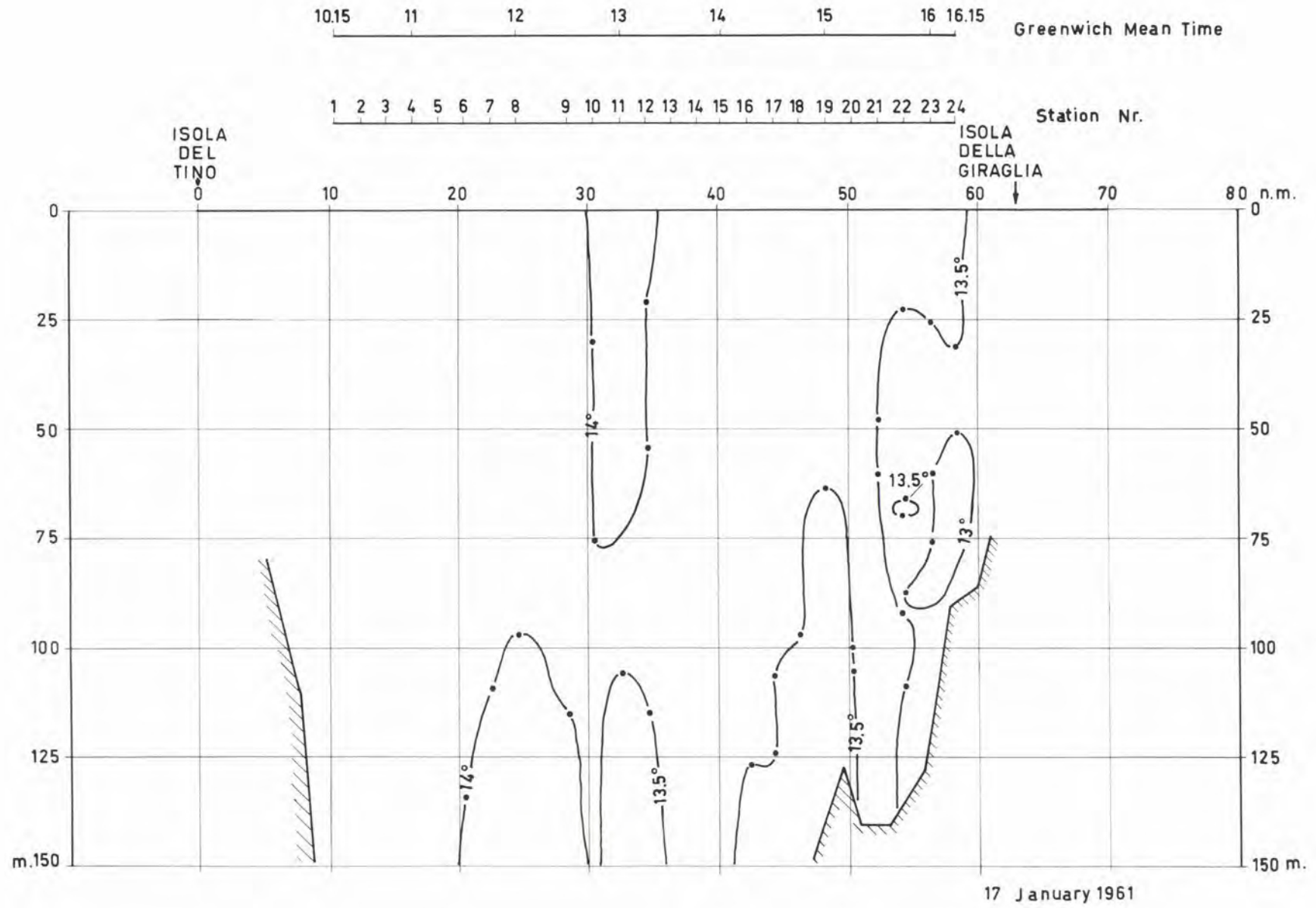


Fig. 5

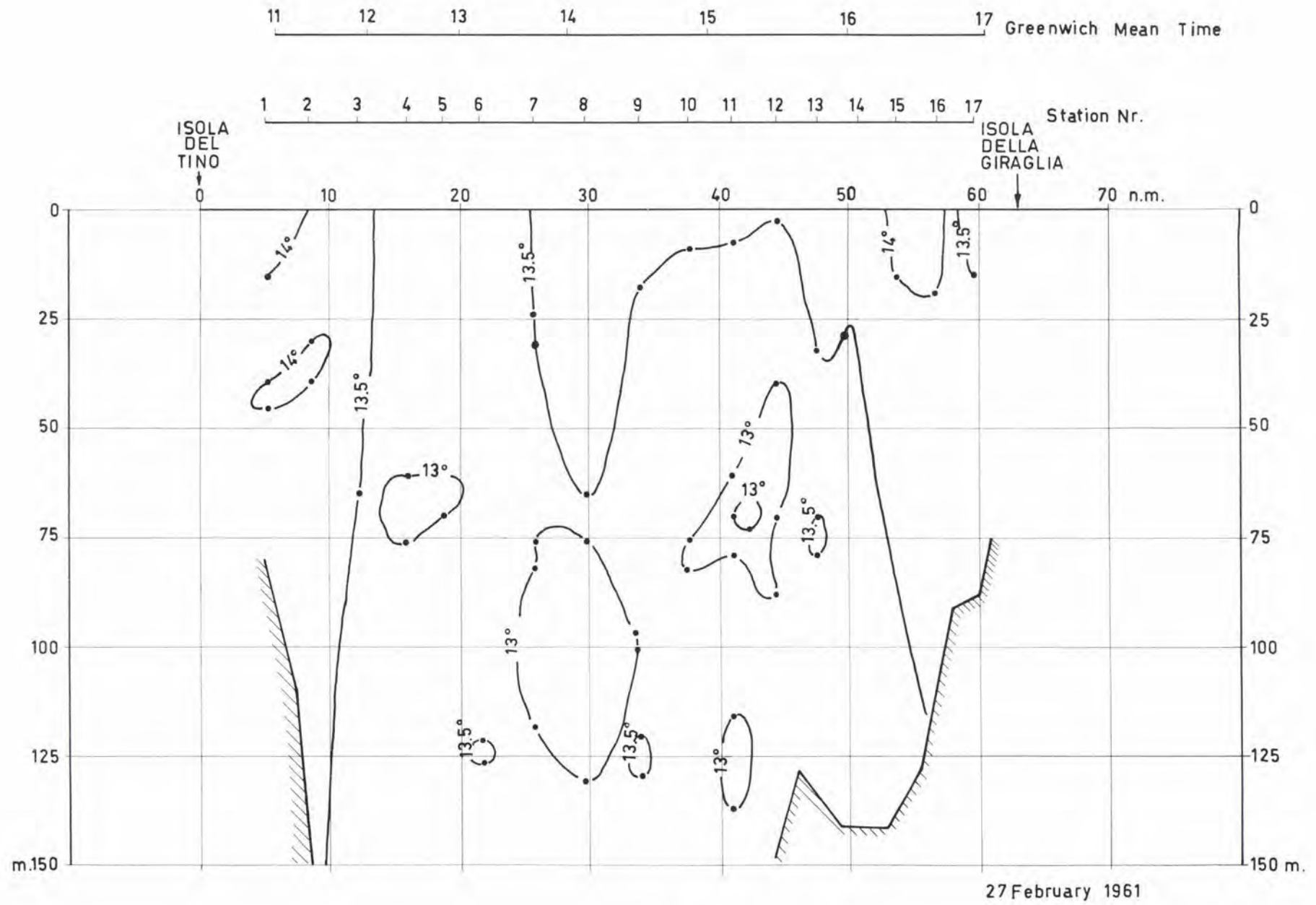


Fig. 6

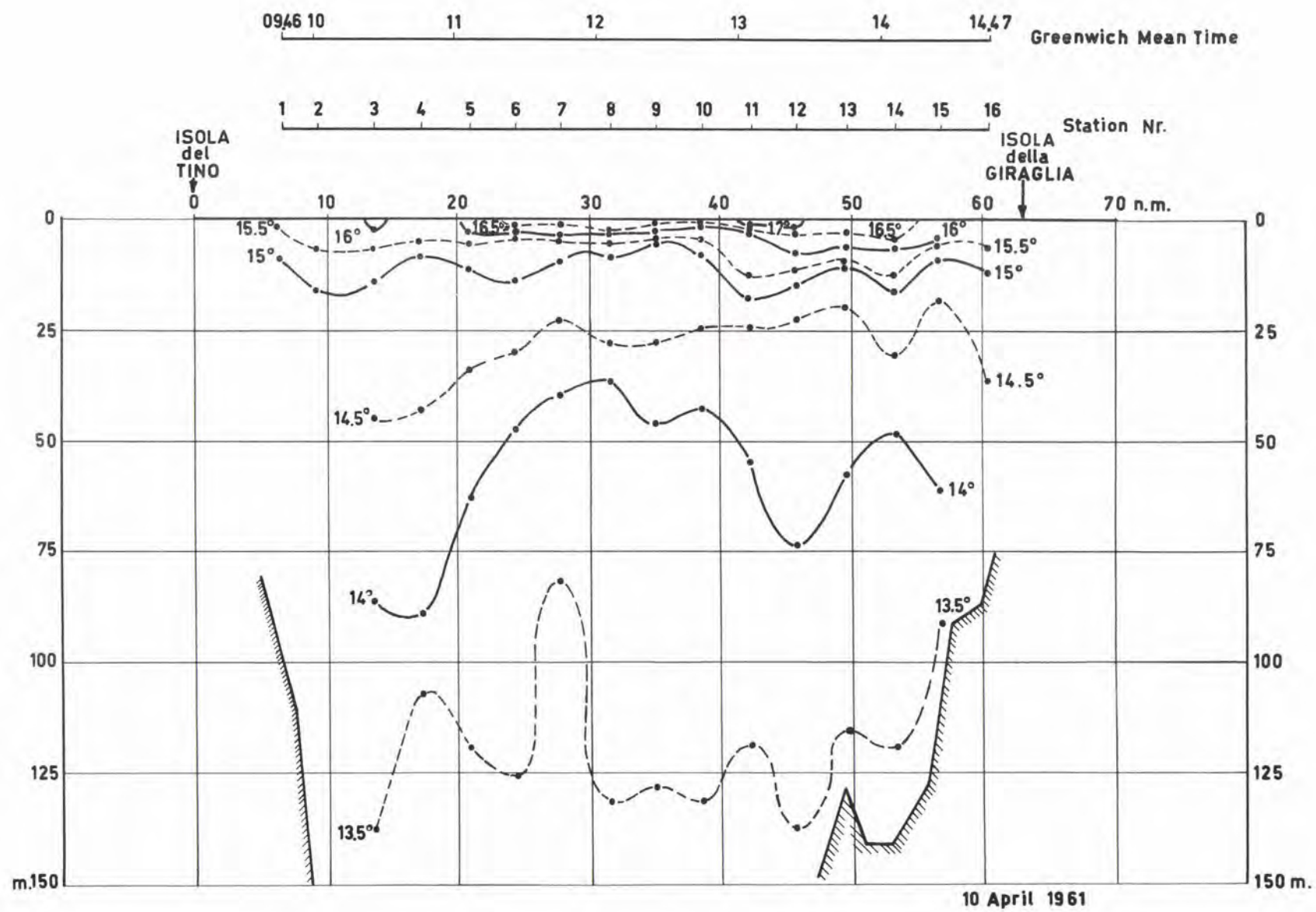


Fig. 7

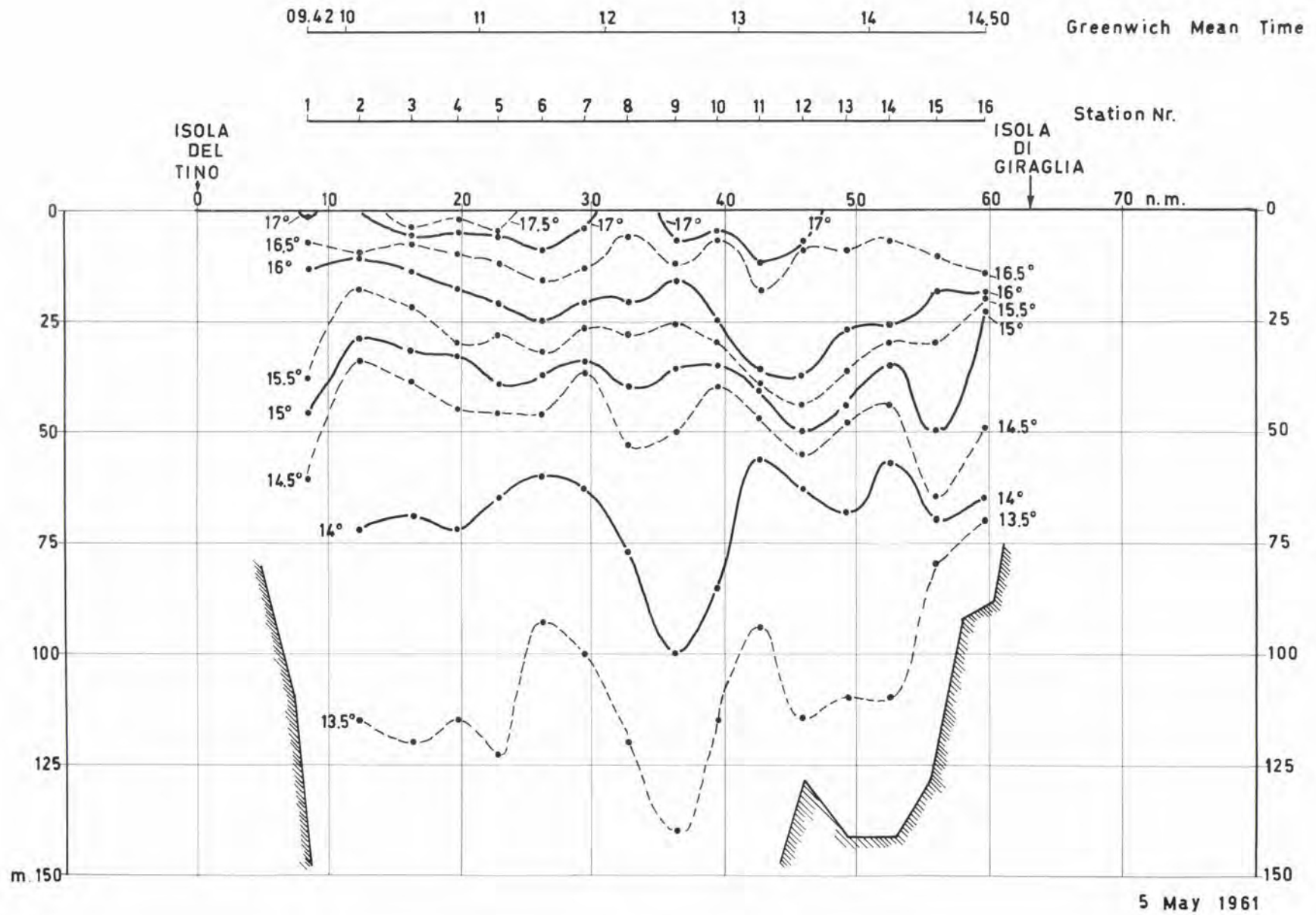


Fig. 8

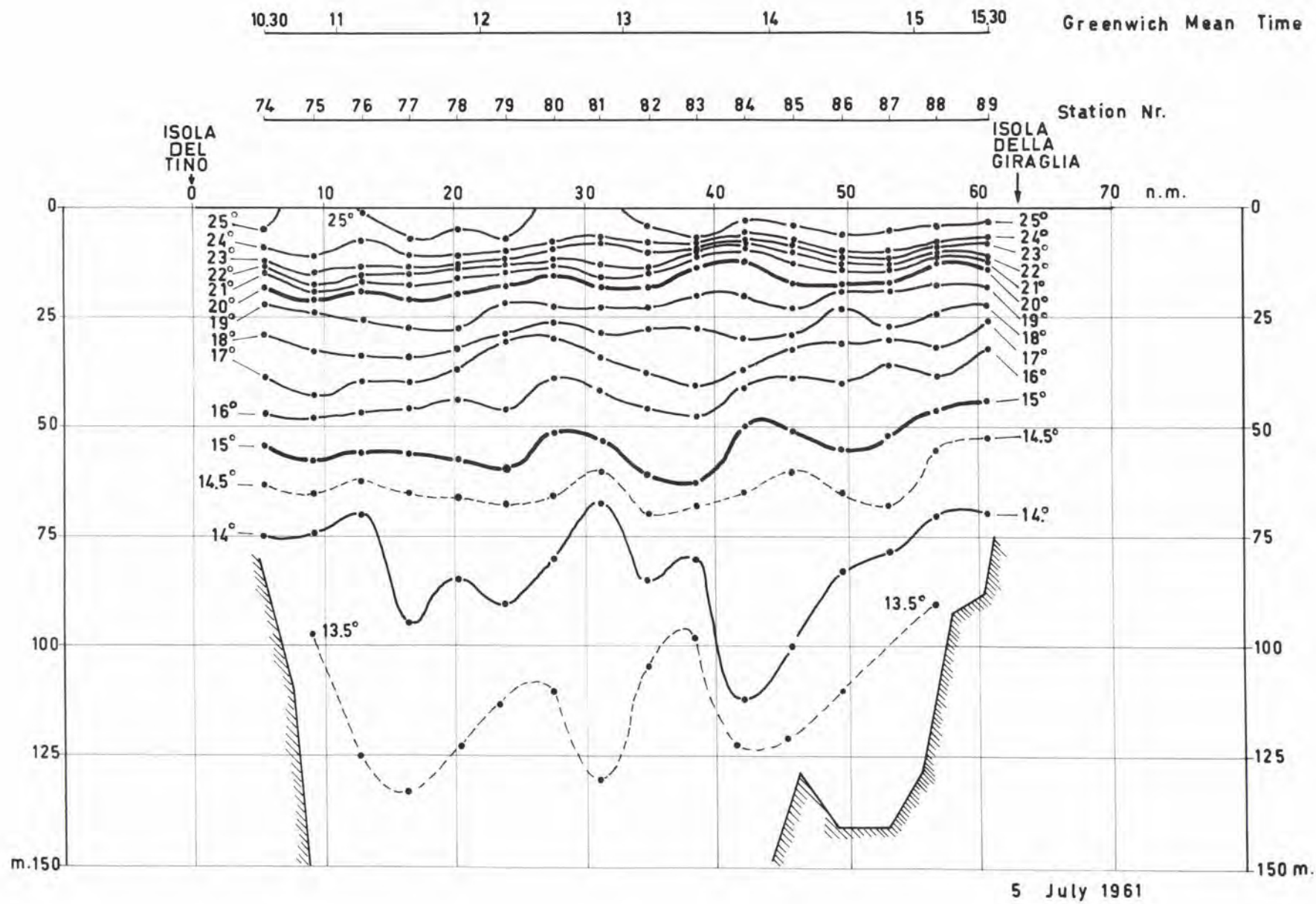


Fig. 9

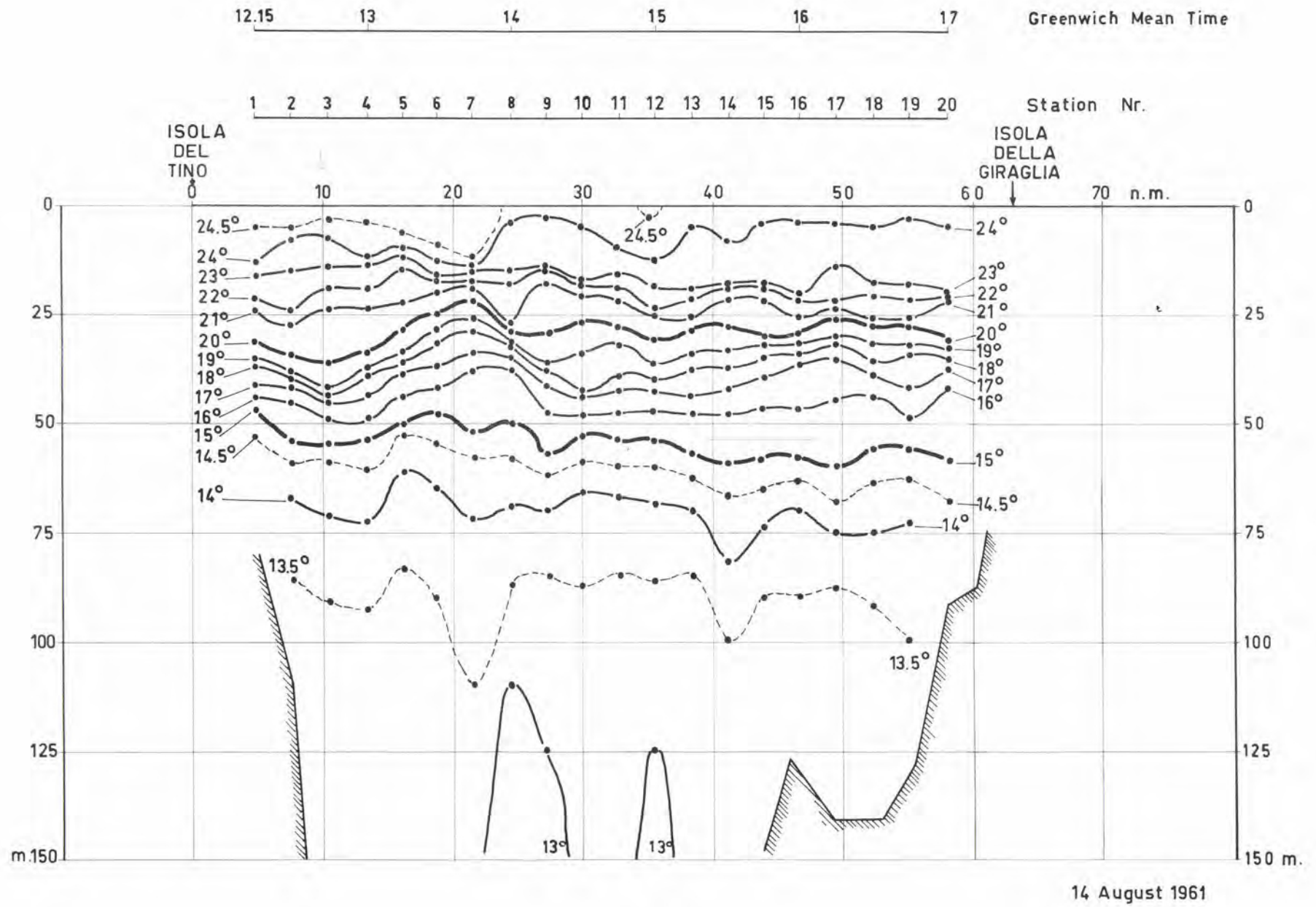


Fig. 10

14 August 1961

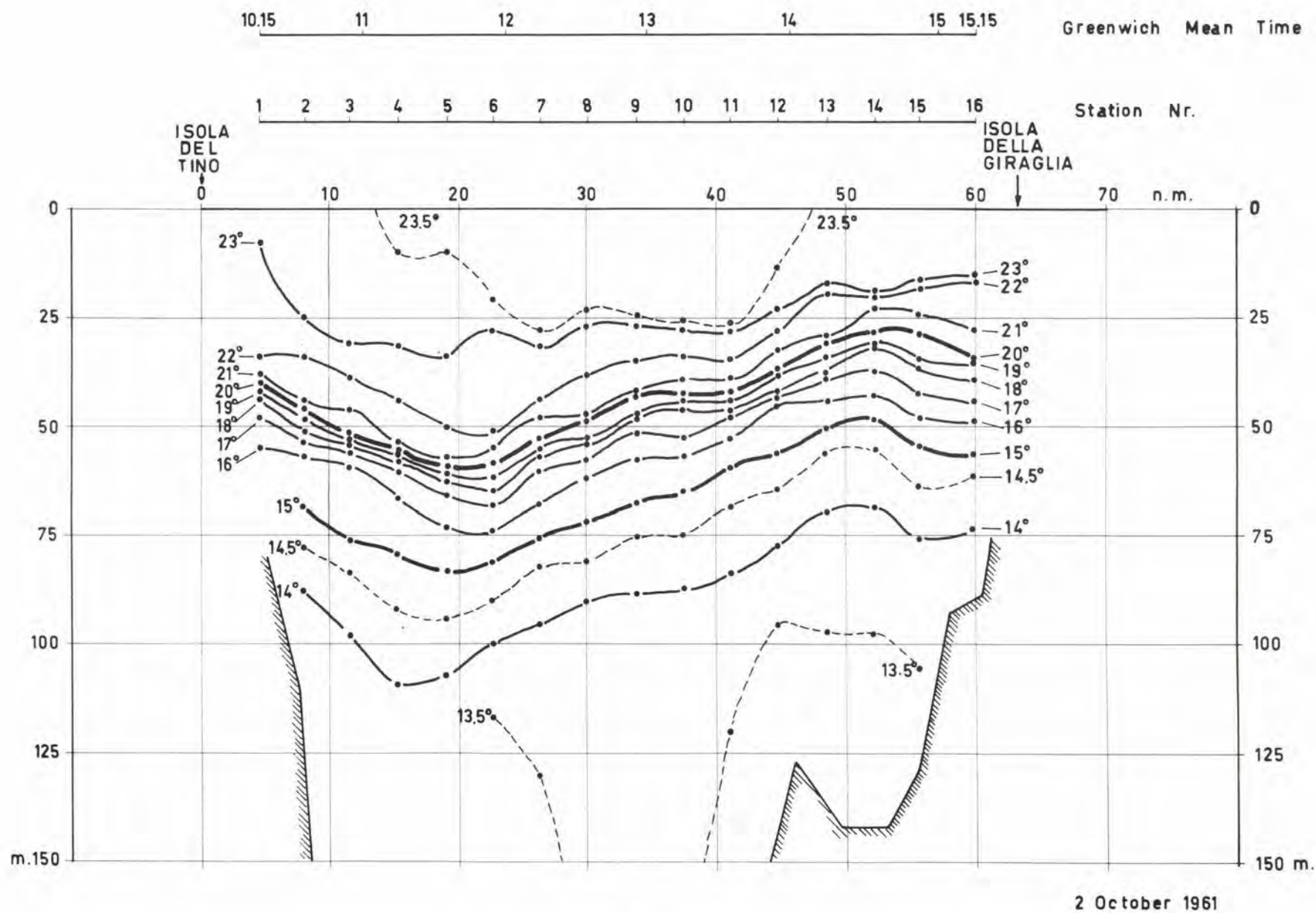


Fig. 11

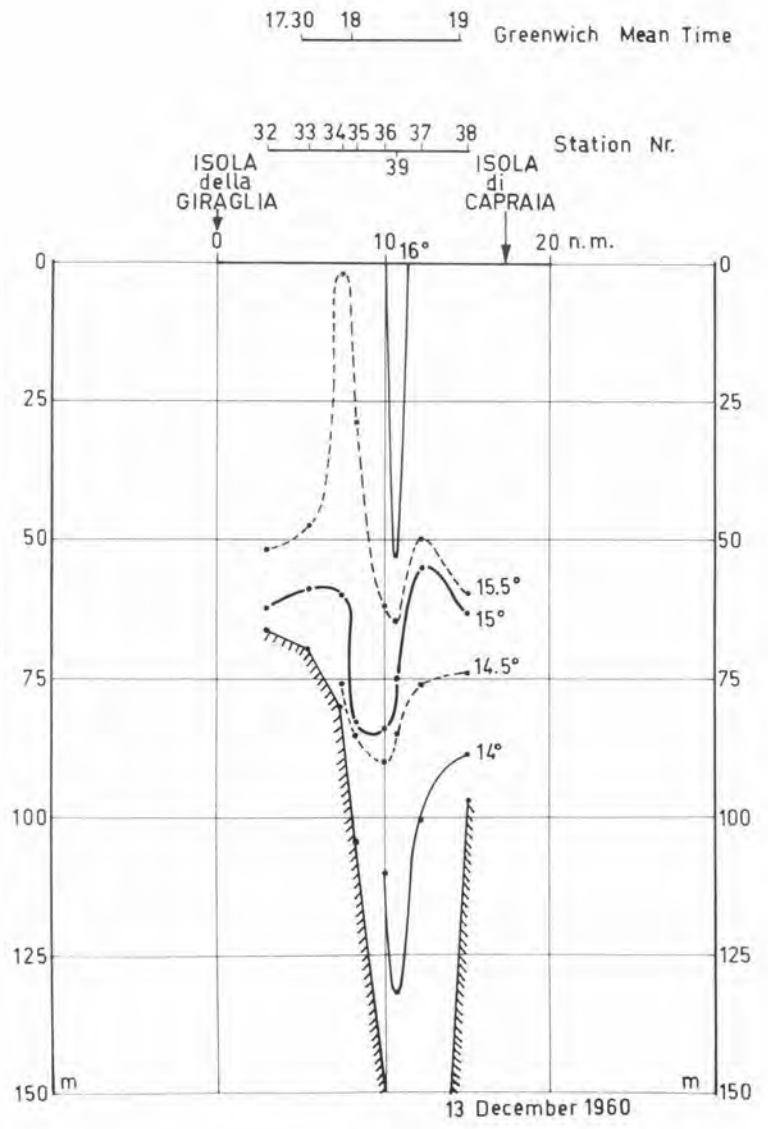


Fig. 12

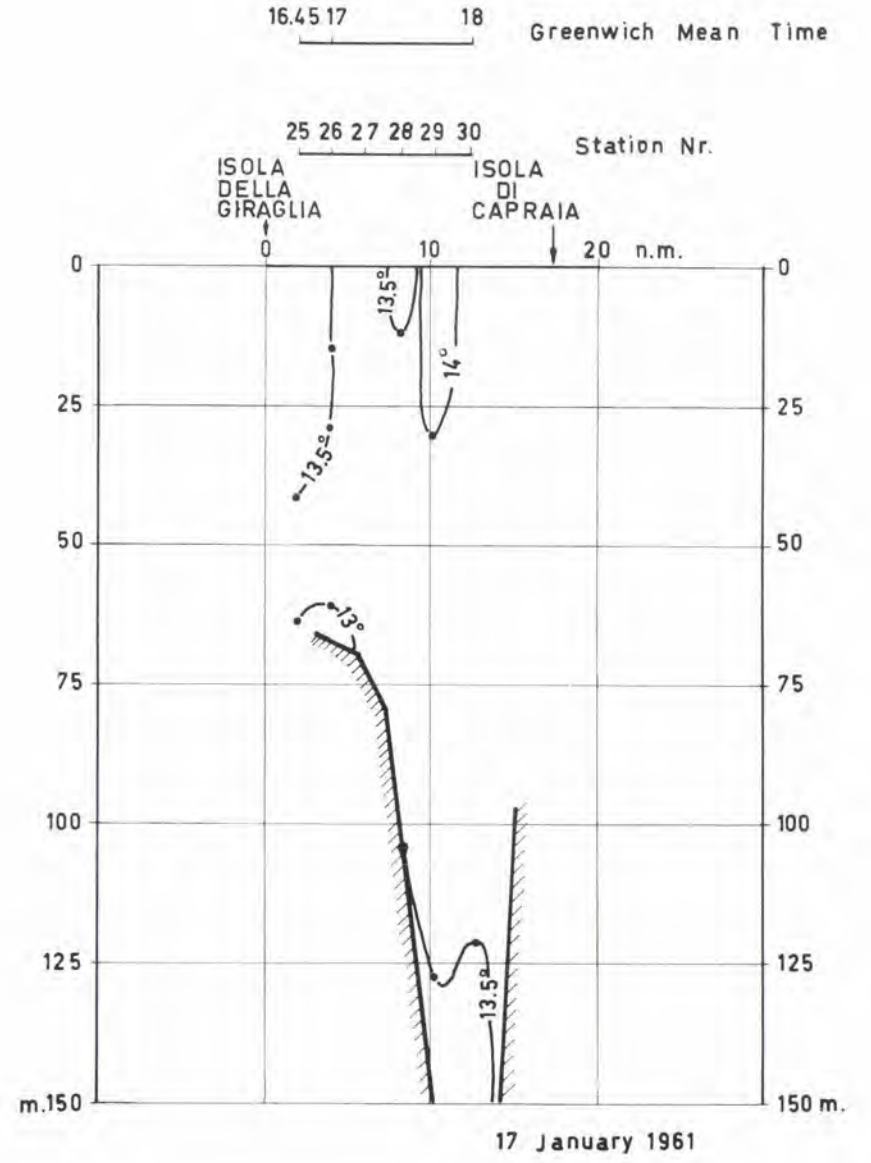


Fig. 13

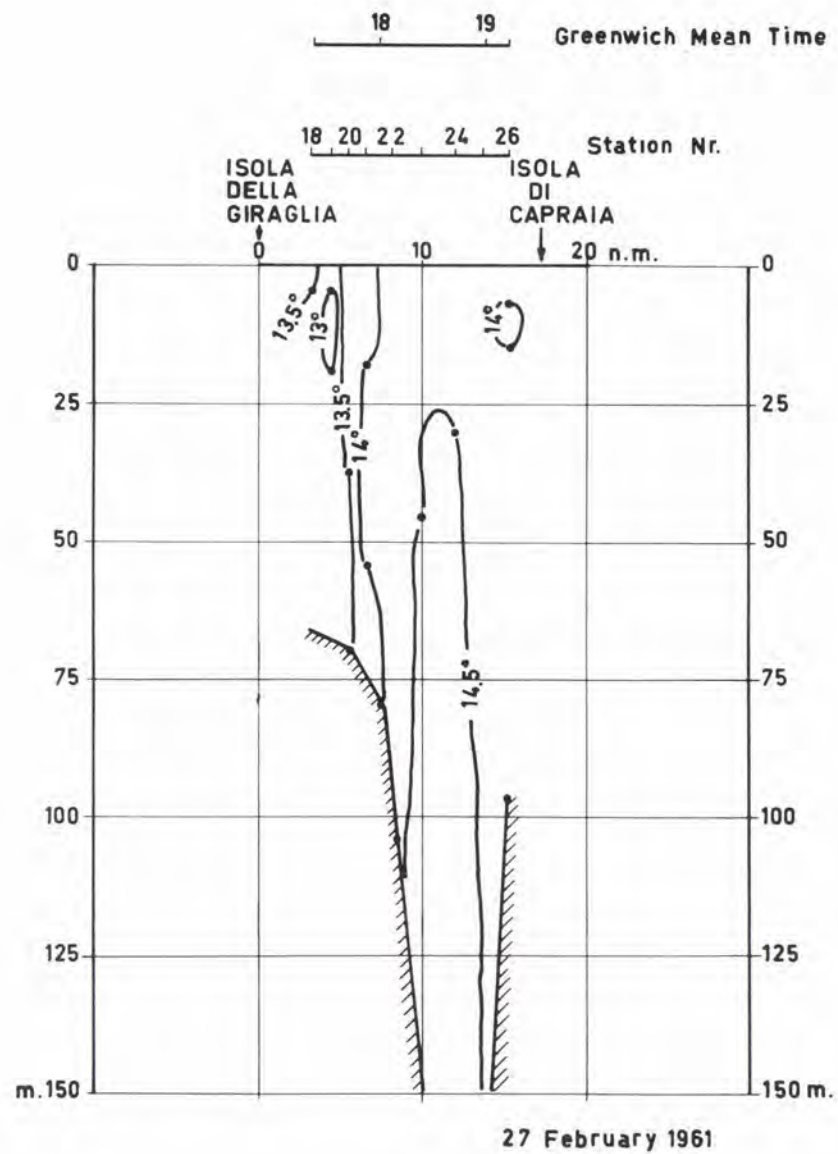


Fig. 14

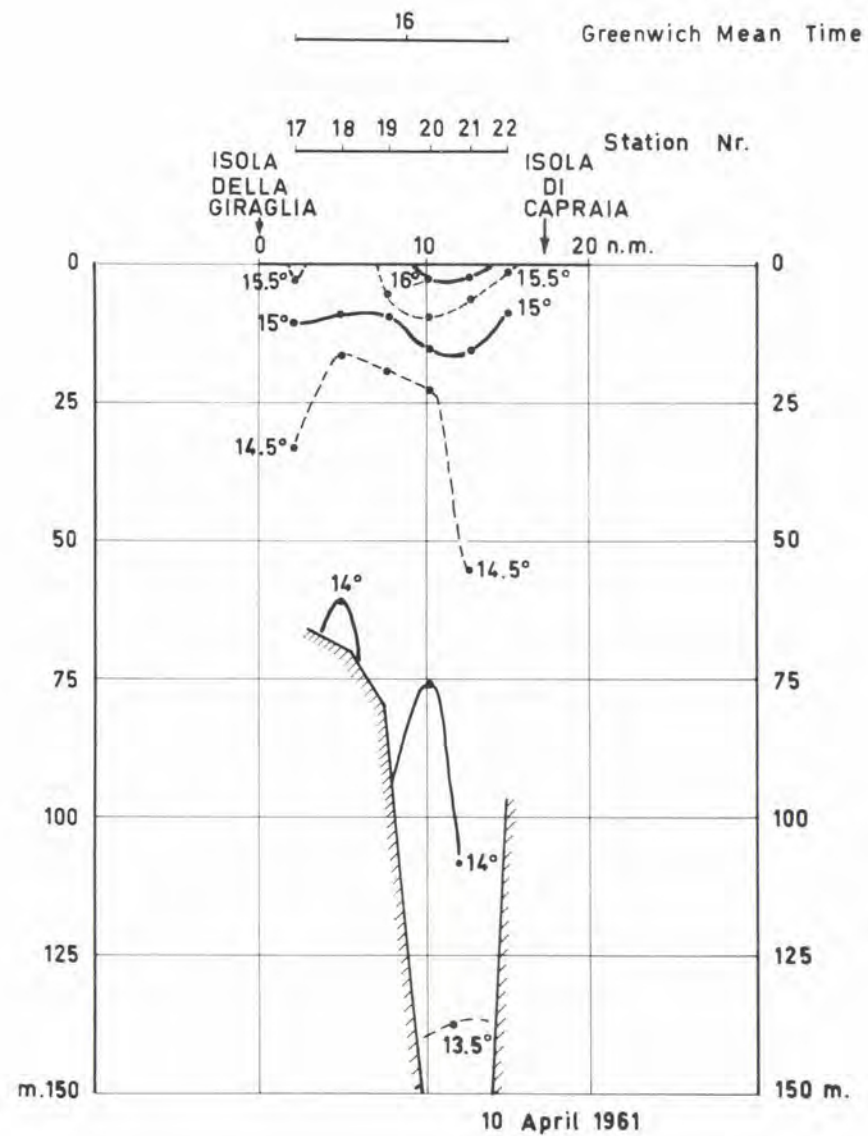


Fig. 15

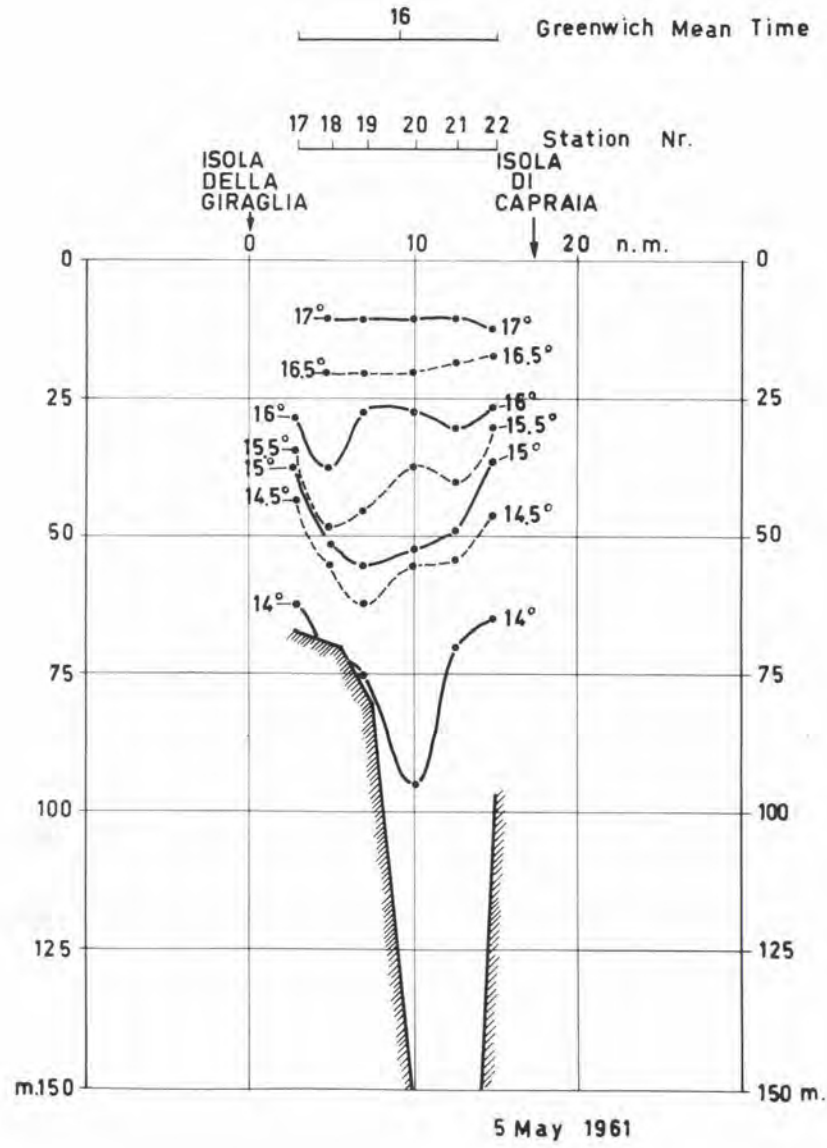


Fig. 16

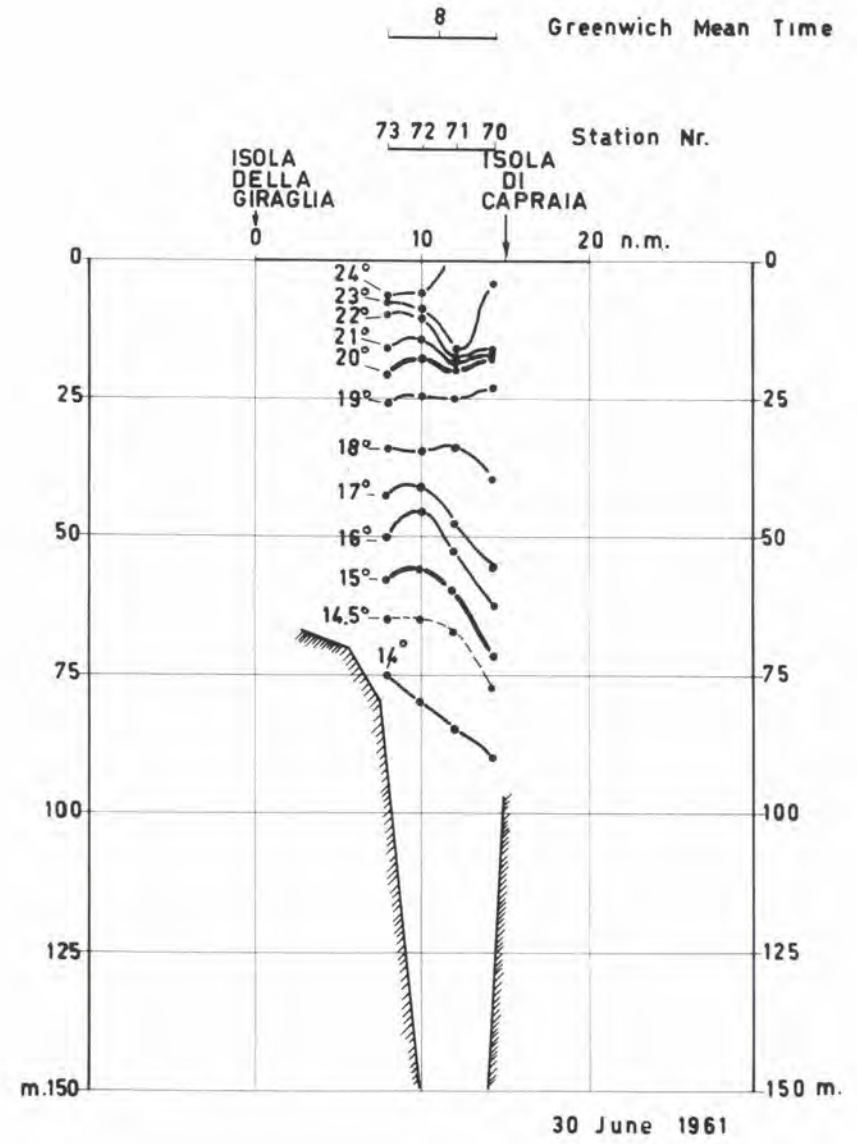


Fig. 17

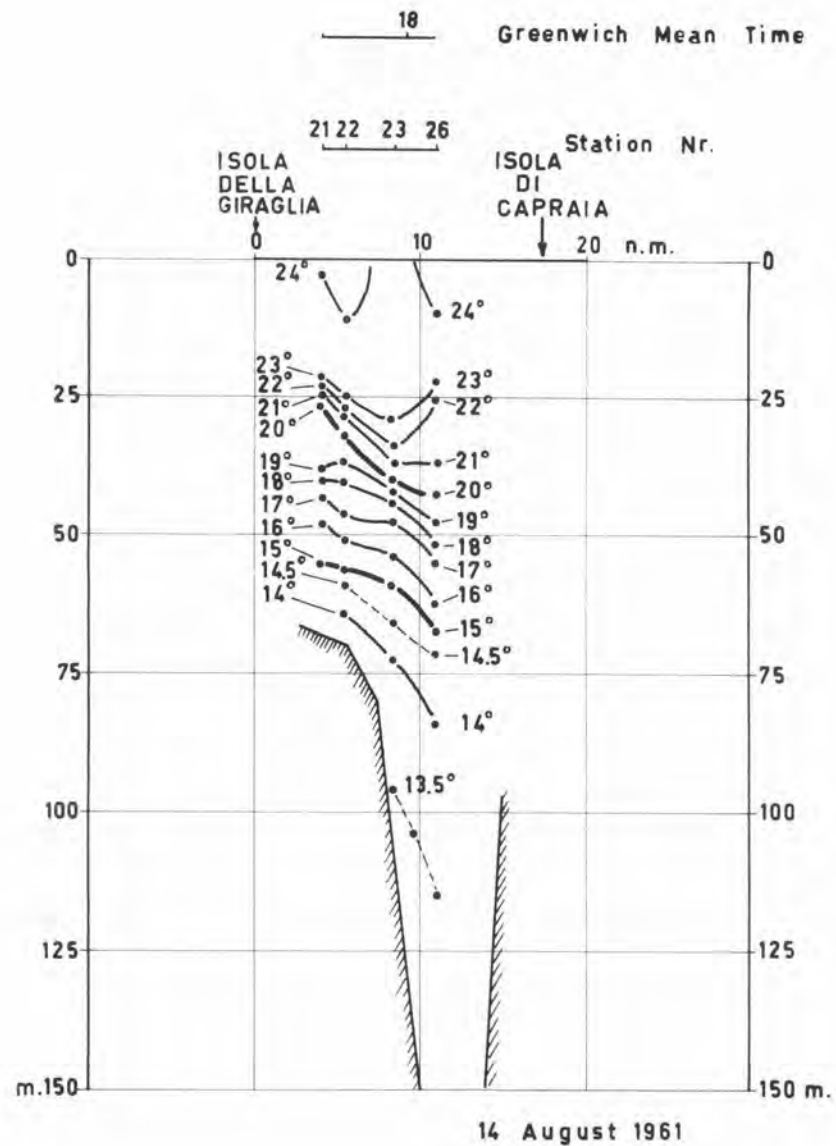


Fig. 18

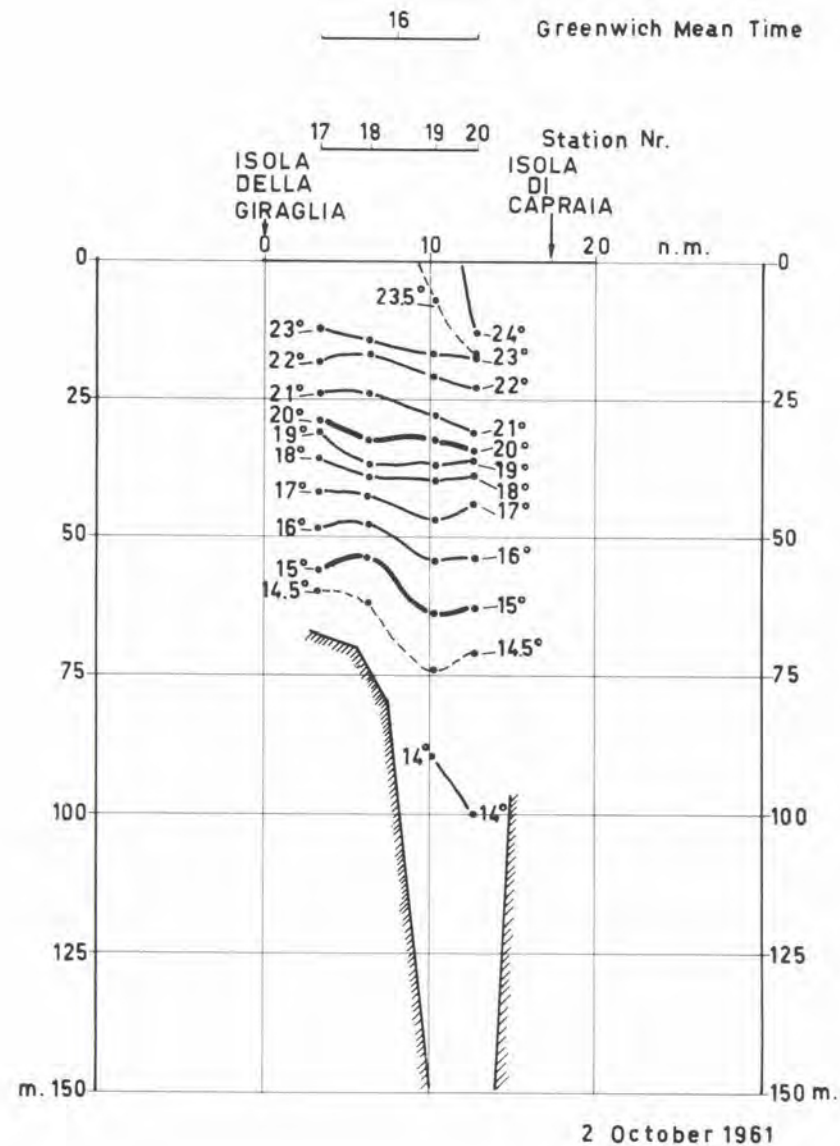


Fig. 19

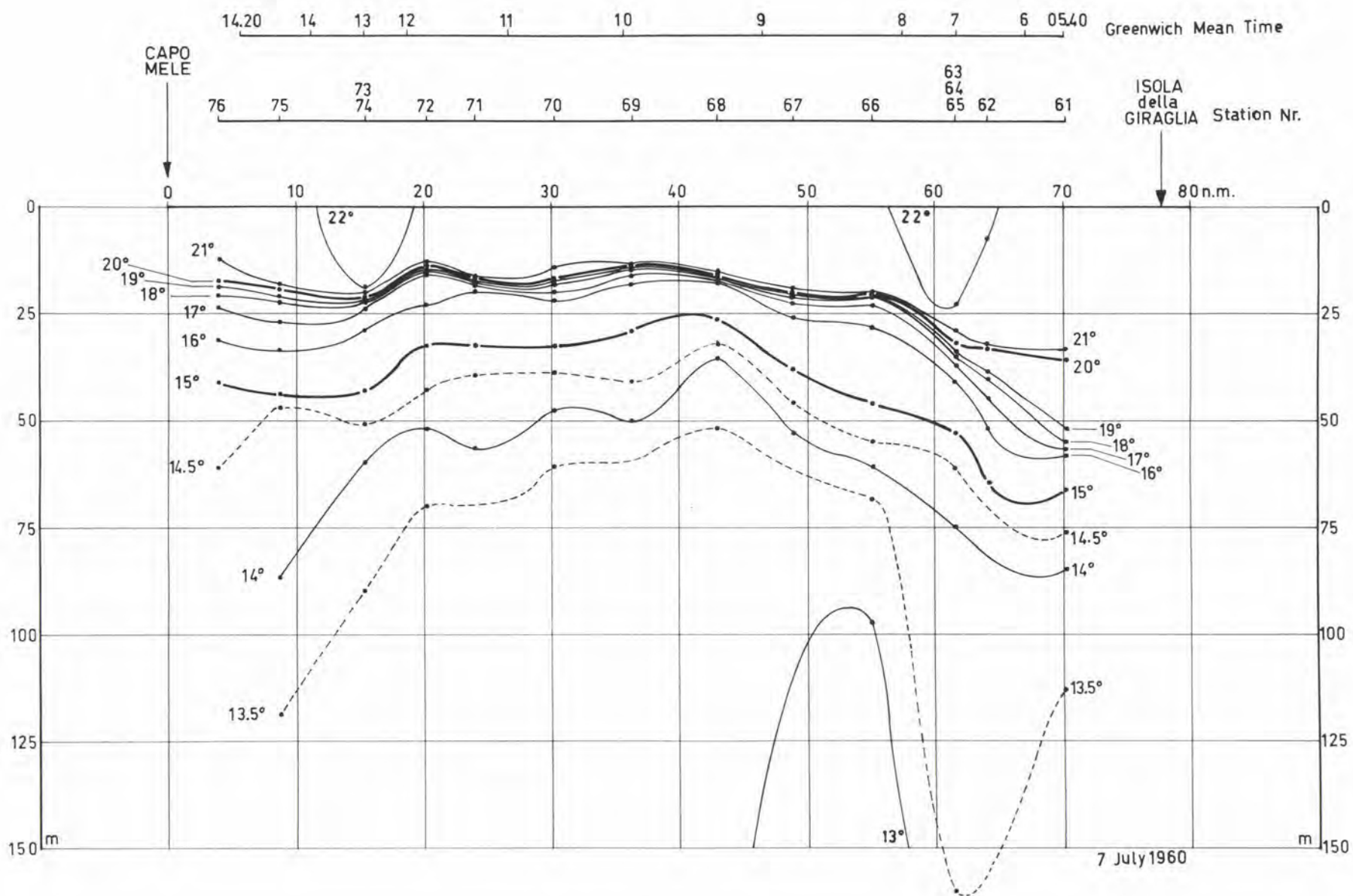


Fig. 20

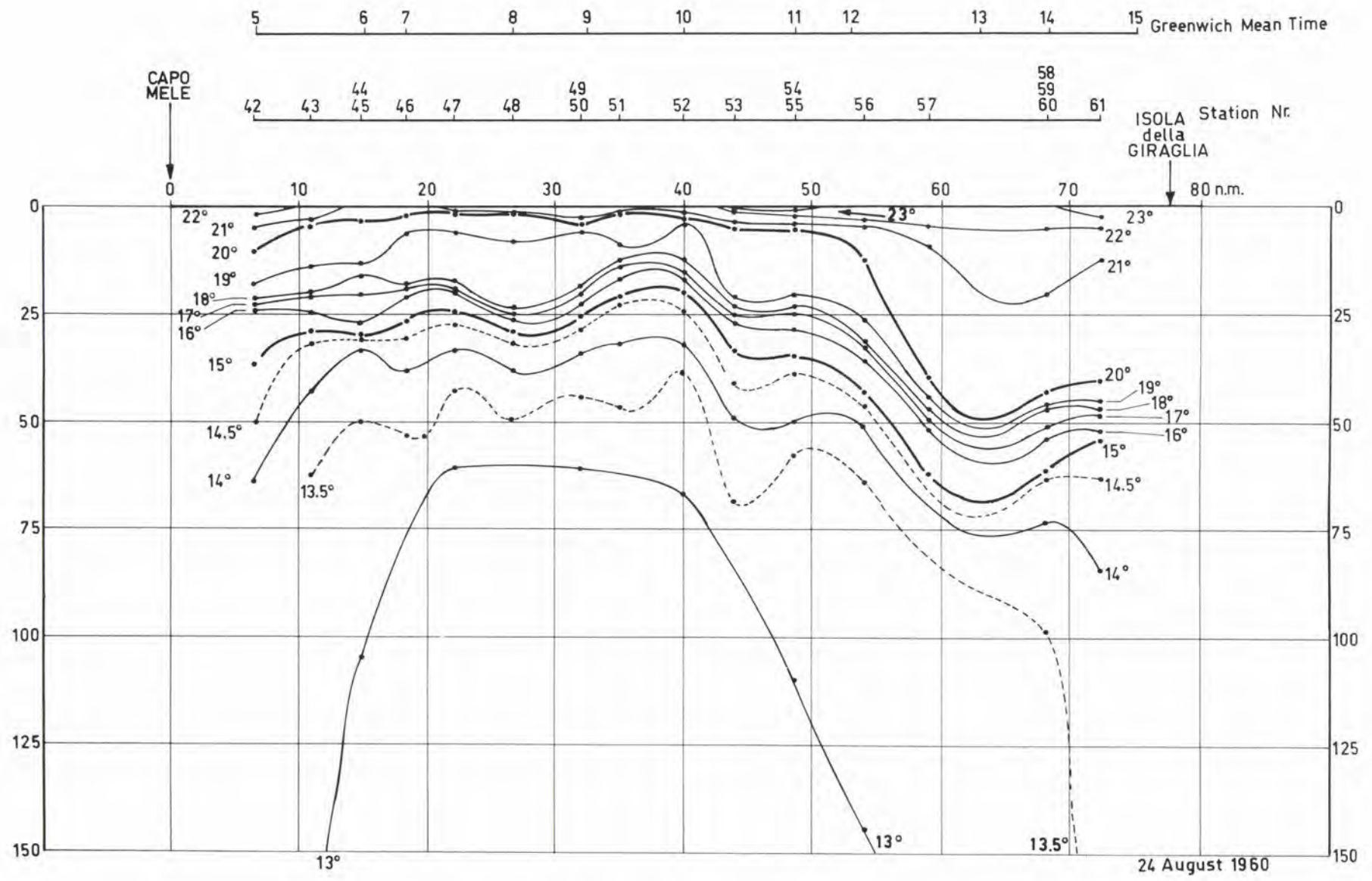


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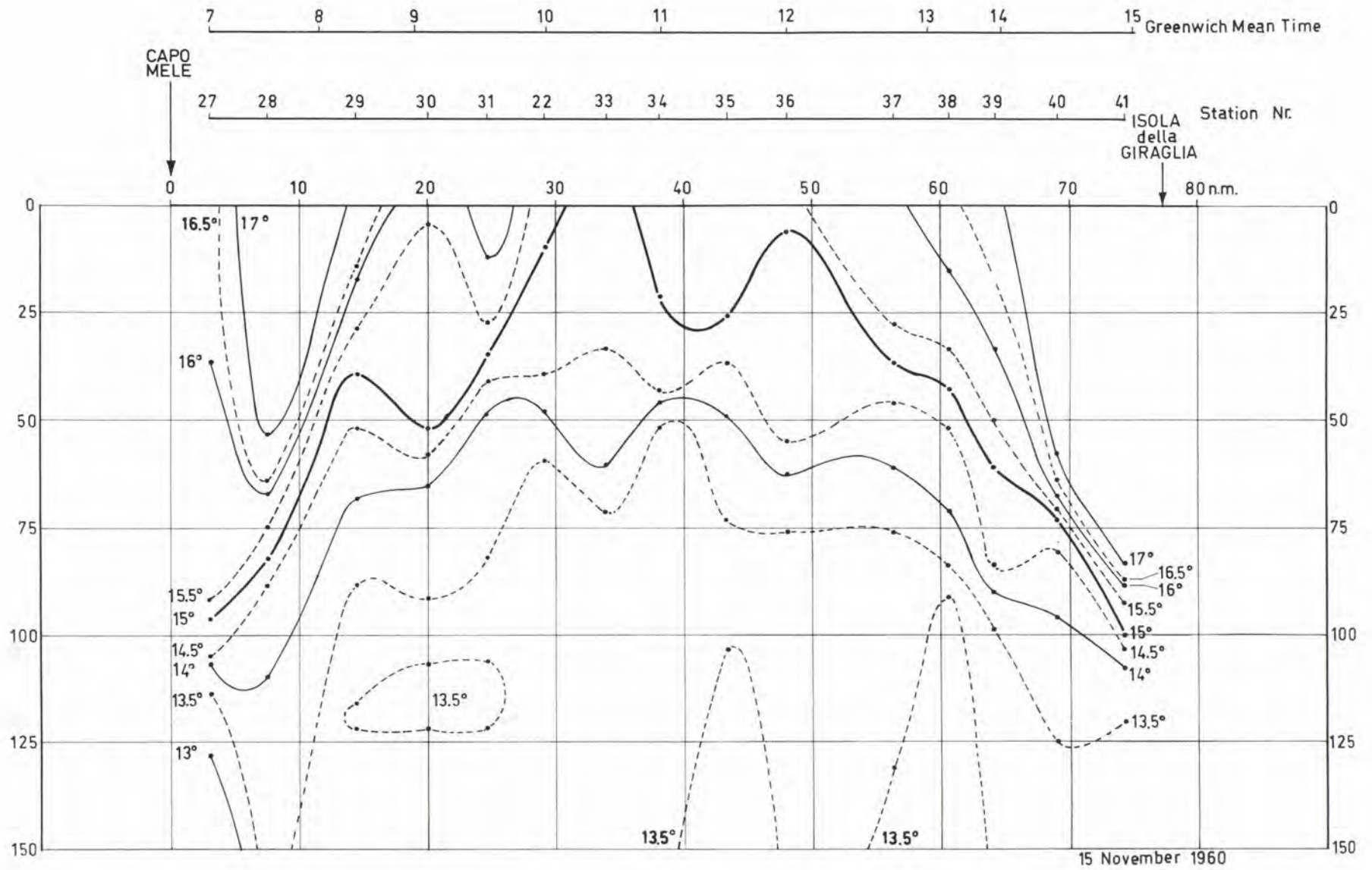


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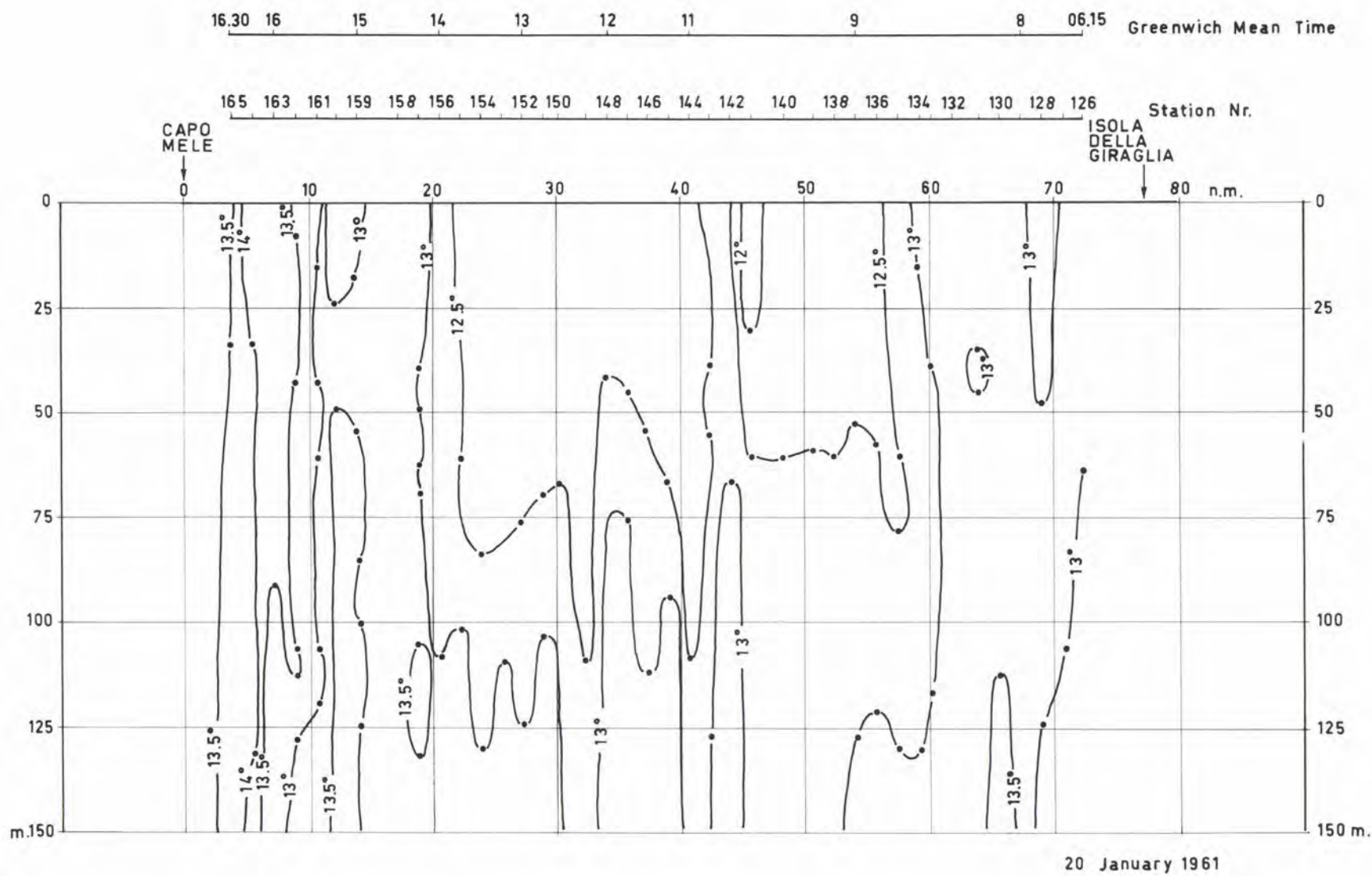


Fig. 23

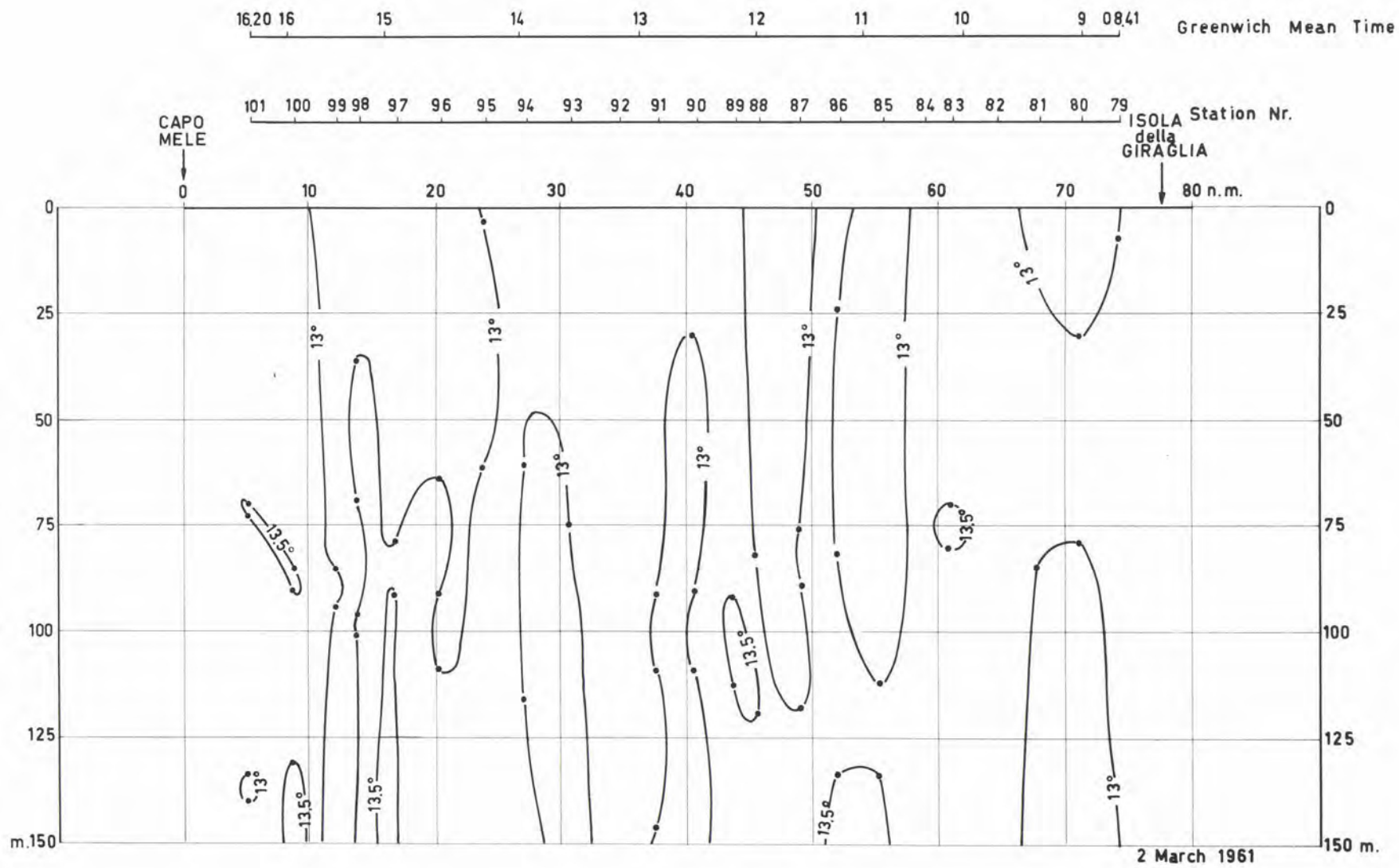


Fig. 24

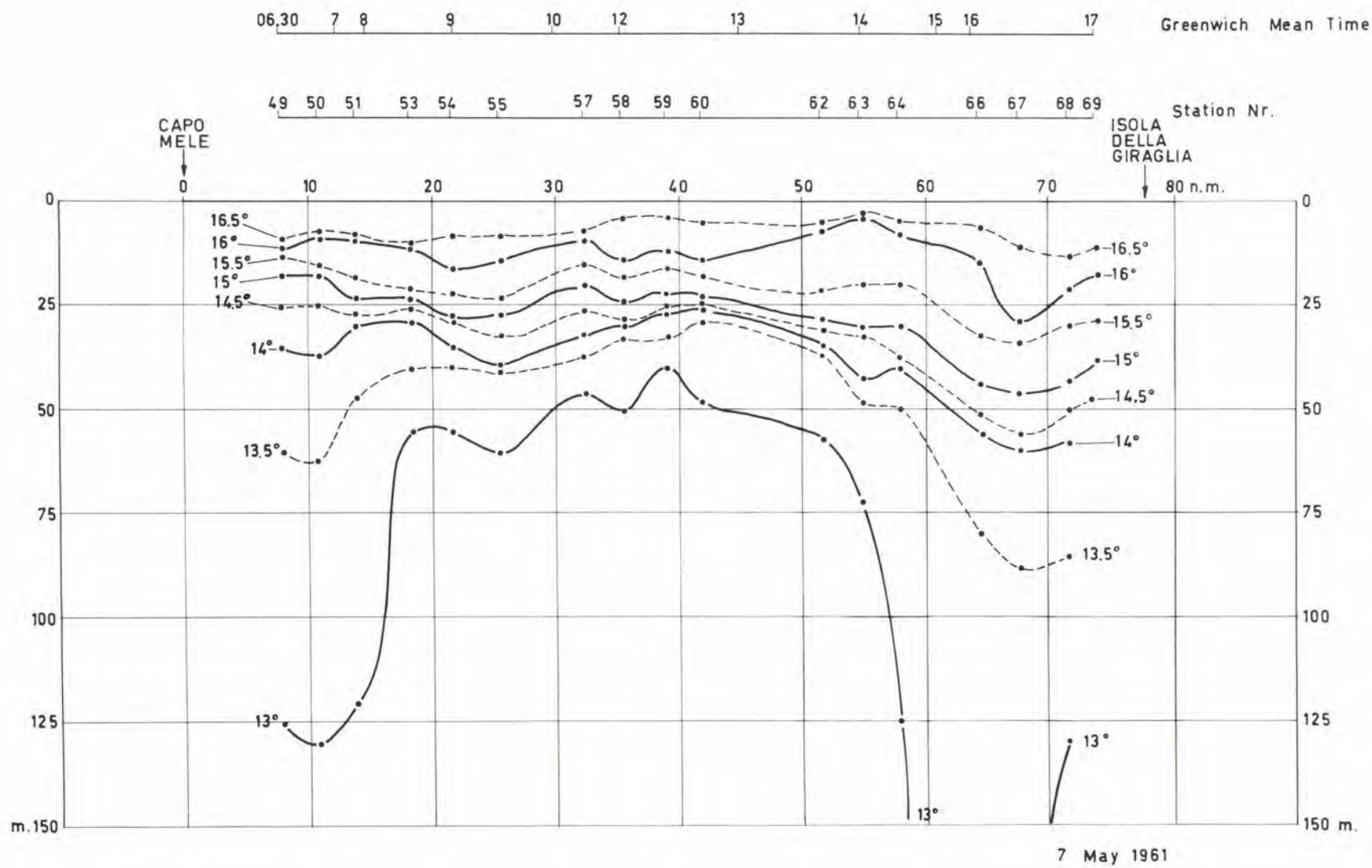
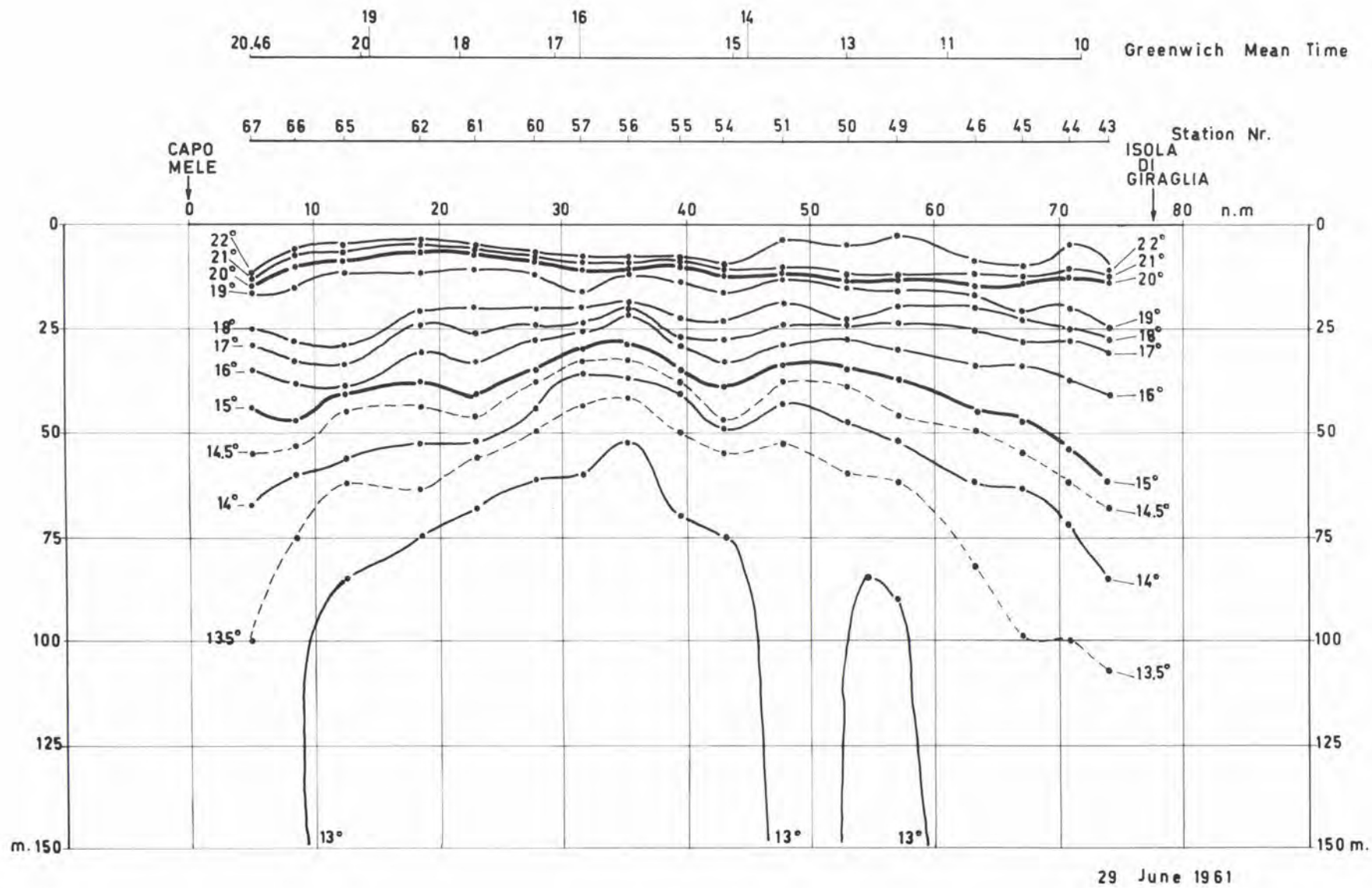


Fig. 25



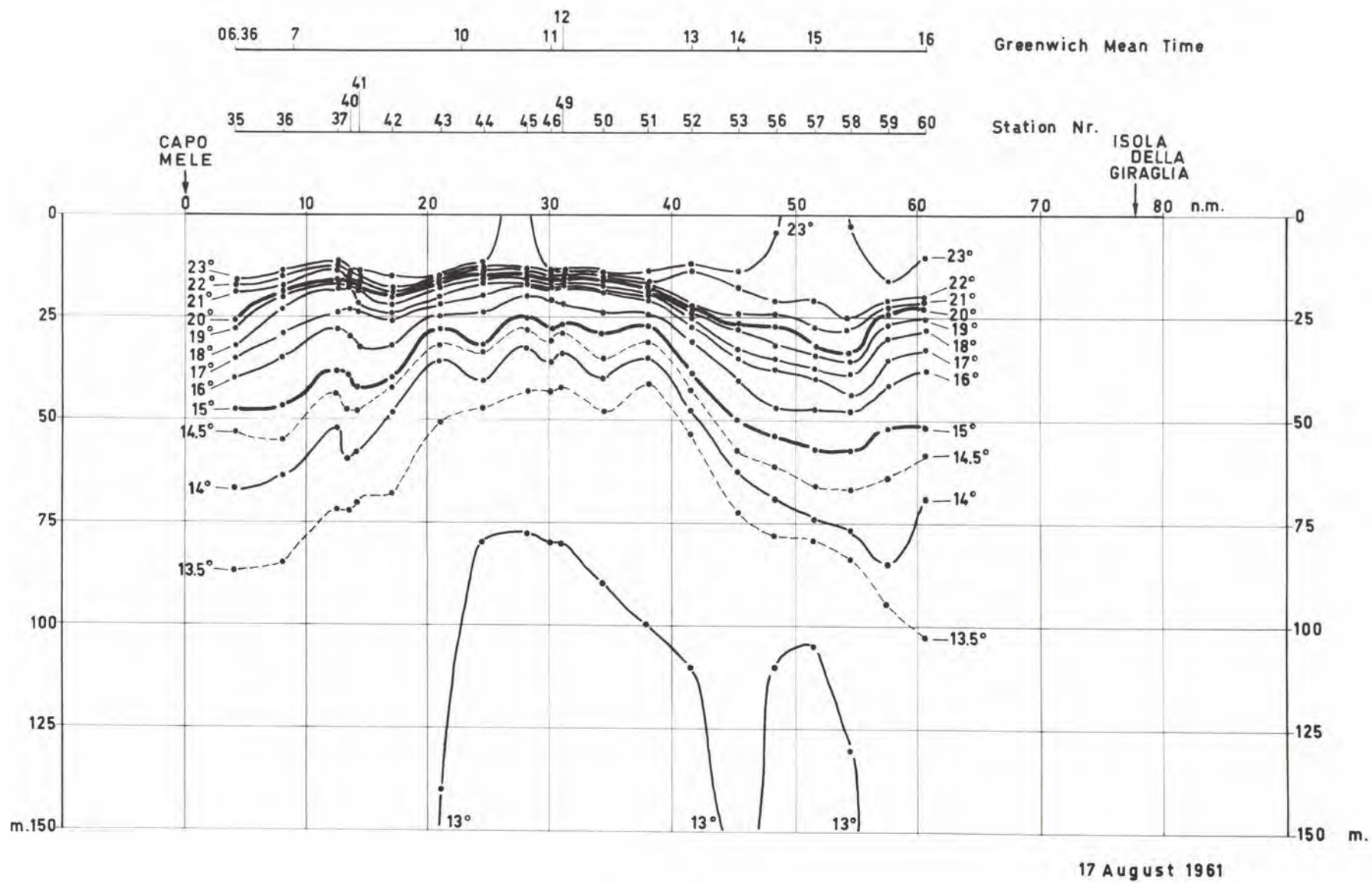


Fig. 27

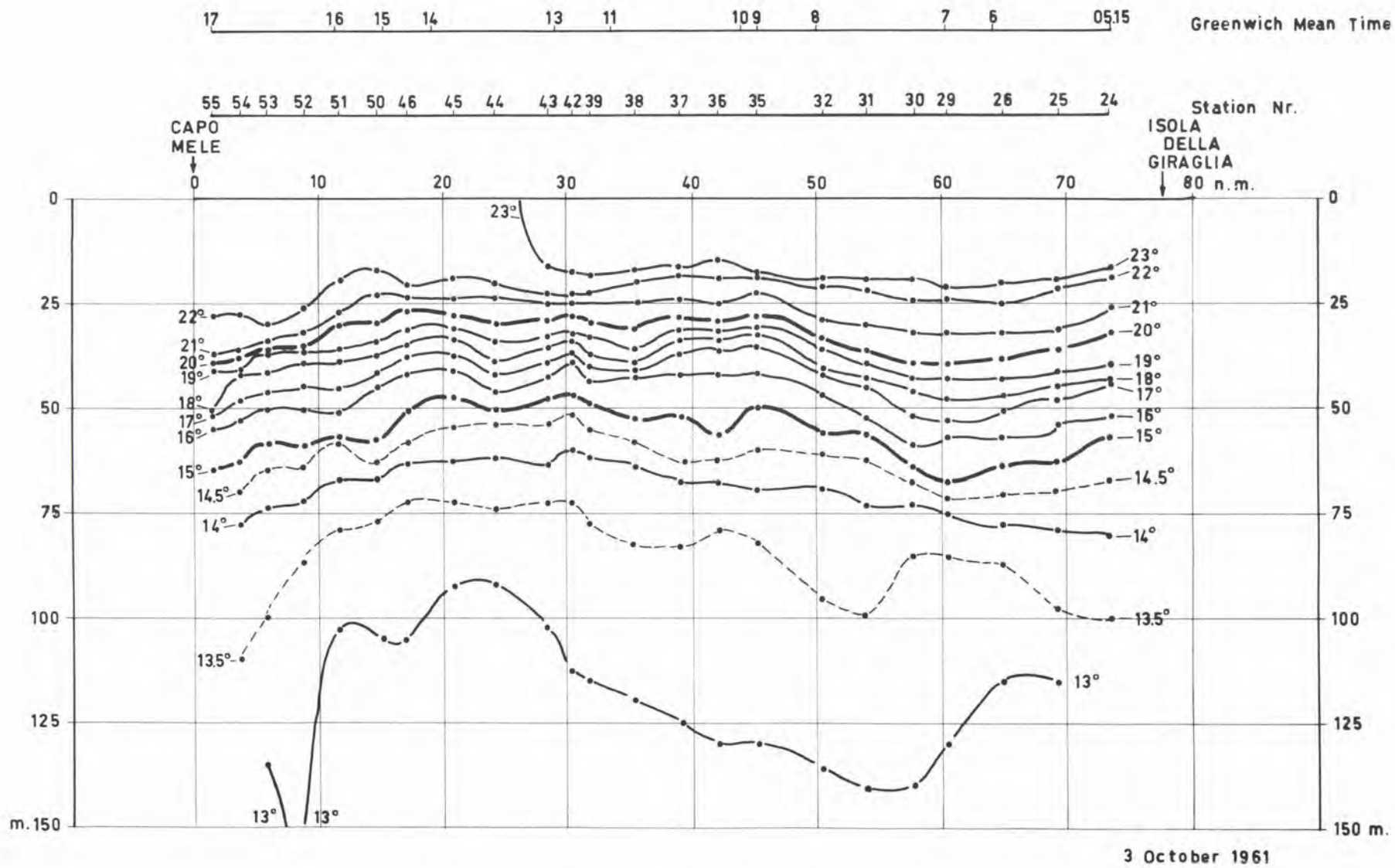


Fig. 28

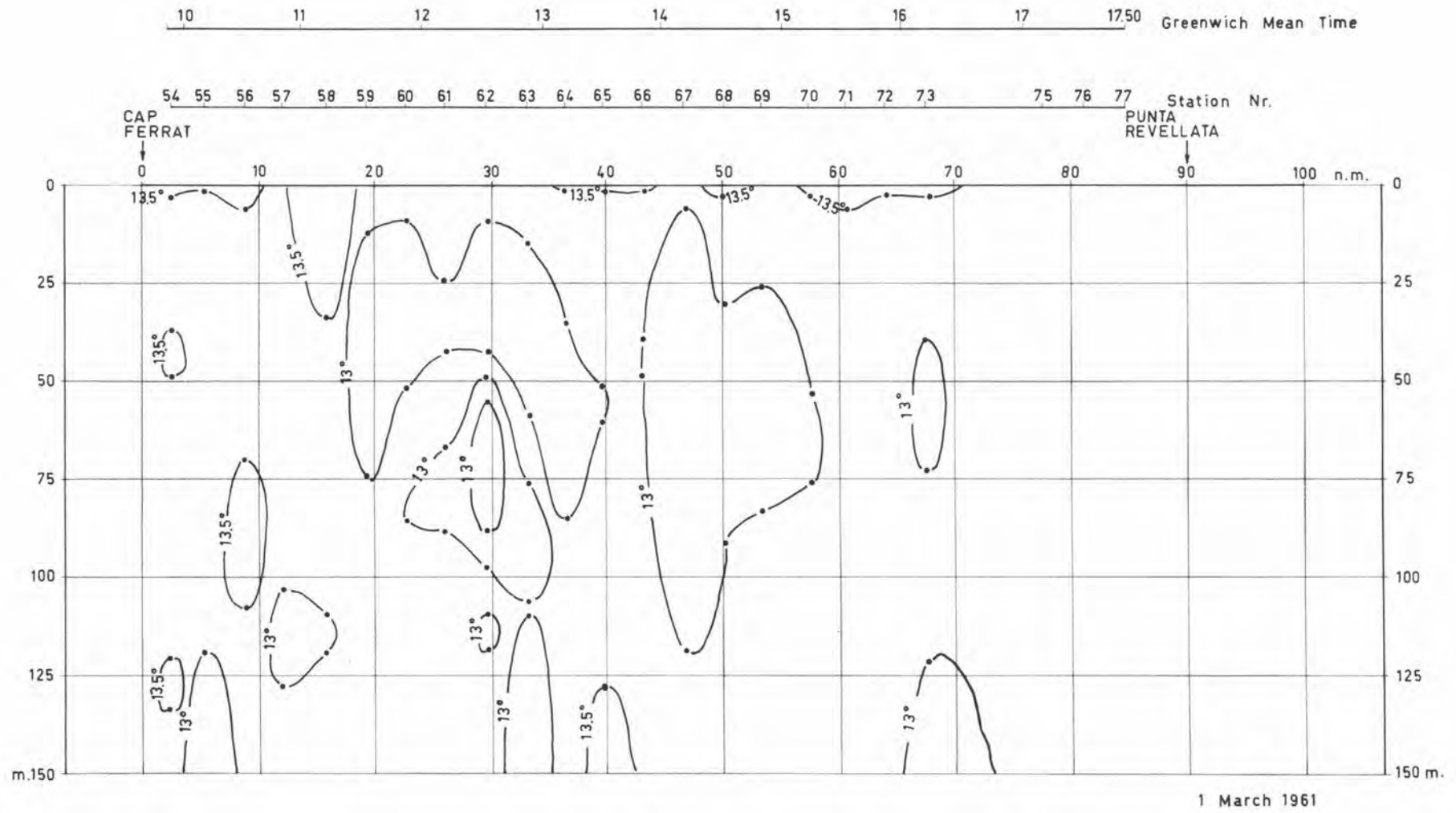


Fig. 29

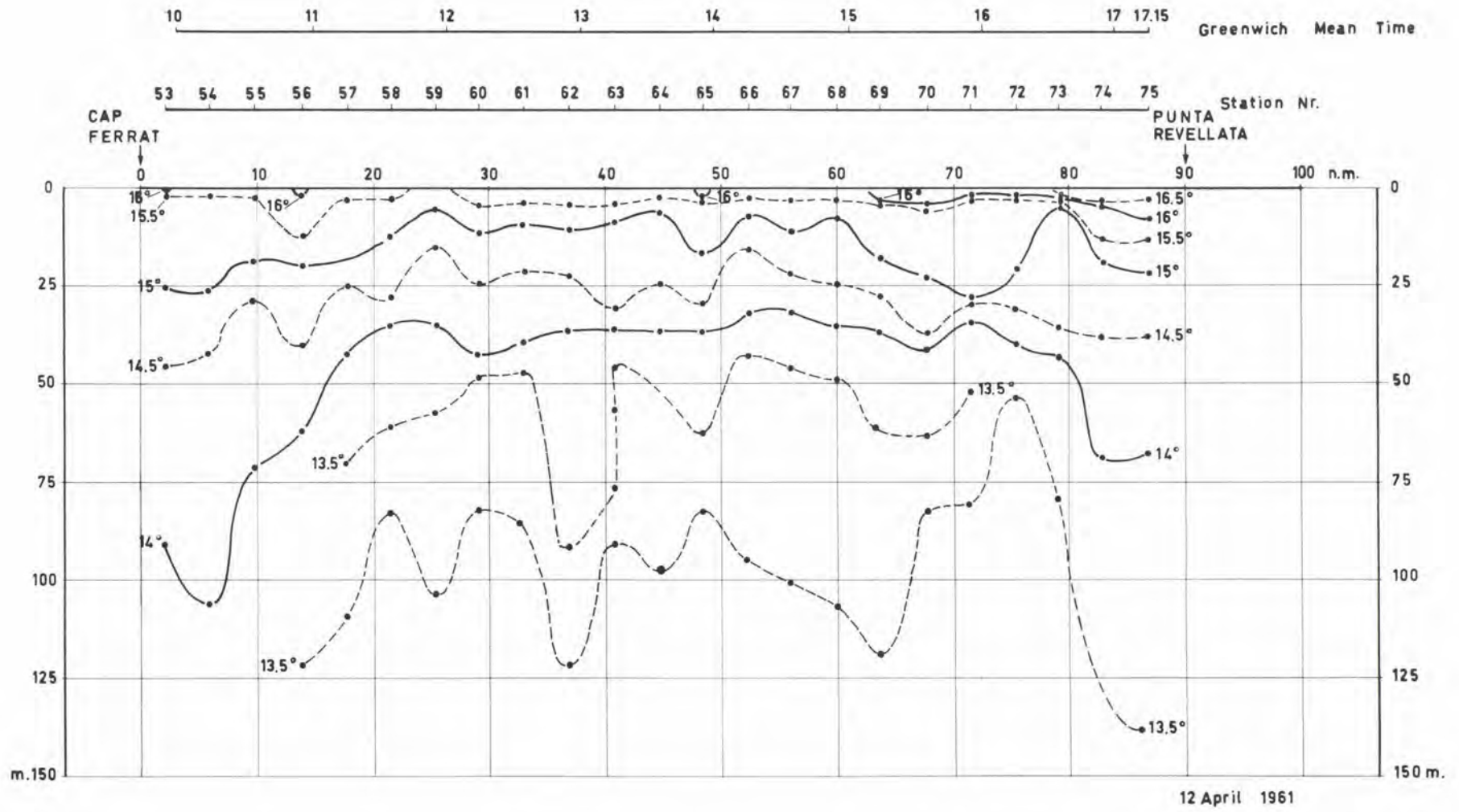


Fig. 30

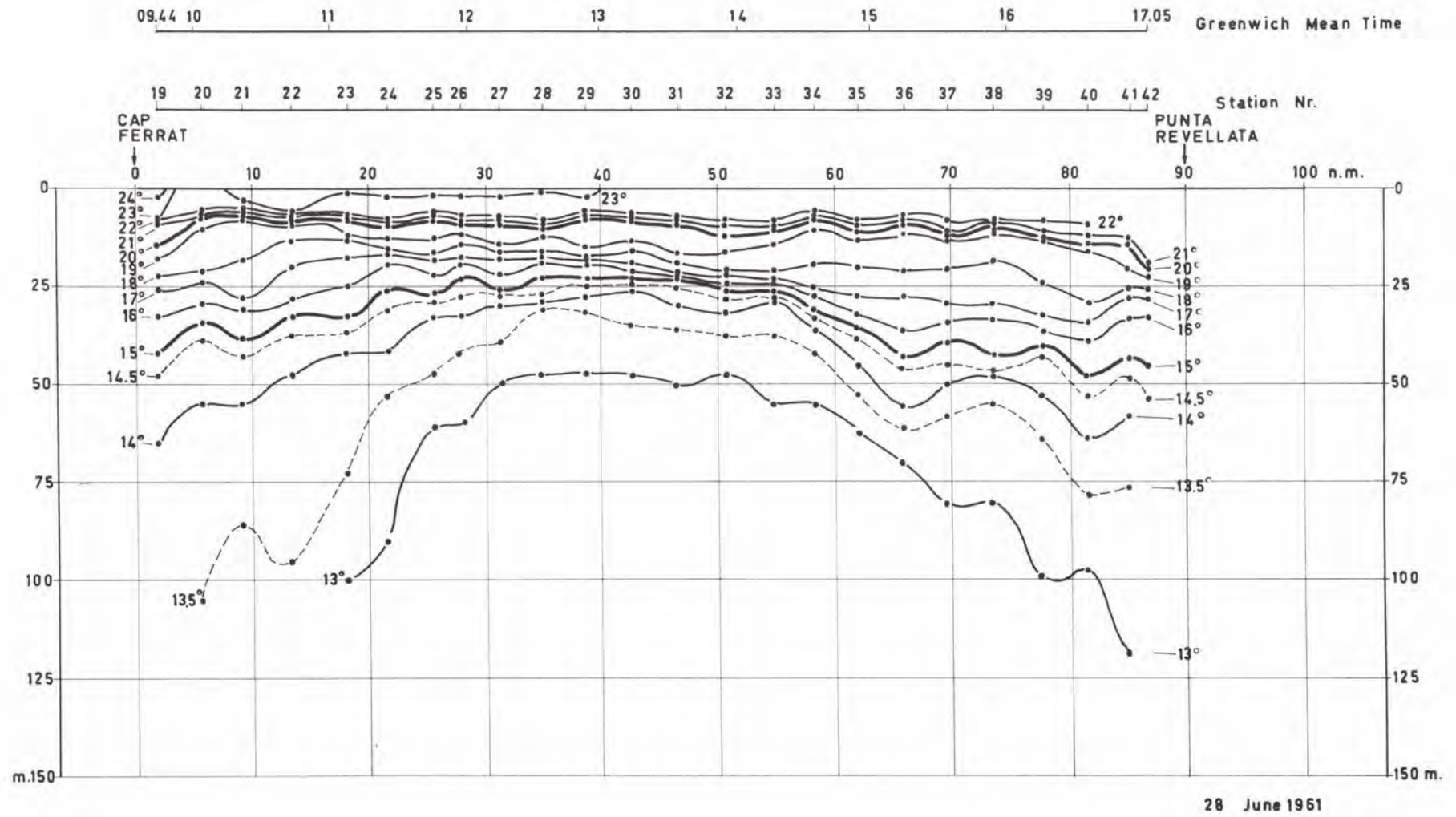


Fig. 31

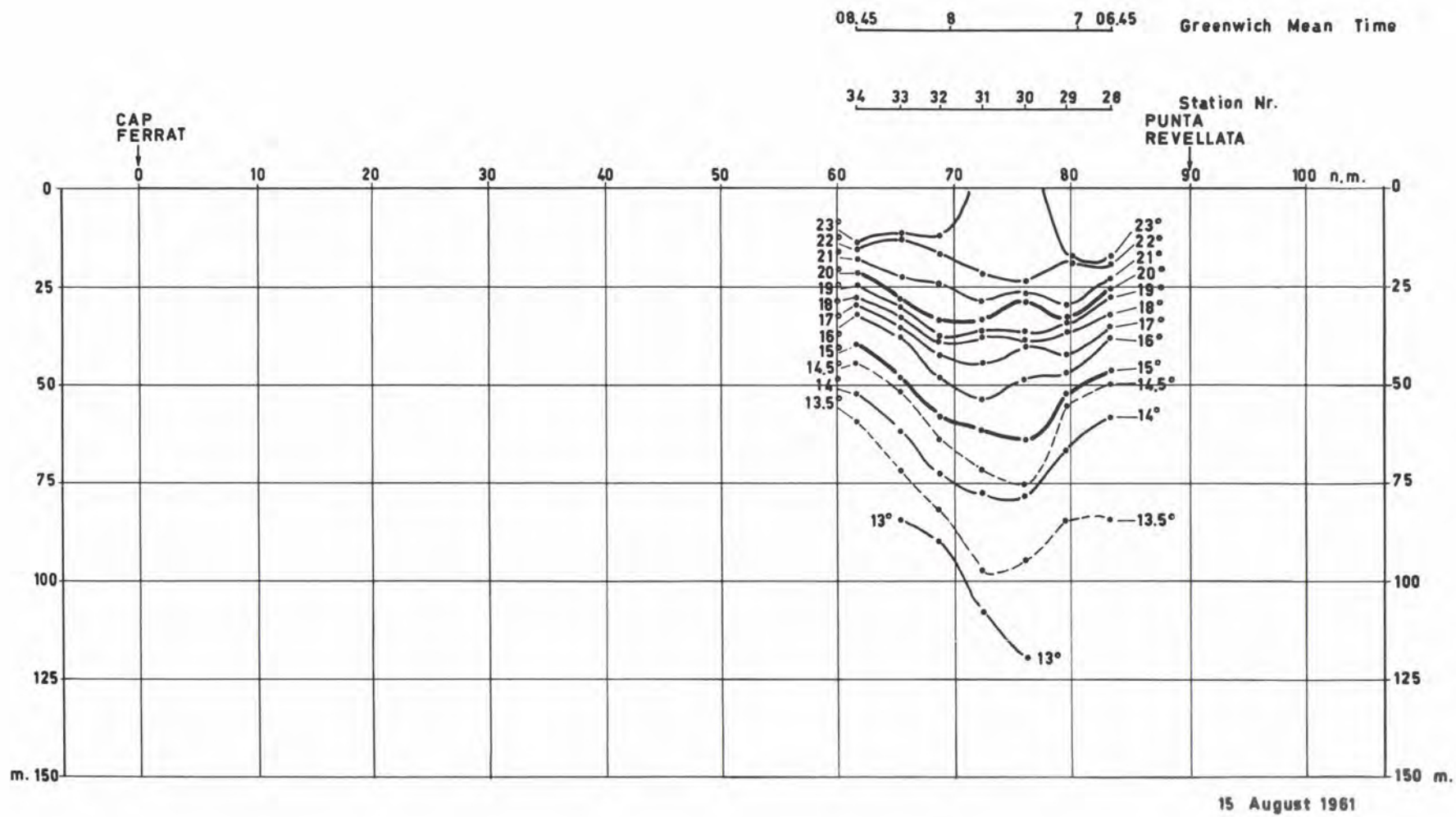


Fig. 32

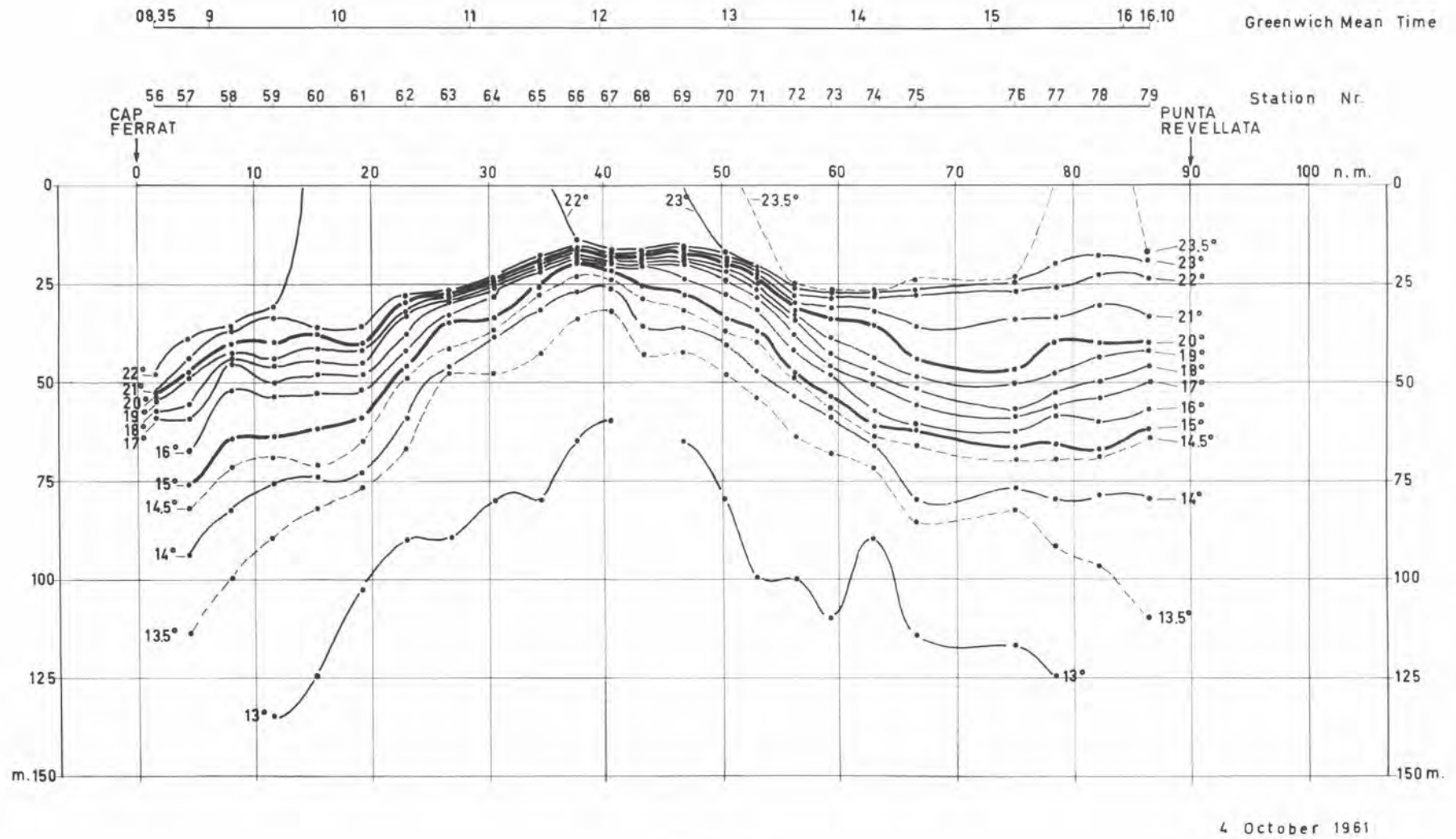


Fig. 33

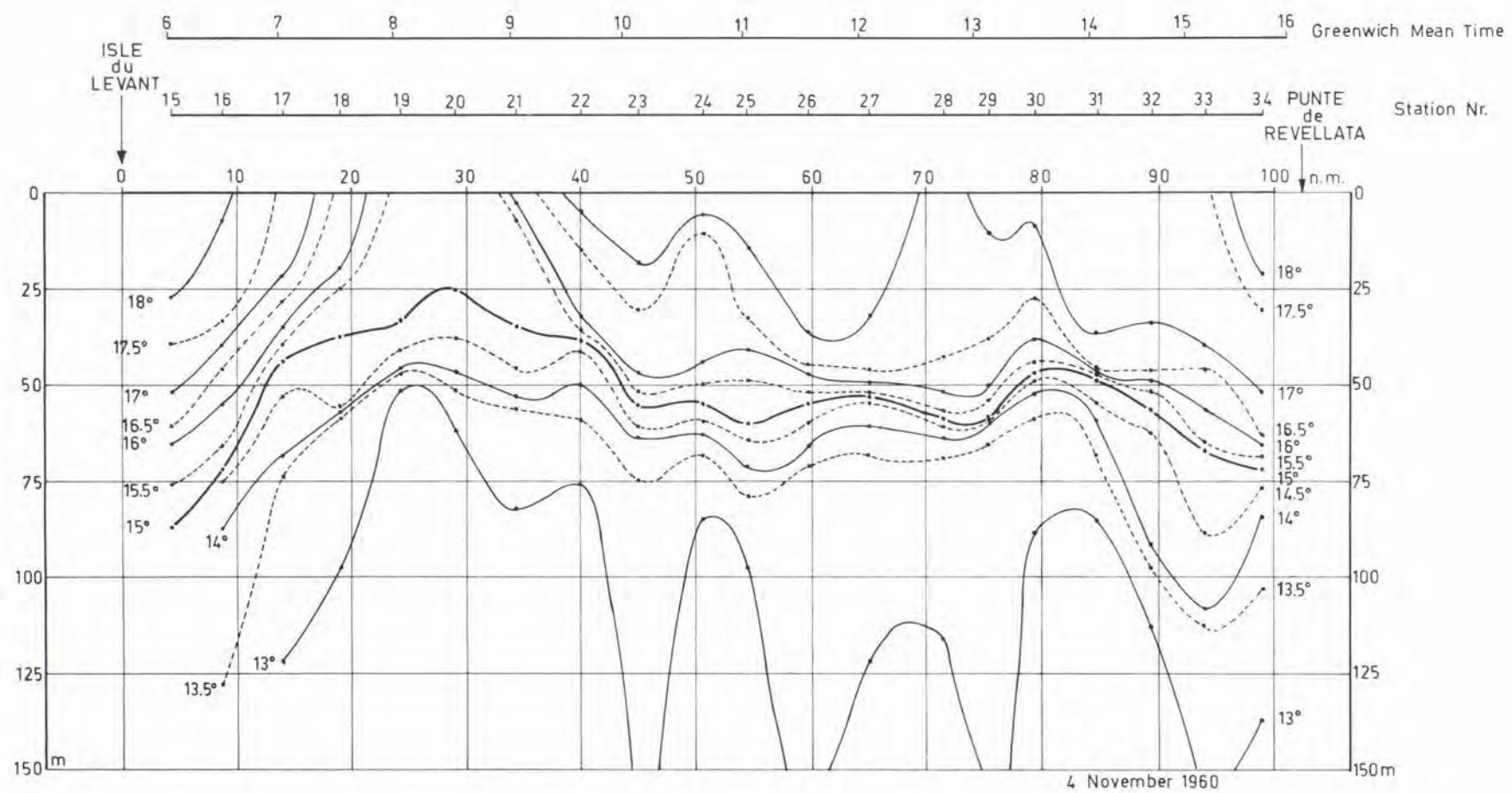


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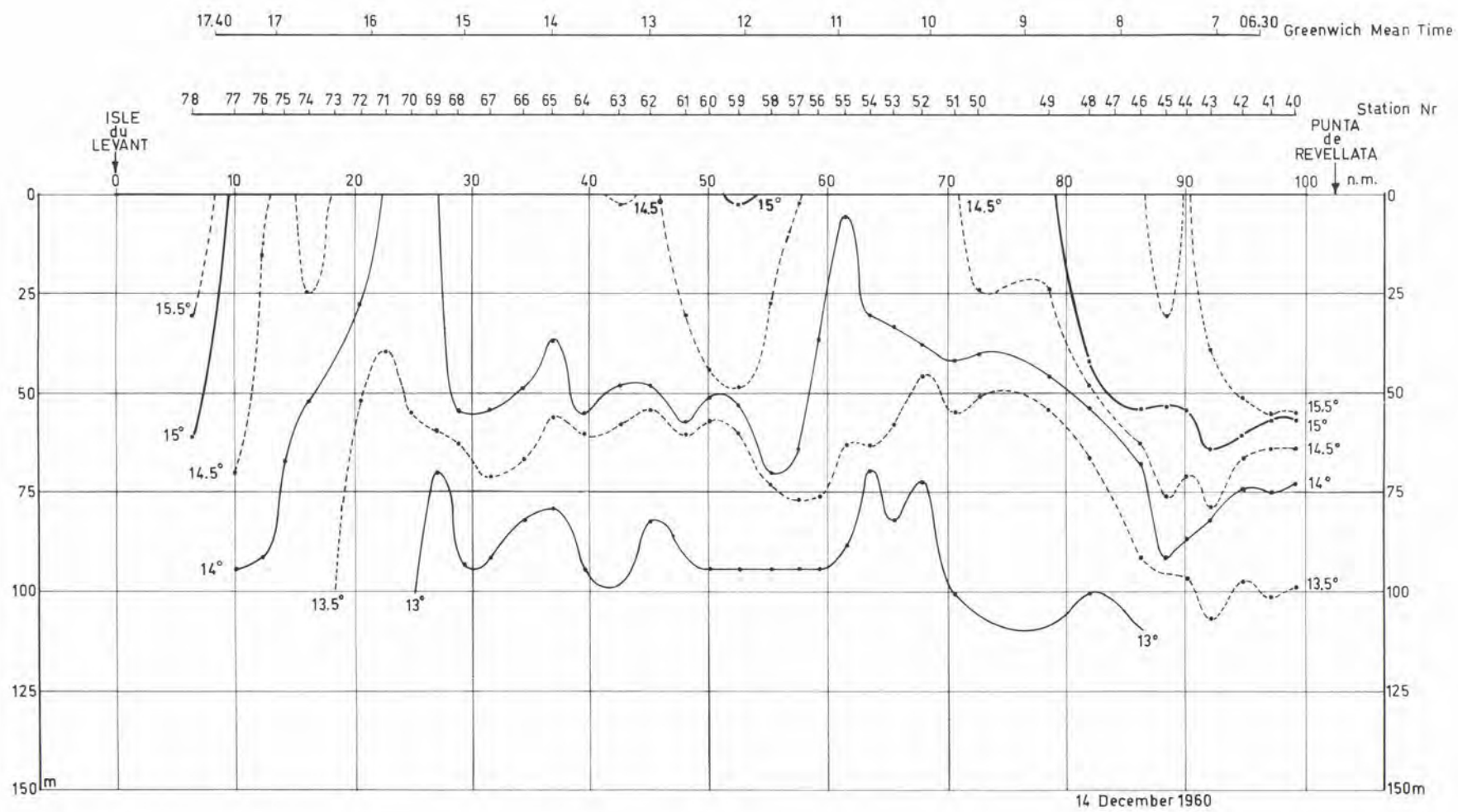


Fig. 35

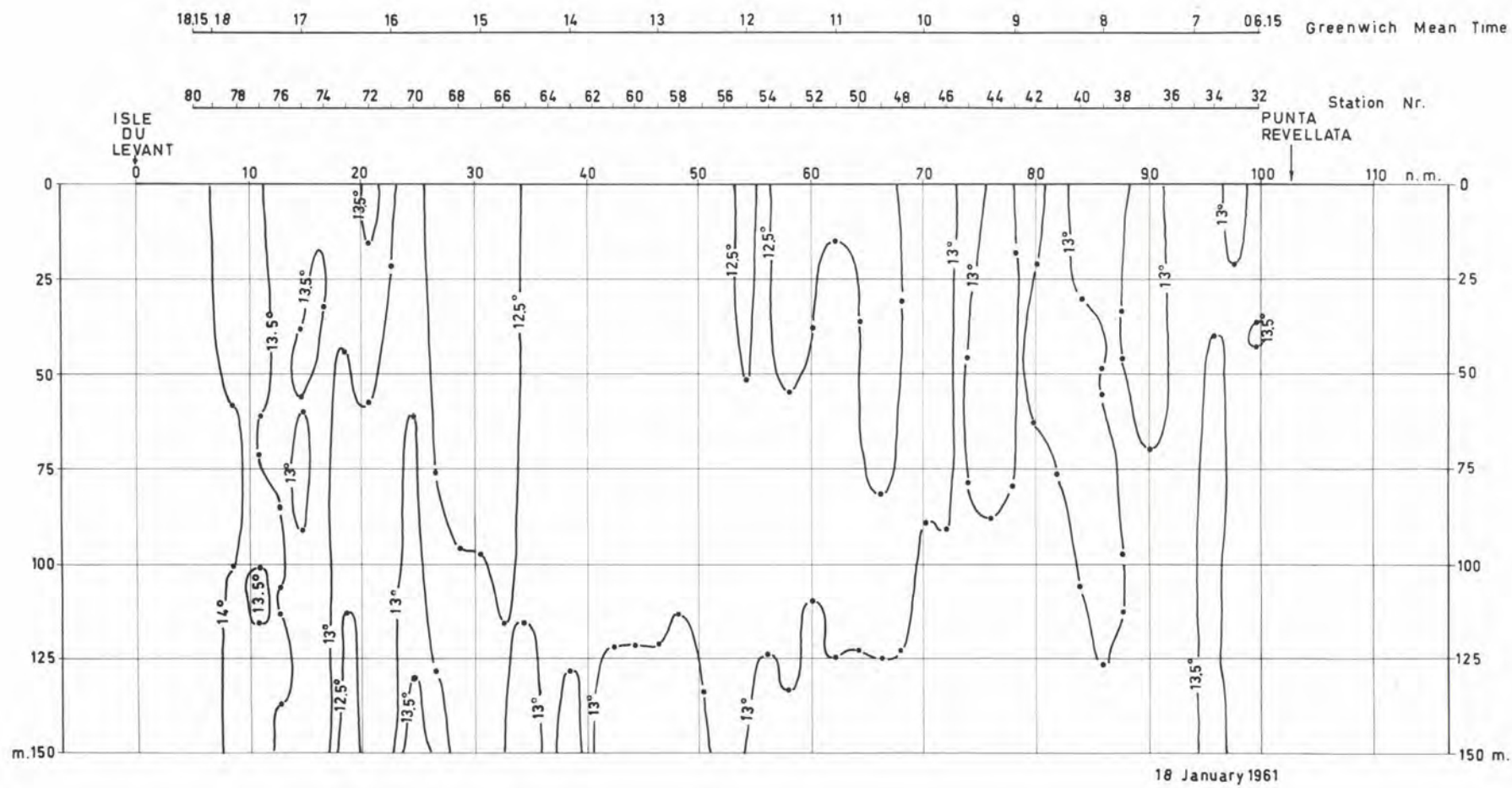


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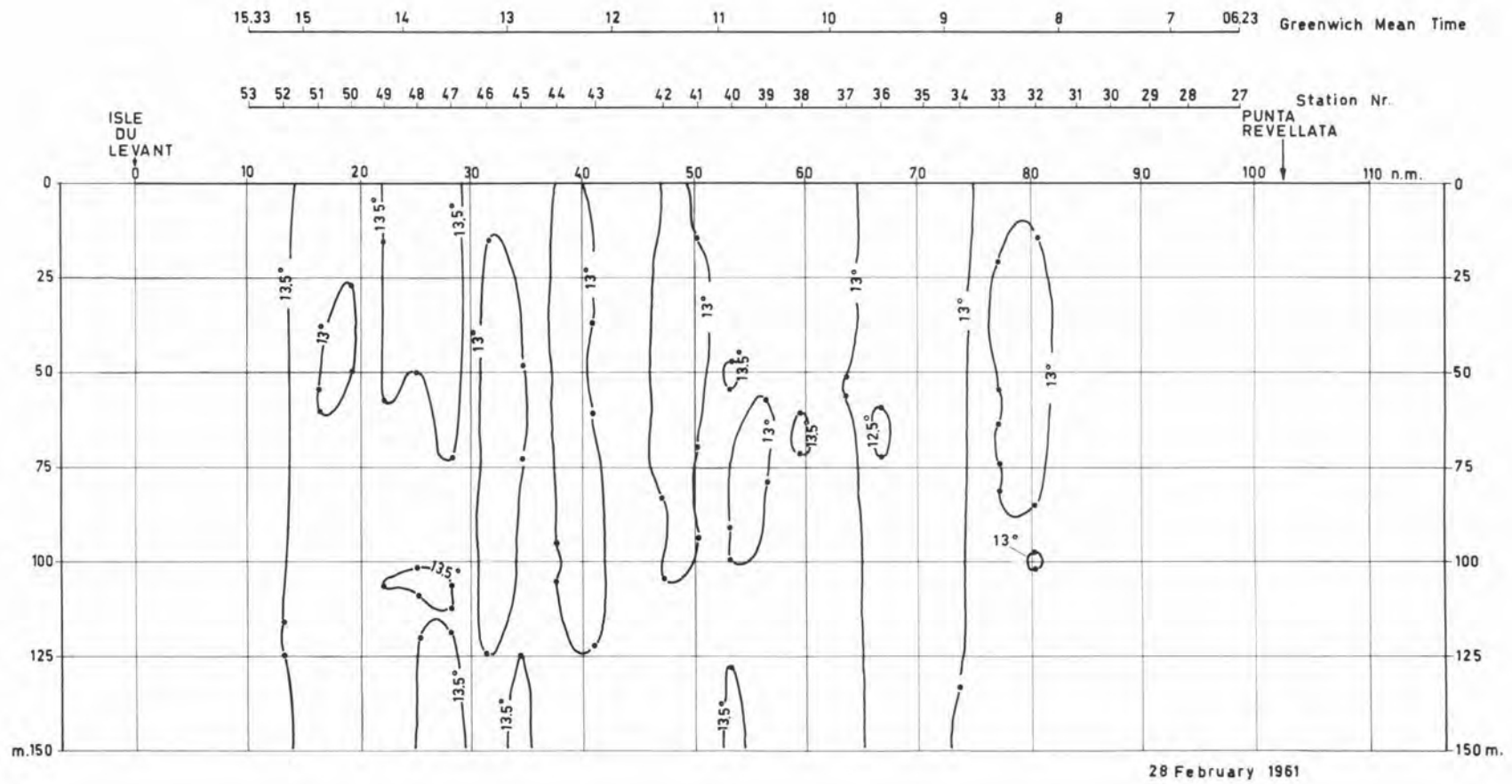


Fig. 37

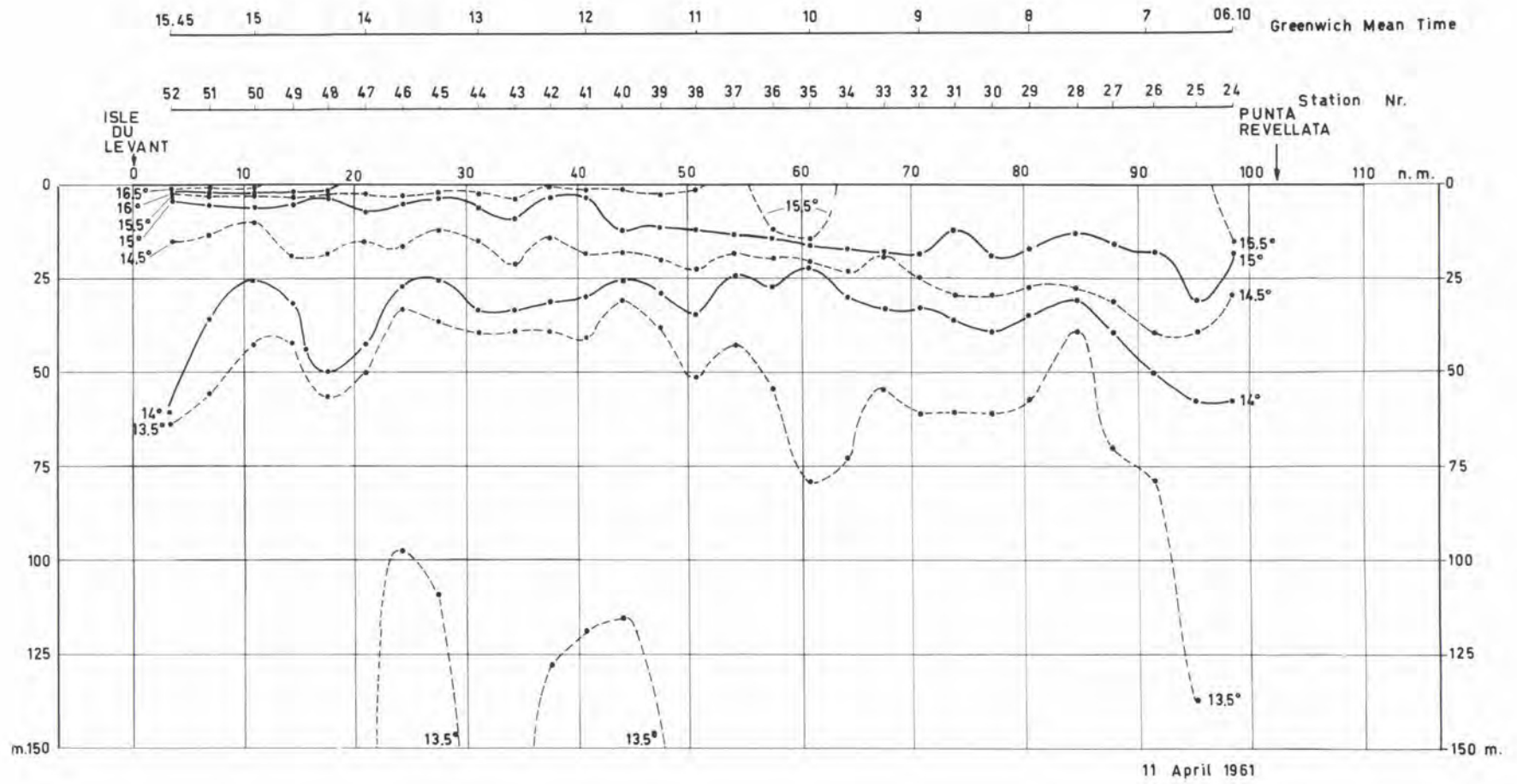


Fig. 38



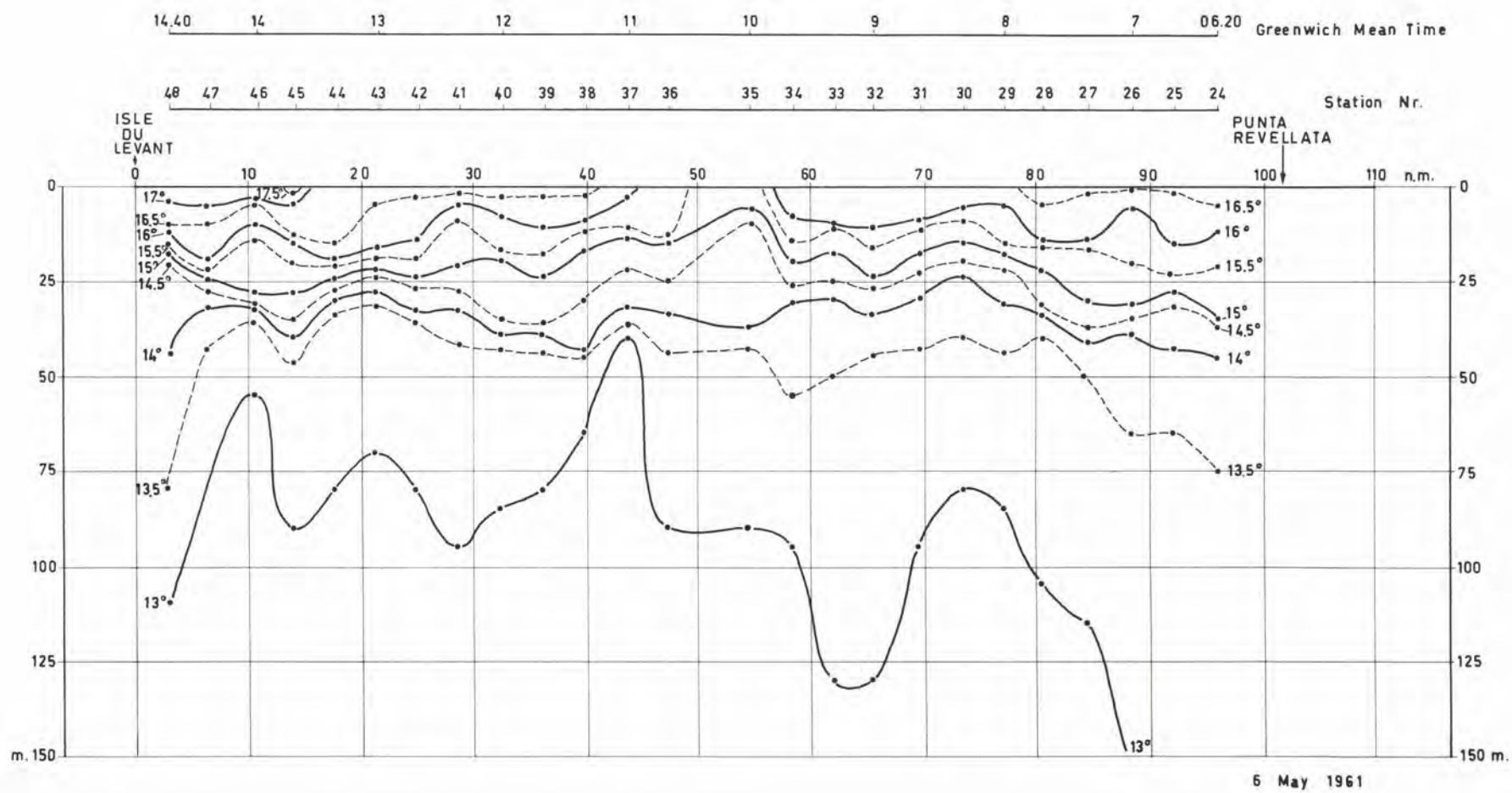


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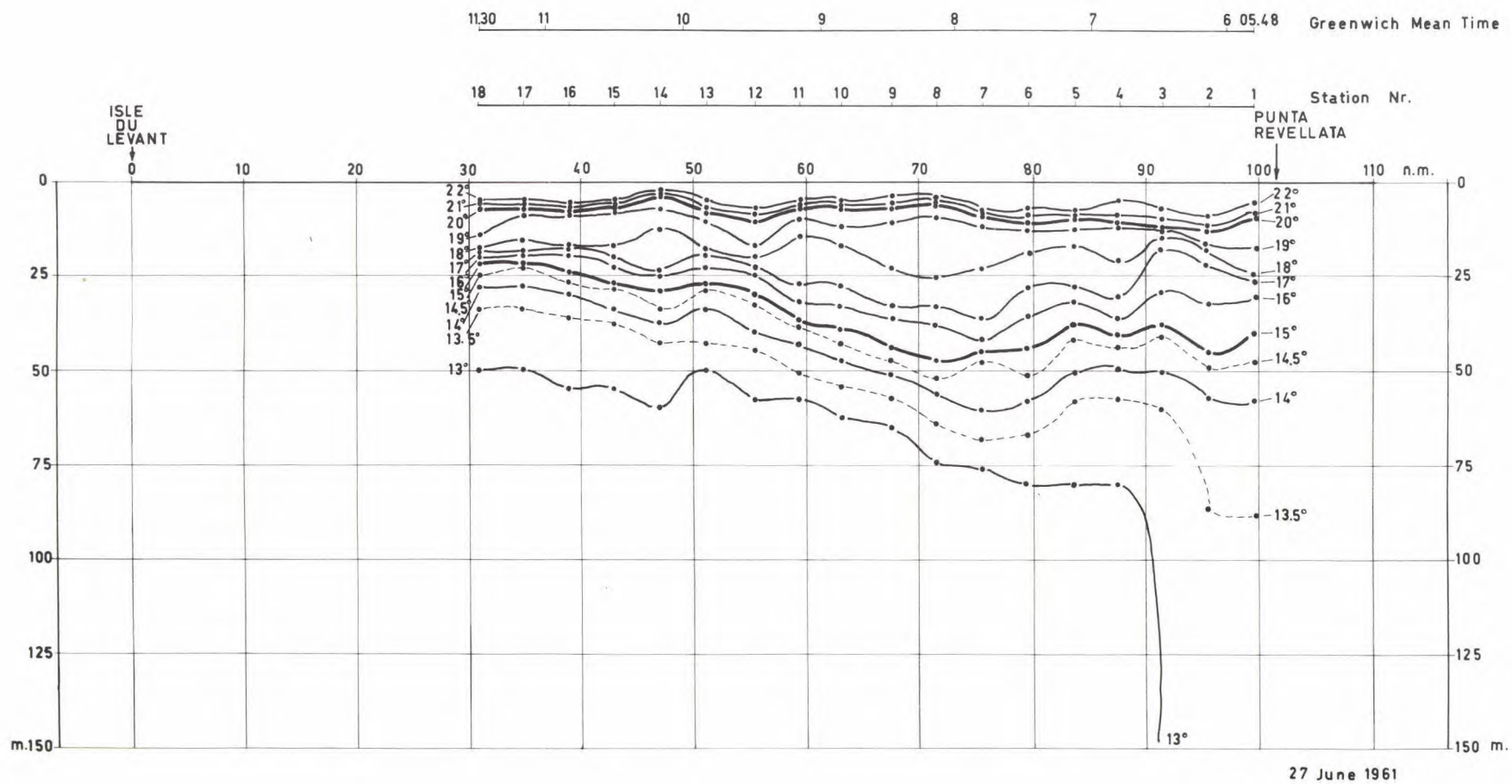


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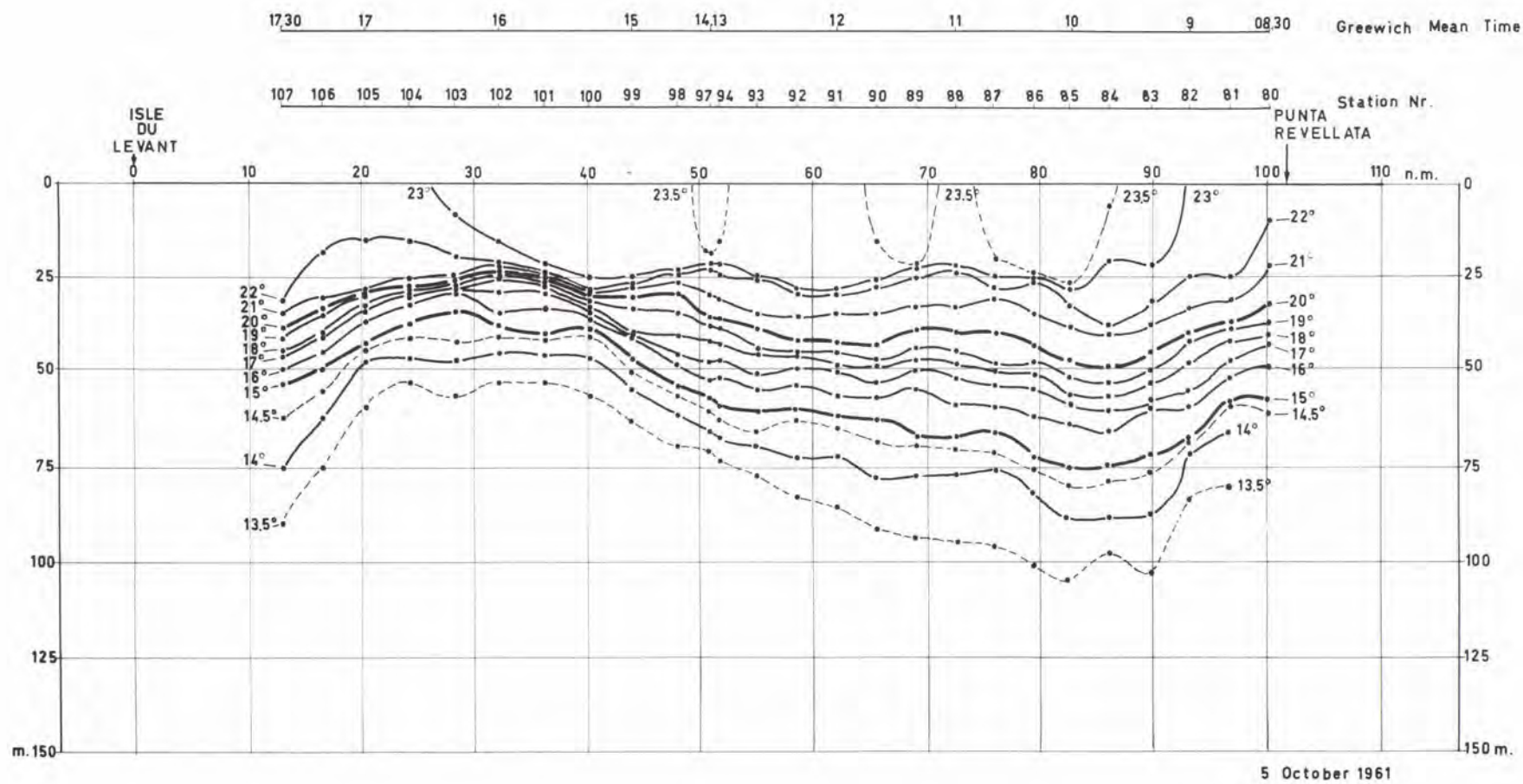


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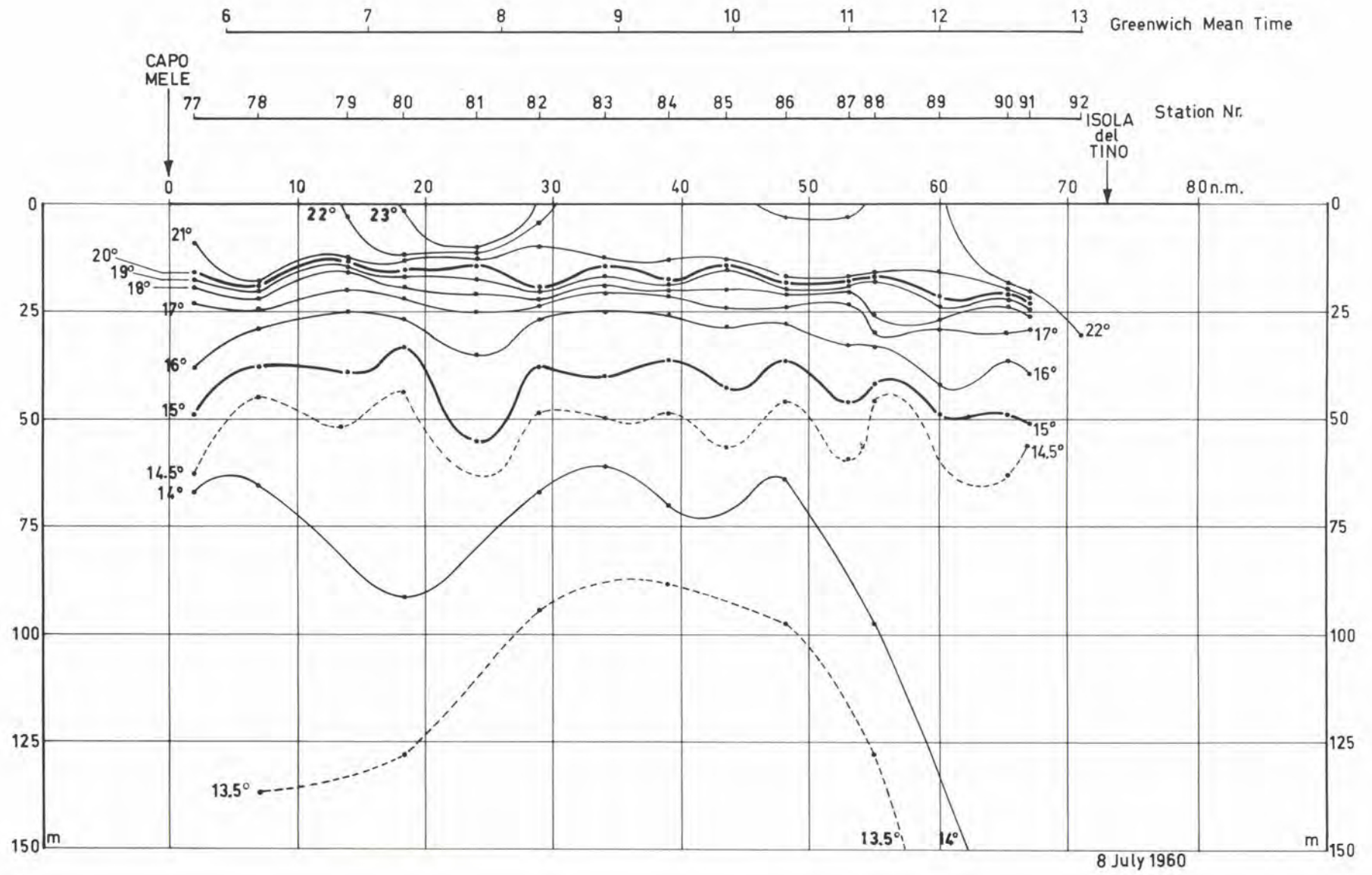


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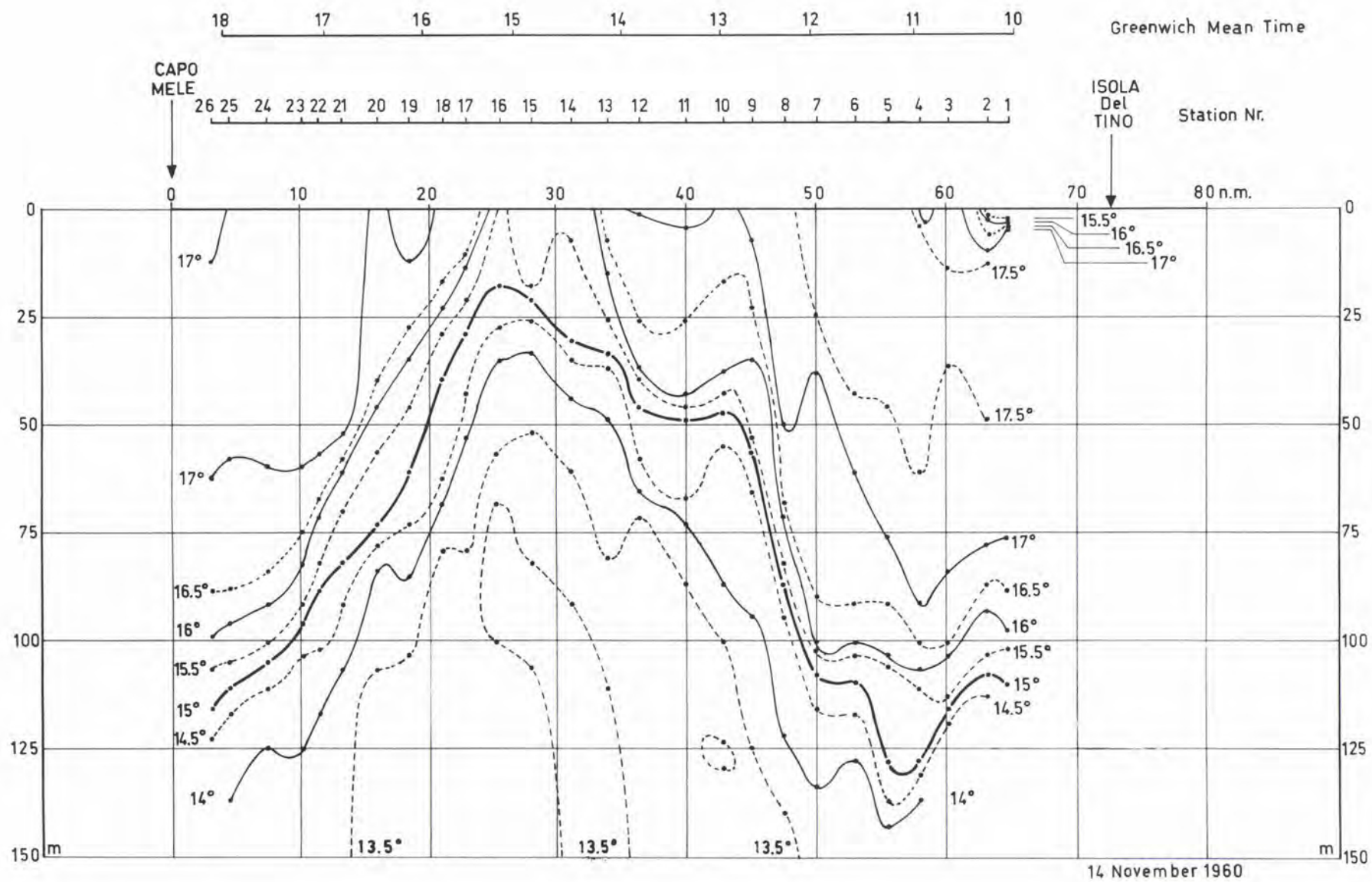


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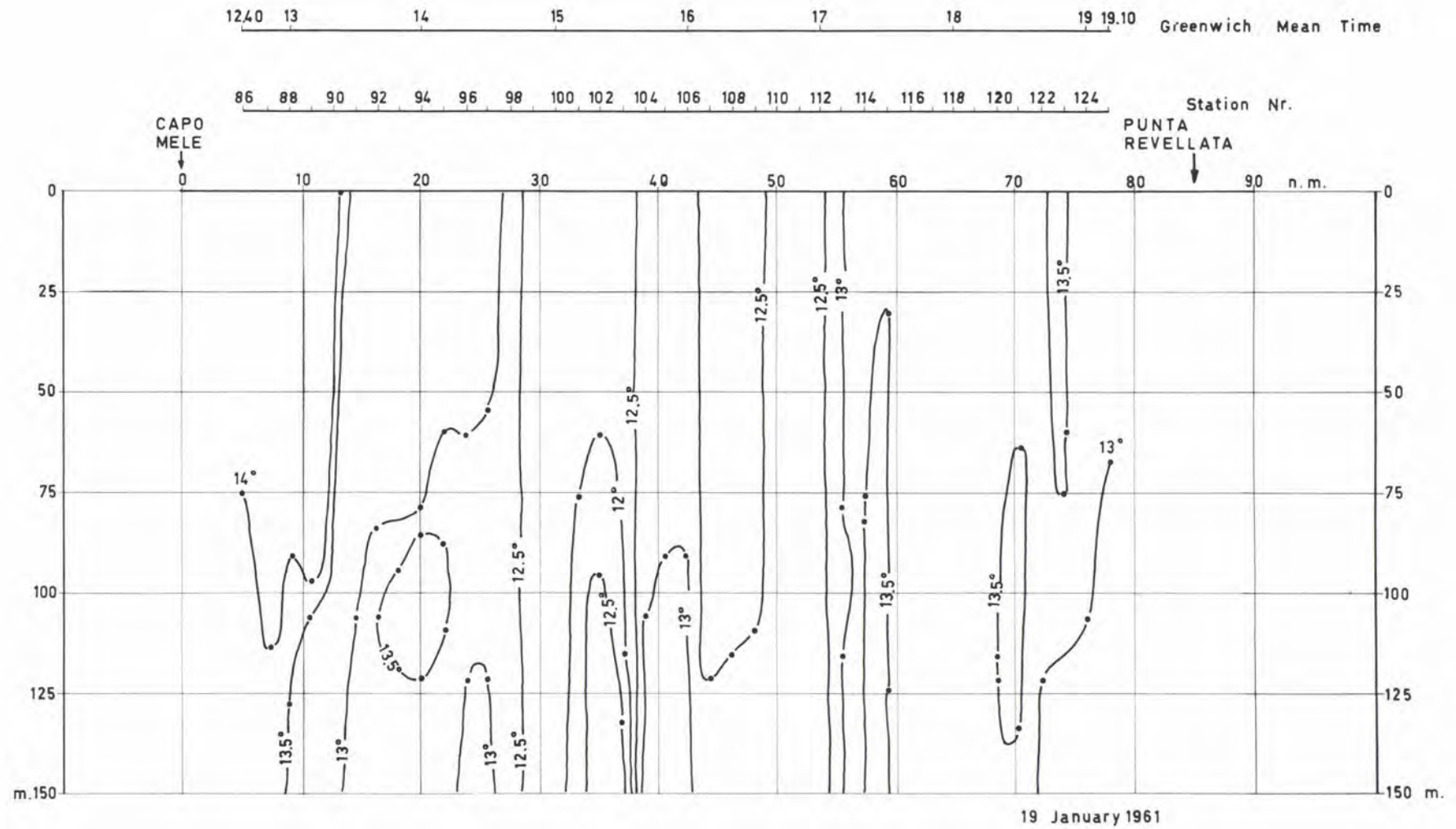


Fig. 44

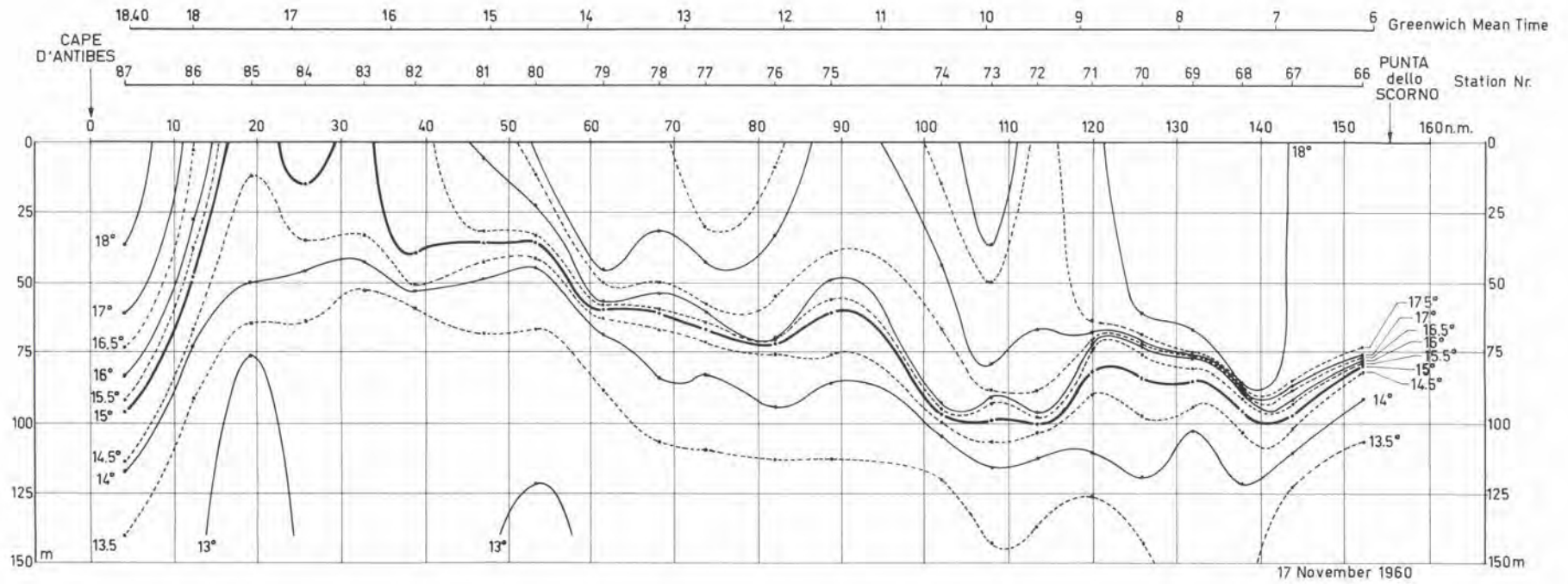


Fig. 45

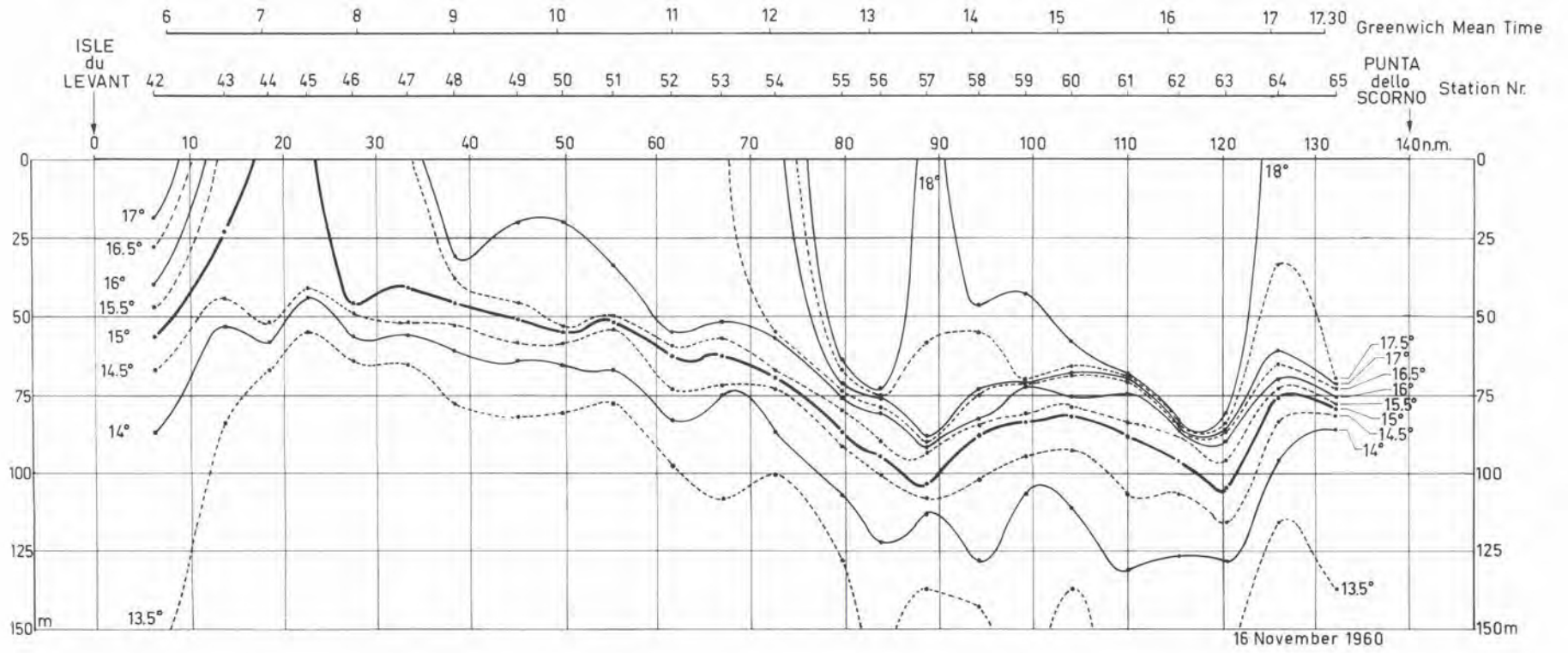


Fig. 46

T A B L E I
 Meteorological Data for the Period
 July 1960 - October 1961

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
62	1960	July	7	0600	22.0	20.6	-	22	09	3
65	"	"	"	0700	22.7	21.3	-	20	10	-
69	"	"	"	1000	22.0	20.8	1019	20	11	3
74	"	"	"	1300	23.3	21.6	-	21	17	3
79	1960	July	8	0700	21.8	21.3	1016	-	-	2
84	"	"	"	0900	22.7	21.8	-	15	09	3
92	"	"	"	1300	23.1	22.9	-	15	09	3
44	1960	Aug	24	0600	25.4	20.4	1024	15	03	0
48	"	"	"	0800	23.0	19.8	-	-	0	0-1
49	"	"	"	0900	24.5	20.5	-	14	06	0-1
52	"	"	"	1000	23.3	20.6	-	-	-	1
54	"	"	"	1100	-	-	-	11	07	1-2
58	"	"	"	1300	24.2	20.9	-	0	09	2
1	1960	Nov	3	0800	16.2	14.8	1024	22	08	3
3	"	"	"	0900	17.4	13.5	-	23	06	3
6	"	"	"	1000	18.2	13.6	-	24	09	3
9	"	"	"	1200	17.8	14.7	-	24	12	3

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
11	1960	Nov	3	1300	18.0	14.8	-	25	07	2
13	"	"	"	1400	18.1	13.8	-	25	08	2
16	1960	Nov	4	0700	16.3	15.8	1023	13	09	2
19	"	"	"	0800	16.2	15.7	-	14	05	2
21	"	"	"	0900	17.2	16.4	-	14	09	2
23	"	"	"	1000	17.2	16.6	-	13	11	2
25	"	"	"	1100	18.4	16.0	-	11	07	2
28	"	"	"	1300	18.4	15.0	-	07	14	2
30	"	"	"	1400	18.2	15.1	-	07	13	2
32	"	"	"	1500	17.8	15.5	-	07	11	2
34	"	"	"	1600	18.4	16.3	-	04	18	3
36	1960	Nov	5	0700	-	-	1013	23	39	5
37	"	"	"	0800	-	-	-	23	29	-
42	"	"	"	1000	-	-	-	26	27	-
46	"	"	"	1300	-	-	-	25	23	-
4	1960	Nov	14	1100	15.2	10.9	1024	31	08	2
7	"	"	"	1200	15.4	11.4	-	27	11	2
12	"	"	"	1400	14.8	11.6	-	22	12	2
16	"	"	"	1500	14.1	11.5	-	20	14	2
19	"	"	"	1600	14.6	11.1	-	20	13	-
28	1960	Nov	15	0800	13.4	10.9	-	06	03	2

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
29	1960	Nov	15	0900	14.3	11.3	1023	-	0	1
31	"	"	"	1000	14.5	11.3	-	-	0	1
33	"	"	"	1030	14.6	12.1	-	18	04	1
35	"	"	"	1100	15.3	12.6	-	23	12	1
37	"	"	"	1200	15.7	13.8	-	23	21	2
38	"	"	"	1300	15.9	13.7	-	24	15	2
40	"	"	"	1400	16.7	12.9	-	24	08	1
43	1960	Nov	16	0700	14.9	14.1	1020	28	12	2
45	"	"	"	0800	15.1	14.0	-	28	14	3
48	"	"	"	0900	15.4	14.5	-	28	13	3
50	"	"	"	1000	15.9	14.5	-	28	17	3
52	"	"	"	1100	16.2	14.5	-	28	16	3
56	"	"	"	1300	16.7	14.4	-	28	13	3
58	"	"	"	1400	16.9	14.6	-	27	14	3
60	"	"	"	1500	16.8	14.7	-	28	13	3
62	"	"	"	1600	16.4	14.7	-	28	14	3
64	"	"	"	1700	16.6	14.8	-	27	17	3
67	1960	Nov	17	0700	16.6	15.0	1021	19	12	2
69	"	"	"	0800	17.3	15.0	-	20	13	2
71	"	"	"	0900	17.2	15.0	-	19	12	2
73	"	"	"	1000	17.3	15.2	-	19	11	2

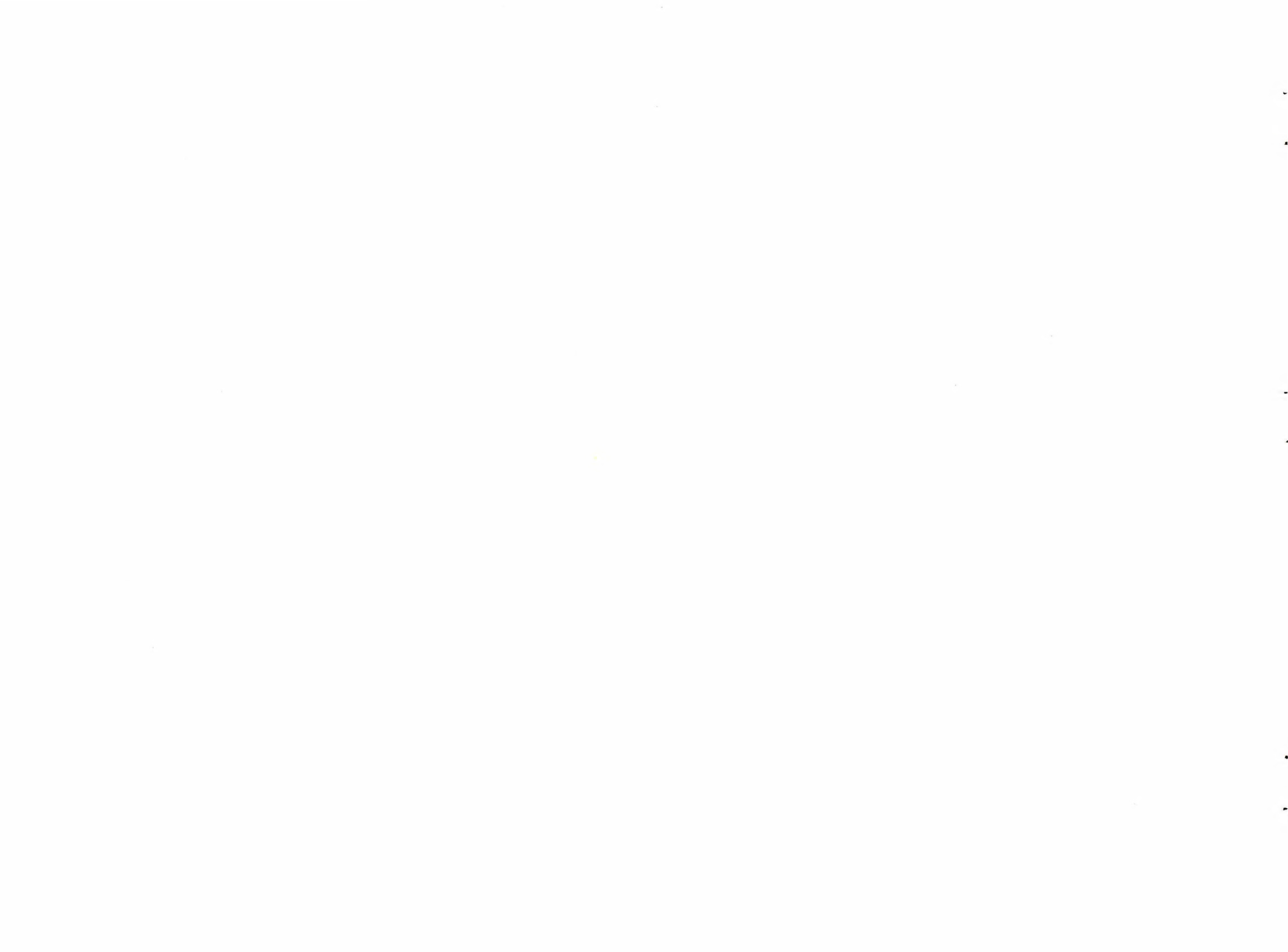
Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
75	1960	Nov	17	1130	16.9	15.5	-	18	10	2
77	"	"	"	1300	17.3	15.9	-	16	08	2
79	"	"	"	1400	14.3	14.1	-	05	16	3
81	"	"	"	1500	15.7	15.5	-	04	20	3
83	"	"	"	1600	12.4	11.0	-	06	11	3
85	"	"	"	1700	13.0	11.2	-	12	08	2
2	1960	Dec	13	1000	10.1	08.7	1015	18	04	2
6	"	"	"	1100	11.1	09.5	-	36	05	-
10	"	"	"	1200	11.8	10.4	-	06	03	-
15	"	"	"	1300	11.9	11.0	-	10	04	2
19	"	"	"	1400	11.6	09.9	-	11	04	2
23	"	"	"	1500	11.4	10.1	-	27	03	2
27	"	"	"	1600	11.2	09.8	-	32	02	-
30	"	"	"	1700	11.1	09.8	-	33	16	-
35	"	"	"	1800	11.3	09.9	-	18	04	-
42	1960	Dec	14	0700	09.8	08.3	-	22	12	3
46	"	"	"	0800	10.0	08.1	-	22	10	3
49	"	"	"	0900	10.1	08.7	-	22	10	-
51	"	"	"	1000	11.7	11.0	-	14	05	-
55	"	"	"	1100	10.5	07.8	-	09	04	-
59	"	"	"	1200	10.7	09.0	-	33	06	-



Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
64	1960	Dec	14	1400	11.2	09.7	-	34	06	-
69	"	"	"	1500	11.1	09.2	1013	01	10	-
72	"	"	"	1600	11.6	09.4	-	06	15	-
76	"	"	"	1700	12.0	10.0	-	06	20	-
1	1961	Jan	17	1000	9.6	9.2	1027	13	06	2
4	"	"	"	1100	9.5	8.0	-	12	05	2
8	"	"	"	1200	10.1	7.9	-	13	07	2
11	"	"	"	1300	11.0	8.4	-	12	07	3
14	"	"	"	1400	10.4	8.2	-	11	05	2
19	"	"	"	1500	10.5	8.9	-	11	05	2
23	"	"	"	1600	10.2	8.4	-	09	03	2
26	"	"	"	1700	10.2	7.9	-	10	05	-
30	"	"	"	1800	10.2	7.5	-	10	03	-
35	1961	Jan	18	0700	10.5	9.1	1027	33	05	2
38	"	"	"	0730	10.7	10.4	-	05	10	-
39	"	"	"	0800	10.7	10.4	-	05	10	2
43	"	"	"	0900	11.1	10.4	-	05	10	2
47	"	"	"	1000	11.5	10.0	-	05	07	2
50	"	"	"	1100	11.6	10.0	-	05	10	2
55	"	"	"	1200	11.9	10.1	1027	05	10	2
59	"	"	"	1300	11.9	10.1	-	06	08	2

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
63	1961	Jan	18	1400	12.0	10.0	-	06	09	2
67	"	"	"	1500	11.6	9.8	-	06	09	2
71	"	"	"	1600	11.7	9.0	-	06	09	2
75	"	"	"	1700	11.3	9.4	-	06	10	2
86	1961	Jan	19	1230	7.9	6.9	-	10	09	3
89	"	"	"	1300	7.8	6.8	-	10	09	3
93	"	"	"	1400	7.9	6.7	-	07	06	3
97	"	"	"	1430	8.1	6.7	-	04	05	2-3
101	"	"	"	1500	8.1	6.4	-	07	06	2
105	"	"	"	1600	7.8	6.4	-	08	07	2
109	"	"	"	1630	7.6	5.9	-	08	07	2
112	"	"	"	1700	8.3	6.3	-	08	07	-
129	1961	Jan	20	0700	8.2	7.1	-	01	09	2
133	"	"	"	0800	8.2	7.1	1029	01	07	2
137	"	"	"	0900	8.4	6.8	-	07	04	2
140	"	"	"	1000	7.9	7.0	-	01	08	2
144	"	"	"	1100	7.9	6.9	-	02	07	2
149	"	"	"	1200	7.8	7.1	-	02	07	2
152	"	"	"	1300	7.6	6.1	-	02	04	2
156	"	"	"	1400	7.6	6.7	-	02	04	2
158	"	"	"	1430	7.6	6.1	-	02	06	2

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
160	1961	Jan	20	1500	7.7	6.0	-	02	03	2
165	"	"	"	1630	7.6	5.9	-	12	04	1-2
1	1961	Feb	27	1100	13.9	13.4	1035	13	03	1
5	"	"	"	1300	14.5	14.3	-	26	04	1
8	"	"	"	1400	14.1	13.7	-	28	05	1
11	"	"	"	1500	13.7	13.1	-	28	05	1
14	"	"	"	1600	13.5	13.2	-	27	08	1
16	"	"	"	1700	13.7	12.4	-	27	12	1
21	"	"	"	1800	13.5	12.2	-	30	11	1
25	"	"	"	1900	13.1	11.9	-	32	11	-
27	1961	Feb	28	0600	12.6	10.0	1032	20	14	2
30	"	"	"	0800	12.8	11.6	-	21	17	3
33	"	"	"	0900	13.4	11.9	-	21	20	3
36	"	"	"	1000	-	-	1029	-	-	-
40	"	"	"	1100	14.1	13.1	-	22	24	3
44	"	"	"	1300	13.9	12.9	-	24	29	3
47	"	"	"	1400	14.5	12.9	1027	27	31	3
50	"	"	"	1500	15.6	12.3	-	29	32	3
57	1961	March	1	1100	-	-	-	18	07	1
61	"	"	"	1200	-	-	1024	24	06	1
64	"	"	"	1300	-	-	-	22	03	1



Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
67	1961	March	1	1400	-	-	-	18	03	1
70	"	"	"	1500	-	-	-	16	04	1
73	"	"	"	1600	-	-	-	05	07	1
76	"	"	"	1730	-	-	-	05	09	1
78	1961	March	2	0700	-	-	-	05	12	2
79	"	"	"	0900	-	-	-	02	14	3
82	"	"	"	1000	-	-	-	03	22	3
85	"	"	"	1100	-	-	-	05	21	3
93	"	"	"	1400	-	-	-	04	07	2
99	"	"	"	1600	-	-	-	28	07	1
101	"	"	"	1630	-	-	-	29	15	2
4	1961	Apr	10	1100	16.0	14.7	1017	20	01	1
10	"	"	"	1300	18.3	16.2	-	20	02	1
14	"	"	"	1400	17.7	15.5	-	22	18	2
16	"	"	"	1500	17.5	14.7	-	22	24	3
19	"	"	"	1600	17.5	16.0	-	19	05	2
22	"	"	"	1700	16.3	14.7	-	29	13	2
26	1961	Apr	11	0700	15.1	14.4	-	21	24	4
38	"	"	"	1100	-	-	-	31	05	2
45	"	"	"	1300	-	-	-	28	10	2
52	"	"	"	1600	-	-	-	36	06	2



Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
53	1961	Apr	12	1000	-	-	-	22	03	1
55	"	"	"	1100	-	-	-	26	05	1
60	"	"	"	1200	-	-	1020	26	09	1-2
65	"	"	"	1400	-	-	-	24	08	2
68	"	"	"	1500	-	-	-	28	08	2
74	"	"	"	1700	-	-	-	22	04	1
2	1961	May	5	1000	19.0	17.5	1027	16	11	2
8	"	"	"	1200	19.4	17.8	-	15	13	2
11	"	"	"	1300	19.3	17.6	-	14	20	2
14	"	"	"	1400	18.5	17.2	-	14	23	2
17	"	"	"	1500	18.2	17.0	-	14	19	3
20	"	"	"	1600	18.4	16.7	-	15	20	3
25	1961	May	6	0700	17.8	17.1	-	30	05	2
29	"	"	"	0800	18.2	16.9	1024	35	03	1
32	"	"	"	0900	17.4	16.5	-	01	06	2
36	"	"	"	1100	17.9	16.6	-	01	11	2
41	"	"	"	1200	20.6	17.1	-	30	06	2
45	"	"	"	1400	18.6	16.9	-	25	16	2
48	"	"	"	1500	19.4	17.3	-	25	16	2
50	1961	May	7	0700	16.5	15.5	1025	05	13	2
53	"	"	"	0900	17.0	15.6	-	08	10	2

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
55	1961	May	7	1000	17.0	15.6	-	36	04	1
59	"	"	"	1200	19.0	16.6	-	20	03	1
63	"	"	"	1400	18.3	16.0	1024	24	04	1
66	"	"	"	1600	18.9	16.3	-	23	09	2
69	"	"	"	1700	18.1	16.3	-	22	17	2
3	1961	June	27	0600	23.9	23.1	1011	21	11	2
6	"	"	"	0700	23.8	23.0	-	23	17	2
9	"	"	"	0800	24.5	23.9	-	29	04	2
13	"	"	"	1000	23.9	23.6	-	26	05	-
15	"	"	"	1030	24.0	23.5	1012	29	10	-
19	1961	June	28	1000	24.7	23.2	1017	11	09	2
21	"	"	"	1030	24.5	23.2	-	11	09	-
27	"	"	"	1200	25.6	23.4	1018	12	04	-
34	"	"	"	1500	24.9	23.2	-	23	16	2
38	"	"	"	1600	24.0	22.0	-	22	19	3
40	"	"	"	1630	23.8	22.2	-	22	20	3
42	"	"	"	1700	23.9	21.8	1019	23	19	3
44	1961	June	29	1000	24.6	23.1	-	36	11	2
47	"	"	"	1200	-	-	-	03	11	2
50	"	"	"	1300	25.6	22.9	-	01	09	2
53	"	"	"	1400	24.8	23.3	-	03	04	1

Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
57	1961	June	29	1600	26.6	24.7	-	03	07	1
60	"	"	"	1800	26.9	24.3	-	10	02	1
64	"	"	"	1900	24.6	23.6	-	28	04	1
70	1961	June	30	0700	23.7	20.6	-	11	16	3
71	"	"	"	0800	24.7	22.1	-	09	11	3
73	"	"	"	0900	25.7	21.0	-	10	13	3
74	1961	July	5	1030	26.4	24.4	1011	14	08	2
77	"	"	"	1130	26.9	24.8	-	15	09	2
80	"	"	"	1230	27.1	25.6	-	14	16	3
83	"	"	"	1330	26.6	24.7	-	13	14	3
86	"	"	"	1430	27.0	25.0	-	24	04	1
89	"	"	"	1530	26.8	25.2	1010	24	11	1
1	1961	Aug	14	1200	26.2	25.2	-	-	-	2
4	"	"	"	1300	26.6	24.6	-	03	22	2
8	"	"	"	1400	26.5	23.5	-	-	-	1-2
12	"	"	"	1500	25.7	24.3	-	03	16	1
16	"	"	"	1600	25.2	23.4	-	03	24	1-2
20	"	"	"	1700	24.6	22.7	-	03	22	1-2
24	"	"	"	1800	23.8	22.6	-	-	-	2-3
28	1961	Aug	15	0630	23.5	21.7	-	05	28	3
29	"	"	"	0700	23.7	22.2	-	05	23	2-3



Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
32	1961	Aug	15	0800	23.9	22.2	-	05	19	2-3
34	"	"	"	0900	23.9	21.5	-	-	-	3
36	1961	Aug	17	0700	22.6	19.7	-	02	16	1
39	"	"	"	0800	23.8	20.4	-	13	15	2-3
41	"	"	"	0900	24.6	21.3	-	12	10	1-2
44	"	"	"	1000	23.1	19.9	-	12	18	1-2
46	"	"	"	1100	25.0	21.9	-	11	11	1-2
50	"	"	"	1200	24.0	20.4	-	11	10	1
55	"	"	"	1400	23.7	20.4	-	-	05	1
57	"	"	"	1500	24.5	22.5	-	03	09	1-2
10	1961	Oct	2	1300	22.8	20.6	1013	12	16	3
13	"	"	"	1400	22.1	20.2	-	15	13	3
16	"	"	"	1500	21.8	19.0	-	11	16	2
20	"	"	"	1600	22.2	19.5	1012	11	06	2
26	1961	Oct	3	0600	20.6	19.2	1011	09	18	3
32	"	"	"	0800	22.5	19.5	-	08	19	3
40	"	"	"	1200	23.3	21.7	1012	03	19	3
44	"	"	"	1300	23.4	20.9	-	01	22	3
47	"	"	"	1400	-	-	1011	01	24	-
59	1961	Oct	4	0900	23.1	20.1	1013	08	08	2
62	"	"	"	1000	23.4	21.0	-	05	16	3



Station No.	Year	Month	Day	Hour GMT	Air Temperature		Barometer mb	Wind		Sea State
					dry bulb °C	wet bulb °C		dir	speed knots	
65	1961	Oct	4	1100	23.3	19.5	-	04	18	3
68	"	"	"	1200	23.3	20.2	1013	04	22	3
74	"	"	"	1400	23.2	20.6	-	04	26	3
79	"	"	"	1600	22.8	20.8	1012	05	22	3
84	1961	Oct	5	1000	24.4	21.9	1018	03	15	3
86	"	"	"	1030	24.5	22.4	-	03	16	3
89	"	"	"	1100	24.6	21.2	-	04	20	3
92	"	"	"	1200	23.8	20.7	1017	05	18	3
100	"	"	"	1500	23.4	22.2	-	08	14	2
106	"	"	"	1700	22.5	20.9	1017	08	14	2





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