13. PRELIMINARY SITE SURVEYS IN THE BERING SEA FOR THE DEEP SEA DRILLING PROJECT, LEG 19

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INTRODUCTION

In July and August of 1970 the R/V *Melville* of Scripps Institution of Oceanography conducted geologic and geophysical surveys and related oceanographic studies in the North Pacific Ocean and the Bering Sea. These surveys were performed on Legs II and III of ANTIPODE Expedition, with George G. Shor, Jr., as chief scientist, and with the support of the Office of Naval Research and the National Science Foundation. For a more detailed account of the ANTIPODE II and III surveys see Shor (1971).

One of the primary objectives of these surveys was to investigate the proposed drilling sites of the Deep Sea Drilling Project Leg 19. Consequently, much time was spent surveying the areas of interest with seismic reflection air-gun equipment, magnetometer, and 12 kHz and 3.5 kHz bottom and subbottom echo sounders.

The following five reports of ANTIPODE site surveys were selected on the basis of their proximity to the actual drill holes on Leg 19 (see Figure 1). All of the seismic reflection records for a site are located at the end of each site report along with the pertinent figures and illustrations.

Much of the information presented herein is a summary of the reports in Shor (1971); the various authors of that report should be credited for their individual efforts. They include J. Grow, S. Einsohn, and the authors.

ANTIPODE SITE SURVEY 2-2 ALEUTIAN ABYSSAL PLAIN

Location

This site survey covered an area bounded by 51°15′ to 51°50′N and 160°50′ to 161°50′W (Figures 2, 3, and 4) from 14 July to 16 July 1970 on Leg II of ANTIPODE Expedition and was located on the southern boundary of magnetic anomaly 25 (Figure 5).

Background Data

The magnetic anomaly patterns of the northwest Pacific (Raff and Mason, 1961; Hayes and Heirtzler, 1968; Peter et al., 1970) indicate that the Aleutian Abyssal Plain lies to the west of the Great Magnetic Bight. Magnetic anomaly 25 has an east-west lineation and lies immediately south of the Aleutian Trench on the abyssal plain. The reflection records of Hamilton (1967) indicated that 0.1 sec of pelagic sediment may overlie 0.2 sec of turbidite deposits in the basin. Hamilton (1967) also suggests that the turbidite deposits originated on the Alaskan mainland and were carried to the ocean through Cook Inlet.

Topography, Structure, and Site Survey Data

Topographically the surveyed area is a plain with a mean depth of 2490 fathoms and a slight southerly dip (Figure 6). Small nonlineated hills rise 50 to 100 fathoms above the bottom, with a maximum relief of 350 fathoms. The reflection profiles (Profile 1-7) show an average sediment thickness of 0.40 to 0.50 sec with maximum thickness of 0.60 sec. At 0.20 sec of depth, a discontinuous reflecting horizon is visible which is underlain by another nonreflecting unit at 0.40 sec. The reflectivity of the units below 0.40 sec of sediment seems to vary with the basement topography. The hard reflectors that were present at this depth were usually found in ponded troughs at the base of the basement highs. Conversely, the reflectors were absent in areas where the basement was essentially flat. The east-west and north-south air-gun profiles are shown in Profile 4.

The 0.1 sec of pelagic sediments previously reported for this area (Hamilton, 1967) were not clearly resolved on the reflection records, however, the discontinuous reflector at 0.2 sec is probably equivalent to that reported by Hamilton. A small abyssal hill at the east end of the east-west Profile 4 also has 0.2 sec of pelagic sediment on top of it. Consequently, the pelagic layer appeared to be nearer 0.2 sec in this particular area.

A 60-foot piston core was taken at 51°43′N, 160°55.7′W, where records showed 0.5 sec of penetration and the magnetics were interpreted to indicate a position on anomaly 25. The core yielded 35 feet of sediment with mud on the barrel of the corer for a distance of 50 feet from the nose which indicates compression of the core. Samples were taken every 150 cm. The sediment was basically a gray green silty clay composed mainly of diatoms, with some quartz, dark heavy minerals, and radiolarians. The sediment was, for the most part, relatively undisturbed, with the component particles being well preserved.

ANTIPODE SITE SURVEY 2-4 ALEUTIAN TERRACE (ATKA BASIN)

Location

The Atka Basin section of the Aleutian Terrace was surveyed by the R/V *Melville* on 20 to 21 July 1970. Additional survey work was completed on the R/V *Thomas Washington*, also of Scripps, between 27 July and 6 August 1970. The general location of the over-all survey area lies at approximately 51°00′N latitude and between 173°00′W and 177°00′W longitude.

Background Data

The north wall of the central Aleutian Trench between 160° and 180°W is interrupted by a 40- to 60-km wide terrace at an intermediate depth, 2000 to 3000 fathoms (Figure 7). The southern border of the terrace between

R/V *Melville* ANTIPODE Site Survey Numbers	DSDP Prospectus Site Numbers	Leg 19		
		Site Numbers	Latitude	Longitude
2-2	19-1D	183	52°34.30'N	161°12.33'W
2-4	19-6A	186	51°07.81'N	174°00.34'W
		187	51°06.6'N	173°57.2'W
3-1	19-5B	188	53°45.2'N	178°39.56'E
3-2	19-4E	190	55°33.55'N	171°38.42'E
3-3	19-7E	191	56°56.70'N	168°10.72'E

Figure 1. *Interrelationship of ANTIPODE Legs II and III Site Survey Numbers and Deep Sea Drilling Project Leg 19 Drill Sites*

173° and 177°W is an anticlinal arch, with the sediments thinning from north to south onto the arch.

Topography, Structure, and Site Survey Data

Reflection profiles of this survey area indicate the Aleutian Terrace contains 1 to 2 km of very gently deformed sediments (Figure 8). Figure 7 shows the positions of seven air-gun profiles over the terrace between 170° and 177°W. The profiles shown as lines A-G in Figure 8 are shown in Figures A-G, respectively, with north side to the right. All are 10-sec sweep records.

Profile 14D shows the general structure of the central Aleutian Terrace between 173° and 177°W with the greatest clarity. The terrace has a broad anticlinal arch on the south with greater than 0.8 sec of sediments. A broad synclinal trough lies to its north with sediments thickening to greater than 1.5 sec. The anticlinal axis seen in profile D can be traced westward along strike to profiles C, B, and A, where it forms Hawley Ridge. In profile A, Hawley Ridge is uplifted nearly 700 fathoms higher than in profile D and a fault has developed on the north side. Continuing to the east of profile D to E, the acoustically opaque pinnacle on E is directly along strike with the anticlinal axis through profiles A-D, and could be faulted and disturbed sedimentary sequence, but the anticlinal trend appears to have died out. The eastward and westward limits of the anticlinal structure appear to be aligned with the Adak and Amlia feacture zones of the Pacific plate.

Grow (1972, p. 85) summarizes the structure of this general area in Figure 9, and by saying:

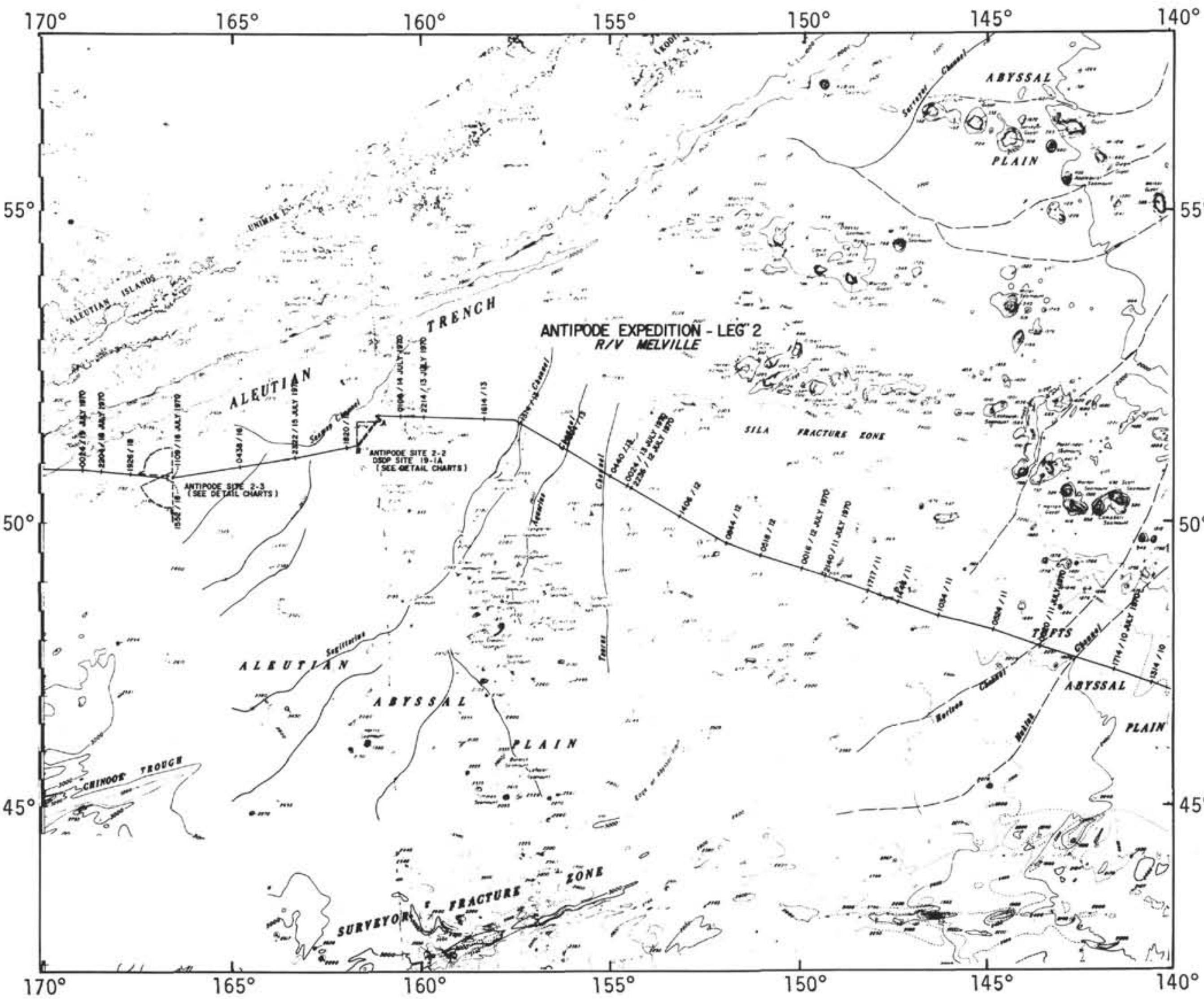

Figure 2.

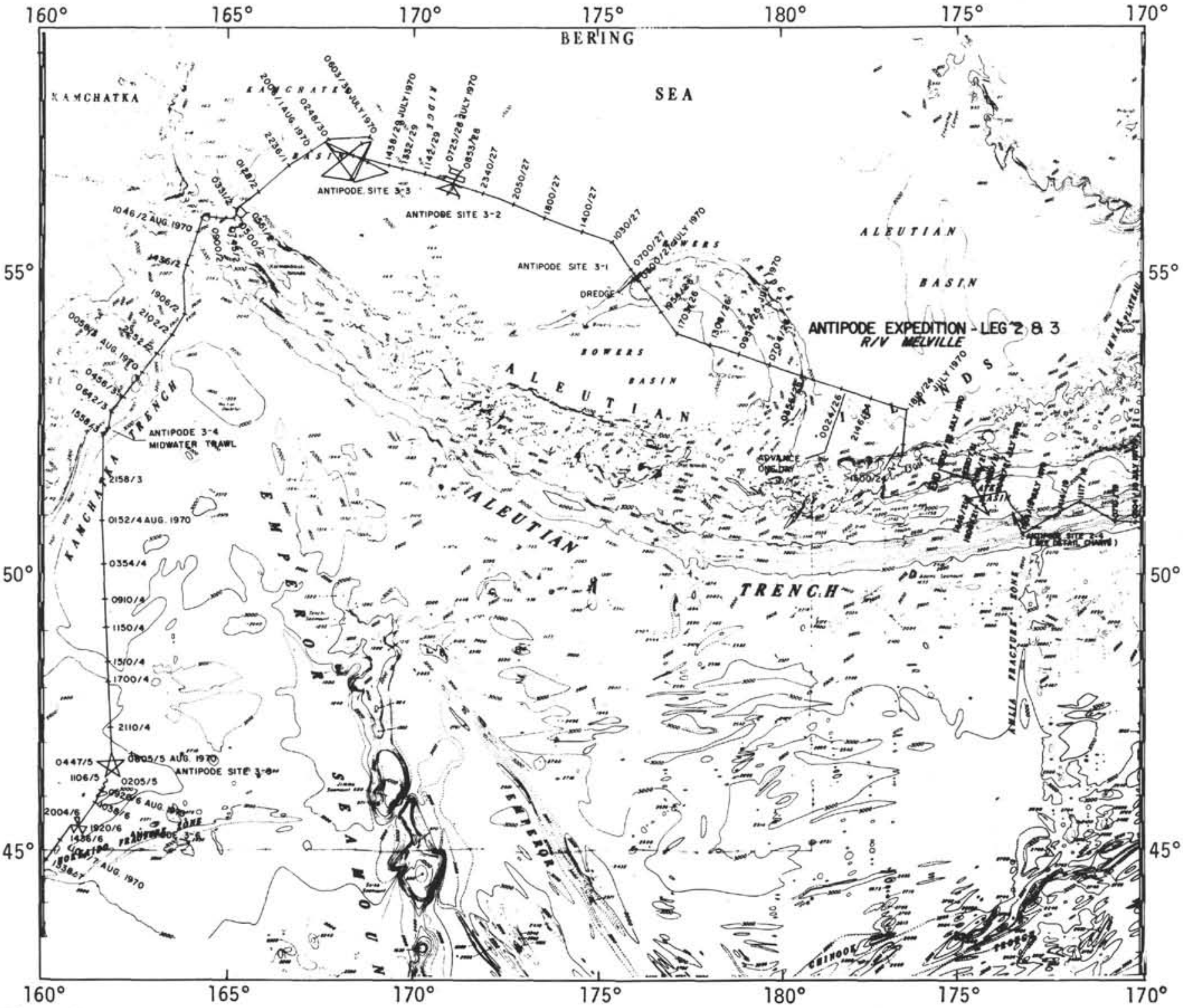

Figure 3.

The deep-tow data over the north wall (of the Aleutian trench in this area) indicates that the most active fault outcrops in a narrow zone on the south side of the linear ridge, suggesting a northward dipping thrust fault. . . Furthermore, because no tensional morphology was observed between the trench floor and the Aleutian terrace, thrusting and complex folding are presumed to be dominant over this zone. Over the southern edge of the Aleutian terrace, the uplifting of the complex anticlinal arch is probably caused by reverse faulting at depth, but some local tension faulting might be expected near the surface due to the anticlinal arching of the uplifted terrace sediments. (p. 85)

ANTIPODE SITE SURVEY 3-1 BOWERS RIDGE

Location

The R/V *Melville* made two crossings of Bowers Ridge (Figure 3) between 0130 hours on 26 July and 0500 hours on 27 July 1970. The survey included a dredge station which sampled an interval between 400 to 600 fathoms.

Background Data

In the area north of the Aleutian Ridge there is an accumulation of over 1.0 sec of layered sediment below the ocean floor. It has been suggested (Ewing et al., 1965) that the distinct and often continuous reflector "P" found at 1.0 sec represents the same era of deposition in the Aleutian Basin and Bowers Basin. Overlying this basal reflector is a series of continuous reflectors in the basins, but on Bowers Ridge there is an intervening opaque layer and only the top 0.35 sec is composed of reflectors (Profiles 9-11). These upper reflectors on the ridge do not appear to be continuous with those in the basins.

Topography, Structure, and Site Survey Data

The Aleutian Basin in this area is at a depth of 2100 fathoms (Profile 8), with Bowers Ridge rising from a depth

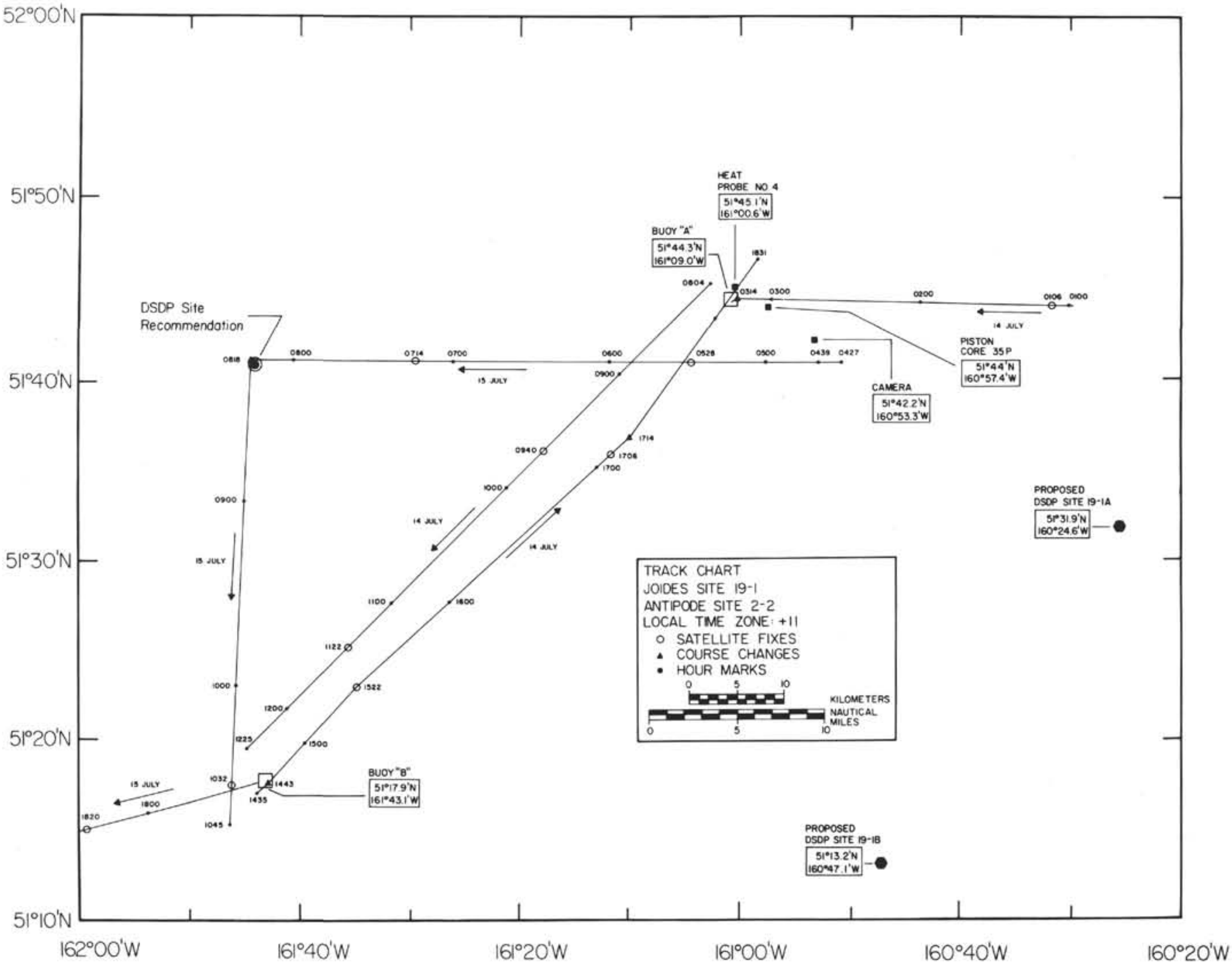

Figure 4.

of 1200 fathoms (Profile 9). Between this scarp and the basement peak of Bowers Ridge (8 miles) is over 1.0 sec of disturbed sediment with interspersed easterly tilted reflectors, whose maximum depths are at 0.20, 0.25, 0.35, and 1.25 sec respectively, which end abruptly against the "basement" material.

To the west of this sediment trough is a 16-mile long basement peak which rises to 325 fathoms (Profile 9). This outcrop has a thin veneer of sediment on the east flank and 0.10 to 0.15 sec of sediment on the west flank. To the west of this peak there is an accumulation of 0.50 sec of sediment in a trough 1600 fathoms deep. All of the sediments in this basin appear to be disturbed, as seen by noncontinuous reflectors which would be a result of flow deposition off the basement high.

Farther west on the ridge is a small channel preceding a hill which rises to 1475 fathoms. There are 0.75 sec of sediment draping this rise in which 0.35 sec of distinct continuous reflectors are present, with the sediments below 0.35 sec being disturbed. There are a number of faults present, one on the peak, three or four on the west flank of the knoll, and at several places on the west flank where over 160 fathoms of block relief are present.

"White-outs" occur on the records over the ridge below sediment which is 0.20 sec deep. These white-outs indicate the presence of peaks of unstratified, possibly volcanic material which forms the main bulk of the ridge in this locale (Profile 12). Dredge haul 40D was located in this area at 54°55.1'N, 176°12.9'E, and sampled an interval of 202 fathoms on the slope between 653 fathoms and 451 fathoms. The visual examination determined the haul to be basalt with ice-rafted, well-rounded, and some angular fragments of granite, granodiorite, and quartz, with many sponges present.

On our crossing, Bowers Ridge gently sloped down into Bowers Basin to a depth of 2100 fathoms (Profiles 10 and 11). In the basin there is at least 1.25 sec of sediment with distinct reflectors at 0.10, 0.30, 0.50, 0.60, 0.75, and 0.80 sec respectively, at a distance of 16 miles out into the basin west of Bowers Ridge.

The south flank of the ridge has 0.30 sec of sediment on it which appears to have "rolled down" the flank. At the

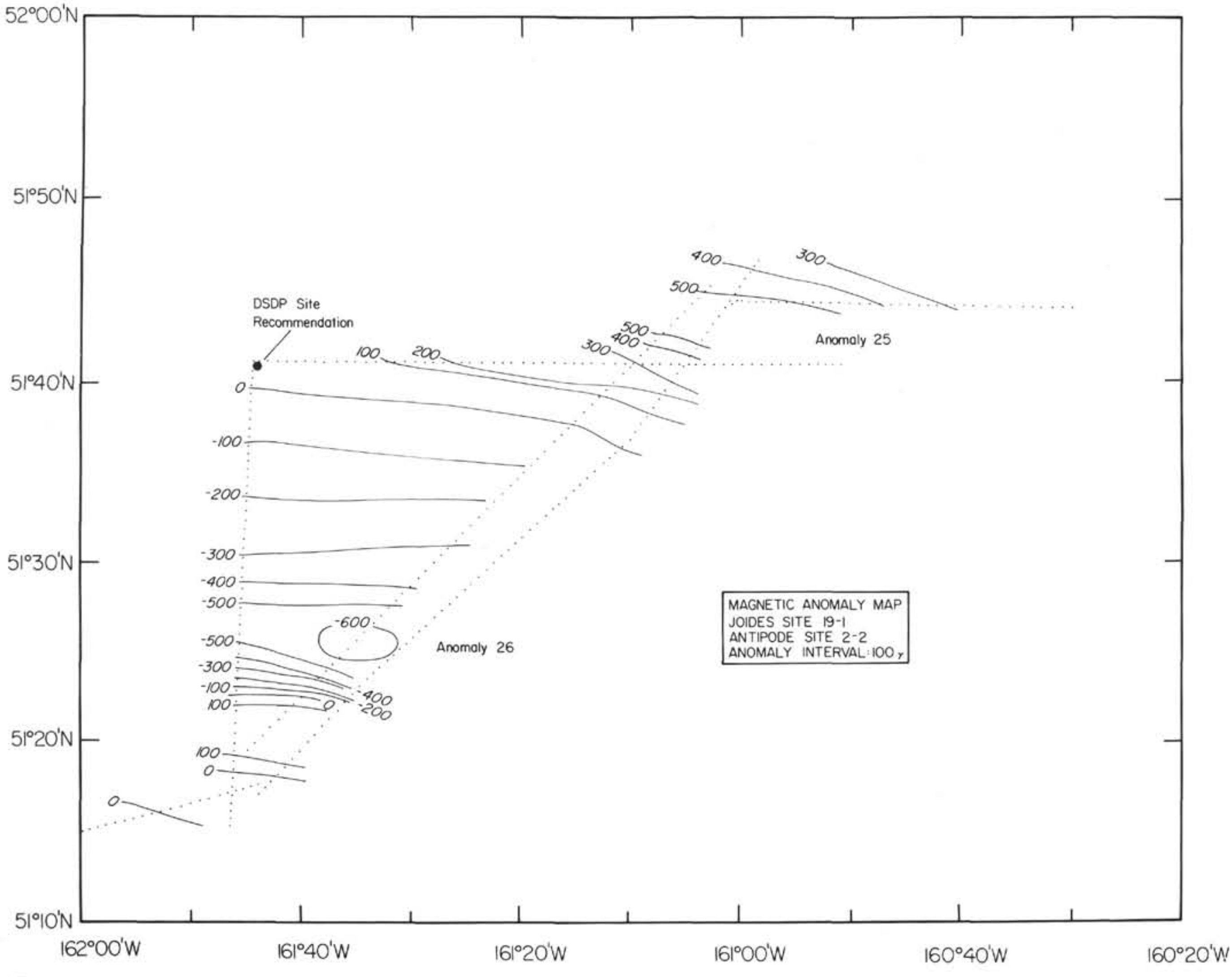

Figure 5.

juncture of Bowers Basin and the south-facing scarp of Bowers Ridge, the basin sediments abut against the "rolled down" material. Below the basin floor there does not appear to be any mixing at the interface of the "rolled down" flank material and the stratified basin sediments.

ANTIPODE SITE SURVEY 3-2 SHIRSHOV RIDGE

Location

A small area bounded by 56°10.0'N, 170°50.0'E, and 56°40.0'N, 171°50.0'E was surveyed by the *Melville* from 0000 hours 27 July to 1230 hours on 28 July (Figure 10). The survey included several southeast-northwest track lines over the south-central portion of Shirshov Ridge.

Background Data

The Shirshov Ridge is a major topographic feature in the Bering Sea. It is 250 miles long and 100 miles wide, bounded on the east by the Aleutian Basin, on the west by the Kamchatka Basin, and on the north by Cape Olyutorskiy of the U.S.S.R.

Topography, Structure, and Site Survey Data

On the *Melville* seismic reflection records, the Shirshov Ridge rises from 2000 fathoms in the Aleutian Basin up to 850 fathoms (Profiles 13 and 14). The site survey showed that there are two major breaks in the slope of the ridge in this area, one where the sediment cover on top begins and another where the ascent to the peak begins (see sections EF and GH, Figure 11). A steep, linear ridge of basement material 7 miles long, trending northeast-southwest, rises from the Aleutian Basin on the east side of Shirshov Ridge.

There is at least 1.0 sec of sediment on top of the ridge with distinct reflecting horizons at 0.20, 0.35, and 1.00 sec, respectively. The deepest strong reflector at 1.00 sec still appears to be sedimentary. Irregular reflectors which could be construed as basement material were not observed during any of the crossings.

In the Aleutian Basin there are reflecting horizons at 0.30, 0.50, and 1.00 sec, respectively (Profile 15), which end by deflecting abruptly upwards against the scarp. The reflecting horizons are not continuous from the basin onto the ridge across the scarp.

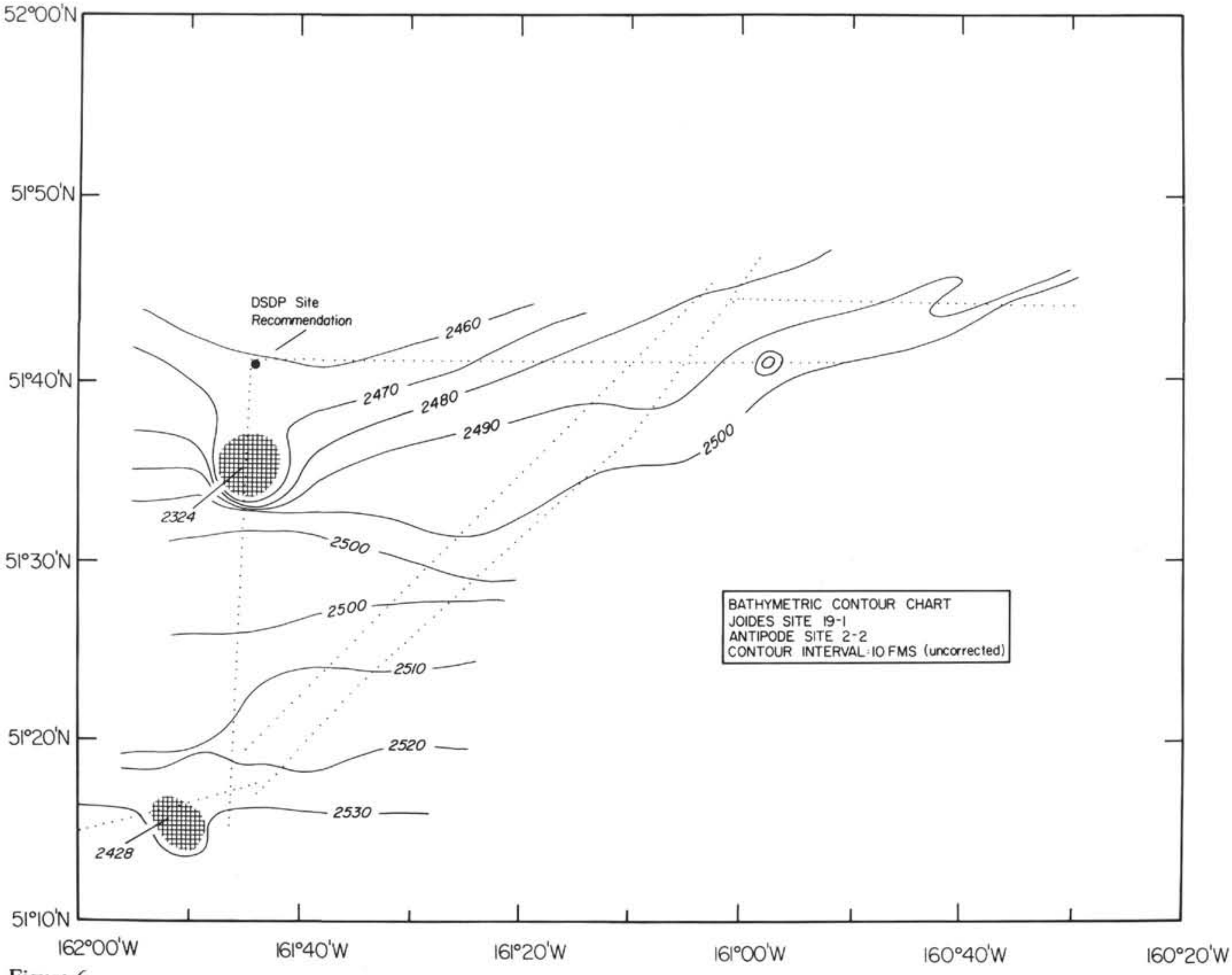

Figure 6.

Dredge haul 41D was taken at 56°19.0'N, 171°26.0'E, near the base of the eastern scarp of the ridge (Profile 17). The depth interval dredge was 1600 to 1800 fathoms at a point where two reflectors were seen to outcrop (1845 hours, 28 July to 2121 hours, 28 July). The dredge contained several fragments of coral containing benthonic foraminifera.

A 40-foot piston corer, 42P, was lowered at 56°23.2'N, 171°05.0'E. 1116 cm of sediment were recovered with the catcher sample containing a green gray siliceous ooze composed of diatoms and radiolarians.

Two heat probe lowerings and a camera station were made at the same location as the piston corer, but no usable data were obtained from any of the lowerings.

ANTIPODE SITE SURVEY 3-3 KAMCHATKA BASIN

Location

The R/V *Melville* surveyed an area in the central Kamchatka Basin between 56°23.0'N and 57°00.0'N latitude, and 167°30.0' and 169°00.0'E longitude (Figures 3 and 12) from 1400 hours on 29 July to 2000 hours on 1 August 1970. The survey included 400 miles of underway profiling, two gravity cores, a piston corer, camera lowering, heat probe, and a three-buoy anisotropy seismic station. The seismic station pattern controlled the layout of the survey.

Background Data

The Kamchatka Basin is the westernmost basin in the Bering Sea, being flanked on the east by Shirshov Ridge and on the west by the Kamchatka Peninsula.

Topography, Structure, and Site Survey Data

The area surveyed in the basin has a relatively flat bottom with slightly increasing depth toward the south. There were a few abyssal hills present with depth increasing from 2070 to 2100 fathoms and maximum hill relief of 200 fathoms (Profiles 18 and 32). The upper 0.60 to 0.70 sec of subbottom penetration on the profiler record consistently shows numerous reflectors, which are undulating and

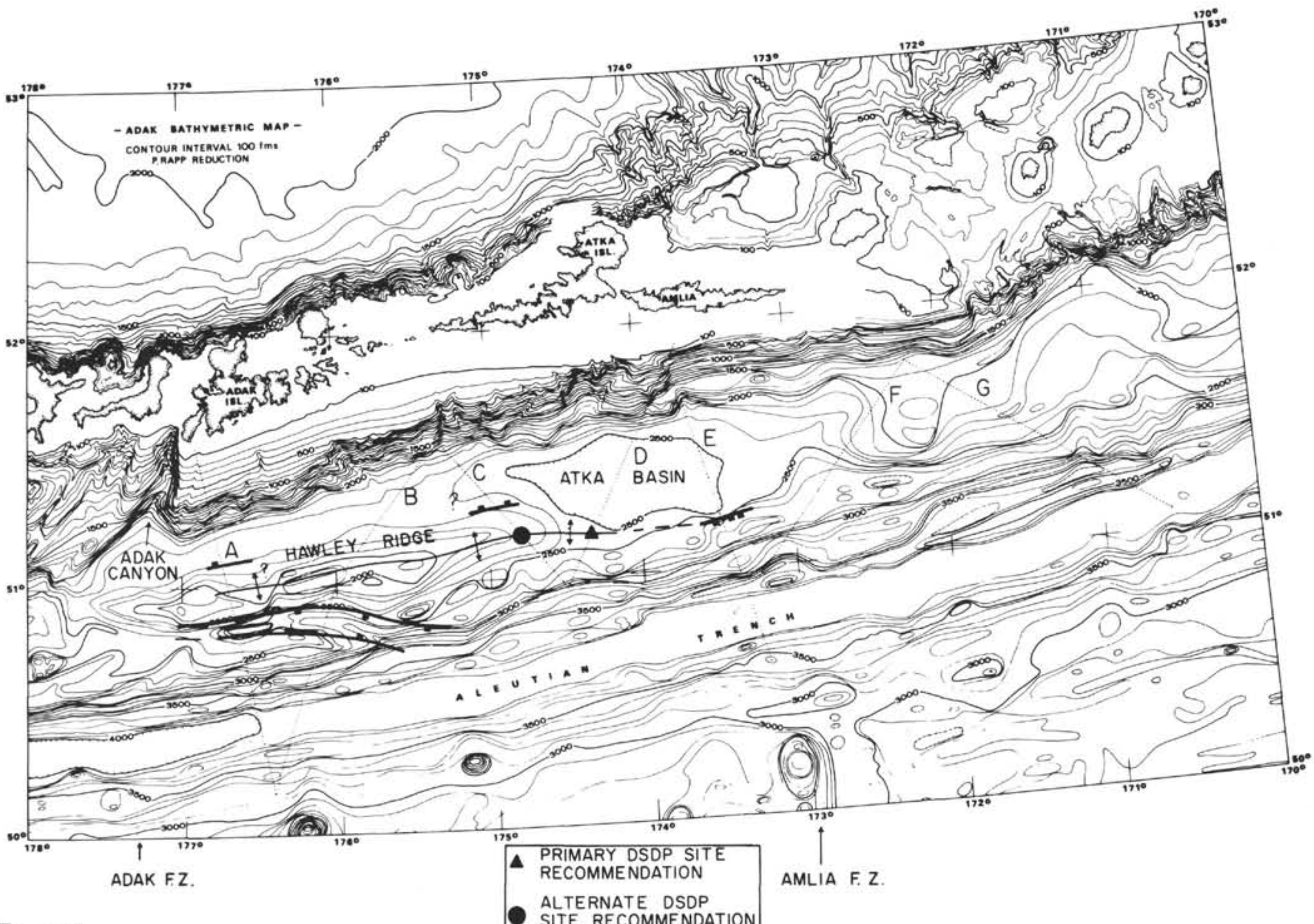

Figure 7.

confused in appearance and untraceable over long distances. The quantity and character of these upper reflectors, their flow around rather than over basement hills, their unconformable relationship to each other and the basement, and the flat floor of the basin, all indicate turbidity current deposition. Owing to the location of the basin between a mountainous land mass on the west and a submarine ridge on the east and south, it was not surprising to find such a thick deposition of turbidites. Underlying this zone of reflectors is transparent material which is present whenever basement can be identified. The thickness of the transparent material is directly related to the basement topography, thinning to 0.05 sec over basement rises and thickening to 0.50 sec in the troughs. Maximum penetration to basement is 1.50 sec (1505 hours on 1 August on Profile 19) and in many places it appears at 1.25 sec but over most of the area the basement appears to be deeper and is not seen.

The piston core (44P) taken in the area at 56°32.0'N, 168°09.0'E yielded 916 cm of a gray green silty clay, while the trip gravity core (44PG) recovered 88 cm of the uppermost sediments. The one heat probe station (#7) located at 56°25.8'N, 168°22.9'E, produced a value of 2.64 $\times 10^{-6}$ cal/cm^{2}sec (see also Chapter 17, this volume). The deep-sea camera station produced no usable data.

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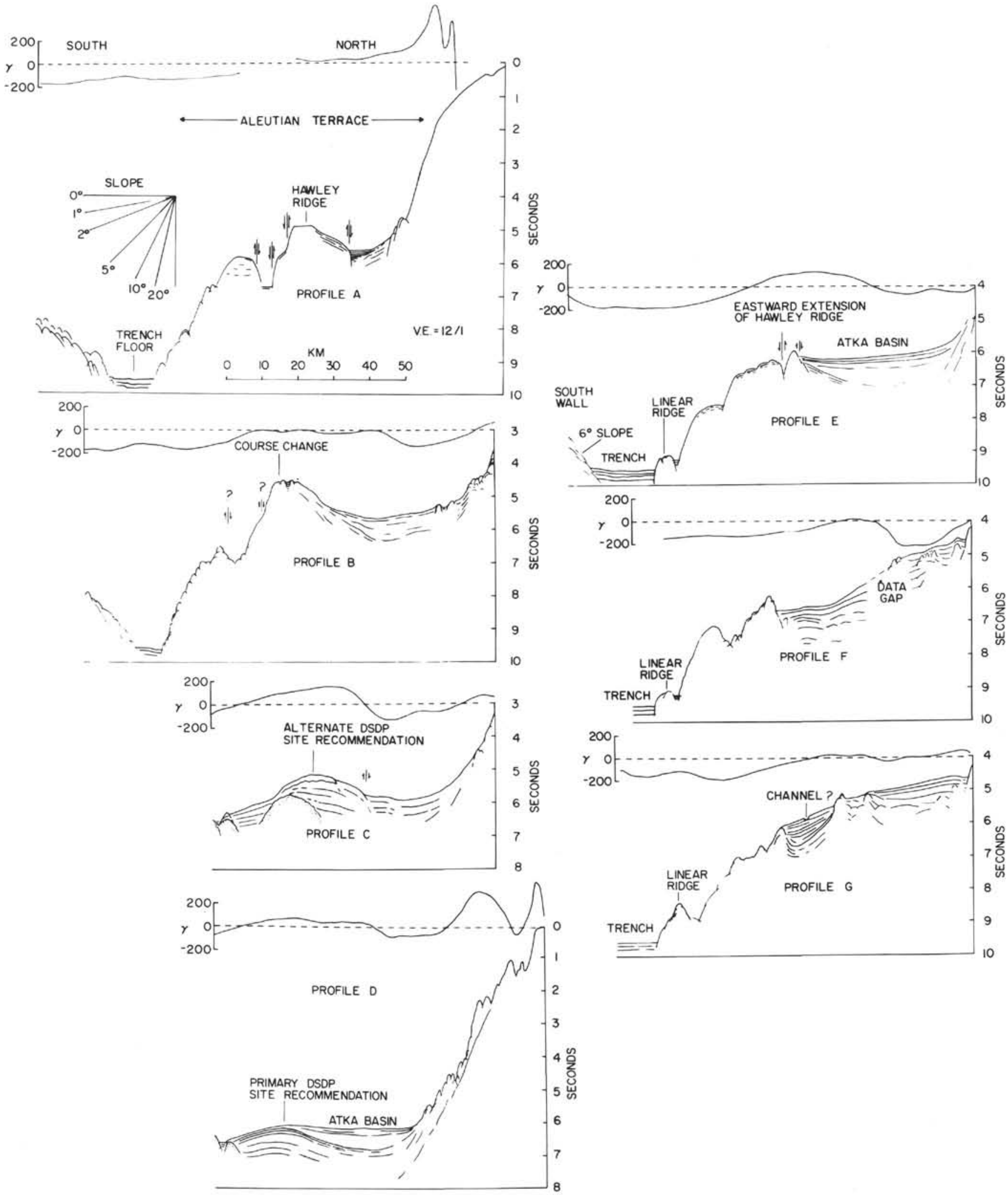

SOUTH
NORTH
ALEUTIAN TERRACE
SLOPE
HAWLEY RIDGE
PROFILE A
TRENCH FLOOR
V.E. = 12/1
KM
SECONDS
COURSE CHANGE
PROFILE B
ALTERNATE DSDP SITE RECOMMENDATION
PROFILE C
PROFILE D
PRIMARY DSDP SITE RECOMMENDATION
ATKA BASIN
EASTWARD EXTENSION OF HAWLEY RIDGE
SOUTH WALL
6° SLOPE
TRENCH
LINEAR RIDGE
PROFILE E
DATA GAP
PROFILE F
CHANNEL ?
PROFILE G

Figure 8.

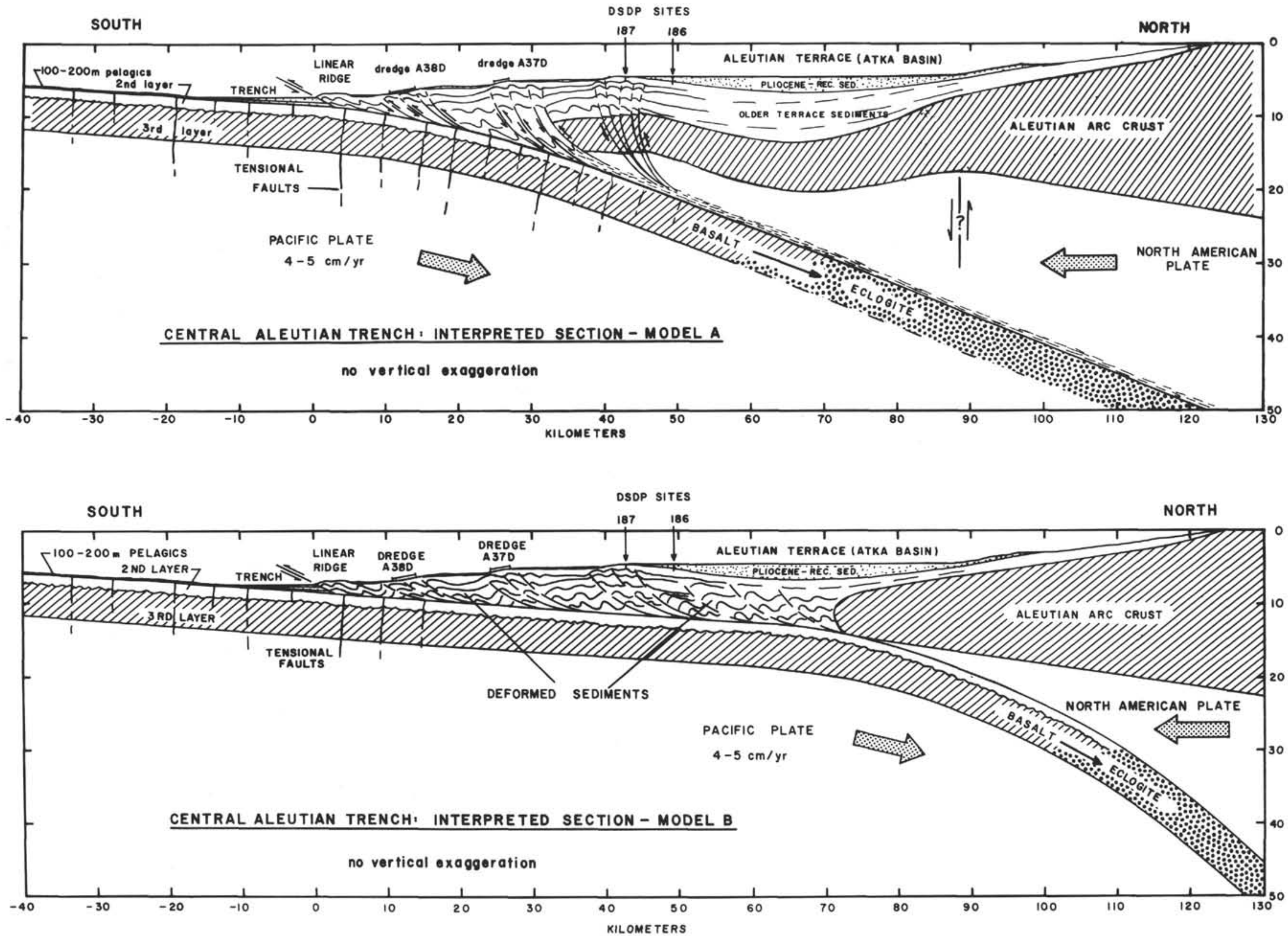
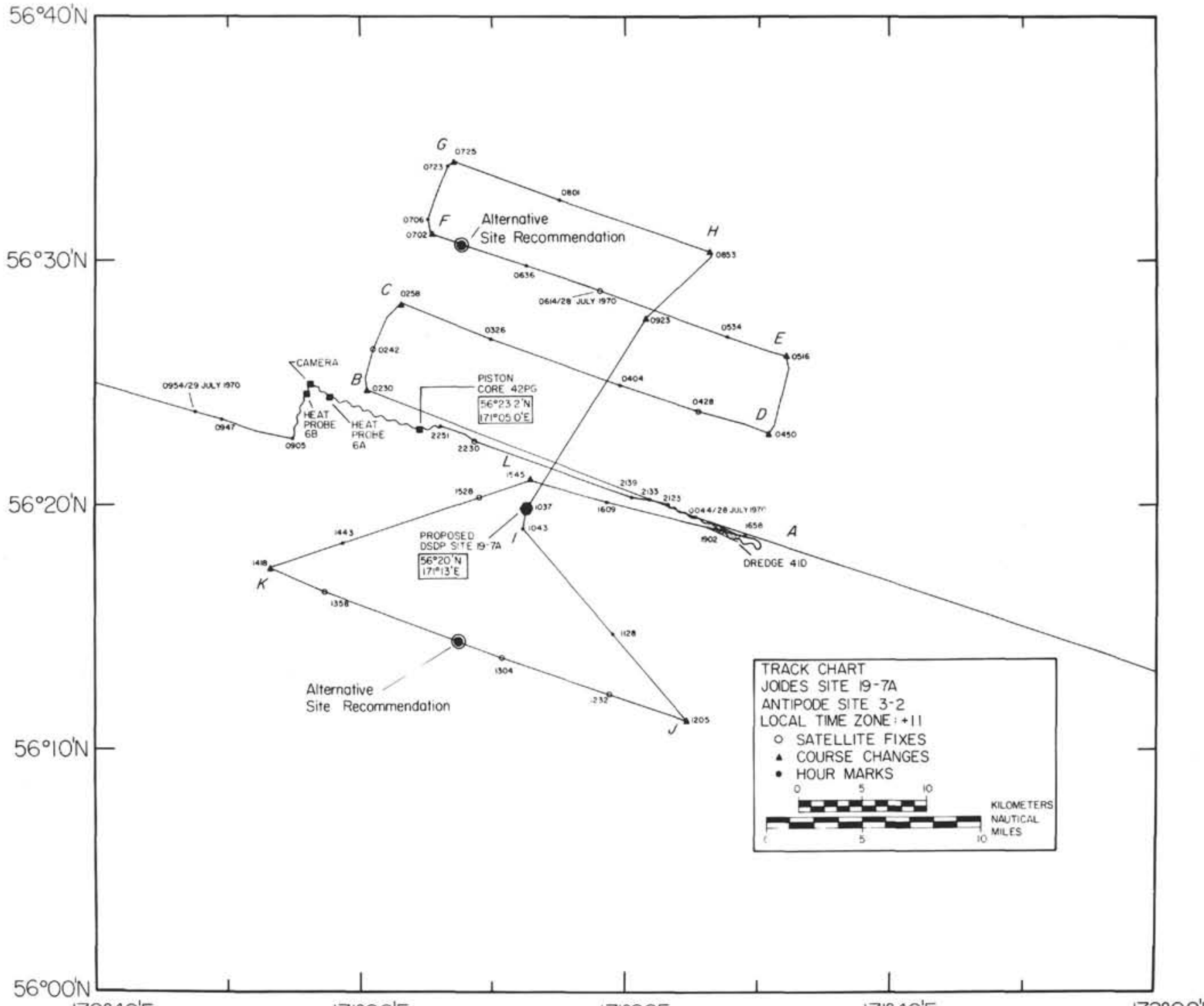


Figure 9. *Interpreted structural sections of trench and terrace. Both Models A and B are compatible with essentially all of the available data. Uncertainty between the two models is due from ambiguity in the depth to the Benioff zone beneath the terrace (from Grow, 1972).*


56°40'N
56°30'N
56°20'N
56°10'N
56°00'N
170°40'E
171°00'E
171°20'E
171°40'E
172°00'E
Alternative Site Recommendation
Alternative Site Recommendation
CAMERA
HEAT PROBE 6B
HEAT PROBE 6A
PISTON CORE 42PG
56°23.2'N
171°05.0'E
PROPOSED DSDP SITE 19-7A
56°20'N
171°13'E
DREDGE 41D
TRACK CHART
JOIDES SITE 19-7A
ANTIPODE SITE 3-2
LOCAL TIME ZONE: +11
SATELLITE FIXES
COURSE CHANGES
HOUR MARKS
KILOMETERS
NAUTICAL MILES
Figure 10.

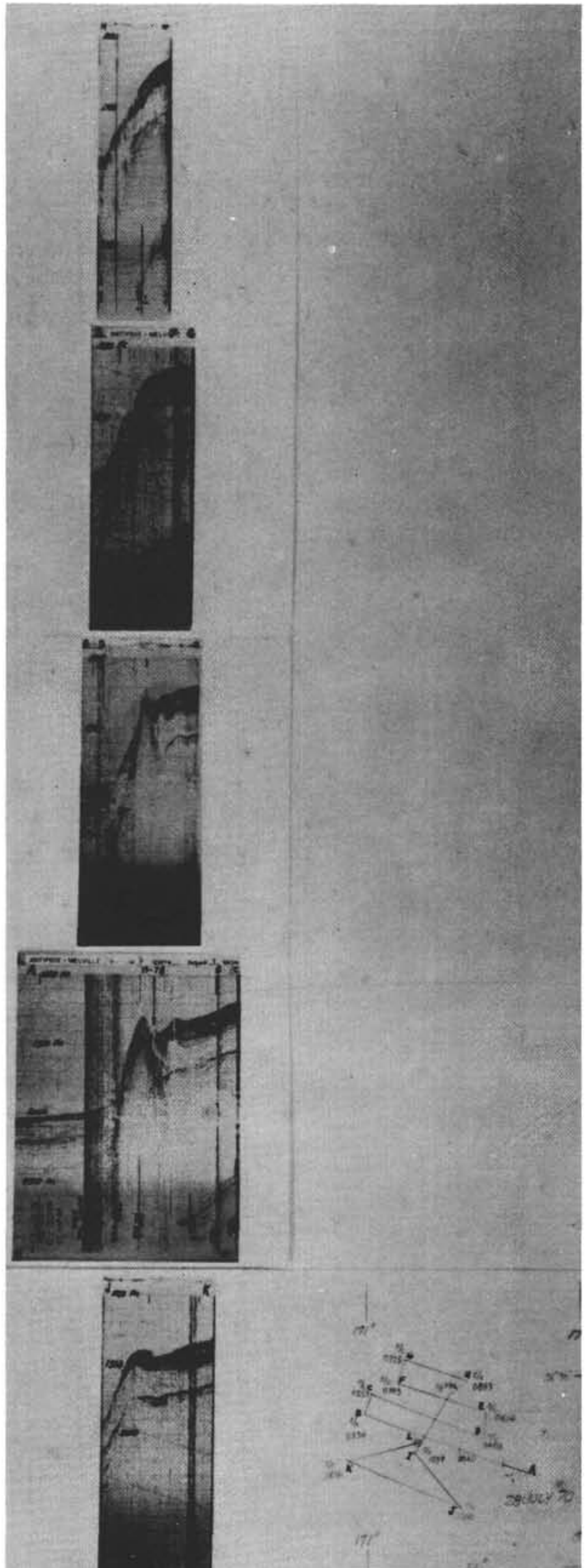


Figure 11.

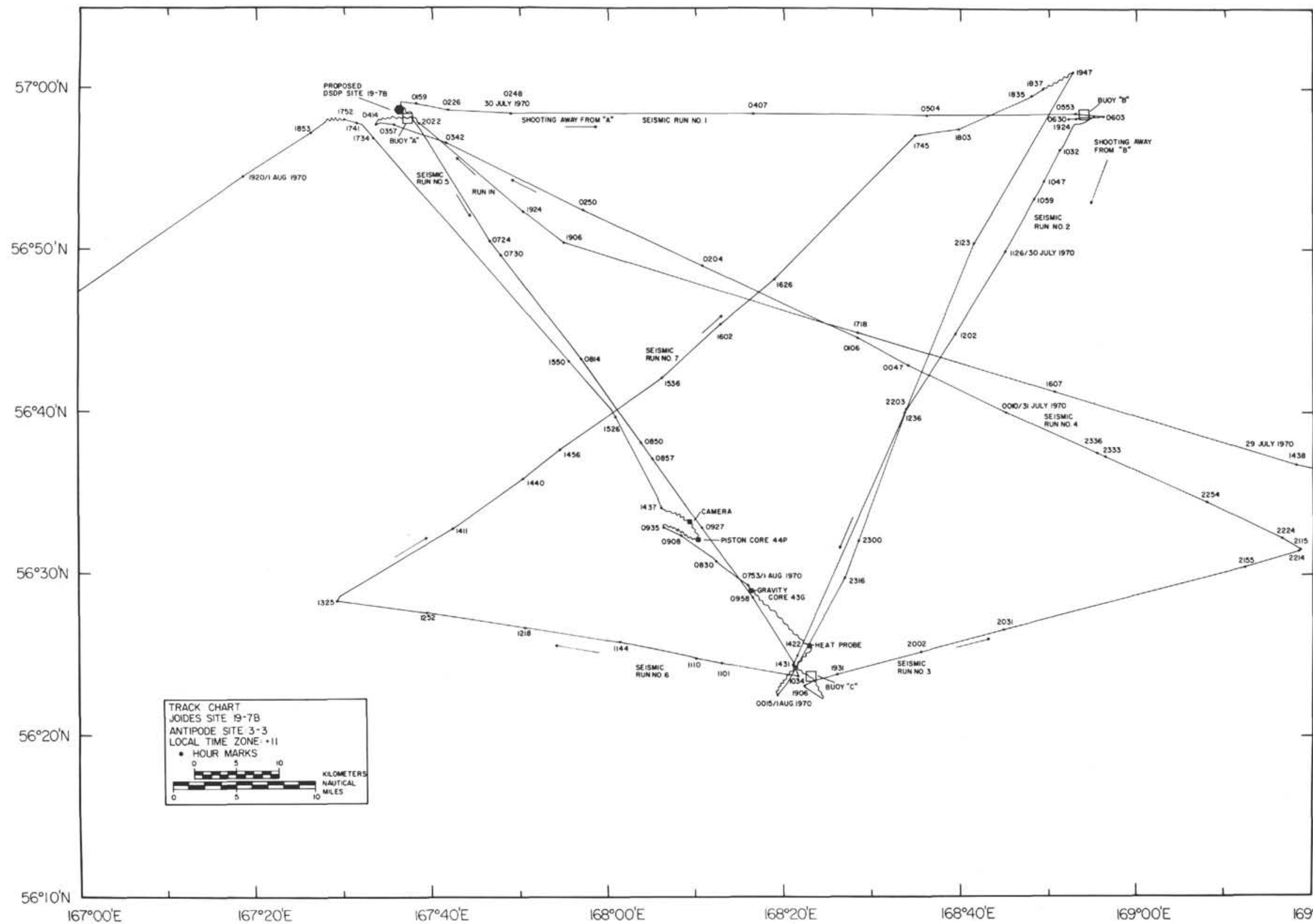
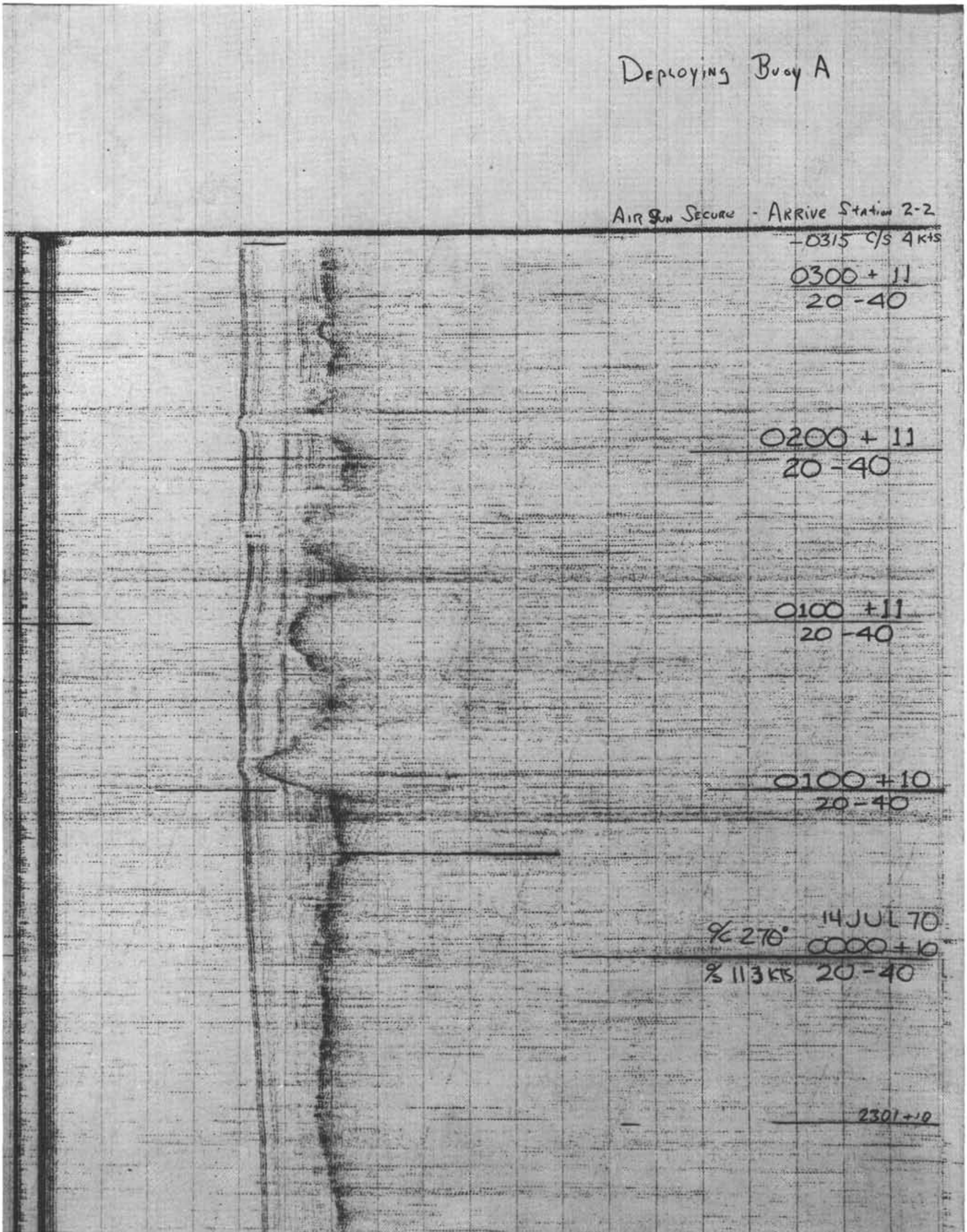
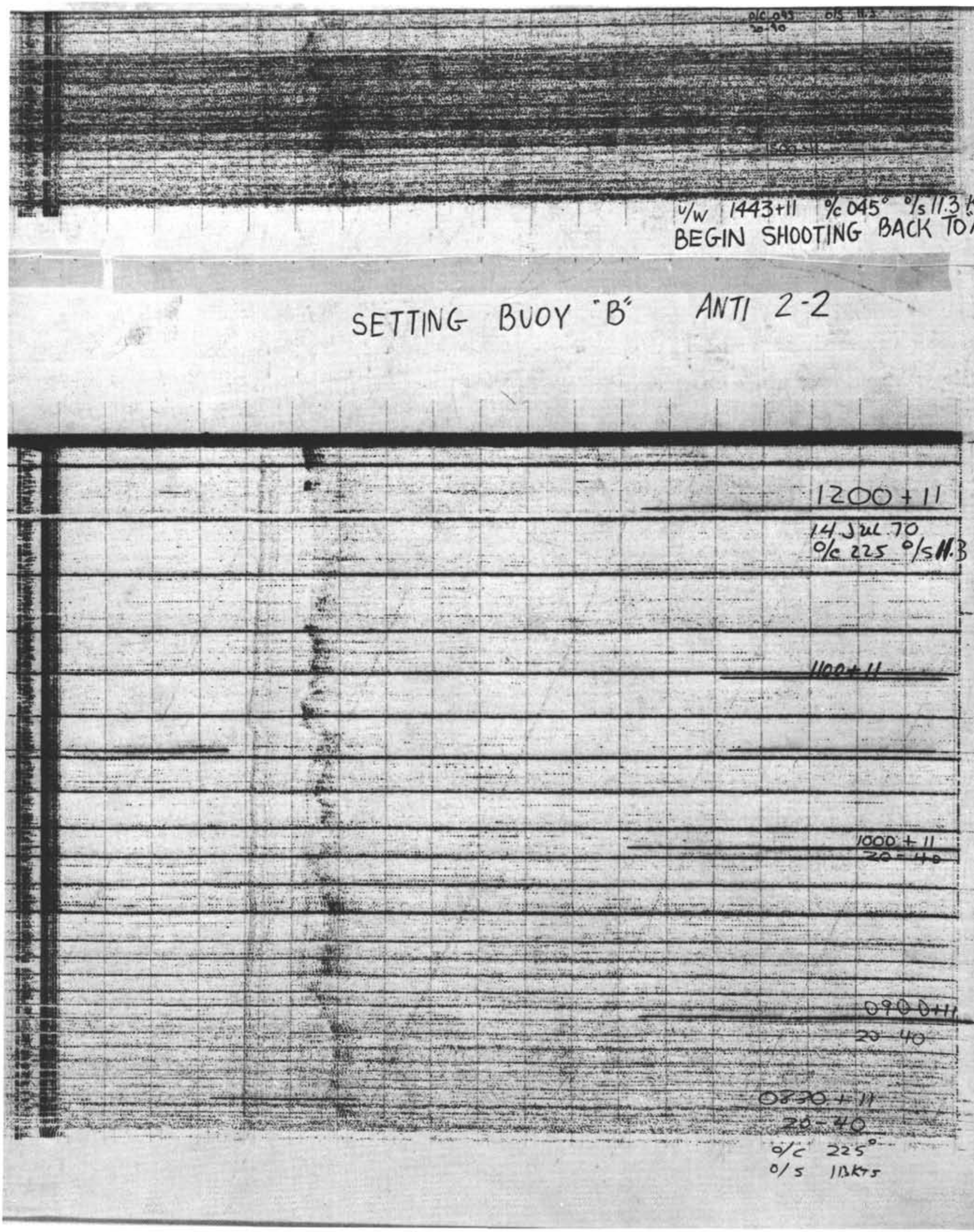

TRACK CHART
JOIDES SITE 19-7B
ANTIPODE SITE 3-3
LOCAL TIME ZONE +11
• HOUR MARKS
KILOMETERS
NAUTICAL MILES
PROPOSED DSDP SITE 19-7B
BUOY "A"
BUOY "B"
BUOY "C"
30 JULY 1970
SHOOTING AWAY FROM "A"
SEISMIC RUN NO. 1
SHOOTING AWAY FROM "B"
SEISMIC RUN NO. 2
1126/30 JULY 1970
SEISMIC RUN NO. 3
SEISMIC RUN NO. 4
0010/31 JULY 1970
29 JULY 1970
SEISMIC RUN NO. 5
RUN IN
SEISMIC RUN NO. 6
SEISMIC RUN NO. 7
1920/1 AUG 1970
0753/1 AUG 1970
0015/1 AUG 1970
CAMERA
PISTON CORE 44P
GRAVITY CORE 43G
HEAT PROBE
57°00'N
56°50'N
56°40'N
56°30'N
56°20'N
56°10'N
167°00'E
167°20'E
167°40'E
168°00'E
168°20'E
168°40'E
169°00'E
169°20'E

Figure 12.


Deploying Buoy A
Air Gun Secure - Arrive Station 2-2
-0315 C/S 4 Kts
0300 + 11
20 -40
0200 + 11
20 - 40
0100 + 11
20 - 40
0100 + 10
20 - 40
14 JUL 70
% 270°
0000 + 10
% 11 3 KTS
20 - 40
2301 + 10

Profile 1.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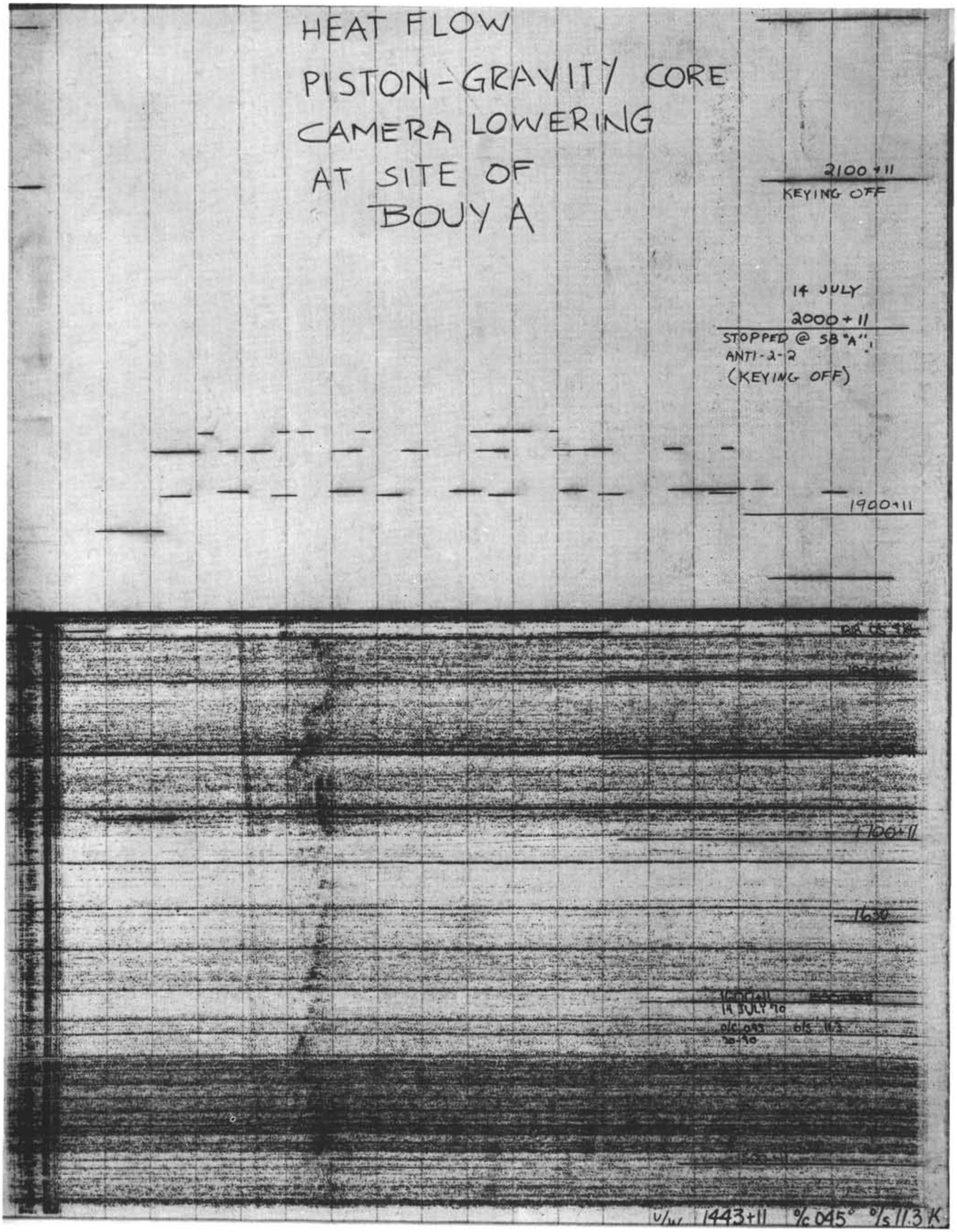
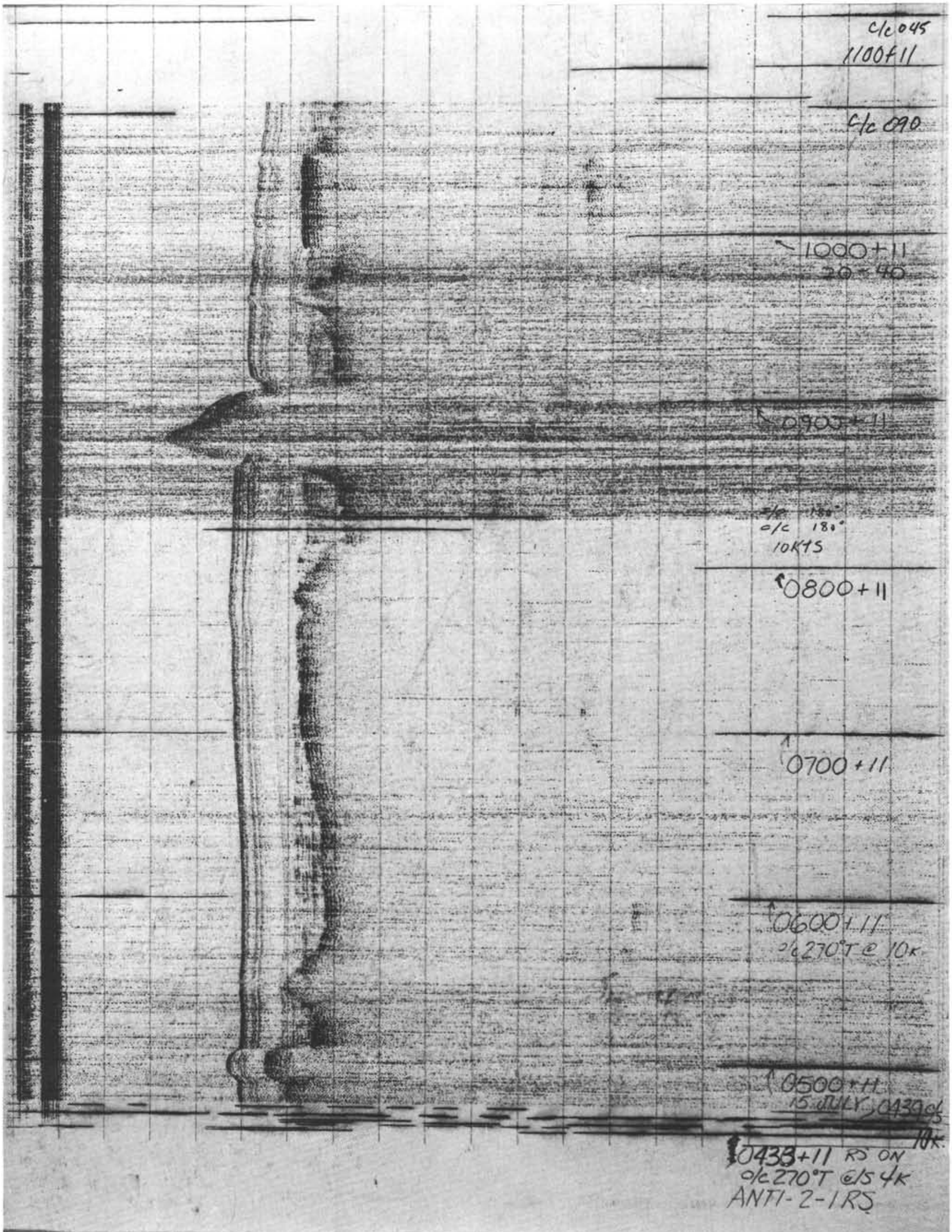
SETTING BUOY "B" ANTI 2-2
1200 + 11
14 JUL 70
1100+11
1000 + 11

Profile 2.


HEAT FLOW
PISTON-GRAVITY CORE
CAMERA LOWERING
AT SITE OF
BOUY A
2100+11
KEYING OFF
14 JULY
2000+11
STOPPED @ SB "A",
ANTI-2-2
(KEYING OFF)
1900+11
1700+11
1630
14 JULY '70
U/W 1443+11 °/c 045° °/s 11.3 K

Profile 3.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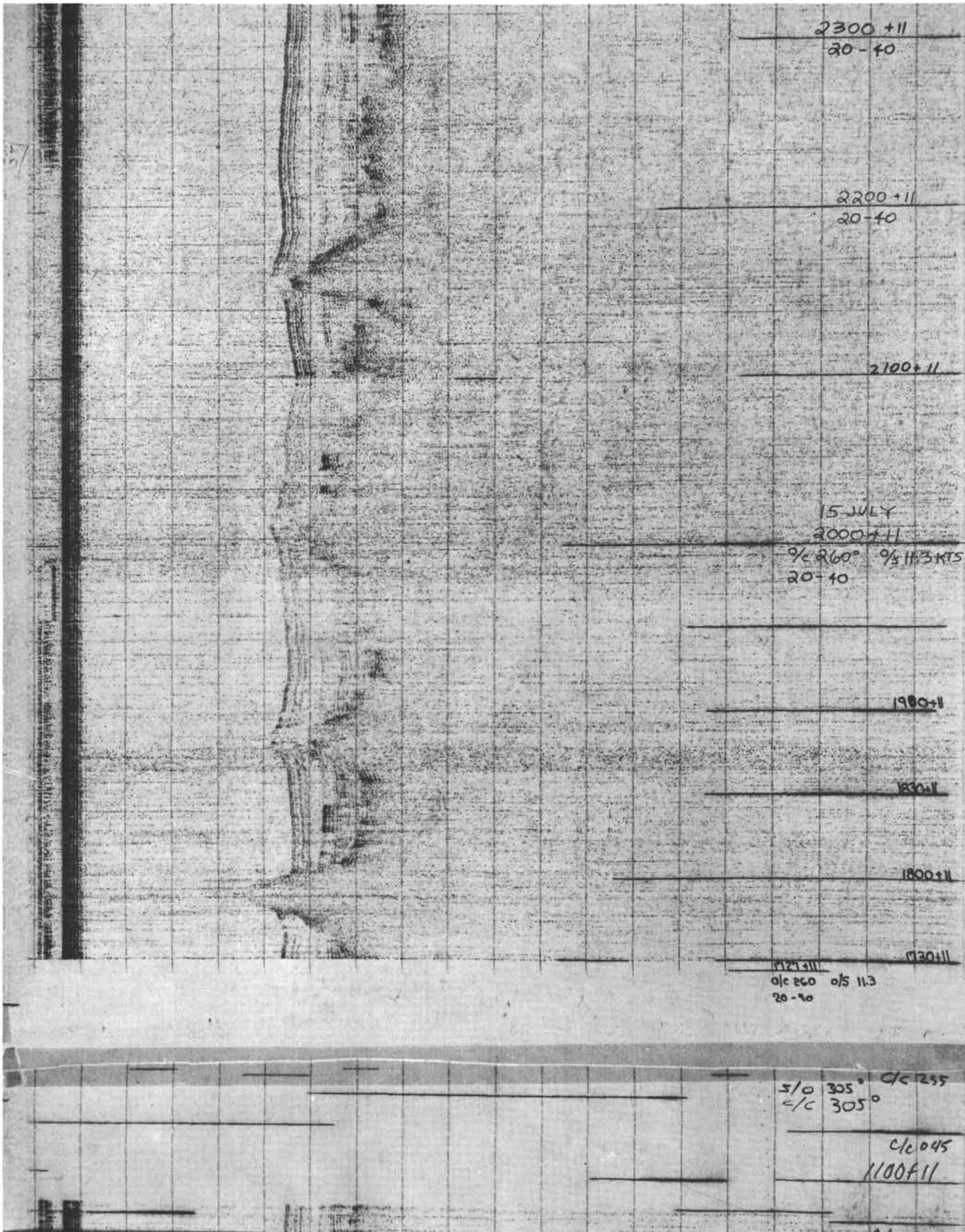
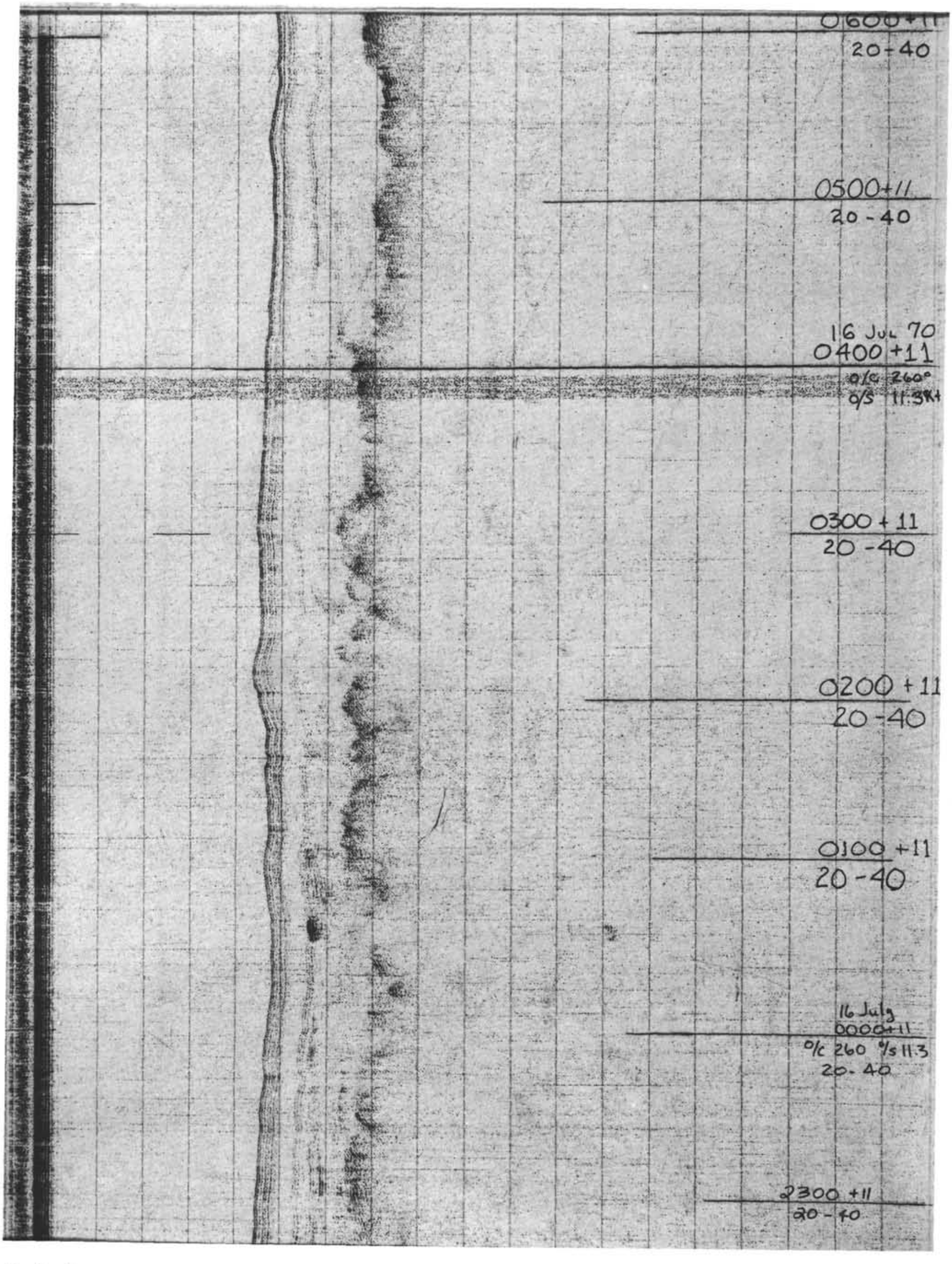
1000+11
0800+11
0700+11
0600+11
0500+11
0433+11 RS ON
ANTI-2-1 RS

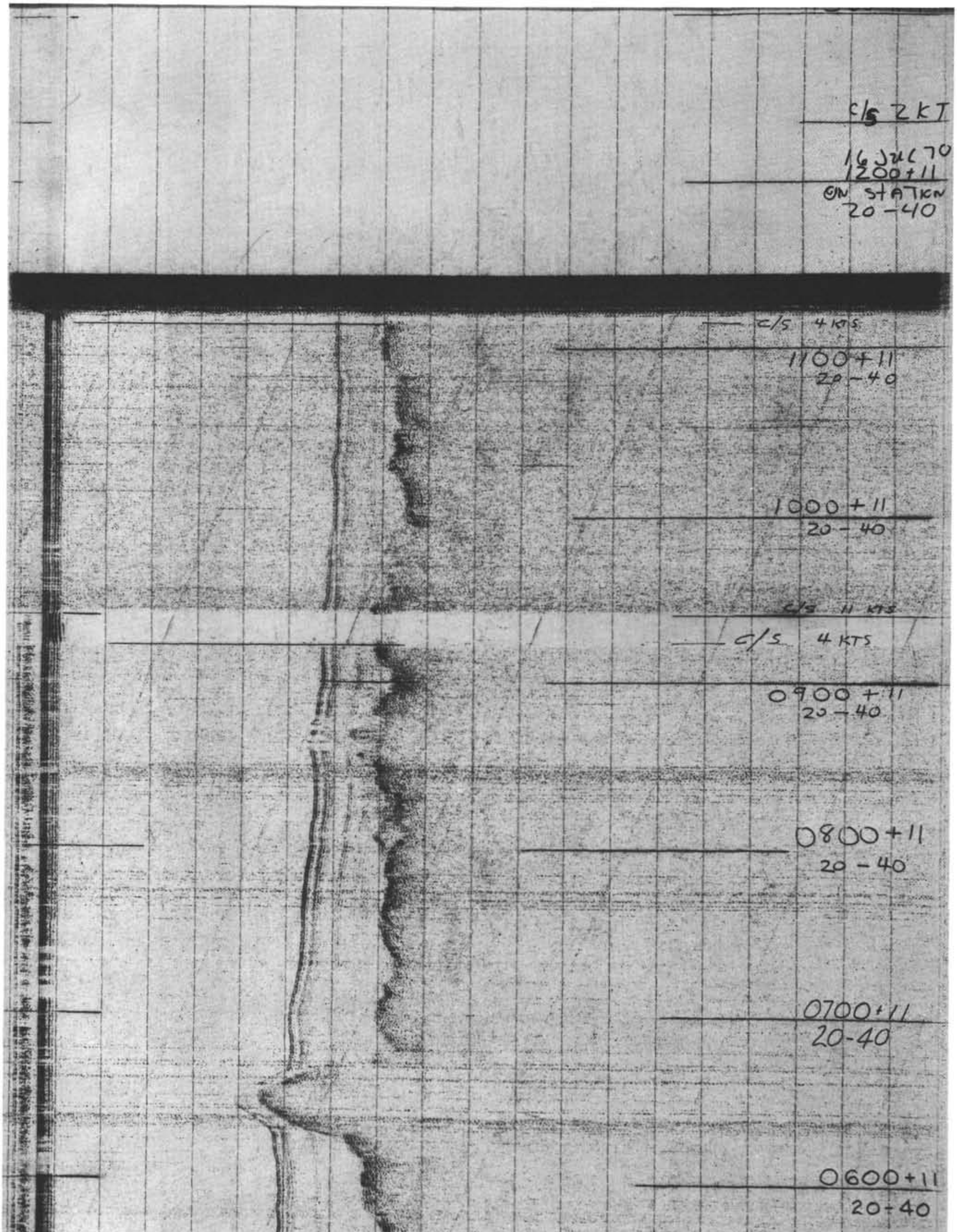
Profile 4.


2300 +11
20 - 40
2200 +11
20-40
2100+ 11
15 JULY
2000+11
20-40
1900+11
1830+11
1800+11
1730+11
0/c 260 0/s 11.3
20 - 40
S/o 305°
C/c 305°
C/c 255
C/c 045
1100+11

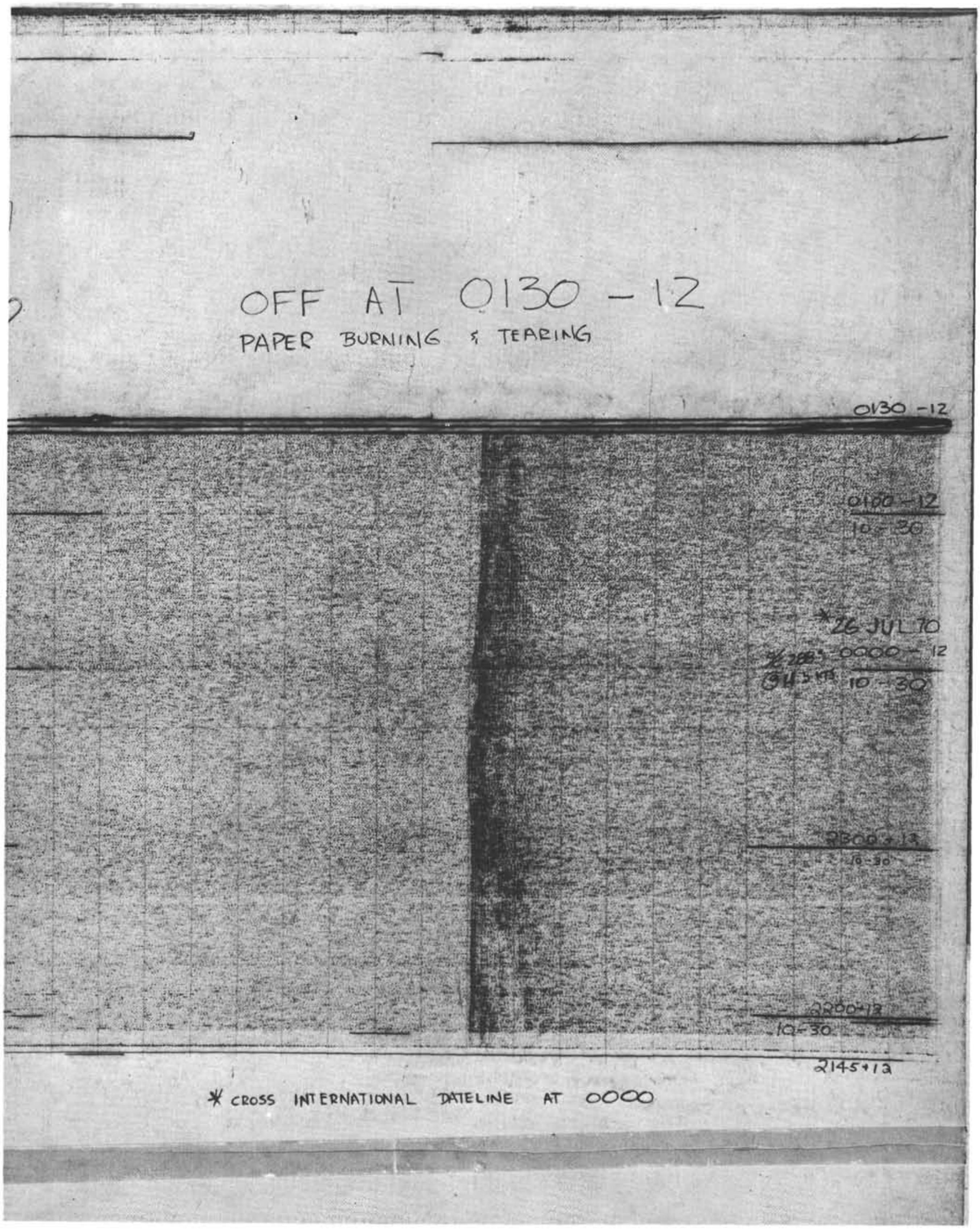
Profile 5.


0600+11
20-40
0500+11
20-40
16 JUL 70
0400+11
0/c 260°
0/s 11.3K+
0300+11
20-40
0200+11
20-40
0100+11
20-40
16 July
0000+11
0/c 260 0/s 11.3
20-40
2300+11
20-40

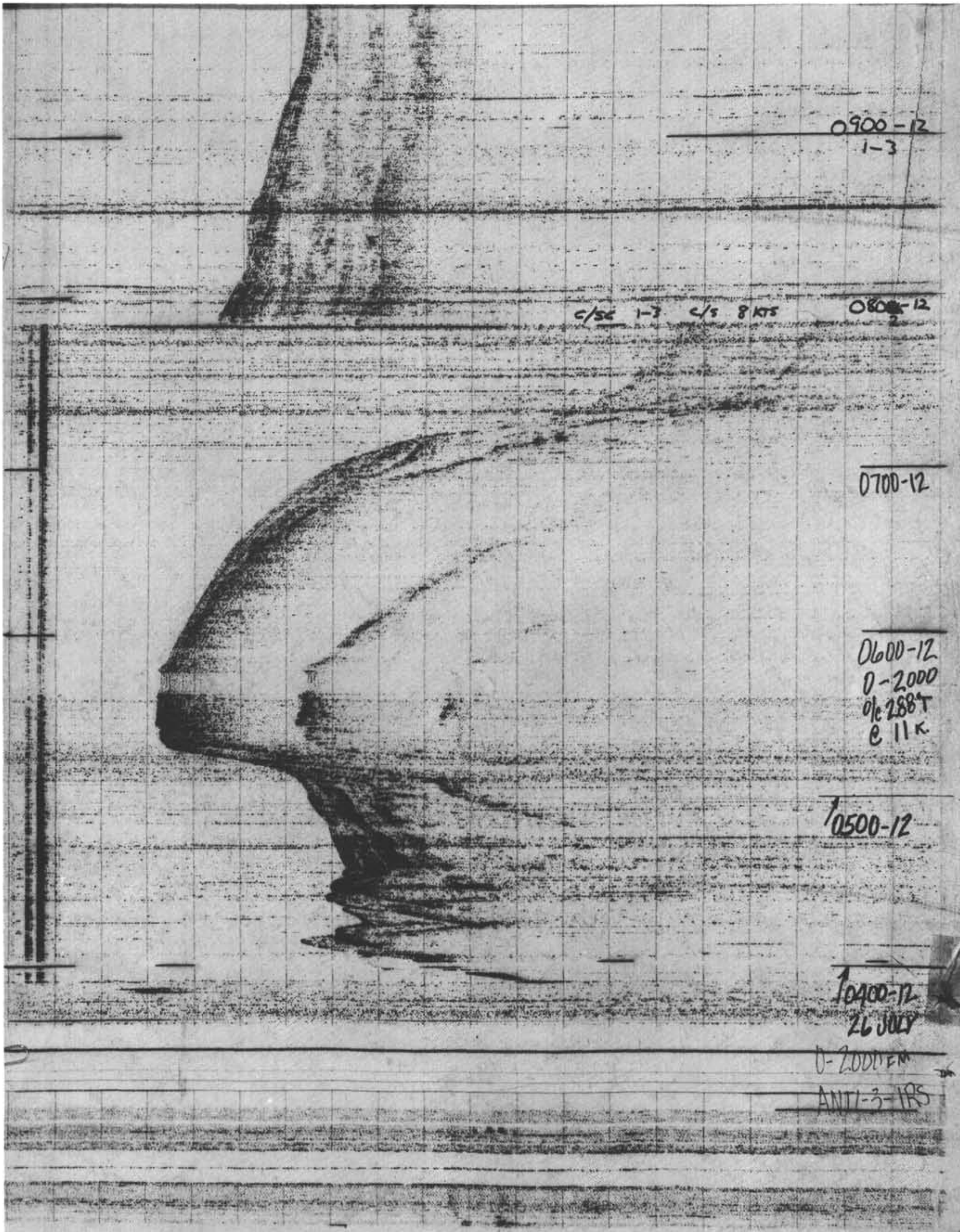
Profile 6.


C/S 2 KT
16 JUL 70
1200+11
ON STATION
20-40
C/S 4 KTS
1100+11
20-40
1000+11
20-40
C/S 11 KTS
C/S 4 KTS
0900+11
20-40
0800+11
20-40
0700+11
20-40
0600+11
20-40

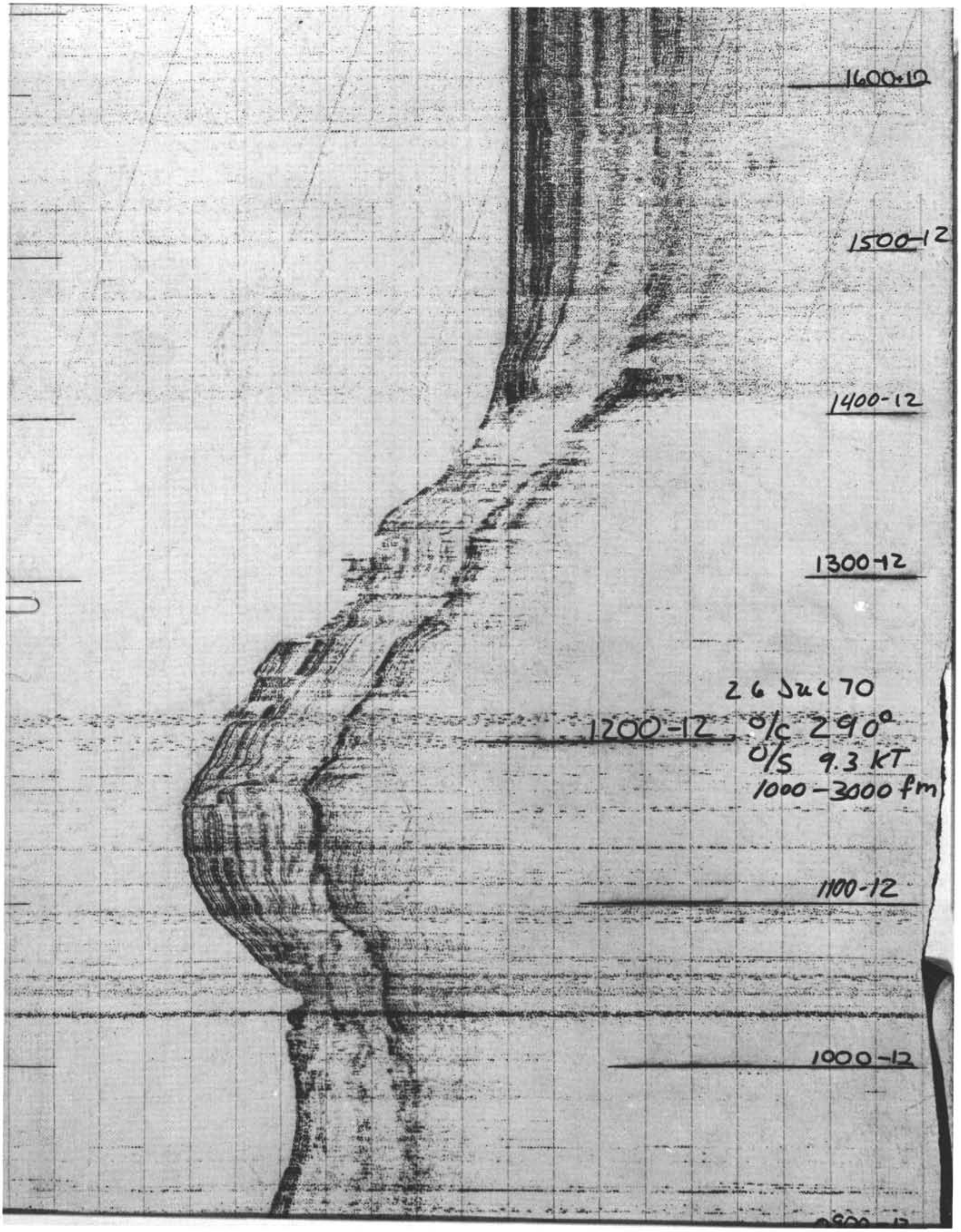
Profile 7.


OFF AT 0130 - 12
PAPER BURNING & TEARING
0130 -12
0100 - 12
10 - 30
*26 JUL 70
0000 - 12
10 - 30
2200+13
10-30
2145+13
* CROSS INTERNATIONAL DATELINE AT 0000

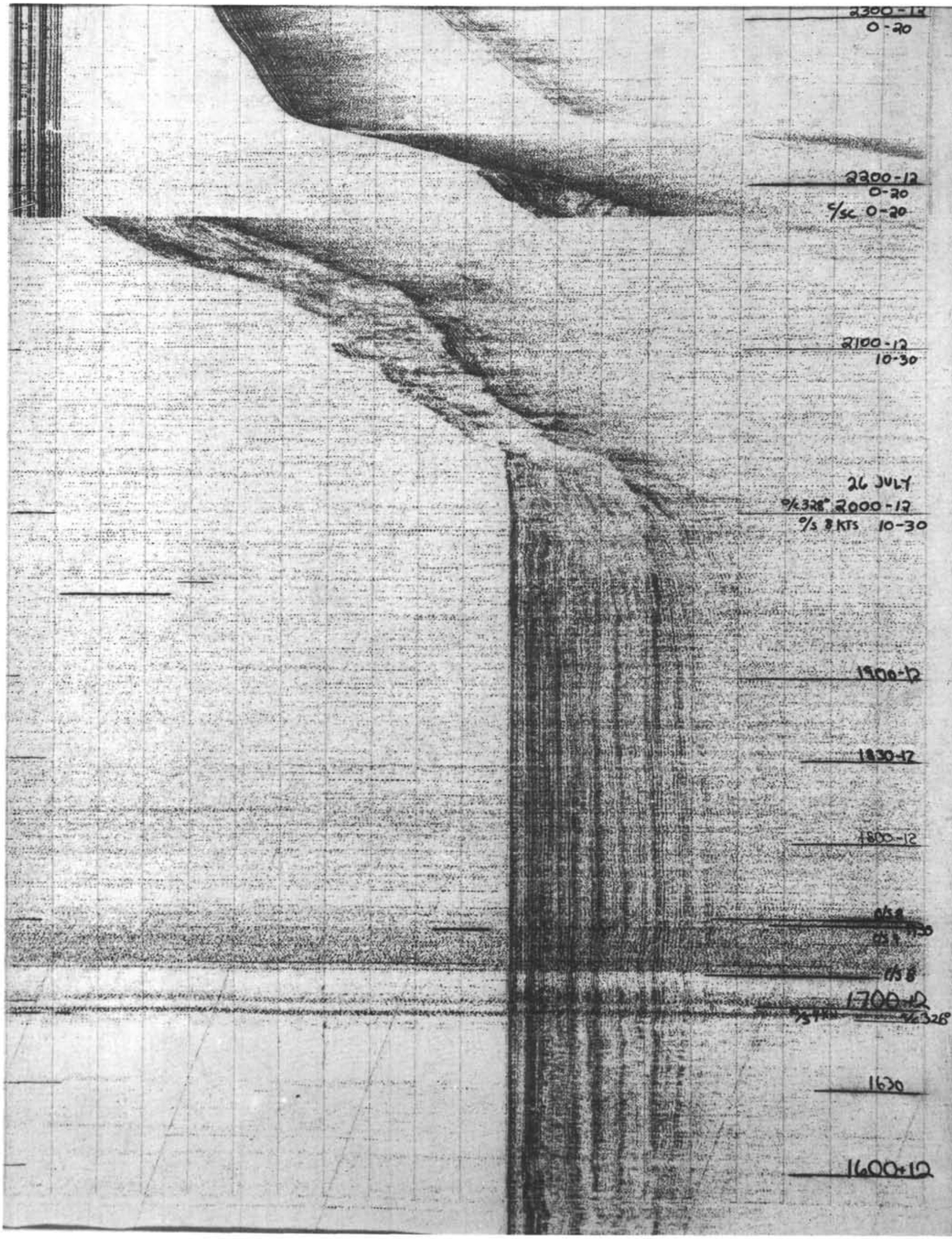
Profile 8.


0900-12
1-3
8 KTS
0700-12
0600-12
0-2000
@ 11 K.
0500-12
0400-12
26 JULY

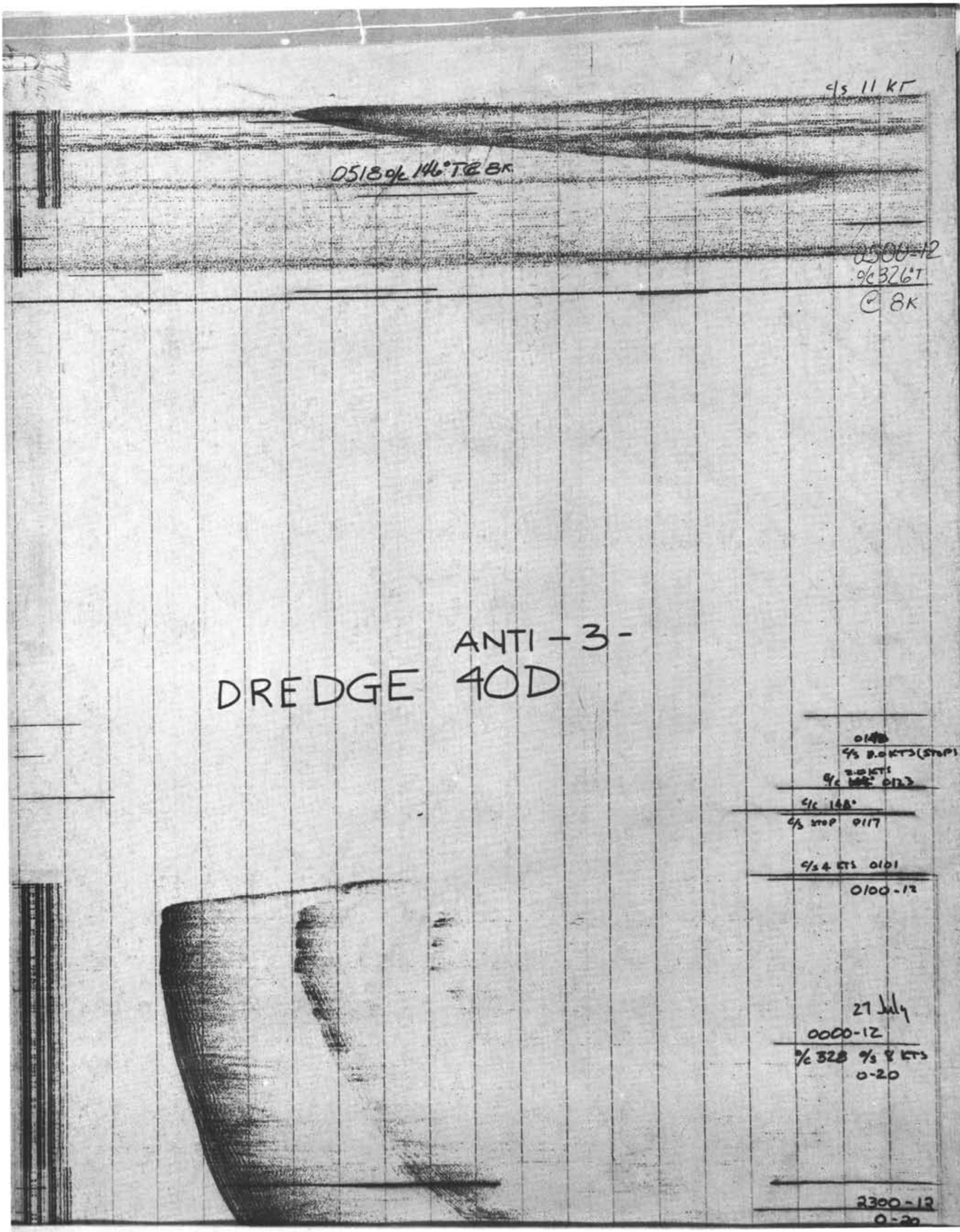
Profile 9.


1600-12
1500-12
1400-12
1300-12
26 JUL 70
1200-12
O/C 290°
O/S 9.3 KT
1000–3000 fm
1100-12
1000-12

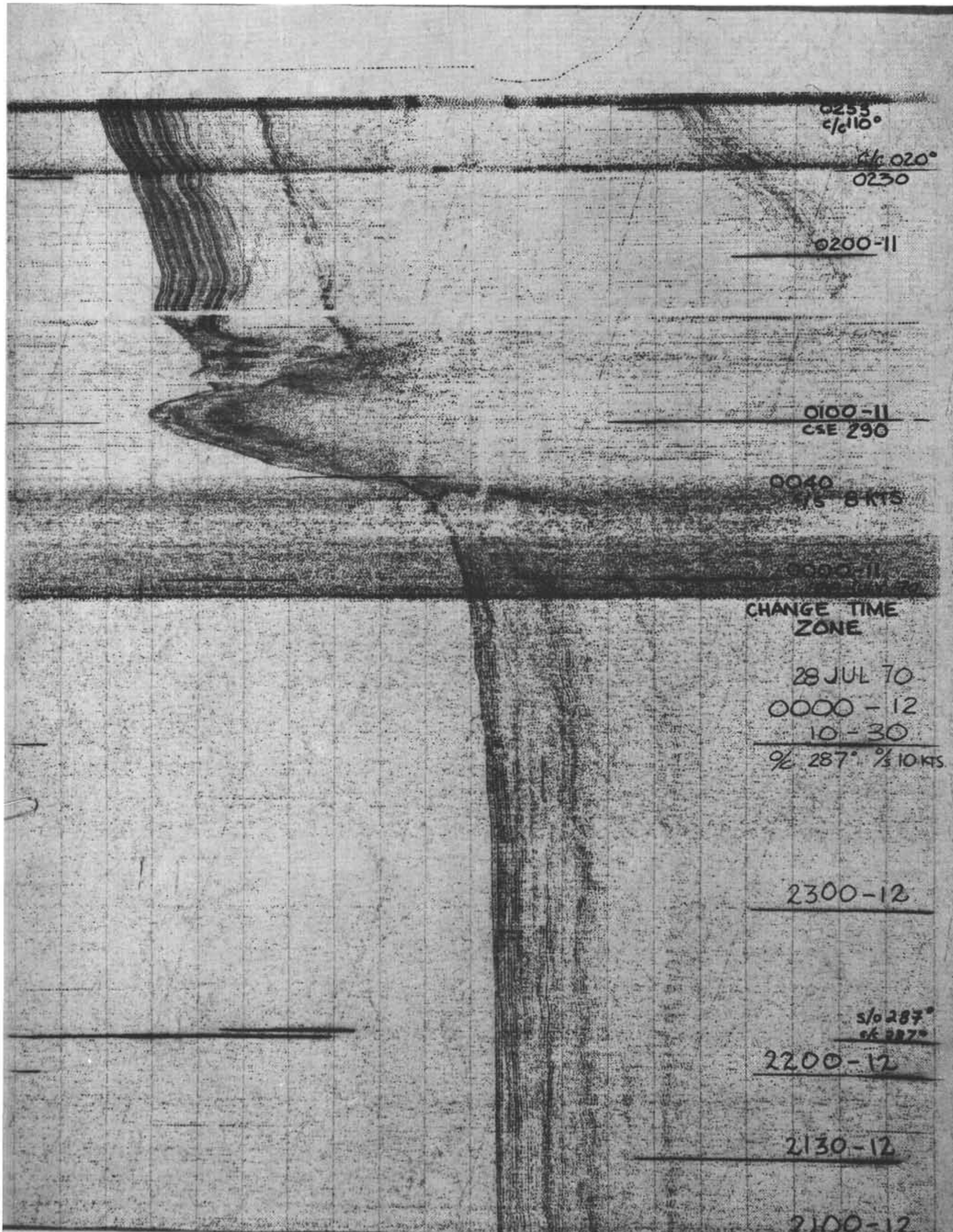
Profile 10.


2200-12
0-20
2100-12
10-30
26 JULY
2000-12
10-30
1900-12
1830-12
1800-12
1630
1600-12

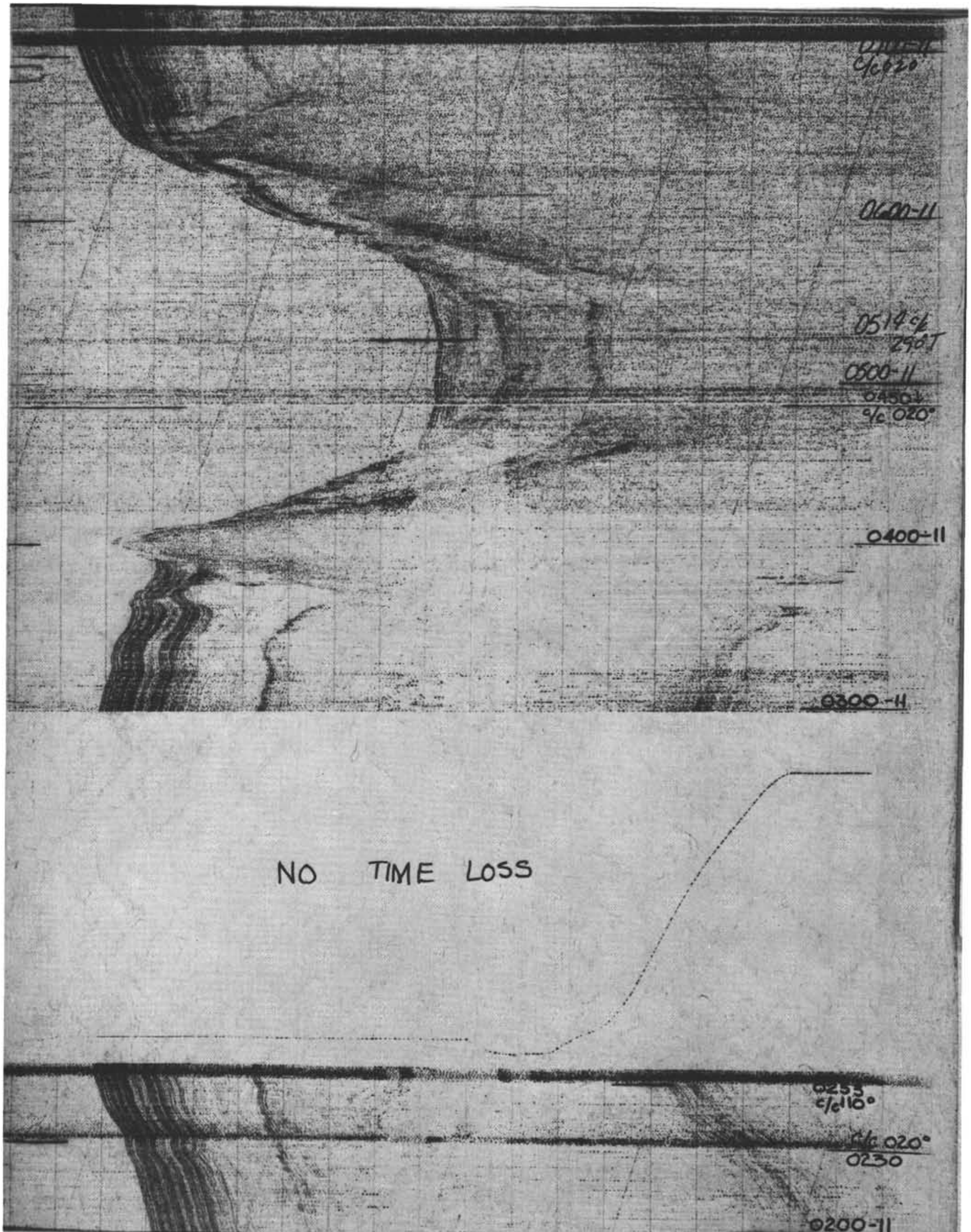
Profile 11.


c/s 11 KT
0518 c/c 146°T @ 8K
2300-12
c/c 326°T
@ 8K
ANTI-3-
DREDGE 40D
c/s STOP 0117
c/s 4 KTS 0101
0100-12
27 July
0000-12
c/c 328 c/s 8 KTS
0-20
2300-12
0-20

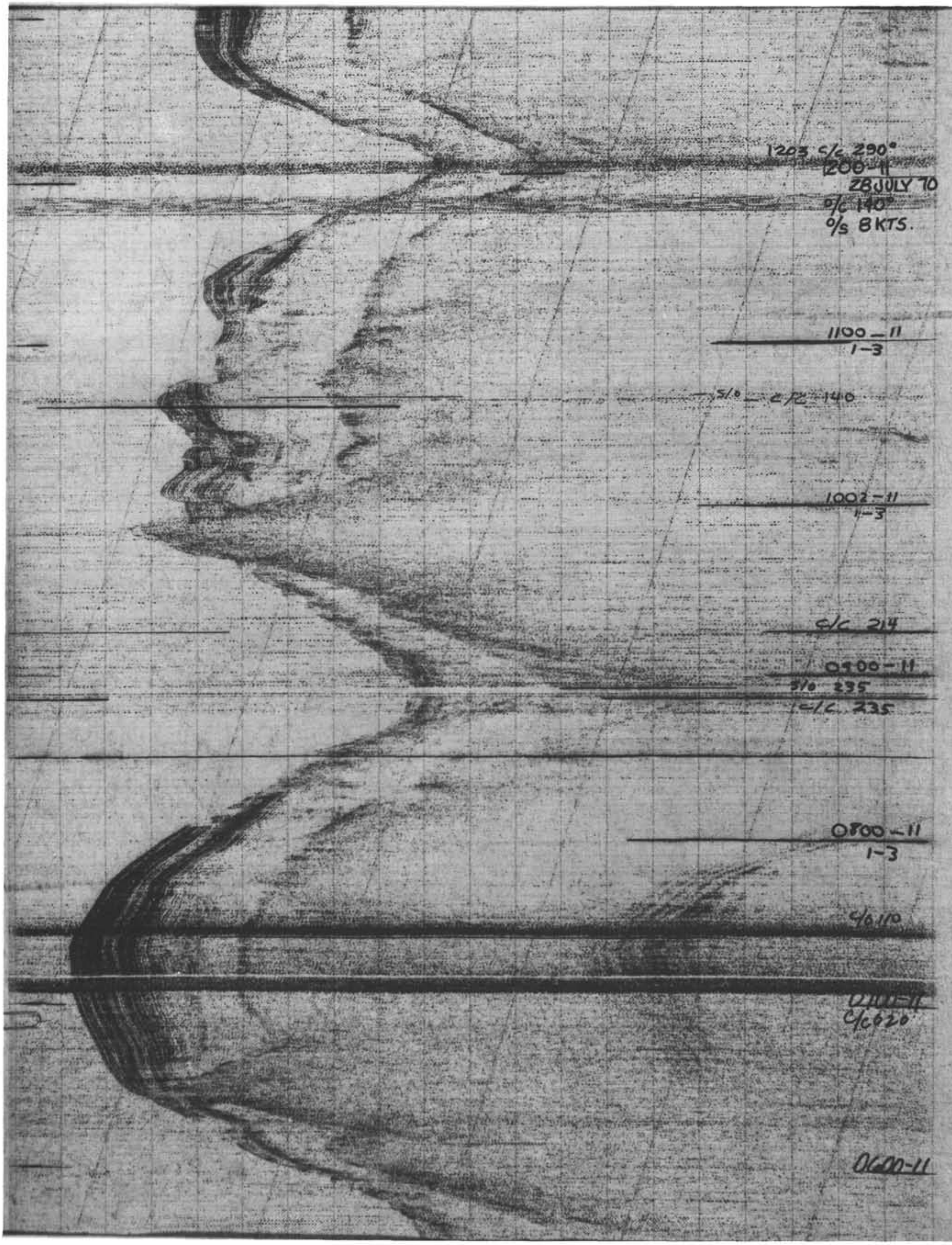
Profile 12.


0230
0200-11
0100-11
CSE 290
0040
CHANGE TIME
ZONE
28 JUL 70
0000 - 12
10 - 30
2300-12
2200-12
2130-12
2100-12

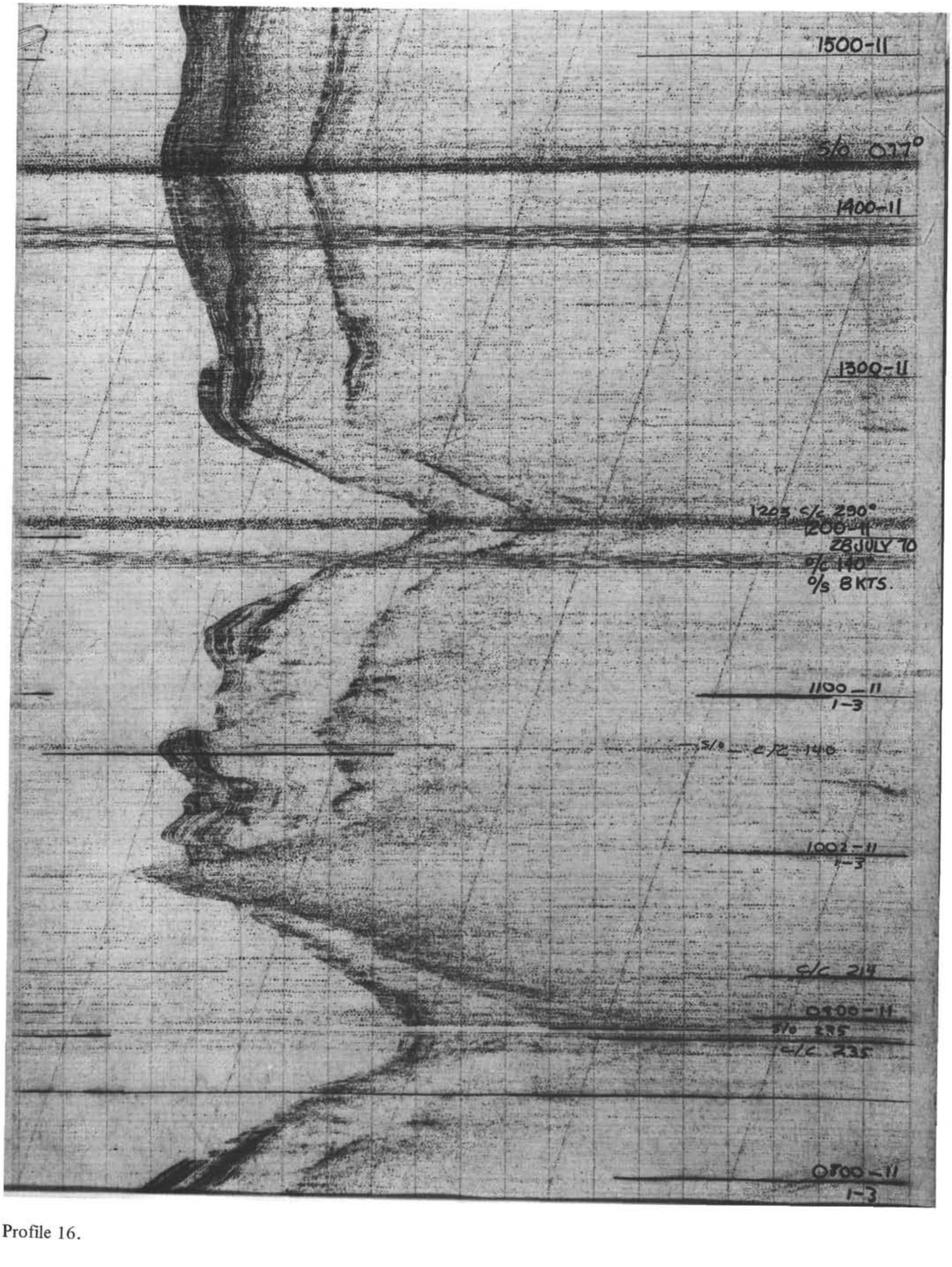
Profile 13.


0600-11
0514 c/c 290T
0500-11
0450 c/c 020°
0400-11
0300-11
NO TIME LOSS
0253 c/c 110°
c/c 020°
0230
0200-11

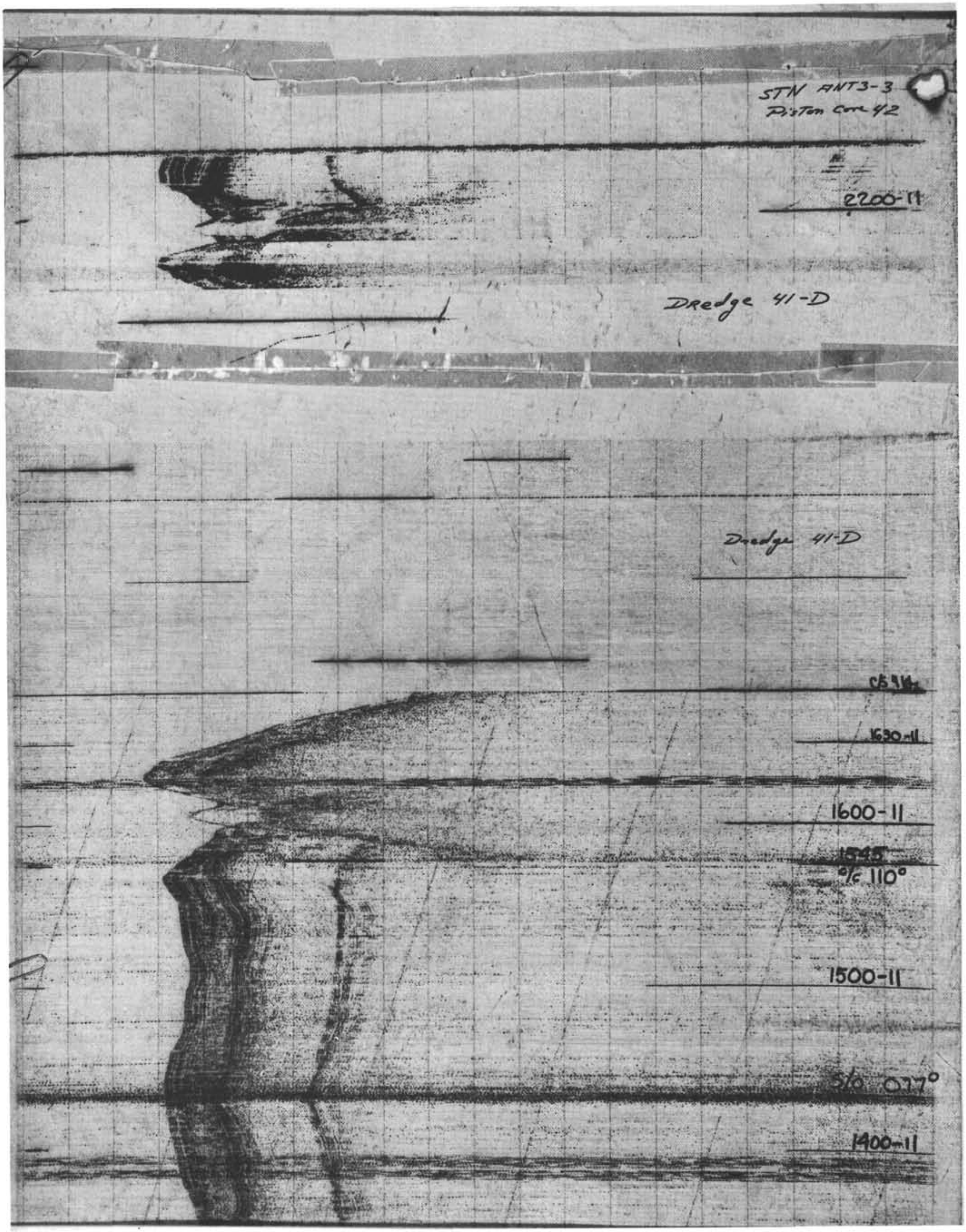
Profile 14.


1200-11
28 JULY 70
o/s 8 KTS.
1100-11
1-3
1002-11
1-3
0900-11
0800-11
1-3
0600-11

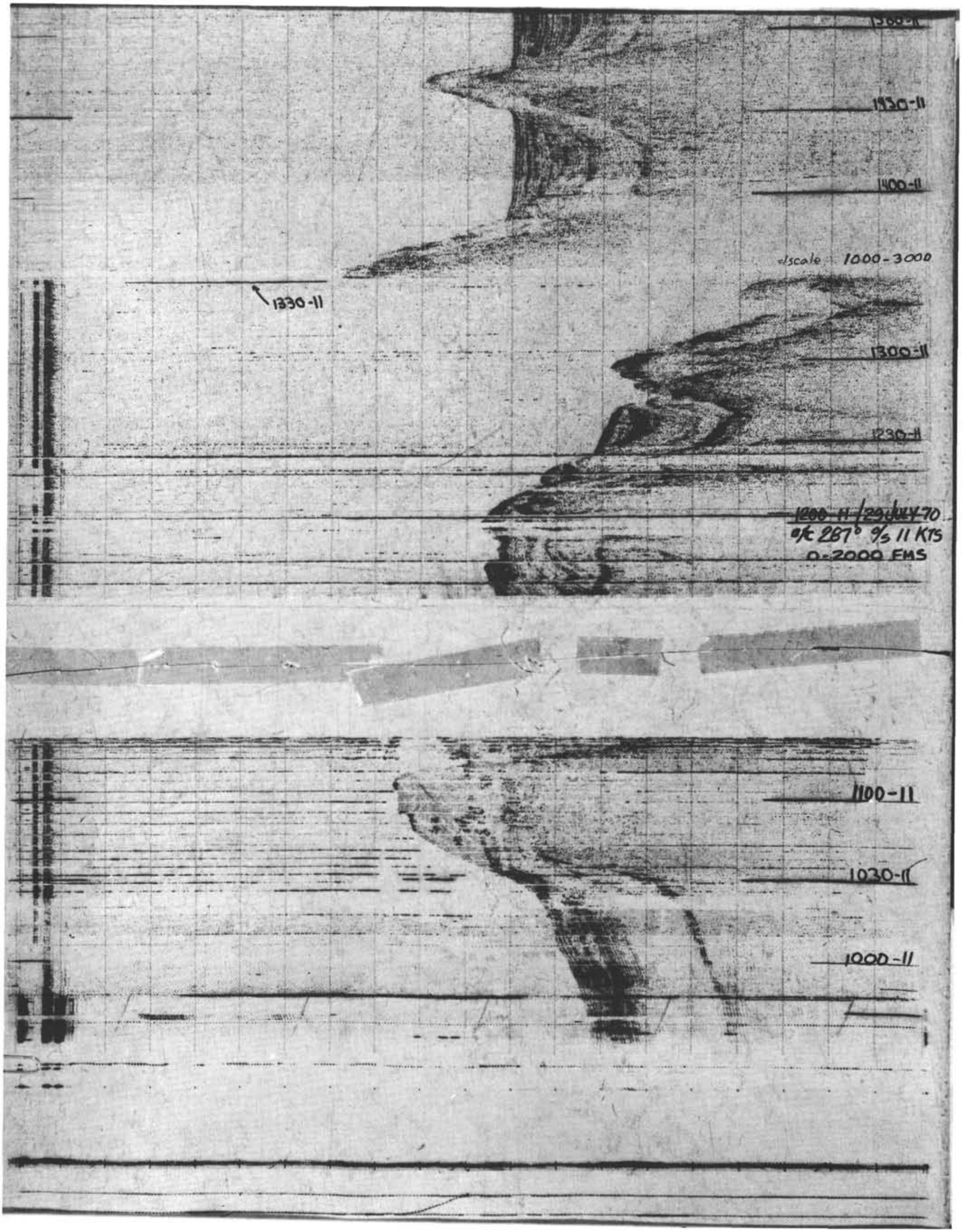
Profile 15.


1500-11
S/0 077°
1400-11
1300-11
1203 C/C 290°
1200-11
28 JULY 70
C/C 140°
C/S 8 KTS.
1100-11
1-3
1002-11
1-3
C/C 214
0900-11
S/O 235
C/C 235
0800-11
1-3

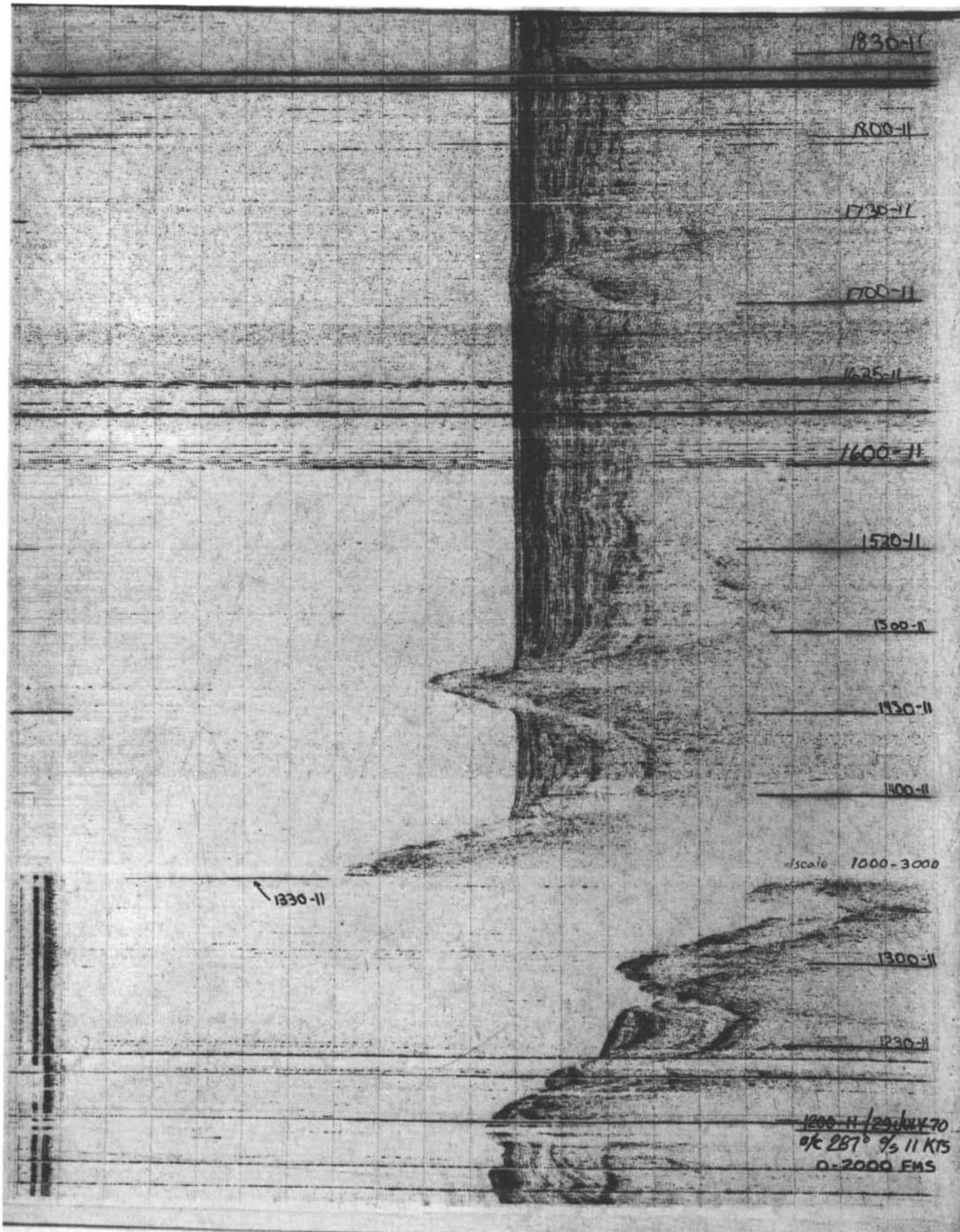
Profile 16.


STN ANT3-3
Piston Core 42
2200-11
Dredge 41-D
Dredge 41-D
1630-11
1600-11
1545
c/c 110°
1500-11
1400-11

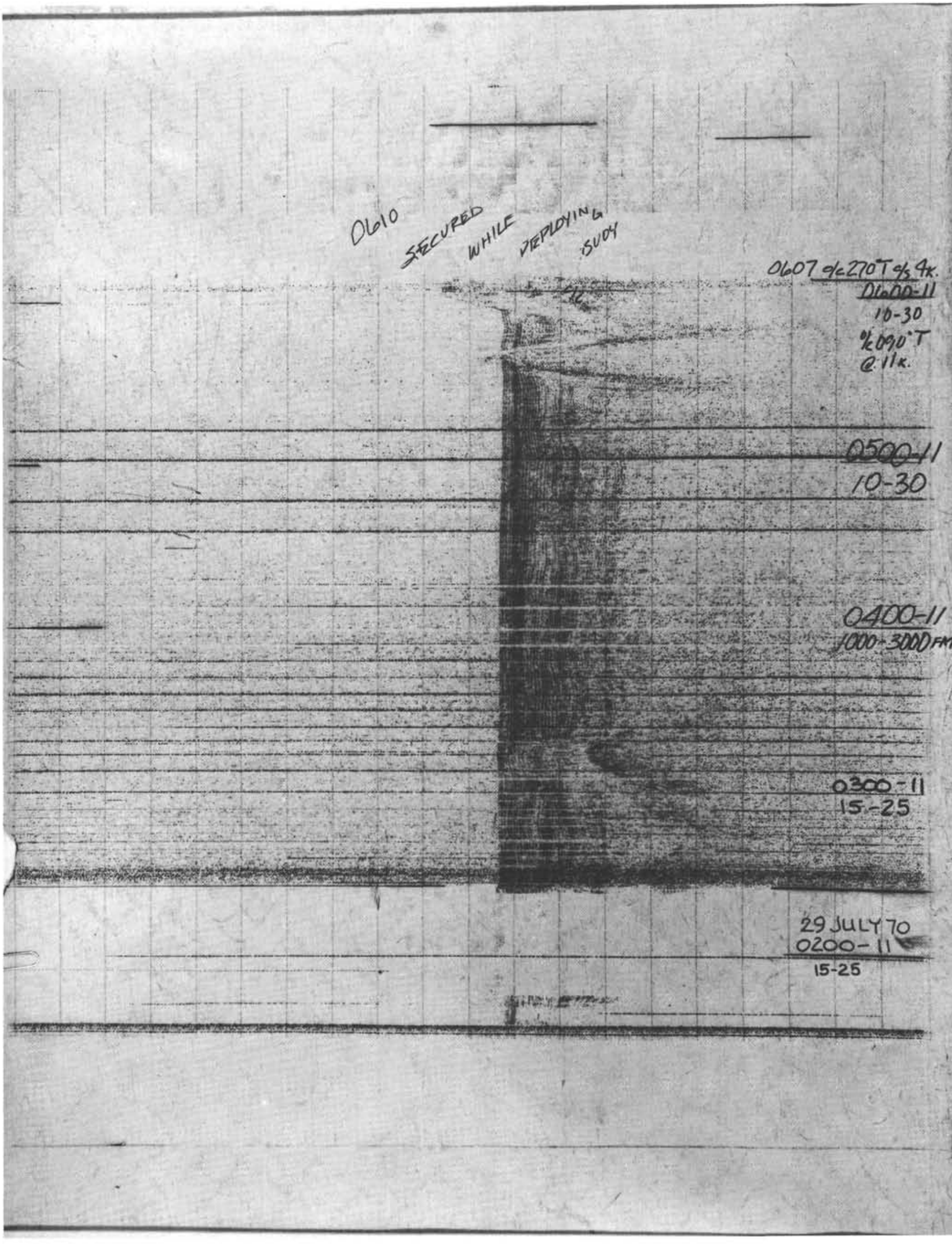
Profile 17.


1400-11
c/scale 1000-3000
1330-11
1300-11
1230-11
1200-11 /29 JULY 70
c/c 287° s/s 11 KTS
0-2000 FMS
1100-11
1030-11
1000-11

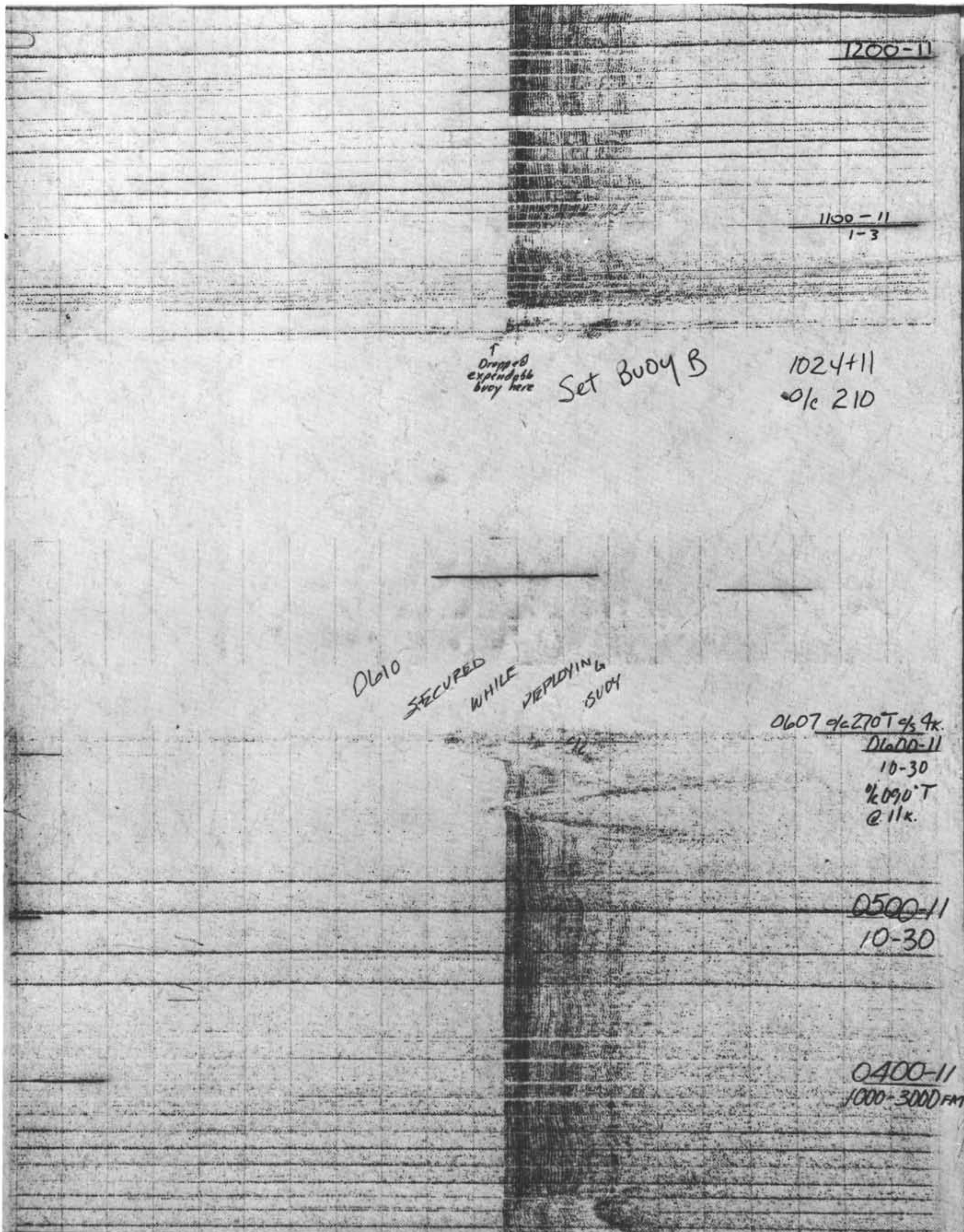
Profile 18.


1830-11
1800-11
1730-11
1700-11
1625-11
1600-11
1530-11
1500-11
1430-11
1400-11
1330-11
scale 1000-3000
1300-11
1230-11
1200-11 /29 JULY 70
11 KTS
0-2000 FMS

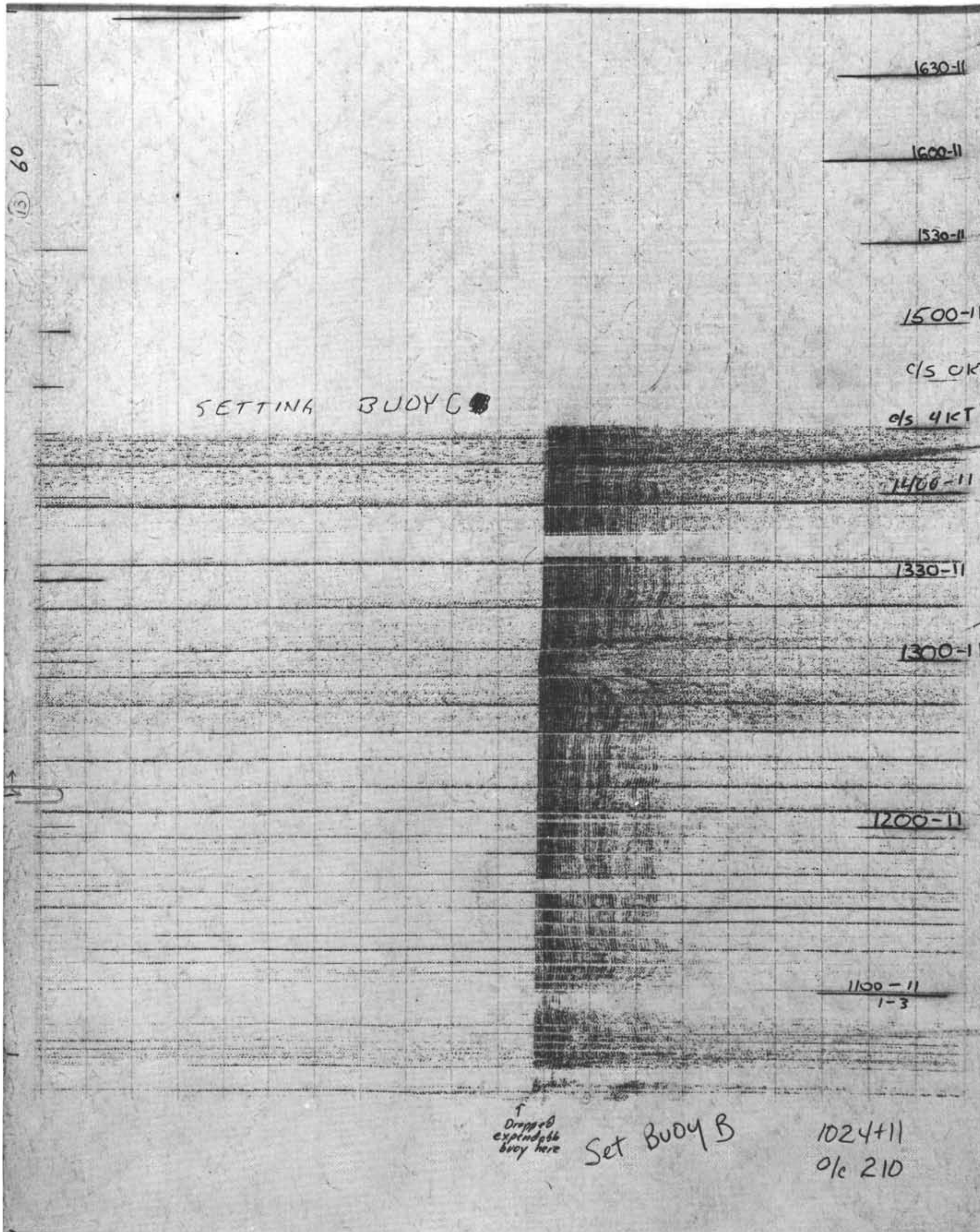
Profile 19.


0610
SECURED WHILE DEPLOYING BUOY
0500-11
10-30
0400-11
1000-3000 FMT
0300-11
15-25
29 JULY 70
0200-11
15-25

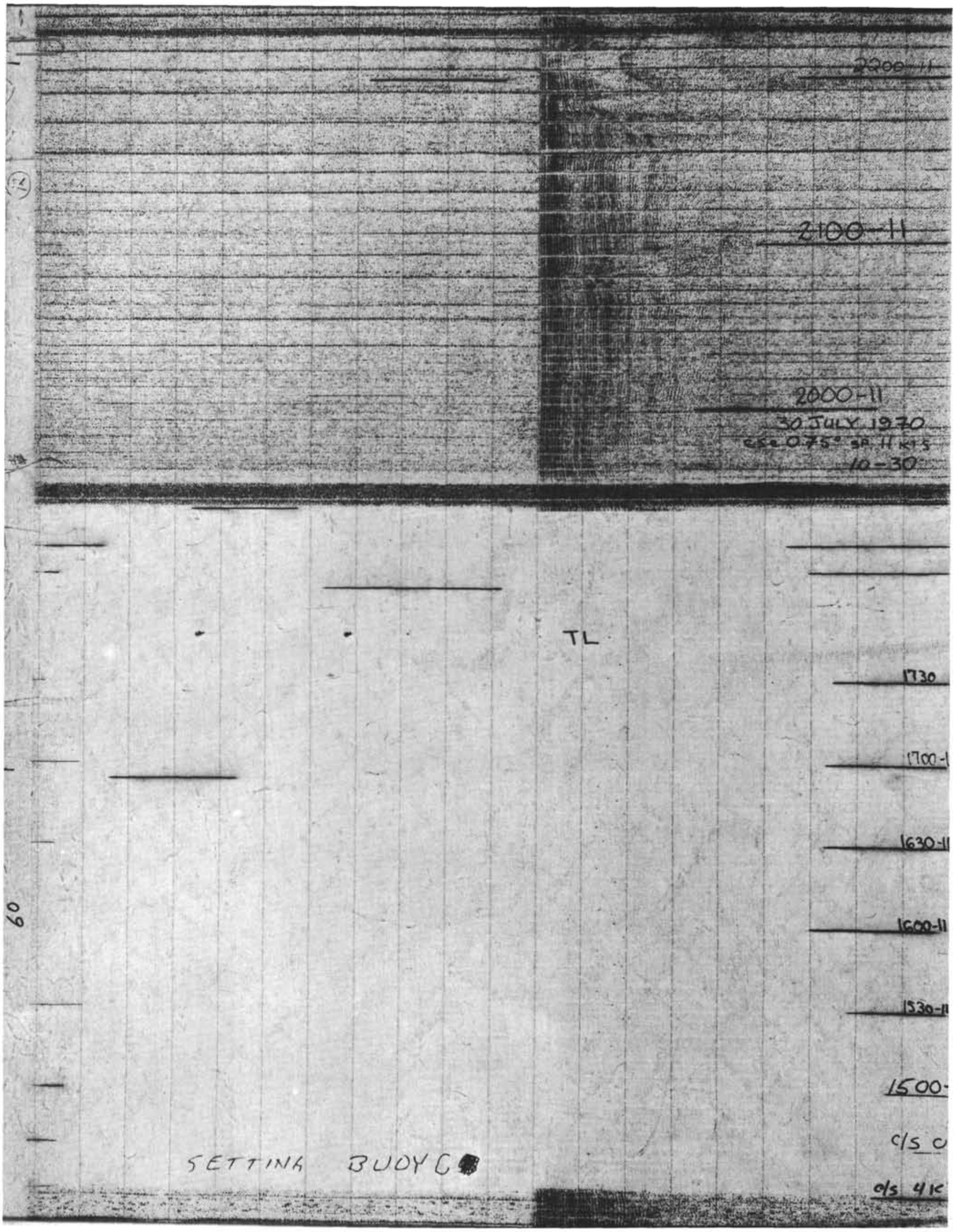
Profile 20.


1200-11
1100-11
1-3
Dropped expendable buoy here
Set Buoy B
1024+11
o/c 210
0610
SECURED WHILE DEPLOYING BUOY
0607 o/c 270°T o/s 4k.
0600-11
10-30
o/c 090°T
@ 11k.
0500-11
10-30
0400-11
1000-3000 FM

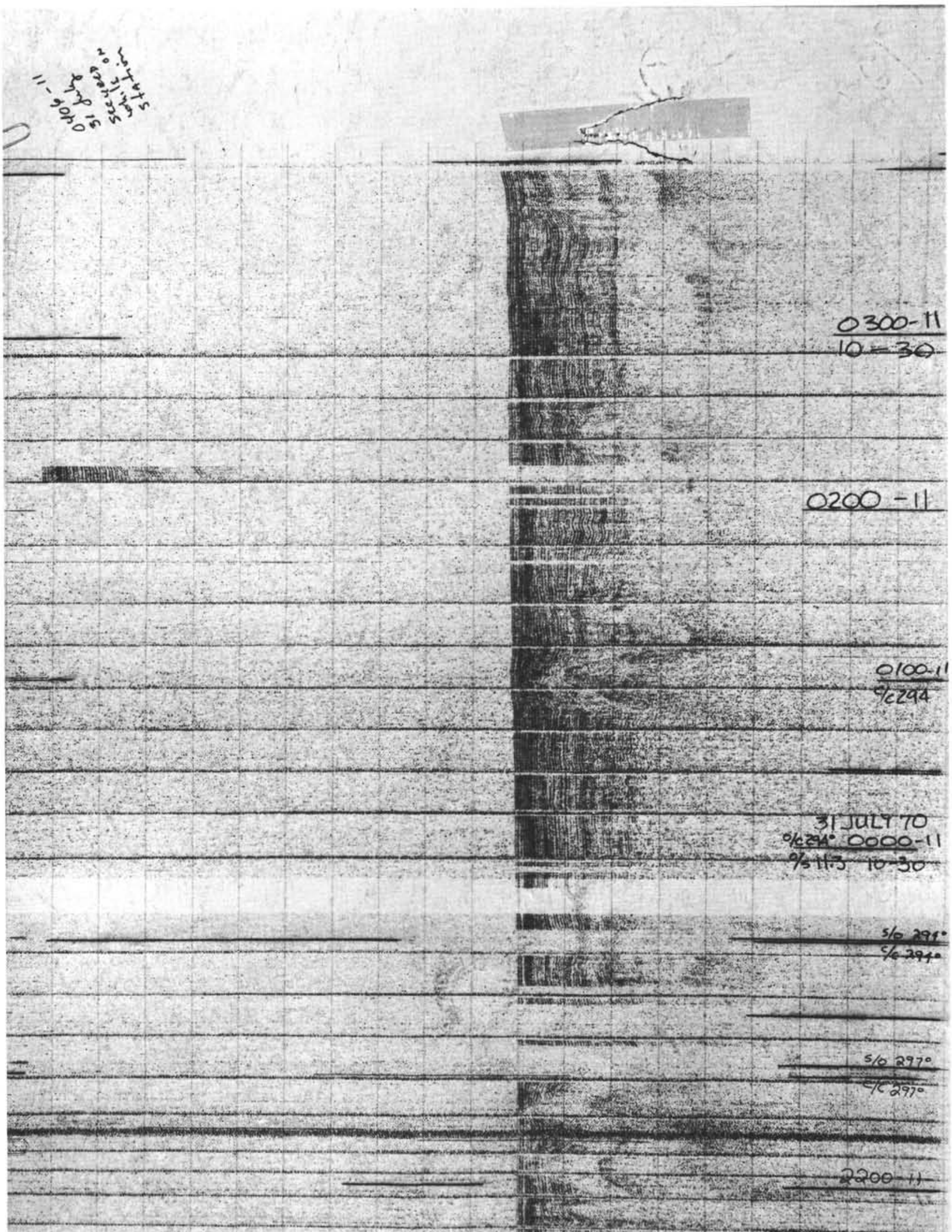
Profile 21.


1630-11
1600-11
1530-11
1500-11
C/S OKT
SETTING BUOY C
C/S 4KT
1400-11
1330-11
1300-11
1200-11
1100-11
1-3
Dropped expendable buoy here
Set Buoy B
1024+11
C/C 210

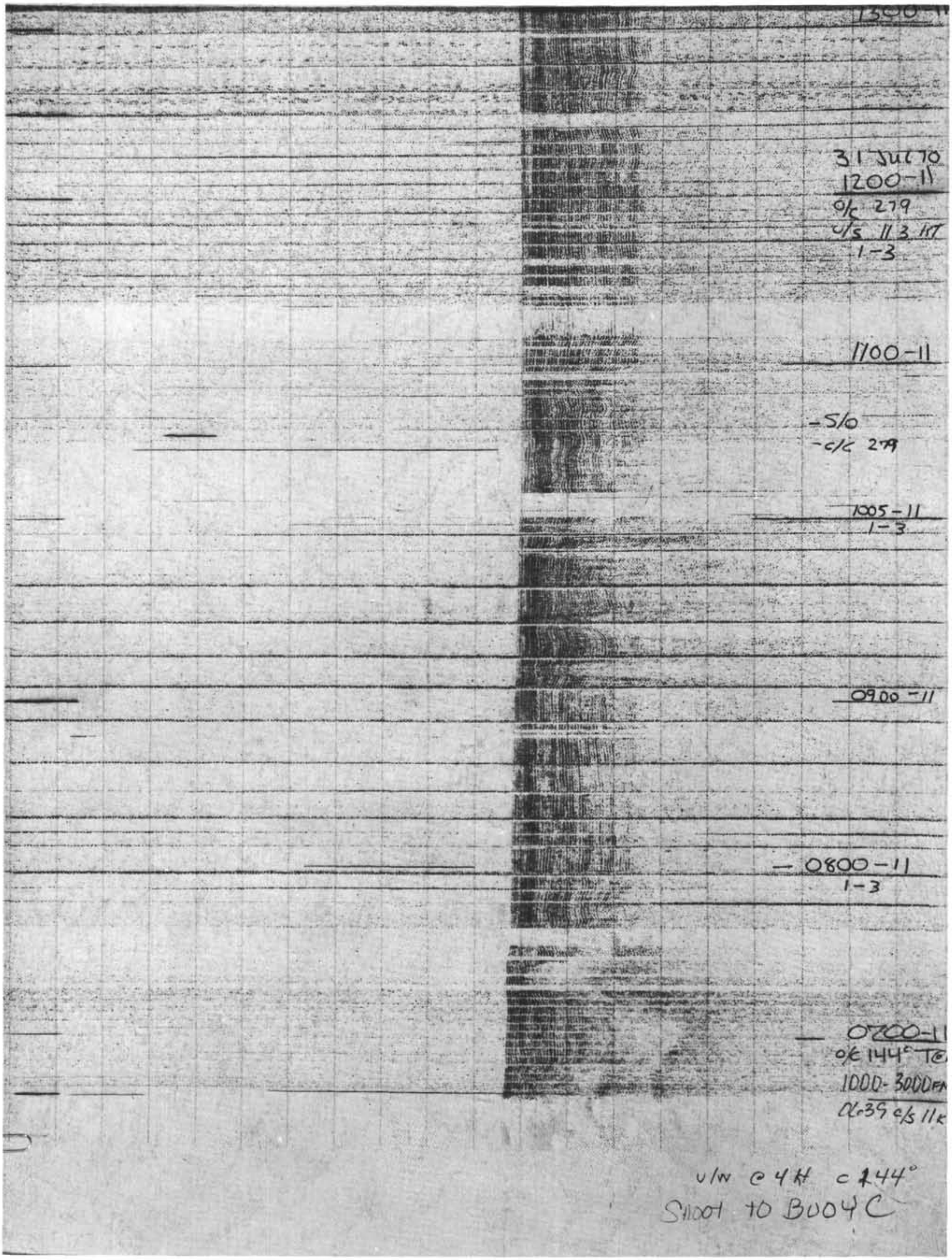
Profile 22.


2200-11
2100-11
2000-11
30 JULY 1970
10-30
TL
1730
1630-11
1600-11
60
SETTING BUOY C

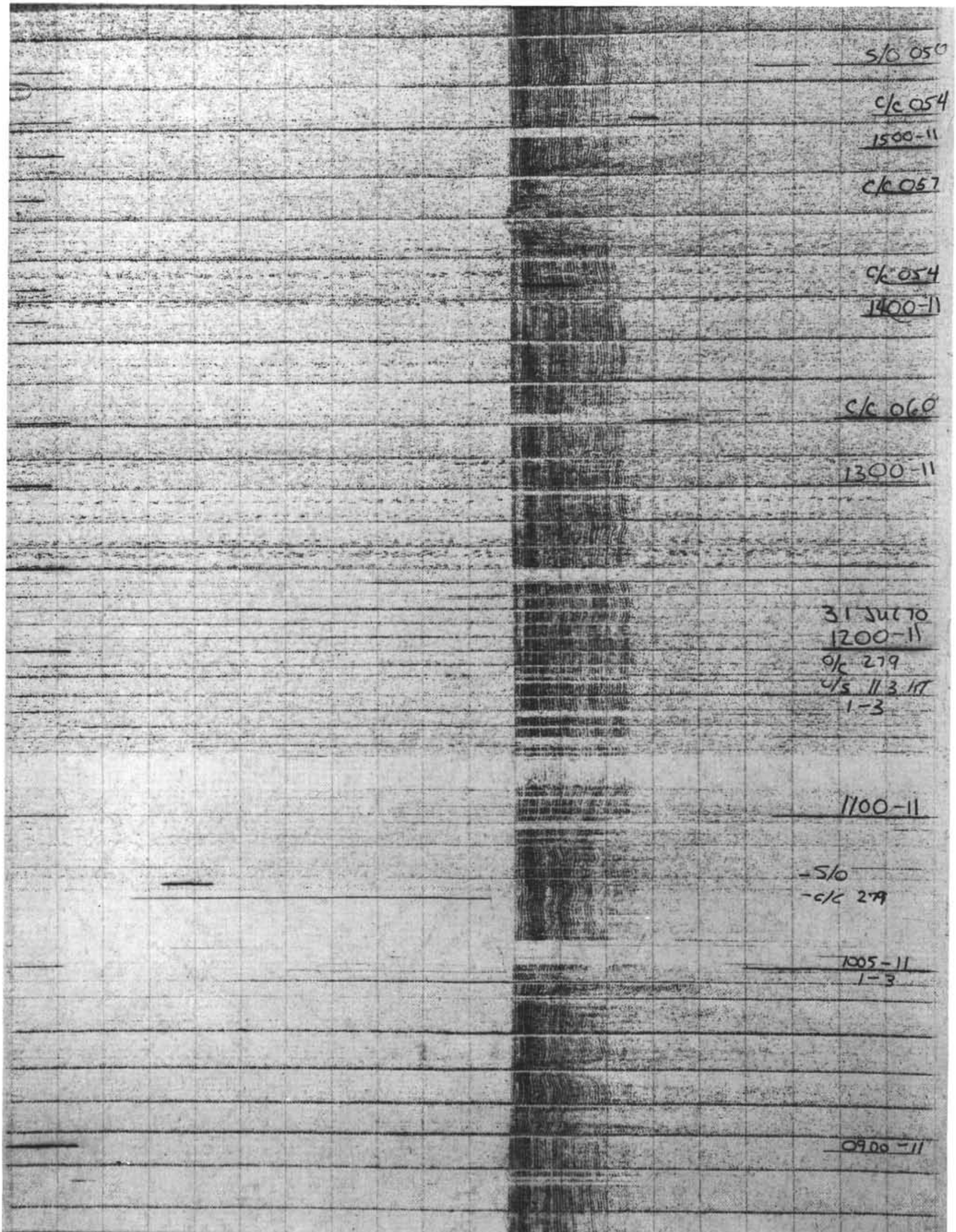
Profile 23.



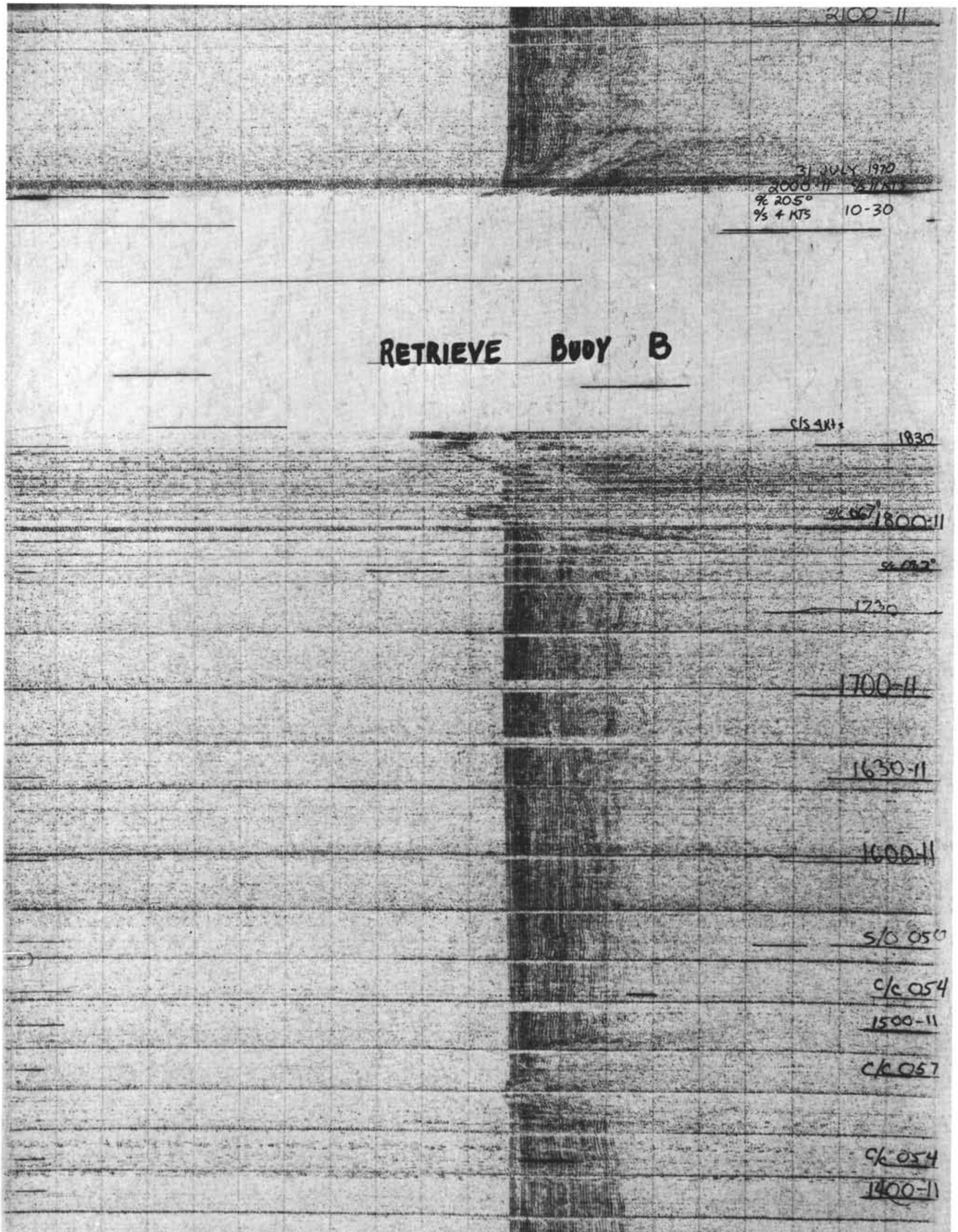
Profile 24.


31 JUL 70
1200-11
1-3
1100-11
1005-11
1-3
0900-11
0800-11
1-3
0700-11
1000-3000FM
Shoot to Buoy C

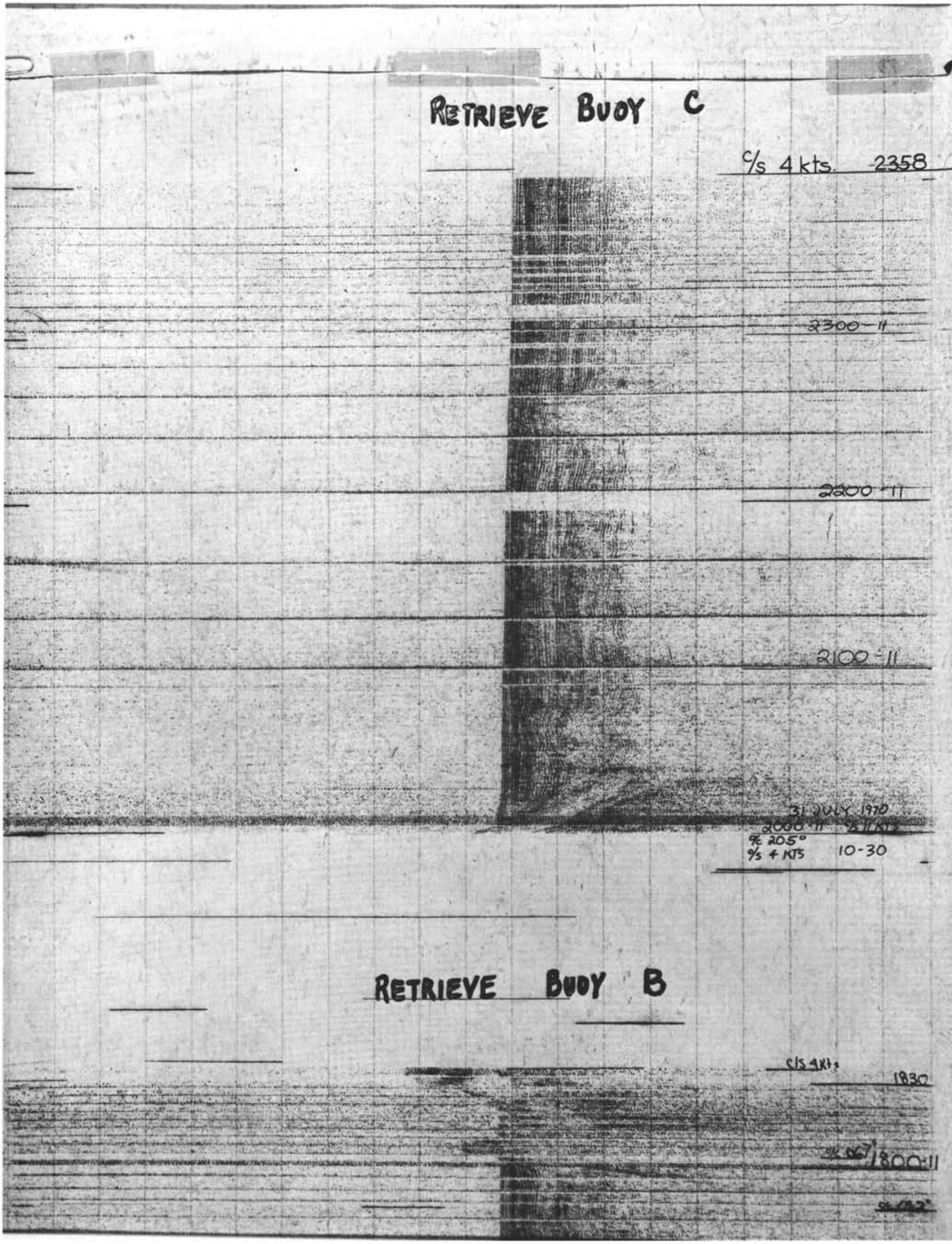
Profile 25.


c/c 054
1500-11
c/c 057
c/c 054
1400-11
c/c 060
1300-11
31 JUL 70
1200-11
1100-11
1005-11
1-3
0900-11

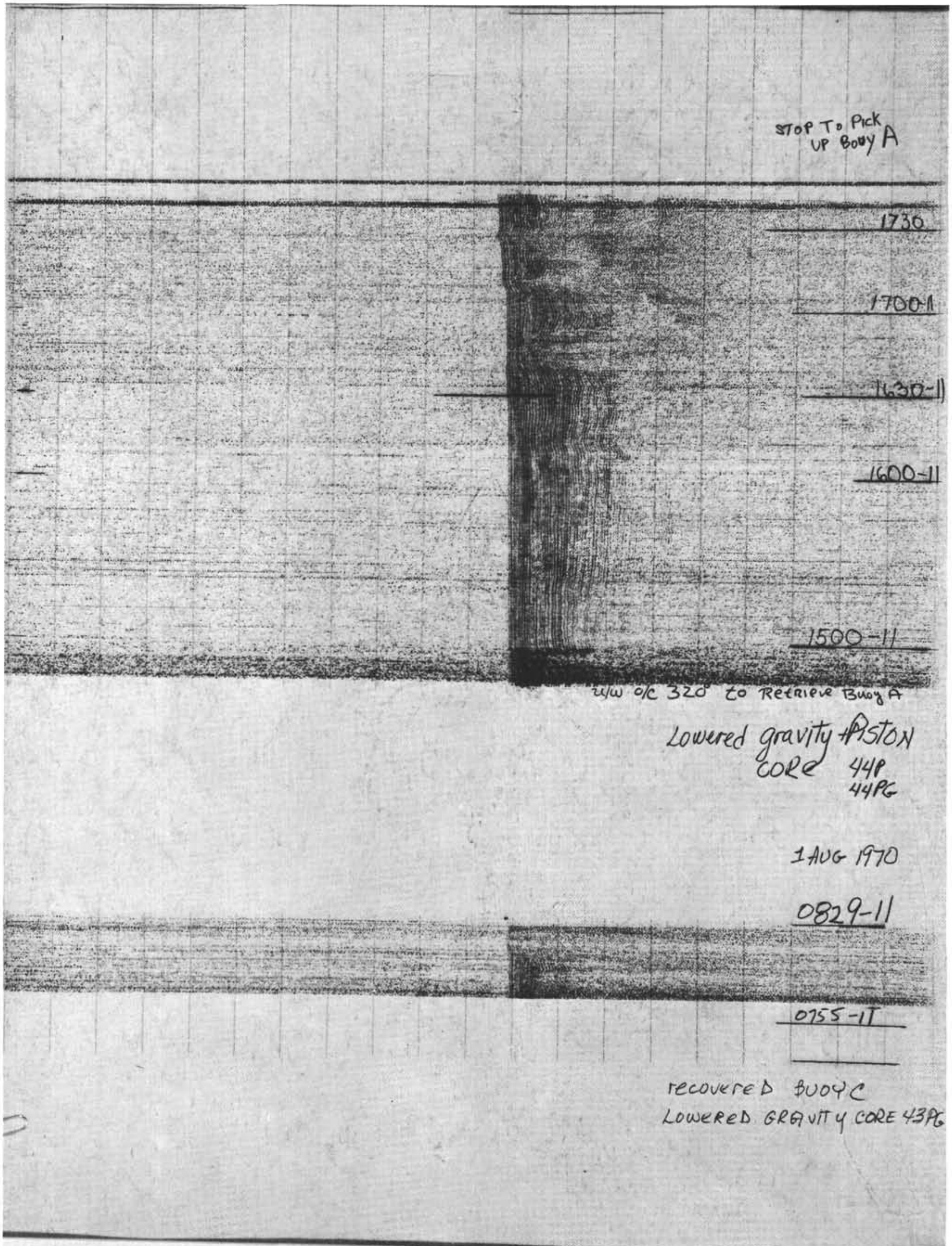
Profile 26.


2100-11
31 JULY 1970
10-30
RETRIEVE BUOY B
1830
1800-11
1700-11
1630-11
1600-11
S/O 050
C/C 054
1500-11
C/C 057
C/C 054
1400-11

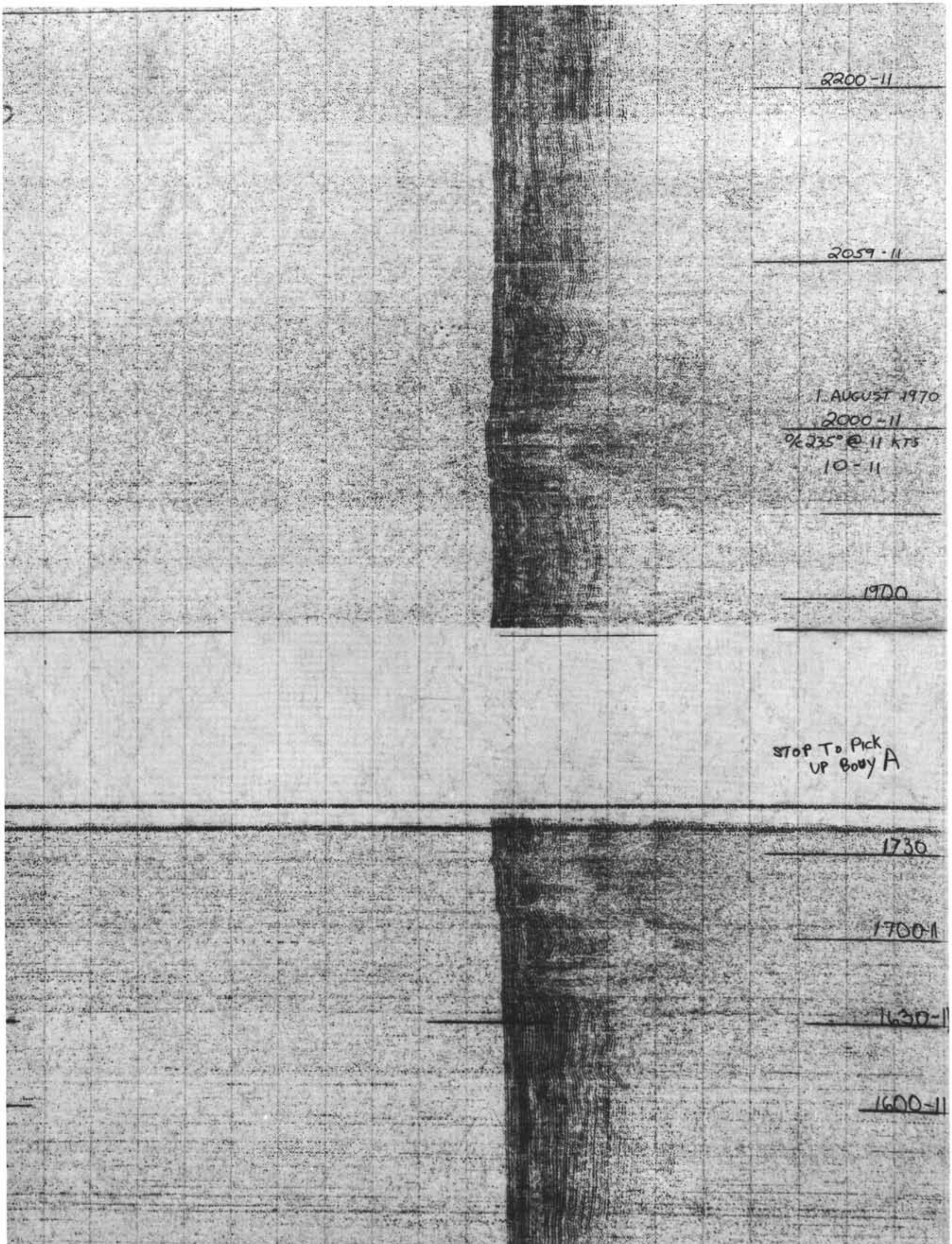
Profile 27.


RETRIEVE BUOY C
C/S 4 kts. 2358
2300-11
2200-11
2100-11
31 JULY 1970
2000-11
10-30
RETRIEVE BUOY B
1830
1800-11

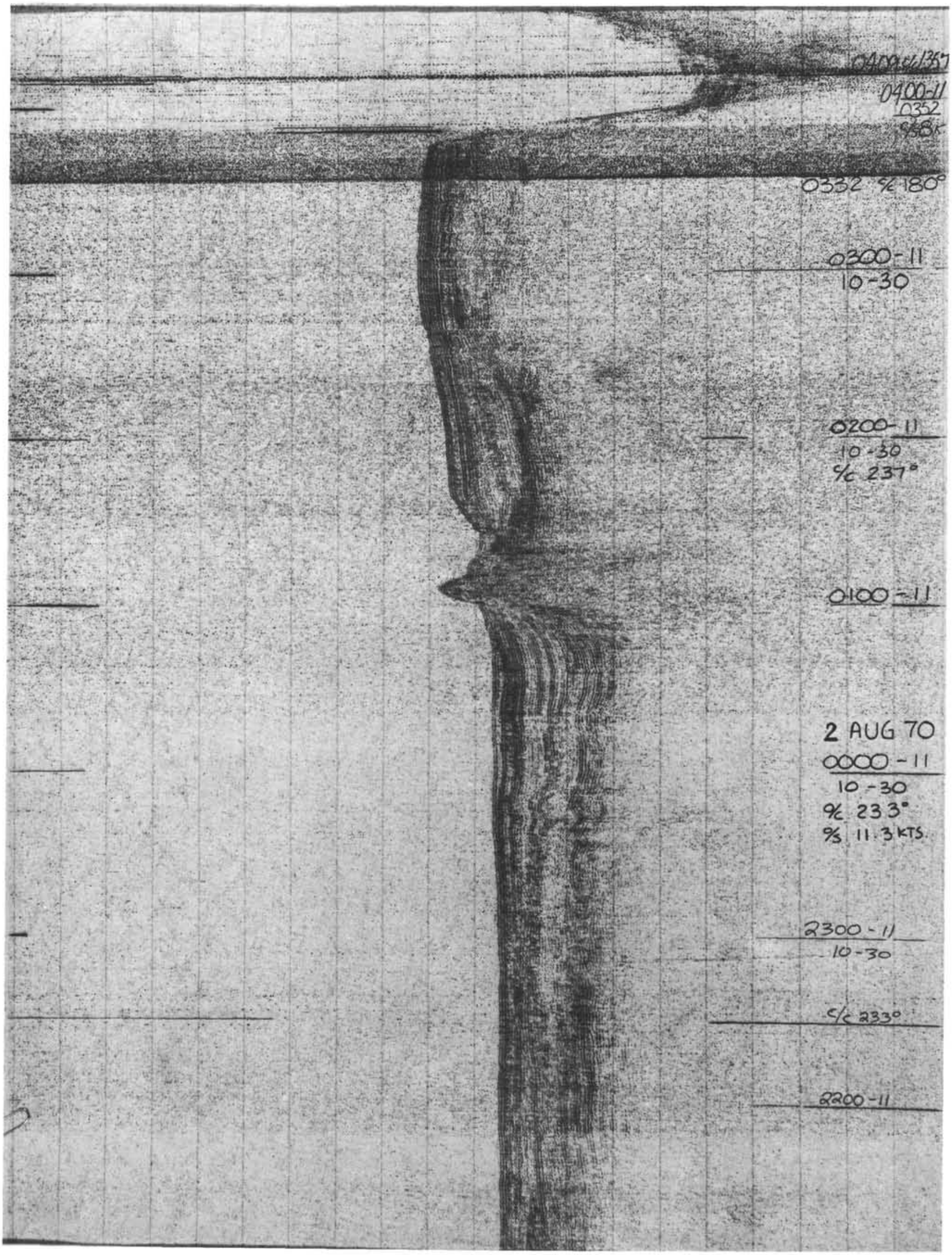
Profile 28.


STOP TO PICK UP BOUY A
1730
1700-11
1630-11
1600-11
1500-11
Lowered gravity + PISTON CORE 44P 44PG
1 AUG 1970
0829-11
recovered BUOY C
LOWERED GRAVITY CORE 43PG

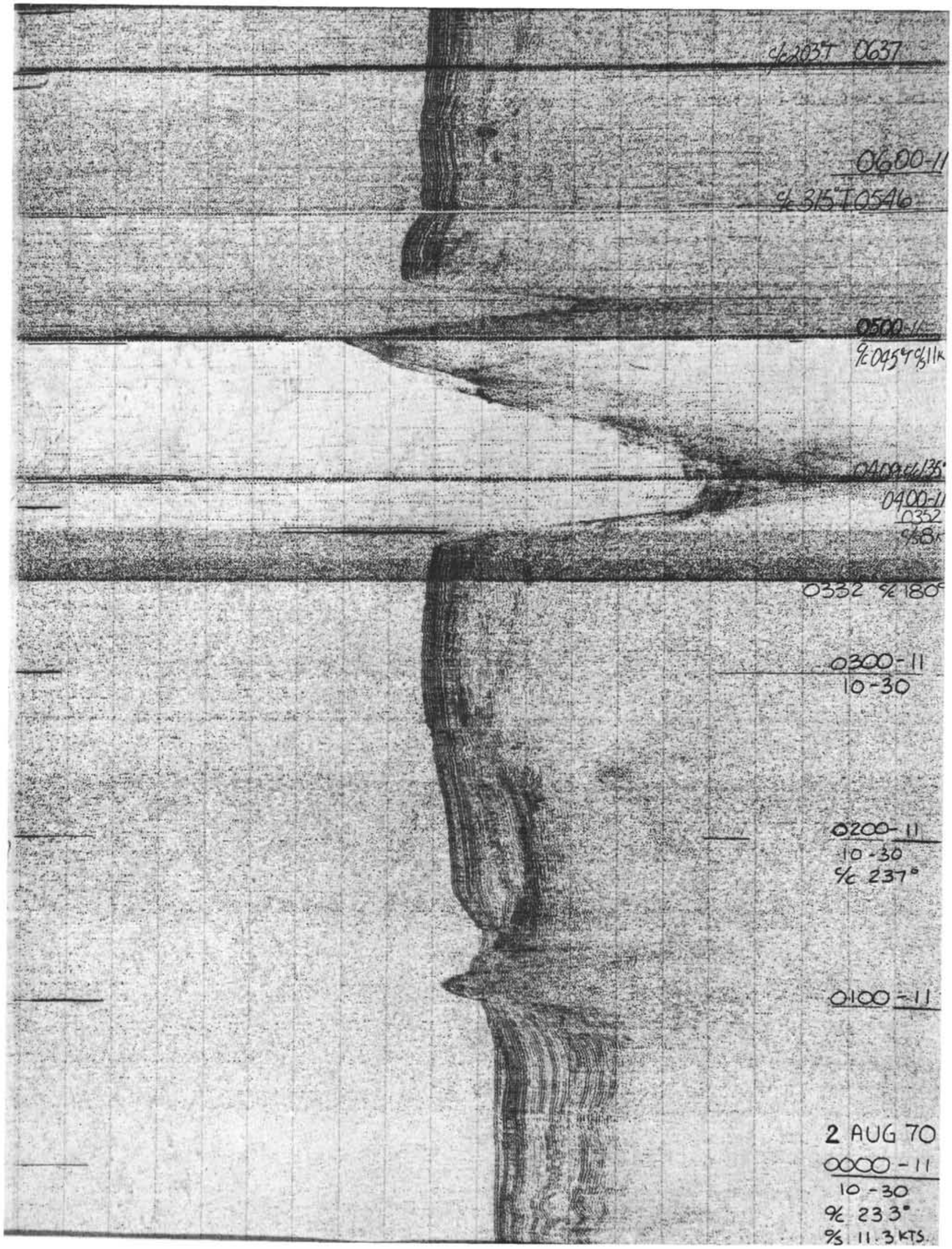
Profile 29.


2200-11
2059-11
1 AUGUST 1970
2000-11
C/235° @ 11 KTS
10-11
1900
STOP TO PICK
UP BOUY A
1730
1700-11
1630-11
1600-11

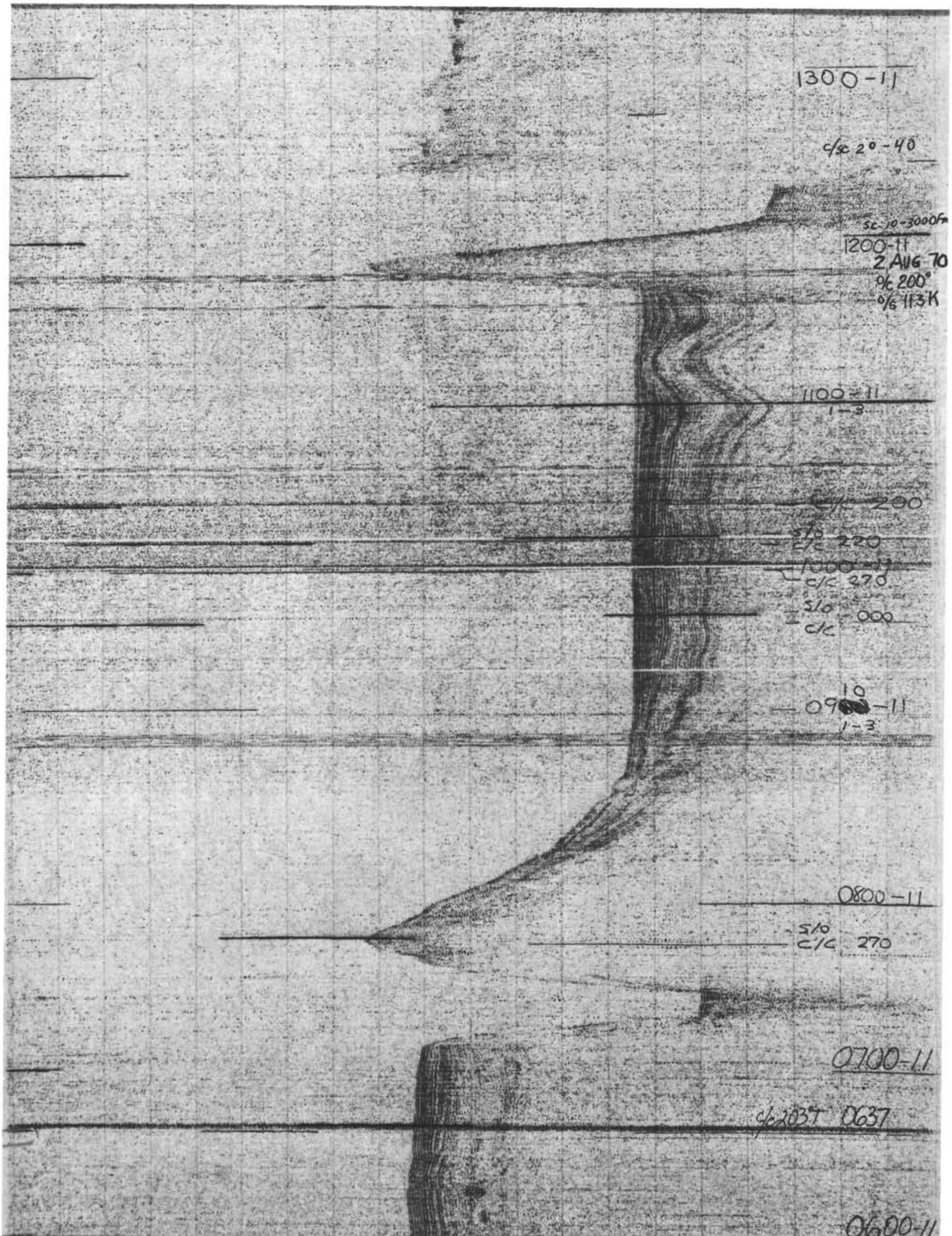
Profile 30.


0400-11
0352
0332 %c 180°
0300-11
10-30
0200-11
10-30
%c 237°
0100-11
2 AUG 70
0000-11
10-30
%c 233°
%s 11.3 KTS.
2300-11
10-30
c/c 233°
2200-11

Profile 31.


0637
0600-11
0546
0500-11
0400-11
0352
0332
0300-11
10-30
0200-11
10-30
237°
0100-11
2 AUG 70
0000-11
10-30
233°
11.3 KTS.

Profile 32.


1300-11
1200-11
2 AUG 70
1100-11
C/C 200
C/C 220
C/C 270
S/O
C/C 000
0800-11
S/O
C/C 270
0700-11
0637
0600-11

Profile 33.