

25. SCAN-CHALLENGER SURVEYS

G. H. Sutton

Figure 1 (in pocket attached to inside back cover) is a topographic map of the east-central Pacific Ocean showing the track of the *Glomar Challenger* during Leg 8. Airgun records keyed to the track chart are given in Figure 2. Additional survey results are given in Chapter 2 and in the individual site reports, Chapters 3 through 10. Magnetometer and echo sounding data at fifteen-minute intervals were picked and plotted for the entire leg, but are not included in this volume.

SCAN surveys were conducted by R/V *Argo* for Sites 68, 70, 71, 74 and 75 (JOIDES Pacific Advisory Panel Sites 22, 24, 25, 26 and 27, respectively). Preliminary results for Sites 74 and 75 were received via radio from the *Argo* during the leg. No SCAN surveys were made for Sites 69, 72 and 73 and, therefore, somewhat more complete surveys were conducted by the *Challenger* for those sites, as can be seen from the navigation plots presented here.

Following a recommendation of the group on the preceding leg, when leaving each site an attempt was made to cross closely above the acoustic beacon used for orienting the *Challenger* over the drilling site. The airgun records from this crossing provide the most reliable estimates of the reflector depths at the site for correlation with the coring data and additional details of very local structure which might have produced local anomalies in the sedimentation at the site. To provide information in the third dimension this crossing was made in a direction perpendicular to the approach to the site.

A good site survey and accurate location of the drilling site relative to that survey is imperative for unambiguous interpretation of the drilling data, especially in complicated areas. At earlier sites of the leg, a barrel or lighted buoy was thrown over as we passed the preferred site location. In order to obtain good survey data over the site the ship retained course and speed for a few minutes beyond the preferred site before slowing to pull in gear and return to the marker buoy. On two occasions, subsequent passage over the acoustic beacon indicated that the drift of the buoy was sufficient that significant differences were observed in reflector depths between the "before" and "after" passes of the site. For this reason, at later sites the beacon itself was dropped while underway over the preferred site, greatly improving precision of site

location. (See survey tracks for individual sites.) On most occasions the ship passed within less than 100 meters of the location of the beacon when leaving the site. At Site 72, however, the beacon was passed at about 300 meters abeam. Unfortunately, the basement dips quite steeply at this site and in the same distance along the *Challenger's* track the basement depth changes by about 0.05 second (~ 40 meters) leaving some uncertainty in the depth of acoustic basement at the site.

Following are brief comments on the survey for each site.

SITE 68 (PAP, SCAN SITE 22)

Topography in the vicinity of the site is shown in Figure 3 and airgun records are shown in Figure 4 (discussed in Chapter 3). The drilling site was chosen in the northeast corner of the surveyed area where a 0.05 second transparent layer, which disappears to the west, overlies more reflective sediments.

A magnetic anomaly of 300 to 400 γ is associated with the seamount in the western portion of the area; smaller anomalies, about 100 γ , occur in the vicinity of the abyssal hills in the eastern portion; and the flat, central portion has low magnetic relief ($< 50\gamma$). There is no noticeable lineation in the anomalies.

The following additional information was obtained for the site during the SCAN Survey:

Piston core — location 16°25.0'N, 164°23.5'W, length 9.0 meters (Chapter 3);

Camera station — location 16°25.6'N, 164°21.3'W, bottom covered with manganese nodules and slabs up to 50 centimeters diameter;

Heat flow station — location 16°24.0'N, 164°24.5'W, 1.41 $\mu\text{cal cm}^{-2}\text{sec}^{-1}$;

Seismic refraction station.

SITE 69

Topography in the vicinity of the site is shown in Figure 5 and airgun records are shown in Figure 6 (discussed in Chapter 4). There was no SCAN survey for this site.

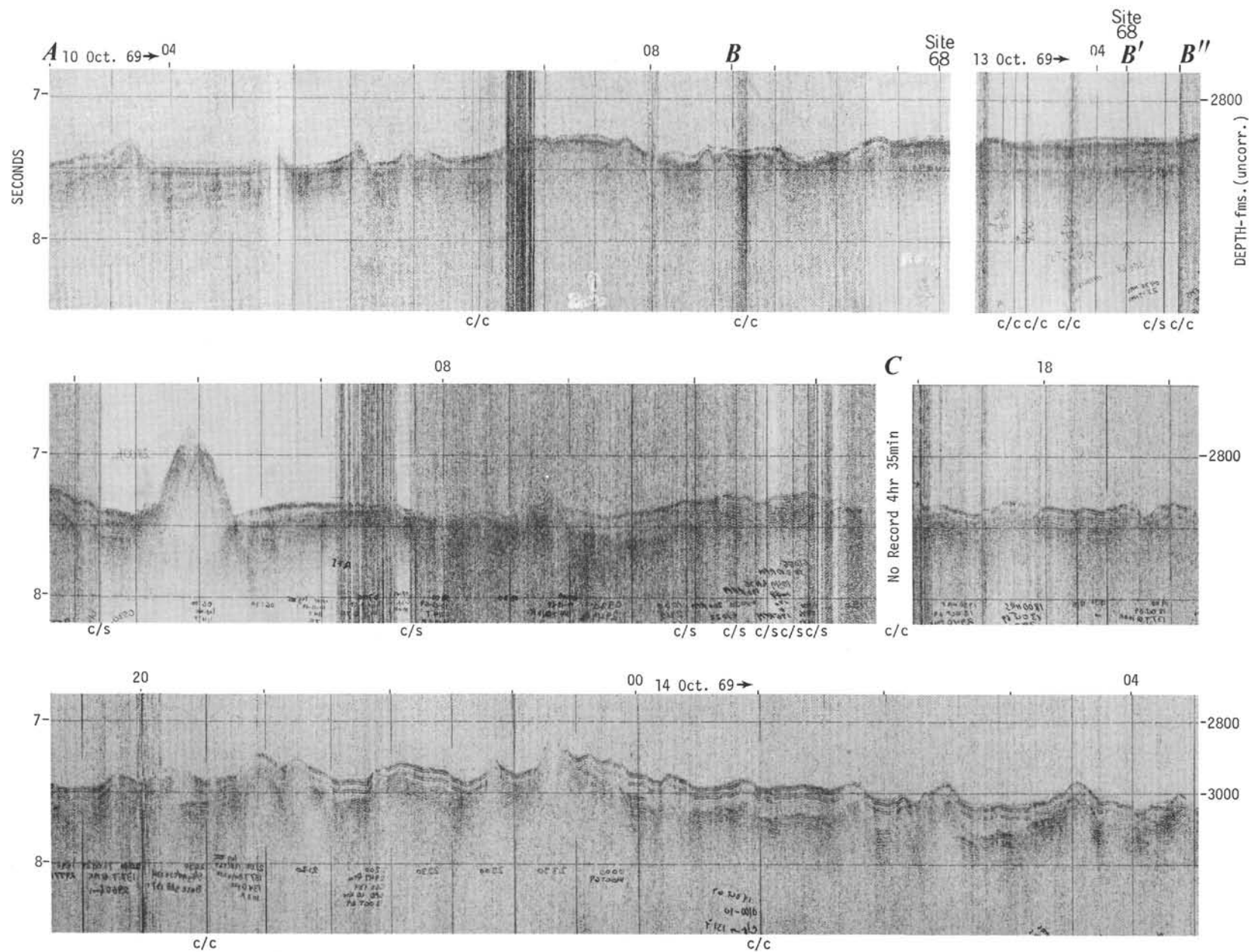
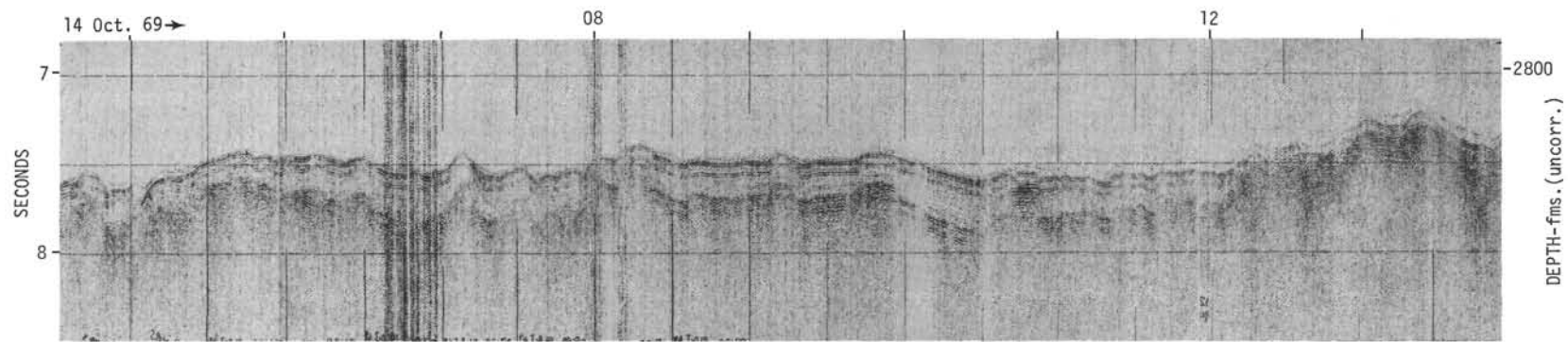
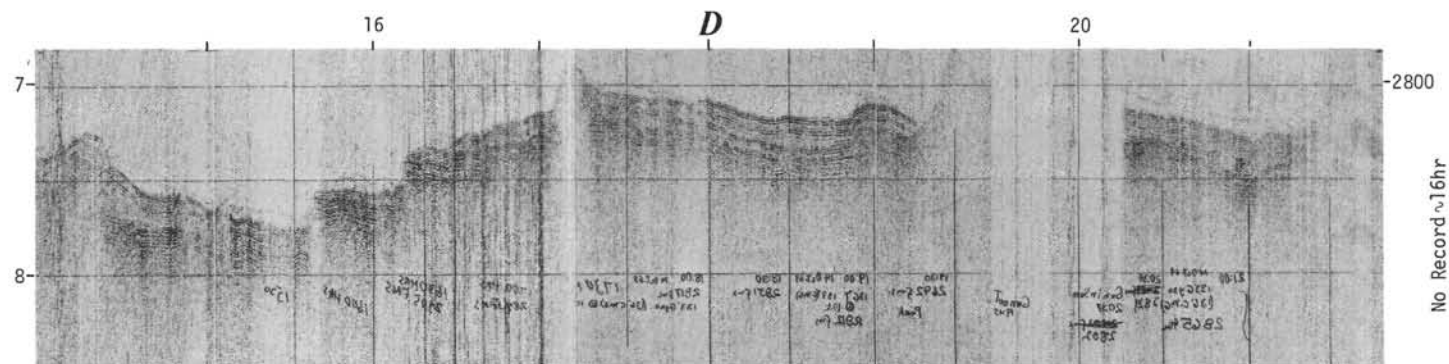


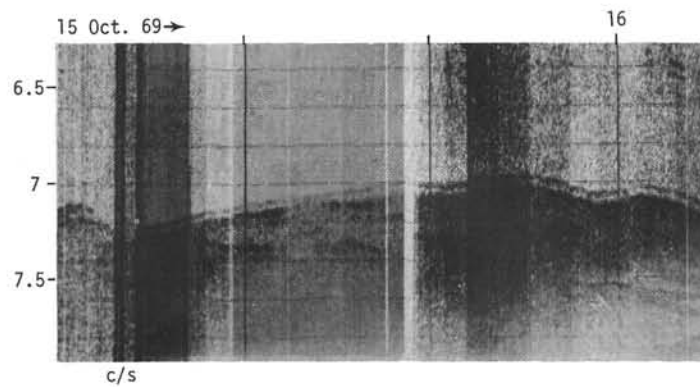
Figure 2a. Challenger airgun records from Leg 8 cruise track. Letters correlate with those of Figure 1.



c/c

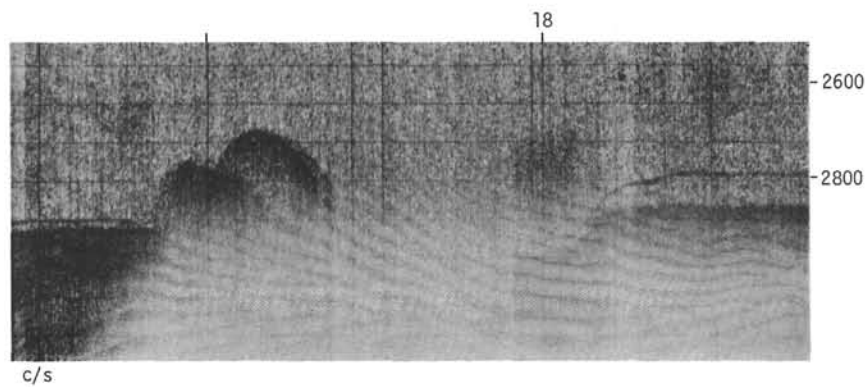


No Record ~16hr



c/s

No Record



c/s

Figure 2b.

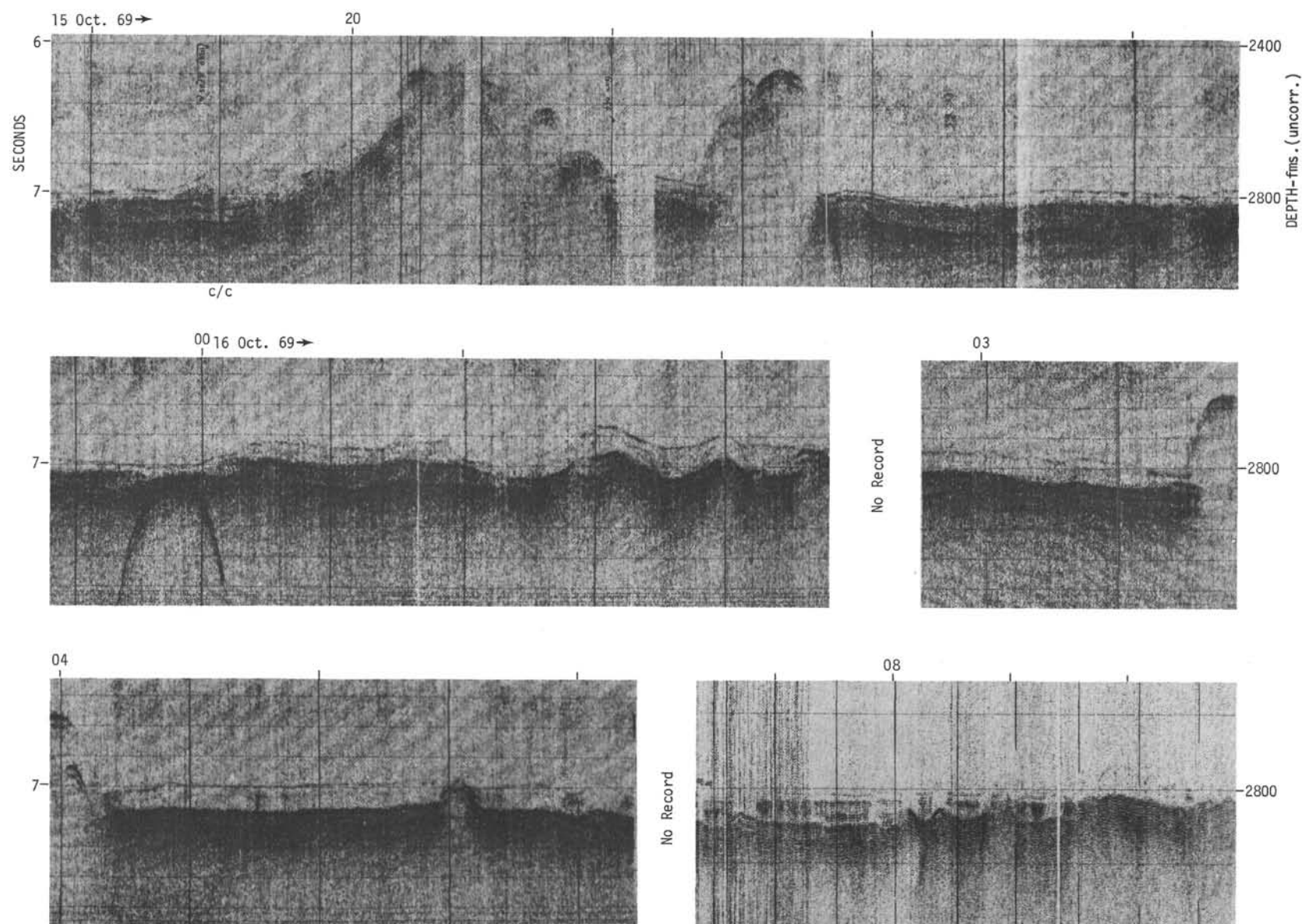


Figure 2c.

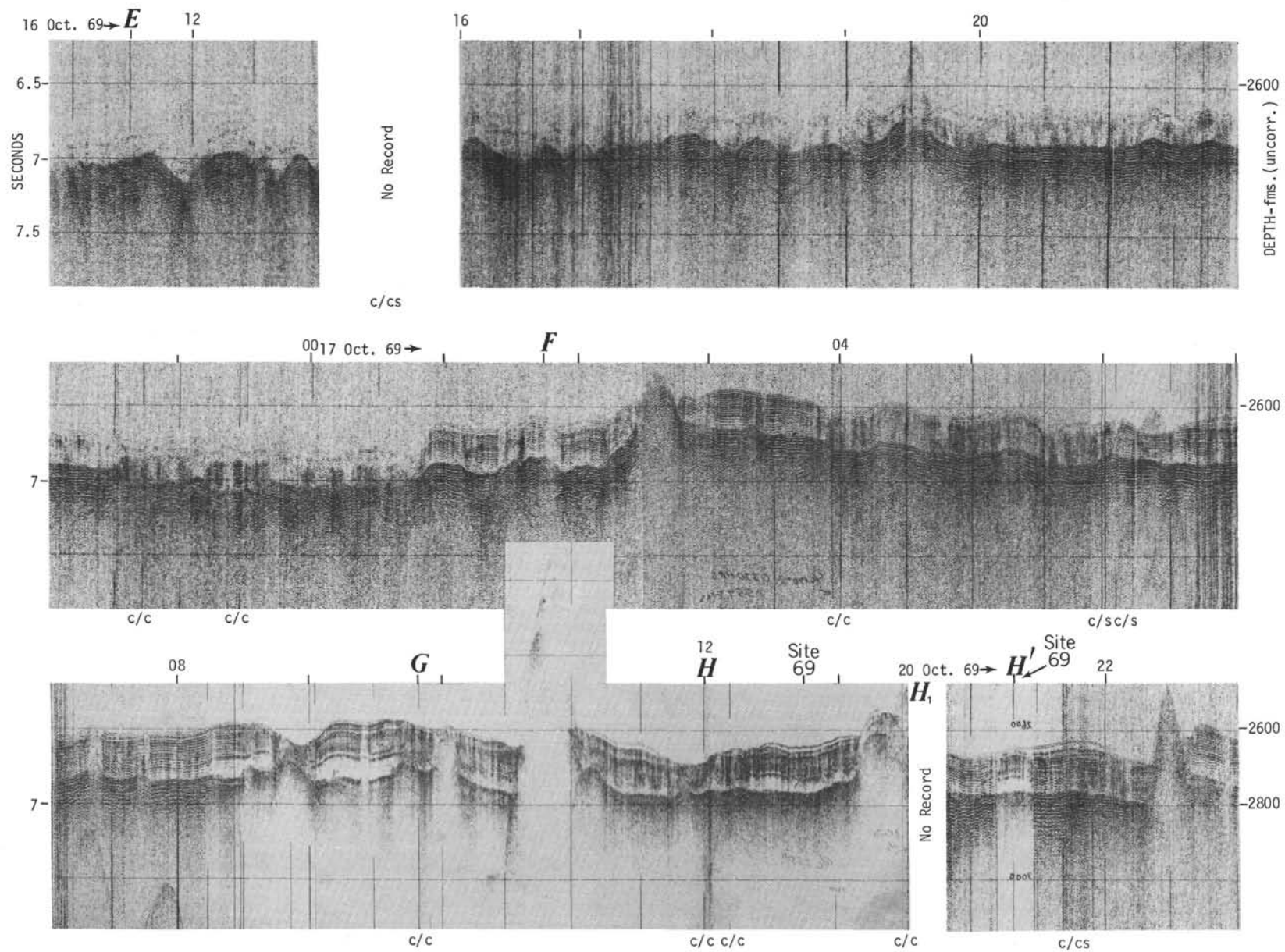


Figure 2d.

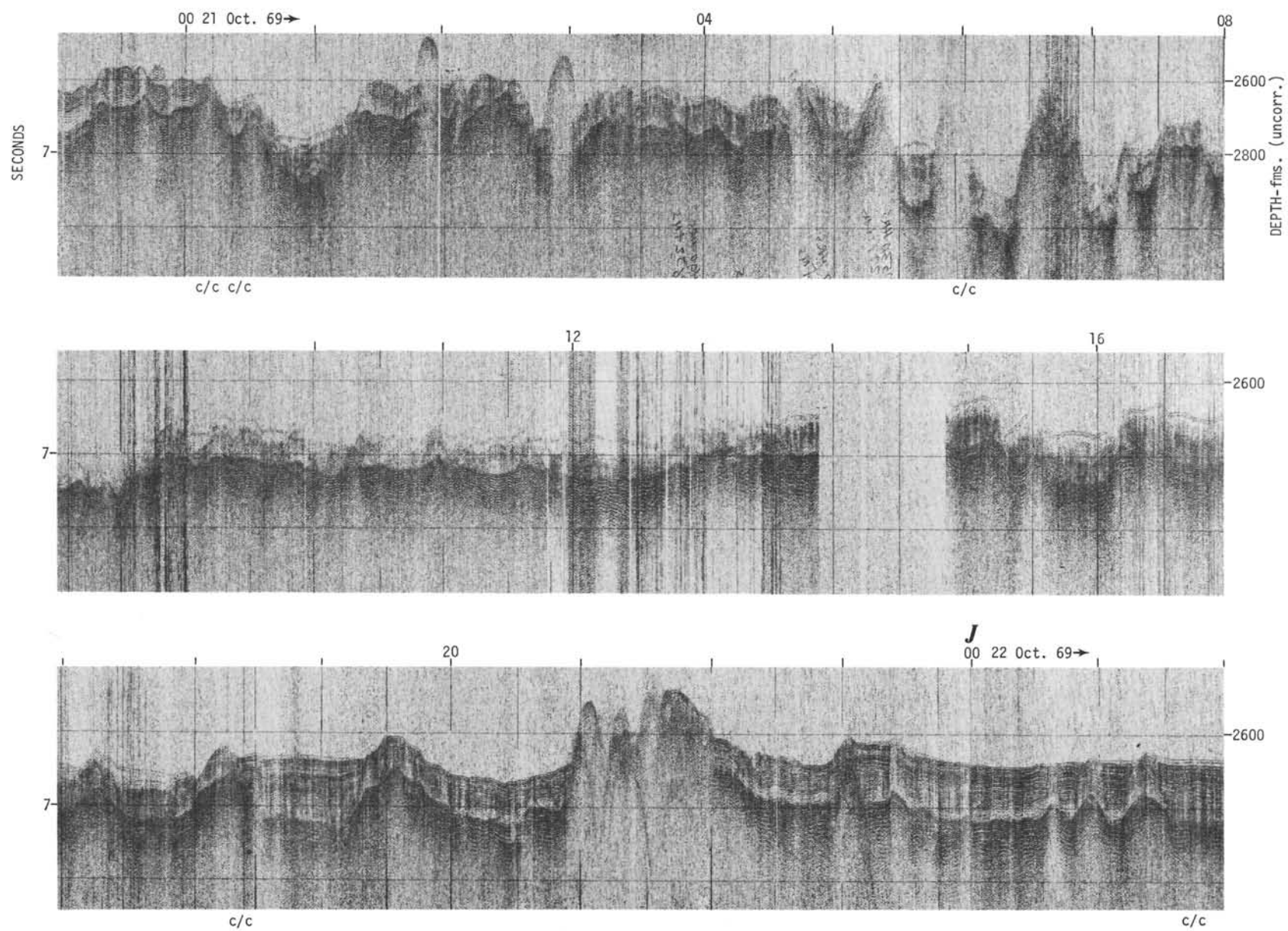


Figure 2e.

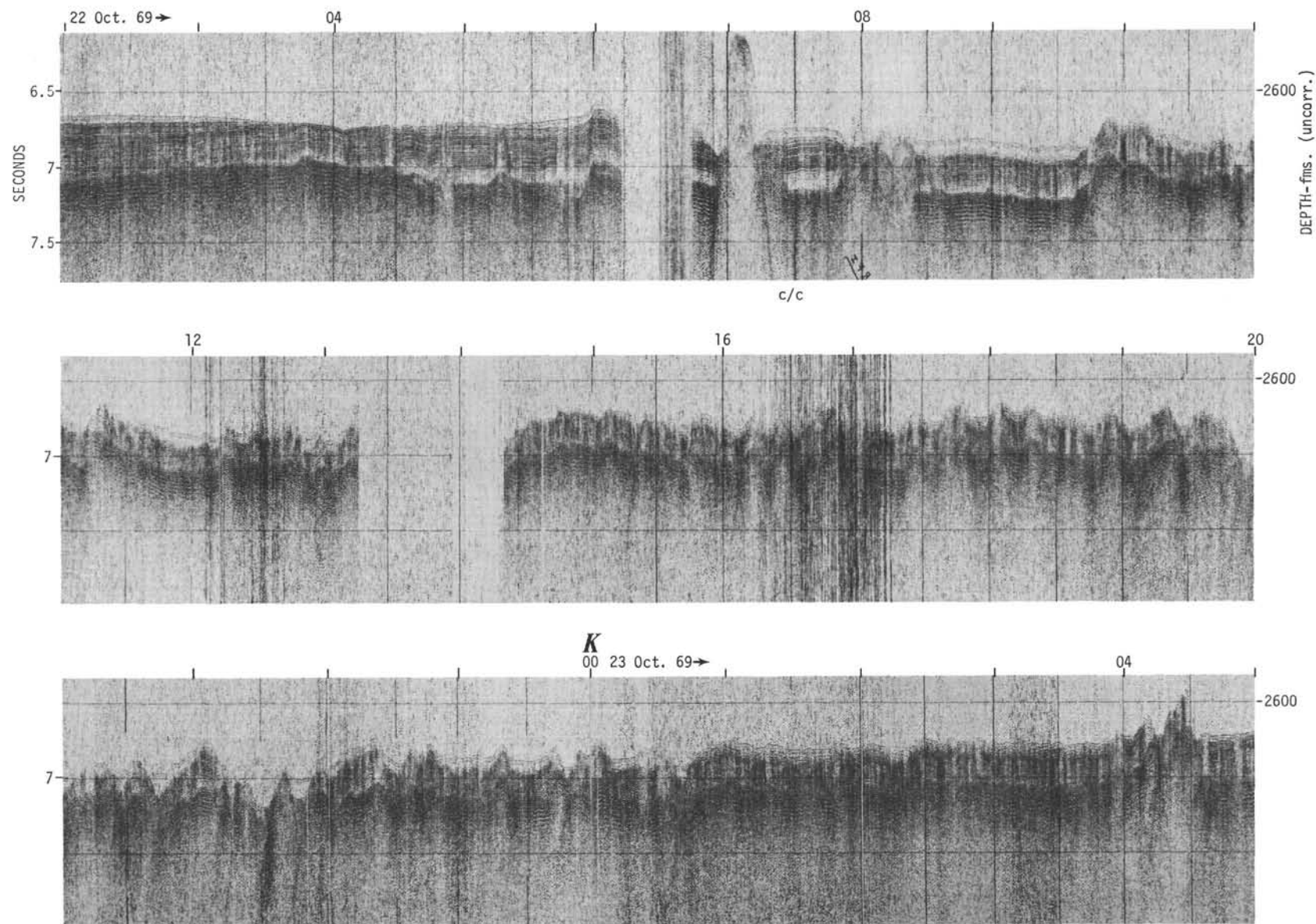


Figure 2f.

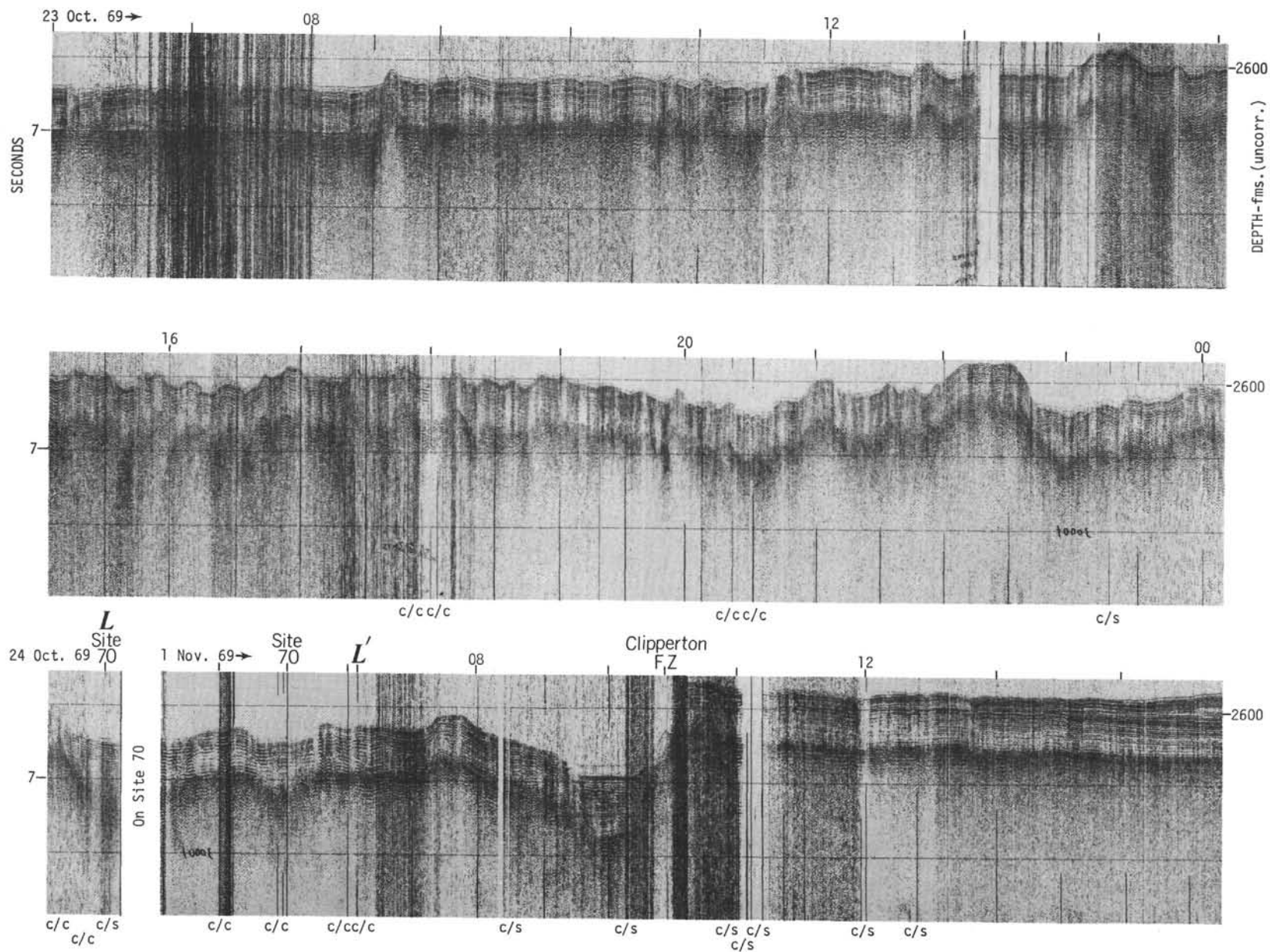


Figure 2g.

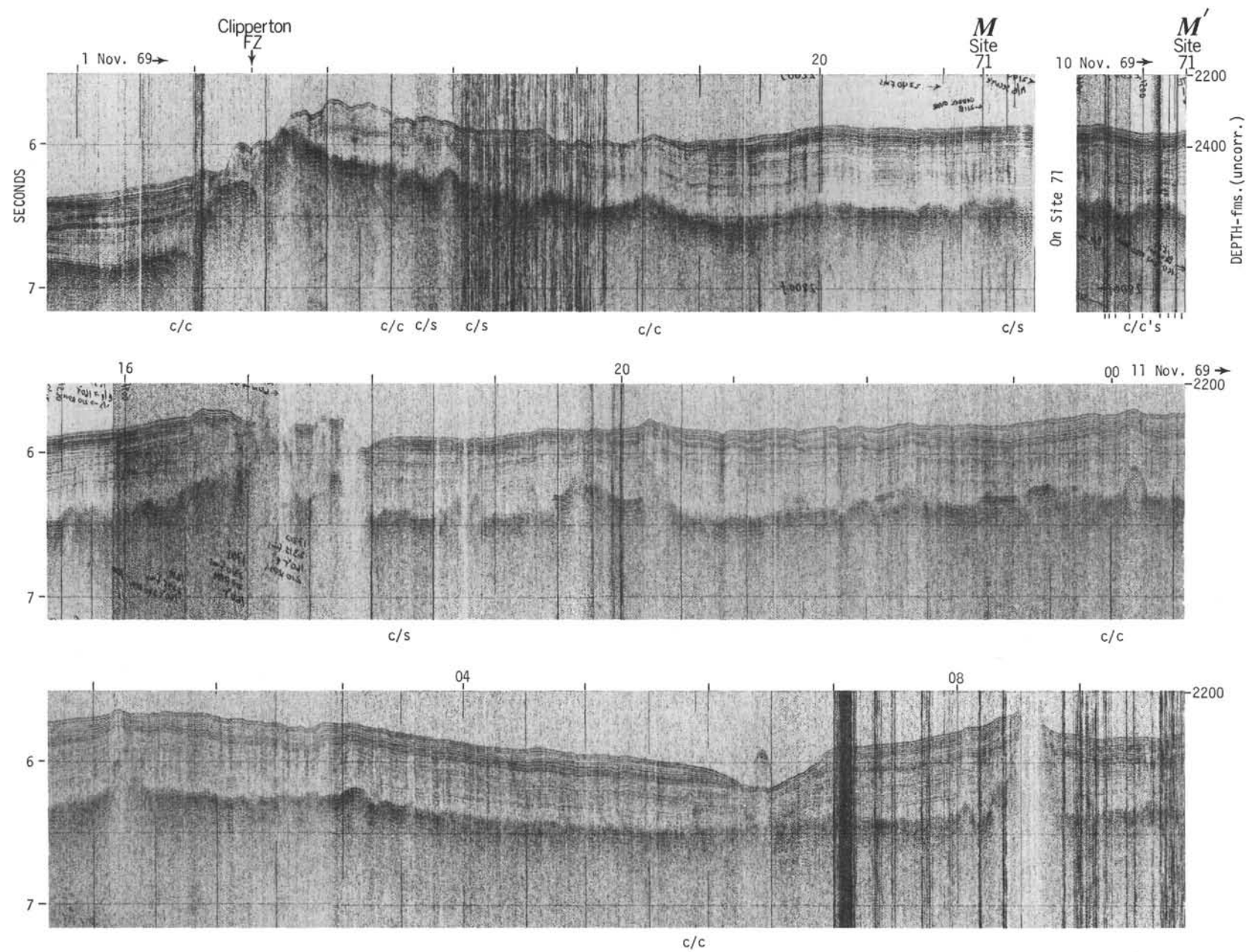


Figure 2h.

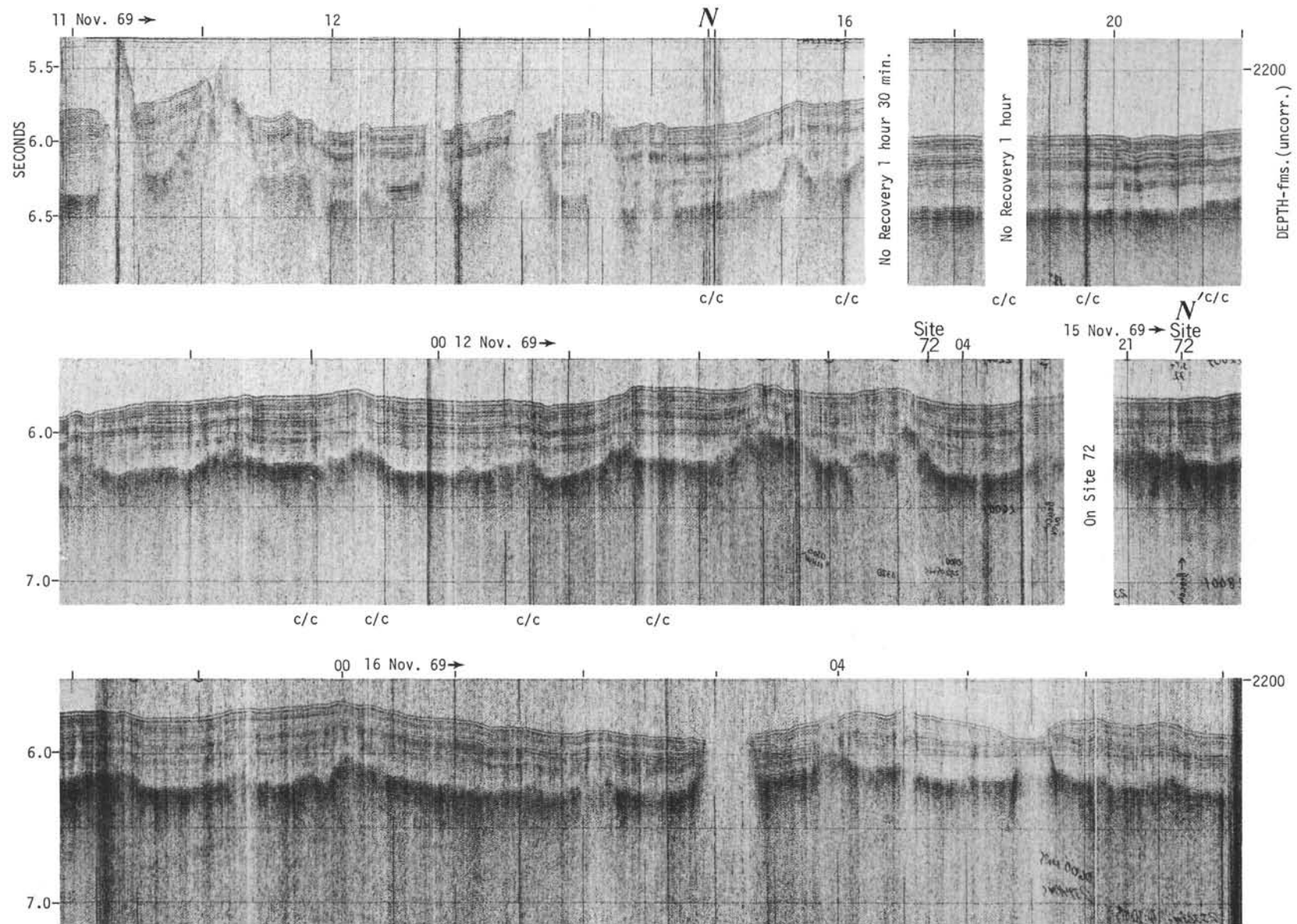


Figure 2i.

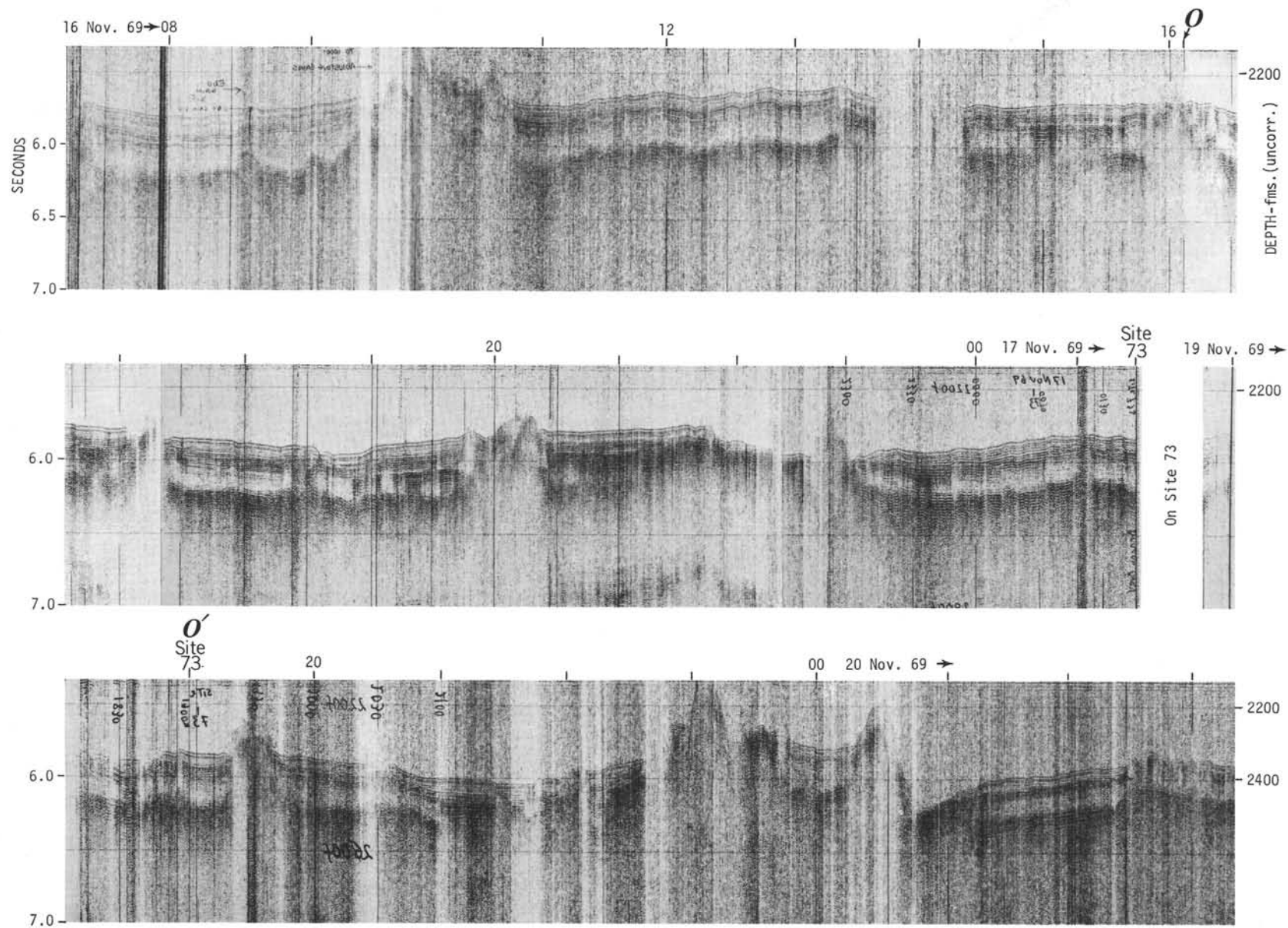


Figure 2j.

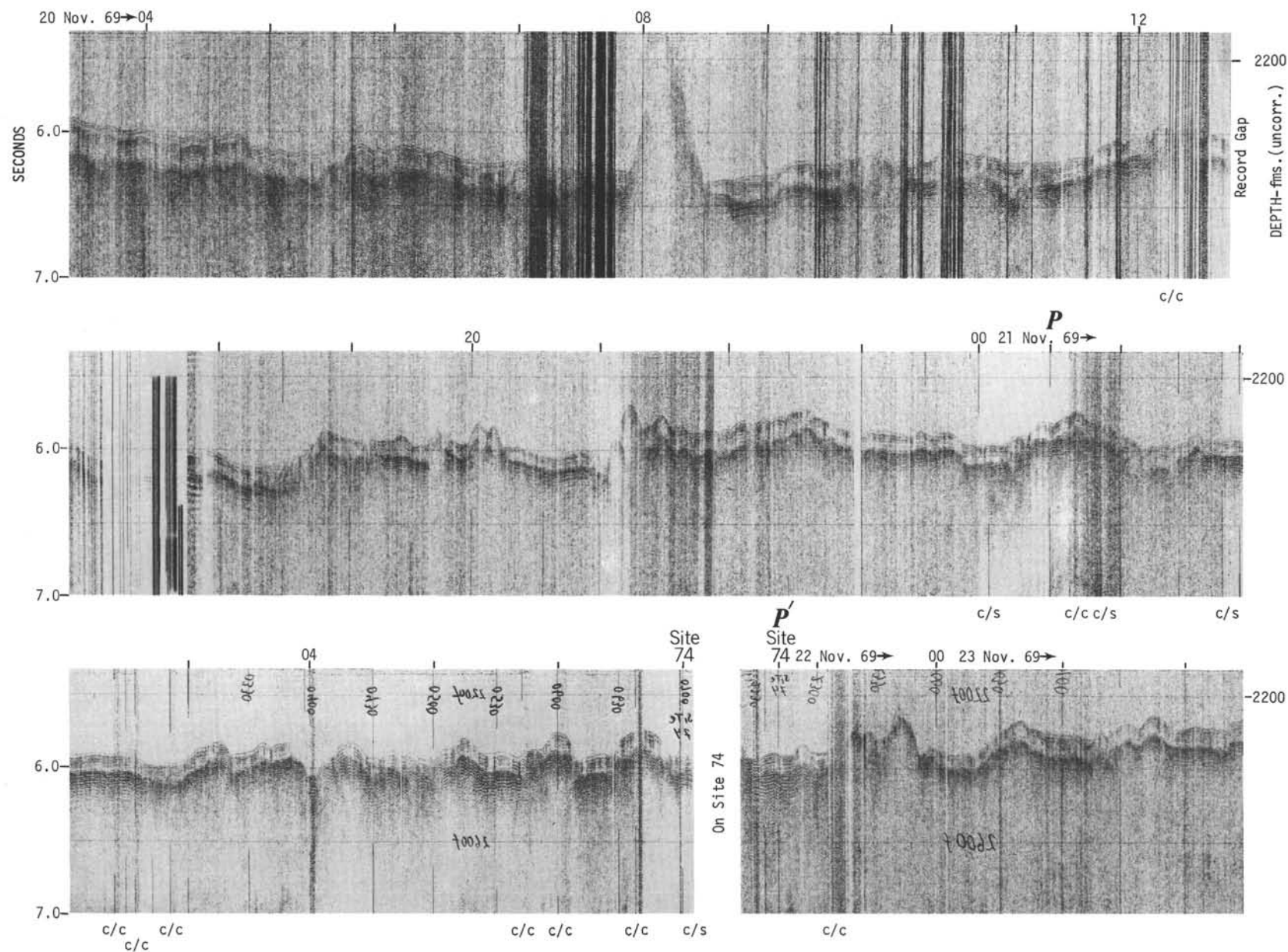


Figure 2k.

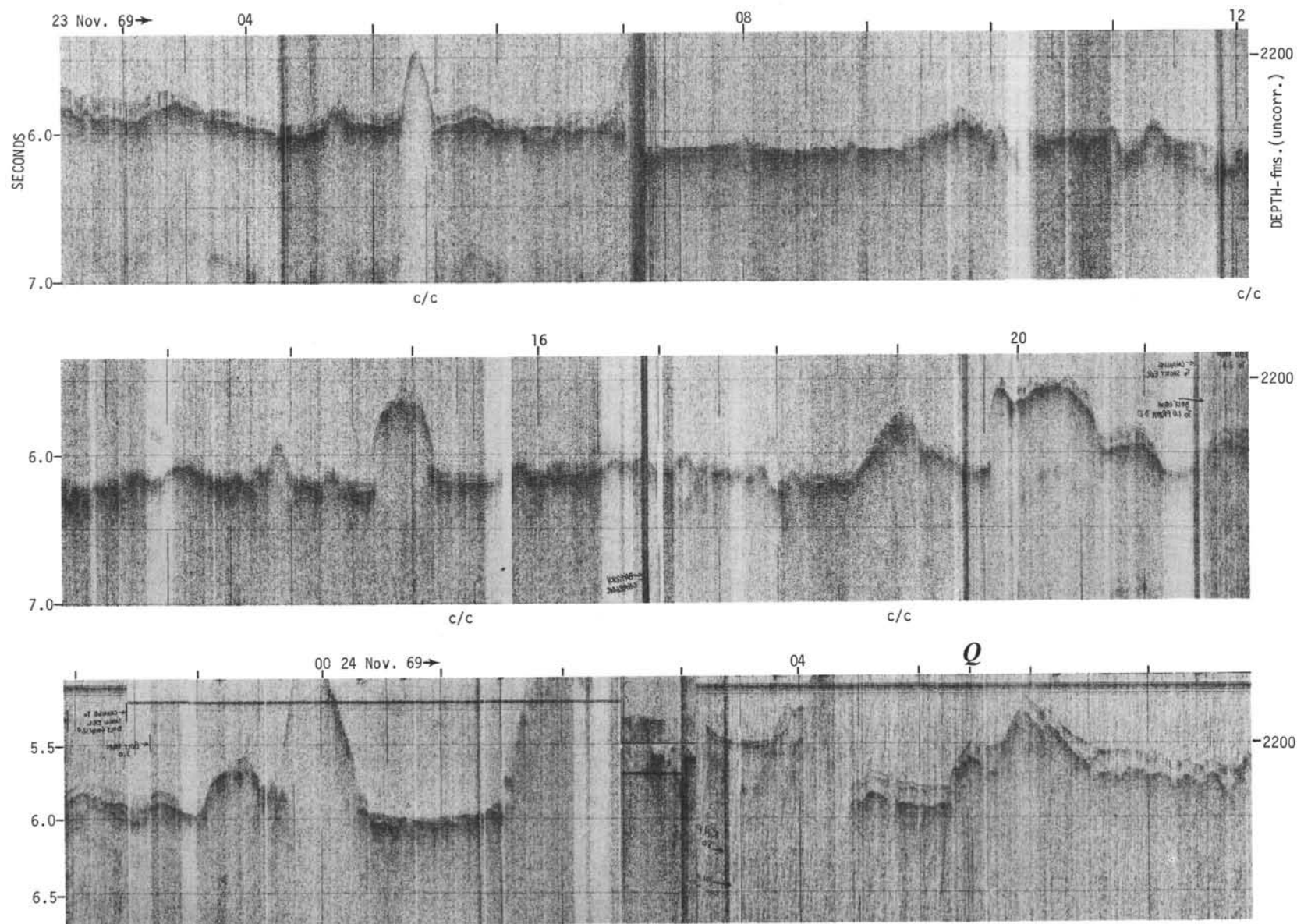


Figure 21.

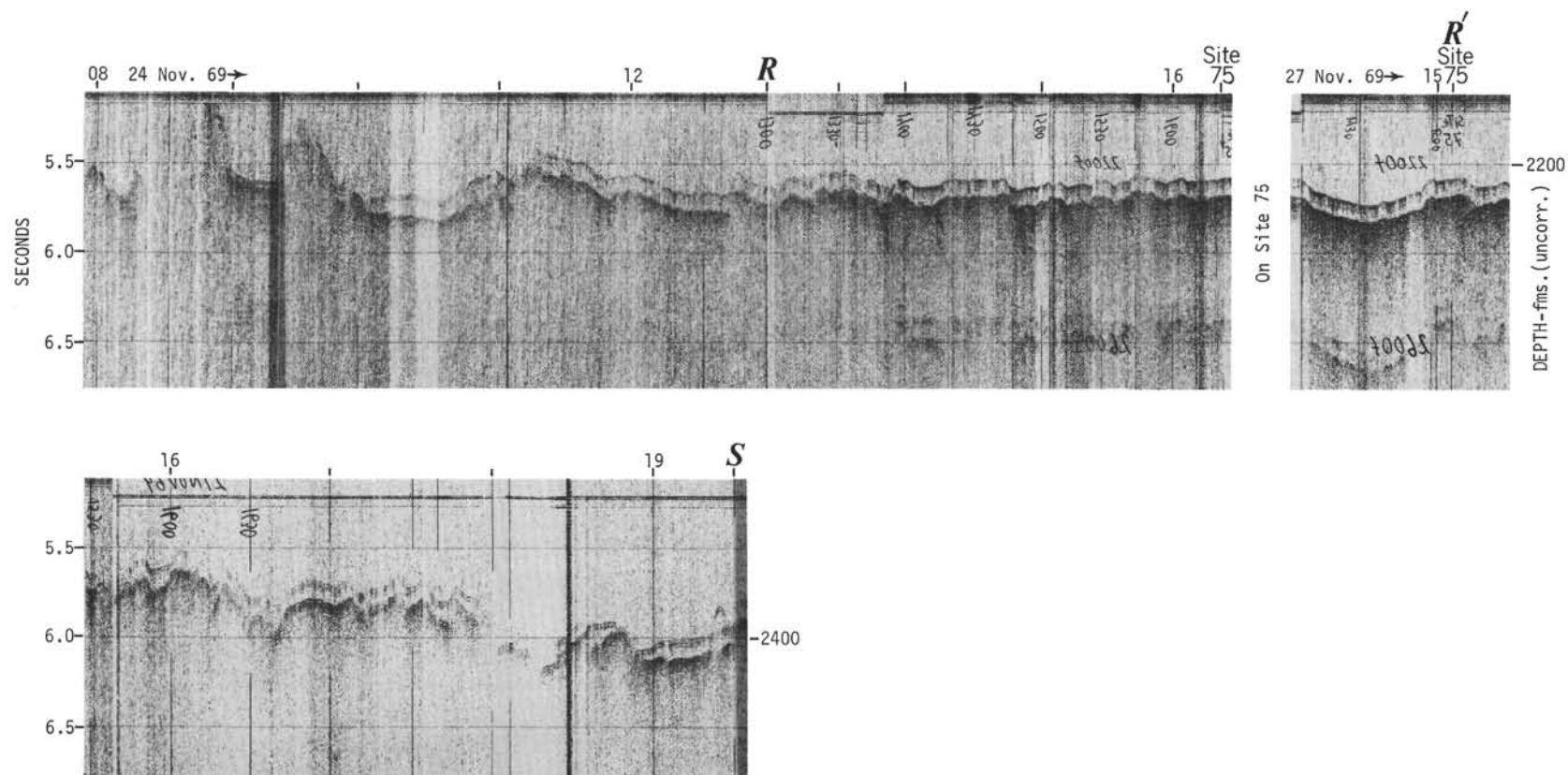


Figure 2m.

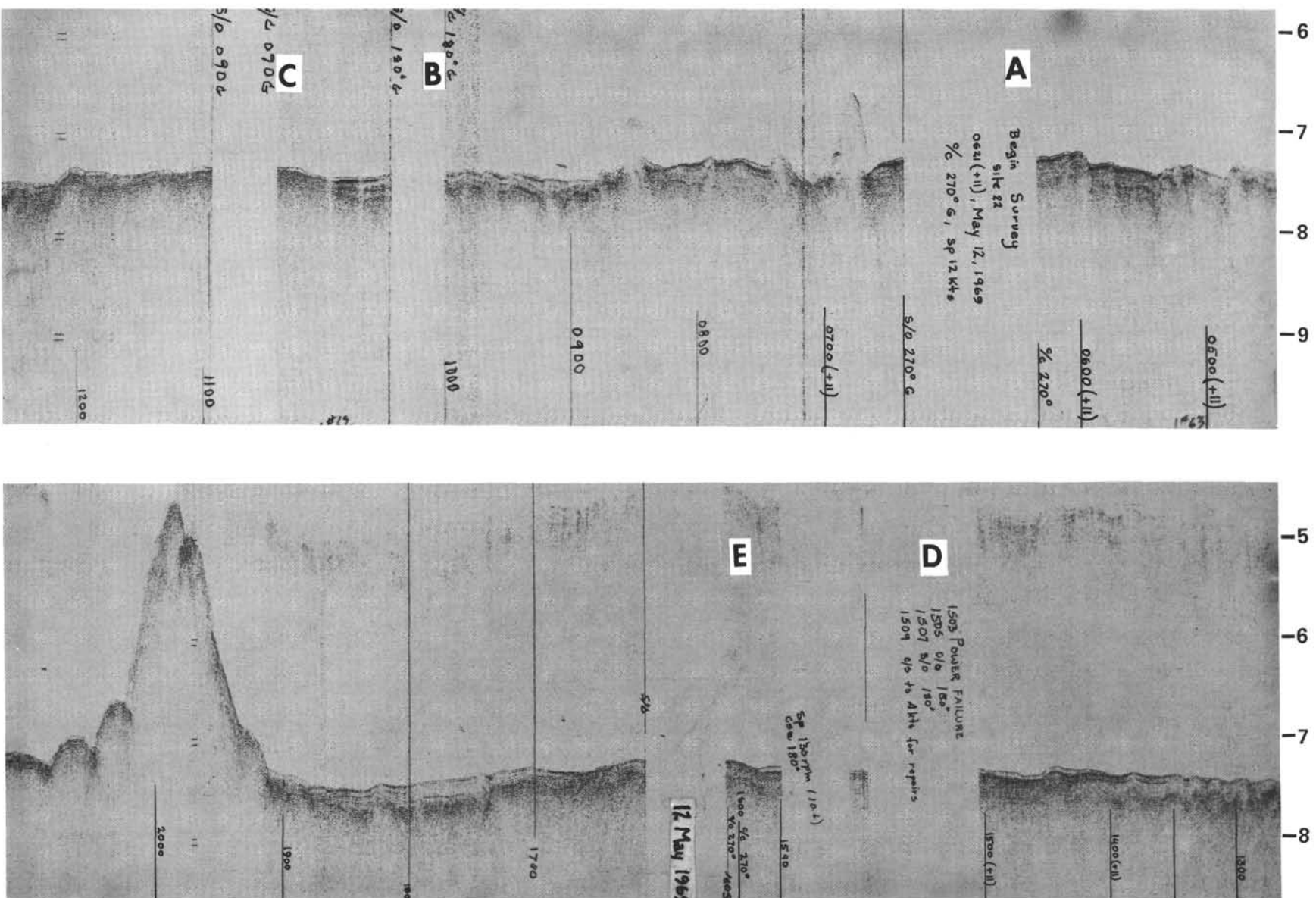


Figure 4a. Airgun records from survey of Site 68. Letters correlate with those on track shown in Figure 3.

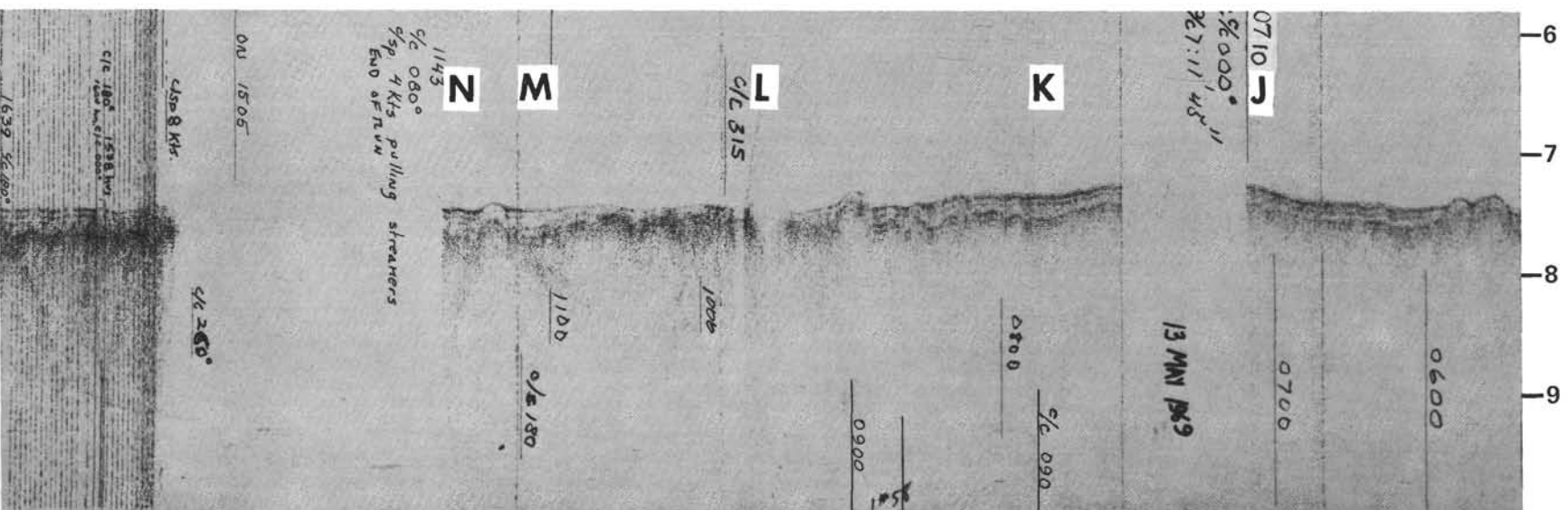
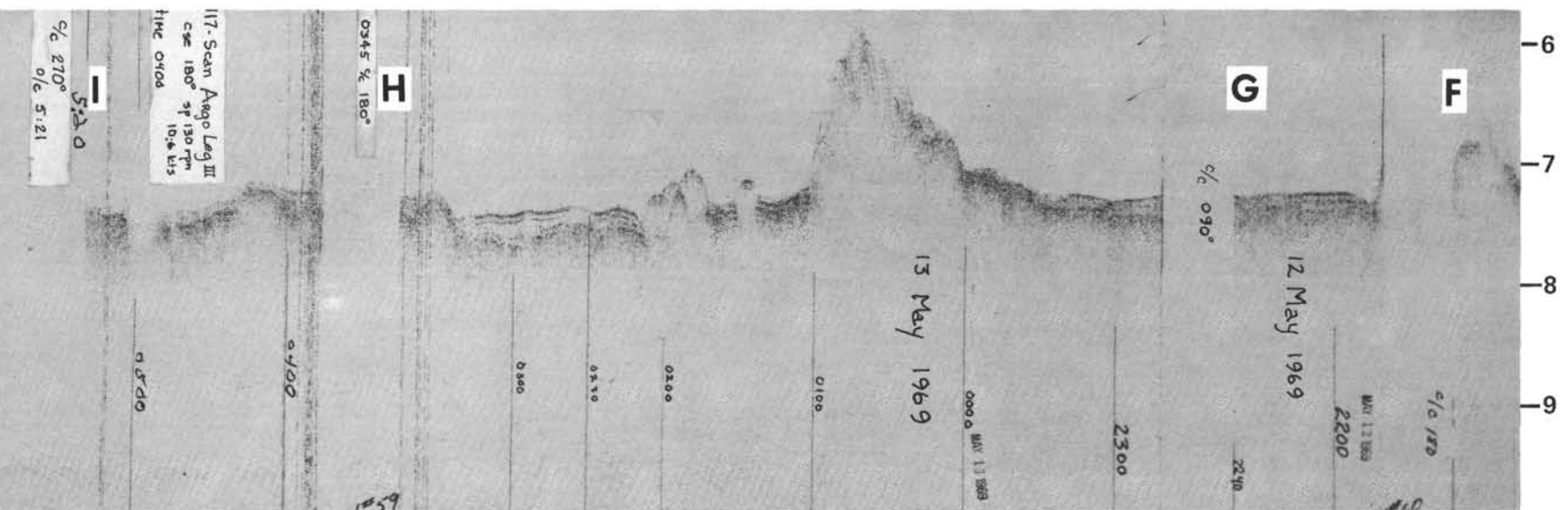


Figure 4b.

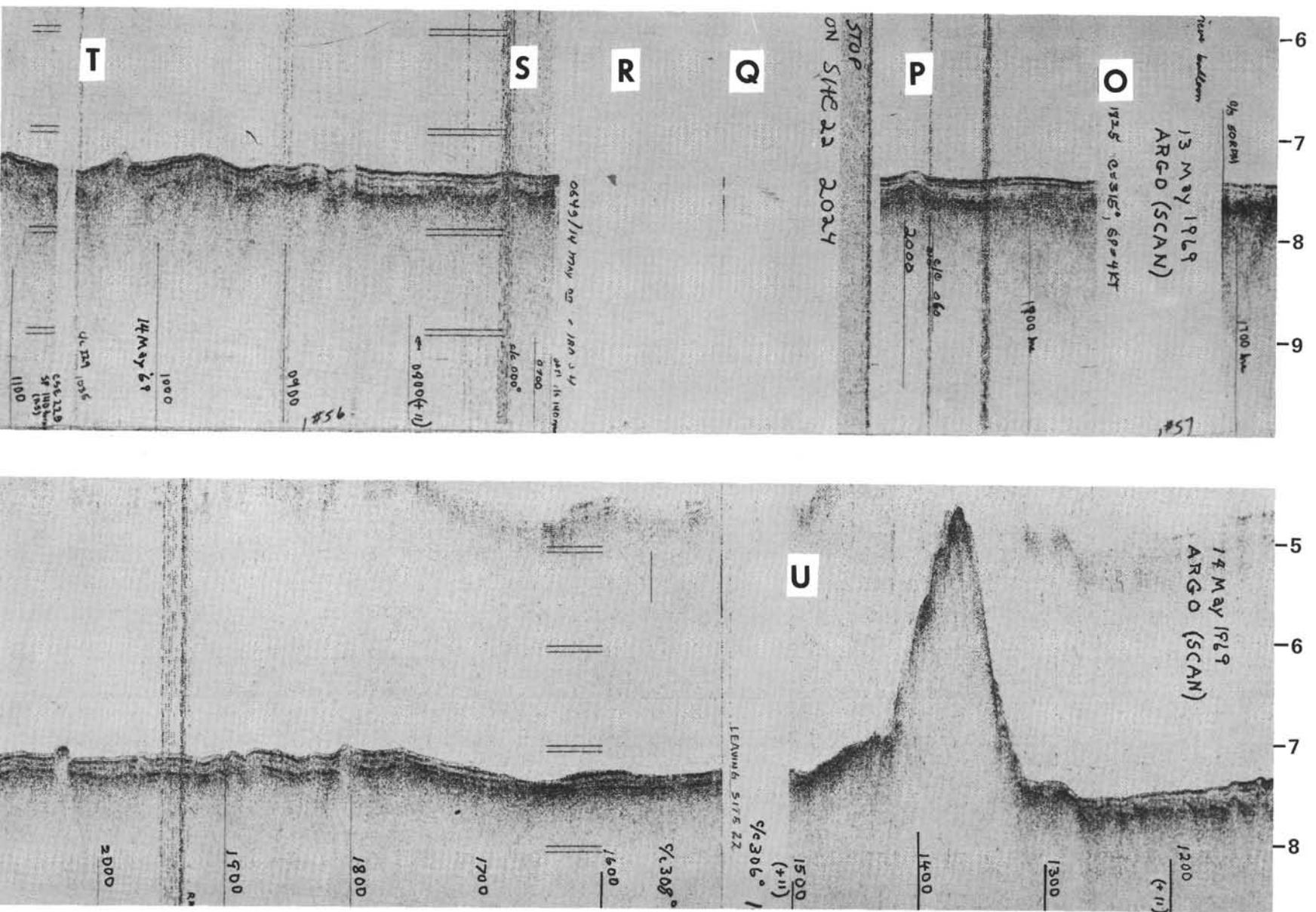


Figure 4c.

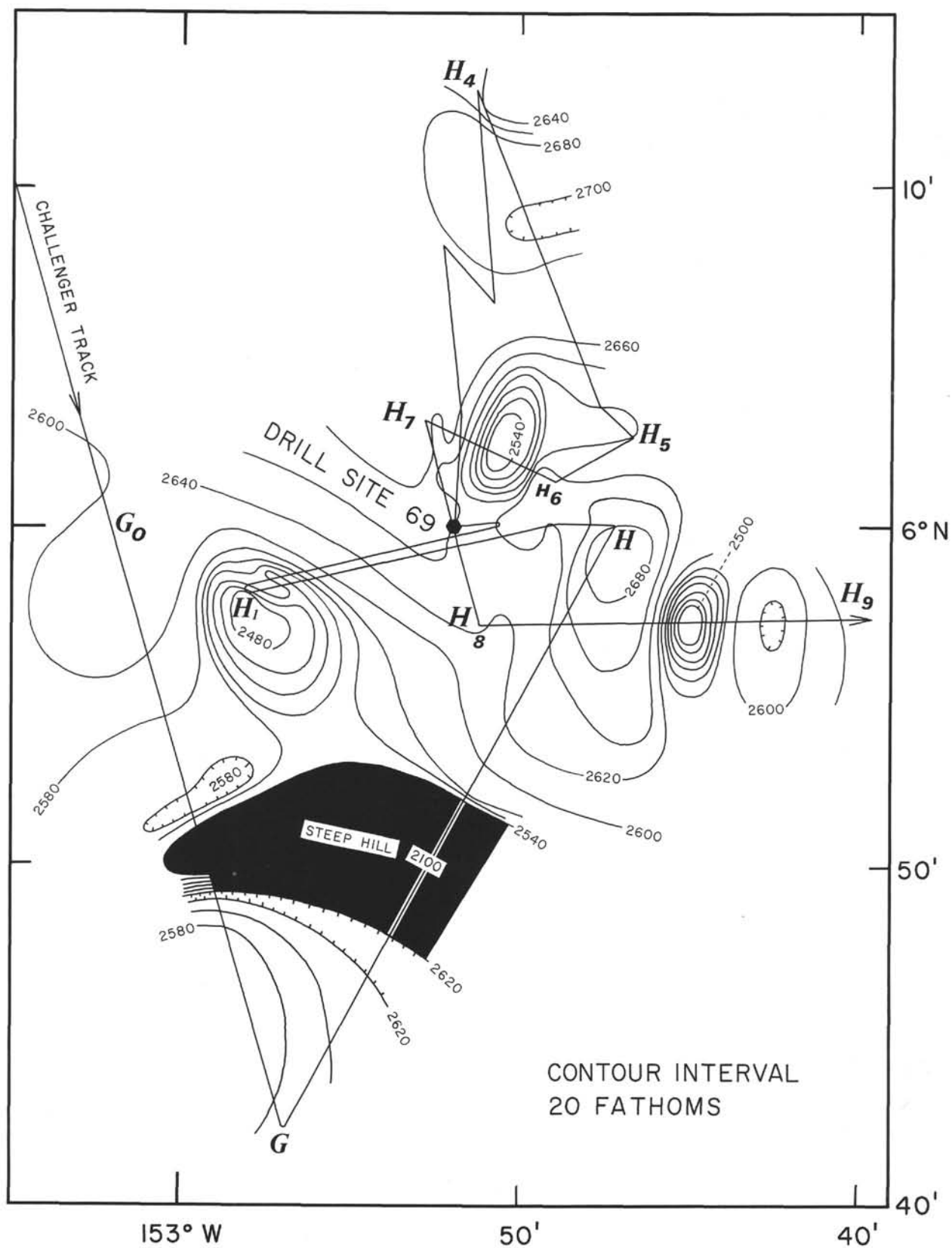


Figure 5. Survey tracks and bathymetry for Site 69. Letters correlate with those on airgun records in Figure 6.

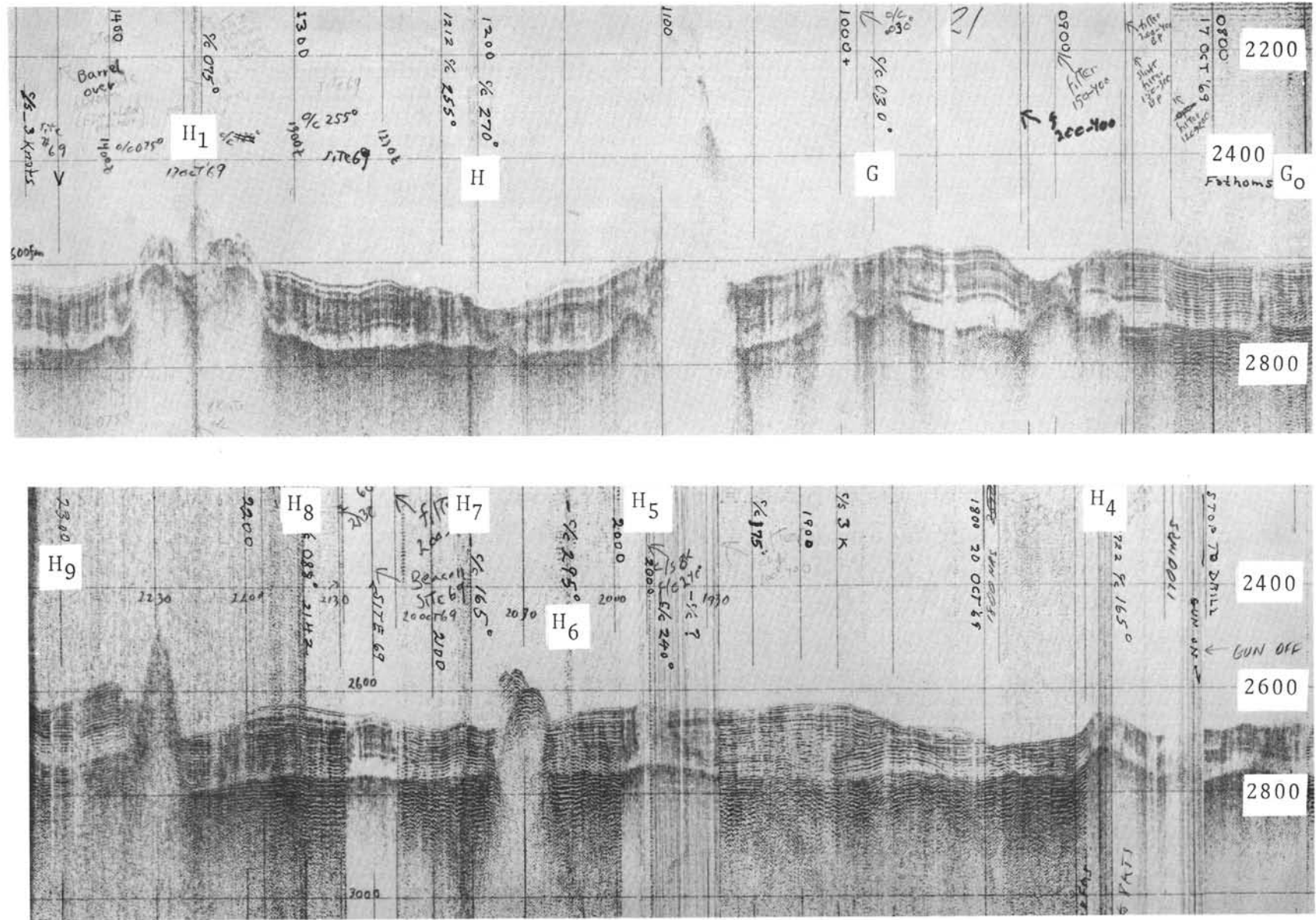


Figure 6. Airgun records from survey of Site 69. Letters correlate with those on track shown in Figure 5.

Magnetic anomalies associated with seamounts in the surveyed area are less than 50 γ . Total variation throughout the area is less than 150 γ .

SITE 70 (PAP, SCAN SITE 24)

Topography in the vicinity of the site is shown in Figure 7 and airgun records are shown in Figure 8 (discussed in Chapter 5). Site 70 is the northernmost of the N-S line of sites occupied during Leg 8 and lies immediately north of the Clipperton Fracture Zone. In Chapter 2, Figure 13 shows the airgun record between Sites 70 and 71 across the fracture zone, and Figure 14 is a cross section of water depth and depth to acoustic basement along the entire track between Sites 70 and 75.

Magnetic anomalies have an amplitude of about 50 γ with no noticeable lineations.

The following additional information was obtained for the site during the SCAN survey:

Piston cores – locations 06°18.8'N, 140°21.1'W and 06°24.8'N, 140°19.7'W, lengths 12.1 and 11.5 meters, respectively (Chapter 5);

Camera station – smooth bottom;

Heat flow station – 2.03 $\mu\text{cal cm}^{-2}\text{sec}^{-1}$;

Seismic refraction station.

SITE 71 (PAP, SCAN SITE 25)

Topography in the vicinity of the site is shown in Figure 9 and airgun records are shown in Figure 10 (discussed in Chapter 6).

Relatively large magnetic anomalies (greater than 250 γ) are present in the area, possibly related to the Clipperton Fracture Zone. They appear to be lineated in a northwesterly direction.

The following additional information was obtained for the site during the SCAN survey:

Piston core – location 04°27.6'N, 140°14.8'W, length 9.9 meters (Chapter 6);

Camera station – relatively smooth surface with evidence of current action and biological activity;

Heat flow station – 1.55 $\mu\text{cal cm}^{-2}\text{sec}^{-1}$ (Chapter 18);

Seismic refraction station and wide-angle reflection profiling.

SITE 72

Topography in the vicinity of the site is shown in Figure 11 and airgun records are shown in Figure 12 (discussed in Chapter 7). There was no SCAN survey for the site.

Magnetic anomalies in the surveyed area are 25 to 50 γ in amplitude. No pattern was established by the survey.

SITE 73

Topography in the vicinity of the site is shown in Figure 13 and airgun records are shown in Figure 14 (discussed in Chapter 8). There was no SCAN survey for this site.

Magnetic anomalies in the surveyed area are 25 γ or less in amplitude. No pattern was established by the survey.

SITE 74 (PAP, SCAN SITE 26)

Topography in the vicinity of the site is shown in Figure 15 and airgun records are shown in Figure 16 (discussed in Chapter 9).

Magnetic anomalies in the surveyed area are 50 γ or less in amplitude. Near the site they are about 25 γ . There is some indication that magnetic lineations trend roughly E-W.

The following additional information was obtained for the site during the SCAN survey:

Piston core – location 06°31.47'S, 136°00.573'W, length 1.2 meters (Chapter 9);

Gravity core – length 0.7 meters;

Heat flow station;

Seismic refraction station.

SITE 75 (PAP, SCAN SITE 27)

Topography in the vicinity of the site is shown in Figure 17 and airgun records are shown in Figure 18 (discussed in Chapter 10).

Magnetic anomalies in the surveyed area occasionally exceed 250 γ . There is no obvious correlation between the anomalies and topography.

The following additional information was obtained for the site during the SCAN survey:

Piston core – location 12°14.66'S, 134°18.753'W, length 3.6 meters (Chapter 10);

Seismic refraction station.

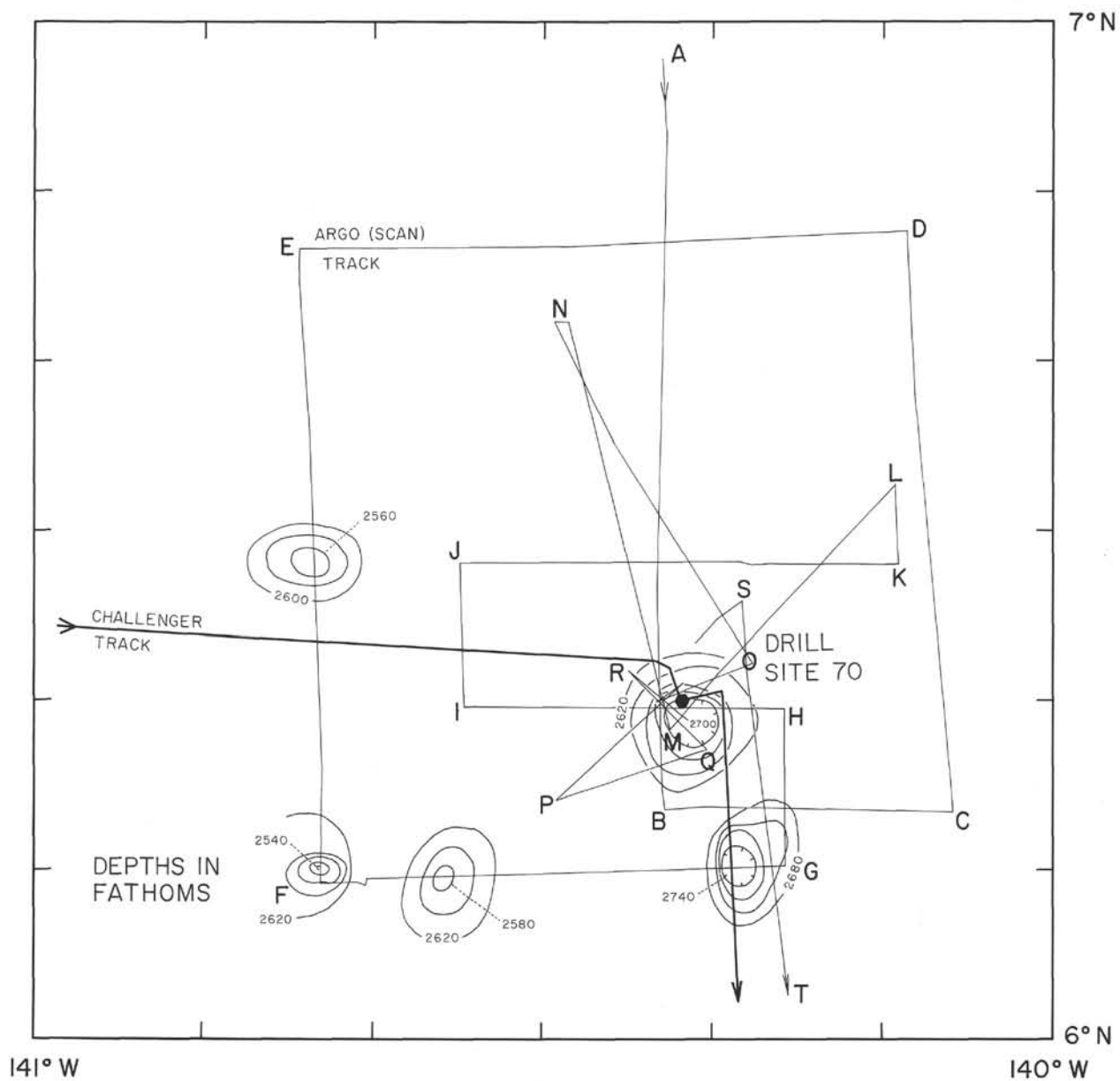


Figure 7. Survey tracks and bathymetry for Site 70. Letters correlate with those on airgun records in Figure 8.

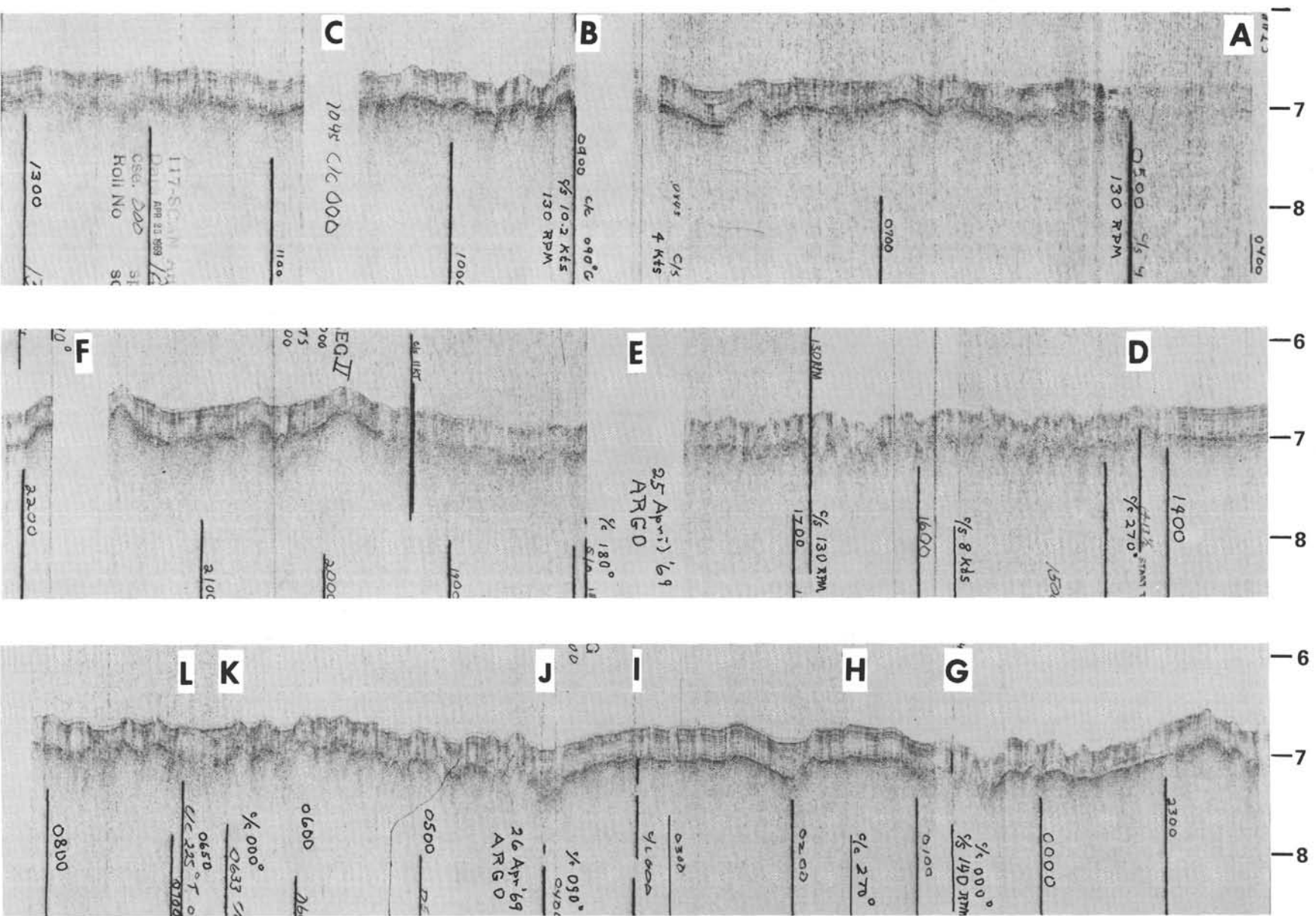


Figure 8a. Airgun records from survey of Site 70. Letters correlate with those on track shown in Figure 7.

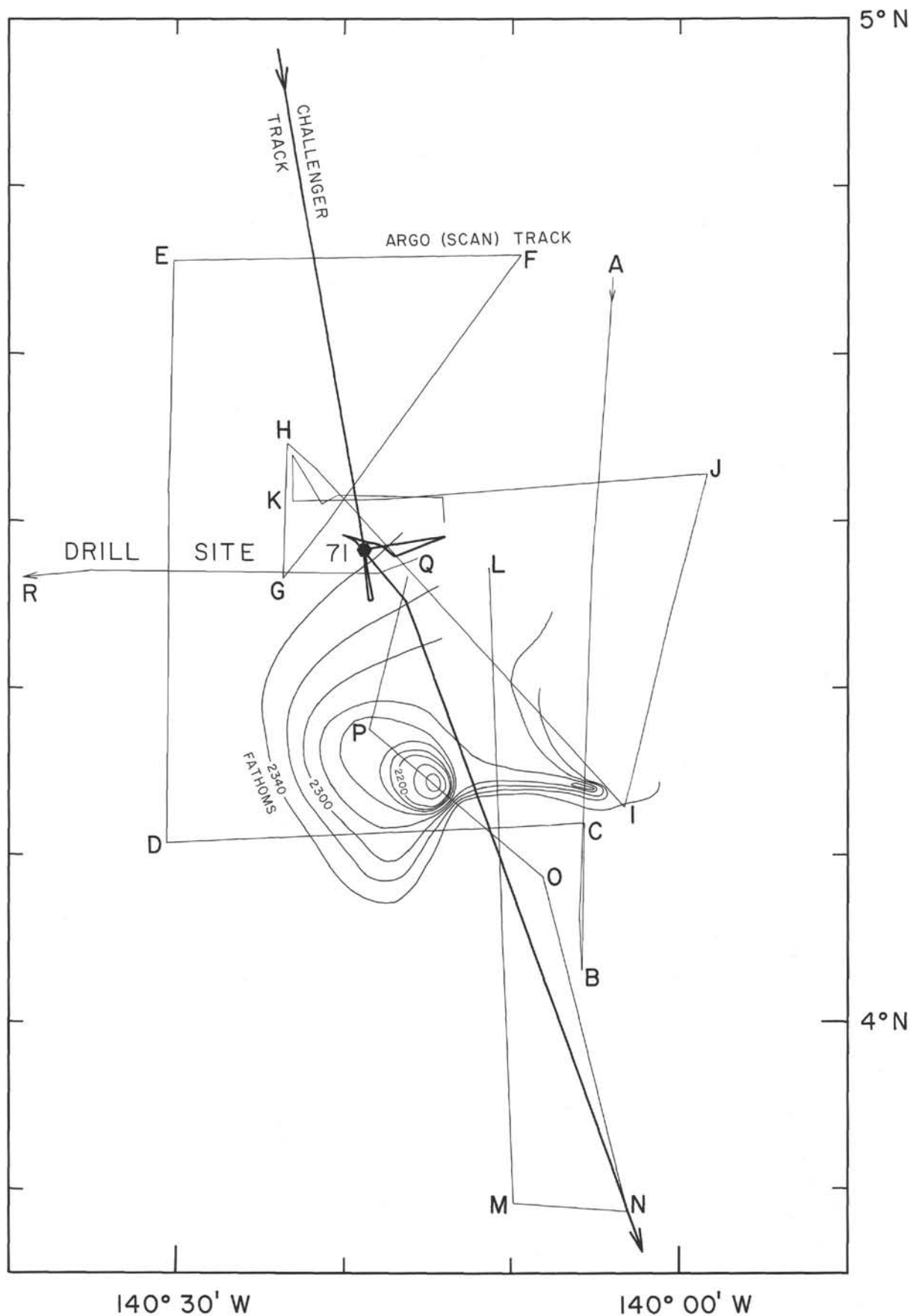


Figure 9. Survey tracks and bathymetry for Site 71. Letters correlate with those on airgun records in Figure 10.

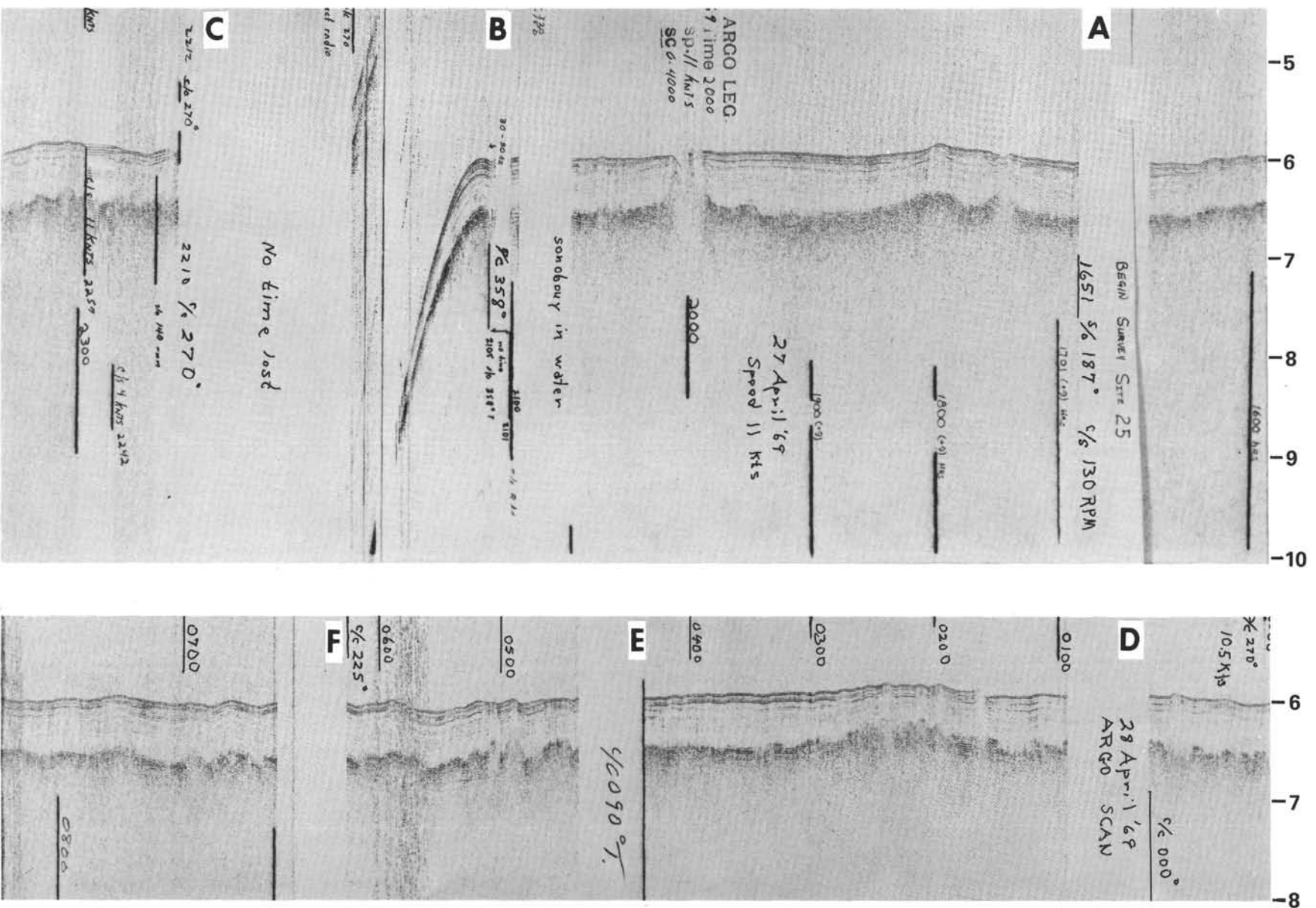


Figure 10a. *Airgun records from survey of Site 71. Letters correlate with those on track shown in Figure 9.*

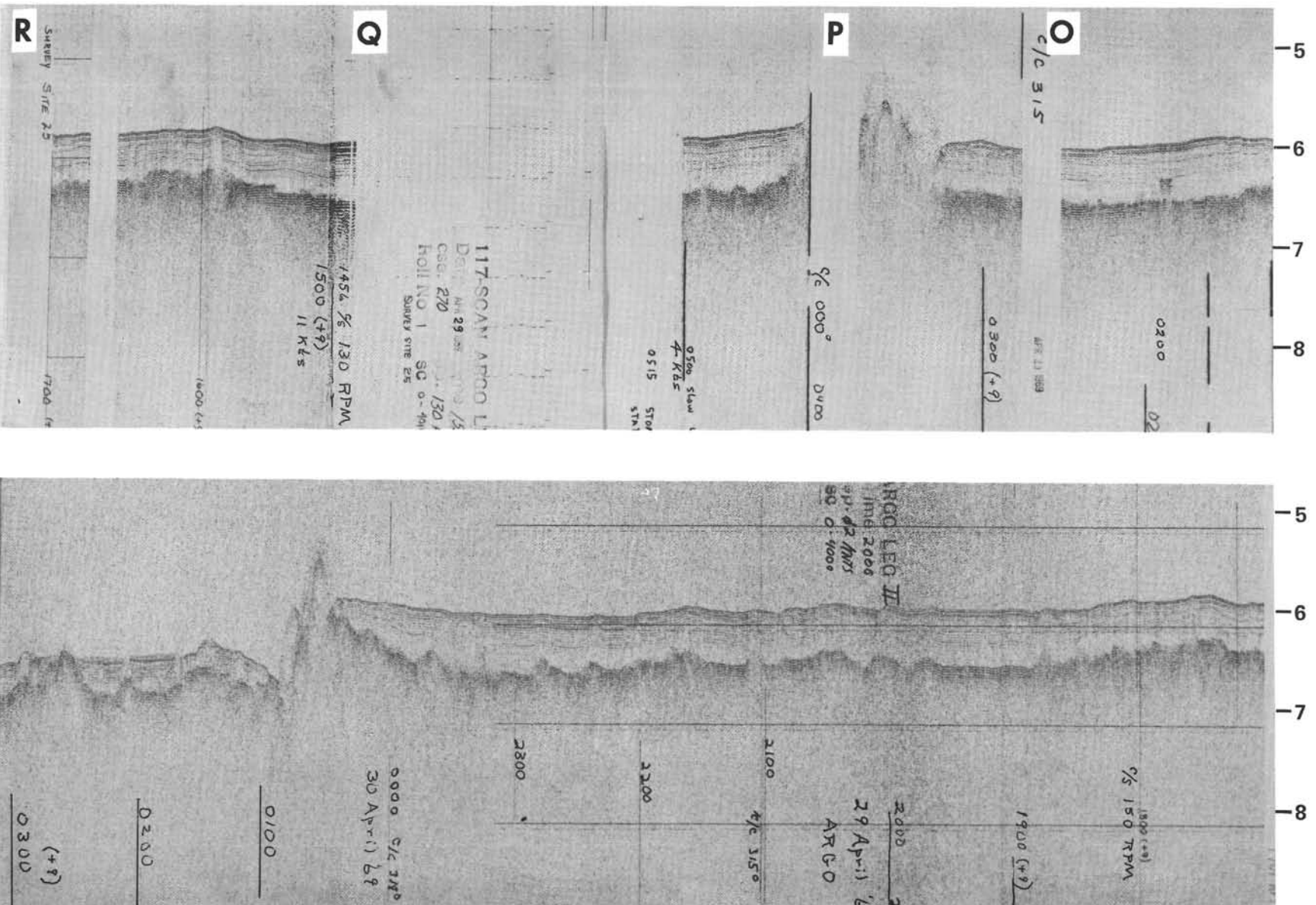


Figure 10c.

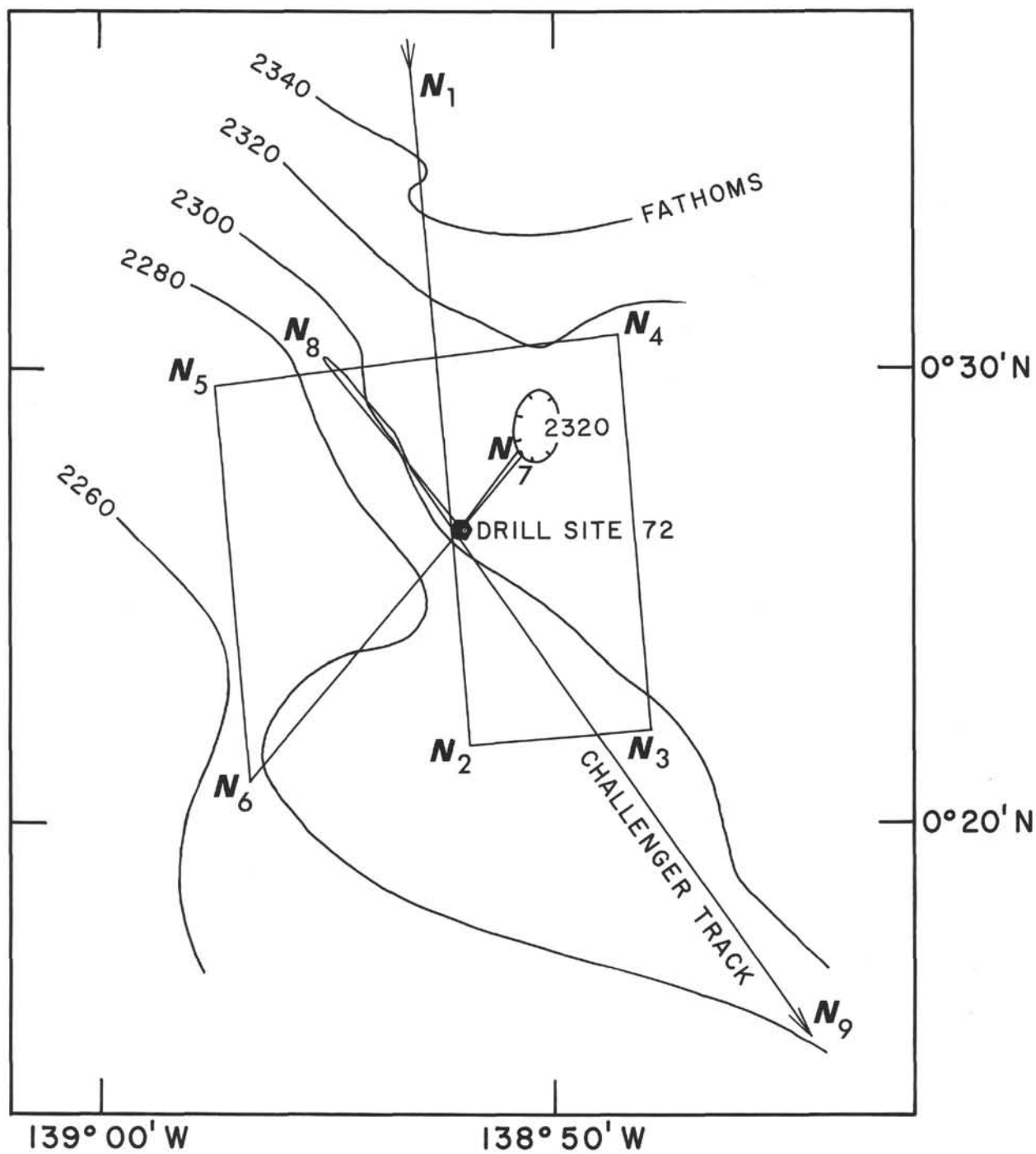


Figure 11. Survey tracks and bathymetry for Site 72. Letters correlate with those on airgun records in Figure 12.

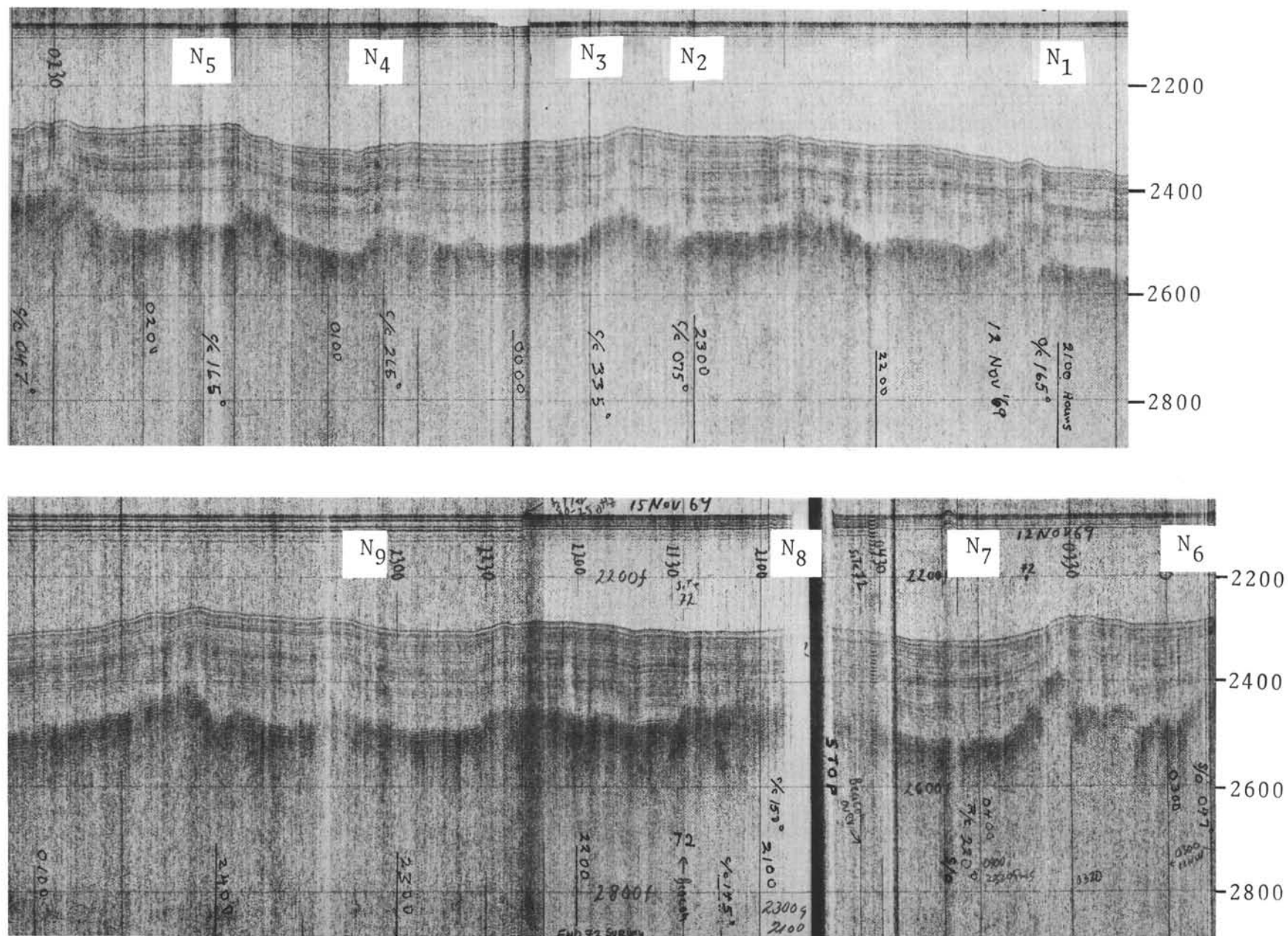


Figure 12. Airgun records from survey of Site 72. Letters correlate with those on track shown in Figure 11.

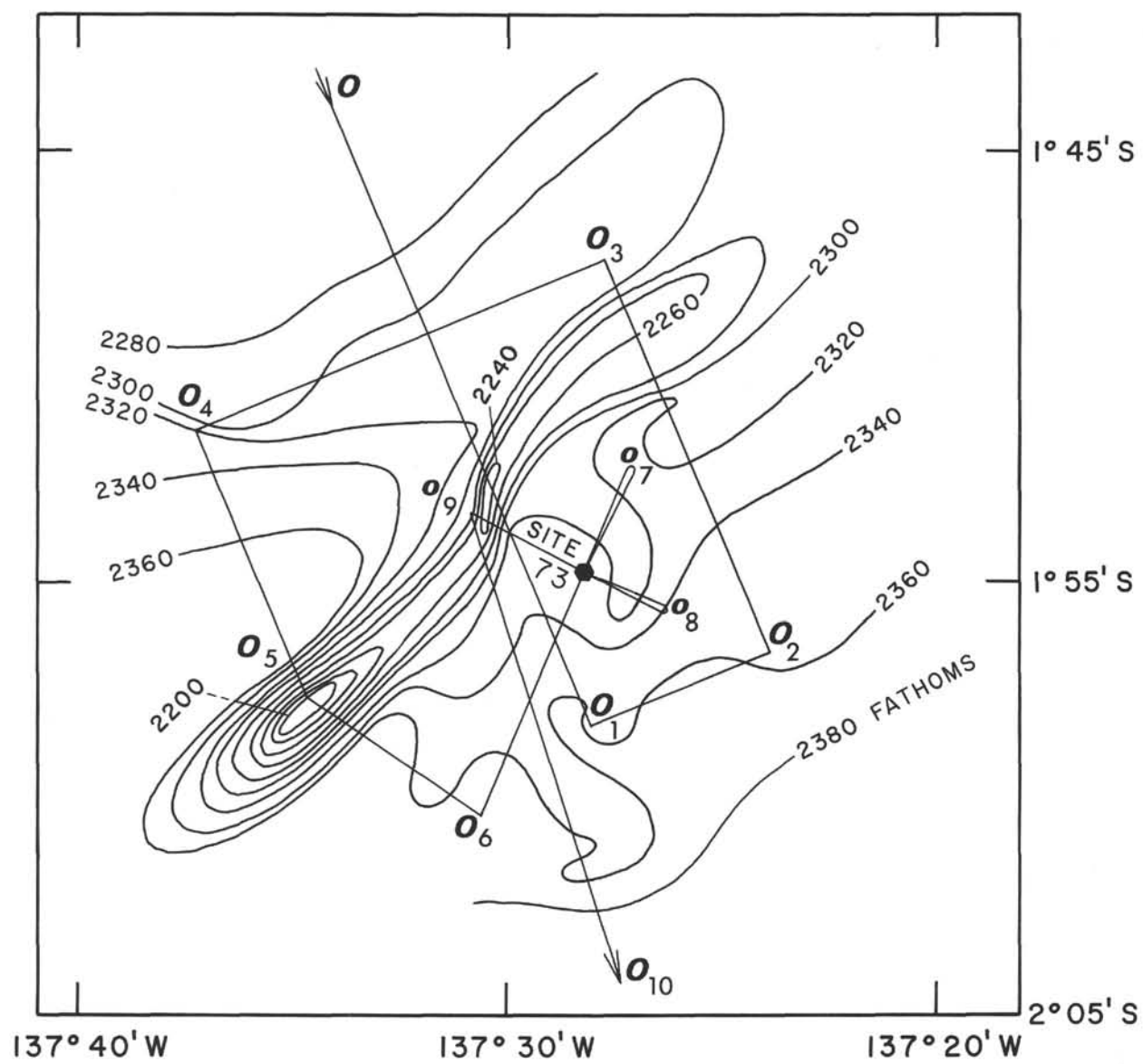


Figure 13. Survey tracks and bathymetry for Site 73. Letters correlate with those on airgun records in Figure 14.

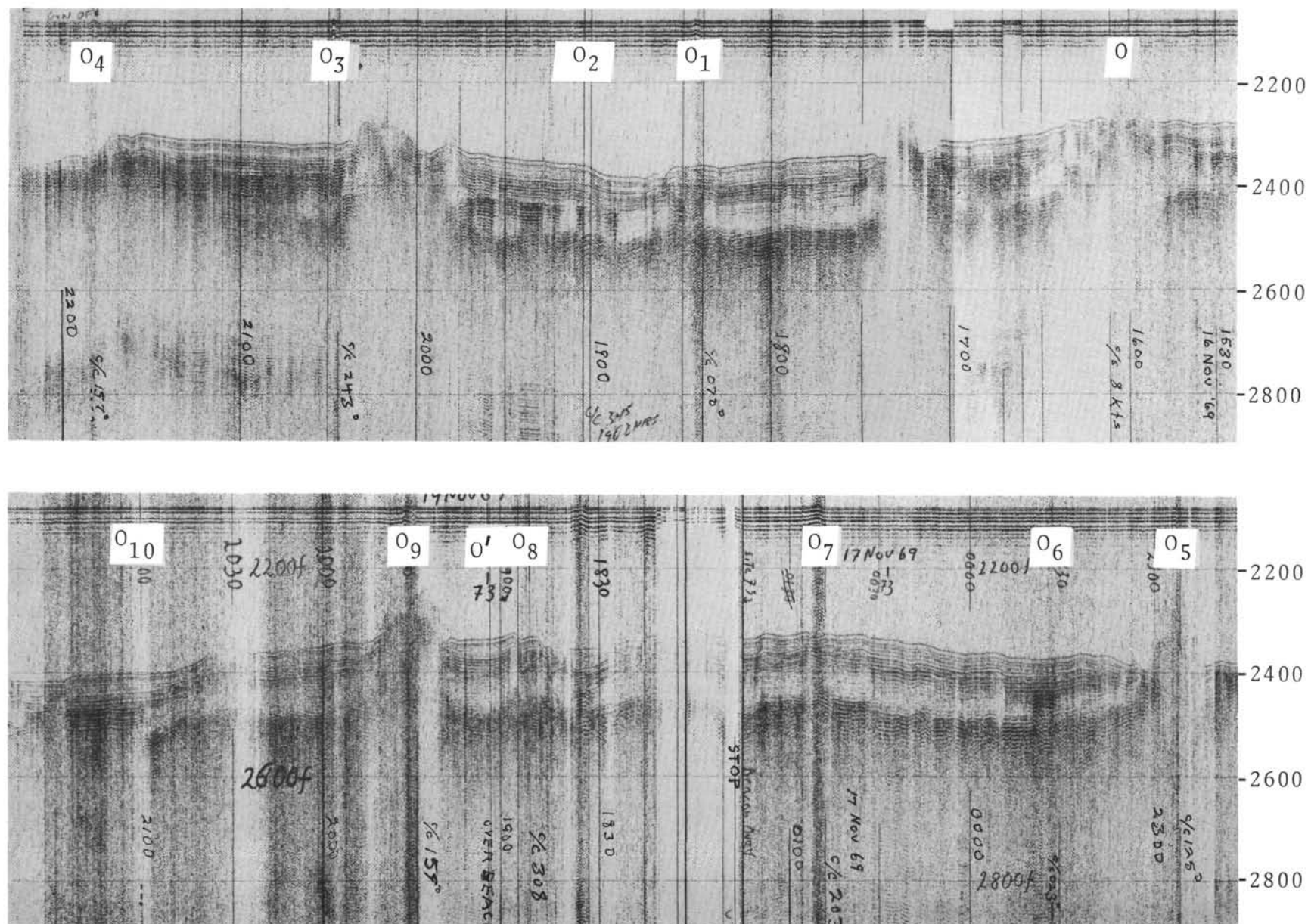


Figure 14. Airgun records from survey of Site 73. Letters correlate with those on track shown in Figure 13.

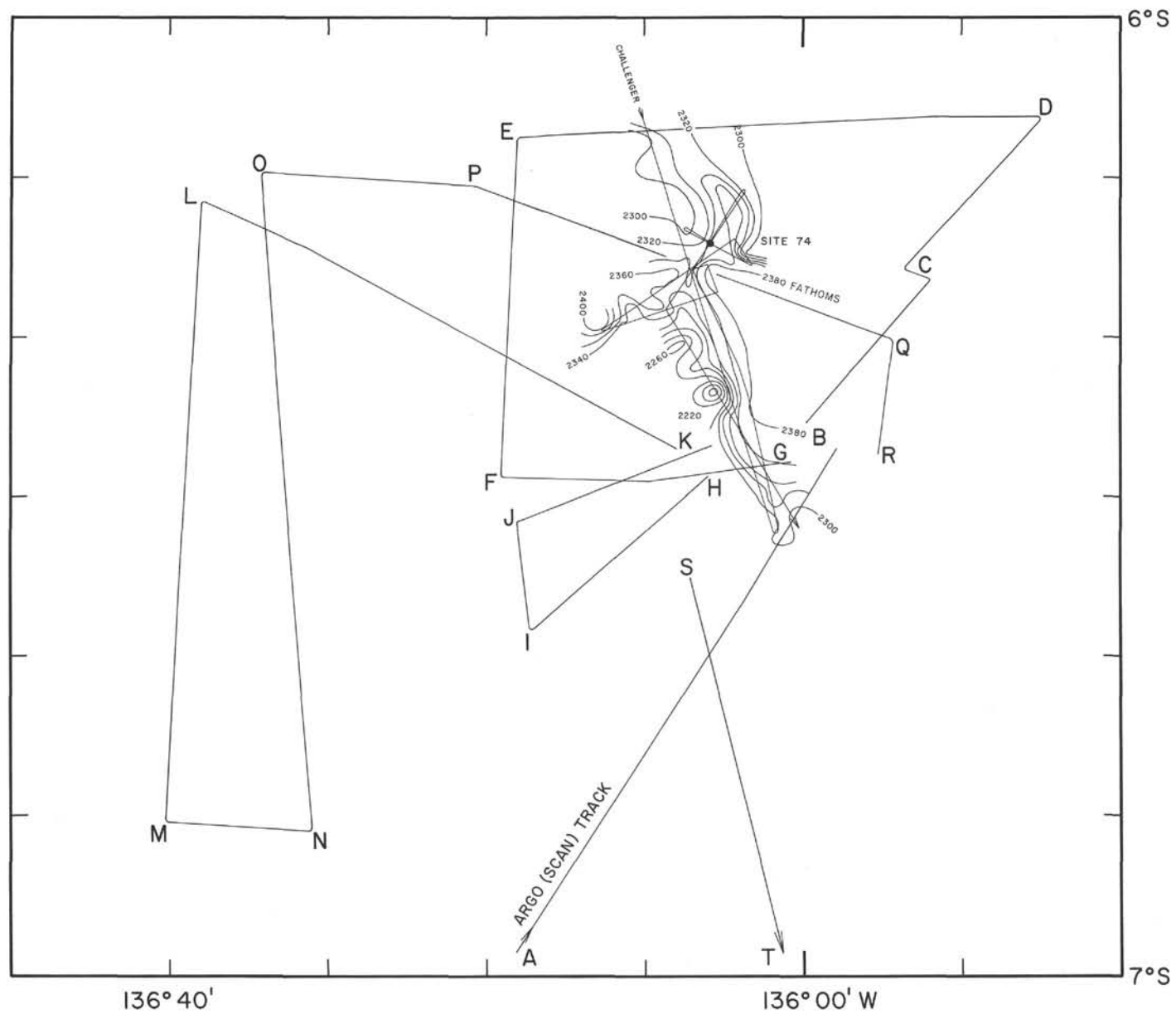


Figure 15. Survey tracks and bathymetry for Site 74. Letters correlate with those on airgun records in Figure 16.

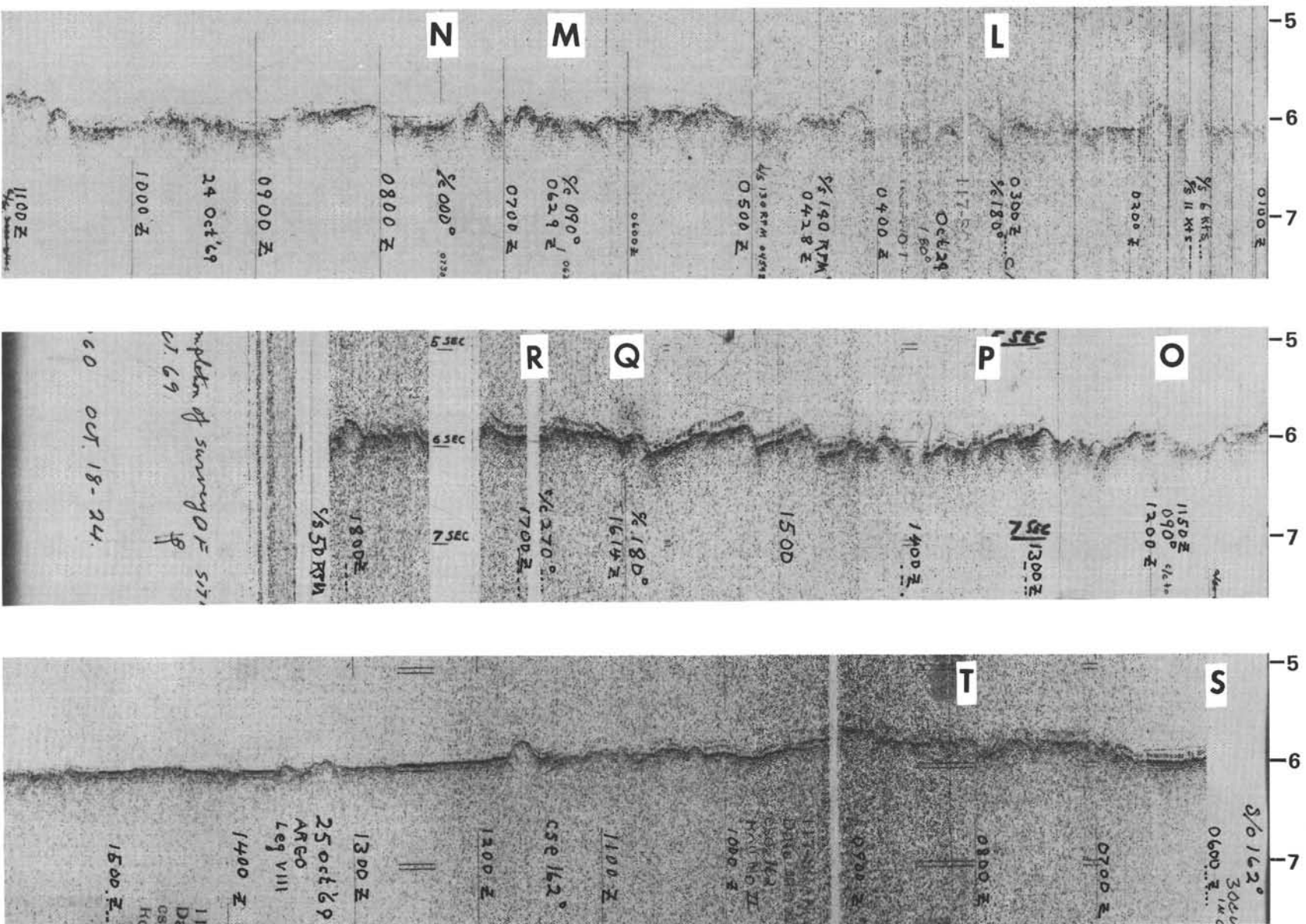


Figure 16b.

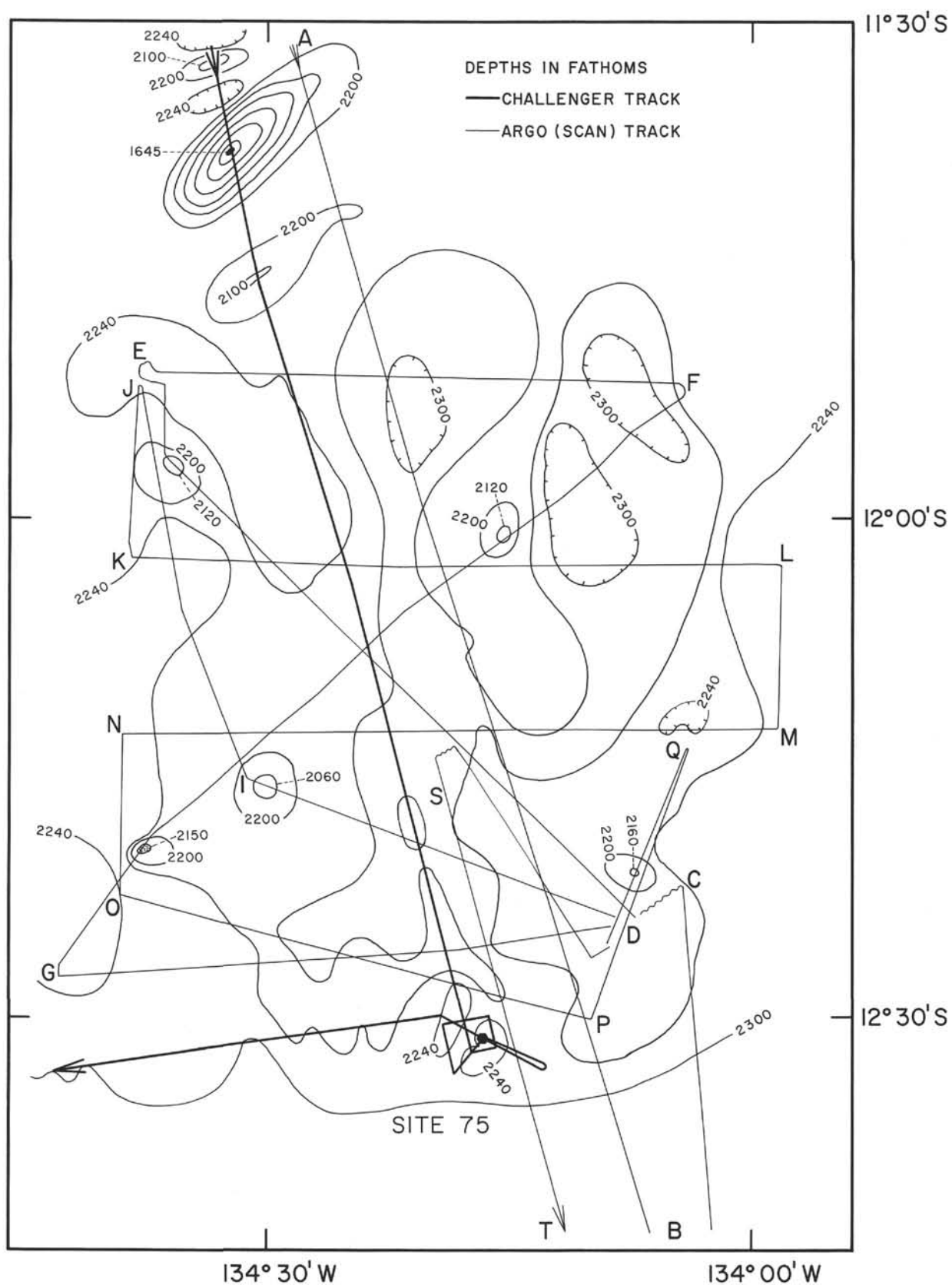


Figure 17. Survey tracks and bathymetry for Site 75. Letters correlate with those on airgun records in Figure 18.

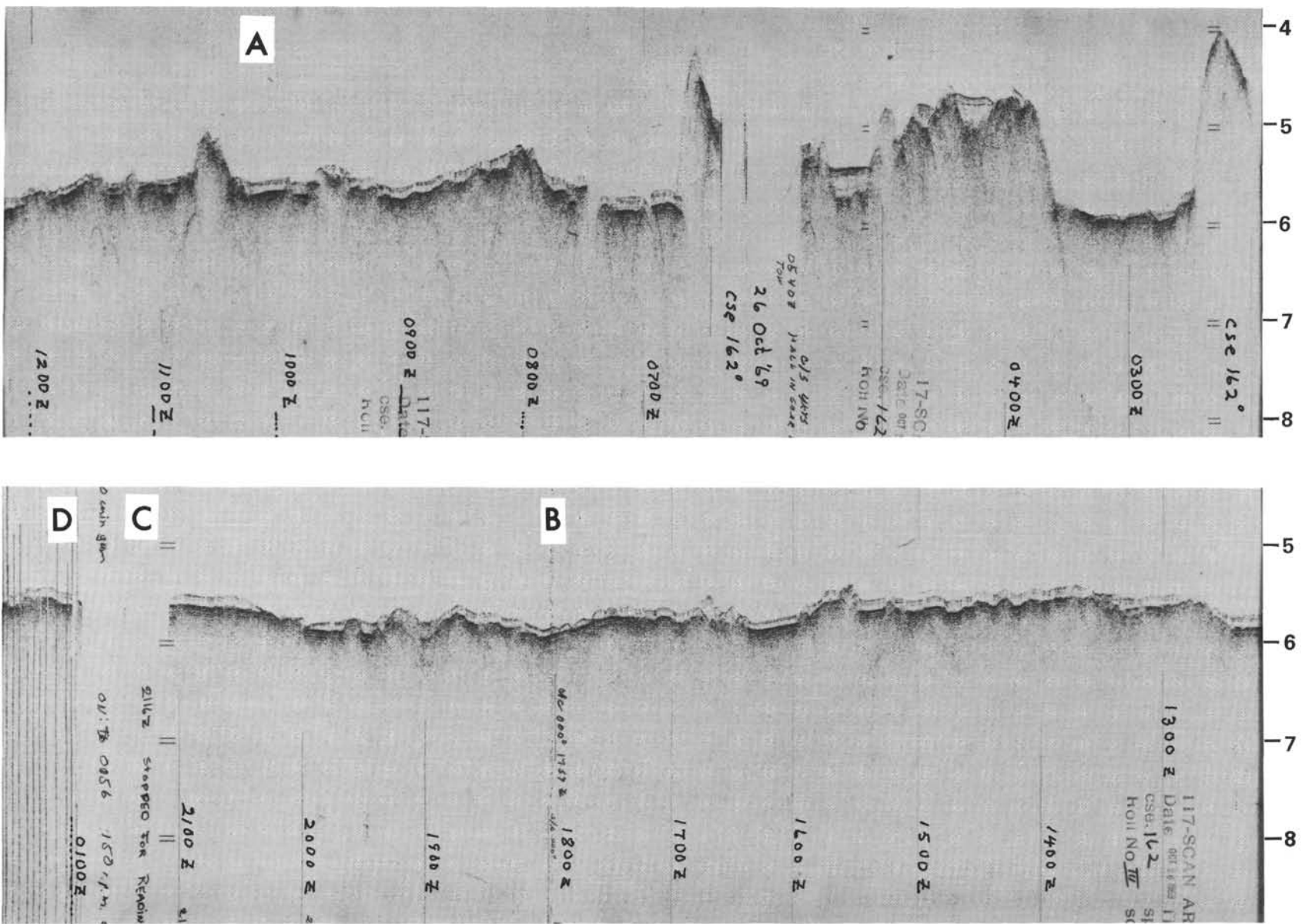


Figure 18a. Airgun records from survey of Site 75. Letters correlate with those on track shown in Figure 17.

