# 15. MAGNETIC, BATHYMETRIC, SEISMIC REFLECTION, AND POSITIONING DATA COLLECTED UNDERWAY ON *GLOMAR CHALLENGER*, LEG 44

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## DATA COLLECTION AND PRESENTATION

Leg 44 began in Norfolk, Virginia, on 16 August and returned to the same port on 30 September 1975. The track made by *Glomar Challenger* during this cruise is shown in Figure 1. Distance along the track in hundreds of nautical miles is shown progressively by the small numbers, and the completed drill sites are indicated. Positioning information is listed in Table 1 along with calculated course and speed maintained between fixes. Navigation was achieved with satellite fixes supplemented with Loran A and C when available. Accuracy of these underway positions is usually within one nautical mile, and the final refined position on station is accurate to within a few tenths of a nautical mile (Talwani et al., 1966). The regional magnetic anomaly for each navigation point as calculated from the coefficients of Cain et al. (1968) is also tabulated in Table 1. These values were used to compute the magnetic anomaly profiles shown in Figure 2.

The magnetic anomaly and bathymetric data are presented as profiles (Figure 2) plotted against linear distance along the track as indicated on the lowermost scale given in hundreds of nautical miles. Also plotted in digital form are the latitude and longitude at navigation points, course and speed between points, date, and time. The vertical scales in Figure 2 are given in gammas for the magnetic anomaly profile and in uncorrected fathoms for water depth. The magnetic data are the darker of the two profiles and have less variation. A nominal speed of sound of 800 fathoms per second is assumed to calculate the bathymetric profile. The reduction of these magnetic and bathymetric data and the presentation of the profiles follow the format of Lamont-Doherty Geological Observatory, who kindly provided these illustrations (Talwani, 1969). The locations of the drill sites completed are also indicated on the plots.

The continuous seismic reflection profile is shown in Figure 3 (foldout, back cover of this volume). Reflection times in seconds of two-way travel time are plotted along the sides of the profiles, and they can be used to determine depth at a conversion rate of 400 fathoms or 750 meters per second. The tick marks along the bottom of the profile mark half-hour intervals; course and speed changes are also marked. The time (given in Greenwich Mean Time), date, speed, and heading maintained between course and speed changes are also indicated. Portions of the profiler record discussed in the text are cited by date. The sites are noted along the upper edge of the profiles. Individual profiles can be located along the track (Figure 1) by converting GMT (ship's time) to location and distance along the track using Table 1.

Two Bolt airguns towed in array and fired every 20 seconds at 2000 psi provided the sound source for these profiles. Chamber sizes were maintained at 40 in.$^3$ for each gun, when possible. Filter settings were generally 20 to 160 Hz. The data presented here were recorded on a dry paper EDO recorder at a 10 second sweep.

## DISCUSSION

The underway geophysical gear was streamed shortly after *Glomar Challenger* left Norfolk, Virginia, and had reached water sufficiently deep to tow the array. We obtained a good profile transverse to the continental margin. Rough steep topography of the canyon-dissected continental slope gives way eastward to the smooth apron of the continental rise sedimentary prism (Figure 2 and Figure 3, 16 August). The continental rise levels off markedly at 180 nautical miles where 0.5 second of well-stratified turbidites are apparently ponded behind one of the landward ridges of the lower continental rise hills (Figure 2 and Figure 3, 17 August) Only at the lower continental rise hills do the deeper reflectors of *A*, *A**, $\beta$ and oceanic basement appear (Figure 3, 17 August), when the relatively low energy of *Glomar Challenger*'s airguns finally penetrated the 1.0 second of sedimentary section. Site 388 was drilled here in the lower continental rise hills.

The magnetometer data underway to Site 388 are characterized by low-amplitude, 50-gamma anomalies typical of the magnetically quiet zone. A prominent anomaly at 100 nautical miles is anomaly *E* of Rabinowitz (1974) which separates the inner (magnetically smoother) quiet zone from the outer (magnetically rougher) quiet zone.

When *Challenger* returned to Norfolk because of mechanical difficulty at Site 388, underway geophysical measurements were repeated over the same track to and from port (Figure 2 and Figure 3, 18 August to 22 August). The magnetometer data were collected higher on the shelf during this crossing so that we could see the prominent east coast anomaly at 510 and 540 nautical miles (Taylor et al., 1968).

After Site 388 was abandoned, *Glomar Challenger* sailed southwest toward the Blake Nose. This track

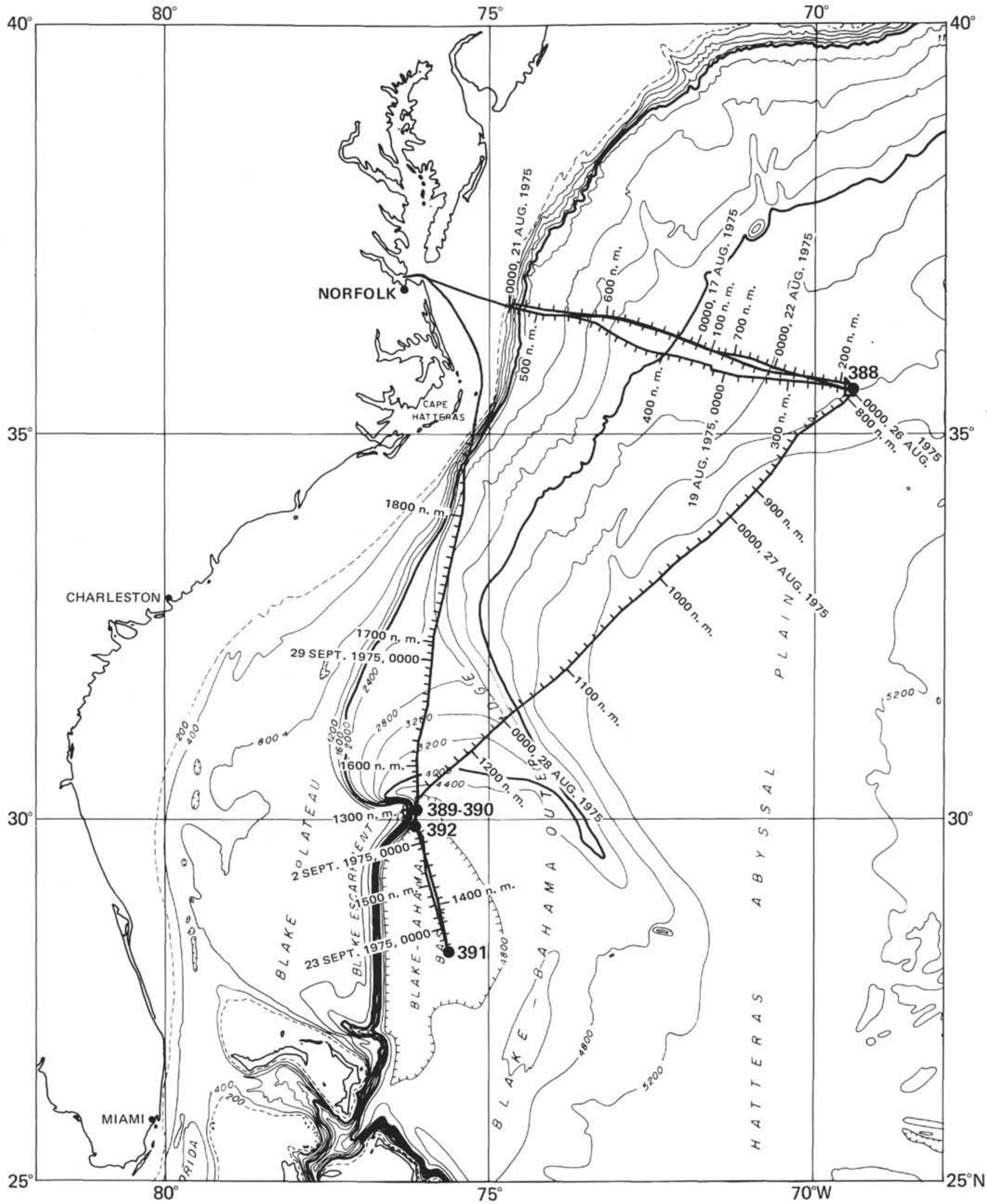


Figure 1. *Track chart of* Glomar Challenger *during Leg 44 from Norfolk, Virginia, to Norfolk, Virginia. Dots and larger numbers indicate sites. Smaller numbers denote distance along track in hundreds of nautical miles.*

**TABLE 1**
**Navigation Data for the Underway Portion of Leg 44 of *Glomar Challenger*, 16 August to 29 September 1975**

| Day | Time[a] (GMT) | Latitude (N) | Longitude (W) | Distance (nautical miles) | Speed (knots) | Course | Regional Magnetic Field (gammas) |
|---|---|---|---|---|---|---|---|
| **August** | | | | | | | |
| 16 | 1608 | 36°28.0′ | 73°32.8′ | 0.0 | 12.3 | 90 | 54652. |
| 16 | 1630 | 36°28.0′ | 73°27.2′ | 4.5 | 12.2 | 91 | 54637. |
| 16 | 1712 | 36°27.9′ | 73°16.6′ | 13.0 | 12.1 | 94 | 54607. |
| 16 | 1754 | 36°27.3′ | 73°06.1′ | 21.5 | 11.4 | 100 | 54573. |
| 16 | 1821 | 36°26.4′ | 72°59.8′ | 26.6 | 11.3 | 105 | 54549. |
| 16 | 1924 | 36°23.4′ | 72°45.6′ | 38.5 | 11.1 | 108 | 54485. |
| 16 | 2240 | 36°12.1′ | 72°02.7′ | 74.8 | 10.4 | 113 | 54269. |
| 17 | 000 | 36°06.7′ | 71°46.8′ | 88.8 | 10.6 | 113 | 54178. |
| 17 | 026 | 36°04.9′ | 71°41.6′ | 93.3 | 10.2 | 116 | 54147. |
| 17 | 054 | 36°02.8′ | 71°36.3′ | 98.1 | 9.7 | 114 | 54114. |
| 17 | 100 | 36°02.4′ | 71°35.2′ | 99.1 | 9.4 | 109 | 54108. |
| 17 | 148 | 36°00.0′ | 71°26.4′ | 106.6 | 8.8 | 111 | 54062. |
| 17 | 240 | 36°57.2′ | 71°17.6′ | 114.2 | 9.1 | 113 | 54012. |
| 17 | 332 | 35°54.1′ | 71°08.6′ | 122.2 | 8.8 | 116 | 53959. |
| 17 | 404 | 35°52.0′ | 71°03.4′ | 126.9 | 8.9 | 110 | 53925. |
| 17 | 436 | 35°50.4′ | 70°57.9′ | 131.6 | 8.8 | 107 | 53895. |
| 17 | 554 | 35°47.1′ | 70°44.4′ | 143.0 | 9.2 | 110 | 53825. |
| 17 | 617 | 35°45.9′ | 70°40.3′ | 146.6 | 9.1 | 102 | 53803. |
| 17 | 640 | 35°45.2′ | 70°36.1′ | 150.1 | 8.4 | 99 | 53784. |
| 17 | 704 | 35°44.7′ | 70°32.0′ | 153.4 | 8.5 | 96 | 53766. |
| 17 | 1020 | 35°41.7′ | 69°58.0′ | 181.2 | 8.5 | 102 | 53632. |
| 17 | 1206 | 35°38.6′ | 69°39.9′ | 196.2 | 8.6 | 97 | 53547. |
| 17 | 1230 | 35°38.2′ | 69°35.7′ | 199.6 | 8.4 | 100 | 53529. |
| 17 | 1330 | 35°36.7′ | 69°25.5′ | 208.1 | 6.6 | 99 | 53483. |
| 17 | 1354 | 35°36.3′ | 69°22.3′ | 210.7 | 7.7 | 96 | 53469. |
| 17 | 1410 | 35°36.1′ | 69°19.8′ | 212.8 | 6.6 | 176 | 53459. |
| 17 | 1420 | 35°35.0′ | 69°19.7′ | 213.9 | 6.6 | 202 | 53449. |
| 17 | 1505 | 35°30.4′ | 69°22.0′ | 218.8 | 7.6 | 274 | 53419. |
| 17 | 1557 | 35°30.9′ | 69°30.1′ | 225.4 | 9.1 | 1 | 53450. |
| 17 | 1630 | 35°35.9′ | 69°30.0′ | 230.4 | 7.4 | 354 | 53491. |
| 17 | 1706 | 35°40.3′ | 69°30.6′ | 234.9 | 9.7 | 358 | 53530. |
| 17 | 1719 | 35°42.4′ | 69°30.7′ | 237.0 | 6.2 | 129 | 53547. |
| 17 | 1736 | 35°41.3′ | 69°29.0′ | 238.7 | 6.3 | 140 | 53533. |
| 17 | 1806 | 35°38.9′ | 69°26.5′ | 241.9 | 5.7 | 160 | 53505. |
| 17 | 1816 | 35°38.0′ | 69°26.1′ | 242.8 | 5.4 | 159 | 53496. |
| 17 | 1921 | 35°32.5′ | 69°23.5′ | 248.7 | 5.6 | 188 | 53441. |
| 17 | 1934 | 35°31.3′ | 69°23.7′ | 249.9 | 0.0 | 34 | 53432. |
| 18 | 1412 | 35°3 1.9′ | 69°23.2′ | 250.7 | 6.2 | 309 | 53436. |
| 18 | 1415 | 35°32.1′ | 69°23.5′ | 251.0 | 9.5 | 285 | 53438. |
| 18 | 1432 | 35°32.8′ | 69°26.7′ | 253.7 | 10.3 | 283 | 53455. |
| 18 | 1452 | 35°33.6′ | 69°30.8′ | 257.1 | 9.6 | 286 | 53475. |
| 18 | 1538 | 35°35.6′ | 69°39.5′ | 264.5 | 9.8 | 284 | 53521. |
| 18 | 1558 | 35°36.4′ | 69°43.4′ | 267.7 | 10.0 | 283 | 53540. |
| 18 | 1606 | 35°36.7′ | 69°45.0′ | 269.1 | 9.7 | 278 | 53548. |
| 18 | 1724 | 35°38.5′ | 70°00.3′ | 281.6 | 9.9 | 273 | 53613. |
| 18 | 1800 | 35°38.8′ | 70°07.6′ | 287.6 | 9.9 | 275 | 53639. |
| 18 | 1930 | 35°40.1′ | 70°25.8′ | 302.4 | 10.0 | 272 | 53709. |
| 18 | 2056 | 35°40.6′ | 70°43.4′ | 316.7 | 9.9 | 277 | 53769. |
| 18 | 2250 | 35°42.8′ | 71°06.3′ | 335.4 | 9.9 | 280 | 53858. |
| 18 | 2320 | 35°43.7′ | 71°12.3′ | 340.4 | 9.8 | 284 | 53884. |
| 19 | 000 | 35°45.3′ | 71°20.1′ | 346.9 | 9.9 | 285 | 53921. |
| 19 | 036 | 35°46.8′ | 71°27.2′ | 352.9 | 10.5 | 285 | 53955. |
| 19 | 100 | 35°47.9′ | 71°32.2′ | 357.1 | 9.1 | 291 | 53979. |
| 19 | 111 | 35°48.5′ | 71°34.1′ | 358.7 | 9.3 | 5 | 53990. |
| 19 | 124 | 35°50.5′ | 71°33.9′ | 360.7 | 9.0 | 387 | 54006. |
| 19 | 250 | 35°54.2′ | 71°49.2′ | 373.7 | 9.4 | 287 | 54082. |
| 19 | 336 | 35°56.3′ | 71°57.7′ | 380.9 | 9.0 | 282 | 54125. |
| 19 | 602 | 36°00.9′ | 72°24.1′ | 402.7 | 8.1 | 283 | 54239. |
| 19 | 640 | 36°02.1′ | 72°30.3′ | 407.9 | 8.1 | 287 | 54267. |
| 19 | 708 | 36°03.2′ | 72°34.8′ | 411.7 | 7.5 | 295 | 54289. |
| 19 | 1004 | 36°12.3′ | 72°59.5′ | 433.6 | 7.5 | 303 | 54433. |
| 19 | 1214 | 36°21.1′ | 73°16.5′ | 449.9 | 7.6 | 308 | 54551. |
| 19 | 1247 | 36°23.7′ | 73°20.6′ | 454.1 | 6.7 | 286 | 54584. |
| 19 | 1528 | 36°28.6′ | 73°42.1′ | 472.1 | 8.6 | 275 | 54681. |
| 19 | 1632 | 36°29.4′ | 73°53.5′ | 481.3 | 8.1 | 269 | 54718. |
| 19 | 1714 | 36°29.3′ | 74°00.5′ | 486.9 | 9.2 | 268 | 54735. |
| 19 | 1735 | 36°29.2′ | 74°04.5′ | 490.1 | 9.2 | 281 | 54745. |
| 19 | 1820 | 36°30.5′ | 74°12.9′ | 497.0 | 9.3 | 281 | 54777. |
| 19 | 1900 | 36°31.7′ | 74°20.5′ | 503.2 | 9.3 | 285 | 54806. |
| 19 | 1930 | 36°32.9′ | 74°26.1′ | 507.9 | 9.2 | 284 | 54830. |
| 19 | 2103 | 36°36.4′ | 74°43.4′ | 522.2 | 3.9 | 321 | 54902. |
| 19 | 2105 | 36°36.5′ | 74°43.5′ | 522.3 | 7.6 | 282 | 54903. |
| 19 | 2116 | 36°36.8′ | 74°45.2′ | 523.7 | 0.2 | 68 | 54909. |
| 21 | 350 | 36°38.8′ | 74°39.0′ | 529.1 | 9.6 | 102 | 54910. |
| 21 | 422 | 36°37.7′ | 74°32.8′ | 534.2 | 10.5 | 98 | 54886. |
| 21 | 500 | 36°36.8′ | 74°24.6′ | 540.8 | 10.5 | 101 | 54858. |
| 21 | 540 | 36°35.5′ | 74°16.0′ | 547.9 | 10.3 | 103 | 54825. |
| 21 | 652 | 36°32.7′ | 74°01.0′ | 560.2 | 10.5 | 100 | 54764. |
| 21 | 705 | 36°32.3′ | 73°58.2′ | 562.5 | 10.5 | 97 | 54753. |
| 21 | 1030 | 36°27.9′ | 73°13.7′ | 598.6 | 10.3 | 103 | 54599. |
| 21 | 1158 | 36°24.4′ | 72°55.4′ | 613.7 | 9.6 | 105 | 54520. |
| 21 | 1222 | 36°23.4′ | 72°50.8′ | 617.5 | 10.8 | 104 | 54499. |
| 21 | 1545 | 36°14.5′ | 72°07.0′ | 653.9 | 11.0 | 113 | 54301. |
| 21 | 1800 | 36°04.7′ | 71°39.0′ | 678.6 | 11.0 | 110 | 54 138. |
| 21 | 1840 | 36°02.2′ | 71°30.5′ | 685.9 | 8.7 | 114 | 54092. |
| 21 | 1905 | 36°00.7′ | 71°26.4′ | 689.5 | 8.8 | 109 | 54067. |
| 21 | 1930 | 35°59.5′ | 71°22.1′ | 693.2 | 8.0 | 95 | 54044. |
| 21 | 2112 | 35°58.2′ | 71°05.3′ | 706.8 | 9.0 | 105 | 53982. |
| 21 | 2140 | 35°57.1′ | 71°00.3′ | 711.0 | 9.0 | 112 | 53957. |

**TABLE 1** – *Continued*

| Day | Time[a] (GMT) | Latitude (N) | Longitude (W) | Distance (nautical miles) | Speed (knots) | Course | Regional Magnetic Field (gammas) |
|---|---|---|---|---|---|---|---|
| **August**–*Continued* | | | | | | | |
| 21 | 2212 | 35°55.3′ | 70°54.8′ | 715.8 | 8.6 | 114 | 53925. |
| 21 | 2358 | 35°49.1′ | 70°37.7′ | 731.0 | 7.7 | 112 | 53820. |
| 22 | 000 | 35°49.0′ | 70°37.4′ | 731.3 | 8.8 | 114 | 53819. |
| 22 | 020 | 35°47.8′ | 70°34.1′ | 734.2 | 8.4 | 111 | 53798. |
| 22 | 130 | 35°44.2′ | 70°22.8′ | 744.1 | 8.1 | 110 | 53733. |
| 22 | 200 | 35°42.8′ | 70°18.1′ | 748.1 | 8.4 | 98 | 53706. |
| 22 | 210 | 35°42.6′ | 70°16.4′ | 749.5 | 7.9 | 100 | 53699. |
| 22 | 314 | 35°41.1′ | 70°06.2′ | 757.9 | 8.4 | 100 | 53653. |
| 22 | 334 | 35°40.6′ | 70°02.8′ | 760.8 | 8.2 | 100 | 53638. |
| 22 | 418 | 35°39.6′ | 69°55.5′ | 766.8 | 8.3 | 105 | 53606. |
| 22 | 432 | 35°39.1′ | 69°53.2′ | 768.7 | 8.3 | 105 | 53594. |
| 22 | 500 | 35°38.1′ | 69°48.6′ | 772.6 | 8.4 | 109 | 53571. |
| 22 | 522 | 35°37.1′ | 69°45.0′ | 775.7 | 8.2 | 108 | 53551. |
| 22 | 620 | 35°34.6′ | 69°35.7′ | 783.6 | 11.6 | 109 | 53499. |
| 22 | 700 | 35°32.1′ | 69°26.7′ | 791.4 | 10.0 | 109 | 53449. |
| 22 | 715 | 35°31.3′ | 69°23.8′ | 793.9 | 0.0 | 90 | 53432. |
| 26 | 750 | 35°31.3′ | 69°23,8′ | 793.9 | 9.1 | 229 | 53432. |
| 26 | 755 | 35°30.8′ | 69°24.5′ | 794.6 | 9.5 | 228 | 53430. |
| 26 | 900 | 35°23.9′ | 69°33.9′ | 804.9 | 8.3 | 230 | 53404. |
| 26 | 944 | 35°20.0′ | 69°39.6′ | 811.0 | 8.4 | 238 | 53390. |
| 26 | 1040 | 35°15.8′ | 69°47.7′ | 818.0 | 8.3 | 234 | 53382. |
| 26 | 1338 | 35°01.4′ | 70°12.2′ | 843.5 | 7.9 | 229 | 53340. |
| 26 | 1400 | 34°59.5′ | 70°14.9′ | 846.4 | 7.8 | 220 | 53333. |
| 26 | 1506 | 34°52.9′ | 70°21.6′ | 855.0 | 7.4 | 212 | 53298. |
| 26 | 1552 | 34°48.1′ | 70°25.3′ | 860.7 | 7.2 | 212 | 53269. |
| 26 | 1654 | 34°41.8′ | 70°30.1′ | 868.1 | 8.1 | 210 | 53230. |
| 26 | 1700 | 34°41.1′ | 70°30.6′ | 868.9 | 8.1 | 215 | 53226. |
| 26 | 1824 | 34°31.9′ | 70°38.5′ | 880.2 | 7.9 | 210 | 53171. |
| 26 | 1845 | 34°29.5′ | 70°40.2′ | 883.0 | 7.6 | 223 | 53156. |
| 26 | 2010 | 34°21.7′ | 70°49.1′ | 893.7 | 8.6 | 226 | 53116. |
| 26 | 2142 | 34°12.5′ | 71°00.5′ | 906.8 | 9.4 | 224 | 53071. |
| 26 | 2328 | 34°00.6′ | 71°14.4′ | 923.4 | 9.1 | 223 | 53008. |
| 26 | 2348 | 33°58.4′ | 71°16.9′ | 926.4 | 9.9 | 225 | 52996. |
| 27 | 000 | 33°57.0′ | 71°18.6′ | 928.4 | 9.6 | 225 | 52989. |
| 27 | 112 | 33°48.9′ | 71°28.5′ | 939.9 | 9.6 | 227 | 52947. |
| 27 | 134 | 33°46.5′ | 71°3 16′ | 943.5 | 9.8 | 229 | 52934. |
| 27 | 258 | 33°37.4′ | 71°44.0′ | 957.2 | 10.4 | 230 | 52890. |
| 27 | 348 | 33°31.9′ | 71°52.0′ | 965.9 | 10.0 | 231 | 52863. |
| 27 | 411 | 33°29.5′ | 71°55.6′ | 969.7 | 10.2 | 239 | 52852. |
| 27 | 419 | 33°28.8′ | 71°57.0′ | 971.1 | 10.0 | 232 | 52850. |
| 27 | 450 | 33°25.6′ | 72°01.9′ | 976.3 | 10.2 | 231 | 52835. |
| 27 | 534 | 33°20.9′ | 72°08.9′ | 983.8 | 9.8 | 232 | 52812. |
| 27 | 600 | 33°18.3′ | 72°12.9′ | 988.0 | 9.8 | 228 | 52800. |
| 27 | 620 | 33°16.1′ | 72°15.8′ | 991.3 | 9.7 | 226 | 52788. |
| 27 | 804 | 33°04.4′ | 72°30.1′ | 1008.0 | 9.7 | 231 | 52721. |
| 27 | 1042 | 32°48.3′ | 72°53.8′ | 1033.6 | 10.0 | 231 | 52637. |
| 27 | 1104 | 32°46.0′ | 72°57.2′ | 1037.3 | 10.2 | 228 | 52624. |
| 27 | 1112 | 32°45.1′ | 72°58.4′ | 1038.6 | 10.1 | 225 | 52619. |
| 27 | 1250 | 32°33.4′ | 73°12.1′ | 1055.1 | 9.7 | 221 | 52546. |
| 27 | 1420 | 32°22.4′ | 73°23.4′ | 1069.6 | 9.7 | 225 | 52473. |
| 27 | 1440 | 32°20.1′ | 73°26.1′ | 1072.8 | 9.9 | 223 | 52458. |
| 27 | 1554 | 32°11.2′ | 73°35.9′ | 1085.0 | 5.5 | 224 | 52399. |
| 27 | 1606 | 32°10.4′ | 73°36.8′ | 1086.1 | 5.5 | 226 | 52393. |
| 27 | 1628 | 32°09.0′ | 73°38.5′ | 1088.1 | 9.9 | 224 | 52384. |
| 27 | 1740 | 32°00.5′ | 73°48.3′ | 1100.0 | 9.9 | 227 | 52328. |
| 27 | 1855 | 31°52.0′ | 73°58.9′ | 1112.4 | 9.8 | 229 | 52273. |
| 27 | 1940 | 31°47.2′ | 74°05.5′ | 1119.8 | 9.9 | 231 | 52243. |
| 27 | 2102 | 31°38.8′ | 74°17.9′ | 1133.2 | 10.1 | 233 | 52191. |
| 27 | 2238 | 31°29.0′ | 74°32.9′ | 1149.3 | 10.2 | 232 | 52131. |
| 27 | 2330 | 31°23.6′ | 74°41.1′ | 1158.2 | 10.0 | 229 | 52097. |
| 28 | 000 | 31°20.3′ | 74°45.5′ | 1163.2 | 10.2 | 229 | 52075. |
| 28 | 026 | 31°17.4′ | 74°49.4′ | 1167.6 | 9.3 | 228 | 52055. |
| 28 | 046 | 31°15.3′ | 74°52.1′ | 1170.7 | 9.9 | 227 | 52041. |
| 28 | 152 | 31°07.8′ | 75°01.4′ | 1181.7 | 9.8 | 226 | 51988. |
| 28 | 216 | 31°05.1′ | 75°04.7′ | 1185.6 | 9.8 | 224 | 51968. |
| 28 | 234 | 31°03.0′ | 75°07.1′ | 1188.5 | 9.8 | 224 | 51953. |
| 28 | 338 | 30°55.5′ | 75°15.6′ | 1199.0 | 9.7 | 224 | 51897. |
| 28 | 410 | 30°51.8′ | 75°19.8′ | 1204.1 | 9.6 | 233 | 51869. |
| 28 | 510 | 30°40.2′ | 75°37.7′ | 1223.4 | 9.5 | 231 | 51791. |
| 28 | 651 | 30°36.1′ | 75°43.6′ | 1229.9 | 9.7 | 226 | 51762. |
| 28 | 708 | 30°34.2′ | 75°45.9′ | 1232.7 | 9.6 | 225 | 51747. |
| 28 | 854 | 30°22.2′ | 75°59.9′ | 1249.7 | 10.0 | 225 | 51655. |
| 28 | 924 | 30°18.7′ | 76°04.0′ | 1254.7 | 9.8 | 243 | 51627. |
| 28 | 940 | 30°17.5′ | 76°06.7′ | 1257.3 | 10.5 | 180 | 51620. |
| 28 | 944 | 30°16.8′ | 76°06.7′ | 1258.0 | 7.8 | 176 | 51613. |
| 28 | 954 | 30°15.5′ | 76°06.6′ | 1259.3 | 8.2 | 177 | 51600. |
| 28 | 1019 | 30°12.1′ | 76°06.4′ | 1262.7 | 8.1 | 178 | 51566. |
| 28 | 1202 | 29°58.2′ | 76°05.9′ | 1276.6 | 8.6 | 188 | 51425. |
| 28 | 1243 | 29°52.4′ | 76°06.8′ | 1282.4 | 7.5 | 306 | 51368. |
| 28 | 1306 | 29°54.1′ | 76°09.5′ | 1285.3 | 7.0 | 320 | 51390. |
| 28 | 1412 | 30°00.0′ | 76°15.2′ | 1293.0 | 6.7 | 335 | 51460. |
| 28 | 1500 | 30°04.9 | 76°17.8′ | 1298.4 | 6.4 | 353 | 51514. |
| 28 | 1538 | 30°08.9′ | 76°18.4′ | 1302.5 | 6.4 | 102 | 51555. |
| 28 | 1552 | 30°08.6′ | 76°16.7′ | 1304.0 | 6.9 | 90 | 51549. |
| 28 | 1558 | 30°08.6′ | 76°15.9′ | 1304.6 | 7.1 | 88 | 51548. |
| 28 | 1620 | 30°08.7′ | 76°12.9′ | 1307.2 | 7.0 | 92 | 51543. |
| 28 | 1714 | 30°08.5′ | 76°05.6′ | 1313.6 | 0.1 | 90 | 51528. |
| 29 | 1730 | 30°08.5′ | 76°04.1′ | 1314.9 | 6.8 | 270 | 51525. |
| 29 | 1750 | 30°08.5′ | 76°06.7′ | 1317.1 | 0.0 | 90 | 51530. |

TABLE 1 – *Continued*

| Day | Time[a] (GMT) | Latitude (N) | Longitude (W) | Distance (nautical miles) | Speed (knots) | Course | Regional Magnetic Field (gammas) |
|---|---|---|---|---|---|---|---|
| September | | | | | | | |
| 1 | 2025 | 30°08.5′ | 76°06.7′ | 1317.1 | 8.3 | 272 | 51529. |
| 1 | 2045 | 30°08.6′ | 76°09.9′ | 1319.9 | 8.5 | 173 | 51536. |
| 1 | 2050 | 30°07.9′ | 76°09.8′ | 1320.6 | 9.5 | 169 | 51529. |
| 1 | 2210 | 29°55.5′ | 76°06.9′ | 1333.2 | 9.1 | 165 | 51399. |
| 1 | 2356 | 29°40.0′ | 76°02.1′ | 1349.3 | 9.3 | 164 | 51233. |
| 2 | 000 | 29°39.4′ | 76°01.9′ | 1349.9 | 8.9 | 166 | 51226. |
| 2 | 134 | 29°25.9′ | 75°58.0′ | 1363.8 | 8.9 | 165 | 51082. |
| 2 | 202 | 29°21.9′ | 75°56.8′ | 1368.0 | 9.1 | 164 | 51039. |
| 2 | 320 | 29°10.6′ | 75°53.0′ | 1379.7 | 9.4 | 163 | 50916. |
| 2 | 356 | 29°05.2′ | 75°51.1′ | 1385.4 | 9.5 | 163 | 50857. |
| 2 | 500 | 28°55.5′ | 75°47.8′ | 1395.5 | 9.5 | 165 | 50751. |
| 2 | 544 | 28°48.8′ | 75°45.8′ | 1402.4 | 9.9 | 162 | 50679. |
| 2 | 630 | 28°41.6′ | 75°43.1′ | 1410.0 | 9.8 | 167 | 50599. |
| 2 | 750 | 28°28.9′ | 75°39.8′ | 1423.0 | 10.3 | 162 | 50462. |
| 2 | 820 | 28°24.0′ | 75°38.0′ | 1428.2 | 10.2 | 168 | 50408. |
| 2 | 850 | 28°19.0′ | 75°36.8′ | 1433.3 | 7.8 | 164 | 50353. |
| 2 | 910 | 28°16.5′ | 75°36.0′ | 1435.9 | 10.0 | 167 | 50326. |
| 2 | 926 | 28°13.9′ | 75°35.3′ | 1438.6 | 10.7 | 177 | 50297. |
| 2 | 935 | 28°12.3′ | 75°35.2′ | 1440.2 | 0.5 | 90 | 50281. |
| 2 | 946 | 28°12.3′ | 75°35.1′ | 1440.2 | 6.8 | 320 | 50280. |
| 2 | 1015 | 28°14.8′ | 75°37.5′ | 1443.5 | 0.6 | 145 | 50311. |
| 2 | 1112 | 28°14.3′ | 75°37.1′ | 1444.1 | 0.8 | 156 | 50305. |
| 2 | 1200 | 28°13.7′ | 75°36.8′ | 1444.8 | 0.0 | 338 | 50298. |
| 22 | 2230 | 28°18.9′ | 75°39.2′ | 1450.4 | 9.8 | 345 | 50354. |
| 22 | 2258 | 28°23.3′ | 75°40.5′ | 1455.0 | 9.1 | 342 | 50402. |
| 23 | 000 | 28°32.2′ | 75°43.8′ | 1464.3 | 9.1 | 342 | 50501. |
| 23 | 040 | 28°38.0′ | 75°45.9′ | 1470.4 | 9.1 | 345 | 50564. |
| 23 | 154 | 28°48.9′ | 75°49.2′ | 1481.7 | 8.8 | 344 | 50683. |
| 23 | 224 | 28°53.1′ | 75°50.6′ | 1486.1 | 9.0 | 345 | 50729. |
| 23 | 340 | 29°04.1′ | 75°54.0′ | 1497.4 | 9.1 | 343 | 50848. |
| 23 | 400 | 29°07.0′ | 75°55.0′ | 1500.5 | 9.0 | 347 | 50880. |
| 23 | 618 | 29°27.2′ | 76°00.3′ | 1521.2 | 8.6 | 356 | 51097. |
| 23 | 700 | 29°33.2′ | 76°00.8′ | 1527.2 | 8.7 | 358 | 51159. |
| 23 | 740 | 29°39.0′ | 76°01.0′ | 1533.0 | 8.6 | 356 | 51218. |
| 23 | 828 | 29°45.9′ | 76°01.5′ | 1539.9 | 8.8 | 0 | 51289. |
| 23 | 830 | 29°46.2′ | 76°01.5′ | 1540.2 | 8.7 | 327 | 51292. |
| 23 | 920 | 29°52.3′ | 76°06.0′ | 1547.5 | 6.2 | 299 | 51362. |
| 23 | 1005 | 29°54.6′ | 76°10.7′ | 1552.1 | 0.0 | 90 | 51394. |
| 28 | 630 | 29°54.6′ | 76°10.7′ | 1552.1 | 6.7 | 21 | 51393. |
| 28 | 656 | 29°57.3′ | 76°09.5′ | 1555.0 | 9.3 | 16 | 51418. |
| 28 | 702 | 29°58.2′ | 76°09.2′ | 1556.0 | 7.9 | 15 | 51427. |
| 28 | 720 | 30°00.5′ | 76°08.5′ | 1558.4 | 7.6 | 7 | 51449. |
| 28 | 758 | 30°05.3′ | 76°07.8′ | 1563.2 | 9.2 | 8 | 51496. |
| 28 | 815 | 30°07.9′ | 76°07.4′ | 1565.8 | 8.1 | 8 | 51521. |
| 28 | 944 | 30°19.8′ | 76°05.5′ | 1577.8 | 8.5 | 358 | 51637. |
| 28 | 1312 | 30°49.2 | 76°06.5′ | 1607.2 | 8.3 | 357 | 51932. |
| 28 | 1325 | 30°51.0′ | 76°06.6′ | 1609.0 | 6.5 | 0 | 51950. |
| 28 | 1337 | 30°52.3′ | 76°06.6′ | 1610.3 | 6.8 | 9 | 51963. |
| 28 | 1426 | 30°57.8′ | 76°05.6′ | 1615.9 | 9.0 | 10 | 52015. |
| 28 | 1458 | 31°02.5′ | 76°04.6′ | 1620.7 | 8.8 | 11 | 52059. |
| 28 | 1530 | 31°07.1′ | 76°03.6′ | 1625.4 | 8.7 | 13 | 52103. |
| 28 | 1630 | 31°15.6′ | 76°01.3′ | 1634.1 | 8.7 | 15 | 52182. |
| 28 | 1723 | 31°23.0′ | 75°58.9′ | 1641.8 | 7.3 | 17 | 52249. |
| 28 | 1735 | 31°24.4′ | 75°58.4′ | 1643.2 | 8.0 | 16 | 52262. |
| 28 | 1800 | 31°27.6′ | 75°57.3′ | 1646.6 | 6.6 | 11 | 52291. |
| 28 | 1840 | 31°31.9′ | 75°56.3′ | 1651.0 | 6.4 | 6 | 52331. |
| 28 | 1925 | 31°36.7′ | 75°55.7′ | 1655.8 | 7.7 | 8 | 52376. |
| 28 | 1954 | 31°40.4′ | 75°55.1′ | 1659.5 | 7.1 | 5 | 52411. |
| 28 | 2110 | 31°49.3′ | 75°54.1′ | 1668.5 | 7.1 | 7 | 52495. |
| 28 | 2140 | 31°52.8′ | 75°53.6′ | 1672.0 | 6.2 | 358 | 52527. |
| 28 | 2205 | 31°55.4′ | 75°53.7′ | 1674.6 | 6.1 | 3 | 52553. |
| 29 | 000 | 32°07.0′ | 75°53.0′ | 1686.2 | 6.1 | 3 | 52662. |
| 29 | 106 | 32°13.7′ | 75°52.6′ | 1692.9 | 6.0 | 0 | 52725. |
| 29 | 108 | 32°13.9′ | 75°52.6′ | 1693.1 | 6.5 | 0 | 52727. |
| 29 | 130 | 32°16.3′ | 75°52.6′ | 1695.5 | 6.2 | 6 | 52750. |
| 29 | 200 | 32°19.4′ | 75°52.2′ | 1698.6 | 6.2 | 13 | 52779. |
| 29 | 354 | 32°30.8′ | 75°49.0′ | 1710.3 | 6.8 | 18 | 52880. |
| 29 | 500 | 32°37.9′ | 75°46.3′ | 1717.8 | 6.9 | 11 | 52942. |
| 29 | 800 | 32°58.2′ | 75°41.5′ | 1738.5 | 7.0 | 11 | 53122. |
| 29 | 854 | 33°04.4′ | 75°40.0′ | 1744.8 | 7.4 | 10 | 53176. |
| 29 | 1124 | 33°22.7′ | 75°36.0′ | 1763.4 | 7.5 | 16 | 53337. |
| 29 | 1200 | 33°27.0′ | 75°34.5′ | 1767.9 | 7.9 | 13 | 53373. |
| 29 | 1222 | 33°29.8′ | 75°33.7′ | 1770.8 | 8.2 | 14 | 53397. |
| 29 | 1308 | 33°35.9′ | 75°31.9′ | 1777.1 | 8.3 | 13 | 53449. |
| 29 | 1506 | 33°51.8′ | 75°27.5′ | 1793.4 | 8.6 | 13 | 53584. |
| 29 | 1600 | 33°59.3′ | 75°25.4′ | 1801.1 | 8.4 | 13 | 53647. |
| 29 | 1700 | 34°07.5′ | 75°23.2′ | 1809.5 | 8.4 | 357 | 53716. |
| 29 | 1720 | 34°10.3′ | 75°23.4′ | 1812.3 | 8.9 | 359 | 53742. |
| 29 | 1906 | 34°26.1′ | 75°23.9′ | 1828.1 | 10.1 | 5 | 53884. |
| 29 | 1942 | 34°32.1′ | 75°23.2′ | 1834.1 | 10.1 | 19 | 53935. |
| 29 | 2052 | 34°43.2′ | 75°18.5′ | 1845.9 | 9.4 | 18 | 54023. |
| 29 | 2210 | 34°54.8′ | 75°13.9′ | 1858.1 | 9.5 | 0 | 54114. |
| 29 | 2229 | 34°57.8′ | 75°13.9′ | 1861.1 | | | 54140. |

[a]Local ship's time is 4 hours earlier, with daylight savings time.

(Figure 1) parallels the strike of the small amplitude, <50 gamma, magnetic anomalies of the magnetic quiet zone (Figure 2), and consequently the profile is remarkably smooth. The water depths of the area of the lower continental rise hills are clearly recorded on this track and are most revealing. *Glomar Challenger* crossed ridge and swale topography of several wavelengths. Typically the steeper flanks of the clearly asymmetric ridges were to the north or northwest. As at Site 388, the "hilly" topography and internal structures of the lower continental rise hills are confined to sediments well above horizon *A* (Figure 3, 26 August). The deeper reflectors ($A^*$, $\beta$, and oceanic basement) which we also see along this track show little structural relief. The persistent asymmetry of these ridges and their consistent wavelength within any one cluster, such as 790-830 nautical miles versus 840-880 nautical miles (Figure 2 and Figure 3, 26 August) support the conclusion that they originated as current-built mud ridges, as suggested by Heezen and Hollister (1971). Formation by rotation of local slump blocks, as proposed by Ballard (1966), would probably result in more chaotic features.

As *Glomar Challenger* approached the Blake Nose from the northeast, its track crossed the northern part of the Blake-Bahama Outer Ridge at 1170 nautical miles, and the ancillary ridge crest forming on its southwest flank at 1225 nautical miles (Figure 2 and Figure 3, 27, 28 August). Horizon *A* which passes beneath the ridge is very weak on these profiles, but the details of bedding structures which cross the bottom-simulating reflector *Y* (of possible clathrate origin) are clearly visible. The ancillary ridge southwest of the main Blake-Bahama Outer Ridge crest apparently is forming by current deposited sediments ponding on its lower flanks (Figure 3, 28 August).

Beyond the Blake-Bahama Outer Ridge flank there is a steep 200-fathoms drop, 0.5 second, at 1260 nautical miles (Figure 2 and Figure 3, 28 August). This forms a canyon at the base of the steep north side of the Blake Nose. Pratt (1971) called this the Eastward Canyon after the research vessel *Eastward* from which mapping of that area was conducted. Hard limestones have been dredged from the base of the Blake Nose (Heezen and Sheridan, 1966). Erosion and possible undercutting of these limestones by bottom and turbidity currents flowing down the canyon have formed the topography as it now exists.

The *Challenger*'s track then passes directly over the eastern edge of the Blake Nose on a due south course at 1270 nautical miles (Figure 2 and Figure 3, 28 August). This profile was required by the JOIDES Safety and Pollution Prevention Panel to ensure that there were no arched reflectors along this strike in order to preclude any possibility of closure at the proposed site. No structural relief was evident in the relatively flat-lying reflectors; this is especially clear in the prominent reflector at 4 seconds depth.

The *Challenger* then changed course to run due east over the Blake Nose. The beacon for Site 389 was dropped near the *Challenger*'s north-south seismic tie-line (Figure 2 and Figure 3, 28 August). During the approach to the site we (RES and WEB) detected an angular unconformity on the profiler record which truncates several of the reflectors seen on the due east profile. Accordingly we dropped the beacon only when the *Challenger* was beyond the last "pinch-out" associated with this unconformity.

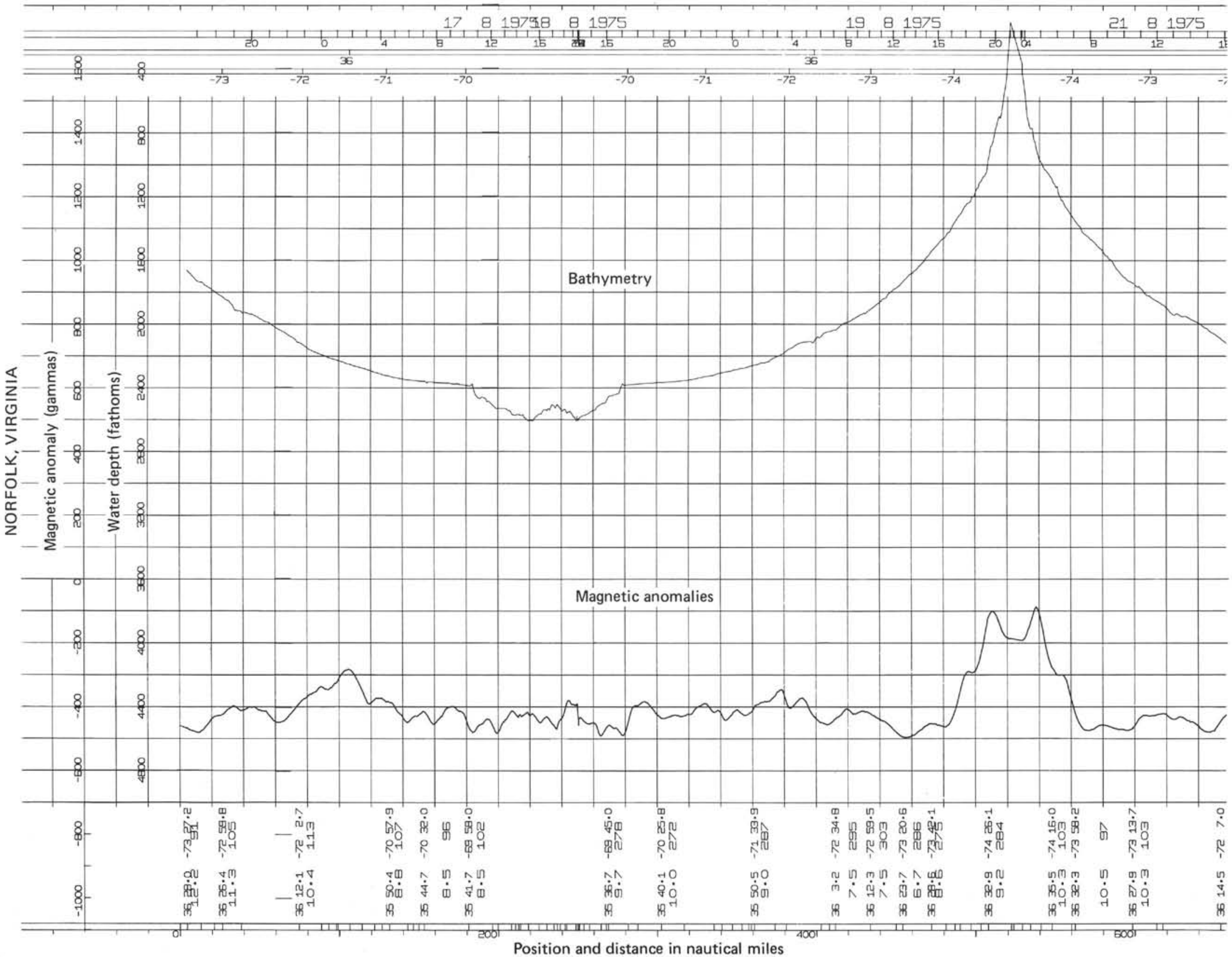


Figure 2. *Magnetic anomaly and bathymetric profiles along the track of* Glomar Challenger *during Leg 44. Plots and scales are explained in the text.*

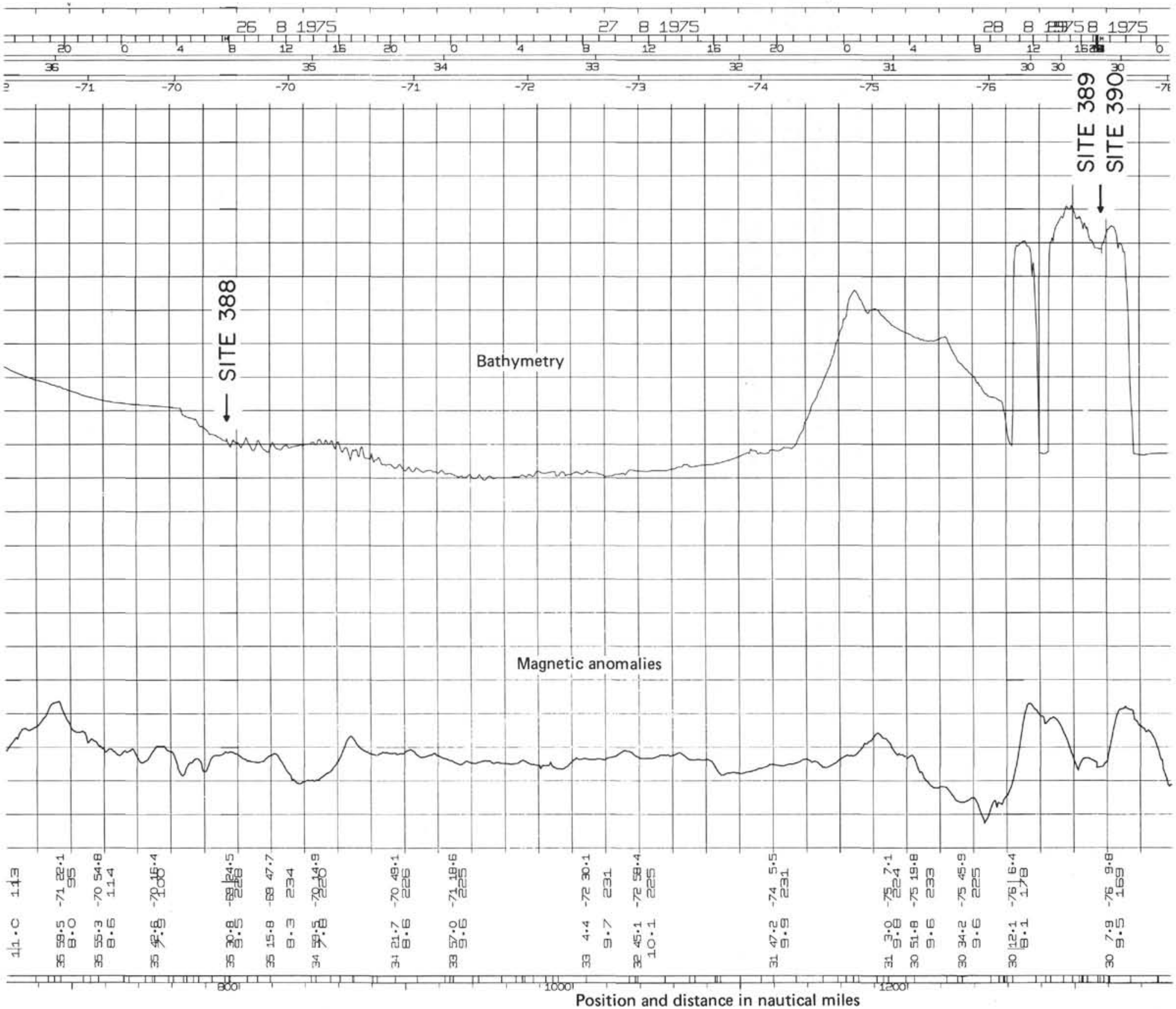


Figure 2. *(Continued).*

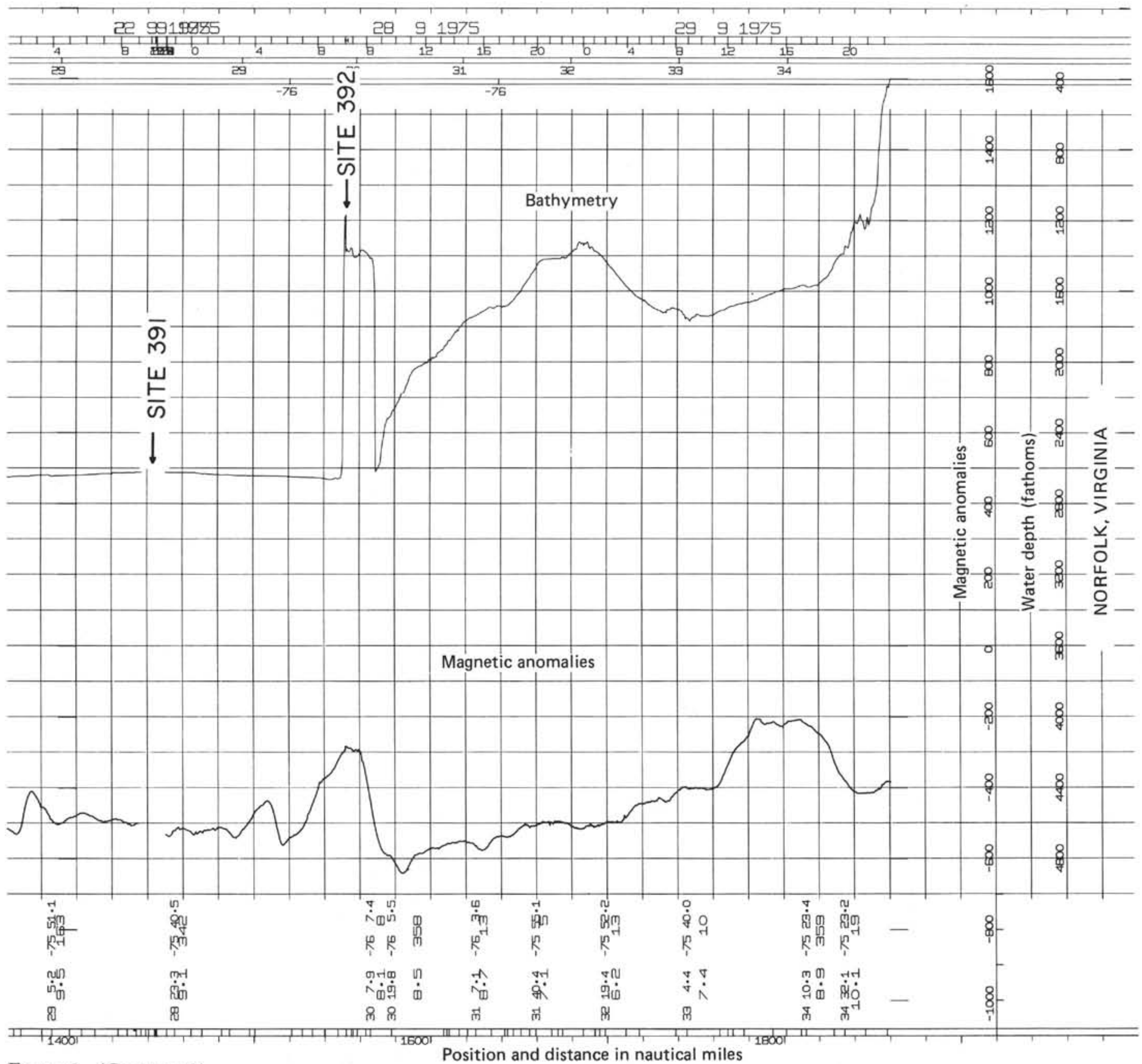


Figure 2. *(Continued).*

A significant magnetic anomaly is associated with the Blake Nose (Figure 2). A 200-gamma anomaly of relatively long wavelength occurs over the nose. Depth to magnetic basement is great, perhaps 10 km. The magnetic anomaly near the Blake Nose, however, is quite distinct from the adjacent quiet-zone profile.

After drilling was completed at Site 390 on the Blake Nose, the *Challenger* was headed toward Site 391 across the Blake Escarpment into the abyssal depths of the Blake-Bahama Basin (Figure 2 and Figure 3, 1 September). Two prominent reflectors are seen at the base of the Blake Escarpment (Figure 3, 1 September). These have been previously identified as the top of a Miocene turbidite horizon (6.7 sec) and horizon *A* (7.1 sec) (Sheridan et al., 1974; Dillon et al., 1976). No definite reflectors are seen on the *Challenger* profiles below horizon *A*, but the two prominent reflectors, denoted *M* and *A* by Dillon et al. (1976), can be traced to Site 391.

The magnetic anomaly profile (Figure 2) shows the prominent small amplitude (150-gamma) Blake-Spur anomaly at 1375 nautical miles, and the even smaller amplitude (50 gamma) quiet-zone anomaly at 1405 nautical miles, designated "*a*" by Drake et al. (1963).

The same track was virtually repeated during the cruise from Site 391 back to the Blake Nose, Site 392, with nearly identical geophysical results (Figure 2 and Figure 3, 22, 23 September). Site 392, however, was drilled on the southern rim of the Blake Nose over an acoustically opaque zone into which beds from the west appear to terminate. This feature is presumed to be a massive reef complex adjacent to back-reef strata. The complex appeared to have been truncated and exposed to flushing on the southeast face of the nose on the basis of the seismic profile. Hence, drilling could be conducted here without fear of penetrating a closure.

The ship's track between Site 392 and Norfolk, Virginia, nearly paralleled the upper continental rise (Figure 1). The main topographic features crossed were the steep north face of the Blake Nose, Eastward Canyon, the northern part of the Blake-Bahama Outer Ridge, and the Hatteras continental rise and slope (Figure 3, 28, 29 September).

On the seismic reflection profiles the bottom-simulating reflector of possible clathrate origin is distinct at about 0.6 seconds sub-bottom on the Blake-Bahama Outer Ridge (Figure 3, 28-29 September), and it appears to persist on the Hatteras continental rise (Figure 3, 29 September). The bottom-simulating reflector is clearly crossed by well-bedded strata, which provide evidence of its diagenetic origin unrelated to depositional bedding. Magnetic anomalies of the quiet zone and east coast trend are recorded on Figure 2.

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