OFFSHORE MINERALS ASSESSMENT STUDIES ON THE GEORGIA CONTINENTAL SHELF - PHASE 2:

Seismic Stratigraphy of the TACTS Area and Evaluation of Selected Sites for Economic Hard Minerals Potential

by
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and Faisal M. Idris

Department of Natural Resources
Environmental Protection Division
Georgia Geologic Survey

Project Report No. 18

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Prepared in cooperation with
U.S. Minerals Management Service
under MMS Agreement No. 14-35-001-30496

This report has not been reviewed for conformity
with Georgia Geologic Survey editorial standards and stratigraphic nomenclature.

DEPARTMENT OF NATURAL RESOURCES
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GEORGIA GEOLOGIC SURVEY
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Atlanta, Georgia
1992

Project Report No. 18

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OFFSHORE MINERALS ASSESSMENT STUDIES ON THE GEORGIA CONTINENTAL SHELF - PHASE 2:
Seismic Stratigraphy of the TACTS Area and Evaluation of Selected Sites for Economic Hard Minerals Potential

ABSTRACT

In July through September of 1989, Georgia State University, under contract to the Georgia Geologic Survey and the U.S. Department of the Interior Minerals Management Service (MMS), conducted a project on the Georgia continental shelf with a twofold objective: first, to run a series of high-resolution seismic profiles between the borings from the Department of the Navy's Tactical Aircrew Combat Training System (TACTS) offshore platforms in order to provide a regional stratigraphic framework for the phosphate-bearing Miocene deposits, and second, to conduct a series of site-specific studies in targeted areas of the Georgia continental shelf in order to determine the presence of heavy minerals, phosphorite, and sand and gravel.

The seismic profiling and site-specific studies were conducted with the technical assistance of the Marine Minerals Technology Center (MMTC) of the University of Mississippi and the Center for Applied Isotope Studies (CAIS) of the University of Georgia. Site-specific studies involved simultaneously towing a CAIS gamma isotope mapping system for the detection of naturally occurring radioactive minerals on or near the seafloor and a high resolution seismic system across four separate target areas. These sites were selected in areas exhibiting sandwaves and/or scarps and buried channels, which have been suggested to be favorable features for heavy mineral and phosphorite accumulation. From the resulting data, fifteen sites were chosen for a drilling program using an MMTC-constructed vibralift drill, capable of interval sampling to a depth of twenty feet.

Although laboratory analyses of the fifty-eight drill samples are not yet completed, ship-board observations indicated favorable amounts of phosphorite in some samples from the area. Only four samples were analyzed for heavy minerals, none of which contained economic percentages. Therefore, predictions as to the economic potential of the sites and features studied cannot be made until all of the samples have been analyzed for both phosphorite and heavy mineral content.

PART I. SEISMIC STRATIGRAPHY OF THE TACTS AREA, GEORGIA CONTINENTAL SHELF

INTRODUCTION

The data on which this study is based were obtained as part of a cooperative study of the Tactical Air Command Test Site (TACTS) borings (Mannheim, 1991) by the U.S. Geological Survey, the Georgia Geologic Survey, Georgia State University and the U.S. Minerals Management Service. The study was conducted during the period August 13-18, 1989 under Contract 701-090065 with the Georgia Department of Natural Resources' Geologic Survey.

LOCATION

The TACTS area, shown in Figure 1, is located in the mid- to outer continental shelf of Georgia. Seismic lines were run so as to connect the eight TACTS borings with the Savannah Light Tower (SLT) test hole, the Atlantic Margin Coring Project (AMCOR) hole 6002 and to provide increased data along geologic strike.

OBJECTIVES

Although the primary objective of this study was to tie-in the TACTS, SLT and AMCOR 6002 borings with high resolution seismic reflection profiles, the overall goal was to re-define the regional stratigraphic framework using the new information provided by the biostratigraphic analysis of TACTS boring sites provided by the Georgia Geologic Survey and the U.S. Geological Survey (Mannheim, 1991). In addition, the study was aimed at further establishing the regional stratigraphy of the phosphate-bearing Miocene-age deposits (Henry and Kellam, 1988). The combined data is presented in a series of seismic profiles and structural contour and isopach maps in the following sections.

DATA ACQUISITION

Seismic Data

The high-resolution seismic reflection data were acquired using an O.R.E. GEOPULSE subbottom profiling system consisting of an O.R.E. model 5813 A Geopulse power supply,

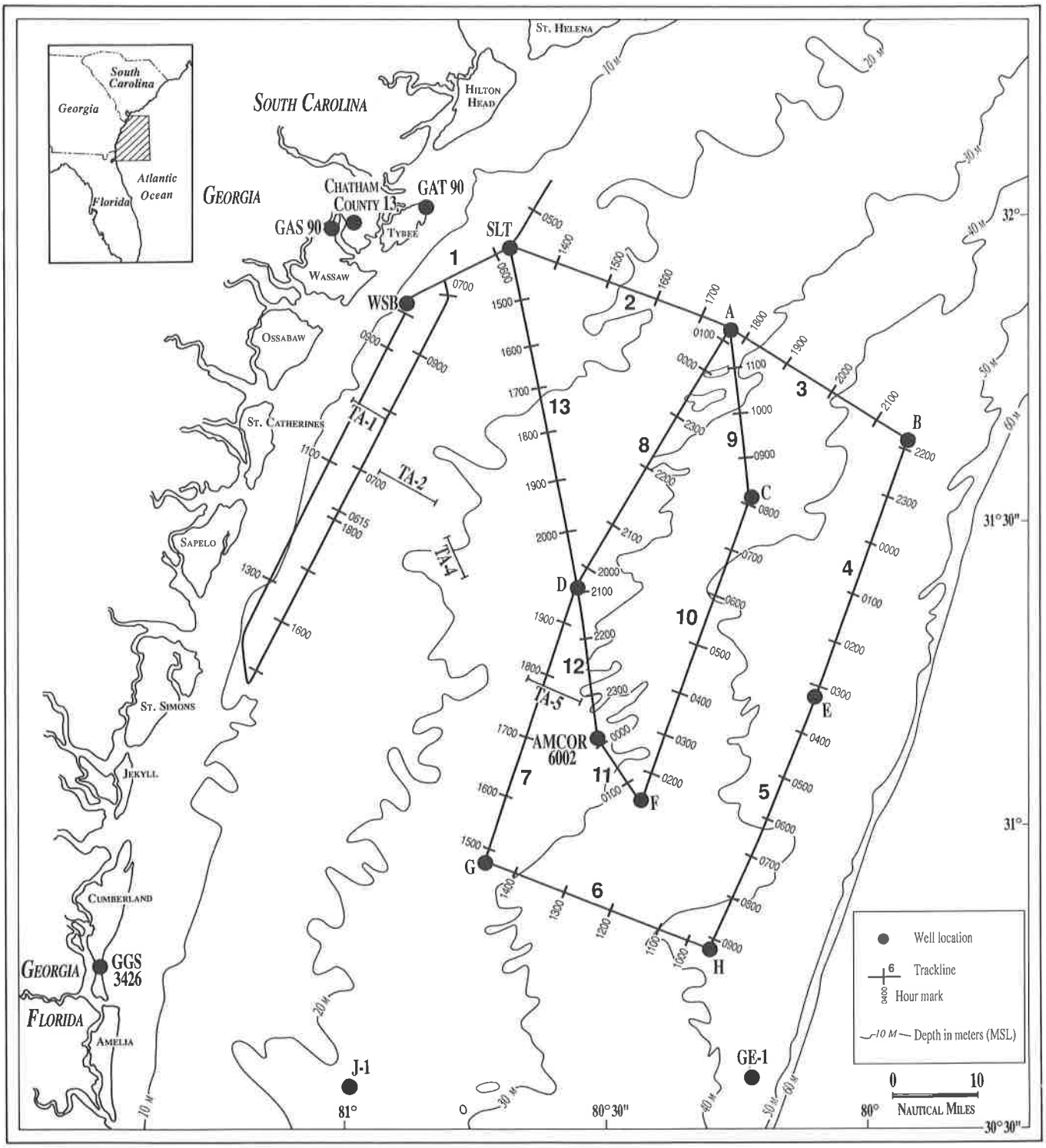


Figure 1. Location of study area TACTS boring (A-H). Other borings used in the study, target areas (A1-A5), seismic tracklines and bathymetry.

O.R.E. model 5210A receiver and an EPC model 1650 graphic recorder onboard the ship and a towed model 5812A source transducer and hydrophone streamer. The data were recorded on stereo videocassette tapes. Navigation was provided by Northstar Loran C fitted with a track plotter. The research vessel used for data acquisition was the R/V Kit Jones of the University of Mississippi Mineral Resources Institute.

Borehole Data

In comparison with the dense network of high-resolution seismic reflection data that covers the Georgia continental shelf (see Henry and Kellam, 1988), only few, and far apart, borehole data points were available before 1984. Thus, lacking the necessary stratigraphic framework needed for correlation, previous seismic stratigraphic interpretations relied primarily on the regional traceability of key reflectors within the seismic sequences.

In 1984 eight foundation boreholes were drilled for the U.S. Navy Tactical Air Command by the McClelland Company of Houston, Texas (Mannheim, 1991). The borings were located along three shore-parallel lines located 30 nm, 45 nm and 60 nm seaward of the coastline (see Figure 1). A biolithostratigraphic analysis of the eight TACTS cores material has been completed by Paul F. Huddlestun of the Georgia Geologic Survey (Mannheim, 1991). Huddlestun (1988) also revised the Neogene stratigraphy along the lower Savannah River out to SLT and AMCOR 6002. Our seismic lines tie directly with the TACTS boreholes, SLT and AMCOR 6002. Thus, our seismic analysis is based on a much better biostratigraphic and lithostratigraphic framework than for previous studies by Henry and Kellam (1988).

DATA REDUCTION AND STRATIGRAPHIC ANALYSIS

Initially, the seismic records were analyzed for identification of depositional sequences i.e. time-stratigraphic units bound at the top and bottom by unconformities, whether erosional or depositional. Key reflectors, assumed to represent formational contacts, were then traced along the grid of seismic reflection lines and correlated with contacts identified in the SLT, TACTS, AMCOR 6002 borings.

Following interpretation of the seismic reflection profiles, line drawings of the identified units and their prominent reflectors were then constructed using common vertical and horizontal scales. Structure contour maps of the tops of the major units identified as well as isopachous maps were then constructed using depths obtained from the original records. Data points for structure-contour and isopach maps outside the TACTS area have been compiled from Foley (1981), Kellam (1982), Idris (1983), Henry and Rueth (1986) and Henry and Kellam

(1988). Velocity used in computation of depths to reflecting horizons was obtained from an acoustic velocity log recently run by the U.S. Geological Survey for borehole GAT 90 on Tybee Island (Huddlestun and Farrell, 1991, personal communication). An average velocity of 1650 m/second was obtained for the sections penetrated in this study. The depths thus obtained correlate well with the stratigraphic contacts in the boreholes drilled in the area.

SEISMIC STRATIGRAPHY OF THE TACTS AREA

General Statement

Our seismic stratigraphic data in the TACTS area of the Georgia continental shelf have delineated seven seismic sequences bounded by unconformities. These sequences range in age from Eocene through Quaternary. However, in the southern portions of the study area, the Eocene and, in some cases, the Oligocene deposits were not traceable due to the penetration limits of the seismic equipment used.

Regional stratigraphic correlation of the key reflectors bounding seismic sequences was based on information obtained from the TACTS boreholes A through H (Mannheim, 1991; Paul Huddlestun, 1990, and 1991, personal communication), SLT (McCollum and Herrick, 1964; Huddlestun, 1988), and AMCOR 6002 (Hathaway and others, 1979; Huddlestun, 1988) which served as tie points for our seismic lines. Outside the TACTS area, the data as compiled from Henry and Kellam, 1988) was correlated with the biostratigraphy of the Chatham County borehole (Furlow, 1969; Huddlestun, 1973, 1982, 1986); GAT 90 and GAS 90 (Huddlestun and Farrell, 1991, personal communication); COST GE-1 (Schlee, 1979); GGS 3426 (Martinez, 1981; Huddlestun, 1988) and JOIDES 1 (J-1) (Bunce and others, 1979; Schlee and Gerard, 1979). The locations of all foregoing boreholes and test wells are shown on Figure 1. Line drawings of the various seismic profiles run between the TACTS boreholes are shown in Figures 2-7.

The depths to the stratigraphic horizons identified on the basis of the seismic data gave a good correlation with those picked on the basis of biostratigraphy and lithostratigraphy. The panel diagram presented in Figure 8 summarizes the stratigraphic relationship and lateral extent of the various units identified within the TACTS area.

Eocene

The top of the Eocene deposits is seen as a weak to moderately strong reflector on lines 1, 2, 3 (Figures 2 and 3) and the northwestern part of line 13 (Figure 7) where upwarping has brought the contact to within the penetration limits of the Geopulse system. The Eocene deep-

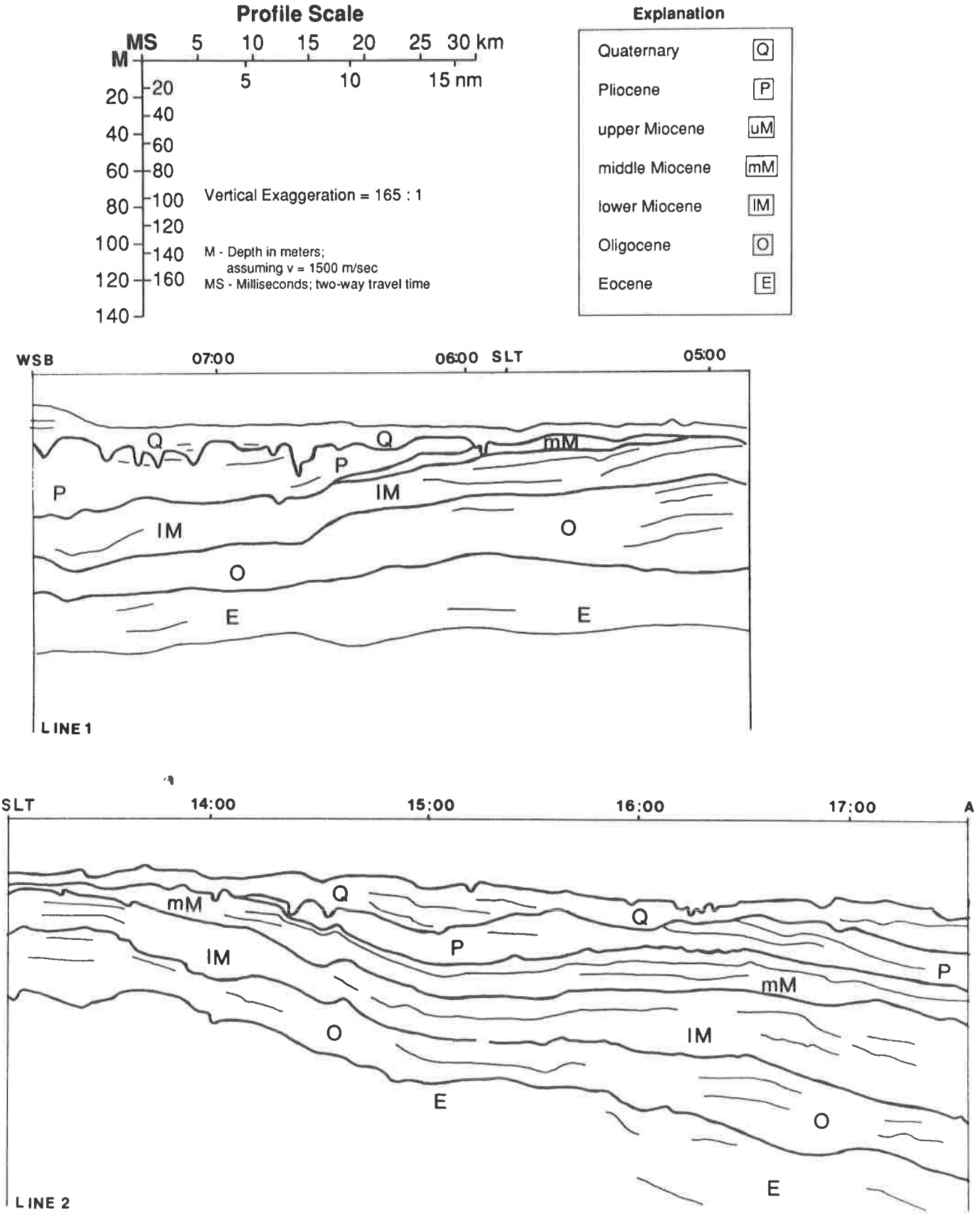


Figure 2. Legend and seismic profiles along TACTS lines 1 and 2.

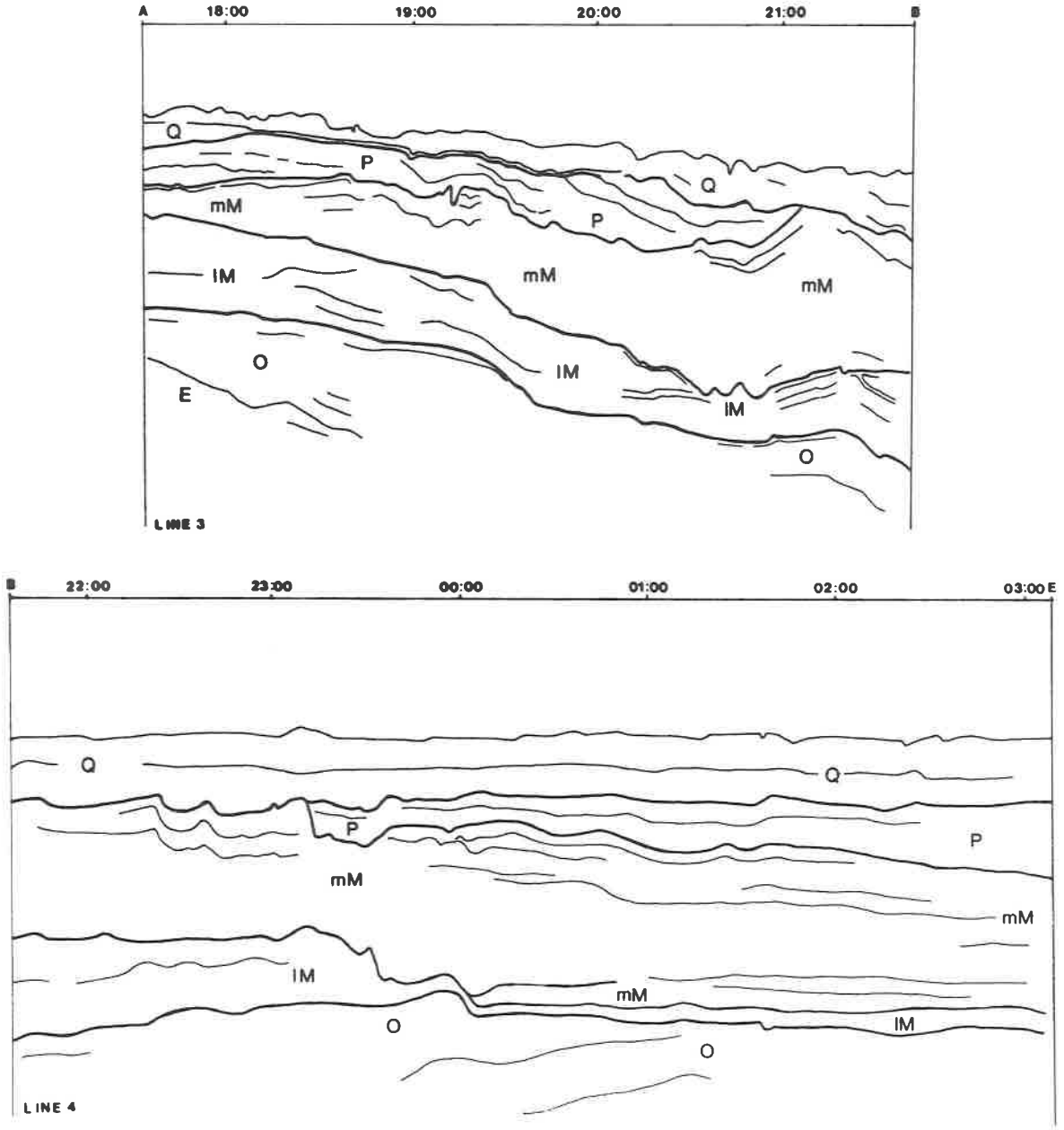


Figure 3. Seismic profiles along TACTS lines 3 and 4.

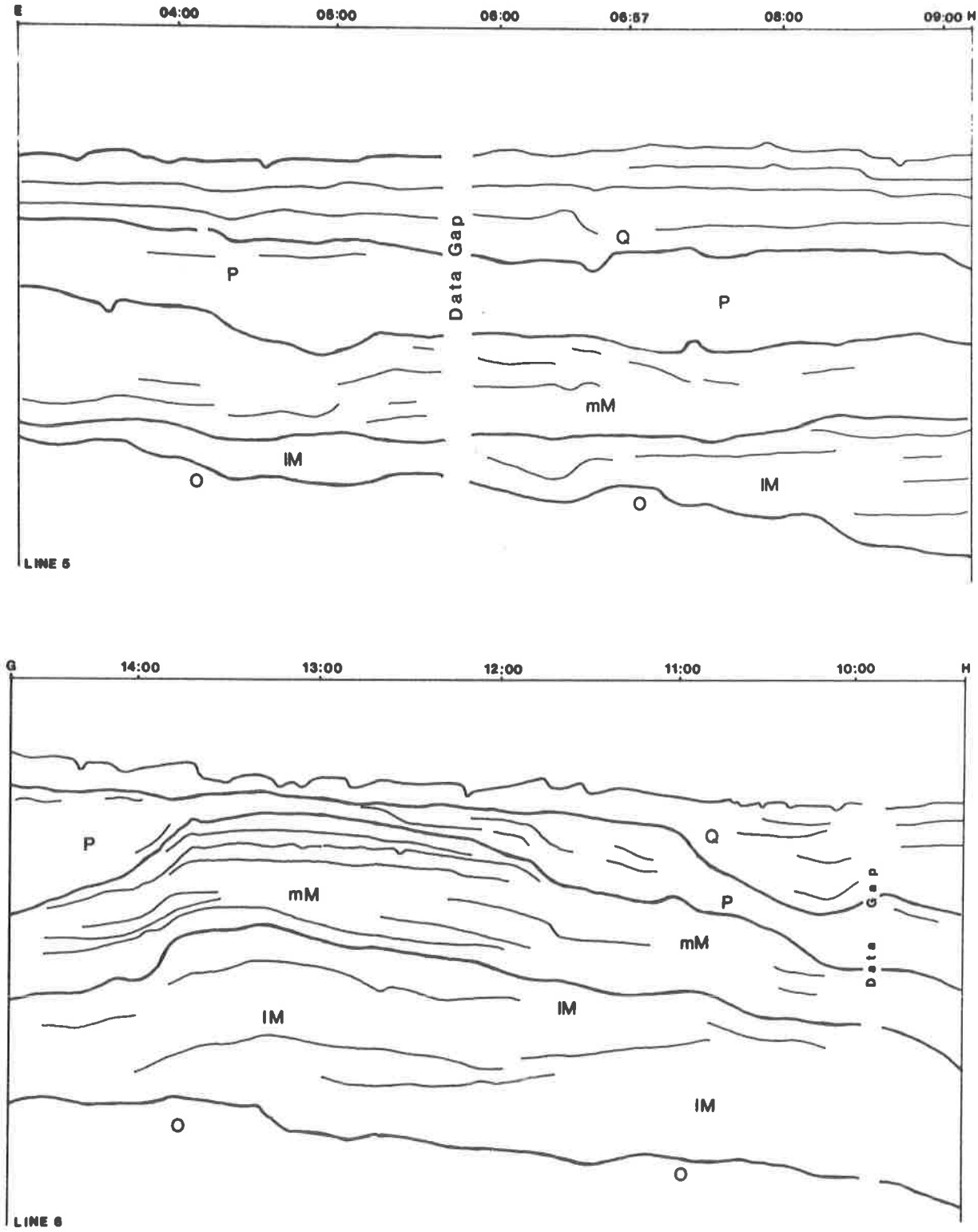


Figure 4. Seismic profiles along TACTS lines 5 and 6.

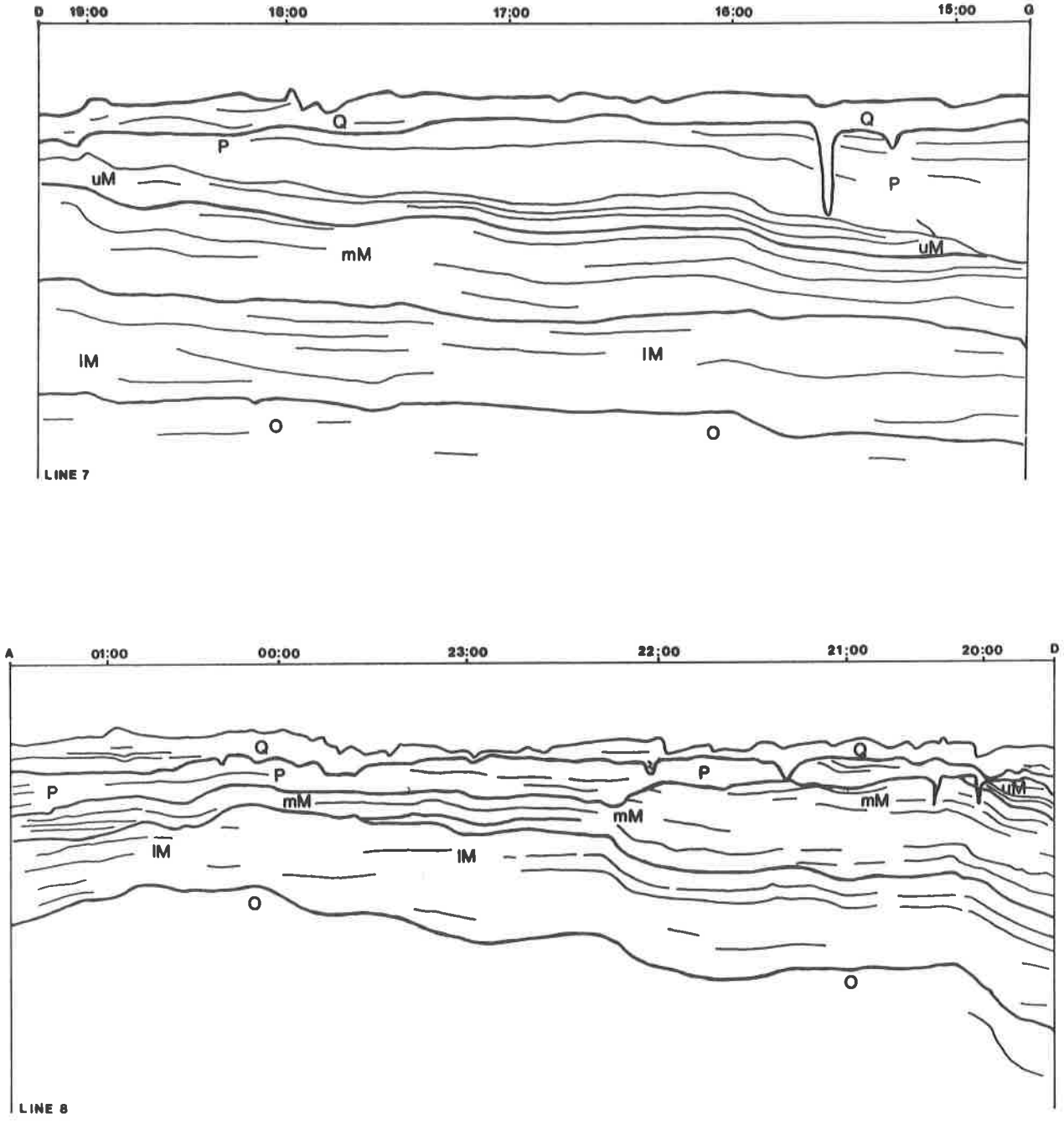


Figure 5. Seismic profiles along TACTS lines 7 and 8.

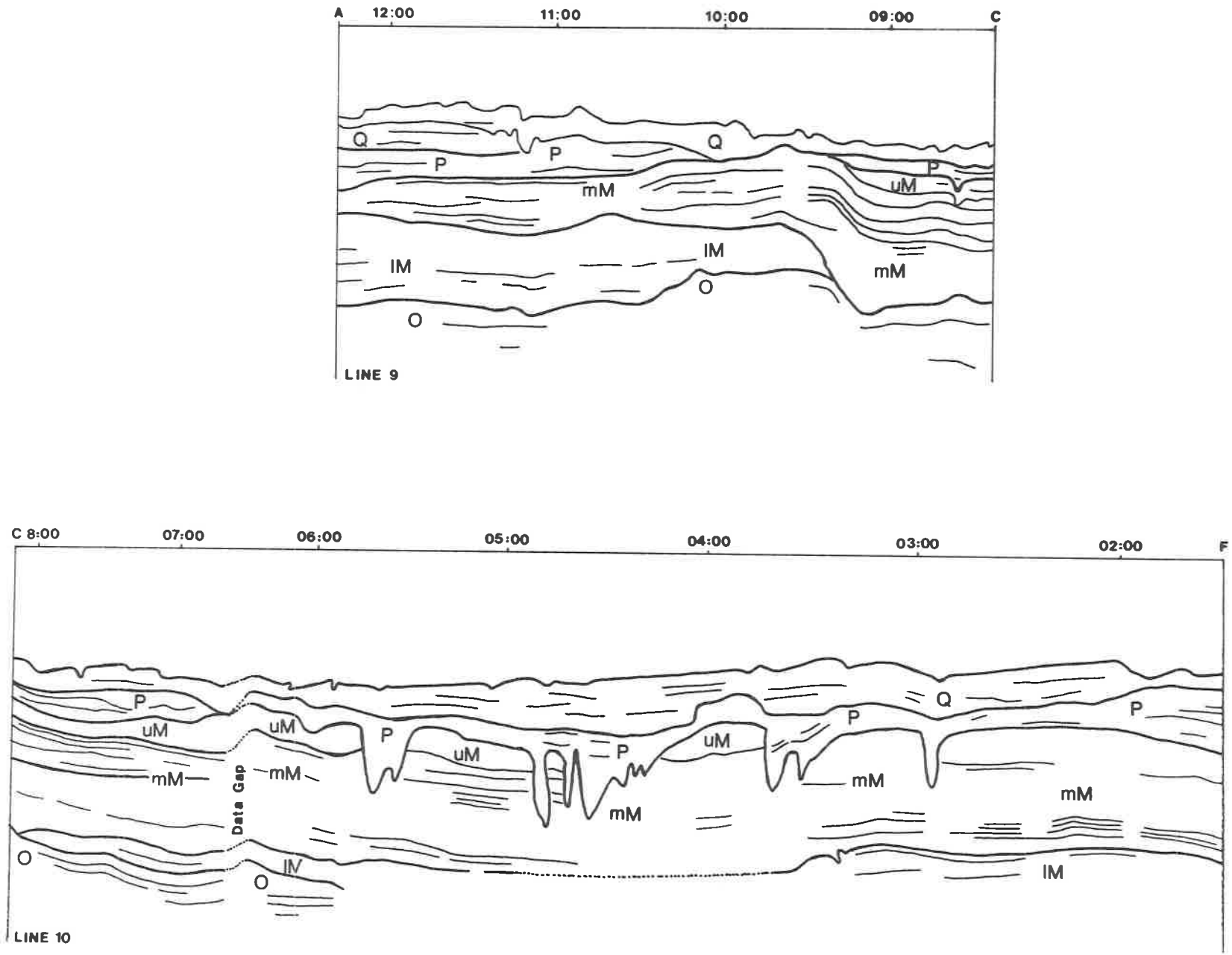
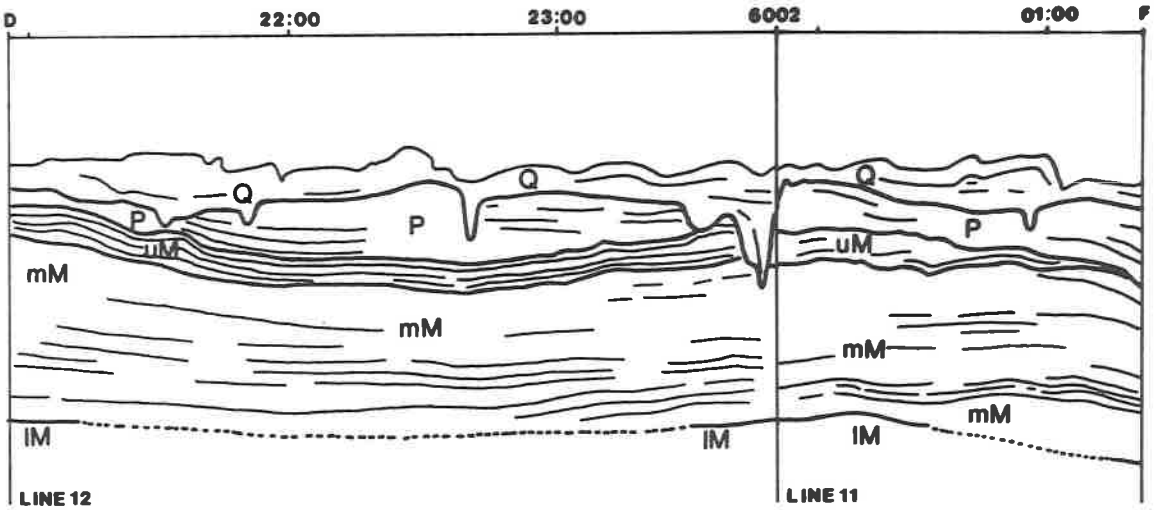


Figure 6. Seismic profiles along TACTS lines 9 and 10.



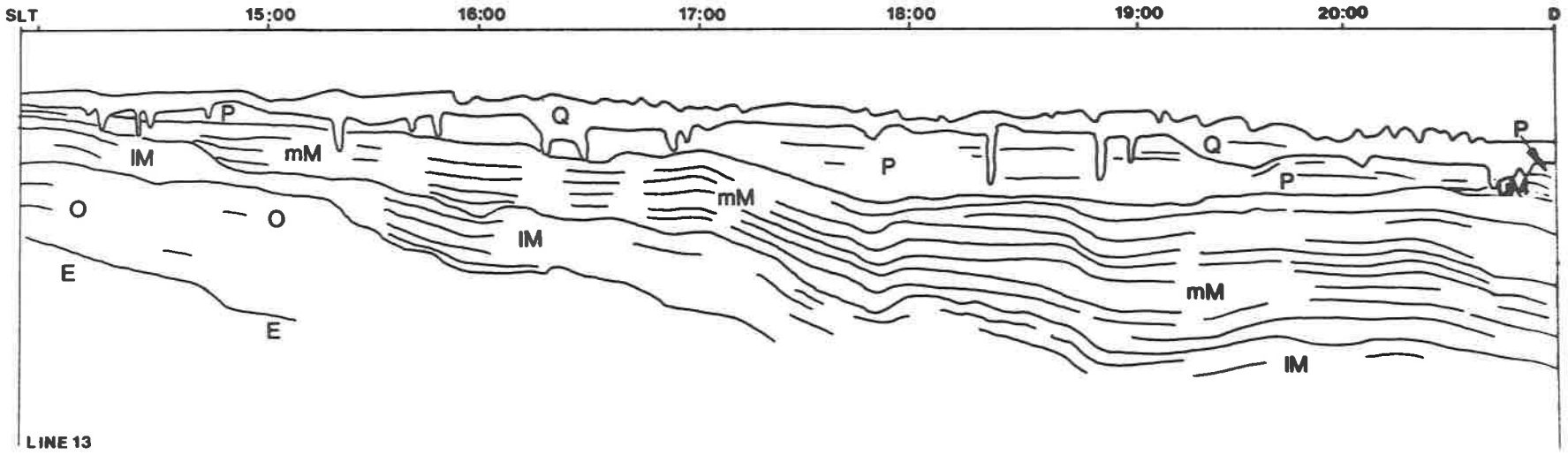


Figure 7. Seismic profiles along TACTS lines 11, 12 and 13.

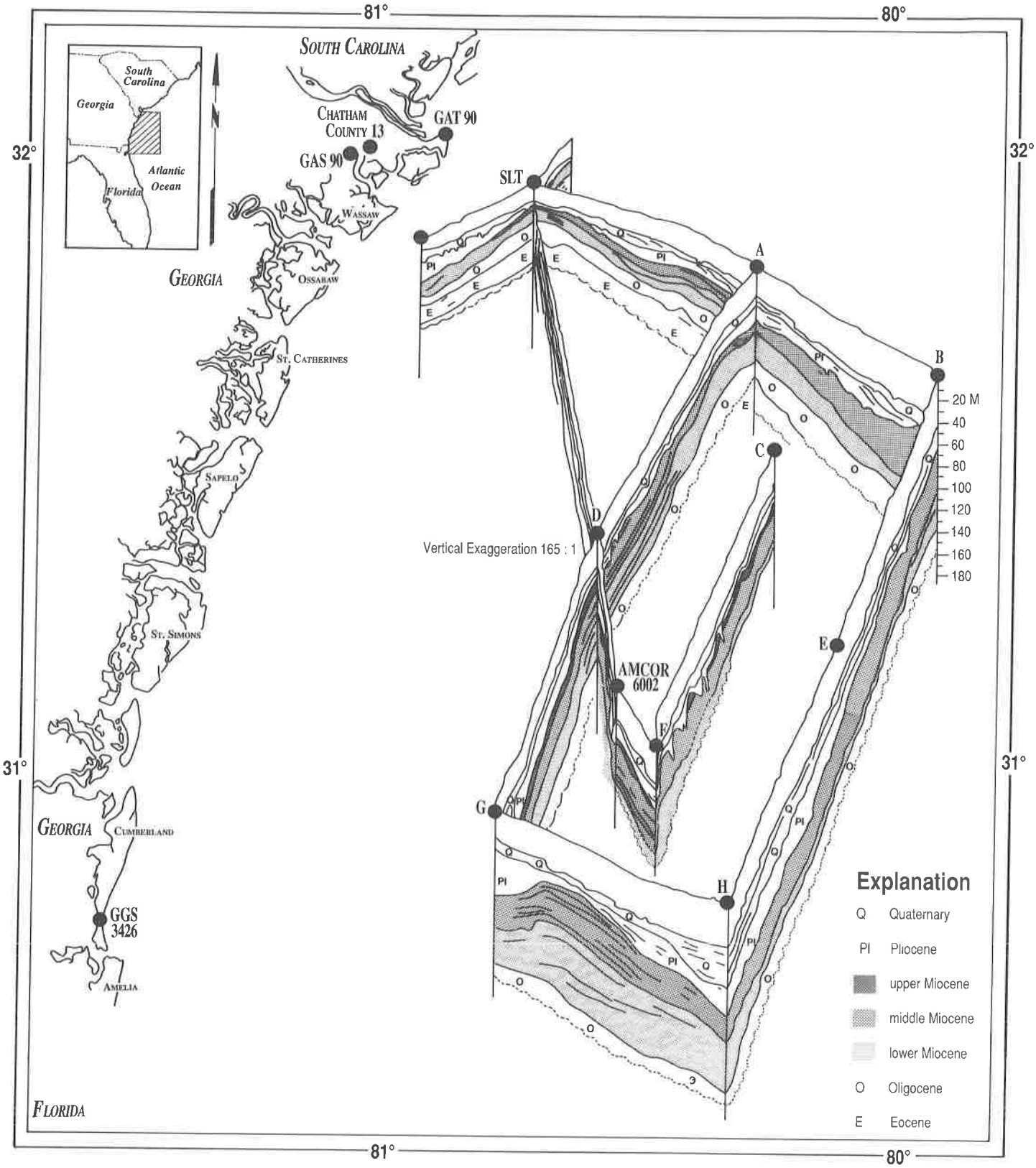


Figure 8. Panel diagram showing seismic stratigraphy of the TACTS area.

ens from 50 meters at SLT to 60 meters at Wassaw Sea Buoy and 101 meters at TACTS borehole A (See Figure 8). The Eocene unit is seismically transparent and reveals only few discontinuous reflectors. An unconformable upper surface separates the unit from the overlying Oligocene sequence.

Oligocene

The Oligocene unit is present as a southward- and seaward-dipping wedge unconformably overlying the Eocene unit. In the northwestern portion of the study area, where the entire Oligocene unit is resolved on the seismic profiles (see profiles 1, 2 and 3), the unit attains thicknesses of 10 to 30 meters. Elsewhere, the lower boundary of the Oligocene unit dips below resolution limits.

The Oligocene seismic package is characterized by sparse, weak, discontinuous and subparallel reflectors. The structure contour map of the upper surface of the Oligocene unit is shown in Figure 9. This surface reveals a topographic high north of SLT bifurcating into a westward branch parallel to the coast to offshore Sapelo Island and a trending branch going southeastward then east toward TACTS borehole A and finally southward toward the area midway between TACTS boreholes D and E where it ends. The topographic lows shown on the structural contour map as hatchured contours are probably solution related.

In the northern part of the study area, where the entire boundary of the Oligocene sequence is resolved, thicknesses range from 16 meters at SLT to 20 meters at TACTS borehole A. Elsewhere, only the upper surface is seen.

Miocene

Lower Miocene

The lower Miocene unit unconformably overlies the Oligocene unit on all profiles except lines 11, 12, and the southern parts of lines 10 and 13 where the upper boundary of the Oligocene surface was not detected. The reflectors of the lower Miocene seismic package are parallel and closely spaced and of weak to moderate strength (see lines 7, 8, and 13 in Figures 5 and 7). The structure contour map of the lower Miocene surface (Figure 10) reveals a topographic high clearly visible between TACTS boreholes G and H. This feature continues northward toward borehole C then northwestward toward SLT and eventually meets the coast at Hilton Head Island. Landward of this high, a broad low area is seen between borehole G and the coast. This low continues northward to offshore St. Catherines Island.

The thickness of lower Miocene deposits delineated on the seismic profiles ranges from

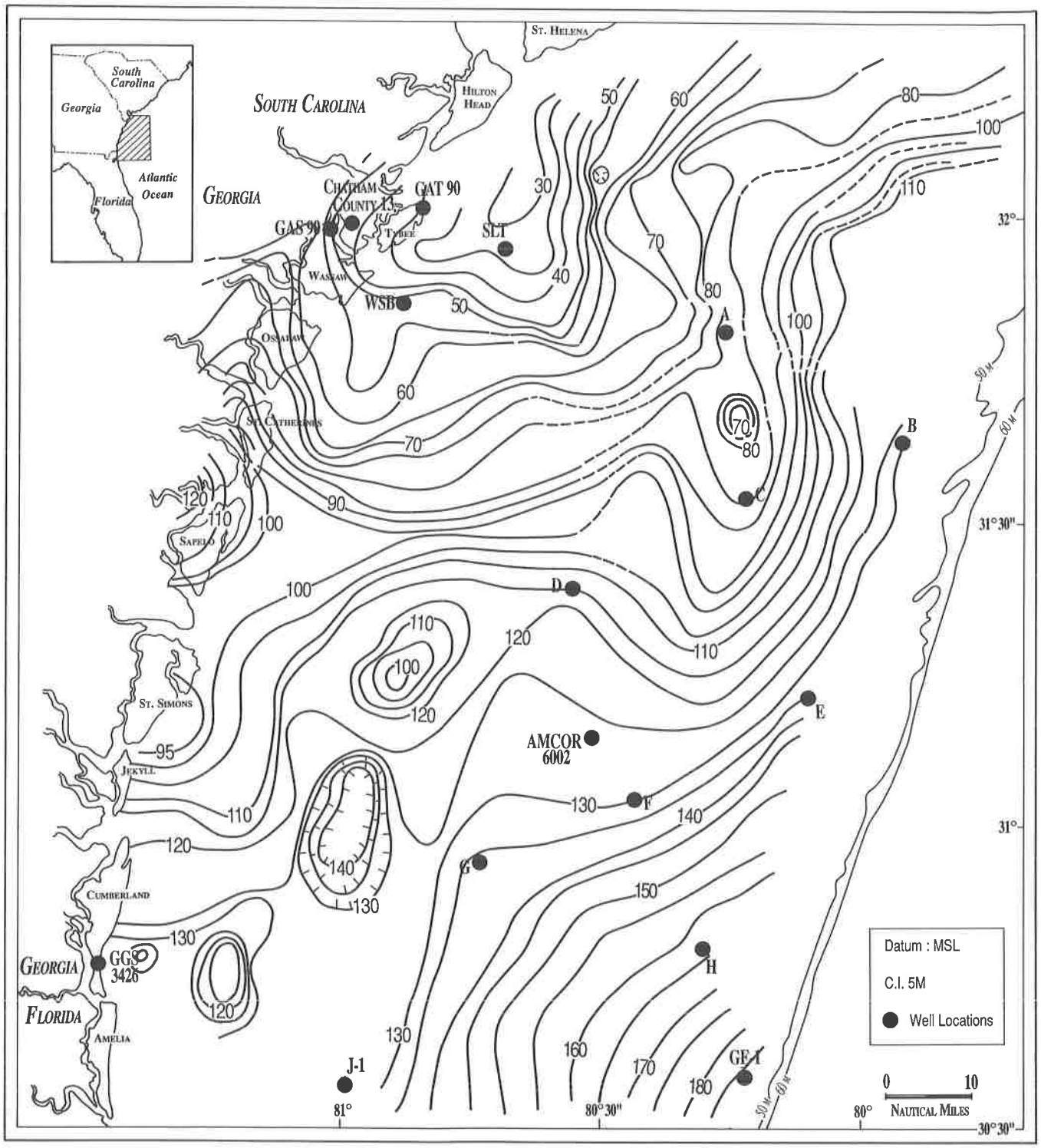


Figure 9. Structure-contour map of the top of Oligocene-age sediments.

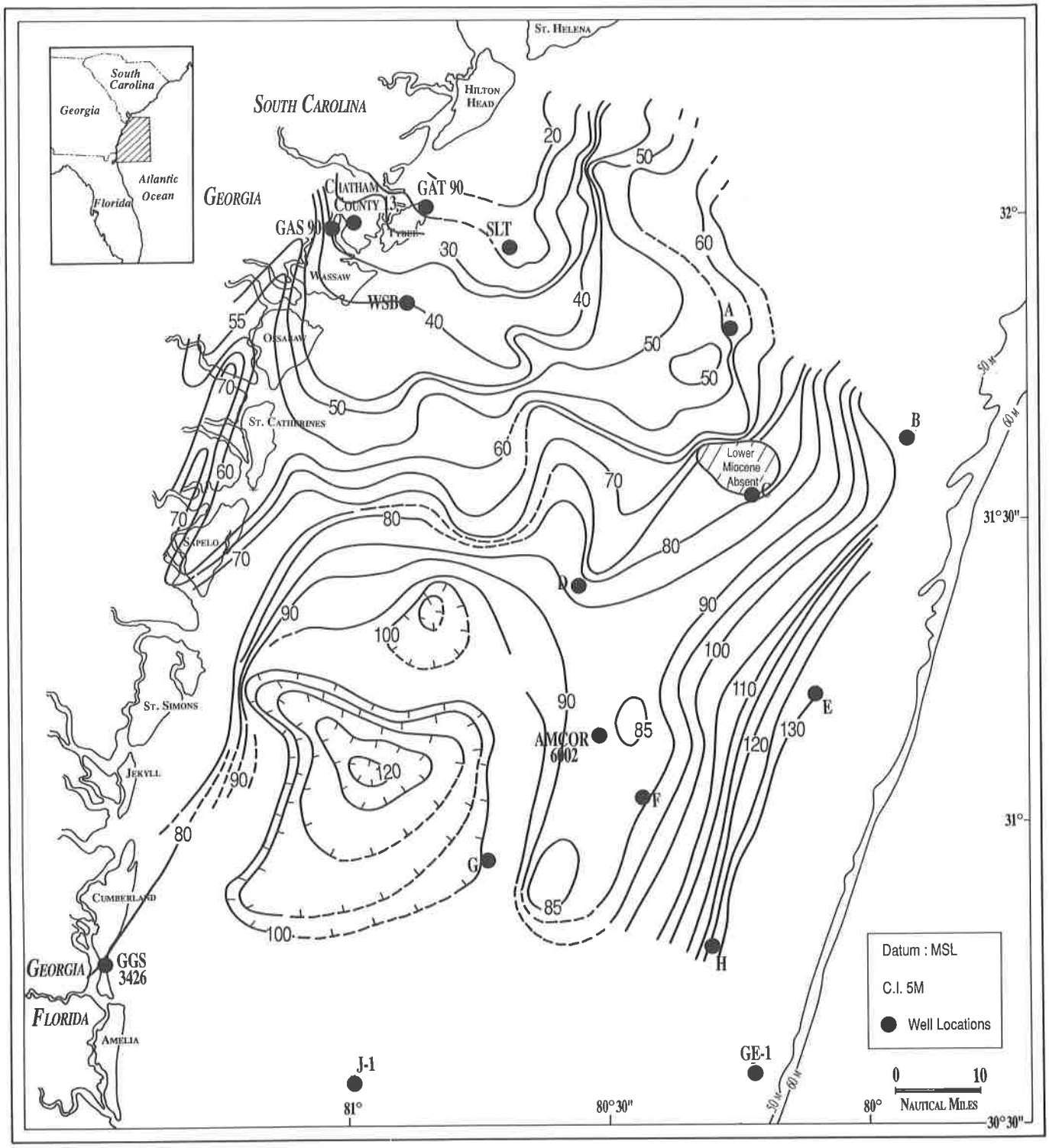


Figure 10. Structure-contour map of the top of Lower Miocene-age sediments.

less than 10 meters at SLT to a maximum of 60 meters between TACTS boreholes G and H (see Figure 11). The isopach map also reveals thickening toward the coast, reaching a maximum of about 60 meters just north of Sapelo Island. Lower Miocene deposits are locally absent in borehole C and the immediate vicinity to the north, apparently due to erosion at the beginning of middle Miocene. The erosional contact between the lower and middle Miocene is marked by a prominent reflector readily traceable throughout the study area.

Middle Miocene

On the seismic records the middle Miocene unit exhibits strong, closely spaced, parallel, and thinly-banded reflectors that are easily distinguished throughout the study area (see Henry and Kellam, 1988, Figure 8, page 21). The upper surface of the middle Miocene is seen as a prominent, erosional, and irregular reflector that is notably channeled between TACTS boreholes C and F (see Figure 6).

The structural contour map of the top of the middle Miocene (Figure 12) clearly depicts three topographic features: the Inner Shelf Low lying between the Outer Shelf High and the coastal Sea Island Escarpment. The Sea Island Escarpment is revealed by the closely spaced contours under the coastal barrier islands, while the Outer Shelf High is a topographic high (ridge) that is aligned north-south between TACTS boreholes G and H and through AMCOR 6002 (see profile 6, Figure 4). The broad trough between the preceding features is the Inner Shelf Low.

The isopach map of the middle Miocene deposits is shown in Figure 13. Within the TACTS area, the greatest thickness of middle Miocene sediments occurs between an area limited by boreholes B, C, D, G, H, and E where thicknesses range from 30 to 50 meters. The area between borehole A and SLT reveals the least thickness of middle Miocene sediments absent as 10 meters or less. Middle Miocene sediments were seen in two localized areas just north of SLT and to the southwest around Wassaw Sea Buoy (WSB).

Upper Miocene

The top of the upper Miocene unit ranges in depth from 40 meters at borehole D to 70 meters just north of borehole G (Figure 14). The boundary between the upper Miocene and the overlying Pliocene unit is an erosional unconformity (see profile 10, Figure 6).

Only discontinuous lenses of upper Miocene deposits were seen within the TACTS area west of a line limited by boreholes B, F, and G (see Figure 15). The thickness of the unit within

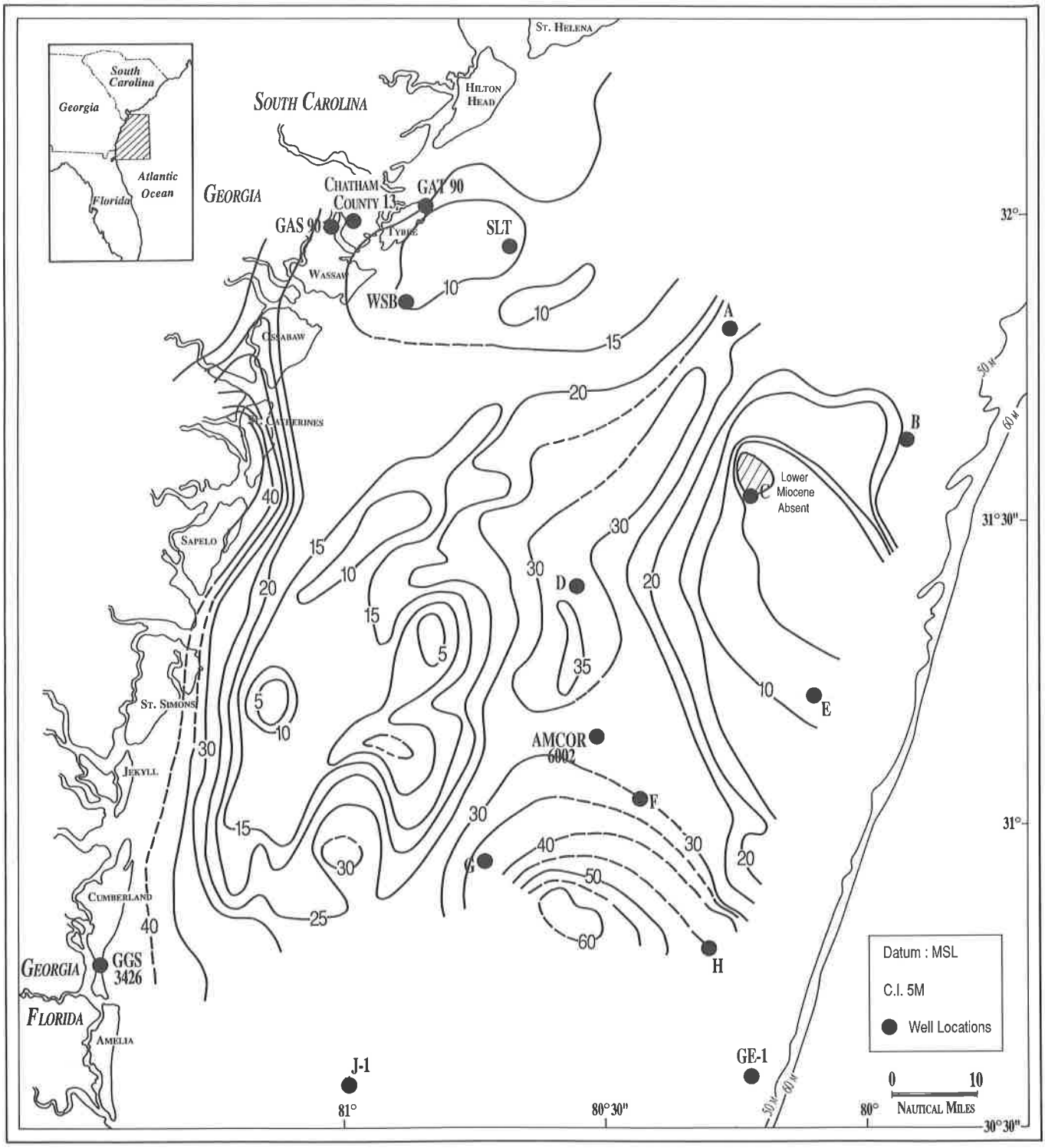


Figure 11. Isopach map of the Lower Miocene-age sediments.

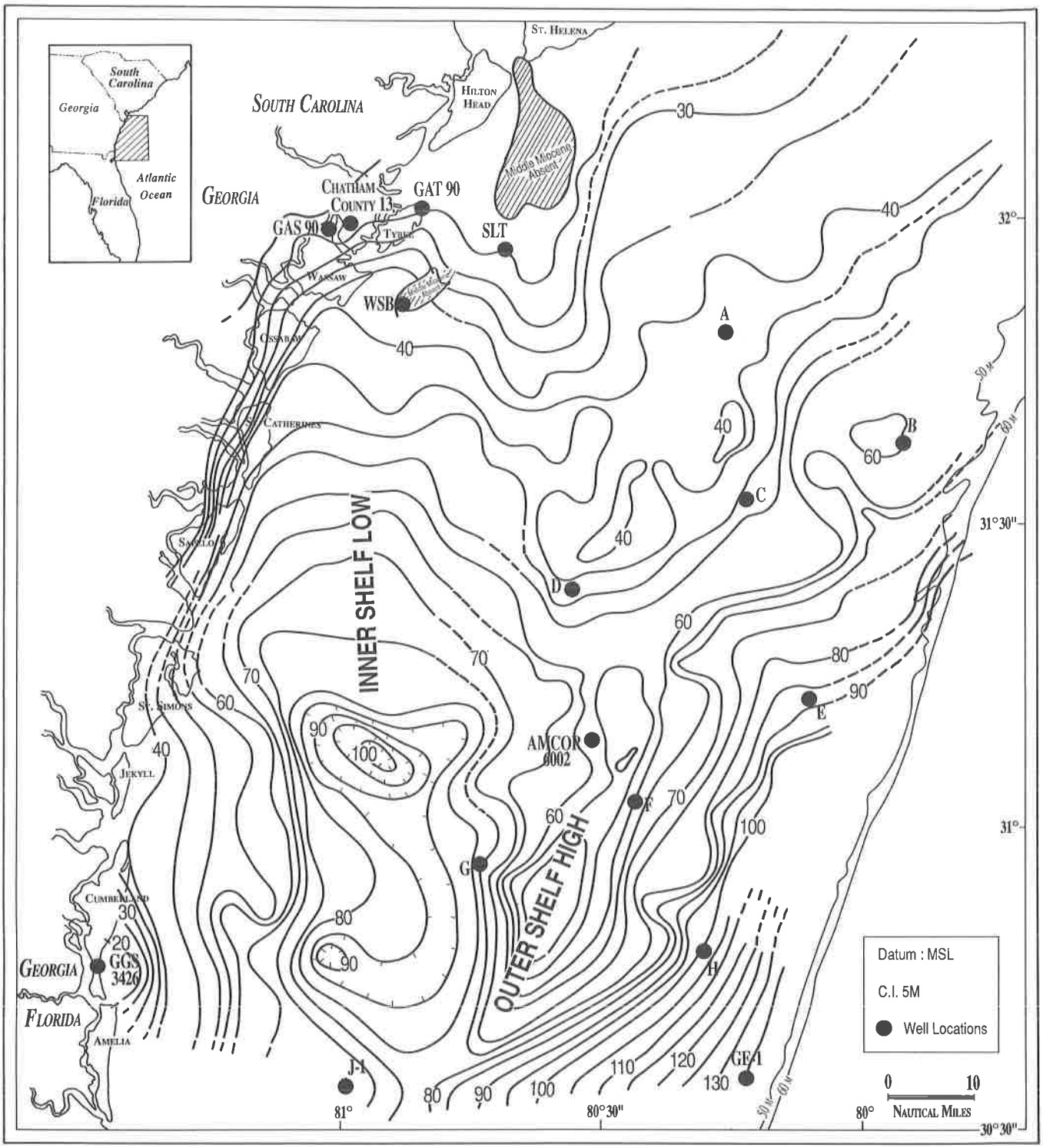


Figure 12. Structure-contour map of the top of Middle Miocene-age sediments.

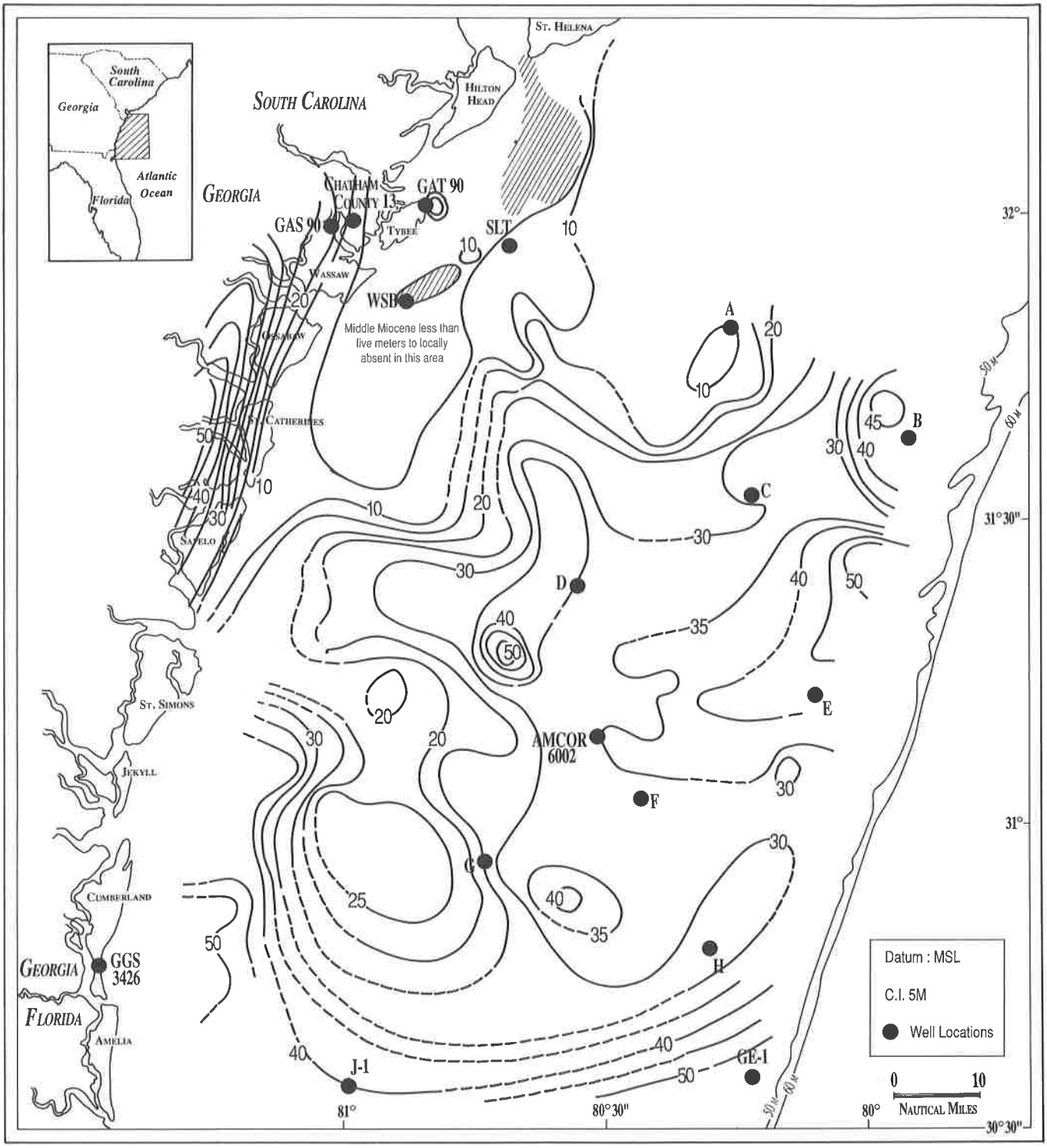


Figure 13. Isopach map of the Middle Miocene-age sediments.

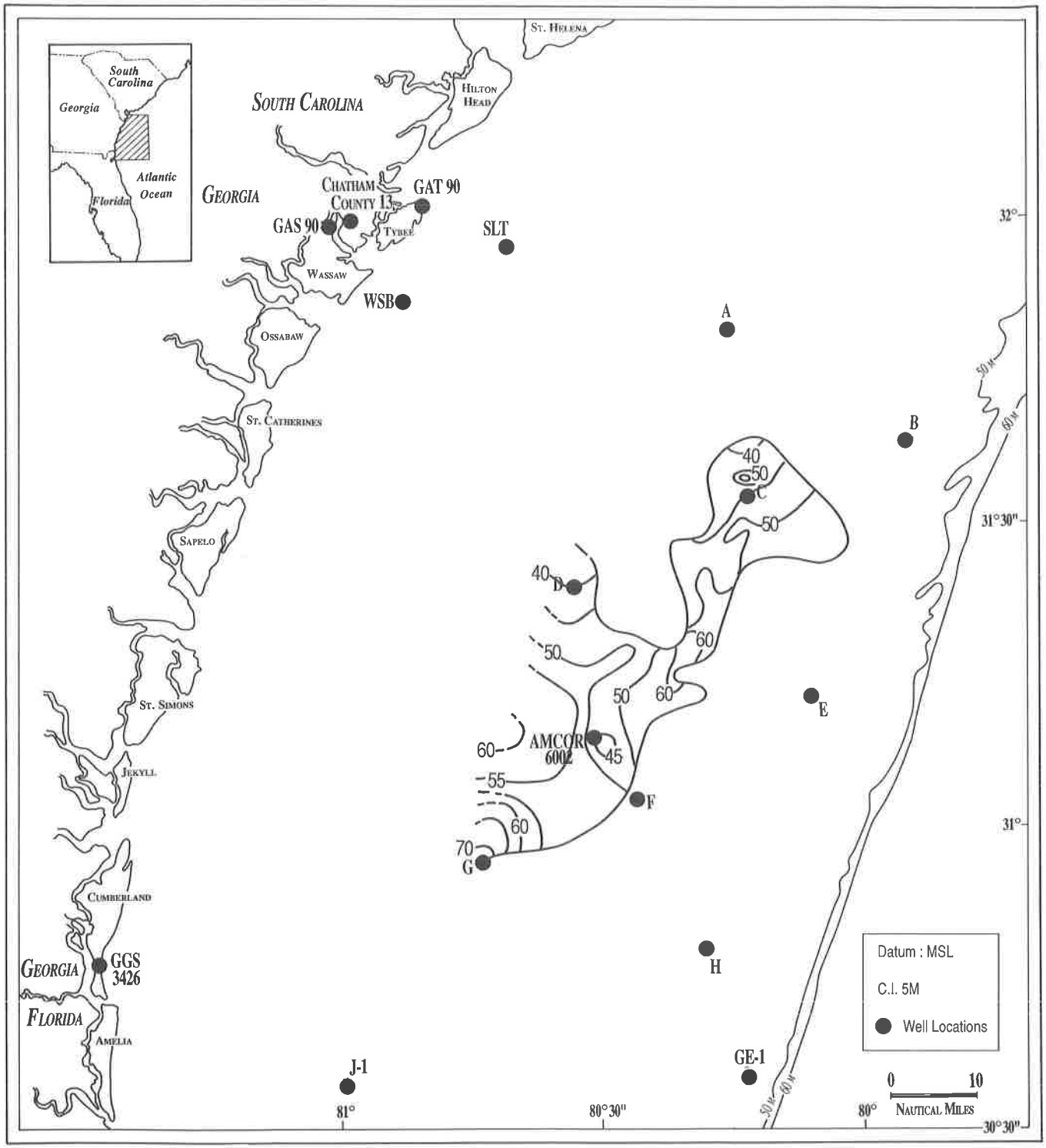


Figure 14. Structure-contour map of the top of the Upper Miocene-age sediments.

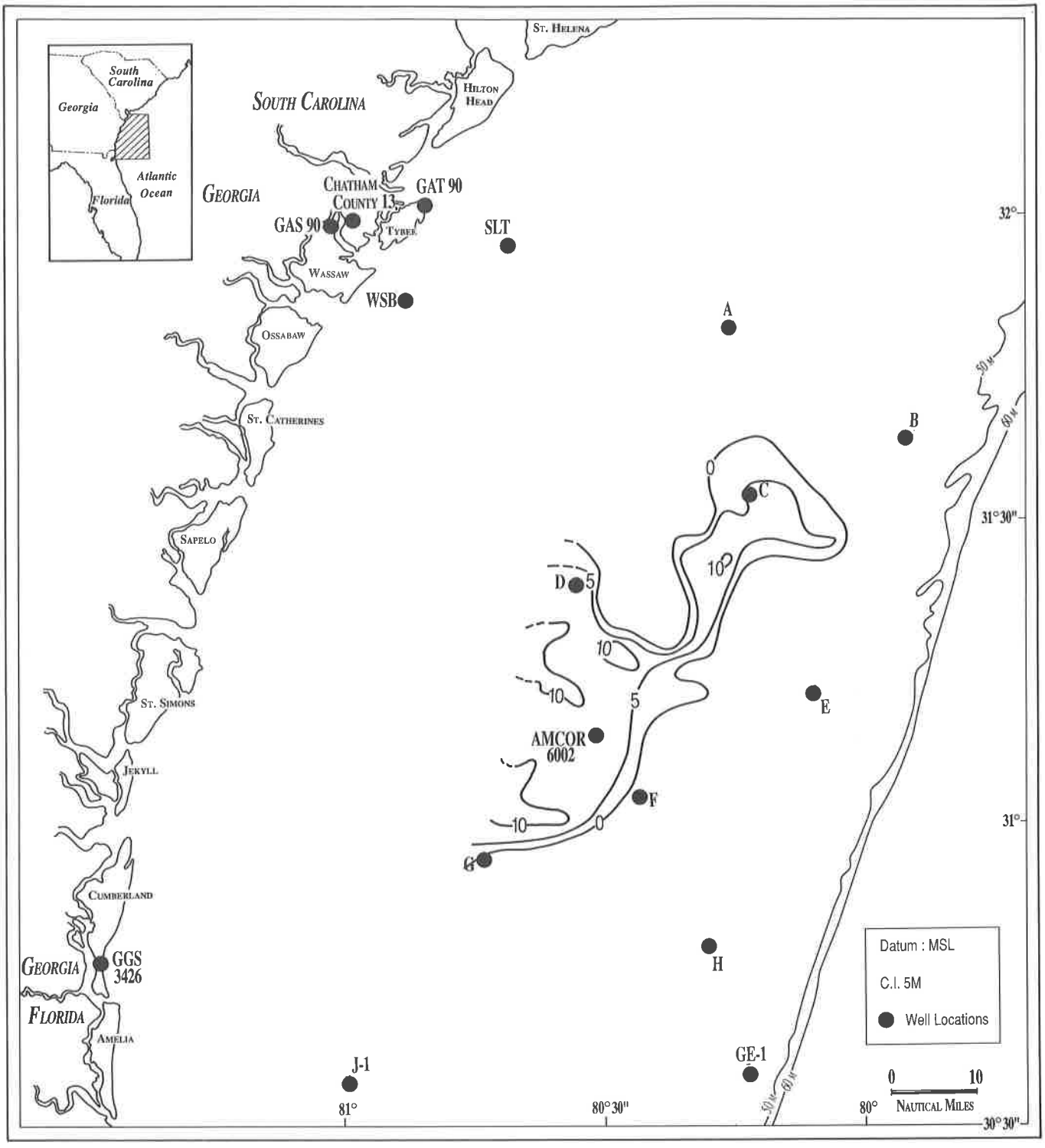


Figure 15. Isopach map of the Upper Miocene-age sediments.

this region reaches a maximum of 10 meters.

Pliocene

The Pliocene seismic package exhibits seaward-prograding foresets that unconformably overly the Miocene unit and underly the surficial Quaternary unit. The lower surface of the Pliocene unit is strikingly channelized between TACTS boreholes F and C (Figure 6), while the upper surface shows numerous cut-and-fill structures between SLT and AMCOR 6002 (see profiles 12 and 13, Figure 7). A structure-contour map of the top surface of the Pliocene deposits is shown in Figure 16.

The Pliocene surface deepens from 20 meters near the coast to 77 meters at TACTS borehole H. The contour lines denote a steeper gradient on the eastern flank of the Outer Shelf High. Pliocene deposits are thickest in the Inner Shelf Low where they reach a maximum thickness of 70 meters (Figure 17). They thin both to the west at the edge of the Sea Island Escarpment and to the east across the top of the Outer Shelf High. Pinch-outs are evident northward toward TACTS borehole B and SLT (see profiles 4 and 13, Figures 3 and 7).

Quaternary

The seismic profiles reveal a thin layer of Quaternary deposits (less than 10 meters) on most of the inner continental shelf except seaward of the Outer Shelf High between TACTS boreholes B and H where thicknesses range from 20 to over 30 meters (see Figure 18 and profiles 4 and 5, Figures 3 and 4). On the seismic profiles, the Quaternary unit exhibits weak to moderately strong discontinuous horizontal reflectors. The prominent lower surface reveals numerous cut-and-fill structures incised into the underlying Pliocene deposits (see profiles 1, 2, 7, and 13 in Figures 2, 5 and 7).

REGIONAL GEOLOGIC FRAMEWORK

Structural and Topographic Features

The Coastal Plain between North Carolina and northeast Florida is underlain by three major structural elements: the Cape Fear Arch, the Southeast Georgia Embayment and the Peninsular Arch. These features were originally thought to be caused by deformation of the Basement Complex (Maher, 1971). However, more recent works by Klitgord and others (1984), Dillon and Popenoe (1988) and Popenoe (1988) have shown that the two arches represent the Carolina Platform in the north and the Florida Platform in the south separated by the Southeast Georgia Embayment, which is underlain by Triassic basins. According to Popenoe (1988),

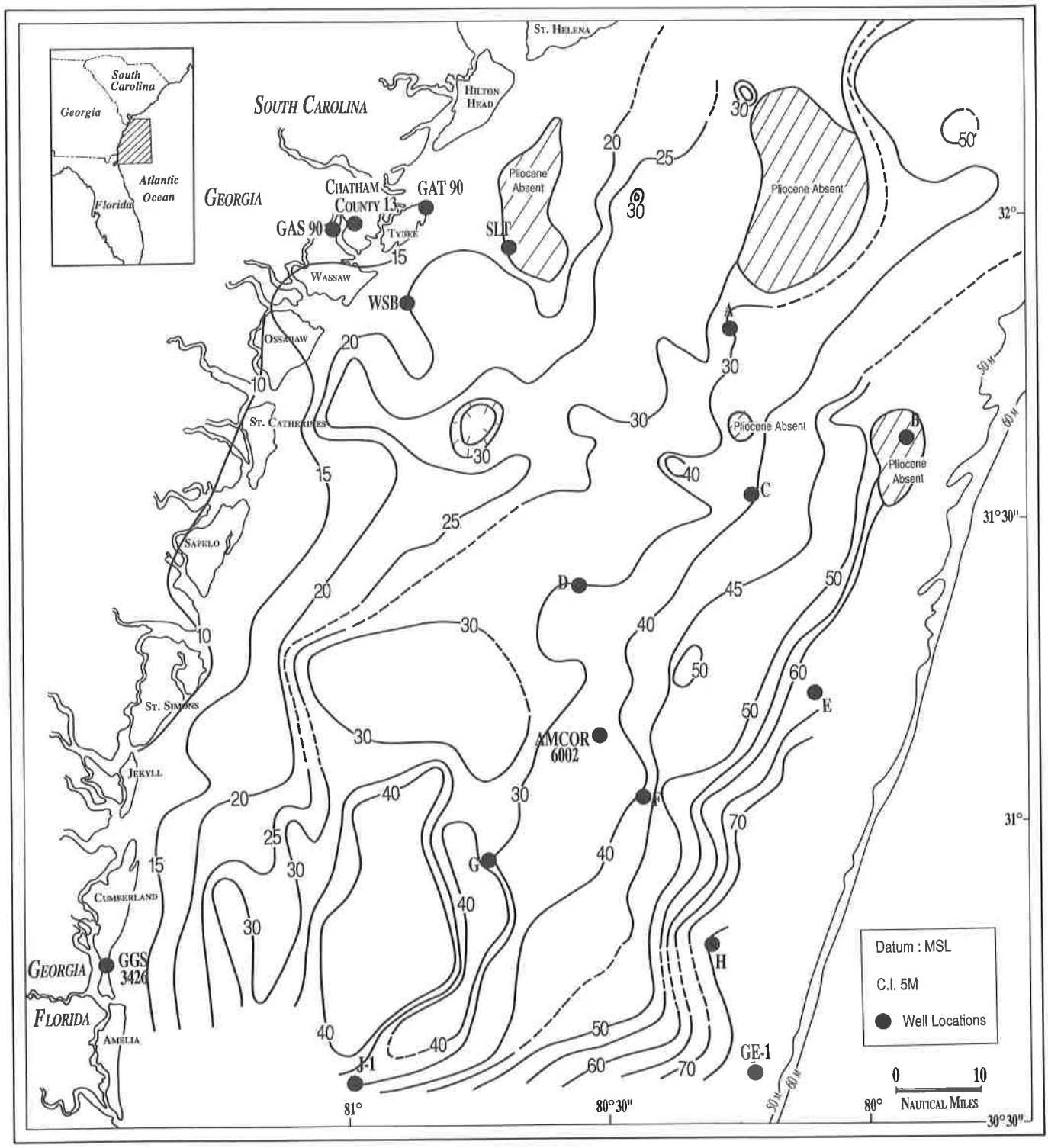


Figure 16. Structure-contour map of the top of Pliocene-age sediments.

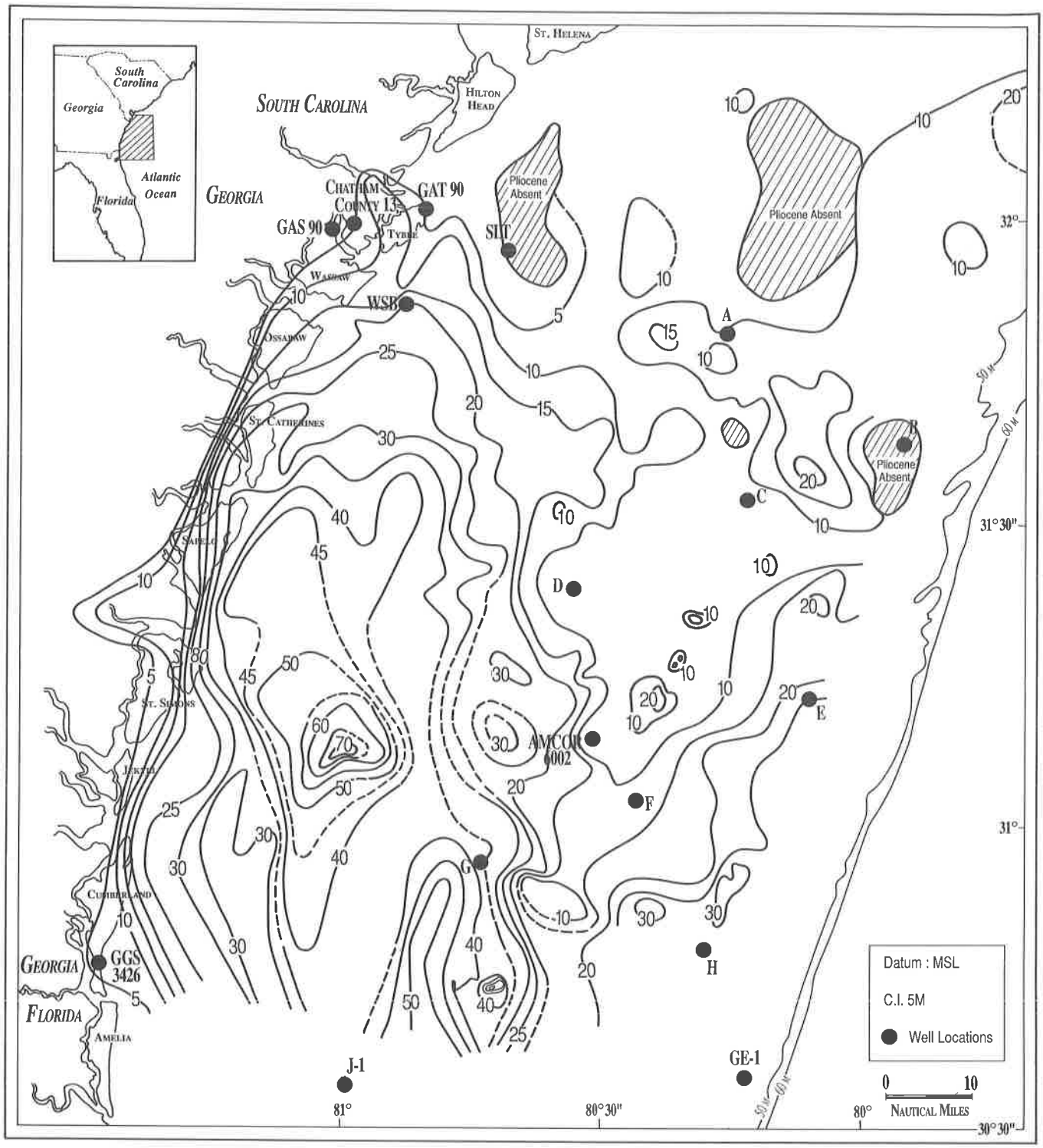


Figure 17. Isopach map of the Pliocene-age sediments.

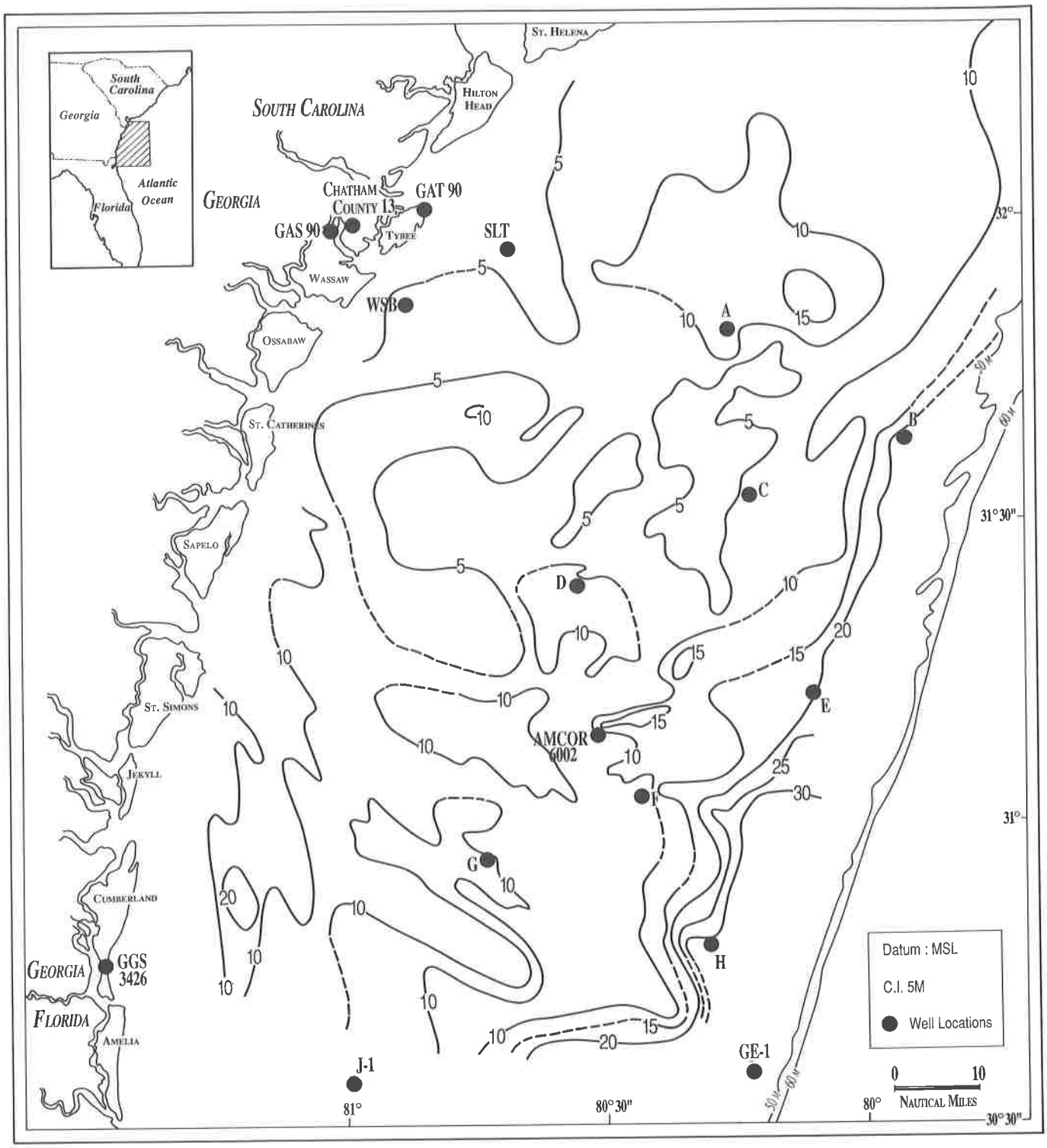


Figure 18. Isopach map of the quaternary-age sediments.

the Cape Fear Arch represents a corner of the Carolina Platform caused by an offset in continental crust across the Blake Spur Fracture Zone.

The Georgia coastline and inner continental shelf are characterized by four relatively small-scale buried topographic features: the Beaufort High/Outer Shelf High, Sea Island Escarpment and the Inner Shelf Low (Henry and Kellam, 1988). The Beaufort High has been mapped from both well data (Huddlestun, 1988) and seismic reflection data (Woolsey, 1977, 1981) Beaufort County, South Carolina, and eastern Chatham County, Georgia.

The Outer Shelf High has been identified by Foley (1981) in the mid-shelf region, from offshore St. Simons Island to offshore Cumberland Island on the basis of seismic reflection profiles. Both the Beaufort High and the Outer Shelf High are low-relief topographic features that essentially affect the Miocene strata.

Because the overlying Pliocene and Quaternary strata as well as the underlying Oligocene deposits are flat-lying, both features are considered to be the result of differential erosion. It is apparent that these features are analogous and that the Outer Shelf High is simply the southerly extension of the Beaufort High.

The Sea Island Escarpment is a Miocene feature originally described by Woolsey and Henry (1974) on the basis of high-resolution seismic reflection records which reveal the feature to extend from southern coastal Chatham County southward under the present barrier Islands. The escarpment, named by Huddlestun (1988), curves seaward at Cumberland Island and continues under the inner shelf as far south as Cape Canaveral (see Henry and Kellam, 1988). According to Woolsey (1977) and Foley (1981), the escarpment was incised by waves and/or currents between middle Miocene and Pliocene time and was overlain by large-scale clinoforms of late Pliocene age. Present data suggest that the escarpment was the inner, erosional edge of the Miocene embayment later filled with Pliocene deposits.

The Inner Shelf Low was described by Foley (1981) for a trough-like feature open to the south that is bounded by the Sea Island Escarpment on the landward side and by the Beaufort High and the Outer Shelf High on the seaward side. The Low is filled with Pliocene deposits that pinch out to the north and west and thicken to the south.

Stratigraphy

Eocene

In the Coastal Plain of Georgia Eocene deposits are known from a series of deep water wells and test holes (McCollum and Herrick, 1964; Maher, 1971; Gohn and others, 1978). On the continental shelf, they have been penetrated in the SLT well (McCollum and Herrick, 1964;

Huddlestun, 1988), AMCOR 6002 well (Hathaway and others, 1979; Huddlestun, 1988) and COST GE-1 well (Poag and Hall, 1979). The Eocene sediments constitute the thickest of the Cenozoic section in the southeastern U.S. Thicknesses range from 130 meters near Charleston, South Carolina to 400 meters in Coastal Georgia (Gohn and others, 1979). The deposits are much thicker offshore, reaching about 500 meters at the COST GE-1 well off southern Georgia (Scholle, 1979).

Eocene strata are primarily fossiliferous limestones and dolomites with small amounts of sands, silts and clays (Maher, 1971; Gohn and others, 1979). In this study, Eocene deposits are delineated only in the extreme north portion of shelf and belong to the upper Eocene Ocala Group consisting of gray to buff, slightly glauconitic, fossiliferous sandy limestone (Herrick and Vorhis, 1963; McCollum and Herrick, 1964). In South Carolina, both the Cross Formation and the lower part of the Cooper Formation constitute the laterally equivalent units (Hazel and others, 1977). In Georgia and South Carolina, the upper Eocene limestones are considered as the primary unit of the Floridan Aquifer.

Oligocene

In the Coastal Plain of Georgia, Oligocene deposits are present as an undifferentiated unit unconformably overlying the Ocala Limestone. The unit consists of light gray fossiliferous limestones updip grading into sandy limestones downdip near the coast (Herrick and Vorhis, 1963; McCollum and Herrick, 1964). On the continental shelf, the strata grade from sandy limestone/calcareous sand of the Lazaretto Creek Formation at the SLT test boring (Huddlestun, 1988) to argillaceous calcareous ooze at AMCOR 6002, JOIDES 1 and COST GE-1 test holes (Bunce and others, 1979; Scholle, 1979; Huddlestun, 1988).

Both onshore and offshore Georgia and South Carolina, the Oligocene strata are less than 100 meters thick and in some places they are completely removed by erosion (Herrick and Vorhis, 1963; Paull and Dillon, 1980; and Huddlestun, 1988). Paleoenvironmental studies show that the Oligocene deposits were deposited in outer shelf or deeper waters (Hathaway and others, 1979).

Miocene

In coastal Georgia and South Carolina, Miocene deposits are represented by the Hawthorne Group composed of the lower Miocene Parachucla Formation and Marks Head Formation and the middle Miocene Coosawhatchie Formation. Upper Miocene deposits are absent in the coastal areas but occur as thin discontinuous lenses in the inner Georgia shelf

(Woolsey, 1977; Foley, 1981).

Lower Miocene: The lower Miocene includes the Parachucla Formation overlain disconformably and paraconformably by the Marks Head Formation. According to Huddlestun (1988), the Parachucla Formation is composed of phosphatic, calcareous, argillaceous sand locally dominated by limestone and dolostone.

The Marks Head Formation is composed of slightly dolomitic, phosphatic, sandy clays and argillaceous sands. The formation has an upper boundary of dolomitic clay that is disconformably overlain by the Coosawhatchie Formation of middle Miocene age. Both the Parachucla and Marks Head formations are less phosphatic than the overlying Coosawhatchie Formation (Henry and Kellam, 1986; Mannheim, 1991).

On seismic reflection profiles, the lower Miocene units reveal closely-spaced, parallel reflectors of weak to moderate strength. Prograding foresets of possible deltaic origin are often seen within the Marks Head Formation (Woolsey, 1977).

The depositional environment during the lower Miocene was that of a shallow shelf and restricted marine deltaic deposits (Woolsey, 1977; Hathaway and others, 1979). During early middle Miocene a drop in sea level resulted in subaerial erosion of the lower Miocene deposits (Vail and others, 1977). This erosional surface is evidenced by a fairly prominent reflector on top of the lower Miocene deposits.

Middle Miocene: On the Coastal Plain and continental shelf of Georgia and southeastern South Carolina, the middle Miocene deposits are assigned by Huddlestun (1982, 1988) to the Coosawhatchie Formation (formerly Coosawhatchie Clay Member) of the Hawthorne Group (formerly Hawthorne Formation). The Coosawhatchie Formation consists of phosphatic clay, sandy clay, argillaceous sand and phosphorite. The formation has been divided by Huddlestun (1988) into four members: the basal Tybee Phosphorite Member, the Berryville Member, the Ebenezer Member, and the Charlton Member. Three of these, namely, the Tybee Phosphorite Member, the Berryville Member, and the Ebenezer Member are represented in the coastal and continental shelf deposits.

The basal Tybee Phosphorite Member consists of quartz sand and phosphorite with small amounts of clay and dolomite (Huddlestun, 1988). The phosphorite occurs as small, well-rounded, black, brown or amber grains or pellets of apatite that range in size from 0.1 mm to 1 mm (Woolsey, 1977; Wallace, 1980; Huddlestun, 1988). It is typically associated with fish bones and teeth. According to Wallace (1980), phosphorite concentrations within the

Tybee Phosphorite Member range from 12% to 40% BPL (Bone Phosphate of Lime). The Tybee Phosphorite Member has not been identified in the TACTS holes (Popenoe and others, 1989), but was identified in JOIDES 1, COST GE-1 and AMCOR 6002 off Georgia (Poag and Hall, 1979).

The Berryville Clay Member conformably overlies the Tybee Phosphorite Member. It is described as an olive-gray, phosphatic, variably calcareous, microfossiliferous, silty clay (Huddlestun, 1988). On the continental shelf of Georgia, the Berryville Clay Member is the most phosphatic unit (Mannheim, 1988) and makes up the entire Coosawhatchie Formation (Huddlestun, 1988). The unit is present in TACTS boreholes B, C, D, E, F, G, H, and AMCOR 6002 (Mannheim, 1991; Huddlestun, 1990, personal communication). Berryville equivalent middle Miocene phosphatic sediments have also been identified in COST GE-1 well between depths of 105 and 218 meters (Scholle, 1979). The Berryville Clay Member grades westward into the more clastic and non-phosphatic Ebenezer Member (Huddlestun, 1988).

The Ebenezer Member constitutes the upper part of the Coosawhatchie Formation and is formed of a gray to olive-gray, slightly phosphatic, argillaceous, fine- to medium-sand (Huddlestun, 1988). In areas where the lower Miocene is absent, the Coosawhatchie Formation constitutes the upper confining layer for the underlying Oligocene and Eocene beds of the Floridan Aquifer.

Upper Miocene: Upper Miocene deposits occur only in few discontinuous lenses in the inner shelf of Georgia (Woolsey, 1977; Foley, 1981; Kellam and Henry, 1988). AMCOR 6002 penetrated 10 meters of olive silty clay and phosphatic sands of late Miocene age (Hathaway and others, 1979). However, no upper Miocene sediments occur onshore in Georgia, apparently a result of subaerial erosion in the latest Miocene low sea level stand (Huddlestun, 1982; Popenoe and others, 1989).

Pliocene

Pliocene deposits on the Georgia coast and continental shelf are represented by the early Pliocene Wabasso Beds of the Hawthorne Group, and the early late Pliocene Duplin Formation. An undifferentiated unit of upper Pliocene sand is also found in the outer continental shelf.

The Wabasso Beds consist of silty, fine- to very fine-grained sand that is variably phosphatic, calcareous, microfossiliferous and argillaceous (Huddlestun, 1988). Seismic profiles indicate that these beds occupy a relatively narrow belt on the seaward side of the Sea Island

Escarpment. On the continental shelf, Wabasso Beds have been cored at TACTS borings A, C, D, H & G. Thicknesses range from 13 meters at boring A to 53 meter at boring G (Huddlestun, 1990, personal communication).

The Duplin Formation consists of well-sorted, massive beds of slightly argillaceous, variably shelly, calcareous and fossiliferous sand that is locally pebbly and gravelly (Huddlestun, 1988). Seismic profiles in the coastal area reveal large-scale eastward-dipping clinoforms within the Duplin Formation (Woolsey and Henry, 1974; Woolsey, 1977; Foley, 1981). On the Georgia coast and continental shelf, the Duplin Formation thins and pinches out in landward and seaward directions as well as to the north of the Beaufort High. The deposits are thickest on the inner shelf low immediately offshore of the islands (Henry and Kellam, 1988; Huddlestun, 1988). Thicknesses on the shelf reach approximately 4 meters at AMCOR 6002 TACTS borehole F (Huddlestun, 1990, personal communication).

The undifferentiated upper Pliocene unit of the outer continental shelf consists of loose brecciated shell hash and loose, fine to very coarse quartz sand that contains phosphate pellets, calcareous mud, glauconite and sedimentary rock fragments (Huddlestun, 1988). The unit has been cored at TACTS boreholes C, E, F and H (Huddlestun, 1990, personal communication), COST GE-1 test well And JOIDES J1 and J2 (Poag, and Hall, 1979). Thicknesses range from 4 meters at TACTS borehole C to 34 meters at COST GE-1.

Quaternary

Quaternary sediments across the continental shelf of Georgia and South Carolina constitute a thin blanket of unconsolidated sands that were deposited during seaward transgressions and regressions associated with fluctuations of sea level (Pilkey and others, 1981). The shelf sands become richer in calcareous material both seaward and to the south (Milliman and others, 1972). In seismic profiles, the unit exhibits weak parallel to subparallel reflectors and numerous cut-and-fill structures incised into the underlying Pliocene deposits (Woolsey, 1977; Henry and others, 1978; Foley, 1981; Kellam, 1981; Idris, 1983).

CONCLUSIONS

1. Seismic reflection profiles within the TACTS area delineate seven depositional sequences bounded by unconformities and ranging in age from Eocene through Quaternary.

However, in the southern portions of the study area, Eocene and, in some parts, Oligocene sequences were not traceable due to the penetration limit of the seismic equipment used.

2. Between boreholes C and F, the Pliocene section reveals extensive channelling into the underlying upper and middle Miocene. The channels may contain phospohorite-rich lag deposits formed by reworking of the underlying middle Miocene deposits, and as such are primary targets for phosphorite exploration.

3. The middle Miocene section along the coast is cut by the Sea Island Escarpment, a major topographic feature that controlled the deposition of the overlying Pliocene deposits.

4. The Outer Shelf High comes to within 10 meters of the seafloor between boreholes G and H and extends northeastward to the vicinity of SLT. The crest of this feature is a primary target for phosphorite exploration.

5. The middle Miocene comes to within 4 meters of the seafloor midway between boreholes A and C, thus making this location another primary target for phosphorite exploration.

6. The Outer Shelf Low is a topographic trough located between the Outer Shelf High and the coastal Sea Island Escarpment and is filled with Pliocene sediments, the lower portion of which may be enriched with phosphorite from the underlying lower Miocene deposits.

PART II. EVALUATION OF SELECTED SITES FOR ECONOMIC HARD MINERALS POTENTIAL

INTRODUCTION

Based on the scientific literature and industry experience, the Georgia Department of Natural Resources and U.S. Minerals Management Service Joint Task on Offshore Minerals Assessment recommended a study of certain features on the continental shelf whose origin involved processes that tended to concentrate economic mineral species. Features such as buried channels that may have cut into ore-bearing deposits, thus creating lag concentrates, and erosional scarps (old shorelines?) that may have heavy mineral deposits concentrated by winnowing were prime targets.

The selection of four target areas conforming to the above criteria were based on previous studies (Henry and Hoyt, 1968; Foley, 1981; Henry, 1983; Henry and Rueth, 1986; and Henry and Kellam, 1988) and high resolution seismic data collected during the course of the present study. (see Figures 19 and 20). The locations of the target areas (TA1-5) are shown in Figure 1.

DATA ACQUISITION

The site-specific studies were carried out with the technical assistance of the Marine Minerals Technology Center (MMTC) of the University of Mississippi and the Center for Applied Isotope Studies (CAIS) of the University of Georgia. The work involved simultaneously towing a gamma isotope mapping system (GIMS) to detect naturally occurring radioactive minerals on or near the seafloor and a high resolution seismic profiling system to define scarps and buried channels and, as it turned out, sandwaves. From the resulting data, a total of fifteen sites were chosen for exploratory drilling.

The Gamma Isotope Mapping System (GIMS)

Developed by the Center for Applied Isotope Studies at the University of Georgia, the GIMS is a rapid, continuous sediment-analysis system that utilizes a gamma spectroscope within a bottom towed sled to determine certain elemental constituents of seafloor sediments that are directly relevant to this study, namely, Bismuth 214, Thallium 208 and Potassium 40. Bi214 indicates uranium activity associated with phosphate, Tl208 is indicative of thorium

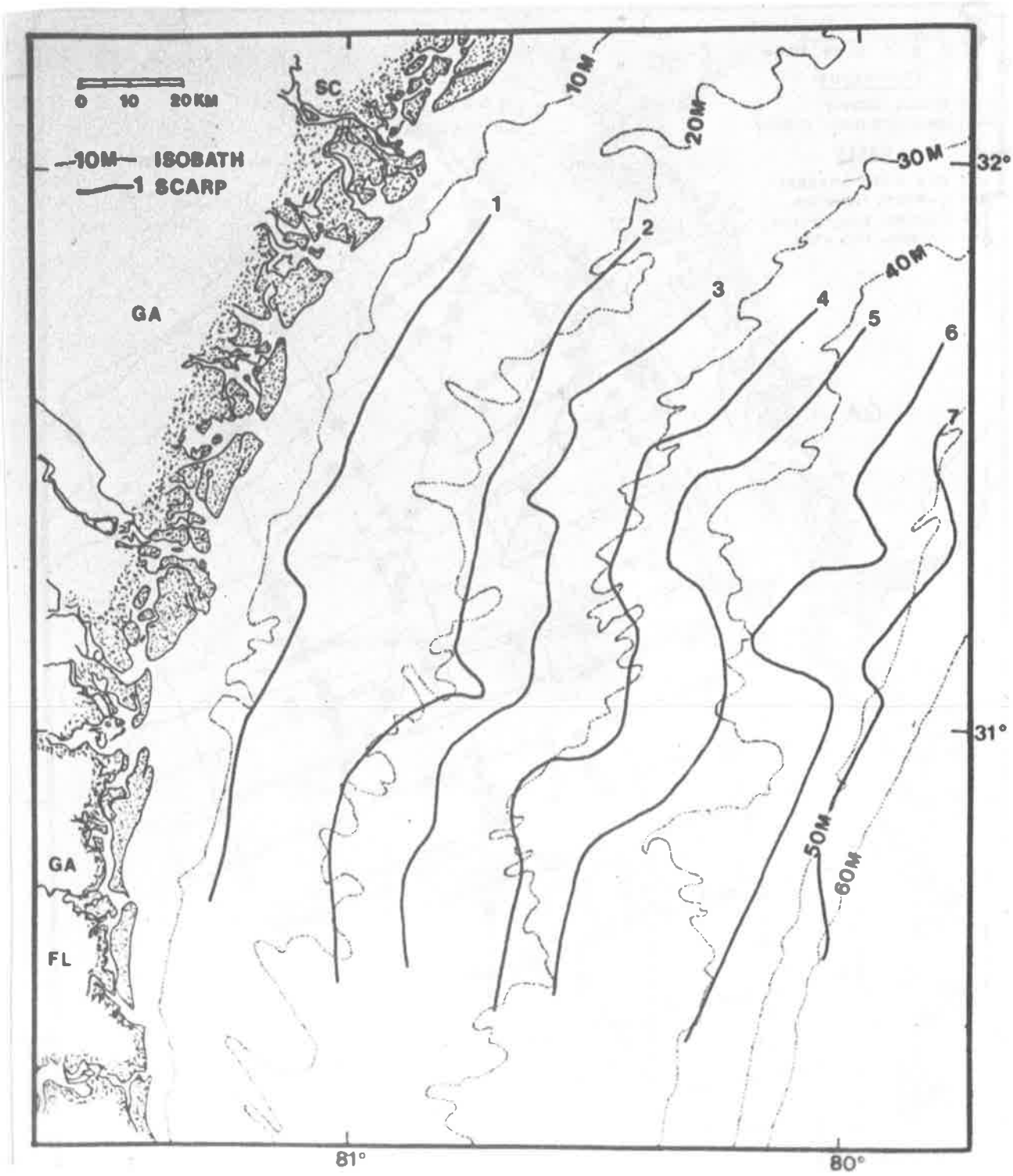


Figure 19. Location of scarp-like features, Georgia Continental Shelf.

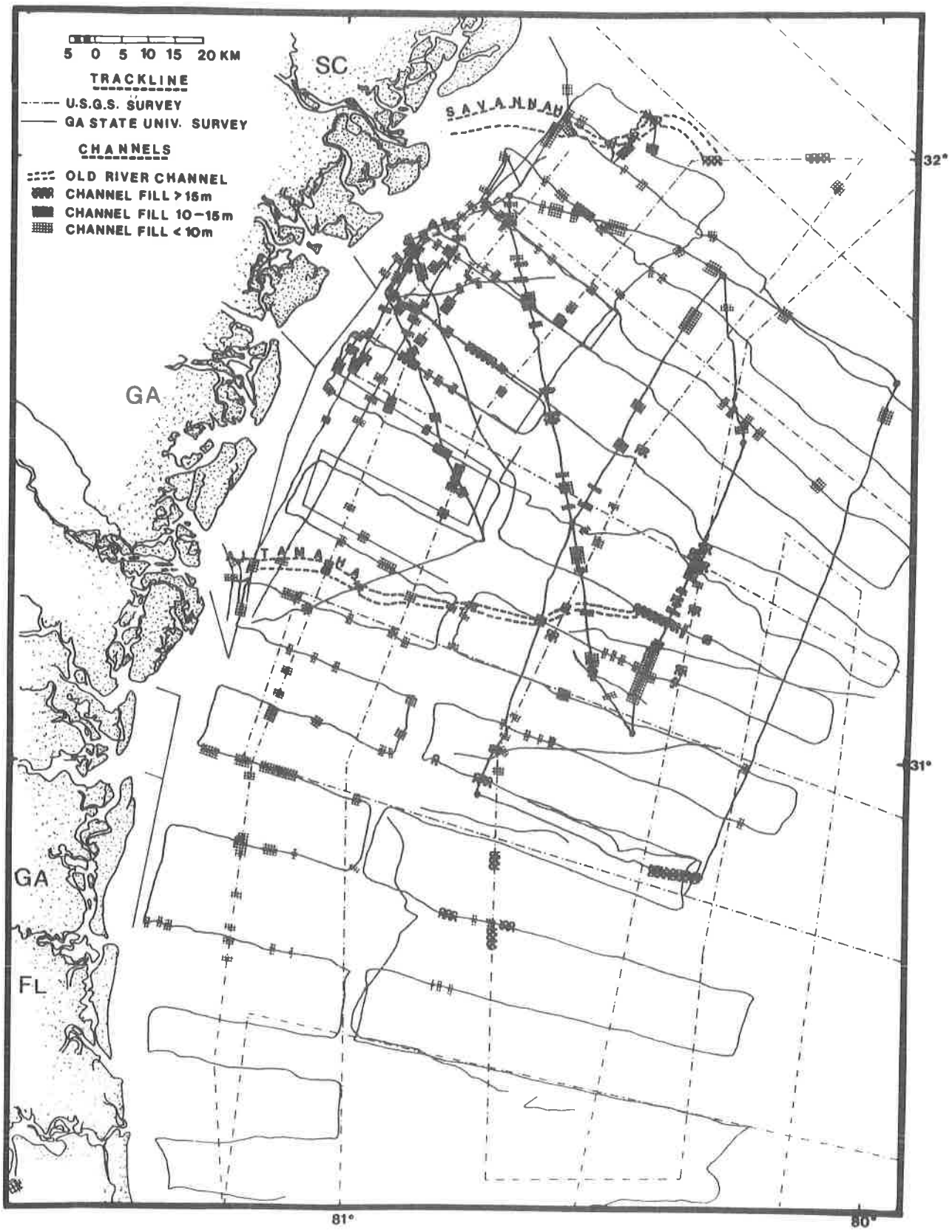


Figure 20. Location of buried channels, Georgia Continental Shelf.

activity in economic heavy mineral deposits and K40 is contained in clay minerals, the relative abundance of which provides information on gross sediment texture.

The GIMS records gamma activity in counts per minute (cpm) for the three elements as well as the total gamma activity. It also records the latitude, longitude and water depth at each data point and is calibrated to the respective ship's systems. There was a 60 sec. delay in data recording to allow the sled to move to the position of the vessel at the time the location was recorded. Technical information concerning the operation of the GIMS is presented in Table 1. It should be noted that maximum subbottom detection of the reference minerals is less than 0.5 meter. While this severely limits its use to survey buried channels, the system is very appropriate for detecting surficial concentrations of heavy minerals. Trackline maps of each target area are presented in Figures 21, 22, 26 and 34. The points (sites) along each trackline are locations at which gamma activity is recorded. These data are collectively presented for each target area in Appendices 1-4 and Table 2. Analyses of the gamma activity measured within each target area, including hydrography, are also presented in computer-derived diagrams and isopleth maps in Appendices 1-4.

Vibralift Coring

The location of the drillsites in each target area was determined after evaluation of the GINS and seismic surveys. As shown in Figures 21-35, vibralift cores were taken to evaluate areas exhibiting sandwaves and buried channels, and "control" areas of only flat-lying sediments. Also, efforts were made to include areas of both high and low gamma activity.

A total of 15 vibralift cores were obtained using a drill constructed by the MMTC. This device collected fluidized samples through five-foot intervals to a depth of 20 feet. Although a total of 58 five-gallon samples were collected, detailed analyses of mineralogy and texture have not been completed as yet. Preliminary results are presented in Tables 2 and 3 together with the results of gamma isotope mapping in the target areas and drillsites.

DISCUSSION

Examination of the data available to this study thus far suggests that the percent of economic heavy minerals occurring in the target areas is presently below industry interest. This is supported by the results of previous industry surveys in the region by DuPont (Jack Reynolds, 1990. personal communication) and Associated Minerals (Greg Bonn, 1990, personal

Table 1. GIMS target analytes and technical data.

	GIMS
Target Analytes	
Bismuth	Bi-214
Thallium	Tl-208
Potassium	K-40
Total activity	
Technical Data	
Data results:	counts per minute (cpm)
Distance between stations:	60 s
Calibration test:	monazite sand
Calibration results:	spectrum printout
Operating range	
penetration:	- 45 cm
reference:	cs-137
reference channel:	55
resolution:	- 8%
gain:	0-255
preferred gain:	50-200
ship speed:	2.5 to 3 kn

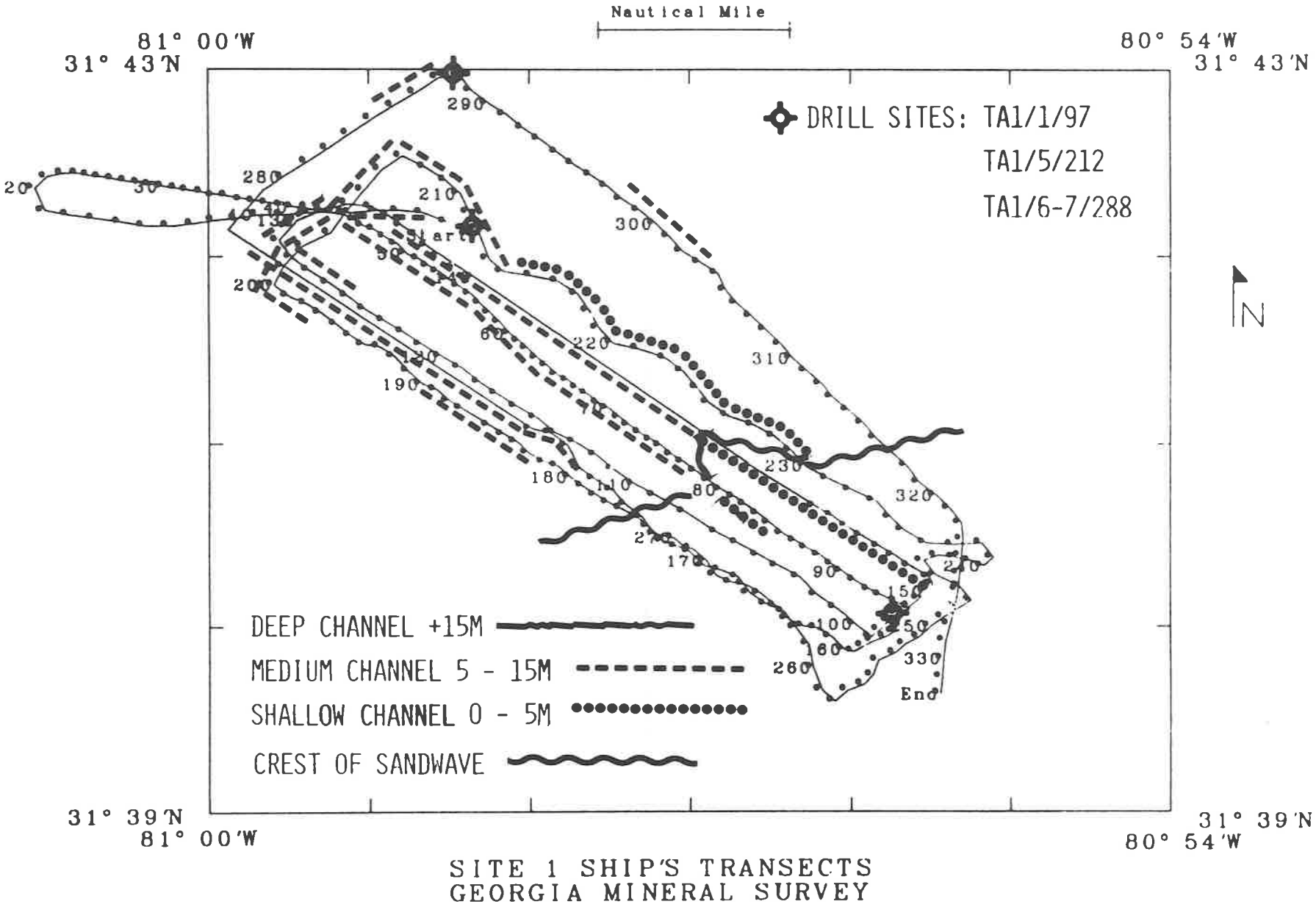


Figure 21. Trackline map of target area (TA1) showing location of drill sites, buried channels and sandwaves.

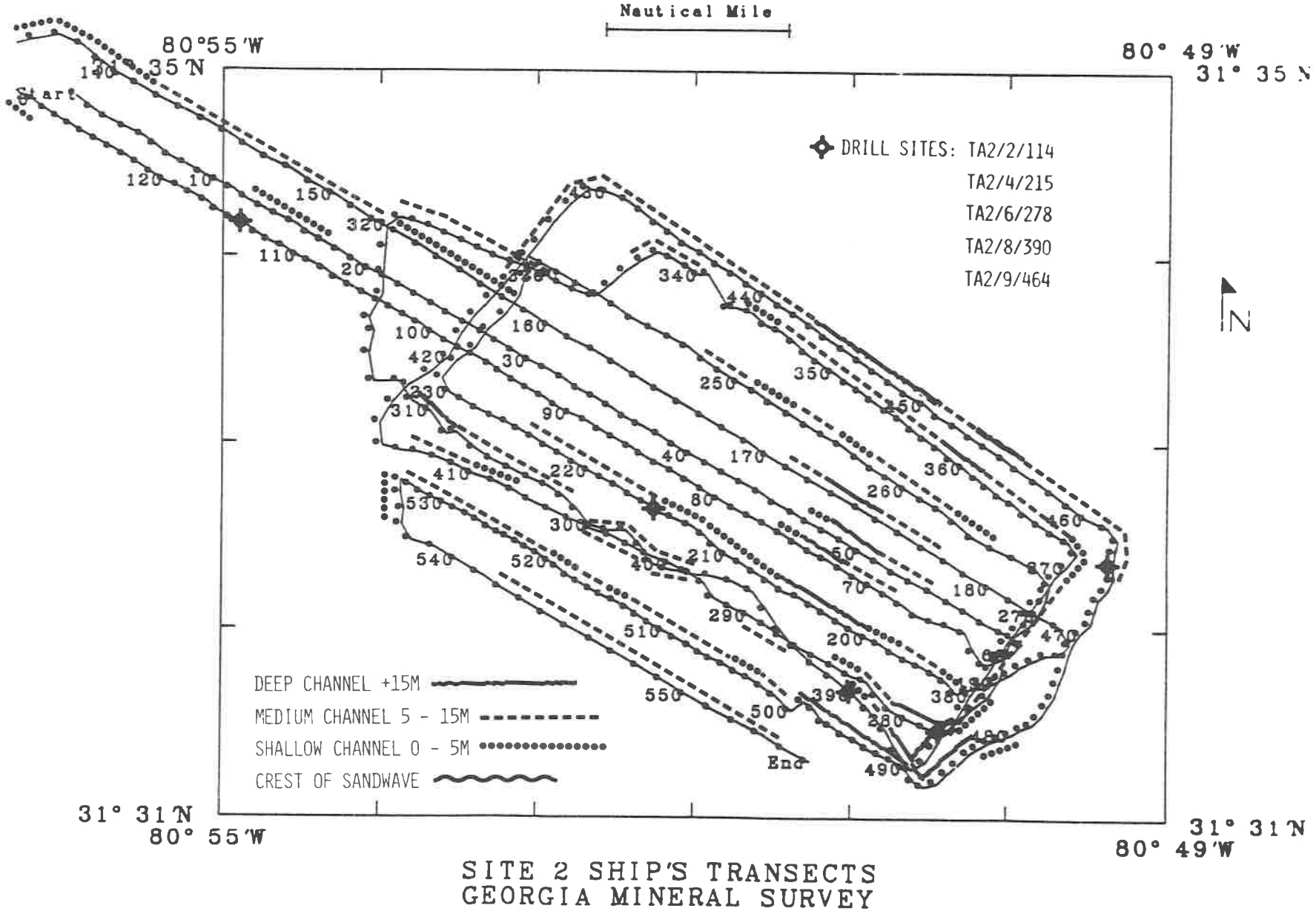


Figure 22. Trackline map of target area 2 (TA2) showing location of drill sites, buried channels and sandwaves.

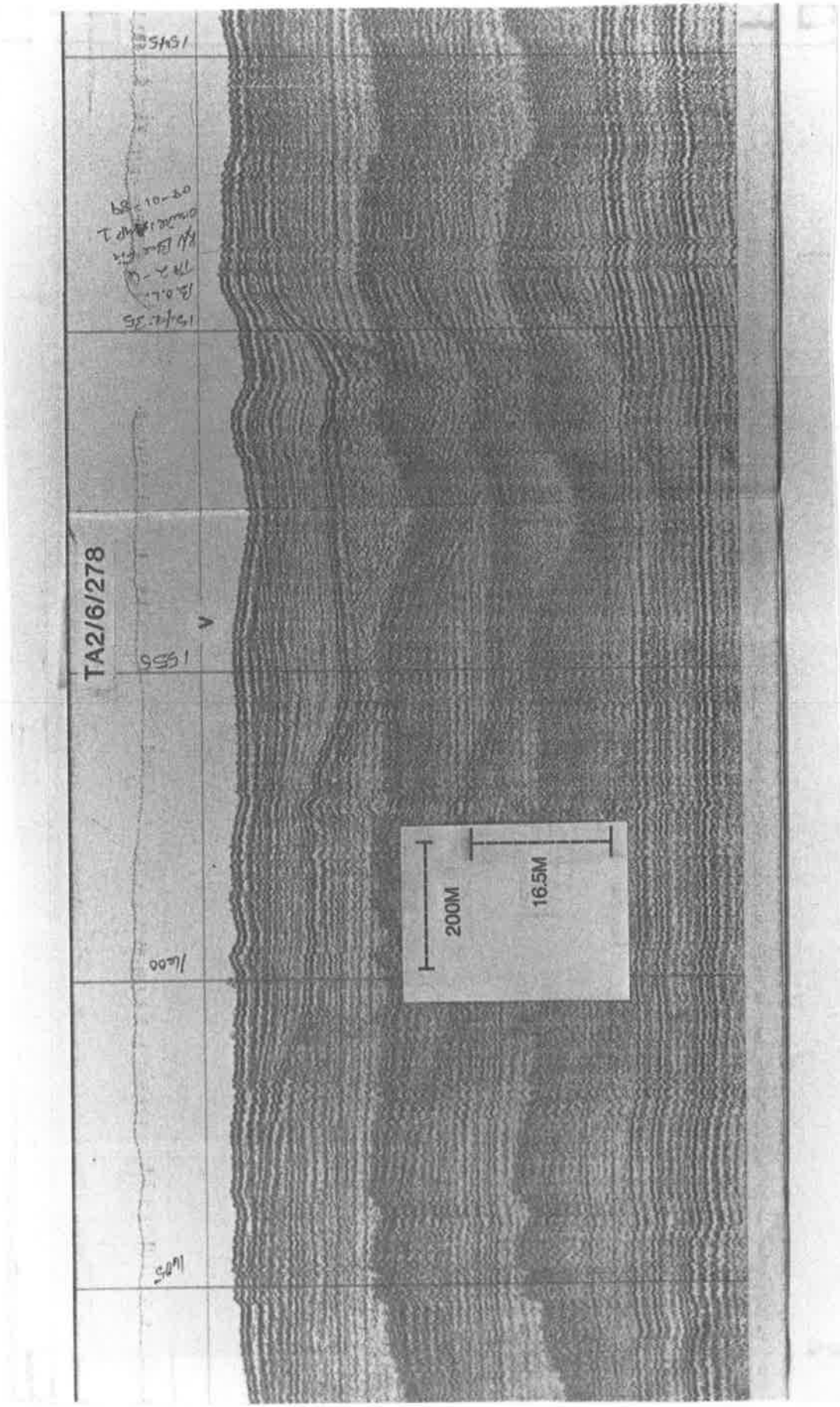


Figure 23. Seismic profile at drill site TA2/6/278.

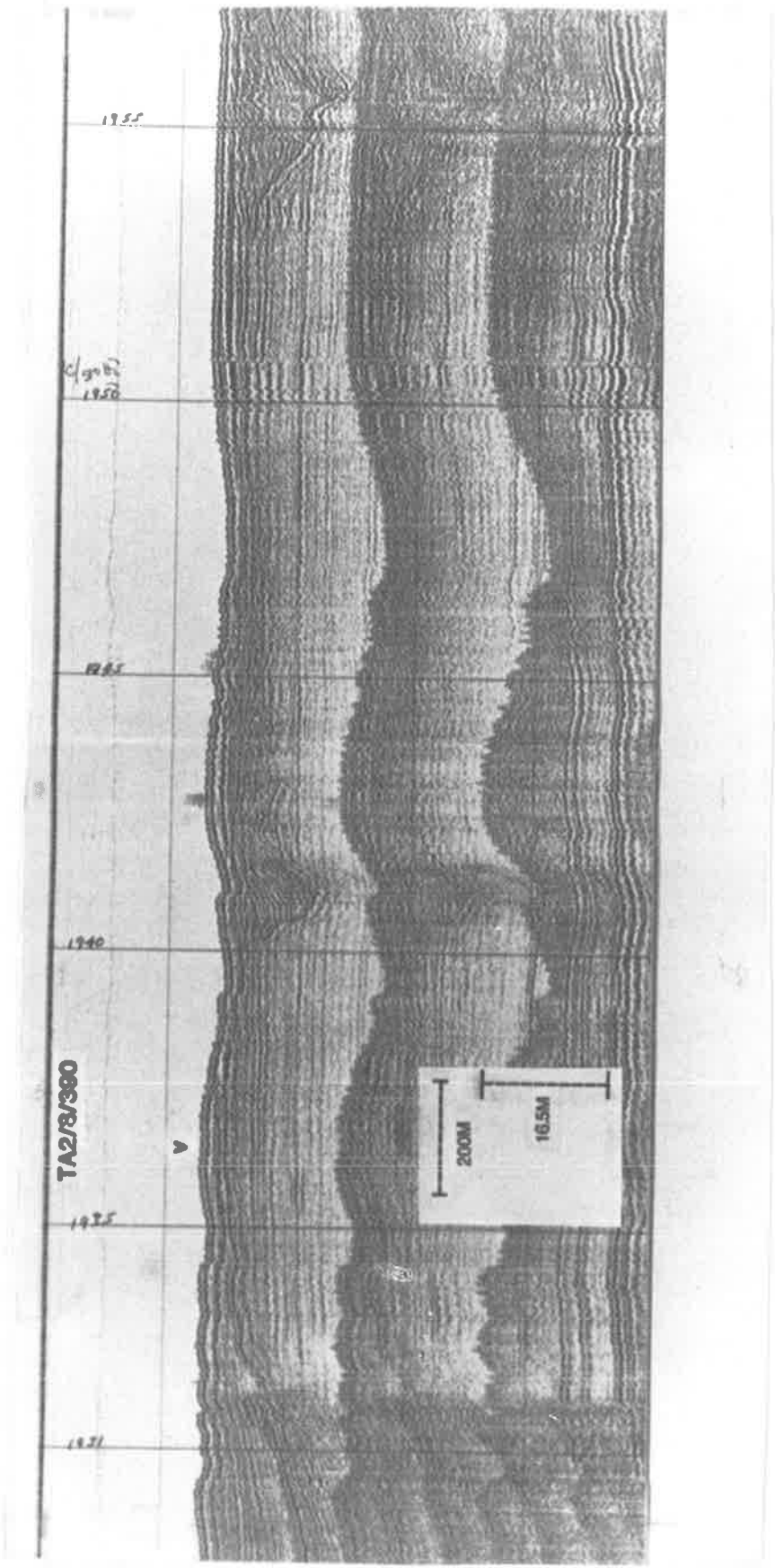


Figure 24. Seismic profile at drill site TA2/8/390.

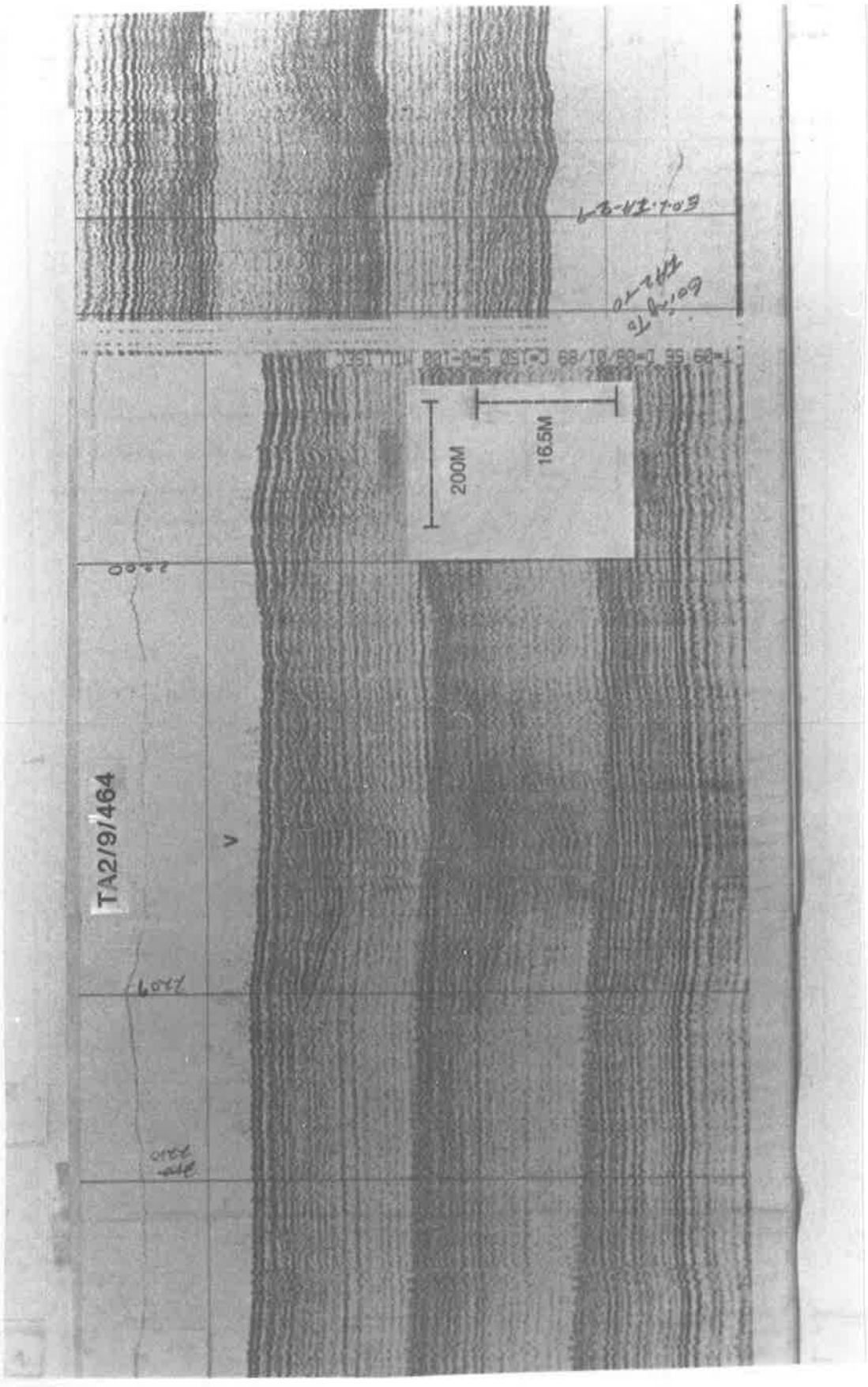


Figure 25. Seismic profile at drill site TA2/9/464.

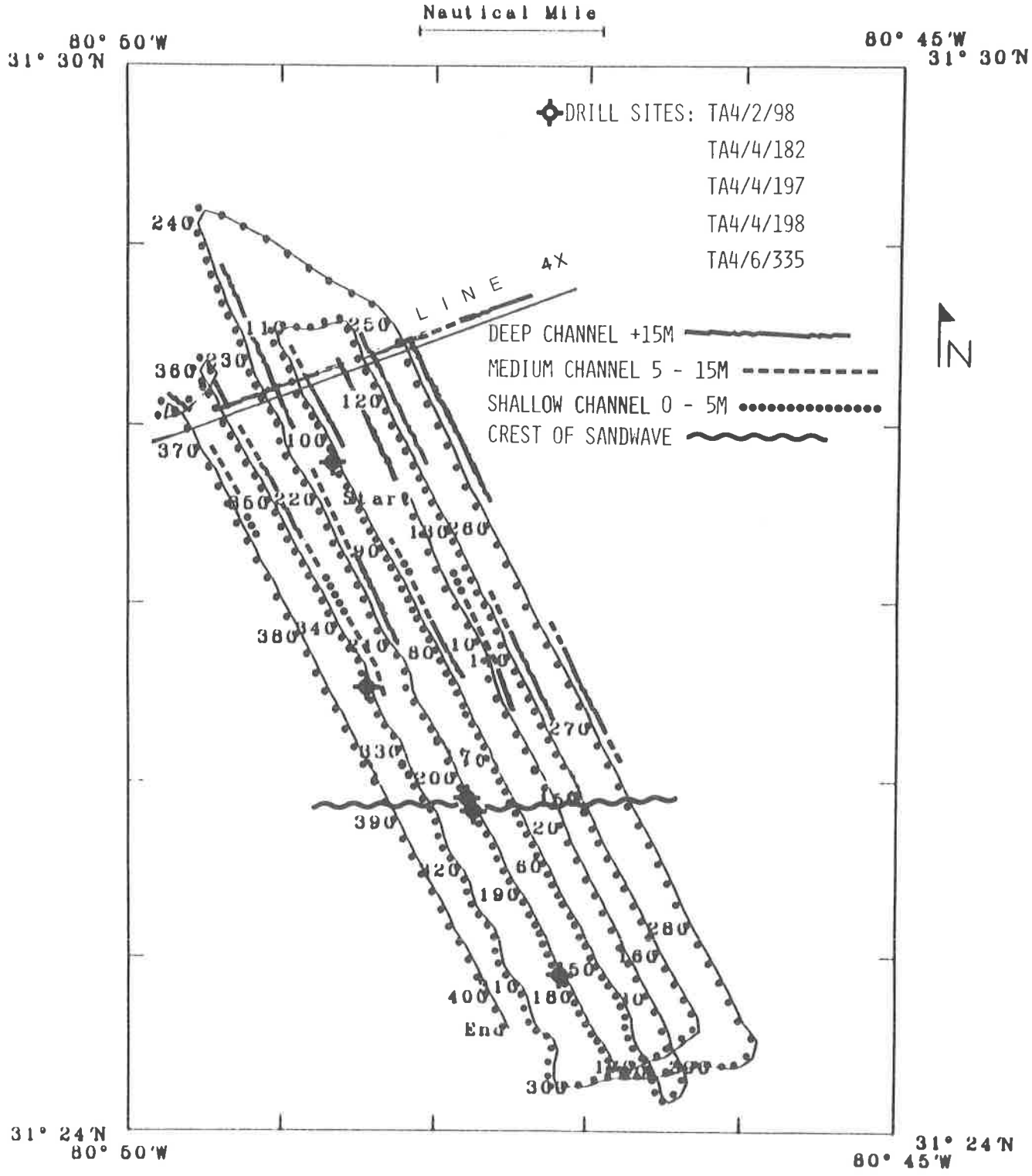


Figure 26. Trackline map of target area 3 (TA3) showing location of drill sites, buried channels and sandwaves.

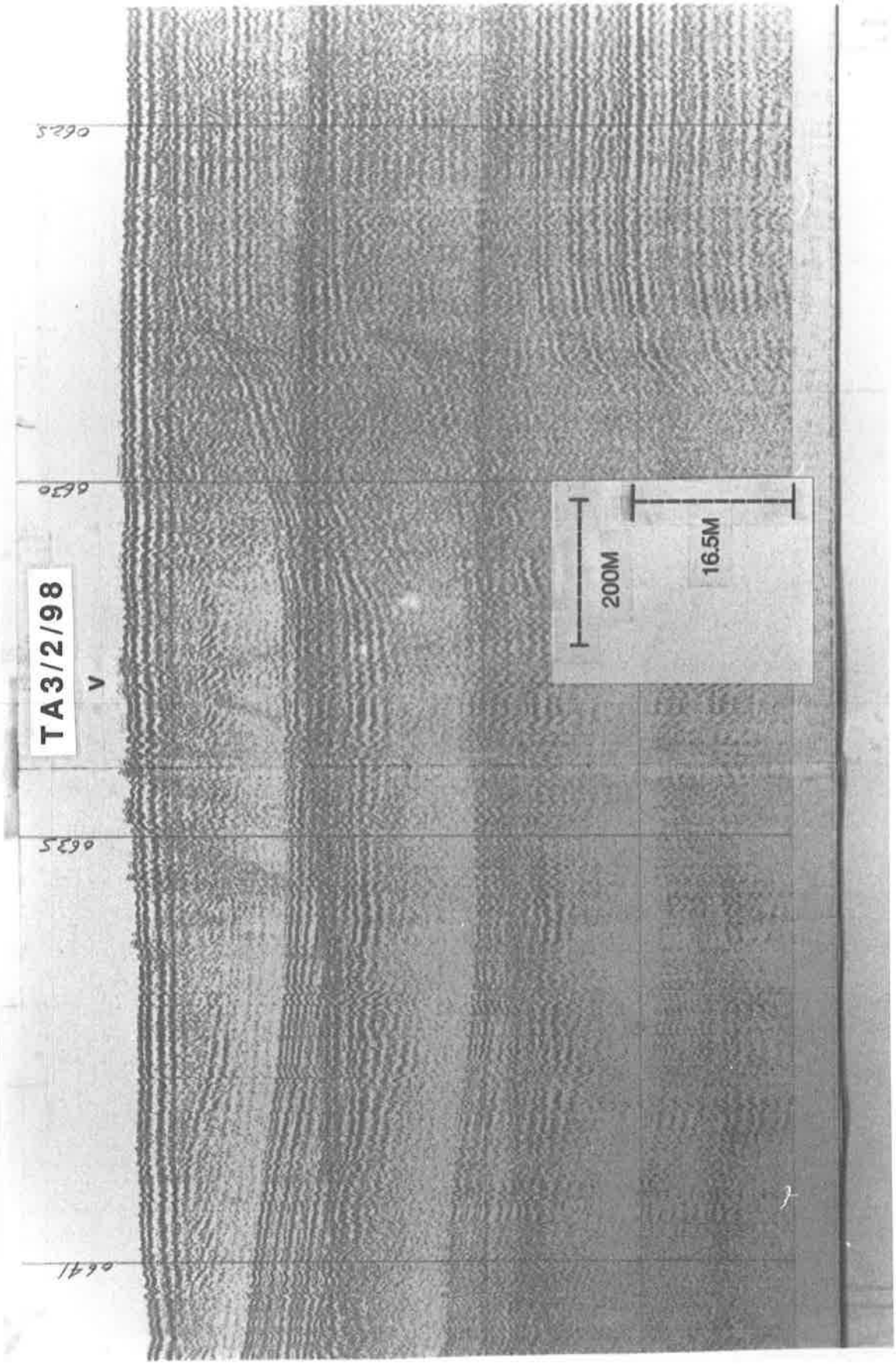


Figure 27. Seismic profile at drill site TA3/2/98.

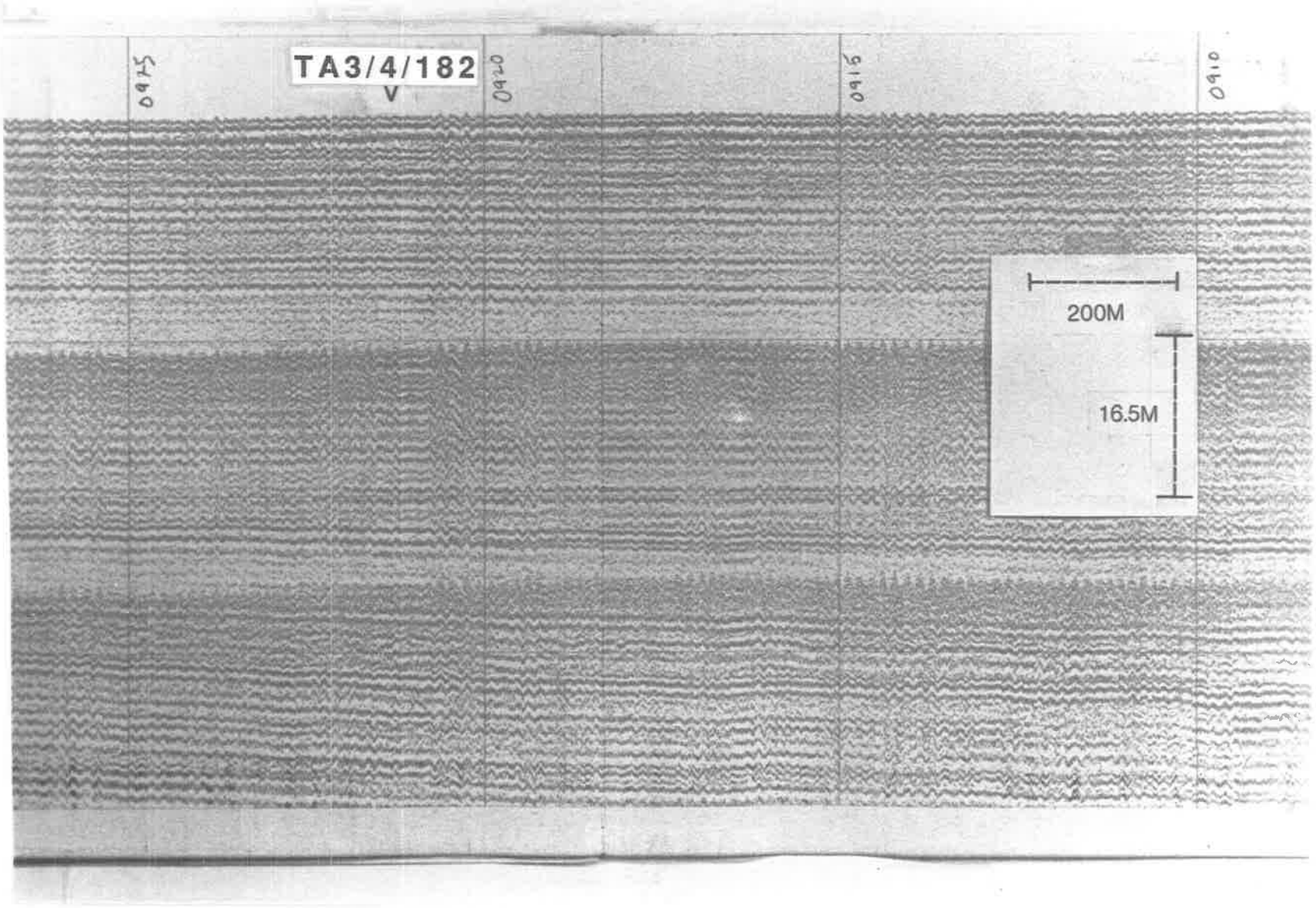


Figure 28. Seismic profile at drill site TA3/4/182.

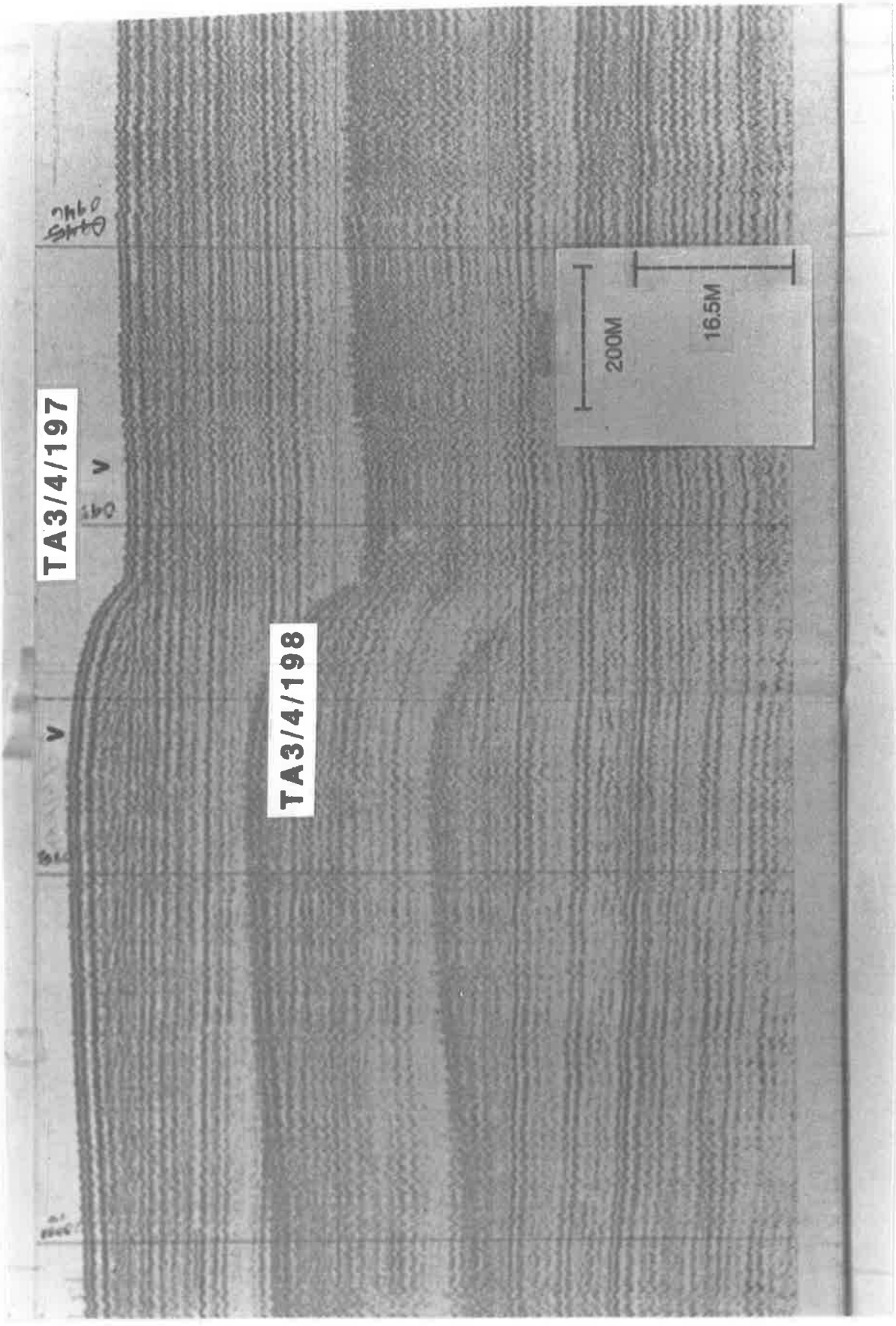


Figure 29. Seismic profile at drill site TA3/4/197 and TA3/4/198.

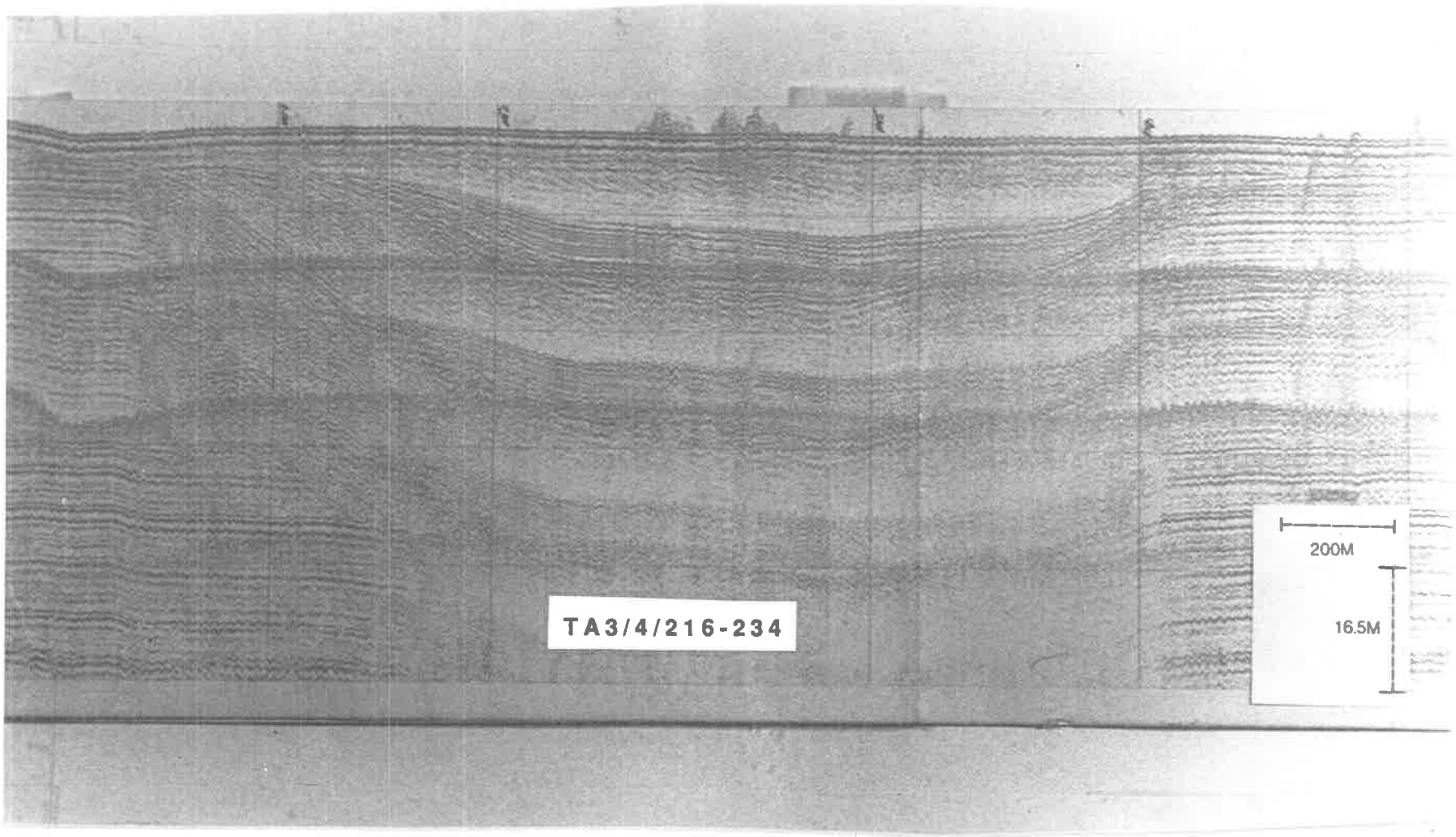


Figure 30. Seismic profile along line segment TA3/4/216-234.

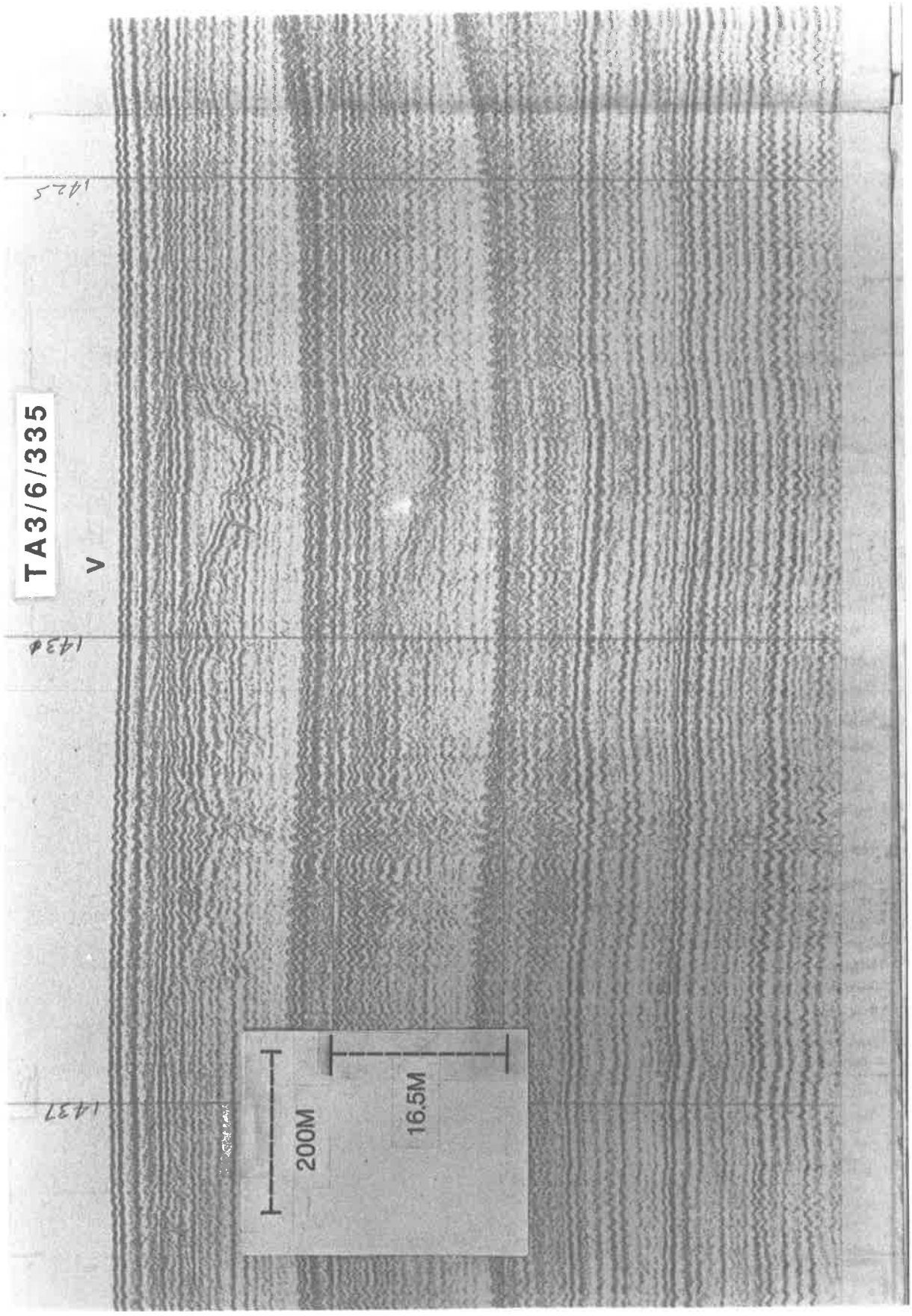


Figure 31. Seismic profile at drill site TA3/6/335.

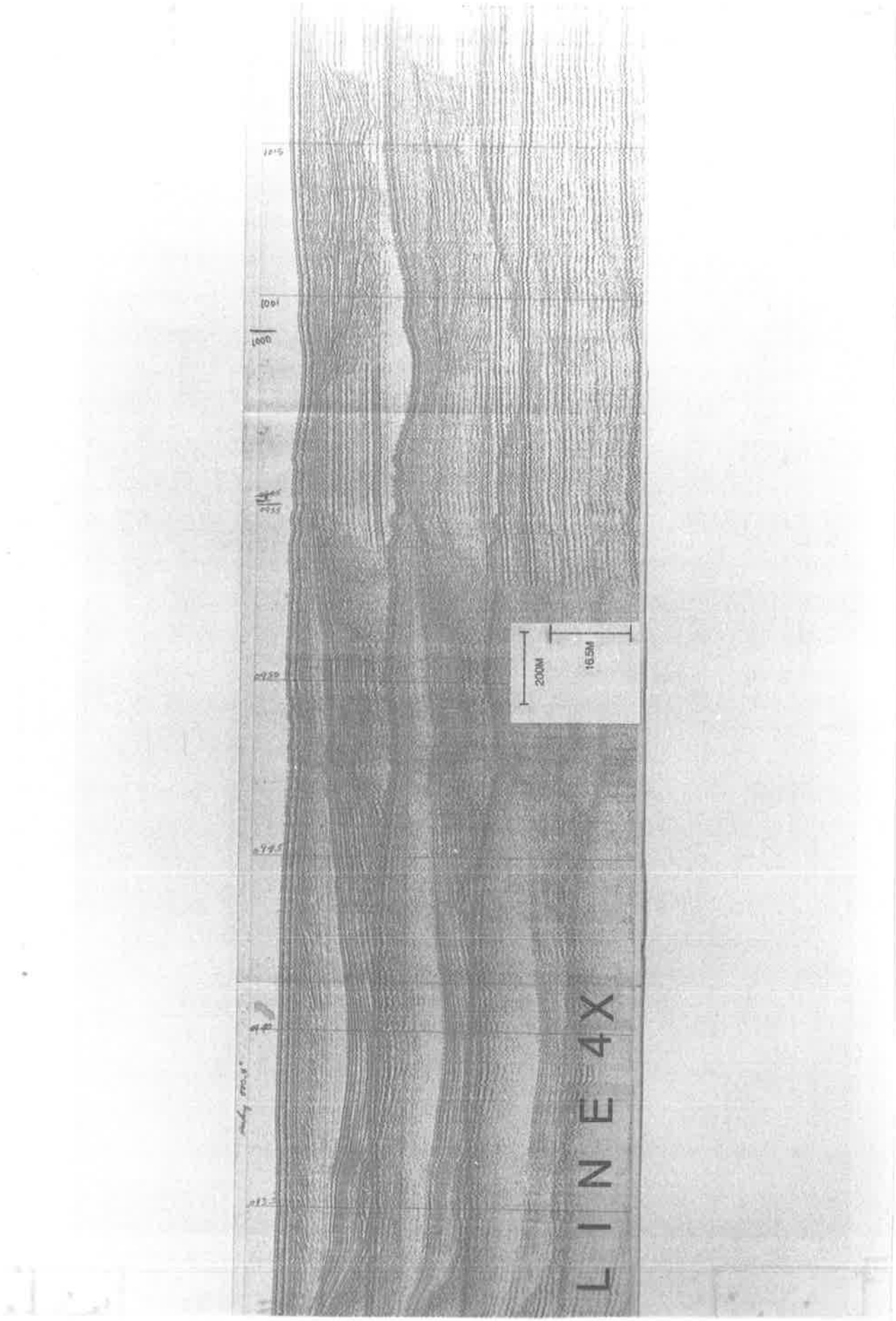


Figure 32. Seismic profile along line 4X, TA3.

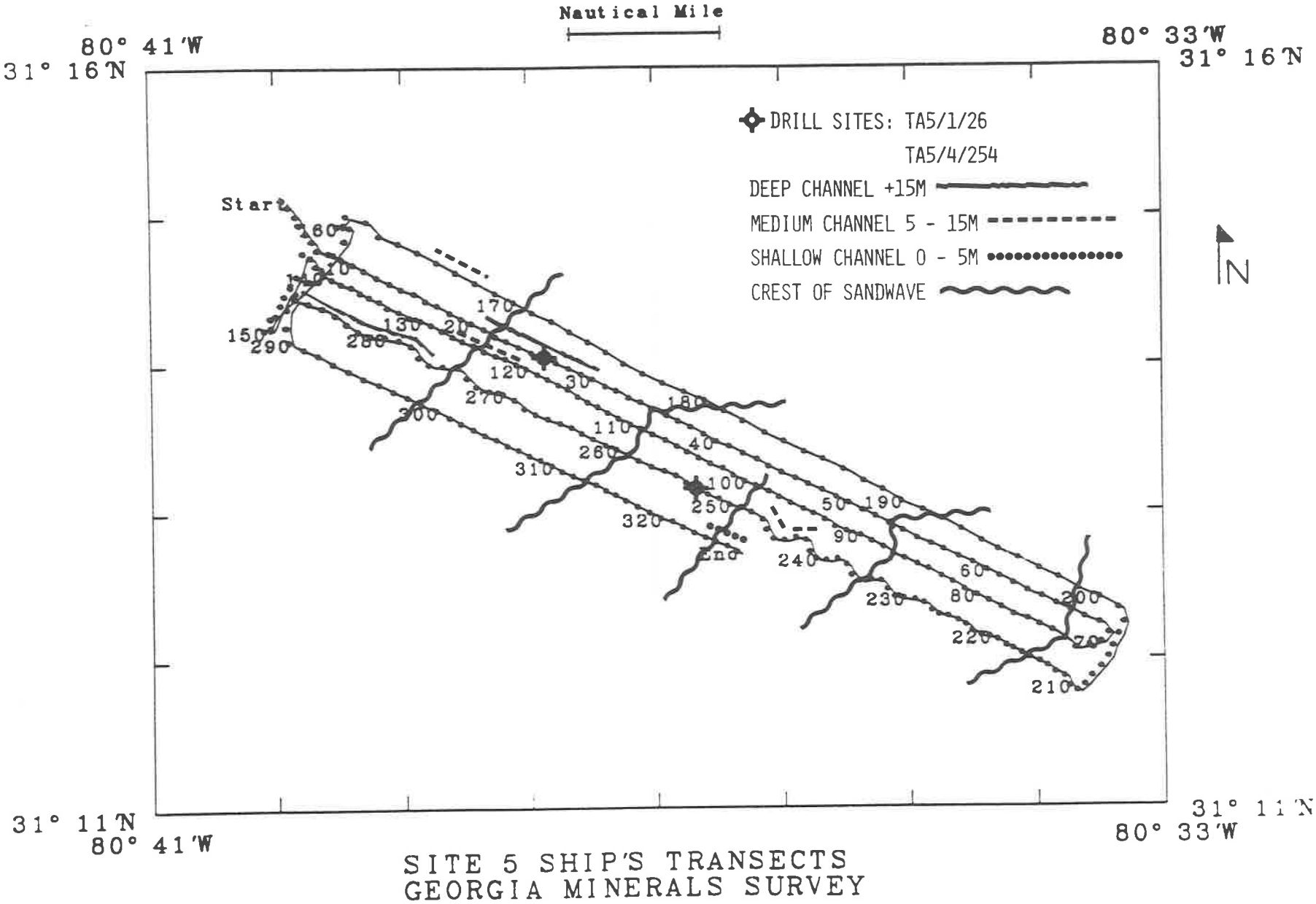


Figure 33. Trackline map of target area (TA4) showing location of drill sites, buried channels and sandwaves.

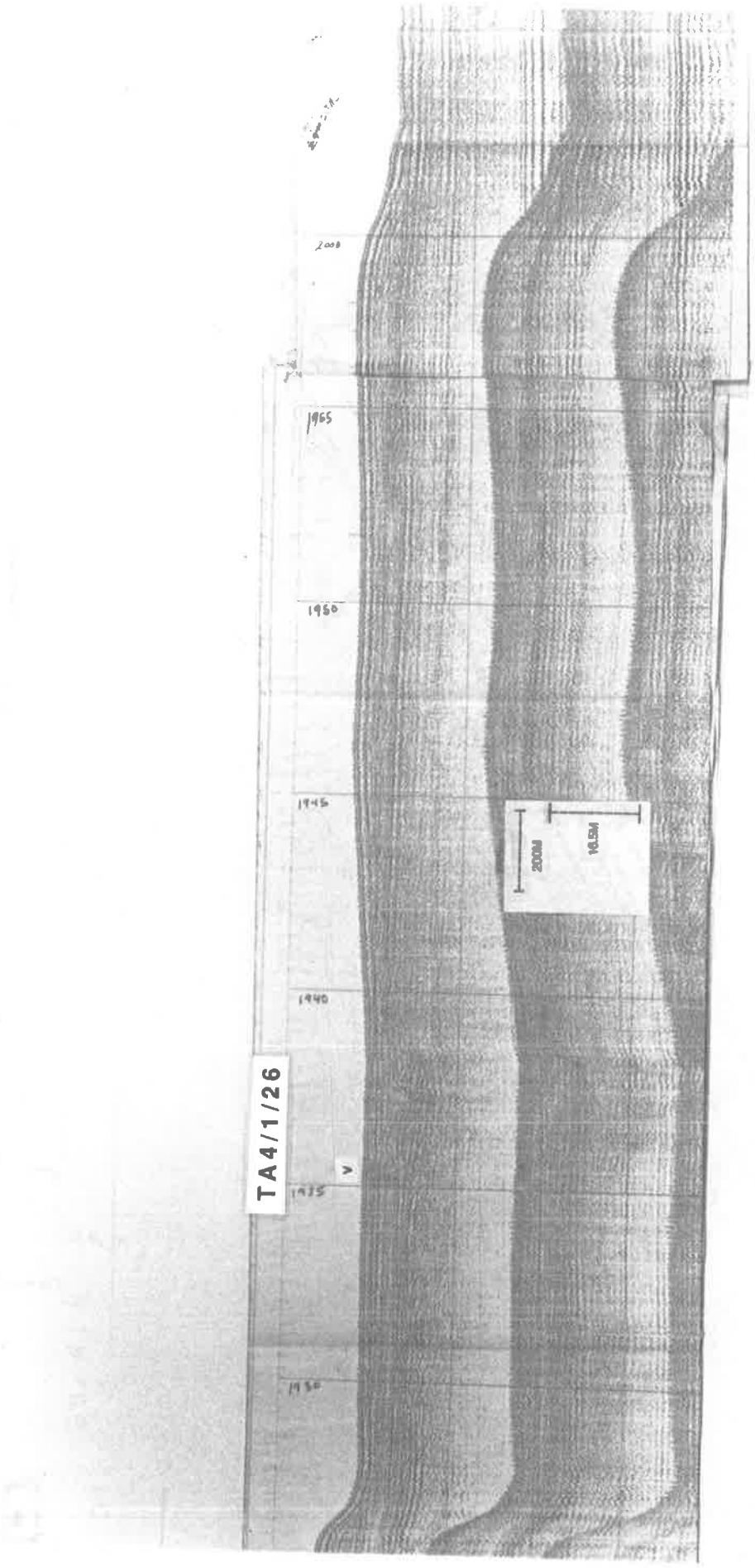


Figure 34. Seismic profile at drill site TA4/1/26.

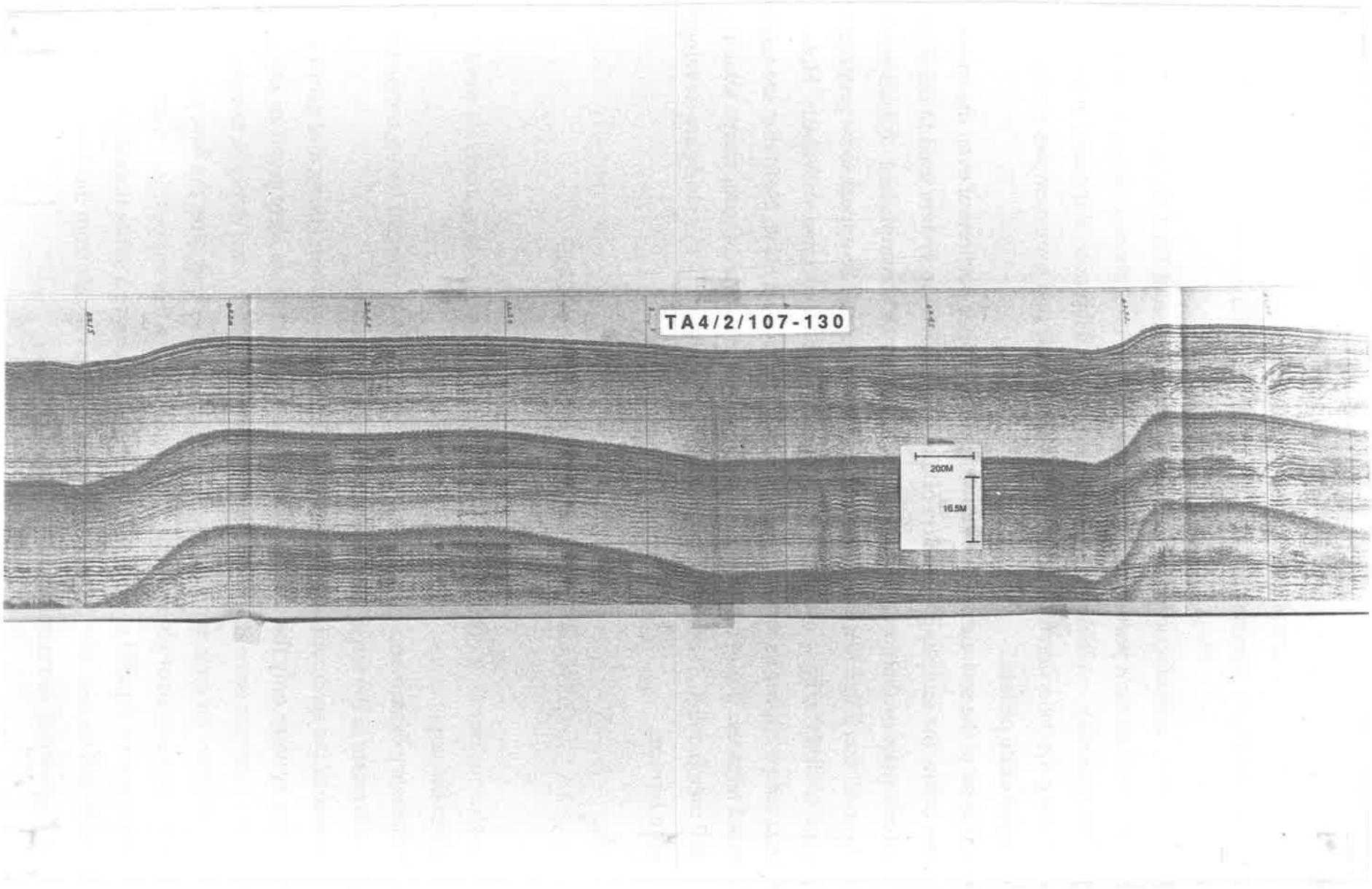


Figure 35. Seismic profile along line segment TA4/2/107-130.

communication). The results of the four samples analyzed (Table 3) show no clear relationships either with the features sampled or the measured gamma activity (Table 2). It should be pointed out that all gamma counts represent only surficial sediments with regard to each target area.

Higher gamma activities occurred in the northeast portion of TA 1, the northern portion of TA 3 and the southwestern portion of TA 4. The values in TA 2 showed no particular trend. No analyses are presently available for phosphorite content. However, shipboard observations made during the collection of vibralift samples indicated that some samples visibly contained phosphorite pellets.

Examination of the seismic profiles shows that the deeper portions of even the smaller channels were below the sampling capability of the vibralift drilling system used in the study. Therefore, an adequate evaluation of these features could not be accomplished. Additionally, the relatively small scarp-like features shown in Figures 30, 35 and 36 appear to be prograding sandwaves and unlikely to have heavy mineral concentrations associated with them. However, erosional scarps appear to be present on the shelf (Henry and Hoyt, 1968) that are associated with broad terraces. These features are separated by the seaward facing scarps which exhibit up to 7 meters relief. It appears that the sandwaves shown in this study are developed on one or more terraces.

CONCLUSIONS AND RECOMMENDATIONS

1. No obvious trends of occurrence of either phosphorite or heavy minerals were observed within the target areas.

2. Preliminary examination of the samples suggests that a potential for economic phosphorite deposits exists in the target area, but not for heavy minerals.

3. Because of the sediment penetration limitation of the vibralift coring and gamma isotope mapping systems only the surficial features of the target areas were given an adequate test. Only at two locations were even the uppermost portions of channel deposits sampled.

4. The data thus far collected indicate that the buried channels offer the best potential for the economic occurrence of phosphorite. To adequately test this supposition, a drilling program using a system capable of obtaining sediment samples to a subbottom depth of at least 25 meters will be necessary. A jack-up rig such as is available from the Savannah District Corps of Engineers is recommended.

5. Based on this study and the results of the recent industry surveys in the region, it appears that any additional heavy mineral surveys on the shelf should be located between Cumberland Island and Cape Canaveral.

6. The foregoing conclusions and recommendations will be re-evaluated after analysis of the 58 sediment samples has been completed.

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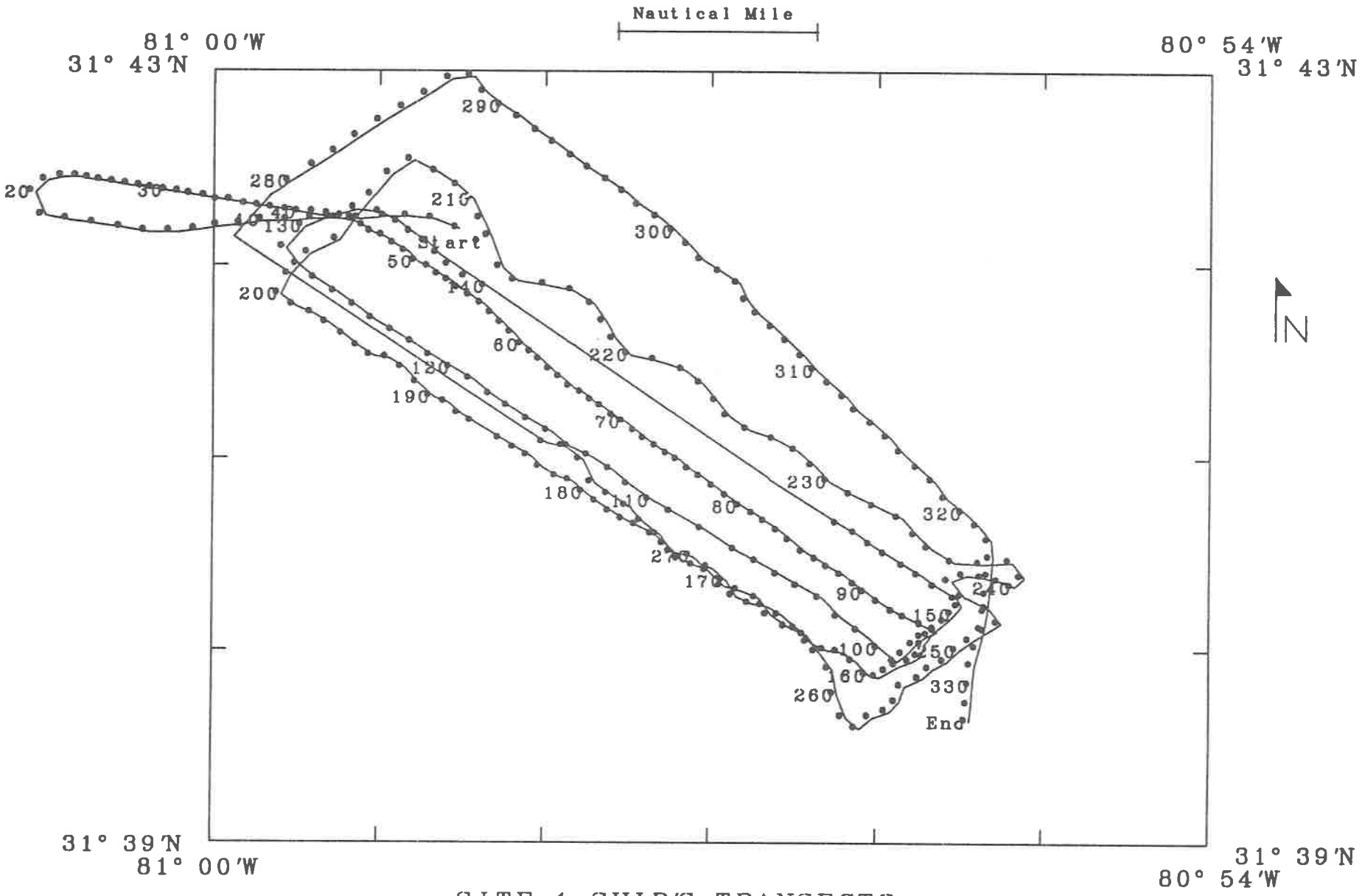
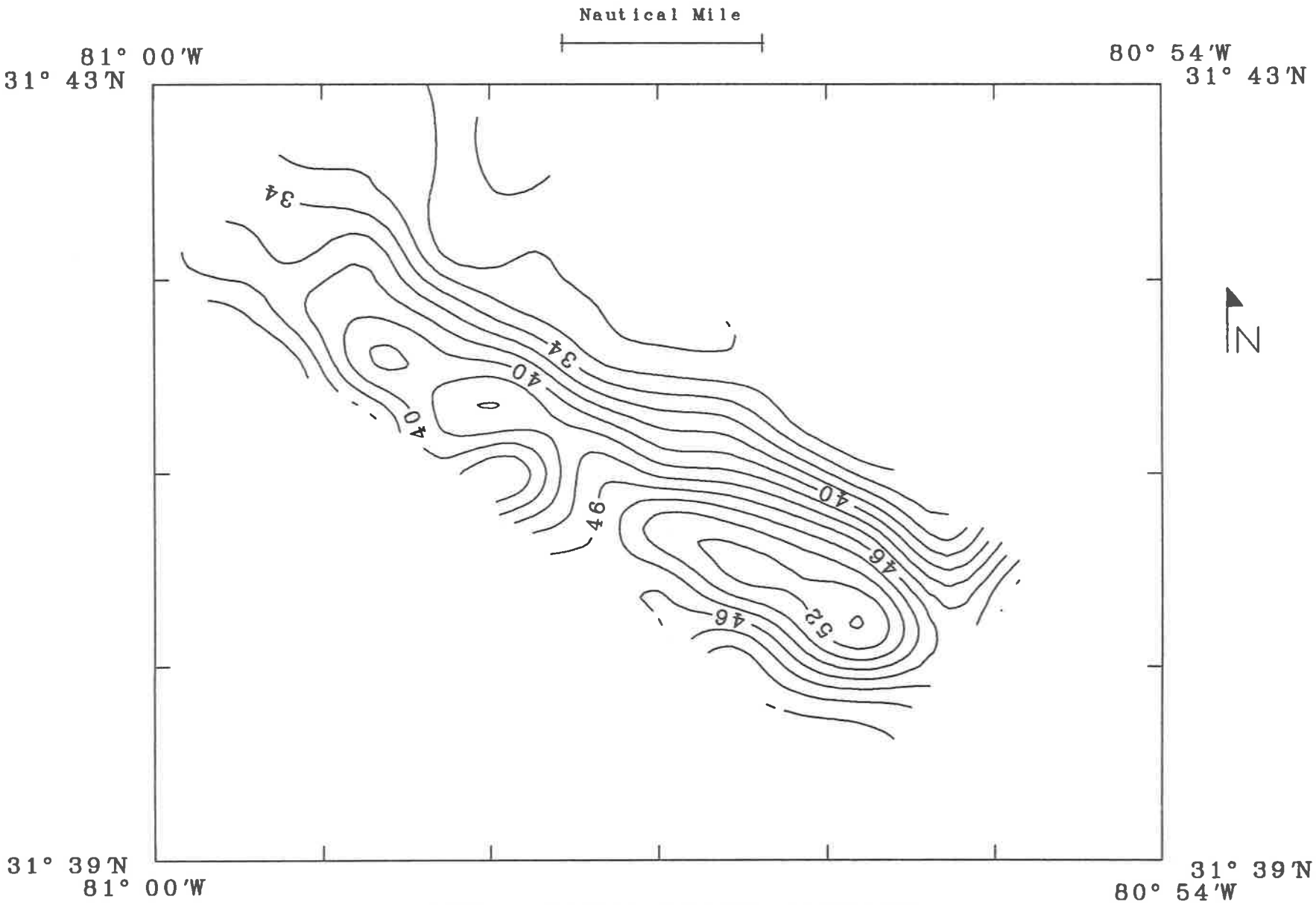
APPENDIX 1

GAMMA ISOTOPE MAPPING DATA

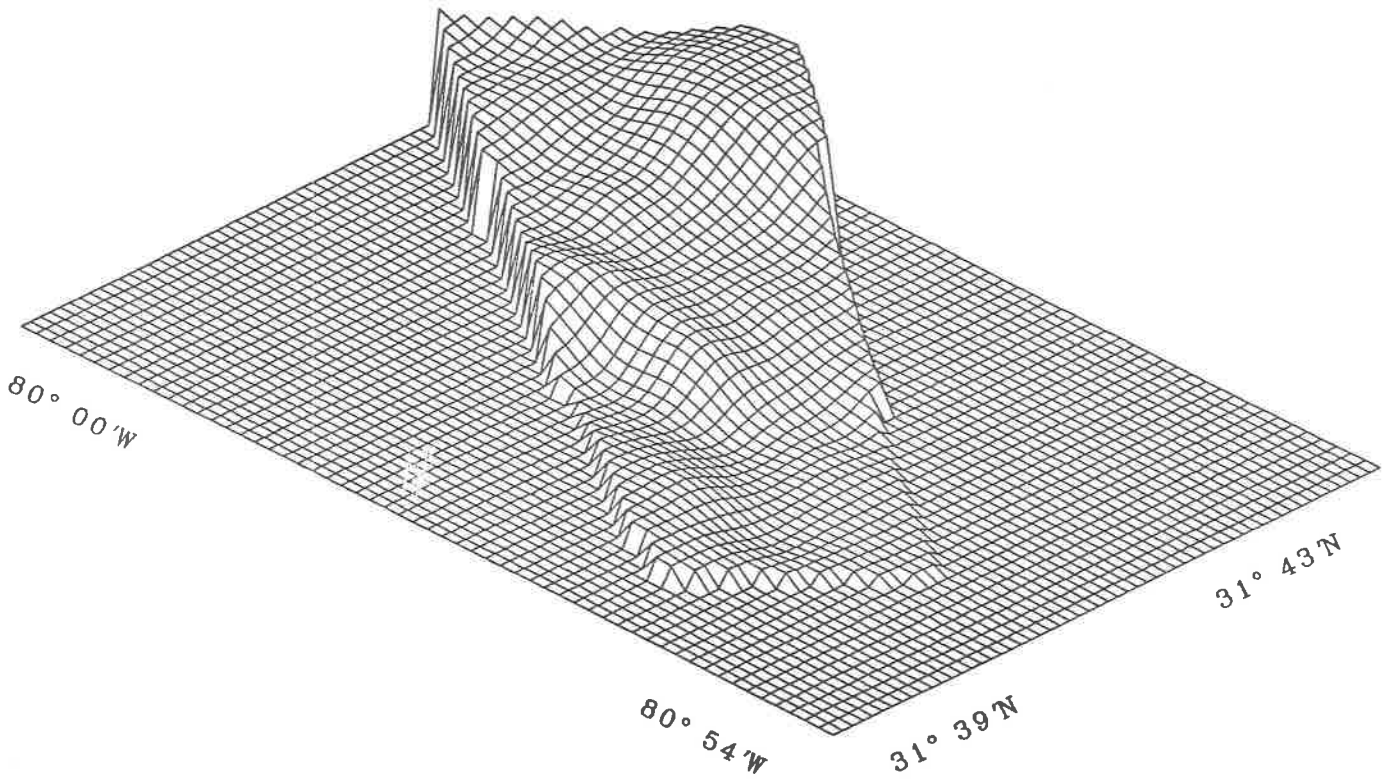
TARGET AREA 1



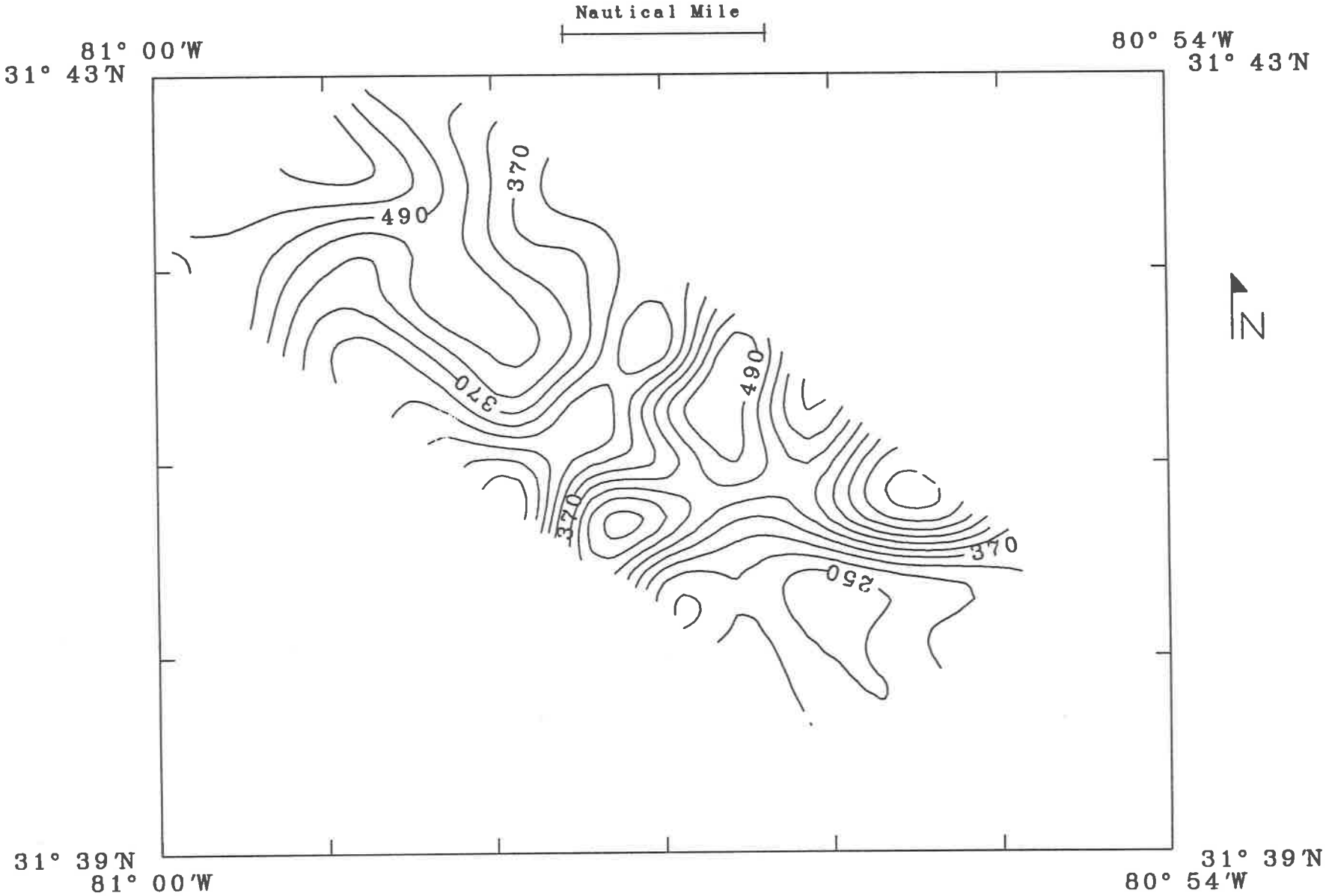
SITE 1 SHIP'S TRANSECTS
GEORGIA MINERAL SURVEY



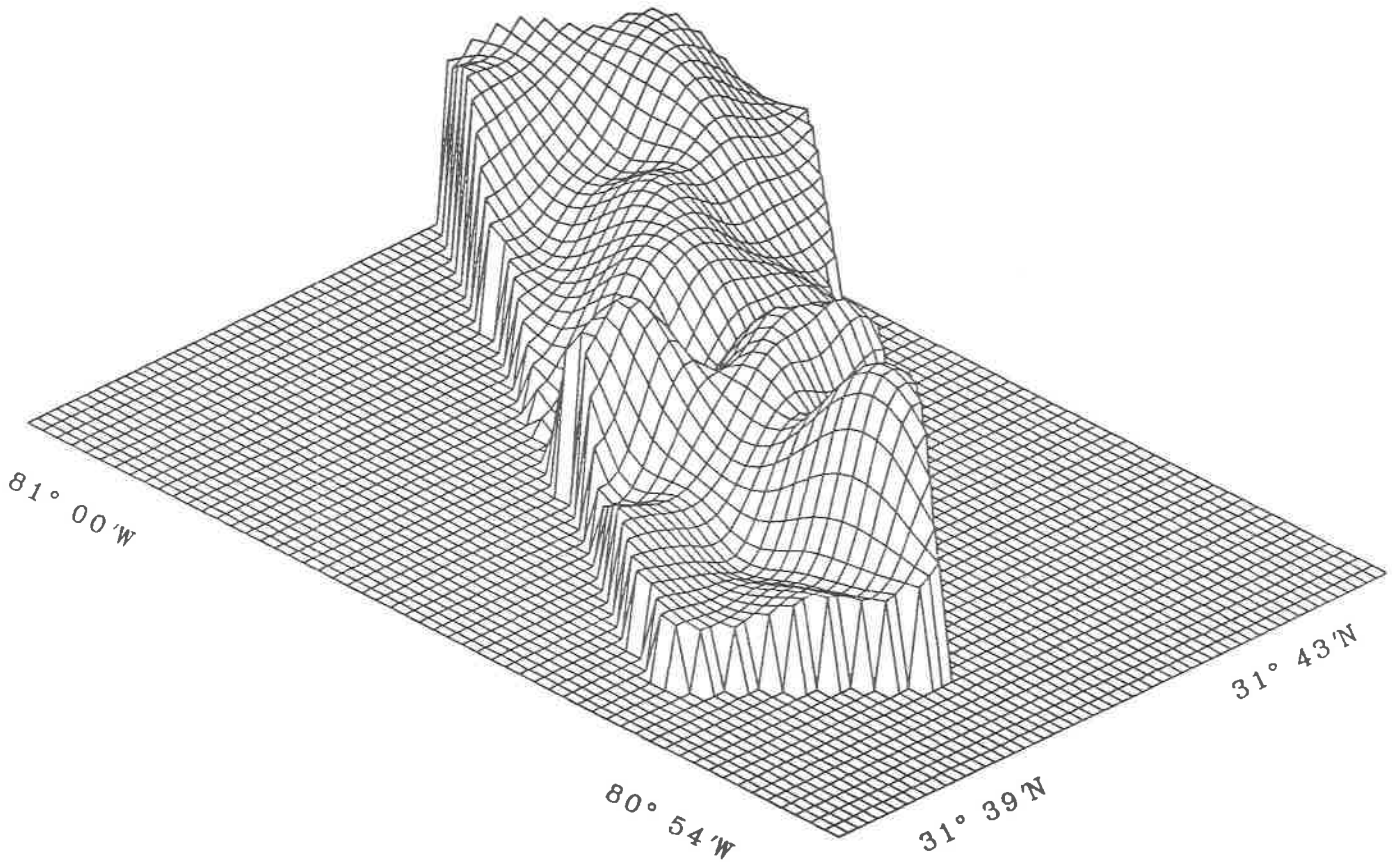
SITE 1 WATER DEPTH CONTOUR
GEORGIA MINERAL SURVEY



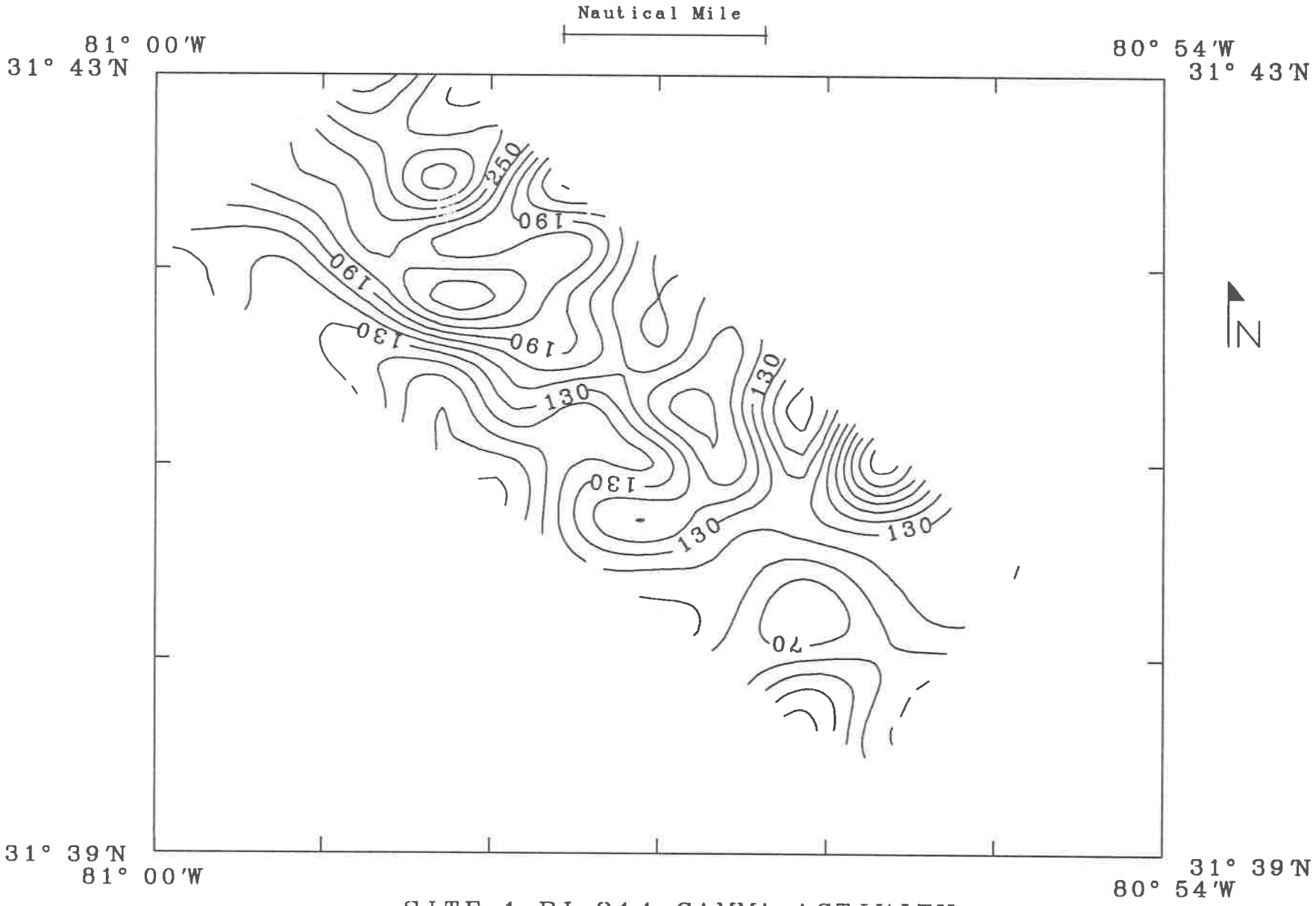
SITE 1 SEAFLOOR
GEORGIA MINERAL SURVEY



SITE 1 K-40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 1 K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



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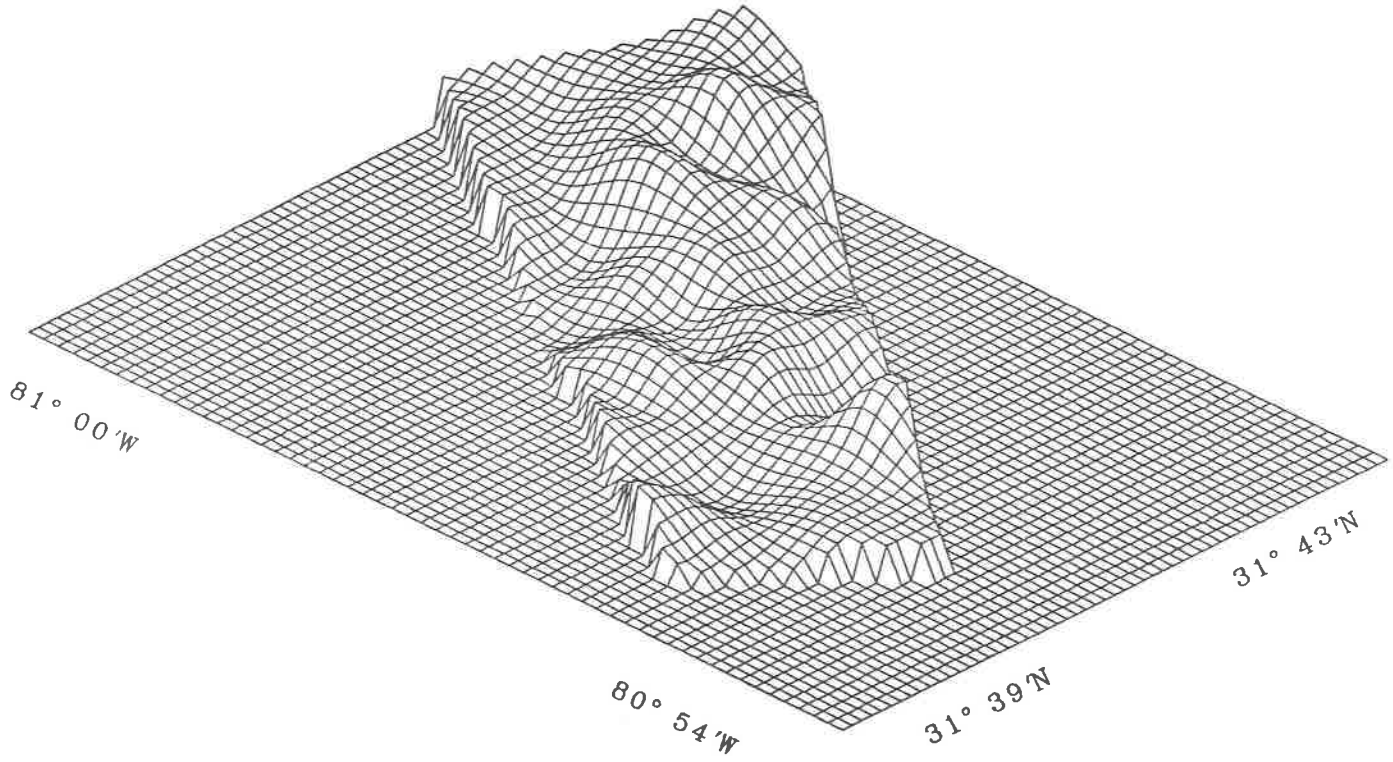

SITE 1 Bi-214 GAMMA ACTIVITY
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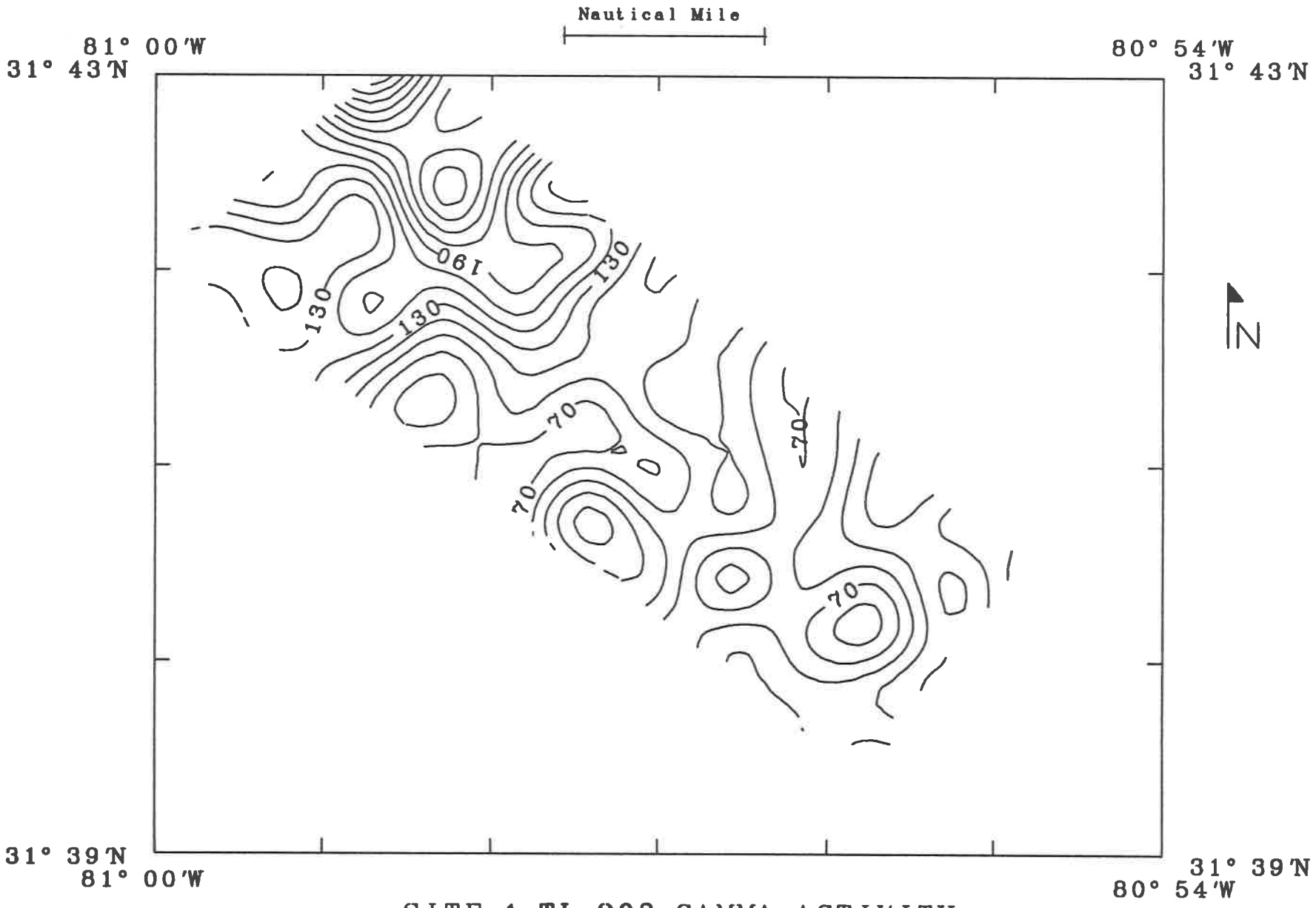

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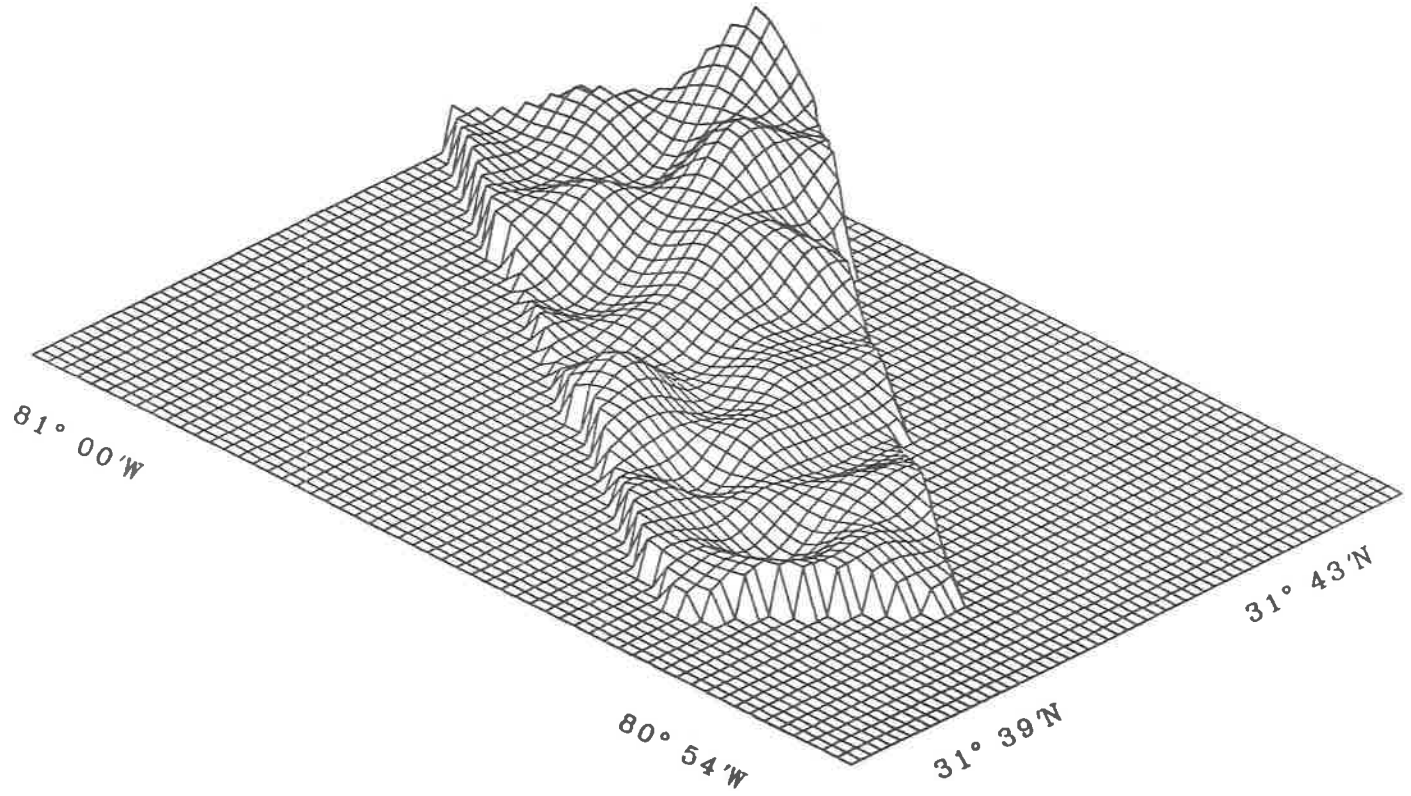

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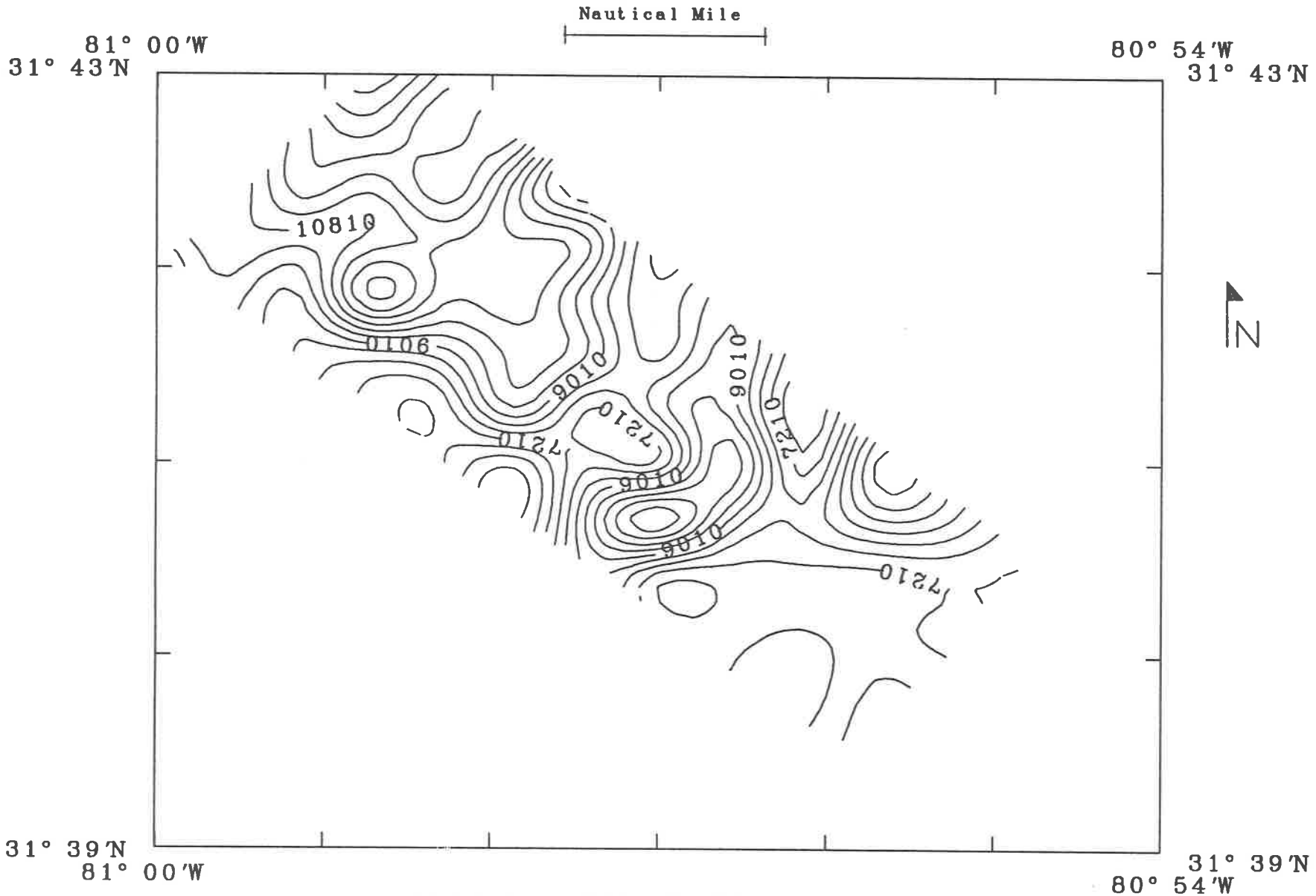
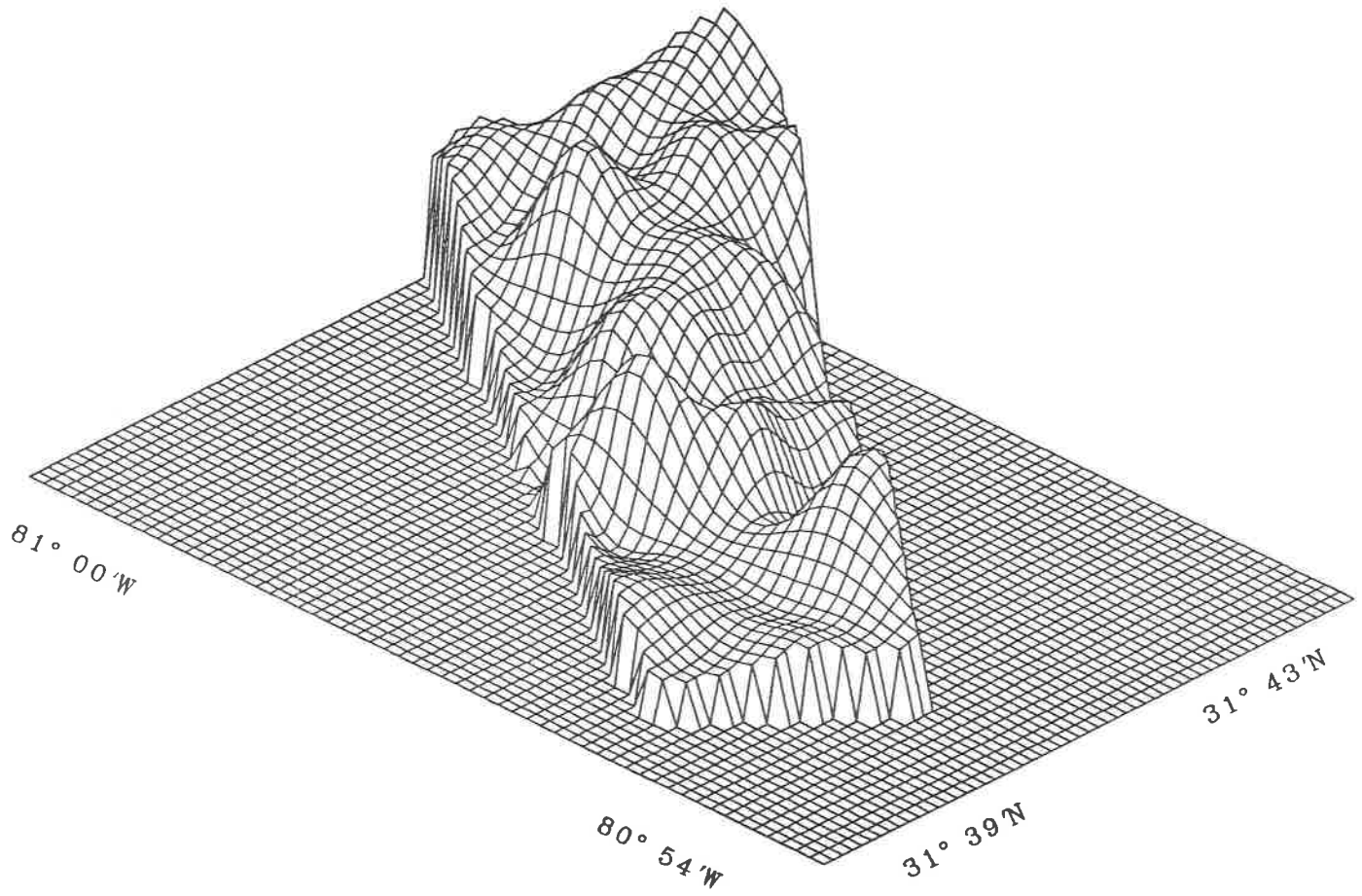


SITE 1 TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 1 TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
1	16:46:28	31 42.12	80 58.38	36	407	270	173	12351
2	16:48:28	31 42.19	80 58.51	34	474	216	90	11604
3	16:50:29	31 42.24	80 58.66	36	430	318	100	11876
4	16:52:30	31 42.25	80 58.81	35	488	252	80	11178
5	16:54:31	31 42.25	80 58.95	35	462	261	121	12015
6	16:56:32	31 42.24	80 59.11	35	416	240	178	12175
7	16:58:32	31 42.24	80 59.25	35	494	229	152	10872
8	17:00:32	31 42.24	80 59.39	34	494	231	75	11302
9	17:02:33	31 42.23	80 59.54	34	425	207	168	11715
10	17:04:33	31 42.23	80 59.69	34	518	237	60	10789
11	17:06:34	31 42.21	80 59.82	34	575	179	120	10874
12	17:08:34	31 42.20	80 59.96	34	627	190	161	11193
13	17:10:34	31 42.18	80 60.09	34	553	145	74	9835
14	17:12:34	31 42.17	80 60.24	32	641	151	122	10981
15	17:14:35	31 42.17	80 60.39	31	644	116	139	11567
16	17:16:35	31 42.19	80 60.54	30	602	218	162	11096
17	17:18:36	31 42.21	80 60.70	30	460	133	123	10282
18	17:20:36	31 42.23	80 60.86	30	536	157	185	9898
19	17:22:35	31 42.25	80 61.01	28	489	134	126	9558
20	17:24:34	31 42.37	80 61.07	29	332	106	78	6945
21	17:26:34	31 42.43	80 60.99	30	415	87	63	6905
22	17:28:33	31 42.45	80 60.89	30	419	92	89	8171
23	17:30:33	31 42.45	80 60.80	29	607	204	191	11777
24	17:32:34	31 42.44	80 60.73	29	711	139	115	11676
25	17:34:35	31 42.43	80 60.66	30	787	162	170	11972
26	17:36:35	31 42.42	80 60.58	30	801	248	137	12140
27	17:38:36	31 42.41	80 60.50	30	664	197	92	12185
28	17:40:37	31 42.40	80 60.42	30	696	191	208	12250
29	17:42:37	31 42.39	80 60.35	30	681	200	145	11920
30	17:44:38	31 42.38	80 60.27	31	685	197	159	12443
31	17:46:39	31 42.37	80 60.19	31	685	204	136	12007
32	17:48:40	31 42.36	80 60.12	31	614	182	144	12417
33	17:50:40	31 42.35	80 60.03	32	731	231	174	12005
34	17:52:41	31 42.33	80 59.96	32	592	218	169	11879
35	17:54:42	31 42.33	80 59.88	33	569	214	158	11875
36	17:56:42	31 42.31	80 59.79	33	658	197	124	11709
37	17:58:43	31 42.30	80 59.71	34	506	190	61	11388
38	18:00:43	31 42.29	80 59.63	35	660	202	180	11216
39	18:02:44	31 42.28	80 59.54	36	559	170	193	11463
40	18:04:45	31 42.27	80 59.47	36	541	204	122	11241
41	18:06:46	31 42.27	80 59.38	37	564	243	183	12053
42	18:08:46	31 42.26	80 59.29	37	491	217	129	11646
43	18:10:48	31 42.25	80 59.21	37	577	190	160	12693
44	18:12:48	31 42.23	80 59.15	38	579	147	127	10905

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
45	18:14:49	31 42.20	80 59.08	38	512	232	145	10758
46	18:16:49	31 42.17	80 59.03	38	499	173	92	10947
47	18:18:50	31 42.15	80 58.96	38	547	208	116	11043
48	18:20:51	31 42.11	80 58.89	39	577	145	100	11526
49	18:22:51	31 42.07	80 58.82	37	476	198	103	10925
50	18:24:51	31 42.02	80 58.76	41	463	197	97	11069
51	18:26:53	31 41.99	80 58.68	40	470	263	259	15075
52	18:28:55	31 41.95	80 58.62	38	438	172	200	13454
53	18:30:54	31 41.92	80 58.56	37	383	113	145	9509
54	18:32:54	31 41.88	80 58.50	39	339	60	33	8596
55	18:34:54	31 41.84	80 58.43	41	442	182	55	8521
56	18:36:54	31 41.80	80 58.36	42	495	155	87	10426
57	18:38:54	31 41.75	80 58.30	38	447	113	78	8951
58	18:40:53	31 41.70	80 58.24	41	388	182	66	8855
59	18:42:53	31 41.65	80 58.18	42	479	149	42	10732
60	18:44:54	31 41.59	80 58.12	43	536	133	137	11003
61	18:46:54	31 41.55	80 58.06	44	475	140	147	11179
62	18:48:55	31 41.51	80 58.01	45	503	178	126	10988
63	18:50:55	31 41.46	80 57.95	44	522	155	131	10996
64	18:52:56	31 41.42	80 57.89	44	475	255	180	12917
65	18:54:57	31 41.37	80 57.83	45	426	141	83	10623
66	18:56:57	31 41.34	80 57.76	46	431	110	75	10419
67	18:58:57	31 41.30	80 57.70	46	463	133	113	9603
68	19:00:56	31 41.27	80 57.64	45	345	93	34	6607
69	19:02:55	31 41.22	80 57.57	42	277	102	37	6839
70	19:04:54	31 41.19	80 57.51	42	176	59	54	6316
71	19:06:52	31 41.14	80 57.44	42	182	56	31	5404
72	19:08:52	31 41.10	80 57.38	48	349	74	94	7550
73	19:10:52	31 41.06	80 57.31	46	417	175	119	9605
74	19:12:51	31 41.02	80 57.24	44	307	94	63	6773
75	19:14:49	31 40.99	80 57.18	45	203	85	56	5987
76	19:16:48	31 40.94	80 57.11	46	247	77	42	5603
77	19:18:47	31 40.90	80 57.04	53	266	47	43	5844
78	19:20:47	31 40.85	80 56.96	53	517	132	106	9849
79	19:22:47	31 40.80	80 56.88	53	409	157	51	9036
80	19:24:47	31 40.75	80 56.80	53	396	122	83	9355
81	19:26:47	31 40.71	80 56.72	53	540	141	109	8818
82	19:28:47	31 40.67	80 56.65	53	391	131	90	8618
83	19:30:47	31 40.62	80 56.57	53	332	103	126	8749
84	19:32:46	31 40.57	80 56.50	51	261	43	88	8031
85	19:34:46	31 40.51	80 56.42	52	309	56	72	7394
86	19:36:45	31 40.47	80 56.34	52	301	66	63	6852
87	19:38:44	31 40.43	80 56.27	52	218	147	62	6763
88	19:40:44	31 40.39	80 56.19	53	245	59	106	7129
89	19:42:43	31 40.34	80 56.11	53	238	83	83	6943

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
90	19:44:42	31 40.30	80 56.05	53	222	114	88	6727
91	19:46:42	31 40.25	80 55.97	53	204	87	89	7932
92	19:48:41	31 40.20	80 55.88	52	255	97	41	7551
93	19:50:40	31 40.17	80 55.81	52	226	102	65	7063
94	19:52:39	31 40.13	80 55.71	52	252	74	50	7023
95	19:54:38	31 40.10	80 55.63	51	214	54	40	6539
96	19:56:37	31 40.07	80 55.71	51	305	93	8	6291
97	19:58:36	31 40.03	80 55.76	51	286	68	71	6450
98	20:00:35	31 39.98	80 55.82	50	251	65	37	6511
99	20:02:34	31 39.94	80 55.87	49	242	34	90	6397
100	20:04:33	31 40.01	80 55.97	50	156	70	39	7105
101	20:06:32	31 40.10	80 56.09	50	247	92	78	7313
102	20:08:31	31 40.17	80 56.21	51	239	11	61	7136
103	20:10:30	31 40.27	80 56.32	51	254	100	67	6571
104	20:12:29	31 40.33	80 56.45	51	229	134	41	7255
105	20:14:28	31 40.39	80 56.57	52	301	115	25	6762
106	20:16:27	31 40.46	80 56.70	51	248	81	98	7000
107	20:18:28	31 40.52	80 56.83	51	354	61	130	7771
108	20:21:49	31 40.63	80 57.03	47	526	193	118	13838
109	20:24:46	31 40.72	80 57.22	45	565	217	110	12608
110	20:26:46	31 40.78	80 57.35	41	498	150	95	8889
111	20:28:45	31 40.86	80 57.48	41	351	150	91	7374
112	20:30:44	31 40.94	80 57.59	42	276	133	87	7801
113	20:32:43	31 41.01	80 57.72	43	288	66	30	5869
114	20:34:42	31 41.06	80 57.84	45	233	26	45	5407
115	20:36:41	31 41.14	80 57.96	42	272	104	95	6888
116	20:38:40	31 41.20	80 58.08	42	265	145	74	9237
117	20:40:40	31 41.27	80 58.20	41	510	123	51	8955
118	20:42:39	31 41.33	80 58.31	40	208	56	35	6059
119	20:44:38	31 41.41	80 58.43	44	344	119	58	7209
120	20:46:37	31 41.47	80 58.55	36	243	108	64	6554
121	20:48:36	31 41.53	80 58.67	39	221	86	124	7806
122	20:50:36	31 41.60	80 58.78	37	424	147	124	8992
123	20:52:36	31 41.66	80 58.90	38	349	145	66	8521
124	20:54:35	31 41.72	80 59.02	38	245	98	104	8230
125	20:56:35	31 41.79	80 59.13	38	438	139	104	8593
126	20:58:35	31 41.86	80 59.25	39	358	114	115	9339
127	21:00:34	31 41.93	80 59.37	37	423	174	34	9039
128	21:02:34	31 42.00	80 59.48	37	368	169	89	9966
129	21:04:35	31 42.09	80 59.56	37	560	129	99	10250
130	21:06:35	31 42.20	80 59.45	38	535	162	115	10531
131	21:08:36	31 42.25	80 59.29	37	488	354	147	12090
132	21:10:36	31 42.29	80 59.13	37	493	153	121	11743
133	21:12:37	31 42.27	80 58.98	38	469	232	86	11670
134	21:14:39	31 42.22	80 58.87	38	465	275	153	13839

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
135	21:16:41	31 42.17	80 58.79	40	397	293	224	15824
136	21:18:41	31 42.12	80 58.70	40	452	198	72	9546
137	21:20:41	31 42.06	80 58.63	38	566	165	93	10939
138	21:22:42	31 42.00	80 58.56	39	481	172	107	10950
139	21:24:42	31 41.94	80 58.46	38	359	159	127	11064
140	22:11:44	31 41.89	80 58.34	39	497	218	157	10931
141	22:13:43	31 40.66	80 56.22	52	310	103	116	7805
142	22:15:42	31 40.61	80 56.11	50	277	116	51	6978
143	22:17:43	31 40.55	80 56.02	50	244	40	98	6929
144	22:19:42	31 40.50	80 55.93	51	207	56	121	7038
145	22:21:46	31 40.44	80 55.82	51	306	26	107	7514
146	22:23:45	31 40.39	80 55.73	51	232	116	56	6580
147	22:25:44	31 40.33	80 55.63	54	263	63	53	6458
148	22:27:43	31 40.27	80 55.51	52	223	78	50	6511
149	22:29:42	31 40.23	80 55.49	50	279	69	89	6433
150	22:31:41	31 40.19	80 55.53	50	183	52	100	7455
151	22:33:40	31 40.15	80 55.57	49	256	87	99	7059
152	22:35:39	31 40.11	80 55.63	49	230	33	51	6290
153	22:37:38	31 40.08	80 55.67	47	231	92	32	6186
154	22:39:36	31 40.03	80 55.71	47	225	63	22	6242
155	22:41:35	31 39.97	80 55.73	47	242	73	85	6257
156	22:43:34	31 39.94	80 55.78	46	198	70	45	6108
157	22:45:33	31 39.92	80 55.86	47	268	120	50	6724
158	22:47:32	31 39.89	80 55.92	46	349	89	81	6816
159	22:49:31	31 39.86	80 55.98	44	345	92	108	7306
160	22:51:31	31 39.87	80 56.04	42	282	130	93	7394
161	22:53:30	31 39.94	80 56.12	44	269	106	85	7337
162	22:55:29	31 39.99	80 56.21	44	232	106	93	6955
163	22:57:28	31 40.00	80 56.29	45	219	66	92	6835
164	22:59:27	31 40.04	80 56.39	46	243	111	99	6429
165	23:01:26	31 40.11	80 56.46	47	272	124	47	7198
166	23:03:25	31 40.18	80 56.56	46	217	134	120	7390
167	23:05:24	31 40.23	80 56.66	47	241	92	72	7020
168	23:07:23	31 40.24	80 56.74	47	202	100	51	7078
169	23:09:22	31 40.28	80 56.84	48	251	156	95	7127
170	23:11:21	31 40.36	80 56.90	46	249	54	67	6979
171	23:13:20	31 40.43	80 56.99	47	280	84	91	7150
172	23:15:20	31 40.44	80 57.08	48	281	114	104	7704
173	23:17:19	31 40.47	80 57.17	46	439	88	137	8796
174	23:19:19	31 40.55	80 57.26	48	405	100	163	8961
175	23:21:18	31 40.60	80 57.33	47	444	120	109	8618
176	23:23:18	31 40.65	80 57.43	42	548	153	152	9812
177	23:25:18	31 40.68	80 57.51	41	463	94	100	7873
178	23:27:16	31 40.72	80 57.59	39	242	58	48	6121
179	23:29:15	31 40.77	80 57.67	38	229	100	66	5224

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
180	23:31:13	31 40.82	80 57.75	38	177	85	58	5266
181	23:33:12	31 40.88	80 57.83	38	270	22	79	5732
182	23:35:11	31 40.90	80 57.91	38	223	127	64	6293
183	23:37:10	31 40.95	80 58.01	41	162	127	146	7159
184	23:39:10	31 41.01	80 58.08	38	566	57	95	9408
185	23:41:09	31 41.05	80 58.16	38	213	92	84	6514
186	23:43:08	31 41.10	80 58.25	36	235	70	76	6832
187	23:45:07	31 41.19	80 58.42	36	210	21	60	6298
188	23:47:05	31 41.23	80 58.50	36	233	69	53	5756
189	23:49:04	31 41.29	80 58.58	38	295	82	80	6707
190	23:51:03	31 41.32	80 58.67	40	366	137	63	7081
191	23:53:02	31 41.39	80 58.75	34	175	112	84	7154
192	23:55:02	31 41.47	80 58.84	34	287	136	112	7738
193	23:57:01	31 41.52	80 58.93	34	354	132	160	8134
194	23:59:00	31 41.53	80 59.03	31	318	147	113	7406
195	00:01:00	31 41.58	80 59.11	32	379	151	133	8421
196	00:02:59	31 41.64	80 59.20	33	354	93	123	8064
197	00:04:59	31 41.70	80 59.30	33	405	75	127	9550
198	00:06:59	31 41.75	80 59.39	34	499	146	120	9299
199	00:08:59	31 41.79	80 59.50	34	486	190	117	10324
200	00:10:59	31 41.85	80 59.59	32	533	123	131	9616
201	00:12:59	31 41.95	80 59.53	35	495	280	170	11337
202	00:14:59	31 42.06	80 59.41	34	516	195	148	10435
203	00:17:00	31 42.13	80 59.24	35	561	133	170	10889
204	00:19:00	31 42.24	80 59.15	32	569	164	116	10323
205	00:21:01	31 42.36	80 59.03	32	557	223	232	12395
206	00:23:01	31 42.47	80 58.92	32	549	283	204	12194
207	00:25:02	31 42.54	80 58.79	32	599	236	179	12029
208	00:27:03	31 42.48	80 58.64	31	594	237	170	11969
209	00:29:04	31 42.41	80 58.51	30	504	329	244	12139
210	00:31:04	31 42.34	80 58.43	30	531	371	226	12612
211	00:33:06	31 42.24	80 58.37	31	390	192	328	14863
212	00:35:07	31 42.15	80 58.32	31	454	217	216	11615
213	00:37:07	31 41.99	80 58.25	30	438	422	163	11779
214	00:39:09	31 41.92	80 58.16	32	555	360	269	13583
215	00:41:10	31 41.90	80 57.98	30	524	273	223	12411
216	00:43:10	31 41.87	80 57.82	29	426	232	183	11006
217	00:45:09	31 41.80	80 57.70	29	404	201	88	8280
218	00:47:08	31 41.71	80 57.63	34	314	113	30	7635
219	00:49:08	31 41.62	80 57.57	34	467	139	133	9323
220	00:51:08	31 41.54	80 57.48	33	337	200	112	9857
221	00:53:08	31 41.51	80 57.32	32	370	157	93	9257
222	00:55:07	31 41.46	80 57.15	30	244	107	123	7328
223	00:57:06	31 41.39	80 57.04	38	155	138	84	6256
224	00:59:06	31 41.30	80 56.95	40	538	201	126	9699

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
225	01:01:06	31 41.22	80 56.88	36	670	252	131	10057
226	01:03:06	31 41.15	80 56.76	40	581	185	74	9426
227	01:05:06	31 41.10	80 56.60	42	571	200	152	11369
228	01:07:06	31 41.04	80 56.47	36	515	197	68	9336
229	01:09:05	31 40.96	80 56.37	42	306	123	22	6586
230	01:11:04	31 40.88	80 56.28	46	457	102	91	7069
231	01:13:03	31 40.81	80 56.14	46	439	94	48	6729
232	01:15:03	31 40.75	80 56.00	47	549	100	68	7713
233	01:17:03	31 40.69	80 55.85	48	544	119	118	9296
234	01:19:02	31 40.60	80 55.75	48	474	107	107	8038
235	01:21:02	31 40.53	80 55.67	44	414	108	122	8166
236	01:23:01	31 40.46	80 55.53	48	318	109	164	7871
237	01:25:01	31 40.45	80 55.36	48	336	118	72	7065
238	01:27:00	31 40.46	80 55.18	48	286	84	129	6759
239	01:28:59	31 40.38	80 55.11	48	282	122	97	7113
240	01:30:59	31 40.33	80 55.17	48	316	88	145	7501
241	01:32:58	31 40.36	80 55.25	41	276	109	186	8063
242	01:34:57	31 40.38	80 55.35	48	285	125	110	7263
243	01:36:56	31 40.39	80 55.46	48	319	56	149	7236
244	01:38:55	31 40.36	80 55.55	49	241	118	60	6404
245	01:40:54	31 40.28	80 55.47	47	200	61	90	6365
246	01:42:53	31 40.22	80 55.32	47	240	116	137	6838
247	01:44:52	31 40.14	80 55.25	47	310	69	81	6847
248	01:46:51	31 40.10	80 55.33	44	276	161	198	8478
249	01:48:51	31 40.05	80 55.42	44	212	121	151	8442
250	01:50:50	31 40.00	80 55.50	44	256	136	187	8842
251	01:52:50	31 39.94	80 55.57	45	197	114	168	7670
252	01:54:49	31 39.90	80 55.66	44	220	53	105	6555
253	01:56:47	31 39.85	80 55.72	43	254	99	108	6578
254	01:58:46	31 39.81	80 55.83	42	309	55	62	6042
255	02:00:45	31 39.73	80 55.86	40	232	79	89	6239
256	02:02:44	31 39.68	80 55.92	40	293	57	60	6336
257	02:04:43	31 39.65	80 56.02	40	251	80	51	6358
258	02:06:42	31 39.59	80 56.10	39	299	151	90	6894
259	02:08:41	31 39.65	80 56.18	37	275	175	146	7798
260	02:10:40	31 39.77	80 56.23	39	204	102	108	7510
261	02:12:40	31 39.90	80 56.26	39	308	166	90	8343
262	02:14:39	31 39.99	80 56.34	39	343	73	174	8708
263	02:16:38	31 40.08	80 56.41	41	272	92	71	6627
264	02:18:37	31 40.12	80 56.52	41	358	47	59	6373
265	02:20:36	31 40.18	80 56.63	42	331	70	117	6962
266	02:22:36	31 40.27	80 56.70	42	234	77	116	7645
267	02:24:35	31 40.31	80 56.81	43	259	127	111	7124
268	02:26:35	31 40.33	80 56.91	43	308	106	93	7149
269	02:28:34	31 40.41	80 57.00	42	331	114	132	7241

Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
270	02:30:34	31 40.49	80 57.10	45	324	140	130	8044
271	02:32:33	31 40.51	80 57.22	41	413	85	89	7417
272	02:34:33	31 40.60	80 57.30	45	324	51	147	8184
273	02:36:32	31 40.67	80 57.40	44	428	143	188	8666
274	02:38:32	31 40.75	80 57.49	53	493	109	142	8688
275	02:40:32	31 40.81	80 57.60	45	589	246	129	9697
276	02:42:31	31 40.87	80 57.70	34	251	95	56	5777
277	02:44:30	31 40.99	80 57.77	38	288	144	70	6669
278	02:46:28	31 41.06	80 57.87	34	154	65	57	5333
279	03:34:10	31 41.08	80 57.99	34	244	46	117	6060
280	03:36:11	31 42.43	80 59.53	29	727	270	208	11918
281	03:38:12	31 42.51	80 59.38	30	665	260	248	12576
282	03:40:13	31 42.58	80 59.25	29	620	263	168	12585
283	03:42:13	31 42.66	80 59.12	29	586	212	183	12220
284	03:44:14	31 42.74	80 58.98	28	579	305	190	12332
285	03:46:16	31 42.81	80 58.84	29	557	275	240	13576
286	03:48:17	31 42.88	80 58.70	28	477	330	357	14758
287	03:50:19	31 42.96	80 58.56	28	396	341	430	15460
288	03:52:20	31 42.97	80 58.43	30	552	238	251	12789
289	03:54:22	31 42.89	80 58.35	31	431	305	234	13921
290	03:56:23	31 42.82	80 58.25	30	390	257	260	11842
291	03:58:23	31 42.76	80 58.14	32	547	182	158	11601
292	04:00:24	31 42.69	80 58.03	29	539	243	209	12308
293	04:02:26	31 42.63	80 57.93	30	337	349	328	15510
294	04:04:26	31 42.56	80 57.82	30	379	185	143	10453
295	04:06:26	31 42.50	80 57.72	32	333	122	129	7790
296	04:08:24	31 42.44	80 57.61	32	215	61	75	5998
297	04:10:23	31 42.38	80 57.51	31	288	57	72	6208
298	04:12:22	31 42.31	80 57.42	31	267	149	100	7630
299	04:14:24	31 42.25	80 57.31	32	430	373	366	15414
300	04:16:25	31 42.18	80 57.21	34	440	199	215	12338
301	04:18:24	31 42.11	80 57.12	36	252	132	88	6129
302	04:20:22	31 42.03	80 57.04	34	288	62	52	5519
303	04:22:21	31 41.97	80 56.93	31	302	151	70	7634
304	04:24:21	31 41.91	80 56.82	35	327	210	148	9098
305	04:26:21	31 41.82	80 56.77	35	384	180	171	10047
306	04:28:21	31 41.75	80 56.70	34	417	114	80	7927
307	04:30:20	31 41.68	80 56.61	35	453	129	129	8552
308	04:32:20	31 41.61	80 56.52	39	562	213	104	9779
309	04:34:19	31 41.53	80 56.43	39	406	122	113	7677
310	04:36:18	31 41.46	80 56.36	35	303	58	38	5963
311	04:38:16	31 41.39	80 56.27	38	241	72	53	5916
312	04:40:15	31 41.32	80 56.18	37	279	74	44	5428
313	04:42:14	31 41.25	80 56.11	35	373	49	94	6713
314	04:44:13	31 41.18	80 56.01	37	316	80	71	5887

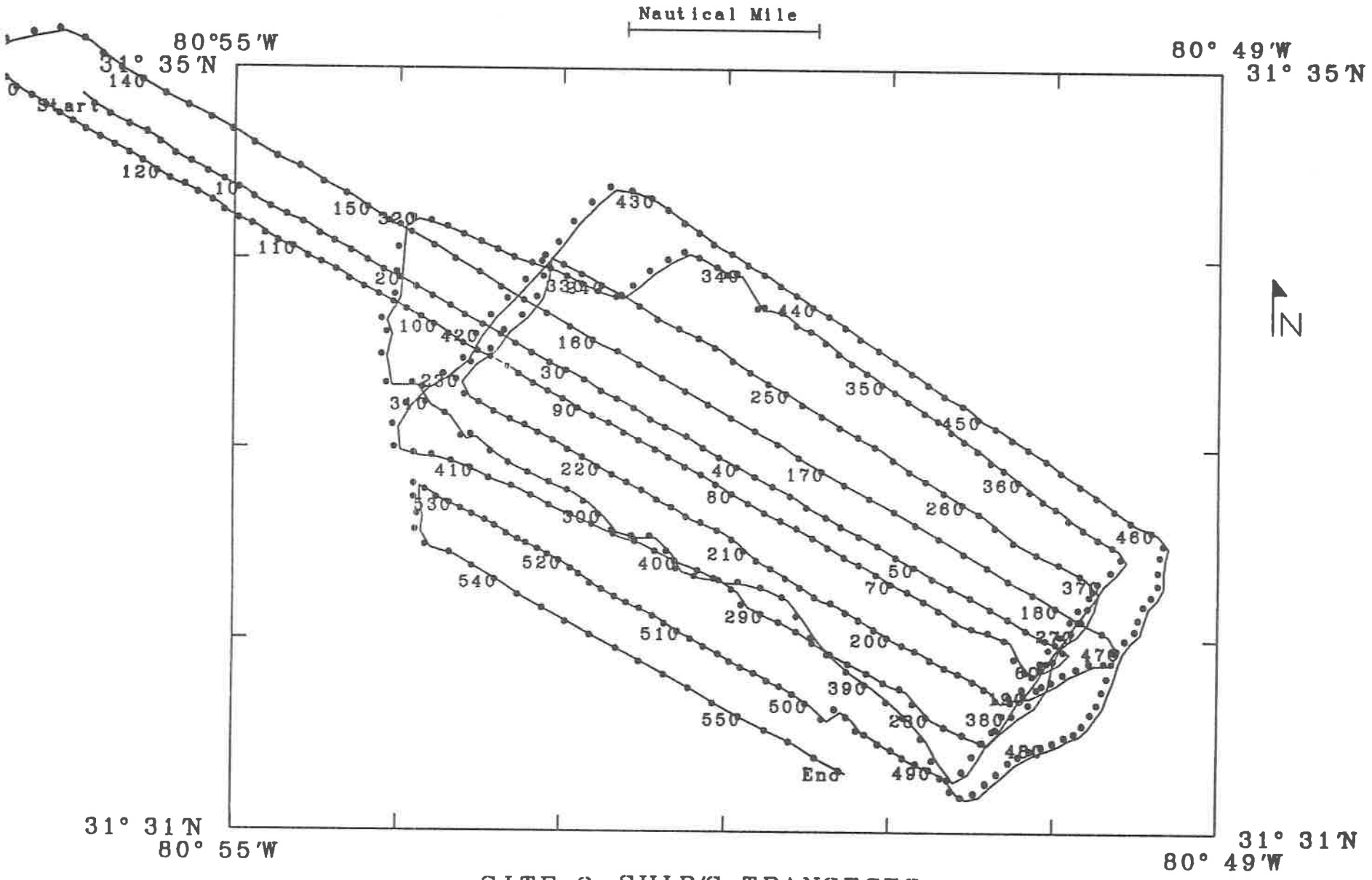
Georgia Site 1 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
315	04:46:12	31 41.11	80 55.92	44	554	182	103	9146
316	04:48:12	31 41.03	80 55.84	41	451	167	91	8020
317	04:50:12	31 40.95	80 55.74	47	602	285	129	11398
318	04:52:13	31 40.88	80 55.65	49	592	224	192	11467
319	04:54:13	31 40.79	80 55.57	50	637	161	145	10527
320	04:56:13	31 40.72	80 55.47	51	620	156	130	10270
321	04:58:12	31 40.65	80 55.38	51	520	113	118	8889
322	05:00:12	31 40.57	80 55.31	51	565	132	70	8769
323	05:02:11	31 40.48	80 55.30	52	390	135	121	7382
324	05:04:10	31 40.39	80 55.31	51	282	93	138	7223
325	05:06:09	31 40.29	80 55.32	51	293	94	133	6932
326	05:08:08	31 40.20	80 55.33	51	244	90	133	7285
327	05:10:08	31 40.11	80 55.35	50	358	126	160	8005
328	05:12:07	31 40.01	80 55.38	47	245	38	217	8400
329	05:14:06	31 39.92	80 55.41	47	272	119	156	7372
330	05:16:05	31 39.82	80 55.42	48	335	61	148	6926
331	05:18:04	31 39.72	80 55.43	48	280	70	92	6754
332	05:20:05	31 39.63	80 55.44	47	247	90	88	6361

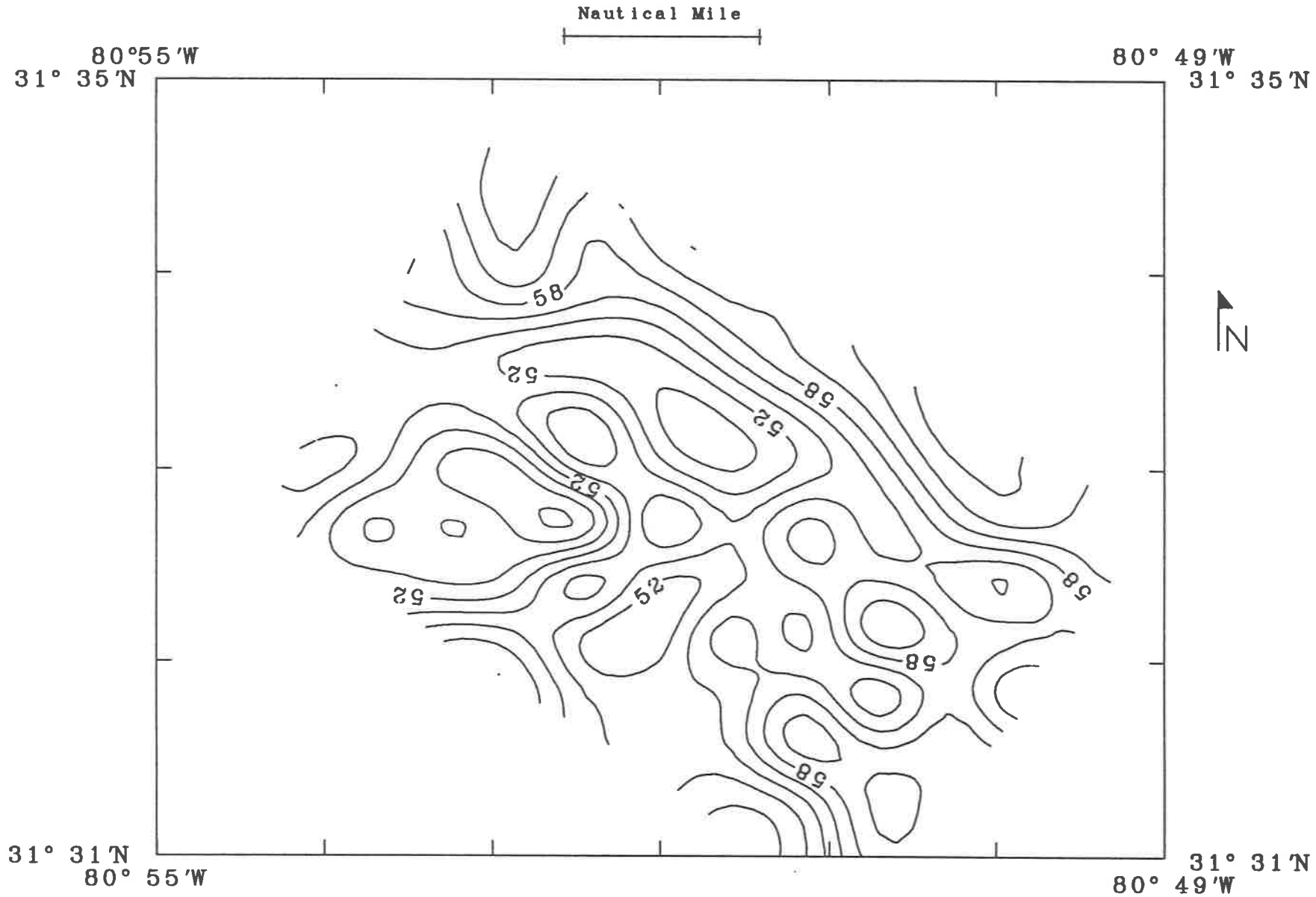
APPENDIX 2

GAMMA ISOTOPE MAPPING DATA

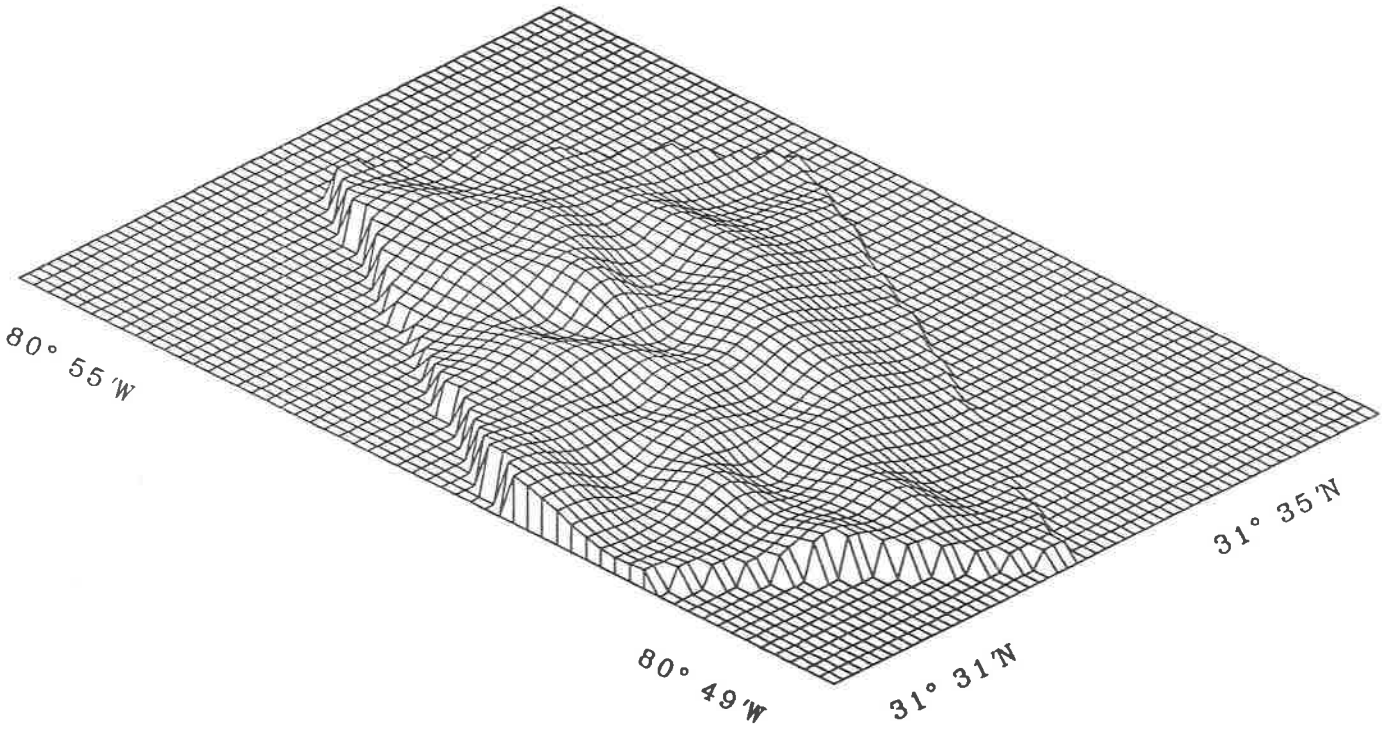
TARGET AREA 2



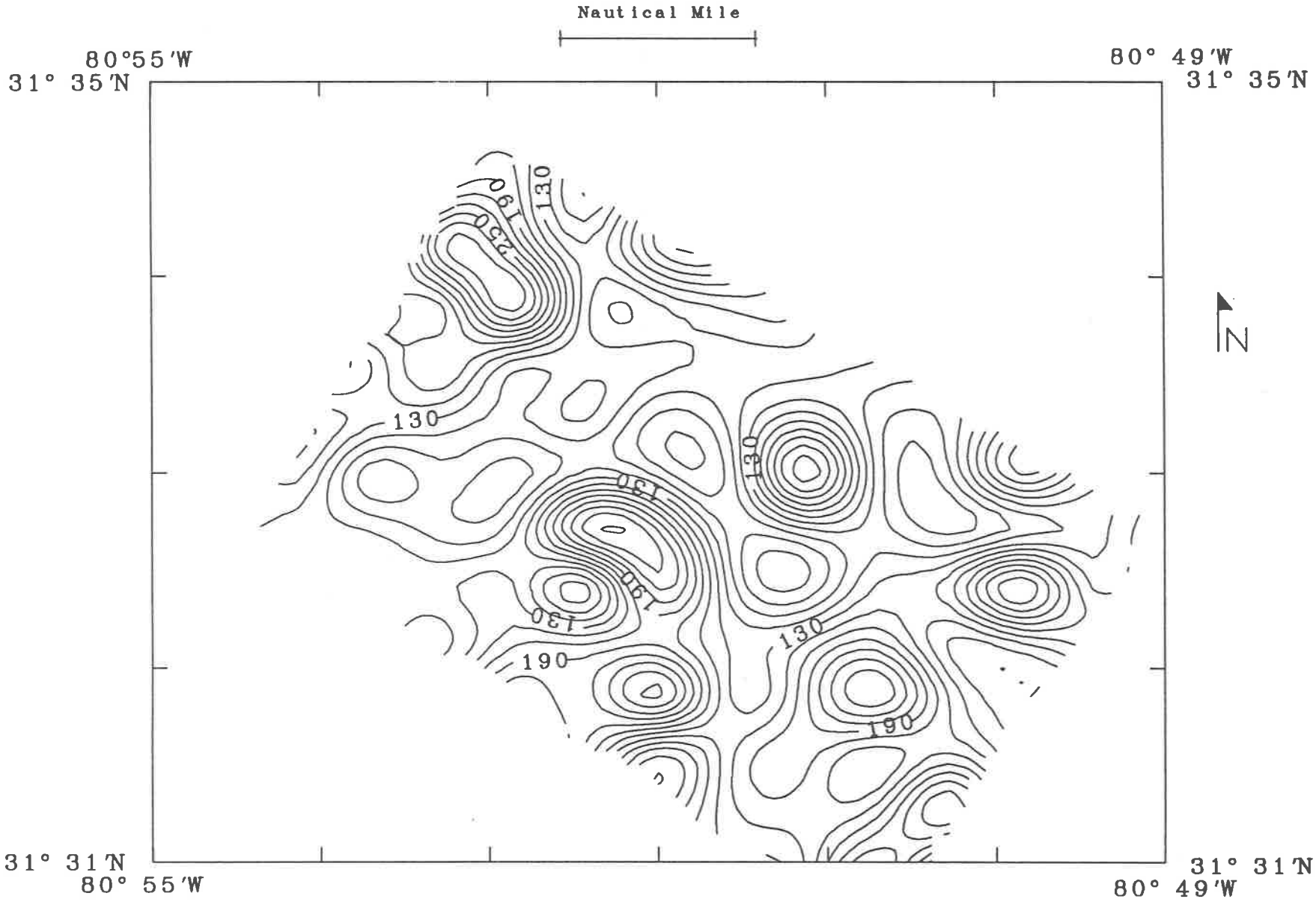
SITE 2 SHIP'S TRANSECTS
GEORGIA MINERAL SURVEY



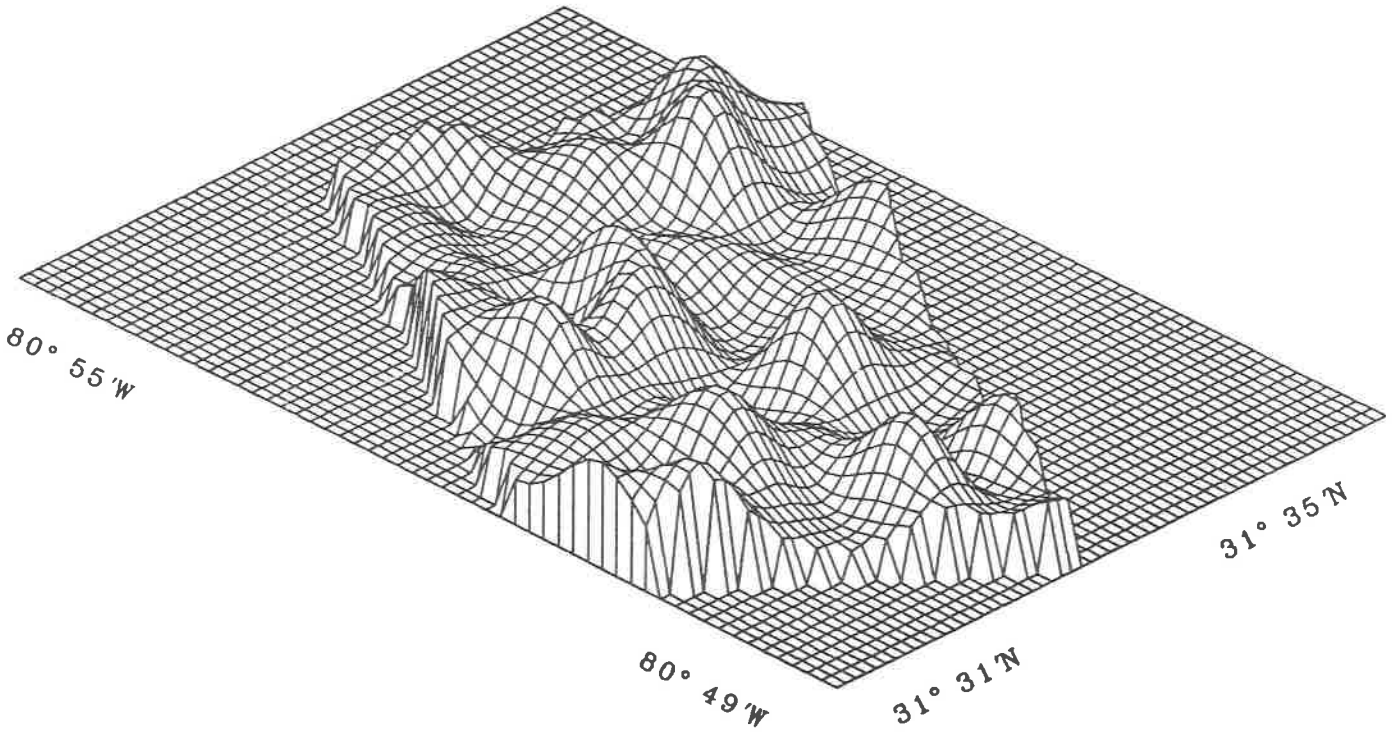
SITE 2 WATER DEPTH CONTOUR
GEORGIA MINERAL SURVEY



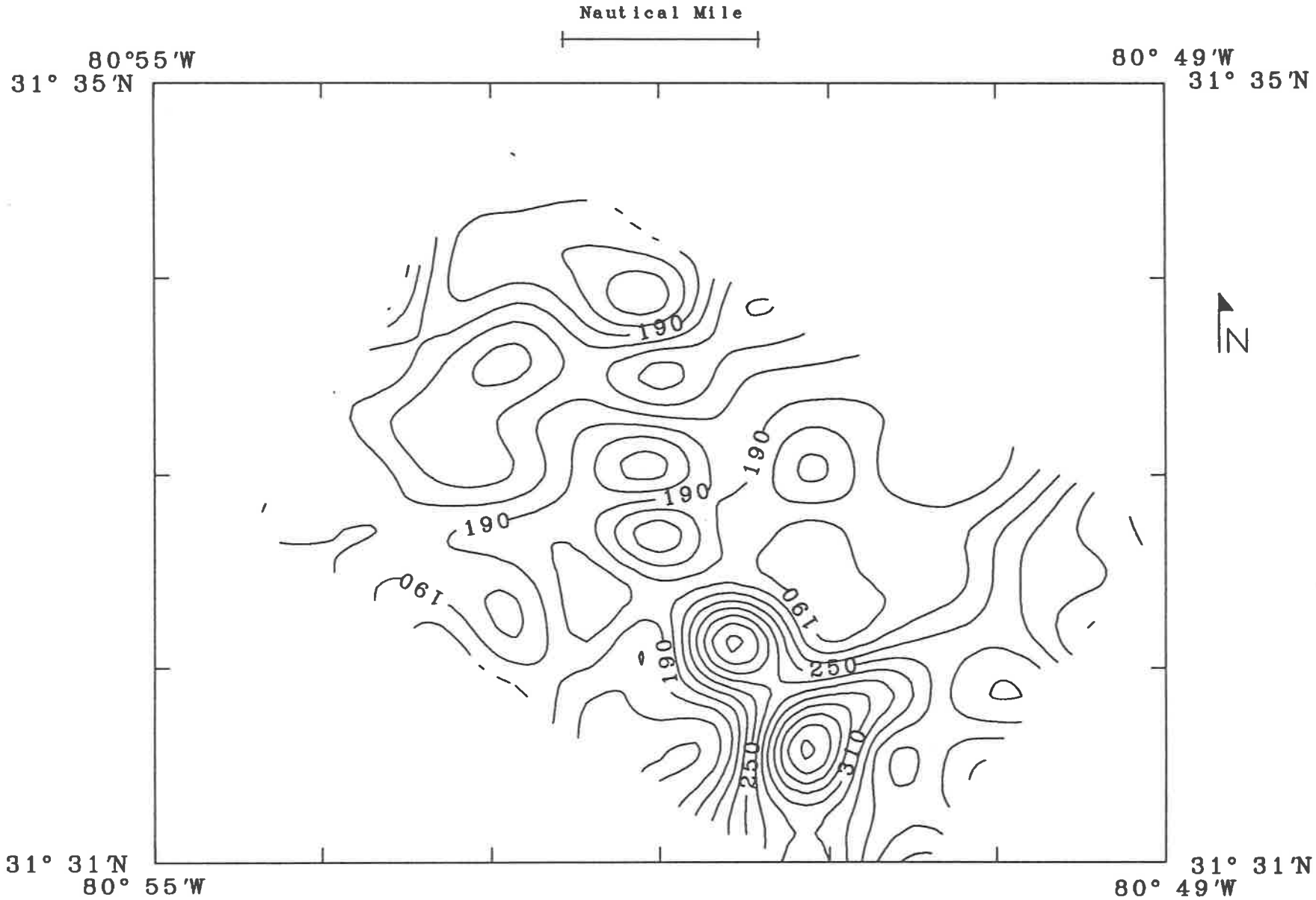
SITE 2 SEAFLOOR
GEORGIA MINERAL SURVEY



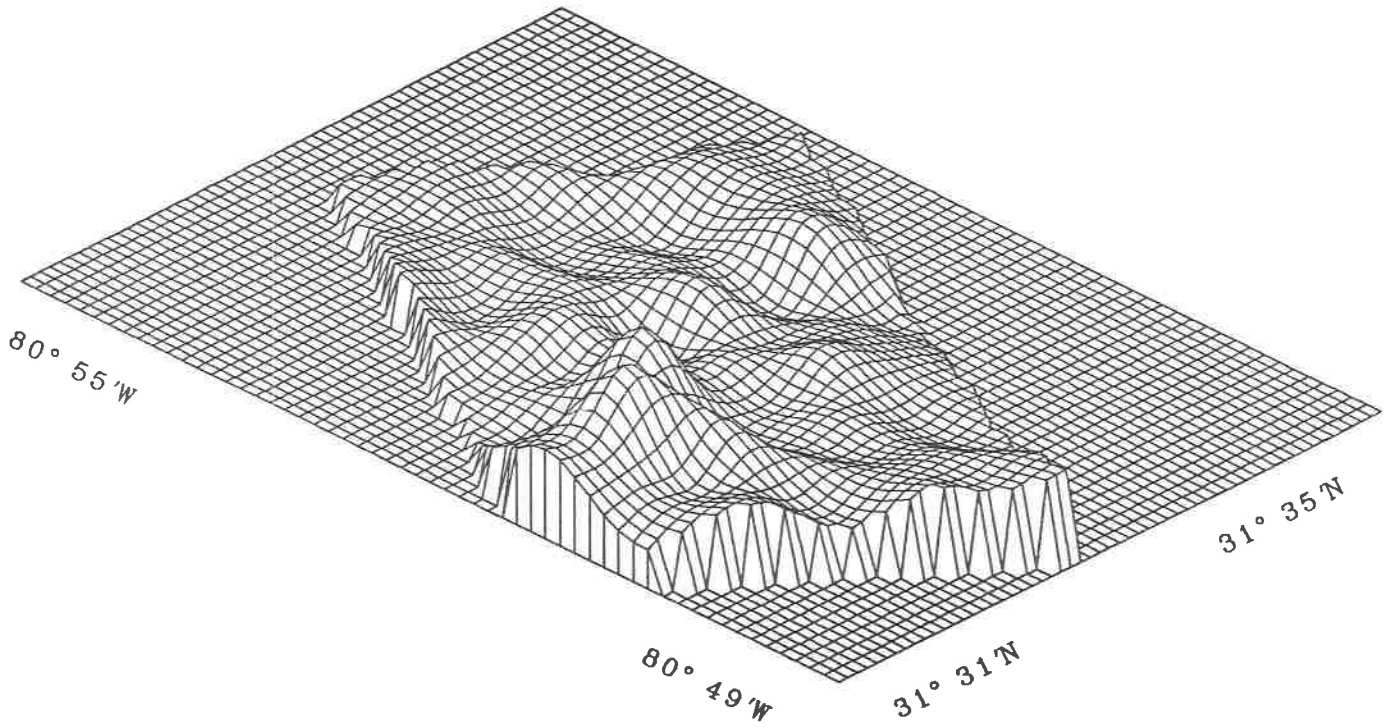
SITE 2 TL–208 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



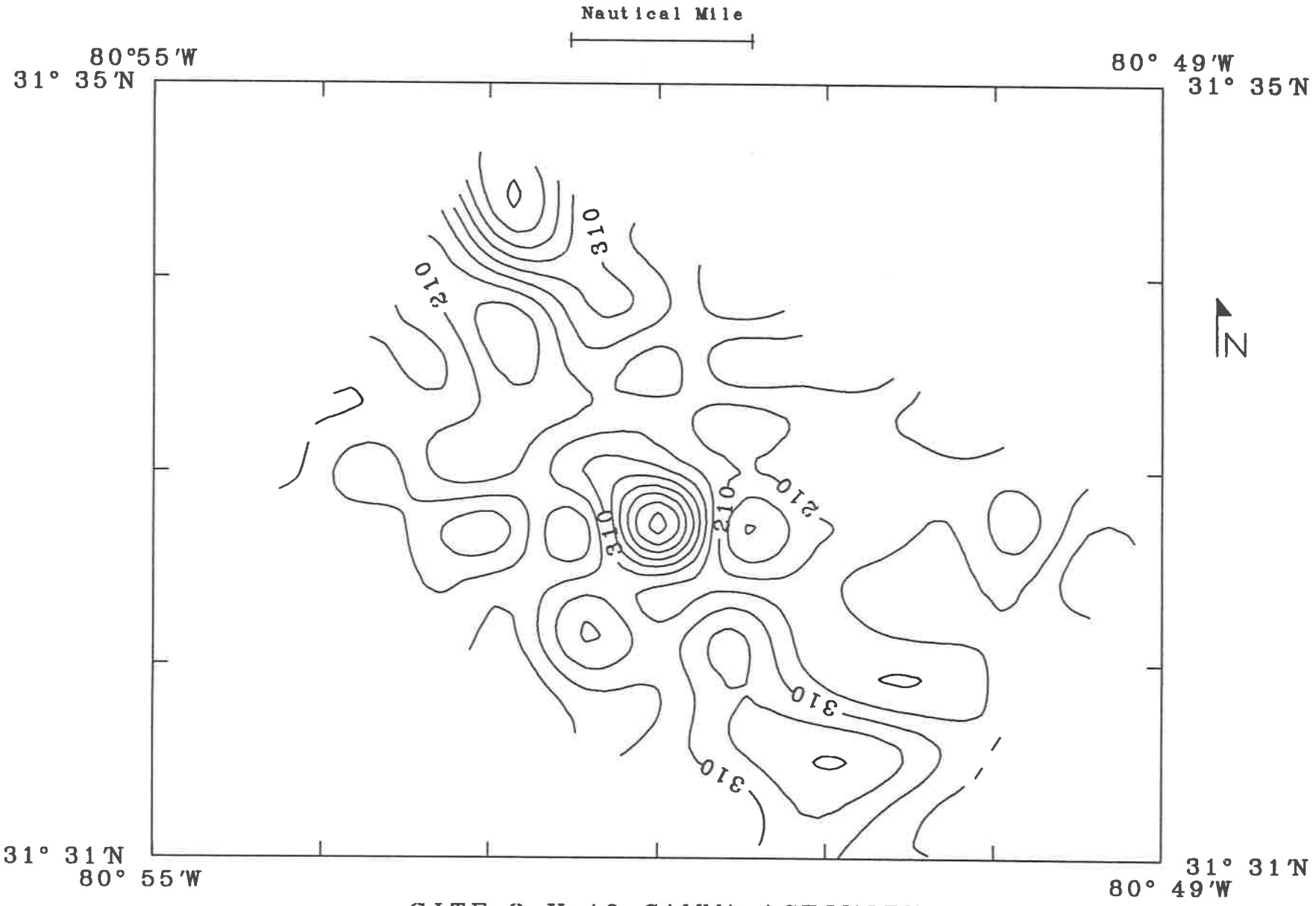
SITE 2 TL-208 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



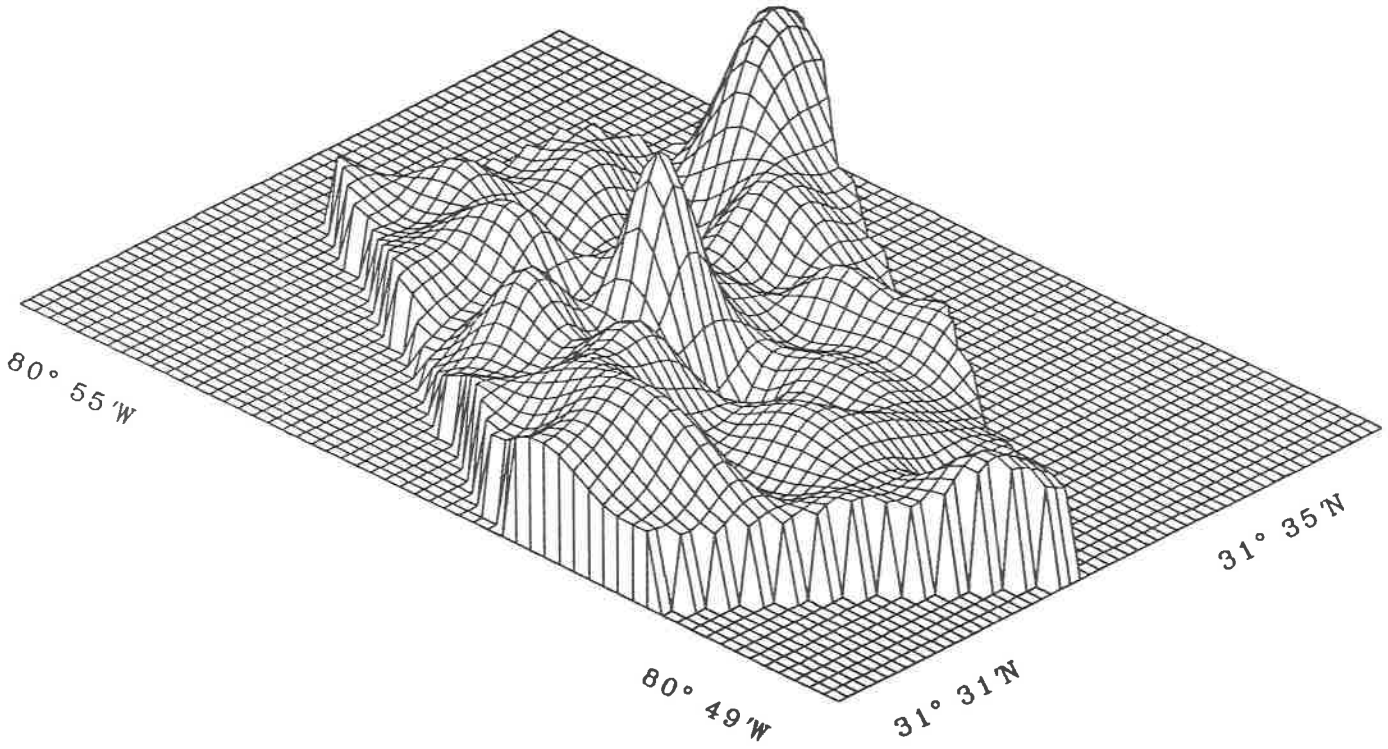
SITE 2 BI–214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



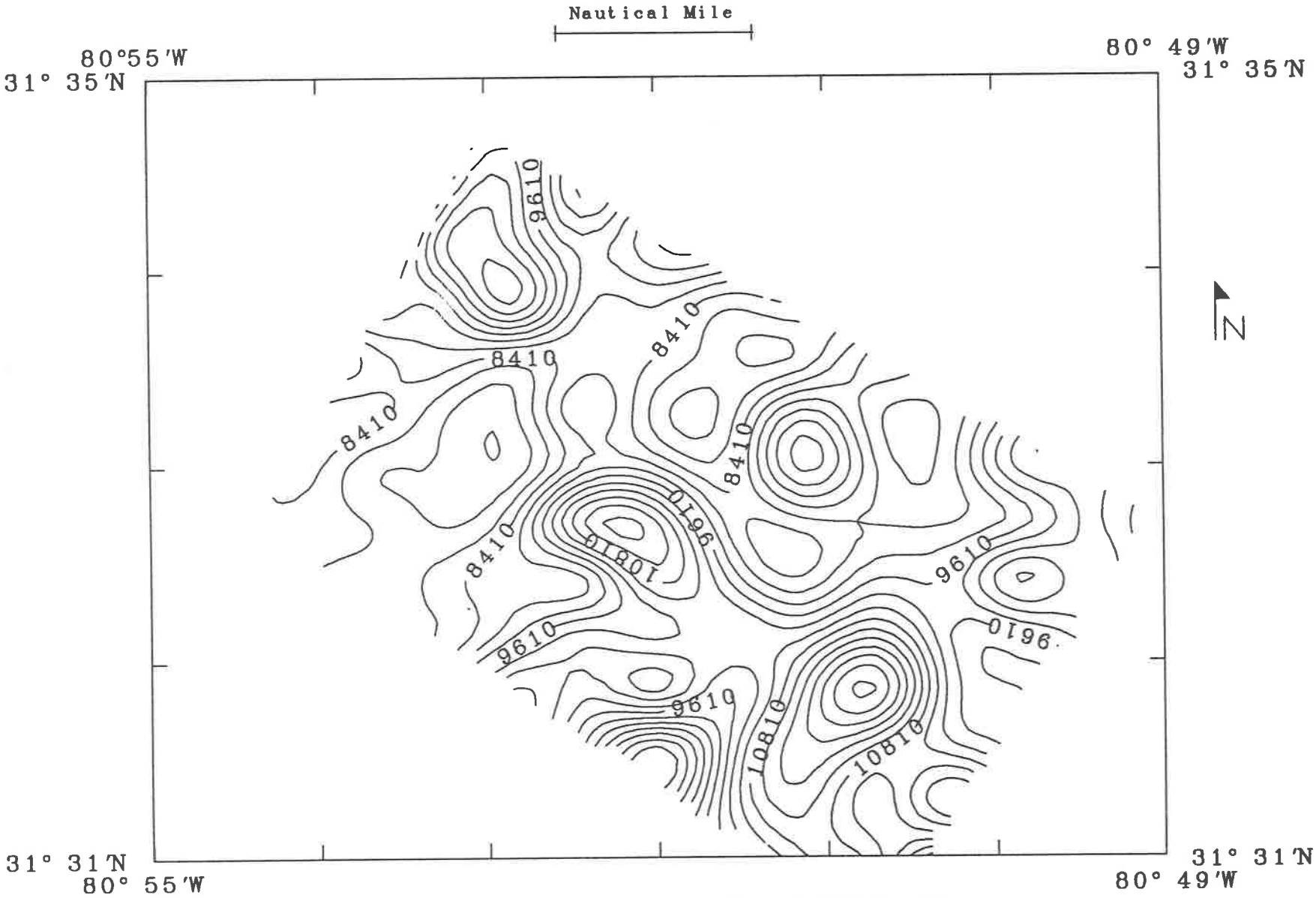
SITE 2 BI–214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



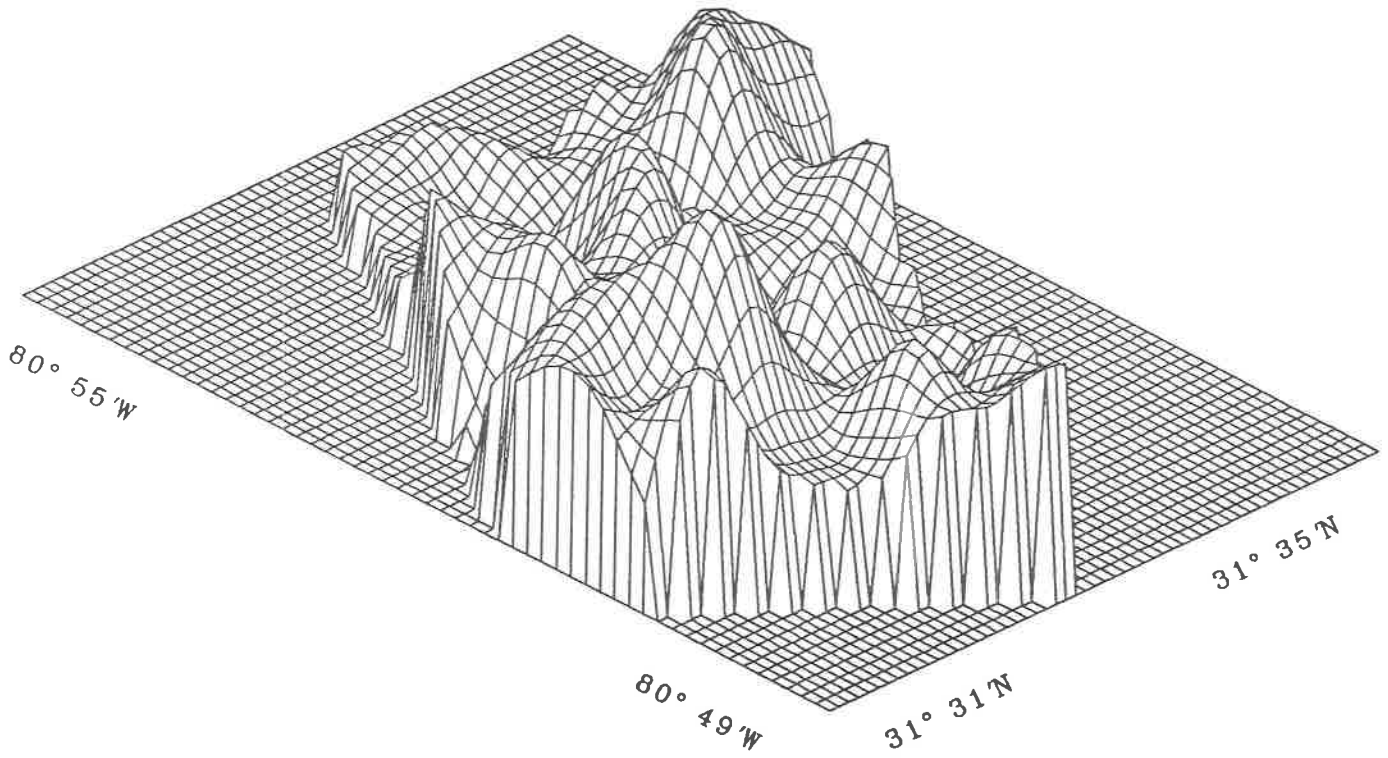
SITE 2 K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 2 K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 2 TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 2 TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
1	06:39:33	31 34.78	80 55.83	47	321	88	54	6441
2	06:41:32	31 34.73	80 55.73	48	233	74	170	7557
3	06:43:31	31 34.68	80 55.61	48	224	87	168	7309
4	06:45:30	31 34.64	80 55.50	48	167	164	118	6757
5	06:47:29	31 34.59	80 55.42	48	254	76	78	6724
6	06:49:28	31 34.53	80 55.33	47	228	37	151	7224
7	06:51:27	31 34.49	80 55.23	48	207	108	119	6448
8	06:53:26	31 34.44	80 55.13	47	266	154	116	6657
9	06:55:25	31 34.40	80 55.03	48	198	165	171	7387
10	06:57:24	31 34.36	80 54.94	51	361	109	38	5956
11	06:59:23	31 34.31	80 54.85	52	216	122	129	7445
12	07:01:22	31 34.26	80 54.75	52	199	112	139	8377
13	07:03:22	31 34.22	80 54.65	50	193	155	152	7648
14	07:05:21	31 34.18	80 54.55	50	258	172	115	7410
15	07:07:20	31 34.12	80 54.45	49	308	107	72	6845
16	07:09:19	31 34.08	80 54.36	53	220	133	113	7927
17	07:11:18	31 34.03	80 54.26	53	269	168	91	7266
18	07:13:17	31 33.98	80 54.16	54	282	105	83	6633
19	07:15:16	31 33.93	80 54.06	55	189	133	133	7207
20	07:17:16	31 33.89	80 53.96	55	213	140	148	7307
21	07:19:15	31 33.84	80 53.86	55	192	87	272	10197
22	07:21:15	31 33.79	80 53.76	55	255	144	186	8913
23	07:23:15	31 33.74	80 53.65	55	233	97	152	8964
24	07:25:14	31 33.69	80 53.56	54	277	196	105	8358
25	07:27:14	31 33.64	80 53.45	55	243	148	63	7938
26	07:29:13	31 33.59	80 53.34	55	225	106	169	8308
27	07:31:13	31 33.54	80 53.25	55	309	180	218	9306
28	07:33:13	31 33.49	80 53.15	54	164	118	102	7733
29	07:35:12	31 33.44	80 53.04	54	200	161	63	7159
30	07:37:11	31 33.40	80 52.94	55	219	92	164	8396
31	07:39:11	31 33.35	80 52.83	54	161	189	127	7608
32	07:41:10	31 33.29	80 52.73	55	167	116	113	8239
33	07:43:10	31 33.25	80 52.63	55	268	217	114	8575
34	07:45:09	31 33.20	80 52.53	61	266	194	125	8655
35	07:47:09	31 33.14	80 52.43	63	258	203	73	8360
36	07:49:09	31 33.10	80 52.34	62	407	140	110	9474
37	07:51:08	31 33.05	80 52.21	62	410	230	92	9334
38	07:53:08	31 32.99	80 52.11	56	404	228	127	9604
39	07:55:08	31 32.94	80 52.01	54	380	243	68	9132
40	07:57:08	31 32.89	80 51.90	53	382	169	102	9063
41	07:59:08	31 32.84	80 51.79	56	217	229	85	8559
42	08:01:07	31 32.79	80 51.68	54	126	203	99	9068
43	08:03:07	31 32.74	80 51.57	54	142	200	81	8603
44	08:05:06	31 32.68	80 51.47	54	195	193	69	8095

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
45	08:07:06	31 32.63	80 51.35	54	217	201	90	8343
46	08:09:06	31 32.58	80 51.26	61	159	197	76	7941
47	08:11:05	31 32.53	80 51.15	58	206	191	98	8988
48	08:13:05	31 32.48	80 51.04	63	215	166	46	8682
49	08:15:04	31 32.42	80 50.93	60	215	131	112	8916
50	08:17:04	31 32.37	80 50.82	60	237	155	55	7981
51	08:19:04	31 32.31	80 50.71	60	272	185	132	9530
52	08:21:03	31 32.26	80 50.60	58	242	181	136	10062
53	08:23:04	31 32.21	80 50.48	61	190	231	159	9997
54	08:25:04	31 32.15	80 50.36	59	210	204	87	9560
55	08:27:04	31 32.10	80 50.25	59	307	252	111	9488
56	08:29:04	31 32.04	80 50.14	58	202	197	194	11623
57	08:31:04	31 31.99	80 50.02	57	252	299	184	11267
58	08:33:05	31 31.93	80 49.91	57	203	209	118	9476
59	08:35:05	31 31.88	80 49.97	56	178	223	168	10084
60	08:37:05	31 31.84	80 50.05	56	262	249	125	10444
61	08:39:05	31 31.82	80 50.14	57	218	288	147	10830
62	08:41:06	31 31.89	80 50.21	58	197	249	192	10513
63	08:43:06	31 31.99	80 50.27	59	240	167	94	8876
64	08:45:06	31 32.03	80 50.37	60	186	197	101	9643
65	08:47:06	31 32.05	80 50.47	60	196	280	59	9323
66	08:49:05	31 32.08	80 50.57	61	278	213	62	8561
67	08:51:05	31 32.14	80 50.67	62	180	219	212	11797
68	08:53:06	31 32.19	80 50.76	61	350	180	141	10065
69	08:55:06	31 32.24	80 50.86	60	258	176	69	8080
70	08:57:05	31 32.28	80 50.96	58	251	201	82	8532
71	08:59:05	31 32.33	80 51.05	56	250	196	82	8799
72	09:01:05	31 32.38	80 51.15	54	260	176	29	8211
73	09:03:04	31 32.42	80 51.24	57	137	185	64	8169
74	09:05:04	31 32.47	80 51.34	55	245	220	61	8195
75	09:07:03	31 32.52	80 51.43	61	280	221	99	8665
76	09:09:03	31 32.57	80 51.53	54	209	188	120	8802
77	09:11:03	31 32.61	80 51.63	56	191	209	72	8795
78	09:13:02	31 32.65	80 51.73	56	318	261	296	12552
79	09:15:03	31 32.70	80 51.83	58	238	186	158	8833
80	09:17:03	31 32.75	80 51.93	59	622	120	239	11431
81	09:19:03	31 32.80	80 52.03	59	573	130	202	10791
82	09:21:04	31 32.85	80 52.12	61	647	196	161	11046
83	09:23:04	31 32.89	80 52.22	61	287	191	279	11818
84	09:25:05	31 32.94	80 52.32	62	325	227	201	9885
85	09:27:05	31 32.98	80 52.40	55	323	213	132	9325
86	09:29:05	31 33.03	80 52.50	55	296	196	76	8085
87	09:31:04	31 33.07	80 52.59	54	249	207	128	8419
88	09:33:04	31 33.12	80 52.68	54	252	176	53	7979
89	09:35:03	31 33.16	80 52.78	53	236	166	70	7078

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
90	09:37:02	31 33.20	80 52.87	54	218	148	75	7101
91	09:39:01	31 33.25	80 52.96	53	210	167	76	7335
92	09:41:01	31 33.29	80 53.05	53	238	221	100	8325
93	09:43:00	31 33.33	80 53.14	53	177	194	122	8117
94	09:45:00	31 33.38	80 53.23	54	208	196	164	7924
95	09:46:59	31 33.42	80 53.30	54	232	41	125	7982
96	09:48:59	31 33.47	80 53.40	53	245	110	127	7819
97	09:50:58	31 33.50	80 53.48	53	201	149	135	8164
98	09:52:58	31 33.54	80 53.57	53	166	118	99	8326
99	09:54:57	31 33.59	80 53.66	52	231	139	97	7815
100	09:56:56	31 33.64	80 53.75	52	247	223	167	8416
101	09:58:56	31 33.68	80 53.83	51	237	141	86	7602
102	10:00:55	31 33.72	80 53.92	51	283	188	120	7472
103	10:02:55	31 33.76	80 54.00	49	252	141	111	7222
104	10:04:54	31 33.80	80 54.09	48	256	125	88	7091
105	10:06:53	31 33.84	80 54.18	50	324	147	84	6865
106	10:08:52	31 33.88	80 54.27	50	238	122	43	6633
107	10:10:51	31 33.93	80 54.35	49	251	160	112	7766
108	10:12:50	31 33.97	80 54.44	53	177	152	99	8008
109	10:14:49	31 34.00	80 54.52	49	242	105	74	7610
110	10:16:49	31 34.05	80 54.61	51	217	83	89	6665
111	10:18:48	31 34.08	80 54.70	49	242	89	126	7836
112	10:20:47	31 34.12	80 54.78	50	241	49	92	7436
113	10:22:46	31 34.17	80 54.86	46	354	127	62	7235
114	10:24:45	31 34.20	80 54.94	46	263	67	26	6173
115	10:26:44	31 34.24	80 55.03	45	292	45	44	6012
116	10:28:43	31 34.29	80 55.10	46	213	98	99	6469
117	10:30:42	31 34.33	80 55.19	46	209	89	147	7284
118	10:32:41	31 34.37	80 55.27	44	330	82	88	6557
119	10:34:40	31 34.40	80 55.36	46	186	108	56	6308
120	10:36:39	31 34.44	80 55.44	46	176	125	98	7064
121	10:38:38	31 34.49	80 55.53	50	245	111	79	6224
122	10:40:37	31 34.53	80 55.61	50	244	114	80	6175
123	10:42:35	31 34.57	80 55.70	46	215	78	87	6912
124	10:44:34	31 34.61	80 55.79	43	305	73	46	8036
125	10:46:34	31 34.65	80 55.88	44	331	132	125	8022
126	10:48:33	31 34.69	80 55.96	44	229	81	93	6443
127	10:50:32	31 34.73	80 56.04	44	291	128	37	6600
128	10:52:31	31 34.77	80 56.12	44	300	89	48	6531
129	10:54:30	31 34.82	80 56.21	48	298	64	161	8703
130	10:56:29	31 34.86	80 56.30	45	310	163	115	8006
131	10:58:29	31 34.91	80 56.37	43	307	49	102	6861
132	11:00:28	31 34.97	80 56.44	48	319	146	124	7872
133	11:02:27	31 35.04	80 56.49	49	297	111	111	7499
134	11:04:26	31 35.11	80 56.37	48	289	108	56	6690

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
135	11:06:25	31 35.15	80 56.20	50	265	87	60	7090
136	11:08:24	31 35.17	80 56.04	52	334	133	103	8142
137	11:10:23	31 35.12	80 55.89	47	228	52	128	7034
138	11:12:22	31 35.04	80 55.78	47	248	46	93	6736
139	11:14:22	31 34.97	80 55.66	46	489	94	167	9339
140	11:16:21	31 34.91	80 55.53	44	319	103	142	8223
141	11:18:21	31 34.84	80 55.39	45	240	111	87	6405
142	11:20:19	31 34.78	80 55.25	51	239	107	100	6623
143	11:22:19	31 34.72	80 55.11	50	269	83	94	6754
144	11:24:18	31 34.66	80 54.98	50	294	82	136	6710
145	11:26:16	31 34.59	80 54.85	48	232	183	143	8540
146	11:28:16	31 34.52	80 54.71	49	233	101	36	6143
147	11:30:15	31 34.47	80 54.57	52	352	93	43	7213
148	11:32:14	31 34.39	80 54.43	52	234	132	141	8497
149	11:34:13	31 34.33	80 54.29	54	233	191	185	8160
150	11:36:13	31 34.26	80 54.16	53	191	116	149	9104
151	11:38:13	31 34.19	80 54.03	52	344	150	38	6287
152	11:40:11	31 34.13	80 53.89	54	372	113	93	7831
153	11:42:11	31 34.06	80 53.75	54	382	133	75	7704
154	11:44:10	31 33.99	80 53.62	54	397	105	170	9664
155	11:46:10	31 33.92	80 53.47	53	250	190	198	9498
156	11:48:10	31 33.84	80 53.34	54	132	125	144	9072
157	11:50:10	31 33.77	80 53.20	54	313	113	142	9251
158	11:52:10	31 33.70	80 53.06	51	224	152	169	9438
159	11:54:10	31 33.63	80 52.92	50	115	103	84	7994
160	11:56:09	31 33.56	80 52.78	52	145	146	161	8714
161	11:58:09	31 33.50	80 52.63	51	297	172	89	7900
162	12:00:08	31 33.43	80 52.50	52	173	139	117	8173
163	12:02:08	31 33.36	80 52.36	51	179	191	170	10034
164	12:04:08	31 33.29	80 52.22	51	226	155	42	8092
165	12:06:07	31 33.22	80 52.08	50	285	195	42	7831
166	12:08:07	31 33.15	80 51.94	51	174	213	138	8378
167	12:10:06	31 33.08	80 51.79	50	255	163	65	7617
168	12:12:06	31 33.01	80 51.65	49	172	199	26	7839
169	12:14:05	31 32.94	80 51.52	51	255	163	124	8637
170	12:16:04	31 32.87	80 51.38	56	201	199	126	9085
171	12:18:04	31 32.80	80 51.24	59	142	132	98	8079
172	12:20:04	31 32.73	80 51.09	58	202	193	116	9002
173	12:22:04	31 32.66	80 50.94	58	170	257	87	9635
174	12:24:04	31 32.59	80 50.81	54	204	175	90	8535
175	12:26:03	31 32.52	80 50.67	56	359	233	174	10628
176	12:28:03	31 32.44	80 50.52	55	264	129	224	10624
177	12:30:04	31 32.37	80 50.38	55	343	151	280	10453
178	12:32:04	31 32.30	80 50.25	54	243	274	186	10823
179	12:34:05	31 32.23	80 50.10	54	338	224	109	9539

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
180	12:36:04	31 32.16	80 49.96	54	271	238	77	9673
181	12:38:05	31 32.09	80 49.82	54	277	191	125	9528
182	12:40:05	31 32.03	80 49.67	53	231	210	108	9530
183	12:42:04	31 31.93	80 49.60	51	256	159	66	9279
184	12:44:04	31 31.87	80 49.66	51	269	178	126	9662
185	12:46:04	31 31.87	80 49.75	51	274	252	50	9537
186	12:48:04	31 31.84	80 49.83	51	339	212	93	9211
187	12:50:04	31 31.81	80 49.91	51	238	208	64	8971
188	12:52:04	31 31.77	80 49.98	51	296	244	121	9628
189	12:54:04	31 31.73	80 50.07	51	196	251	45	9690
190	12:56:04	31 31.70	80 50.15	52	171	255	97	9873
191	12:58:04	31 31.69	80 50.24	53	303	284	61	9686
192	13:00:04	31 31.67	80 50.32	54	247	273	105	9432
193	13:02:04	31 31.73	80 50.39	56	265	256	154	9365
194	13:04:04	31 31.77	80 50.46	58	225	203	124	9635
195	13:06:04	31 31.81	80 50.55	55	196	256	102	9989
196	13:08:04	31 31.84	80 50.63	51	226	177	135	10341
197	13:10:05	31 31.88	80 50.72	53	220	326	283	13620
198	13:12:06	31 31.93	80 50.81	53	176	360	318	15683
199	13:14:08	31 31.96	80 50.89	51	277	307	226	13169
200	13:16:09	31 32.00	80 50.98	52	289	223	80	9655
201	13:18:09	31 32.04	80 51.06	52	174	244	256	11993
202	13:20:10	31 32.09	80 51.15	53	275	189	166	10576
203	13:22:10	31 32.13	80 51.23	54	198	237	121	10017
204	13:24:11	31 32.18	80 51.32	53	162	235	208	11461
205	13:26:11	31 32.21	80 51.42	51	177	138	125	9572
206	13:28:11	31 32.26	80 51.51	50	247	276	64	9934
207	13:30:11	31 32.31	80 51.60	53	269	252	120	10417
208	13:32:12	31 32.36	80 51.69	52	249	187	98	10170
209	13:34:12	31 32.40	80 51.78	51	282	207	102	8351
210	13:36:11	31 32.45	80 51.86	49	247	96	98	8116
211	13:38:11	31 32.51	80 51.93	49	208	150	254	10581
212	13:40:11	31 32.56	80 52.02	52	501	134	223	11373
213	13:42:12	31 32.60	80 52.12	53	473	256	189	10298
214	13:44:12	31 32.63	80 52.21	54	182	289	414	15291
215	13:46:14	31 32.68	80 52.30	52	129	391	510	15901
216	13:48:16	31 32.72	80 52.39	47	179	234	309	12131
217	13:50:17	31 32.77	80 52.48	47	214	111	185	9951
218	13:52:17	31 32.81	80 52.57	48	350	209	353	10706
219	13:54:17	31 32.85	80 52.66	47	156	276	521	15110
220	13:56:19	31 32.89	80 52.75	45	250	135	94	8440
221	13:58:19	31 32.94	80 52.84	46	216	168	35	7419
222	14:00:18	31 32.98	80 52.93	47	186	130	102	7349
223	14:02:17	31 33.03	80 53.02	46	219	91	43	6870
224	14:04:16	31 33.07	80 53.11	47	124	145	86	7132

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
225	14:06:15	31 33.11	80 53.19	47	222	190	90	8031
226	14:08:15	31 33.14	80 53.28	48	223	99	83	7423
227	14:10:14	31 33.18	80 53.38	49	265	94	123	7423
228	14:12:13	31 33.23	80 53.47	50	256	123	84	7825
229	14:14:12	31 33.27	80 53.56	49	280	154	133	8113
230	14:16:12	31 33.35	80 53.61	51	207	99	150	7948
231	14:18:11	31 33.44	80 53.52	52	265	170	107	8203
232	14:20:11	31 33.51	80 53.40	51	256	133	133	7965
233	14:22:10	31 33.61	80 53.32	52	271	171	147	8204
234	14:24:10	31 33.69	80 53.21	54	278	220	148	9036
235	14:26:09	31 33.79	80 53.12	53	266	204	86	8499
236	14:28:09	31 33.90	80 53.08	54	312	192	192	9602
237	14:30:09	31 34.01	80 53.07	52	210	164	154	9384
238	14:32:09	31 33.96	80 52.96	52	281	175	169	9806
239	14:34:09	31 33.91	80 52.85	51	329	164	300	10604
240	14:36:09	31 33.85	80 52.73	51	158	108	210	9850
241	14:38:09	31 33.80	80 52.61	50	300	170	139	8618
242	14:40:09	31 33.74	80 52.50	51	221	154	172	10244
243	14:42:09	31 33.67	80 52.39	51	271	157	95	8273
244	14:44:08	31 33.62	80 52.26	50	282	214	143	8282
245	14:46:08	31 33.57	80 52.14	51	188	183	62	8093
246	14:48:07	31 33.52	80 52.04	50	163	104	140	8611
247	14:50:07	31 33.45	80 51.93	51	292	137	37	7646
248	14:52:06	31 33.39	80 51.82	50	191	147	55	7548
249	14:54:06	31 33.33	80 51.71	50	208	155	64	7473
250	14:56:05	31 33.28	80 51.60	50	174	175	102	7779
251	14:58:04	31 33.22	80 51.50	51	234	171	71	7753
252	15:00:04	31 33.16	80 51.38	50	264	205	174	9108
253	15:02:03	31 33.10	80 51.27	50	174	200	450	14798
254	15:04:05	31 33.05	80 51.16	52	271	266	377	11888
255	15:06:06	31 33.00	80 51.06	53	198	211	111	8823
256	15:08:06	31 32.93	80 50.95	53	129	131	132	9421
257	15:10:06	31 32.87	80 50.85	54	317	223	152	9296
258	15:12:06	31 32.82	80 50.75	54	208	167	118	9158
259	15:14:06	31 32.76	80 50.64	56	198	224	83	8281
260	15:16:05	31 32.70	80 50.53	57	193	200	61	8593
261	15:18:05	31 32.65	80 50.43	56	274	166	37	8543
262	15:20:04	31 32.58	80 50.33	56	309	210	53	8490
263	15:22:04	31 32.50	80 50.22	57	241	199	56	8567
264	15:24:04	31 32.44	80 50.08	55	377	263	100	8942
265	15:26:03	31 32.39	80 49.94	52	285	255	347	12304
266	15:28:04	31 32.33	80 49.81	51	199	220	240	10657
267	15:30:05	31 32.25	80 49.73	50	225	259	189	9993
268	15:32:05	31 32.16	80 49.76	54	296	157	105	9283
269	15:34:05	31 32.09	80 49.80	57	233	183	138	9213

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
270	15:36:04	31 32.03	80 49.86	52	144	181	120	9271
271	15:38:04	31 31.97	80 49.96	56	200	216	133	10318
272	15:40:05	31 31.87	80 50.01	57	172	220	148	10096
273	15:42:05	31 31.75	80 50.04	62	297	231	152	10100
274	15:44:05	31 31.65	80 50.12	56	326	263	109	8948
275	15:46:05	31 31.59	80 50.22	57	336	268	178	10648
276	15:48:05	31 31.52	80 50.32	55	306	352	239	12190
277	15:50:06	31 31.45	80 50.40	57	388	247	125	10101
278	15:52:06	31 31.49	80 50.52	54	489	270	159	11764
279	15:54:07	31 31.53	80 50.63	53	374	301	115	11092
280	15:56:07	31 31.58	80 50.74	59	394	240	146	11243
281	15:58:08	31 31.65	80 50.82	60	314	287	284	12003
282	16:00:08	31 31.73	80 50.90	56	364	218	215	11569
283	16:02:09	31 31.76	80 51.00	56	329	222	196	13375
284	16:04:10	31 31.81	80 51.10	58	259	299	244	12556
285	16:06:11	31 31.86	80 51.21	58	346	338	122	11109
286	16:08:12	31 31.91	80 51.32	58	532	283	117	11582
287	16:10:13	31 31.97	80 51.43	53	260	346	111	10034
288	16:12:13	31 32.03	80 51.53	53	264	289	142	11474
289	16:14:13	31 32.08	80 51.64	53	383	225	103	8576
290	16:16:13	31 32.12	80 51.75	53	357	210	70	8294
291	16:18:12	31 32.17	80 51.87	52	414	120	81	8835
292	16:20:12	31 32.25	80 51.93	51	244	135	86	7683
293	16:22:11	31 32.31	80 52.04	51	178	319	291	12116
294	16:24:12	31 32.32	80 52.16	51	222	291	517	15328
295	16:26:14	31 32.36	80 52.27	52	201	203	66	8803
296	16:28:14	31 32.45	80 52.33	52	255	254	99	9988
297	16:30:14	31 32.53	80 52.43	52	311	268	164	10039
298	16:32:14	31 32.53	80 52.54	53	194	207	141	9536
299	16:34:14	31 32.56	80 52.66	50	183	264	454	13281
300	16:36:15	31 32.64	80 52.74	51	291	248	122	8977
301	16:38:15	31 32.71	80 52.83	47	329	229	117	8877
302	16:40:15	31 32.77	80 52.93	47	281	125	79	7294
303	16:42:14	31 32.81	80 53.04	48	329	228	47	7168
304	16:44:13	31 32.86	80 53.17	49	206	148	74	7839
305	16:46:12	31 32.91	80 53.29	49	213	133	81	7380
306	16:48:12	31 32.97	80 53.40	46	172	174	78	7677
307	16:50:11	31 33.06	80 53.52	45	160	151	106	8245
308	16:52:10	31 33.05	80 53.58	49	292	178	100	7868
309	16:54:10	31 33.17	80 53.68	47	203	215	135	8124
310	16:56:09	31 33.23	80 53.80	49	174	144	75	8538
311	16:58:09	31 33.33	80 53.88	50	253	209	281	11111
312	17:00:09	31 33.33	80 54.04	50	188	202	229	9631
313	17:02:09	31 33.48	80 54.07	51	257	129	88	7084
314	17:04:08	31 33.60	80 54.04	51	201	158	70	7441

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
315	17:06:08	31 33.67	80 54.07	52	265	110	65	7165
316	17:08:07	31 33.80	80 53.99	53	314	77	73	7253
317	17:10:06	31 33.92	80 53.98	54	230	110	118	7202
318	17:12:05	31 34.05	80 53.97	54	238	143	87	6930
319	17:14:04	31 34.17	80 53.96	54	219	124	60	6329
320	17:16:03	31 34.21	80 53.88	55	210	130	60	6262
321	17:18:02	31 34.19	80 53.77	55	286	89	55	6604
322	17:20:01	31 34.16	80 53.67	55	213	58	66	6668
323	17:22:00	31 34.12	80 53.57	56	295	124	131	8286
324	17:23:59	31 34.08	80 53.46	56	288	219	204	9124
325	17:25:59	31 34.04	80 53.36	56	196	172	298	10149
326	17:27:59	31 34.00	80 53.26	56	126	228	279	10897
327	17:29:59	31 33.97	80 53.15	58	204	278	289	11925
328	17:32:00	31 33.94	80 53.04	58	303	97	150	8714
329	17:34:00	31 33.90	80 52.94	58	246	194	259	11252
330	17:36:00	31 33.86	80 52.85	60	115	163	298	11411
331	17:38:01	31 33.82	80 52.75	57	205	161	64	8435
332	17:40:00	31 33.79	80 52.64	58	211	171	147	9247
333	17:42:00	31 33.85	80 52.54	60	259	238	123	8507
334	17:43:59	31 33.93	80 52.44	57	348	198	105	8935
335	17:45:59	31 33.99	80 52.33	55	345	289	127	9525
336	17:47:59	31 34.03	80 52.23	55	256	169	179	9804
337	17:49:59	31 34.00	80 52.14	56	295	193	96	8625
338	17:51:59	31 33.95	80 52.03	58	336	289	123	8867
339	17:53:58	31 33.91	80 51.97	57	247	233	142	9534
340	17:55:58	31 33.92	80 51.91	58	287	194	149	9532
341	17:57:58	31 33.73	80 51.78	57	182	157	103	8130
342	17:59:58	31 33.74	80 51.74	56	236	174	107	7651
343	18:01:57	31 33.71	80 51.63	55	343	133	92	7476
344	18:03:56	31 33.64	80 51.54	57	323	143	129	7894
345	18:05:56	31 33.61	80 51.45	61	242	207	103	7818
346	18:07:55	31 33.55	80 51.36	56	188	143	123	7998
347	18:09:54	31 33.49	80 51.28	56	274	176	105	7599
348	18:11:54	31 33.44	80 51.20	57	155	209	79	7762
349	18:13:53	31 33.39	80 51.11	57	274	190	62	8049
350	18:15:52	31 33.33	80 51.02	58	237	178	49	8532
351	18:17:52	31 33.29	80 50.94	58	133	275	499	15242
352	18:19:54	31 33.24	80 50.86	58	256	276	148	9653
353	18:21:54	31 33.18	80 50.76	58	181	186	119	8546
354	18:23:54	31 33.14	80 50.68	59	287	225	91	8438
355	18:25:53	31 33.08	80 50.60	58	234	155	76	8916
356	18:27:53	31 33.03	80 50.52	59	266	193	100	8713
357	18:29:52	31 32.98	80 50.44	59	183	201	115	8793
358	18:31:52	31 32.92	80 50.36	61	210	150	74	9016
359	18:33:52	31 32.88	80 50.28	63	293	220	80	8887

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
360	18:35:52	31 32.82	80 50.19	62	188	245	94	9140
361	18:37:51	31 32.77	80 50.12	62	265	168	60	8896
362	18:39:51	31 32.72	80 50.04	62	231	215	93	8839
363	18:41:51	31 32.68	80 49.96	62	118	278	64	9370
364	18:43:51	31 32.62	80 49.88	61	210	240	66	8542
365	18:45:50	31 32.57	80 49.79	61	340	300	81	8740
366	18:47:50	31 32.52	80 49.70	61	131	270	429	14882
367	18:49:52	31 32.48	80 49.61	61	306	186	186	10454
368	18:51:52	31 32.42	80 49.56	59	309	316	182	10574
369	18:53:52	31 32.35	80 49.62	59	212	219	155	10136
370	18:55:52	31 32.29	80 49.70	57	254	193	163	10119
371	18:57:53	31 32.22	80 49.75	57	297	240	125	9660
372	18:59:53	31 32.15	80 49.82	56	249	270	178	9890
373	19:01:53	31 32.09	80 49.87	59	253	206	101	9212
374	19:03:52	31 32.01	80 49.93	62	290	266	187	9805
375	19:05:53	31 31.94	80 50.00	59	248	222	170	10923
376	19:07:53	31 31.87	80 50.05	62	231	320	163	10600
377	19:09:53	31 31.80	80 50.10	64	230	339	132	10184
378	19:11:53	31 31.73	80 50.16	62	194	263	107	10101
379	19:13:54	31 31.66	80 50.23	61	286	196	36	8658
380	19:15:53	31 31.59	80 50.28	61	319	209	112	9107
381	19:17:53	31 31.51	80 50.34	60	238	308	231	11325
382	19:19:53	31 31.45	80 50.41	60	427	356	133	11227
383	19:21:54	31 31.38	80 50.46	59	467	182	81	9442
384	19:23:54	31 31.30	80 50.52	59	358	244	97	9331
385	19:25:54	31 31.26	80 50.61	63	351	189	106	9774
386	19:27:54	31 31.36	80 50.70	65	394	298	149	10584
387	19:29:54	31 31.47	80 50.77	59	326	189	144	10219
388	19:31:54	31 31.58	80 50.88	61	348	331	221	11545
389	19:33:55	31 31.66	80 50.98	63	379	345	154	11763
390	19:35:55	31 31.75	80 51.11	65	218	423	249	13432
391	19:37:57	31 31.82	80 51.22	58	433	216	139	10831
392	19:39:57	31 31.91	80 51.34	58	414	213	188	11128
393	19:41:58	31 32.00	80 51.44	58	230	287	139	11285
394	19:43:58	31 32.11	80 51.53	59	402	388	119	10497
395	19:45:58	31 32.21	80 51.62	58	338	324	164	11456
396	19:47:59	31 32.26	80 51.75	57	405	202	100	9601
397	19:49:59	31 32.29	80 51.89	57	261	156	56	7780
398	19:51:58	31 32.30	80 52.01	55	198	236	234	10893
399	19:53:59	31 32.35	80 52.14	56	339	160	246	10718
400	19:55:59	31 32.40	80 52.28	55	346	235	113	9148
401	19:57:59	31 32.45	80 52.40	57	288	234	89	9217
402	19:59:59	31 32.50	80 52.52	56	230	241	96	8688
403	20:01:58	31 32.54	80 52.65	54	124	318	335	12152
404	20:03:59	31 32.59	80 52.78	50	257	210	241	10791

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
405	20:06:00	31 32.64	80 52.91	51	228	168	96	8031
406	20:07:59	31 32.69	80 53.04	52	262	174	168	9435
407	20:09:59	31 32.74	80 53.15	51	260	209	100	8606
408	20:11:59	31 32.79	80 53.27	52	329	186	77	7375
409	20:13:58	31 32.83	80 53.41	50	249	139	50	7052
410	20:15:57	31 32.88	80 53.52	51	264	193	93	7852
411	20:17:57	31 32.92	80 53.64	53	211	151	59	7606
412	20:19:56	31 32.95	80 53.76	54	348	187	33	7651
413	20:21:55	31 32.96	80 53.87	55	181	190	117	7562
414	20:23:54	31 32.99	80 53.99	56	194	168	119	8657
415	20:25:54	31 33.11	80 54.00	57	225	195	121	7727
416	20:27:54	31 33.22	80 53.92	58	168	189	160	8697
417	20:29:53	31 33.31	80 53.82	59	198	123	184	9563
418	20:31:53	31 33.38	80 53.69	60	265	208	175	8790
419	20:33:53	31 33.46	80 53.57	61	202	185	179	8516
420	20:35:52	31 33.59	80 53.49	62	211	130	140	8093
421	20:37:52	31 33.69	80 53.40	61	340	201	105	8270
422	20:39:51	31 33.78	80 53.30	59	263	236	125	8739
423	20:41:51	31 33.88	80 53.19	60	326	288	200	9848
424	20:43:51	31 33.98	80 53.09	61	241	194	259	10710
425	20:45:51	31 34.08	80 52.99	67	358	160	338	11985
426	20:47:52	31 34.19	80 52.90	64	349	239	212	10425
427	20:49:52	31 34.29	80 52.79	62	650	140	214	11020
428	20:51:53	31 34.37	80 52.68	61	472	200	133	9627
429	20:53:53	31 34.35	80 52.55	60	302	230	65	8062
430	20:55:52	31 34.31	80 52.43	59	324	158	53	7308
431	20:57:51	31 34.25	80 52.33	59	301	191	136	9881
432	20:59:51	31 34.18	80 52.23	60	372	187	179	9567
433	21:01:51	31 34.13	80 52.14	61	286	180	107	8660
434	21:03:51	31 34.07	80 52.05	59	239	234	176	9487
435	21:05:51	31 34.02	80 51.94	59	195	190	279	11028
436	21:07:51	31 33.96	80 51.84	62	280	175	236	10368
437	21:09:51	31 33.91	80 51.74	62	244	136	140	9179
438	21:11:51	31 33.85	80 51.64	60	177	173	121	8275
439	21:13:50	31 33.80	80 51.54	59	203	108	140	7868
440	21:15:50	31 33.74	80 51.44	59	260	187	149	8649
441	21:17:49	31 33.69	80 51.34	59	179	135	145	8889
442	21:19:49	31 33.63	80 51.24	59	159	176	105	8002
443	21:21:48	31 33.57	80 51.15	60	282	169	105	7632
444	21:23:48	31 33.51	80 51.04	61	287	162	92	8163
445	21:25:47	31 33.45	80 50.94	62	364	234	128	10109
446	21:27:47	31 33.39	80 50.84	61	274	162	224	10095
447	21:29:48	31 33.33	80 50.74	61	211	206	91	8642
448	21:31:47	31 33.27	80 50.64	61	240	158	115	8712
449	21:33:47	31 33.22	80 50.53	61	194	213	77	9121

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
450	21:35:47	31 33.15	80 50.44	66	162	177	97	8359
451	21:37:47	31 33.10	80 50.33	65	204	197	74	8309
452	21:39:46	31 33.04	80 50.23	64	219	163	98	8417
453	21:41:46	31 32.99	80 50.13	62	193	143	147	9041
454	21:43:46	31 32.93	80 50.02	64	217	183	210	10344
455	21:45:46	31 32.87	80 49.93	64	225	252	235	10886
456	21:47:46	31 32.80	80 49.81	63	177	200	132	10017
457	21:49:46	31 32.74	80 49.71	63	248	246	136	10727
458	21:51:47	31 32.67	80 49.60	61	306	219	140	9872
459	21:53:47	31 32.61	80 49.50	61	367	295	142	11386
460	21:55:48	31 32.56	80 49.37	60	247	274	153	10754
461	21:57:48	31 32.49	80 49.30	60	250	322	153	11465
462	21:59:49	31 32.43	80 49.32	60	405	195	92	9708
463	22:01:49	31 32.35	80 49.33	59	444	251	118	10329
464	22:03:49	31 32.28	80 49.33	59	318	337	399	14481
465	22:05:50	31 32.22	80 49.37	58	188	300	395	13901
466	22:07:52	31 32.17	80 49.42	56	260	302	179	10731
467	22:09:52	31 32.10	80 49.45	56	342	290	141	9889
468	22:11:52	31 32.04	80 49.47	56	206	201	112	9166
469	22:13:52	31 31.99	80 49.53	56	282	234	156	8913
470	22:15:52	31 31.94	80 49.58	55	255	260	128	9201
471	22:17:52	31 31.87	80 49.61	55	322	283	72	9357
472	22:19:51	31 31.79	80 49.64	56	325	141	117	8868
473	22:21:51	31 31.72	80 49.67	59	295	335	90	9223
474	22:23:51	31 31.65	80 49.70	59	235	253	94	9560
475	22:25:51	31 31.60	80 49.74	59	236	260	110	9474
476	22:27:51	31 31.54	80 49.79	57	217	246	77	9479
477	22:29:51	31 31.50	80 49.84	58	292	296	101	9276
478	22:31:51	31 31.48	80 49.90	59	228	284	149	9657
479	22:33:51	31 31.45	80 49.97	60	198	281	161	10856
480	22:35:51	31 31.43	80 50.04	60	276	354	70	11456
481	22:37:52	31 31.41	80 50.11	62	241	294	64	9760
482	22:39:52	31 31.38	80 50.18	59	250	247	81	9229
483	22:41:51	31 31.35	80 50.24	59	242	302	210	11662
484	22:43:52	31 31.29	80 50.31	59	263	241	290	11724
485	22:45:53	31 31.24	80 50.38	57	254	209	133	10655
486	22:47:53	31 31.19	80 50.45	59	325	185	64	7565
487	22:49:53	31 31.17	80 50.53	58	328	187	136	10049
488	22:51:53	31 31.20	80 50.59	62	406	208	156	10045
489	22:53:53	31 31.27	80 50.65	62	351	211	151	9689
490	22:55:53	31 31.31	80 50.72	59	315	255	178	10231
491	22:57:53	31 31.34	80 50.80	61	418	195	161	9574
492	22:59:53	31 31.37	80 50.88	58	297	184	197	10684
493	23:01:53	31 31.41	80 50.95	62	245	224	251	12121
494	23:03:54	31 31.44	80 51.03	64	274	246	138	10642

Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
495	23:05:54	31 31.49	80 51.11	62	344	358	247	11498
496	23:07:55	31 31.51	80 51.16	60	377	374	133	12139
497	23:09:56	31 31.58	80 51.22	59	484	380	167	10812
498	23:11:56	31 31.62	80 51.29	57	386	270	120	10481
499	23:13:56	31 31.57	80 51.37	57	204	109	152	7908
500	23:15:56	31 31.65	80 51.47	56	316	225	208	12187
501	23:17:56	31 31.70	80 51.55	56	378	212	127	9545
502	23:19:56	31 31.74	80 51.63	55	513	200	160	9938
503	23:21:56	31 31.77	80 51.71	56	274	107	86	6663
504	23:23:55	31 31.81	80 51.79	56	262	167	81	6809
505	23:25:54	31 31.84	80 51.87	54	228	185	107	8519
506	23:27:54	31 31.87	80 51.94	55	337	203	295	11835
507	23:29:54	31 31.91	80 52.01	52	203	179	316	11255
508	23:31:55	31 31.95	80 52.10	51	244	130	150	8439
509	23:33:55	31 31.99	80 52.18	48	334	209	107	9307
510	23:35:55	31 32.03	80 52.26	51	255	220	122	10566
511	23:37:55	31 32.07	80 52.34	55	315	275	116	10025
512	23:39:55	31 32.11	80 52.41	53	332	186	212	10471
513	23:41:55	31 32.15	80 52.49	50	432	249	109	9964
514	23:43:55	31 32.18	80 52.57	50	251	140	96	7293
515	23:45:54	31 32.21	80 52.64	50	246	140	137	8325
516	23:47:54	31 32.25	80 52.72	50	239	234	139	9001
517	23:49:53	31 32.28	80 52.79	49	260	224	290	11704
518	23:51:54	31 32.33	80 52.86	51	225	138	107	8061
519	23:53:54	31 32.36	80 52.91	52	249	160	78	7811
520	23:55:53	31 32.40	80 52.98	49	263	180	42	7615
521	23:57:52	31 32.43	80 53.05	47	310	170	93	7840
522	23:59:52	31 32.46	80 53.11	46	328	168	104	8150
523	00:01:51	31 32.49	80 53.18	46	204	164	110	7896
524	00:03:51	31 32.51	80 53.23	46	201	146	160	8560
525	00:05:50	31 32.54	80 53.30	47	320	224	113	8044
526	00:07:50	31 32.58	80 53.37	46	252	173	65	7284
527	00:09:49	31 32.61	80 53.43	44	315	150	59	7111
528	00:11:48	31 32.64	80 53.51	45	306	141	70	6893
529	00:13:47	31 32.67	80 53.58	46	211	183	65	6928
530	00:15:46	31 32.70	80 53.65	47	280	247	65	7490
531	00:17:45	31 32.73	80 53.73	48	213	144	118	8133
532	00:19:45	31 32.77	80 53.80	49	137	172	130	8259
533	00:21:44	31 32.80	80 53.87	53	306	162	63	7339
534	00:23:43	31 32.73	80 53.87	47	168	168	187	8720
535	00:25:43	31 32.64	80 53.85	49	217	198	151	8600
536	00:27:42	31 32.56	80 53.86	49	267	183	103	7752
537	00:29:42	31 32.48	80 53.80	50	236	121	87	7478
538	00:31:41	31 32.44	80 53.65	51	217	234	154	8097
539	00:33:40	31 32.37	80 53.51	52	206	168	96	7479

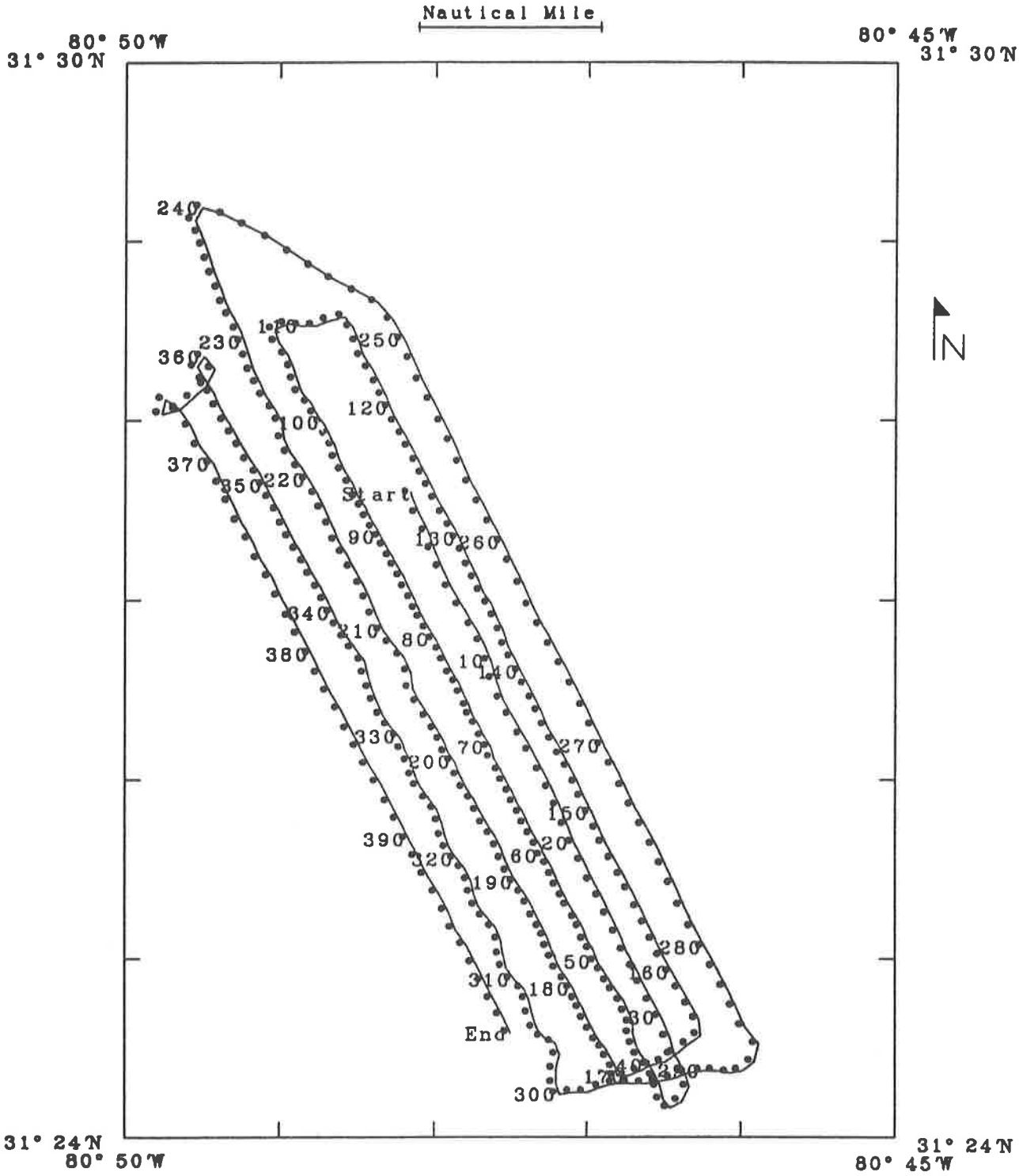
Georgia Site 2 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
540	00:35:40	31 32.30	80 53.37	55	367	196	111	8129
541	00:37:39	31 32.22	80 53.23	56	224	215	99	7846
542	00:39:38	31 32.15	80 53.08	57	283	292	117	9118
543	00:41:38	31 32.08	80 52.94	60	183	123	95	7509
544	00:43:37	31 32.01	80 52.79	59	154	212	239	10975
545	00:45:38	31 31.94	80 52.63	55	113	251	324	12732
546	00:47:39	31 31.87	80 52.49	54	252	166	204	10707
547	00:49:39	31 31.80	80 52.34	53	246	170	214	9070
548	00:51:39	31 31.73	80 52.19	54	281	165	81	7976
549	00:53:38	31 31.65	80 52.04	54	252	149	101	7345
550	00:55:37	31 31.58	80 51.88	53	294	156	72	7226
551	00:57:37	31 31.51	80 51.72	52	426	139	84	7955
552	00:59:36	31 31.45	80 51.57	53	317	218	140	9744
553	01:01:36	31 31.37	80 51.41	50	200	274	193	11276
554	01:03:36	31 31.30	80 51.26	49	270	236	168	11802

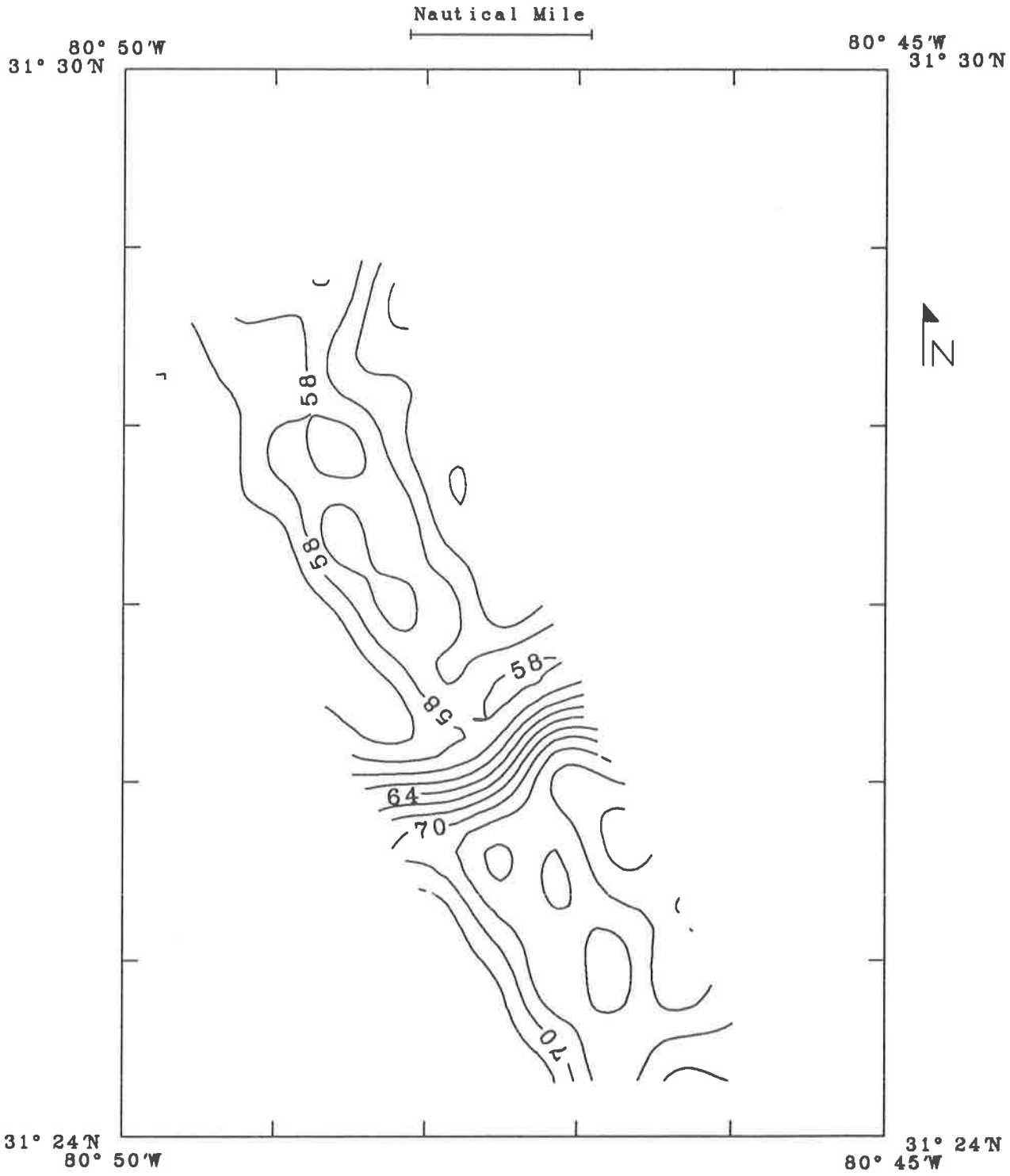
APPENDIX 3

GAMMA ISOTOPE MAPPING DATA

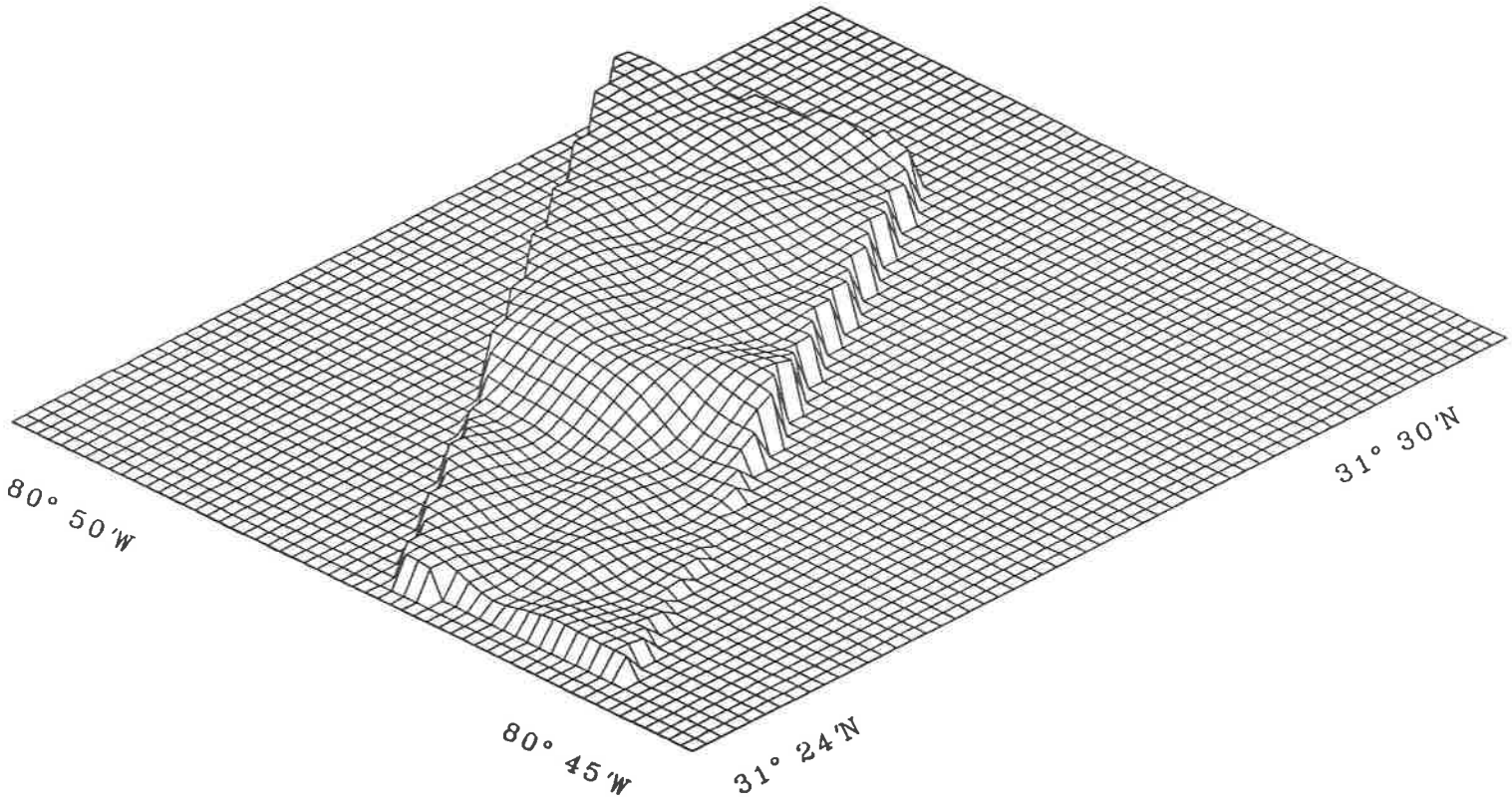
TARGET AREA 3



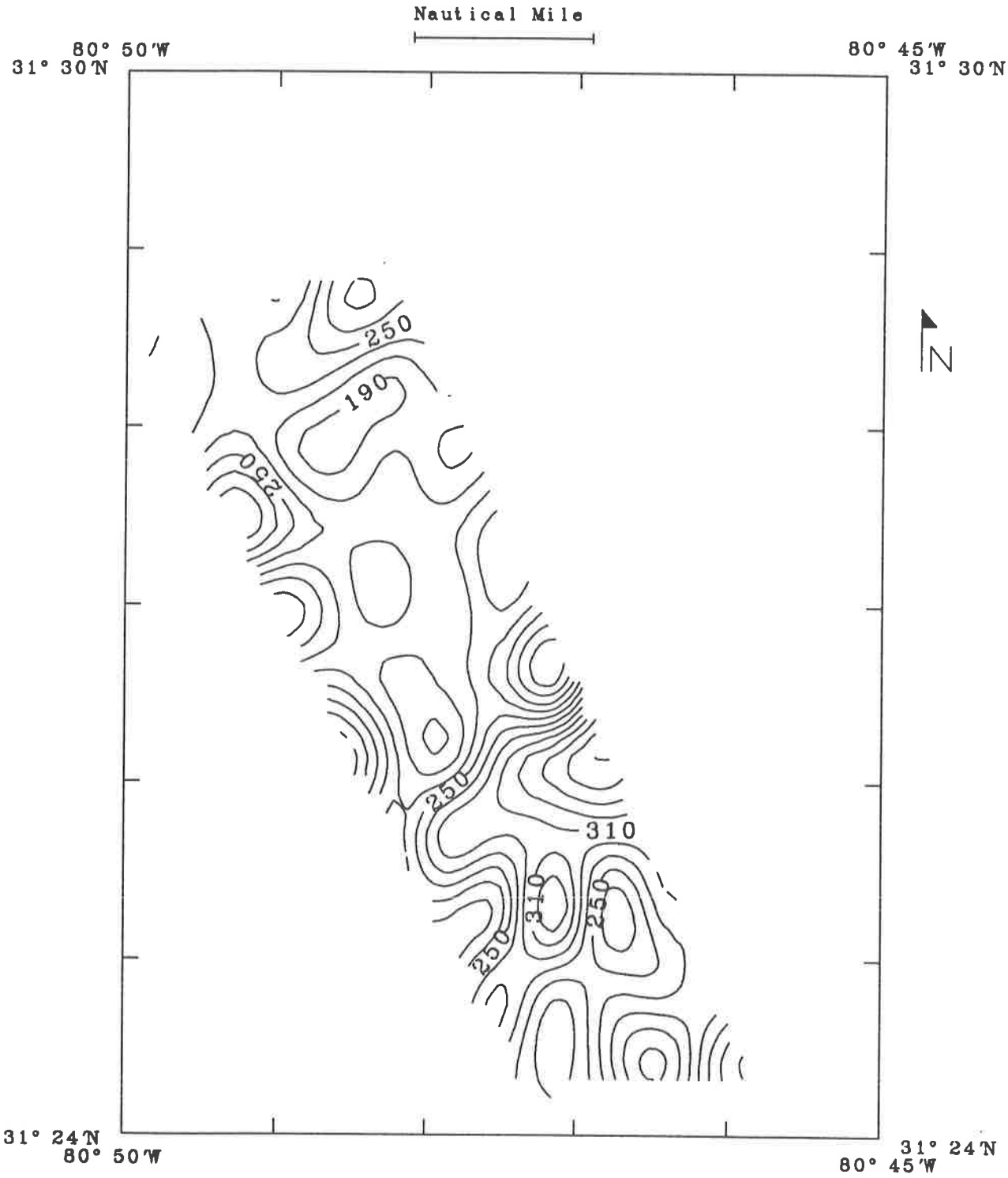
SITE 3 GRAY'S REEF SHIP'S TRANSECTS
GEORGIA MINERAL SURVEY



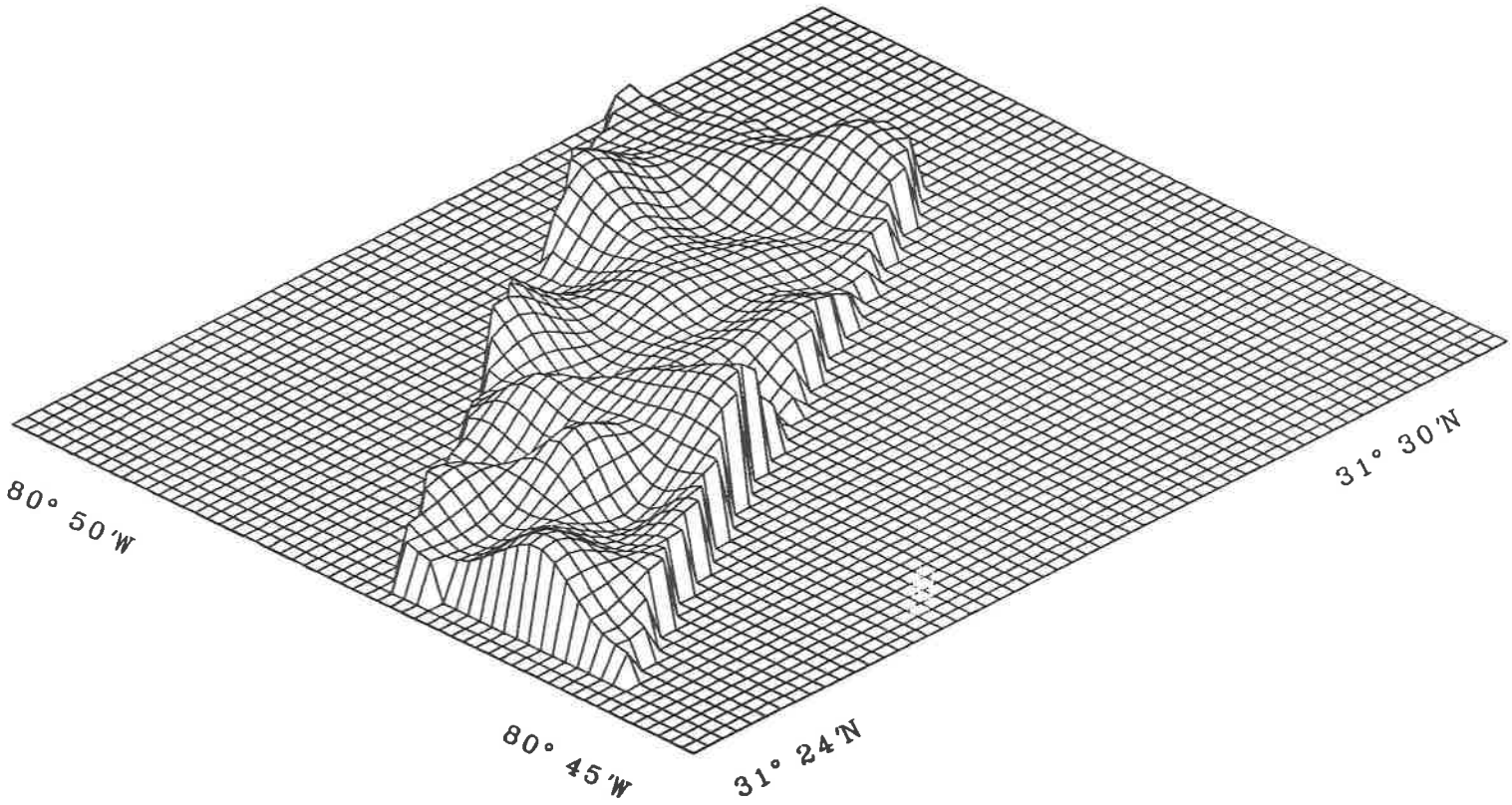
SITE 3 GRAY'S REEF WATER DEPTH CONTOUR
GEORGIA MINERAL SURVEY



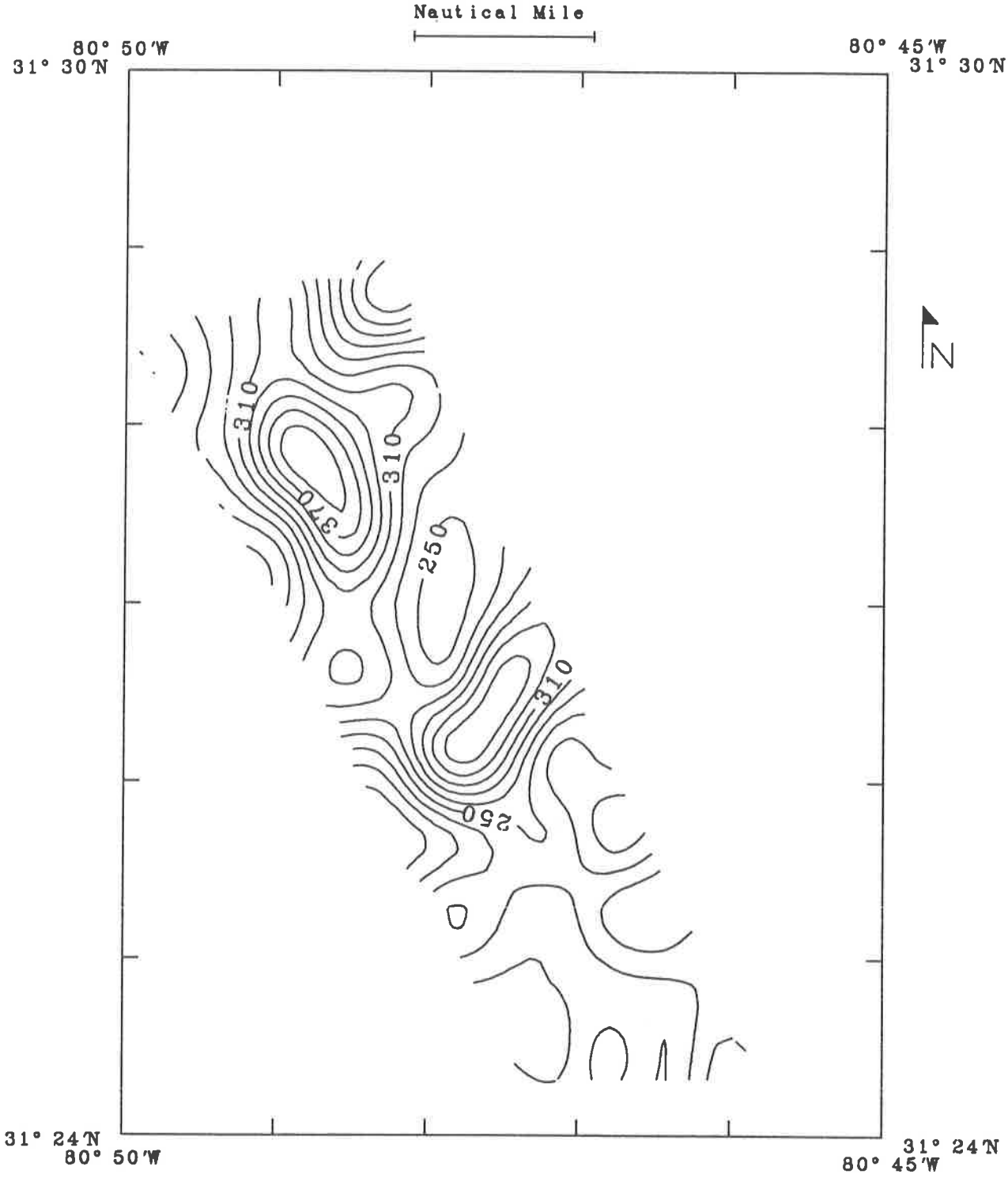
SITE 3 GRAY'S REEF SEAFLOOR
GEORGIA MINERAL SURVEY



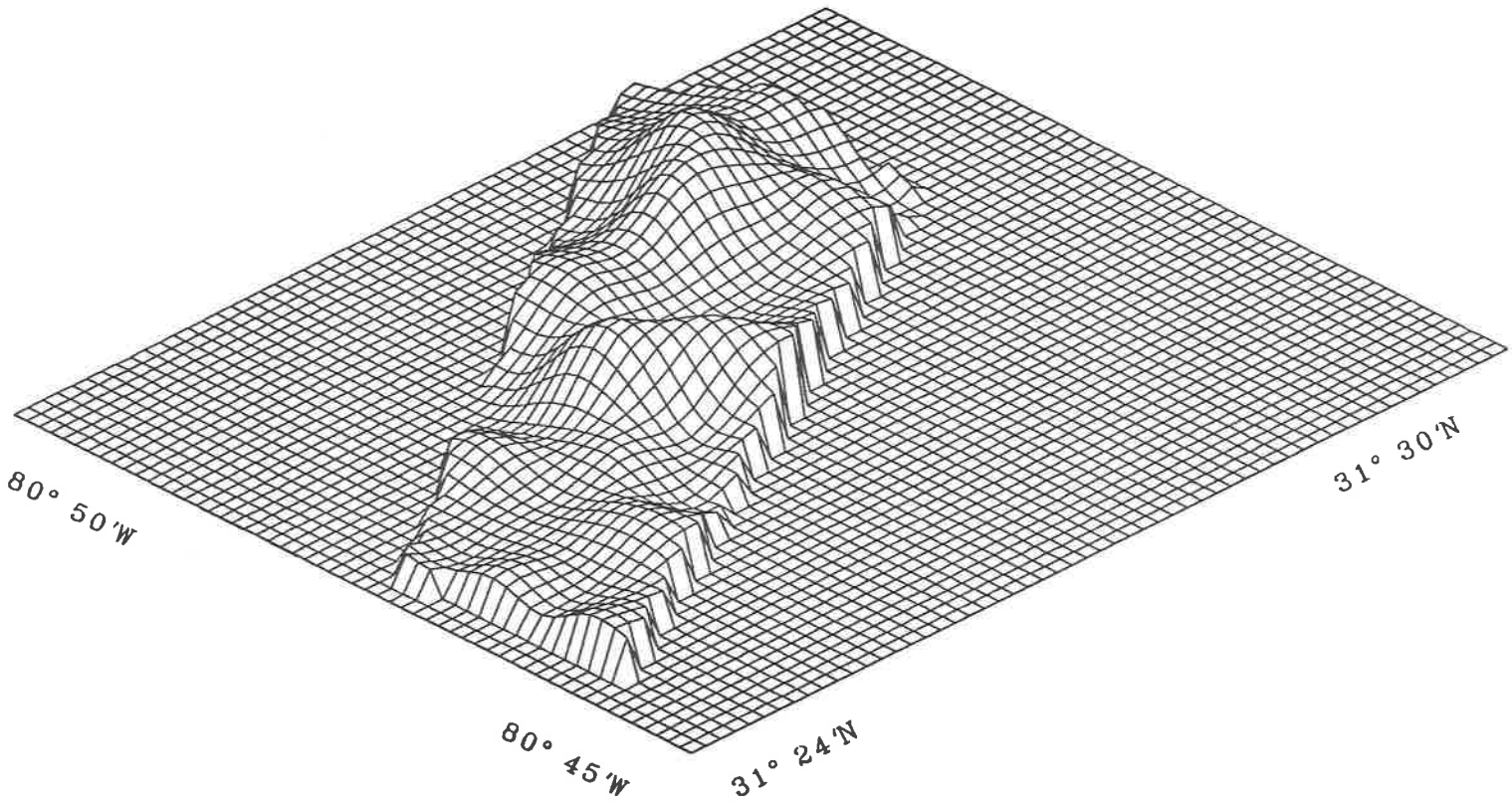
SITE 3 GRAY'S REEF K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



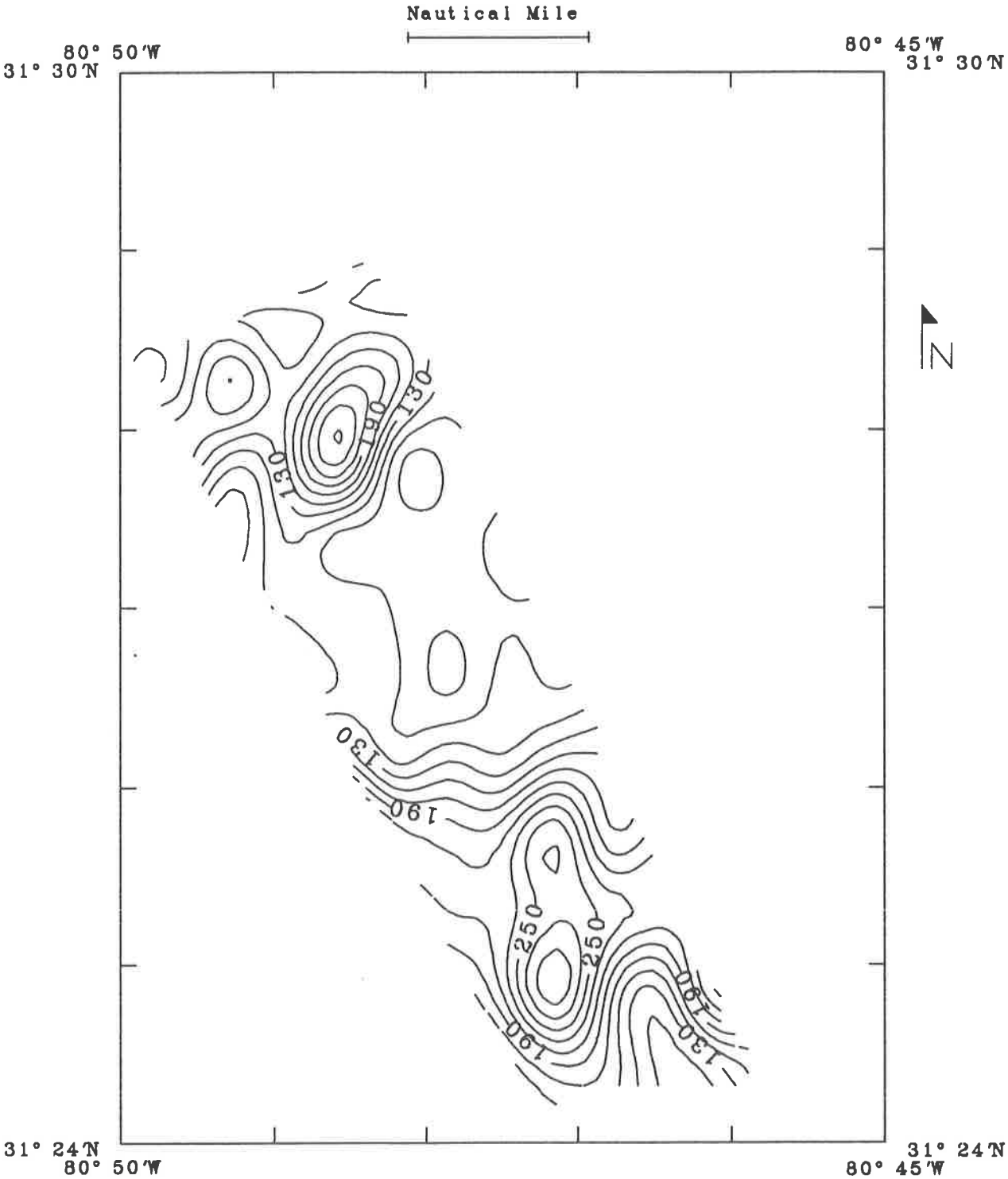
SITE 3 GRAY'S REEF K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



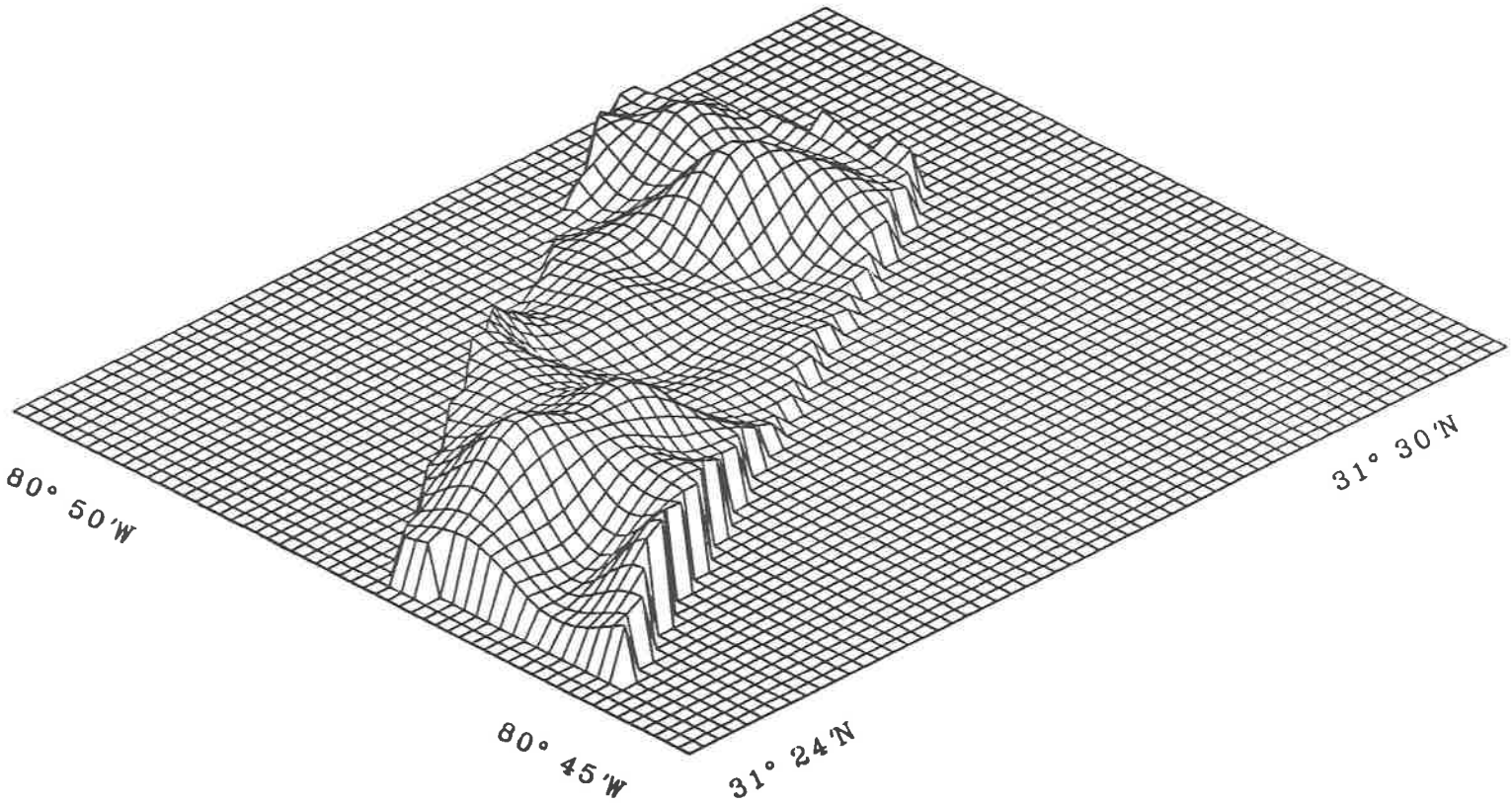
SITE 3 GRAY'S REEF BI-214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



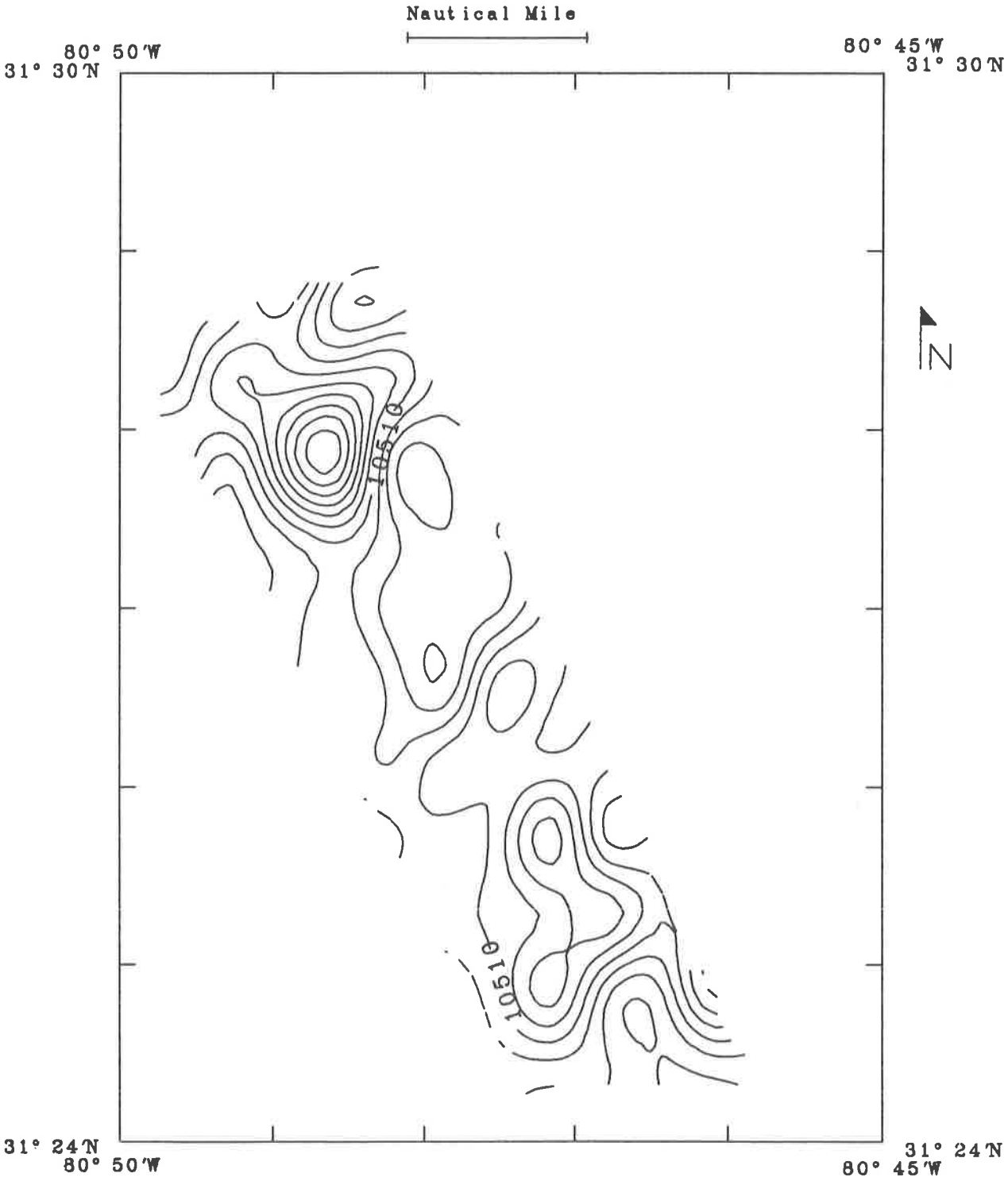
SITE 3 GRAY'S REEF Bi–214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



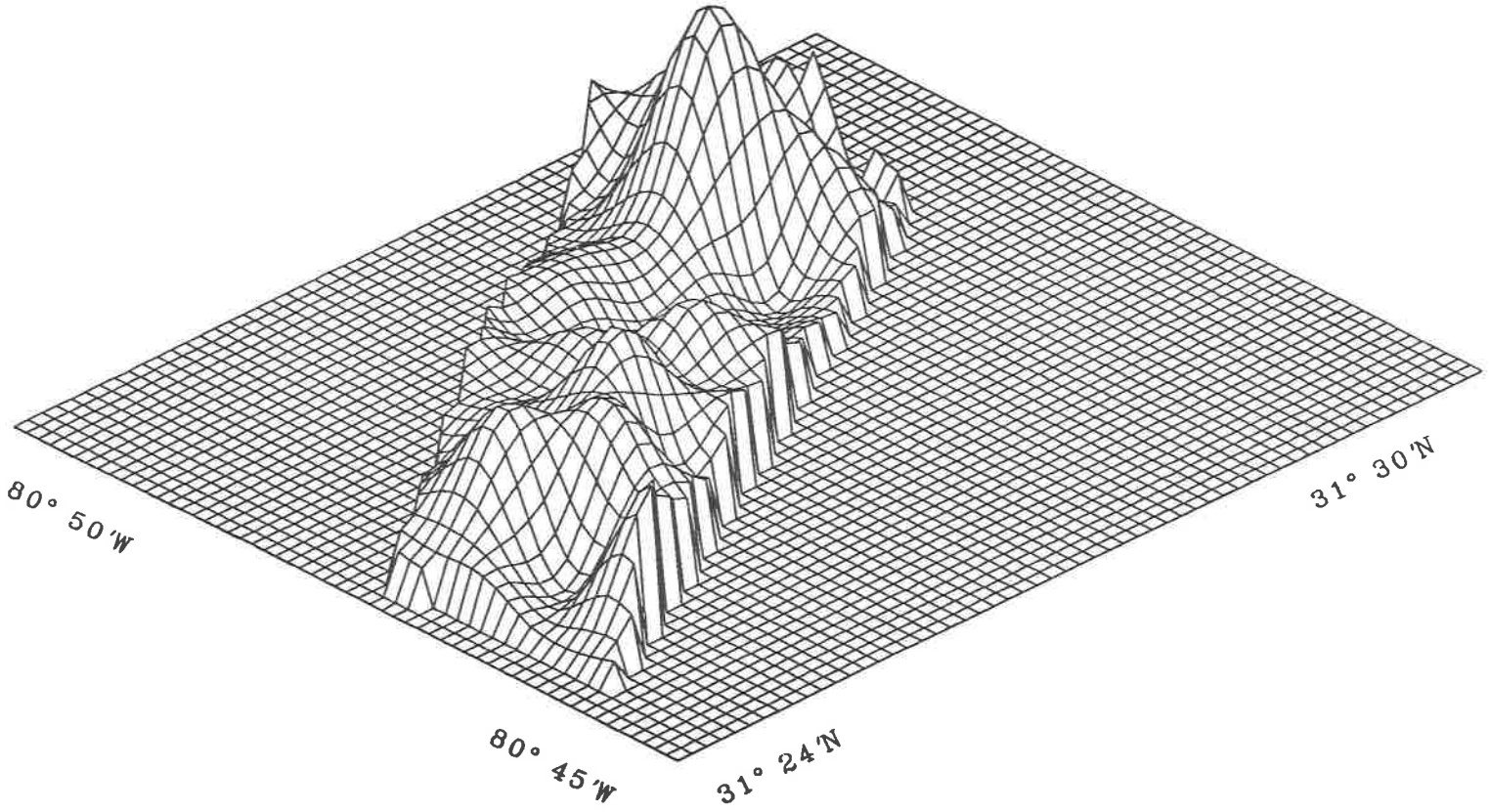
SITE 3 GRAY'S REEF TL-208 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 3 GRAY'S REEF TL-208 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 3 GRAY'S REEF TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 3 GRAY'S REEF TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
1	03:12:04	31 27.59	80 48.15	56	188	301	66	9802
2	03:14:04	31 27.48	80 48.10	58	281	279	98	8835
3	03:16:04	31 27.38	80 48.04	59	234	238	73	8672
4	03:18:04	31 27.28	80 48.00	57	276	264	94	9475
5	03:20:04	31 27.18	80 47.95	54	282	309	169	10990
6	03:22:04	31 27.07	80 47.89	56	221	282	44	9843
7	03:24:04	31 26.97	80 47.82	61	204	215	98	9018
8	03:26:04	31 26.86	80 47.74	58	256	270	98	9589
9	03:28:04	31 26.77	80 47.68	56	220	373	95	10416
10	03:30:04	31 26.66	80 47.63	53	86	284	179	11341
11	03:32:05	31 26.56	80 47.60	54	205	454	87	11218
12	03:34:05	31 26.45	80 47.55	58	184	386	88	10383
13	03:36:06	31 26.36	80 47.49	58	254	280	51	9121
14	03:38:07	31 26.25	80 47.42	69	396	247	155	10125
15	03:40:07	31 26.16	80 47.36	72	384	270	151	9745
16	03:42:07	31 26.05	80 47.29	73	368	238	125	9857
17	03:44:08	31 25.95	80 47.23	74	428	246	126	10372
18	03:46:08	31 25.85	80 47.18	72	314	215	272	11454
19	03:48:08	31 25.74	80 47.13	73	307	239	288	12742
20	03:50:09	31 25.64	80 47.08	72	289	278	197	10762
21	03:52:09	31 25.54	80 47.02	72	195	258	277	11113
22	03:54:11	31 25.43	80 46.96	70	262	254	402	13550
23	03:56:11	31 25.34	80 46.90	71	266	374	408	14104
24	03:58:12	31 25.24	80 46.85	71	216	262	172	10738
25	04:00:13	31 25.14	80 46.79	70	311	242	225	10333
26	04:02:15	31 25.04	80 46.74	71	204	207	187	9968
27	04:04:16	31 24.95	80 46.68	70	237	262	134	9277
28	04:06:16	31 24.86	80 46.63	71	244	193	121	9296
29	04:08:16	31 24.76	80 46.57	70	225	213	94	9344
30	04:10:17	31 24.67	80 46.51	69	253	272	90	9053
31	04:12:16	31 24.56	80 46.46	69	305	214	109	9196
32	04:14:17	31 24.46	80 46.43	68	356	230	92	9181
33	04:16:17	31 24.37	80 46.36	69	179	214	73	8846
34	04:18:17	31 24.28	80 46.33	69	346	297	106	9114
35	04:20:17	31 24.20	80 46.38	68	263	214	113	8983
36	04:22:17	31 24.16	80 46.45	69	233	199	137	9129
37	04:24:17	31 24.21	80 46.50	70	296	256	143	9034
38	04:26:17	31 24.28	80 46.52	70	293	246	171	8785
39	04:28:17	31 24.34	80 46.55	70	225	259	119	8826
40	04:30:17	31 24.40	80 46.59	70	248	238	132	9114
41	04:32:16	31 24.46	80 46.65	70	306	227	141	9210
42	04:34:16	31 24.52	80 46.68	70	245	214	159	9438
43	04:36:16	31 24.58	80 46.70	70	242	250	154	9692
44	04:38:16	31 24.64	80 46.70	70	277	207	205	10189

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
45	04:40:16	31 24.70	80 46.73	70	271	202	200	10195
46	04:42:16	31 24.76	80 46.76	70	239	195	156	9870
47	04:44:17	31 24.82	80 46.81	71	244	211	183	9652
48	04:46:17	31 24.87	80 46.85	71	304	236	214	10309
49	04:48:18	31 24.93	80 46.89	70	253	200	229	11188
50	04:50:18	31 24.98	80 46.93	70	194	229	236	12035
51	04:52:18	31 25.05	80 46.96	71	273	389	381	13214
52	04:54:19	31 25.10	80 47.00	71	304	184	299	12263
53	04:56:20	31 25.17	80 47.03	73	340	276	329	12717
54	04:58:21	31 25.22	80 47.06	73	263	200	271	11451
55	05:00:22	31 25.29	80 47.11	72	422	216	287	11313
56	05:02:24	31 25.34	80 47.14	71	238	206	225	10893
57	05:04:25	31 25.40	80 47.18	71	258	145	173	9489
58	05:06:25	31 25.46	80 47.21	71	314	210	257	10569
59	05:08:26	31 25.52	80 47.24	72	275	231	246	11332
60	05:10:26	31 25.57	80 47.28	72	358	191	161	9584
61	05:12:26	31 25.63	80 47.31	72	328	294	247	11178
62	05:14:27	31 25.69	80 47.35	72	355	200	267	11136
63	05:16:27	31 25.75	80 47.39	73	341	269	194	9603
64	05:18:27	31 25.81	80 47.42	72	343	276	129	10316
65	05:20:28	31 25.87	80 47.46	72	496	223	145	10417
66	05:22:28	31 25.93	80 47.49	65	326	248	55	8956
67	05:24:28	31 25.99	80 47.53	60	250	374	87	10767
68	05:26:28	31 26.05	80 47.56	60	255	243	68	10313
69	05:28:28	31 26.12	80 47.61	55	205	449	87	11885
70	05:30:28	31 26.18	80 47.63	55	223	424	130	11691
71	05:32:29	31 26.24	80 47.67	57	257	361	140	11073
72	05:34:30	31 26.31	80 47.71	58	311	294	131	10592
73	05:36:31	31 26.36	80 47.75	58	336	361	129	10371
74	05:38:31	31 26.41	80 47.77	59	163	361	140	9498
75	05:40:32	31 26.48	80 47.81	60	238	204	87	8672
76	05:42:32	31 26.54	80 47.84	61	189	197	42	8539
77	05:44:33	31 26.59	80 47.88	59	243	338	91	9686
78	05:46:33	31 26.66	80 47.92	54	214	218	177	10976
79	05:48:32	31 26.72	80 47.95	56	274	252	124	9750
80	05:50:33	31 26.78	80 47.99	57	289	297	74	9199
81	05:52:33	31 26.84	80 48.03	59	353	286	102	8945
82	05:54:34	31 26.90	80 48.07	61	254	246	73	8615
83	05:56:34	31 26.95	80 48.10	62	283	249	101	8400
84	05:58:34	31 27.01	80 48.13	62	286	266	74	8610
85	06:00:33	31 27.07	80 48.17	59	183	299	113	9346
86	06:02:33	31 27.13	80 48.20	57	302	305	87	10138
87	06:04:33	31 27.19	80 48.24	57	196	300	117	10168
88	06:06:33	31 27.24	80 48.27	58	168	343	57	9731
89	06:08:33	31 27.30	80 48.31	58	189	328	54	10176

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
90	06:10:34	31 27.35	80 48.34	59	165	338	60	10529
91	06:12:34	31 27.40	80 48.38	59	221	316	132	10462
92	06:14:34	31 27.46	80 48.42	59	194	303	99	10209
93	06:16:35	31 27.52	80 48.45	59	254	347	106	9976
94	06:18:36	31 27.57	80 48.49	59	197	386	97	10085
95	06:20:36	31 27.65	80 48.53	58	191	316	110	10511
96	06:22:36	31 27.72	80 48.58	57	169	369	129	12448
97	06:24:37	31 27.79	80 48.62	56	131	414	286	14211
98	06:26:37	31 27.86	80 48.64	57	182	416	288	15376
99	06:28:38	31 27.92	80 48.68	58	252	321	207	12905
100	06:30:40	31 27.99	80 48.72	59	189	357	115	11126
101	06:32:43	31 28.04	80 48.76	60	170	363	140	10816
102	06:34:44	31 28.10	80 48.80	60	196	333	218	12281
103	06:36:45	31 28.16	80 48.86	62	296	310	140	10316
104	06:38:45	31 28.23	80 48.89	58	190	265	82	9686
105	06:40:47	31 28.30	80 48.91	56	260	346	140	11635
106	06:42:47	31 28.37	80 48.95	58	219	306	268	11920
107	06:44:47	31 28.44	80 49.01	58	261	310	133	10776
108	06:46:48	31 28.51	80 49.03	59	215	329	85	10909
109	06:48:49	31 28.54	80 48.95	59	239	305	65	10204
110	06:50:50	31 28.53	80 48.86	59	326	297	77	9474
111	06:52:50	31 28.53	80 48.77	60	230	263	144	9444
112	06:54:51	31 28.56	80 48.68	61	294	212	105	9252
113	06:56:51	31 28.58	80 48.58	62	209	375	92	9893
114	06:58:51	31 28.52	80 48.53	66	292	197	71	8741
115	07:00:51	31 28.44	80 48.49	65	229	277	232	10601
116	07:02:51	31 28.36	80 48.46	61	232	296	189	11379
117	07:04:51	31 28.29	80 48.41	60	200	285	204	11507
118	07:06:52	31 28.21	80 48.36	60	120	301	280	12553
119	07:08:52	31 28.14	80 48.32	60	257	292	142	10156
120	07:10:53	31 28.07	80 48.28	62	132	223	90	9455
121	07:12:54	31 27.99	80 48.24	61	255	334	116	9438
122	07:14:55	31 27.92	80 48.19	61	174	288	90	9536
123	07:16:55	31 27.85	80 48.15	62	218	324	93	9077
124	07:18:55	31 27.77	80 48.10	62	279	216	99	9044
125	07:20:55	31 27.70	80 48.06	61	194	305	144	9174
126	07:22:55	31 27.63	80 48.02	61	297	317	132	9951
127	07:24:55	31 27.56	80 47.98	61	216	315	102	9786
128	07:26:55	31 27.48	80 47.93	62	237	294	71	9422
129	07:28:56	31 27.41	80 47.88	63	227	223	70	8863
130	07:30:56	31 27.34	80 47.84	62	232	300	111	9205
131	07:32:56	31 27.27	80 47.80	60	187	323	166	10081
132	07:34:56	31 27.19	80 47.76	59	303	367	141	10772
133	07:36:56	31 27.12	80 47.72	62	186	331	53	10980
134	07:38:57	31 27.05	80 47.68	64	261	293	79	9435

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
135	07:40:57	31 26.98	80 47.63	65	291	302	97	8912
136	07:42:58	31 26.91	80 47.59	64	167	283	96	9337
137	07:44:58	31 26.83	80 47.55	63	175	263	74	9481
138	07:46:58	31 26.75	80 47.52	63	117	354	123	10164
139	07:48:58	31 26.68	80 47.48	60	195	322	90	11505
140	07:50:58	31 26.60	80 47.43	60	256	293	100	11427
141	07:52:59	31 26.53	80 47.39	60	254	365	87	10583
142	07:54:59	31 26.45	80 47.34	61	223	358	142	10523
143	07:57:00	31 26.38	80 47.30	63	209	285	88	9319
144	07:59:01	31 26.30	80 47.26	64	140	338	81	10502
145	08:01:01	31 26.22	80 47.21	69	418	311	159	10648
146	08:03:01	31 26.14	80 47.16	73	340	214	160	10653
147	08:05:02	31 26.07	80 47.11	76	395	238	128	10058
148	08:07:02	31 25.98	80 47.06	79	346	179	211	10423
149	08:09:03	31 25.90	80 47.02	79	345	207	186	10228
150	08:11:03	31 25.81	80 46.97	77	435	222	209	10283
151	08:13:03	31 25.72	80 46.92	77	381	186	214	11065
152	08:15:04	31 25.64	80 46.88	76	239	248	189	10841
153	08:17:04	31 25.55	80 46.82	76	277	256	130	8685
154	08:19:05	31 25.46	80 46.76	76	363	197	243	11250
155	08:21:05	31 25.38	80 46.71	77	188	231	318	13551
156	08:23:05	31 25.28	80 46.65	76	157	189	187	10885
157	08:25:06	31 25.19	80 46.60	75	276	314	150	10217
158	08:27:07	31 25.10	80 46.55	75	253	239	188	9972
159	08:29:08	31 25.01	80 46.50	75	259	235	128	9520
160	08:31:08	31 24.92	80 46.44	75	253	259	115	9337
161	08:33:09	31 24.83	80 46.38	76	265	202	172	9804
162	08:35:09	31 24.74	80 46.32	75	195	262	192	9886
163	08:37:09	31 24.66	80 46.27	74	188	293	129	9847
164	08:39:09	31 24.57	80 46.26	74	191	207	114	9326
165	08:41:09	31 24.52	80 46.33	74	163	163	97	9044
166	08:43:09	31 24.47	80 46.41	74	286	183	113	8863
167	08:45:09	31 24.42	80 46.49	75	292	148	105	8987
168	08:47:09	31 24.40	80 46.57	74	260	222	115	9282
169	08:49:09	31 24.37	80 46.65	73	283	215	146	9054
170	08:51:09	31 24.34	80 46.73	74	225	250	114	9179
171	08:53:09	31 24.34	80 46.80	74	296	230	133	9078
172	08:55:09	31 24.39	80 46.81	74	270	278	152	9515
173	08:57:09	31 24.45	80 46.85	74	292	165	181	9658
174	08:59:09	31 24.50	80 46.88	73	254	202	182	9449
175	09:01:09	31 24.54	80 46.92	74	217	205	150	9589
176	09:03:09	31 24.60	80 46.96	74	256	239	142	9485
177	09:05:09	31 24.66	80 47.00	73	335	179	122	9946
178	09:07:10	31 24.72	80 47.03	74	302	325	159	10511
179	09:09:10	31 24.77	80 47.06	74	294	246	205	11013

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
180	09:11:10	31 24.83	80 47.09	73	202	148	236	11342
181	09:13:11	31 24.88	80 47.13	74	260	240	322	11982
182	09:15:11	31 24.94	80 47.18	74	221	168	424	12834
183	09:17:12	31 25.00	80 47.21	75	197	188	293	12091
184	09:19:13	31 25.06	80 47.24	75	222	246	268	11045
185	09:21:14	31 25.12	80 47.26	75	257	233	294	12025
186	09:23:15	31 25.17	80 47.29	75	253	357	249	10457
187	09:25:16	31 25.23	80 47.33	75	303	198	249	10313
188	09:27:17	31 25.30	80 47.37	75	254	216	190	10657
189	09:29:17	31 25.36	80 47.41	75	187	300	244	10929
190	09:31:18	31 25.42	80 47.46	75	220	163	225	10987
191	09:33:18	31 25.48	80 47.50	74	185	221	273	10639
192	09:35:19	31 25.55	80 47.54	75	298	271	251	11440
193	09:37:19	31 25.62	80 47.57	74	143	231	223	10837
194	09:39:20	31 25.69	80 47.61	74	292	230	239	12019
195	09:41:20	31 25.75	80 47.66	76	244	212	190	9431
196	09:43:21	31 25.82	80 47.70	75	259	182	169	9240
197	09:45:22	31 25.89	80 47.74	76	458	140	128	9453
198	09:47:22	31 25.95	80 47.79	78	210	282	58	10151
199	09:49:22	31 26.02	80 47.83	62	238	406	128	11703
200	09:51:22	31 26.10	80 47.87	59	206	331	127	11222
201	09:53:23	31 26.15	80 47.91	59	159	377	132	10101
202	09:55:24	31 26.22	80 47.94	60	288	230	84	9491
203	09:57:24	31 26.28	80 47.98	62	292	208	79	9293
204	09:59:25	31 26.35	80 48.03	62	266	237	58	9083
205	10:01:25	31 26.43	80 48.09	62	211	292	80	9995
206	10:03:25	31 26.51	80 48.14	59	197	345	102	10633
207	10:05:25	31 26.60	80 48.15	55	207	245	89	9241
208	10:07:25	31 26.69	80 48.20	59	244	236	90	9270
209	10:09:26	31 26.76	80 48.27	61	238	182	117	8996
210	10:11:26	31 26.83	80 48.33	62	240	216	39	9330
211	10:13:26	31 26.92	80 48.38	62	196	266	96	10852
212	10:15:26	31 27.01	80 48.42	59	243	260	99	10537
213	10:17:26	31 27.09	80 48.46	59	179	359	129	10182
214	10:19:26	31 27.18	80 48.52	61	179	318	79	9601
215	10:21:27	31 27.26	80 48.57	61	177	264	113	9326
216	10:23:27	31 27.33	80 48.62	64	291	366	55	10965
217	10:25:28	31 27.42	80 48.66	62	196	444	99	11423
218	10:27:28	31 27.51	80 48.71	60	187	316	66	10865
219	10:29:28	31 27.59	80 48.75	61	103	366	134	11662
220	10:31:29	31 27.67	80 48.81	59	194	444	138	12675
221	10:33:30	31 27.74	80 48.86	59	149	462	312	16031
222	10:35:31	31 27.82	80 48.93	58	226	426	134	12293
223	10:37:32	31 27.90	80 48.97	60	153	350	162	12347
224	10:39:35	31 28.00	80 48.99	60	266	397	140	11038

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
225	10:41:36	31 28.07	80 49.03	60	270	279	80	10052
226	10:43:37	31 28.14	80 49.09	60	173	245	115	9780
227	10:45:38	31 28.21	80 49.13	58	218	318	111	10140
228	10:47:38	31 28.28	80 49.17	58	284	300	130	11212
229	10:49:38	31 28.36	80 49.20	57	200	346	373	14951
230	10:51:39	31 28.44	80 49.23	58	97	305	311	13755
231	10:53:39	31 28.51	80 49.26	58	280	240	155	9470
232	10:55:41	31 28.59	80 49.31	60	276	240	66	9754
233	10:57:43	31 28.66	80 49.35	60	157	333	199	11707
234	10:59:43	31 28.74	80 49.38	55	246	291	178	10201
235	11:01:44	31 28.82	80 49.42	57	202	338	106	9488
236	11:03:45	31 28.90	80 49.45	58	245	167	120	9156
237	11:05:45	31 28.98	80 49.48	59	249	169	103	8159
238	11:07:45	31 29.05	80 49.51	60	272	263	110	9677
239	11:09:45	31 29.12	80 49.55	60	318	251	123	10099
240	11:11:45	31 29.19	80 49.50	58	193	324	255	12325
241	11:13:45	31 29.15	80 49.35	57	255	221	247	11762
242	11:15:45	31 29.09	80 49.21	58	102	388	390	15054
243	11:17:46	31 29.02	80 49.06	58	215	217	289	13484
244	11:19:48	31 28.94	80 48.92	58	130	264	243	13382
245	11:21:50	31 28.86	80 48.78	57	215	390	174	11523
246	11:23:51	31 28.79	80 48.65	56	235	248	213	10861
247	11:25:53	31 28.72	80 48.50	60	350	161	101	8143
248	11:27:54	31 28.66	80 48.37	67	286	175	89	8516
249	11:29:54	31 28.56	80 48.27	64	269	175	113	9335
250	11:31:54	31 28.45	80 48.20	64	170	298	272	12263
251	11:33:54	31 28.34	80 48.14	63	193	321	154	10929
252	11:35:54	31 28.22	80 48.08	62	235	270	92	9592
253	11:37:55	31 28.11	80 48.01	60	233	292	75	9305
254	11:39:56	31 27.99	80 47.94	62	291	268	95	9274
255	11:41:56	31 27.88	80 47.88	64	182	296	64	8762
256	11:43:56	31 27.76	80 47.82	63	192	211	109	10126
257	11:45:56	31 27.65	80 47.76	62	264	286	73	9413
258	11:47:56	31 27.54	80 47.69	62	126	260	96	9213
259	11:49:56	31 27.43	80 47.62	62	283	313	119	9902
260	11:51:56	31 27.32	80 47.55	63	267	261	85	9672
261	11:53:57	31 27.21	80 47.49	60	233	227	86	8856
262	11:55:57	31 27.09	80 47.42	62	266	259	94	9641
263	11:57:57	31 26.97	80 47.36	64	278	346	72	10258
264	11:59:57	31 26.86	80 47.29	62	130	391	101	11217
265	12:01:57	31 26.75	80 47.22	60	195	321	83	11094
266	12:03:58	31 26.64	80 47.15	58	115	259	98	10964
267	12:05:58	31 26.53	80 47.08	59	210	350	73	10341
268	12:07:59	31 26.41	80 47.01	61	406	218	82	8095
269	12:10:00	31 26.30	80 46.95	61	431	267	179	11249

Georgia Site 3 Shipboard Data - Gamma Radiation

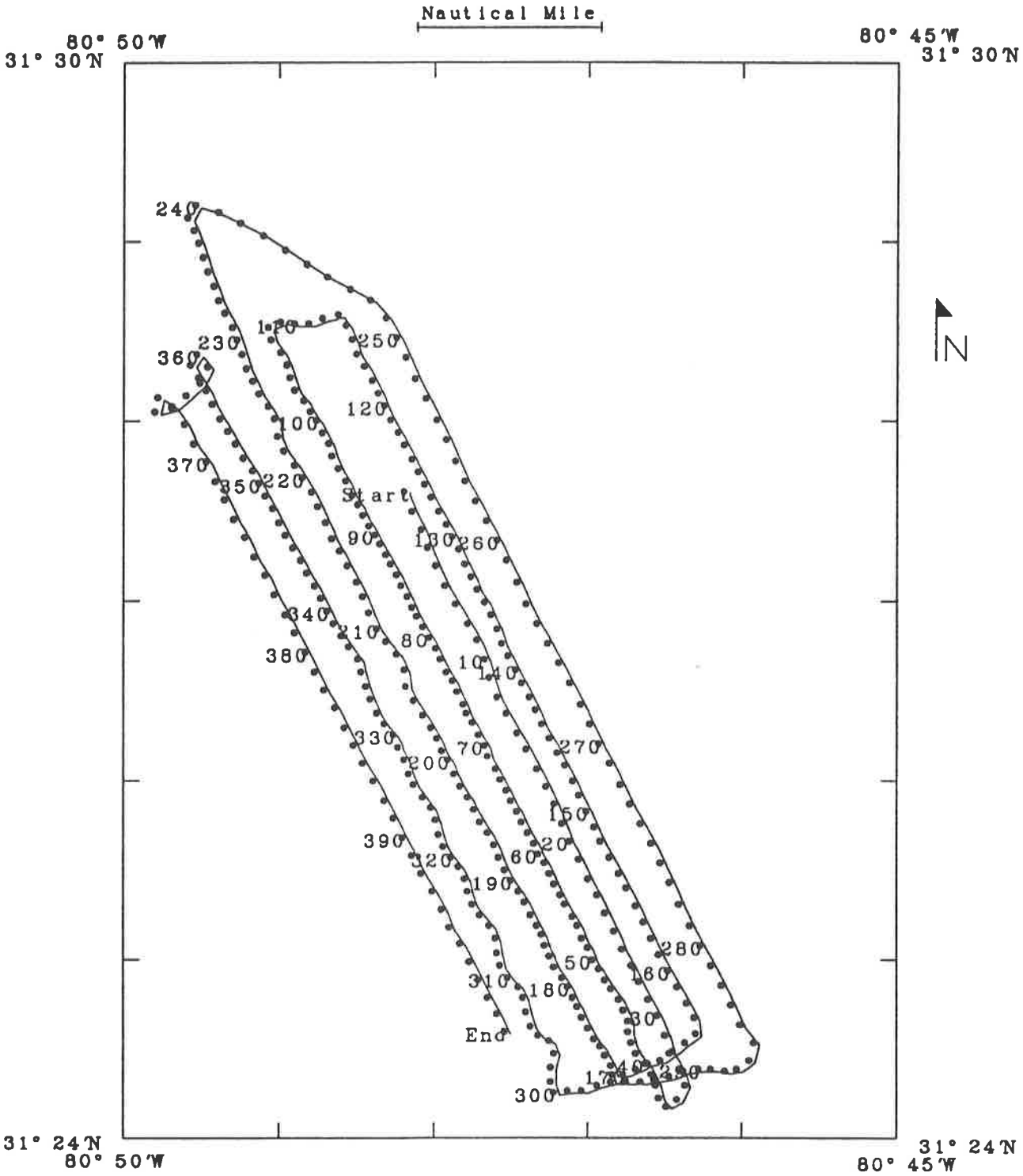
Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
270	12:12:00	31 26.19	80 46.89	68	431	261	158	10115
271	12:14:00	31 26.08	80 46.82	75	369	224	160	11232
272	12:16:01	31 25.96	80 46.75	76	364	249	128	8979
273	12:18:01	31 25.85	80 46.69	75	294	150	176	9363
274	12:20:01	31 25.74	80 46.62	77	278	170	184	9197
275	12:22:01	31 25.63	80 46.55	76	342	245	152	9615
276	12:24:01	31 25.52	80 46.49	75	228	233	341	12692
277	12:26:01	31 25.41	80 46.43	74	300	359	349	12402
278	12:28:01	31 25.29	80 46.37	74	287	247	205	10179
279	12:30:03	31 25.17	80 46.30	72	219	208	129	9171
280	12:32:04	31 25.06	80 46.23	72	228	308	117	9335
281	12:34:04	31 24.95	80 46.16	72	335	205	128	9897
282	12:36:04	31 24.84	80 46.09	74	283	233	287	12101
283	12:38:05	31 24.73	80 46.03	72	226	287	144	9807
284	12:40:05	31 24.62	80 45.97	71	207	262	119	9343
285	12:42:06	31 24.52	80 45.88	71	177	245	152	9289
286	12:44:06	31 24.42	80 45.91	70	211	221	177	9030
287	12:46:06	31 24.37	80 45.99	70	246	264	112	8992
288	12:48:06	31 24.36	80 46.07	70	256	281	136	9273
289	12:50:07	31 24.37	80 46.16	70	249	208	138	9249
290	12:52:07	31 24.37	80 46.24	69	213	251	105	9116
291	12:54:07	31 24.36	80 46.34	70	248	164	129	9088
292	12:56:07	31 24.33	80 46.43	70	295	257	120	8954
293	12:58:07	31 24.31	80 46.53	70	312	211	131	9260
294	13:00:07	31 24.30	80 46.62	70	247	233	103	8992
295	13:02:07	31 24.30	80 46.71	70	287	194	148	8834
296	13:04:07	31 24.30	80 46.81	71	221	205	82	8636
297	13:06:07	31 24.28	80 46.90	69	252	189	120	8823
298	13:08:07	31 24.25	80 47.00	69	246	208	154	9173
299	13:10:06	31 24.25	80 47.09	69	231	252	104	9345
300	13:12:06	31 24.24	80 47.18	68	252	282	175	9696
301	13:14:06	31 24.30	80 47.20	68	197	211	149	9737
302	13:16:06	31 24.38	80 47.20	68	136	179	172	9944
303	13:18:06	31 24.46	80 47.18	68	254	208	219	10015
304	13:20:07	31 24.53	80 47.21	69	238	208	180	10077
305	13:22:07	31 24.56	80 47.28	68	253	222	234	10251
306	13:24:07	31 24.61	80 47.33	68	300	203	261	10649
307	13:26:07	31 24.69	80 47.36	69	236	266	216	10068
308	13:28:08	31 24.77	80 47.38	68	267	274	228	9843
309	13:30:08	31 24.83	80 47.41	69	174	222	230	10450
310	13:32:09	31 24.88	80 47.48	68	324	208	223	10695
311	13:34:09	31 24.95	80 47.53	69	309	195	198	10530
312	13:36:09	31 25.02	80 47.55	69	258	311	144	10009
313	13:38:10	31 25.10	80 47.56	69	189	258	189	10192
314	13:40:11	31 25.17	80 47.60	69	207	200	200	10608

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
315	13:42:11	31 25.23	80 47.66	69	206	272	209	10299
316	13:44:11	31 25.29	80 47.71	69	307	275	252	10305
317	13:46:12	31 25.36	80 47.74	68	208	205	220	10364
318	13:48:12	31 25.43	80 47.76	68	208	219	182	9000
319	13:50:12	31 25.50	80 47.80	69	250	205	203	10125
320	13:52:12	31 25.55	80 47.85	68	213	228	238	10914
321	13:54:12	31 25.61	80 47.90	68	270	245	310	12060
322	13:56:12	31 25.68	80 47.93	69	302	194	161	10199
323	13:58:13	31 25.76	80 47.95	70	353	236	247	10302
324	14:00:14	31 25.83	80 47.98	70	221	235	128	10347
325	14:02:14	31 25.89	80 48.03	71	380	298	126	9506
326	14:04:14	31 25.96	80 48.09	71	279	372	131	11103
327	14:06:14	31 26.02	80 48.12	71	190	301	61	11085
328	14:08:14	31 26.10	80 48.15	56	233	243	117	10339
329	14:10:15	31 26.17	80 48.19	56	218	235	92	9657
330	14:12:16	31 26.24	80 48.22	57	283	300	94	9291
331	14:14:16	31 26.30	80 48.28	58	269	303	85	9448
332	14:16:16	31 26.36	80 48.33	57	204	292	162	11050
333	14:18:16	31 26.44	80 48.37	57	189	341	64	10892
334	14:20:16	31 26.51	80 48.40	52	123	350	101	10125
335	14:22:17	31 26.59	80 48.43	52	200	346	102	10920
336	14:24:18	31 26.66	80 48.45	54	260	301	100	10572
337	14:26:18	31 26.73	80 48.51	55	319	340	88	9811
338	14:28:19	31 26.79	80 48.56	56	164	311	69	9503
339	14:30:19	31 26.86	80 48.61	56	290	356	144	10200
340	14:32:19	31 26.93	80 48.65	55	215	295	88	10502
341	14:34:19	31 27.00	80 48.69	54	212	259	99	9683
342	14:36:20	31 27.07	80 48.73	54	250	304	113	9909
343	14:38:20	31 27.14	80 48.78	56	301	342	79	9415
344	14:40:21	31 27.21	80 48.82	57	256	339	88	9843
345	14:42:21	31 27.28	80 48.87	58	234	329	170	11744
346	14:44:21	31 27.35	80 48.92	58	364	267	122	10134
347	14:46:21	31 27.42	80 48.96	54	226	275	115	9832
348	14:48:22	31 27.50	80 49.00	60	349	284	65	9669
349	14:50:22	31 27.57	80 49.05	56	269	399	96	10388
350	14:52:23	31 27.64	80 49.09	58	238	459	169	13072
351	14:54:23	31 27.71	80 49.13	59	270	378	217	12652
352	14:56:23	31 27.78	80 49.19	55	197	300	102	10134
353	14:58:25	31 27.86	80 49.24	55	234	346	111	9895
354	15:00:26	31 27.93	80 49.29	57	261	231	84	10331
355	15:02:26	31 28.00	80 49.34	57	196	246	115	9410
356	15:04:26	31 28.08	80 49.39	54	224	255	114	9457
357	15:06:27	31 28.16	80 49.43	54	116	263	107	8821
358	15:08:27	31 28.23	80 49.48	54	231	254	98	8913
359	15:10:27	31 28.30	80 49.53	54	177	216	108	9884

Georgia Site 3 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
360	15:12:27	31 28.36	80 49.49	54	220	281	112	9471
361	15:14:27	31 28.29	80 49.42	55	247	247	112	9376
362	15:16:27	31 28.20	80 49.47	55	226	291	146	9645
363	15:18:27	31 28.13	80 49.56	54	252	300	159	9952
364	15:20:27	31 28.06	80 49.65	54	236	241	65	9029
365	15:22:28	31 28.04	80 49.76	54	238	195	151	10416
366	15:24:28	31 28.12	80 49.74	55	215	251	112	9616
367	15:26:28	31 28.07	80 49.65	54	260	269	145	9607
368	15:28:28	31 27.97	80 49.57	55	86	318	254	12808
369	15:30:28	31 27.86	80 49.51	56	263	273	116	10009
370	15:32:29	31 27.76	80 49.43	54	282	256	154	9948
371	15:34:30	31 27.65	80 49.37	56	317	197	114	9184
372	15:36:30	31 27.55	80 49.31	56	215	231	90	10224
373	15:38:31	31 27.44	80 49.25	56	330	259	46	9249
374	15:40:31	31 27.34	80 49.18	54	263	224	83	9551
375	15:42:31	31 27.23	80 49.12	56	203	227	123	9853
376	15:44:31	31 27.13	80 49.05	59	113	227	101	9960
377	15:46:31	31 27.02	80 48.99	54	191	216	105	9544
378	15:48:31	31 26.91	80 48.92	55	66	267	76	9979
379	15:50:32	31 26.81	80 48.86	54	302	249	50	9448
380	15:52:32	31 26.70	80 48.79	55	224	338	83	10073
381	15:54:33	31 26.59	80 48.73	56	305	300	78	9345
382	15:56:33	31 26.49	80 48.67	55	227	296	82	10844
383	15:58:33	31 26.39	80 48.60	61	198	270	103	10982
384	16:00:33	31 26.28	80 48.54	56	268	300	151	10653
385	16:02:34	31 26.18	80 48.48	57	350	192	183	9732
386	16:04:34	31 26.08	80 48.42	60	361	241	147	10741
387	16:06:35	31 25.98	80 48.35	73	302	244	270	12456
388	16:08:35	31 25.87	80 48.28	68	238	257	280	11547
389	16:10:36	31 25.77	80 48.22	70	205	164	233	10747
390	16:12:37	31 25.66	80 48.16	69	243	192	210	10339
391	16:14:38	31 25.56	80 48.10	68	170	170	225	10424
392	16:16:38	31 25.46	80 48.04	66	229	210	180	10248
393	16:18:39	31 25.36	80 47.97	67	225	246	201	10539
394	16:20:39	31 25.26	80 47.91	67	202	274	214	10431
395	16:22:39	31 25.16	80 47.86	68	203	164	117	9731
396	16:24:40	31 25.07	80 47.79	67	200	235	141	9671
397	16:26:40	31 24.97	80 47.73	68	263	243	212	9857
398	16:28:40	31 24.87	80 47.67	67	181	223	164	9801
399	16:30:40	31 24.77	80 47.61	68	167	210	157	9918
400	16:32:40	31 24.68	80 47.55	67	339	188	144	10042
401	16:34:40	31 24.58	80 47.50	67	313	229	121	9676

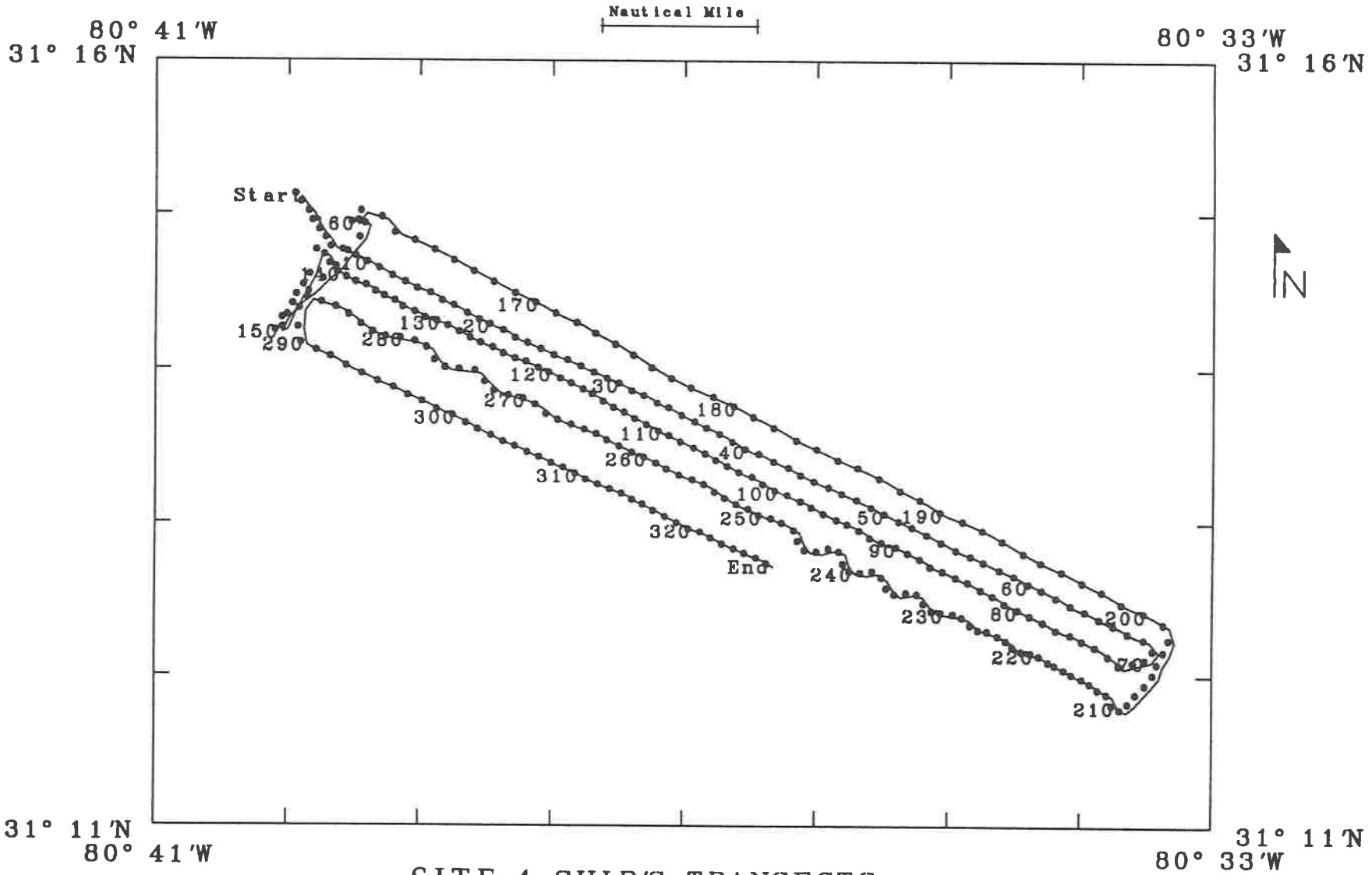


SITE 3 GRAY'S REEF SHIP'S TRANSECTS
GEORGIA MINERAL SURVEY

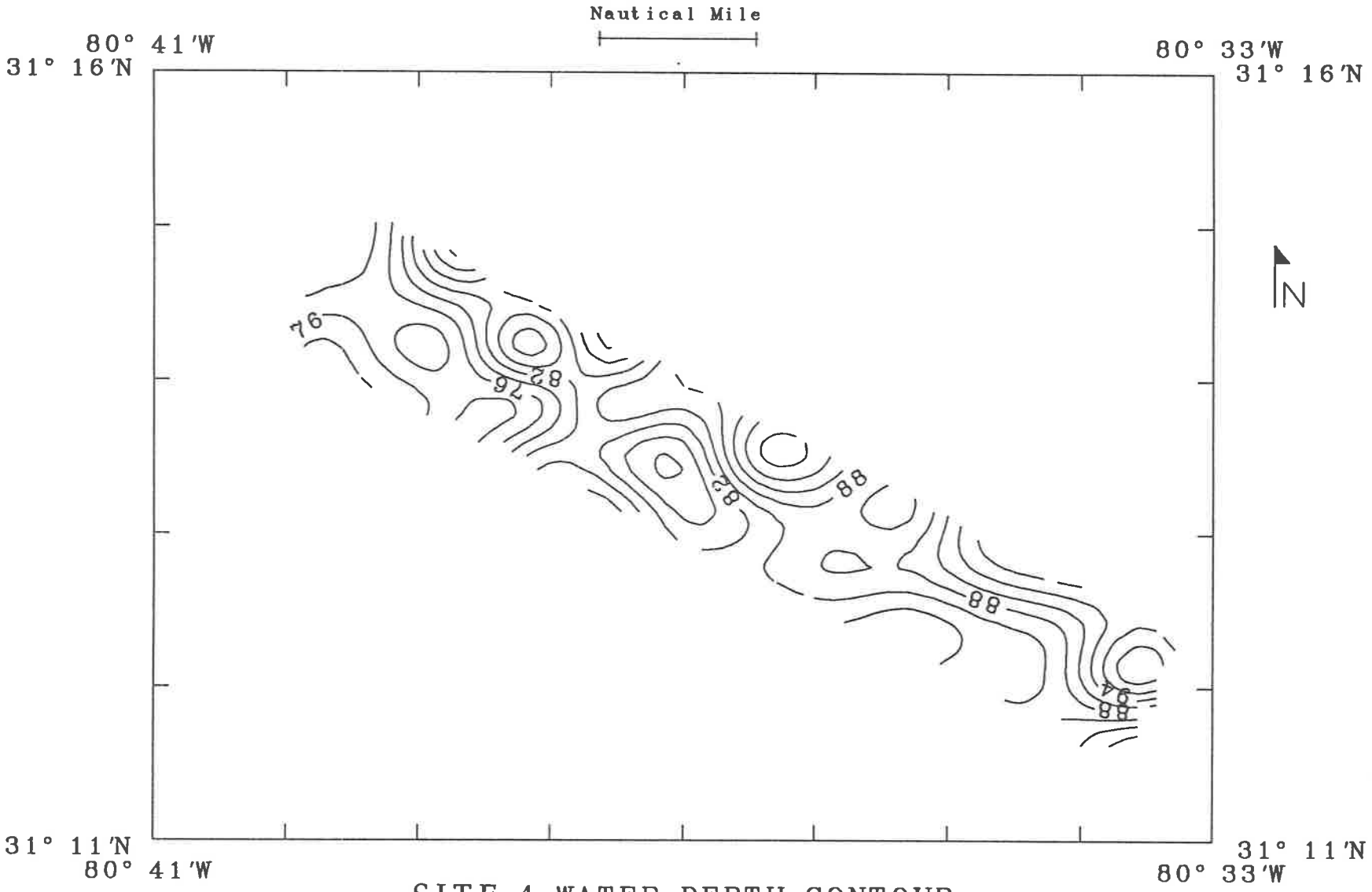
APPENDIX 4

GAMMA ISOTOPE MAPPING DATA

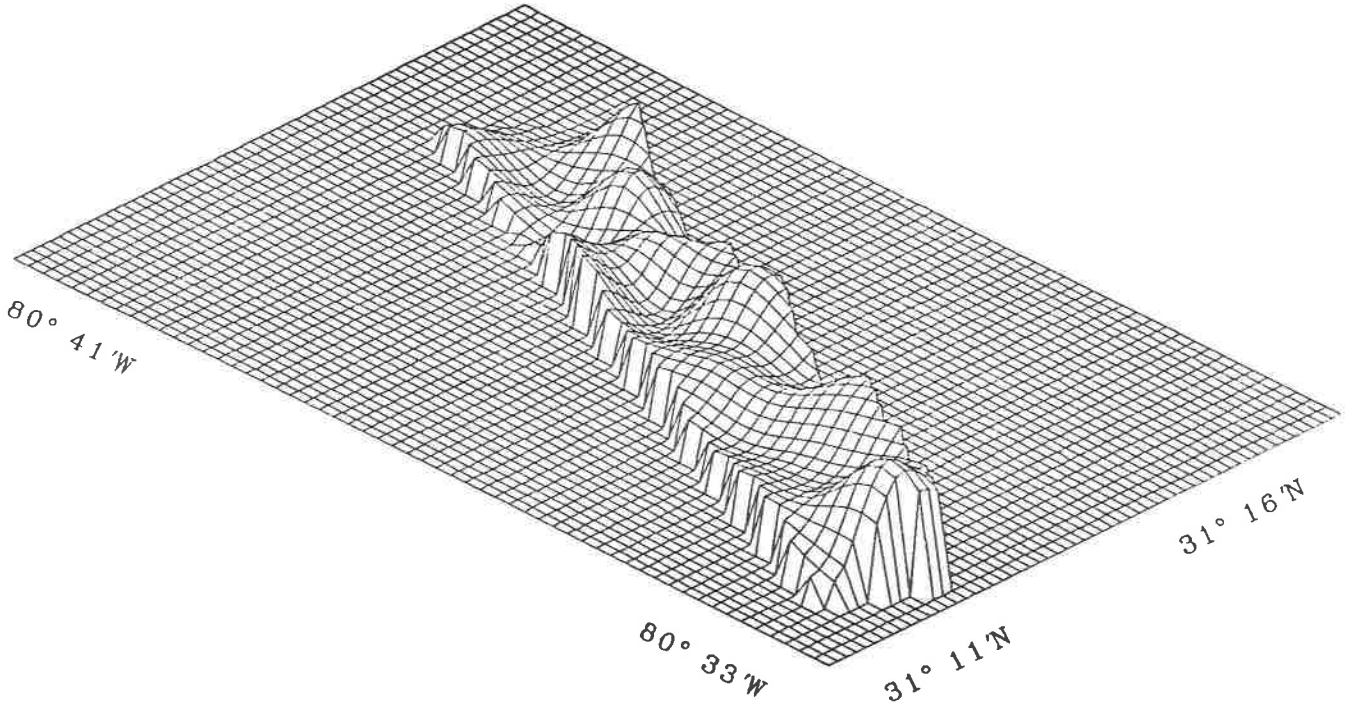
TARGET AREA 4



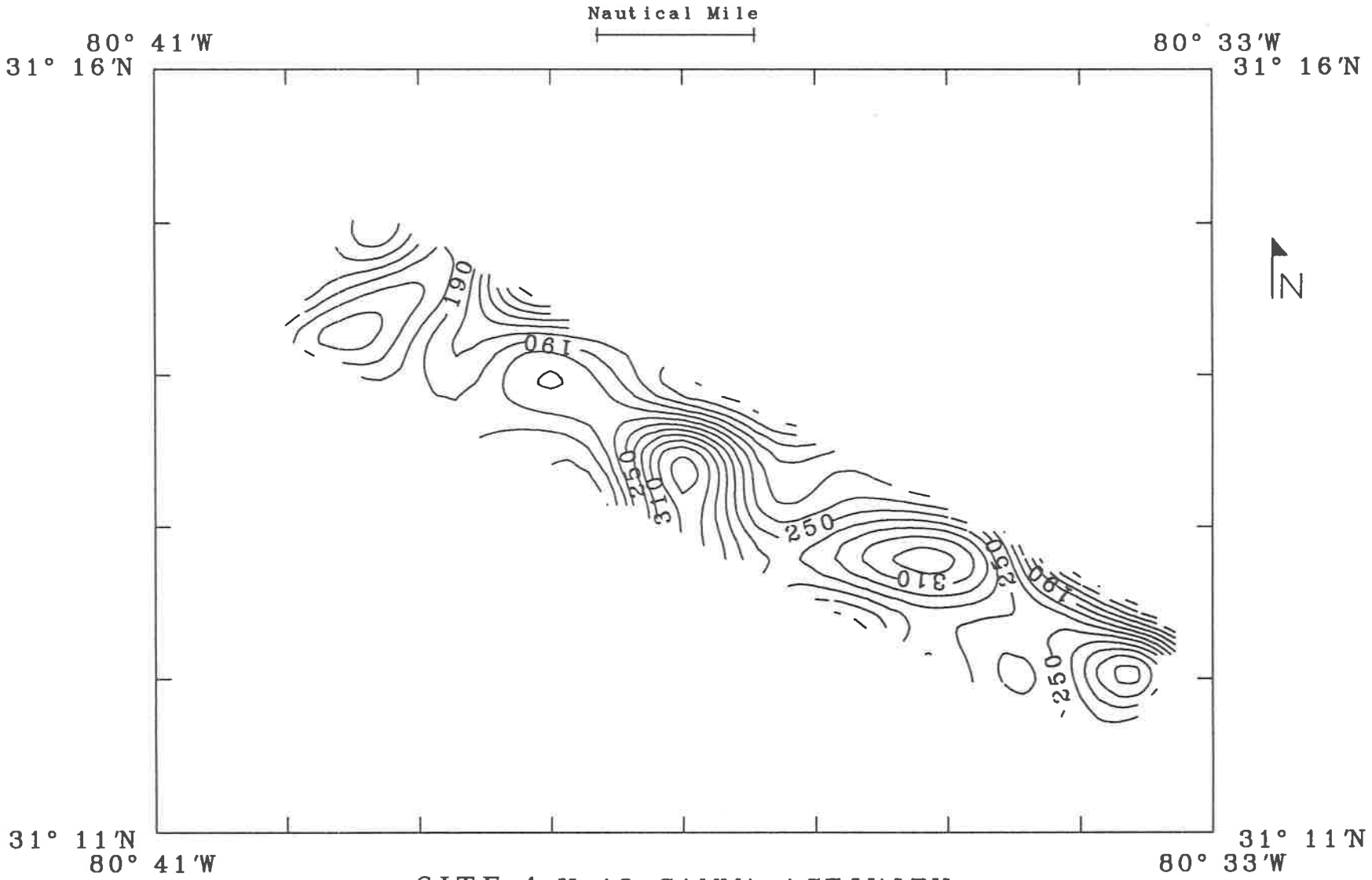
SITE 4 SHIP'S TRANSECTS
GEORGIA MINERALS SURVEY



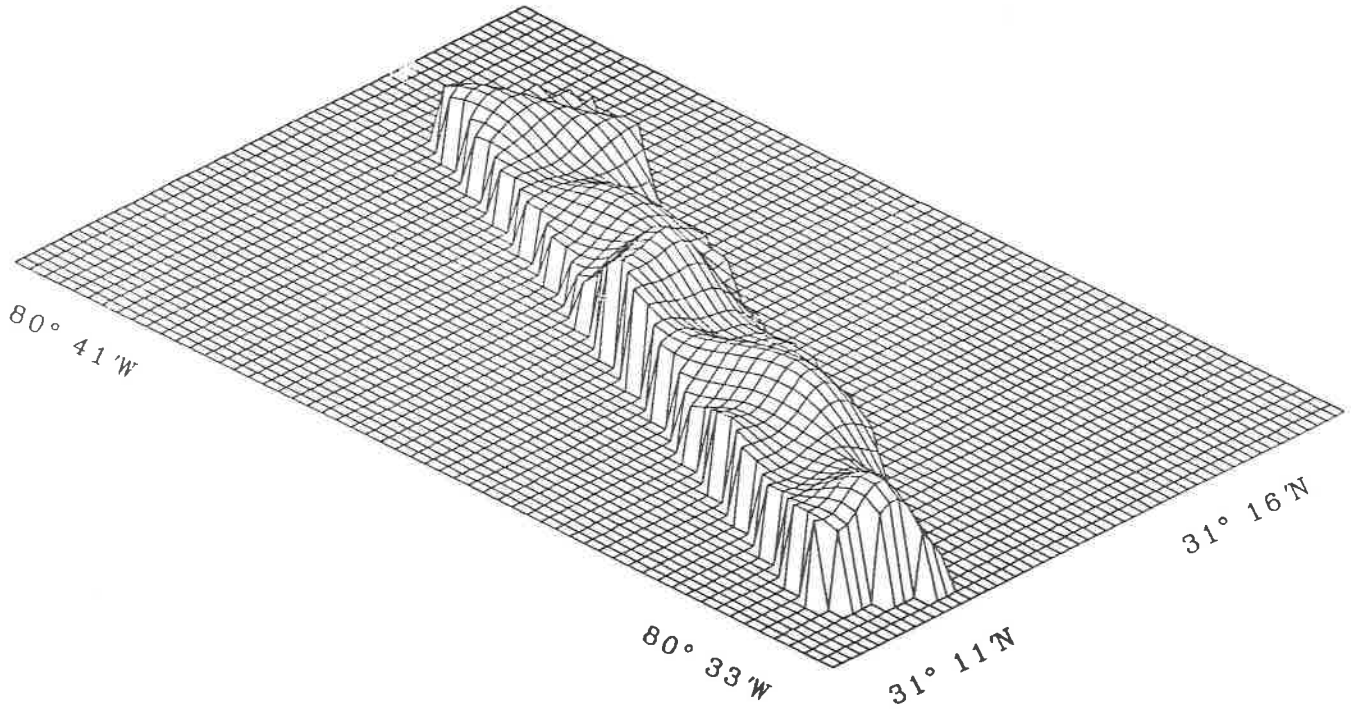
SITE 4 WATER DEPTH CONTOUR
GEORGIA MINERALS SURVEY



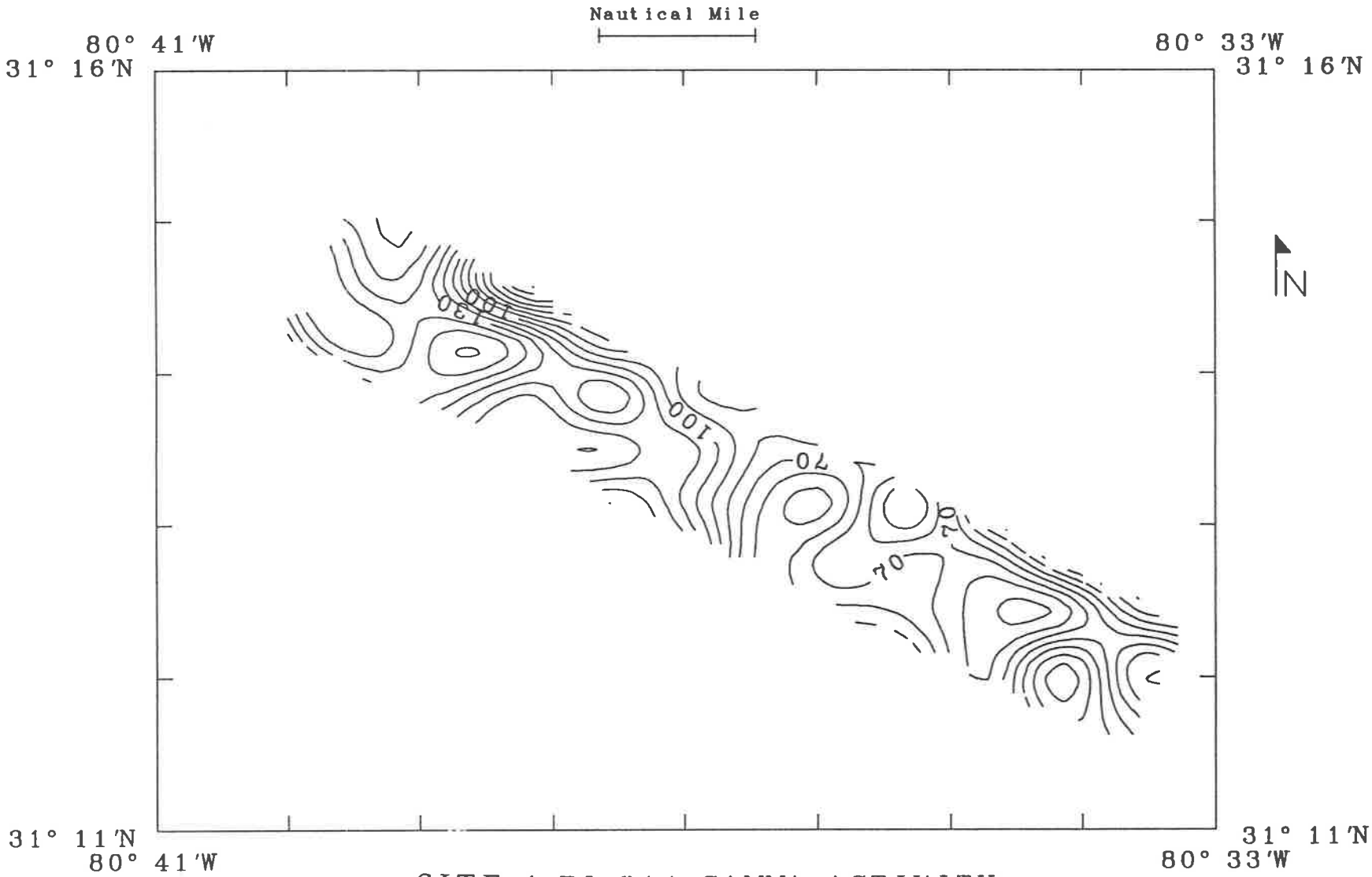
SITE 4 SEAFLOOR
GEORGIA MINERAL SURVEY



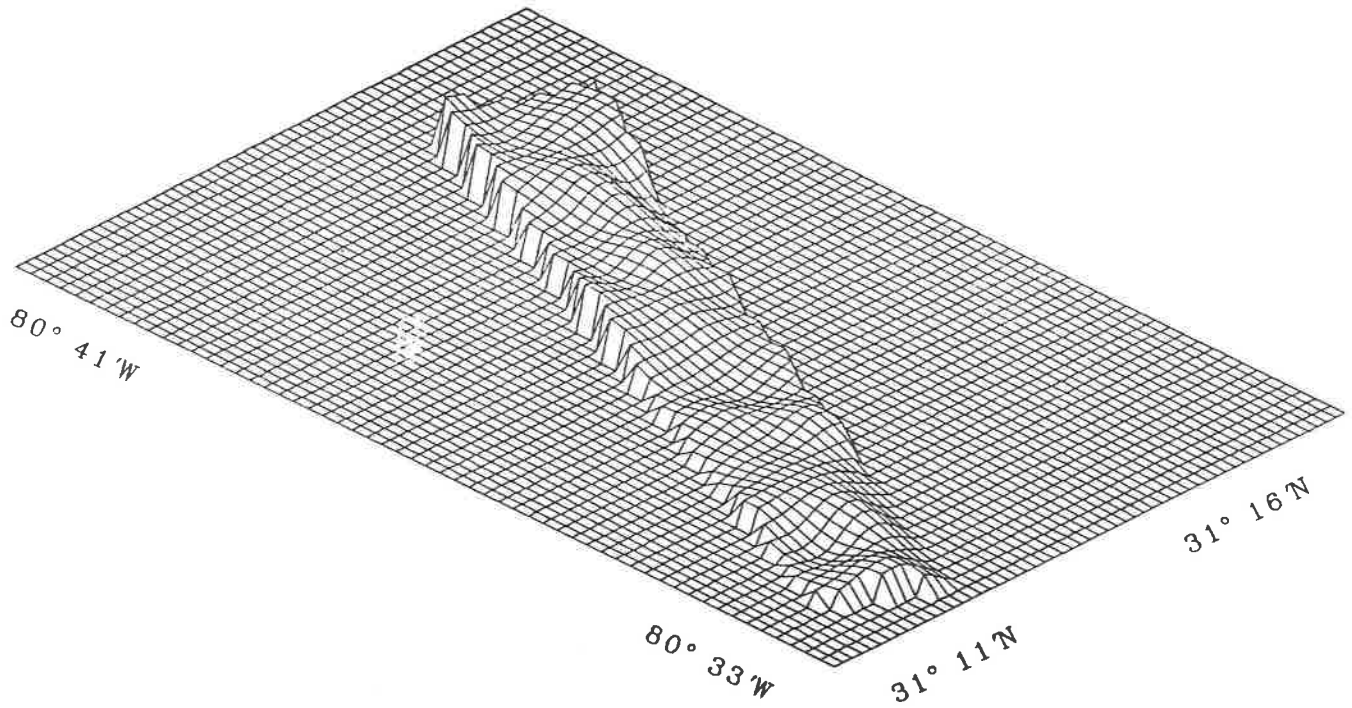
SITE 4 K–40 GAMMA ACTIVITY
GEORGIA MINERALS SURVEY



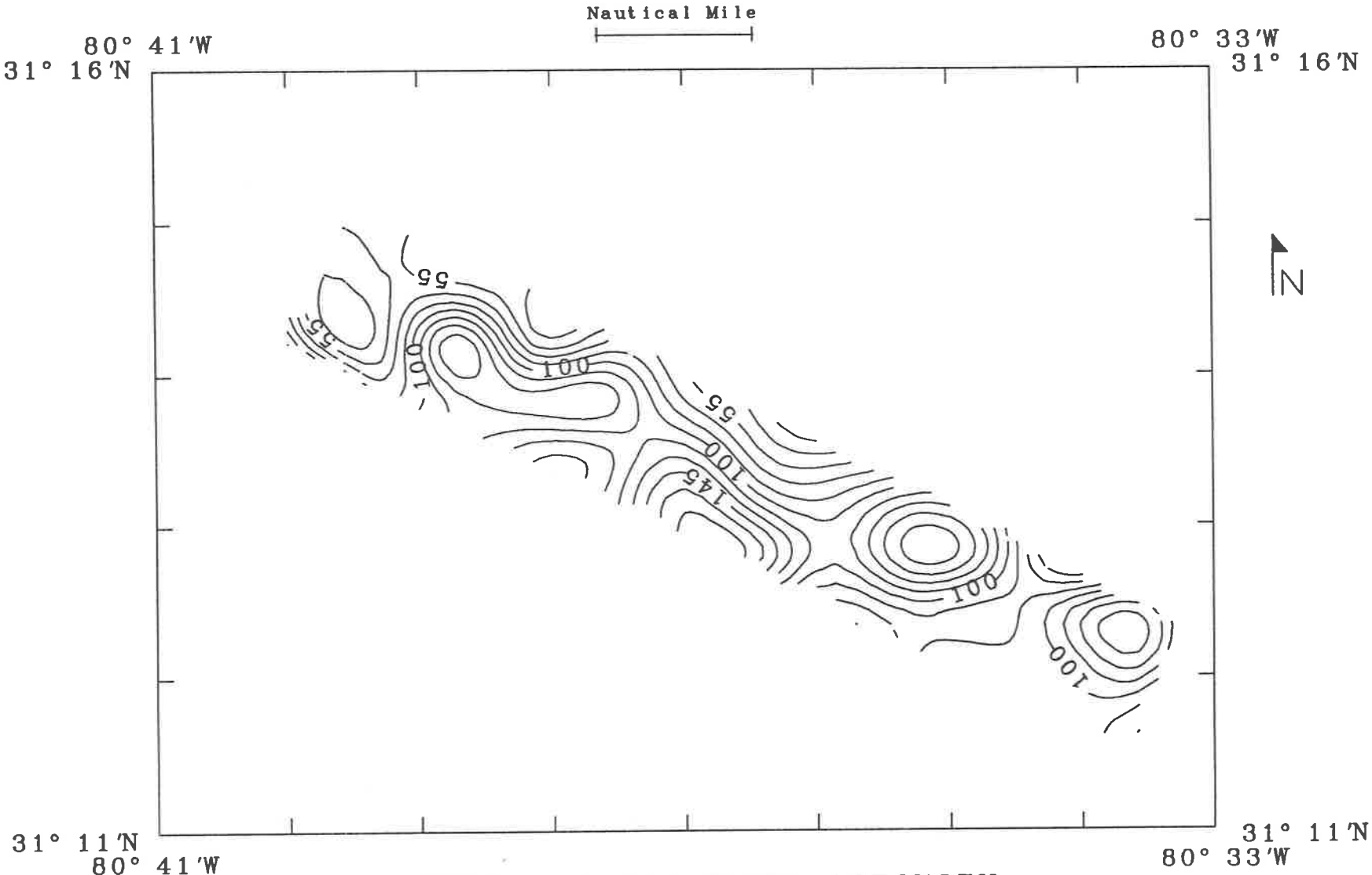
SITE 4 K–40 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



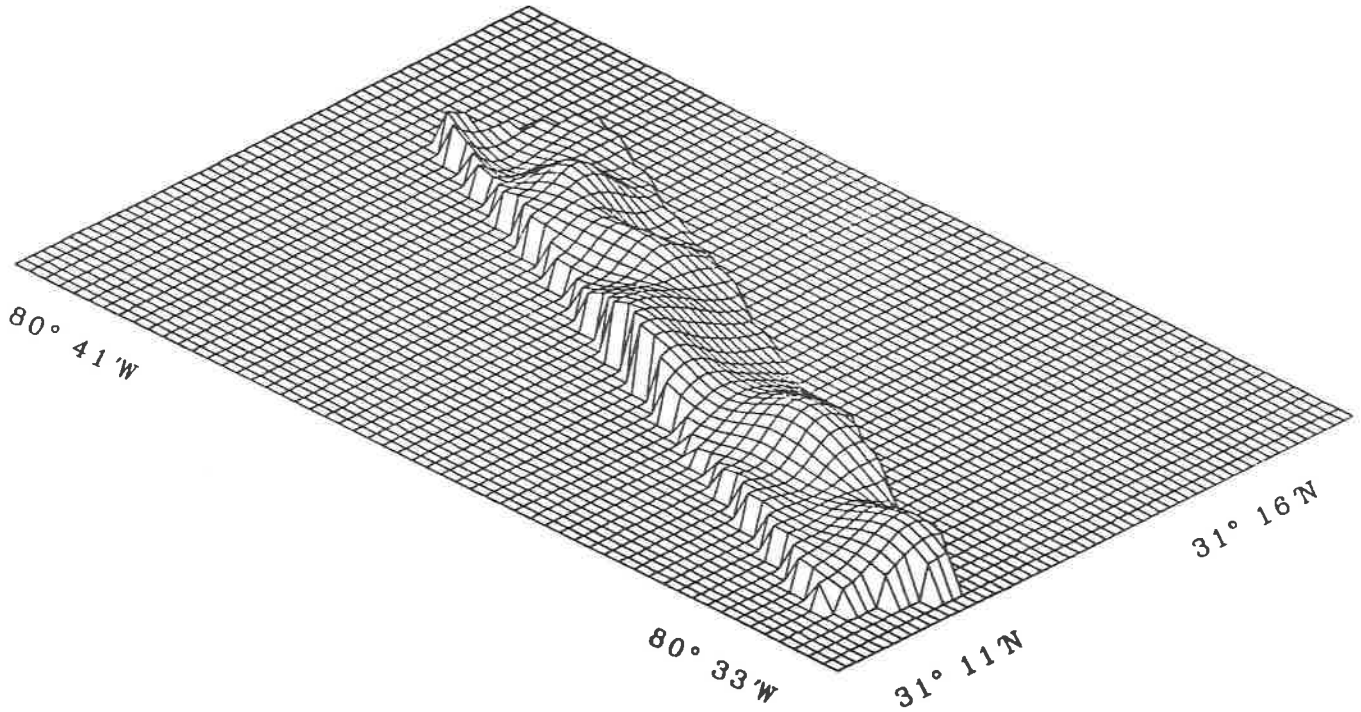
SITE 4 BI–214 GAMMA ACTIVITY
GEORGIA MINERALS SURVEY



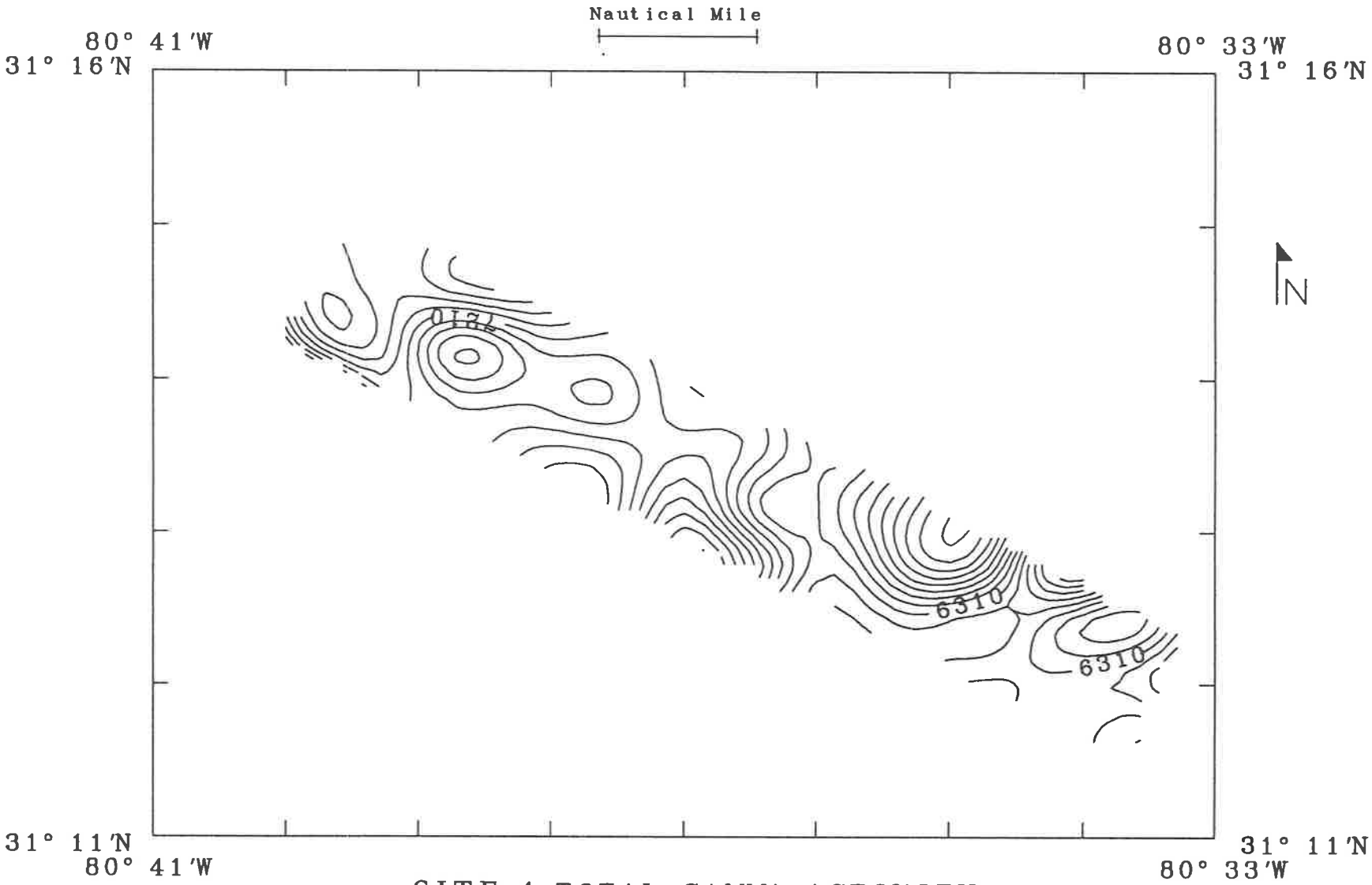
SITE 4 Bi-214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



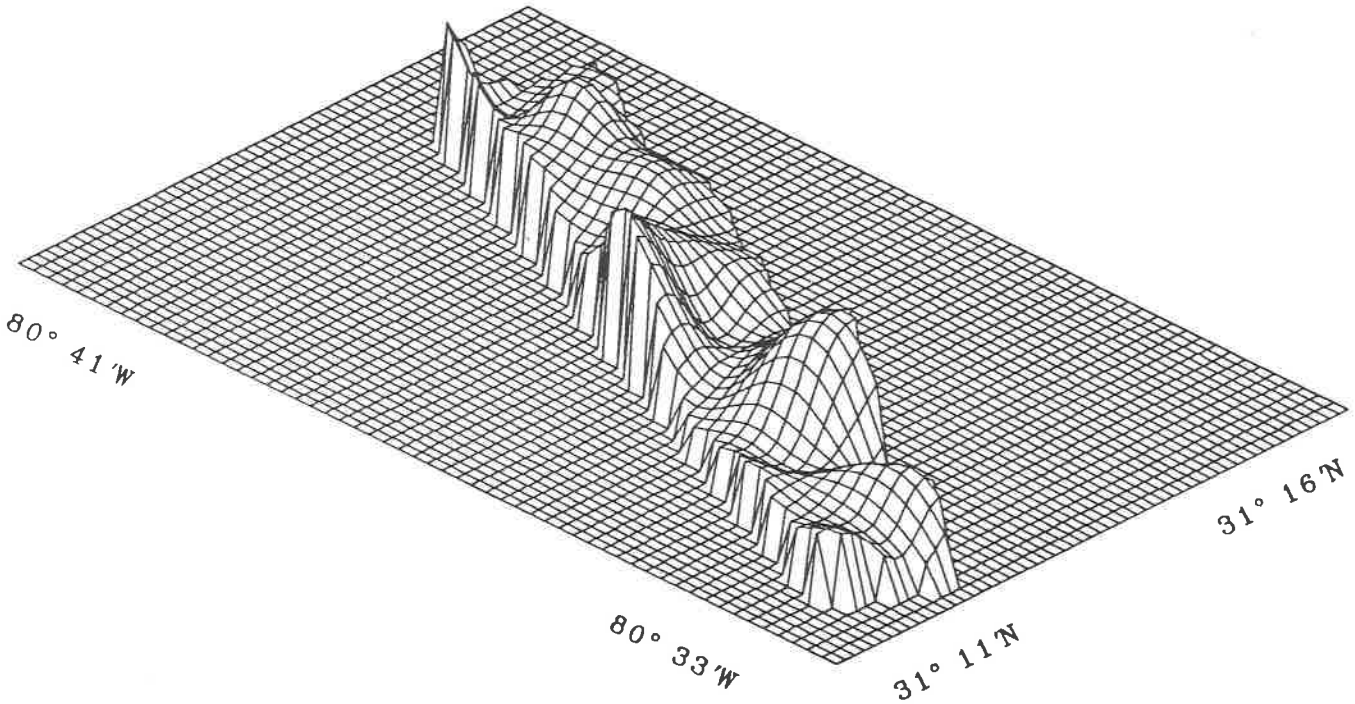
SITE 4 TL-208 GAMMA ACTIVITY
GEORGIA MINERALS SURVEY



SITE 4 TL-214 GAMMA ACTIVITY
GEORGIA MINERAL SURVEY



SITE 4 TOTAL GAMMA ACTIVITY
GEORGIA MINERALS SURVEY



SITE 4 TOTAL GAMMA ACTIVITY
GEORGIA MINERAL SURVEY

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
1	18:47:52	31 15.06	80 39.86	67	179	115	56	6555
2	18:49:51	31 15.00	80 39.80	69	236	149	50	6238
3	18:51:49	31 14.94	80 39.77	68	179	140	50	6087
4	18:53:48	31 14.88	80 39.72	67	233	156	61	6433
5	18:55:48	31 14.83	80 39.67	68	187	157	58	6852
6	18:57:47	31 14.77	80 39.63	69	225	175	107	7385
7	18:59:46	31 14.75	80 39.54	70	244	163	96	6998
8	19:01:44	31 14.71	80 39.44	72	211	152	74	6561
9	19:03:43	31 14.67	80 39.35	75	265	194	61	6517
10	19:05:42	31 14.63	80 39.26	76	243	128	59	6255
11	19:07:41	31 14.58	80 39.16	76	222	118	47	6109
12	19:09:39	31 14.54	80 39.06	74	248	128	80	6172
13	19:11:38	31 14.50	80 38.97	72	260	100	11	6124
14	19:13:37	31 14.47	80 38.87	74	182	80	94	6494
15	19:15:36	31 14.42	80 38.78	73	187	140	73	6744
16	19:17:35	31 14.39	80 38.69	76	210	105	97	6283
17	19:19:34	31 14.34	80 38.59	80	278	88	58	6386
18	19:21:32	31 14.30	80 38.50	76	269	95	25	5976
19	19:23:31	31 14.27	80 38.42	70	287	99	49	6140
20	19:25:30	31 14.23	80 38.32	67	204	76	63	6499
21	19:27:30	31 14.18	80 38.23	92	209	155	98	7579
22	19:29:29	31 14.15	80 38.14	90	225	144	49	8054
23	19:31:28	31 14.11	80 38.04	90	265	152	97	7233
24	19:33:27	31 14.07	80 37.94	89	181	112	141	7659
25	19:35:27	31 14.04	80 37.84	90	157	107	101	7441
26	19:37:26	31 14.00	80 37.74	90	209	178	129	7619
27	19:39:26	31 13.96	80 37.64	88	195	144	104	7810
28	19:41:24	31 13.92	80 37.54	84	275	179	129	8599
29	19:43:23	31 13.89	80 37.45	81	119	54	60	6530
30	19:45:22	31 13.84	80 37.35	78	209	55	39	6198
31	19:47:21	31 13.81	80 37.26	78	100	78	69	6684
32	19:49:20	31 13.76	80 37.16	80	106	30	130	7273
33	19:51:19	31 13.73	80 37.07	80	130	115	38	6842
34	19:53:18	31 13.68	80 36.97	78	56	111	2	6345
35	19:55:17	31 13.64	80 36.87	77	120	66	50	6491
36	19:57:16	31 13.60	80 36.78	75	146	94	86	6598
37	19:59:15	31 13.56	80 36.68	80	83	92	68	7210
38	20:01:14	31 13.51	80 36.58	92	181	158	131	7486
39	20:03:13	31 13.46	80 36.48	99	248	59	54	6878
40	20:05:13	31 13.43	80 36.38	97	231	84	74	7008
41	20:07:12	31 13.38	80 36.27	97	246	88	167	8301
42	20:09:11	31 13.34	80 36.16	93	303	151	264	9711
43	20:11:11	31 13.29	80 36.07	89	294	77	70	6850
44	20:13:10	31 13.25	80 35.97	88	447	60	186	9740

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
45	20:15:09	31 13.21	80 35.86	87	192	49	58	6156
46	20:17:07	31 13.17	80 35.76	86	188	71	83	6216
47	20:19:07	31 13.13	80 35.65	87	259	62	62	5924
48	20:21:06	31 13.08	80 35.54	89	184	65	149	7670
49	20:23:05	31 13.04	80 35.44	92	244	94	194	8413
50	20:25:05	31 12.99	80 35.33	92	198	65	163	7297
51	20:27:04	31 12.95	80 35.23	89	315	120	266	8665
52	20:29:03	31 12.90	80 35.12	88	331	106	217	7875
53	20:31:02	31 12.85	80 35.01	87	364	68	209	7566
54	20:33:02	31 12.80	80 34.90	87	248	94	119	7534
55	20:35:01	31 12.76	80 34.79	92	359	72	179	8042
56	20:36:59	31 12.72	80 34.69	95	269	82	98	7048
57	20:38:58	31 12.67	80 34.57	96	283	54	76	5882
58	20:40:57	31 12.63	80 34.46	96	345	70	97	5921
59	20:42:55	31 12.58	80 34.35	94	219	105	96	6125
60	20:44:54	31 12.54	80 34.25	91	283	45	106	6095
61	20:46:53	31 12.49	80 34.14	88	234	92	88	5933
62	20:48:52	31 12.44	80 34.03	87	269	101	99	6548
63	20:50:51	31 12.40	80 33.92	85	265	55	162	7034
64	20:52:50	31 12.35	80 33.81	87	200	72	104	6708
65	20:54:49	31 12.31	80 33.70	90	228	21	159	7755
66	20:56:47	31 12.26	80 33.59	98	228	33	105	6372
67	20:58:46	31 12.22	80 33.47	102	285	40	56	5481
68	21:00:44	31 12.15	80 33.40	103	377	21	52	5391
69	21:02:43	31 12.09	80 33.46	103	337	88	97	5680
70	21:04:42	31 12.07	80 33.55	102	354	95	143	5889
71	21:06:40	31 12.05	80 33.66	100	224	59	92	5632
72	21:08:38	31 12.11	80 33.74	95	238	44	71	5593
73	21:10:37	31 12.17	80 33.84	88	277	0	50	5132
74	21:12:35	31 12.21	80 33.94	86	151	24	28	5160
75	21:14:34	31 12.25	80 34.03	87	212	29	94	6027
76	21:16:34	31 12.28	80 34.14	91	168	37	130	6802
77	21:18:32	31 12.33	80 34.24	93	158	68	156	7498
78	21:20:32	31 12.37	80 34.34	95	258	93	126	6674
79	21:22:31	31 12.41	80 34.43	95	171	22	165	7542
80	21:24:29	31 12.45	80 34.53	93	204	58	105	6343
81	21:26:28	31 12.50	80 34.62	88	243	122	100	5748
82	21:28:26	31 12.54	80 34.71	86	266	61	67	5951
83	21:30:25	31 12.59	80 34.81	86	251	48	106	5901
84	21:32:24	31 12.62	80 34.90	88	317	21	61	5971
85	21:34:22	31 12.66	80 35.00	90	329	71	74	5745
86	21:36:21	31 12.69	80 35.09	91	293	25	71	5704
87	21:38:20	31 12.74	80 35.17	90	346	66	92	6481
88	21:40:20	31 12.78	80 35.26	89	374	78	148	7881
89	21:42:19	31 12.82	80 35.35	87	223	36	214	8090

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
90	21:44:18	31 12.85	80 35.46	86	316	54	205	7566
91	21:46:17	31 12.88	80 35.55	86	305	75	210	7928
92	21:48:16	31 12.93	80 35.63	87	224	83	236	7505
93	21:50:15	31 12.97	80 35.72	86	209	63	181	6888
94	21:52:14	31 13.00	80 35.80	86	243	91	152	6824
95	21:54:13	31 13.04	80 35.90	87	309	34	114	6978
96	21:56:12	31 13.08	80 35.99	93	272	29	137	6802
97	21:58:11	31 13.12	80 36.07	95	262	55	106	6272
98	22:00:10	31 13.16	80 36.17	96	309	80	53	5900
99	22:02:09	31 13.19	80 36.26	94	243	58	78	6242
100	22:04:08	31 13.23	80 36.35	95	260	61	123	6511
101	22:06:08	31 13.28	80 36.43	98	214	48	101	6539
102	22:08:07	31 13.31	80 36.53	92	310	59	186	8124
103	22:10:07	31 13.35	80 36.62	79	401	112	96	8732
104	22:12:06	31 13.39	80 36.71	76	384	81	126	7341
105	22:14:06	31 13.43	80 36.79	76	394	98	191	8641
106	22:16:06	31 13.47	80 36.88	78	382	90	200	9099
107	22:18:04	31 13.51	80 36.98	77	338	125	118	7598
108	22:20:04	31 13.55	80 37.07	76	296	84	60	5941
109	22:22:03	31 13.58	80 37.15	78	199	121	50	6530
110	22:24:02	31 13.62	80 37.24	81	198	180	127	8074
111	22:26:02	31 13.66	80 37.33	83	97	167	177	8203
112	22:28:01	31 13.70	80 37.41	87	190	91	88	7424
113	22:30:00	31 13.73	80 37.49	89	136	119	156	7361
114	22:31:59	31 13.77	80 37.57	89	137	117	212	7755
115	22:33:58	31 13.82	80 37.65	88	236	125	95	7036
116	22:35:57	31 13.85	80 37.72	89	156	68	123	6420
117	22:37:56	31 13.89	80 37.81	90	173	70	28	6089
118	22:39:55	31 13.92	80 37.89	89	198	100	77	6535
119	22:41:55	31 13.96	80 37.98	92	74	86	96	7656
120	22:43:54	31 13.99	80 38.06	81	229	99	153	8166
121	22:45:53	31 14.03	80 38.15	72	314	104	118	7383
122	22:47:52	31 14.05	80 38.23	72	185	127	110	7238
123	22:49:51	31 14.08	80 38.32	75	182	131	77	7489
124	22:51:50	31 14.12	80 38.40	79	105	95	82	7549
125	22:53:49	31 14.15	80 38.49	77	235	159	62	7230
126	22:55:49	31 14.18	80 38.57	73	256	127	78	6596
127	22:57:48	31 14.22	80 38.65	75	157	178	204	9305
128	22:59:47	31 14.26	80 38.74	73	183	155	139	7870
129	23:01:46	31 14.29	80 38.82	74	157	84	36	6494
130	23:03:45	31 14.31	80 38.91	75	208	97	89	6533
131	23:05:44	31 14.35	80 38.99	77	206	85	20	6190
132	23:07:43	31 14.38	80 39.08	78	216	66	56	6478
133	23:09:41	31 14.42	80 39.14	79	245	87	93	6285
134	23:11:41	31 14.45	80 39.22	79	195	128	56	6353

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
135	23:13:39	31 14.48	80 39.29	75	226	182	95	7323
136	23:15:38	31 14.52	80 39.36	71	201	134	1	6351
137	23:17:37	31 14.54	80 39.44	69	253	80	62	6086
138	23:19:36	31 14.57	80 39.51	68	245	130	42	6031
139	23:21:34	31 14.60	80 39.58	69	115	17	7	5842
140	23:23:33	31 14.66	80 39.64	71	223	43	35	6044
141	23:25:32	31 14.72	80 39.68	71	168	59	27	6197
142	23:27:31	31 14.75	80 39.74	85	171	89	65	6183
143	23:29:30	31 14.67	80 39.76	74	281	147	52	6427
144	23:31:28	31 14.59	80 39.79	72	251	134	43	6182
145	23:33:27	31 14.52	80 39.84	70	123	113	43	6101
146	23:35:26	31 14.46	80 39.89	69	161	125	71	6186
147	23:37:25	31 14.40	80 39.92	68	242	145	86	6162
148	23:39:23	31 14.33	80 39.96	67	224	78	62	6051
149	23:41:24	31 14.25	80 40.00	69	194	62	23	5825
150	23:43:25	31 14.23	80 40.05	68	203	239	203	11174
151	23:45:24	31 14.31	80 40.00	68	242	249	284	11320
152	23:47:24	31 14.40	80 39.92	68	215	270	151	9179
153	23:49:22	31 14.48	80 39.80	69	227	125	114	7910
154	23:51:21	31 14.56	80 39.69	73	225	122	48	5739
155	23:53:20	31 14.64	80 39.59	76	189	60	9	5992
156	23:55:19	31 14.74	80 39.50	76	216	118	50	6166
157	23:57:18	31 14.83	80 39.41	74	223	163	49	6285
158	23:59:16	31 14.92	80 39.37	72	156	156	40	6320
159	00:01:15	31 14.94	80 39.42	75	155	152	37	6403
160	00:03:14	31 14.93	80 39.47	74	245	175	54	6513
161	00:05:13	31 15.00	80 39.40	72	199	156	50	6655
162	00:07:12	31 14.96	80 39.24	93	123	168	71	6761
163	00:09:11	31 14.86	80 39.14	93	165	107	49	6680
164	00:11:10	31 14.81	80 38.99	90	189	147	45	6555
165	00:13:09	31 14.75	80 38.84	88	271	176	67	6235
166	00:15:07	31 14.68	80 38.69	82	202	100	37	6058
167	00:17:06	31 14.61	80 38.54	78	161	102	61	6103
168	00:19:05	31 14.54	80 38.39	81	153	76	59	6218
169	00:21:04	31 14.47	80 38.23	80	71	24	58	6153
170	00:23:02	31 14.41	80 38.08	79	89	59	15	6131
171	00:25:02	31 14.34	80 37.93	79	0	0	16	6799
172	00:27:01	31 14.28	80 37.77	78	151	162	78	7359
173	00:29:00	31 14.21	80 37.63	72	160	50	74	7296
174	00:30:59	31 14.14	80 37.48	89	185	132	73	7548
175	00:32:58	31 14.07	80 37.34	88	223	161	88	7091
176	00:34:57	31 13.99	80 37.20	88	101	35	0	6495
177	00:36:56	31 13.92	80 37.05	88	143	81	79	6637
178	00:38:55	31 13.86	80 36.90	87	207	80	66	7409
179	00:40:54	31 13.80	80 36.73	93	199	105	41	6527

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
180	00:42:53	31 13.74	80 36.57	93	129	65	45	6499
181	00:44:52	31 13.67	80 36.42	84	75	75	49	7560
182	00:46:51	31 13.60	80 36.27	89	126	109	16	6606
183	00:48:50	31 13.52	80 36.10	91	159	96	40	7024
184	00:50:49	31 13.46	80 35.95	96	182	84	40	6375
185	00:52:48	31 13.39	80 35.79	94	247	74	69	6139
186	00:54:46	31 13.34	80 35.64	87	161	44	16	6709
187	00:56:45	31 13.27	80 35.48	83	145	0	29	5738
188	00:58:45	31 13.19	80 35.32	83	260	100	90	6969
189	01:00:45	31 13.13	80 35.17	91	169	95	168	10546
190	01:02:44	31 13.05	80 35.02	96	175	57	139	9103
191	01:04:44	31 12.99	80 34.85	100	278	21	144	8021
192	01:06:43	31 12.93	80 34.70	100	274	17	123	7507
193	01:08:42	31 12.86	80 34.55	98	101	61	29	8125
194	01:10:40	31 12.78	80 34.39	97	229	63	116	6562
195	01:12:38	31 12.72	80 34.26	99	172	43	50	5474
196	01:14:36	31 12.66	80 34.10	97	82	4	20	3296
197	01:16:35	31 12.59	80 33.94	97	145	29	44	4270
198	01:18:34	31 12.53	80 33.79	97	72	0	9	6318
199	01:20:33	31 12.45	80 33.64	95	123	35	126	6669
200	01:22:32	31 12.39	80 33.47	94	149	26	162	7511
201	01:24:29	31 12.32	80 33.32	94	152	20	32	5598
202	01:26:28	31 12.22	80 33.28	93	97	21	11	3286
203	01:30:21	31 12.14	80 33.32	90	168	46	76	4881
204	01:32:20	31 12.06	80 33.37	86	237	109	28	6136
205	01:34:19	31 11.92	80 33.46	84	261	45	56	6342
206	01:36:18	31 11.86	80 33.53	81	246	108	37	6450
207	01:38:16	31 11.80	80 33.59	81	199	60	87	6233
208	01:40:15	31 11.76	80 33.65	82	294	80	72	6566
209	01:42:14	31 11.79	80 33.71	81	259	30	109	6337
210	01:44:12	31 11.86	80 33.75	82	188	71	67	5957
211	01:46:11	31 11.89	80 33.82	82	258	38	83	5569
212	01:48:09	31 11.93	80 33.88	80	314	16	35	5463
213	01:50:08	31 11.96	80 33.94	81	234	63	64	5229
214	01:52:06	31 11.99	80 34.02	83	241	49	75	5083
215	01:54:05	31 12.02	80 34.08	85	228	43	68	5143
216	01:56:04	31 12.05	80 34.15	87	271	2	95	6110
217	01:58:03	31 12.07	80 34.20	88	238	81	121	7102
218	02:00:02	31 12.11	80 34.27	90	197	55	134	7283
219	02:02:01	31 12.13	80 34.33	90	284	48	117	7082
220	02:04:00	31 12.14	80 34.40	89	163	74	83	6868
221	02:05:59	31 12.17	80 34.47	89	298	73	142	6401
222	02:07:57	31 12.21	80 34.52	86	192	84	105	6215
223	02:09:56	31 12.24	80 34.58	83	272	80	95	6625
224	02:11:55	31 12.27	80 34.66	80	189	141	119	6746

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
225	02:13:54	31 12.28	80 34.73	81	245	91	68	5926
226	02:15:52	31 12.31	80 34.79	81	282	59	49	5736
227	02:17:51	31 12.36	80 34.85	83	275	74	77	5460
228	02:19:50	31 12.38	80 34.92	86	214	33	99	5710
229	02:21:49	31 12.39	80 35.01	85	286	85	120	6337
230	02:23:47	31 12.40	80 35.08	86	360	46	119	6455
231	02:25:46	31 12.45	80 35.14	84	296	58	66	6393
232	02:27:45	31 12.51	80 35.19	83	302	60	47	5919
233	02:29:44	31 12.52	80 35.27	81	146	73	75	5677
234	02:31:43	31 12.51	80 35.36	79	312	52	110	6375
235	02:33:43	31 12.55	80 35.42	79	203	71	174	7432
236	02:35:43	31 12.62	80 35.46	81	308	11	250	8556
237	02:37:42	31 12.66	80 35.53	82	205	97	172	7589
238	02:39:41	31 12.65	80 35.62	82	321	89	125	6919
239	02:41:40	31 12.66	80 35.70	81	252	57	134	6547
240	02:43:38	31 12.71	80 35.75	80	195	51	124	6353
241	02:45:37	31 12.79	80 35.78	83	315	51	76	6060
242	02:47:36	31 12.81	80 35.86	90	299	88	128	6153
243	02:49:35	31 12.79	80 35.95	90	215	66	43	6335
244	02:51:34	31 12.80	80 36.04	88	241	12	114	6448
245	02:53:32	31 12.86	80 36.09	91	252	11	172	6484
246	02:55:31	31 12.93	80 36.12	90	163	59	95	6629
247	02:57:30	31 12.98	80 36.21	92	279	79	116	6004
248	02:59:28	31 13.01	80 36.29	88	268	54	49	5646
249	03:01:27	31 13.03	80 36.38	83	180	83	68	5587
250	03:03:26	31 13.07	80 36.46	75	230	60	103	6126
251	03:05:25	31 13.10	80 36.55	72	236	74	163	7091
252	03:07:25	31 13.14	80 36.64	71	257	93	148	6923
253	03:09:25	31 13.18	80 36.72	71	448	131	274	9840
254	03:11:24	31 13.23	80 36.80	73	558	151	363	11327
255	03:13:24	31 13.26	80 36.89	74	356	71	100	7000
256	03:15:24	31 13.29	80 36.99	76	347	79	211	8502
257	03:17:24	31 13.33	80 37.09	78	362	80	237	9369
258	03:19:22	31 13.37	80 37.17	78	396	121	242	9772
259	03:21:21	31 13.41	80 37.26	79	272	120	84	6328
260	03:23:20	31 13.44	80 37.35	80	209	118	44	5772
261	03:25:19	31 13.48	80 37.45	80	215	77	53	6425
262	03:27:18	31 13.52	80 37.54	81	205	89	101	6950
263	03:29:17	31 13.56	80 37.62	82	228	132	124	7052
264	03:31:16	31 13.59	80 37.71	85	195	125	88	6412
265	03:33:15	31 13.62	80 37.81	73	158	137	107	6389
266	03:35:14	31 13.65	80 37.91	72	287	80	62	6443
267	03:37:13	31 13.69	80 38.00	70	234	81	81	6617
268	03:39:12	31 13.75	80 38.08	70	173	126	110	6963
269	03:41:11	31 13.79	80 38.17	73	254	112	137	7542

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
270	03:43:10	31 13.81	80 38.28	72	168	112	176	7640
271	03:45:10	31 13.84	80 38.39	73	231	178	133	7691
272	03:47:10	31 13.90	80 38.46	78	136	166	190	8808
273	03:49:09	31 13.97	80 38.53	74	286	164	157	9132
274	03:51:08	31 13.98	80 38.65	72	246	190	151	8175
275	03:53:07	31 13.99	80 38.76	76	179	91	77	6538
276	03:55:06	31 14.04	80 38.84	79	194	83	45	6523
277	03:57:05	31 14.12	80 38.90	73	172	151	86	7068
278	03:59:05	31 14.16	80 38.99	83	175	138	74	7770
279	04:01:04	31 14.18	80 39.10	78	176	191	283	9649
280	04:03:03	31 14.19	80 39.21	76	259	124	52	6478
281	04:05:02	31 14.22	80 39.31	74	240	126	46	6460
282	04:07:01	31 14.27	80 39.40	74	201	63	116	6532
283	04:09:00	31 14.33	80 39.49	71	275	122	47	6451
284	04:10:59	31 14.38	80 39.59	70	265	155	109	6821
285	04:12:58	31 14.41	80 39.70	77	264	132	109	7362
286	04:14:57	31 14.44	80 39.81	76	214	136	115	7388
287	04:16:56	31 14.37	80 39.87	76	276	151	72	7044
288	04:18:55	31 14.25	80 39.88	78	294	104	34	5944
289	04:20:56	31 14.15	80 39.86	80	161	227	167	9255
290	04:22:56	31 14.10	80 39.74	80	143	93	187	10524
291	04:24:56	31 14.06	80 39.63	81	184	192	308	10567
292	04:26:55	31 14.00	80 39.51	81	159	156	85	9021
293	04:28:55	31 13.95	80 39.39	81	150	150	117	7529
294	04:30:54	31 13.90	80 39.27	79	192	162	90	7540
295	04:32:52	31 13.86	80 39.15	79	253	115	68	6606
296	04:34:51	31 13.81	80 39.04	78	217	97	51	6418
297	04:36:51	31 13.77	80 38.93	77	204	128	75	6829
298	04:38:50	31 13.72	80 38.82	74	177	172	195	8764
299	04:40:50	31 13.68	80 38.70	71	124	80	75	6592
300	04:42:49	31 13.63	80 38.60	71	239	109	157	8591
301	04:44:48	31 13.59	80 38.51	72	176	122	124	7118
302	04:46:47	31 13.55	80 38.41	72	161	180	182	7346
303	04:48:46	31 13.51	80 38.32	74	242	139	112	7206
304	04:50:45	31 13.48	80 38.23	84	104	128	140	7538
305	04:52:44	31 13.44	80 38.14	85	193	92	60	6561
306	04:54:42	31 13.41	80 38.05	88	208	128	100	5984
307	04:56:41	31 13.37	80 37.96	90	224	101	52	5868
308	04:58:40	31 13.34	80 37.87	92	281	77	102	6267
309	05:00:39	31 13.30	80 37.78	90	171	100	129	6833
310	05:02:38	31 13.26	80 37.70	87	178	122	59	6609
311	05:04:37	31 13.23	80 37.61	90	202	177	80	6520
312	05:06:36	31 13.20	80 37.52	90	153	122	122	6610
313	05:08:35	31 13.17	80 37.43	85	117	102	148	6972
314	05:10:33	31 13.13	80 37.35	83	226	130	38	6420

Georgia Site 4 Shipboard Data - Gamma Radiation

Site	Time	Latitude	Longitude	Depth (ft)	K-40 (cpm)	Bi-214 (cpm)	Tl-208 (cpm)	Total (cpm)
315	05:12:32	31 13.10	80 37.27	84	168	112	60	5668
316	05:14:31	31 13.06	80 37.19	84	188	39	70	6280
317	05:16:31	31 13.02	80 37.10	82	250	132	83	6178
318	05:18:32	31 12.98	80 37.01	80	383	164	205	10708
319	05:20:32	31 12.94	80 36.92	80	442	185	338	11485
320	05:22:31	31 12.92	80 36.83	81	233	75	171	10069
321	05:24:29	31 12.88	80 36.75	83	303	51	103	6994
322	05:26:29	31 12.84	80 36.66	86	376	35	94	6834
323	05:28:29	31 12.81	80 36.57	86	579	116	254	10034
324	05:30:28	31 12.78	80 36.49	86	216	77	244	9347
325	05:32:28	31 12.75	80 36.40	84	297	36	113	6571
326	05:34:28	31 12.71	80 36.32	81	186	58	45	5448

Table 2. RESULTS OF GAMMA ISOTOPE MAPPING IN TARGET AREAS AND DRILL SITES
See Figure 1 and Appendices 1-4. Gamma activity is in counts per minute (cpm)

TARGET AREA	DRILL SITE	FEATURE	Max/site K40 Min/site	Bi214	Tl208	TOTAL
TA1 (Fig.21,App.1)	-	-	787/25-155/223	422/213-11/102	430/287-8/96	15460/287-5333/278
	TA1/1/97	layered sediments	286	68	71	6450
	TA1/5/212	layered sediments above small channel	454	217	216	11615
	TA1/6/288	layered sediments	552	238	251	12789
TA2 (Fig.22,App.2)	-	-	647/82-113/545	423/390-37/6	521/219-26/114	15901/215-5956/10
	TA2/2/114	layered sediments above wide shallow channel	263	67	26	6173
	TA2/4/215	layered sediments above wide shallow channel	129	391	510	15901
(Fig. 23)	TA2/6/278	outcropping channel deposits	489	270	159	11764
(Fig. 24)	TA2/8/390	edge of outcropping channel deposits	218	423	249	13432
(Fig. 25)	TA2/9/464	layered sediments above small channel	318	337	399	14481
TA3 (Fig.26,App.3)	-	-	496/65-66/378	462/221-140/197	424/182-42/76	15376/98-8095/268
(Fig. 27)	TA3/2/98	layered sediments above large channel	182	416	288	15376
(Fig. 28)	TA3/4/182	layered sediments	221	168	424	12834
(Fig. 29)	TA3/4/197	toe of sandwave	458	140	128	9453
(Fig. 30)	TA3/4/198	crest of sandwave	210	282	58	10151
(Fig. 32)	TA3/6/335	layered sediments	200	346	102	10920
TA4 (Fig.34,App.4)	-	-	579/323-0/171	270/152-0/171	363/254-0/176	11485/319-3286/202
(Fig. 35)	TA4/1/26	layered sediments between sandwaves	209	178	129	7619
	TA4/4/254	layered sediments between sandwaves	558	151	363	11327

TABLE 3. GROSS TEXTURE/MINERALOGY OF TARGET AREAS VIBRALIFT SAMPLES

NOTE: Petrographic analyses carried out by Jack Reynolds, E.I. DuPont de Nemours Co., Trail Ridge FL and Jim Herring, U.S. Geological Survey, Denver Federal Center

DRILL SITE	SAMPLE DEPTH (ft)	GROSS TEXTURE	% HM	% SLIME	% TiO_2	% ZrO_2	COMMENTS
TA 1/1/97 (Fig. 21)	0-5	f-m sd					layered sediments low to moderate gamma activity
	5-10	vf-f sd					
	10-15	vf-f sd, minor cl, shell					
	15-20	f-m sd, oxidized					
TA 1/5/212 (Fig. 21)	0-5	vf-f sd, minor cl	1.51	2.70	9.14	1.87	layered sediments above small channel moderate K40, Bi214 and Tl208 activity moderate to high total activity low percent heavy minerals channel probably not cored
	5-10	shelly mud	0.94	8.39	9.28	2.52	
	10-15	mud, minor sd	0.93	10.95	15.86	4.35	
	15-20	f-m sd, minor sh	0.42	8.86	17.62	4.16	
TA 1/6/288 (Fig. 21)	0-5	f-vf sd					layered sediments above medium channel moderate gamma activity channel probably not cored
	5-10	f-vf sd, minor sh					
	10-15	shelly f-vf sd					
	15-20	f-vf sd, minor sh					
TA 2/2/114 (Fig. 22)	0-5	f-m sd, minor sh					layered sediments above wide shallow channel low gamma activity
	5-10	f-m sd, some sh					
	10-15	shelly f-m sd					
	15-20	v. shelly f-m sd					
TA 2/4/215 (Fig. 22)	0-5	shelly f-m sd	0.27	37.19	5.79	0.61	layered sediments above wide channel Low K40 activity; high Bi214, Tl208 and very low percent heavy minerals
	5-10	sdy mud	0.84	19.76	12.86	1.62	
	10-15	mud	-	-	-	-	
	15-20	no sample	-	-	-	-	

TABLE 3 CONTINUED

DRILL SITE	SAMPLE DEPTH (ft)	GROSS TEXTURE	% HM	% SLIME	% TiO_2	% ZrO_2	COMMENTS
TA 2/6/278 (Figs. 22, 23)	0-5	mud, minor sd, sh					outcropping muddy channel deposits
	5-10	shelly, sandy mud					moderate to high K40 activity
	10-15	muddy sd and sh					
	15-20	no sample					
TA 2/8/390 (Figs. 22, 24)	0-5	shelly f-m sd					edge of outcropping sandy channel deposits
	5-10	shelly f-m sd					low K40 activity
	10-15	shelly f-m sd					high Bi214 activity
	15-20	f-m sd					
TA 2/9/464 (Figs. 22. 25)	0-5	f-m sd					layered sediments above small channel
	5-10	f-m sd					moderate to high gamma activity
	10-15	f-m sd					
	15-20	f-m sd, minor cl					
TA 3/2/98 (Figs. 26, 27)	0-5	f-m sd					layered sediments above large channel
	5-10	f-m sd					low K40, high Bi214 and total gamma activity
	10-15	vf-f sd, minor cl, sh					channel probably not cored
	15-20	vf-f sd, minor cl, sh					
TA 3/4/182 (Figs. 26, 28)	0-5	shelly f-m sd					layered sediments
	5-10	shelly f-m sd, oxidized					high Tl208 activity
	10-15	shelly f-m sd					
	15-20	f-m sd, oxidized					
TA 3/4/197 (Figs. 26, 29)	0-5	f-m sd, minor sh					toe of sandwave
	5-10	f-m sd, minor sh					high K40 activity (?)
	10-15	shelly f-m sd					low Bi214, Tl208, total activity
	15-20	shelly f-c sd					
TA 3/4/198 (Figs. 26, 30)	0-5	shelly f-m sd					crest of sandwave
	5-10	shelly f-m sd					low Tl208 activity
	10-15	shelly f-m sd					
	15-20	shelly f-m sd					

TABLE 3 CONTINUED

DRILL SITE	SAMPLE DEPTH (ft)	GROSS TEXTURE	% HM	% SLIME	% TiO_2	% ZrO_2	COMMENTS
TA 3/6/335 (Figs. 26, 32)	0-5	f-md sd	0.65	0.65	10.31	3.10	layered sediment above small channel
	5-10	f-md sd	0.69	1.21	7.80	1.57	low T1208 activity
	10-15	shelly f-m sd	0.43	1.63	6.44	1.33	very low percent heavy minerals
	15-20	shelly f-m sd	0.85	1.78	7.37	2.06	channel probably not cored
TA 4/1/26 (Fig. 35)	0-5	shelly f-m sd					layered sediments between sandwaves
	5-10	shelly f-m sd					low to moderate gamma activity
	10-15	shelly f-m sd					very low percent of heavy minerals
	15-20	shelly f-m sd					
TA 4/4/254	0-5	shelly f-m sd	0.20	2.21	8.85	1.60	layered sediments between sandwaves
	5-10	dense clay with m sand and organic matter	0.31	6.44	7.97	2.38	dense organic clay layer overlying highly oxidized sand
	10-15	f-m sd, oxidized	0.36	6.08	22.16	3.60	high K40 and T1208 activity
	15-20	f-m sd, oxidized	0.35	5.02	18.68	2.84	wood was found on anchor fluke

c = coarse
m = medium
f = fine
vf = very fine
v. = very

sd = sand
sh = shell
sdy = sandy

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