A DESCRIPTION OF OCEANOGRAPHIC CONDITIONS OFF THE SOUTHEASTERN UNITED STATES DURING 1973[1]

T. D. Mathews and O. Pashuk

Marine Resources Research Institute
South Carolina Wildlife and Marine Resources Department
Charleston, South Carolina 29412

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Introduction

Until the past two decades very little emphasis had been placed on understanding the chemistry and physics of continental shelf waters off the southeastern coast of the United States. Much of what was done was either large scale, covering most of the east coast (Bumpus, 1973, Richardson et al., 1973), or small scale, covering an area off one state (Bumpus, 1955, Wells and Gray, 1960, Gray and Cerame-Vivas, 1963, Blanton, 1971, Stefansson et al., 1971, and Schumacher and Korgen, 1976). Data were frequently so sketchy in the larger studies that only the most general circulation features could be detected. The small scale studies were often exceptionally detailed, but too narrow in areal extent to delineate large scale features. As a result, circulation on the southeastern continental shelf has been only partially elucidated.

Partly in response to this need, the Marine Resources Research Institute (MRRI) of the South Carolina Wildlife and Marine Resources Department has initiated a series of seasonal cruises along the southeastern coast of the United States as a part of the National Marine Fisheries Service Marine Resources Monitoring, Assessment, and Prediction (MARMAP) Program. MARMAP was begun in 1972 with the mission of obtaining, processing, analyzing, and distributing data pertinent to living marine resources of waters contiguous to the United States. The area covered by the MRRI-MARMAP cruises includes continental shelf and slope waters from Cape Fear, North Carolina, to Cape Canaveral, Florida.

This report is presented as a partial fulfillment of the MARMAP mission and as a means of illustrating some of the major circulation features of continental shelf waters off the southeastern United States during 1973. The results presented herein include seasonal meteorological and hydrographic data with a general interpretation of their significance. As the data from later cruises are processed and analyzed, additional reports and publications will be released.

Methods

All hydrographic data, except temperature, were derived from water samples collected aboard the R/V Dolphin during 1973. Temperature was determined using reversing thermometers (placed on Niskin bottles) and bathythermographs, both mechanical and expendable. Unprotected thermometers were used at deep stations to determine the depths of reversal.

Dissolved oxygen was measured at sea with a Yellow Springs Instrument Company oxygen meter and probe immediately after collection. Salinity and nutrient samples were stored in polyethylene bottles and analyzed ashore. Nutrient samples were frozen immediately and not thawed until analysis, which was performed colorimetrically (Strickland and Parsons, 1972). Salinities were determined conductometrically with an induction salinometer. Analyses were begun immediately upon receipt at MRRI, but analysis of all the samples usually required 4-8 weeks.

All samples were collected during four cruises in 1973: D2-73, February 13 to March 23; D3-73, May 15-27; D4-73, July 9-10; and D5-73, October 23 to November 16. D2-73 and D3-73 had regularly spaced stations arranged about every 30' of latitude and longitude along the continental shelf and slope (Figures 1 and 2), while the other cruises had irregularly spaced stations (Figures 3 and 4).

Cruise D4-73 was primarily a neuston gear test cruise with limited hydrographic sampling (see Eldridge et al., 1977). D4-73 stations were selected at sea after the sorting and examination of neuston samples taken during neuston gear tests. Hydrographic samples were collected in areas having a relatively suitable and stable concentration of desired types of neuston fish and invertebrates (deemed appropriate for gear testing).

Cruise D5-73 had irregularly spaced, random stations, the selection of which was based on a stratified, random design to reduce bias in sampling groundfish. A set number of station positions were preselected within each of six depth strata (10-18 m, 19-27 m, 28-55 m, 56-110 m, 111-183 m, and 184-366 m).

The results are displayed in a series of horizontal and vertical graphs in Figures 5-92 and in Table 1. Wind and weather data are presented in Tables 2-7. With few exceptions the same variables are plotted for each cruise to aid in making comparisons with respect to season, depth, and location. In some instances, in particular Figure 59, graphs may appear to be incomplete, i.e. broken lines (indicating insufficient data) are drawn where samples were collected. The data are missing because the National Oceanographic Data Center judged the data to be beyond accepted ranges or simply because no data were obtained from the particular samples (mainly for nutrient samples).

Results and Discussion

Horizontal Distribution of Parameters

Density (σ_t). Less dense water is obvious near shore, particularly in the vicinity of river mouths (Figures 5-8). This is especially evident during the winter off Savannah near the mouth of the Savannah River, where σ_t values increase from < 19.0 to > 25.0 over the distance of 15-20 nautical miles (Figure 5). Low values are still to be found during spring (Figure 6), but there is no longer as great a change in density with distance offshore. The winter and fall data indicate relatively denser water near shore (north of latitude 33°00'N) as opposed to offshore. In addition, the surface σ_t distributions exhibit distinct meanders in the Gulf Stream and in coastal currents. Winter and spring isopycnals show a sharp meander and a large eddy respectively due east of Charleston at 32°30'N, 78°00'W. This area represents probable deflection of the Gulf Stream and will be discussed further in other sections.

Fifty meter σ_t contours show zones of higher density water similar to those at the surface (Figures 9-11). Once again the area east of Charleston exhibits relatively high densities. The overall trends approximate those at the surface.

One hundred meter σ_t values continue the patterns found in shallower water with higher density water located east of Charleston (Figures 12-14). In winter and spring there was a large zone of high density water located in the area east of Savannah to north of latitude 33°00'N.

Bottom values of σ_t seem to be rather smooth with only a few pockets of constant density apparent (Figures 15-17). Bottom isopycnals near the shelf edge follow shelf contours reasonably closely, especially for D3-73 isopycnals. Bottom and surface σ_t values nearshore are essentially the same due to the shallow depths separating them.

Temperature. Surface water temperatures ranged from a low of less than 10°C in February to a high of 30°C in July. Greatest seasonal variation occurred inshore where the temperature range was approximately 10°-29°C (Figures 18-21). Surface waters near the Gulf Stream showed far less variation seasonally with a range of about 5°C, i.e. 25°C in February to about 30°C in July. This is quite similar to conditions off North Carolina as reported by Stefansson and Atkinson (1967). Nearshore waters generally followed air temperatures in addition to being influenced by runoff. Waters along the coast illustrated the marked warming influence of the Gulf Stream, where surface temperature changed from < 10°C to 20°C over the distance of about 30 nautical miles under winter conditions (Figure 18).

Both spring and summer data showed relatively little difference between nearshore and offshore surface water temperatures, although some zones of cool water were still to be found near river mouths (Figure 19). Apparently insolation had not completely warmed all shelf surface waters evenly by May, but these same waters had nonetheless increased in temperature by 5°-10°C.

Fifty meter water was comparatively constant in temperature near the shelf edge, where temperatures varied from about 19°-27°C over the entire year (Figures 22-24). Several zones had spatial and temporal variations on the order of 2°-3°C, such as areas off Cape Canaveral and southern Georgia. An area of greater contrast is due east of Charleston (32°30'N, 78°00'W), where the temperature is noticeably lower than surrounding waters during winter and spring (Figures 22-23). These lower temperatures are apparently the result of upwelling of deeper water due to an eastward turn of the Gulf Stream.

One hundred meter isotherms resemble 50 m contours in shape, but are somewhat lower overall in temperature (Figures 25-27). Minima of < 13°C east of Charleston and Savannah and a maximum of 26°C north of Cape Canaveral were recorded in spring and fall respectively (Figures 26-27). While the maximum 100 m temperature was only 1°C lower than the 50 m maximum, the 100 m minima were 3°-5°C lower than corresponding 50 m minima (Figures 22-27).

Bottom temperature contours, in contrast to shallower isotherms, do not exhibit distinct zones of cold water, although water < 10°C is evident beyond the shelf edge for each season (Figures 28-30). Warm water zones are present in many areas, both nearshore and at the shelf edge. Winter isotherms show the warmest water at or near the shelf edge, bounded on both sides by colder water (Figure 28).

Salinity. Surface salinity values varied in a predictable fashion with lower values nearshore (< 27.0 ‰) and higher values in the vicinity of the Gulf Stream (up to 37.0 ‰) as seen in Figures 31-34. During fall and winter the Stream appears to come close to shore in several areas as shown by high surface salinities. Due to mixing of shelf and Gulf Stream waters, surface salinities alone are not conclusive proof of Gulf Stream intrusions. They do suggest, however, that Gulf Stream water does approach within 15 miles of shore.

Fifty meter salinity contours (Figures 35-37) suggest that deeper water has risen as indicated by areas of lower salinity east of Charleston. Meanders or deflection of the Gulf Stream would enable denser, less saline waters to rise.

One hundred meter isohalines are also quite complex with many similarities to 50 m contours (Figures 38-40). In the area due east of Charleston salinity values are lower than corresponding 50 m values in keeping with the premise that slope water is present.

Bottom isohalines extend along the coast and shelf edge smoothly, especially in winter and spring (Figures 41-43). Offshore the lowest salinities are found along the bottom, in keeping with the trend of decreasing salinity with depth. Along the shelf, salinity increases on the bottom out to the shelf edge (Figures 41-43). Nearshore bottom salinities are essentially the same as the respective surface salinity values, since depths are less than 20 m in many areas.

Dissolved Oxygen. Dissolved oxygen is the most difficult of the parameters to interpret. Trends, when evident, cannot be readily correlated with such physical processes as runoff or Gulf Stream meanders. This is not surprising when considering that oxygen is a dissolved gas subject to biological processes such as respiration and photosynthesis and to physical processes such as turbulent mixing, diffusion, and advection.

Surface oxygen patterns appear to follow temperature patterns to a great extent, i.e. low temperatures and high oxygen concentrations (Figures 18, 19, 21, and 44-46). However, since temperature and oxygen concentrations do not correlate in every case, some factor other than temperature must be affecting oxygen concentrations.

Both 50 and 100 m plots indicate zones of low oxygen concentrations east of Charleston (Figures 47-52). Two zones are visible in the winter cruise, while a rather broad area of low oxygen is the case for spring and fall. At these depths low temperature and low oxygen concentrations correlate as a result of the uplift of relatively cold, oxygen-poor slope water (Figures 22-27, 47-52).

Bottom dissolved oxygen concentrations follow trends similar to those of other parameters, i.e. contours follow the shelf edge rather closely (Figures 53-55). As in the case of 50 and 100 m oxygen concentrations, bottom oxygen patterns reflect the influence of slope water on oxygen concentrations. Water at or beyond the shelf edge is colder and lower in oxygen than shallower water near shore (Figures 28-31 and 53-55).

Orthophosphate. As a result of the inherent problems in sample preservation of frozen micronutrients, only orthophosphate data from the D3-73 cruise will be discussed. The surface distribution of orthophosphate, though somewhat complex, is predictable with very low values offshore and high values near river mouths (Figure 56). Concentrations ranged from 0-0.16 ug-at/l.

Both 50 and 100 m distributions indicate zones of relatively high orthophosphate concentrations due east of Charleston (Figures 57 and 58). Concentrations at 50 m are 8 times higher than at the surface, while 100 m values are 9-10 times higher than surface concentrations.

Bottom orthophosphate concentrations are higher than corresponding 100 m values east of Charleston (Figure 59). These high values, however, are distributed over a larger area along the shelf edge than both 50 and 100 m concentrations, somewhat like the bottom distributions of other parameters previously discussed.

Vertical Distribution of Properties

Vertical distributions of the variables were plotted in east-west transects of the continental shelf. Wherever possible, transects at similar locations were chosen for a seasonal comparison. This was not feasible in each case due to the fact that cruise D3-73 did not extend south of 31°00'N and cruise D5-73 had randomly distributed stations. The isopleths were drawn using a bottom contour representing the actual station depths for a particular transect. It should be noted, however, that during the spring cruise at 31°30'N the bottom dropped off during a station, as a result of drifting in the main current of the Gulf Stream (Figures 63, 69, 76 and 82). The bottom contour shown represents the recorded depth at that station.

Density (σ_t). The distribution of density shows quite plainly the core of the Gulf Stream during the winter cruise of 1973, e.g. the Gulf Stream is easily located by examining Figures 60 and 61, in which the isopycnals slope downward steeply near the shelf edge, indicating the left edge of the Gulf Stream. The Stream appears to be slightly beyond the shelf break in each case, but a broadening of isopycnals over the shelf indicates a shoreward movement. At 32 30'N (Figure 61c) the Stream seems to be deflected eastward, allowing relatively high density water, i.e. σ_t of 26.5, to be uplifted near the edge of the continental shelf.

The same general situation exists for spring in that the core of the Gulf Stream is beyond the shelf edge, though not so well defined (Figures 63 and 64). Once again the main current appears to have turned eastward in the 32°30'N region (Figure 64a). The similarity between winter and spring vertical distributions, however, does not include continental shelf water, for there is no dense water on the shelf in the spring even at 32°30'N.

The fall density distribution indicated a return to winter conditions with high density water ($\sigma_t \geq 26.0$) on the shelf once again (Figure 65). This high density water, shown in Figures 8 and 65f, apparently originated offshore, since the salinity range in the same area (south of Cape Fear) was 36.4-36.6 $^{o}/oo$ (Figure 34). Also a suggestion of upwelling was evident in the 32°30'N and 33°00'N transects (Figures 65e and f).

Temperature. As should be expected, vertical temperature structure is virtually identical to vertical density structure. D2-73 distributions illustrate this well by showing the Gulf Stream core with water > 25°C just beyond the edge of the continental shelf (Figures 66 and 67). Comparatively warm water, i.e. > 16°C, is evident along the outer continental shelf (Figures 66-68). Also at 32°30'N the temperature structure shows plainly a doming of isotherms, indicative of the zone of upwelling (Figures 67c and 68a).

D3-73 temperature data in like manner correspond to D3-73 density data very closely. Warm water can be seen along the continental shelf with temperatures up to 24°C (Figures 69 and 70). As in winter the zone of upwelling is clearly delineated at 32°30'N, where the isotherms are convex upwards.

For D4-73 the only parameter with sufficient data for a graph of vertical distribution is temperature (Figure 71). Temperatures in excess of 28°C can be found in the shallow water near shore, while water further offshore is only slightly cooler. This vertical section in conjunction with D4-73 surface plots (Figures 20 and 33) illustrates that comparatively warm water of high salinity was present in the area.

Fall temperatures are practically identical in distribution to fall densities (Figure 72). Warm water of 24-25°C can be found on the shelf at each transect. At 32°30'N the temperature data intimate an area of uplift, but once again as for density the isotherms do not extend seaward far enough to delineate the full extent of the uplift (Figure 72e).

Salinity. Winter vertical salinity patterns showed surface salinities < 36.2 °/oo beyond the edge of the continental shelf in the region occupied by the Gulf Stream (Figures 73-75). Each transect had relatively high salinities (≥ 32.0 °/oo) on the shelf, except for two transects in the region south of Savannah (Figures 73c and 74a). Upwelling was indicated at 32°30'N, 78°00'W by doming of the isohalines (Figures 74c and 75a).

Spring vertical salinity patterns (Figures 76 and 77) are distinctly different in shape from corresponding temperature and density profiles. As in the winter example salinities ≥ 33.0 °/oo were found far onto the continental shelf. Spring sections have pockets of higher salinity water (≥ 36.0 °/oo) beyond the shelf break indicating the presence of Gulf Stream water. Unlike the winter data, however, upwelling is indicated at 32°00'N (Figure 76c) and 32°30'N (Figure 77a) with convex isohalines pointing upward and a zone of high salinity water (> 36.2 °/oo) on either side.

Fall vertical salinity profiles indicate very high salinity water (≥ 35.0 °/oo) near shore (Figure 78) in keeping with reduced runoff due to very limited rainfall (Figure 92). Some evidence of upwelling can be seen at 32°30'N, 78°00'W (Figure 78e), where the isohalines slope upward.

Dissolved Oxygen. Highest winter oxygen concentrations can be seen along the shelf in each case, for oxygen is as high as 6.5 ml/l in shallow areas (Figures 79-81). Values up to 5.0 or 5.5 ml/l can be found in surface waters out to and beyond the shelf edge. The overall picture is one of decreasing oxygen concentrations with depth and distance from shore, with concentrations being < 3.5 ml/l below 200-300 m.

Spring dissolved oxygen data are likewise complex with many pockets of both high and low oxygen concentrations (Figures 82 and 83). While values do tend to be higher in surface water along the continental shelf than in subsurface water beyond the shelf, the concentrations are not as high as in winter, e.g. only > 5.5 ml/l in one small area and generally 5.0 ml/l or less. Values of 3.0-3.5 ml/l can now be found in waters < 100 m deep as compared to 200-300 m in winter.

Fall oxygen data only indicate maxima and minima for all practical purposes since the isopleths are very short (Figure 84). As above, the highest oxygen concentrations are found along the shelf in surface waters. Most concentrations are between 3.0 and 4.5 ml/l, thus being lower on the average than during the spring cruise. Values of 3.5 ml/l are evident in a few instances in water < 100 m, but such low concentrations are not as common as during spring.

Other Vertical Distributions

Orthophosphate. Due to limited data only one spring vertical section for orthophosphate was graphed (Figure 85). Since this transect was taken through the zone of upwelling east of Charleston, it is interesting to note the relatively high concentrations (> 0.1 ug-at/l), indicative of deep water, near the surface. This agrees favorably with data discussed above.

Composite. Figure 86 shows two composite vertical graphs of oxygen, temperature, salinity, and orthophosphate for winter and spring stations at 32°30'N, 78°00'W. Salinity and orthophosphate show no distinct seasonal variations. Salinity is high at the surface, while decreasing regularly with depth to about 200 m. Orthophosphate is low at the surface, whereas it increases sharply with depth to about 100 m and then more gradually to 300 m.

On the other hand, oxygen and temperature have noticable seasonal differences. Oxygen is about 0.5 ml/l higher at the surface in winter than in spring, presumably due to turbulent mixing and the increased solubility of oxygen in winter. Temperature varies as expected with higher temperatures at the surface, decreasing regularly with depth. The seasonal difference is simply at the surface, where the winter temperature is approximately 4°C less than the corresponding spring temperature.

Circulation

Seasonal circulation patterns were obtained from density distributions (Figures 87-89) and dynamic topography Figures 90-91). Circulation on the shelf was assumed to be more accurately represented by density distributions, whereas in deeper water beyond the shelf edge dynamic topography should have been more accurate in defining circulation patterns. All dynamic topography calculations were performed according to the method of Helland-Hansen (1934), relative to the 400 db surface. While obvious differences in circulation patterns can be seen between the two methods, there is general agreement with respect to gross circulation features. There was no DS-73 plot of dynamic topography, since few stations were occupied beyond the shelf edge.

Winter circulation included several areas with cyclonic eddies or large meanders, most of which are located east to northeast of Charleston (Figures 87 and 90). North of Cape Fear the drift is northeasterly in agreement with findings by Bumpus (1955) and Stefansson and Atkinson (1967). Along the Georgia coast there is predominantly a southwesterly drift close to shore in agreement with work by Bumpus (1973), who described southerly flowing currents as being restricted to a narrow zone near shore.

Spring circulation (Figures 88 and 91) was similar to winter circulation, except that the southerly flowing current mentioned above was better developed, particularly in the region near Charleston and southward along the Georgia coast. A probable explanation for this seasonal difference in coastal currents is based on runoff during winter and spring. Figure 92 shows the 1963-1972 and 1973 rainfall averages for West Central South Carolina, an area bordering the Savannah River due west of Columbia (U. S. Department of Commerce, 1963-1973). Salinities, taken daily in Charleston Harbor at MRRI at each tide change, illustrate quite distinctly the variation in surface and bottom salinities with rainfall (Figure 92). It is evident that rainfall in 1973 was abnormally high during winter, spring, and early summer. Also a record snowfall occurred in February with up to 24 in. being recorded in South Carolina (U. S. Department of Commerce, 1973). Based on rainfall, snowfall, and salinity data, runoff was unusually high for the first half of 1973, and hence the southwest coastal current was well developed by May.

Fall circulation (Figure 89) exhibited considerably different trends. There was no longer a distinct southerly current near shore, except in the area near Cape Canaveral. From Cape Romain northward the predominant drift was to the north without any distinct southerly current components. Based on rainfall and salinity data (Figure 92), the lack of a southerly flowing current along the South Carolina-Georgia coast is directly related to the reduced rainfall and, hence, runoff during late summer and fall.

While many of the circulation features observed in this report have been detected previously as noted above, some of these features were not clearly shown or were only suspected. The Gulf Stream apparently does move well onto the shelf in winter as observed by Blanton (1971) and discussed by Bumpus (1973). Table 1 demonstrates this quite well by using a point at midshelf southeast of Charleston as a basis for reference. The water at this point in winter has characteristics of Gulf Stream water, i.e. σ_t of 26.5, temperature $\geq 16^{\circ}$C, and salinity of 36.2 $^{o}/oo$ (Figures 61c, 67c, and 74c). Spring and summer data indicate water more typical of the continental shelf, i.e. temperatures of 21.6°C in the spring to 28.6°C in the summer, salinity of about 34.5 $^{o}/oo$, and σ_t of 24.0 in the spring and 21.7 in the summer (Figures 63-64, 69-71, and 76-77). Fall data suggested a return to winter conditions, since water having characteristics intermediate to shelf and Stream waters was found at the reference point (Figures 65, 72, and 78).

The zone of upwelling is another example of a phenomenon detected or suspected, but never shown especially clearly. Many workers (Gray and Cerame-Vivas, 1963, Blanton, 1971, and Stefansson et al., 1971) have mentioned upwelling along the continental shelf, particularly at the shelf break, and theorized as to the possible causes. The general opinion is that the Gulf Stream is deflected eastward, thereby allowing upwelling or an intrusion of slope water at the shelf edge. The problem has been to explain the driving force for Stream deflection. Westerly, southwesterly, or even northwesterly winds have been suggested as possible causes for offshore movement of the Stream (Bumpus, 1955, Gray and Cerame-Vivas, 1963), but Webster (1961) estimated that the kinetic energy contributed by winds is at least an order of magnitude less than needed to sustain a meander. If winds are not responsible for the deflection of the Gulf Stream, then bottom topography may be the determining factor (Pashinski and Maul, 1973 and Rao et al., 1971). The main current appears to strike the shelf edge and turn to the east. A mechanism of this type is gaining acceptance at many institutions, and due to the semi-permanent nature of the deflection (Pashinski and Maul, 1973) the term "permanent wave" has been applied (L.P. Atkinson, personal communication).

Summary and Conclusions

Results of 1973 seasonal observations of both physical and chemical parameters of continental shelf and slope waters of the southeastern United States have been presented and discussed. Spatial and temporal distributions of these parameters were described and used, where applicable, to obtain general circulation patterns along the continental shelf.

In particular, a zone east of Charleston was identified as an area of upwelling throughout the year. Relatively cold, nutrient-rich water was detected near the surface during winter, spring, and fall. A distinct deflection of the Gulf Stream in this area was identified as the probable cause for the upwelling, although the reason for the deflection was not ascertained. While winds may appear to correlate with a deflection of the Gulf Stream, they probably do not possess the energy necessary to produce the observed deflection (Webster, 1961). The Stream may simply strike the continental shelf and be deflected by the bottom topography.

Other features noted include the evidence for a well-established southerly current near shore. Our data indicated a southwesterly flowing current during winter and spring in keeping with unusually high runoff. By fall this current had vanished due to greatly diminished runoff.

The presence of water with Gulf Stream charcteristics was also detected within 15-20 miles of Charleston during the winter cruise. Spring and limited summer observations did not show water of the same type, although fall data indicated water intermediate to Gulf Stream and shelf water.

In conclusion, the general results of this study have pointed out significant physical and chemical characteristics during 1973 in waters along the southeastern United States. These results have helped to clarify some circulation features, but quite obviously additional work is needed to understand more fully the complex circulation patterns commonly found along the continental shelf. Due to the complicated interactions of runoff, winds, coastal currents, and the Gulf Stream, it may be that the only way to get a detailed circulation picture will be to obtain synoptic data from a series of semi - permanent stations.

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Table 1

SEASONAL CONDITIONS AT A NEARSHORE STATION

SEASON CRUISE	STATION #	LOCATION	DATE	BOTTOM DEPTH(M)	SURFACE				BOTTOM			
					t°c	S °/oo	σ_t	O_2 ml/l	t°c	S °/oo	σ_t	O_2 ml/l
WINTER D2-73	8	32°30'N 79°30'W	20:II:73	18	16.7	36.22	26.54	5.42	16.6	36.18	26.54	5.17
SPRING D3-73	24	32°30' 79°30'	19:V:73	20	21.6	34.59	24.04	5.22	21.35	34.56	24.09	5.16
SUMMER D4-73	6 (124)	32°30'N 79°30'W	9:VII:73	18	28.9	34.46	21.71	--	22.0	N O D A T A		
FALL D5-73	57	32°29'N 79°39'W	05:XI:73	20	20.7	35.65	25.09	4.48	21.07	36.18	25.39	4.55

Table 2

WIND D2-73 (13.II - 23.III.73)

Beaufort Scale	0		1		2		3		4		5		6		7		8		9		10			
Speed in Knots	<1 Calm		1-3		4-6		7-10		11-16		17-21		22-27		28-33		34-40		41-47		48-55		Σf	%
Direction	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
N					1	1.5	2	3.1			1	1.5	1	1.5									5	7.6
NE					1	1.5	2	3.0	5	7.6			1	1.5									9	13.6
E					2	3.0	2	3.0	3	4.6	1	1.5											8	12.1
SE					1	1.5	1	1.5	2	3.0	3	4.6											10	15.2
S					1	1.5	3	4.5	4	6.1	2	3.0	3	4.6									13	19.7
SW					1	1.5	1	1.5	4	6.1	4	6.1	2	3.0									12	18.2
W							2	3.0	2	3.1			1	1.5									5	7.6
NW									2	3.0	1	1.5											3	4.5
CALM	1	1.5																					1	1.5
Σf	1		-		7		13		22		12		11		-		-		-		-		66	
%		1.5		-		10.5		19.6		33.5		18.2		16.7		-		-		-		-		100.0

Table 3

WEATHER D2-73 (13.II - 23.III.73)

Cloud Form	Ci	Cc	Cs	Ac	As	Ns	Sc	St	Cu	Cb	Clear	Total
Frequency	7	2	0	17	6	3	8	0	28	4	9	84
%	8.3	2.4	0.0	20.2	7.2	3.6	9.5	0.0	33.3	4.8	10.7	100%

Days With:			Cloud Cover (%)			Air Temperature (t°C)			
Rain	Thunderstorm	Fog	Max.	Average	Min.		Max.	Average	Min.
3	1	0	100	50.6	0	Dry	30.6	20.7	5.0
						Wet	25.0	≤18.0	<5.0

Air Temperature (t°C)	4.0 to 5.9	6.0 to 7.9	8.0 to 9.9	10.0 to 11.9	12.0 to 13.0	14.0 to 15.9	16.0 to 17.9	18.0 to 19.9	20.0 to 21.9	22.0 to 23.9	24.0 to 25.9	26.0 to 27.9	28.0 to 29.9	30.0 to 31.9	%
Dry Bulb (%)	1.5	0.0	1.5	0.0	1.5	4.5	10.4	23.9	22.4	11.9	10.4	7.5	3.0	1.5	100%

Table 4

WIND DIRECTION D3-73 (15V-27.V.73)

Beaufort Scale	0		1		2		3		4		5		6		7		8		9		10			
Speed in Knots	<1 Calm		1-3		4-6		7-10		11-16		17-21		22-27		28-33		34-40		41-47		48-55		Σf	%
Direction	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
N							1	2.3	1	2.3	1	2.3	1	2.3									4	9.2
NE					2	4.7	1	2.3			1	2.3											4	9.3
E							3	7	1	2.3	1	2.3											5	11.6
SE																							-	-
S					2	4.7	2	4.7	1	2.3	4	9.4	1	2.3	1	2.3							11	25.7
SW					1	2.3	2	4.7	3	7.0	2	4.7	1	2.3									9	21.0
W							1	2.3	1	2.3	3	7.0	3	7.0									8	18.6
NW					1	2.3					1	2.3											2	4.6
CALM																							-	-
Σf					6		10		7		13		6		1								43	
%						14.0		23.3		16.2		30.3		13.9		2.3								100.0

Table 5

WEATHER D3-73 (15.V - 27.V.73)

Cloud Form	Ci	Cc	Cs	Ac	As	Ns	Sc	St	Cu	Cb	Clear	Total
Frequency	5	0	0	15	18	4	4	0	12	6	8	72
%	6.9	0	0	20.8	25.0	5.6	5.6	0	16.7	8.3	11.1	100

Days With:				Cloud Cover (%)			Air Temperature (t°C)			
Rain	Thunderstorm	Fog	Waterspout	Max.	Average	Min.		Max.	Average	Min.
3	0	0	1	100	48.9	0	Dry	28.0	24.2	18.0
							Wet	25.0	21.1	13.0

Air Temperature (t°C)	10.0 to 11.9	12.0 to 13.9	14.0 to 15.9	16.0 to 16.9	18.0 to 19.9	20.0 to 21.9	22.0 to 23.9	24.0 to 25.9	26.0 to 26.9	28.0 to 28.9	30.0 to 30.9	32.0 to 32.9	%
Dry Bulb (%)	0.0	0.0	0.0	0.0	4.6	14.0	16.3	39.5	23.3	2.3	0.0	0.0	100%

Table 6

WIND D5-73 (23.X - 16.XI.73)

Beaufort Scale	0		1		2		3		4		5		6		7		8		9		10			
Speed in Knots	<1 Calm		1-3		4-6		7-10		11-16		17-21		22-27		28-33		34-40		41-47		48-55		Σf	%
Direction	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%		
N					2	2.2							1	1.1									3	3.3
NE					1	1.1							4	4.5	1	1.1							6	6.7
E					2	2.3	1	1.1			1	1.1											4	4.5
SE																								
S					1	1.1	6	6.7	5	5.6	1	1.1					1	1.1					14	15.6
SW					2	2.3	2	2.3	5	5.6	6	6.7	2	2.3									17	19.2
W					1	1.1	2	2.3	10	11.3	5	5.6	3	3.4	2	2.3	1	1.1					24	27.1
NW					4	4.5	7	7.9	1	1.1	1	1.1	2	2.3	2	2.3	1	1.1					18	20.3
VARIABLE					2	2.2	1	1.1															3	3.3
CALM																								
Σf					15		19		21		14		12		5		3						89	
%						16.8		21.4		23.6		15.6		13.6		5.7		3.3						100.0

Table 7

WEATHER D5-73 (23.X - 16.XI.73)

Cloud Form	Ci	Cc	Cs	Ac	As	Ns	Sc	St	Cu	Cb	Clear	Total
Frequency	14	1	2	10	24	1	10	3	13	6	27	111
%	12.6	0.9	1.8	9.0	21.6	0.9	9.0	2.8	11.7	5.4	24.3	100.0

Days With:					Cloud Cover (%)			Air Temperature (t°C)			
No Clouds or Average Cover Less Than 10%	Average Cloud Cover More Than 50%	Rain	Fog	Thunderstorm	Max.	Average	Min.		Max.	Average	Min.
6	6	2	0	0	100	33.0	0	Dry	27.0	22.3	13.0
								Wet	24.0	19.4	12.0

Air Temperature (t°C)		10.0 to 11.9	12.0 to 13.9	14.0 to 15.9	16.0 to 17.9	18.0 to 19.9	20.0 to 21.9	22.0 to 23.9	24.0 to 25.9	26.0 to 27.9	%
Dry Bulb	f		1	1	5	13	8	22	34	4	88
	%		1.1	1.1	5.7	14.8	9.1	25.0	38.5	4.5	100

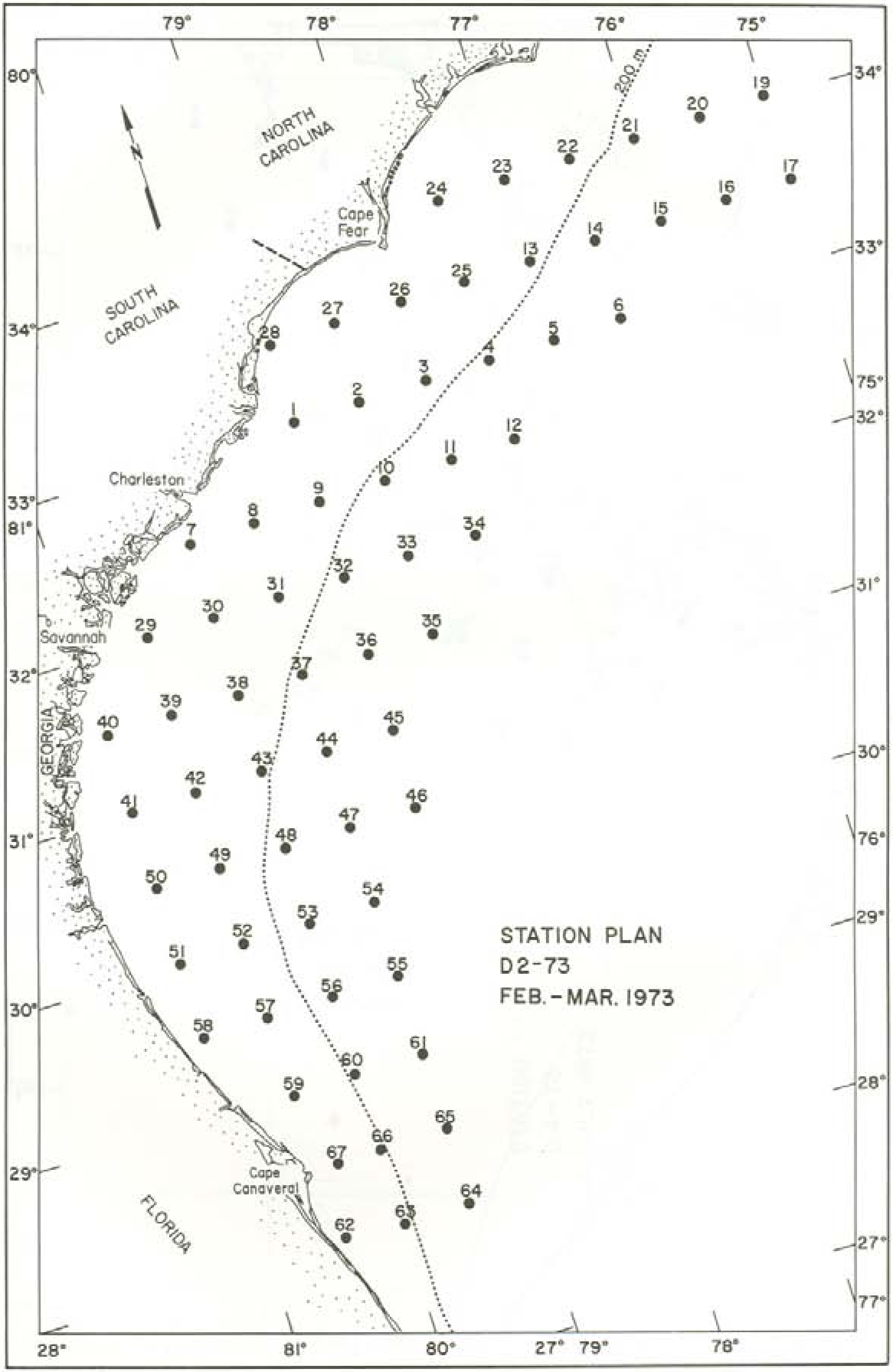

STATION PLAN
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 1

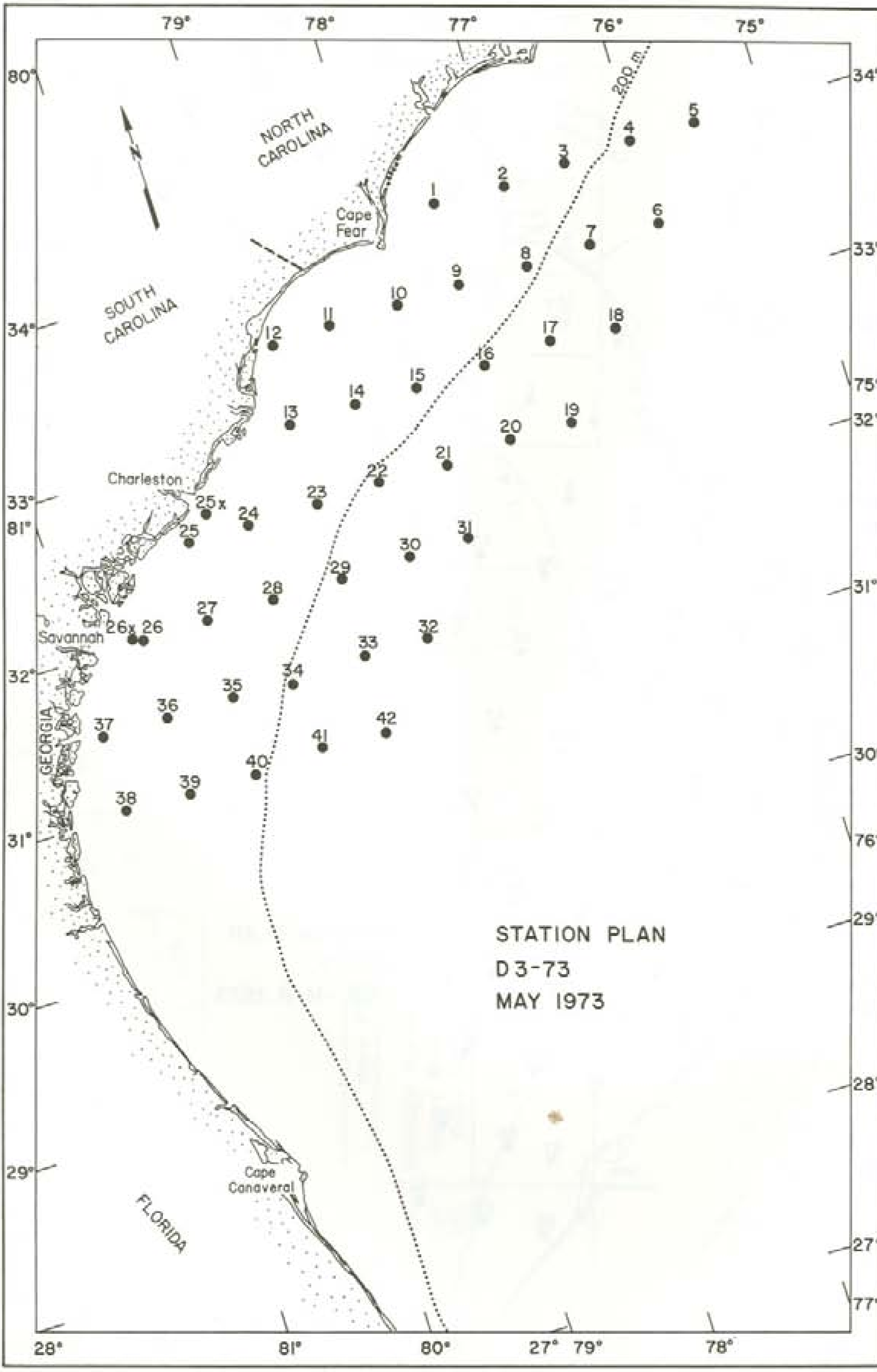

STATION PLAN
D3-73
MAY 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 2

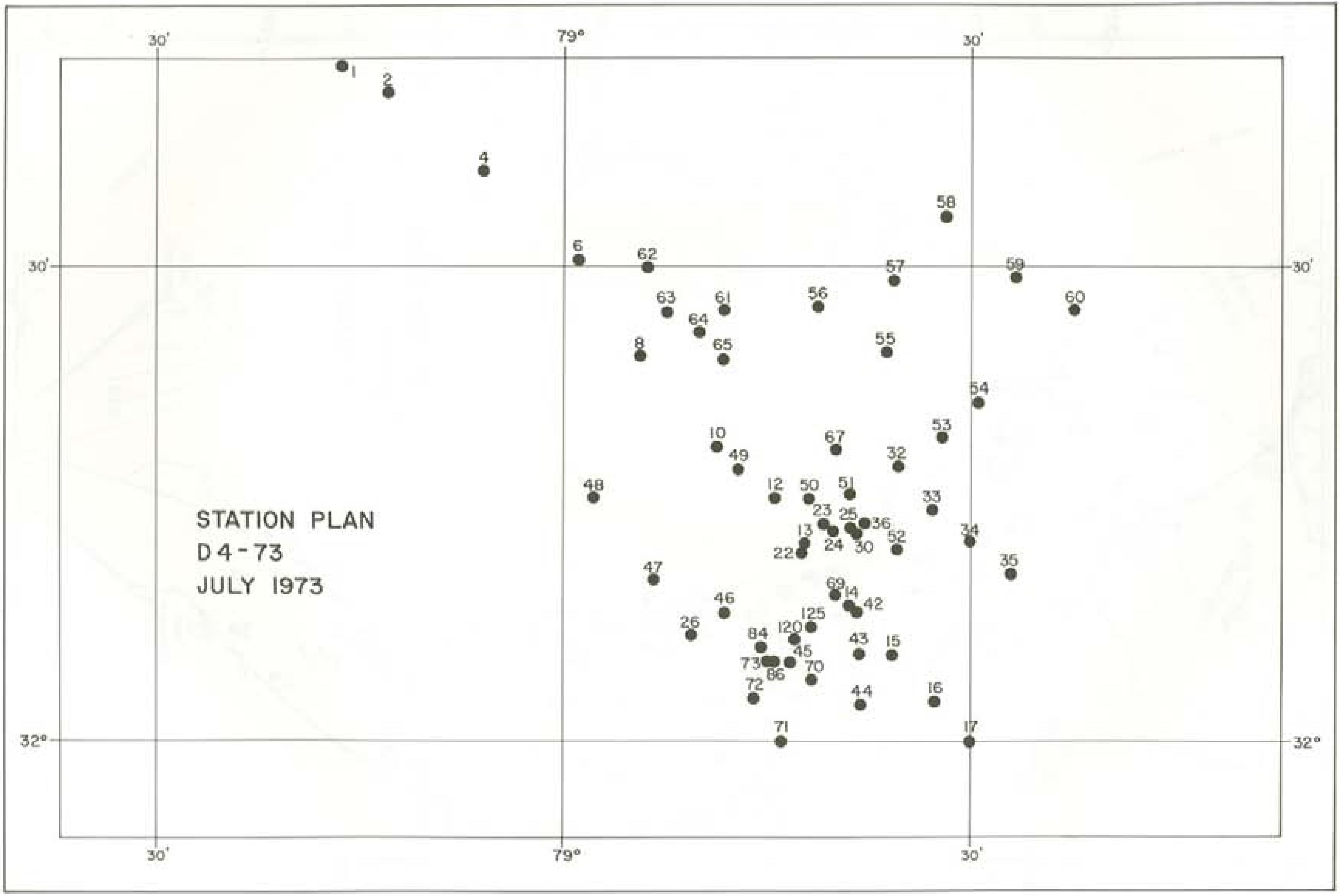

STATION PLAN
D4-73
JULY 1973
30'
79°
30'
32°
1
2
4
6
8
10
12
13
14
15
16
17
22
23
24
25
26
30
32
33
34
35
36
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
67
69
70
71
72
73
84
86
120
125

FIGURE 3

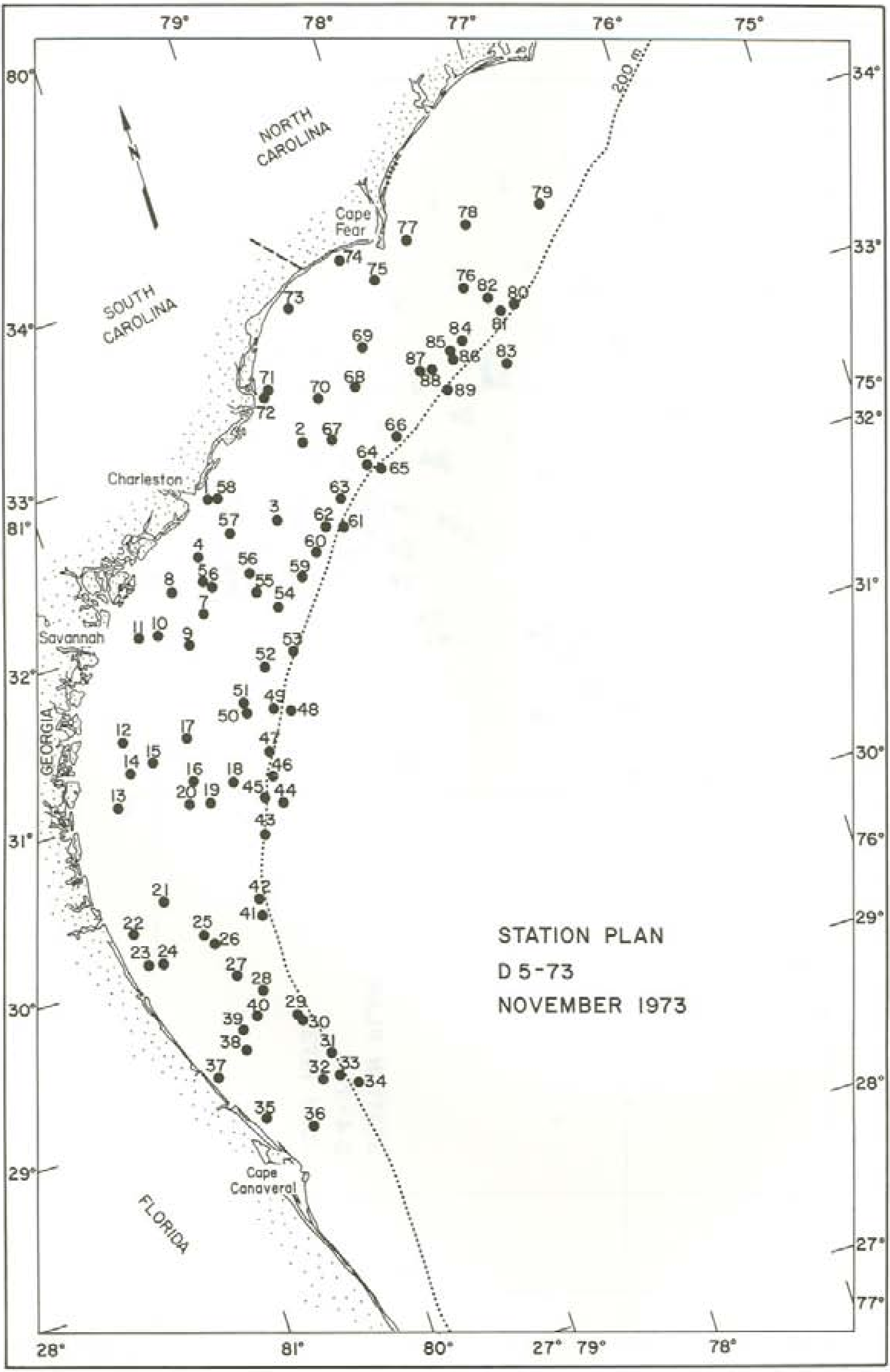

STATION PLAN
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m.
N
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°

FIGURE 4

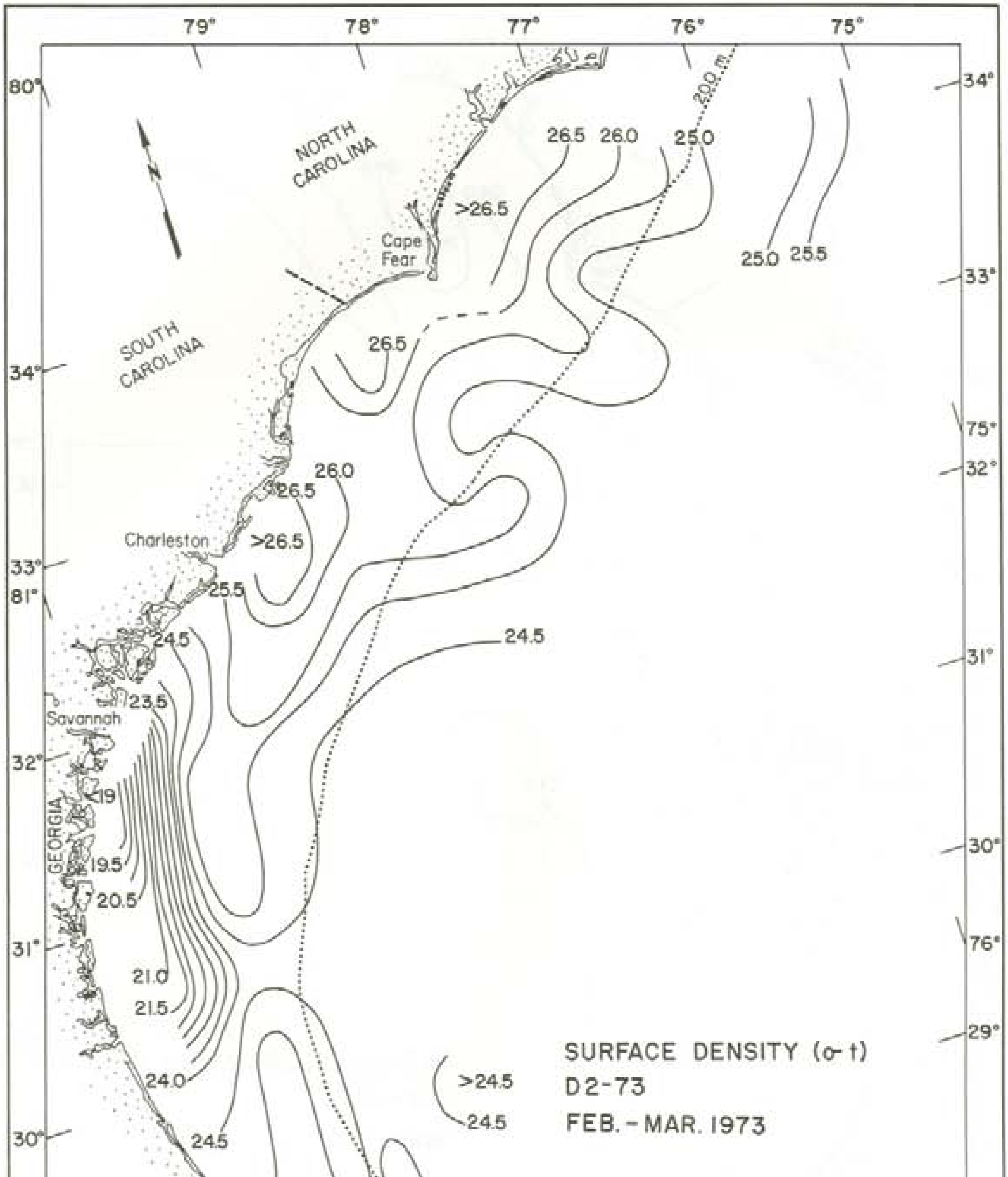
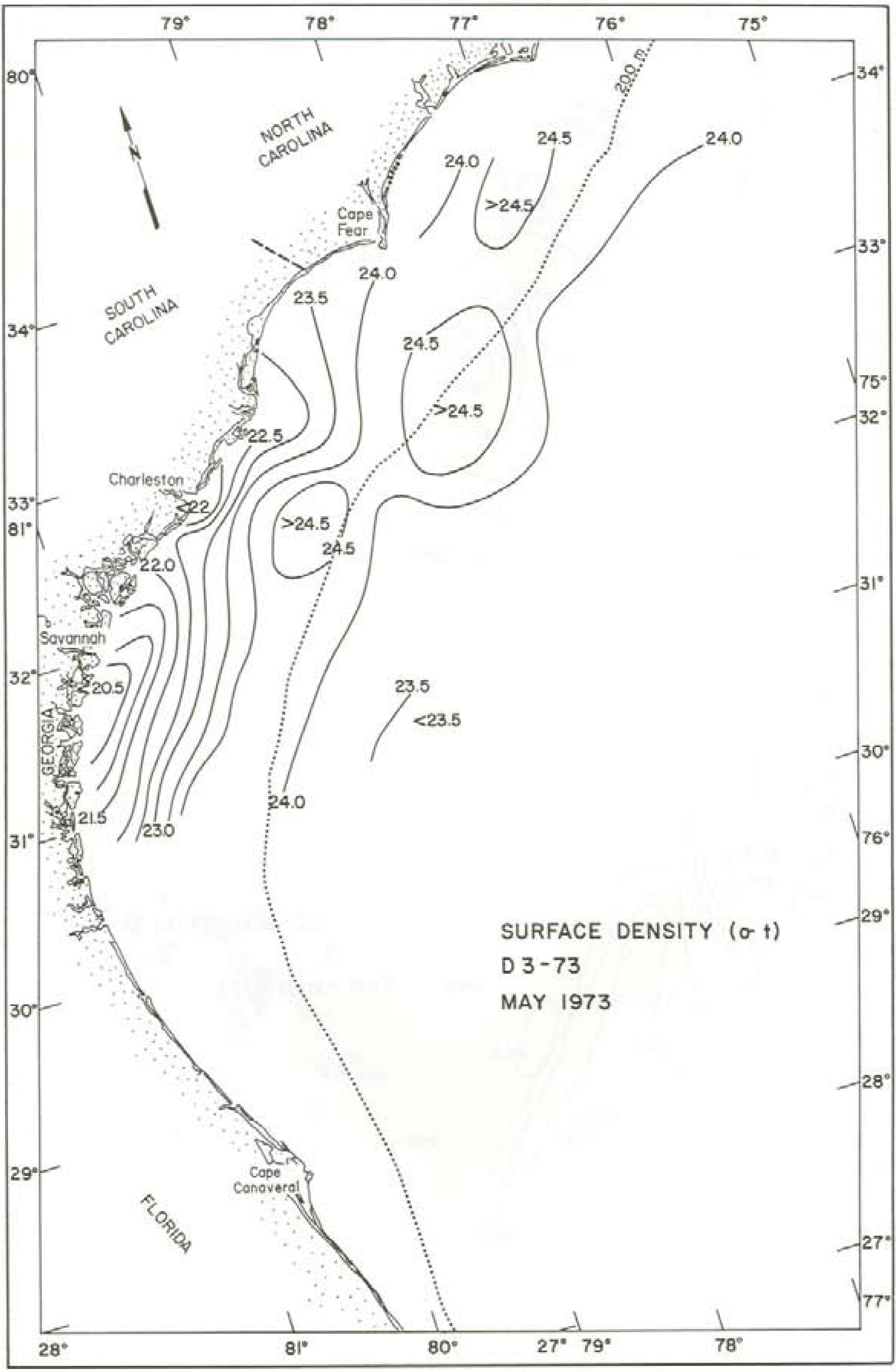

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
SURFACE DENSITY (σ-t)
D2-73
FEB. - MAR. 1973

FIGURE 5



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
24.0
24.5
>24.5
23.5
22.5
>24.5
<22
22.0
20.5
21.5
23.0
<23.5
SURFACE DENSITY (σ t)
D 3-73
MAY 1973

FIGURE 6

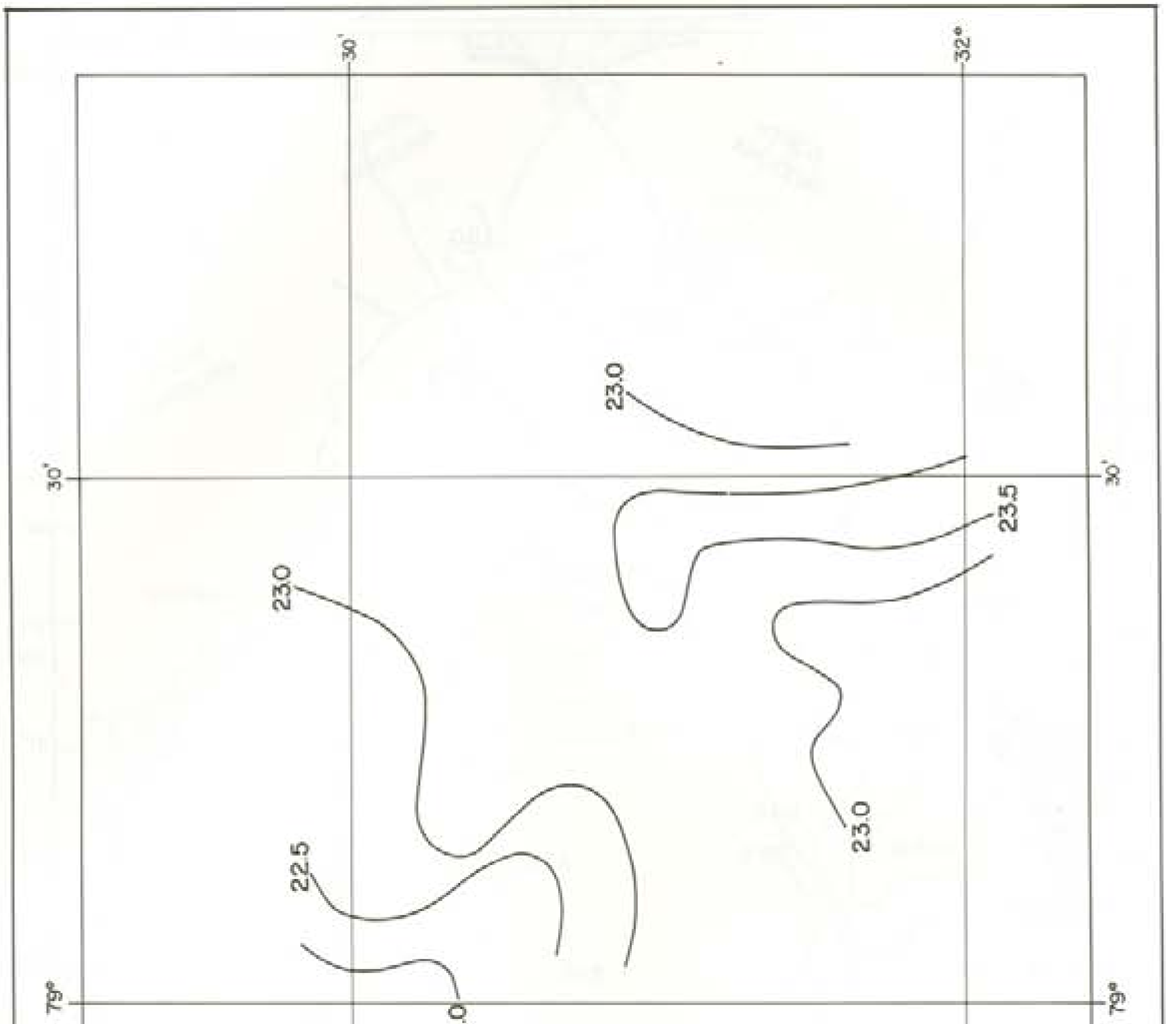

SURFACE DENSITY (σ-t)
D4-73
JULY 1973
17.0
20.0
21.0
22.0
22.5
23.0
23.5
30'
32°
79°

FIGURE 7

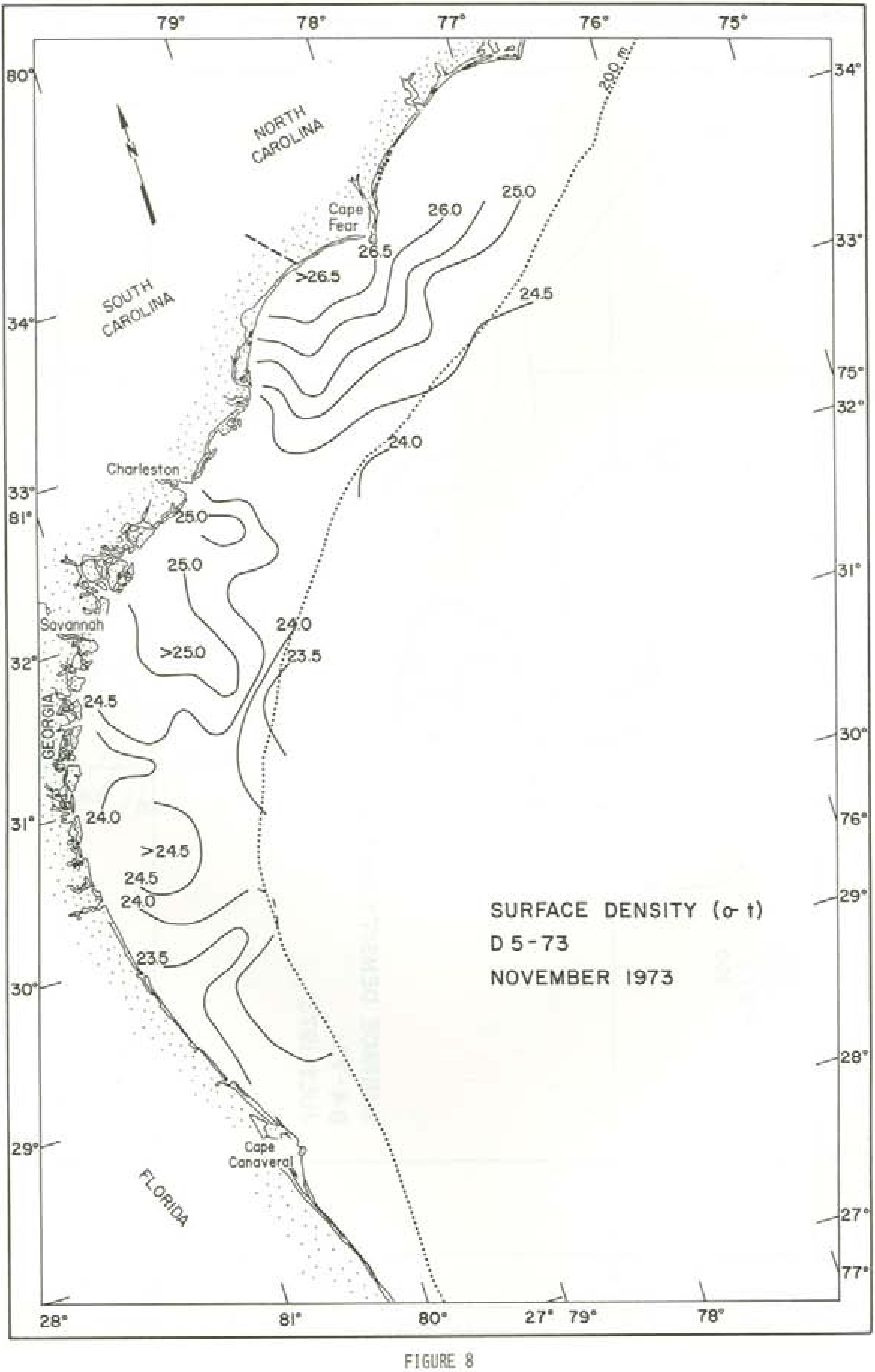

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m.
N
26.0
25.0
26.5
>26.5
24.5
24.0
25.0
25.0
>25.0
24.0
23.5
24.5
24.0
>24.5
24.5
24.0
23.5
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°
75°
76°
77°
SURFACE DENSITY (σ t)
D 5-73
NOVEMBER 1973

FIGURE 8

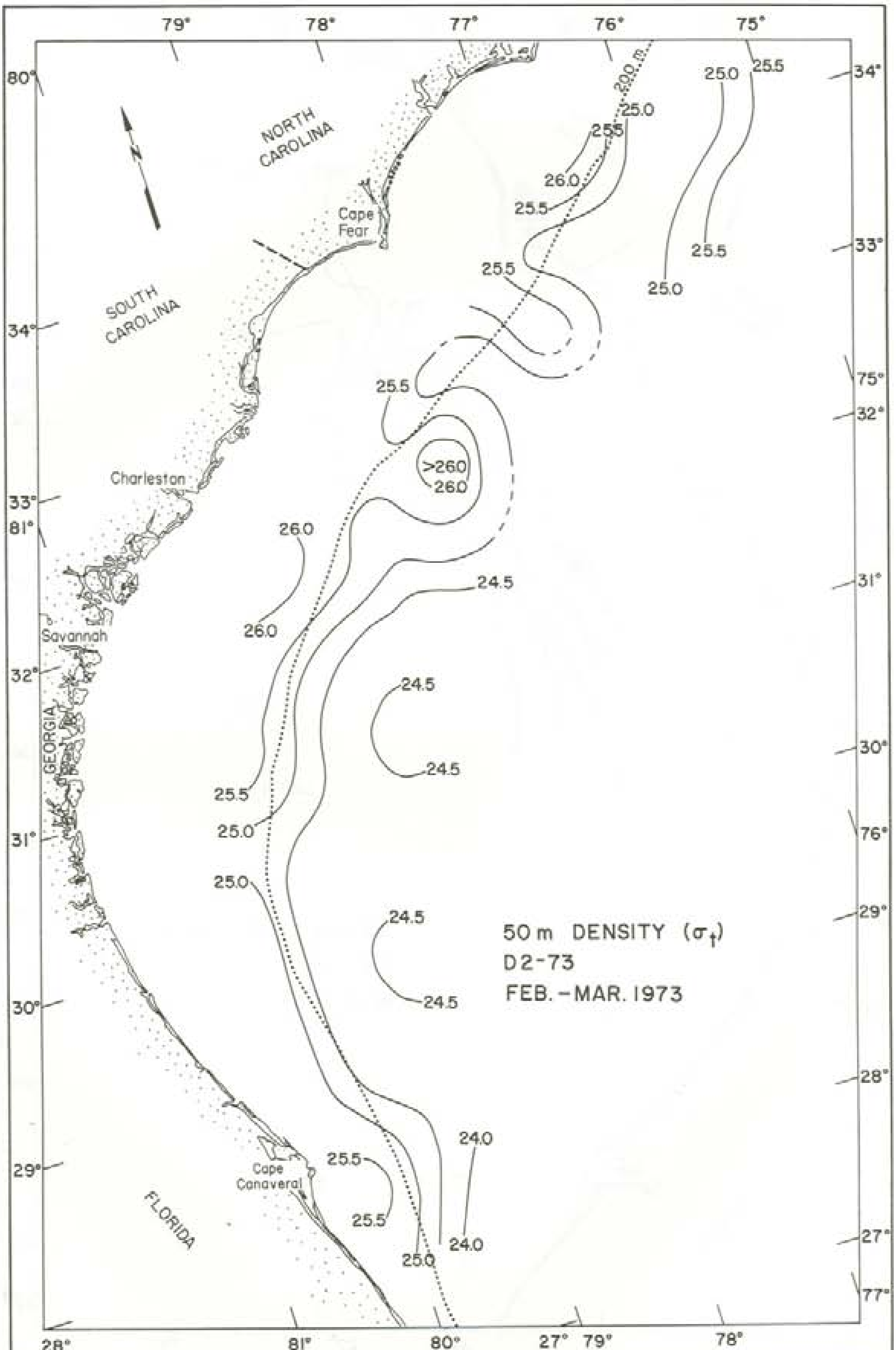

50 m DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
25.0
25.5
26.0
>26.0
24.5
24.0
79°
78°
77°
76°
75°
34°
33°
32°
31°
30°
29°
28°
27°
80°
81°

FIGURE 9

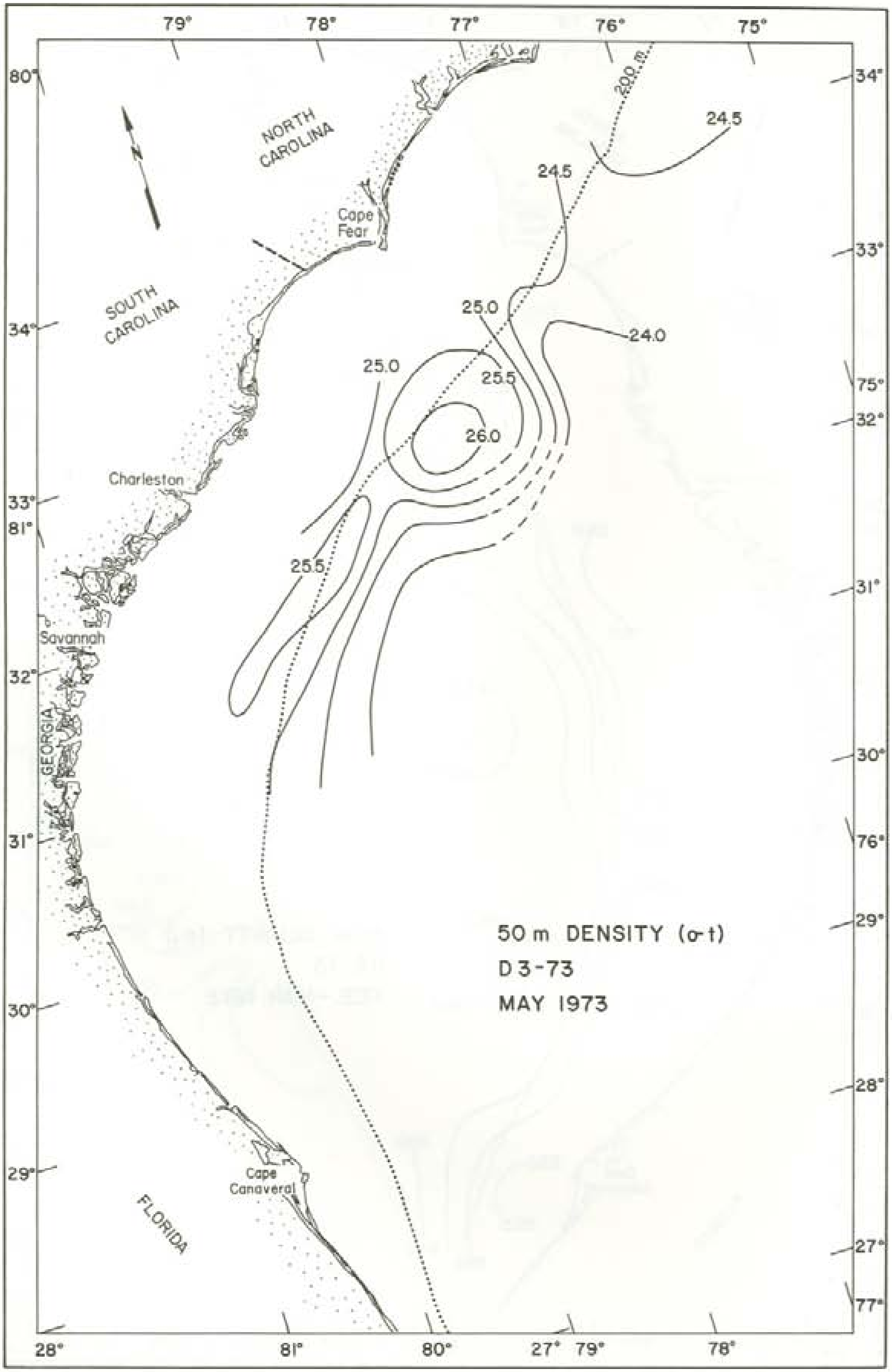
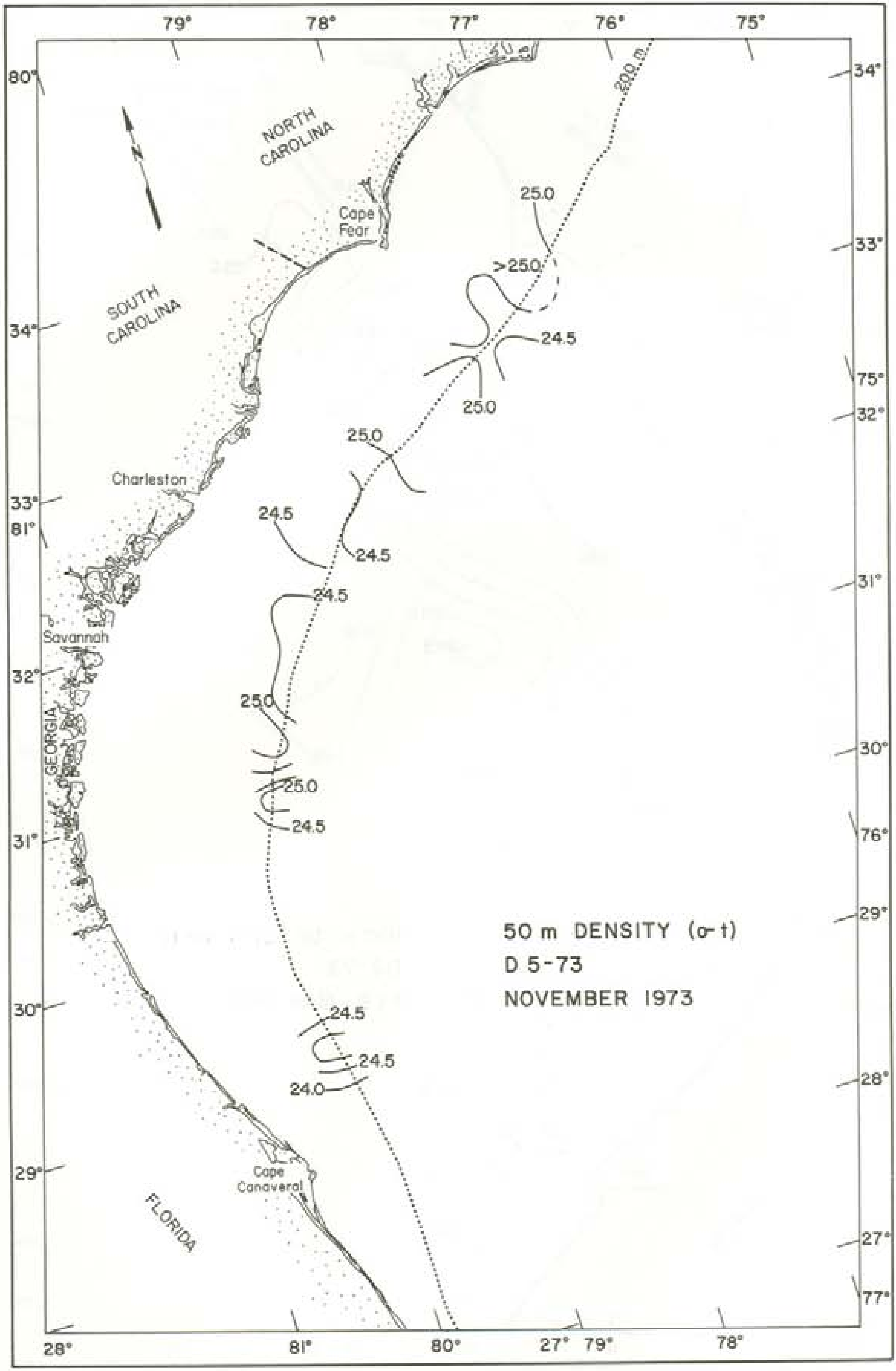

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
24.5
24.5
25.0
24.0
25.0
25.5
26.0
25.5
50 m DENSITY (σ-t)
D3-73
MAY 1973

FIGURE 10



79°
78°
77°
76°
75°
80°
34°
33°
34°
75°
32°
33°
81°
31°
32°
30°
31°
76°
29°
30°
28°
29°
27°
77°
28°
81°
80°
27°
79°
78°
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
25.0
>25.0
24.5
25.0
25.0
24.5
24.5
24.5
25.0
25.0
24.5
24.5
24.5
24.0
50 m DENSITY (σ-t)
D 5-73
NOVEMBER 1973

FIGURE 11

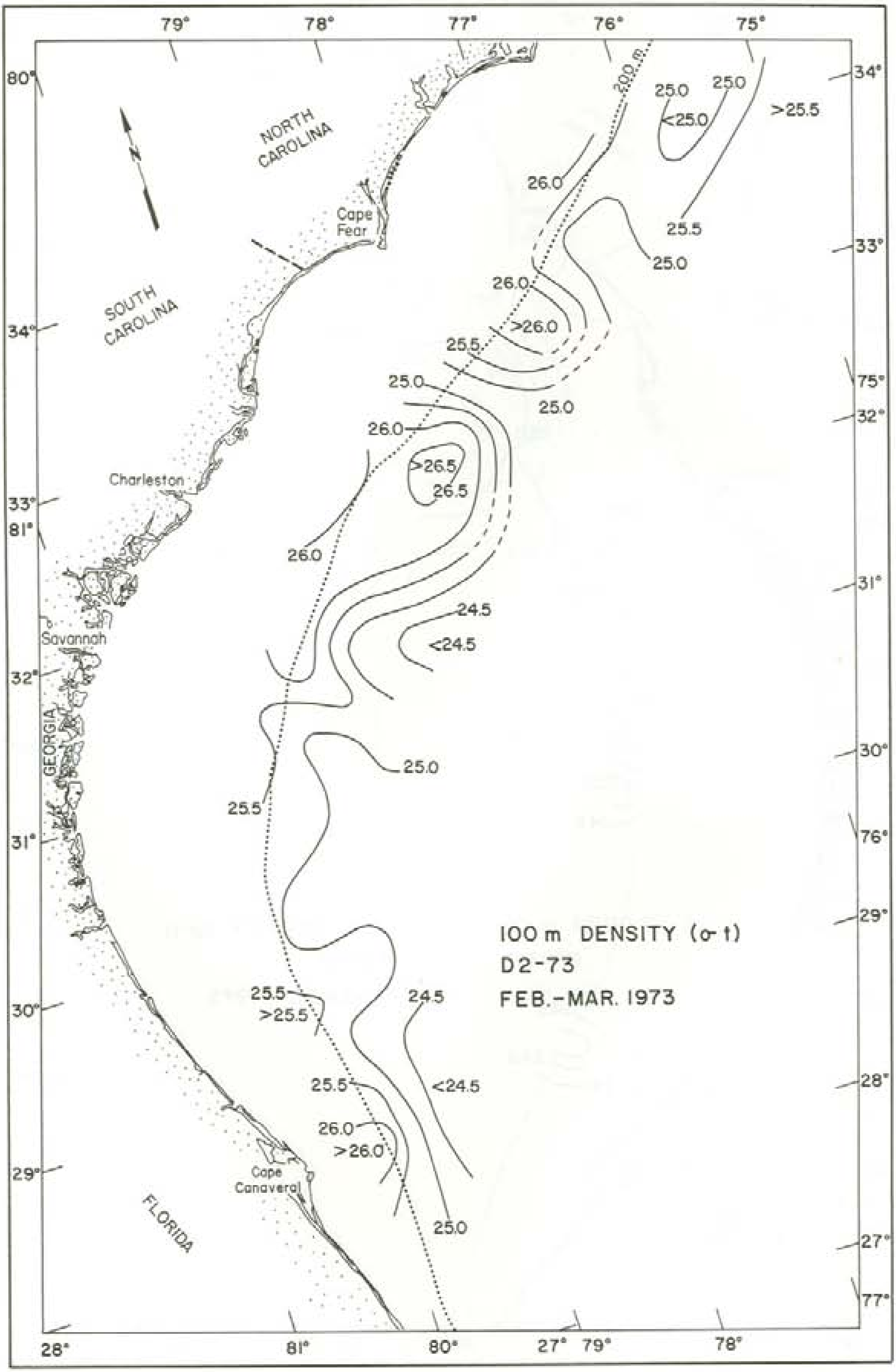

79°
78°
77°
76°
75°
80°
34°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
25.0
25.0
<25.0
>25.5
26.0
25.5
25.0
33°
26.0
>26.0
25.5
25.0
25.0
75°
32°
26.0
>26.5
26.5
26.0
31°
24.5
<24.5
30°
25.0
25.5
76°
29°
100 m DENSITY (σ-t)
D2-73
FEB.-MAR. 1973
25.5
>25.5
24.5
<24.5
28°
25.5
26.0
>26.0
25.0
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 12

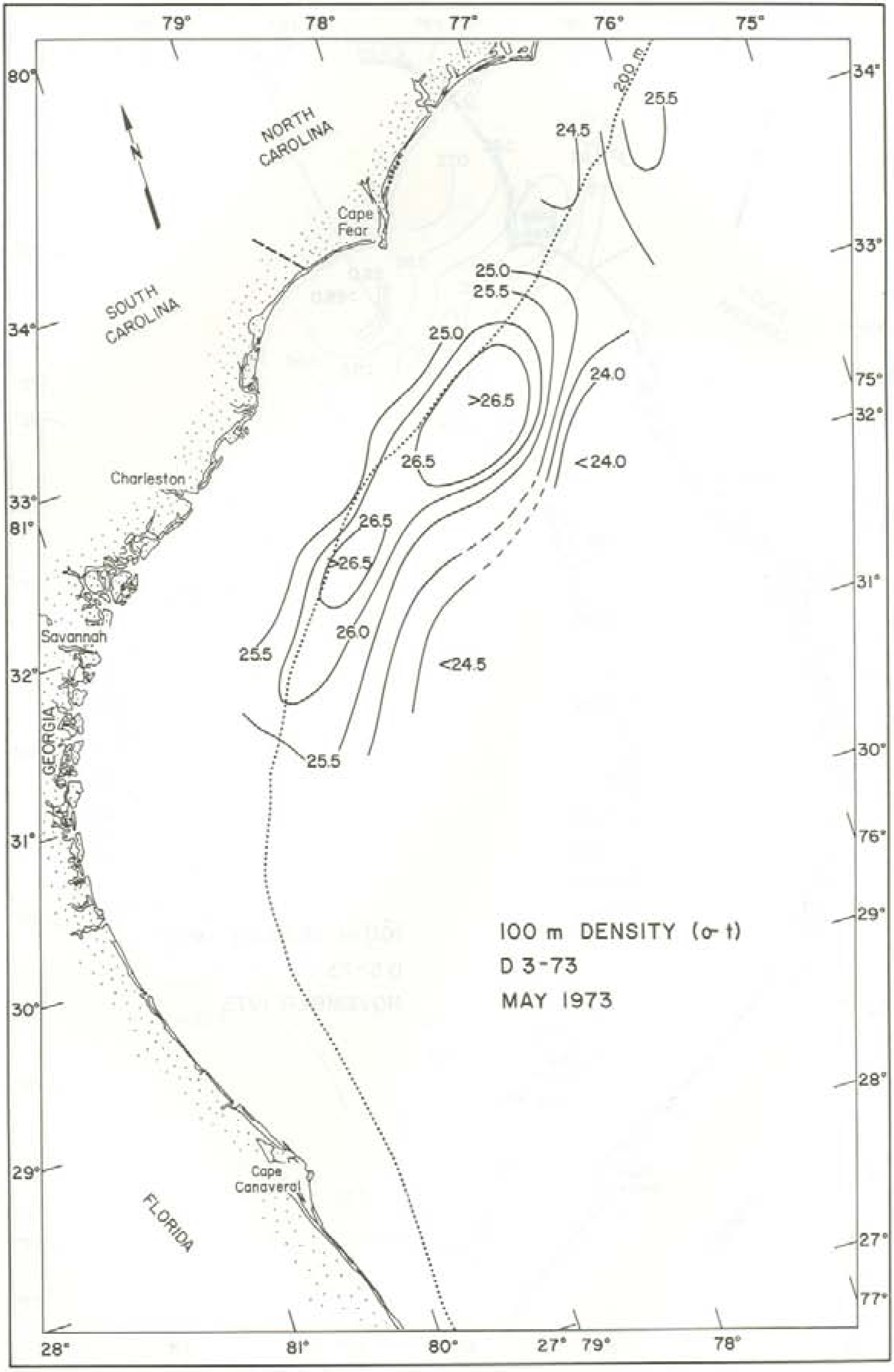

79°
78°
77°
76°
75°
80°
34°
NORTH CAROLINA
SOUTH CAROLINA
Cape Fear
Charleston
Savannah
GEORGIA
FLORIDA
Cape Canaveral
200 m
25.5
24.5
25.0
25.5
25.0
>26.5
24.0
26.5
<24.0
26.5
>26.5
26.0
25.5
<24.5
25.5
33°
32°
31°
30°
29°
28°
27°
81°
80°
79°
78°
75°
76°
77°
100 m DENSITY (σ-t)
D 3-73
MAY 1973

FIGURE 13

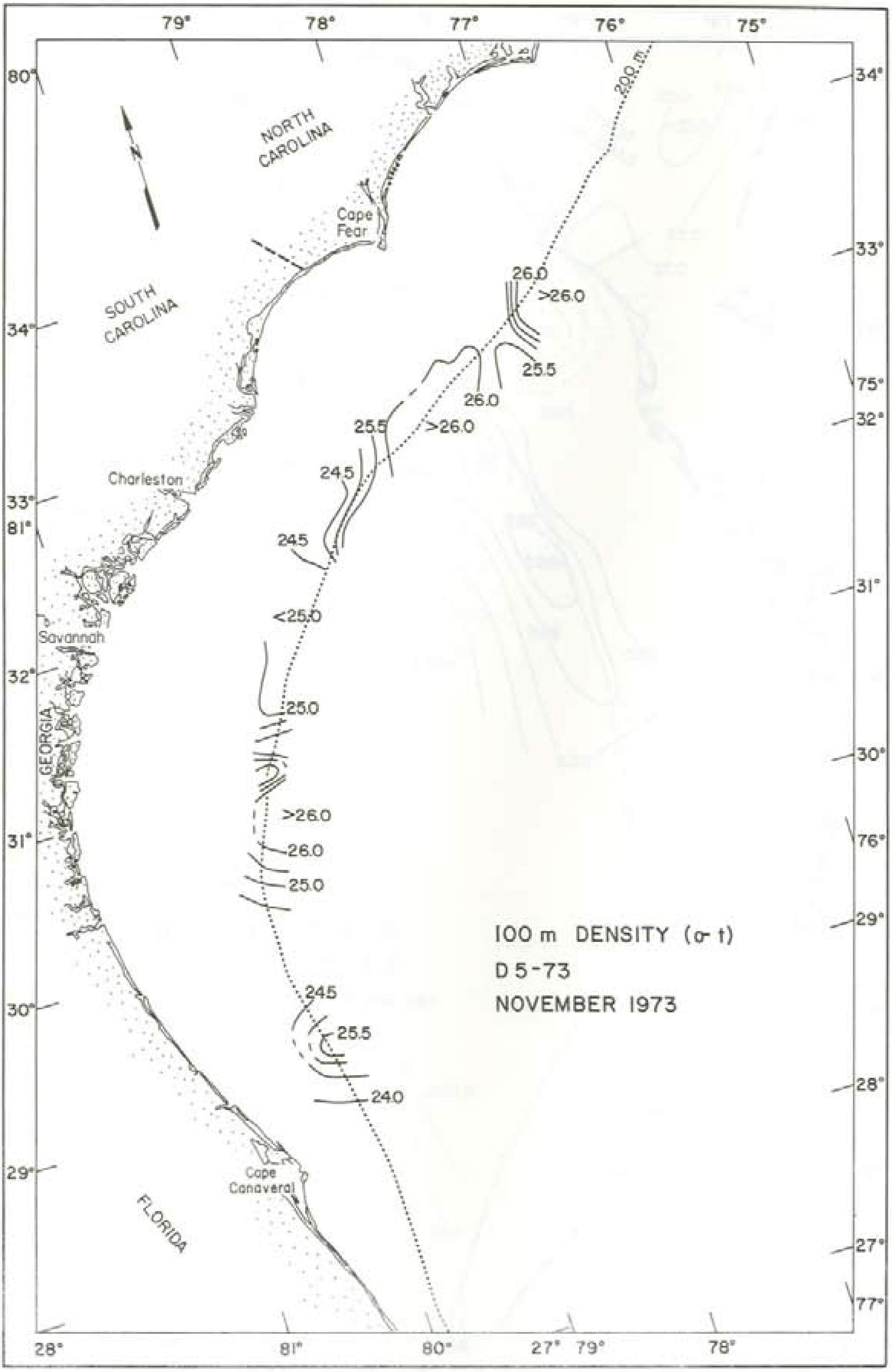
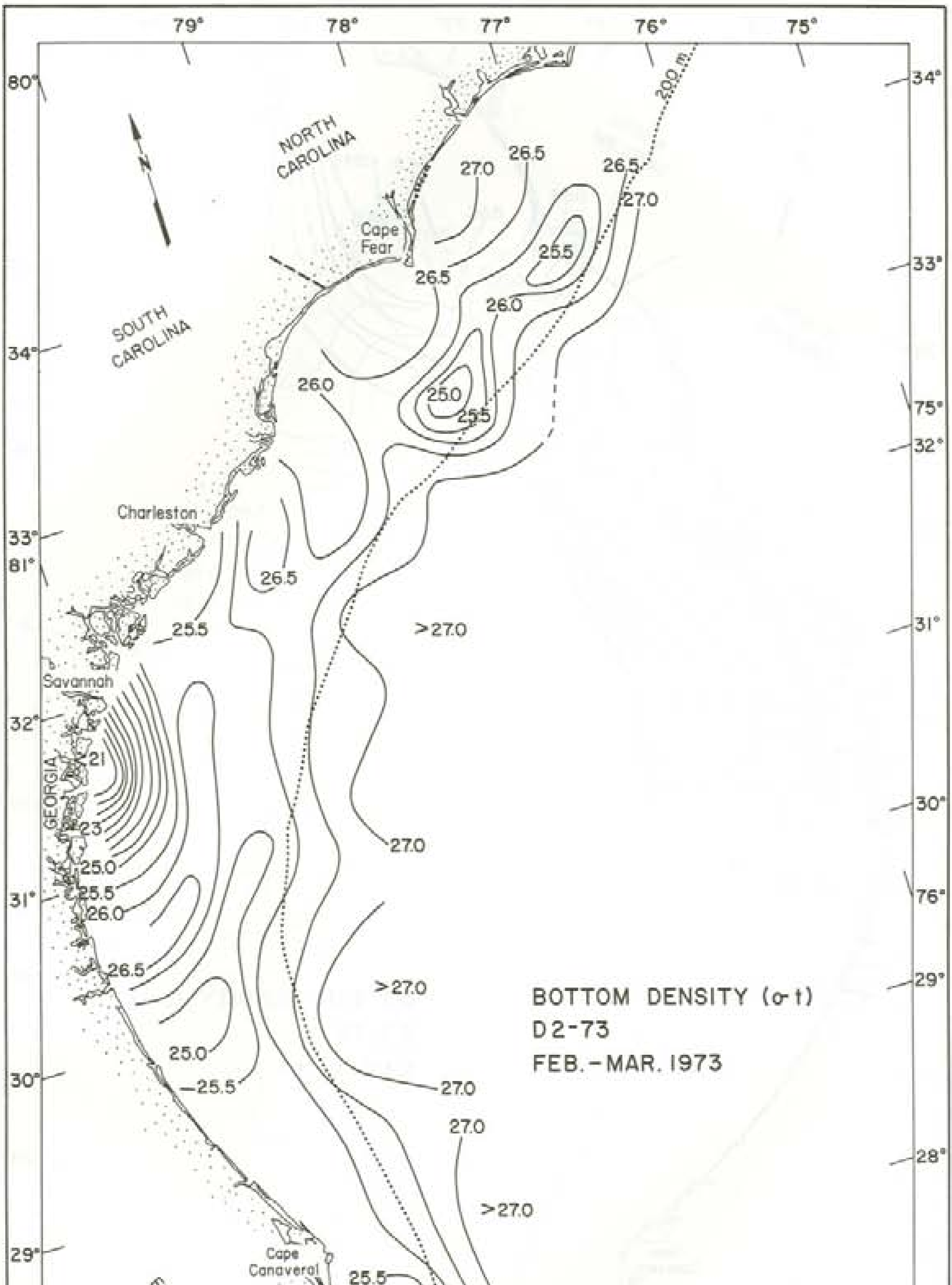

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
26.0
>26.0
25.5
26.0
25.5
>26.0
24.5
24.5
<25.0
25.0
>26.0
26.0
25.0
24.5
25.5
24.0
100 m DENSITY (σ-t)
D 5-73
NOVEMBER 1973
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
80°
79°
78°
77°
76°
75°

FIGURE 14



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
BOTTOM DENSITY (σ-t)
D2-73
FEB.-MAR. 1973
27.0
26.5
25.5
26.0
25.0
>27.0
21
23
<25.5
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°

FIGURE 15

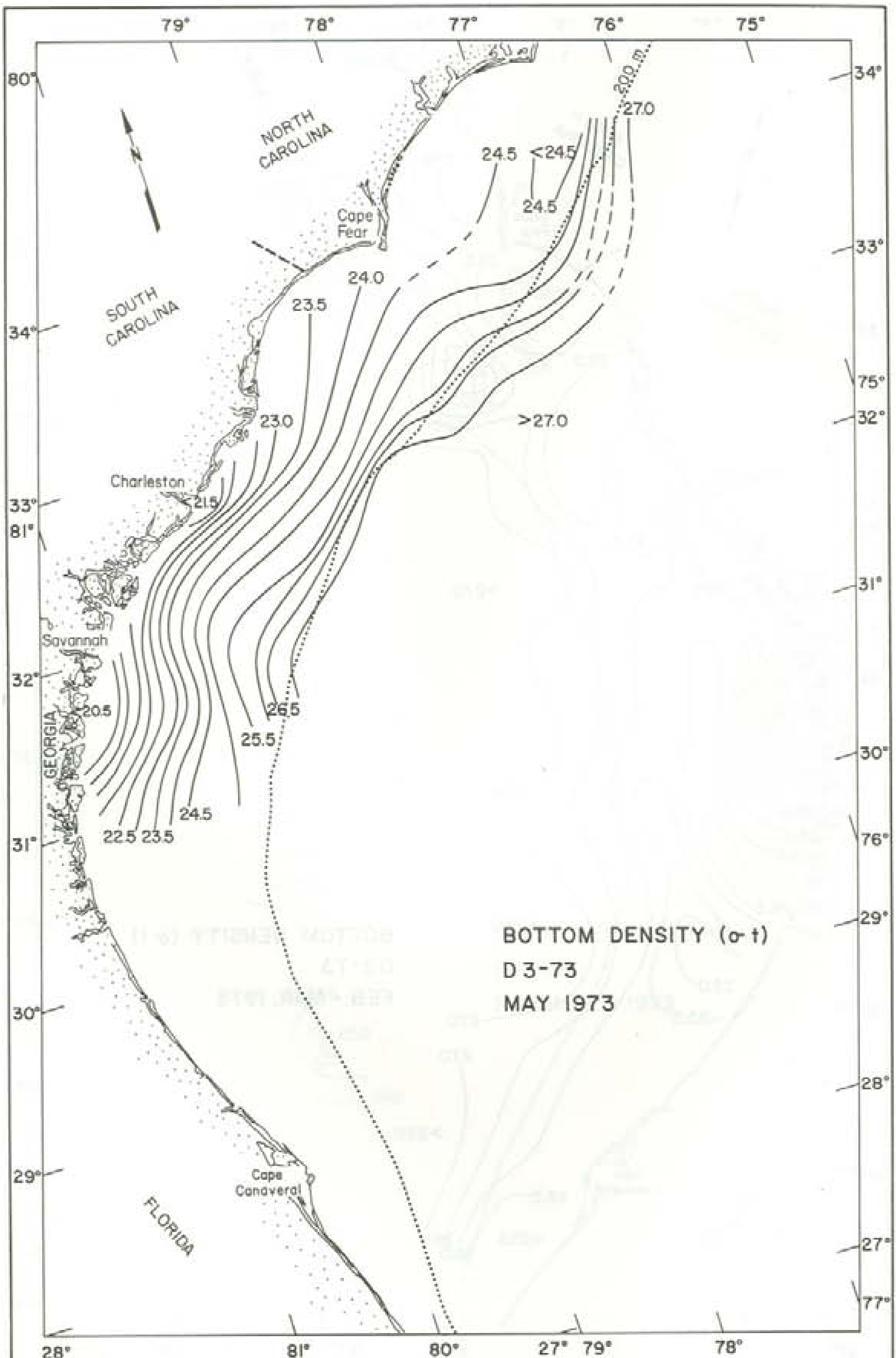

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
27.0
24.5
<24.5
24.0
23.5
23.0
<21.5
20.5
22.5
23.5
24.5
25.5
26.5
>27.0
BOTTOM DENSITY (σ-t)
D 3-73
MAY 1973

FIGURE 16

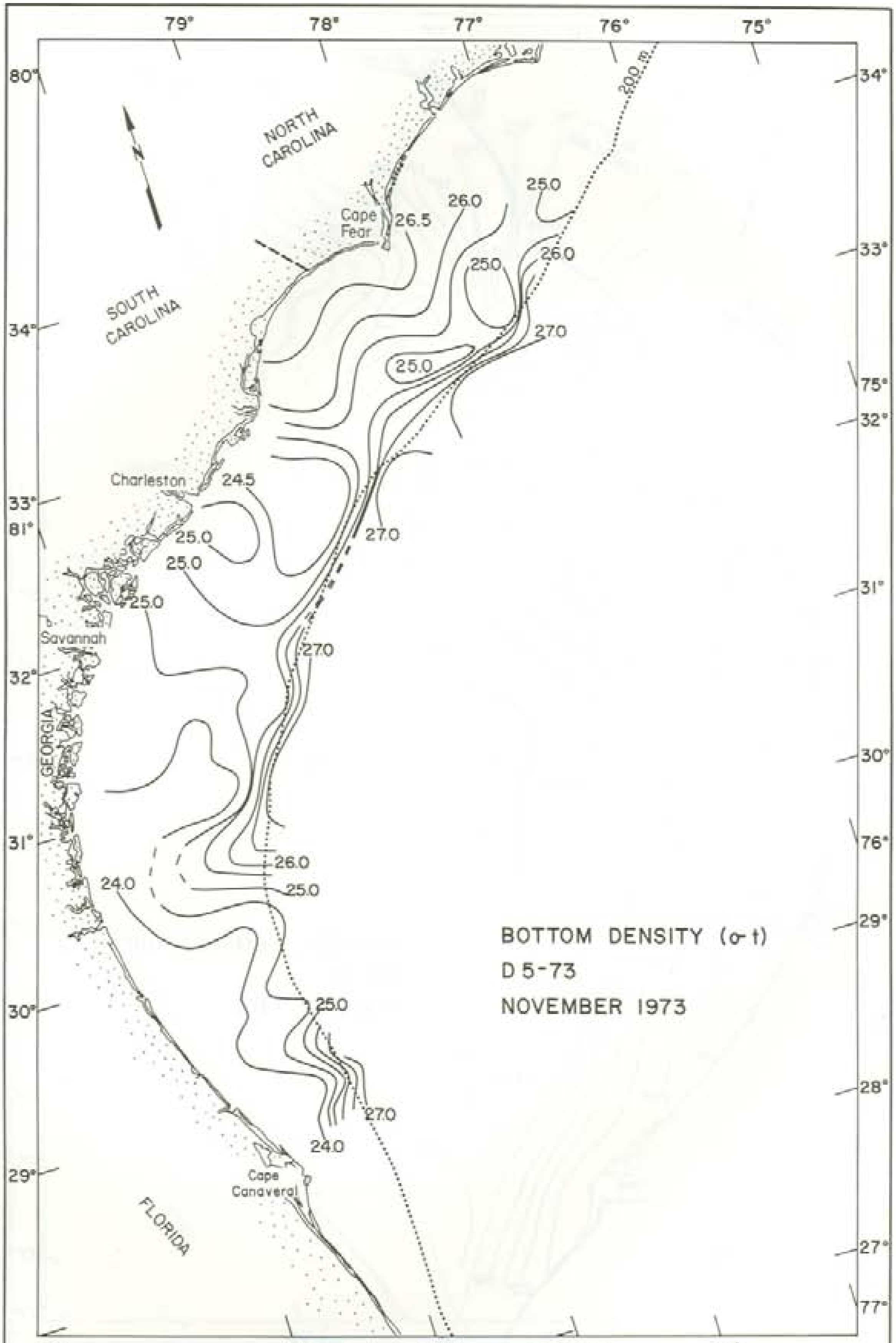

79°
78°
77°
76°
75°
80°
34°
NORTH CAROLINA
200 m
25.0
Cape Fear
26.5
26.0
33°
25.0
26.0
SOUTH CAROLINA
34°
27.0
25.0
75°
32°
Charleston
24.5
33°
81°
27.0
25.0
25.0
31°
25.0
Savannah
27.0
32°
GEORGIA
30°
31°
76°
26.0
24.0
25.0
29°
BOTTOM DENSITY (σ-t)
D 5-73
NOVEMBER 1973
30°
25.0
28°
27.0
24.0
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 17

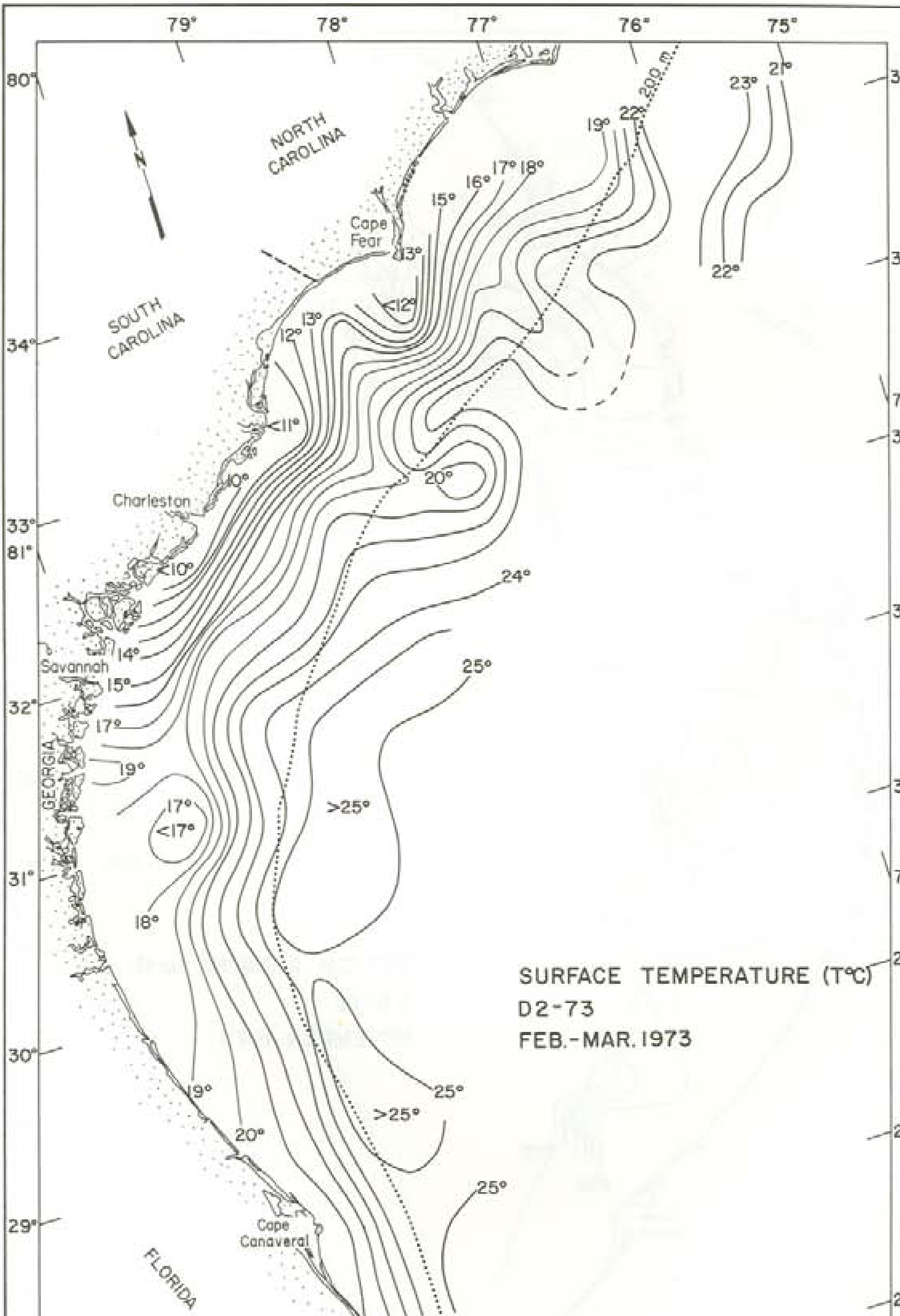

SURFACE TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 18

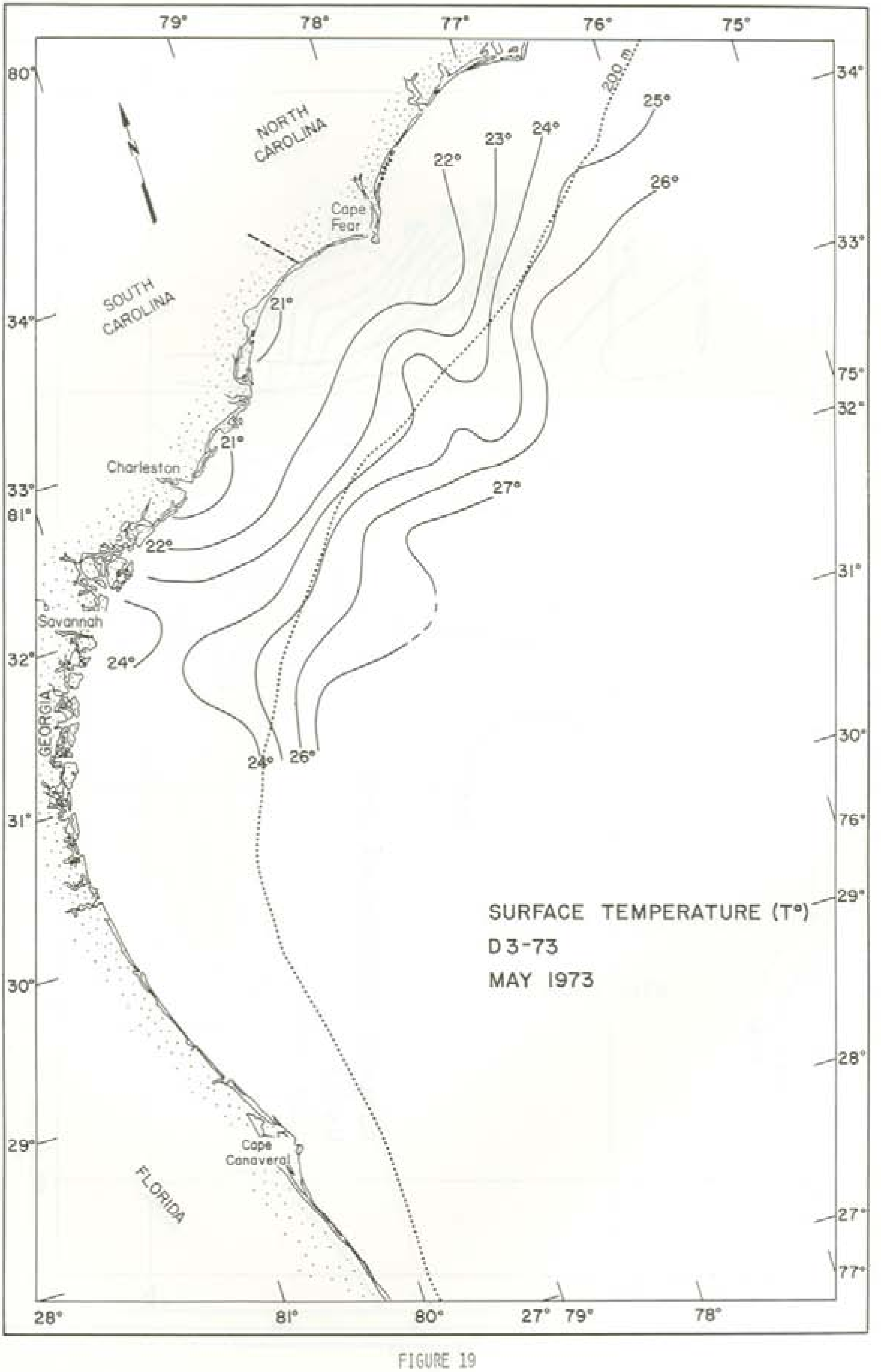

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
21°
21°
22°
22°
23°
24°
24°
24°
25°
26°
26°
27°
79°
78°
77°
76°
75°
80°
34°
33°
81°
32°
31°
30°
29°
28°
27°
SURFACE TEMPERATURE (T°)
D3-73
MAY 1973

FIGURE 19

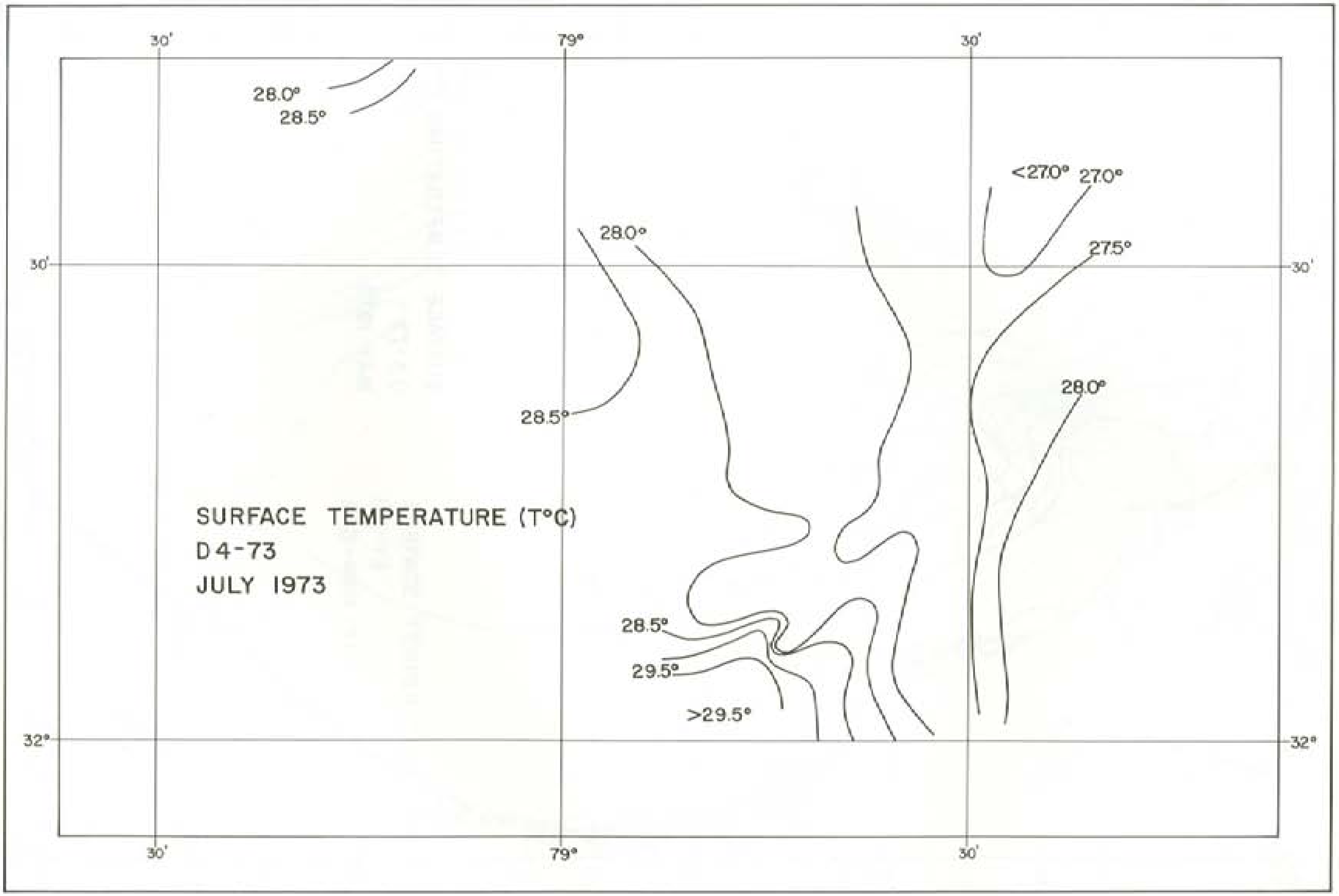

SURFACE TEMPERATURE (T°C)
D4-73
JULY 1973
28.0°
28.5°
<27.0°
27.0°
27.5°
28.0°
28.5°
28.0°
28.5°
29.5°
>29.5°
30'
79°
30'
32°

FIGURE 20

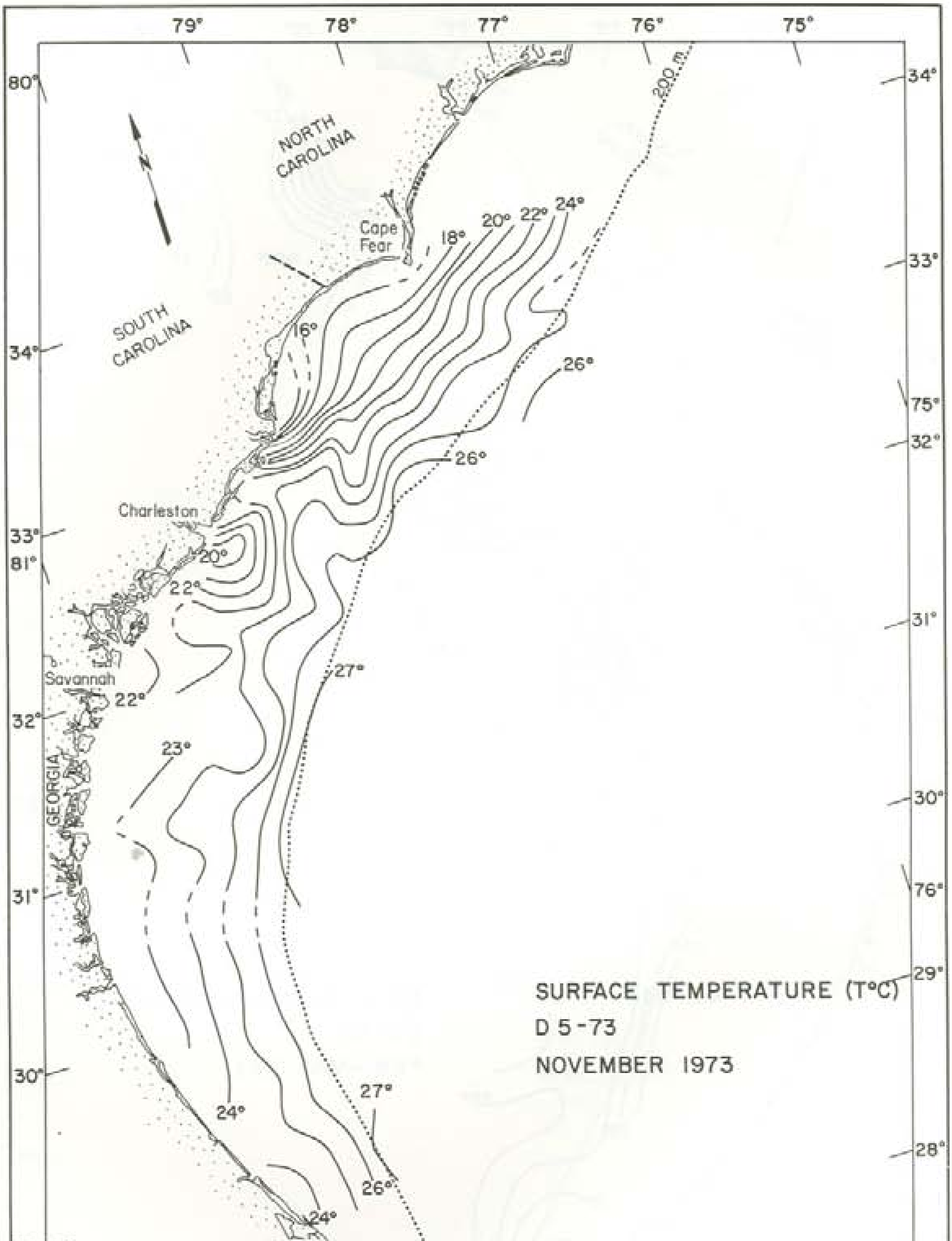
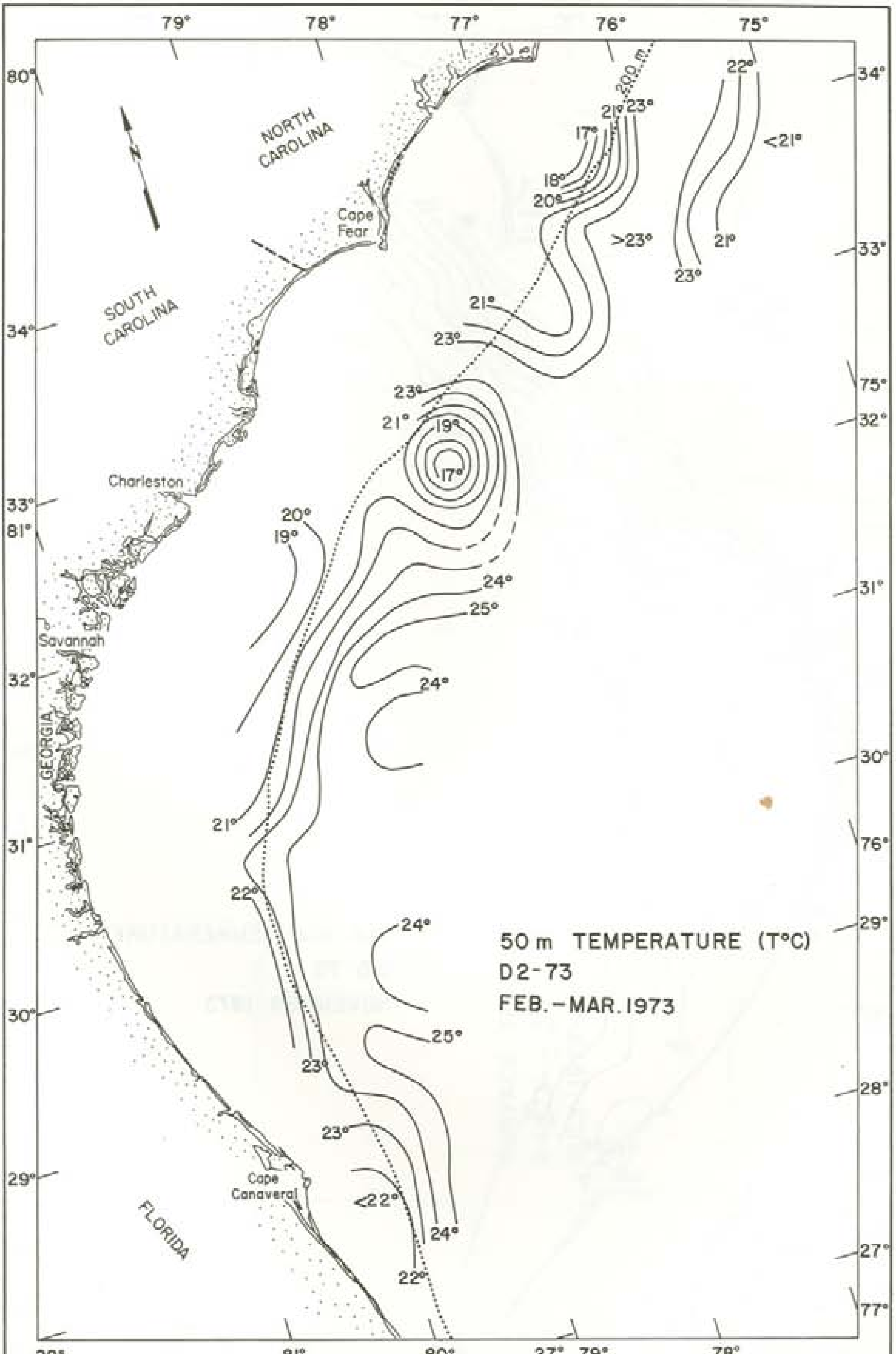

SURFACE TEMPERATURE (T°C)
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
16°
18°
20°
22°
23°
24°
26°
27°
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°

FIGURE 21



79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
22°
21°
23°
<21°
17°
18°
20°
>23°
19°
24°
25°
<22°
50 m TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973

FIGURE 22

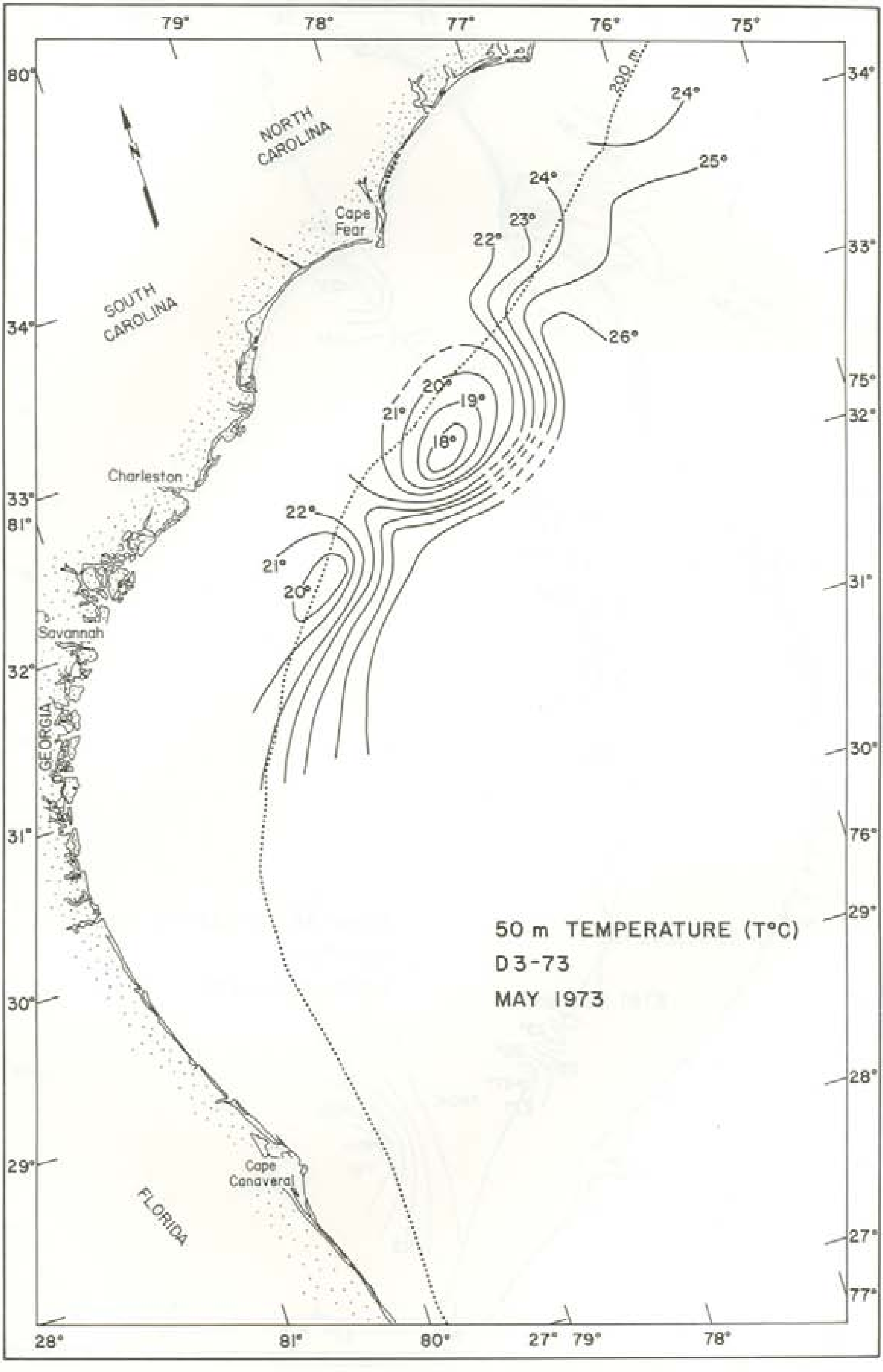
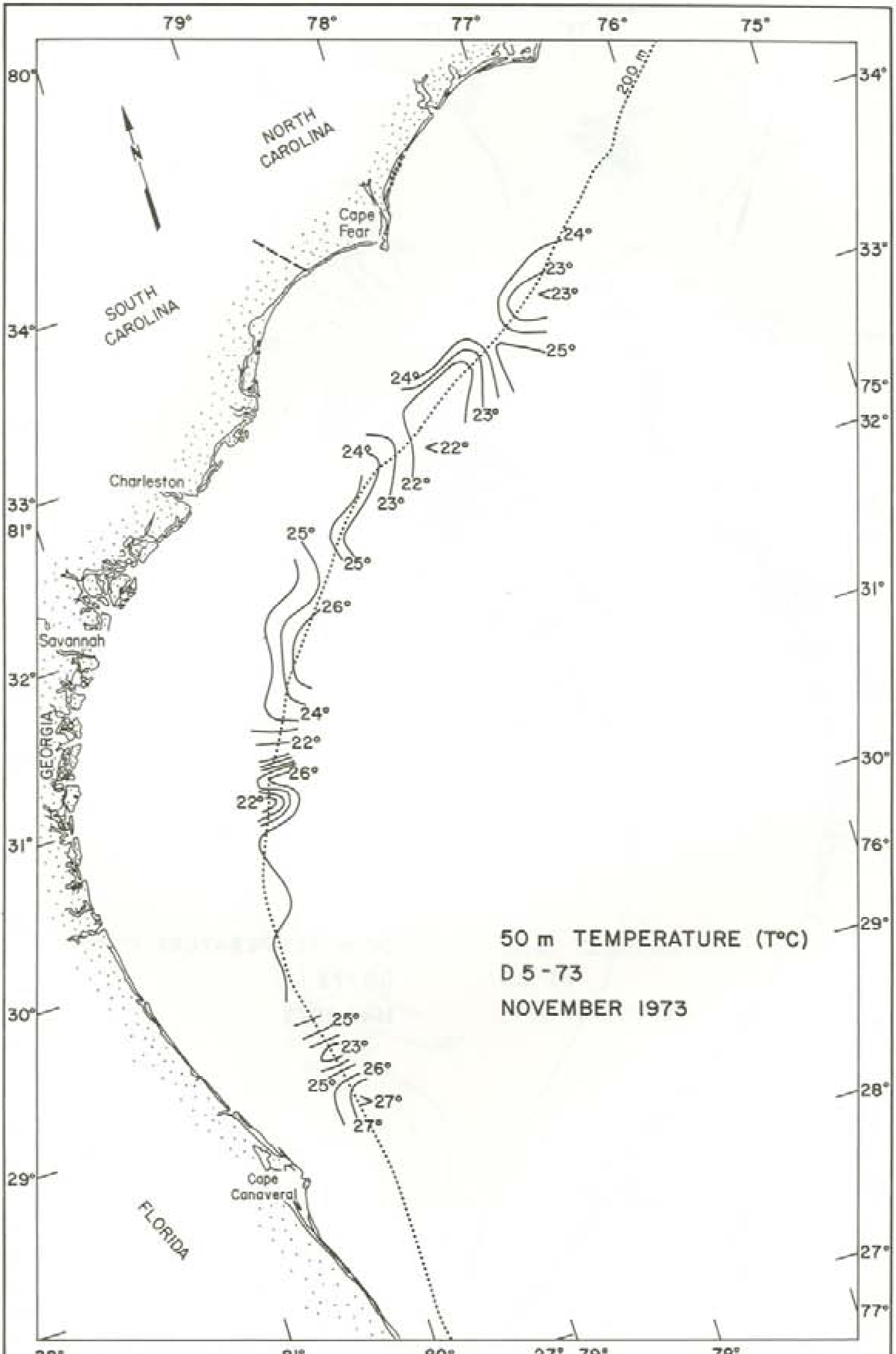

79°
78°
77°
76°
75°
80°
34°
N
NORTH CAROLINA
SOUTH CAROLINA
Cape Fear
Charleston
Savannah
GEORGIA
FLORIDA
Cape Canaveral
200 m
24°
25°
24°
23°
22°
26°
20°
19°
21°
18°
22°
21°
20°
50 m TEMPERATURE (T°C)
D3-73
MAY 1973
33°
32°
31°
30°
29°
28°
27°
81°
80°

FIGURE 23



79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
80°
27°
79°
78°
75°
76°
77°
200 m
NORTH CAROLINA
N
Cape Fear
SOUTH CAROLINA
Charleston
Savannah
GEORGIA
Cape Canaveral
FLORIDA
24°
23°
<23°
25°
24°
23°
24°
<22°
22°
23°
25°
25°
26°
24°
22°
26°
22°
25°
23°
26°
25°
>27°
27°
50 m TEMPERATURE (T°C)
D 5-73
NOVEMBER 1973

FIGURE 24

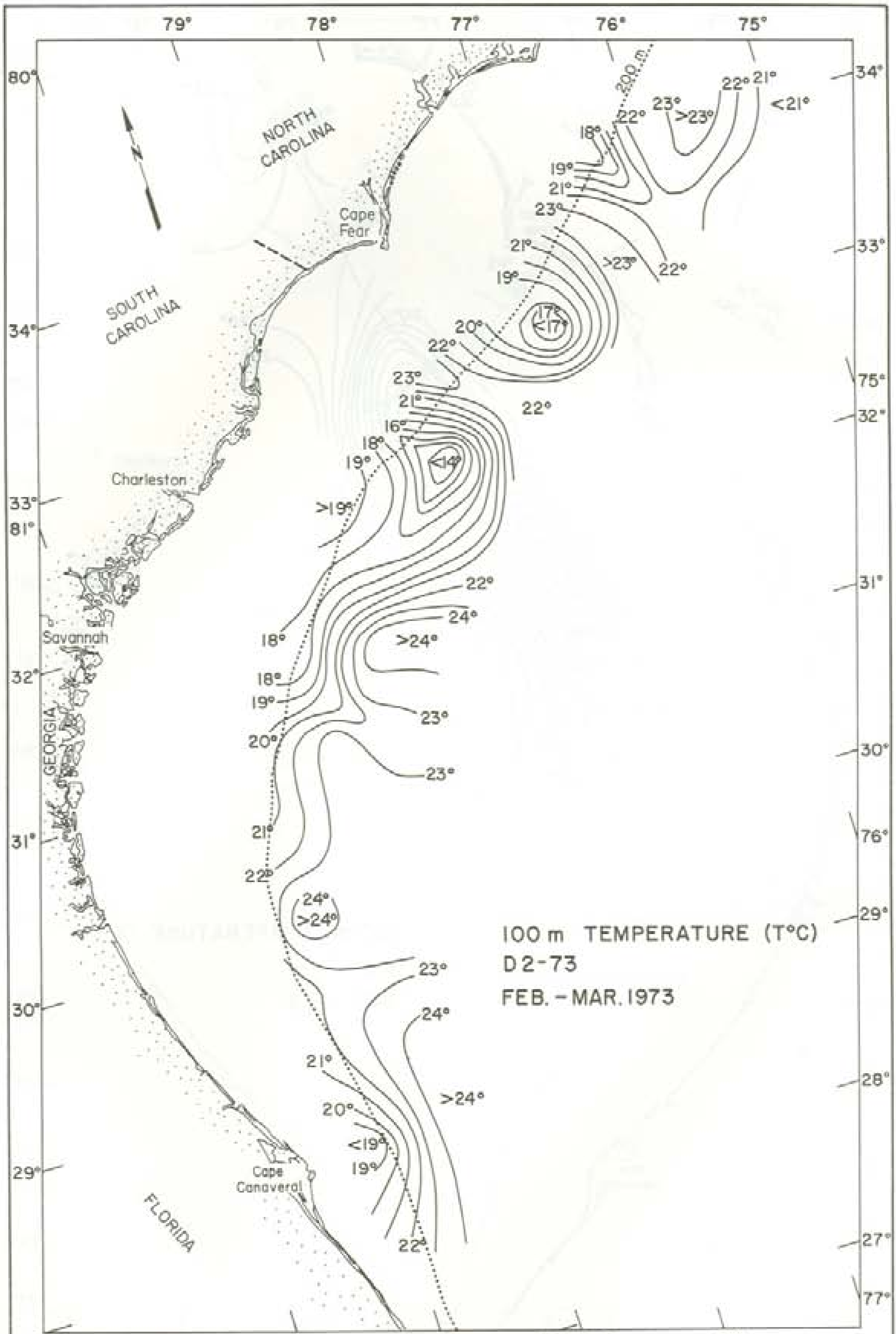
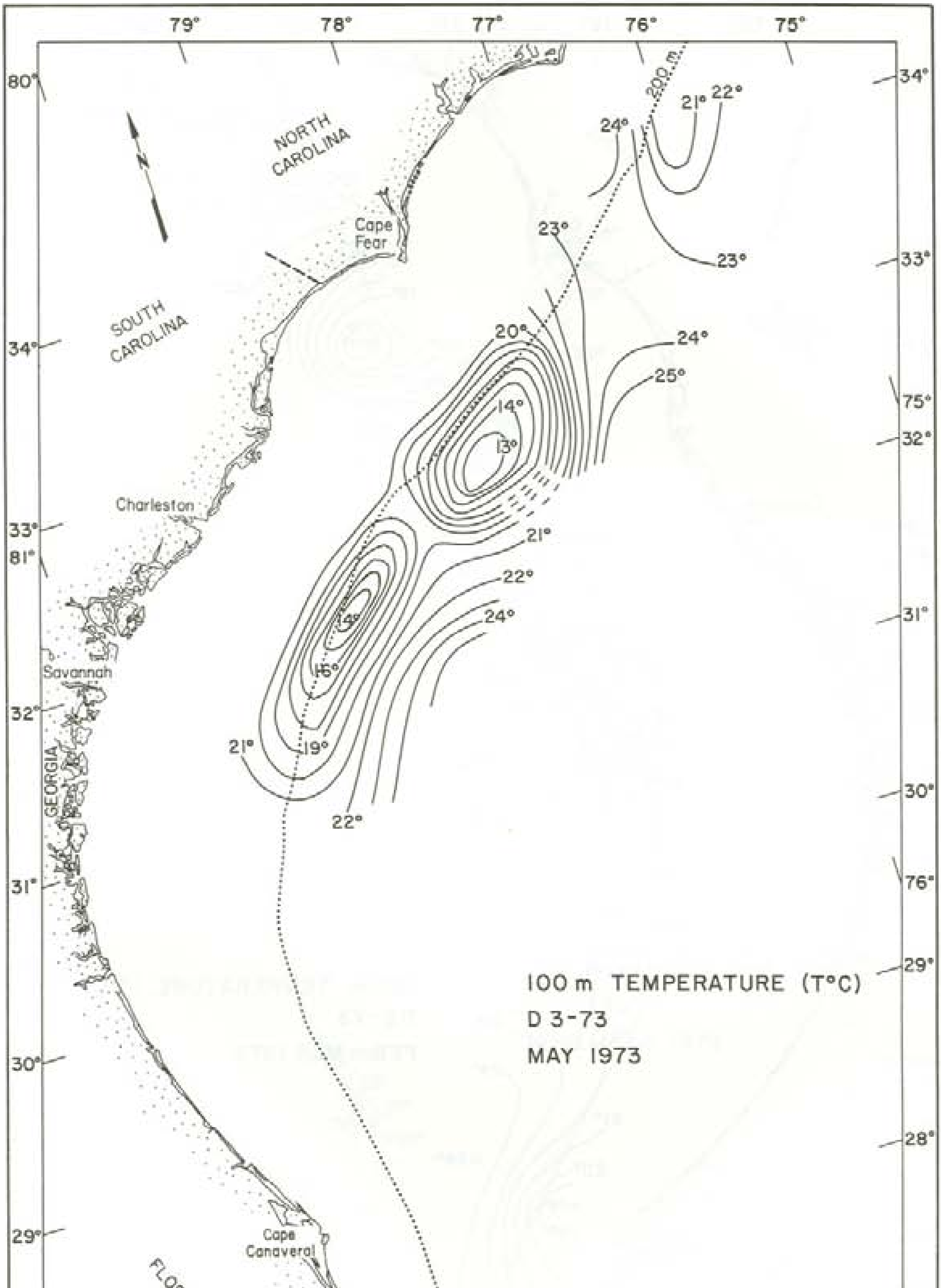

100 m TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m

FIGURE 25



79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
79°
80°
200 m
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
24°
21°
22°
23°
23°
20°
24°
25°
14°
13°
21°
22°
24°
14°
16°
19°
21°
22°
100 m TEMPERATURE (T°C)
D 3-73
MAY 1973

FIGURE 26

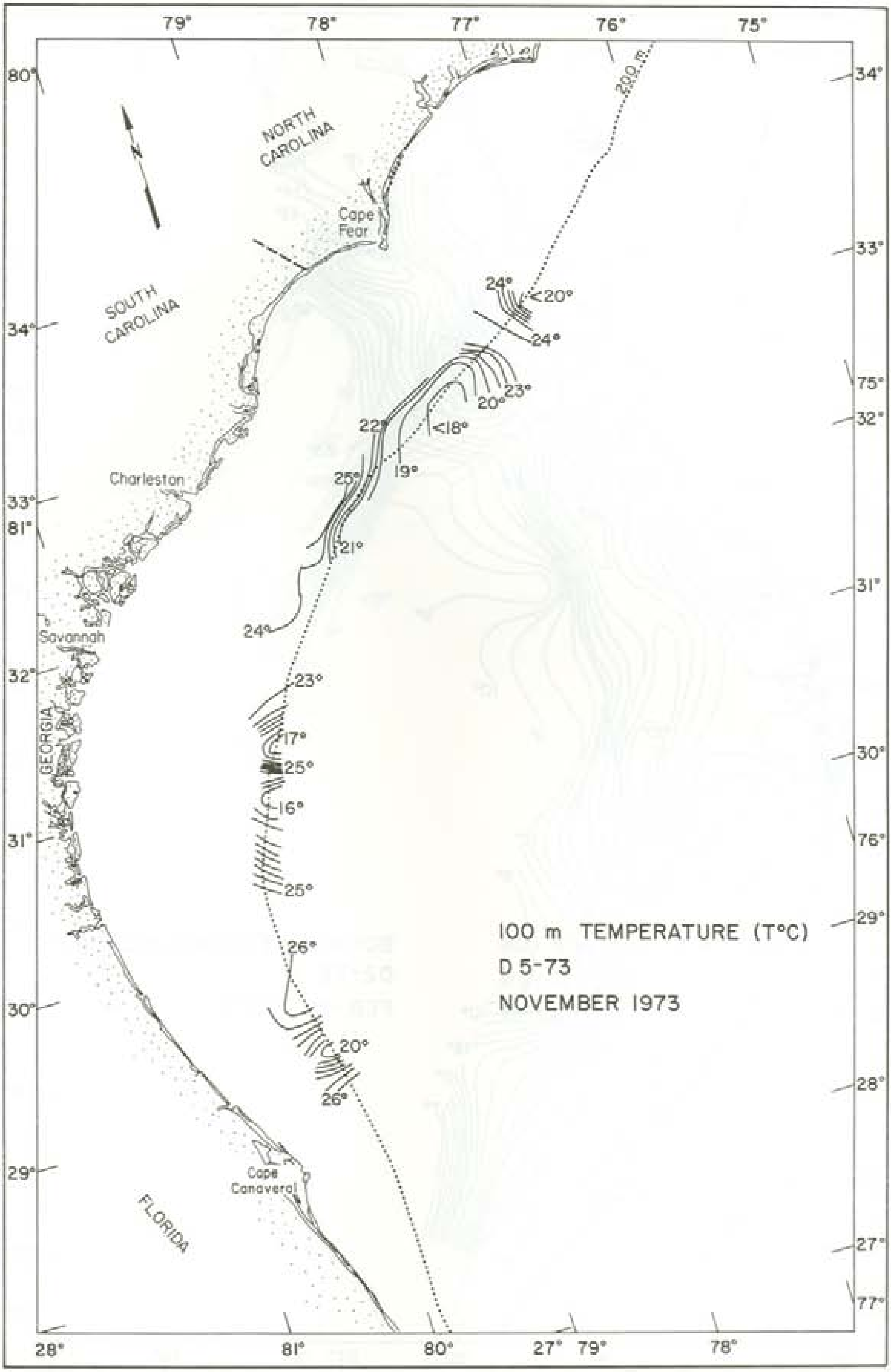

79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
N
Cape Fear
33°
SOUTH CAROLINA
34°
24°
<20°
24°
75°
23°
20°
32°
22°
<18°
19°
Charleston
25°
33°
81°
21°
31°
24°
Savannah
32°
23°
GEORGIA
17°
30°
25°
16°
31°
76°
25°
100 m TEMPERATURE (T°C)
D 5-73
NOVEMBER 1973
29°
26°
30°
20°
28°
26°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 27

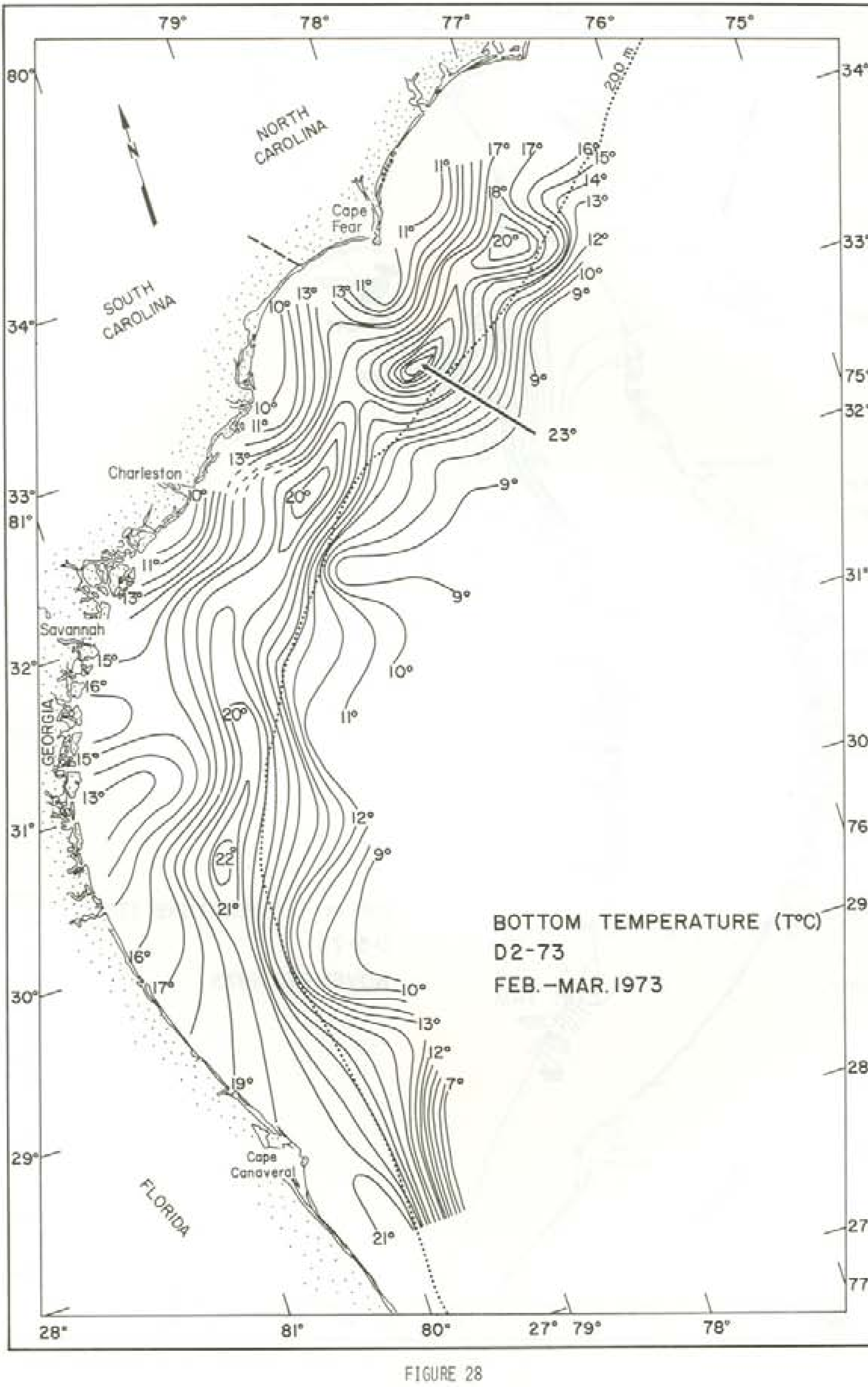

BOTTOM TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 28

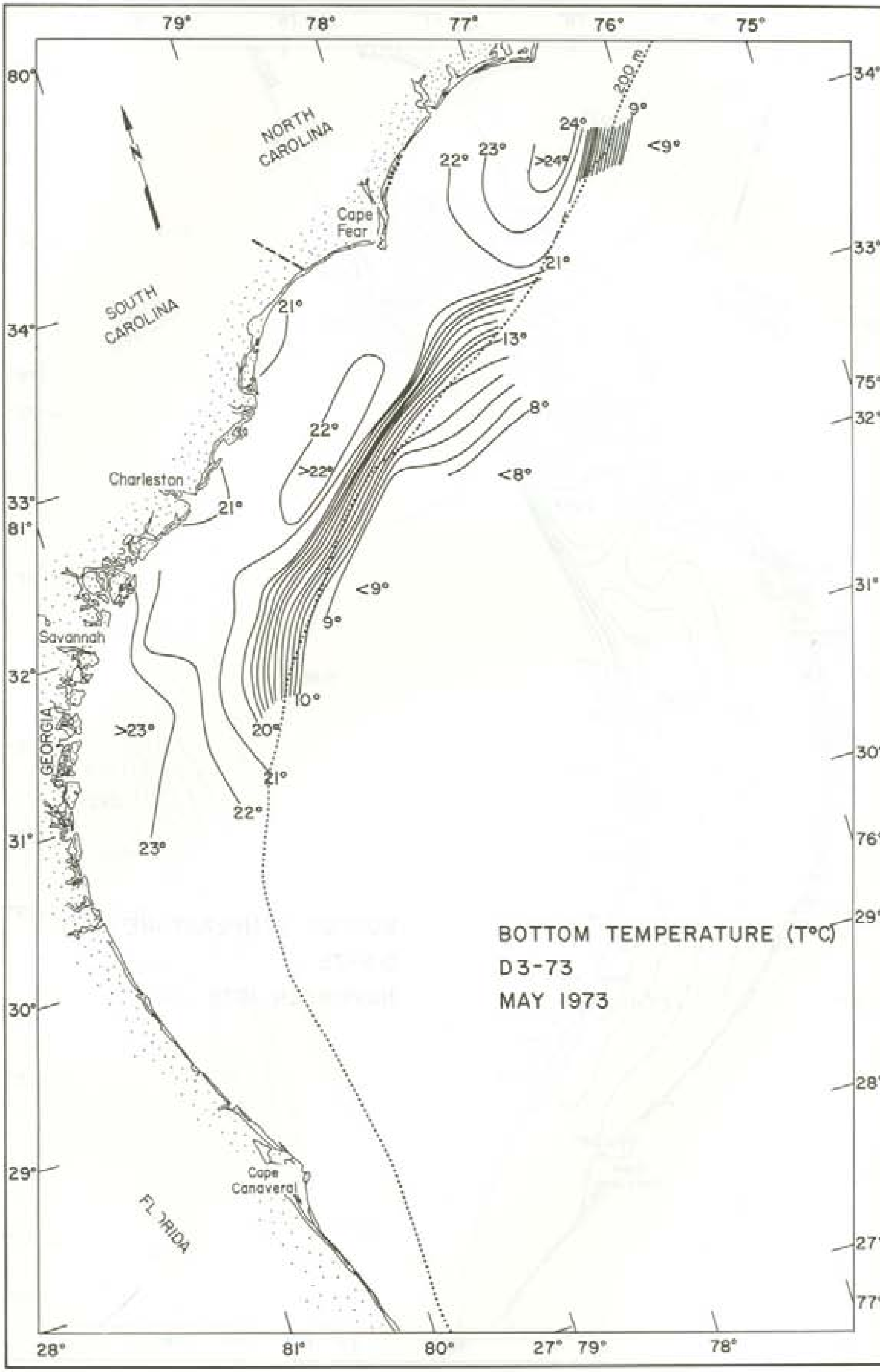

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
BOTTOM TEMPERATURE (T°C)
D3-73
MAY 1973

FIGURE 29

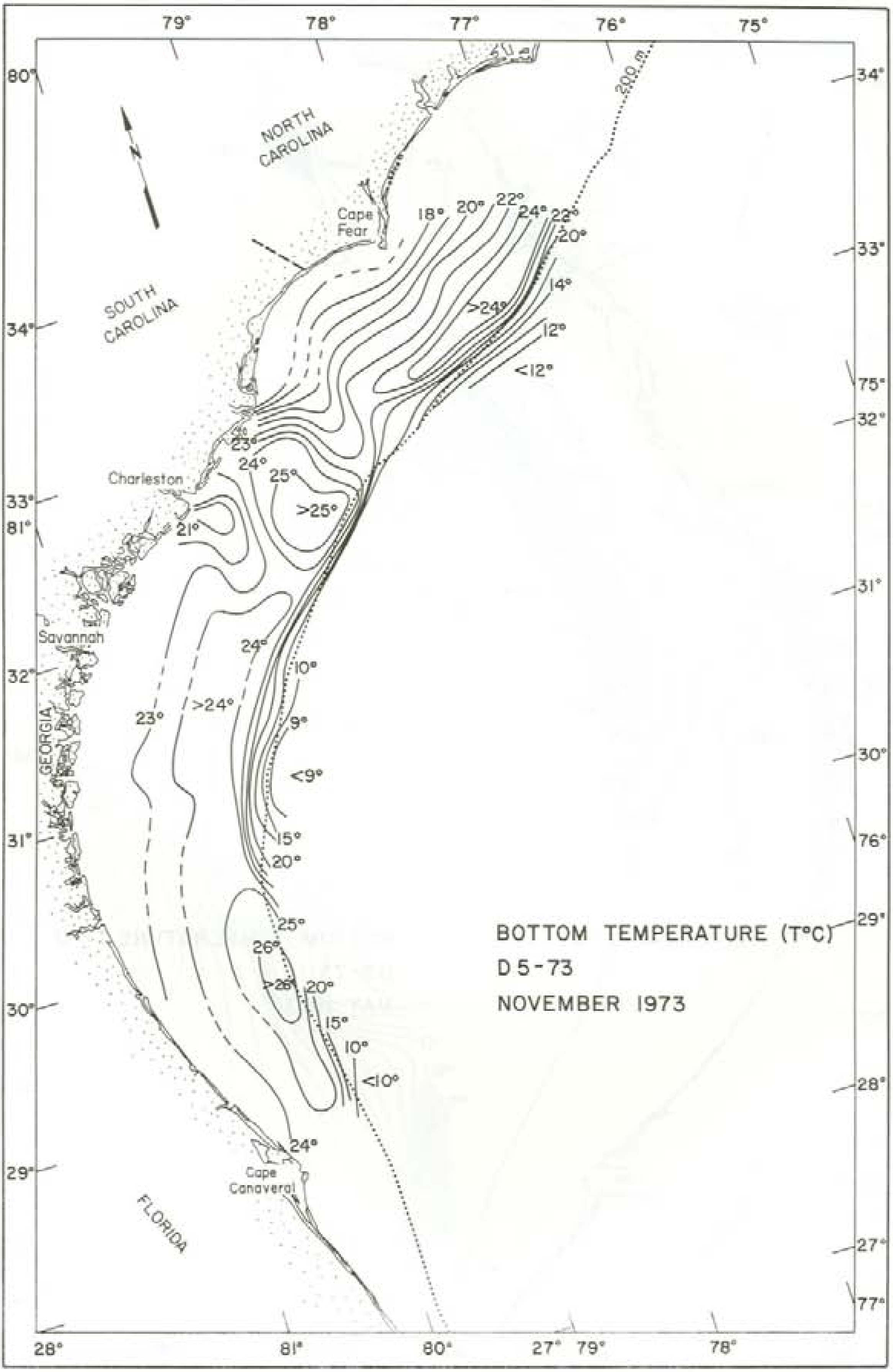
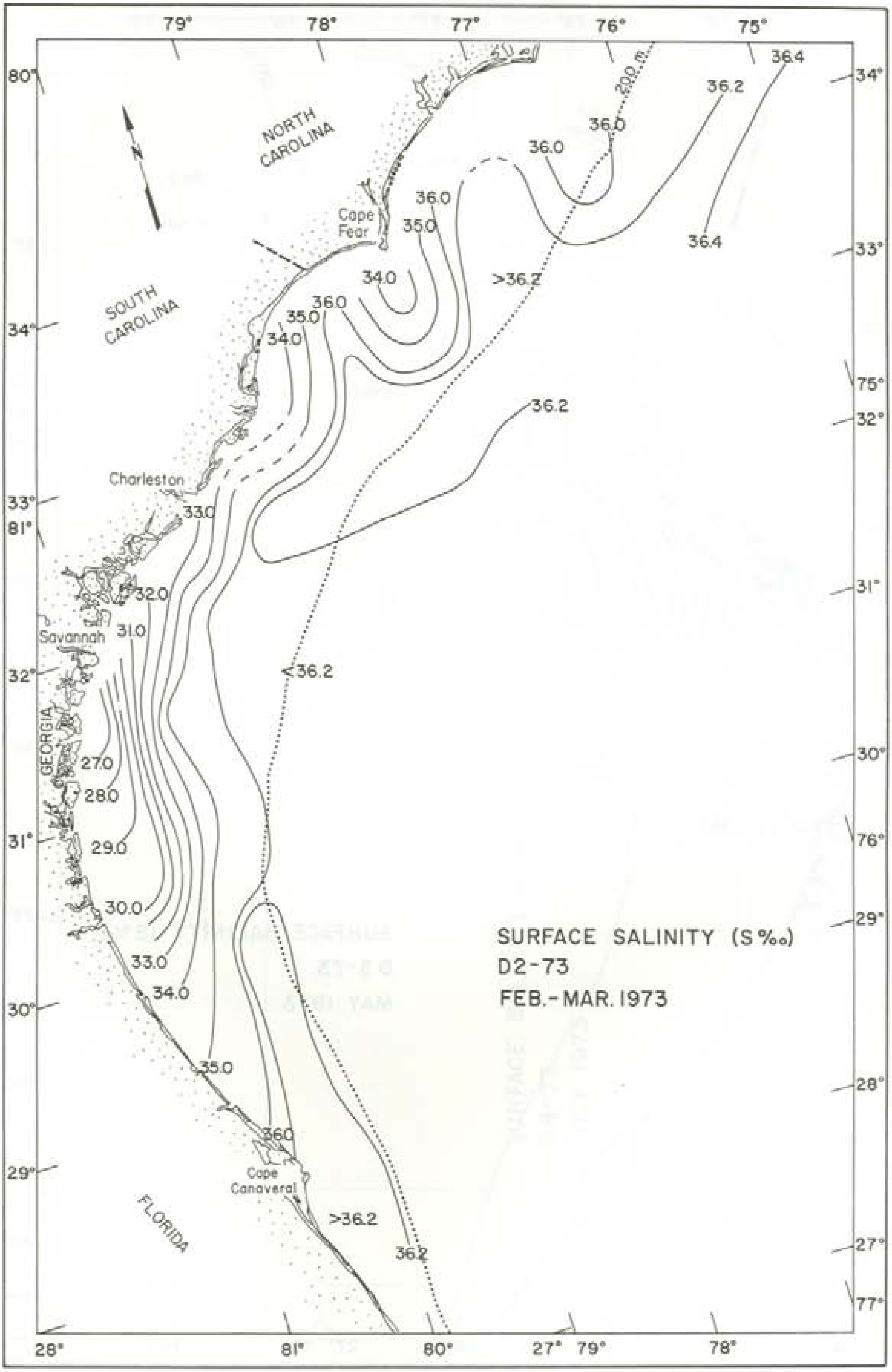

BOTTOM TEMPERATURE (T°C)
D5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
18°
20°
22°
24°
>24°
14°
12°
<12°
23°
24°
25°
>25°
21°
10°
9°
<9°
>24°
15°
26°
>26°
<10°

FIGURE 30



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
36.4
36.2
36.0
35.0
34.0
33.0
32.0
31.0
30.0
29.0
28.0
27.0
>36.2
<36.2
SURFACE SALINITY (S ‰)
D2-73
FEB.-MAR. 1973

FIGURE 31

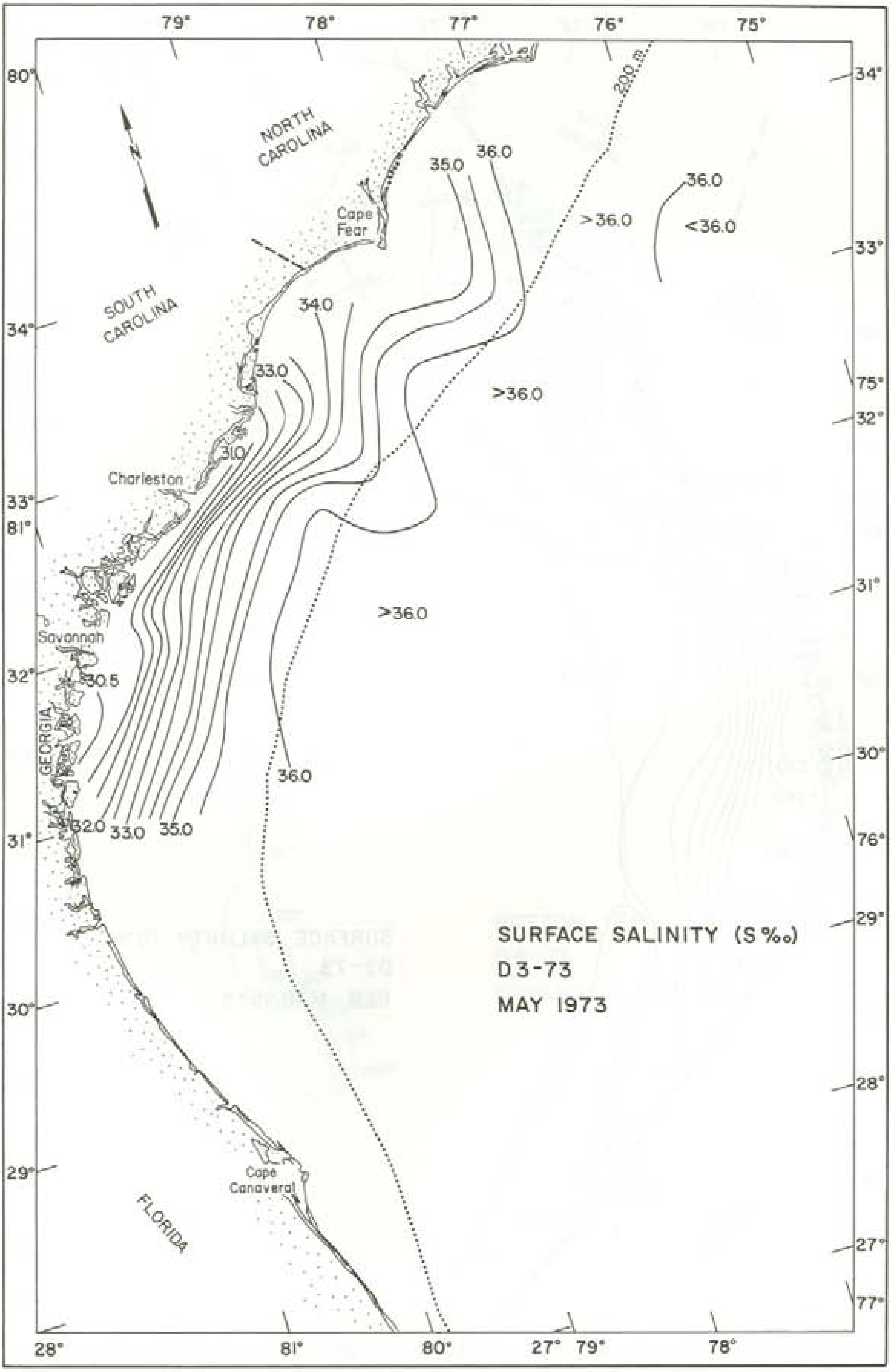

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
35.0
36.0
36.0
>36.0
<36.0
34.0
33.0
>36.0
31.0
>36.0
30.5
36.0
32.0
33.0
35.0
SURFACE SALINITY (S ‰)
D3-73
MAY 1973

FIGURE 32

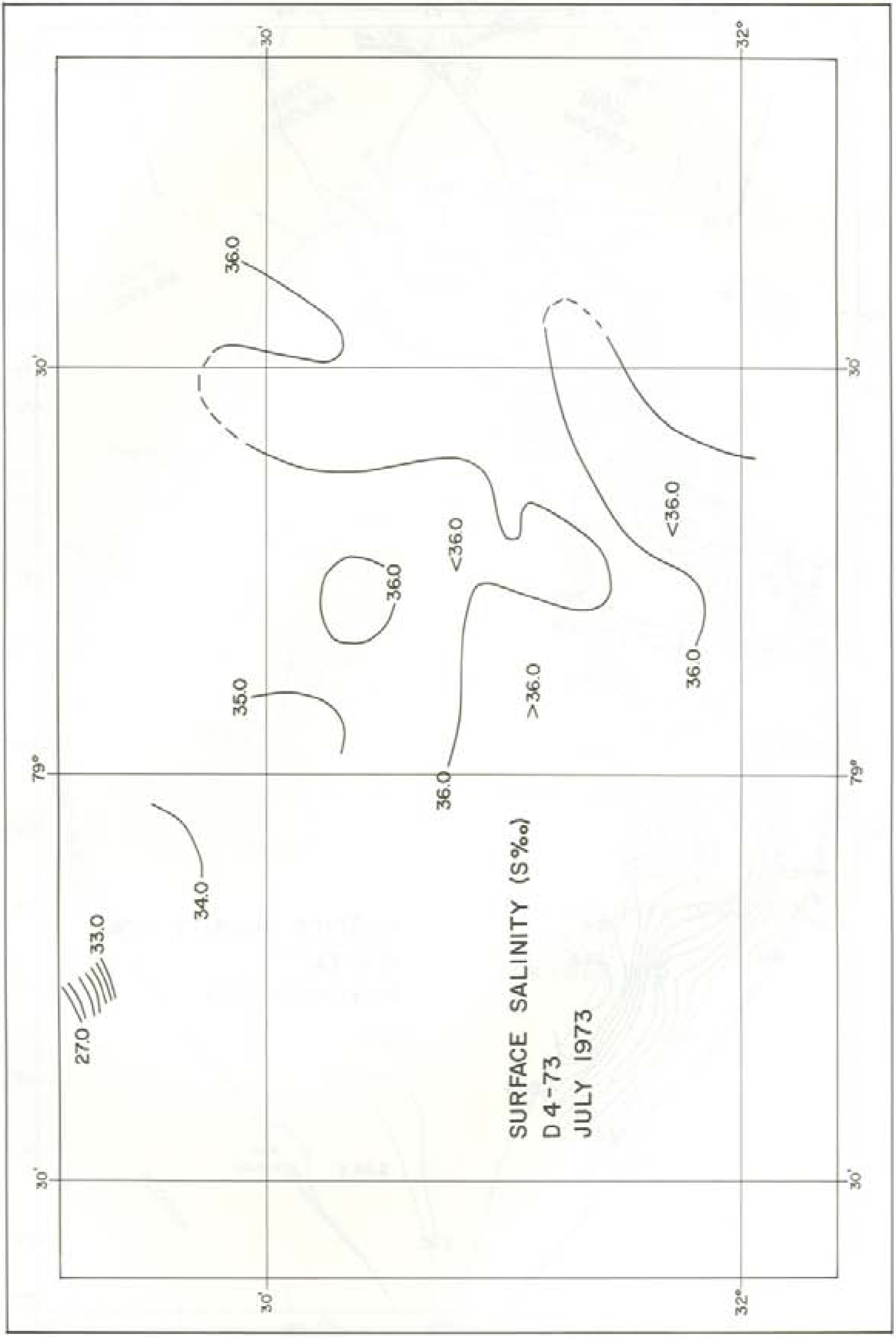
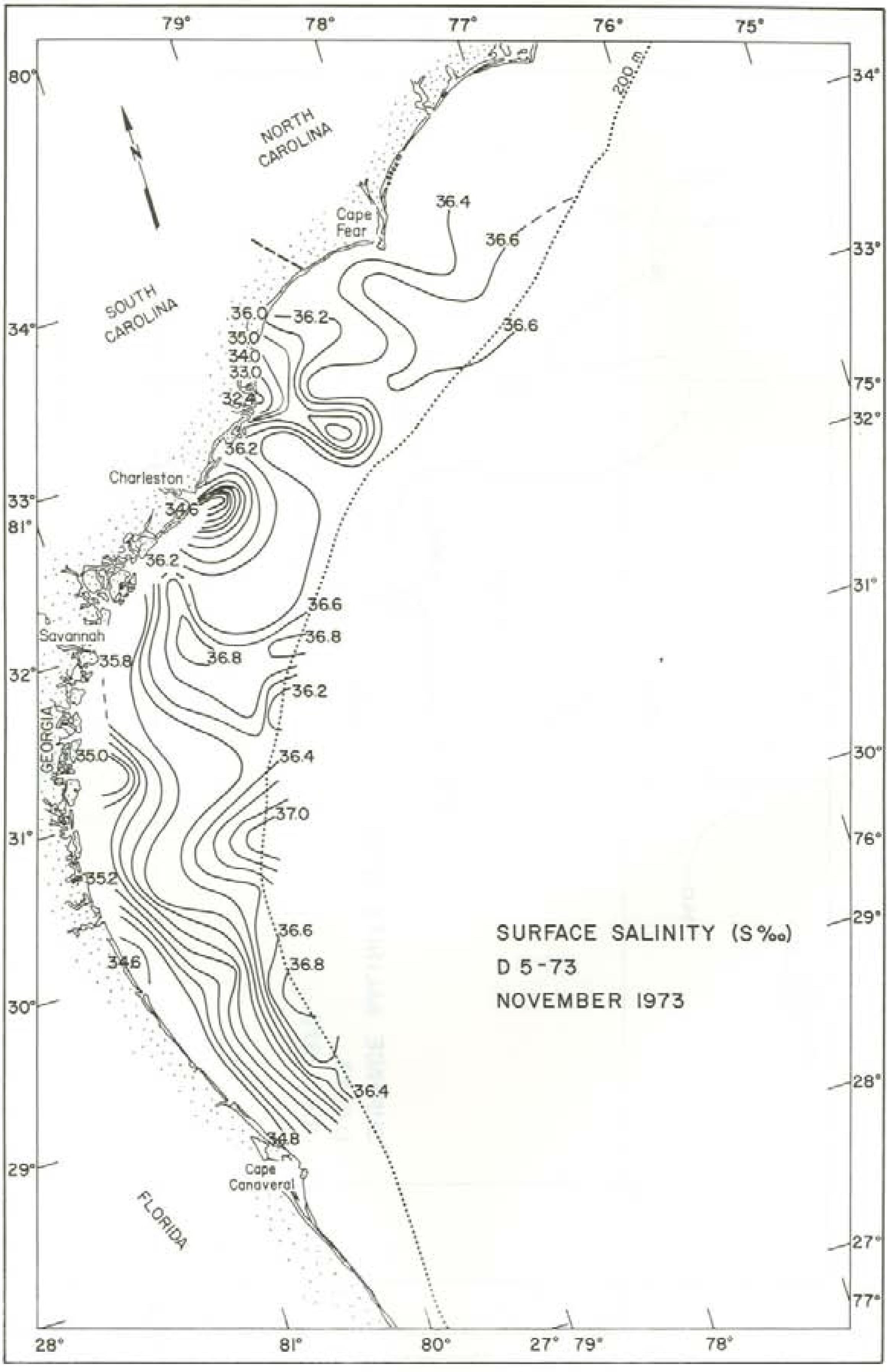
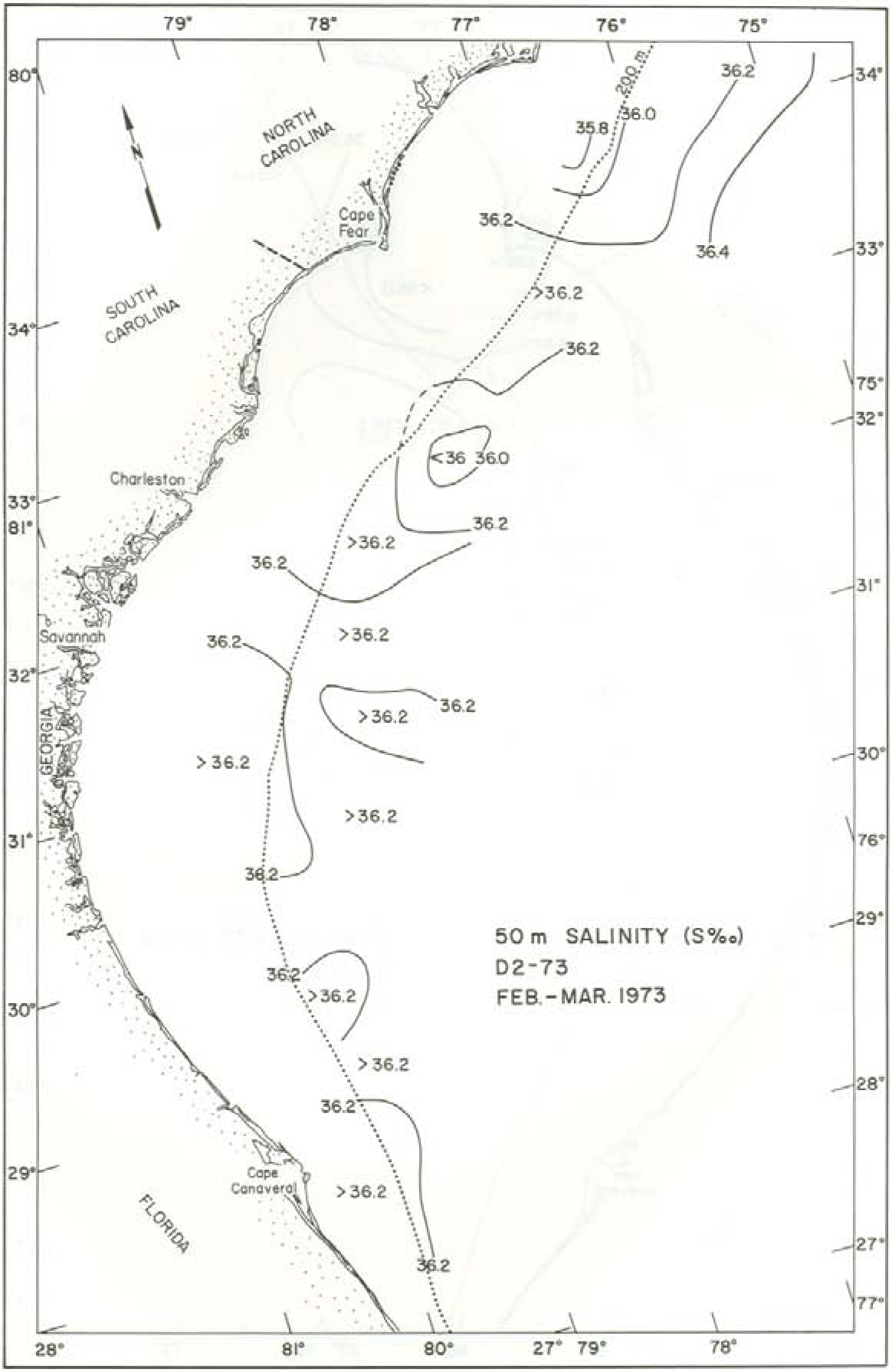

SURFACE SALINITY (S‰)
D 4-73
JULY 1973
30'
32°
79°
36.0
<36.0
>36.0
35.0
34.0
33.0
27.0

FIGURE 33



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
36.4
36.6
36.6
36.0
36.2
35.0
34.0
33.0
32.4
36.2
34.6
36.2
36.6
36.8
36.8
35.8
36.2
35.0
36.4
37.0
35.2
36.6
36.8
34.6
36.4
34.8
SURFACE SALINITY (S ‰)
D 5-73
NOVEMBER 1973

FIGURE 34



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
35.8
36.0
36.2
36.4
>36.2
<36
50 m SALINITY (S‰)
D2-73
FEB.-MAR. 1973

FIGURE 35

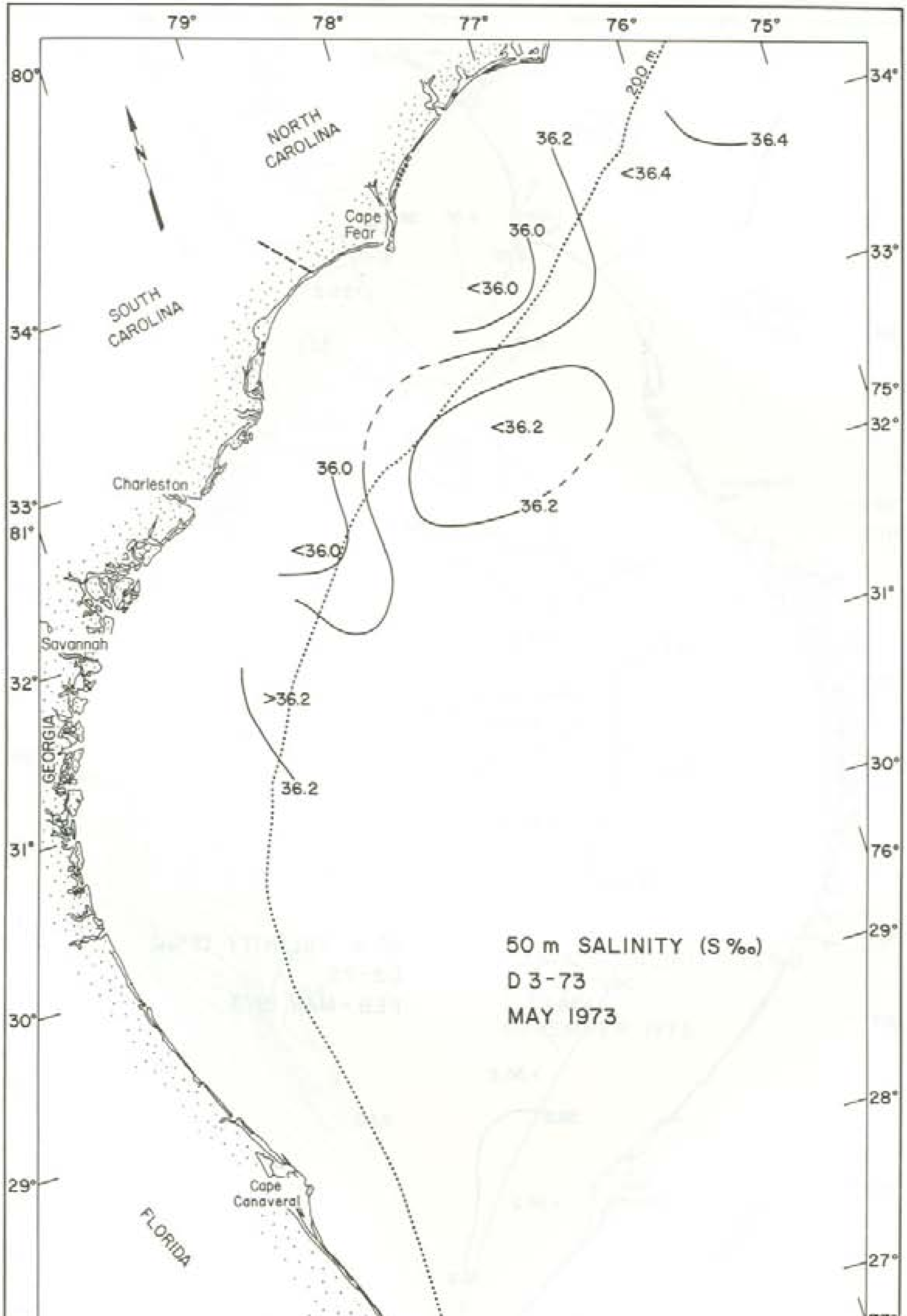
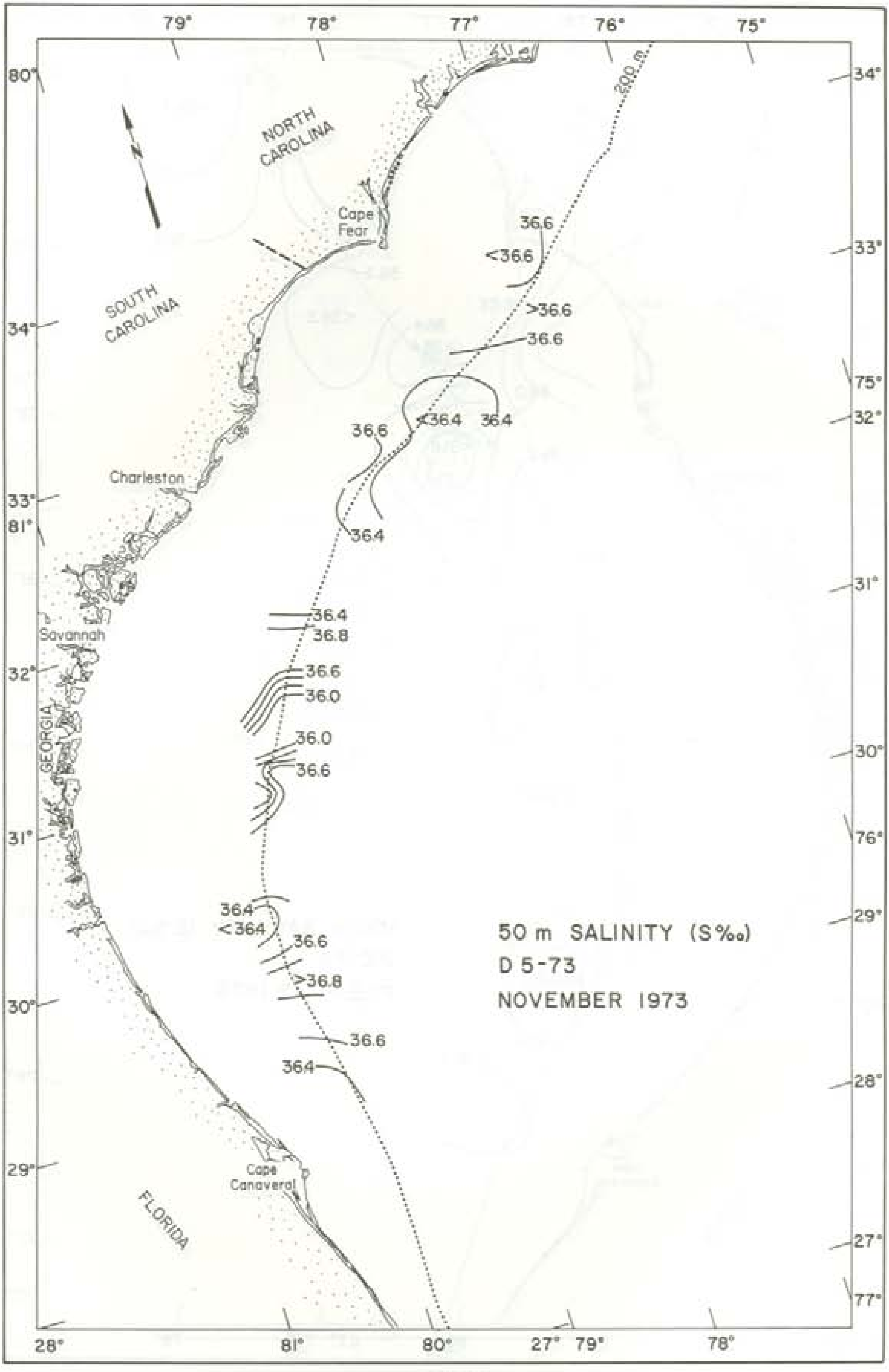
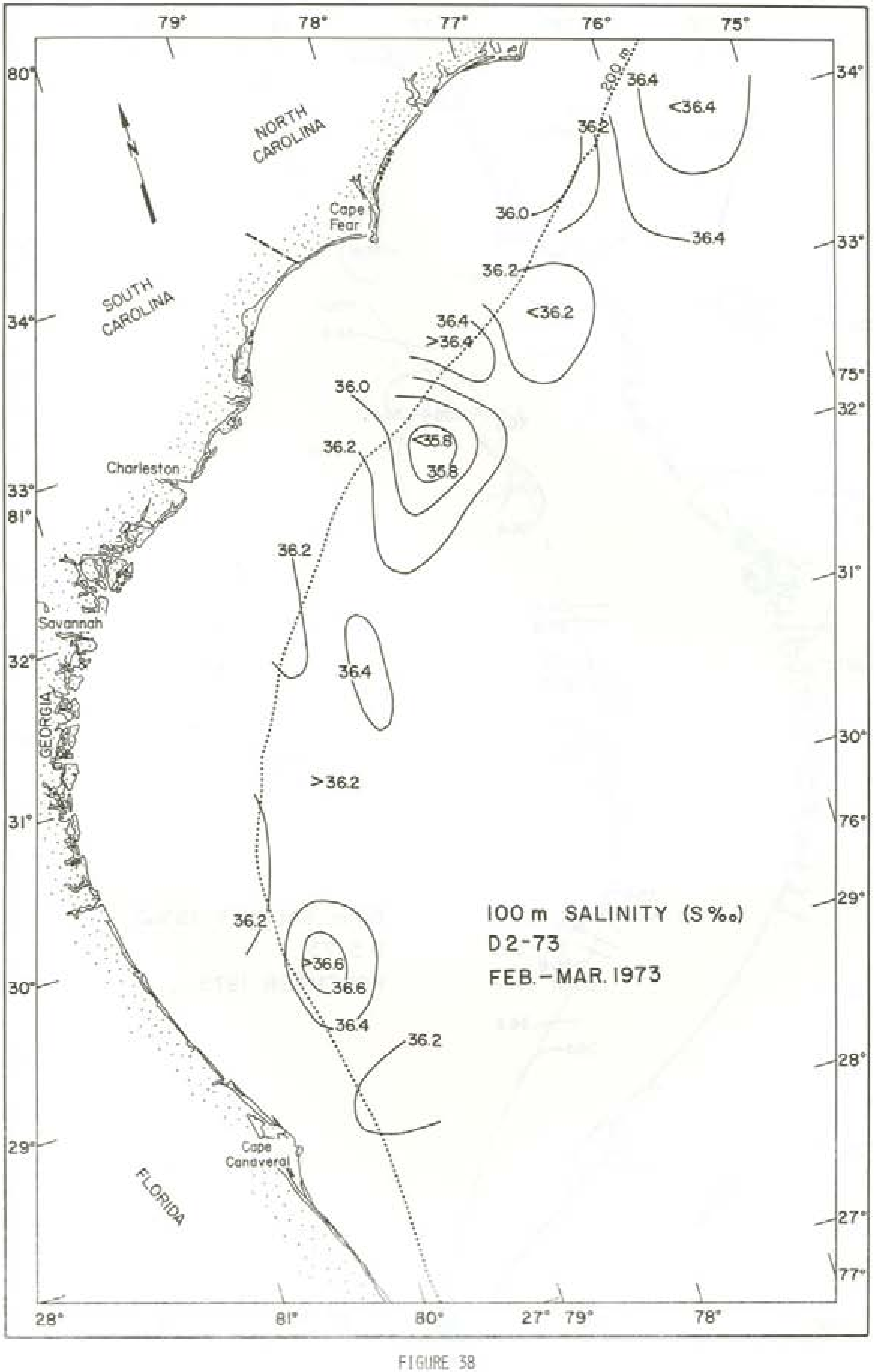

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
36.2
36.4
<36.4
36.0
<36.0
<36.2
36.0
<36.0
36.2
>36.2
36.2
50 m SALINITY (S ‰)
D 3-73
MAY 1973
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°

FIGURE 36



50 m SALINITY (S‰)
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
36.6
<36.6
>36.6
36.6
<36.4
36.4
36.6
36.4
36.4
36.8
36.6
36.0
36.0
36.6
36.4
<36.4
36.6
>36.8
36.6
36.4

FIGURE 37



79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
27°
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.4
<36.4
36.2
36.0
36.4
36.2
<36.2
36.4
>36.4
36.0
36.2
<35.8
35.8
36.2
36.4
>36.2
36.2
>36.6
36.6
36.4
36.2
100 m SALINITY (S ‰)
D2-73
FEB.-MAR. 1973

FIGURE 38

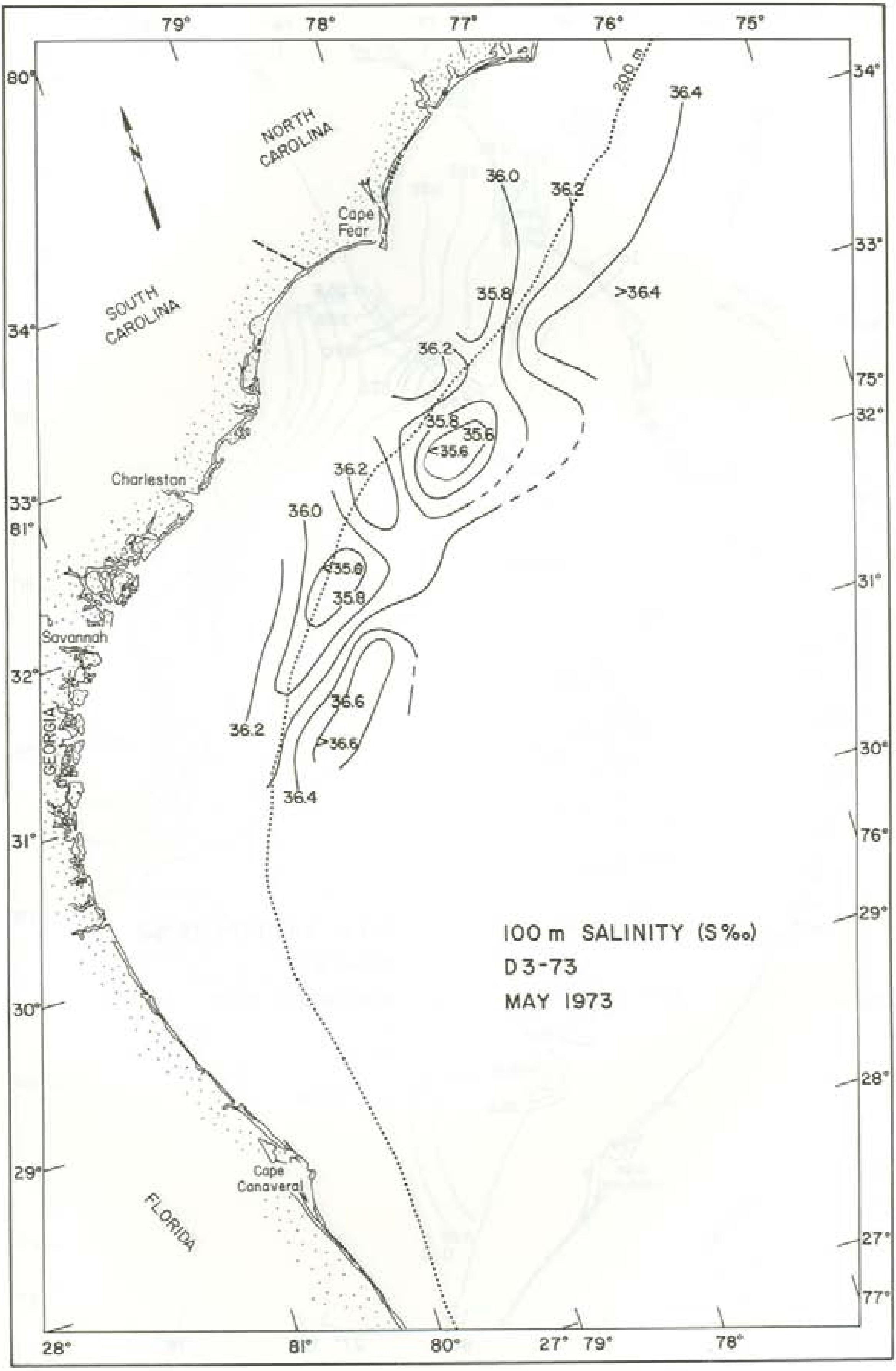
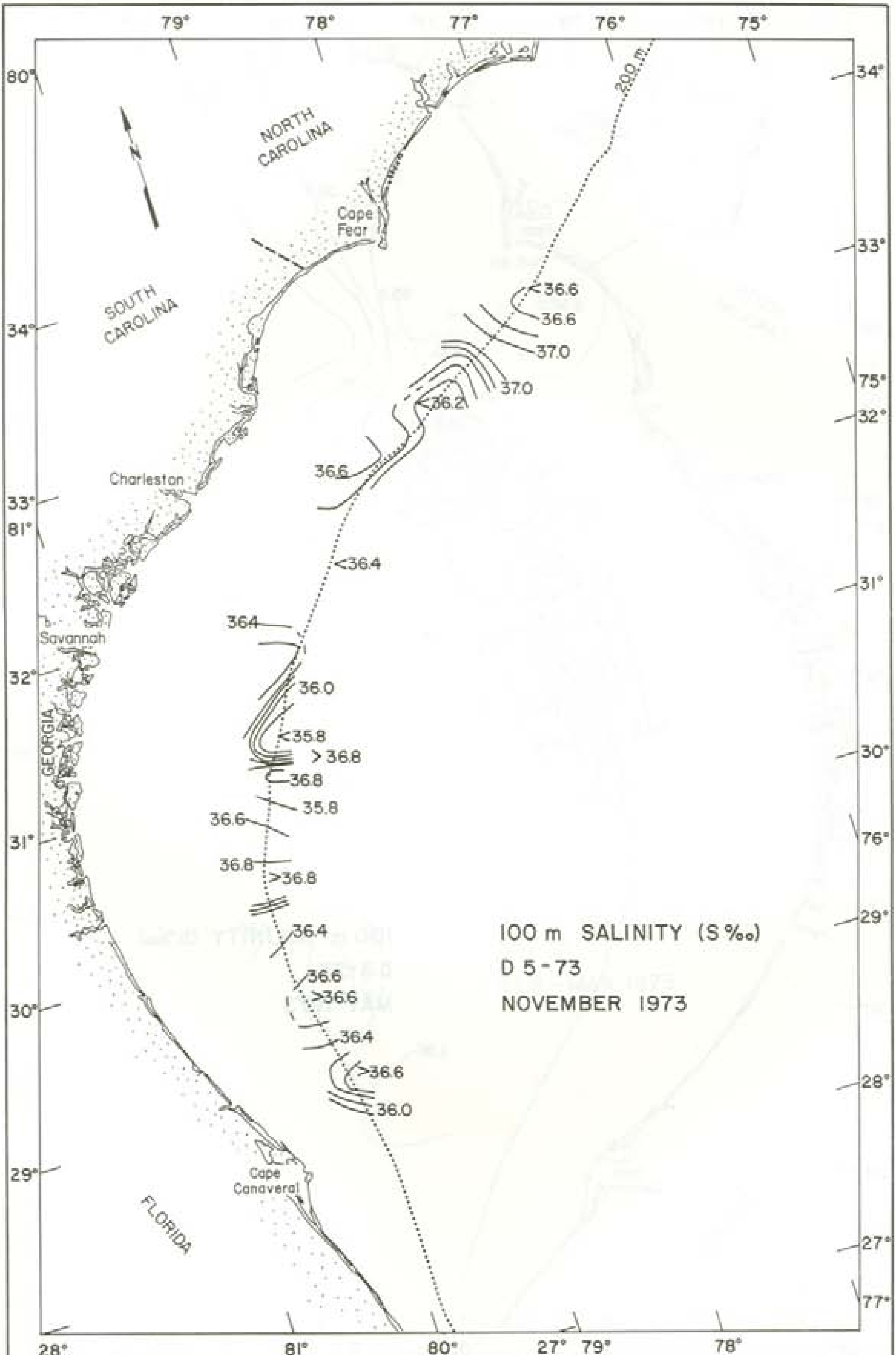

79°
78°
77°
76°
75°
80°
34°
33°
34°
75°
32°
33°
81°
31°
32°
30°
31°
76°
29°
30°
28°
29°
27°
77°
28°
81°
80°
27°
79°
78°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.4
36.0
36.2
35.8
>36.4
36.2
35.8
35.6
<35.6
36.2
36.0
<35.6
35.8
36.6
>36.6
36.2
36.4
100 m SALINITY (S‰)
D3-73
MAY 1973

FIGURE 39



79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
Cape Fear
33°
SOUTH CAROLINA
34°
<36.6
36.6
37.0
37.0
75°
<36.2
32°
36.6
Charleston
33°
81°
<36.4
31°
36.4
Savannah
32°
36.0
GEORGIA
<35.8
>36.8
30°
36.8
35.8
36.6
31°
76°
36.8
>36.8
29°
36.4
100 m SALINITY (S ‰)
D 5-73
NOVEMBER 1973
36.6
>36.6
30°
36.4
>36.6
28°
36.0
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 40

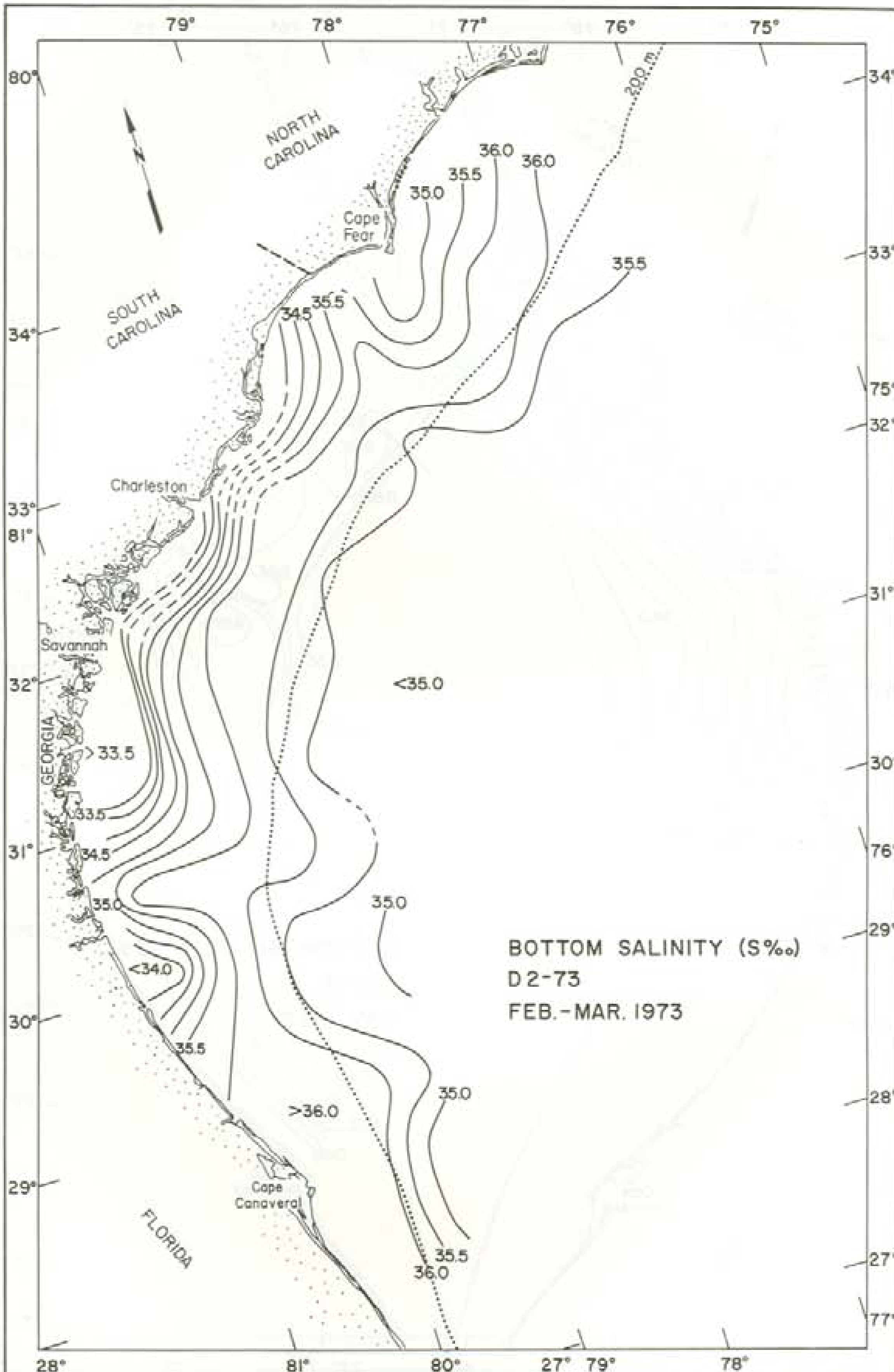

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
80°
79°
78°
200 m
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
36.0
36.0
35.5
35.0
35.5
34.5
35.5
<35.0
>33.5
33.5
34.5
35.0
<34.0
35.5
35.0
35.0
>36.0
35.5
36.0
BOTTOM SALINITY (S‰)
D2-73
FEB.-MAR. 1973

FIGURE 41

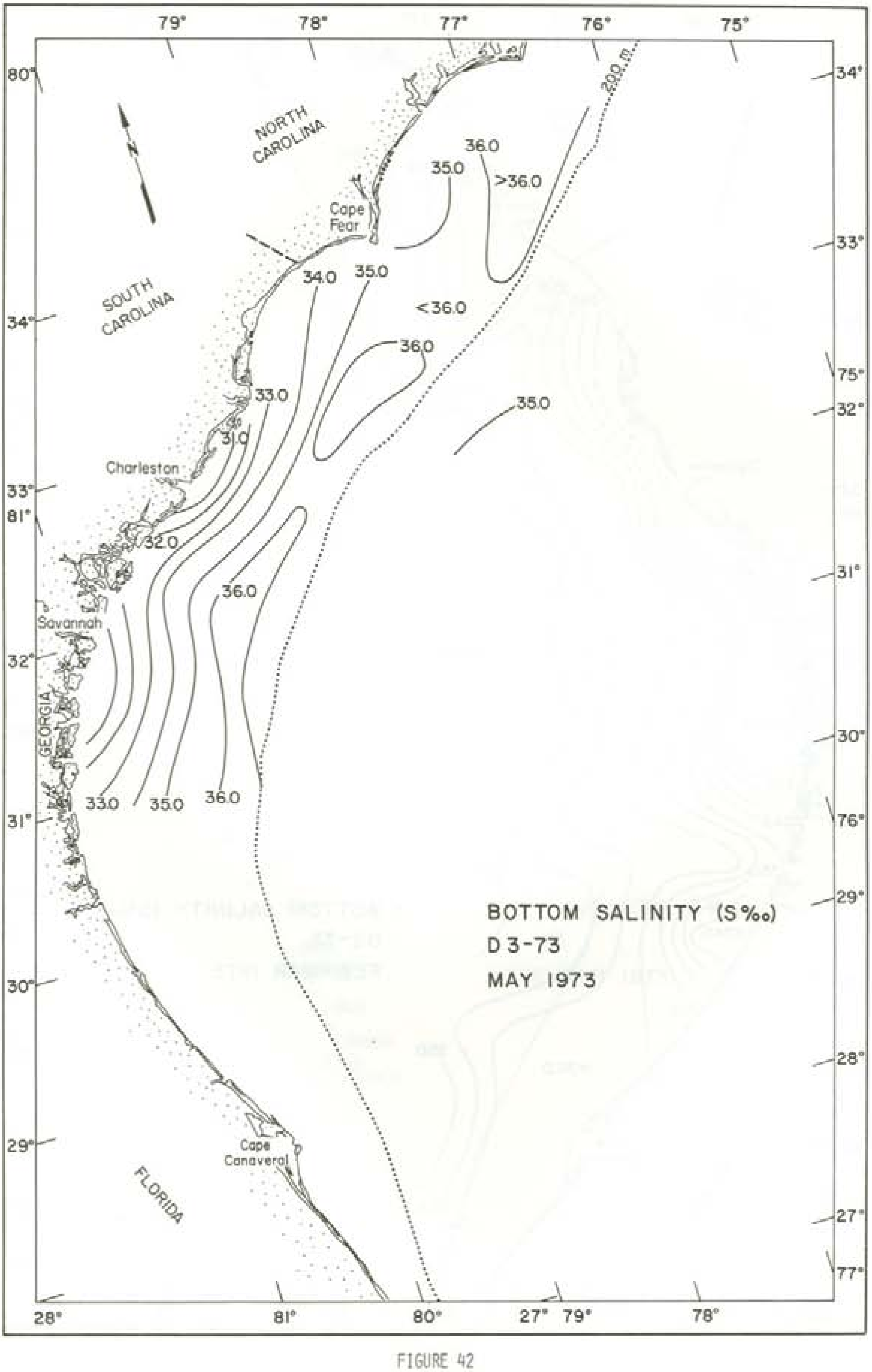
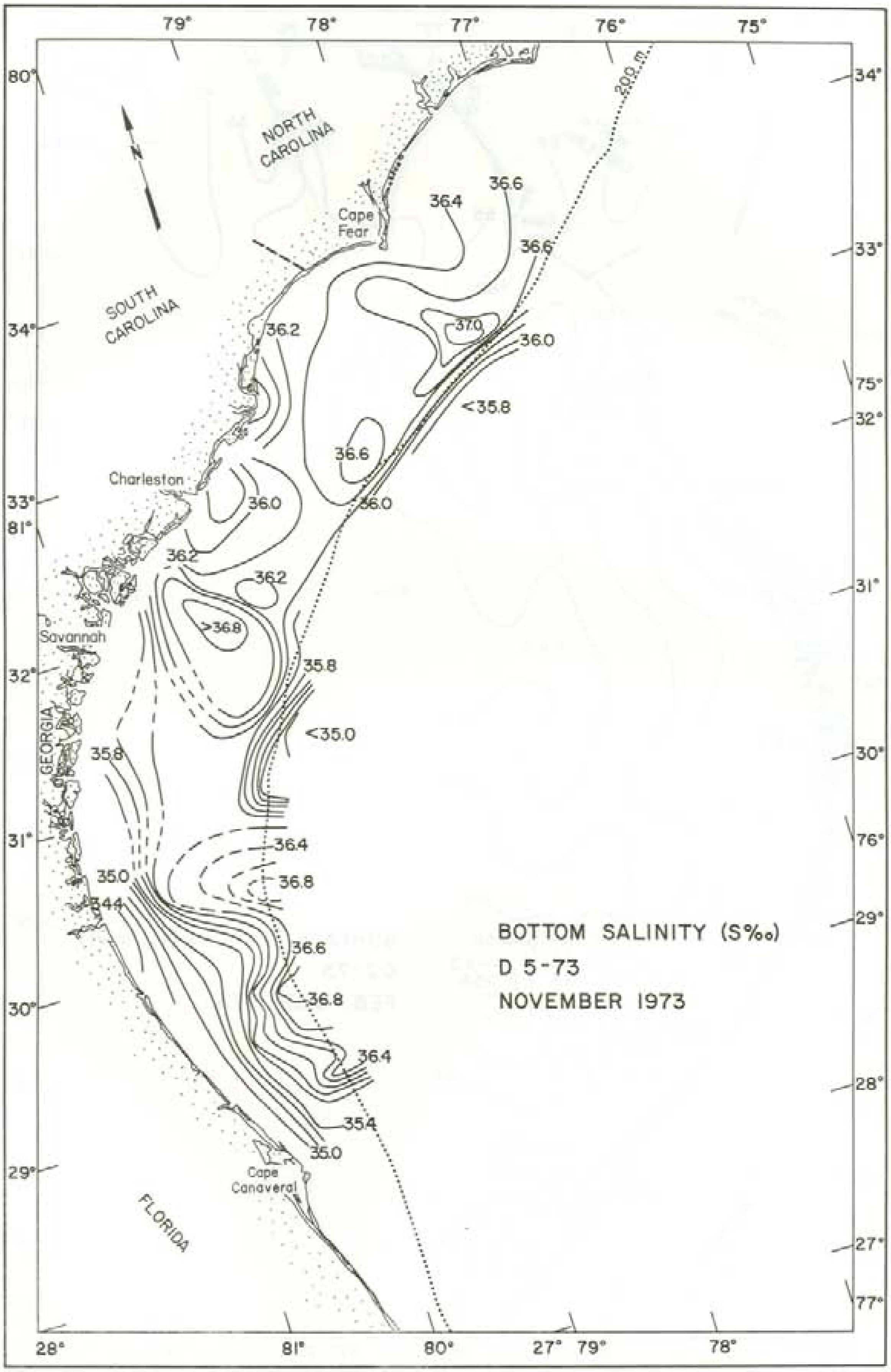

79°
78°
77°
76°
75°
200 m
80°
34°
NORTH CAROLINA
36.0
35.0
>36.0
Cape Fear
33°
SOUTH CAROLINA
34.0
35.0
<36.0
34°
36.0
75°
33.0
35.0
32°
31.0
Charleston
33°
81°
32.0
31°
36.0
Savannah
32°
GEORGIA
30°
33.0
35.0
36.0
31°
76°
29°
BOTTOM SALINITY (S‰)
D 3-73
MAY 1973
30°
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 42



79°
78°
77°
76°
75°
80°
34°
33°
81°
32°
31°
30°
29°
28°
81°
80°
27°
79°
78°
75°
76°
77°
200 m
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
36.4
36.6
36.6
37.0
36.0
36.2
<35.8
36.6
36.0
36.0
36.2
36.2
>36.8
35.8
<35.0
35.8
36.4
36.8
35.0
34.4
36.6
36.8
36.4
35.4
35.0
BOTTOM SALINITY (S‰)
D 5-73
NOVEMBER 1973

FIGURE 43

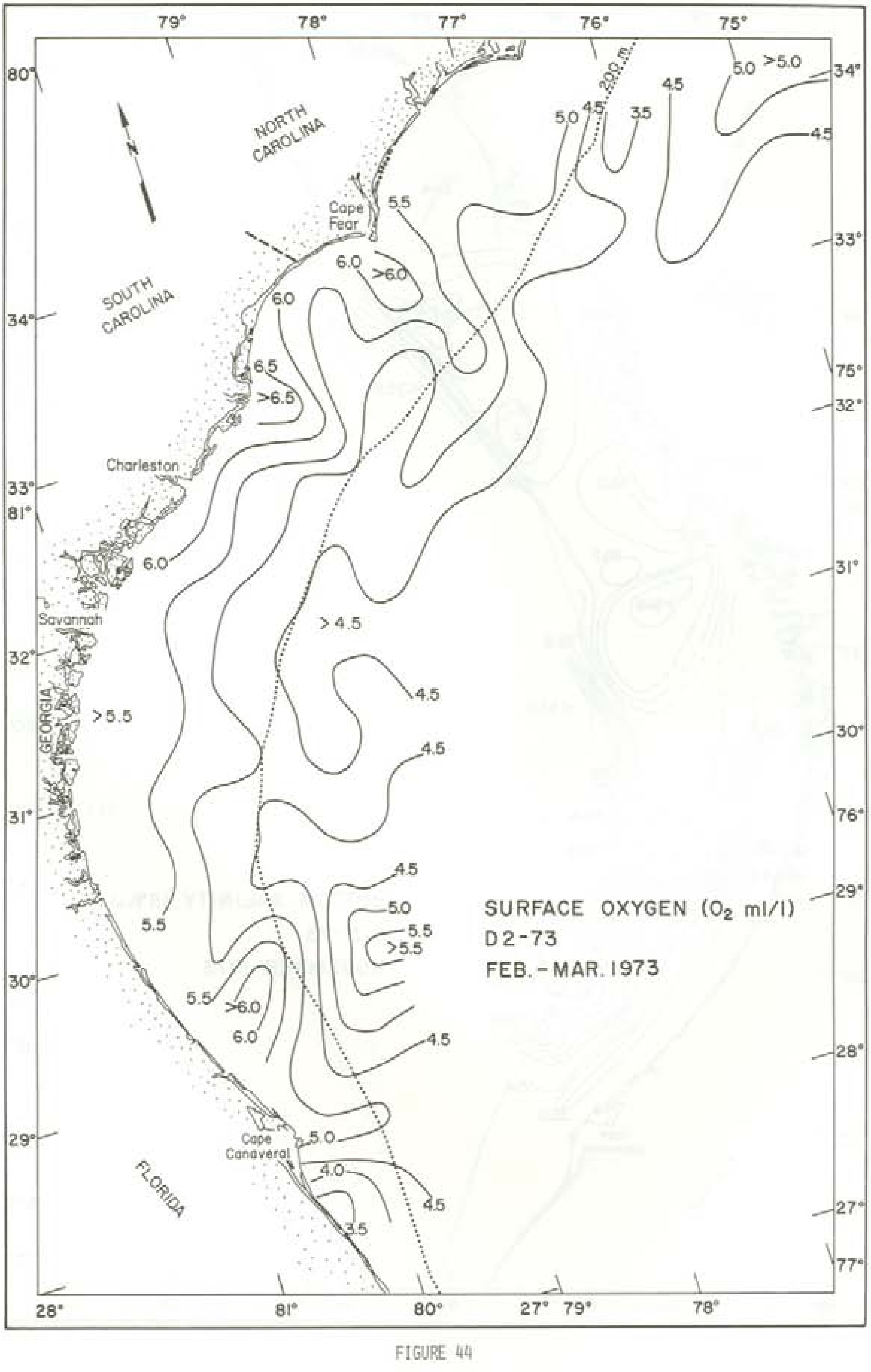

SURFACE OXYGEN (O_2 ml/l)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 44

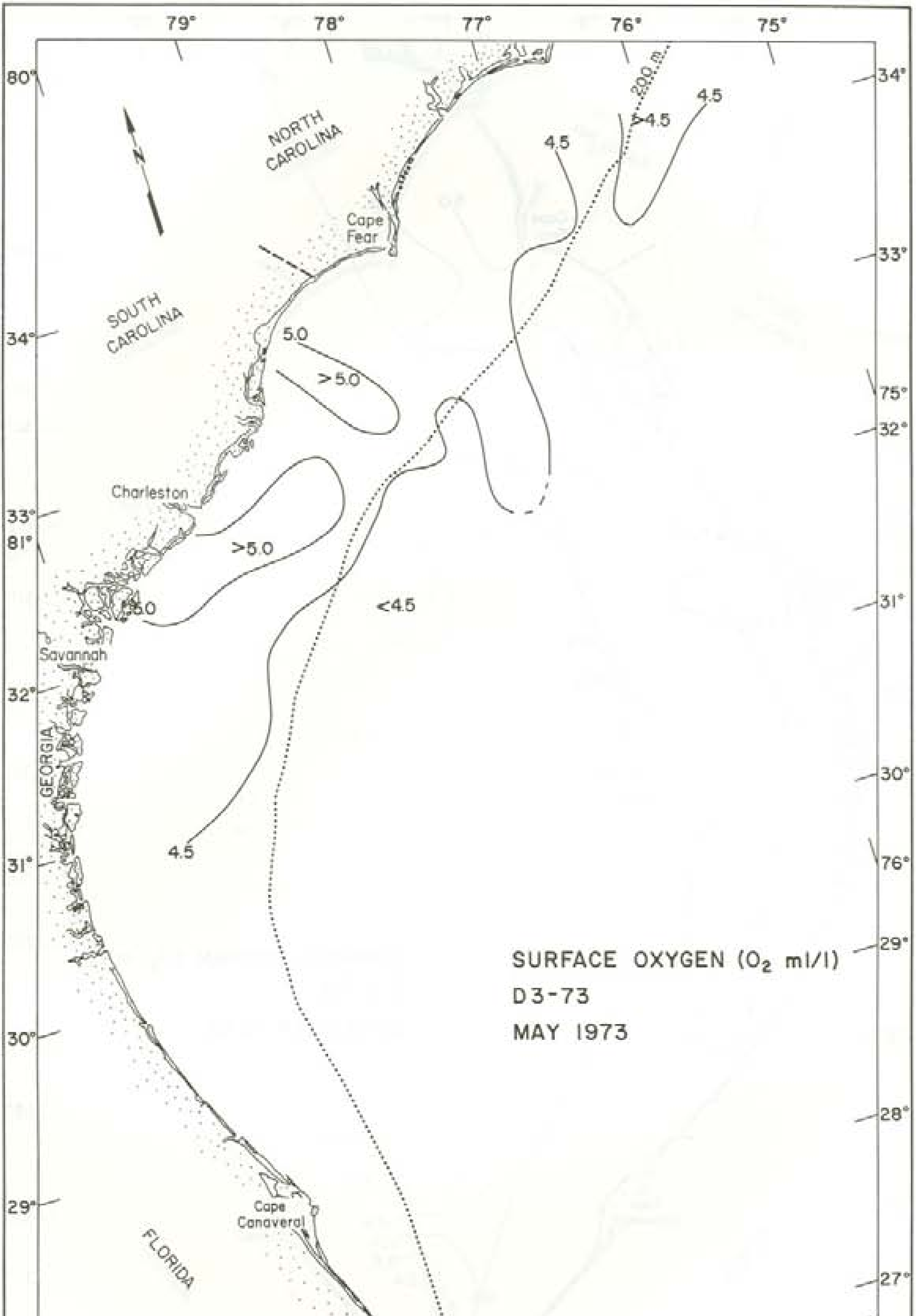
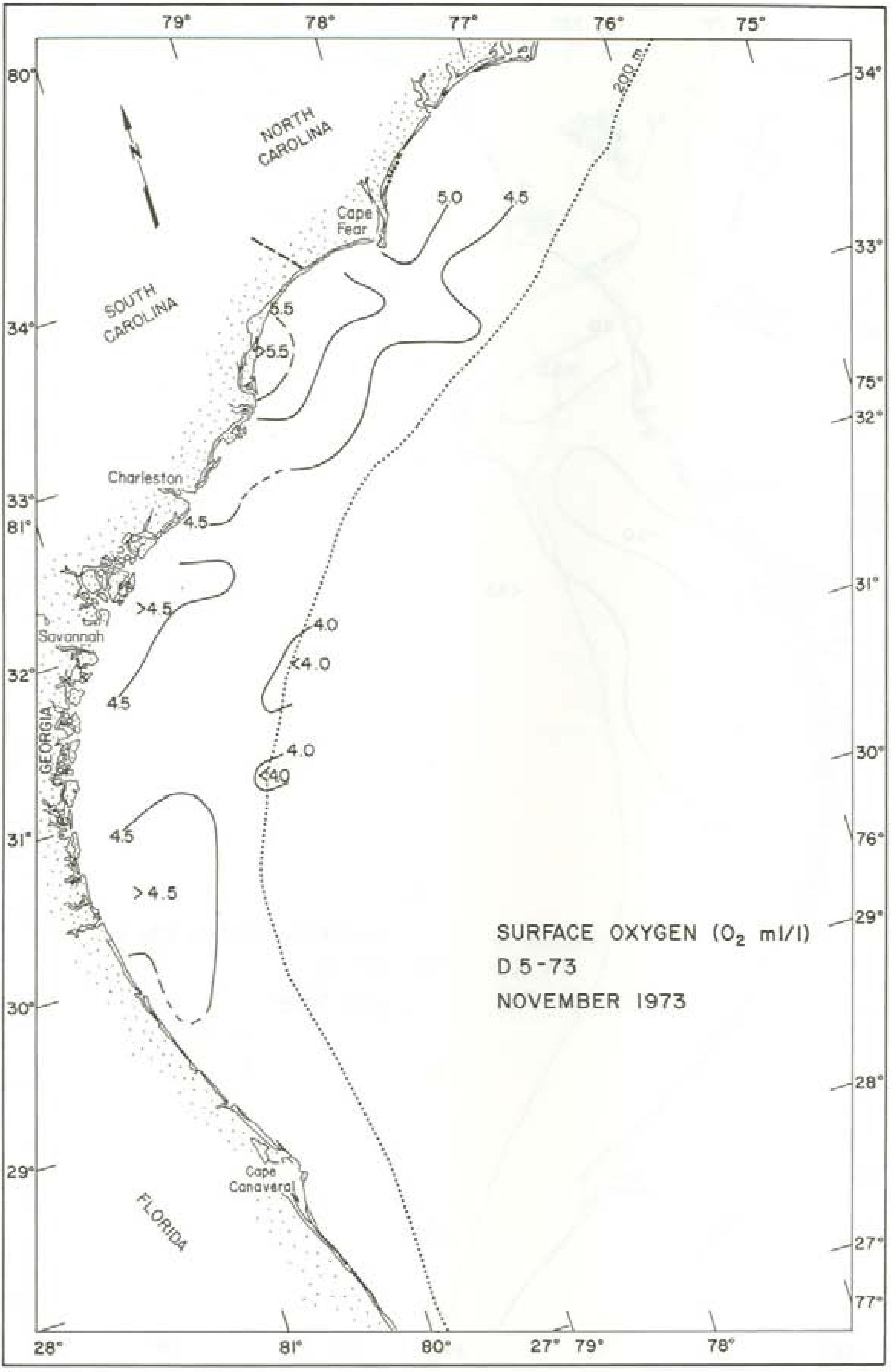

SURFACE OXYGEN (O_2 ml/l)
D3-73
MAY 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
5.0
>5.0
>5.0
5.0
4.5
4.5
>4.5
4.5
<4.5
4.5
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°

FIGURE 45



79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
N
Cape Fear
5.0
4.5
33°
SOUTH CAROLINA
5.5
34°
>5.5
75°
32°
Charleston
33°
81°
4.5
31°
>4.5
4.0
Savannah
<4.0
32°
4.5
GEORGIA
4.0
30°
<4.0
31°
4.5
76°
>4.5
29°
SURFACE OXYGEN (O_2 ml/l)
D 5-73
NOVEMBER 1973
30°
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 46

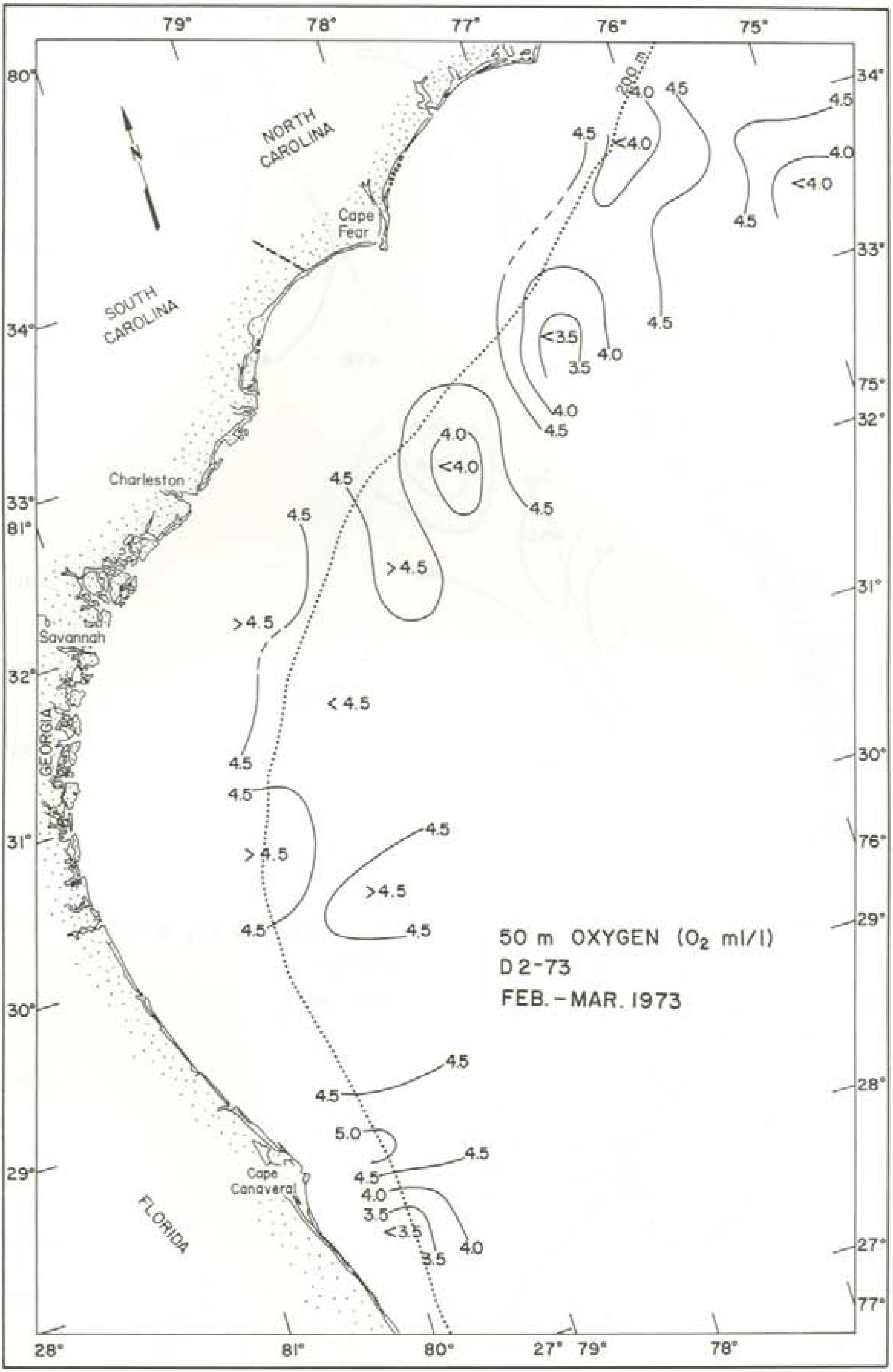

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
50 m OXYGEN (O_2 ml/l)
D2-73
FEB.-MAR. 1973

FIGURE 47

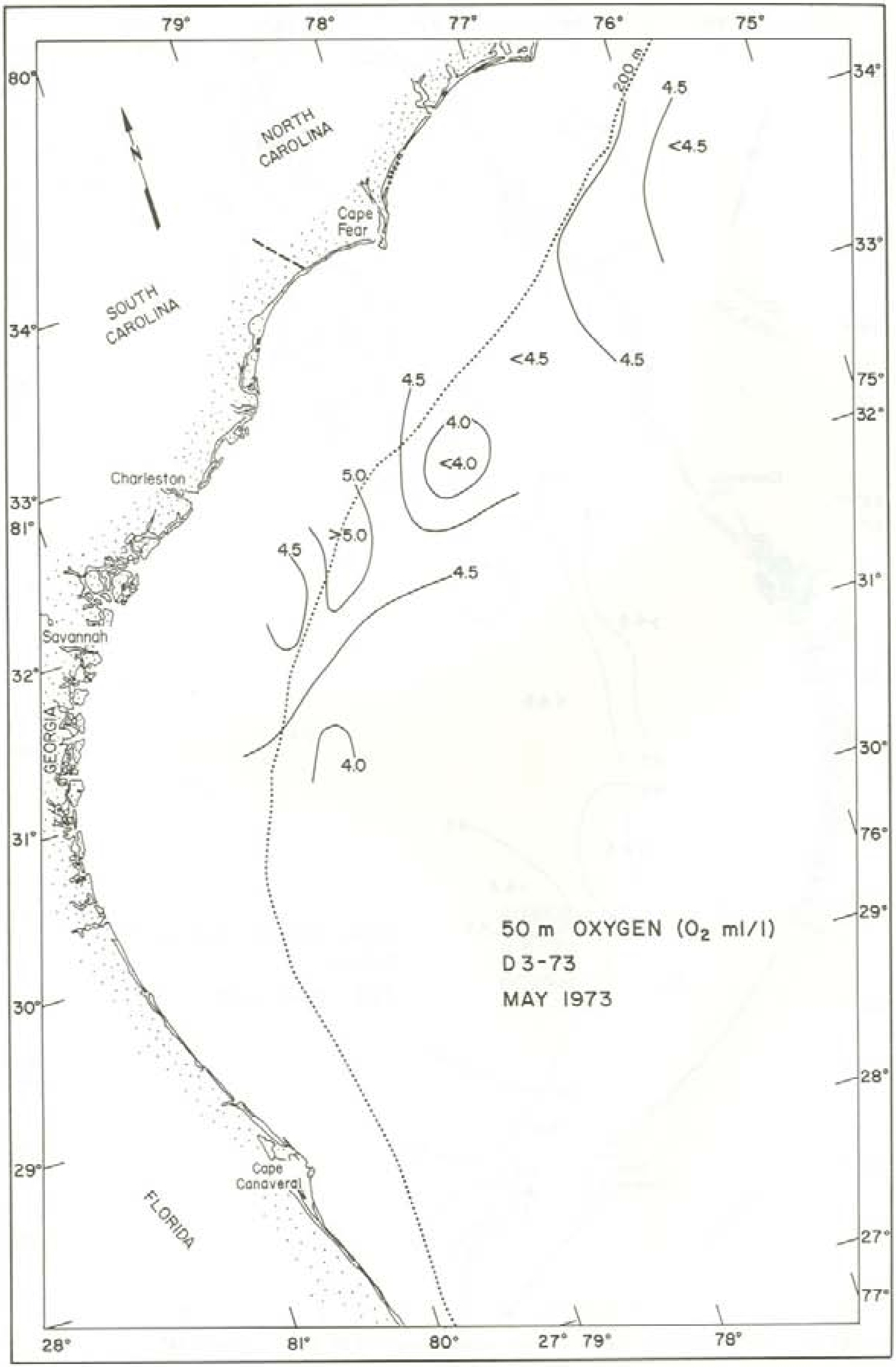

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
80°
79°
78°
200 m
4.5
<4.5
NORTH CAROLINA
Cape Fear
SOUTH CAROLINA
<4.5
4.5
4.5
4.0
<4.0
Charleston
5.0
>5.0
4.5
4.5
Savannah
GEORGIA
4.0
50 m OXYGEN (O_2 ml/l)
D 3-73
MAY 1973
Cape Canaveral
FLORIDA

FIGURE 48

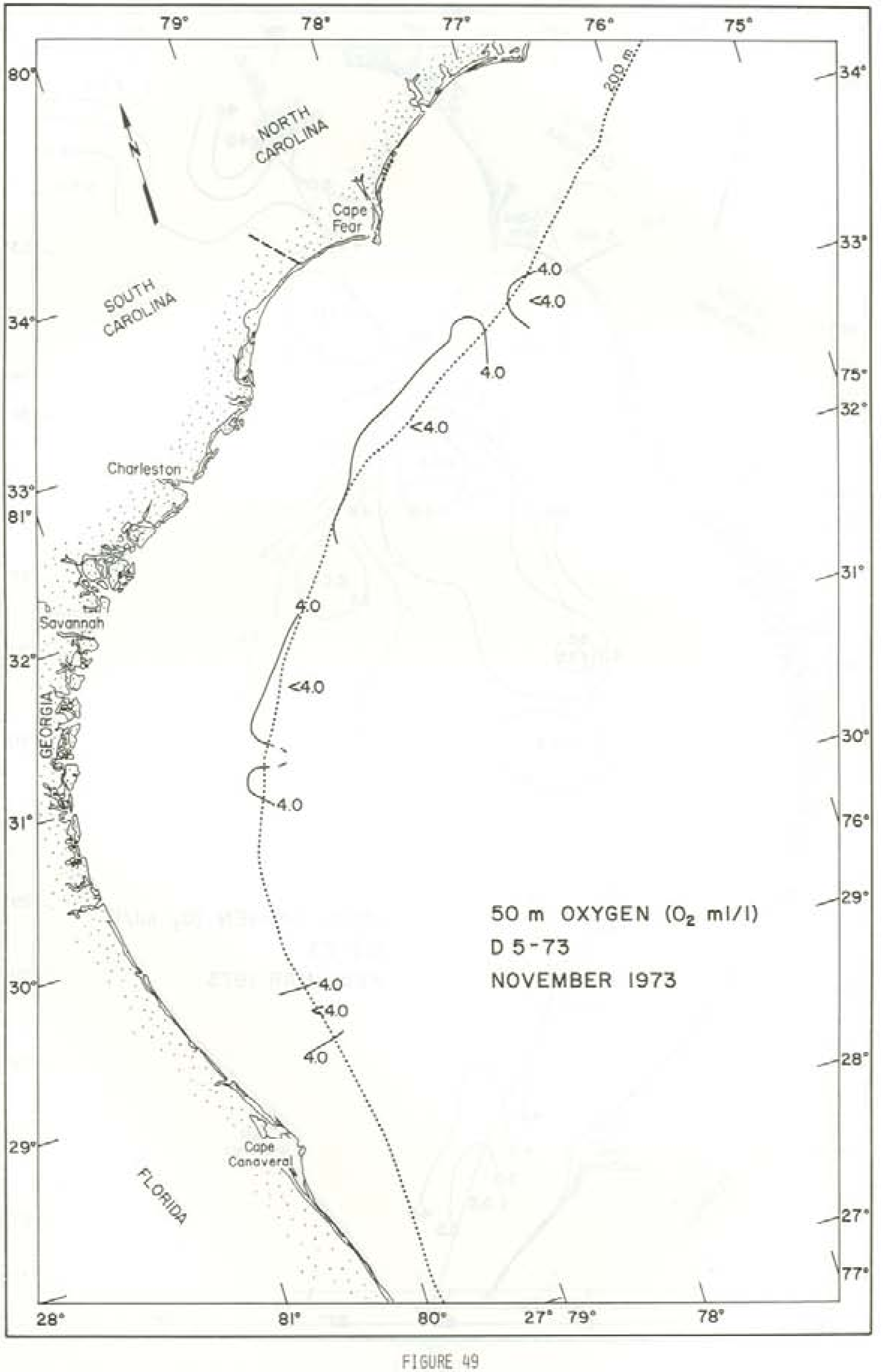

79°
78°
77°
76°
75°
80°
34°
NORTH CAROLINA
N
200 m
Cape Fear
33°
SOUTH CAROLINA
4.0
<4.0
34°
4.0
75°
32°
<4.0
Charleston
33°
81°
31°
4.0
Savannah
32°
<4.0
GEORGIA
30°
4.0
31°
76°
29°
50 m OXYGEN (O_2 ml/l)
D 5-73
NOVEMBER 1973
30°
4.0
<4.0
4.0
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 49

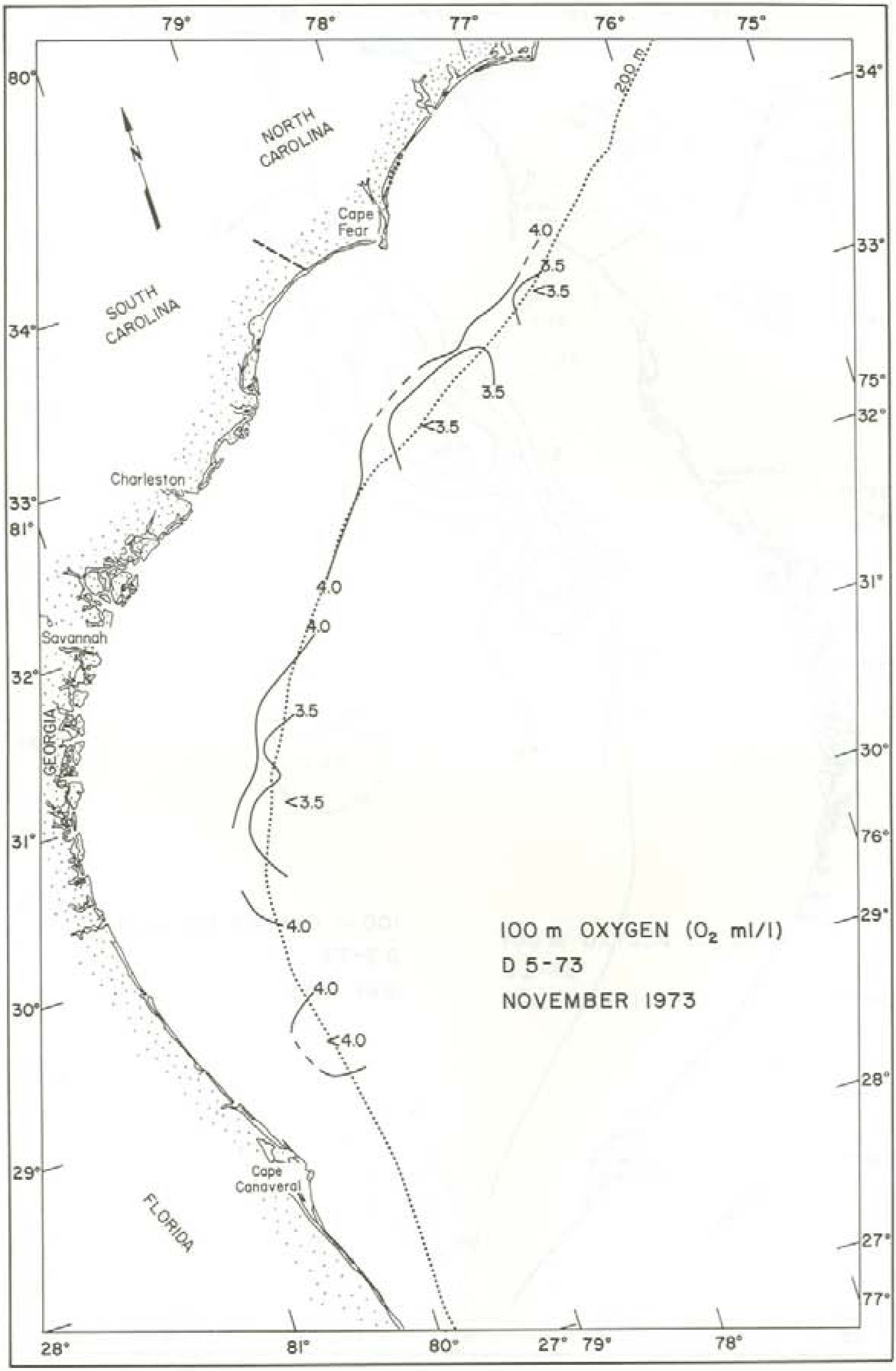

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
27°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
4.0
3.5
<3.5
<4.0
100 m OXYGEN (O_2 ml/l)
D 5-73
NOVEMBER 1973

FIGURE 52

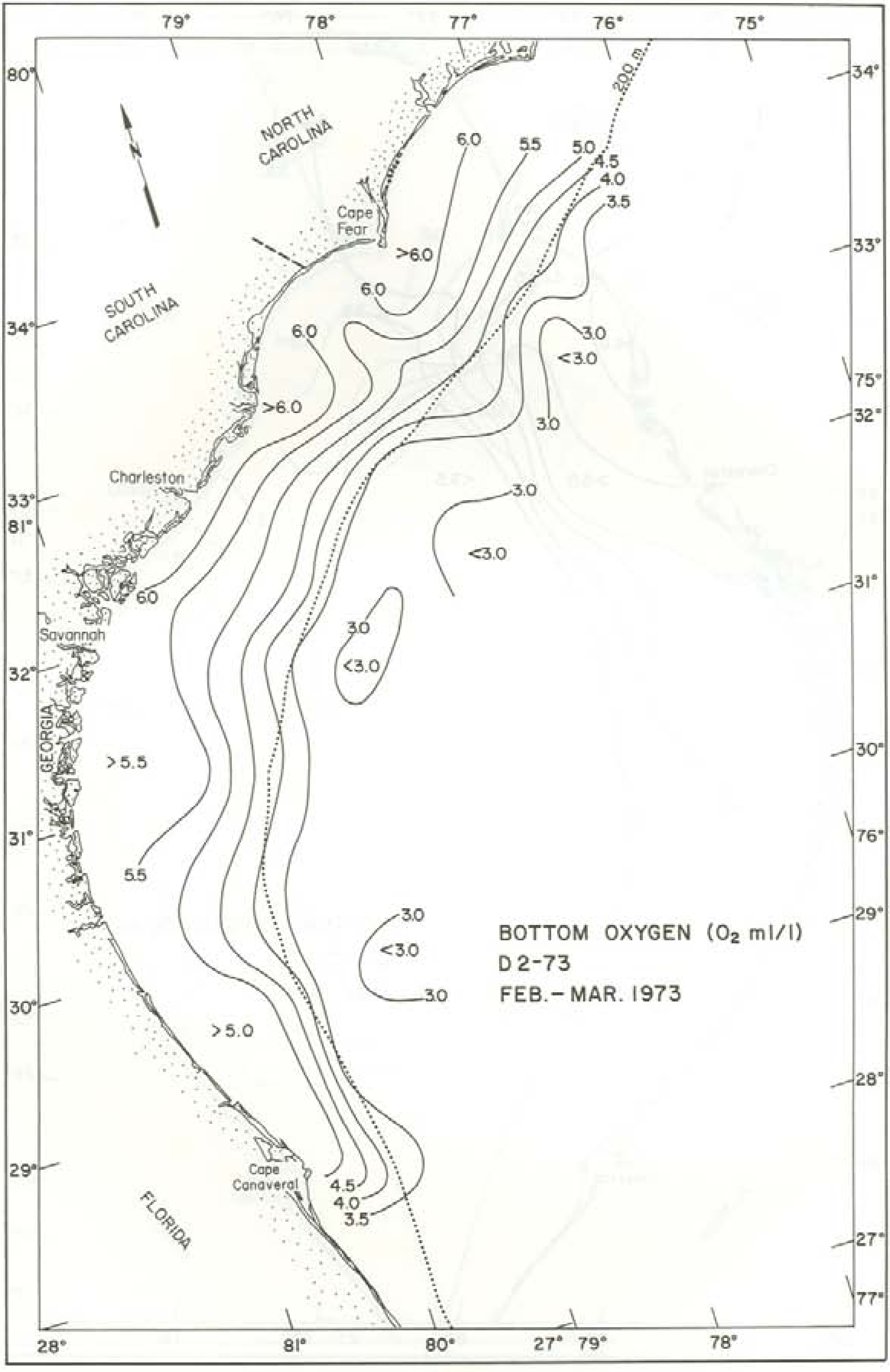

BOTTOM OXYGEN (O_2 ml/l)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
6.0
5.5
5.0
4.5
4.0
3.5
3.0
>6.0
<3.0
>5.5
>5.0
79°
78°
77°
76°
75°
80°
81°
28°
27°
34°
33°
32°
31°
30°
29°

FIGURE 53

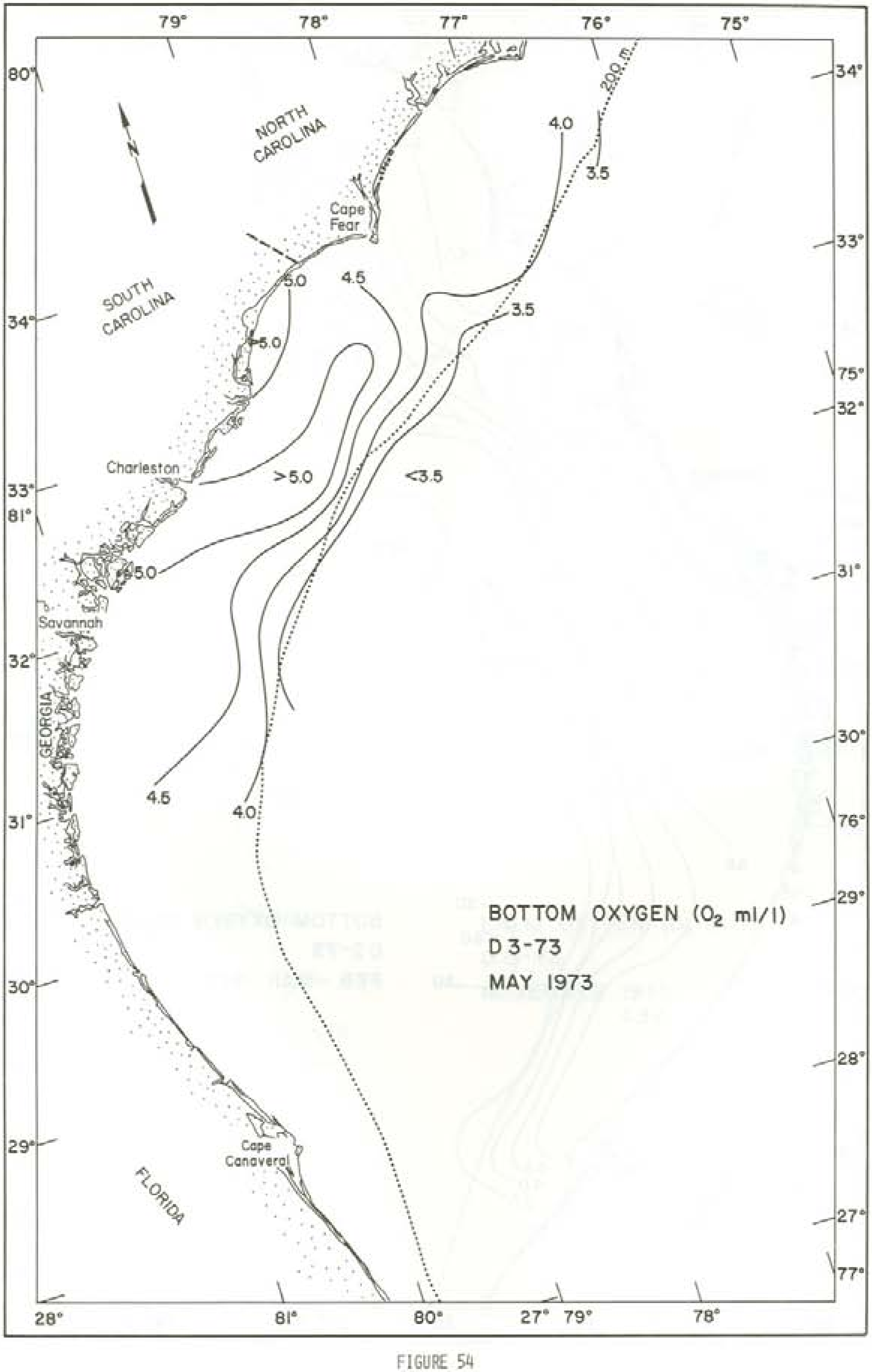

79°
78°
77°
76°
75°
80°
34°
NORTH CAROLINA
SOUTH CAROLINA
Cape Fear
200 m
4.0
3.5
33°
5.0
4.5
3.5
34°
>5.0
75°
32°
Charleston
>5.0
<3.5
33°
81°
5.0
31°
Savannah
32°
GEORGIA
30°
4.5
4.0
31°
76°
29°
BOTTOM OXYGEN (O_2 ml/l)
D 3-73
MAY 1973
30°
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 54

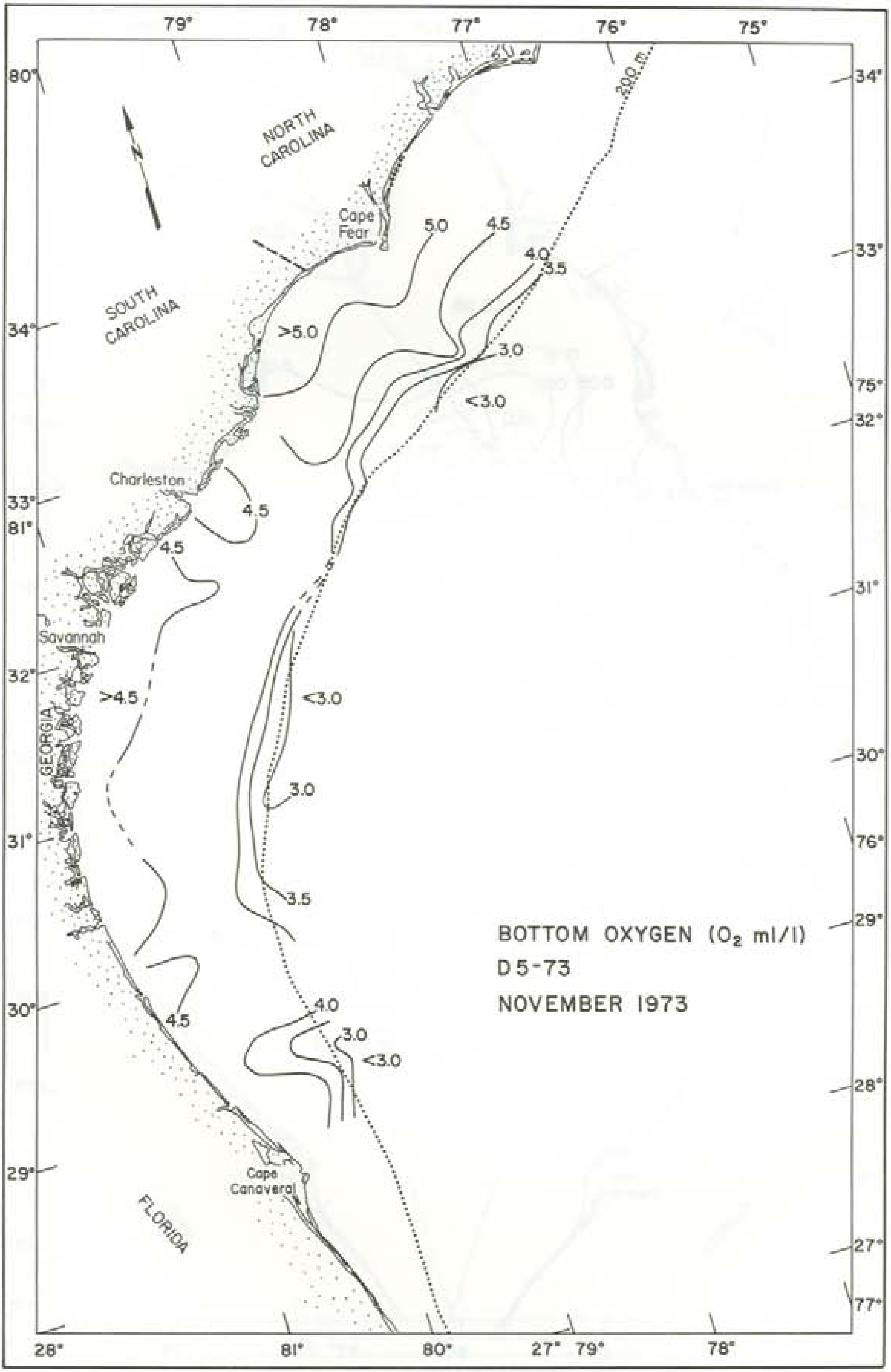

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
200 m
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
5.0
4.5
4.0
3.5
3.0
>5.0
<3.0
4.5
4.5
>4.5
<3.0
3.0
3.5
4.5
4.0
3.0
<3.0
BOTTOM OXYGEN (O2 ml/l)
D5-73
NOVEMBER 1973
80°
27°
79°
78°
77°

FIGURE 55

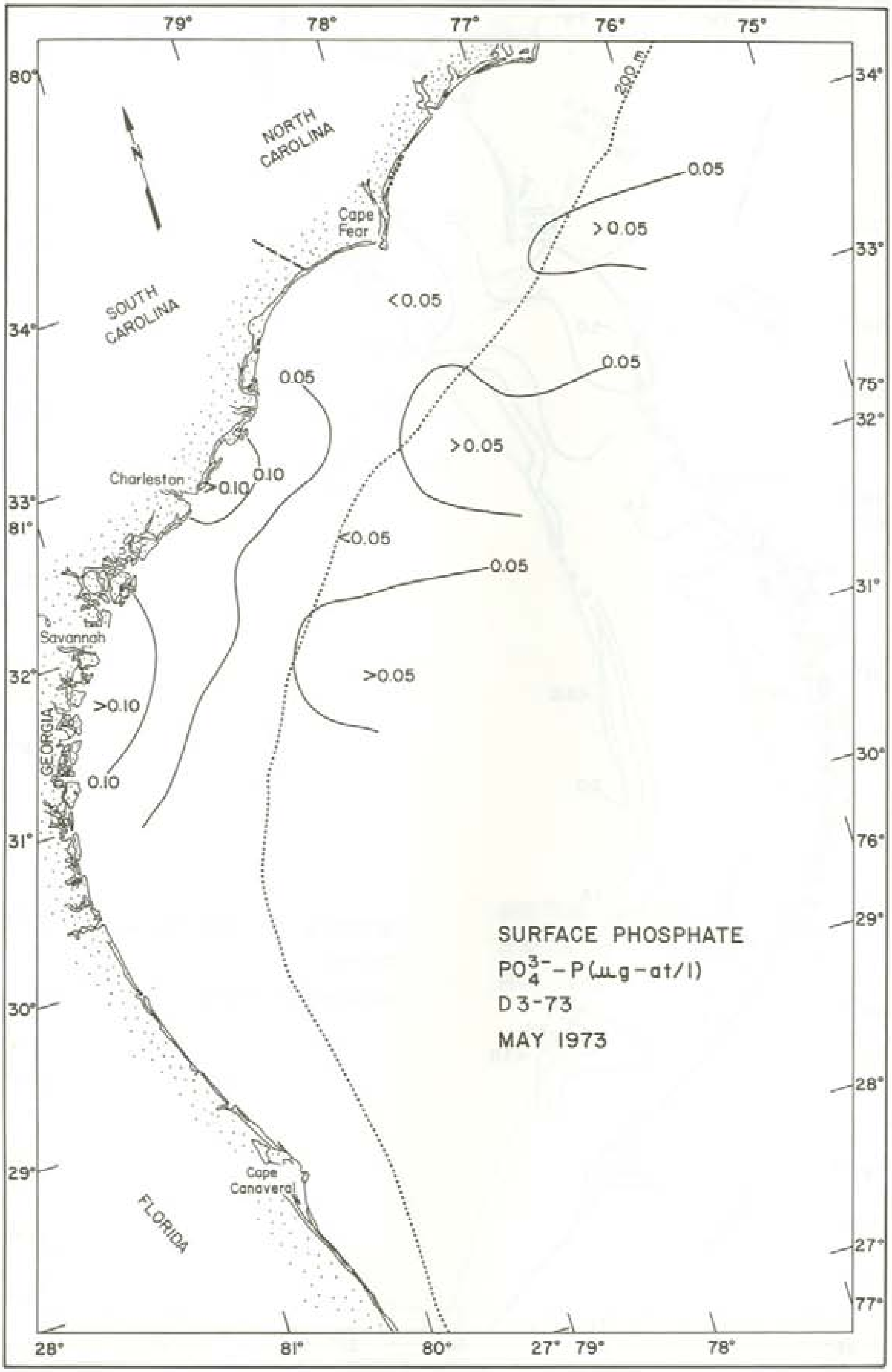
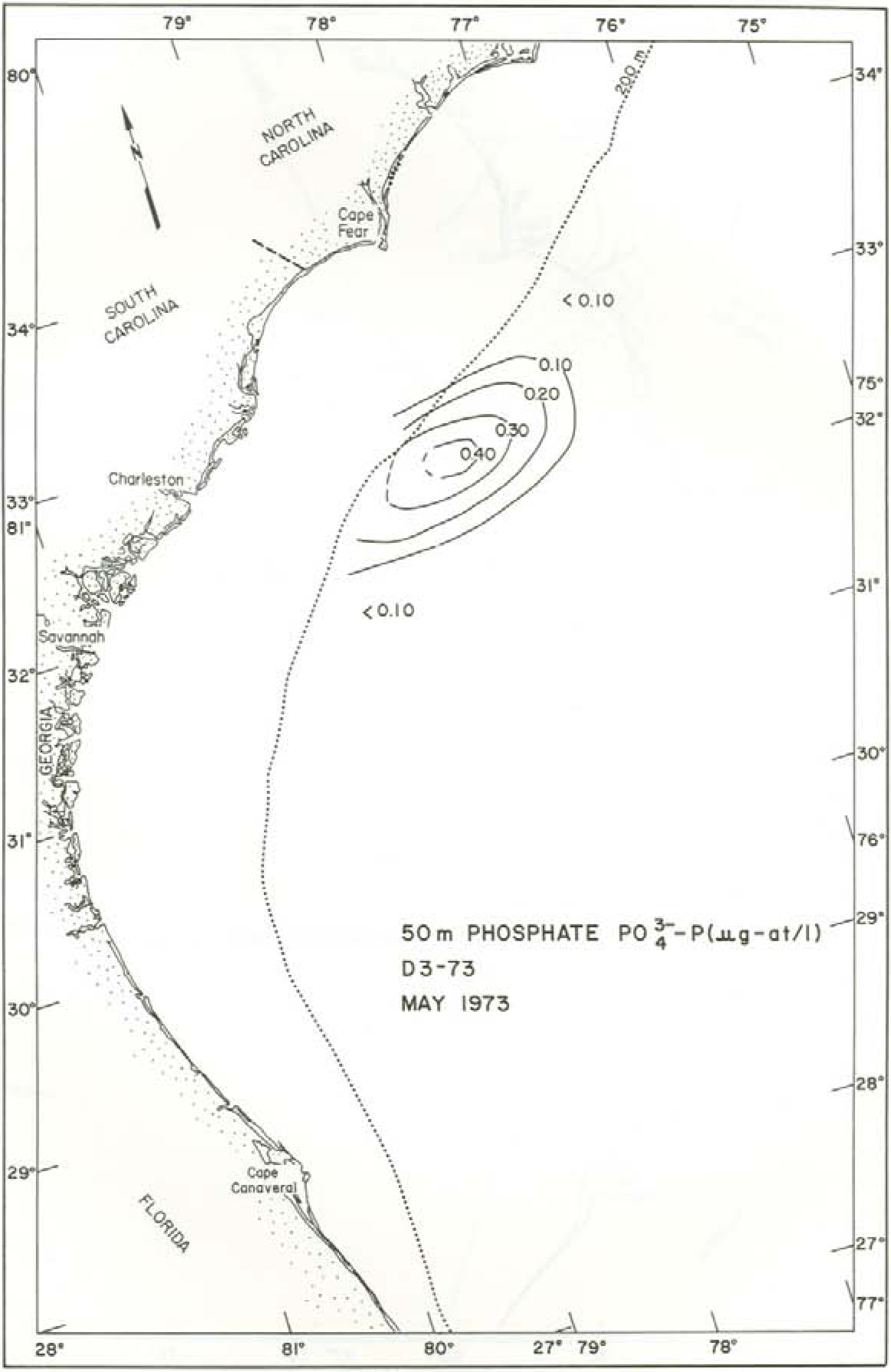
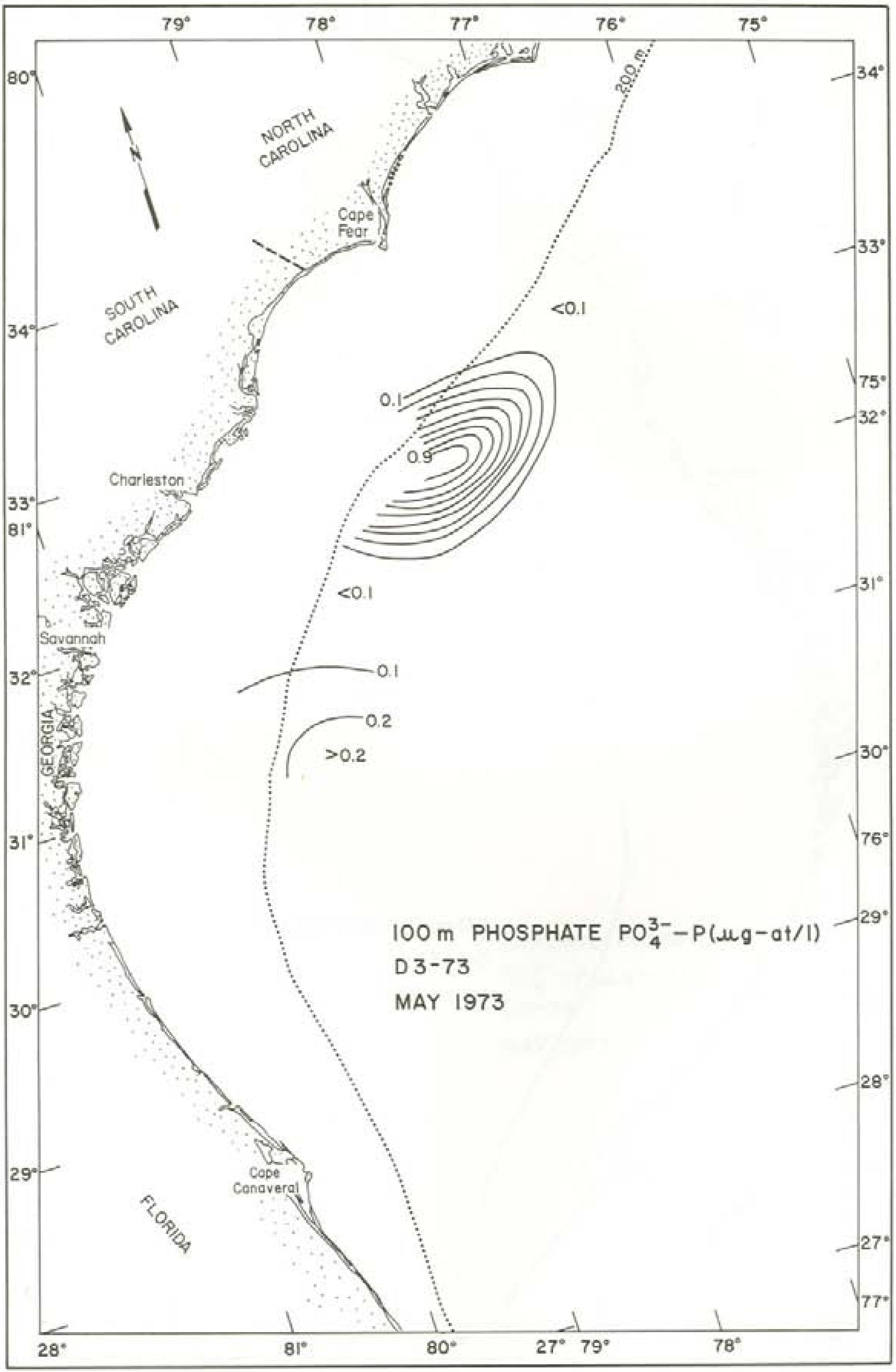

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
27°
200 m
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
0.05
>0.05
<0.05
0.10
>0.10
SURFACE PHOSPHATE
$PO_4^{3-}-P$ (µg-at/l)
D3-73
MAY 1973

FIGURE 56



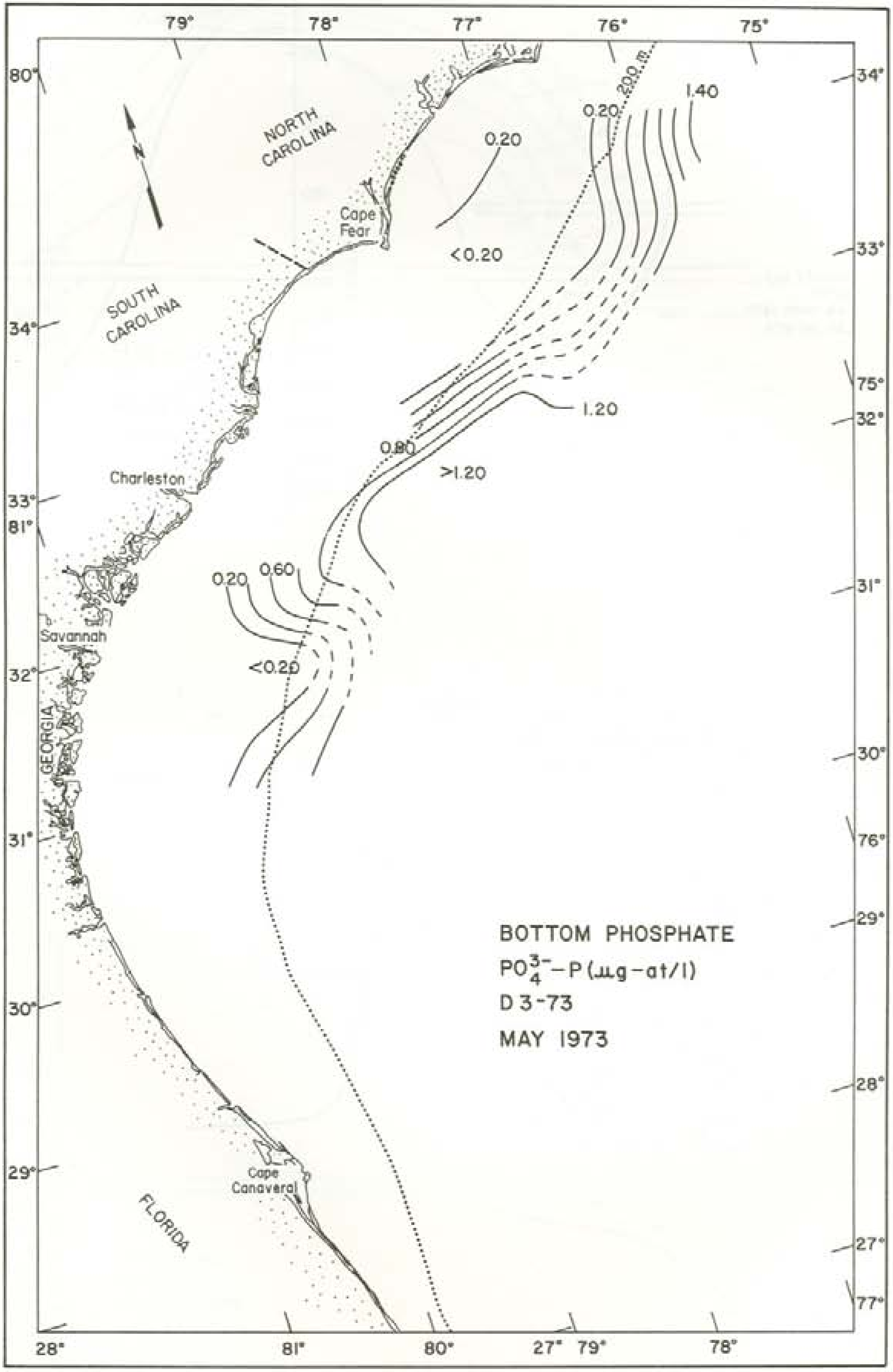
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
81°
75°
76°
27°
77°
80°
79°
78°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
< 0.10
0.10
0.20
0.30
0.40
< 0.10
50 m PHOSPHATE PO_4^{3-}-P(µg-at/l)
D3-73
MAY 1973

FIGURE 57



79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
N
Cape Fear
33°
SOUTH CAROLINA
34°
<0.1
0.1
75°
32°
0.9
Charleston
33°
81°
31°
<0.1
Savannah
32°
0.1
0.2
GEORGIA
>0.2
30°
31°
76°
29°
100 m PHOSPHATE PO_4^{3-} − P(μg-at/l)
D3-73
MAY 1973
30°
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 58



79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
80°
79°
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
1.40
0.20
0.20
<0.20
1.20
0.80
>1.20
0.20
0.60
<0.20
BOTTOM PHOSPHATE
$PO_4^{3-}-P$ (μg-at/l)
D 3-73
MAY 1973

FIGURE 59

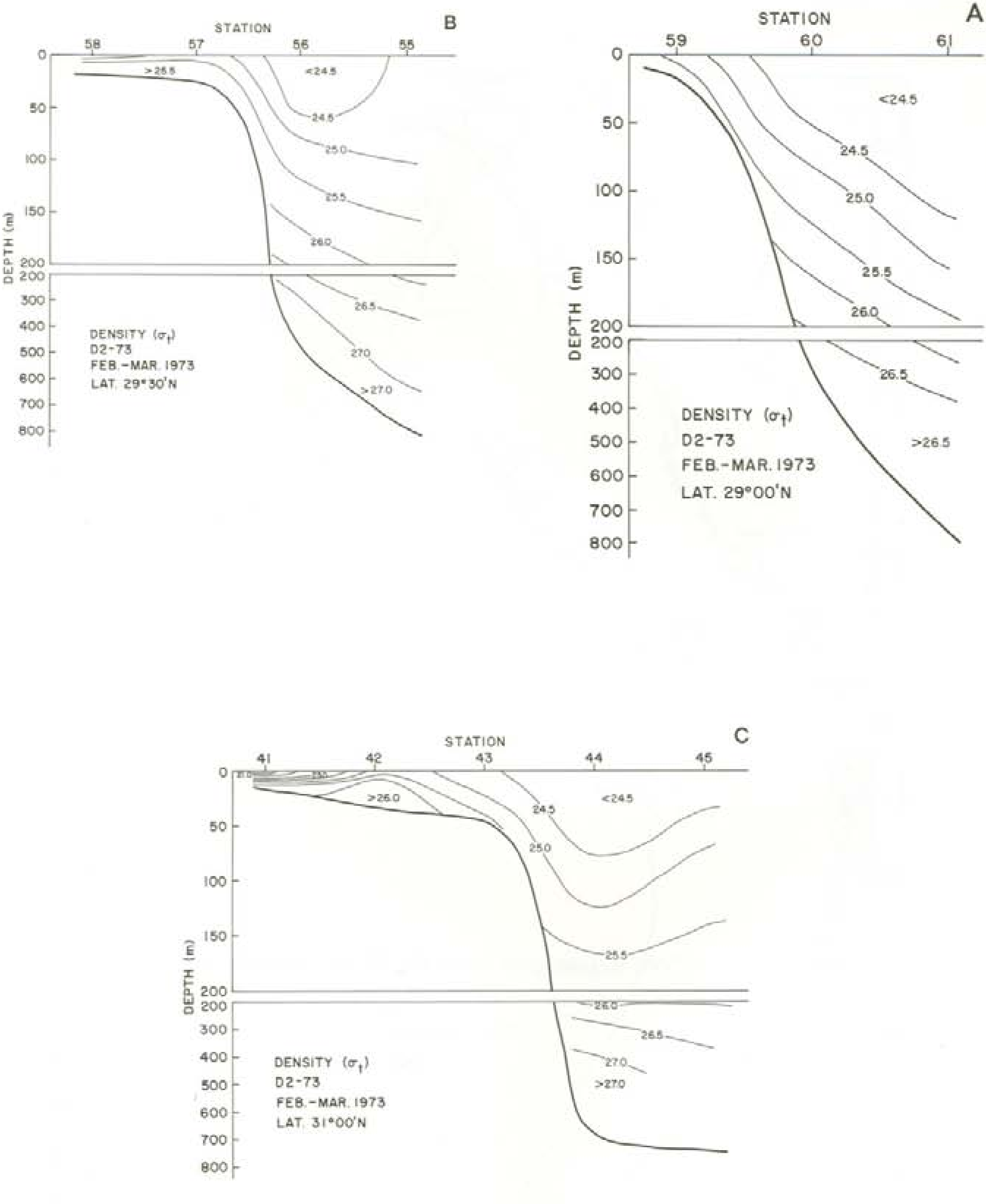
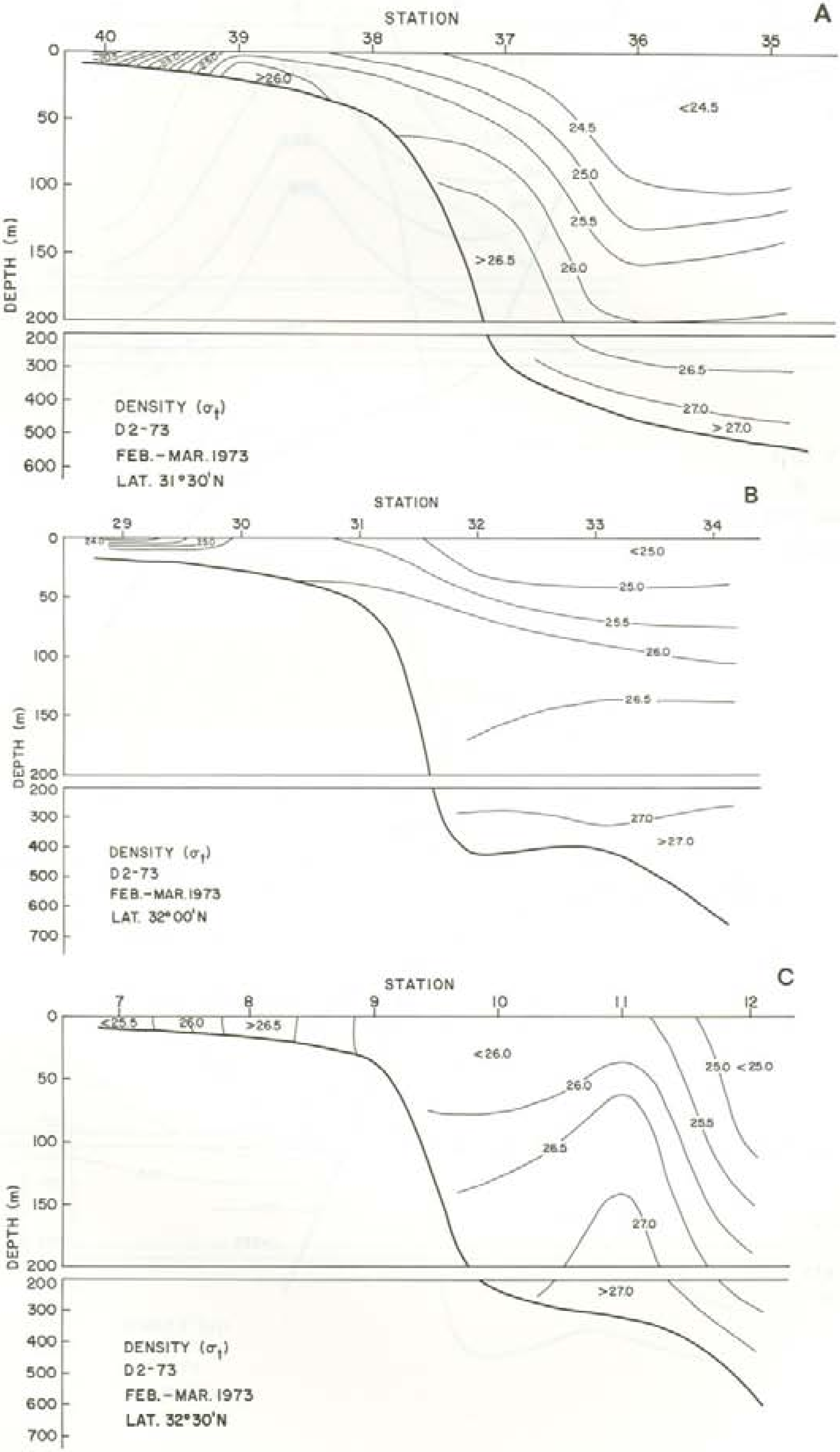
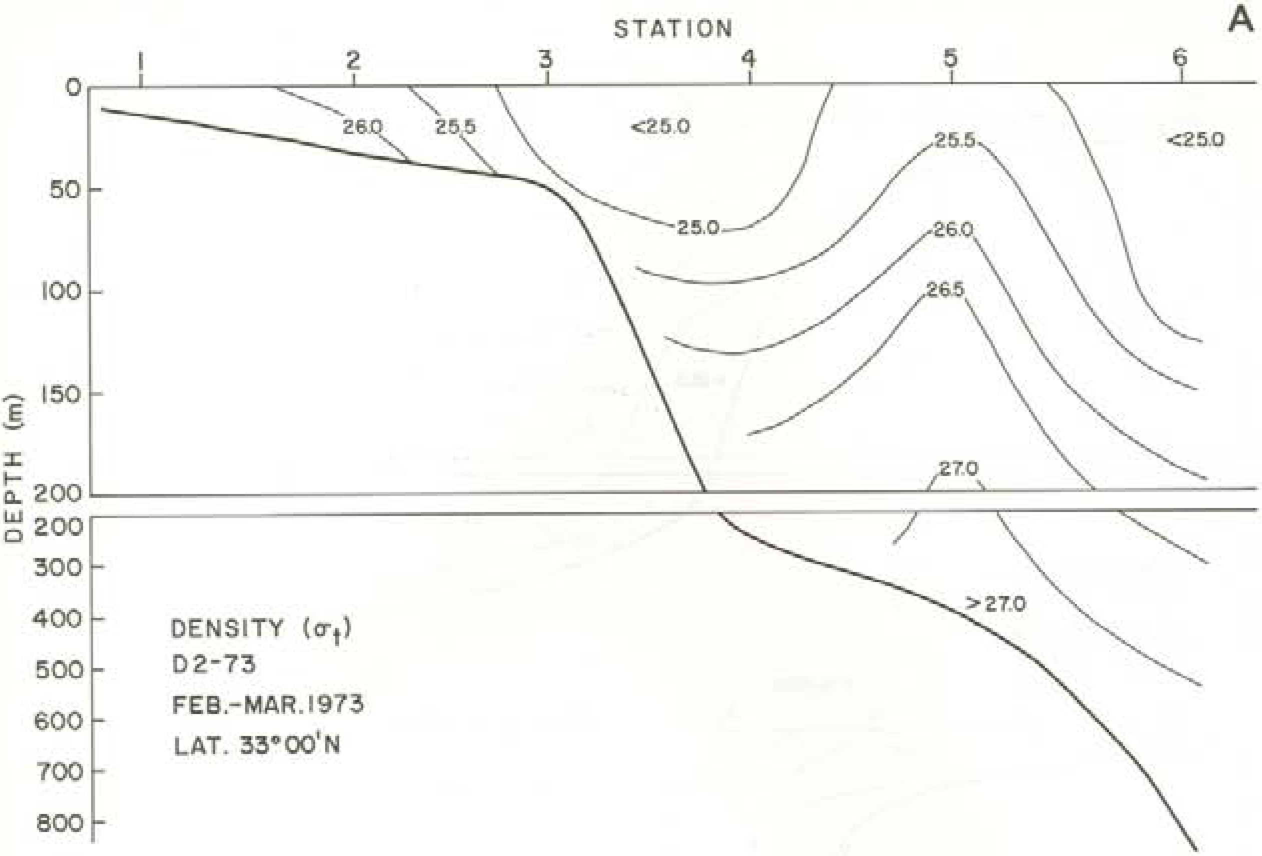

B
STATION
58
57
56
55
DEPTH (m)
0
50
100
150
200
200
300
400
500
600
700
800
>25.5
<24.5
24.5
25.0
25.5
26.0
26.5
27.0
>27.0
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 29°30'N
A
STATION
59
60
61
DEPTH (m)
<24.5
24.5
25.0
25.5
26.0
26.5
>26.5
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 29°00'N
C
STATION
41
42
43
44
45
DEPTH (m)
>26.0
24.5
<24.5
25.0
25.5
26.0
26.5
27.0
>27.0
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 31°00'N

FIGURE 60



A
STATION
40
39
38
37
36
35
>26.0
<24.5
24.5
25.0
25.5
>26.5
26.0
26.5
27.0
>27.0
DEPTH (m)
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 31°30'N
B
STATION
29
30
31
32
33
34
<25.0
25.0
25.5
26.0
26.5
27.0
>27.0
DEPTH (m)
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 32°00'N
C
STATION
7
8
9
10
11
12
<25.5
26.0
>26.5
<26.0
26.0
26.5
27.0
>27.0
25.0 <25.0
25.5
DEPTH (m)
DENSITY (σ_t)
D2-73
FEB.-MAR. 1973
LAT. 32°30'N

FIGURE 61


STATION
A
1
2
3
4
5
6
0
50
100
150
200
DEPTH (m)
300
400
500
600
700
800
26.0
25.5
<25.0
25.0
25.5
26.0
26.5
27.0
>27.0
<25.0
DENSITY (σt)
D2-73
FEB.-MAR. 1973
LAT. 33°00'N

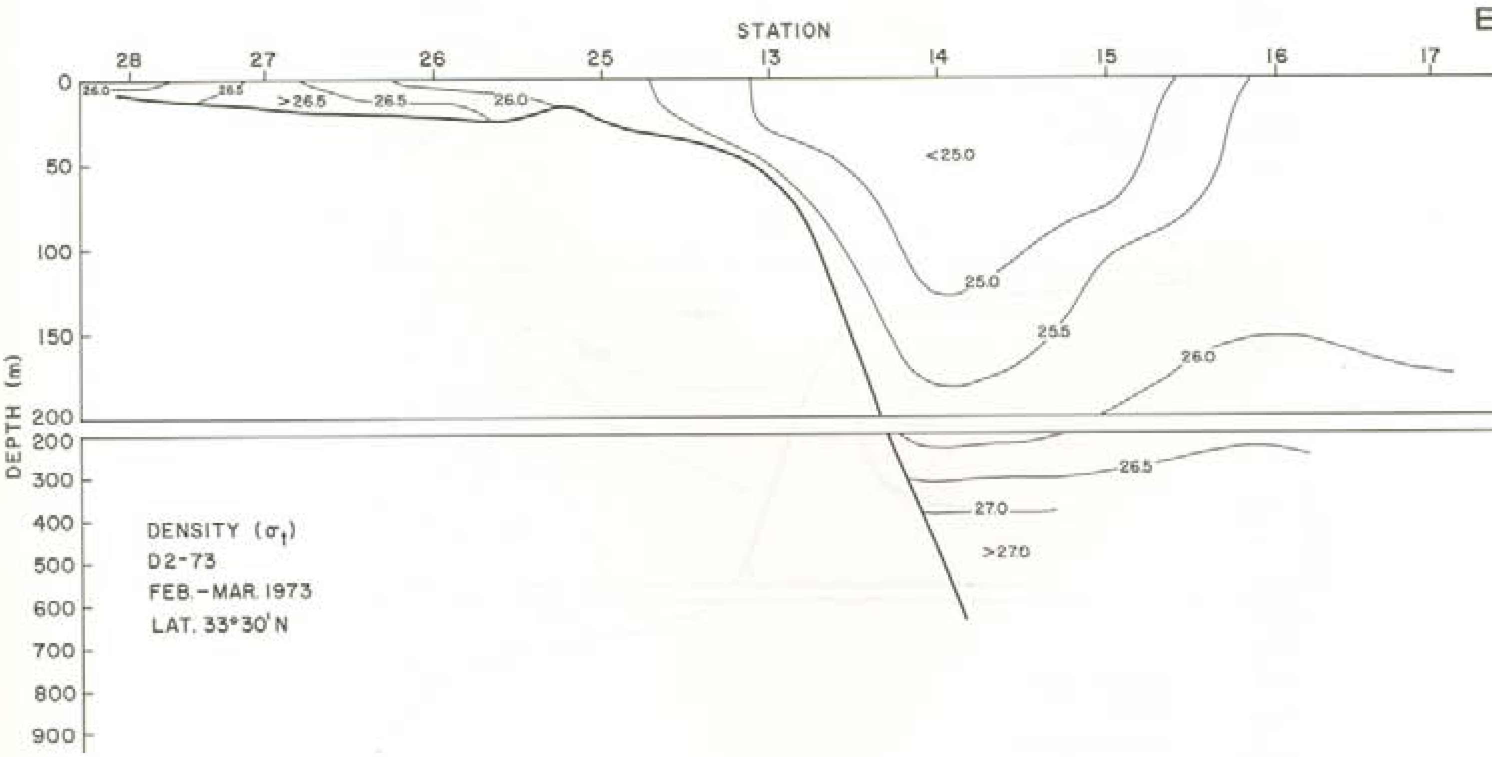
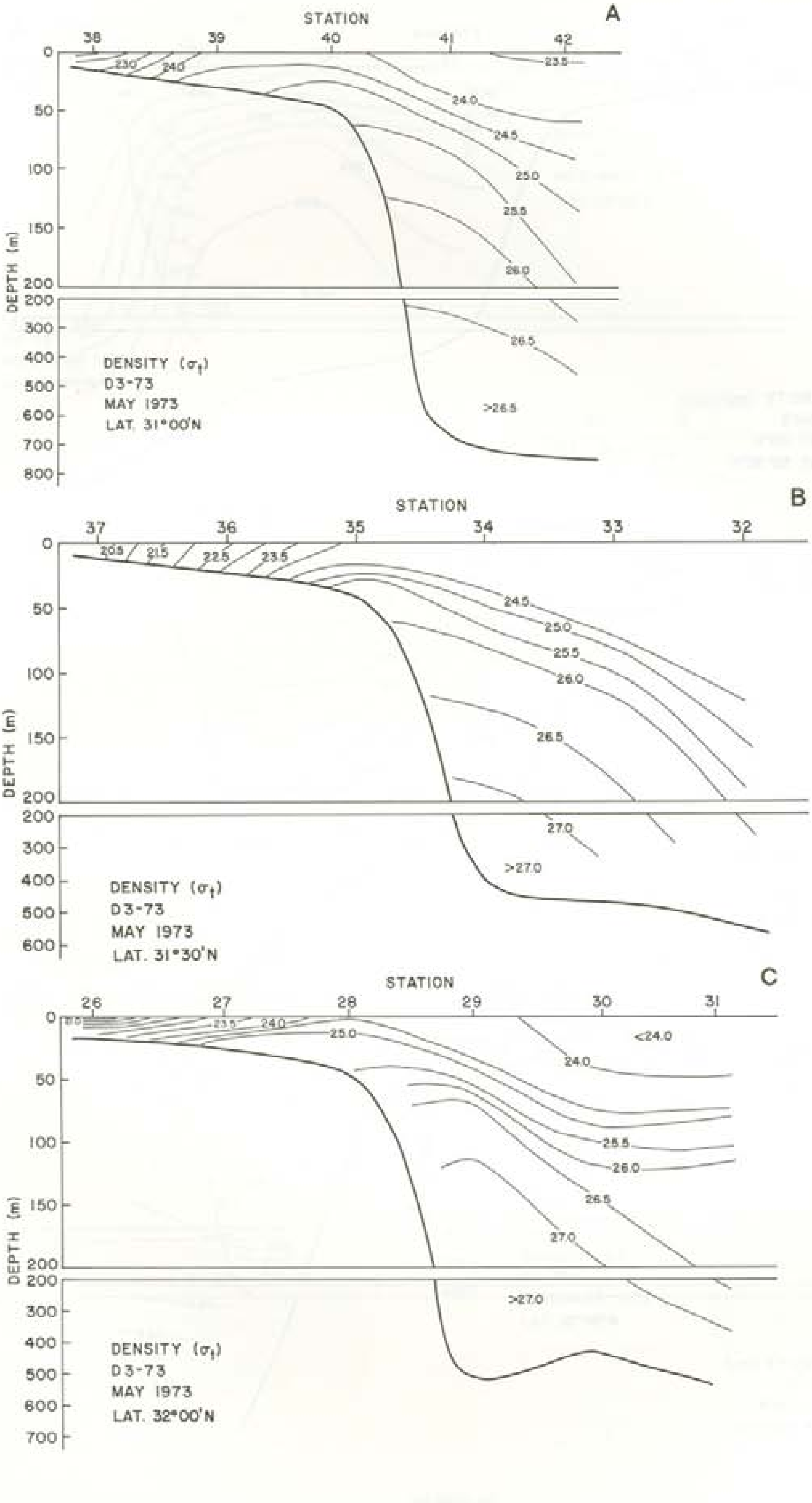

STATION
28
27
26
25
13
14
15
16
17
0
50
100
150
200
DEPTH (m)
300
400
500
600
700
800
900
>26.5
26.5
26.0
<25.0
25.0
25.5
26.0
26.5
27.0
>27.0
DENSITY (σt)
D2-73
FEB.-MAR. 1973
LAT. 33°30'N

FIGURE 62



STATION
A
38
39
40
41
42
23.0
24.0
23.5
24.0
24.5
25.0
25.5
26.0
26.5
>26.5
DEPTH (m)
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 31°00'N
STATION
B
37
36
35
34
33
32
20.5
21.5
22.5
23.5
24.5
25.0
25.5
26.0
26.5
27.0
>27.0
DEPTH (m)
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 31°30'N
STATION
C
26
27
28
29
30
31
23.5
24.0
25.0
<24.0
24.0
25.5
26.0
26.5
27.0
>27.0
DEPTH (m)
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 32°00'N

FIGURE 63

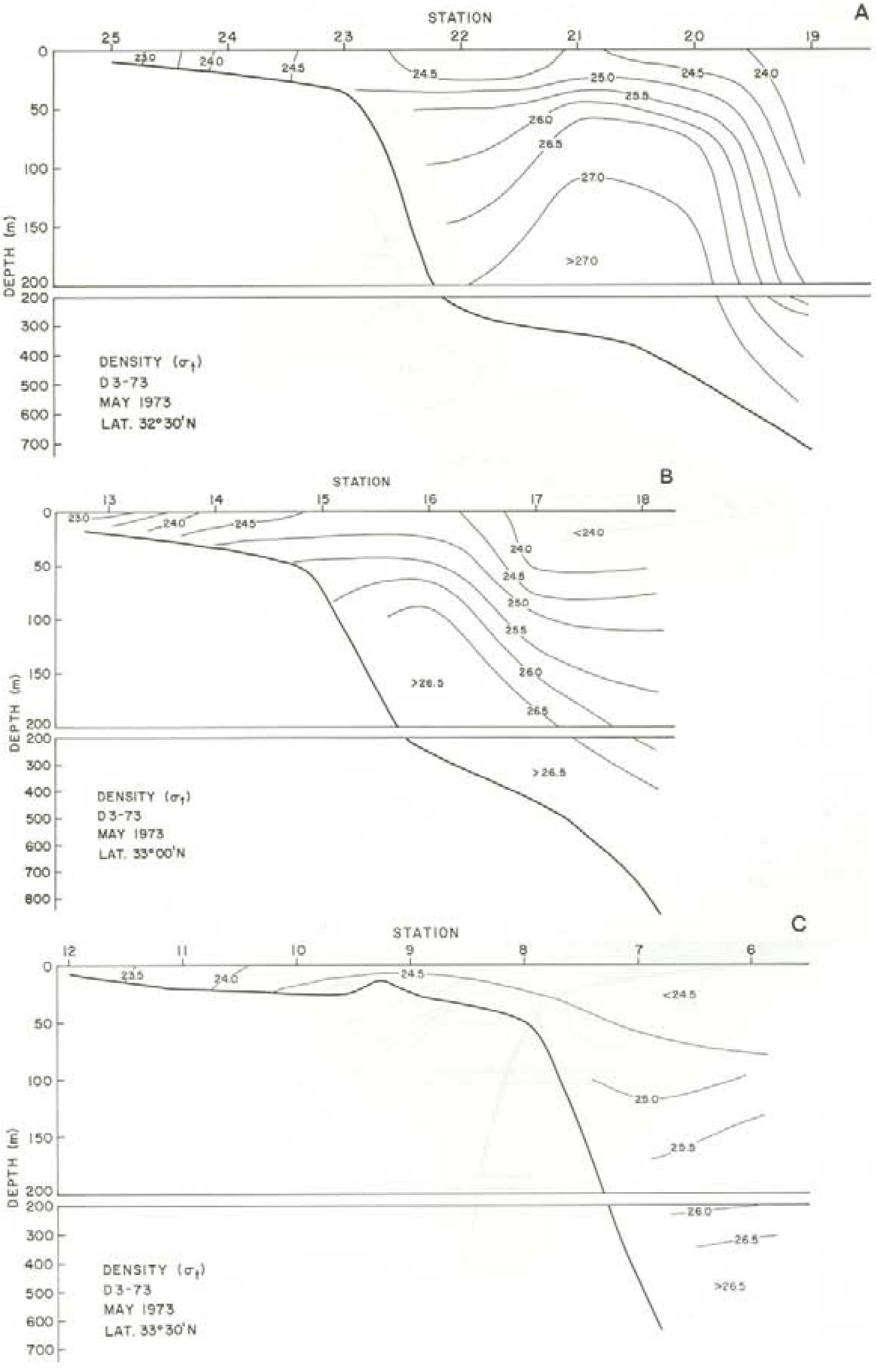
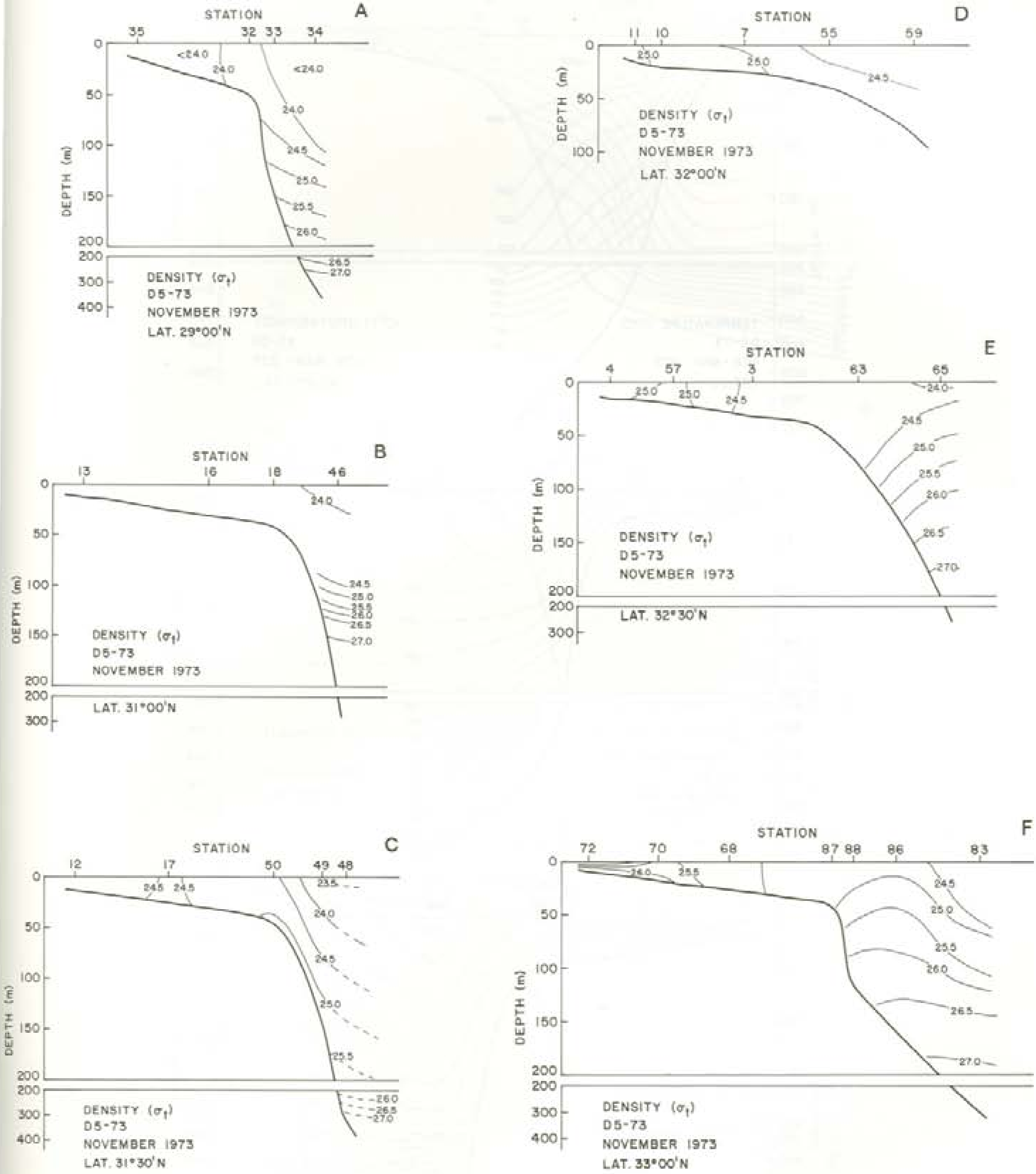
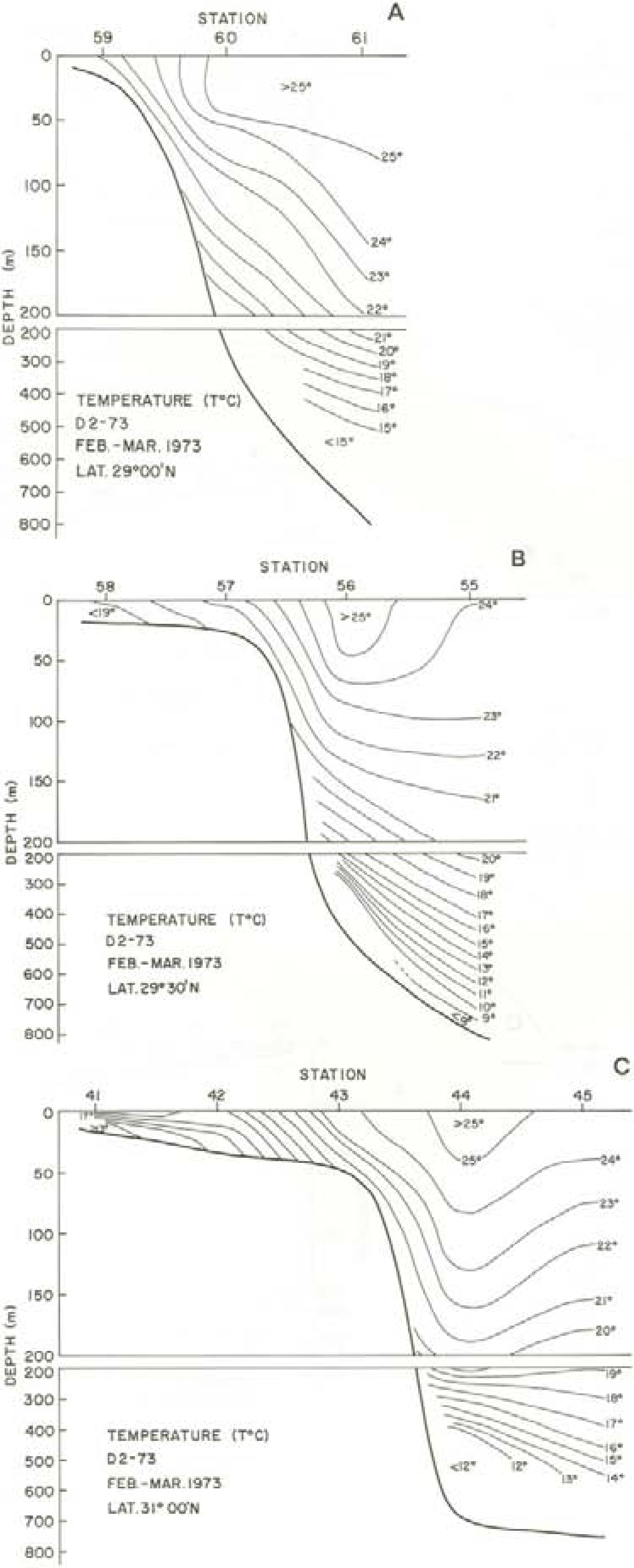

A
STATION
25
24
23
22
21
20
19
DEPTH (m)
23.0
24.0
24.5
25.0
25.5
26.0
26.5
27.0
>27.0
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 32°30'N
B
STATION
13
14
15
16
17
18
<24.0
>26.5
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 33°00'N
C
STATION
12
11
10
9
8
7
6
23.5
<24.5
>26.5
DENSITY (σ_t)
D3-73
MAY 1973
LAT. 33°30'N

FIGURE 64



A
STATION
35 32 33 34
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 29°00'N
B
STATION
13 16 18 46
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 31°00'N
C
STATION
12 17 50 49 48
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 31°30'N
D
STATION
11 10 7 55 59
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 32°00'N
E
STATION
4 57 3 63 65
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 32°30'N
F
STATION
72 70 68 87 88 86 83
DEPTH (m)
DENSITY (σ_t)
D5-73
NOVEMBER 1973
LAT. 33°00'N

FIGURE 65



A
STATION
59
60
61
>25°
25°
24°
23°
22°
21°
20°
19°
18°
17°
16°
15°
<15°
DEPTH (m)
TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
LAT. 29°00'N
B
STATION
58
57
56
55
<19°
>25°
24°
23°
22°
21°
20°
19°
18°
17°
16°
15°
14°
13°
12°
11°
10°
9°
<9°
TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
LAT. 29°30'N
C
STATION
41
42
43
44
45
>25°
25°
24°
23°
22°
21°
20°
19°
18°
17°
16°
15°
14°
13°
12°
<12°
TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
LAT. 31°00'N

FIGURE 66

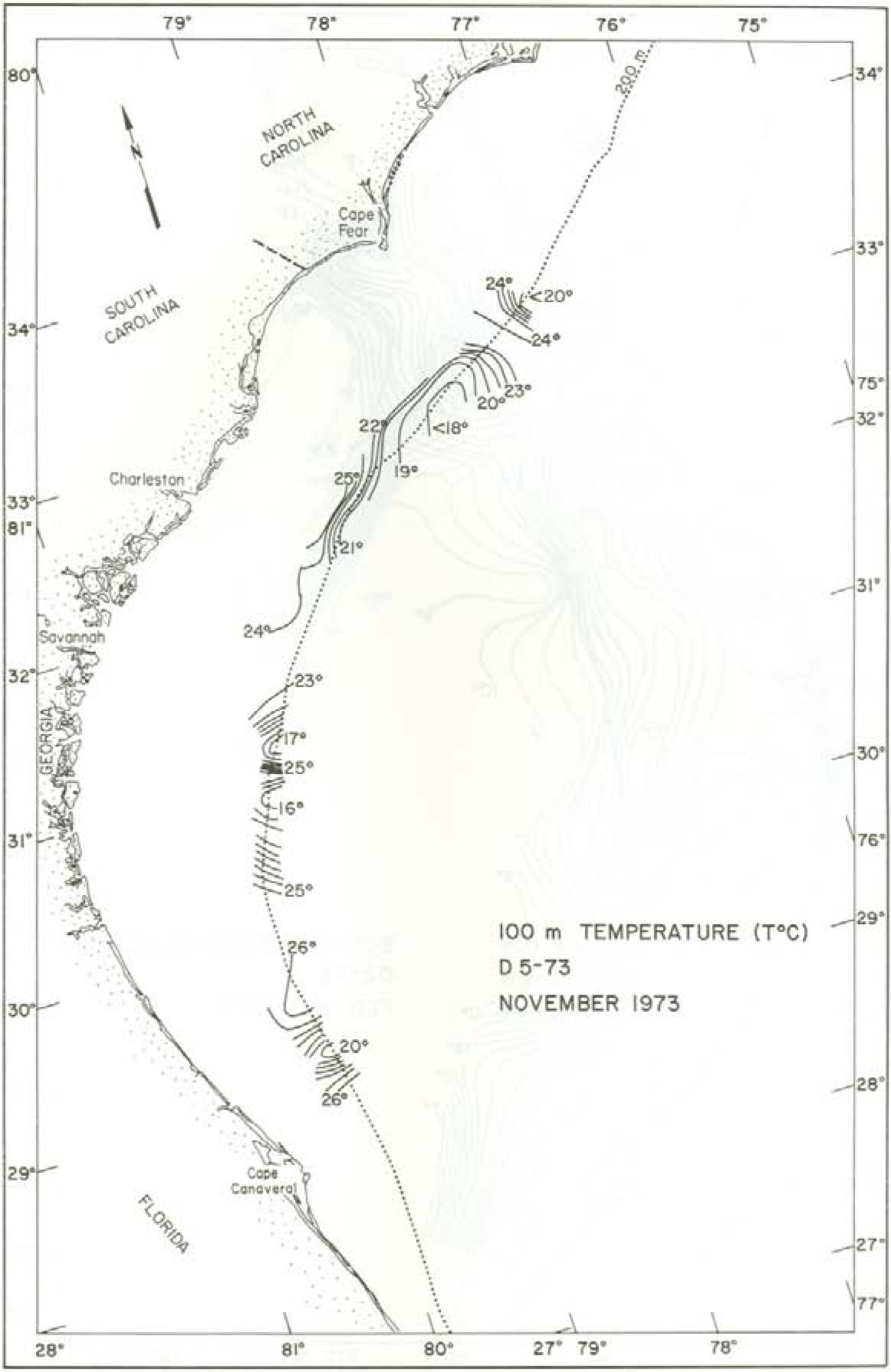

79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
N
Cape Fear
33°
SOUTH CAROLINA
24°
<20°
34°
24°
75°
23°
20°
22°
<18°
32°
19°
Charleston
25°
33°
81°
21°
31°
24°
Savannah
32°
23°
GEORGIA
17°
25°
30°
16°
31°
76°
25°
100 m TEMPERATURE (T°C)
D 5-73
NOVEMBER 1973
29°
26°
30°
20°
28°
26°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 27

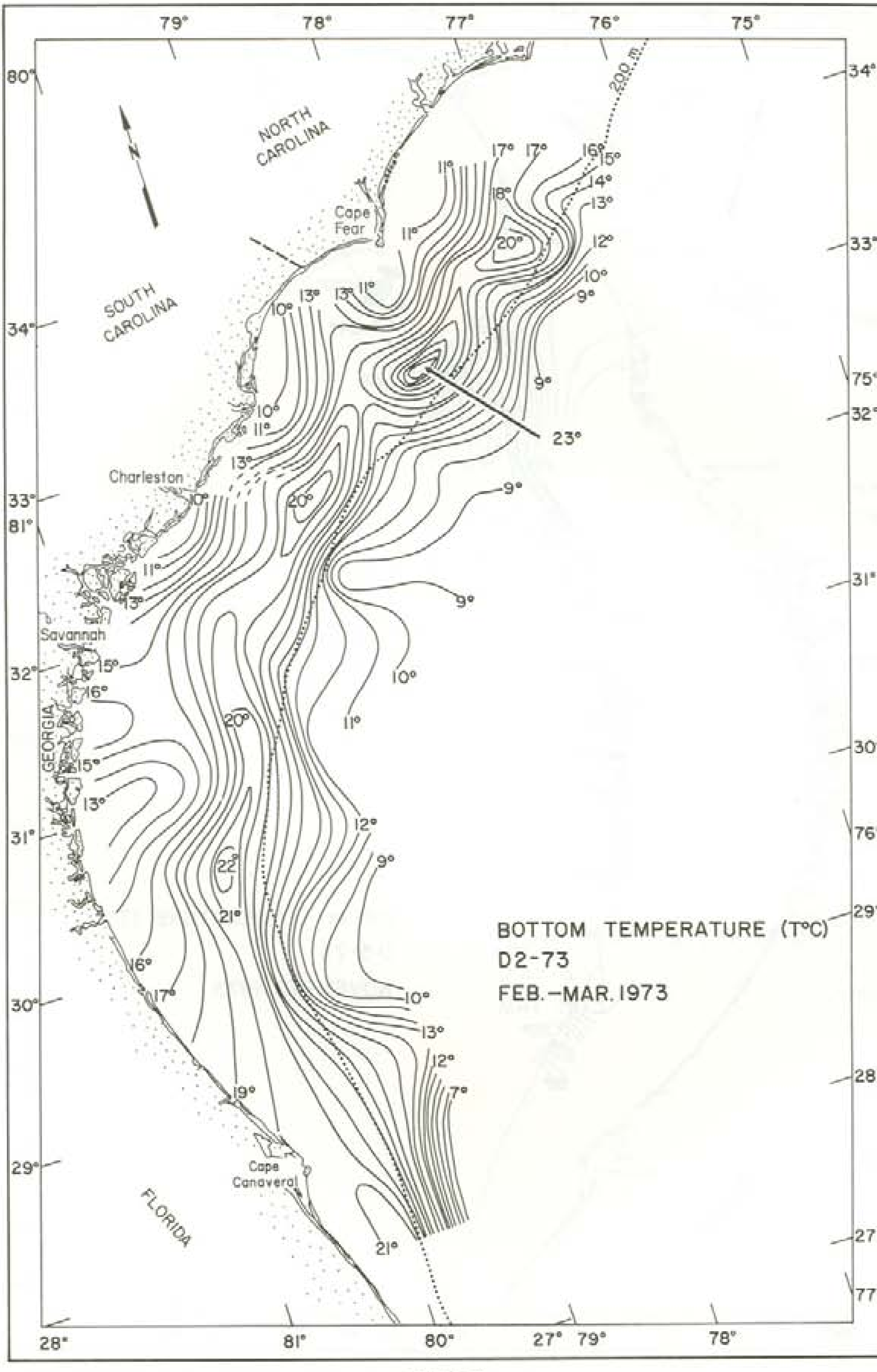
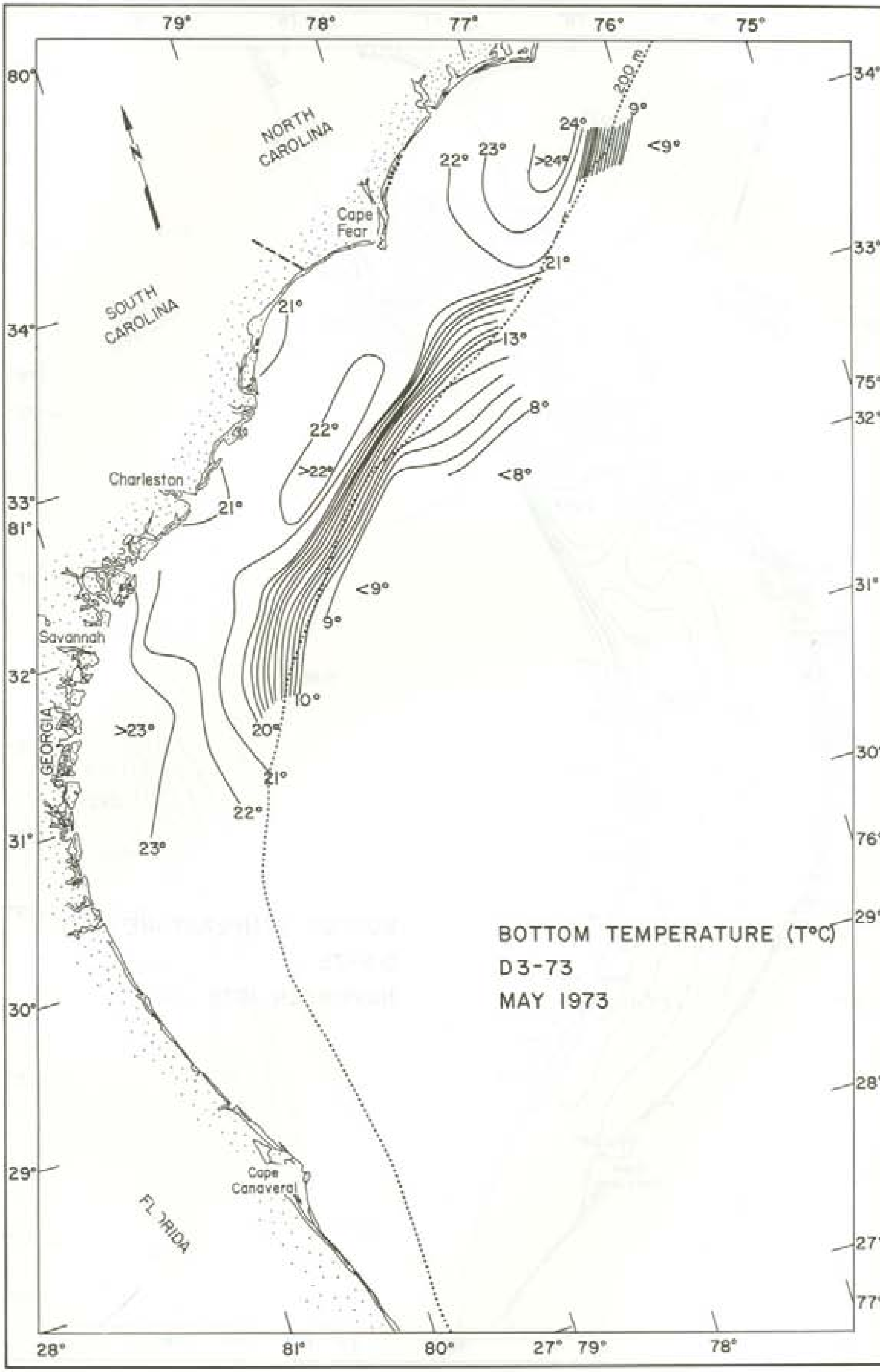
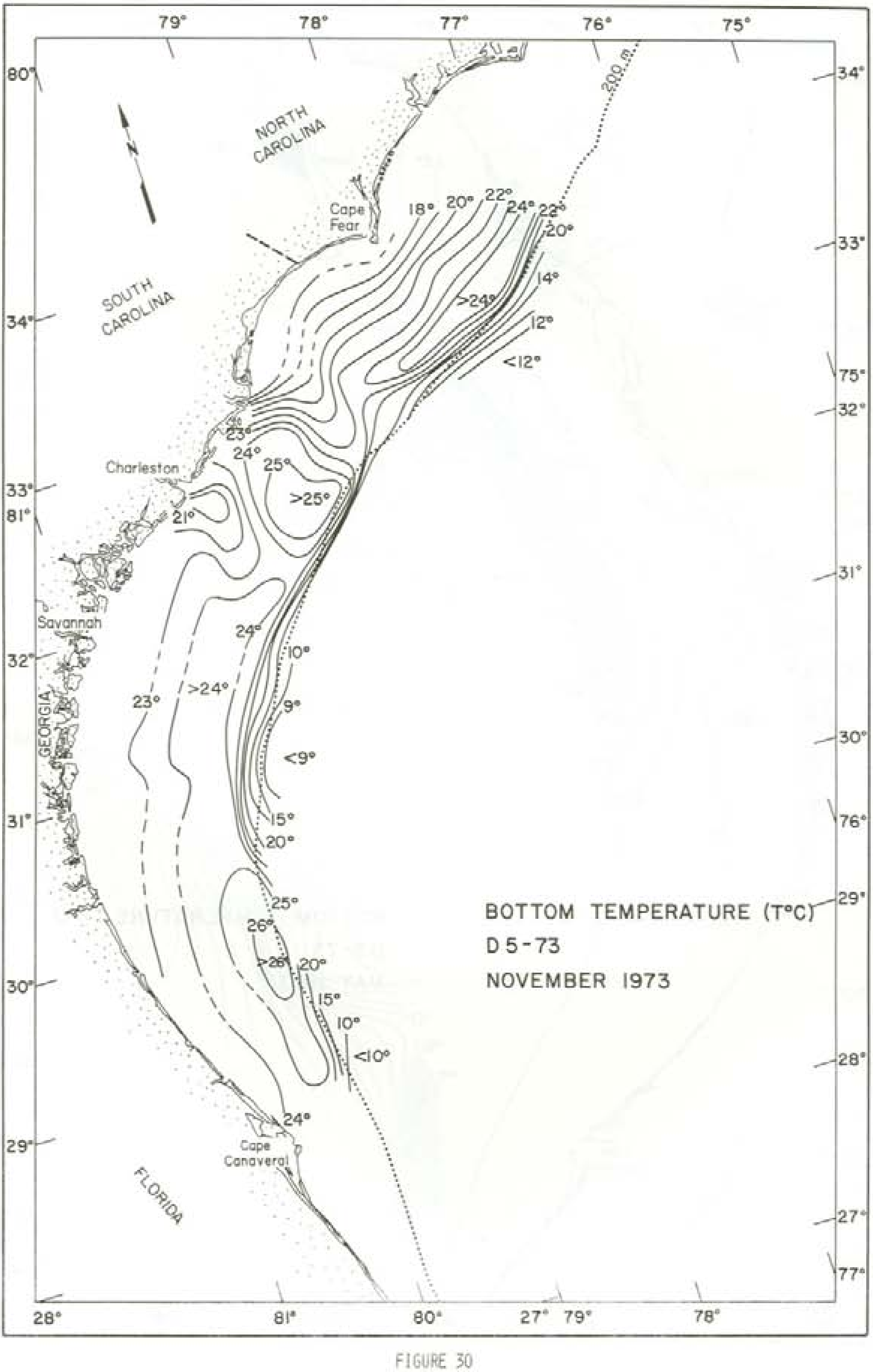

BOTTOM TEMPERATURE (T°C)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 28



BOTTOM TEMPERATURE (T°C)
D3-73
MAY 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m

FIGURE 29



NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
BOTTOM TEMPERATURE (T°C)
D5-73
NOVEMBER 1973

FIGURE 30

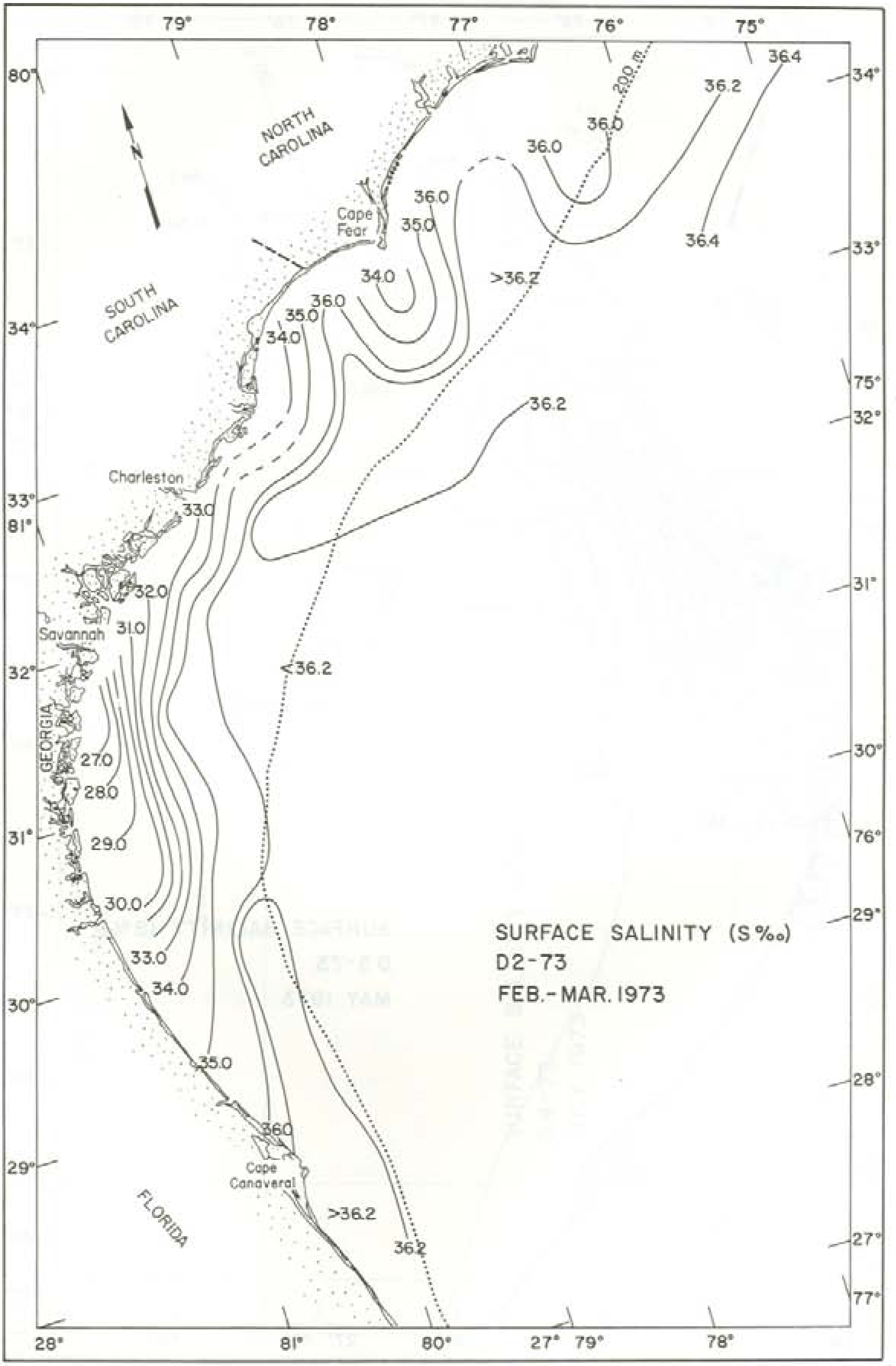

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.4
36.2
36.0
35.0
34.0
>36.2
<36.2
33.0
32.0
31.0
30.0
29.0
28.0
27.0
SURFACE SALINITY (S‰)
D2-73
FEB.-MAR. 1973

FIGURE 31

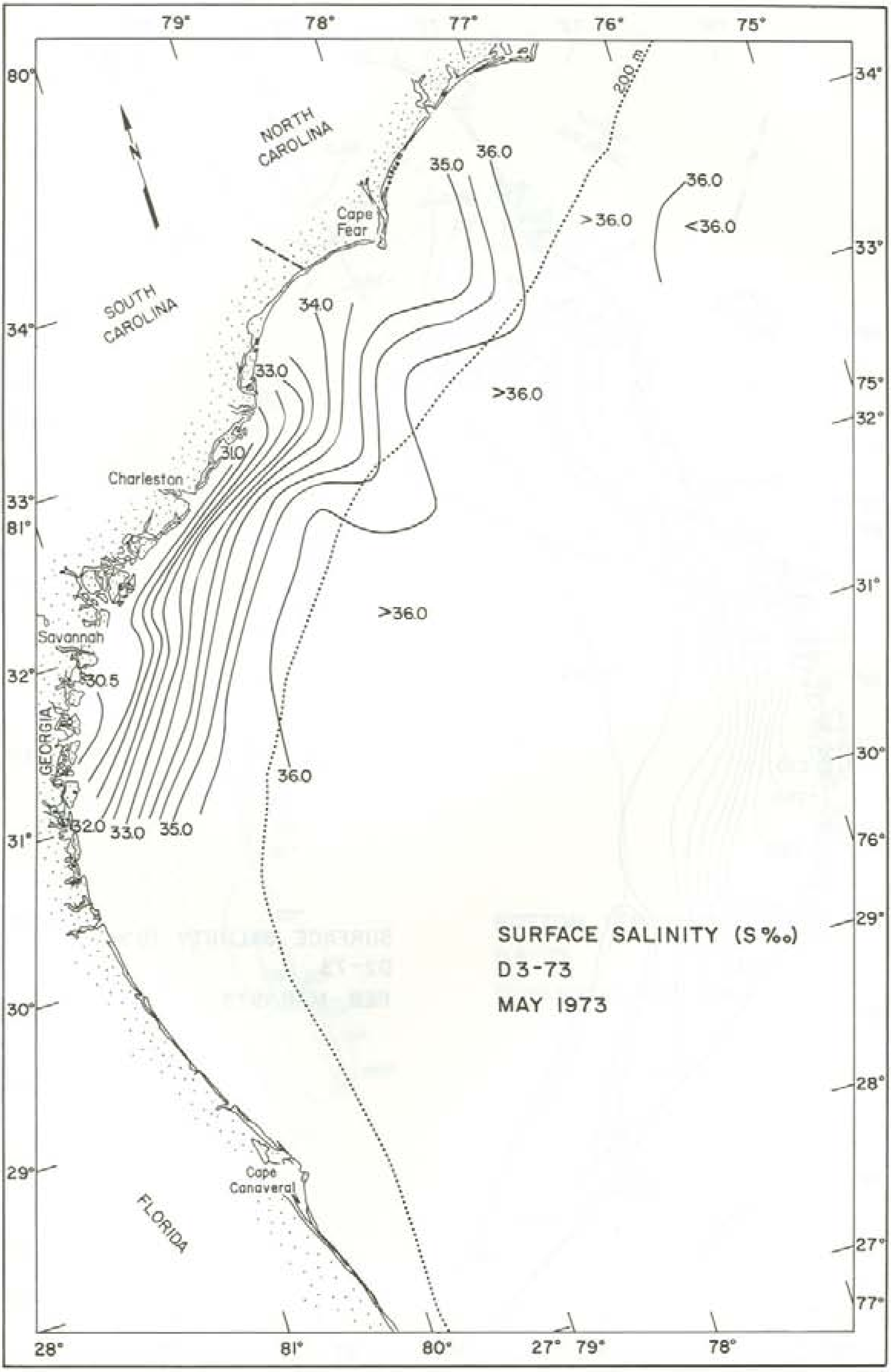

SURFACE SALINITY (S‰)
D3-73
MAY 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
35.0
36.0
36.0
>36.0
<36.0
34.0
33.0
>36.0
31.0
>36.0
30.5
36.0
32.0
33.0
35.0
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°

FIGURE 32

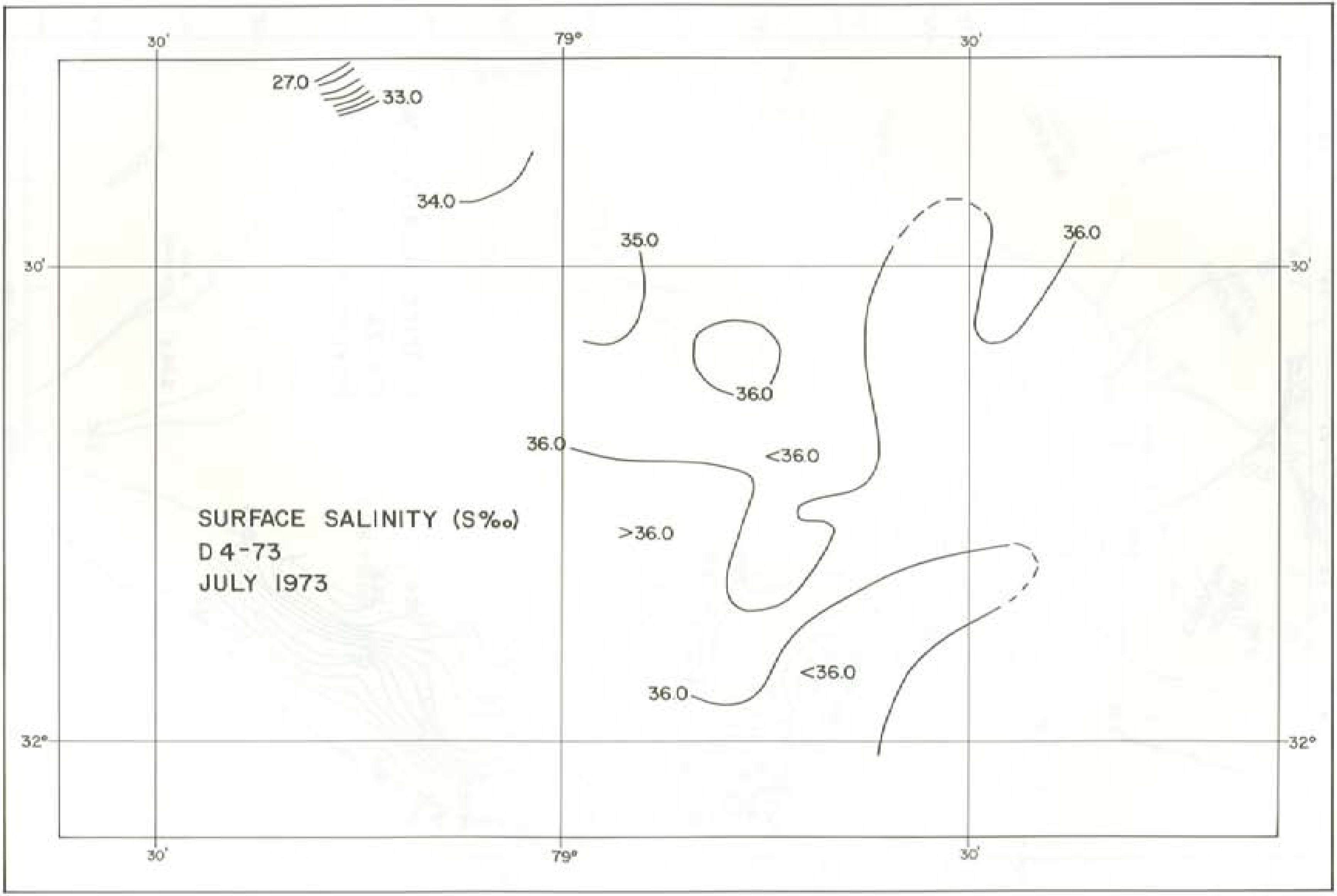

30'
79°
30'
27.0
33.0
34.0
35.0
36.0
36.0
36.0
36.0
<36.0
>36.0
<36.0
SURFACE SALINITY (S‰)
D 4-73
JULY 1973
32°
30'
79°
30'

FIGURE 33

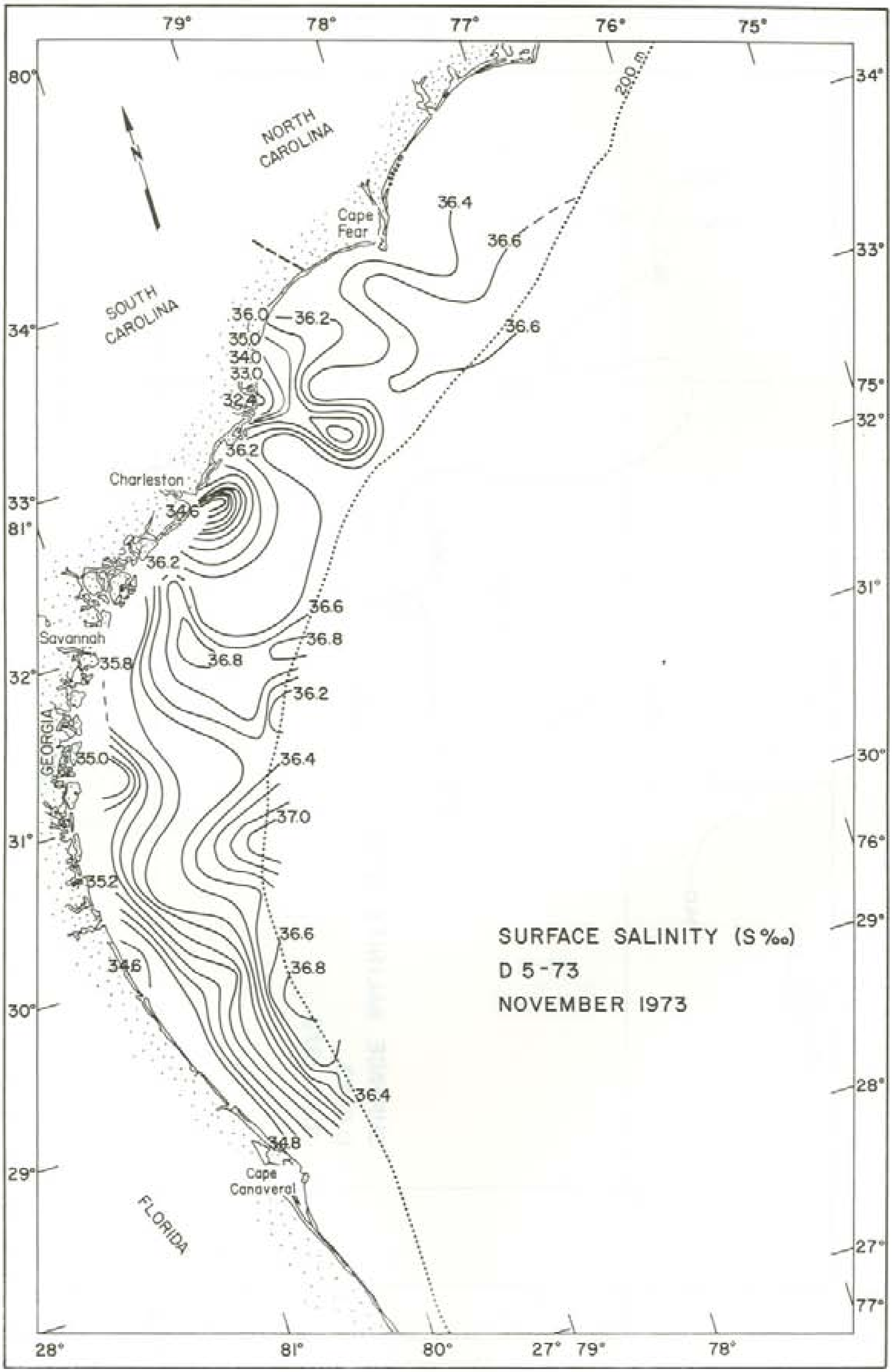

79°
78°
77°
76°
75°
80°
34°
200 m
NORTH CAROLINA
N
Cape Fear
36.4
36.6
33°
SOUTH CAROLINA
36.0
36.2
36.6
34°
35.0
34.0
33.0
32.4
75°
32°
36.2
Charleston
33°
34.6
81°
36.2
31°
36.6
Savannah
36.8
36.8
35.8
32°
36.2
GEORGIA
35.0
36.4
30°
37.0
31°
76°
35.2
29°
36.6
SURFACE SALINITY (S‰)
D 5-73
NOVEMBER 1973
34.6
36.8
30°
28°
36.4
34.8
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 34

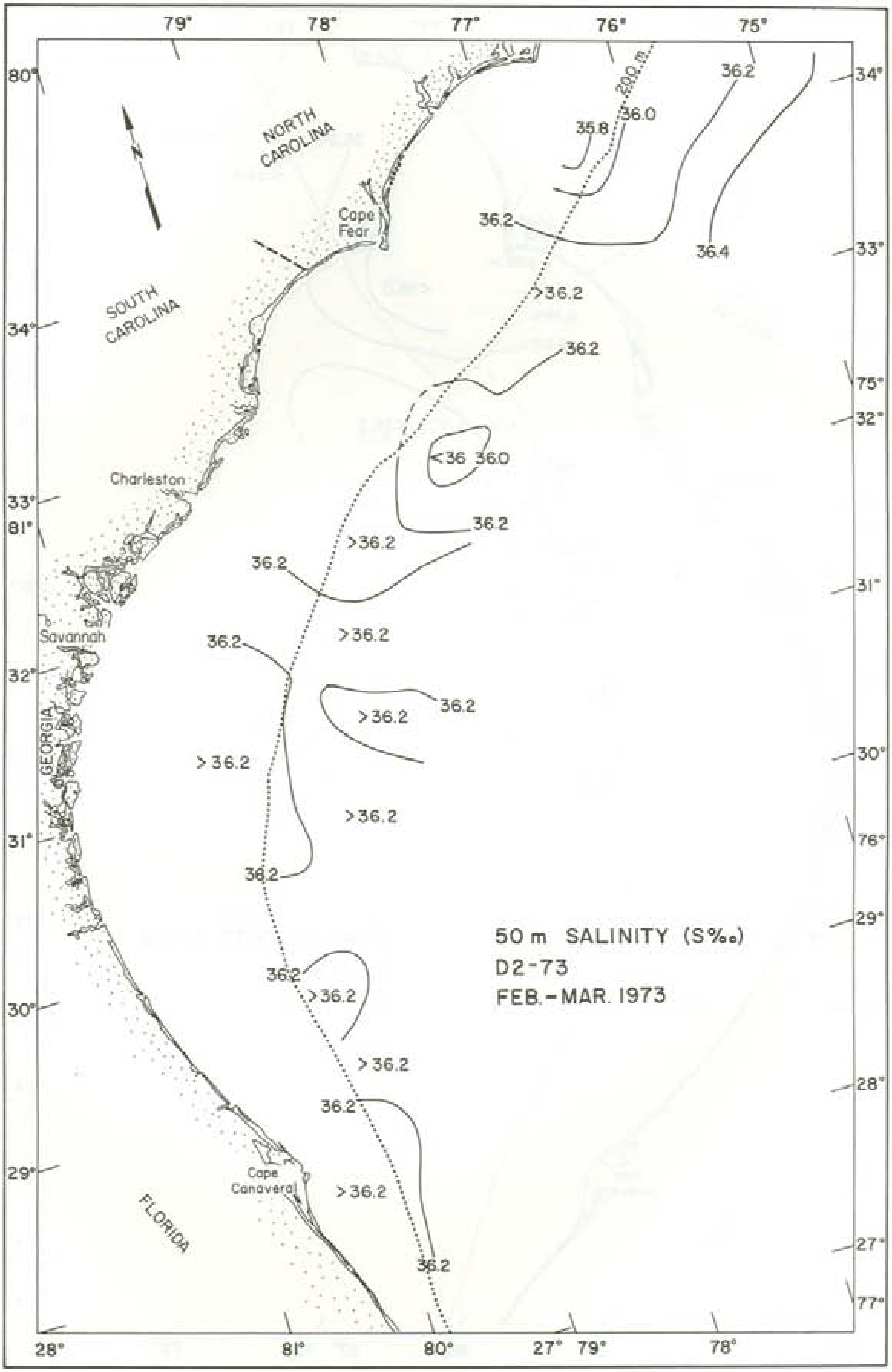

NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
35.8
36.0
36.2
36.4
>36.2
<36
50 m SALINITY (S‰)
D2-73
FEB.-MAR. 1973

FIGURE 35

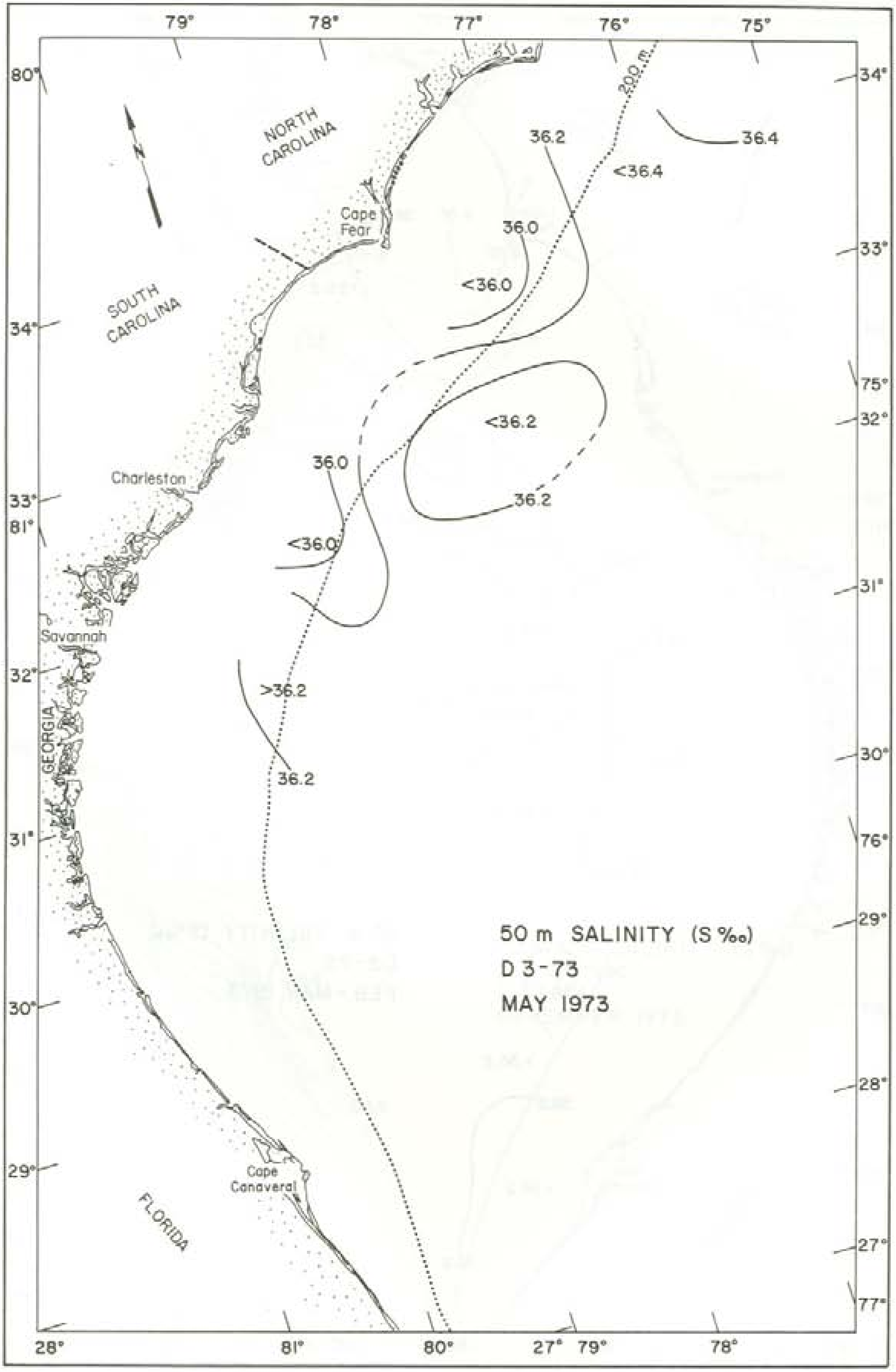
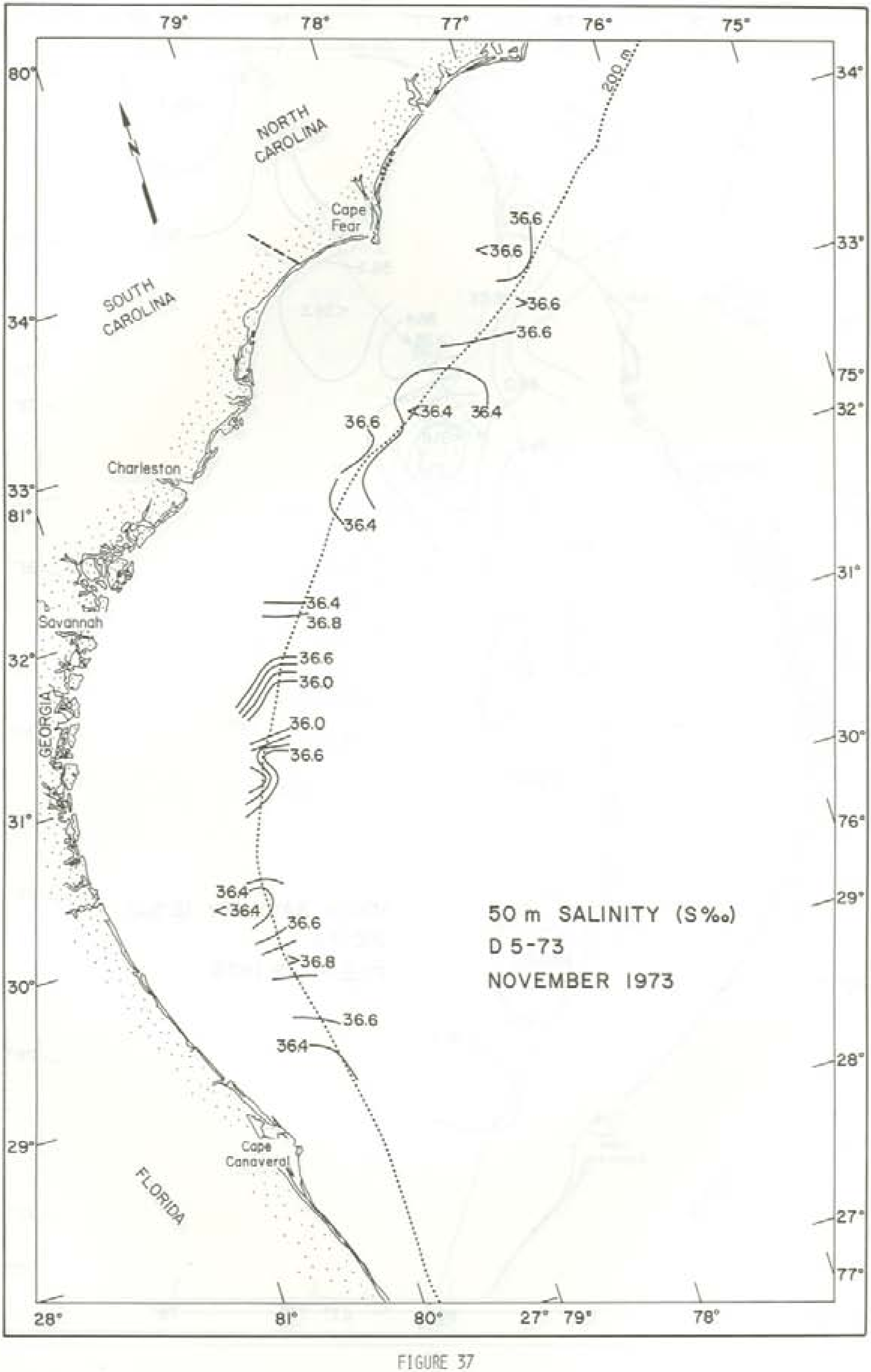

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
200 m
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
36.2
36.4
<36.4
36.0
<36.0
<36.2
36.2
36.0
<36.0
>36.2
36.2
50 m SALINITY (S ‰)
D 3-73
MAY 1973

FIGURE 36


79°
78°
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76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
80°
79°
78°
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
N
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.6
<36.6
>36.6
36.6
<36.4
36.4
36.6
36.4
36.4
36.8
36.6
36.0
36.0
36.6
36.4
<36.4
36.6
>36.8
36.6
36.4
50 m SALINITY (S‰)
D 5-73
NOVEMBER 1973

FIGURE 37

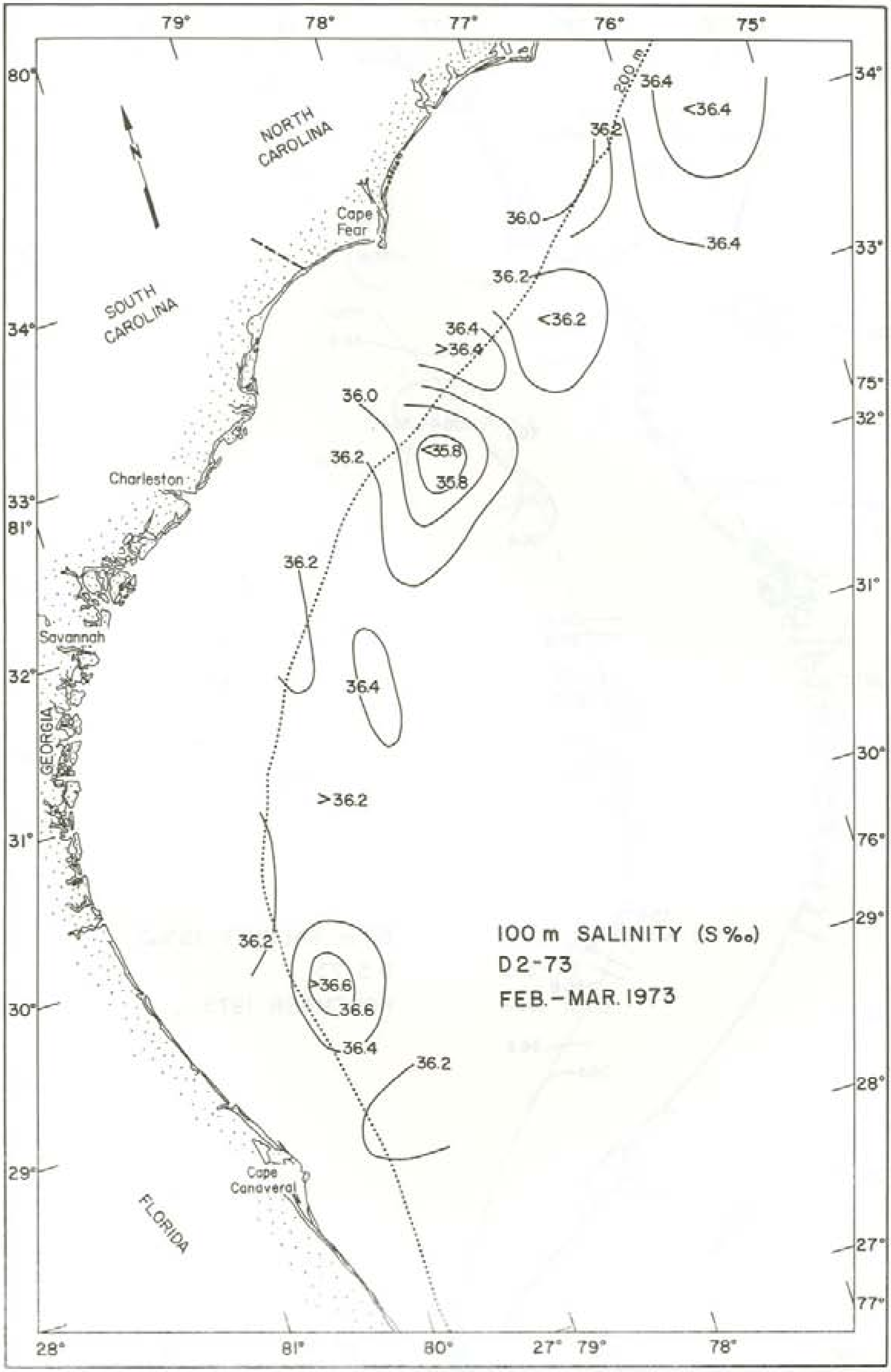

79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.4
<36.4
36.2
36.0
36.4
36.2
<36.2
36.4
>36.4
36.0
36.2
<35.8
35.8
36.2
36.4
>36.2
36.2
>36.6
36.6
36.4
36.2
100 m SALINITY (S‰)
D2-73
FEB.-MAR. 1973

FIGURE 38

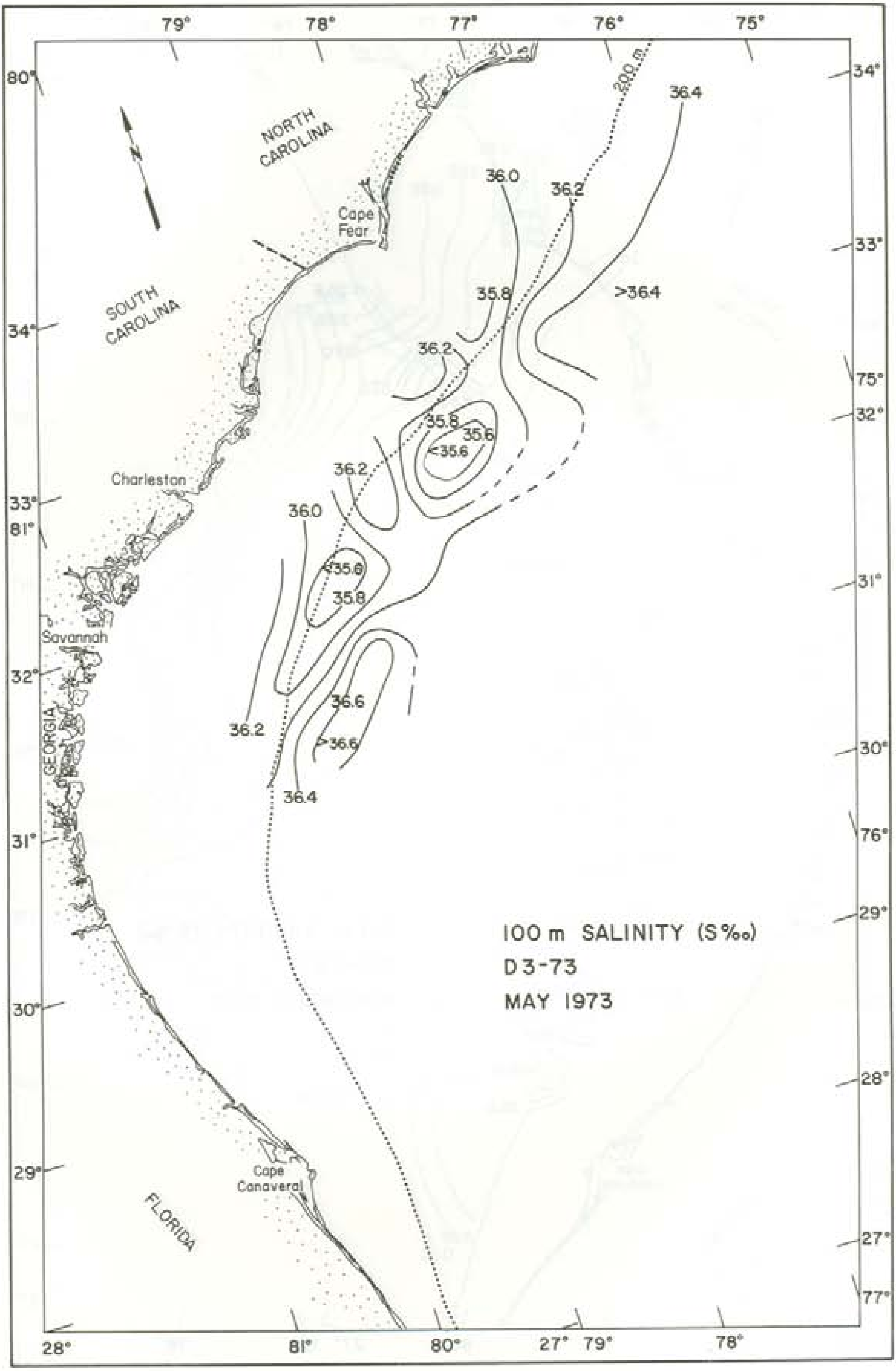
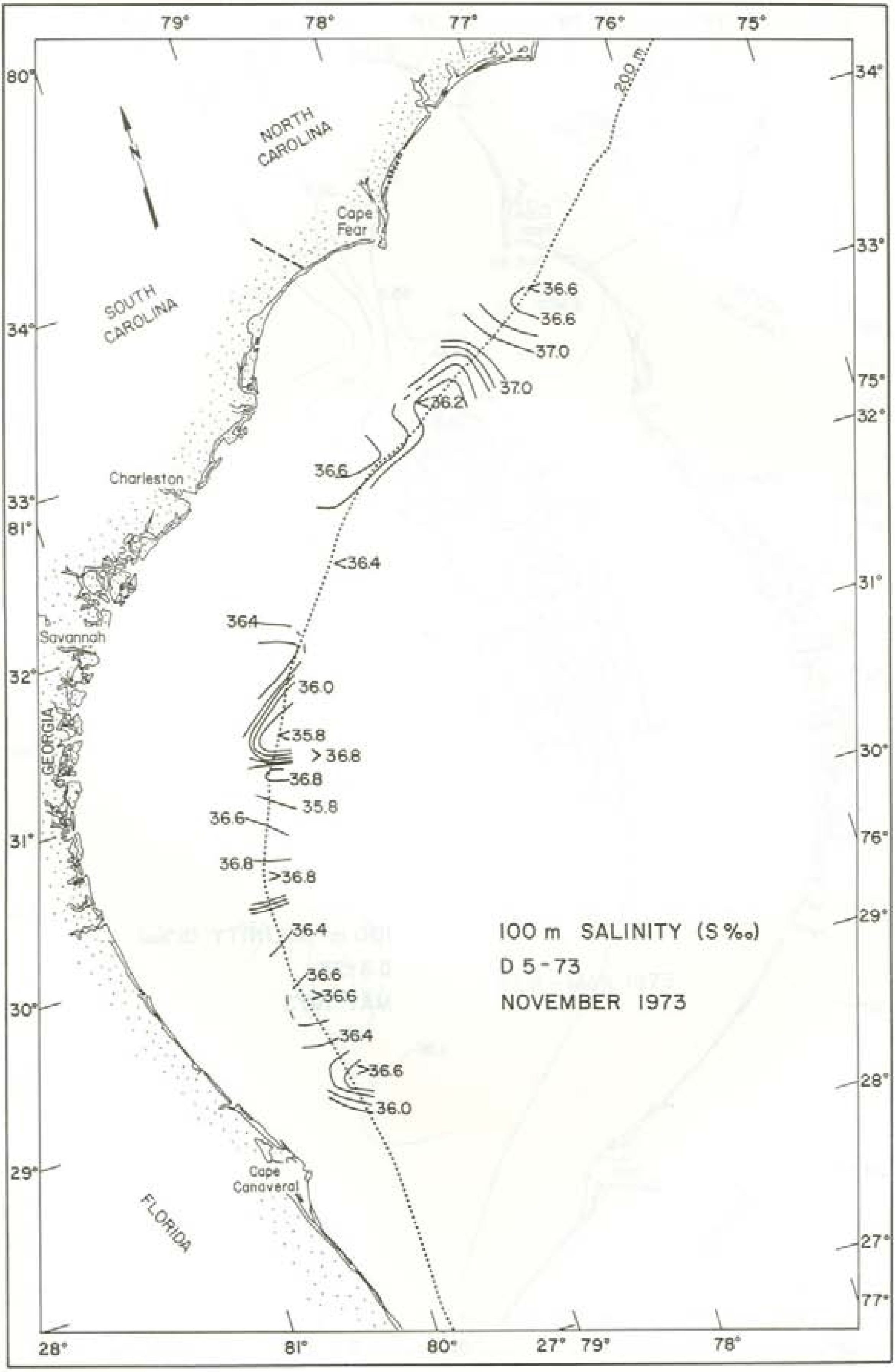

79°
78°
77°
76°
75°
80°
34°
33°
75°
32°
31°
30°
76°
29°
28°
27°
77°
28°
81°
80°
27°
79°
78°
34°
33°
81°
32°
31°
30°
29°
N
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
36.4
36.0
36.2
35.8
>36.4
36.2
35.8
35.6
<35.6
36.2
36.0
<35.6
35.8
36.6
36.2
>36.6
36.4
100 m SALINITY (S‰)
D3-73
MAY 1973

FIGURE 39



100 m SALINITY (S ‰)
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 40

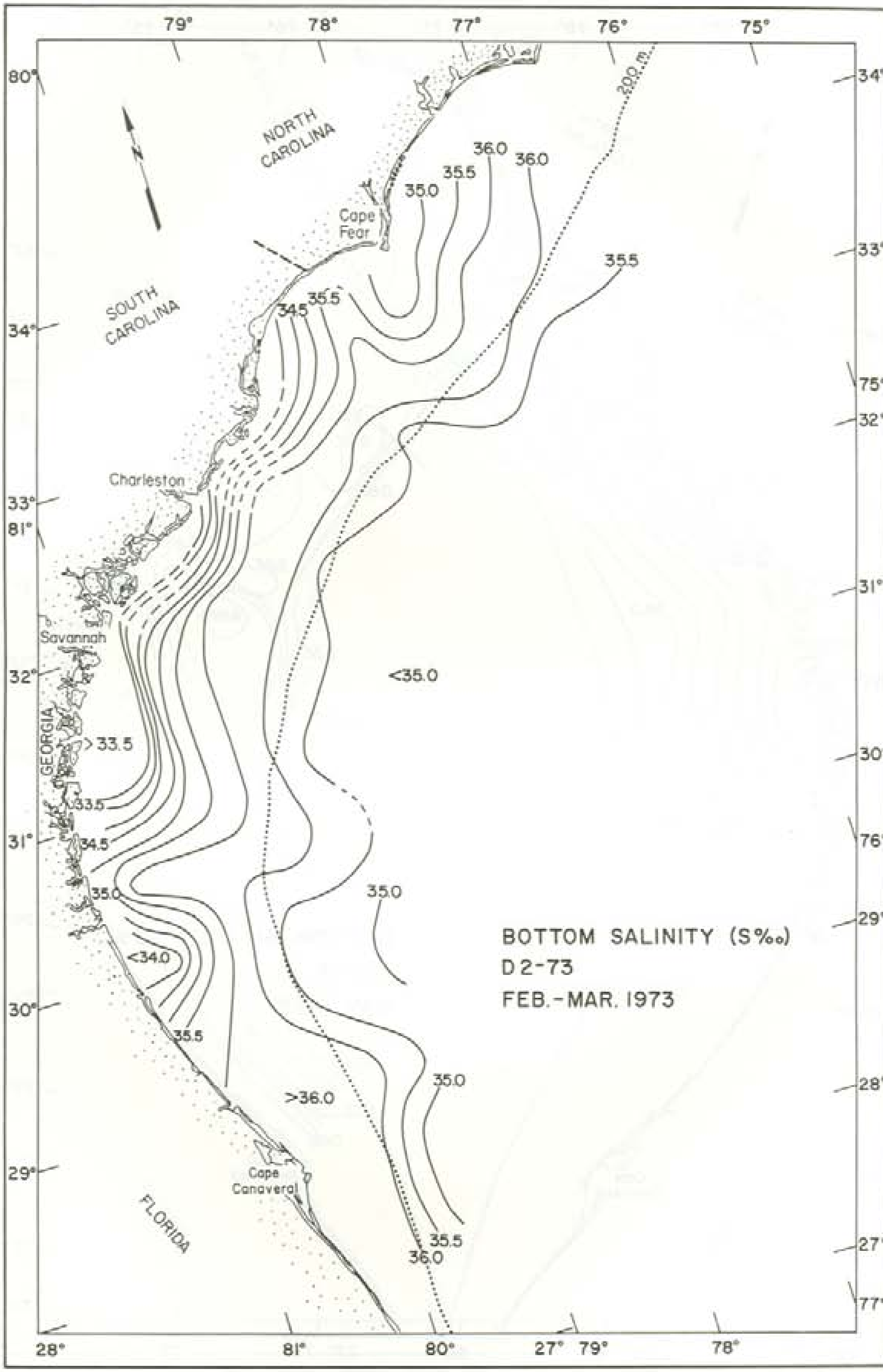

BOTTOM SALINITY (S‰)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
<35.0
>36.0
>33.5
<34.0
33.5
34.5
35.0
35.5
36.0
79°
78°
77°
76°
75°
80°
81°
34°
33°
32°
31°
30°
29°
28°
27°

FIGURE 41

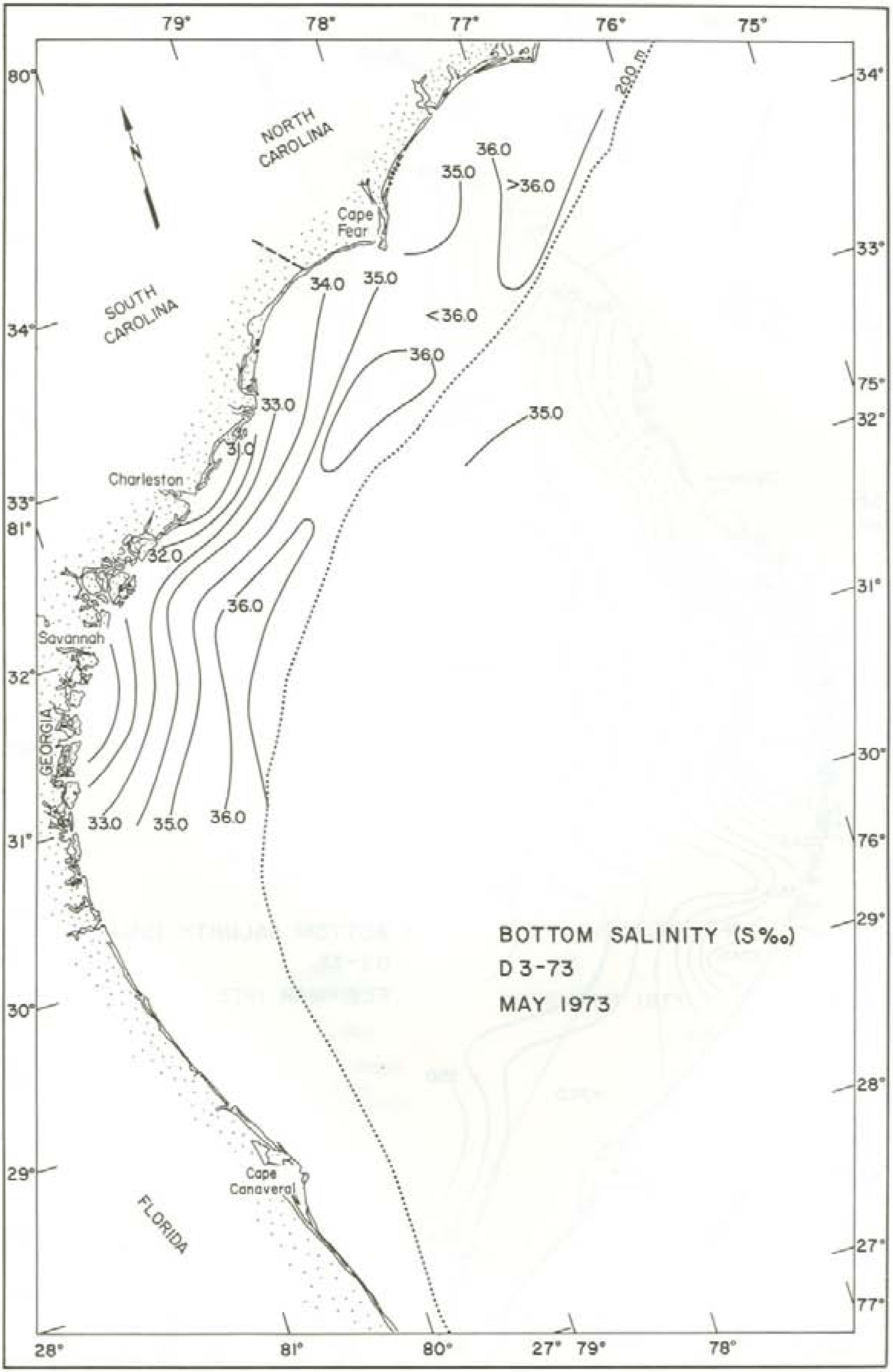
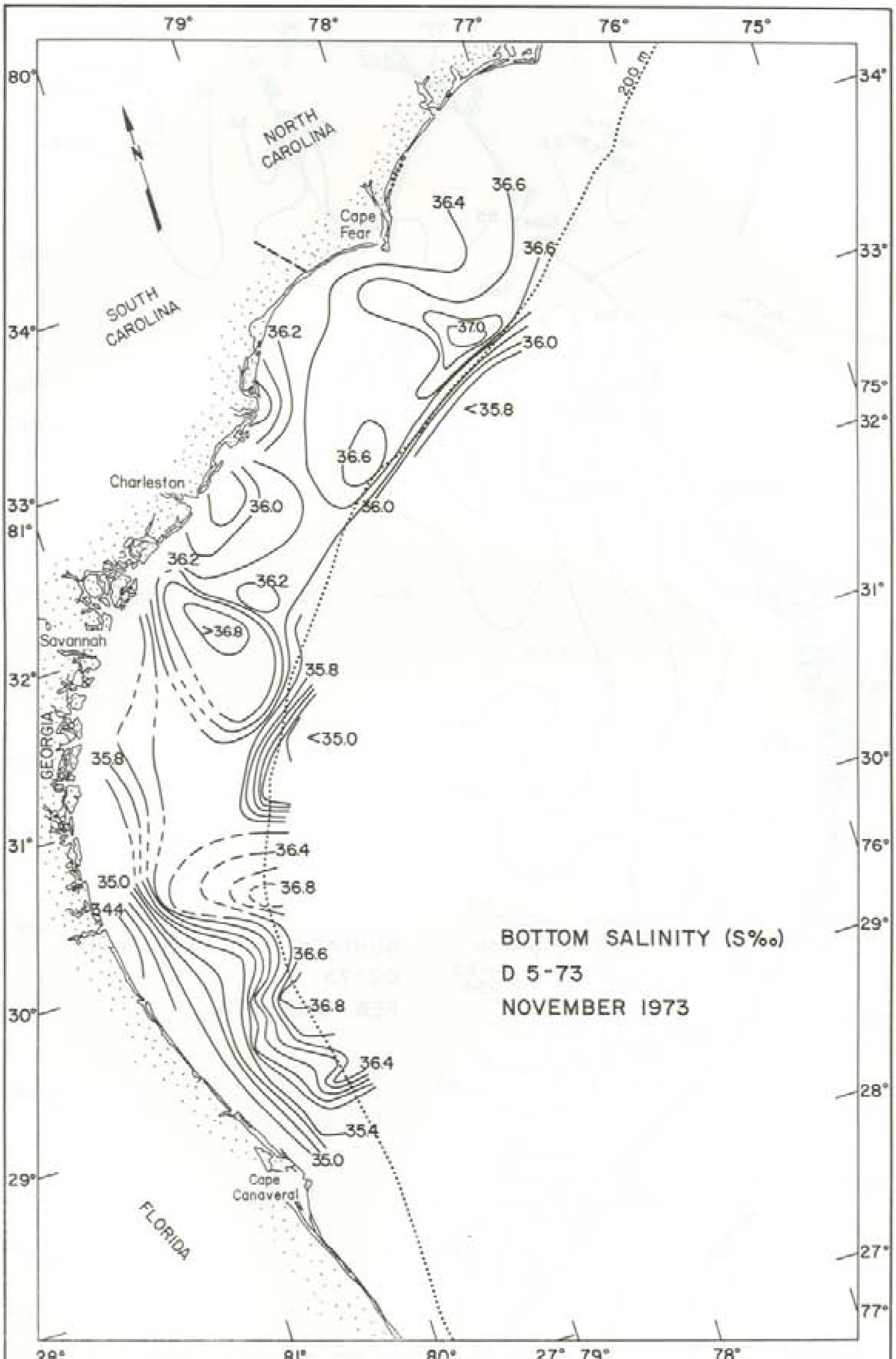

BOTTOM SALINITY (S‰)
D 3-73
MAY 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N
36.0
35.0
>36.0
34.0
35.0
<36.0
36.0
33.0
35.0
31.0
32.0
36.0
33.0
35.0
36.0
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
76°
77°

FIGURE 42



BOTTOM SALINITY (S‰)
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
N
200 m
36.4
36.6
36.6
37.0
36.0
<35.8
36.2
36.6
36.0
36.0
36.2
36.2
>36.8
35.8
<35.0
35.8
36.4
36.8
35.0
34.4
36.6
36.8
36.4
35.4
35.0
79°
78°
77°
76°
75°
80°
34°
33°
32°
31°
30°
29°
28°
27°
81°
75°
76°
77°

FIGURE 43

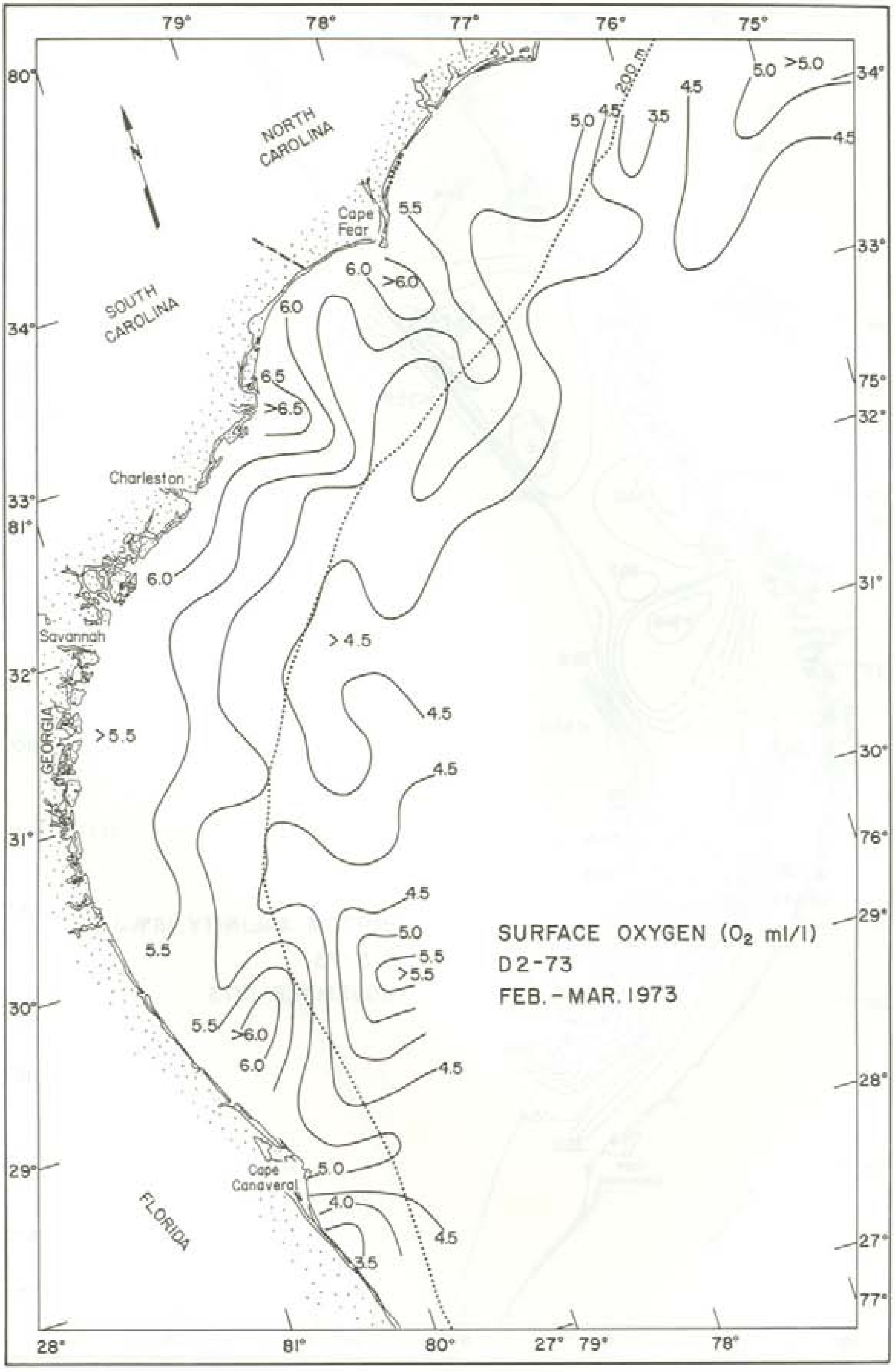
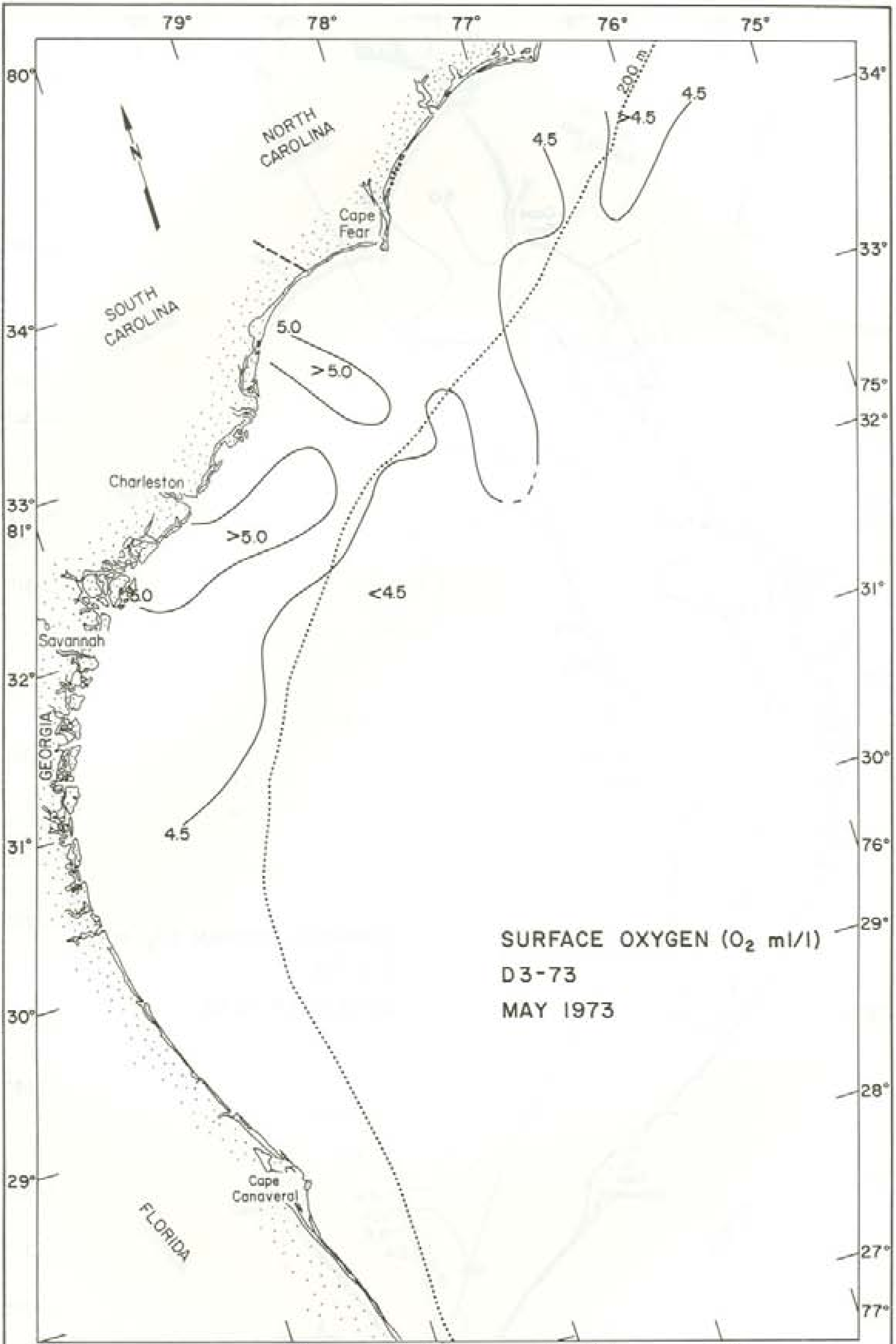

SURFACE OXYGEN (O_2 ml/l)
D2-73
FEB.-MAR. 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
N

FIGURE 44



79°
78°
77°
76°
75°
80°
34°
200 m
4.5
>4.5
4.5
NORTH CAROLINA
N
Cape Fear
33°
SOUTH CAROLINA
34°
5.0
>5.0
75°
32°
Charleston
33°
81°
>5.0
31°
5.0
<4.5
Savannah
32°
GEORGIA
30°
4.5
31°
76°
SURFACE OXYGEN (O_2 ml/l)
D3-73
MAY 1973
29°
30°
28°
29°
Cape Canaveral
FLORIDA
27°
77°
28°
81°
80°
27°
79°
78°

FIGURE 45

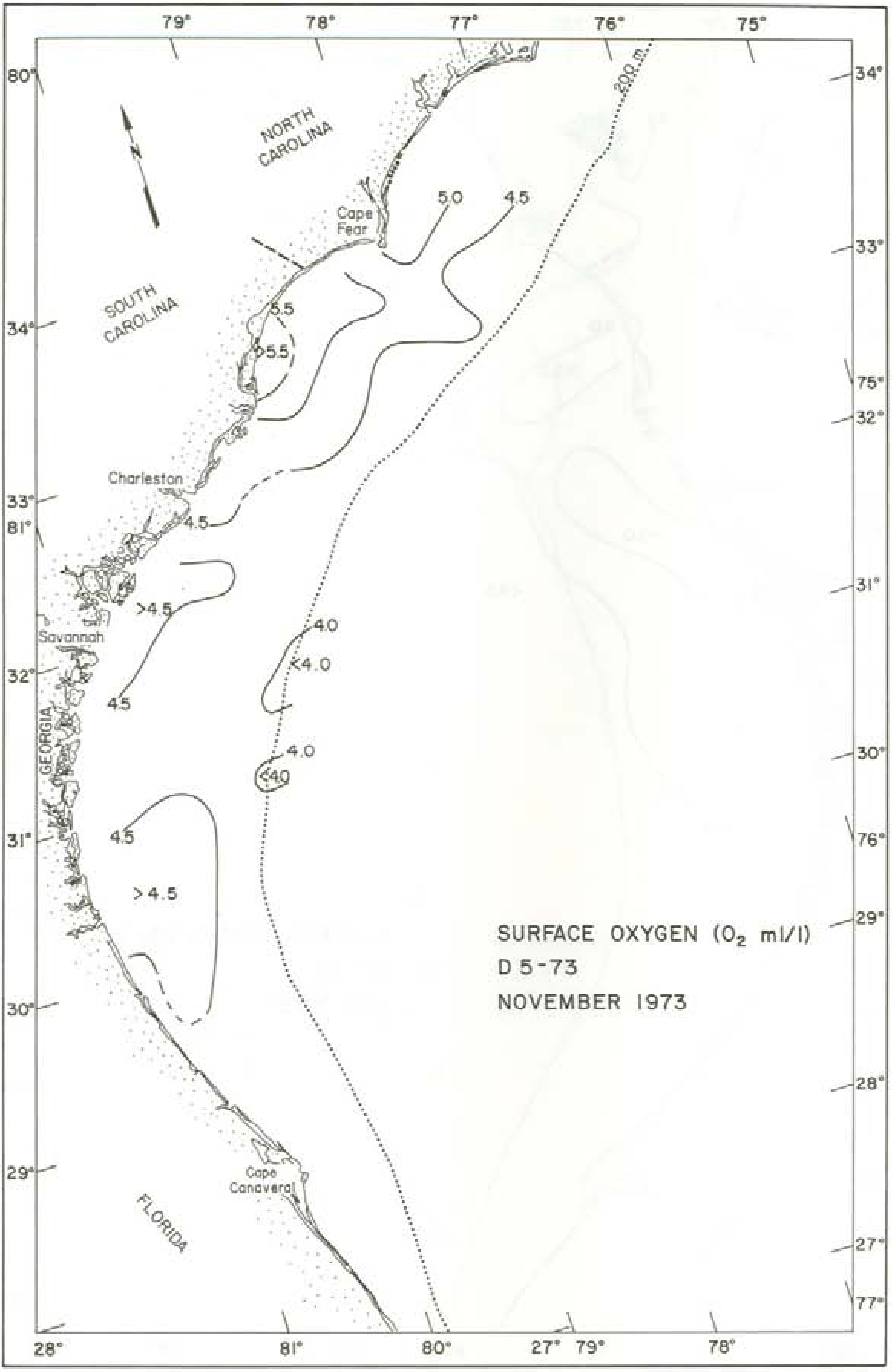

SURFACE OXYGEN (O_2 ml/l)
D 5-73
NOVEMBER 1973
NORTH CAROLINA
SOUTH CAROLINA
GEORGIA
FLORIDA
Cape Fear
Charleston
Savannah
Cape Canaveral
200 m
5.0
4.5
5.5
>5.5
4.5
>4.5
4.5
4.0
<4.0
4.0
<4.0
4.5
>4.5
79°
78°
77°
76°
75°
80°
34°
33°
81°
32°
31°
30°
29°
28°
27°
77°

FIGURE 46