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Carbon and Nitrogen in Sediments of the Scotian Shelf and Adjacent Waters

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Les établissements des Sciences et levés océaniques dans les régions et à l'administration centrale ont cessé de publier leurs diverses séries de rapports en décembre 1981. Une liste complète de ces publications figure dans le volume 39, Index des publications 1982, du *Journal canadien des sciences halieutiques et aquatiques*. La série actuelle a commencé avec la publication du rapport numéro 1 en janvier 1982.

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by

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ABSTRACT

Saunders K.S., Crewe N.F. and Pocklington R. 1989. Carbon and Nitrogen in Sediments of the Scotian Shelf and Adjacent Waters. Can. Data Rep. Hydrogr. Ocean Sci. No. 73: iv + 17 pp.

This report tabulates the results of total carbon, organic carbon and nitrogen determinations performed upon surficial sediments and subsamples from box cores. These were taken on four cruises to the Scotian Shelf and adjacent waters between the years 1982 and 1988 as an integral part of an ongoing program on sources and sinks of organic matter in coastal waters of Canada.

RESUME

Saunders K.S., Crewe N.F. and Pocklington R. 1989. Carbon and Nitrogen in Sediments of the Scotian Shelf and Adjacent Waters. Can. Data Rep. Hydrogr. Ocean Sci. No. 73: iv + 17 pp.

Ce rapport classifie les résultats obtenus lors d'analyses d'azote et de carbone organique et total, pour des sédiments superficiels et d'échantillons de carottes prélevés lors de quatre croisières à la plate-forme Scotian et dans ses eaux avoisinantes.

L'échantillonnage faisait partie intégrante d'un programme des sources et d'enfouissement de matière organique dans les eaux cotières du Canada et eu lieu au cours des années 1982 à 1988.

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ACKNOWLEDGEMENTS

Thanks are due to the officers and men of C.S.S. "Dawson" who over the years provided excellent ship-board help and to those members of Marine Chemistry (and its predecessor Chemical Oceanography) Division who helped with the on-board sampling.

INTRODUCTION

This report is a compilation of carbon and nitrogen determinations on surficial sediments (grab samples) and box cores from four cruises to the Scotian Shelf and adjacent waters (1982 - 1988).

Cruise 88-003 (figure 1) extended over Georges Bank, Browns Bank and the Scotian Shelf. Box cores were sampled from Emerald, Roseway and Georges Basins and the Lydonia Canyon (off Georges Bank). Fifty-six surficial sediment samples were also analyzed. Cruise 87-005 (figure 2) covered the area of Georges Bank, Northeast Channel and Browns Bank. Two box cores were analyzed; one from Emerald Basin and the other from the Corsair Canyon (off Georges Bank). Cruise 85-017 (figure 3) covered the Scotian Shelf and Slope. Five box cores were analyzed from Emerald, Roseway and LaHave Basins and Banquereau and Middle Banks. Ten surficial sediment samples were also analyzed. Cruise 82-006 was primarily to the Scotian Shelf and Slope (figure 4). Sixty-four surficial sediment samples were collected here.

METHOD

Surficial sediments were collected using a Van Veen grab. Box cores were subsampled at centimeter intervals; subsamples were frozen in glass bottles which were pre-rinsed with GC-grade solvent.

Samples were dried at room temperature in a vacuum oven using silica gel to remove excess moisture. An agate mortar and pestle was used to pulverize the samples before passing them through an 80-mesh (180 micron) sieve. A portion of the sieved sediment, approximately one gram, was treated with 5 ml of 1 molar HCl to remove the inorganic carbon by evolution of CO_2. The acid solution was allowed to evaporate by placing vials in a warm water bath and then dried at 50 degrees Celsius in preparation for analysis of organic carbon.

The sediment samples from cruise 88-003 and 82-006 were run once prior to treatment with acid and then duplicates for each sample were run after treatment with acid. For cruises 87-005 and 85-017, duplicates of the samples were run for total carbon then selected samples were treated with acid and duplicates analyzed.

The samples for cruise 82-006 were analyzed on the HEWLETT PACKARD 185B CHN analyzer by the method described in Pocklington & Morash (1979).

A CARLO ERBA elemental analyzer (model 1106) was used for the analysis of the remainder of the samples. Eight to twenty milligram samples were weighed into tin boats. The boats were introduced via an autosampler into an oxidation tube (1025 degrees Celsius), packed with chromic oxide and silvered cobaltous-cobaltic oxide, helium gas (25 ml min^{-1}) being the carrier. During sample introduction, the helium stream was temporarily enriched with pure oxygen. Flash combustion took place, primed by the burning of the tin container. The mixture of combustion gases then passed through a reduction tube containing copper, and the resulting gases were carried through a chromatographic column of Poropak QS that separated the individual components which eluted in the sequence N_2 - CO_2 - H_2O. Their concentrations were measured by a thermal conductivity detector and the results recorded on a Hewlett Packard 3390A integrator.

The instrument was calibrated using acetanilide, (standard reference material 141c, National Bureau of Standards, Washington, D.C.) which has a carbon to nitrogen atom ratio very similar to that of marine organic matter (Pocklington & Morash, 1979). Typically, standards ranged between 50 micrograms and 150 micrograms. Boat blanks were run to determine an average blank value and the values were built into the calibration. Standards were run at the beginning of the day and periodically throughout the day to ensure that the calibration remained true.

The following equations were used for carbon determinations:

(1)

$$K = \frac{A\ std}{f_c * W\ std}$$

$$K = \text{count ug}^{-1}$$

The instrumental response or sensitivity (K) is calculated by dividing the integration counts of the standard (A std) by the fraction of carbon in the standard (f_c = 0.7109) multiplied by the weight of the standard in micrograms (W std).

(2)

$$[C] = \frac{A\ sample}{K * W\ sample}$$

$$[C] = \text{ug of C / mg of sediment}$$

The concentration of carbon in the sediment sample is calculated by dividing the integration counts of carbon in the sample (A sample) by (K) multiplied by the weight of the sample in milligrams (W sample).

(3) $$\text{C/N atom ratio} = [C] / [N] * 14 / 12$$

Excellent precision at 0.2 mg carbon/gram of sediment may be obtained from the analysis but the accuracy associated with the determination of less than 2.0 mg C per gram of sediment are questionable and therefore are reported as < 2. The C:N ratios are not included with these samples as ratios may be generated that have a high degree of uncertainty near the detection limit of both C and N.

REFERENCE

Pocklington, R. and L. Morash (1979). Organic Carbon, Nitrogen and Lignin in Sediments from the Gulf of St. Lawrence and Adjacent Waters. Bedford Institute of Oceanography, Dartmouth, N.S., Report Series,
BI-R-79-1, 16pp.

Table 1 Box Cores - GEORGES BASIN/LYDONIA CANYON/CORSAIR CANYON

CRUISE: 88-003 Station 48 Depth 350m (IDENT.# 42877 - 42900)
LATITUDE: 42-24.95 LONGITUDE: 67-05.61

88-003 Station 40 Depth 565m (IDENT.# 42759 - 42774)
LATITUDE: 40-26.39 LONGITUDE: 67-39.82

87-005 Station 16 Depth 600m (IDENT.# 19508 - 19514)
LATITUDE: 41-21.66 LONGITUDE: 66-09.98

		NOT ACID TREATED			ACID TREATED		
						mean	
IDENT.#	DEPTH cm	TOTAL C mg/g	N mg/g	C:N ratio	Org C mg/g	N mg/g	C:N ratio
42877	0-1	12.1	1.1		7.5	1.0	8.7
42878	1-2	13.5	1.3		7.6	1.1	8.2
42879	2-3	12.9	1.3		7.9	1.0	8.8
42880	3-4	12.8	1.2		7.2	1.0	8.6
42881	4-5	12.6	1.2		7.7	1.0	8.8
42882	5-6	12.8	1.2		7.8	1.0	8.9
42883	6-7	11.6	1.0		7.0	0.9	8.7
42884	7-8	12.7	1.2		7.3	1.0	8.7
42885	8-9	12.5	1.1		7.0	1.0	8.6
42886	9-10	11.2	1.0		6.3	0.9	8.6
42887	10-11	10.1	0.9		5.8	0.7	9.4
42888	11-12	9.0	0.8		5.5	0.7	9.0
42889	12-13	9.6	0.9		5.8	0.8	8.7
42890	13-14	9.3	0.9		5.5	0.7	9.5
42891	14-15	9.6	0.9		5.7	0.8	8.8
42892	15-16	10.1	0.9		5.7	0.7	9.2
42893	16-17	11.3	1.0		6.5	0.8	9.1
42894	17-18	9.5	0.9		5.8	0.7	9.0
42895	18-19	10.5	1.0		6.4	0.8	9.3
42896	19-20	9.6	0.9		6.1	0.8	8.9
42897	20-22	9.7	0.9		6.6	0.9	9.0
42898	22-24	9.6	0.9		6.9	0.9	8.9
42899	24-26	9.1	0.9		5.9	0.8	9.0
42900	26-28	9.2	0.9		6.6	0.9	9.0
42759	0-1	4.0	0.4		2.3	0.3	8.3
42760	1-2	4.2	0.4		2.5	0.3	8.7
42761	2-3	5.2	0.4		2.6	0.4	8.3
42762	3-4	5.1	0.5		3.5	0.4	9.1
42763	4-5	7.3	0.6		4.3	0.6	9.2
42764	5-6	8.4	0.8		5.5	0.7	9.2
42765	6-7	11.3	1.0		7.2	0.9	9.1
42766	7-8	10.6	0.8		4.8	0.6	8.9
42767	8-9	7.4	0.6		3.5	0.5	8.8
42768	9-10	6.8	0.5		3.4	0.4	9.2
42769	10-11	6.5	0.5		4.2	0.5	9.4
42770	11-12	5.8	0.4		3.3	0.4	8.9
42771	12-14	8.2	0.6		3.4	0.4	9.3
42772	14-16	7.5	0.6		2.7	0.3	9.3
42773	16-18	6.6	0.5		3.1	0.4	9.0
42774	18-20	8.1	0.6		4.1	0.5	9.0

Table 1 cont.

IDENT.#	DEPTH cm	NOT ACID TREATED TOTAL C mg/g	mean N mg/g	C:N ratio	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio
19508	0-4	6.2	0.3		2.0	0.3	7.5
19509	4-8	5.0	0.3		2.1	0.3	8.2
19510	8-12	5.9	0.3		2.5	0.3	9.7
19511	12-16	8.3	0.5		5.0	0.6	10.6
19512	16-20	8.8	0.6		6.0	0.6	11.8
19513	20-24	6.1	0.4		4.4	0.5	10.3
19514	24-26	6.1	0.4		3.2	0.4	10.4

Table 2 Box Cores - ROSEWAY BASIN

CRUISE: 88-003 Station 60 Depth 175m (IDENT.# 41974 - 41990)
LATITUDE: 43-09.48 LONGITUDE: 65-05.48

85-017 Station 3 Depth 160m (IDENT.# 18610 - 18617)
LATITUDE: 43-16.00 LONGITUDE: 65-84.00

IDENT.#	DEPTH cm	NOT ACID TREATED TOTAL C mg/g	N mg/g	C:N ratio	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio
41974	0-1	17.5	2.0		14.9	1.8	9.9
41975	1-2	16.6	1.9		14.5	1.9	9.1
41976	2-3	14.5	1.7		12.5	1.6	9.2
41977	3-4	15.7	1.8		13.1	1.6	9.4
41978	4-5	15.3	1.7		13.3	1.6	9.4
41979	5-6	14.6	1.6		13.1	1.7	9.3
41980	6-7	14.1	1.6		14.0	1.7	9.7
41981	7-8	13.3	1.5		12.5	1.6	9.2
41982	8-9	14.4	1.6		13.7	1.7	9.5
41983	9-10	14.3	1.6		12.1	1.5	9.3
41984	10-11	14.5	1.6		12.3	1.5	9.4
41985	11-12	14.2	1.6		12.0	1.5	9.4
41986	12-14	13.7	1.5		11.2	1.4	9.4
41987	14-16	12.4	1.4		10.6	1.3	9.3
41988	16-18	13.1	1.5		11.6	1.5	9.2
41989	18-20	13.5	1.3		10.8	1.3	9.4
41990	20-23	13.2	1.5		11.3	1.4	9.4
		NOT ACID TREATED	mean		ACID TREATED	mean	
18610	0-1	15.8	1.7		11.4	1.4	9.2
18611	1-5	16.1	1.8	10.3			
18612	5-6	14.8	1.7		11.5	1.5	8.8
18613	6-10	15.2	1.7	10.4			
18614	10-11	15.4	1.8		12.5	1.7	8.6
18615	11-15	15.2	1.8	9.9			
18616	15-16	14.7	1.8		11.9	1.6	8.7
18617	16-20	15.1	1.8		11.5	1.3	10.0

Table 3 Box Core - LAHAVE BASIN

CRUISE: 85-017 Station 1 Depth 239m (IDENT.# 18601 - 18609)
LATTITUDE: 43-43.90 LONGITUDE: 63-49.80

		NOT ACID TREATED			ACID TREATED		
			mean			mean	
IDENT.#	DEPTH cm	TOTAL C mg/g	N mg/g	C:N ratio	Org C mg/g	N mg/g	C:N ratio
18601	0-1	28.3	3.2		22.4	2.9	9.2
18602	1-5	28.3	3.2	10.4			
18603	5-6	27.3	3.1		23.0	3.0	9.0
18604	6-10	29.3	3.2	10.6			
18605	10-11	29.6	3.2		21.9	2.8	9.1
18606	11-15	28.8	3.2	10.3			
18607	15-16	28.7	3.2		20.6	2.5	9.6
18608	16-20	27.4	3.0	10.6			
18609	20-25	30.6	3.4		21.7	3.2	8.0

Table 4 Box Cores - EMERALD BASIN

CRUISE: 88-003 Station 79 (IDENT.# 42168 - 42188)
LATTITUDE: 43-48.55 LONGITUDE: 63-01.49

87-005 Station 1 Depth 265m (IDENT.# 19501 - 19507)
LATTITUDE: 43-48.81 LONGITUDE: 63-01.22

85-017 Station 18 Depth 260m (IDENT.# 18803 - 18825)
LATTITUDE: 43-41.40 LONGITUDE: 63-05.10

		NOT ACID TREATED			ACID TREATED		
						mean	
IDENT.#	DEPTH cm	TOTAL C mg/g	N mg/g	C:N ratio	Org C mg/g	N mg/g	C:N ratio
42168	0-1	26.2	2.4		16.1	2.0	9.1
42169	1-2	26.8	2.4		16.5	2.0	9.7
42170	2-3	26.5	2.4		15.0	1.8	9.6
42171	3-4	25.8	2.3		15.6	1.9	9.4
42172	4-5	25.7	2.3		14.9	1.8	9.6
42173	5-6	25.5	2.2		15.0	1.8	9.5
42174	6-7	25.7	2.2		15.5	1.9	9.4
42175	7-8	26.5	2.4		15.2	1.9	9.5
42176	8-9	26.1	2.4		16.7	2.1	9.4
42177	9-10	26.2	2.3		16.2	2.0	9.5
42178	10-11	25.6	2.3		16.6	2.1	9.3
42179	11-12	26.0	2.3		15.7	1.9	9.5
42180	12-13	24.8	2.2		16.5	2.0	9.7
42181	13-14	24.3	2.1		16.3	2.0	9.8
42182	14-16	23.8	2.1		15.7	1.9	9.8
42183	16-18	26.7	2.3		16.2	1.9	9.9
42184	18-20	24.5	2.2		15.8	1.9	9.6
42185	20-22	24.0	2.1		16.1	1.9	9.8

Table 4 cont.

IDENT.#	DEPTH cm	NOT ACID TREATED TOTAL C mg/g	N mg/g	C:N ratio	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio
42186	22-24	24.1	2.1		14.6	1.7	9.9
42187	24-26	22.8	1.8		14.3	1.7	9.6
42188	26-30	20.8	1.5		14.6	1.7	9.8
		NOT ACID TREATED	mean		ACID TREATED	mean	
19501	0-10	25.6	2.5	11.9			
19502	10-15	25.6	2.5	11.9			
19503	15-20	25.9	2.5	12.3			
19504	20-25	25.0	2.3		17.2	2.1	9.4
19505	25-30	24.9	2.2		18.6	2.3	9.4
19506	30-35	23.1	1.8		15.8	2.0	9.2
19507	35-40	21.6	1.5		11.8	1.4	9.7
18825	surface	29.7	3.0		19.6	2.2	10.5
18803	0-1	29.2	2.9	11.8			
18815	1-2	28.7	2.8		20.0	2.5	9.3
18817	2-5	29.2	2.9		19.7	2.5	9.4
18818	5-6	29.8	2.9	11.9			
18819	6-10	28.7	2.8	12.0			
18820	10-11	28.4	2.8		20.7	2.6	9.3
18821	11-15	29.2	2.8	12.0			
18822	15-16	28.9	2.8	12.2			
18823	16-20	28.8	2.8		20.6	2.6	9.2
18824	21-25	28.4	2.8	12.0			

Table 5 Box Cores - BANQUEREAU BANK/MIDDLE BANK

CRUISE: 85-017 Station 28 Depth 255m (IDENT.# 18832 - 18813)
LATITUDE: 44-47.40 LONGITUDE: 59-01.60

85-017 Station 38 Depth 222m (IDENT.# 18836 - 18846)
LATITUDE: 44-49.90 LONGITUDE: 60-56.90

IDENT.#	DEPTH cm	NOT ACID TREATED TOTAL C mg/g	mean N mg/g	C:N ratio	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio
18832	surface	46.4	5.8	9.4			
18804	0-1	46.5	5.8		40.4	5.4	8.7
18826	1-2	45.8	5.7	9.4			
18806	2-5	45.8	5.8	9.2			
18807	5-6	45.6	5.6		41.1	5.4	8.8
18808	6-10	45.6	5.7	9.4			
18809	10-11	46.3	5.7		40.9	5.8	8.3
18810	11-15	46.3	5.8		40.4	5.2	9.1
18811	15-16	43.5	5.4	9.5			
18812	16-20	42.9	5.3		35.8	4.4	9.5
18813	20-21	43.0	5.3	9.5			

Table 5 cont.

IDENT.#	DEPTH cm	NOT ACID TREATED TOTAL C mg/g	mean N mg/g	C:N ratio	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio
18836	0-1	38.0	4.7		33.5	4.4	9.0
18837	1-2	37.7	4.7	9.3			
18838	2-5	37.0	4.6	9.5			
18839	5-6	37.1	4.6		31.1	3.8	9.6
18840	6-10	36.8	4.6		31.1	4.2	8.7
18841	10-11	37.0	4.6	9.5			
18842	11-15	35.9	4.5		29.6	3.9	8.9
18843	15-16	34.8	4.4	9.3			
18844	16-20	32.3	4.0	9.4			
18845	20-25	32.4	4.0		27.4	3.6	8.9
18846	>25	32.0	3.9	9.5			

Table 6 Grab Samples - GEORGES BANK

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
88003	41925	58	41-59.66	65-55.64	135	< 2			sand/sh. frag.
88003	42410	1	41-46.18	65-56.72	105	< 2			c. sand/shells
88003	42432	3	42-06.17	66-17.21	80	< 2			c. sand
88003	42442	4	41-51.90	66-33.53	75	< 2			c. sand/gravel
88003	42526	13	42-24.84	67-06.03	363	7.0	0.9	9.5	
88003	42536	14	42-12.19	67-06.31	195	5.5	0.8	7.6	sand
88003	42557	20	42-08.92	67-21.18	160	6.6	0.8	9.8	clay
88003	42567	21	42-03.10	66-59.40	61	2.3	0.4	6.5	sand/sh. frag.
88003	42577	22	41-57.11	67-12.25	50	2.2	0.4	6.5	sand
88003	42587	23	41-49.34	67-05.53	56	< 2			
88003	42606	25	41-32.68	66-50.00	71	< 2			fine sand
88003	42616	26	41-23.61	66-42.20	82	< 2			sand/some gr.
88003	42626	27	41-14.65	66-34.66	85	< 2			sand/sh.frag./gr.
88003	42636	28	41-06.16	66-27.55	115	< 2			sand
88003	42646	29	41-04.87	66-24.24	550	4.8	0.7	8.2	sand
88003	42647	29	41-04.87	66-24.24	550	3.7	0.5	8.4	sand
88003	42657	30	41-00.26	66-40.31	81	4.2	0.5	10.3	sand
88003	42667	31	40-55.10	66-50.68	91	3.9	0.5	8.4	mostly sh. frag.
88003	42686	33	40-44.22	67-11.87	95	< 2			sand/sh. frag.
88003	42705	35	40-33.02	67-34.32	106	2.4	0.3	8.3	sand
88003	42715	36	40-41.29	67-41.42	73	< 2			
88003	42735	38	40-32.02	68-04.09	103	3.0	0.4	7.9	
88003	42745	39	40-27.87	68-09.25	375	< 2			c. sand
88003	42756	40	40-26.51	67-39.70	565	10.0	1.3	8.8	sandy mud
88003	42757	40	40-26.51	67-39.70	565	3.7	0.5	8.1	sandy mud
88003	42758	40	40-26.51	67-39.70	565	6.9	0.8	9.5	sandy mud
88003	42811	42	40-53.40	67-19.83	84	2.1	0.4	6.1	f. sand/sh. frag.
88003	42821	43	40-58.61	67-08.16	77	< 2			sand/shells
88003	42841	45	41-47.55	66-47.06	62	< 2			
88003	42864	47	41-46.86	66-45.76	124	< 2			sand/gravel
88003	42831	44	41-04.32	66-56.83	70	< 2			sand/shells

Table 6 cont.

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
88003	42875	48	42-25.00	67-05.91	350	6.2	0.8	9.0	mud
88003	42876	48	42-25.00	67-05.91	350	8.0	1.0	8.9	mud
88003	42935	49	42-20.57	65-50.98	201	5.1	0.8	7.7	c. sand/gravel
88003	42945	50	42-29.02	65-45.73	94	2.7	0.4	7.3	gr./some sand
88003	42964	52	42-39.55	66-10.72	56	< 2			sand/sh. frag.
88003	42972	53	42-35.19	66-11.34	67	< 2			

sh. frag. - shell fragments
c. sand - coarse sand
f. sand - fine sand
gr. - gravel

Table 7 Grab Samples - BROWNS BANK

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
88003	41903	56	42-51.35	66-14.27	147	< 2			sand/shells
88003	41915	57	42-54.32	66-08.52	147	2.2	0.5	5.0	
88003	42983	54	42-42.67	66-30.66	145	< 2			fine sand
88003	42993	55	42-48.22	66-19.08	54	< 2			c. sand/sh. frag.

Table 8 Grab Samples - ROSEWAY BASIN

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
88003	41935	59	43-05.16	65-42.99	93	2.6	0.5	6.5	sand/sh. frag.
88003	41945	60	43-09.53	65-05.43	175	11.0	1.4	9.5	clay
88003	41946	60	43-09.53	65-05.43	175	14.8	1.8	9.6	clay
						NOT ACID TREATED	mean		
85017	6329	3	43-16.00	65-04.00	160	16.6	2.0	9.5	clay

Table 9 Grab Samples - LAHAVE BASIN

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
82006	8512	6	43-52.00	63-36.00	240	20.4	2.5	9.7	clay
82006	8514	7	43-40.90	63-46.00	235	23.2	3.0	9.1	clay
82006	8515	8	43-29.00	63-46.00	223	20.7	2.6	9.4	clay

Table 9 cont.

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	Org C mg/g	N mg/g	C:N ratio	SEDIMENT type
						ACID TREATED			
							mean		
82006	8516	9	43-44.00	63-54.00	240	21.3	2.6	9.7	clay/few shells
82006	8517	10	43-44.60	64-07.00	212	23.5	2.7	10.1	clay/silt
82006	8518	11	43-32.50	64-15.00	204	19.6	2.5	9.1	clay
82006	8519	12	43-22.00	64-18.00	190	8.7	1.1	9.0	clay/silt
						NOT ACID TREATED			
							mean		
85017	6309	1	43-43.90	63-49.80	239	27.8	3.0	10.7	clay

Table 10 Grab Samples - EMERALD BASIN

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	Org C mg/g	N mg/g	C:N ratio	SEDIMENT type
						ACID TREATED			
							mean		
88003	42166	79	43-48.58	63-01.46		14.2	1.8	9.0	clay
85017	6484	18	43-41.40	63-05.10	260	20.5	2.7	9.0	clay
82006	8501	1	44-14.00	63-01.35	180	20.7	2.4	10.0	pelite
82006	8504	2	43-59.00	62-56.00	242	21.1	2.6	9.4	clay
82006	8509	3	43-47.00	62-52.00	240	17.9	2.1	9.9	clay/some silt
82006	8510	4	43-38.20	63-06.59	230	17.3	2.2	9.4	clay
82006	8511	5	43-29.45	63-18.91	206	13.2	1.7	9.2	clay
						NOT ACID TREATED			
							mean		
85017	6484	18	43-41.40	63-05.10	260	29.6	2.9		clay

Table 11 Grab Samples - MIDDLE BANK

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	Org C mg/g	N mg/g	C:N ratio	SEDIMENT type
						ACID TREATED			
							mean		
88003	42147	77	44-30.19	60-14.90	147	< 2			sand
88003	42156	78	44-38.04	60-20.07		17.2	2.0	10.0	clay
85017	6644	38	44-49.90	60-56.90	222	30.2	4.0	8.9	clay
						NOT ACID TREATED			
							mean		
85017	6644	38	44-49.90	60-56.90	222	38.0	4.6		clay

Table 12 Grab Samples - SCOTIAN SHELF/SLOPE

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
88003	42001	62	42-51.39	63-26.01	172	7.4	0.9	9.7	sand/rock
88003	42011	63	42-51.84	62-44.51	117	< 2			mostly gravel
88003	42021	64	42-58.84	62-06.17	136	< 2			sand
88003	42060	68	43-30.01	61-19.62	75	2.1	0.3	7.3	sand
88003	42070	69	43-22.75	61-22.99	78	5.7	0.8	8.7	c. sand/gravel
88003	42079	70	43-20.21	61-19.89	73	< 2			sand
88003	42087	71	43-30.60	61-00.83	68	2.2	0.4	7.0	sand/sh. frag.
88003	42098	72				< 2			sand/sh.frag./gr.
88003	42108	73				< 2			sand/shells
85017	6341	6	42-29.80	64-27.90	1100	8.5	1.2	8.5	clay
85017	6575	29	45-59.80	58-24.70	300	24.0	3.2	8.8	clay
82006	8524	13	42-44.20	64-10.60	200	< 2			sand/sh. frag.
82006	8525	14	42-40.90	64-09.80	465	2.8	0.4	9.0	mud/sh. frag.
82006	8526	15	42-39.10	64-07.30	670	5.5	0.5	12.4	clay
82006	8527	16	42-32.70	64-02.80	1115	6.6	0.9	8.7	clay
82006	8528	17	42-26.10	63-57.00	1530	7.1	1.1	7.8	clay
82006	8529	18	42-17.30	63-51.00	2020	6.8	0.9	8.6	clay
82006	8530	19	42-27.00	63-42.96	1650	9.5	1.1	10.2	clay
82006	8531	20	42-33.54	63-38.58	1340	9.3	1.2	9.3	clay
82006	8532	21	42-39.07	63-35.73	1095	9.2	1.3	8.6	clay
82006	8540	22	42-47.10	63-30.00	320	3.1	0.4	9.4	sandy/rock
82006	8541	24	42-56.06	62-27.57	430	3.1	0.4	8.6	mud/silt
82006	8547	25	43-11.60	61-17.20	530	6.8	0.6	12.4	silty clay
82006	8548	26	43-14.60	61-09.70	560	6.0	0.6	12.5	sand/silt
82006	8549	27	43-22.20	60-32.40	440	8.5	0.6	17.8	clay
82006	8550	28	43-21.06	60-31.79	810	4.1	0.5	9.4	clay
82006	8551	29	43-16.70	60-27.20	1360	9.5	1.1	10.2	clay
82006	8558	30	43-19.70	60-18.20	1320	9.2	0.9	12.3	clay/silt
82006	8559	31	43-27.90	59-52.70	760	3.9	0.5	9.8	sandy mud
82006	8560	32	43-35.80	59-19.50	760	4.2	0.5	9.2	sand/clay
82006	8561	33	43-40.40	59-01.90	620	5.2	0.7	9.2	sand/rock/sh.
82006	8562	34	43-43.00	59-01.90	380	4.3	0.6	9.1	sand/clay
82006	8563	35	43-45.50	59-02.20	310	6.9	0.5	15.6	sandy clay
82006	8564	36	43-48.00	59-02.20	210	3.8	0.3	14.2	sandy clay
82006	8565	37	43-57.10	59-02.30	320	4.4	0.3	14.6	sand/silt
82006	8566	38	44-13.00	59-34.10	215	22.0	2.6	9.8	clay
82006	8567	39	44-20.40	59-29.00	200	30.0	3.8	9.2	clay
82006	8568	40	44-20.90	59-21.20	120	21.2	2.6	9.6	clay/rock
82006	8569	41	44-19.90	59-11.25	210	4.1	0.5	8.9	clay/silt
82006	8571	42	44-10.90	58-22.80	360	9.2	0.7	14.5	sand
82006	8576	43	44-08.90	58-18.30	229	2.6	0.3	10.7	sand/silt
82006	8577	44	44-06.10	58-14.70	1060	6.3	0.6	11.7	sand/silt/clay
82006	8578	45	44-03.10	58-12.10	1560	11.1	1.5	8.5	clay
82006	8581	46	44-00.00	58-08.70	2220	8.0	1.0	9.4	
82006	8582	48	44-05.60	57-35.00	1680	4.2	0.5	9.8	mud/sand
82006	8583	49	44-14.60	57-09.90	1810	7.0	0.9	8.9	mud/sand
82006	8584	50	44-31.40	56-28.60	1450	6.8	1.0	8.1	clay/silt
82006	8588	51	44-44.94	56-38.32	400	14.2	1.9	8.7	clay
82006	8593	52	44-58.30	56-48.90	440	21.5	2.8	8.9	clay

Table 12 cont.

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	NOT ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
85017	6341	6	42-29.80	64-27.90	1100	17.0	1.1		clay
85017	6357	8	41-59.90	64-06.90	2330	31.0	0.7	50.1	clay
85017	6370	9	41-15.90	63-13.90	3860	47.6	3.9	14.1	clay
85017	6454	14	42-37.10	61-49.00	1810	25.6	1.0	30.8	clay
85017	6575	29	45-59.80	58-24.70	300	30.2	3.3		clay
85017	6623	35	44-46.60	54-55.20	250	39.7	5.0	9.3	clay

Table 13 Grab Samples - LAURENTIAN CHANNEL

CRUISE NUMBER	IDENT.#	STA#	LAT.	LONG.	DEPTH (m)	ACID TREATED Org C mg/g	mean N mg/g	C:N ratio	SEDIMENT type
82006	8594	53	45-11.50	56-59.20	438	15.1	2.1	8.4	sand/clay
82006	8595	54	45-25.60	57-10.20	430	21.2	2.7	9.1	clay
82006	8602	55	45-38.55	57-20.57	440	22.9	3.0	9.0	clay
82006	8603	56	45-50.70	57-30.81	450	23.0	2.7	9.8	clay
82006	8604	57	46-03.40	57-41.30	465	20.7	2.6	9.3	clay
82006	8605	58	46-16.10	57-51.00	470	24.7	3.0	9.6	clay/some sand
82006	8606	59	46-28.50	58-01.40	450	23.1	3.0	8.9	clay
82006	8607	60	46-41.20	58-12.00	445	22.4	3.2	8.2	clay
82006	8608	61	46-50.30	58-18.90	460	20.8	2.6	9.5	clay
82006	8609	62	46-57.26	58-38.22	410	9.9	1.2	9.3	silty clay
82006	8610	63	47-03.49	58-56.87	430	15.8	2.2	8.5	clay/silt
82006	8611	64	47-10.40	59-16.00	458	14.8	1.9	8.9	silty clay
82006	8612	65	47-17.60	59-34.50	480	16.9	2.1	9.2	clay
82006	8615	66	47-20.70	59-47.20	465	16.6	2.1	9.3	clay/silt

Figure 1. Cruise track for 88-003

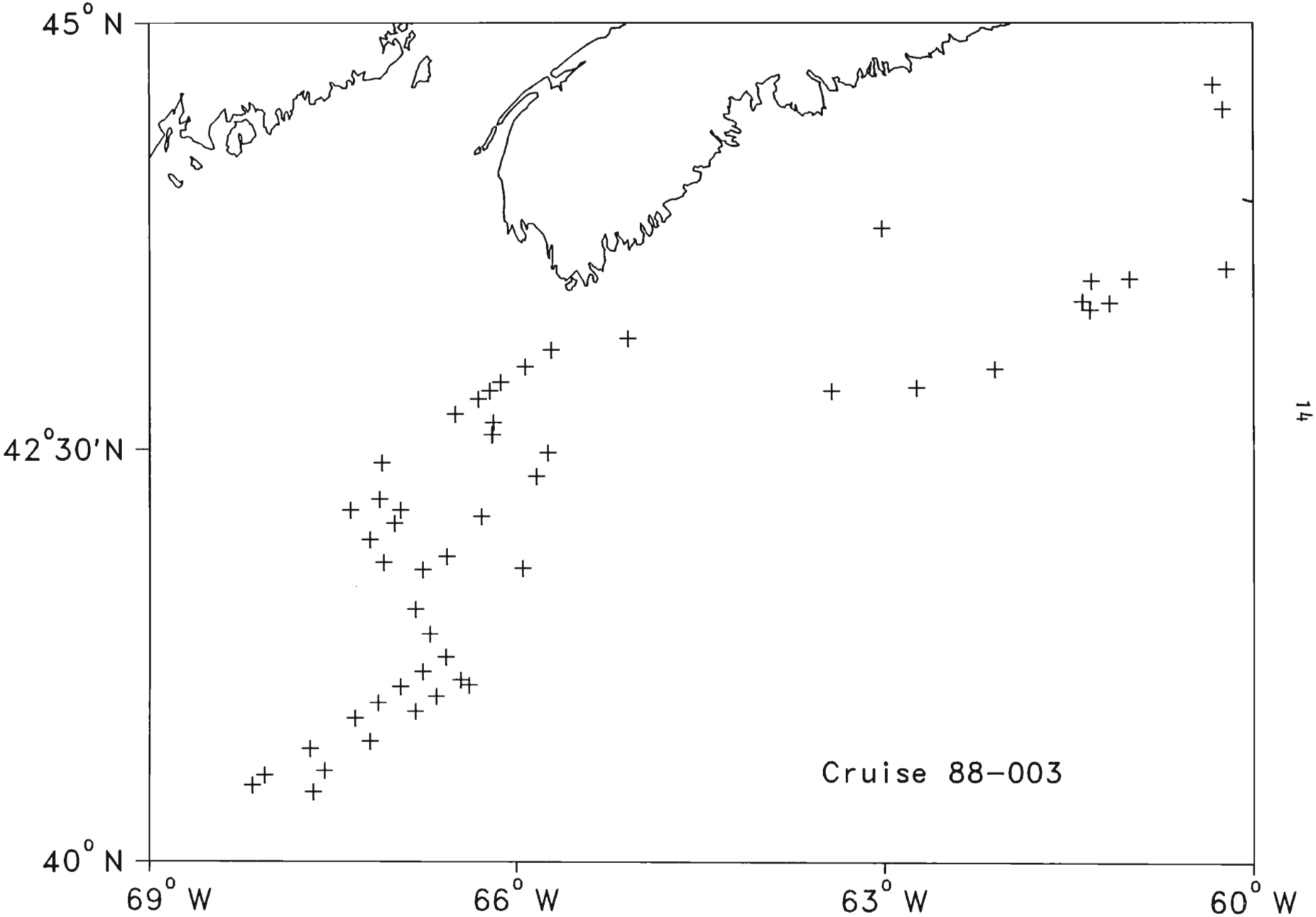

Figure 2. Cruise track for 87-005

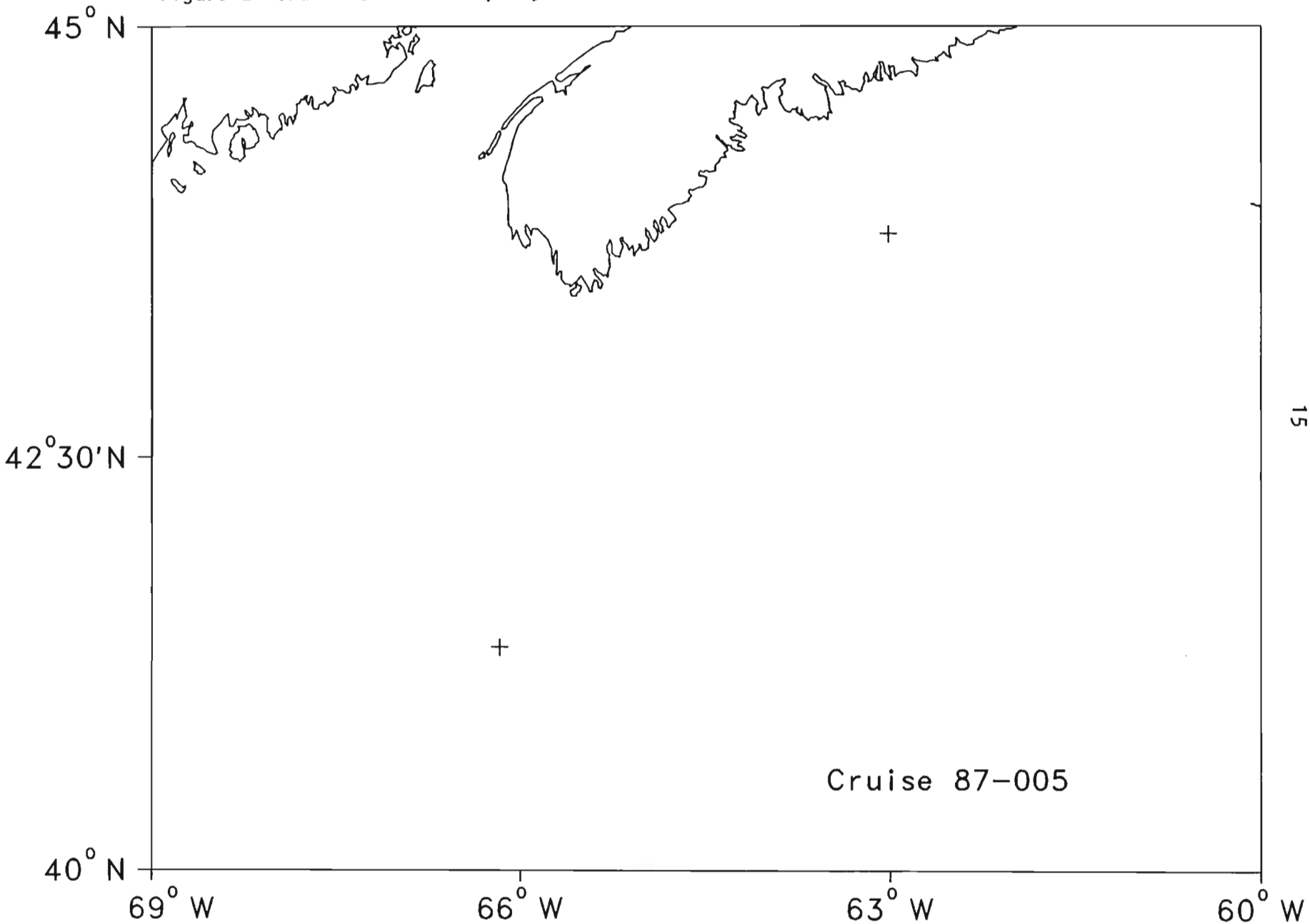

Figure 3. Cruise track for 85-017

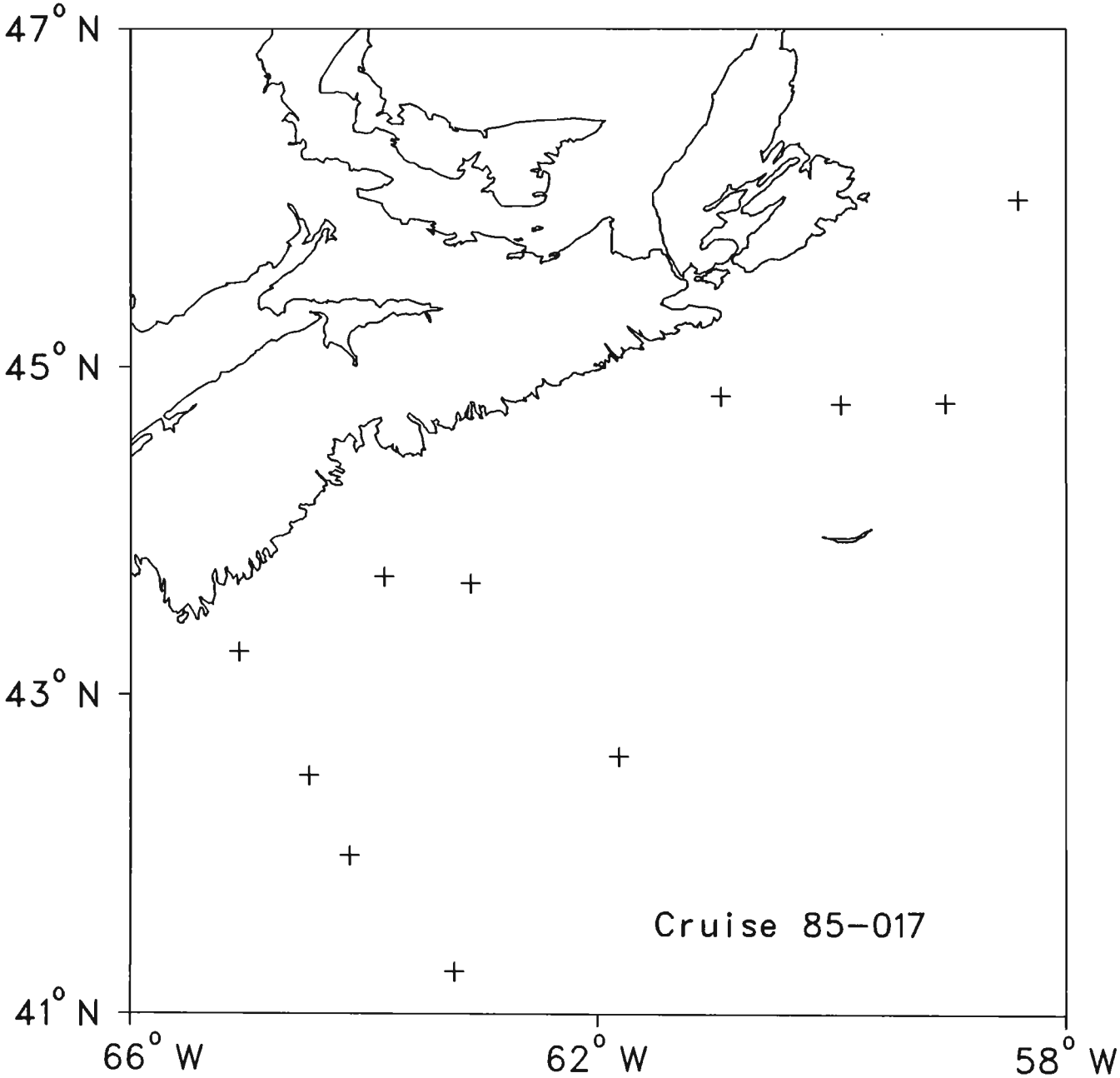

Figure 4. Cruise track for 82-006