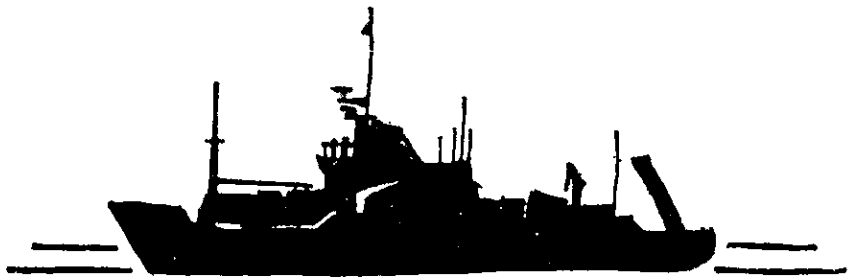
Scottish Marine Biological Association

Dunstaffnage Marine Research Laboratory



CRUISE REPORT

DUNSTAFFNAGE MARINE LABORATORY

and the

SCOTTISH MARINE BIOLOGICAL ASSOCIATION

OBAN, ARGYLL, SCOTLAND

CRUISE REPORT

RRS CHALLENGER

CRUISE 86/1991

23 Nov. - 2 Dec. 1991

Natural Environment Research Council

Dunstaffnage Marine Laboratory
Marine Physics Group
P.O.Box 3
Oban
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PA34 4AD

R.R.V. Challenger Cruise 86/91
Leg 2: Oban to Troon
November 23rd to December 2nd 1991

Cruise Report
Anton Edwards
4th December 1991

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DML Dunstaffnage Marine Laboratory
UEA University of East Anglia
RVS NERC Research Vessel Services
NCC Nature Conservancy Council

Aims

1). To collect CTD profiles and large volume water samples at standard positions between the Sound of Mull and the shelf edge West of Barra for radiocaesium studies.

2). To service the DML current meter mooring in the Tiree Passage.

3). To work the CTD stations of the Anton Dohrn seamount section between the shelf-edge and Rockall to continue the Rockall Trough time series as a contribution to WOCE goal 2.

4). To work the Rockall to Malin Head CTD section for further investigation of recent water mass changes west of Britain.

5). To work shelf CTD sections in the Sea of the Hebrides and the North Channel as time permits.

6. To collect Acoustic Doppler Current Profiler (ADCP) measurements over the shelf and in deeper water in relation to geographical position.

7). To continue observational study of seabird populations west of Britain.

Narrative

"Challenger" was delayed into Oban by an overnight power failure, but docked in Oban about 1130Z on the 23rd of November. Staff joined by 1200Z. The vessel left Oban Railway pier at 1610Z and headed for Loch Linnhe. With gales 7-9 forecast in the Hebrides sea area, it was decided to lie in Loch Linnhe until the prognosis improved and course could be set for a line of stations west towards Rockall. Five satisfactory test dips of the new DML SeaBird CTD system were made. Gales and unfavourable prognoses continued until the evening of Monday 26th, and the vessel sheltered in Outer Loch Linnhe.

In the early morning of Tuesday 26th the ship steamed in improving conditions to the west end of the Sound of Mull and on to the Tiree Passage to service the mooring there at around slack water 1000Z. The mooring was successfully relaid and the ship started work on a line of stations from the Sound of Mull to Barra Head and westward. Barra head was passed at about midnight in deteriorating conditions and work stopped at station C7 at about 0600Z on the morning of the 27th. Shelter was found in the Minch in hope of improvement and more work on the Barra Head - Anton Dohrn section. By midday on the 28th it was clear that, with more gales forecast, the section had to be abandoned in favour of work to the South. After passage through the Sounds of Mull and Islay, CTD section B was completed in the early morning of the 29th and section C before noon. With a Southerly gale blowing, the ship could not start section A in the North Channel and took shelter in the vicinity of Rathlin Island until early on the 30th.

A lull now offered the chance to work CTD section D West of Islay and the vessel arrived there early on the 30th. The line was completed by 1400 and course set for station A5, the first of a line A of CTD stations from Ireland to the Mull of Kintyre. This line was finished

by 1000 and, during the night, lines Y and Z were completed.

By midday on the 1st of December, work had started on a clockwise ring of CTD stations encircling Arran. This was finished by midnight and the remainder of the cruise was spent on an ADCP / CTD survey of the Clyde Deep inflow channel between stations CL16 and CL13.

Equipment

Ship's Gear

The gear in use worked satisfactorily throughout the cruise.

It is inconvenient that the Simrad Echo sounder cannot be triggered with a selectable delay relative to a standard clock. Could this be done, it would be easier to find the trace of pingers.

DML Seabird CTD

The new CTD system on most occasions logged successfully. The main problems experienced were:

1). The user interface for cast set up is primitive and conducive to operator error.

2). Logging of 8 second averages of the 24 Hz data sets was reliable, but when logging all incoming data at 24Hz, the system sometimes filled the data buffer, displayed data late and lost data.

3). On one occasion the software clock was found to be in error, falsifying the time written into the data files. The cause of this is not known.

4). During the later stages of the cruise, temperature records became noisy with a range of about 0.1 degrees Celsius. This owed to intermittency in the values of the middle temperature byte of the incoming data stream. The problem disappeared after changing connectors.

Acknowledgements:

This work was partly funded by the MAFF and the UK WOCE programme. The careful attention of the master, Peter Maw, and all his personnel is gratefully acknowledged. Colour was added to the immediate results of the cruise by the kind efforts of Andrew Lord, RVS.

"Challenger" Cruise 86/91: Stations List

Stat -ion	Disc /Dip	Lat. °.'N	Long. °.'W	Date/ Time	Dep- th,m	CTD	Cs Samples Sur Mid Bot
				26/11			
Test		-	-	-	-	-	
1G/C1	005	56.40	6.08	1436	79	75	50l 25l 25l
2G/C2	006	56.41	6.17	1521	31	25	50l 25l 25l
/3G		56.42	6.22	1605	-		- - -
C3/4G	007	56.44	6.27	1648	157	141	50l 25l 25l
/5G		56.44	6.36	1741	-	40	- - -
C4/6G	008	56.44	6.45	1821	49	135	50l - 25l
C5/7G	009	56.44	7.00	2009	147		50l 25l 25l
/8G		56.44	7.10	2105	-		- - -
C6/9G	010	56.44	7.20	2154	163	154	50l 25l 25l
				27/11			
C7/10G	011	56.44	7.30	0007	219	210	- - -
C8/11G	012	56.44	7.40	0124	67	55	50l 25l 25l
				28/11			
5B	013	55.39	6.01	2340	82	70	
				29/11			
4B	014	55.38	5.57	0020	11	105	
3B	015	55.37	5.53	0100	13	125	
2B	016	55.36	5.49	0141	56	45	
1B	017	55.35	5.45	0225	12	8	
7C	018	55.42	6.22	0545	23	15	
6C	019	55.37	6.26	0630	67	55	
5C	020	55.33	6.30	0721	99	95	
4C	021	55.28	6.33	0825	98	90	
3C	022	55.23	6.37	0924	11	100	
2C	023	55.19	6.41	1017	82	75	
1C	024	55.14	6.45	1124	20	15	
				30/11			
0D	025	55.46	8.00	0612	105	100	
1D	026	55.46	7.41	0728	99	90	
2D	027	55.46	7.29	0840	56	55	
3D	028	55.46	7.16	0942	63	55	
4D	029	55.46	7.04	1042	53	45	
5D	030	55.46	6.55	1129	50	-	
6D	031	55.46	6.46	1214	48	40	
7D	032	55.46	6.37	1300	64	60	
8D	033	55.46	6.30	1353	26	20	
5A	034	55.09	5.43	1804	103	90	
4A	035	55.11	5.56	1846	138	130	
3A	036	55.13	5.52	1929	131	135	
2A	037	55.15	5.47	2017	141	130	
1A	038	55.17	6.00	2124	43	35	
5Y	039	55.13	5.38	2222	94	80	
4Y	040	55.09	5.32	2318	107	100	
				1/12			
3Y	041	55.05	5.26	0020	98	90	

Stat -ion	Disc /Dip	Lat. °.'N	Long. °.'W	Date/ Time	Dep- th,m	CTD	Cs Samples Sur Mid Bot
				1/12			
2Y	042	55.01	5.20	0124	91	85	
1Y	043	54.57	5.14	0226	54	50	
6Z	044	54.48	5.10	0339	25	20	
5Z	045	54.46	5.15	0415	141	138	
4Z	046	54.45	5.20	0455	274	260	
3Z	047	54.43	5.20	0415	165	155	
2Z	048/9	54.42	5.25	0545	110	100	
1Z	050	54.40	5.30	0635	108	25	
CL1	051	55.17	5.17	1110	49	49	
CL2	052	55.21	5.22	1219	48	48	
CL3	053	55.26	5.26	1310	45	35	
CL4	054	55.31	5.26	1356	78	78	
CL5	055	55.35	5.25	1440	133	115	
CL6	056	55.39	5.26	1524	151	145	
CL7	057	55.43	5.19	1615	109	109	
CL8	058	55.48	5.15	1703	164	155	
CL9	059	55.44	5.11	1807	173	173	
CL10	060	55.40	5.04	1900	154	154	
CL11	061	55.36	4.59	1953	145	145	
CL12	062	55.31	4.59	2047	113	105	
CL13	063	55.26	5.02	2132	125	116	
CL14	064	55.21	5.04	2218	63	55	
CL16..	065	55.25	4.55	2340	67	60	
repeat	to	.....	....	....	...	...	
..CL13	071	55.26	5.02	0632	125	115	

Tiree Passage Mooring Details

The mooring was grappled at 0954Z, two meters and all gear were successfully inboard by 1013Z.

It was redeployed by 1136Z as a marked "U" shaped mooring with two Aanderaa RCM7/4S meters at 10 and 20 metres from the sea bed. The position of the current meters was 56º 37.2' N. 6º 24.0'W. in a depth of 47 metres.

Nature Conservancy Council Seabirds at Sea Team Report by Carolyn Stone, NCC Seabirds at Sea Team.

Challenger Cruise 86/91 Legs 1 and 2:
15th November to 2nd December 1991

R.R.S. Challenger sailed from Troon at 1000 hrs GMT on 15/11 and proceeded to steam past the Isle of Arran and the Mull of Kintyre, across the North Channel and westwards past Malin Head. The morning of 16/11 was spent sampling the benthos at 1500 metre depth, after which we proceeded to deeper waters to the west of Ireland. Most of 17/11 was spent using an Agassiz trawl at 54º N, 12 ºW. 18/11 was spent slowly steaming northwards, arriving at the continental slope west of the Hebrides on 19/11, where deep fishing commenced. Trawling

continued over the continental slope on 20/11 and 21/11 before steaming over the shelf to the mainland on 22/11, arriving at Oban at 1100 hrs on 23/11. Departed Oban at 1600 hrs on 23/11 and spent 24/11 and 25/11 sheltering in Loch Linnhe. 26/11 was spent servicing the DML current meter mooring in the Tiree passage and collecting water samples from the Sound of Mull. Sheltered east of South Uist on 27/11 before steaming back to the Sound of Mull on 28/11. Worked CTDs off the Northern Ireland coast on 29/11, to the west of Islay on 30/11, and around Arran on 1/12, before docking at Troon at 0930/2/12.

The weather was initially good, with light winds on 15/11, but increasing to force 6 on 16/11 and 17/11. Conditions deteriorated to force 8 to 9 on 18/22, but moderated to force 4 on 19/11. On the evening of 20/11 conditions again deteriorated to force 8, moderating only slightly on 21/11 and 22/11. Wind speeds reached force 9 on 24/11 and 25/11, temporarily moderating to force 3 to 4 on 26/11 before increasing to force 8 9 again on 27/11. On 28/11 the wind moderated sufficiently to allow work to continue for the remainder of the cruise.

Visibility was good on all days when conditions were calm enough to permit observations to be made. 3040 minutes of observations were recorded, 2800 of these being in November and 240 in December. A total of 39 statistical squares were covered (see attached figure), 36 in November and 4 in December (one square covered in both months). 34 squares were new to the project for November and 2 were new for December.

Species Accounts

Fulmar

Seen on all days but most abundant over deep water in the Rockall Trough.

Manx Shearwater

Two seen on 15/11 between Arran and the Mull of Kintyre and two seen in the same area on 1/12.

Gannet

Seen on most days in low numbers. Highest numbers seen to the west of Coll and Tiree.

Cormorant

Eleven birds seen in the Sound of Mull on 26/11 and nine near Arran on 1/12.

Shag

Sixteen birds seen in the Sound of Mull on 26/11 and 28/11 and nine seen near Arran on 1/12.

Redbreasted Merganser

One bird seen in the Sound of Mull on 29/11.

Turnstone

One seen flying south from Rathlin Island to mainland Northern Ireland on 29/11.

Bonxie

One seen to the west of Arran on 1/12, and one whilst not recording in Loch Linnhe on 25/11.

Black headed Gull
Three seen in the Clyde on 15/11.

Common Gull
Two seen in the Clyde on 15/11.

Lesser Black-backed Gull
A total of six birds seen, four of these to the west of Ireland on 16/11.

Herring Gull
Common close to the shore. Highest numbers seen in the Clyde on 15/11 and 1/12. Only one bird seen over deep water.

Glaucous Gull / Iceland Gull
Four immature birds seen: one east of Rhum on 28/11, one in the Sound of Mull on 28/11, and two in the Clyde (possibly the same bird) on 1/12.

Great Black backed Gull
Widespread but in low numbers. Highest numbers seen between South Uist and the Sound of Mull.

Kittiwake
Seen in all areas. Large numbers in the Clyde on 15/11 and over the shelf to the west of Coll and Tiree. Larger numbers around the shelf break than over deep water.

Guillemot
Common close to shore. Largest numbers seen around Arran and the Mull of Kintyre, west of Barra Head, to the north of Coll and near Mull. Only one seen over deep water. The majority of birds were in winter plumage, but some were moulting into summer plumage.

Razorbill
Seen close to shore, although in lower numbers than guillemots. Highest numbers between South Uist and the Sound of Mull. Of those birds where plumage could be identified, all were in winter plumage.

Little Auk
One seen over deep water in the Rockall Trough on 20/11.

Puffin
One seen over deep water in the Rockall Trough on 20/11 and twelve seen near Mull on 26/11.

Pilot Whale
Seven seen to the west of Ireland on 16/11.

Common Dolphin
A total of thirteen seen. One was seen in the Rockall Trough on 17/11 and six were seen in the same area on 18/11. Three were seen over the continental slope on 21/11 and three over the shelf to the west of Islay on 30/11. In addition, one unidentified dolphin was seen to the west of Ireland on 16/11.

Summary

The trip provided useful coverage of the Rockall Trough and North Channel areas, most of which was new to the project for this time of year. Relatively few birds were seen over deep waters, the four main species seen beyond the shelf edge being fulmars, kittiwakes, great black backed gulls and gannets. Guillemots, razorbills and herring gulls were common nearer to land, while shags and cormorants were restricted to inshore waters. Mixed species feeding flocks of herring gulls, kittiwakes, great black backed gulls, fulmars, gannets and guillemots were observed over shallow banks to the north of Coll and a large flock of feeding kittiwakes and guillemots was seen in Church Bay, Rathlin Island.

Acknowledgements

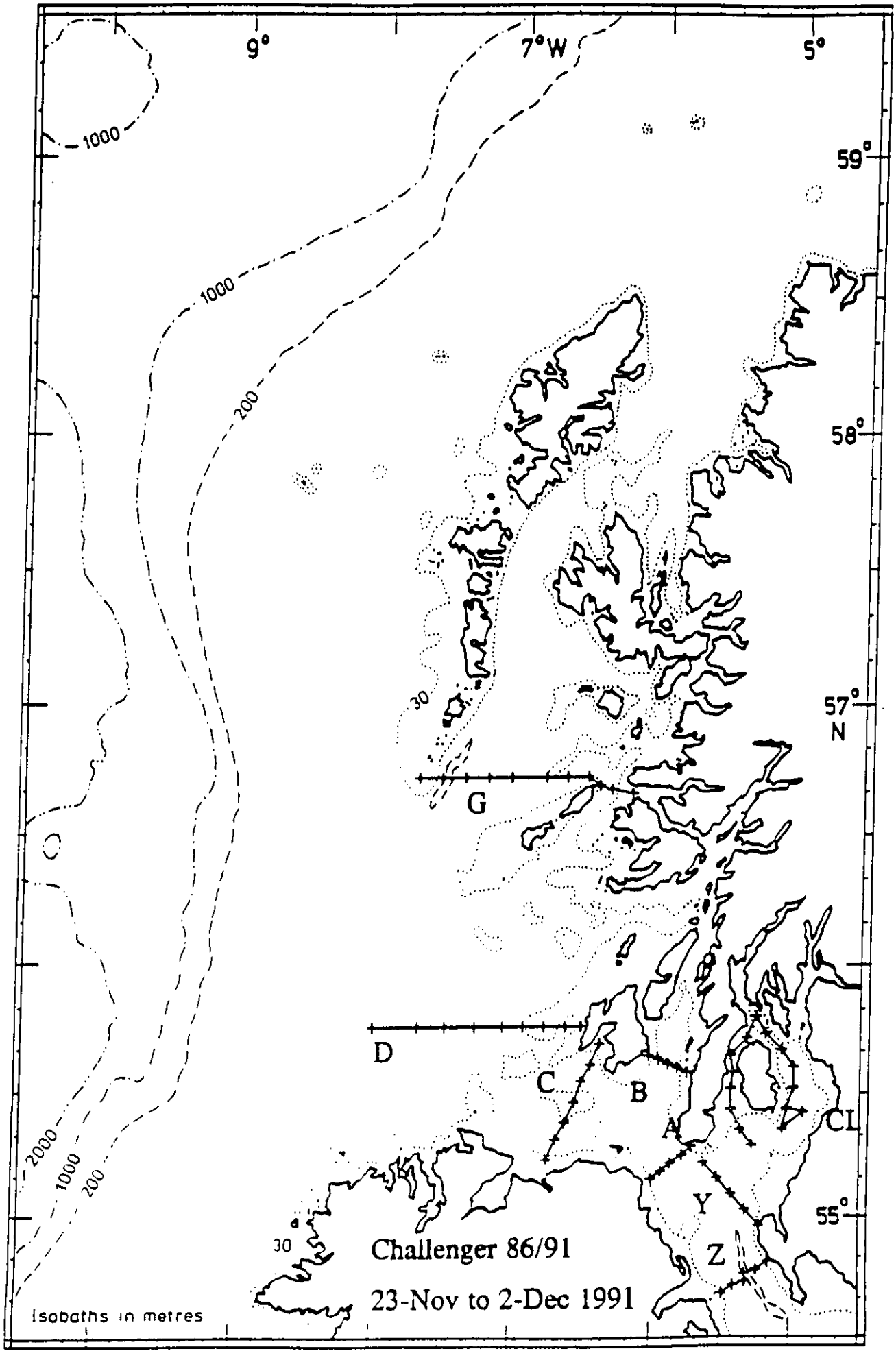
The cooperation of the captain, officers and crew of the Challenger was very much appreciated.

Cruise Track

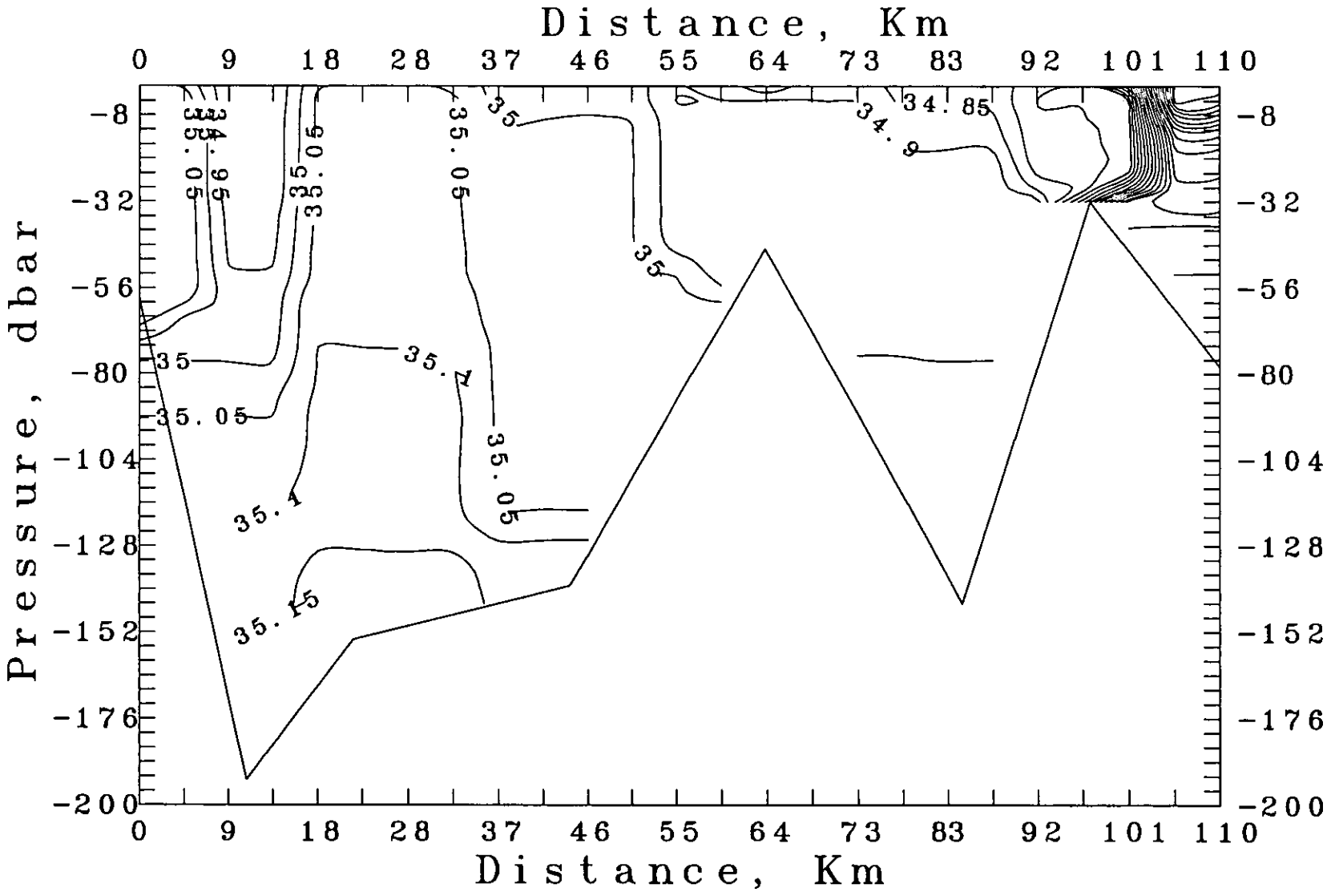
The following map shows the rough cruise track.

Main CTD Sections

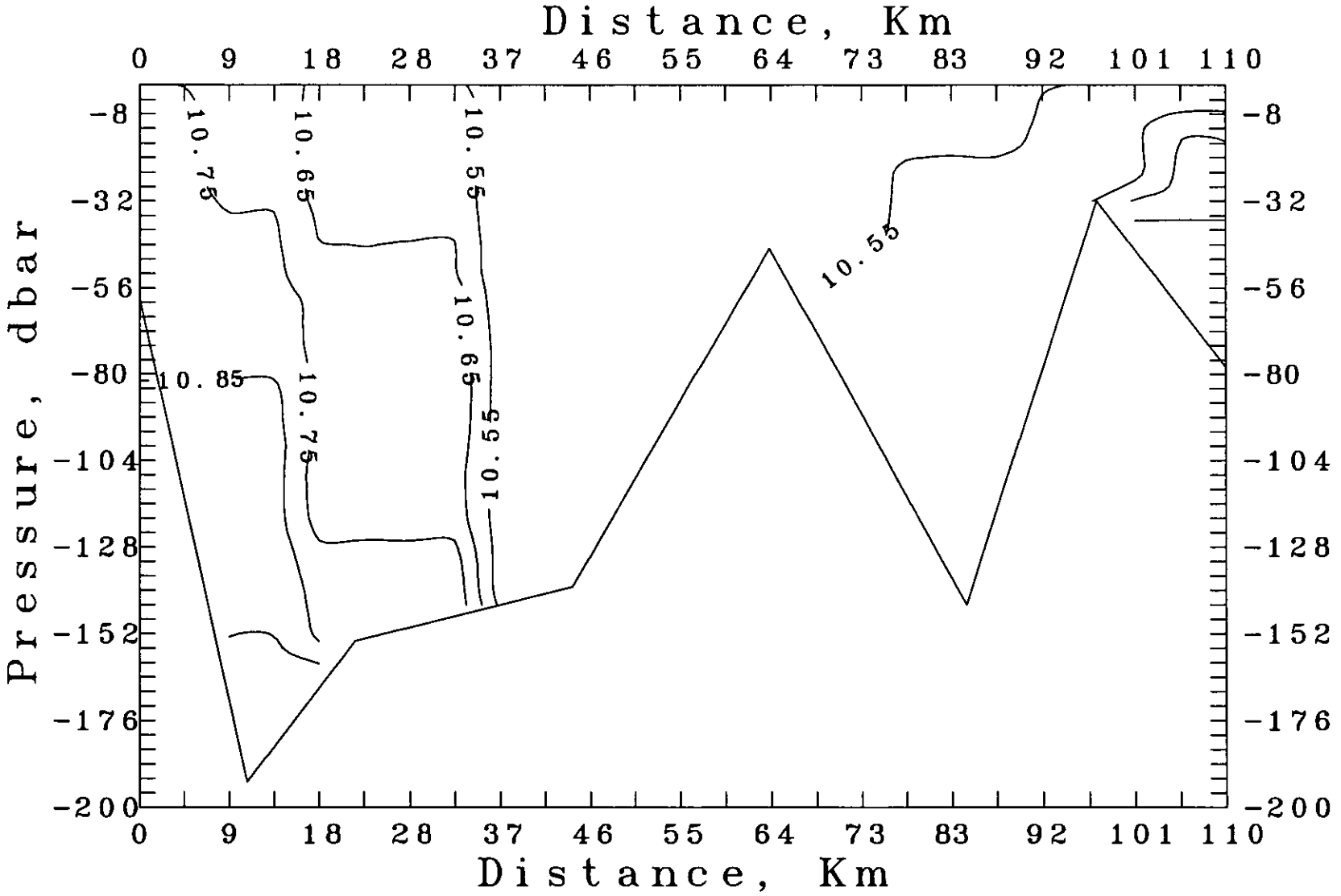
The following diagrams show the sections of temperature and salinity obtained from the CTD data using the manufacturer's calibrations. All sections are shown from west to east (left to right).


9°
7°W
5°
59°
58°
57°
N
1000
1000
200
30
G
D
C
B
A
CL
Y
Z
2000
1000
200
30
55°
Challenger 86/91
23-Nov to 2-Dec 1991
Isobaths in metres

CH8691 Line G Salinity, psu



CH8691 Line G Temperature C.



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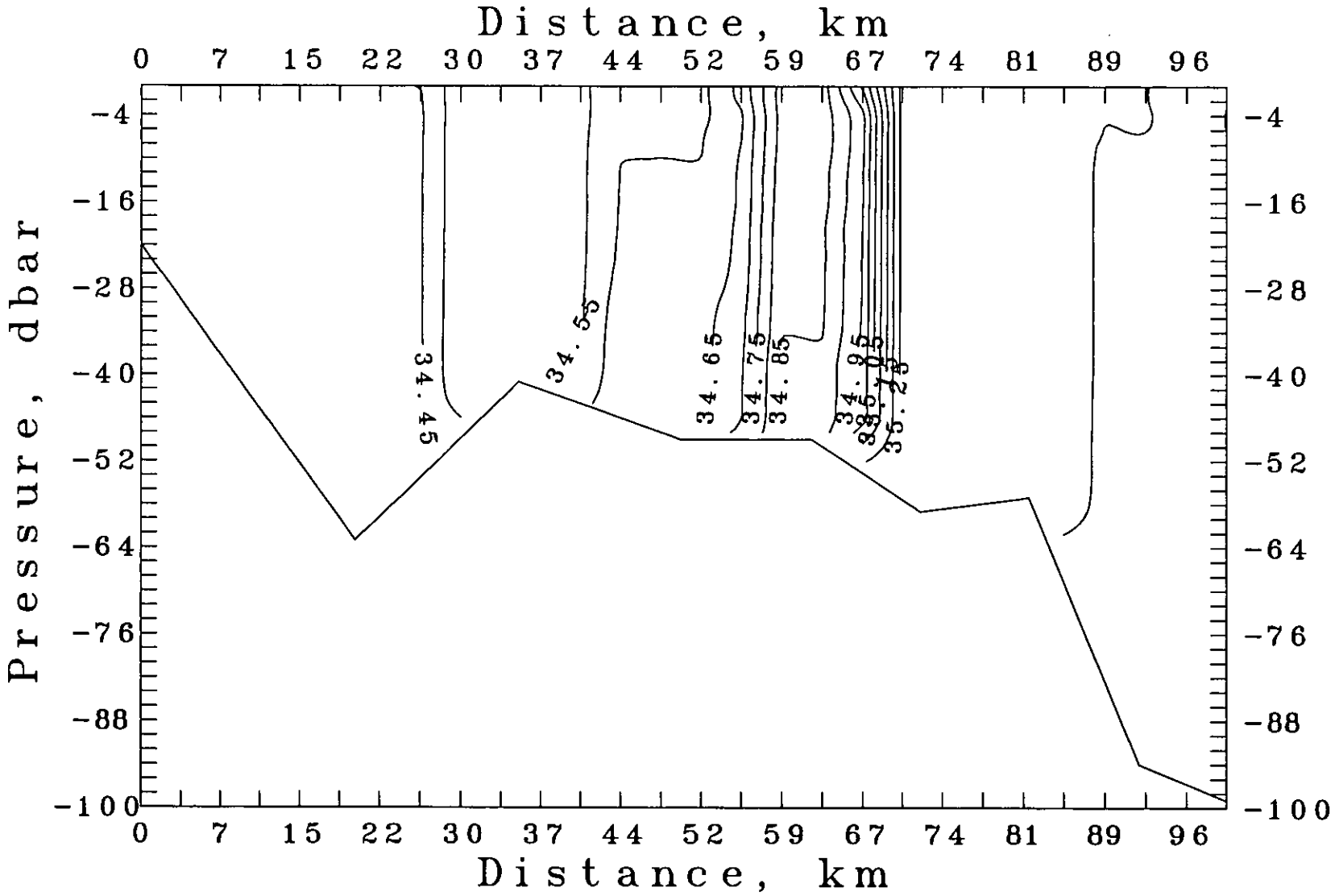

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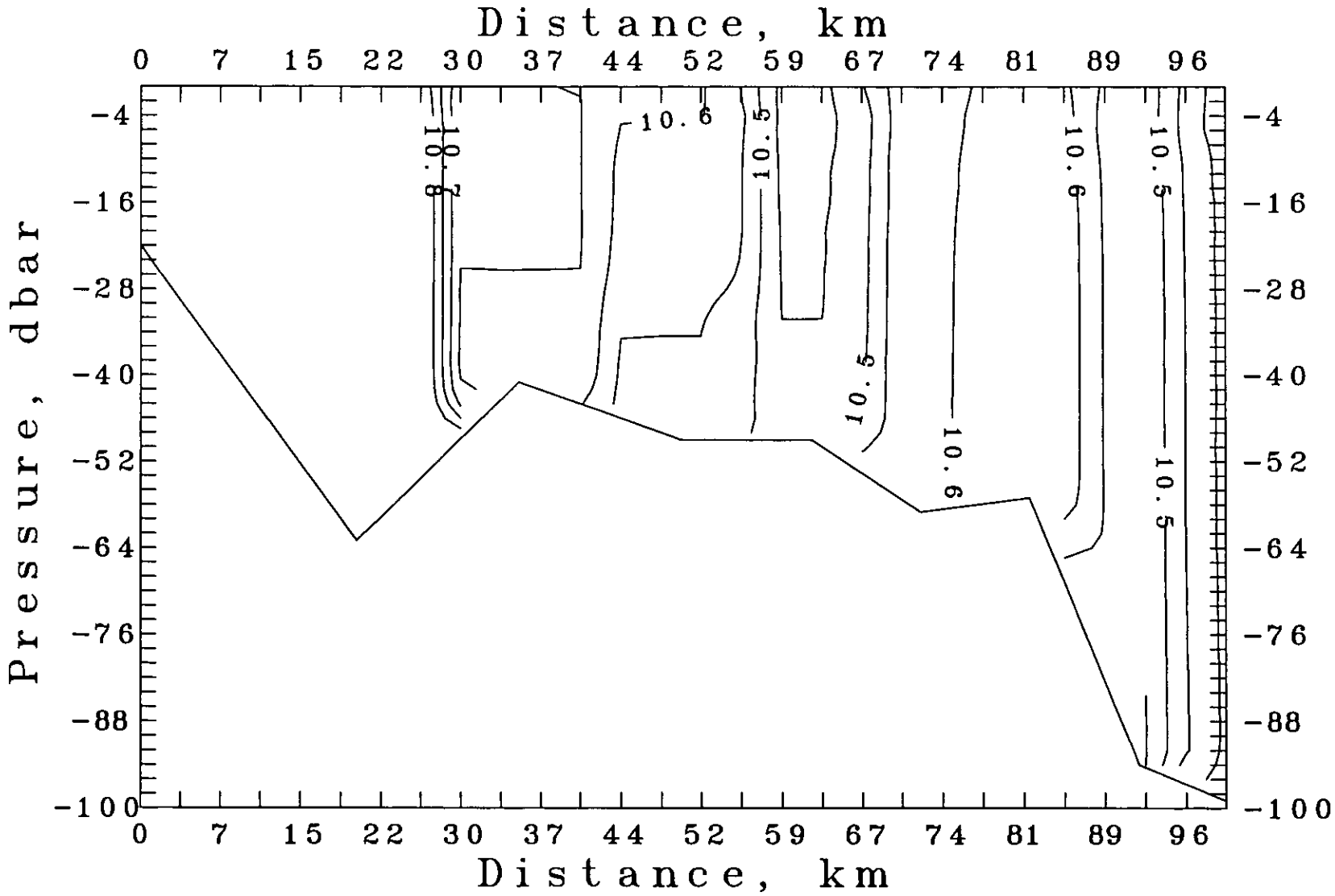

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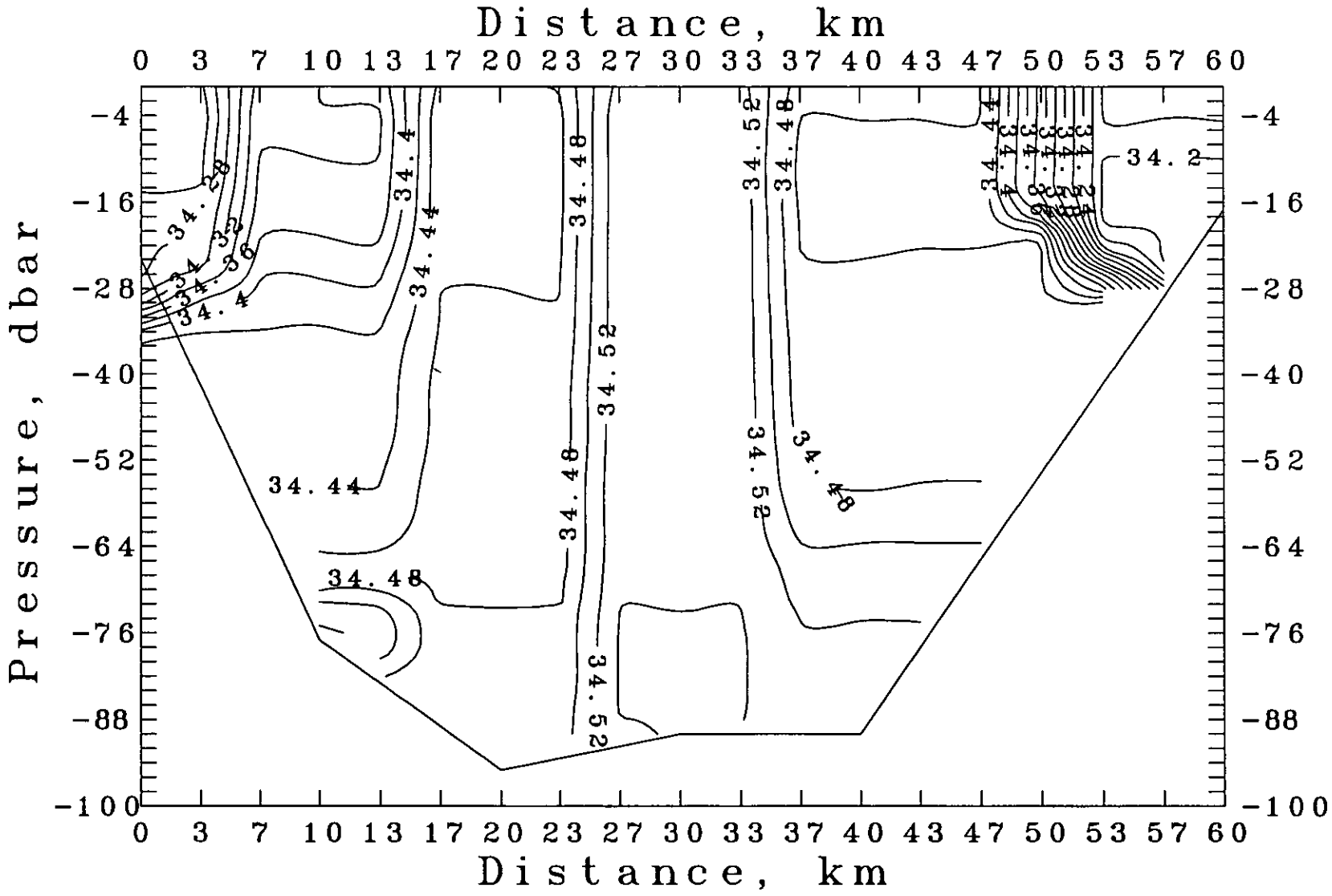

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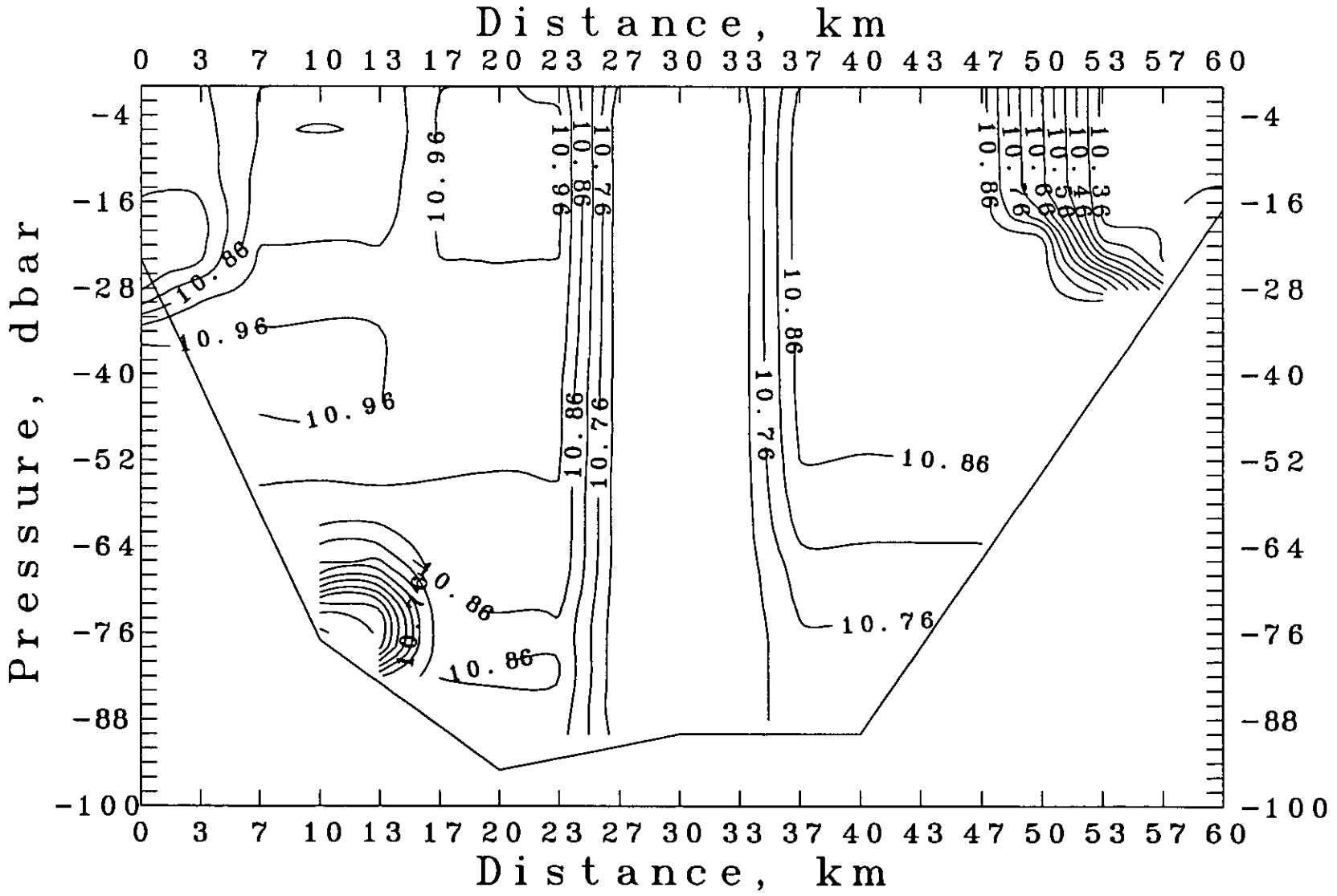

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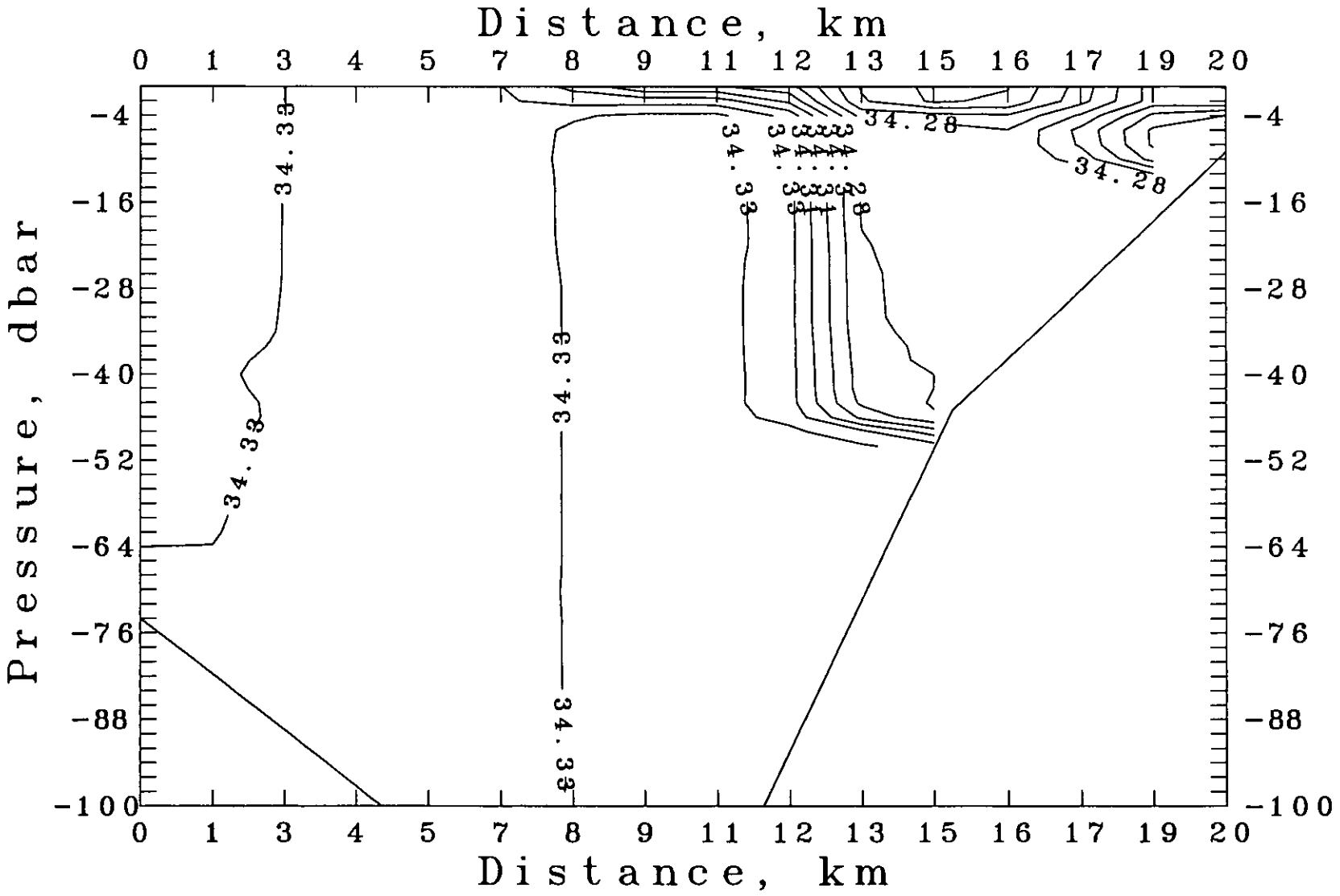

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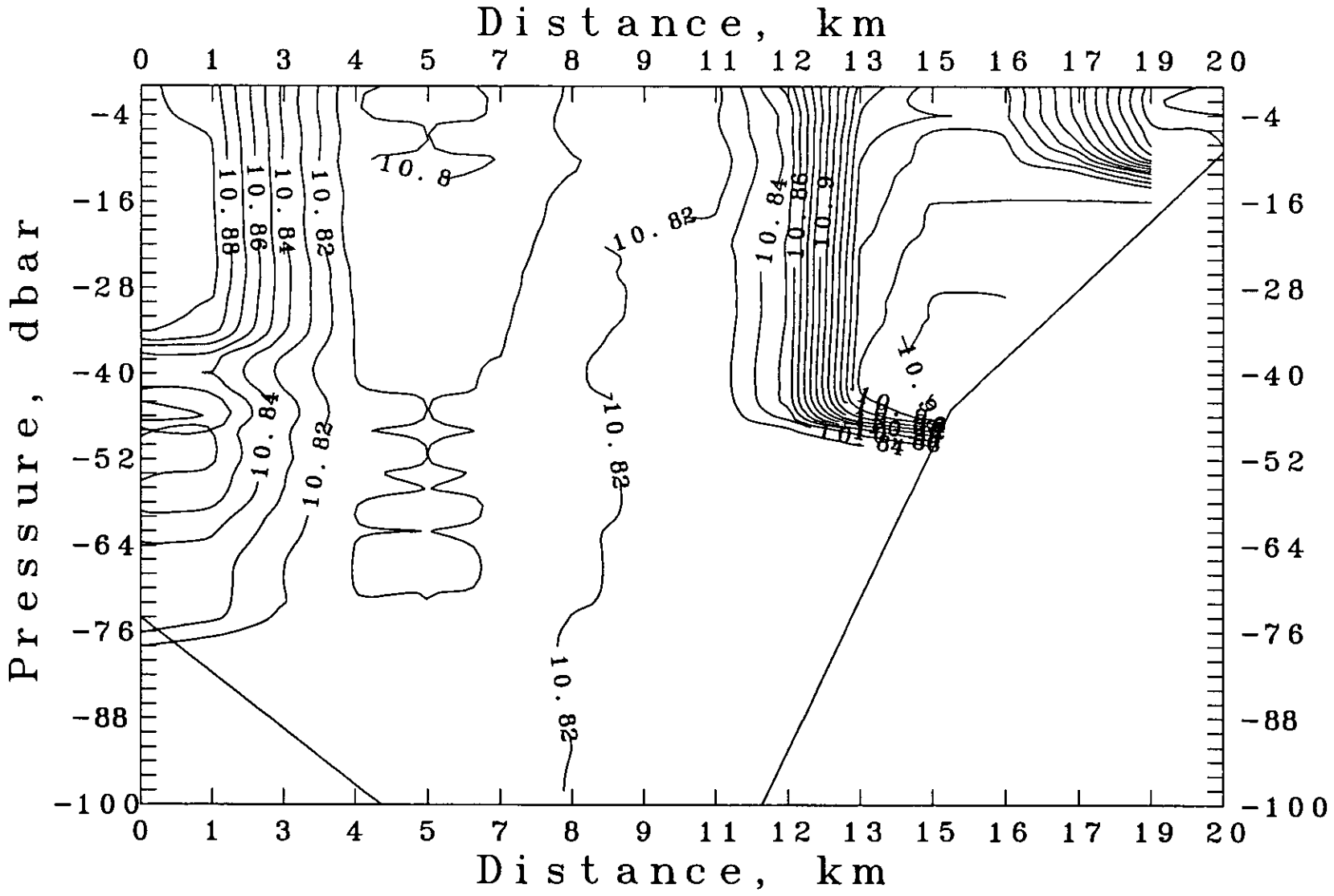
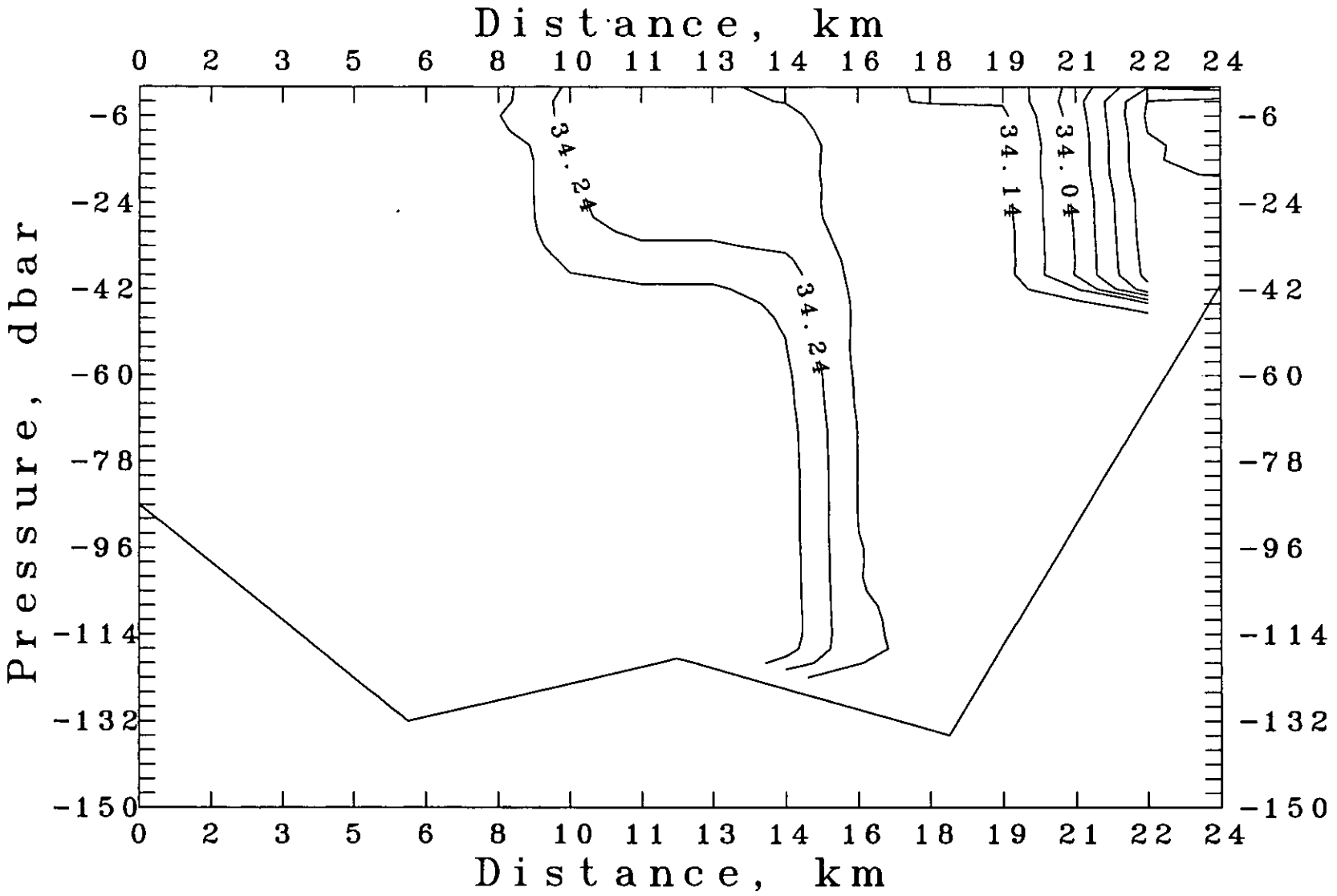


CH8691 Line A Salinity



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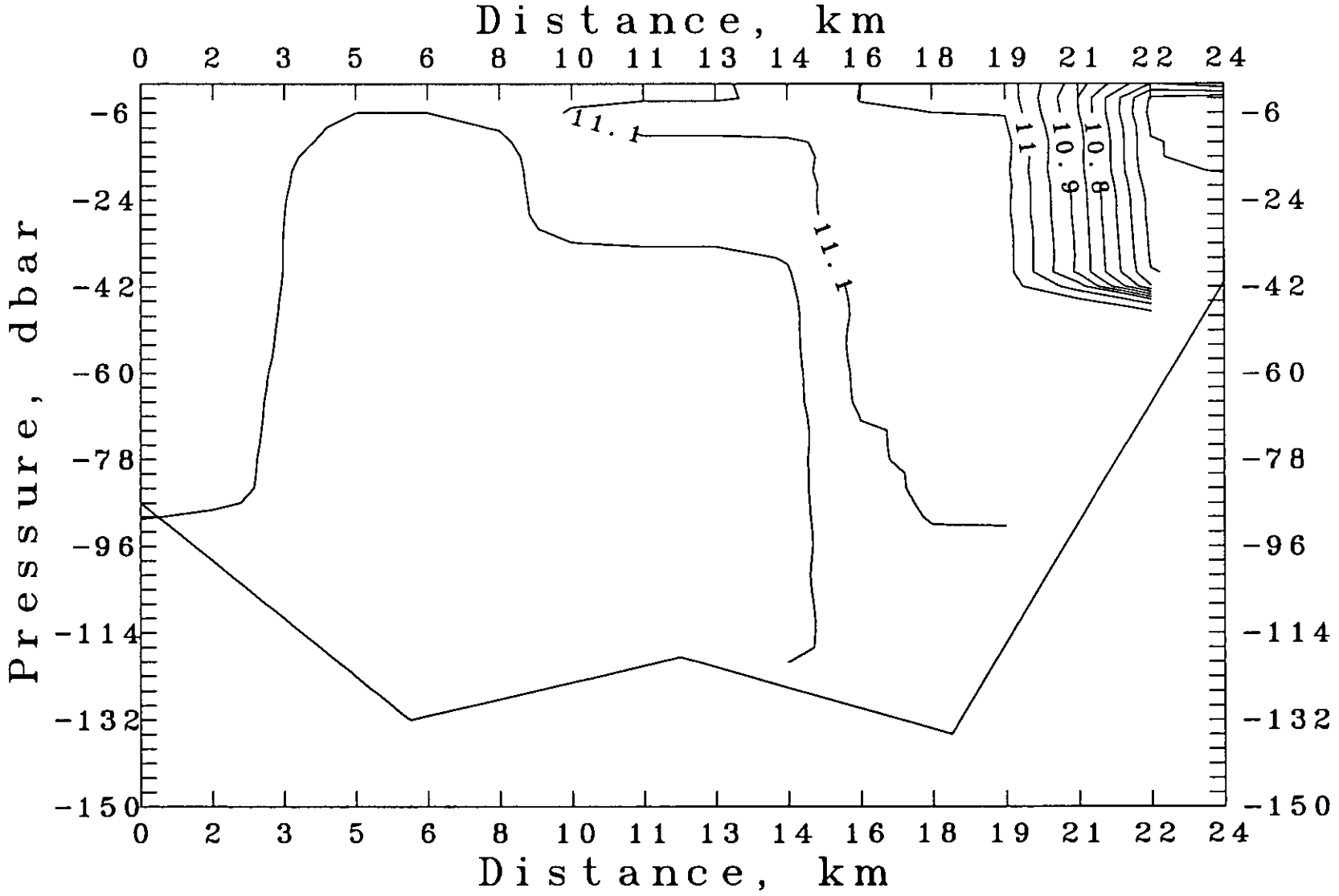

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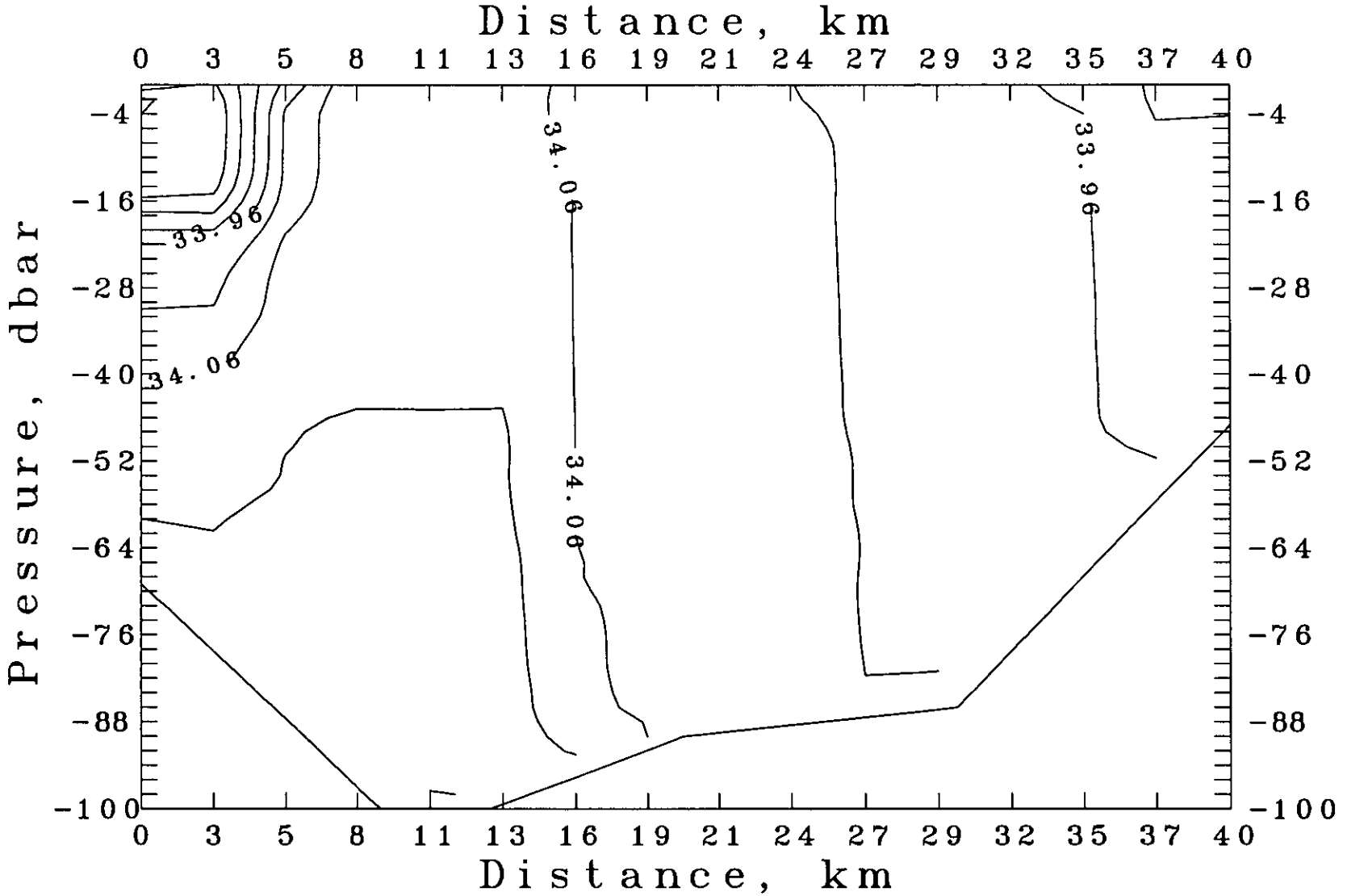

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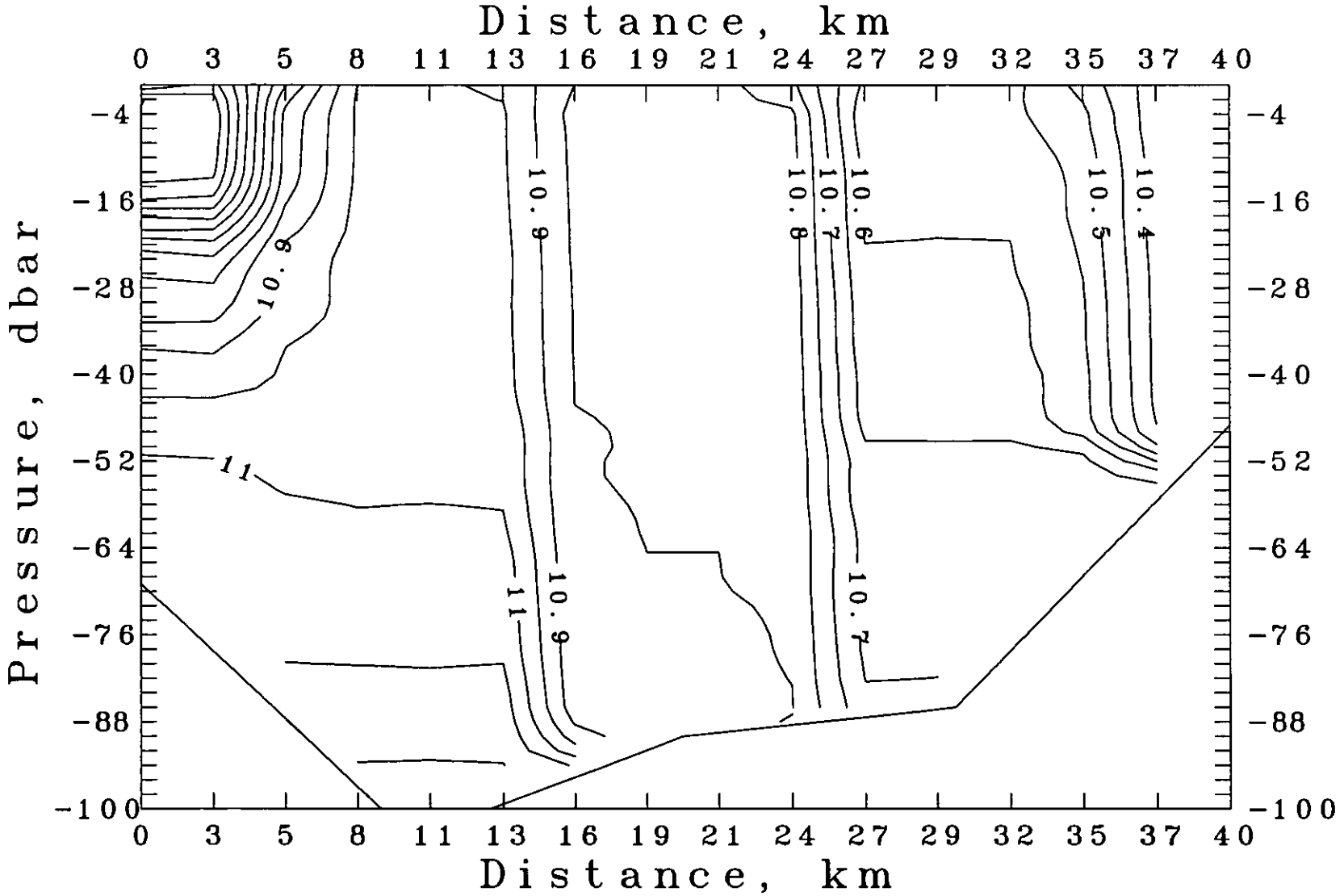
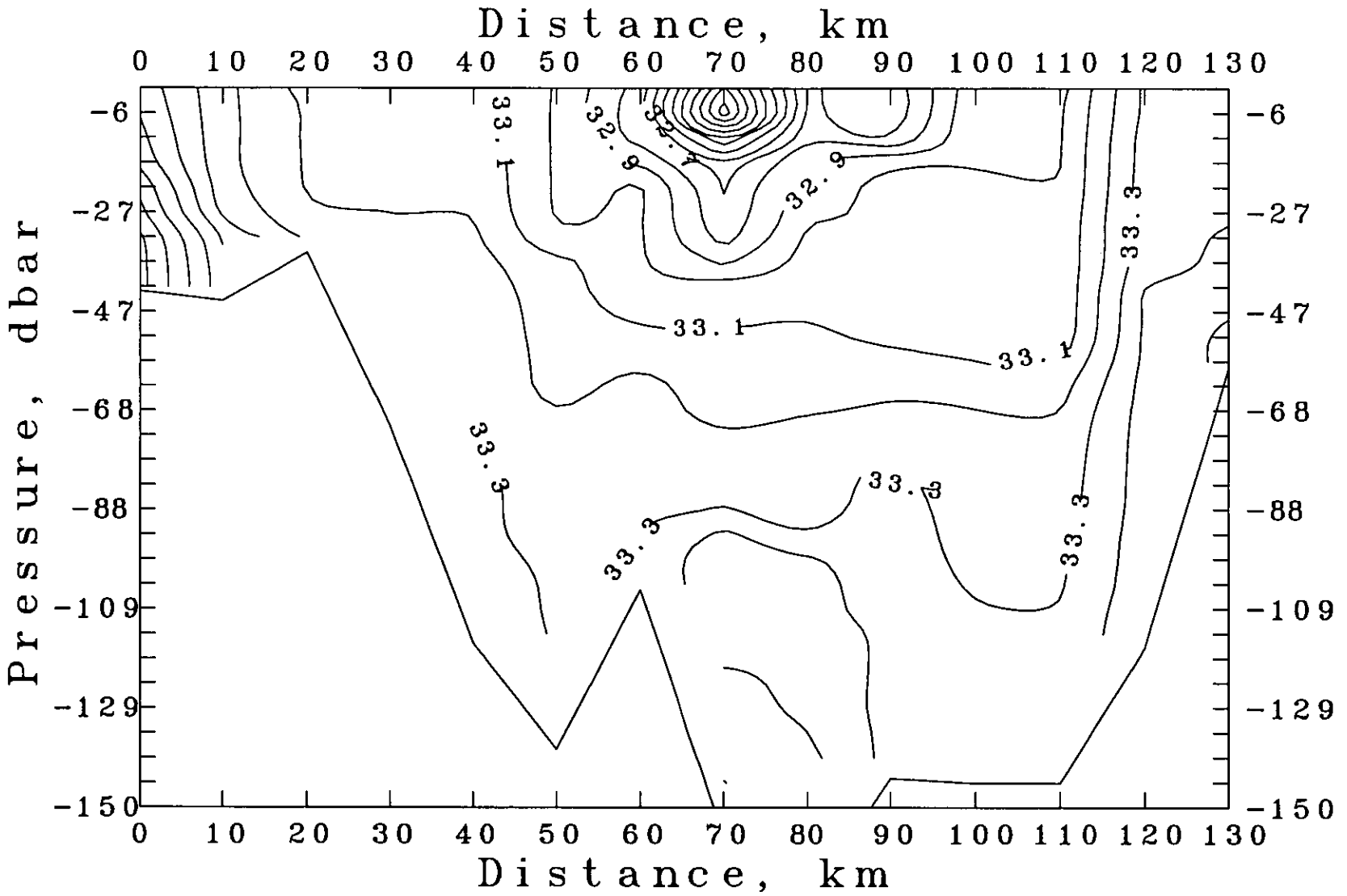


CH8691 Clyde Arc Salinity



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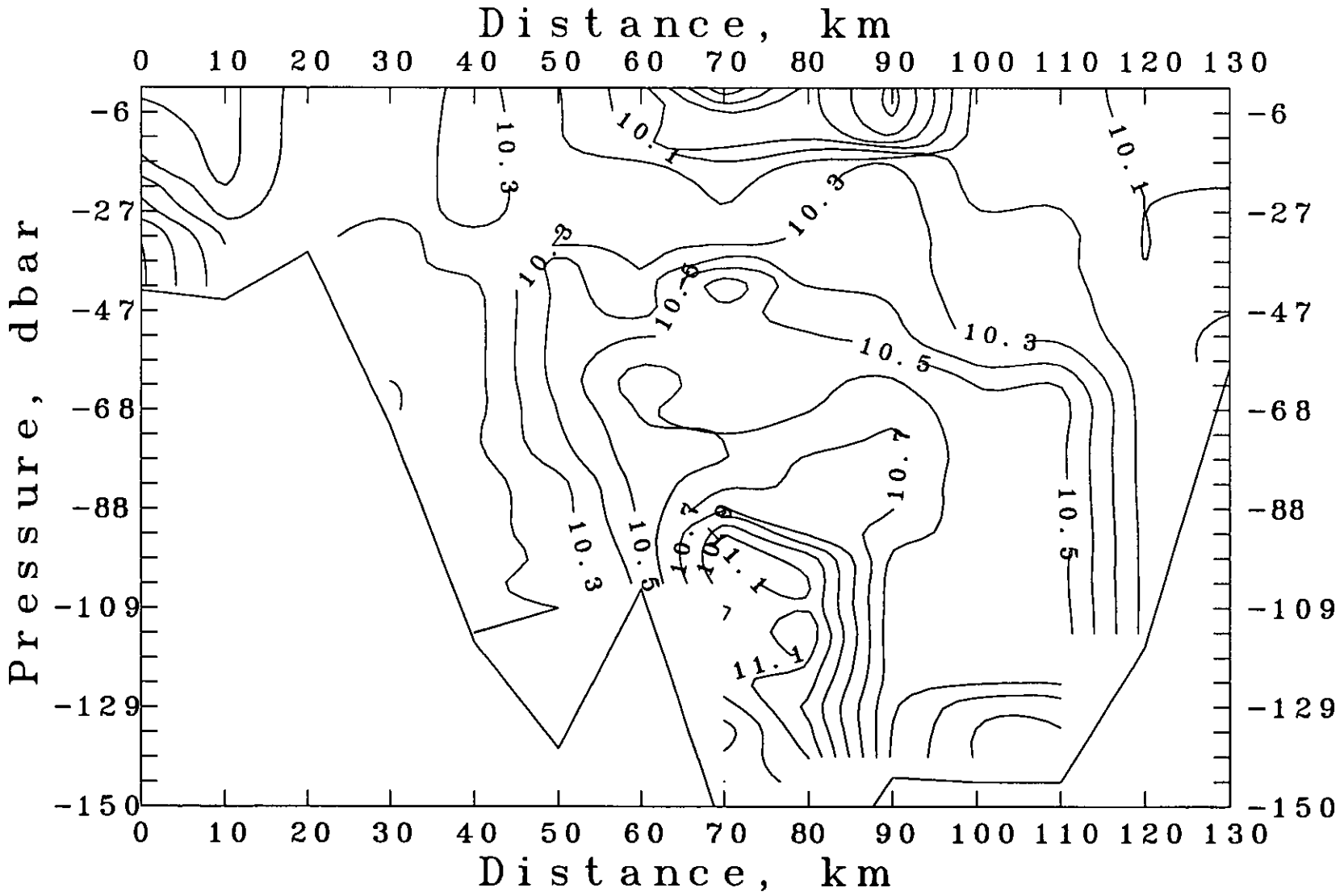

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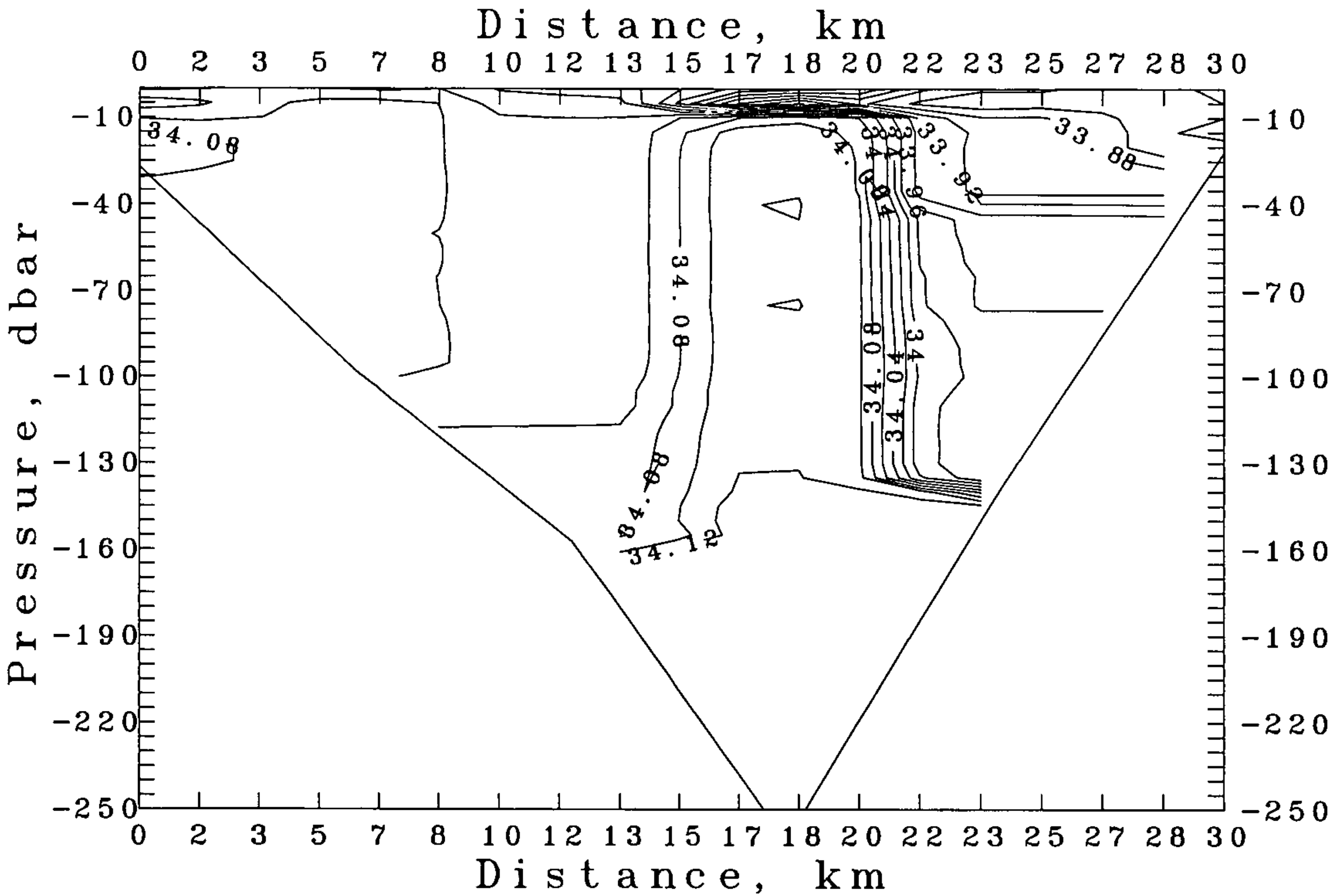

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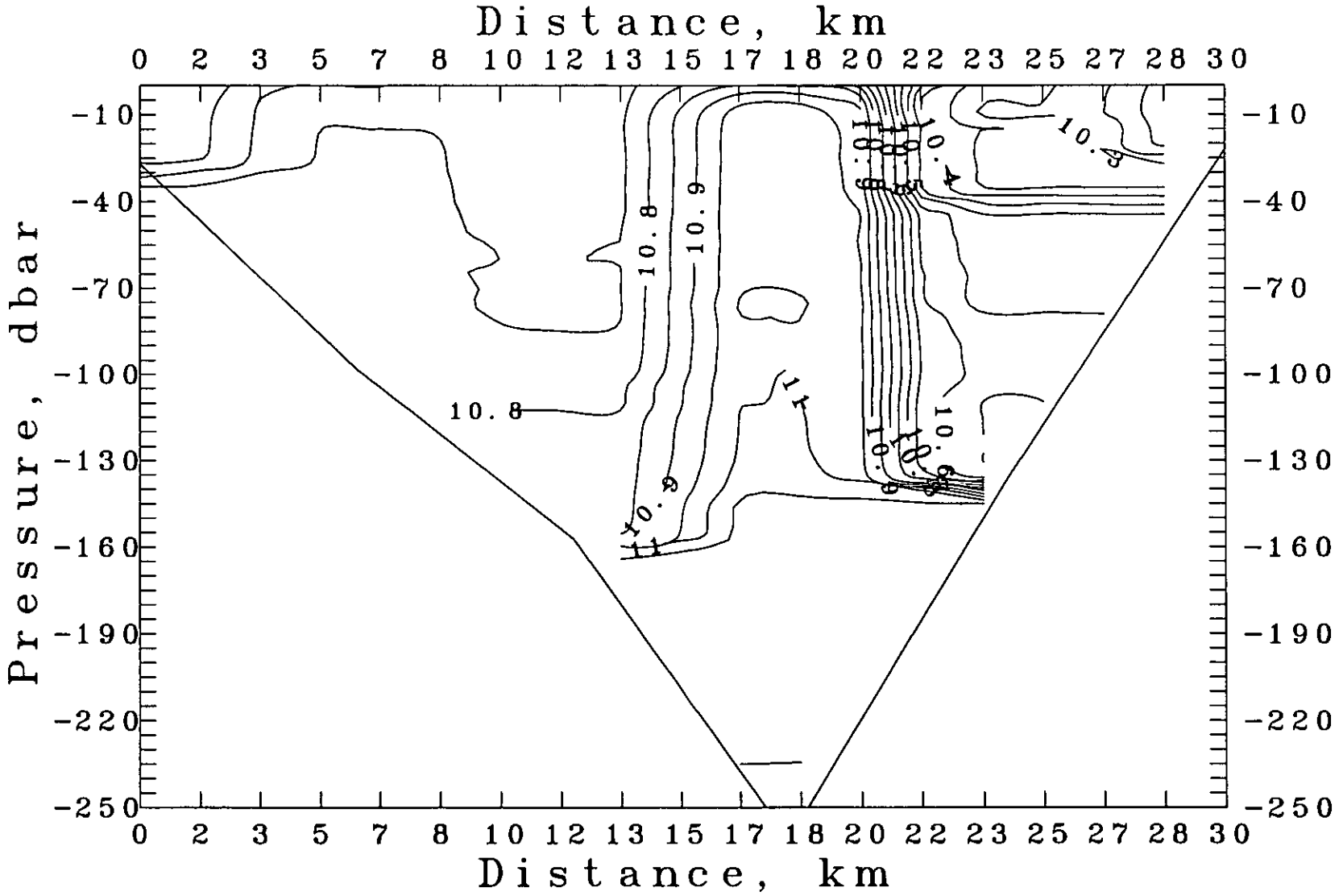

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