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# **Moored Current Meter Data From Belle Isle Bank, June - October, 1981**

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May 1986

## **Canadian Data Report of Hydrography and Ocean Sciences No. 45**



Pêches  
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Canada

## Canadian Data Report Of Hydrography and Ocean Sciences

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Regional and headquarters establishments of Ocean Science and Surveys ceased publication of their various report series as of December 1981. A complete listing of these publications is published in the *Canadian Journal of Fisheries and Aquatic Sciences*, Volume 39: Index to Publications 1982. The current series, which begins with report number 1, was initiated in January 1982.

### **Rapport statistique canadien sur l'hydrographie et les sciences océaniques**

Les rapports statistiques servent de véhicule pour la compilation et la diffusion des données sous une forme directement utilisable par les scientifiques et les techniciens. En général, les rapports contiennent des données brutes ou analysées, mais ne fournissent pas d'interprétation des données. Ces compilations sont préparées le plus souvent à l'appui de travaux liés aux programmes et intérêts du service des Sciences et levés océaniques (SLO) du ministère des Pêches et des Océans.

Les rapports statistiques ne sont pas destinés à une vaste distribution et leur contenu ne doit pas être mentionné dans une publication sans une autorisation écrite préalable de l'établissement auteur. Le titre exact paraît au-dessus du résumé de chaque rapport. Les rapports statistiques sont résumés dans la revue *Résumés des sciences halieutiques et aquatiques*, et ils sont classés dans l'index annuel des publications scientifiques et techniques du Ministère.

Les rapports statistiques sont produits à l'échelon régional, mais numérotés à l'échelon national. Les demandes de rapports seront satisfaites par l'établissement auteur dont le nom figure sur la couverture et la page du titre. Les rapports épuisés sont fournis contre rétribution par des agents commerciaux.

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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MOORED CURRENT METER DATA FROM  
BELLE ISLE BANK, JUNE - OCTOBER, 1981

by

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ABSTRACT

Lazier, J.R.N., Buckley, J.R., and Hackett, J.R. 1986. Moored current meter data from Belle Isle Bank, June-October, 1981. Can. Data Rep. Hydrogr. Ocean Sci. No. 45: iv + 67 p.

Data from 15 current meters, on 5 moorings arranged on Belle Isle Bank along 2 crossed 40-mile lines, are graphically presented as filtered time series of speed, direction, east-west component, north-south component, temperature and salinity and as progressive vector and "stick plots". The mean temperatures and salinities measured by the current meters are compared, and shown to agree, with three salinity-temperature-depth profiles obtained close to the mooring sites in 1984 and 1985.

RESUME

Lazier, J.R.N., Buckley, J.R., and Hackett, J.R. 1986. Moored current meter data from Belle Isle Bank, June-October, 1981. Can. Data Rep. Hydrogr. Ocean Sci. No. 45: iv + 67 p.

Les données provenant de quinze courantomètres, amarrés en cinq emplacements disposés suivant deux lignes croisées, chacune d'une longueur de quarante milles sur le banc de Belle-Isle, sont présentées graphiquement sous forme de séries chronologiques filtrées de vitesses, de directions, de composantes est-ouest, de composantes nord-sud, de températures et de salinités ainsi que sous forme de vecteurs progressifs et de graphiques en bâtonnets. On compare les températures et les salinités moyennes mesurées au moyen des courantomètres avec trois profils salinité-température-profondeur obtenus à proximité des emplacements d'amarrage en 1984 et 1985, et on constate qu'il y a concordance.

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## INTRODUCTION

The data presented in this report were obtained at five sites on Belle Isle Bank, Figs. 1 and 2, between June 21 and October 16, 1981. The experiment was designed to determine, with a current meter array, the length scales of the dominant eddies in the flow over the north-east Newfoundland Shelf. This information is important to the design of unaliased biological sampling arrays.

The original array had two lines crossed at right angles with four moorings in each line. The moorings were at variable distances to provide a large selection of spacings over which correlations could be calculated. Each mooring had three current meters, one close to the bottom, one nominally at 100 m and one nominally at 30 m. Due to an error in soundings, the upper two meters ended up 15-20 m shallower than expected. The nominal depths are shown in the plot legends, and the statistics from the pressure transducers are listed in the tables accompanying each record.

Two of the moorings, 3 and 4, were supplied by the Bedford Institute. The other five were Petro Canada's. All placements and recoveries of the moorings were done by Dobrocky Seatech on contract to Petro Canada. Complete records were recovered from all meters on moorings 2, 3, 4, 6 and 7. Moorings 1 and 5 were not recovered; however, the upper meter on mooring 5 drifted to Ireland and was recovered there. The mean velocity measured at this meter is shown on Fig. 2, and the mean temperature and salinity are plotted on Figs. 3 and 4, but the time series plots are not presented as they were published by Dobrocky Seatech (1984).

The positions of three salinity and temperature versus depth profiles obtained with Batfish in 1984 and 1985 are shown in Fig. 2. The profiles are plotted in Fig. 3, along with the average temperatures and salinities obtained from the fifteen current meters. The same information is plotted in Fig. 4 in a temperature versus salinity plot. Considering that the vertical profiles were obtained three and four years after the current meter measurements, the agreement between the two sets of data is good. The temperature and salinity profiles show variations of 0.5 in salinity and 1.0°C in temperature between stations. Some of this is due to inter-annual differences, but some is also probably due to spatial differences that are not properly mapped yet. The near surface temperatures obtained with the current meters are all higher than the Batfish temperatures because the latter were obtained during the first two weeks of July before the water warmed up in summer, but the bulk of the current meter records were obtained during the warmer months.

After checking editing and despiking, the current meter data were filtered. For the time series and progressive vector plots a low pass filter with half power attenuation at 24 hours was applied. The stick plots were constructed from data which had been smoothed with a low pass filter having 50% cut off at 144 hours.

REFERENCES

Dobrocky Seatech. Data Report RCM4 Tape 3703/5, 1981 Southern Cross Program.  
Petro Canada Inc., July 1984.

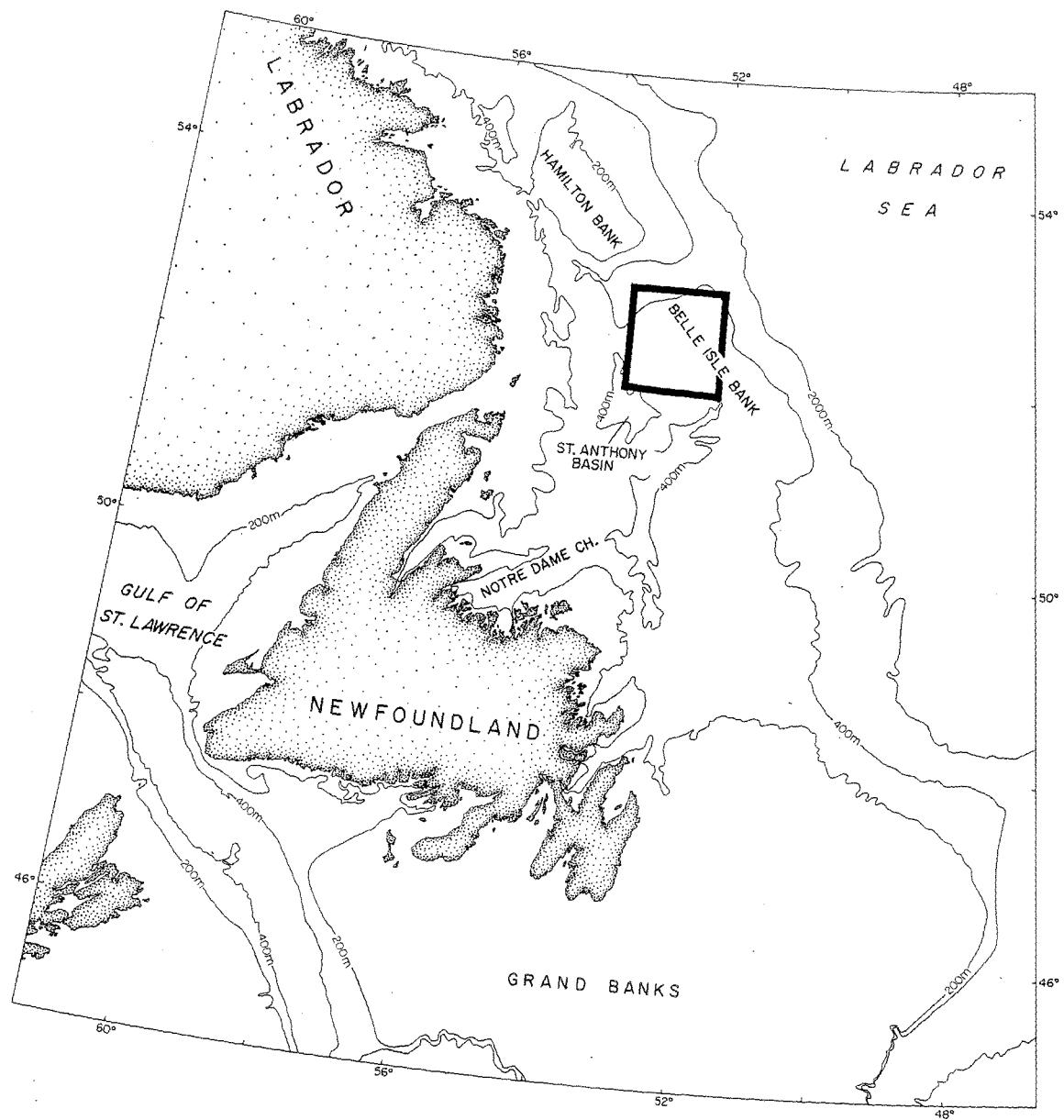


FIG. 1

Map of region near Belle Isle Bank. The study area lies within the solid rectangular boundary.

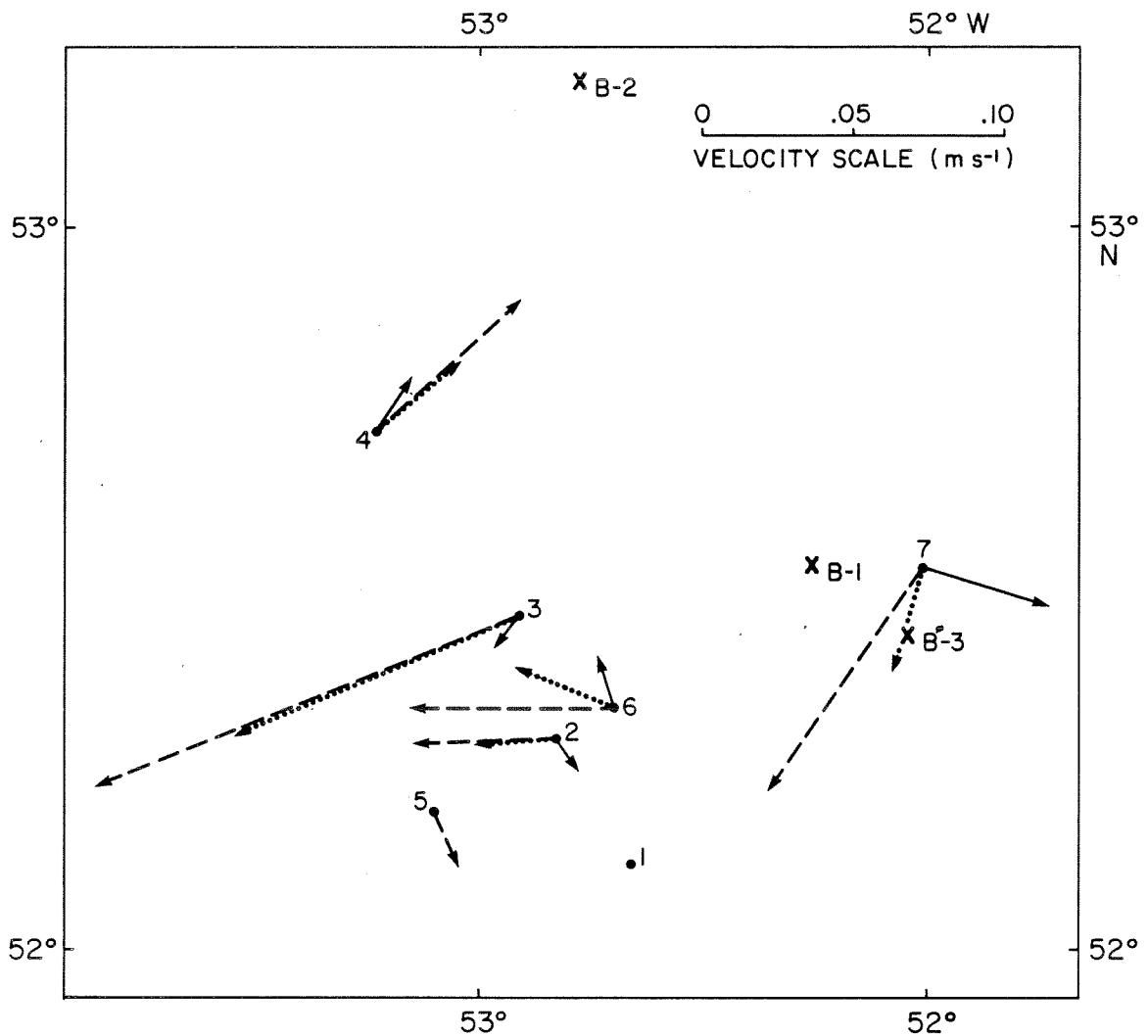


Fig. 2 Positions of the seven moorings with mean velocity vectors; dashed for near surface, dotted for midwater and solid for near bottom. The positions of three Batfish profiles are also shown. Profile B-1 was obtained on July 1, 1984, B-2 on July 9, 1985, and B-3 on July 11, 1985.

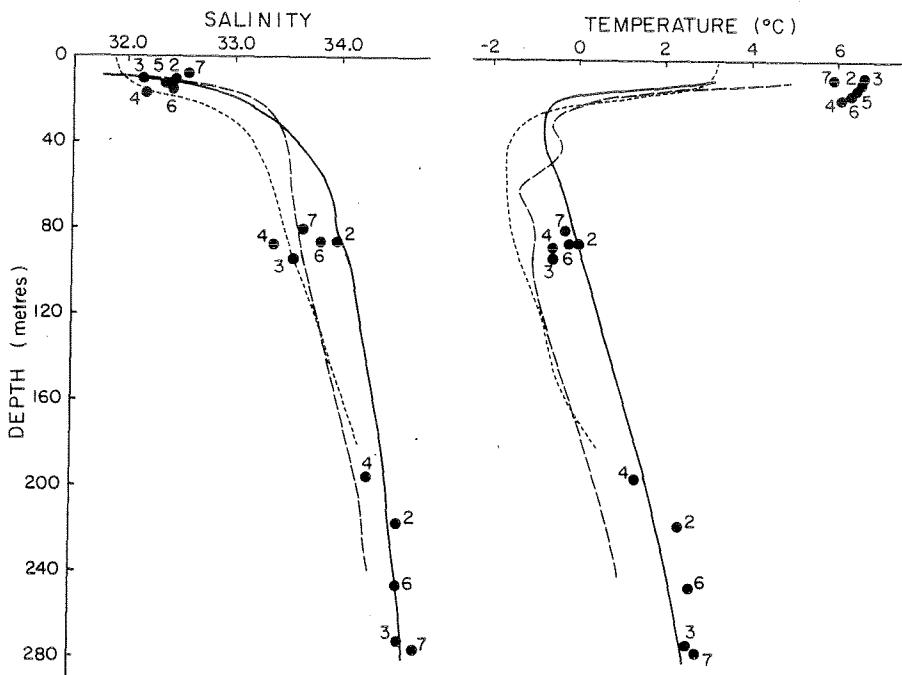


Fig. 3 Profiles of temperature and salinity versus depth obtained at positions B-1 (short dash), B-2 (solid) and B-3 (dash), and the average temperature and salinities measured by the sixteen recovered current meters. The numbers are the mooring numbers.

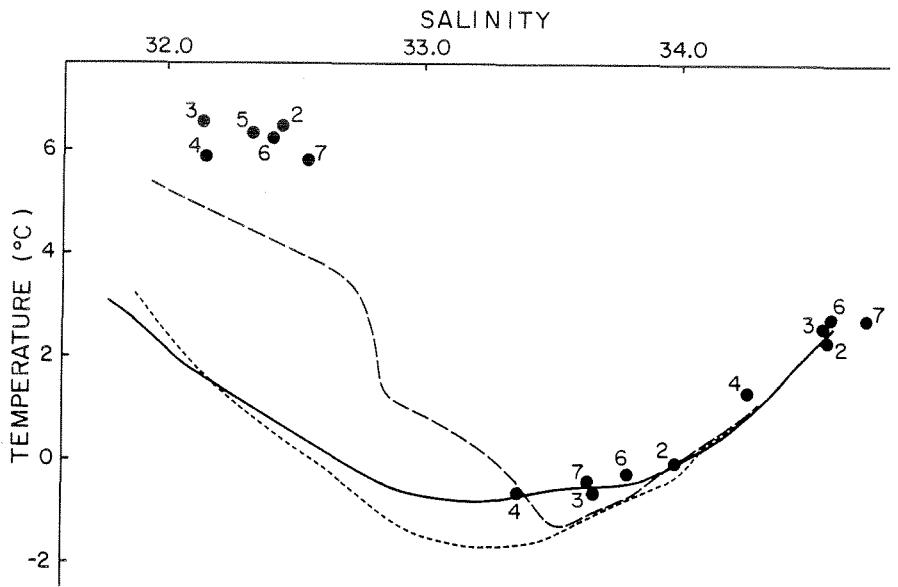


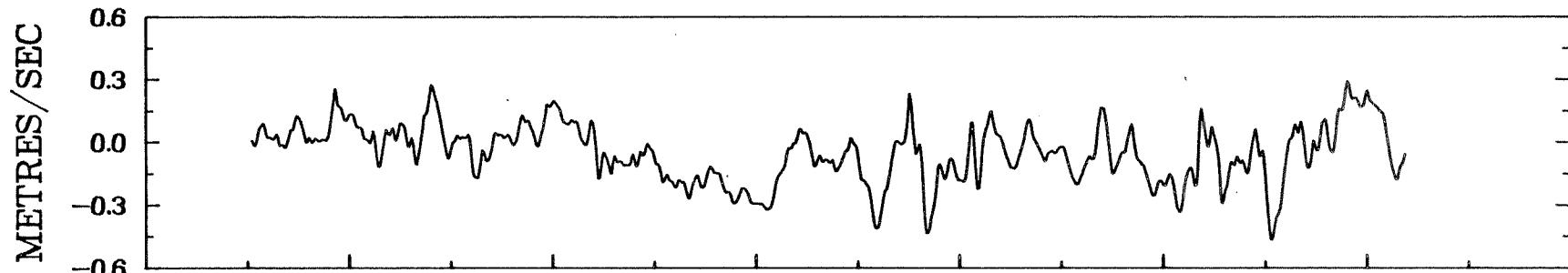
Fig. 4 Temperature versus salinity curves obtained at positions B-1 (short dash), B-2 (solid) and B-3 (dash), and the average temperatures and salinities measured by the sixteen recovered current meters. The numbers, as in Fig. 3, are the mooring numbers.\*

## Mooring 2

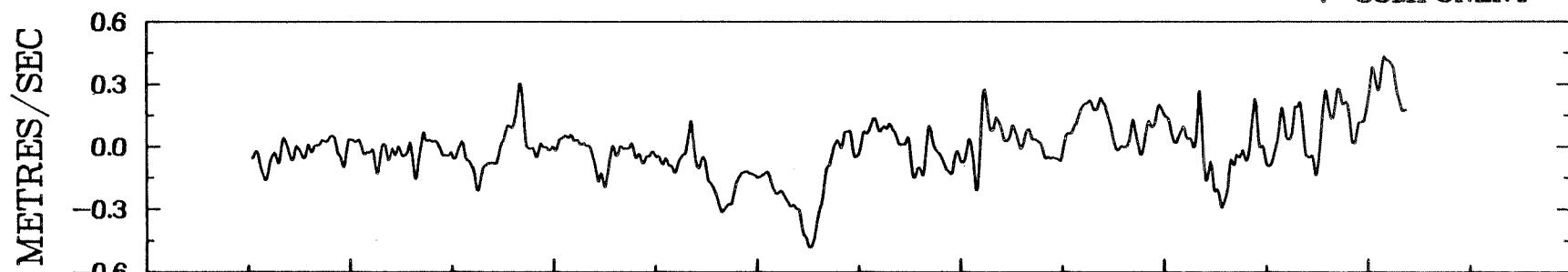
Nominal Depth            30 m  
 Bottom Depth            227 m  
 Latitude                52° 17.52'N  
 Longitude               52° 49.98'W  
 Duration (days)        230.5

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	7.1	13.6	10.4	0.6
Temperature	°C	2.25	9.65	6.54	1.84
Salinity		31.64	33.26	32.44	0.34
N-S Component	ms <sup>-1</sup>	-0.48	0.43	-0.0027	0.14
E-W Component	ms <sup>-1</sup>	-0.47	0.29	-0.047	0.14

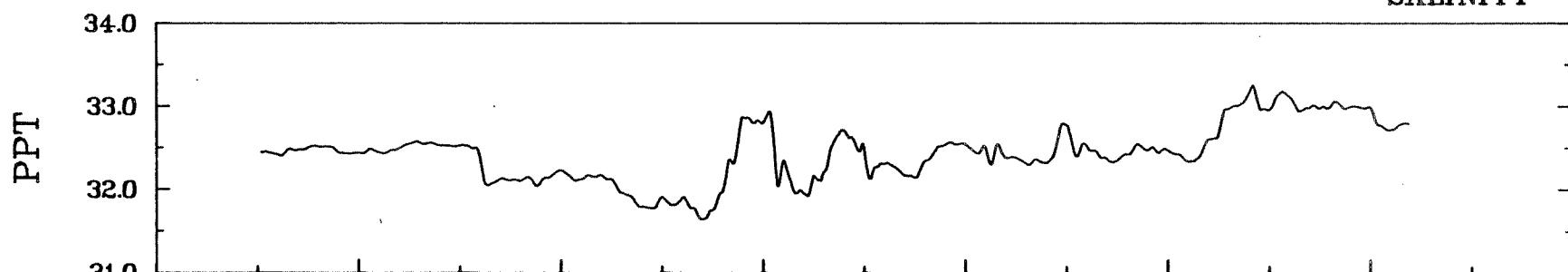
U-COMPONENT



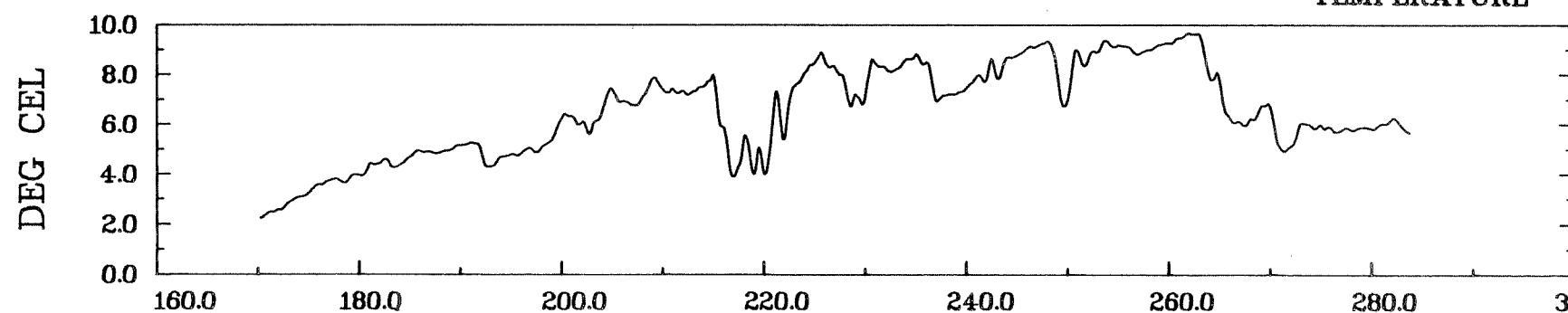
V-COMPONENT

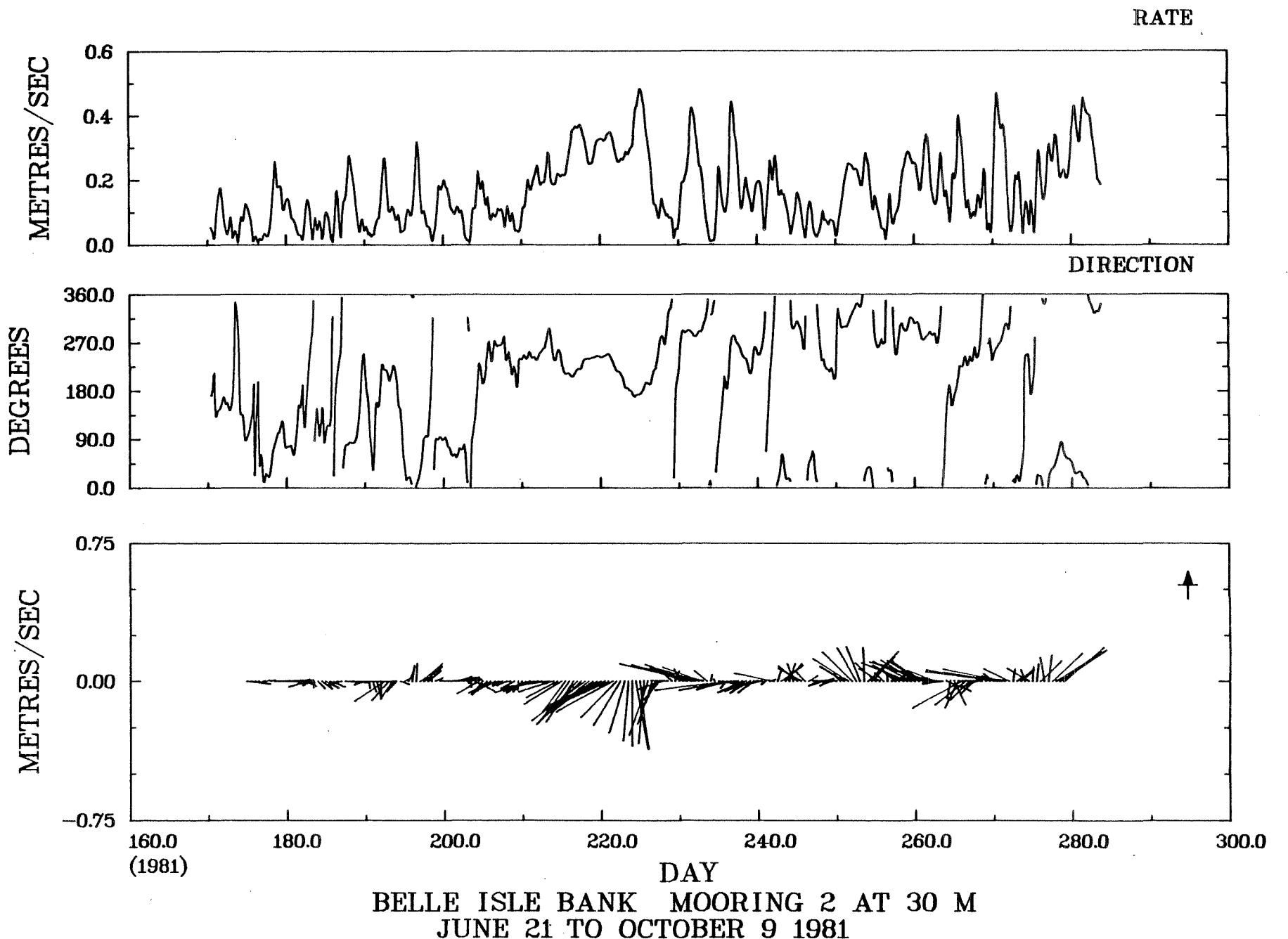


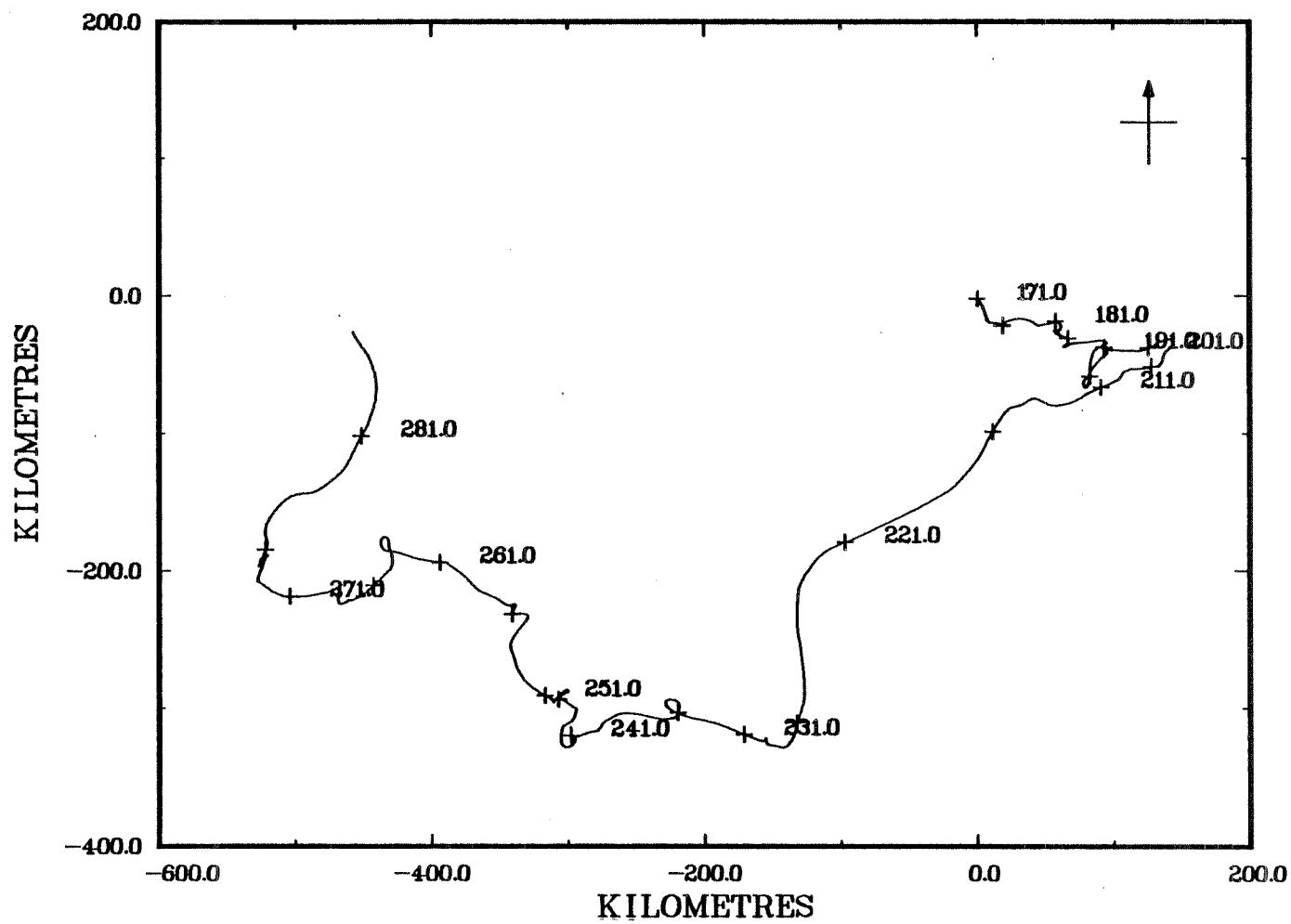
SALINITY



TEMPERATURE





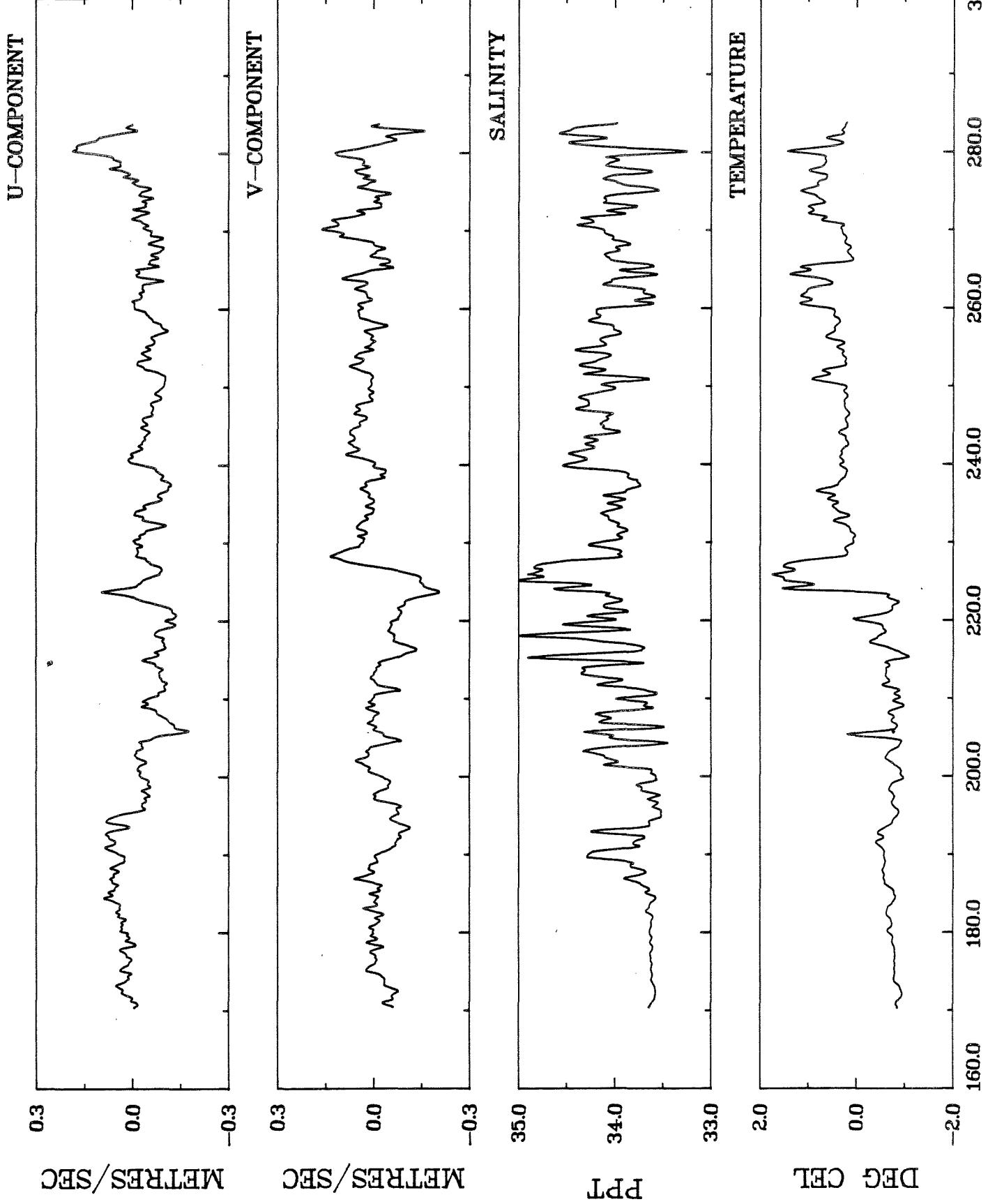


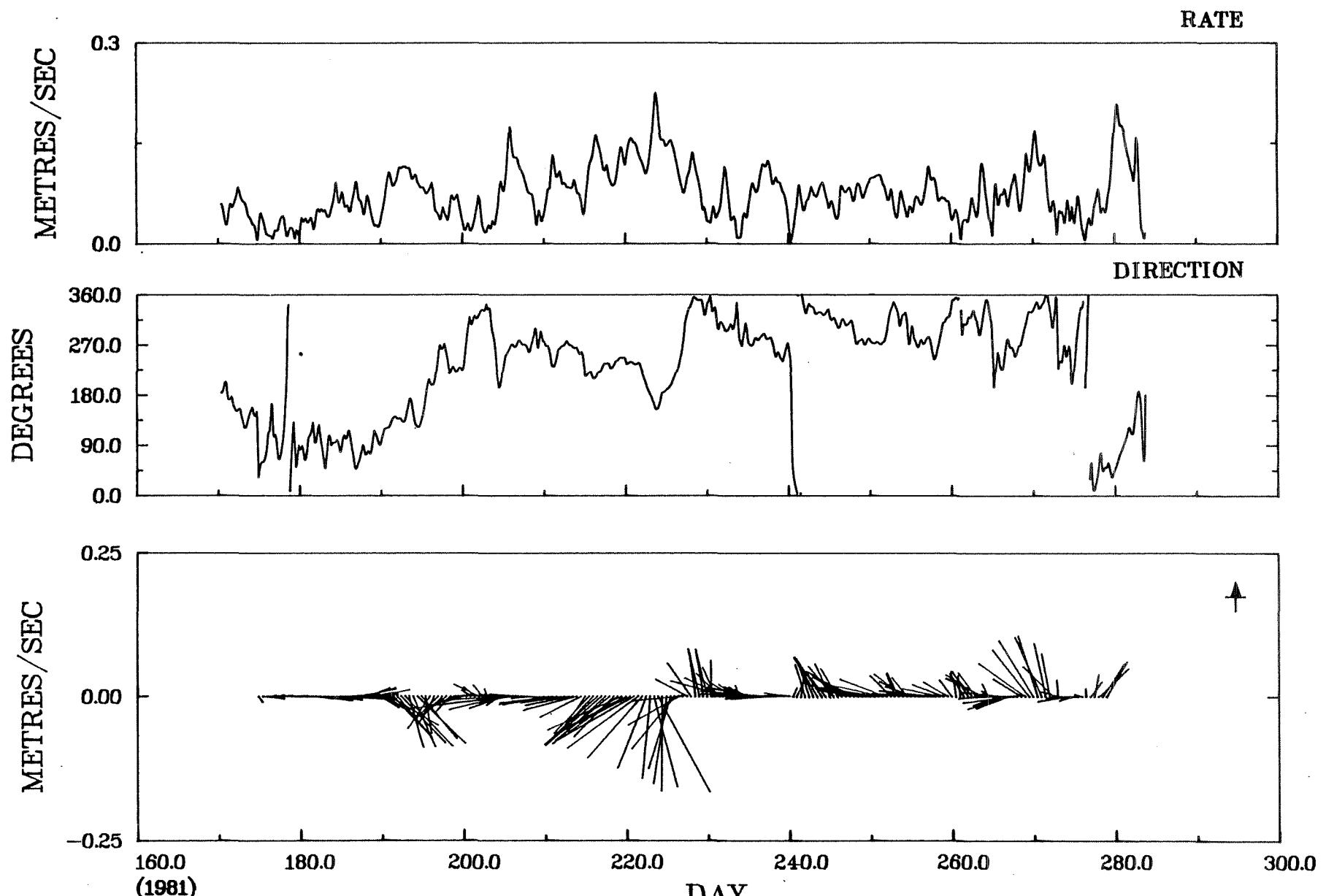
BELLE ISLE BANK MOORING 2 AT 30 M  
JUNE 21 TO OCTOBER 9 1981

## Mooring 2

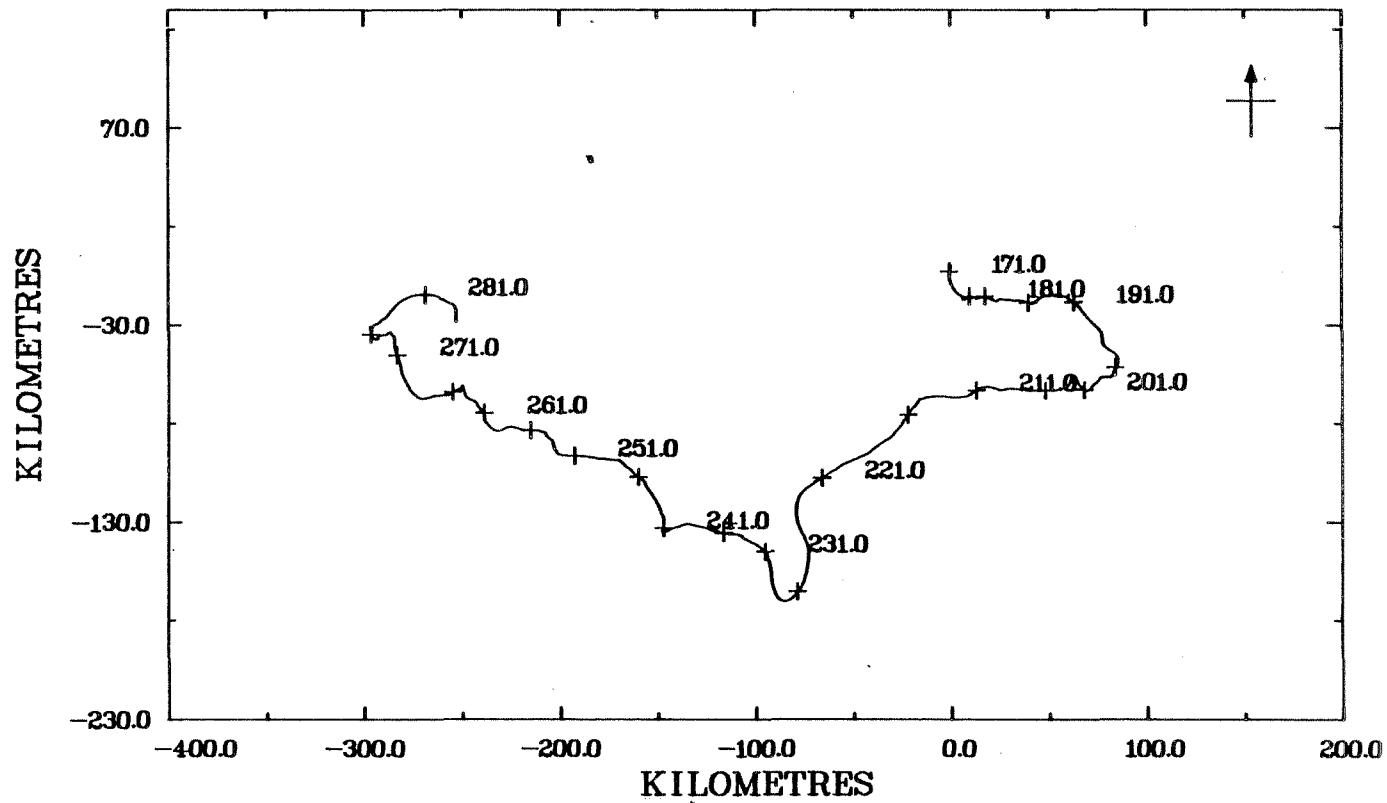
Nominal Depth            100 m  
 Bottom Depth            227 m  
 Latitude                52° 17.52'N  
 Longitude               52° 49.98'W  
 Duration (days)        230.5

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	83.5	125.3	87.5	7.5
Temperature	°C	-1.09	1.74	-0.046	0.69
Salinity		33.25	35.07	33.98	0.31
N-S Component	ms <sup>-1</sup>	-0.20	0.16	-0.0028	0.06
E-W Component	ms <sup>-1</sup>	-0.18	0.19	-0.026	0.006





BELLE ISLE BANK MOORING 2 AT 100 M  
JUNE 21 TO OCTOBER 9 1981



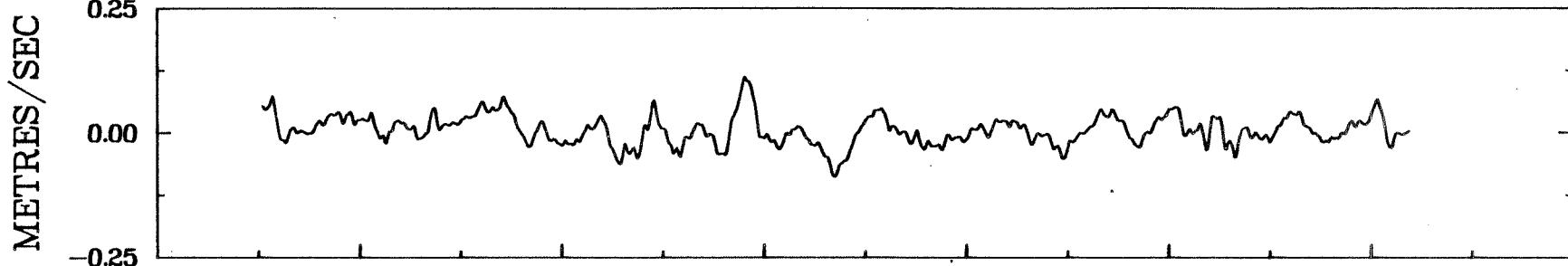
BELLE ISLE BANK MOORING 2 AT 100 M  
JUNE 21 TO OCTOBER 9 1981

## Mooring 2

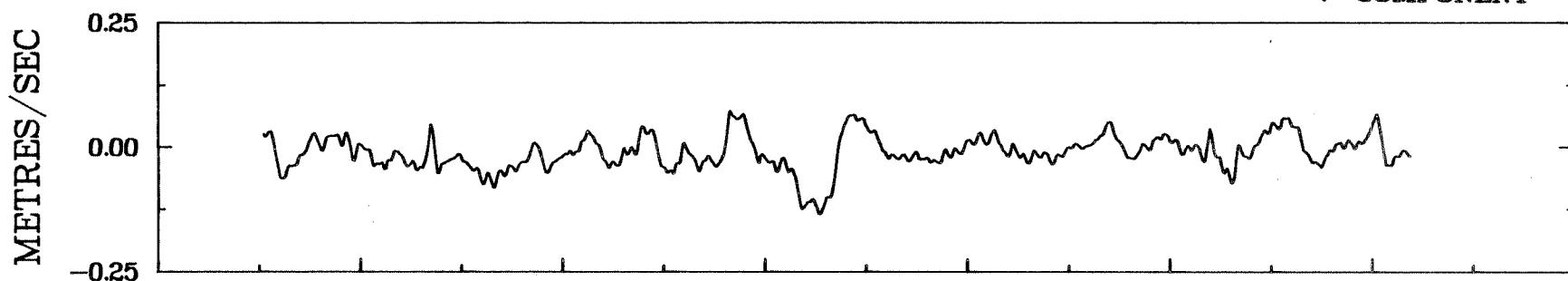
Nominal Depth            217 m  
 Bottom Depth            227 m  
 Latitude                52° 17.52' N  
 Longitude               52° 49.98' W  
 Duration (days)        230.5

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	216.2	216.5	216.4	0.17
Temperature	°C	1.75	2.81	2.41	0.25
Salinity		34.39	34.68	34.56	0.062
N-S Component	ms <sup>-1</sup>	-0.14	0.074	-0.0098	0.035
E-W Component	ms <sup>-1</sup>	-0.088	0.11	0.0064	0.029

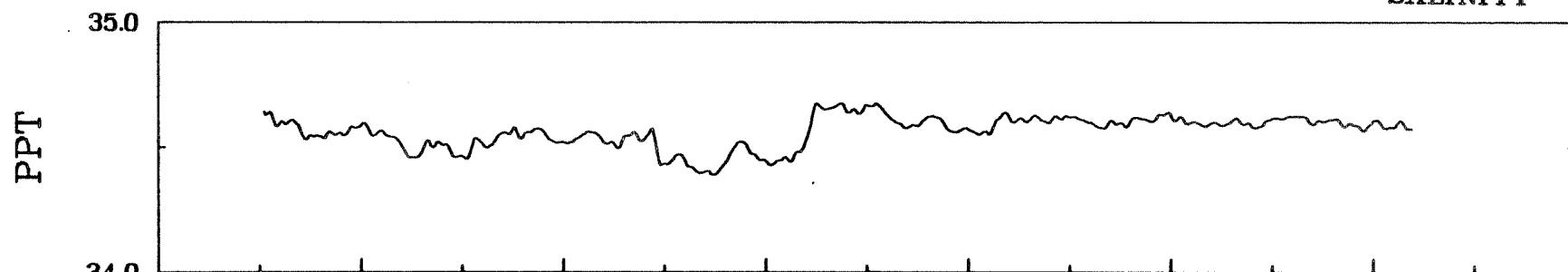
U-COMPONENT



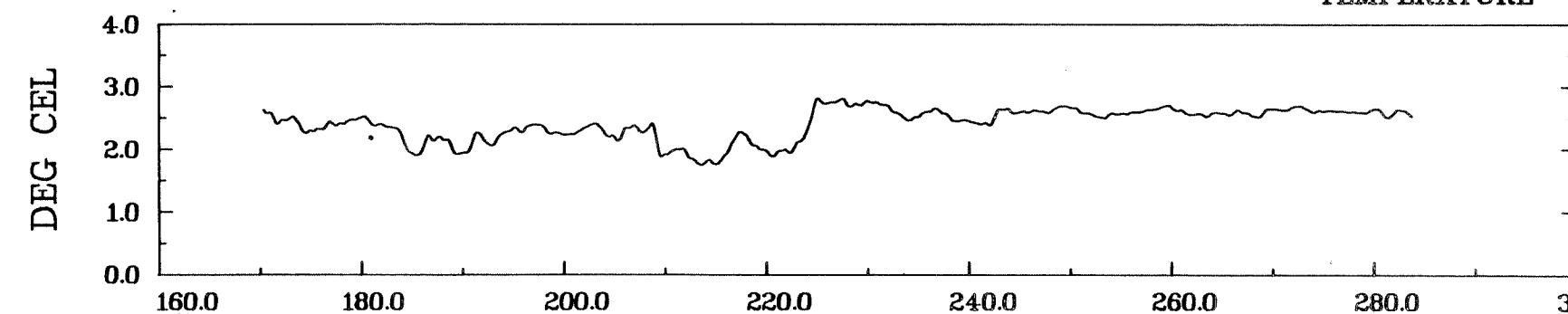
V-COMPONENT



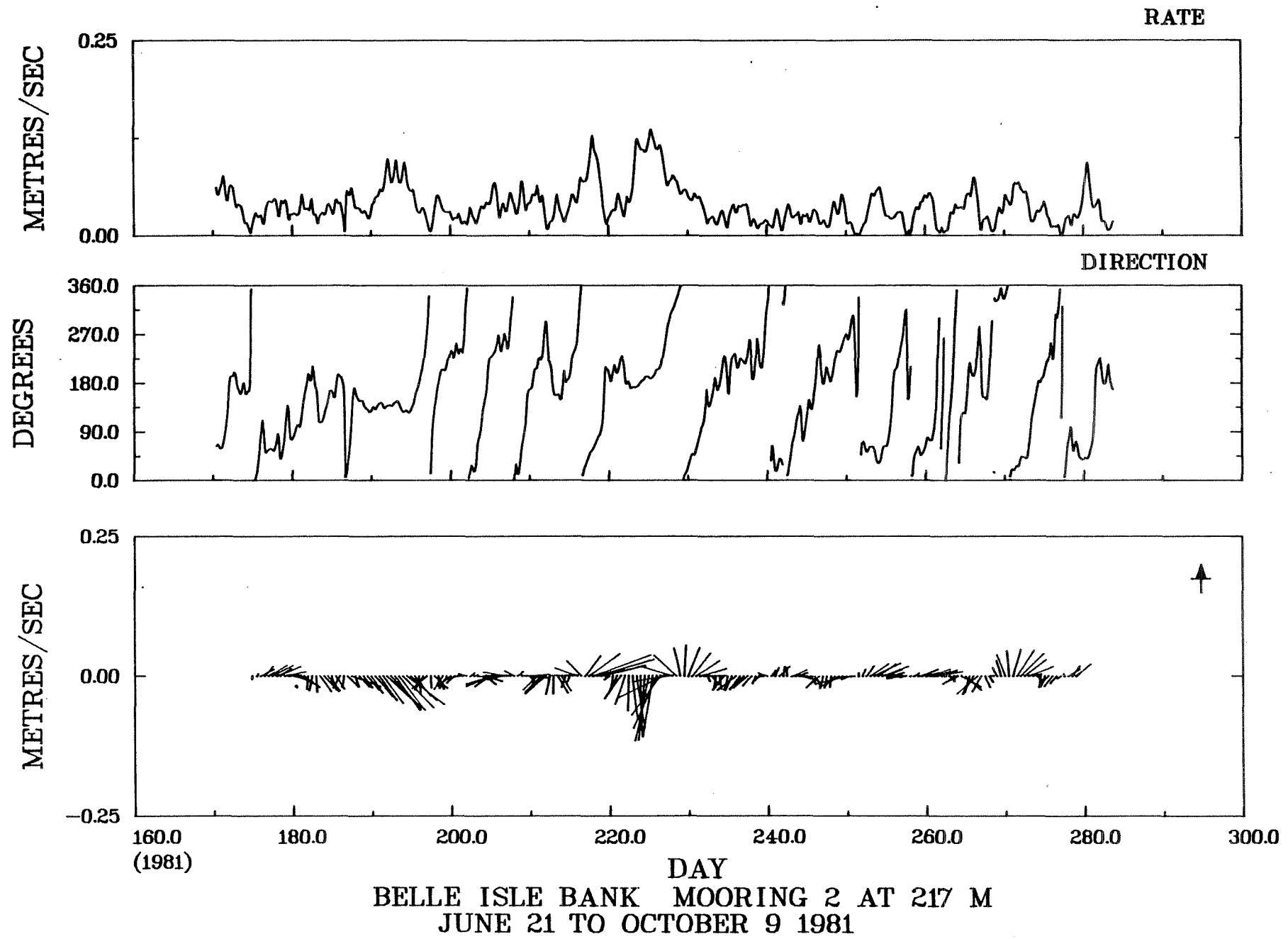
SALINITY

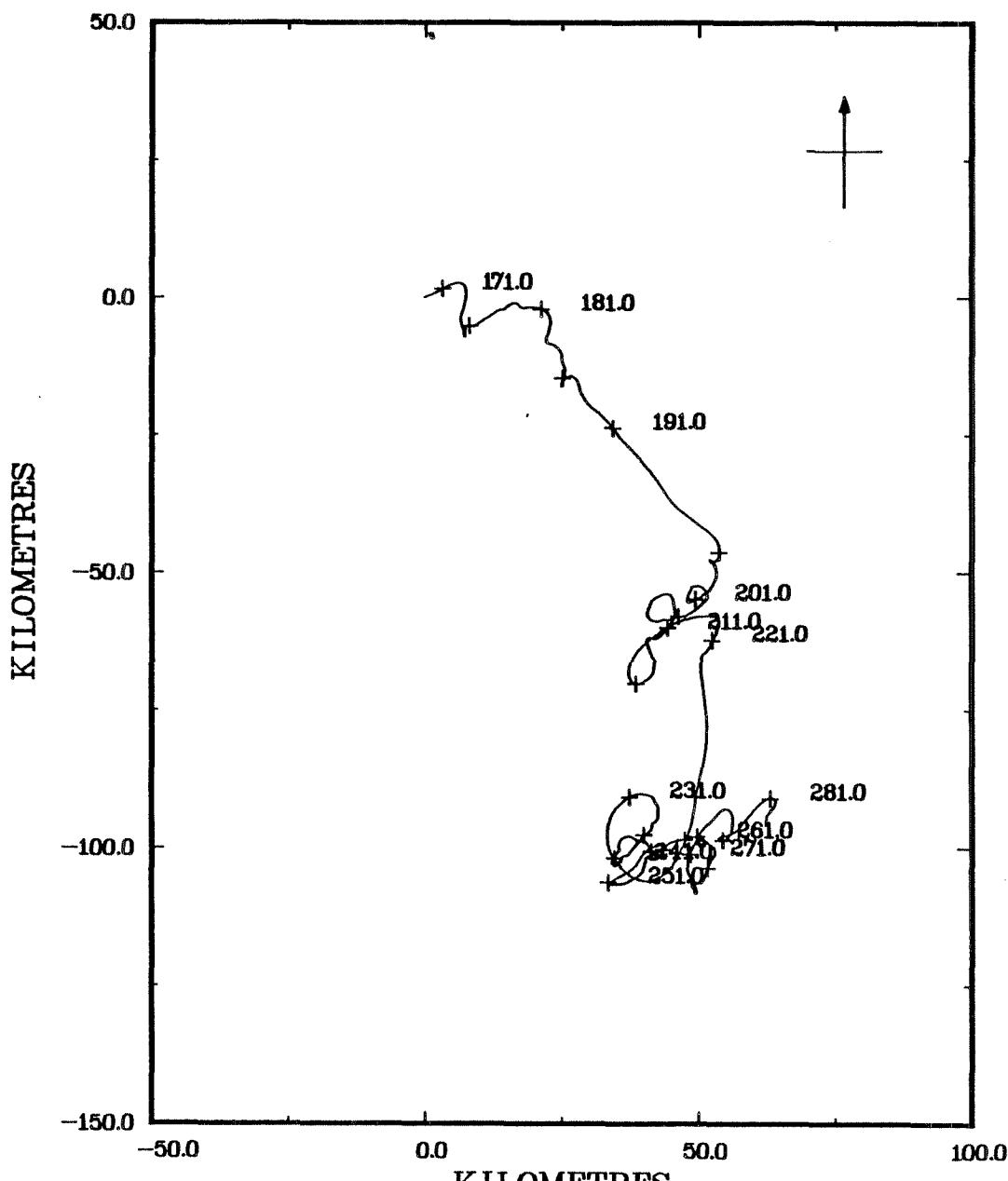


TEMPERATURE



L1



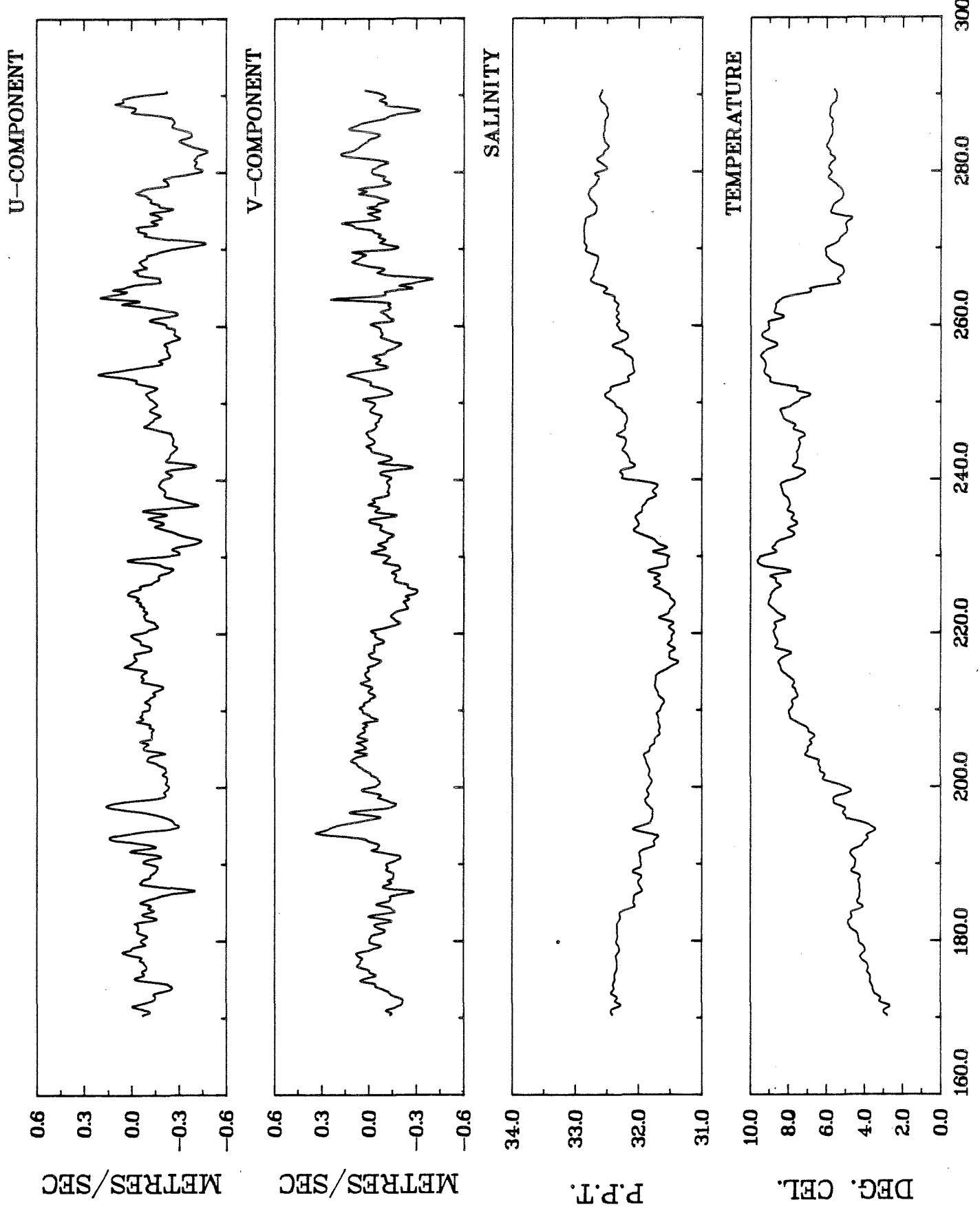


BELLE ISLE BANK MOORING 2 AT 217 M  
JUNE 21 TO OCTOBER 9 1981

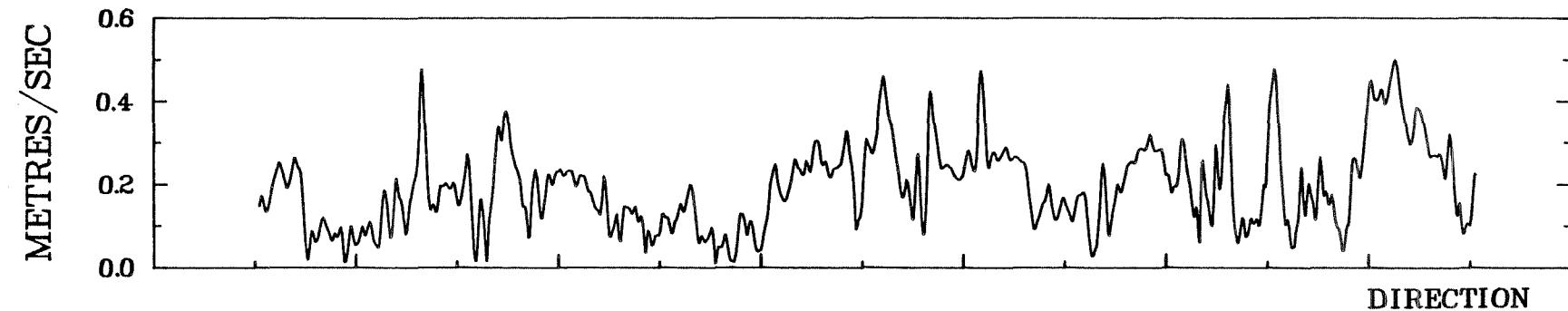
## Mooring 3

Nominal Depth            30 m  
 Bottom Depth            292 m  
 Latitude                52° 27.78' N  
 Longitude               52° 54.84' W  
 Duration (days)        244.2

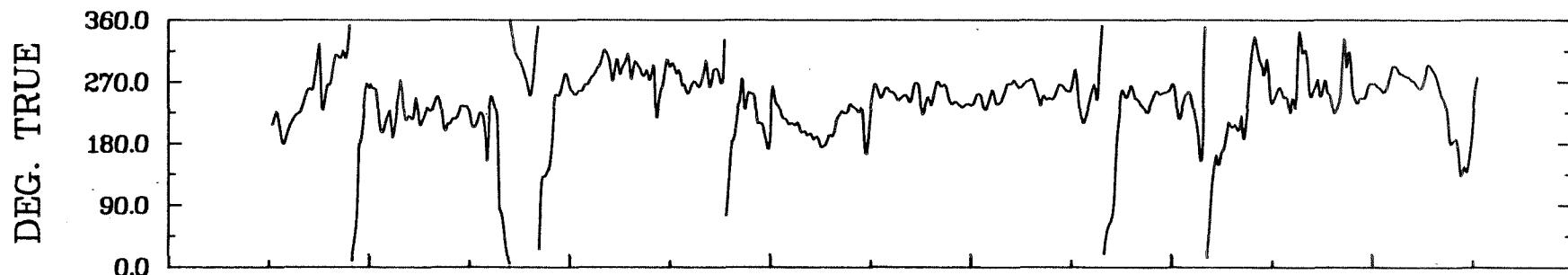
		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	5.6	9.4	7.3	6.9
Temperature	°C	2.67	9.64	6.58	1.81
Salinity		31.37	32.87	32.13	0.40
N-S Component	ms <sup>-1</sup>	-0.40	0.34	-0.056	0.10
E-W Component	ms <sup>-1</sup>	-0.48	0.21	-0.14	0.12



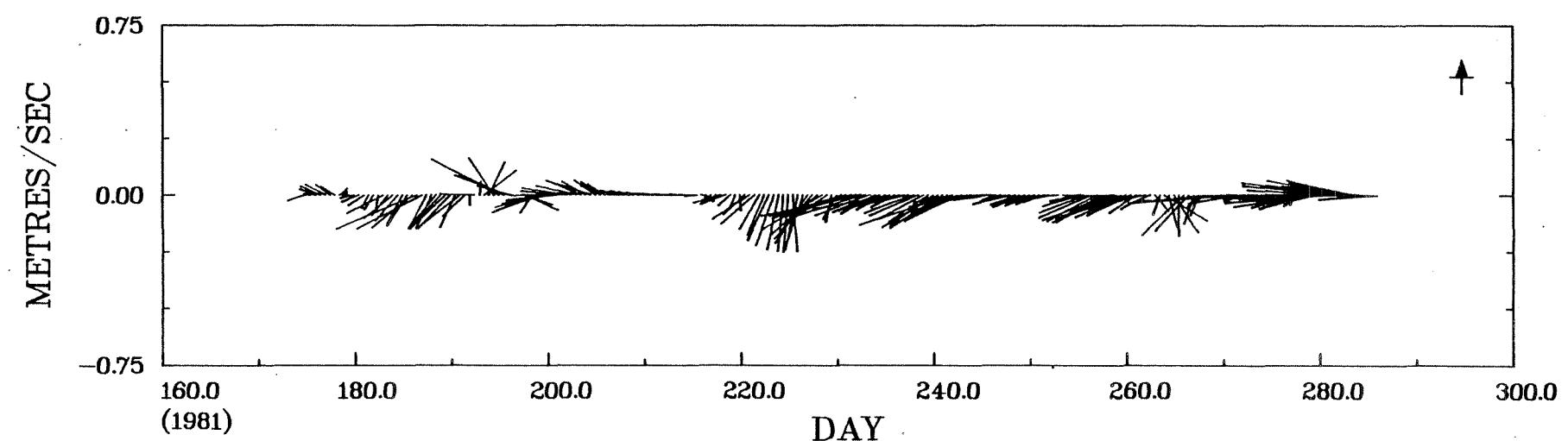
RATE



DIRECTION

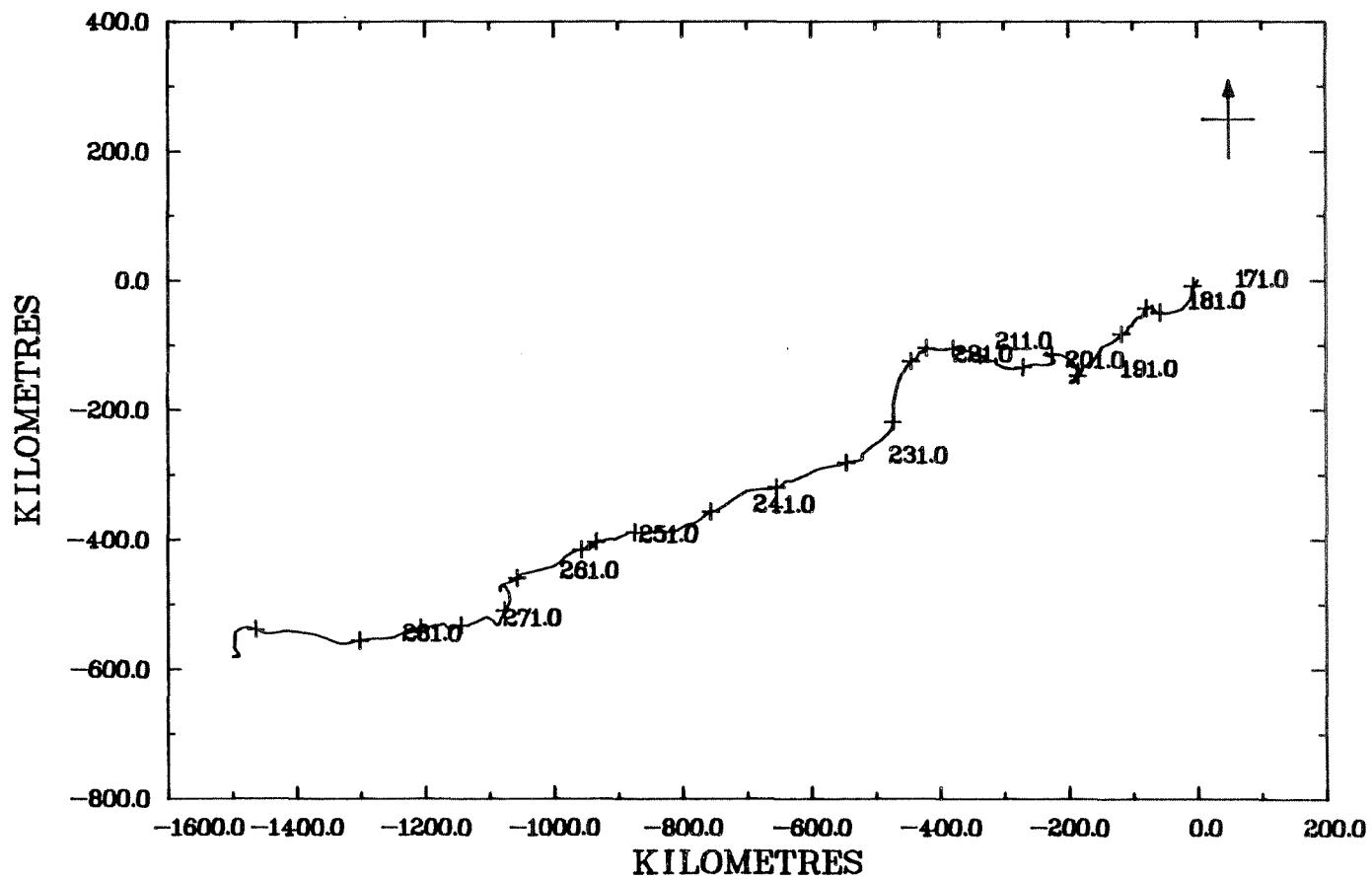


22



DAY

BELLE ISLE BANK MOORING 3 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

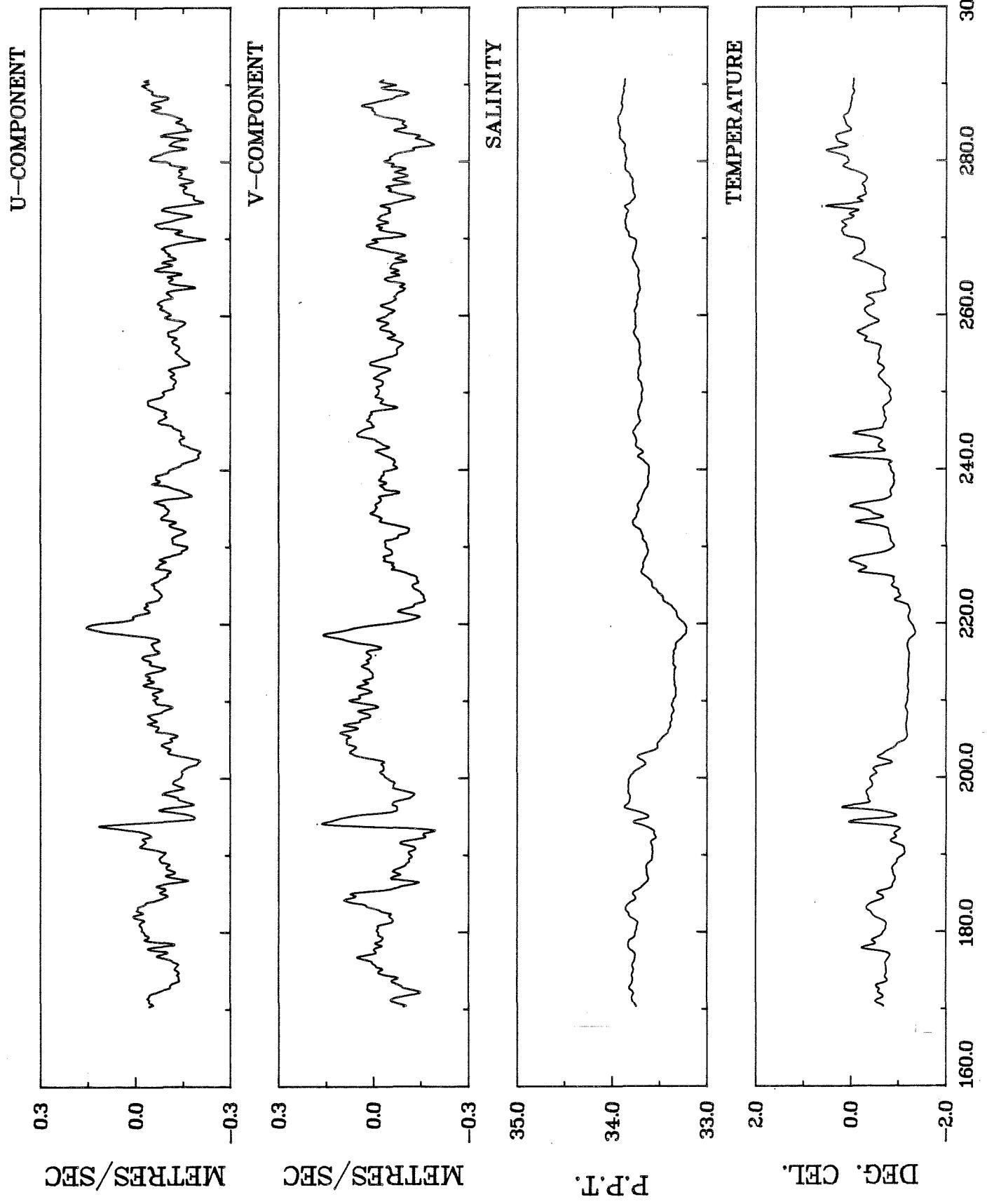


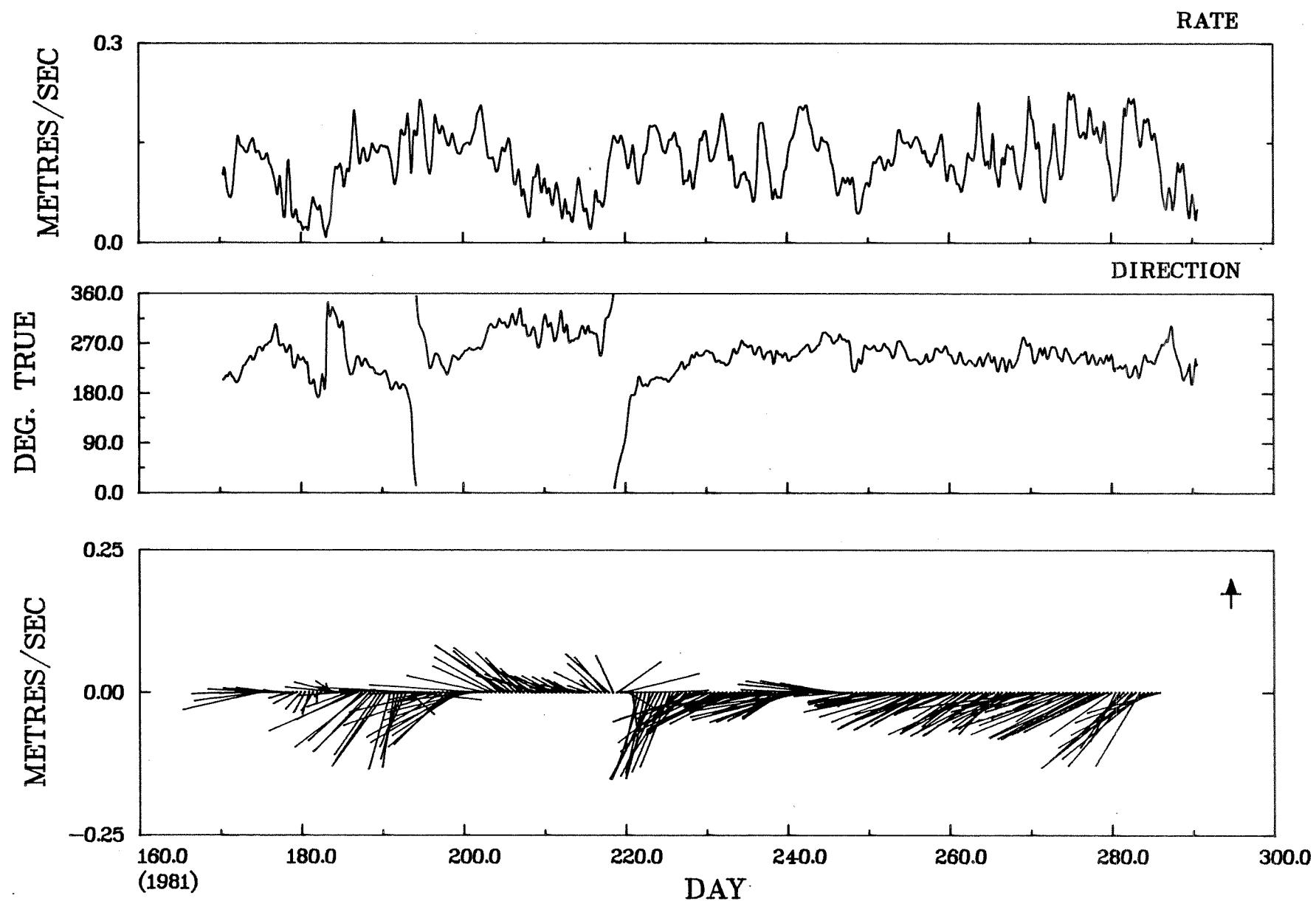
BELLE ISLE BANK MOORING 3 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 3

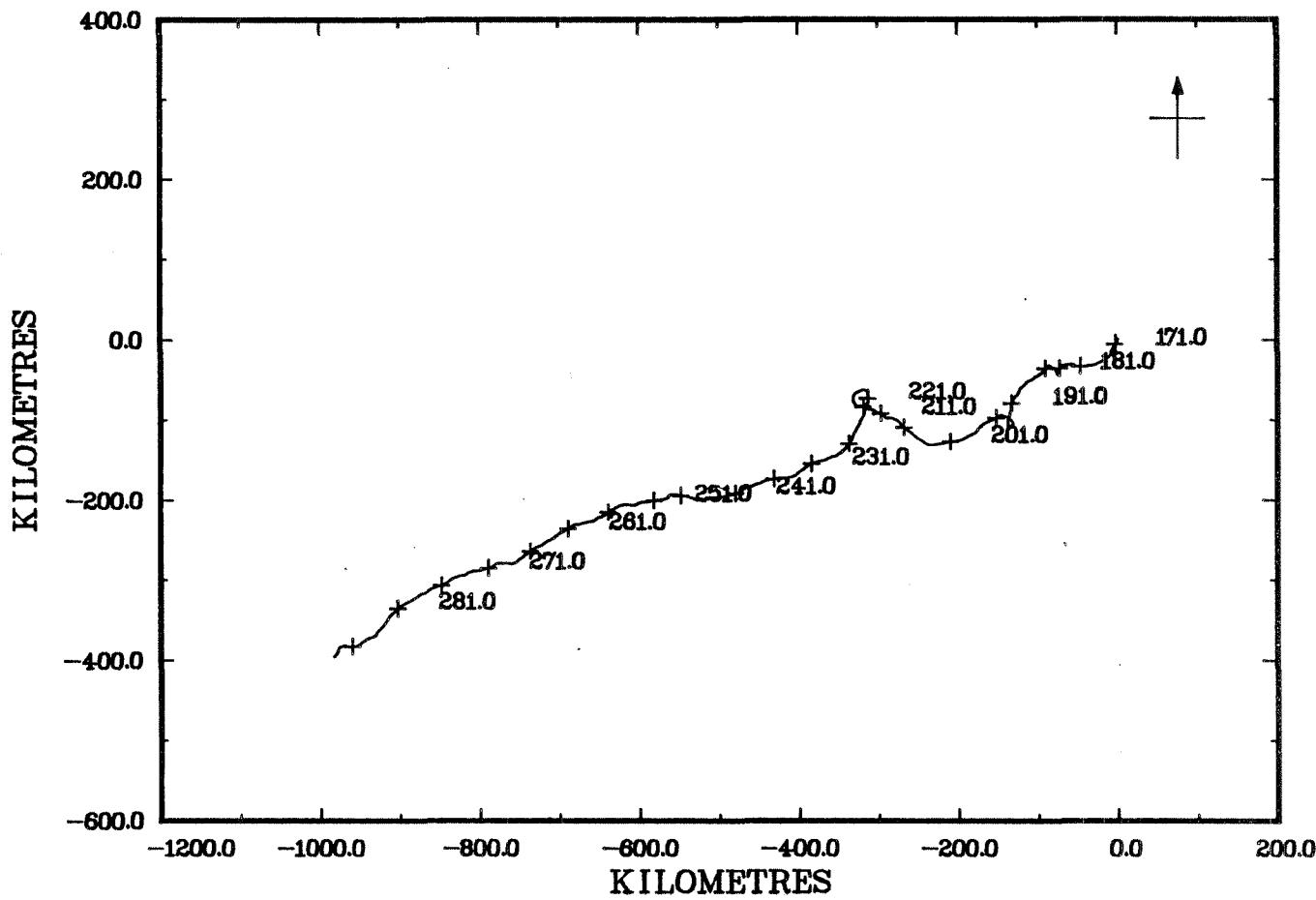
Nominal Depth	100 m
Bottom Depth	292 m
Latitude	52° 27.78'N
Longitude	52° 54.84'W
Duration (days)	244.2

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	91.6	95.4	92.4	.07
Temperature	°C	-1.36	1.22	-0.58	0.45
Salinity		33.16	34.04	33.67	0.17
N-S Component	ms <sup>-1</sup>	-0.19	0.16	-0.038	0.061
E-W Component	ms <sup>-1</sup>	-0.22	0.15	-0.094	0.055





BELLE ISLE BANK MOORING 3 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

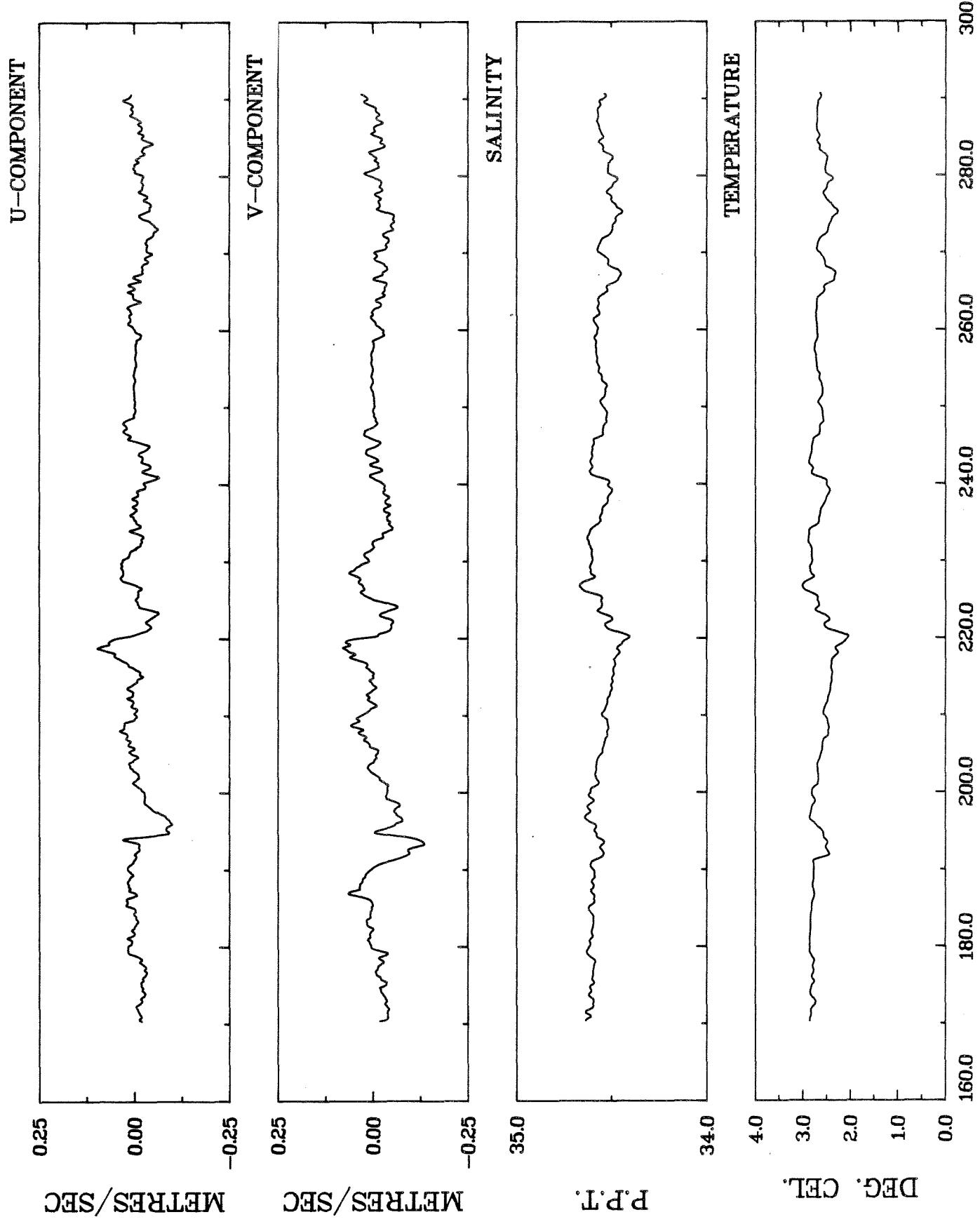


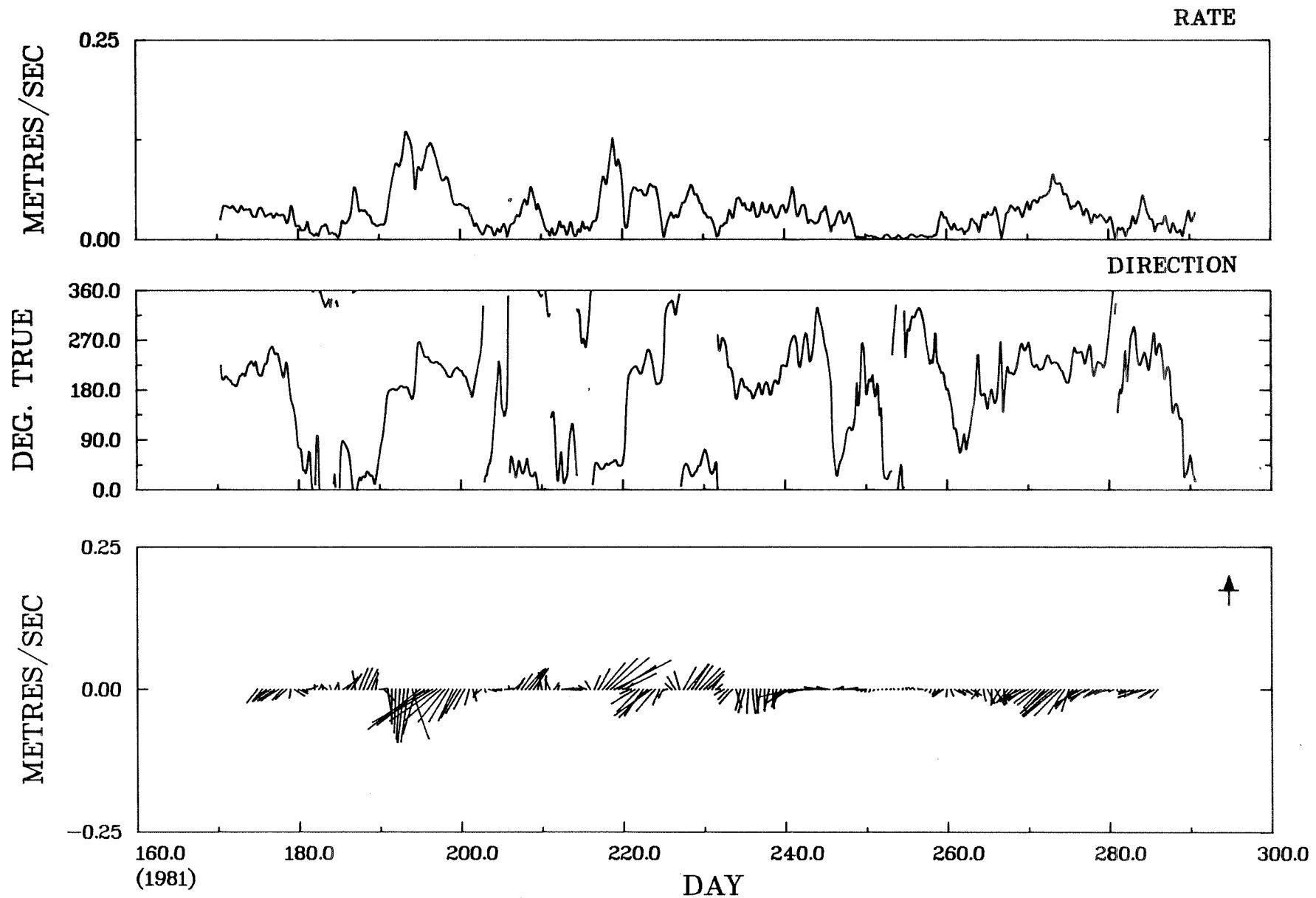
BELLE ISLE BANK MOORING 3 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 3

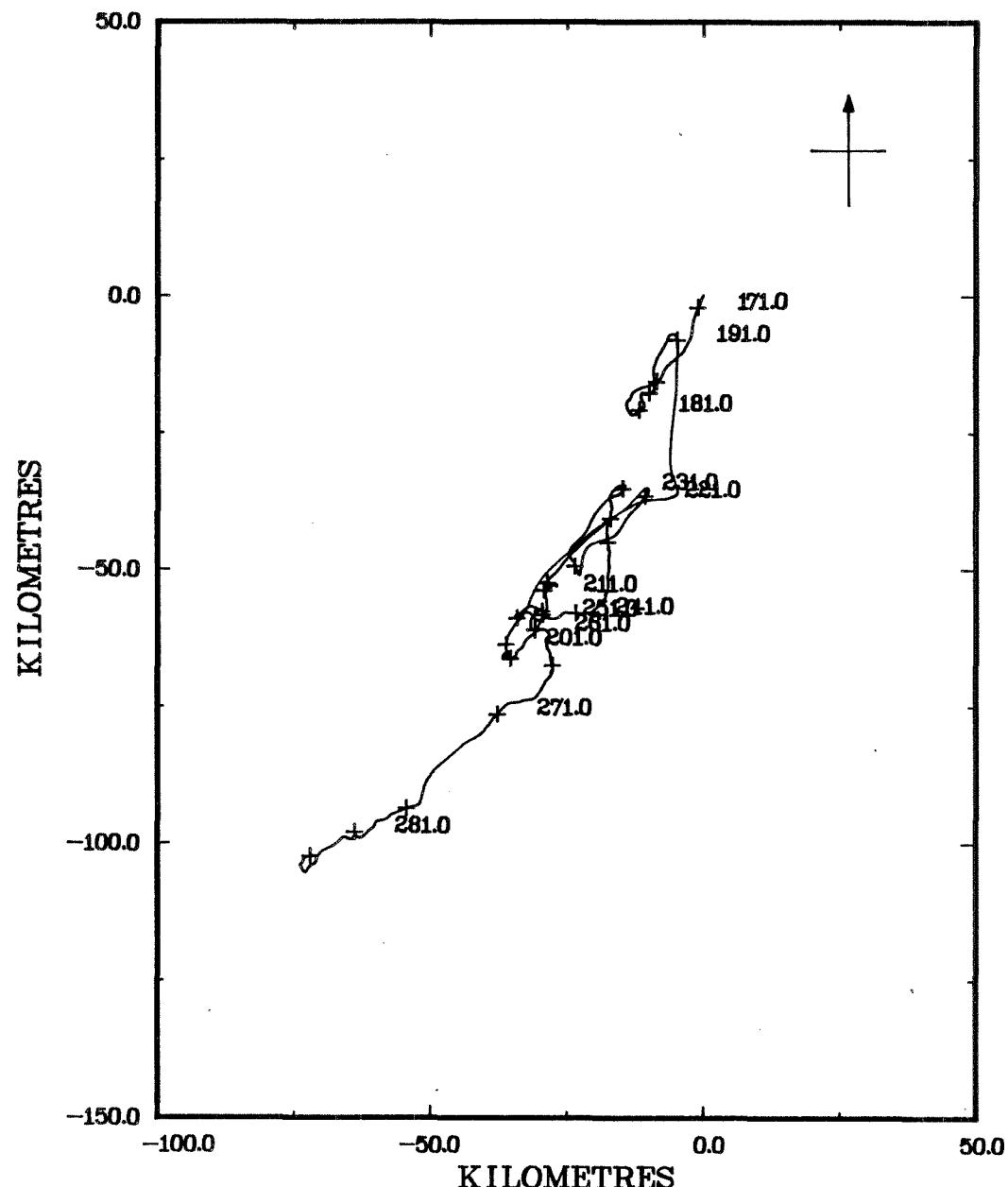
Nominal Depth            282 m  
 Bottom Depth            292 m  
 Latitude                52° 27.78'N  
 Longitude               52° 54.84'W  
 Duration (days)       244.2

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	271.5	272.3	272.3	0.08
Temperature	°C	2.04	3.01	2.65	0.17
Salinity		34.40	34.67	34.56	0.048
N-S Component	ms <sup>-1</sup>	-0.13	0.080	-0.0099	0.031
E-W Component	ms <sup>-1</sup>	-0.10	0.099	-0.0068	0.026





BELLE ISLE BANK MOORING 3 AT 282 M  
JUNE 21 TO OCTOBER 16 1981

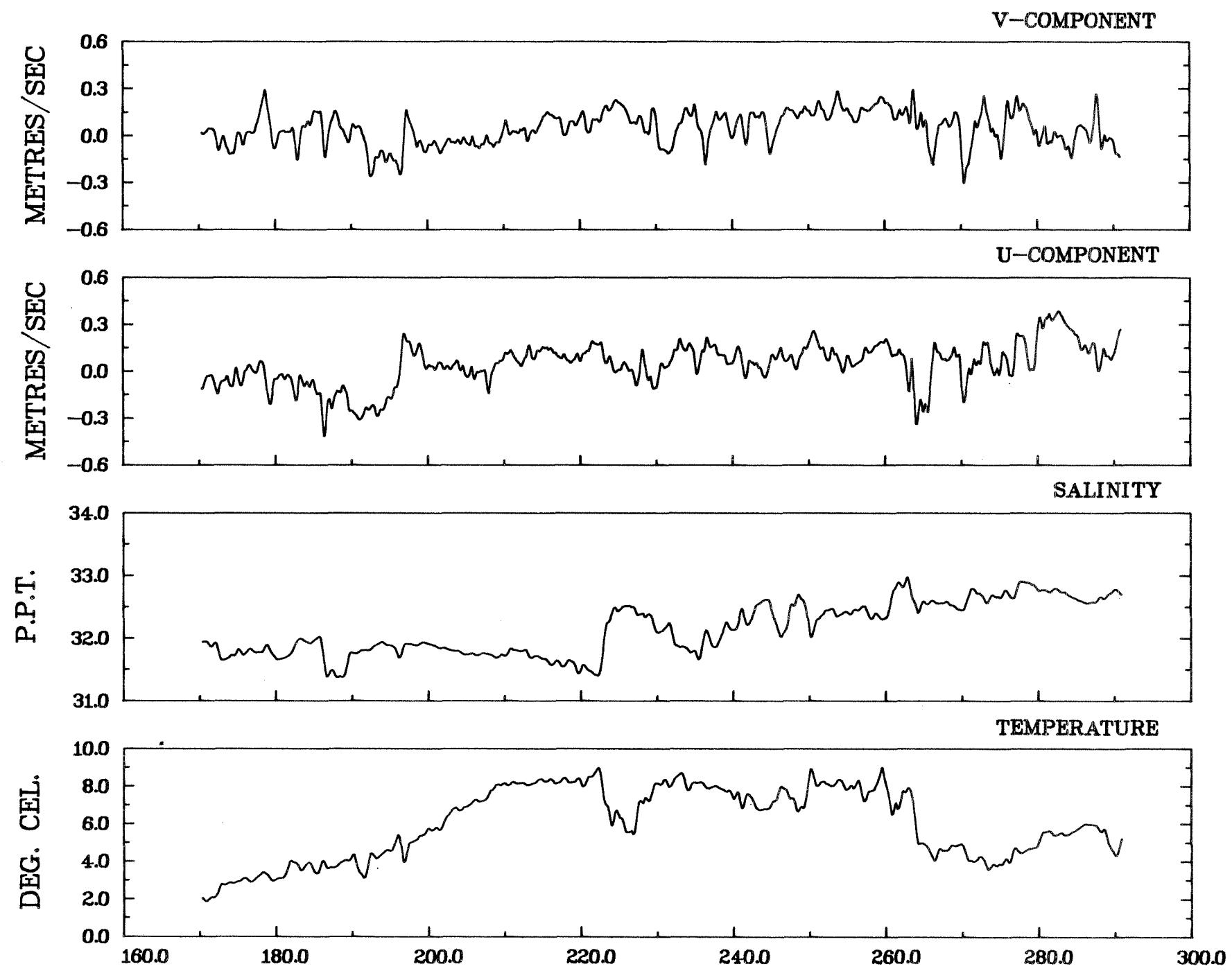


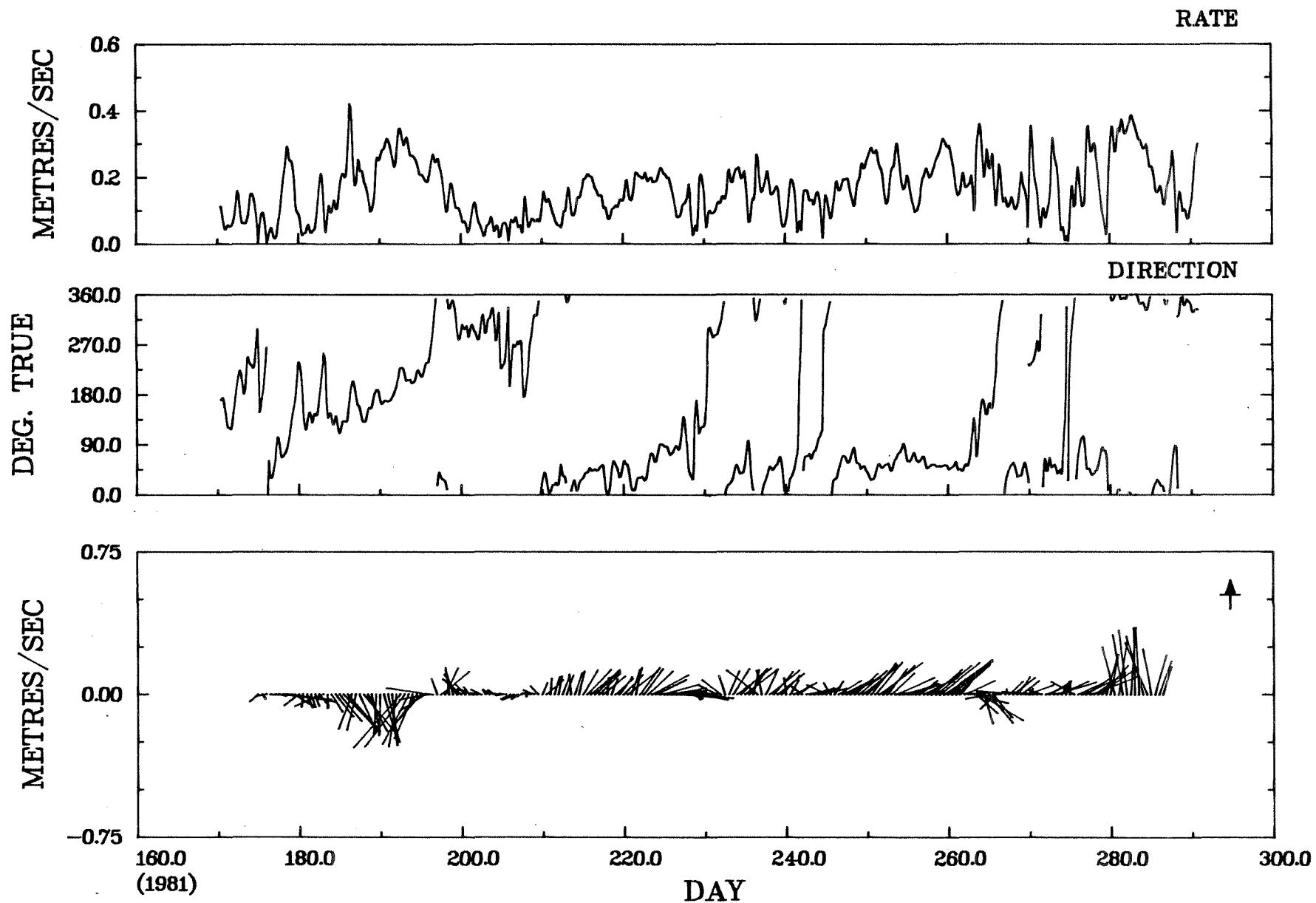
BELLE ISLE BANK MOORING 3 AT 282 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 4

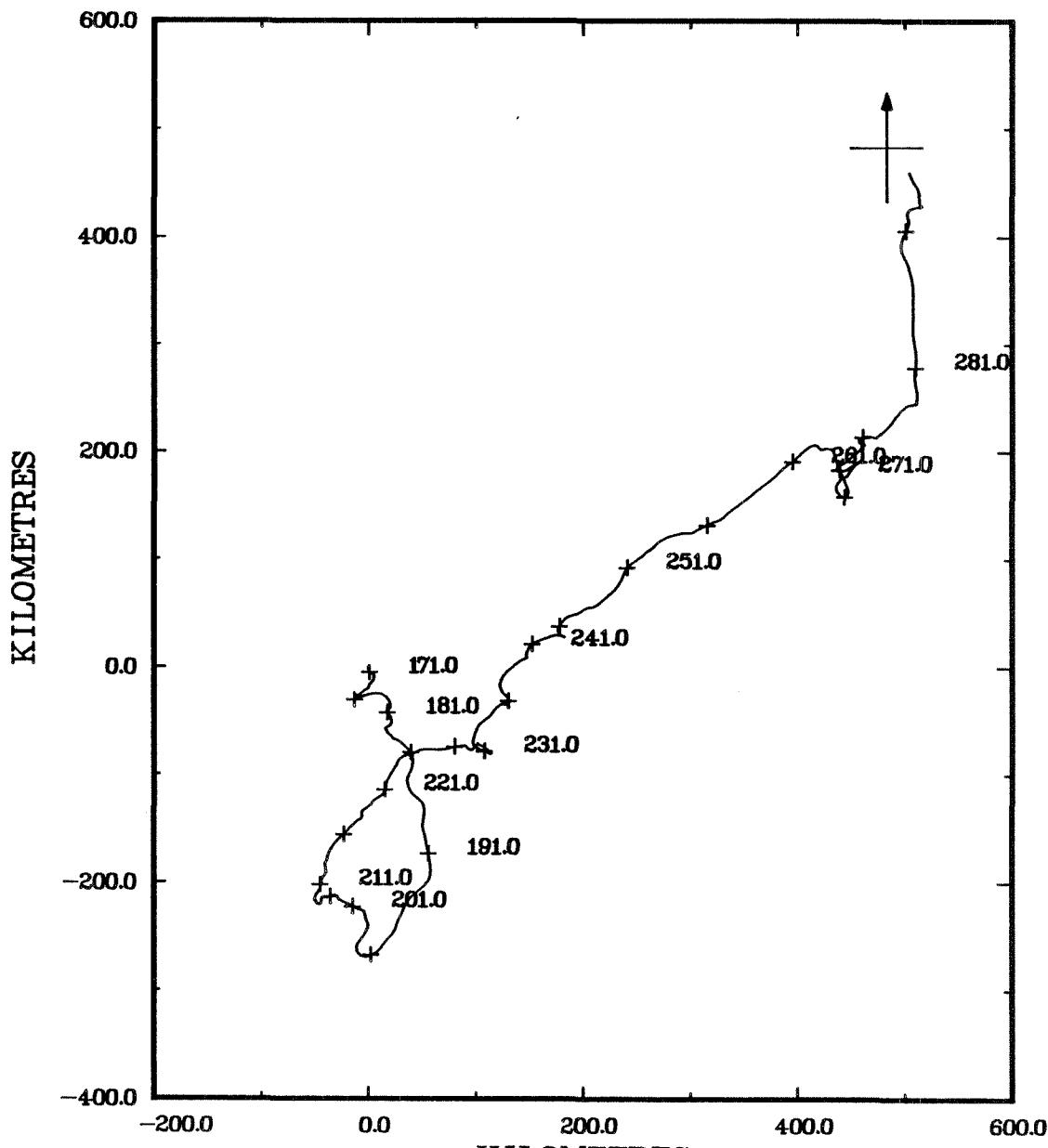
Nominal Depth            30 m  
 Bottom Depth            215 m  
 Latitude                52° 43.03'N  
 Longitude               53° 14.00'W  
 Duration (days)       244.7

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	-	-	-	-
Temperature	°C	1.86	9.03	6.03	1.90
Salinity		31.37	32.98	32.15	0.42
N-S Component	ms <sup>-1</sup>	-0.42	0.39	0.044	0.13
E-W Component	ms <sup>-1</sup>	-0.30	0.30	0.048	0.11





BELLE ISLE BANK MOORING 4 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

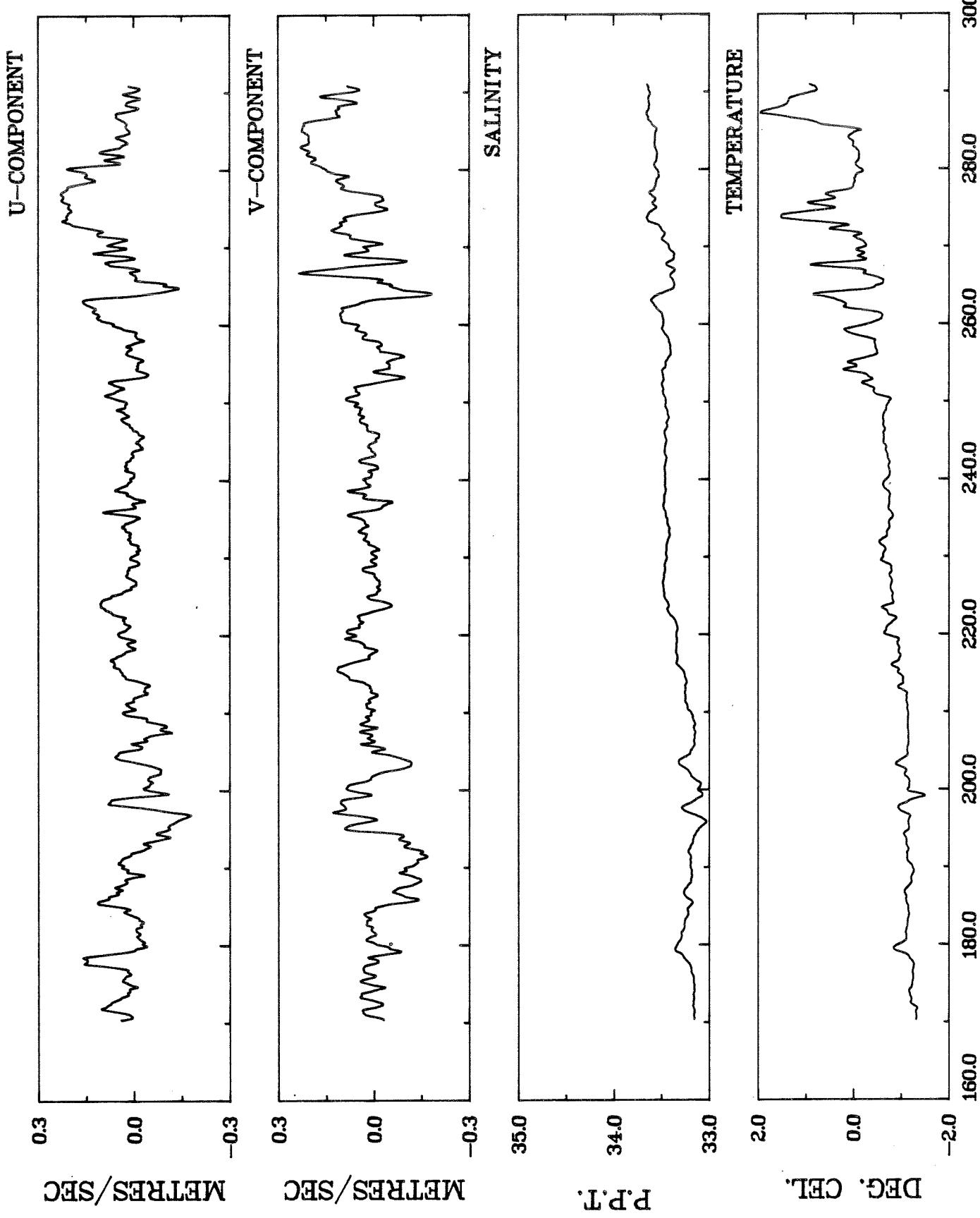


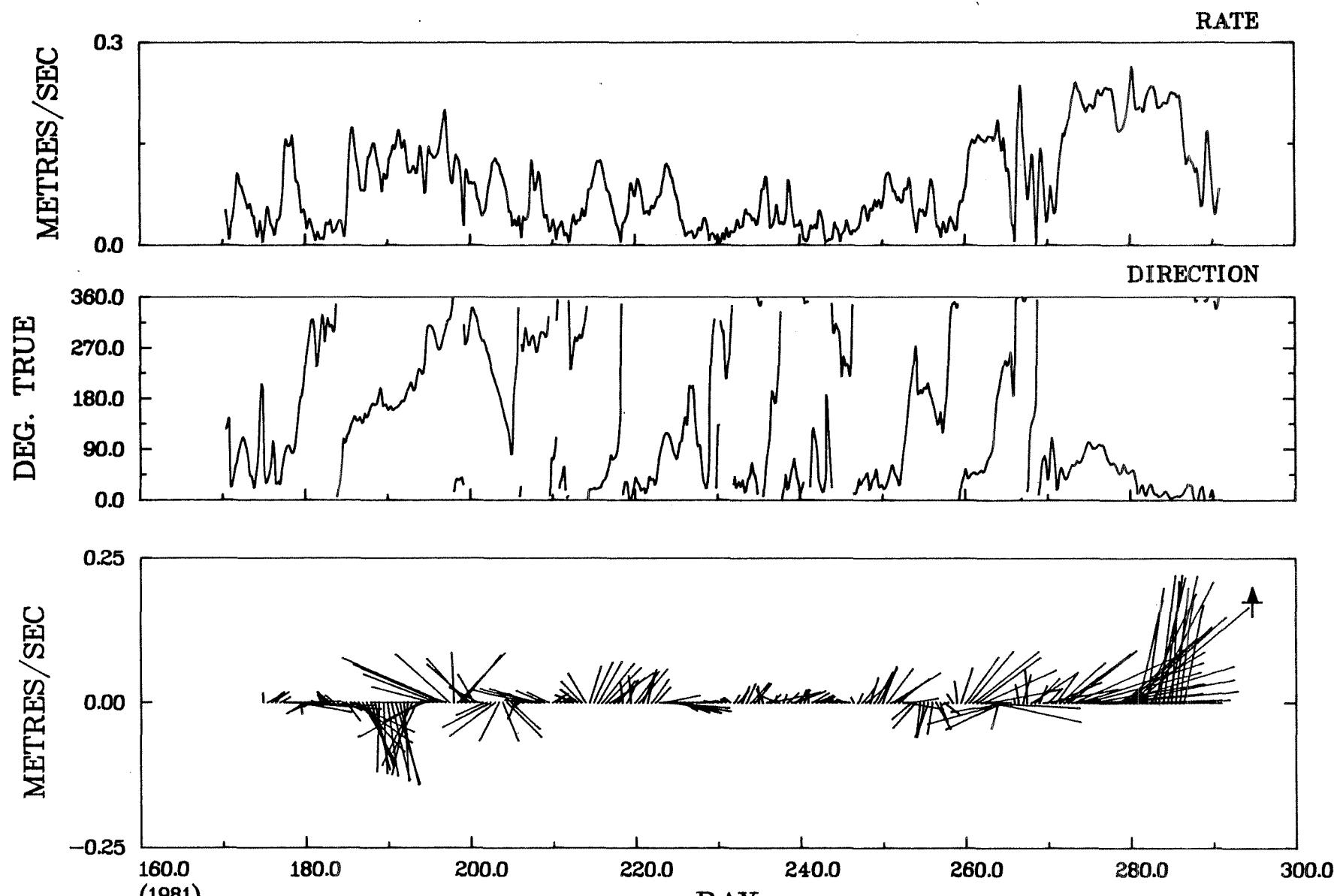
BELLE ISLE BANK MOORING 4 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 4

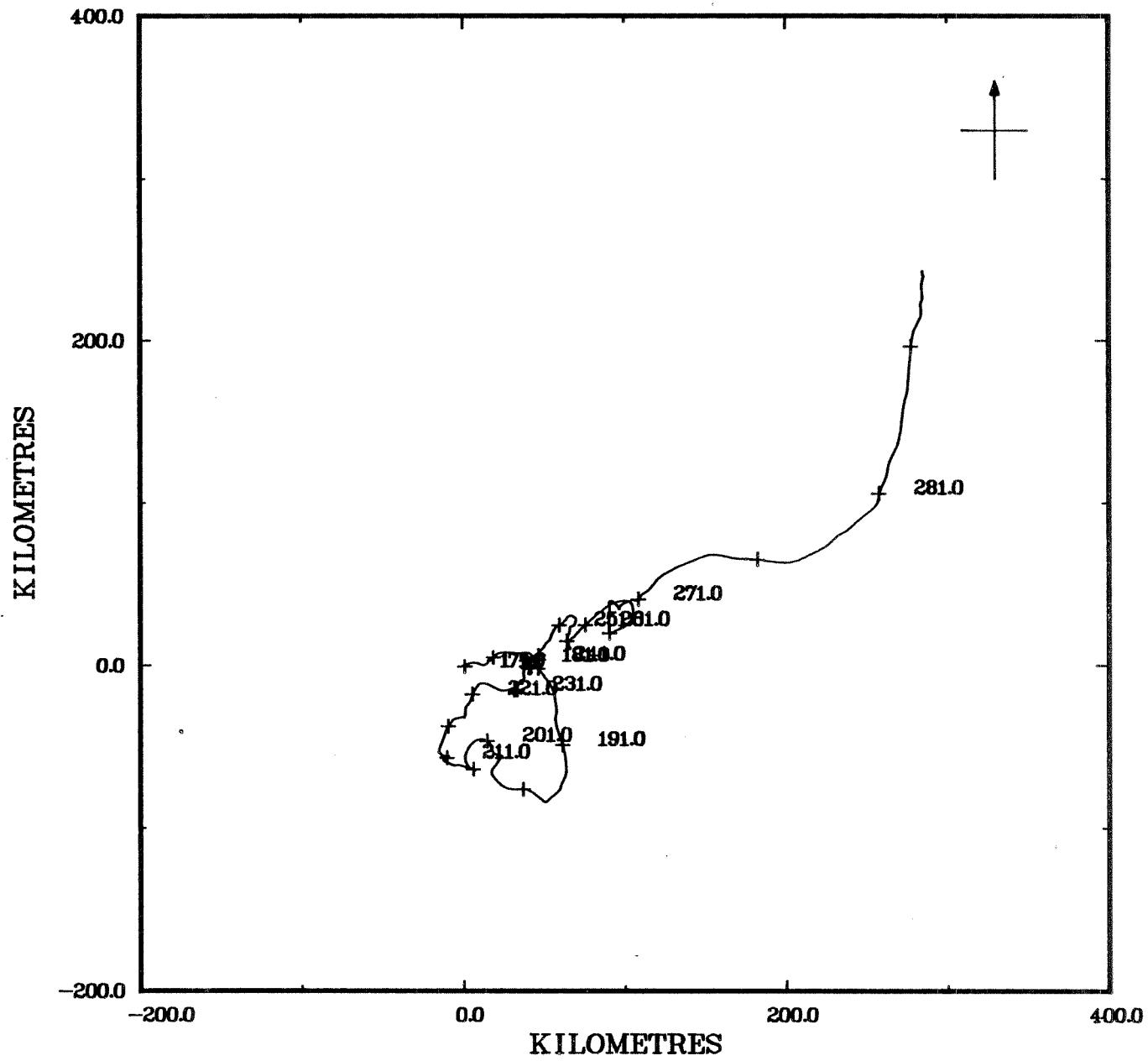
Nominal Depth            100 m  
 Bottom Depth            215 m  
 Latitude                52° 43.03'N  
 Longitude               53° 14.00'W  
 Duration (days)       244.7

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	85.6	87.2	86.4	0.2
Temperature	°C	-1.50	1.95	-0.59	0.66
Salinity		33.03	33.66	33.37	0.15
N-S Component	ms <sup>-1</sup>	-0.18	0.24	0.023	0.077
E-W Component	ms <sup>-1</sup>	-0.18	0.23	0.027	0.069





BELLE ISLE BANK MOORING 4 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

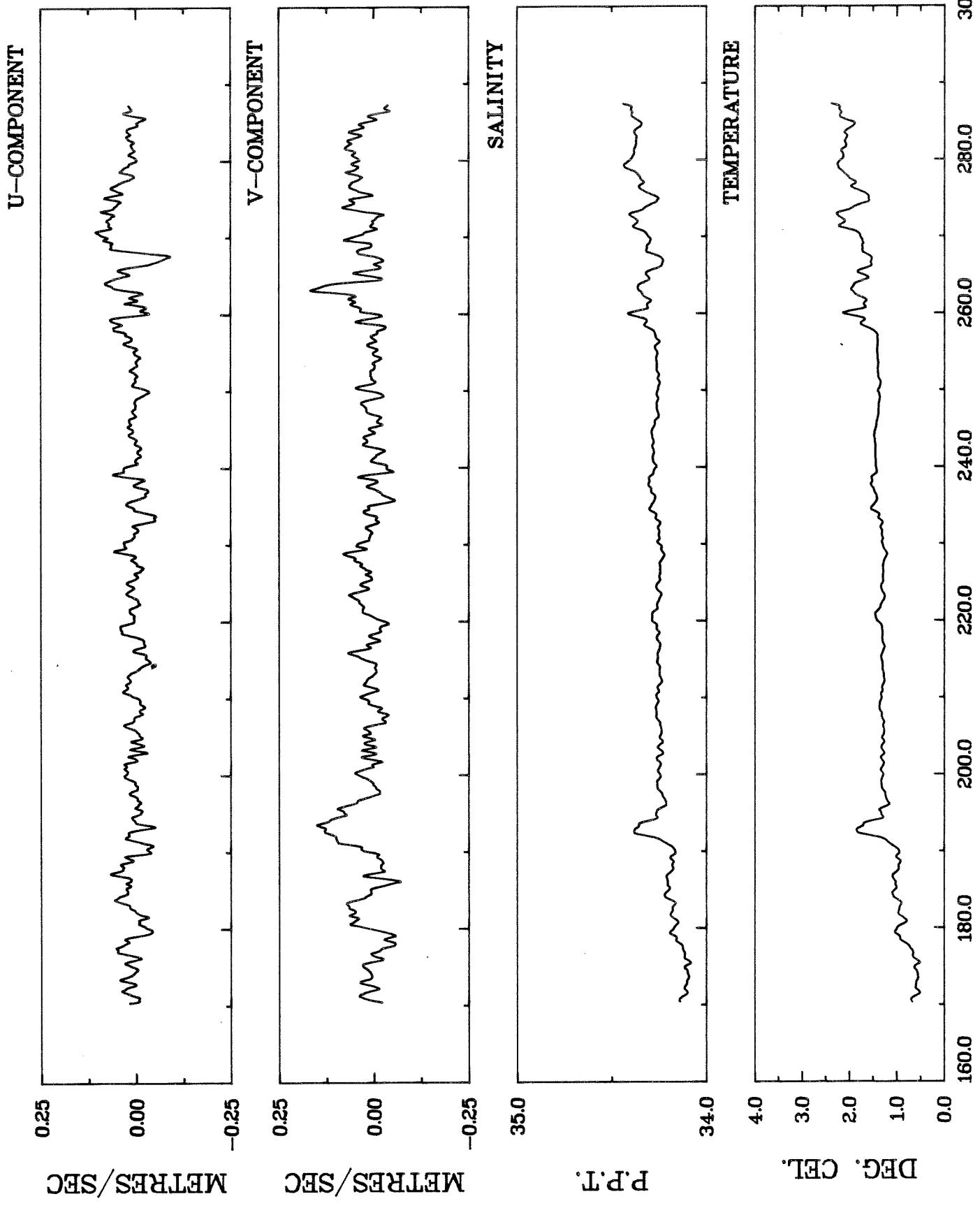


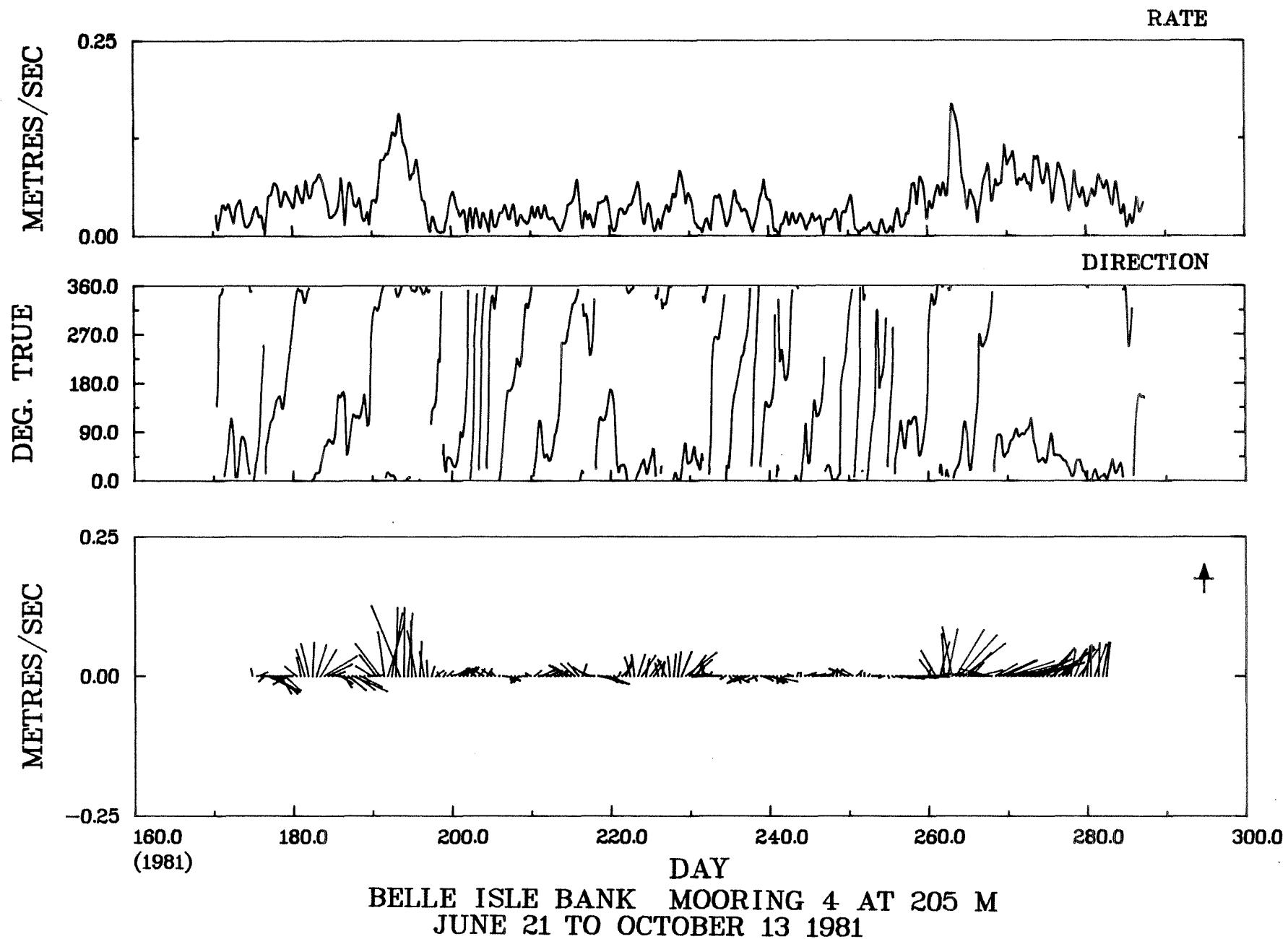
BELLE ISLE BANK MOORING 4 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

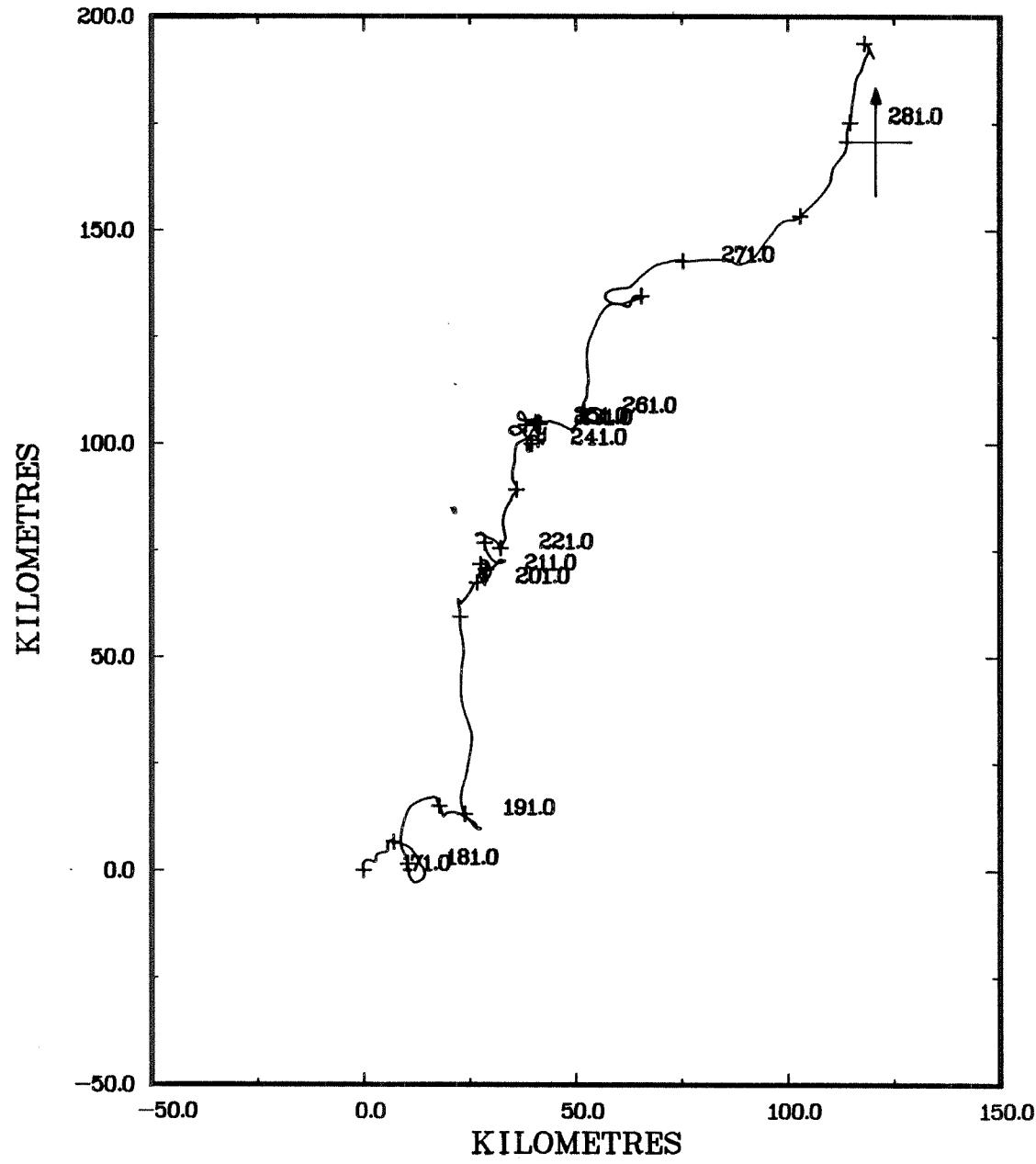
## Mooring 4

Nominal Depth            205 m  
 Bottom Depth            215 m  
 Latitude                52° 43.03'N  
 Longitude               53° 14.00'W  
 Duration (days)       237.6

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	192.8	194.3	193.5	0.1
Temperature	°C	0.51	2.38	1.41	0.38
Salinity		34.08	34.44	34.26	0.069
N-S Component	ms <sup>-1</sup>	-0.071	0.17	0.019	0.037
E-W Component	ms <sup>-1</sup>	-0.091	0.11	0.012	0.029





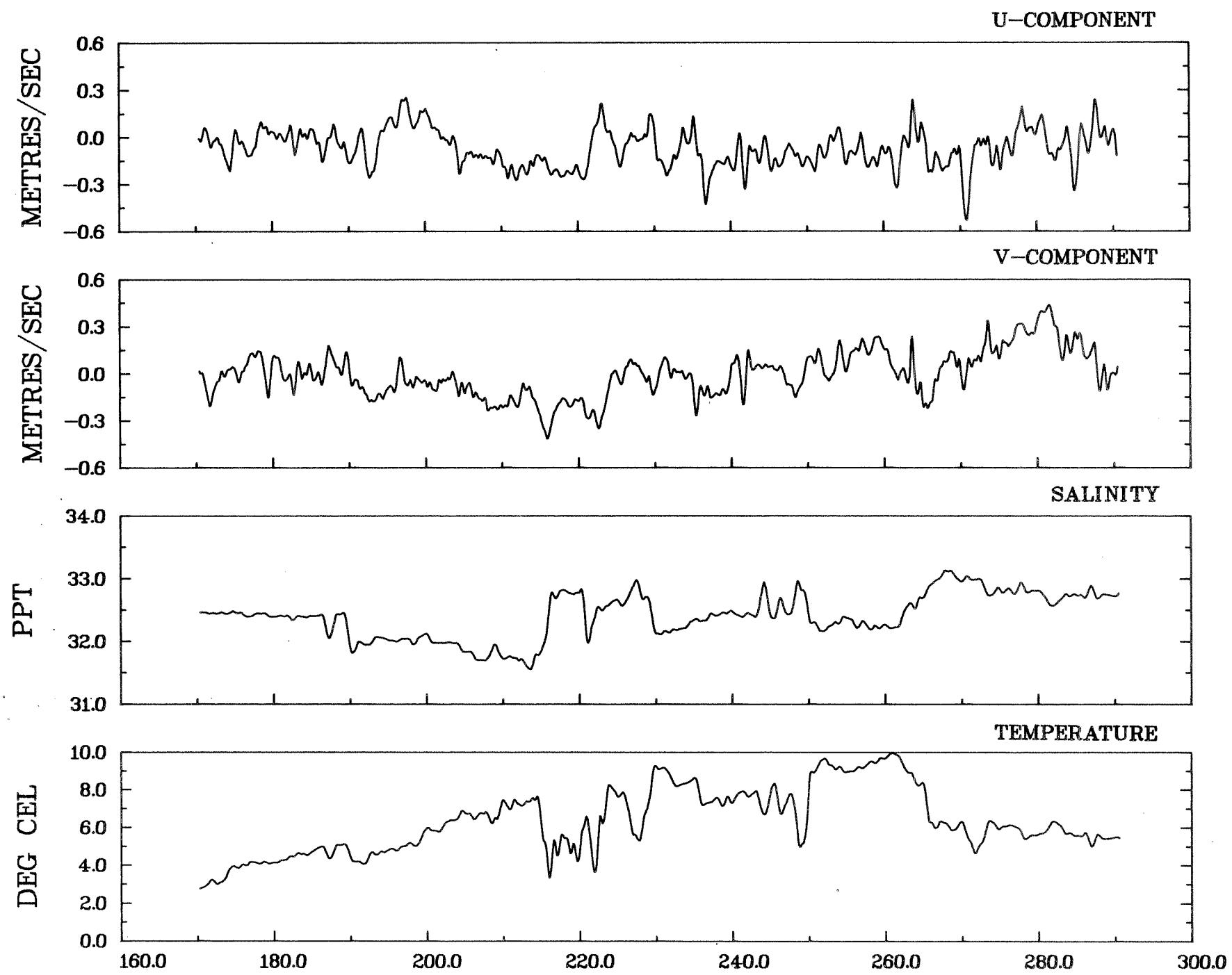


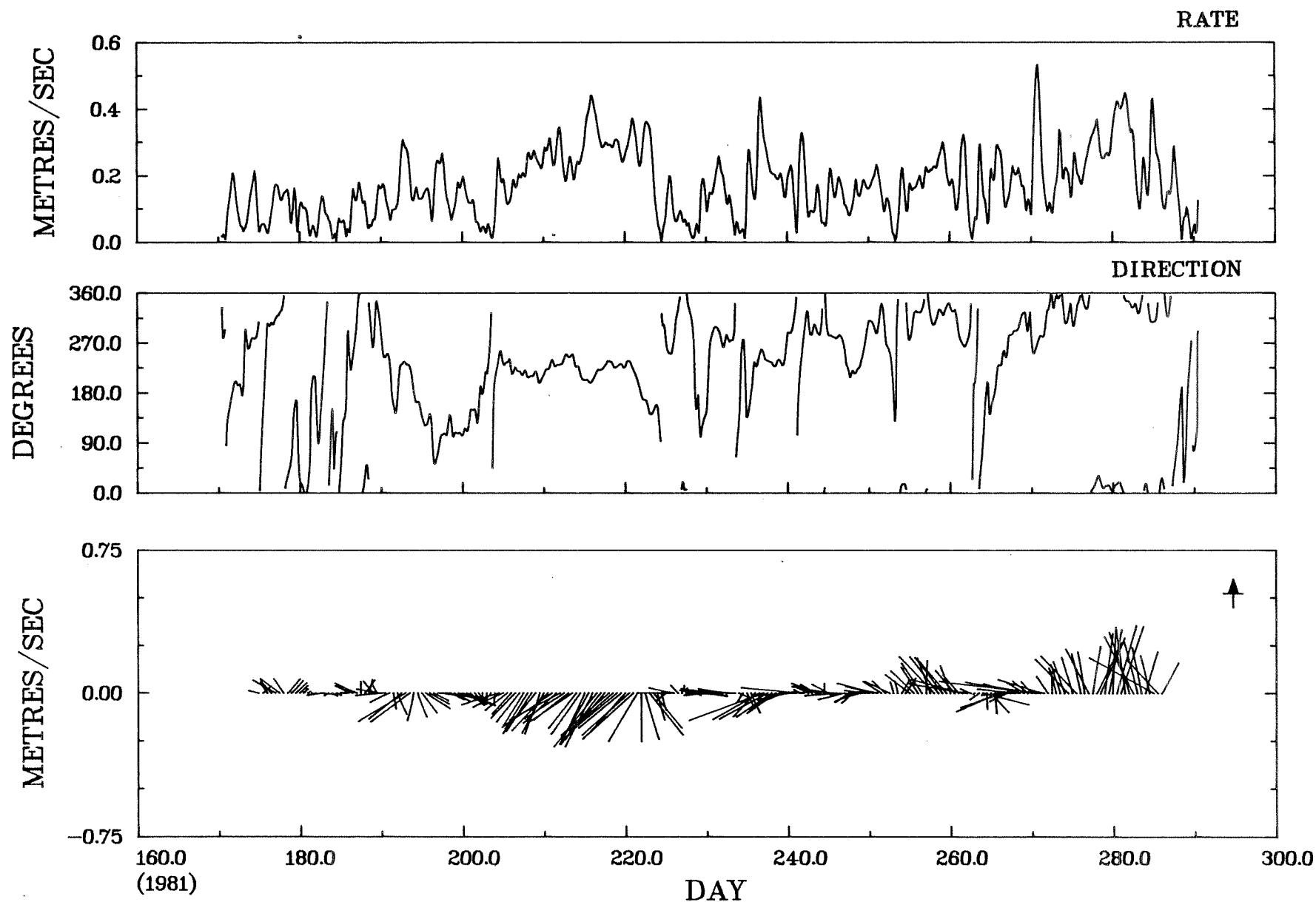
BELLE ISLE BANK MOORING 4 AT 205 M  
JUNE 21 TO OCTOBER 13 1981

## Mooring 6

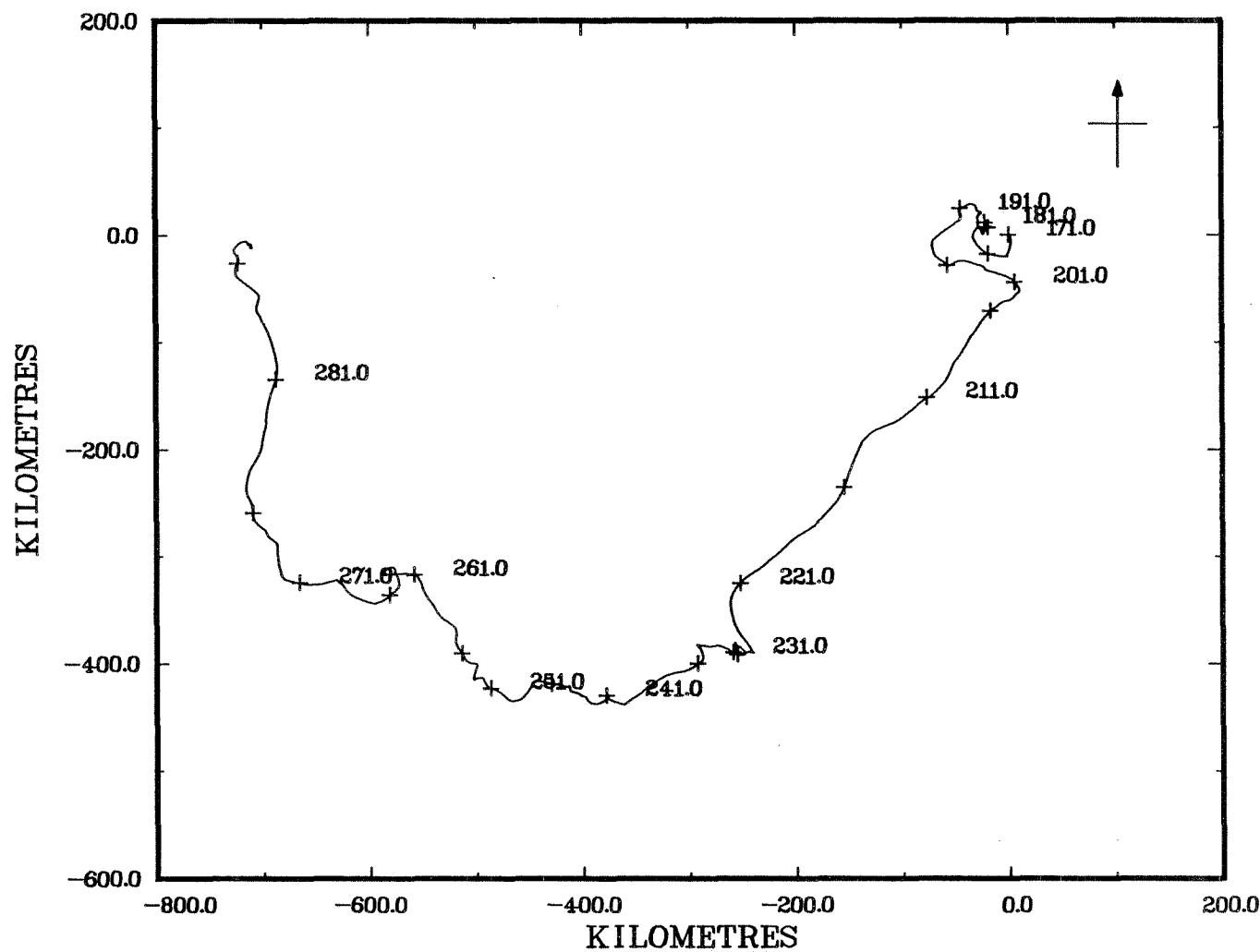
Nominal Depth            30 m  
 Bottom Depth            252 m  
 Latitude                52° 20.12'N  
 Longitude               52° 42.01'W  
 Duration (days)        243.3

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	12.6	18.1	14.9	0.6
Temperature	°C	2.76	9.96	6.34	1.72
Salinity		31.55	33.13	32.41	0.35
N-S Component	ms <sup>-1</sup>	-0.41	0.44	-0.0011	0.15
E-W Component	ms <sup>-1</sup>	-0.53	0.26	-0.068	0.12





BELLE ISLE BANK MOORING 6 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

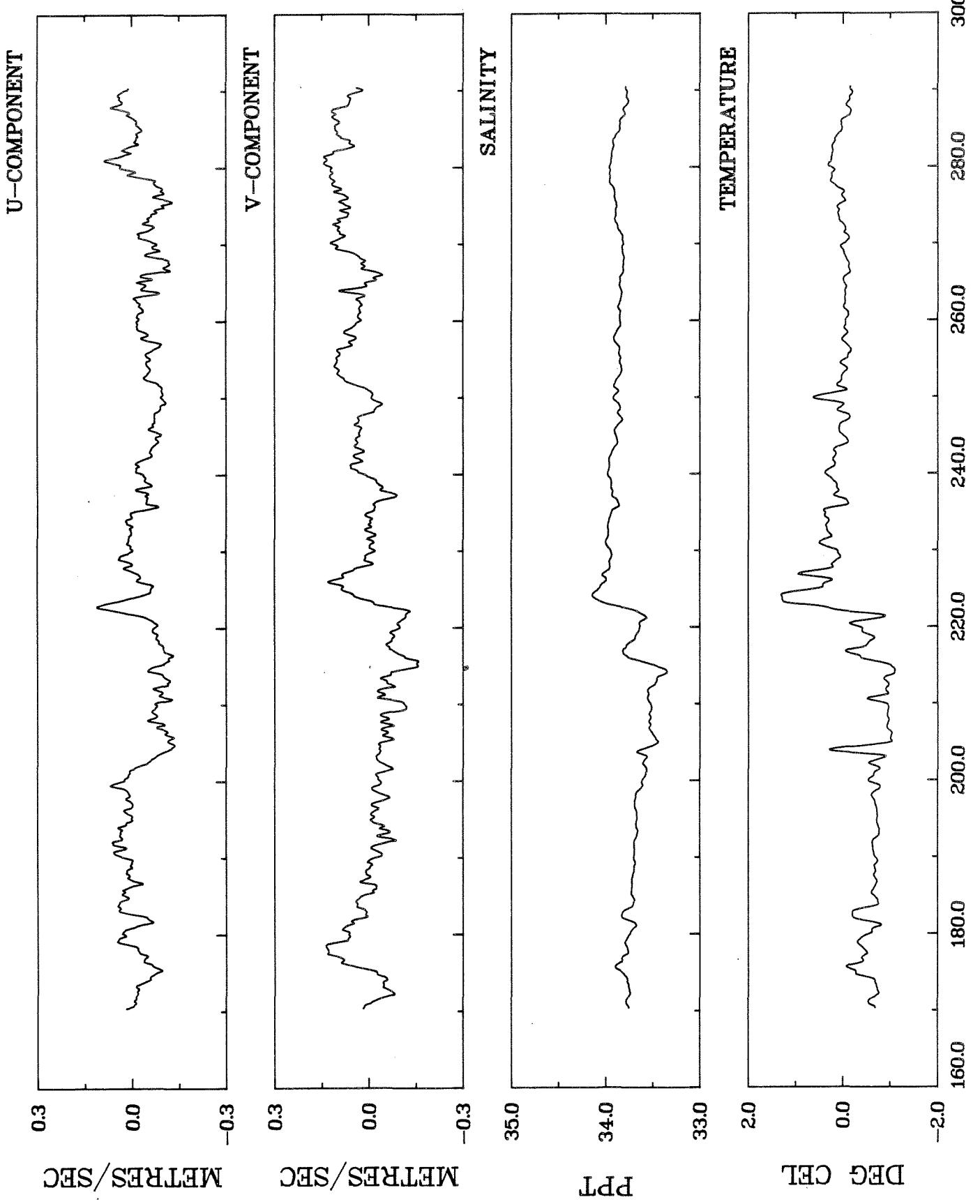


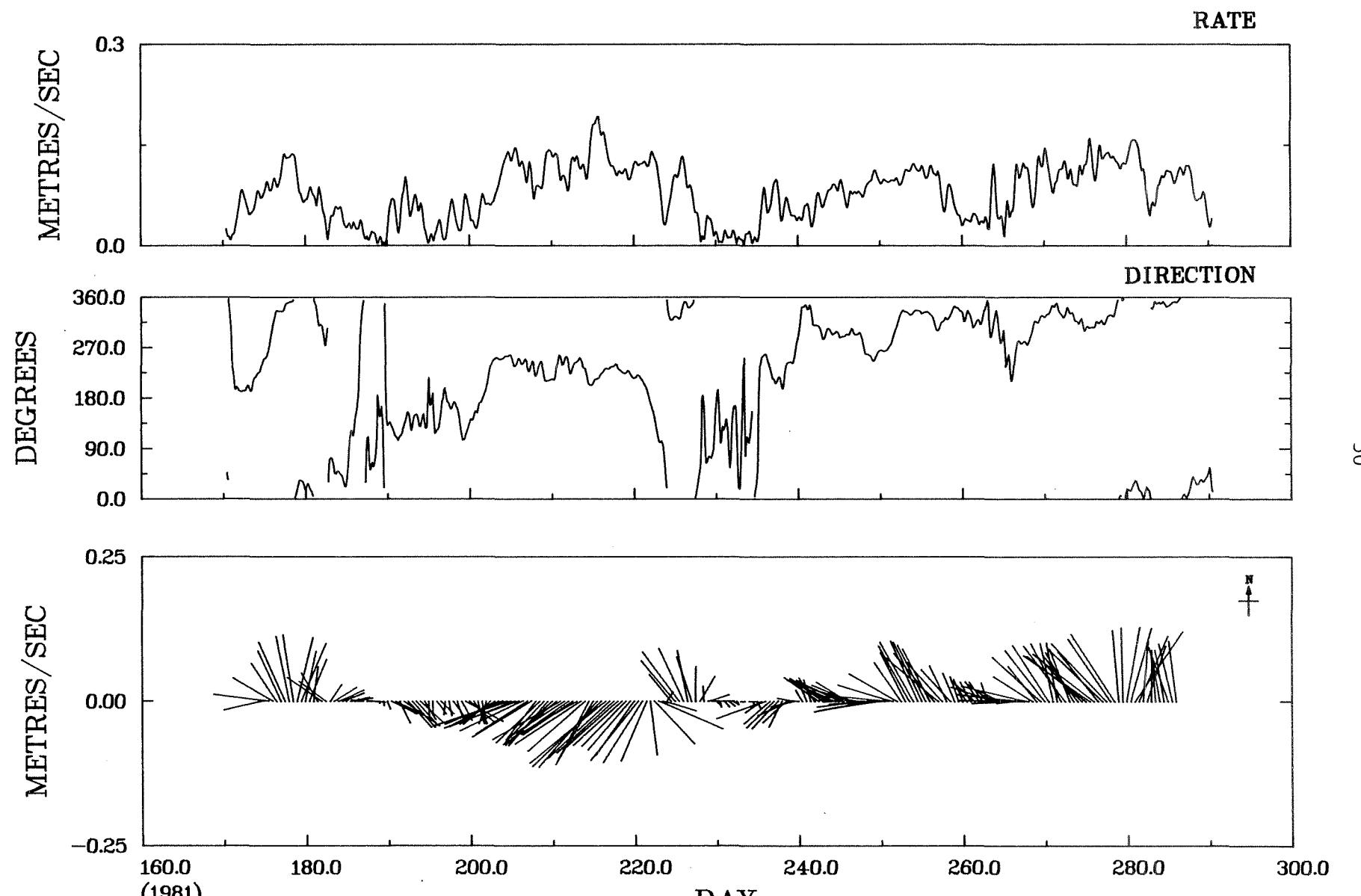
BELLE ISLE BANK MOORING 6 AT 30 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 6

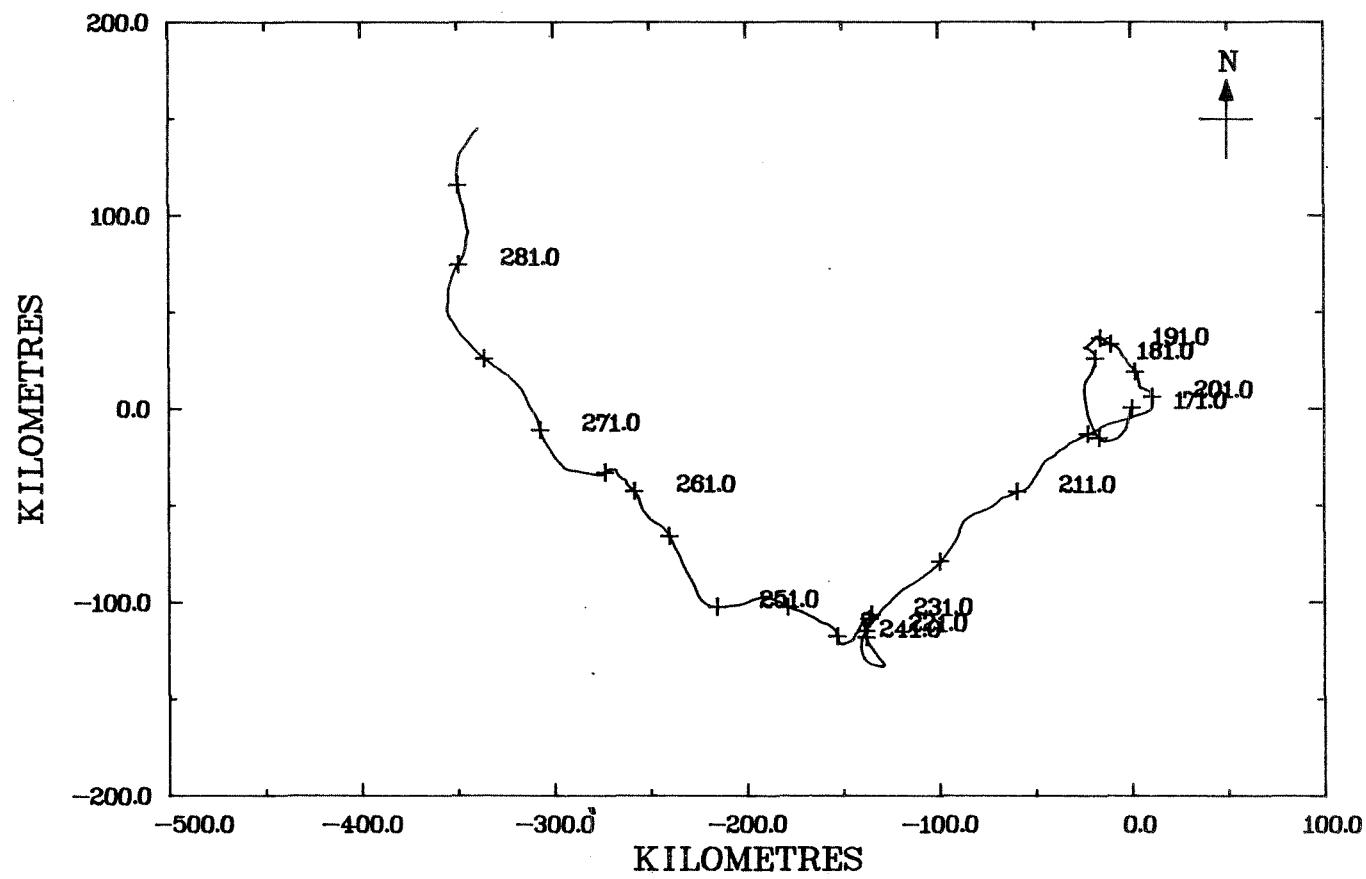
Nominal Depth 100 m  
 Bottom Depth 252 m  
 Latitude 52° 20.12'N  
 Longitude 52° 42.01'W  
 Duration (days) 243.8

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	82.4	84.2	83.3	0.31
Temperature	°C	-1.15	1.76	-0.21	0.47
Salinity		33.20	34.70	33.80	0.15
N-S Component	ms <sup>-1</sup>	-0.28	0.28	0.014	0.088
E-W Component	ms <sup>-1</sup>	-0.24	0.20	-0.032	0.087





BELLE ISLE BANK MOORING 6 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

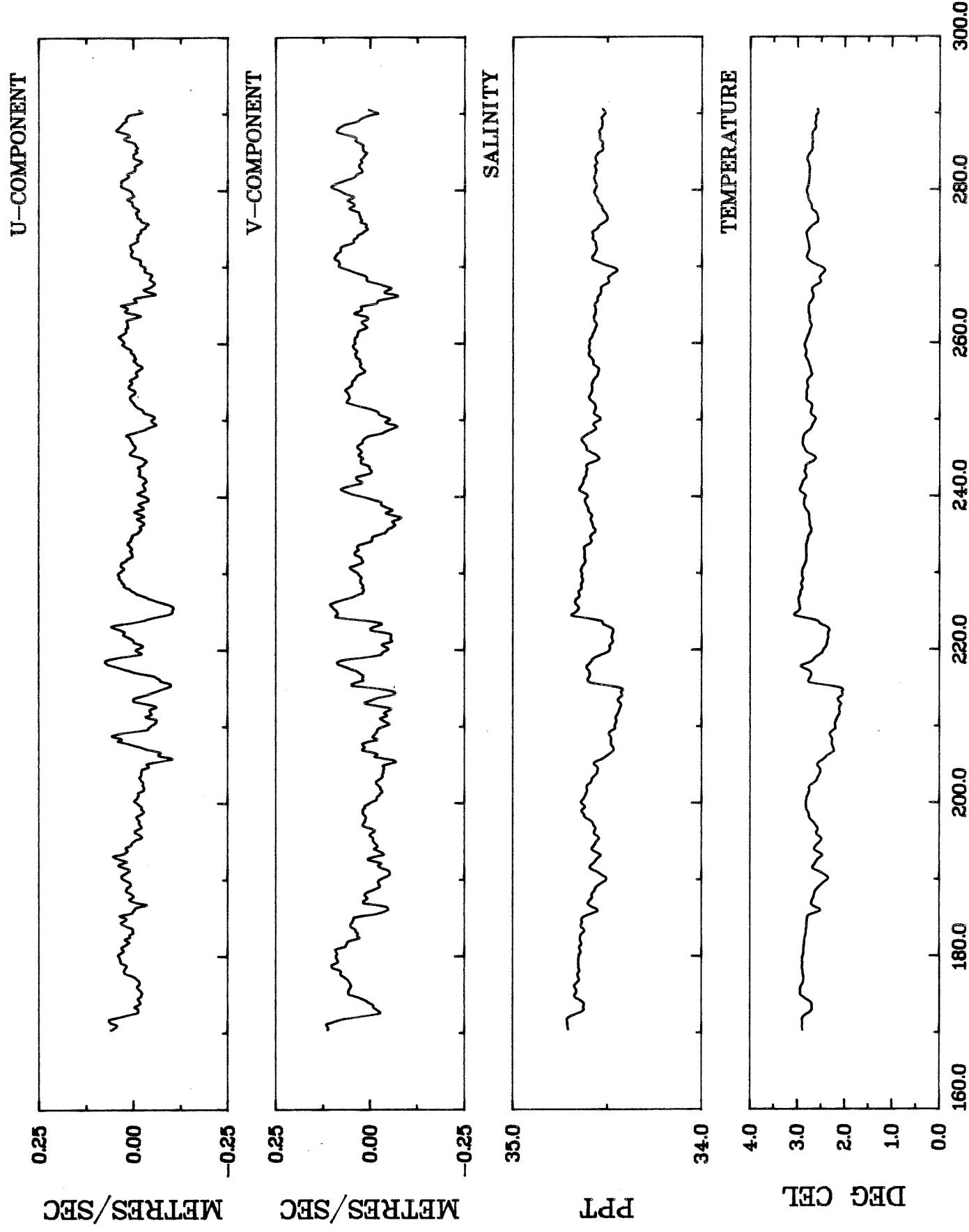


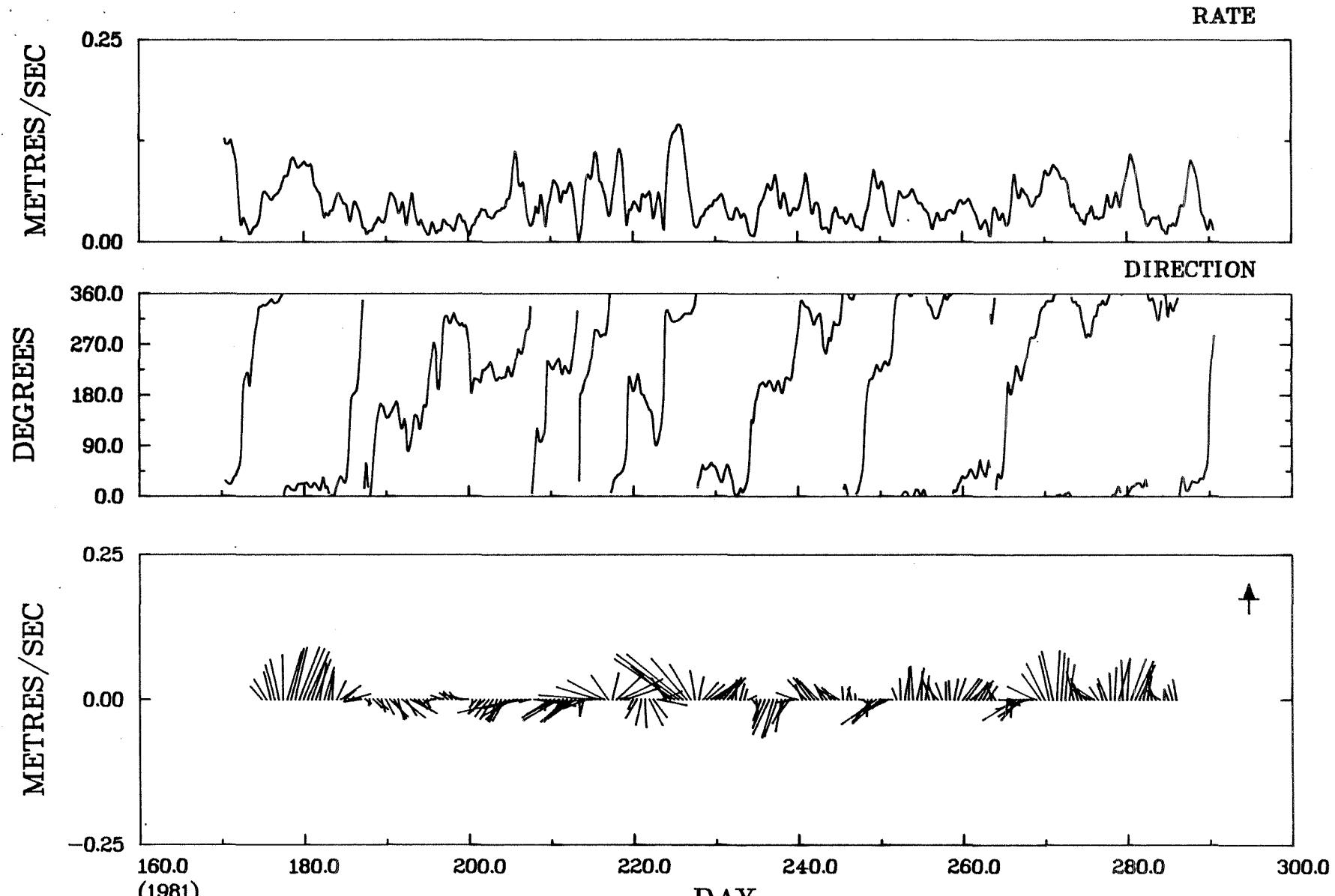
BELLE ISLE BANK MOORING 6 AT 100 M  
JUNE 21 TO OCTOBER 16 1981

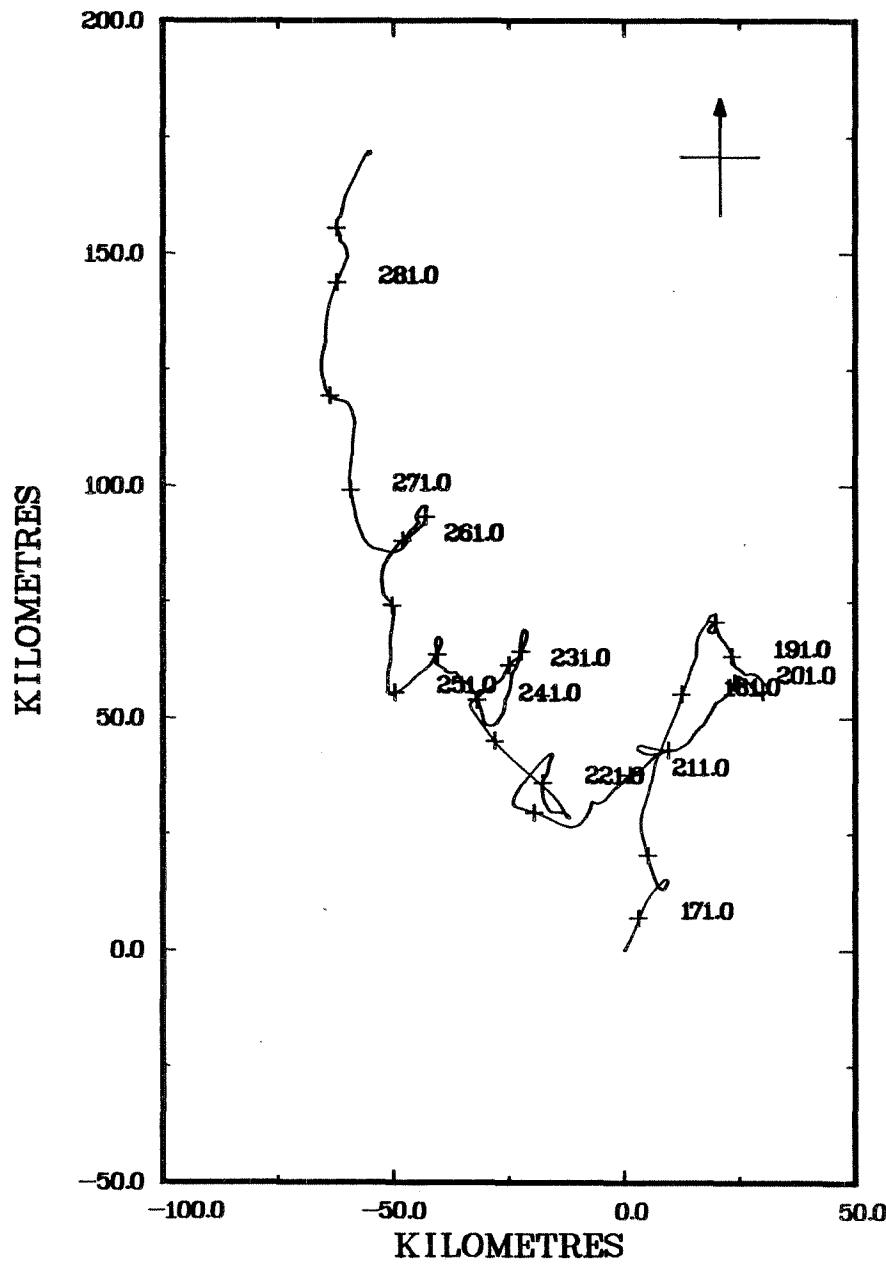
## Mooring 6

Nominal Depth            242 m  
 Bottom Depth            252 m  
 Latitude                52° 20.12'N  
 Longitude               52° 42.01'W  
 Duration (days)       243.9

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	242.3	243.1	242.7	0.14
Temperature	°C	2.03	3.07	2.69	0.20
Salinity		34.41	34.71	34.57	0.059
N-S Component	ms <sup>-1</sup>	-0.083	0.12	0.016	0.043
E-W Component	ms <sup>-1</sup>	-0.11	0.076	-0.0054	0.051





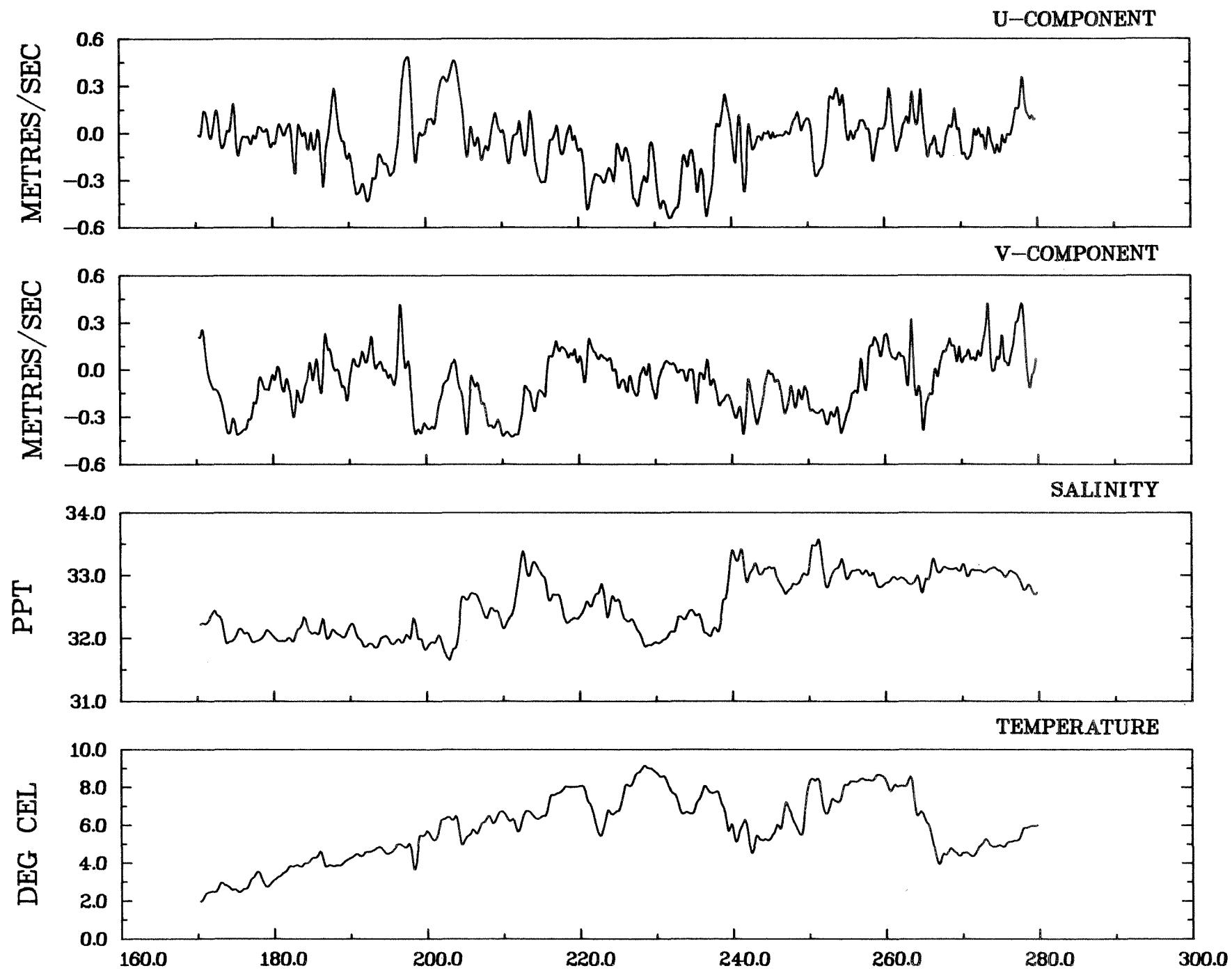


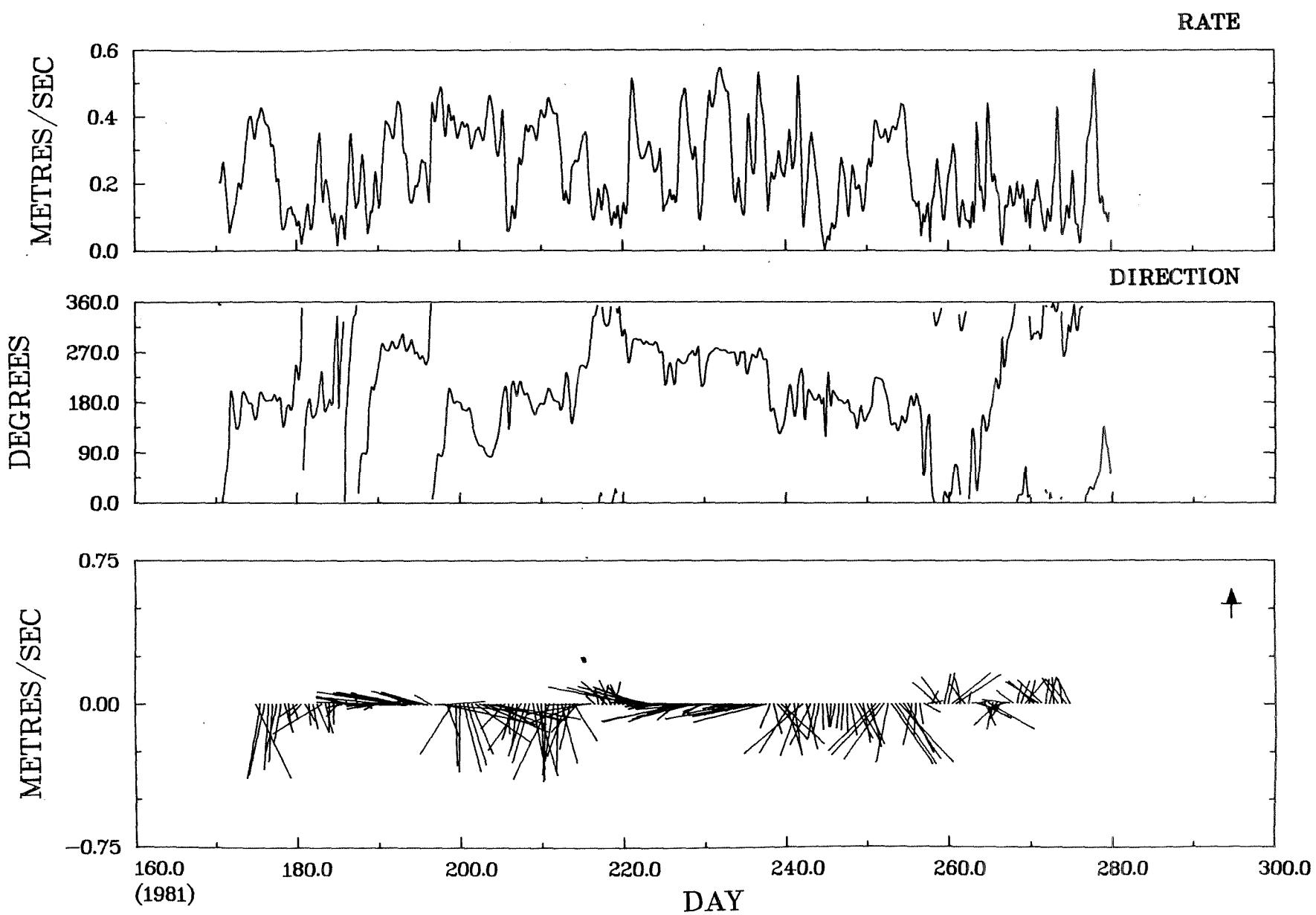
BELLE ISLE BANK MOORING 6 AT 242 M  
JUNE 21 TO OCTOBER 16 1981

## Mooring 7

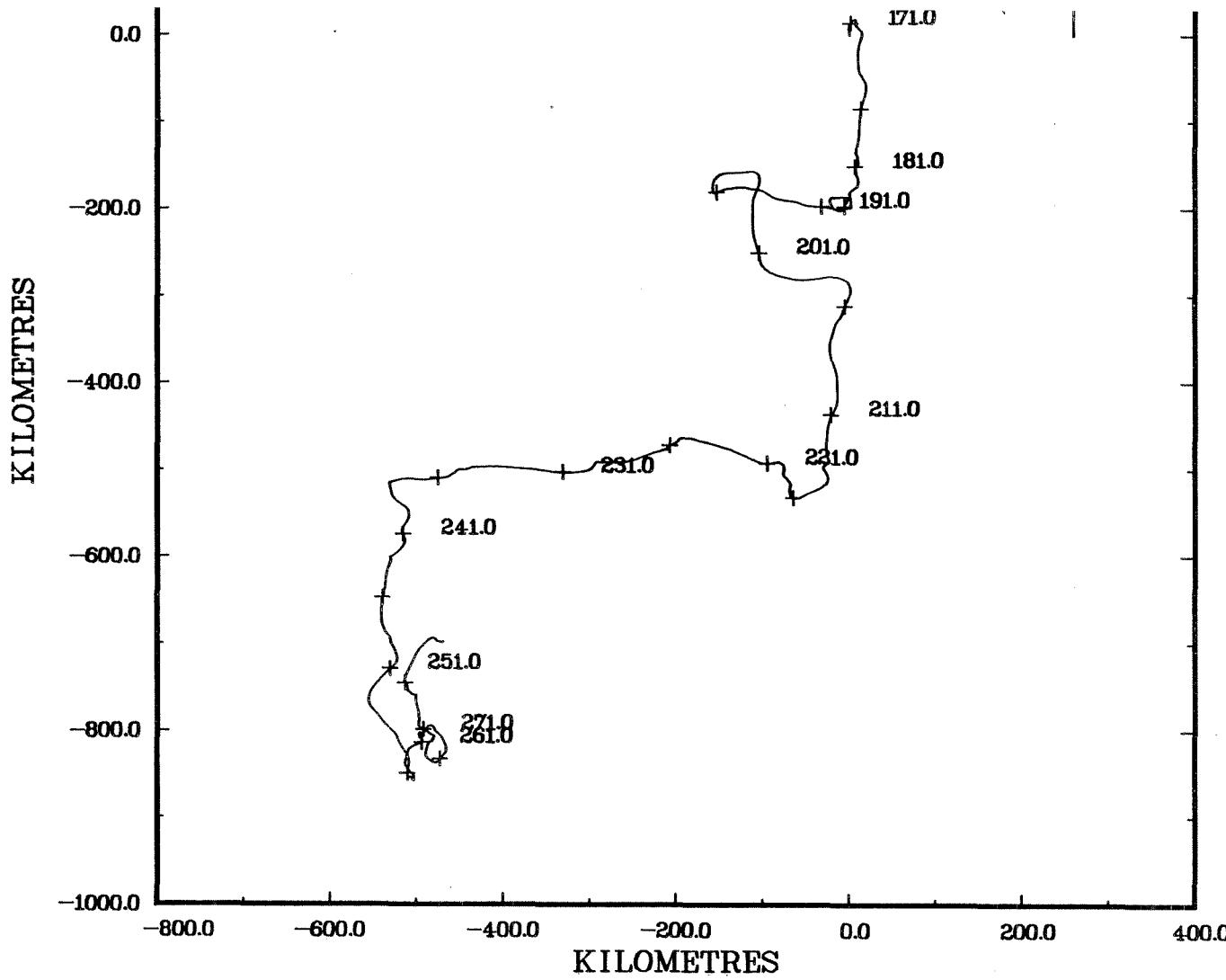
Nominal Depth            30 m  
 Bottom Depth            285 m  
 Latitude                52° 31.98'N  
 Longitude               52° 0.80'W  
 Duration (days)        222.4

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	6.3	15.4	8.3	0.7
Temperature	°C	1.96	9.16	5.88	1.74
Salinity		31.65	33.58	32.54	0.47
N-S Component	ms <sup>-1</sup>	-0.43	0.42	-0.074	0.18
E-W Component	ms <sup>-1</sup>	-0.54	0.49	-0.050	0.19





BELLE ISLE BANK MOORING 7 AT 30 M  
 JUNE 21 TO OCTOBER 5 1981

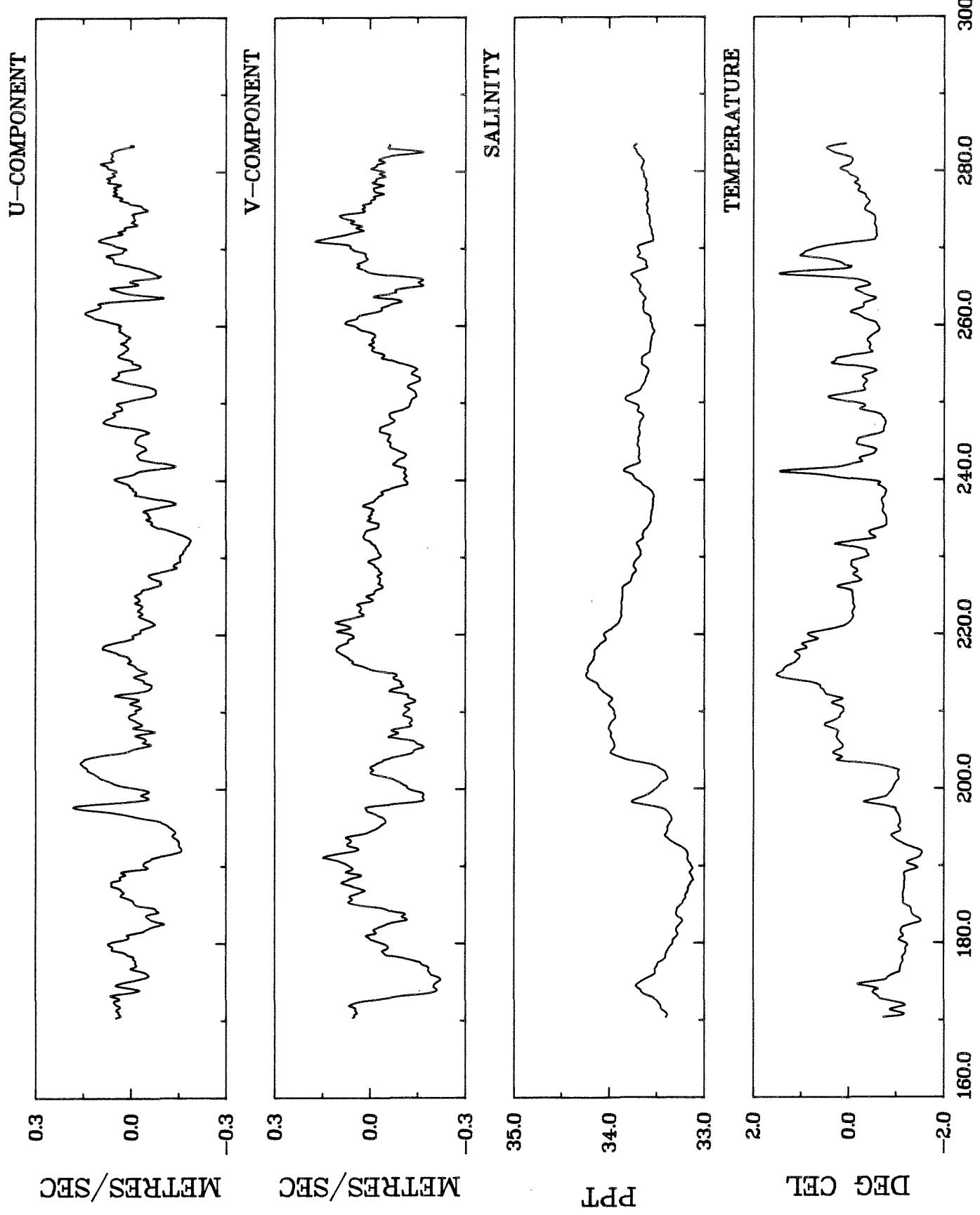


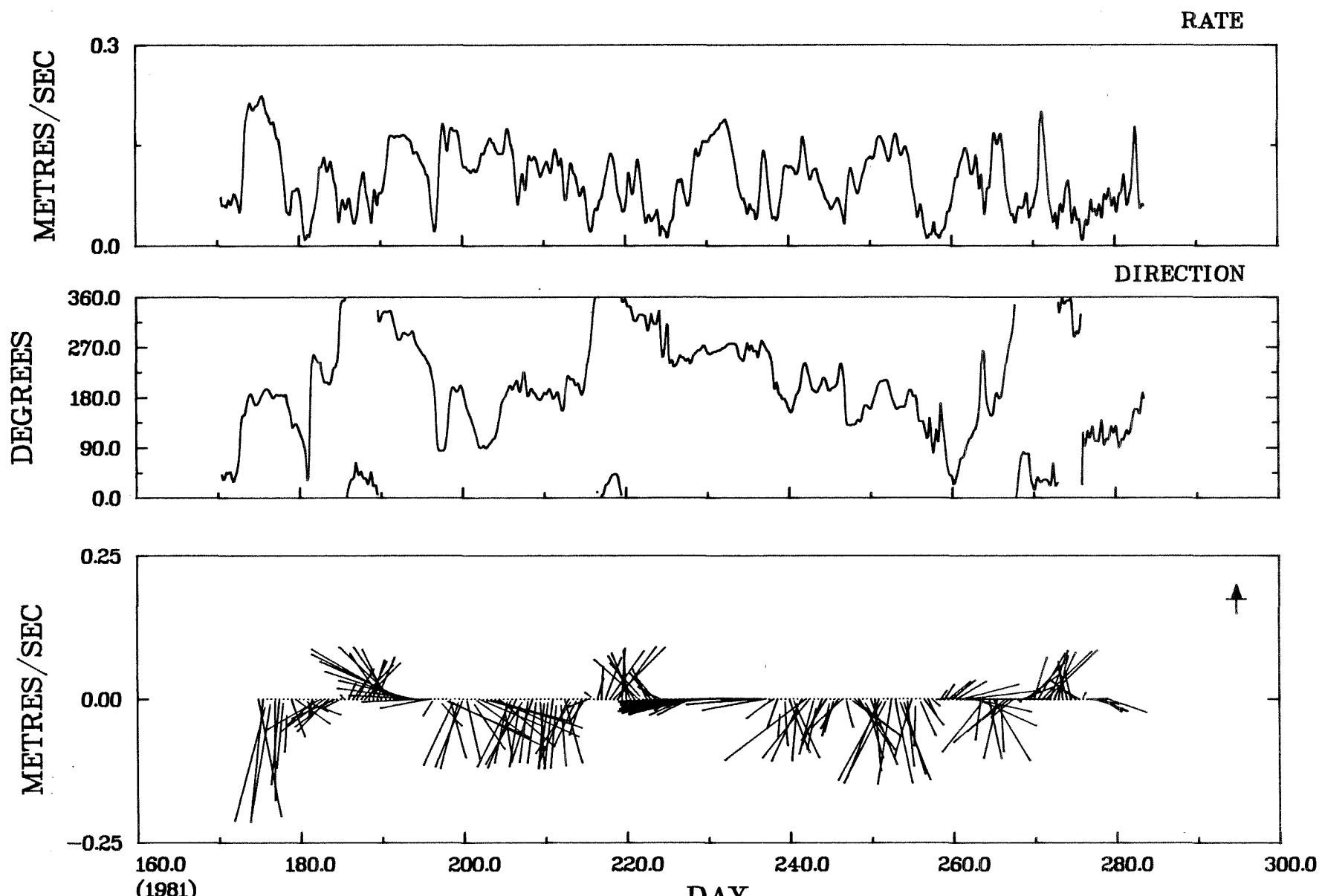
BELLE ISLE BANK MOORING 7 AT 30 M  
JUNE 21 TO OCTOBER 5 1981

## Mooring 7

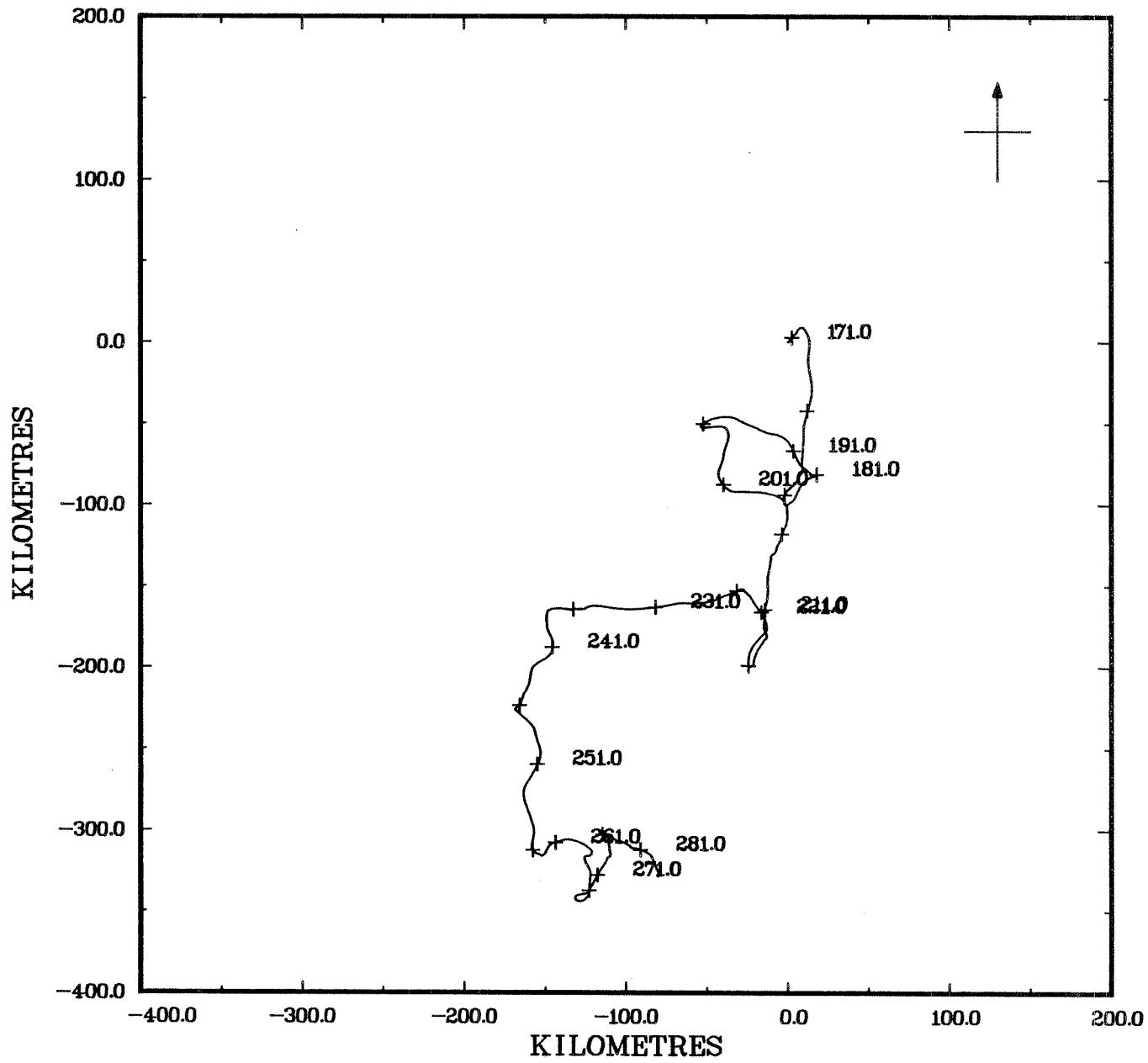
Nominal Depth            100 m  
 Bottom Depth            285 m  
 Latitude                52° 31.98'N  
 Longitude               52° 0.80'W  
 Duration (days)        229.9

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	80.0	81.9	80.9	0.2
Temperature	°C	-1.55	1.51	-0.33	0.66
Salinity		33.11	34.24	33.64	0.24
N-S Component	ms <sup>-1</sup>	-0.22	0.17	-0.034	0.078
E-W Component	ms <sup>-1</sup>	-0.19	0.18	-0.0082	0.070





BELLE ISLE BANK MOORING 7 AT 100 M  
JUNE 21 TO OCTOBER 9 1981

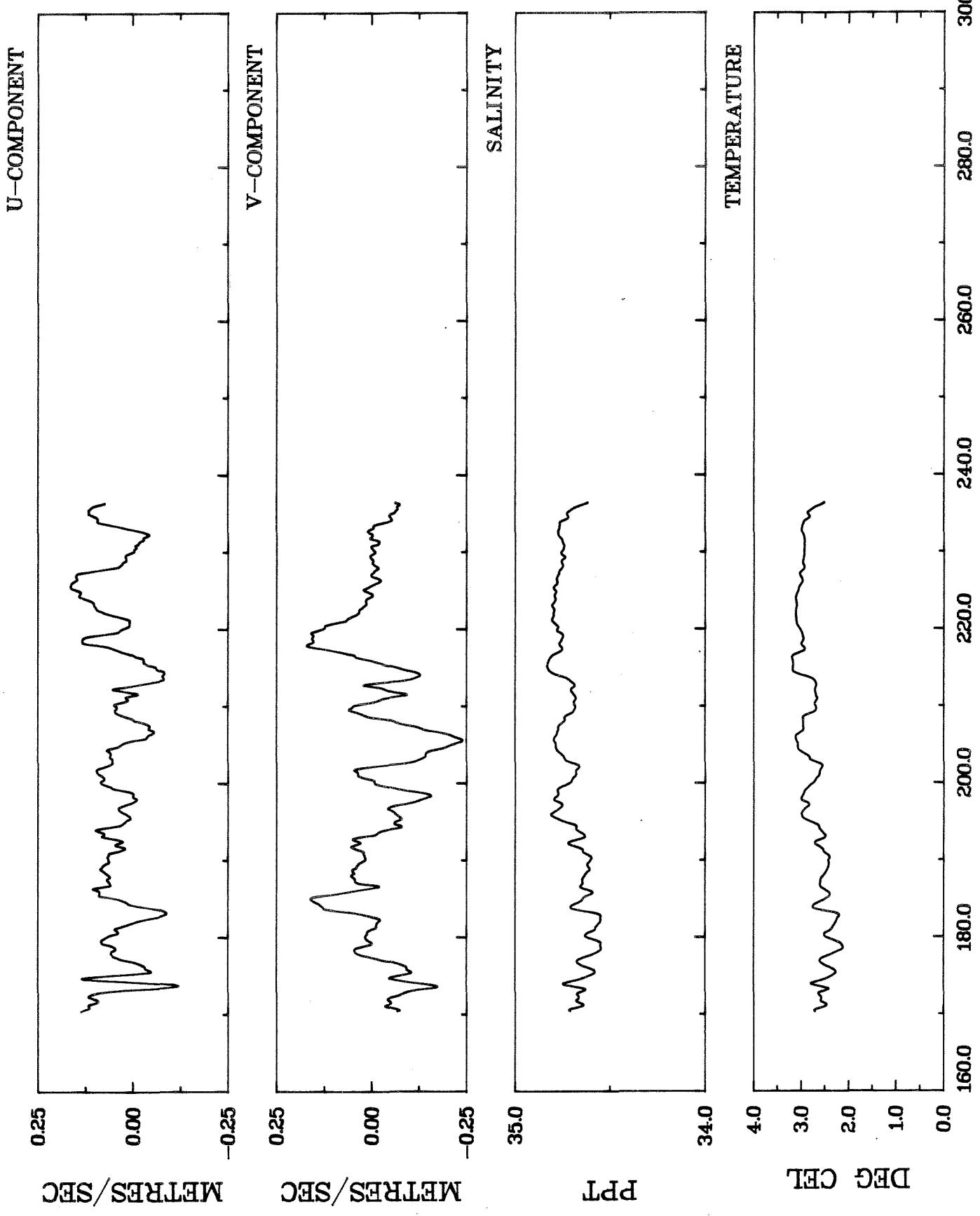


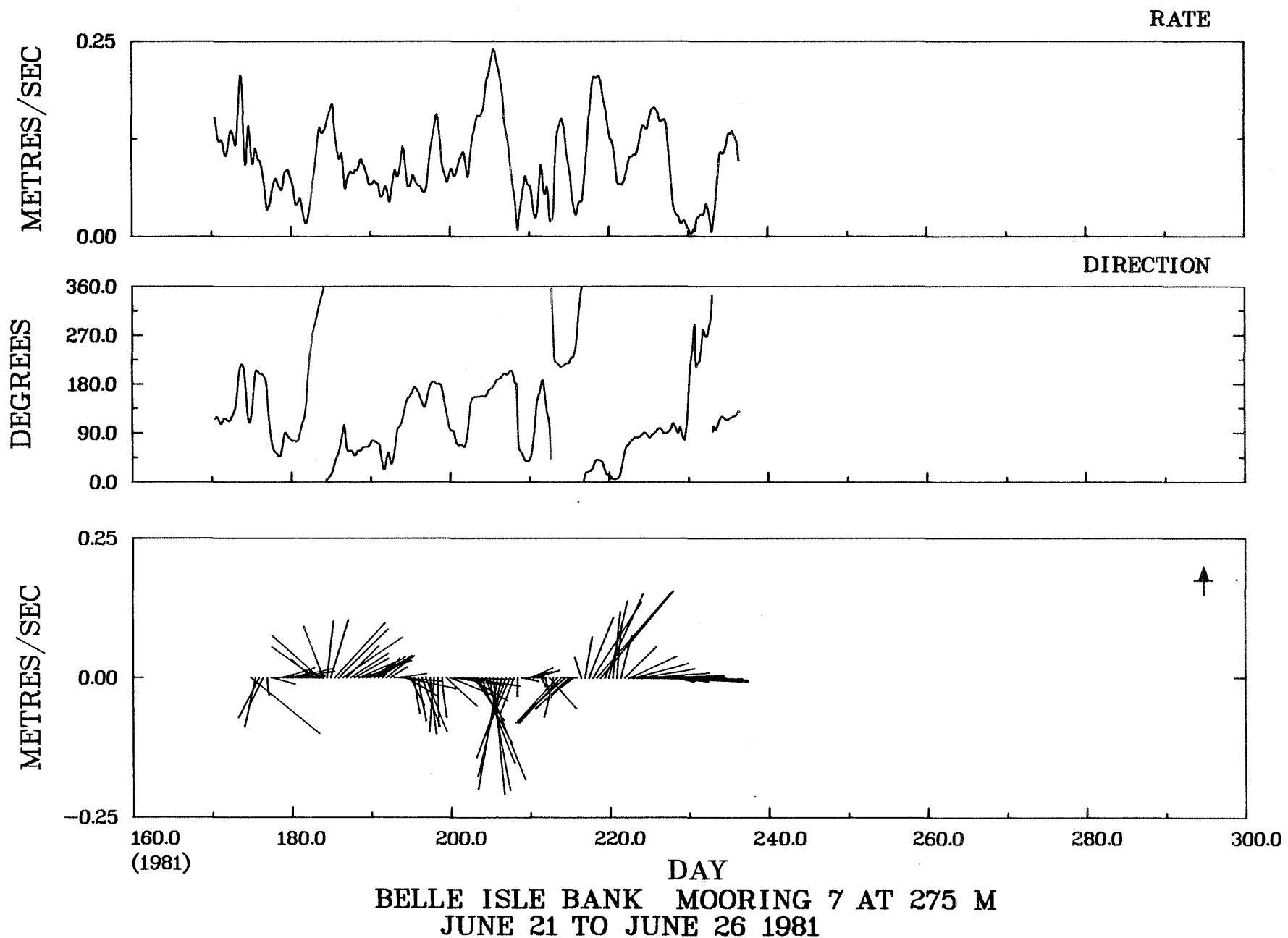
BELLE ISLE BANK MOORING 7 AT 100 M  
JUNE 21 TO OCTOBER 9 1981

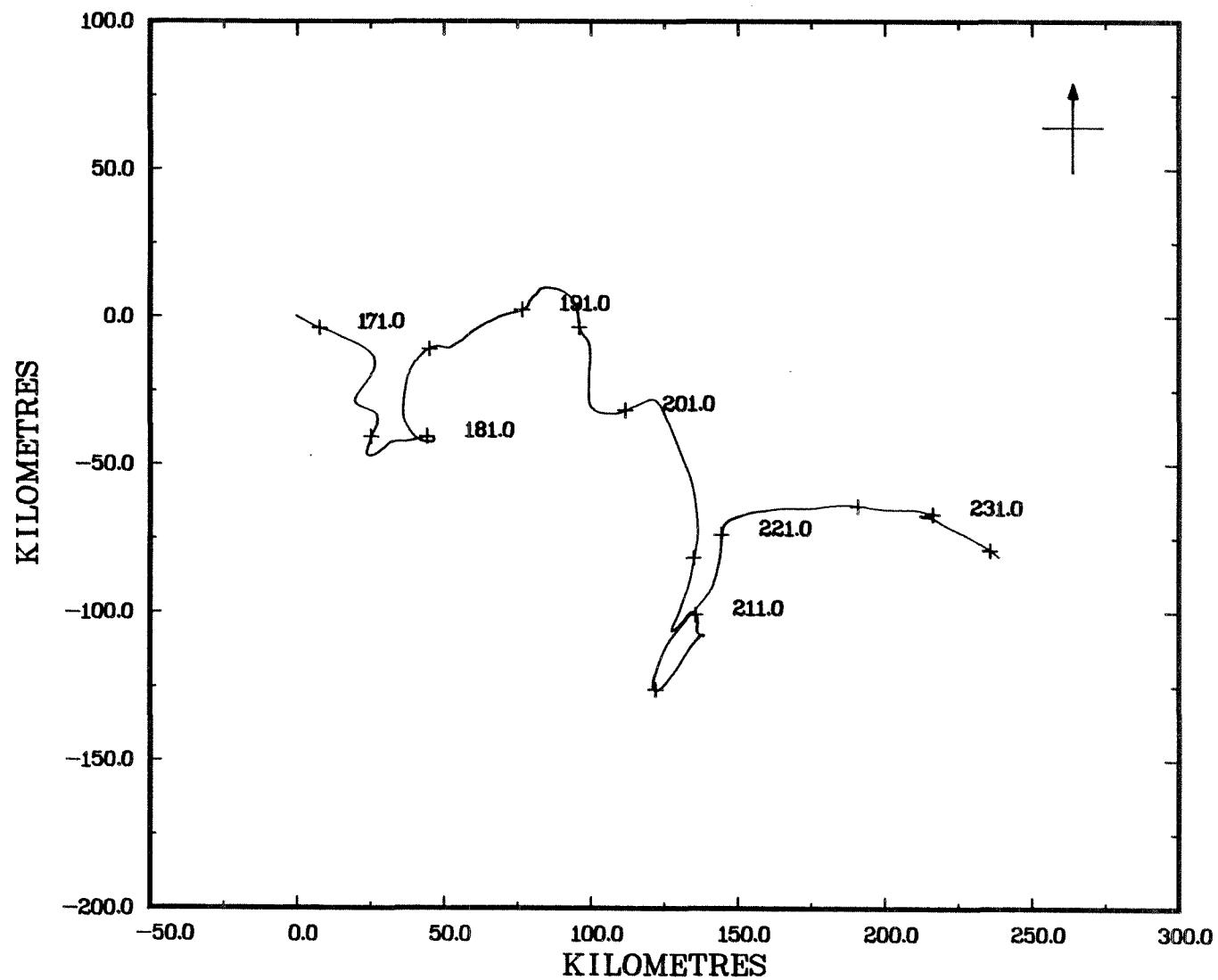
## Mooring 7

Nominal Depth            275 m  
 Bottom Depth            285 m  
 Latitude                52° 31.98' N  
 Longitude               52° 0.80' W  
 Duration (days)        135.8

		Minimum	Maximum	Mean	Std. Dev.
Pressure	db	155.3	276.0	274.3	0.2
Temperature	°C	2.12	3.20	2.76	0.26
Salinity		34.55	34.83	34.71	0.073
N-S Component	ms <sup>-1</sup>	-0.24	0.17	-0.014	0.080
E-W Component	ms <sup>-1</sup>	-0.12	0.16	0.042	0.058







BELLE ISLE BANK MOORING 7 AT 275 M  
JUNE 21 TO JUNE 26 1981