

NATIONAL INSTITUTE OF OCEANOGRAPHY
WORMLEY, GODALMING, SURREY

NEUTRALLY BUOYANT FLOATS

Serial Nos. 99 - 119

June - August 1960

TABLES AND DIAGRAMS

by

G. F. CASTON

and

J. C. SWALLOW

N.I.O. INTERNAL REPORT No. D. 7

March 1971

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Tables of times and positions.
Diagrams showing trajectories
and components of displacement.

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Introduction

This is the fourth and final volume of data from neutrally buoyant floats tracked off Bermuda during the "Aries" project. The earlier data are given in Refs. 1, 2 and 3. Those listed here are from observations made in June-August 1960, and all except serial nos. 104-109 were in the neighbourhood of $31\frac{1}{2}^{\circ}\text{N}$, $67\frac{1}{2}^{\circ}\text{W}$. Floats 104-109 were tracked in an area NNE of Bermuda, near 34° - 35°N , 62°W , and showed some exceptionally high speeds.

As before, the trajectories have been re-numbered chronologically, but the original designations of the floats are given as well. Two of the floats (V36 and V39) were built by G.H. Volkmann, and two (B21 and B25) by J.R. Barrett.

Navigation was based on Loran-C (Ref.4) supplemented by Loran-A. Mean velocities have been derived by fitting straight lines to the components of displacement plotted against time, with the fixes subdivided into two or more groups as seemed appropriate. The estimated accuracy given for positions is the relative accuracy. There was a systematic difference between Loran-A and Loran-C, which has been allowed for, but the latter may have a systematic error of its own. At Bermuda, the Loran-C differed from land fixes by approximately 0.5 km.

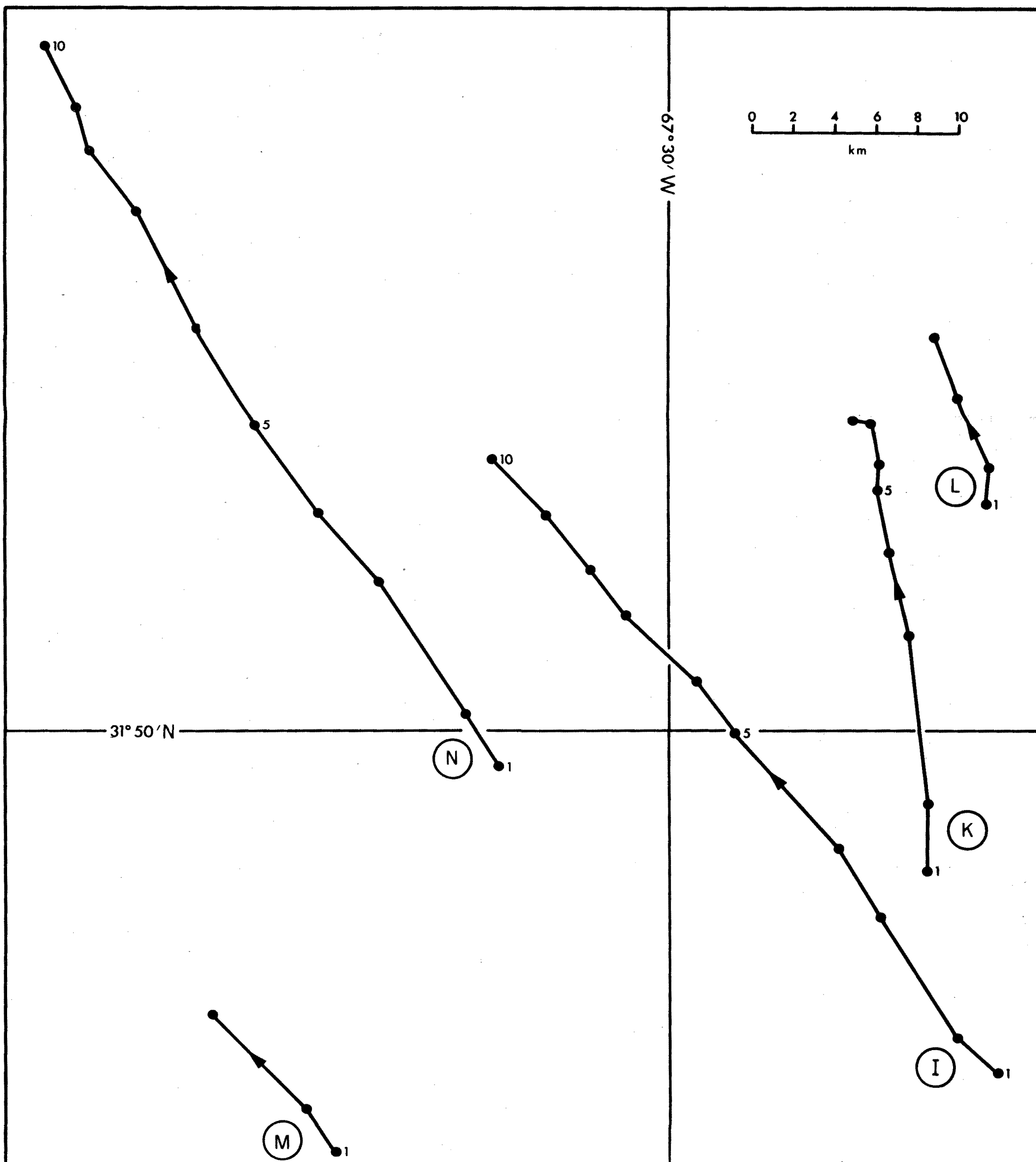
LIST OF FLOATS

Serial No	Original Designation	Date and time laid
99	I	0840/18.VI.60
100	L	1515/18.VI.60
101	N	1200/19.VI.60
102	K	1345/20.VI.60
103	M	1649/21.VI.60
104	O	1540/3.VII.60
105	P	0928/4.VII.60
106	Q	1328/5.VII.60
107	H12	1648/6.VII.60
108	V39	1005/7.VII.60
109	V36	1112/10.VII.60
110	R	0935/24.VII.60
111	U	1338/24.VII.60
112	WX	1248/25.VII.60
113	S	1213/26.VII.60
114	Z	1032/11.VIII.60
115	V	1112/11.VIII.60
116	Y	1150/11.VIII.60
117	S4	1053/12.VIII.60
118	B21	1137/12.VIII.60
119	B25	0955/12.VIII.60

REFERENCES

1. Caston, G.F. and J.C. Swallow, 1970. Neutrally Buoyant Floats, Serial Nos. 40-58, June-October 1959. Tables and Diagrams. N.I.O. Internal Report No. D4.
2. Caston, G.F. and J.C. Swallow, 1970. Neutrally Buoyant Floats, Serial Nos. 59-77, November-December 1959. Tables and Diagrams. N.I.O. Internal Report No. D5.
3. Caston, G.F. and J.C. Swallow, 1971. Neutrally Buoyant Floats, Serial Nos 78-98, February-June 1960. Tables and Diagrams. N.I.O. Internal Report No. D6.
4. Walden, R.G. 1961. An Interim Loran-C Receiving System. W.H.O.I. Technical Report No. 61-22 (unpublished manuscript).

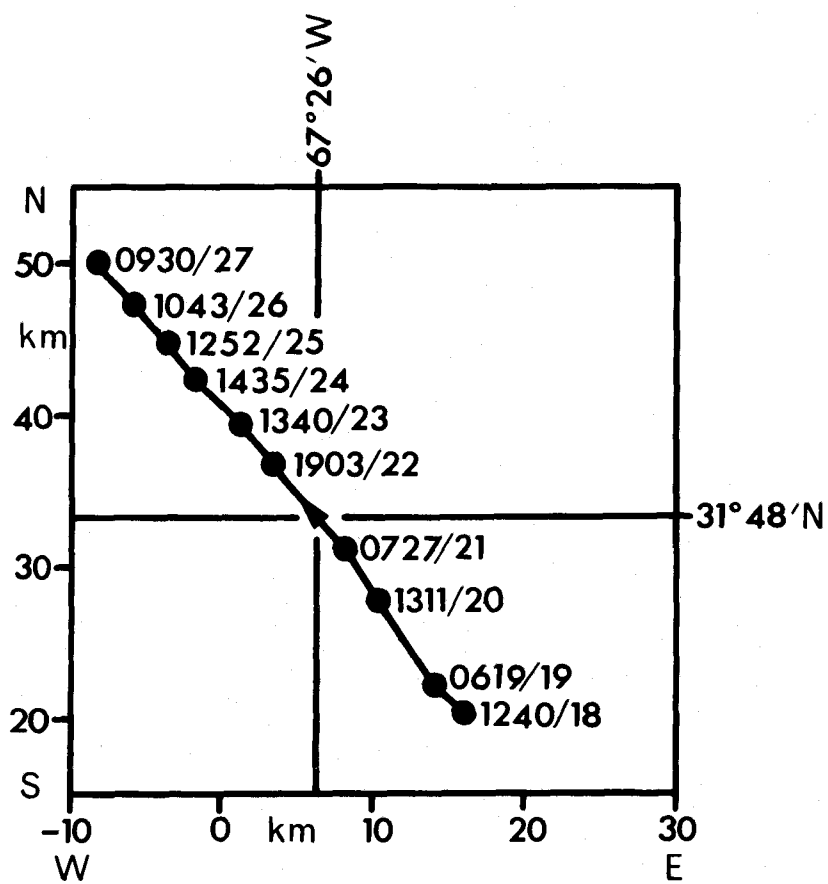
FLOAT DESIGNATIONS: I(laid 0840/18.VI.60), L(laid 1515/18.VI.60), N(laid 1200/19.VI.60),
K(laid 1345/20.VI.60), M(laid 1649/21.VI.60).



SERIAL Nos: 99-103

FLOAT DESIGNATION: I

Date and time laid: 0840/18.VI.60.



FLOAT DESIGNATION: I

Date and time laid: 0840/18.VI.60

Position laid: $31^{\circ} 40' .88N$, $67^{\circ} 19' .61W$ Displacement origin: $31^{\circ} 30' N$
 $(16.4 \text{ km E}, 20.1 \text{ km N})$ $67^{\circ} 30' W$

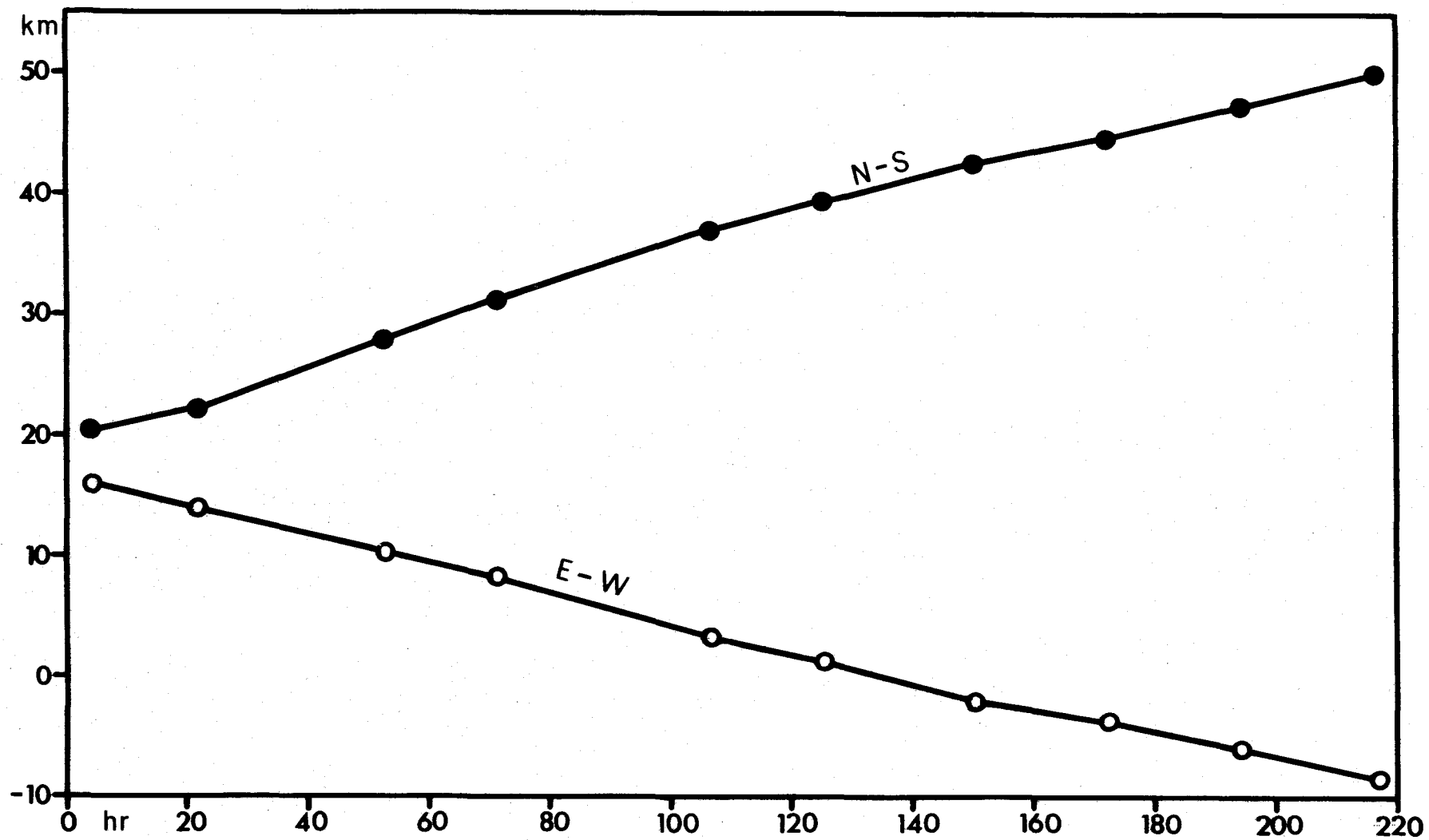
Navigation based on: Loran C

Estimated accuracy of positions: $\pm 0.2 \text{ km}$ (relative)

Depth(m): Nominal Observed S.D. S.D.(mean)
 2000 1780 ± 300 ± 60

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	18.VI	1240	$31^{\circ} 41' .05$	$67^{\circ} 19' .92$	4.0	+15.9	+20.4	+0.2	-0.6
2	19.VI	0619	$31^{\circ} 42' .02$	$67^{\circ} 21' .20$	21.6	+13.9	+22.2	+0.2	-1.3
3	20.VI	1311	$31^{\circ} 45' .15$	$67^{\circ} 23' .50$	52.5	+10.2	+28.0	+0.1	+0.1
4	21.VI	0727	$31^{\circ} 46' .94$	$67^{\circ} 24' .81$	70.8	+8.2	+31.3	+0.3	+0.8
5	22.VI	1903	$31^{\circ} 49' .95$	$67^{\circ} 27' .95$	106.4	+3.2	+36.9	-0.6	+1.3
6	23.VI	1340	$31^{\circ} 51' .30$	$67^{\circ} 29' .20$	125.0	+1.3	+39.4	-0.4	+1.1
7	24.VI	1435	$31^{\circ} 53' .05$	$67^{\circ} 31' .30$	149.9	-2.1	+42.6	-0.9	+0.8
8	25.VI	1252	$31^{\circ} 54' .23$	$67^{\circ} 32' .40$	172.2	-3.8	+44.8	0.0	-0.2
9	26.VI	1043	$31^{\circ} 55' .64$	$67^{\circ} 33' .74$	194.0	-5.9	+47.4	+0.5	-0.7
10	27.VI	0930	$31^{\circ} 57' .10$	$67^{\circ} 35' .38$	216.8	-8.5	+50.1	+0.5	-1.2

Fitted lines: $x = -0.116 t + 16.2$ $y = +0.142 t + 20.5$ Mean velocity = $5.1(\pm 0.1) \text{ cm/sec}$, $321(\pm 7)^{\circ} T$

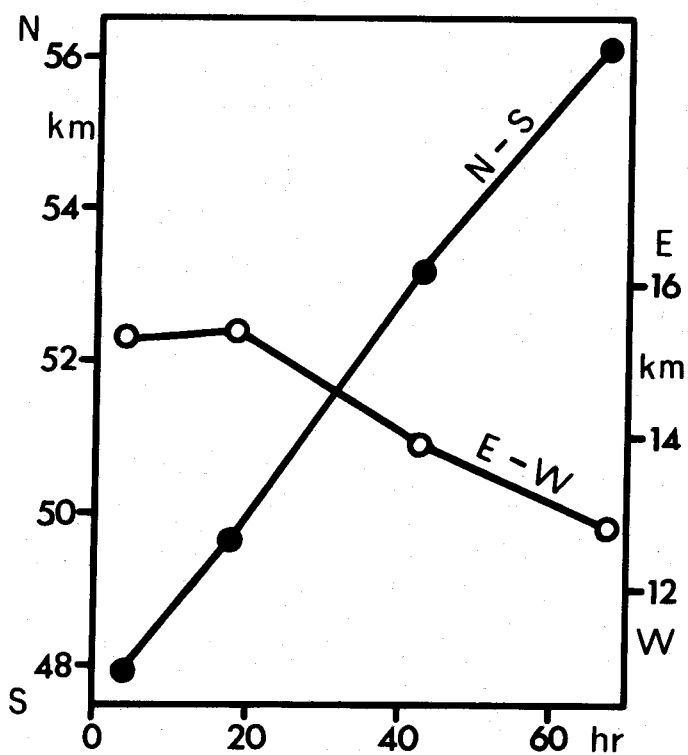
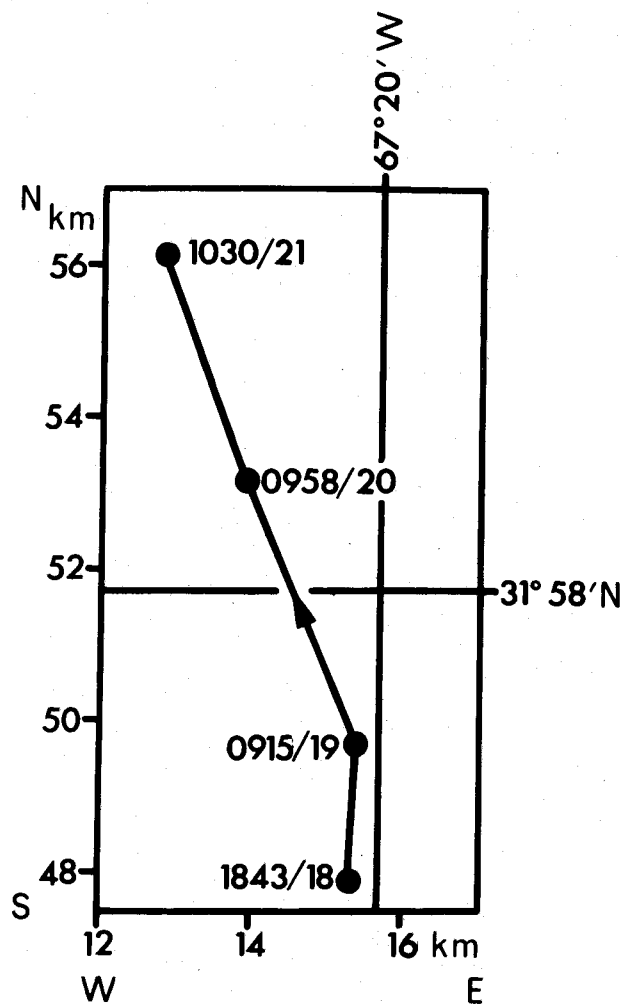


FLOAT DESIGNATION: I

Date and time laid: 0840/18.VI.60.

FLOAT DESIGNATION: L

Date and time laid: 1515/18.VI.60.



FLOAT DESIGNATION: L

Date and time laid: 1515/18.VI.60

Position laid: $31^{\circ} 55' .62N$, $67^{\circ} 19' .86W$
(16.0km E, 47.3 km N)

Displacement origin: $31^{\circ} 30'N$
 $67^{\circ} 30'W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.1 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1840	± 260	± 90

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	18.VI	1843	$31^{\circ} 55' .93$	$67^{\circ} 20' .30$	3.5	+15.3	+47.9	-0.3	0.0
2	19.VI	0915	$31^{\circ} 56' .88$	$67^{\circ} 20' .20$	18.0	+15.4	+49.7	+0.4	-0.1
3	20.VI	0958	$31^{\circ} 58' .78$	$67^{\circ} 21' .18$	42.7	+13.9	+53.2	0.0	+0.2
4	21.VI	1030	$32^{\circ} 00' .36$	$67^{\circ} 21' .90$	67.2	+12.8	+56.1	-0.1	-0.1

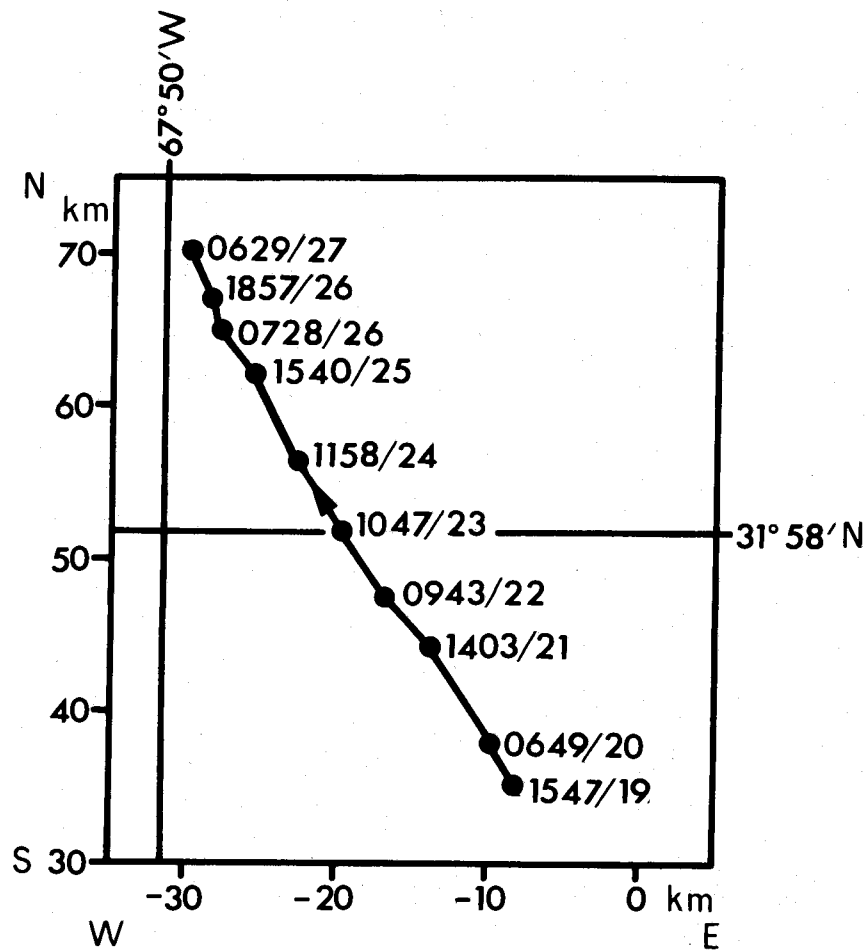
Fitted lines: $x = - 0.043 t + 15.8$

$y = + 0.130 t + 47.4$

Mean velocity = $3.8(\pm 0.1)$ cm/sec, $342(\pm 3)^{\circ}T$

FLOAT DESIGNATION: N

Date and time laid: 1200/19.VI.60.



FLOAT DESIGNATION: N

Date and time laid: 1200/19.VI.60

Position laid: $31^{\circ}48'92''N$, $67^{\circ}34'62''W$
(7.3 kmW, 35.0 kmN)Displacement origin: $31^{\circ}30'N$
 $67^{\circ}30'W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.3 km

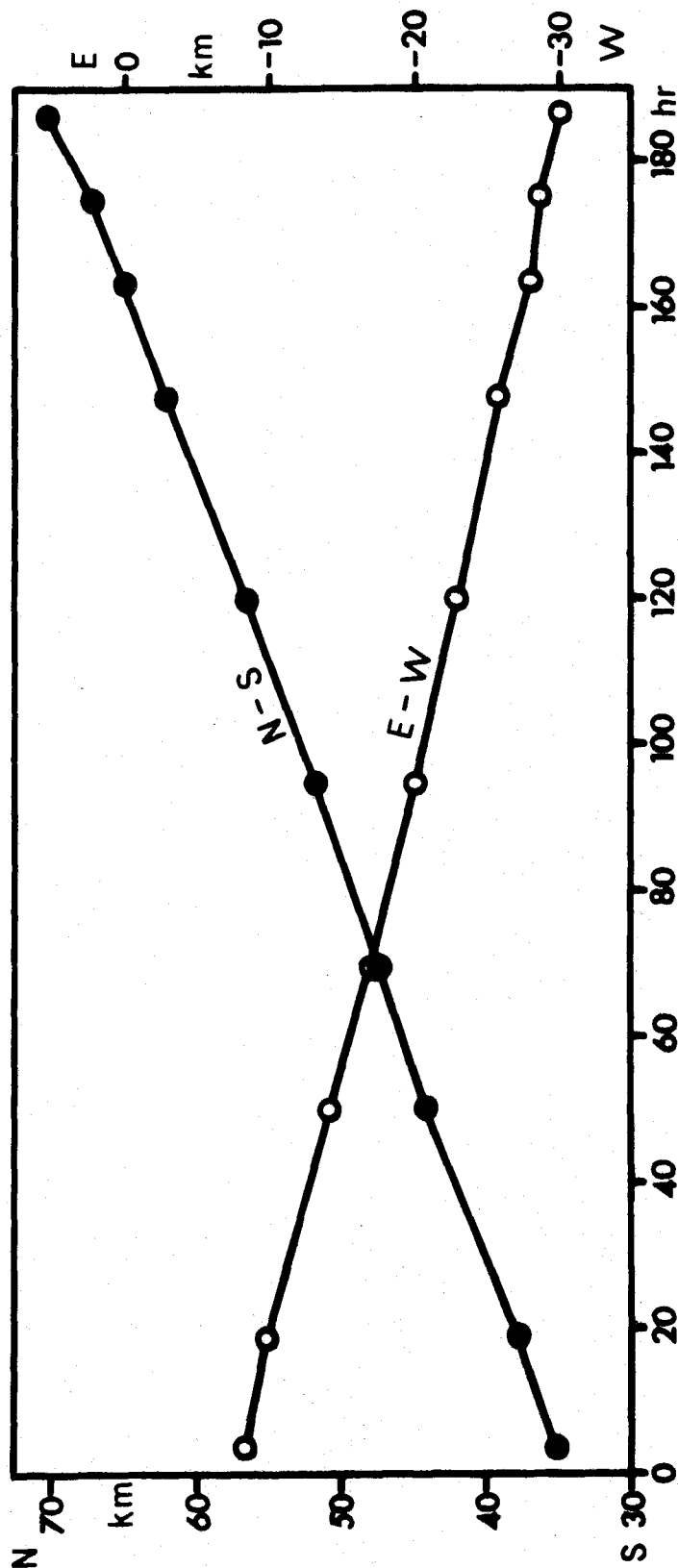
Depth (m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1990	± 500	± 100

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	19.VI	1547	$31^{\circ}49'08''$	$67^{\circ}35'20''$	3.8	-8.2	+35.3	+0.3	+0.2
2	20.VI	0649	$31^{\circ}50'44''$	$67^{\circ}36'20''$	18.8	-9.8	+37.8	+0.5	-0.1
3	21.VI	1403	$31^{\circ}53'93''$	$67^{\circ}38'88''$	50.0	-14.0	+44.2	0.0	+0.4
4	22.VI	0943	$31^{\circ}55'70''$	$67^{\circ}40'71''$	69.7	-16.9	+47.5	-0.5	0.0
5	23.VI	1047	$31^{\circ}58'06''$	$67^{\circ}42'70''$	94.8	-20.0	+51.8	-0.6	-0.4
6	24.VI	1158	$32^{\circ}00'56''$	$67^{\circ}44'49''$	120.0	-22.8	+56.5	-0.3	-0.5
7	25.VI	1540	$32^{\circ}03'66''$	$67^{\circ}46'35''$	147.7	-25.7	+62.2	+0.1	0.0
8	26.VI	0728	$32^{\circ}05'23''$	$67^{\circ}47'80''$	163.5	-28.0	+65.1	-0.3	-0.1
9	26.VI	1857	$32^{\circ}06'38''$	$67^{\circ}48'14''$	175.0	-28.6	+67.2	+0.5	-0.2
10	27.VI	0629	$32^{\circ}07'98''$	$67^{\circ}49'13''$	186.5	-30.1	+70.2	+0.4	+0.7

Fitted lines: $x = -0.120 t - 8.0$ $y = +0.188 t + 34.4$ Mean velocity = $6.2(\pm 0.1)$ cm/sec, $327(\pm 0.4)^{\circ}T$

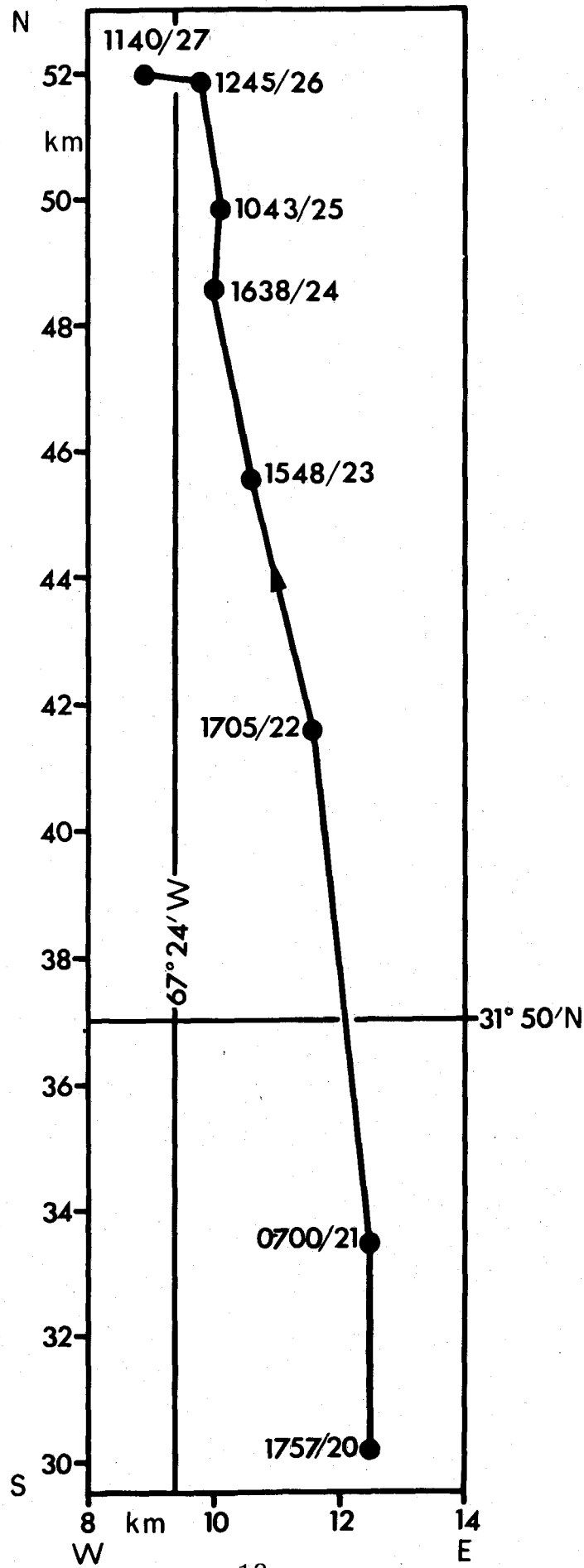
FLOAT DESIGNATION: N

Date and time laid: 1200/19.VI.60.



FLOAT DESIGNATION: K

Date and time laid: 1345/20.VI.60.



FLOAT DESIGNATION: K

Date and time laid: 1345/20.VI.60

Position laid: $31^{\circ} 46' .26N$, $67^{\circ} 22' .01W$
(12.6 kmE, 30.0 kmN)Displacement origin: $31^{\circ} 30'N$
 $67^{\circ} 30'W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.2 km

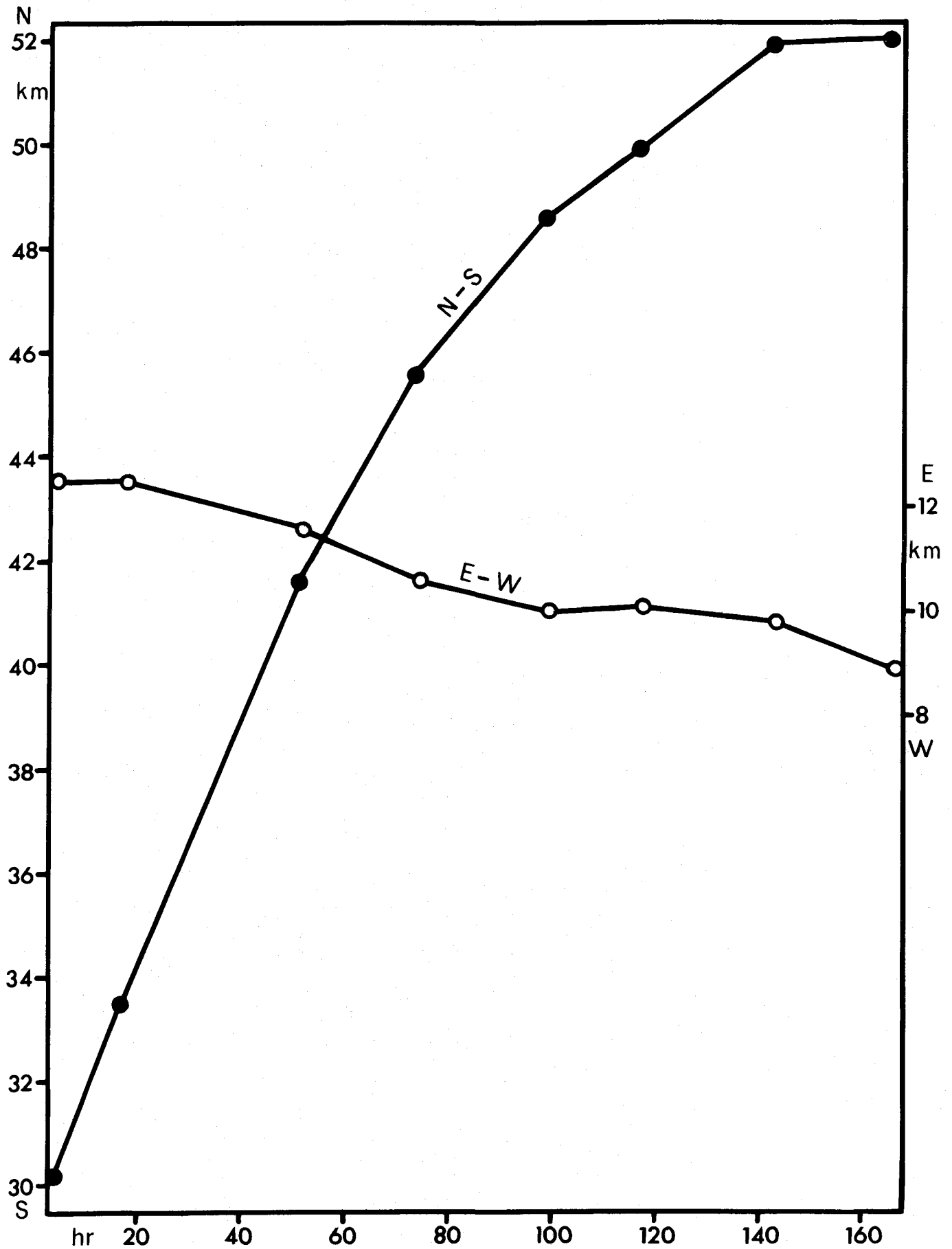
Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	3690	± 660	± 160

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	20.VI	1757	$31^{\circ} 46' .35$	$67^{\circ} 22' .05$	4.2	+12.5	+30.2	0.0	-2.9
2	21.VI	0700	$31^{\circ} 48' .15$	$67^{\circ} 22' .08$	17.2	+12.5	+33.5	+0.3	-1.4
3	22.VI	1705	$31^{\circ} 52' .52$	$67^{\circ} 22' .66$	51.3	+11.6	+41.6	+0.1	+2.0
4	23.VI	1548	$31^{\circ} 54' .70$	$67^{\circ} 23' .25$	74.0	+10.6	+45.6	-0.4	+2.8
5	24.VI	1638	$31^{\circ} 56' .30$	$67^{\circ} 23' .66$	98.9	+10.0	+48.6	-0.4	+2.4
6	25.VI	1043	$31^{\circ} 56' .99$	$67^{\circ} 23' .58$	117.0	+10.1	+49.9	+0.1	+1.2
7	26.VI	1245	$31^{\circ} 58' .08$	$67^{\circ} 23' .77$	143.0	+9.8	+51.9	+0.4	-0.4
8	27.VI	1140	$31^{\circ} 58' .15$	$67^{\circ} 24' .34$	165.9	+8.9	+52.0	0.0	-3.5

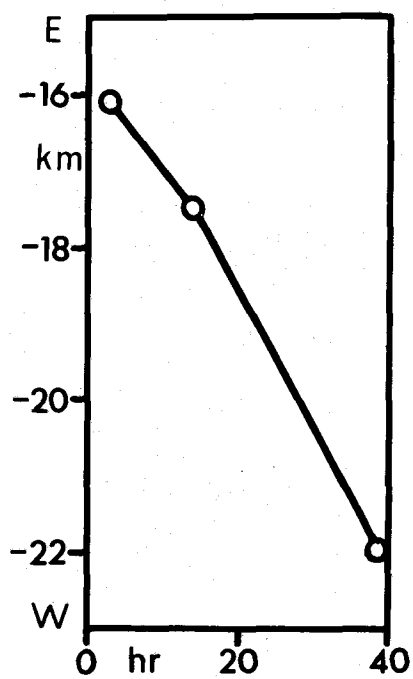
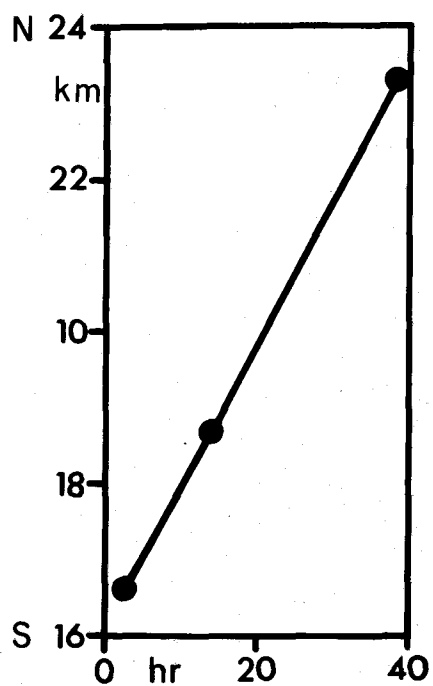
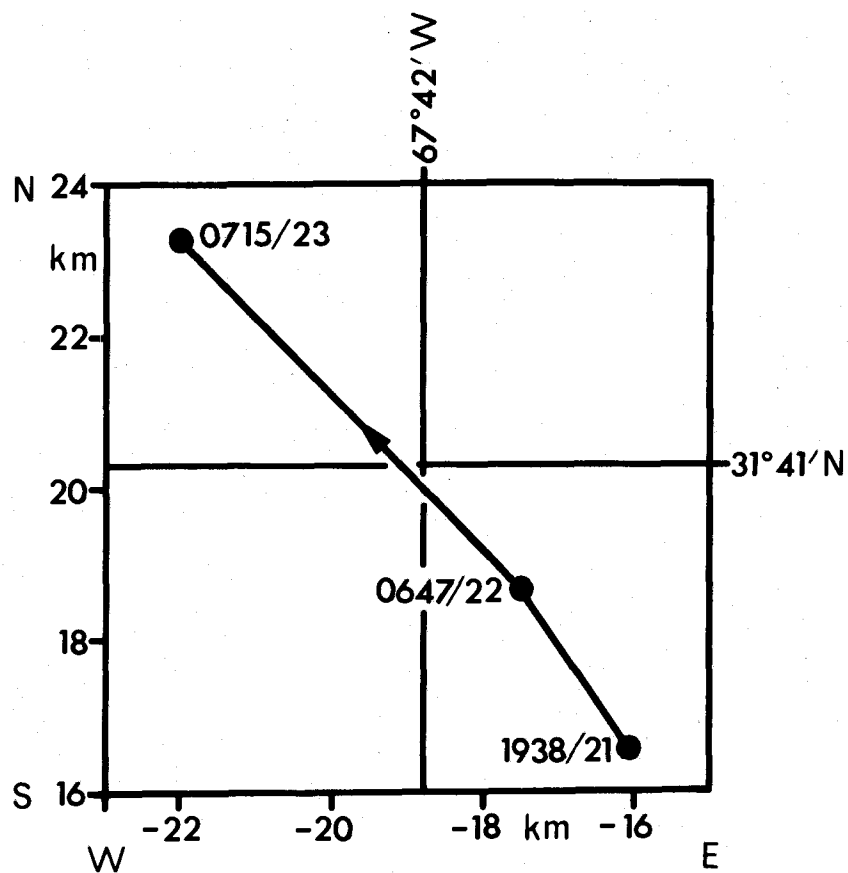
Fitted lines: $x = -0.022 t + 12.6$ $y = +0.138 t + 32.6$ Mean velocity = $3.9(\pm 0.5)$ cm/sec, $351(\pm 0.8)^{\circ}T$

FLOAT DESIGNATION: K

Date and time laid: 1345/20.VI.60.



FLOAT DESIGNATION: M Date and time laid: 1649/21.VI.60.



FLOAT DESIGNATION: M

Date and time laid: 1649/21.VI.60

Position laid: $31^{\circ} 38' .87N$ $67^{\circ} 40' .00W$
(15.7 km W, 16.4 kmN)

Displacement origin: $31^{\circ} 30'N$
 $67^{\circ} 30'W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.3 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1680	± 470	± 180

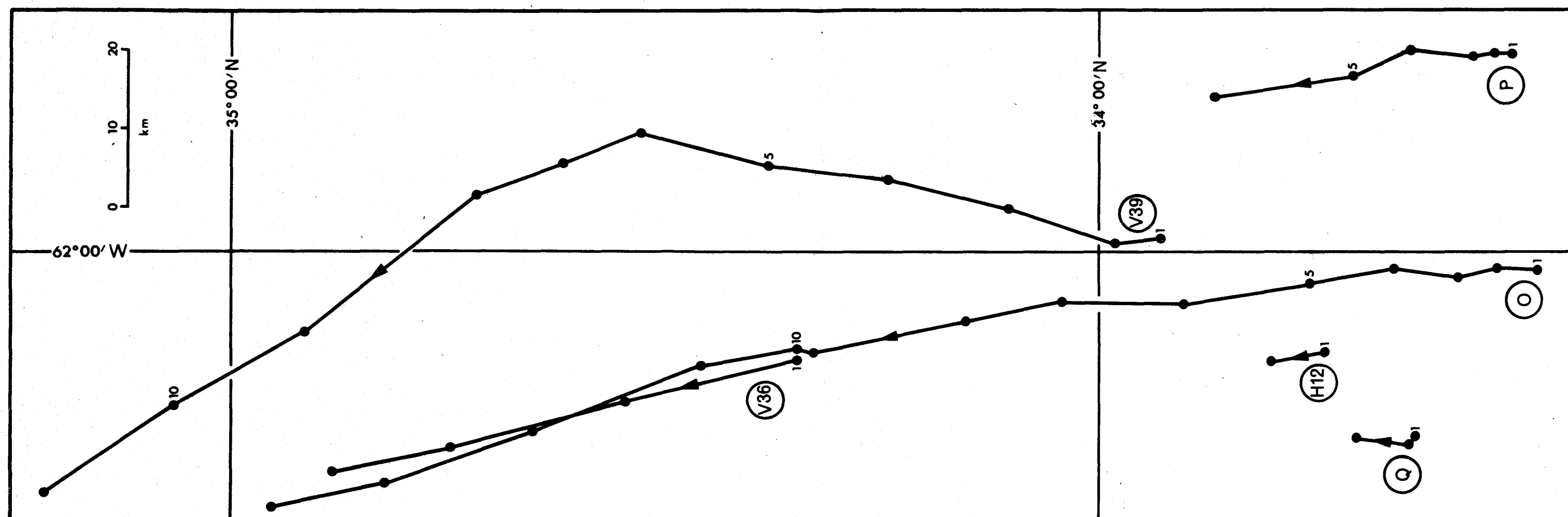
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	21.VI	1938	$31^{\circ}39' .00$	$67^{\circ}40' .20$	2.8	-16.1	+16.6	-0.2	0.0
2	22.VI	0647	$31^{\circ}40' .10$	$67^{\circ}41' .10$	14.0	-17.5	+18.7	+0.3	0.0
3	23.VI	0715	$31^{\circ}42' .62$	$67^{\circ}43' .94$	38.4	-22.0	+23.3	-0.1	0.0

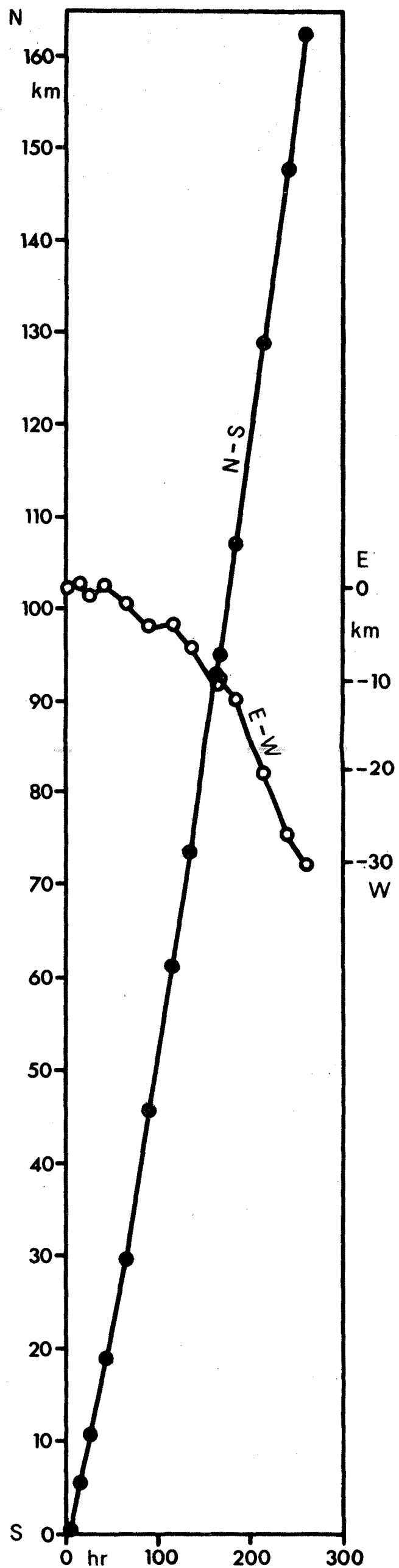
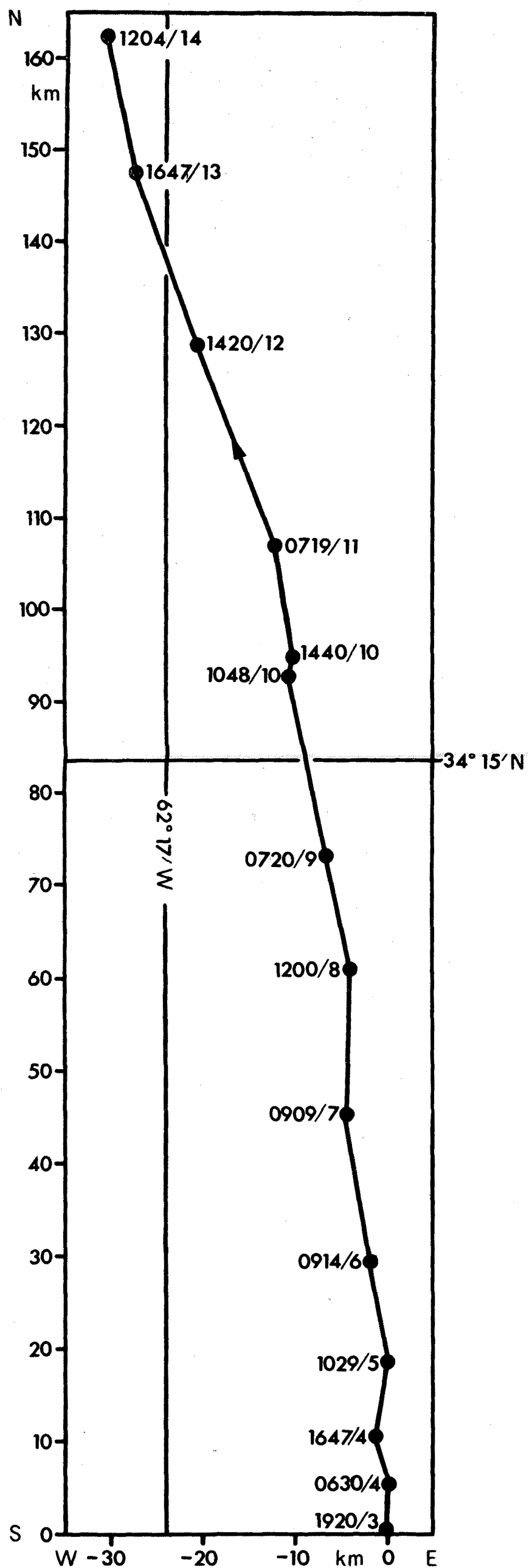
Fitted lines: $x = -0.169 t - 15.4$

$y = +0.188 t + 16.1$

Mean velocity = $7.0(\pm 0.3)$ cm/sec, $318(\pm 2)^{\circ}T$

FLOAT DESIGNATIONS: O(laid 1540/3.VII.60), P(laid 0928/4.VII.60), Q(laid 1328/5.VII.60),
H12(laid 1648/6.VII.60), V39(laid 1005/7.VII.60), V36(laid 1112/10.VII.60).





FLOAT DESIGNATION: 0

Date and time laid: 1540/3.VII.60

Position laid: 33° 29' .79N, 62° 01' .25W

Displacement origin: 33° 29' .79N
62° 01' .25W

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.3 km

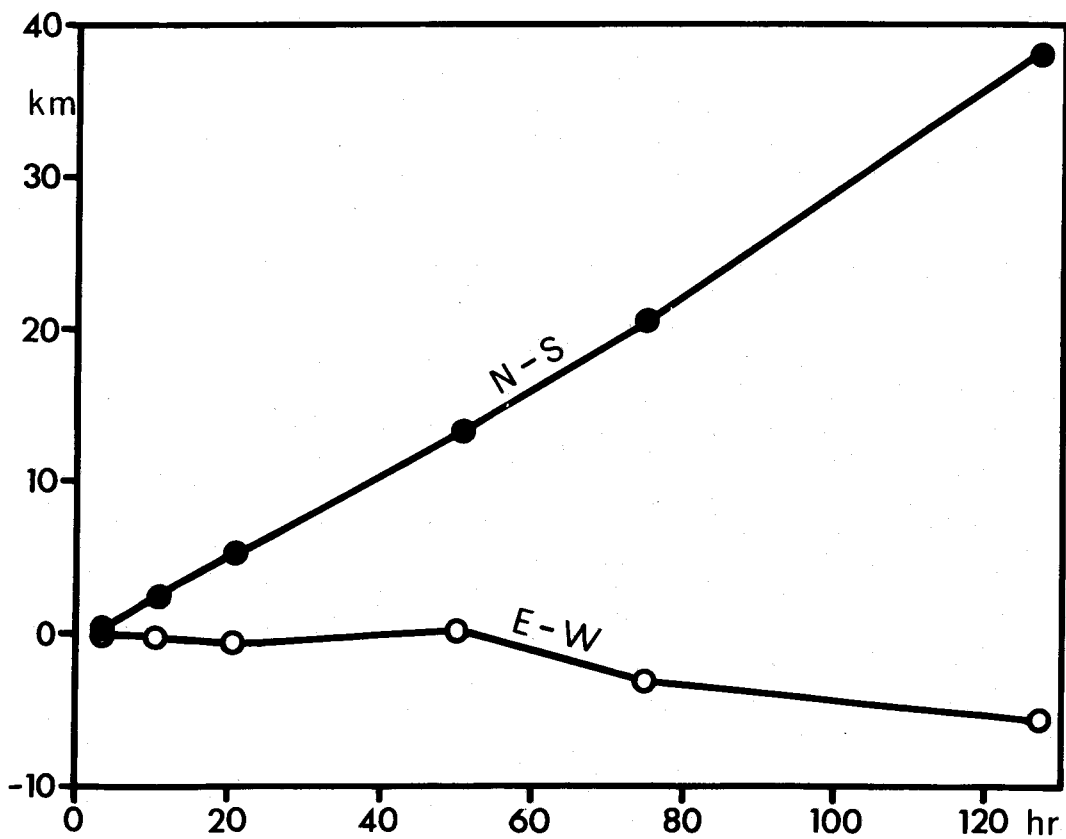
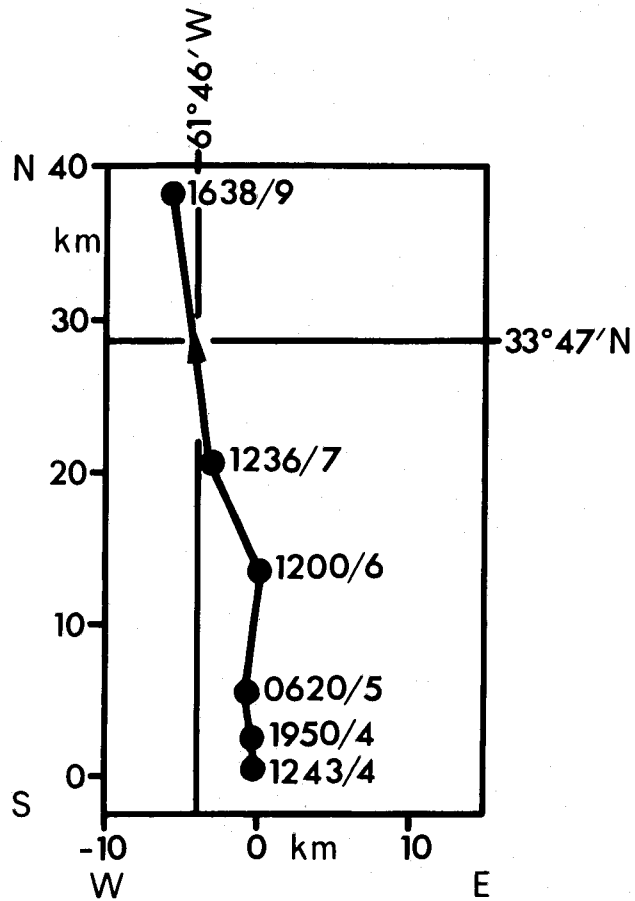
Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1950	± 350	± 80

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	3.VII	1920	33°29' .9	62°01' .4	3.7	-0.2	+0.2	-4.2	+5.7
2	4.VII	0630	33°32' .7	62°01' .2	14.8	+0.1	+5.4	-2.6	+3.9
3	4.VII	1647	33°35' .45	62°02' .05	25.1	-1.2	+10.5	-2.8	+2.5
4	5.VII	1029	33°39' .9	62°01' .25	42.8	0.0	+18.7	+0.4	-0.4
5	6.VII	0914	33°45' .7	62°02' .5	65.6	-1.9	+29.4	+1.0	-4.1
6	7.VII	0909	33°54' .4	62°04' .2	89.5	-4.5	+45.5	+1.1	-3.1
7	8.VII	1200	34°02' .8	62°04' .0	116.3	-4.2	+61.0	+4.3	-4.5
8	9.VII	0720	34°09' .5	62°05' .6	135.7	-6.7	+73.4	+4.0	-4.4
9	10.VII	1048	34°20' .05	62°08' .25	163.1	-10.7	+92.9	+3.0	-2.2
10	10.VII	1440	34°21' .15	62°07' .9	167.0	-10.2	+95.0	+4.0	-2.5
11	11.VII	0719	34°27' .7	62°09' .25	183.6	-12.2	+107.1	+3.8	-0.9
12	12.VII	1420	34°39' .4	62°14' .7	214.7	-20.6	+128.7	-1.1	+1.0
13	13.VII	1647	34°49' .6	62°19' .2	241.1	-27.3	+147.6	-4.9	+3.3
14	14.VII	1204	34°57' .5	62°21' .2	260.4	-30.4	+162.2	-5.9	+5.7

Fitted lines: $x = -0.111 t + 4.4$ $y = +0.631 t - 7.9$ Mean velocity = $17.8(\pm 0.3)$ cm/sec, $350(\pm 1)^\circ \text{T}$

FLOAT DESIGNATION: P

Date and time laid: 0928/4.VII.60.



FLOAT DESIGNATION: P

Date and time laid: 0928/4.VII.60

Position laid: $33^{\circ} 31'.55N$, $61^{\circ} 43'.45W$ Displacement origin: $33^{\circ} 31'.55N$
 $61^{\circ} 43'.45W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.3 km

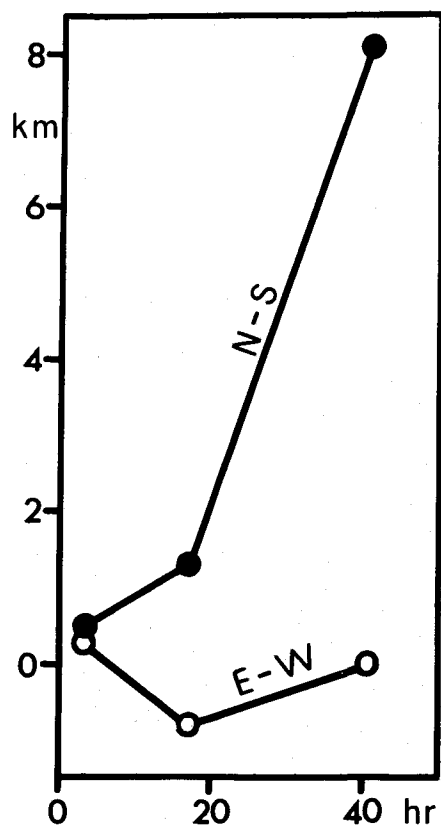
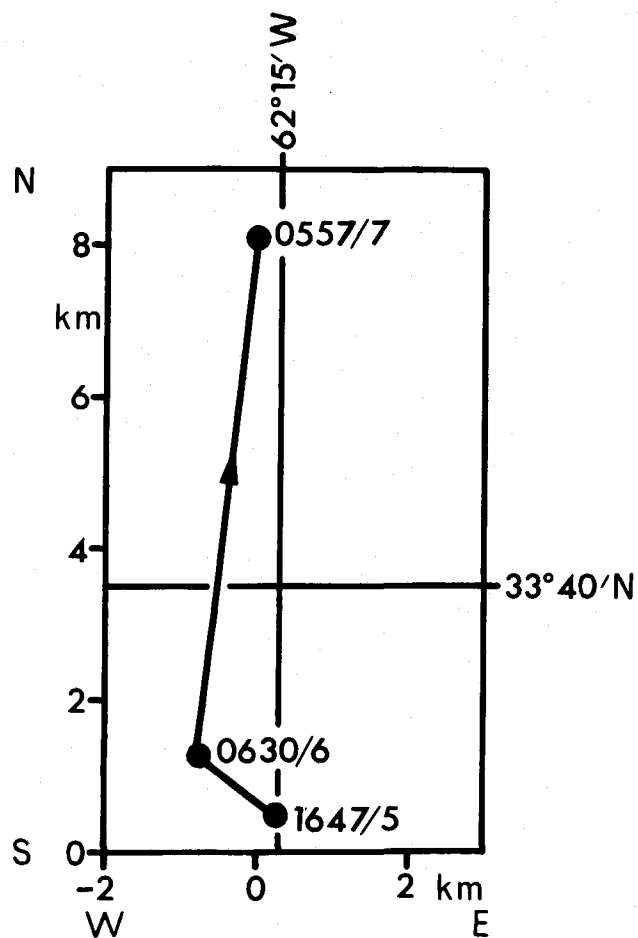
Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	2058	± 850	± 300

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	4.VII	1243	$33^{\circ} 31'.65$	$61^{\circ} 43'.60$	3.2	-0.2	+0.2	-0.6	+0.4
2	4.VII	1950	$33^{\circ} 32'.90$	$61^{\circ} 43'.60$	10.4	-0.2	+2.5	-0.3	+0.5
3	5.VII	0620	$33^{\circ} 34'.4$	$61^{\circ} 43'.9$	20.9	-0.7	+5.3	-0.3	+0.1
4	6.VII	1200	$33^{\circ} 38'.8$	$61^{\circ} 43'.3$	50.5	+0.2	+13.4	+1.9	-0.8
5	7.VII	1236	$33^{\circ} 42'.7$	$61^{\circ} 45'.45$	75.1	-3.1	+20.6	-0.3	-1.0
6	9.VII	1638	$33^{\circ} 52'.2$	$61^{\circ} 47'.05$	127.2	-5.6	+38.2	-0.5	+0.8

Fitted lines: $x = -0.044 t + 0.5$ $y = +0.303 t - 1.1$ Mean velocity = $8.5(\pm 0.2)$ cm/sec, $352(\pm 1.8)^{\circ}T$

FLOAT DESIGNATION: Q

Date and time laid: 1328/5.VII.60.



FLOAT DESIGNATION: Q

Date and time laid: 1328/5.VII.60

Position laid: $33^{\circ} 38' \cdot 1N$, $62^{\circ} 15' \cdot 2W$ Displacement origin: $33^{\circ} 38' \cdot 1N$
 $62^{\circ} 15' \cdot 2W$

Navigation based on: Loran C

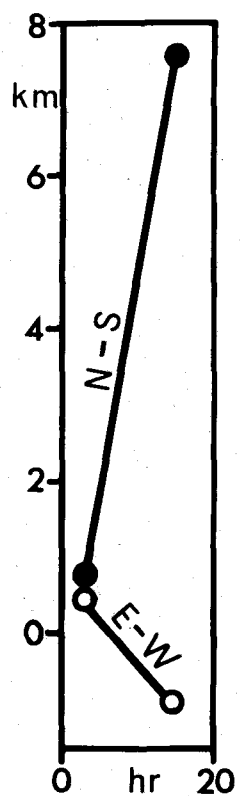
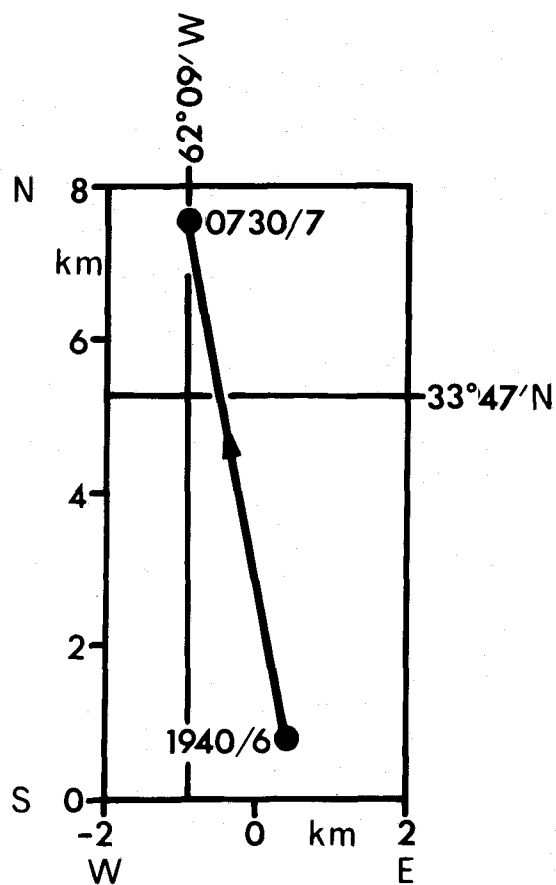
Estimated accuracy of positions: ± 0.5 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	2250	± 950	± 380

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	5.VII	1647	$33^{\circ} 38' \cdot 35$	$62^{\circ} 15' \cdot 0$	3.3	+0.3	+0.5	+0.4	+0.8
2	6.VII	0630	$33^{\circ} 38' \cdot 8$	$62^{\circ} 15' \cdot 7$	17.0	-0.8	+1.3	-0.6	-1.3
3	7.VII	0557	$33^{\circ} 42' \cdot 5$	$62^{\circ} 15' \cdot 2$	40.5	0.0	+8.1	+0.2	+0.5

Fitted lines: $x = -0.003 t - 0.1$ $y = +0.214 t - 1.0$ Mean velocity = $5.9(\pm 1.7)$ cm/sec, $359(\pm 8)^{\circ} T$

FLOAT DESIGNATION: H12 Date and time laid: 1648/6.VII.60.



FLOAT DESIGNATION: H 12

Date and time laid : 1648/6.VII.60

Position laid: 33° 44'.15N, 62° 08'.45 W

Displacement origin: 33° 44'.15 N
62° 08'.45 W

Navigation based on: Loran C

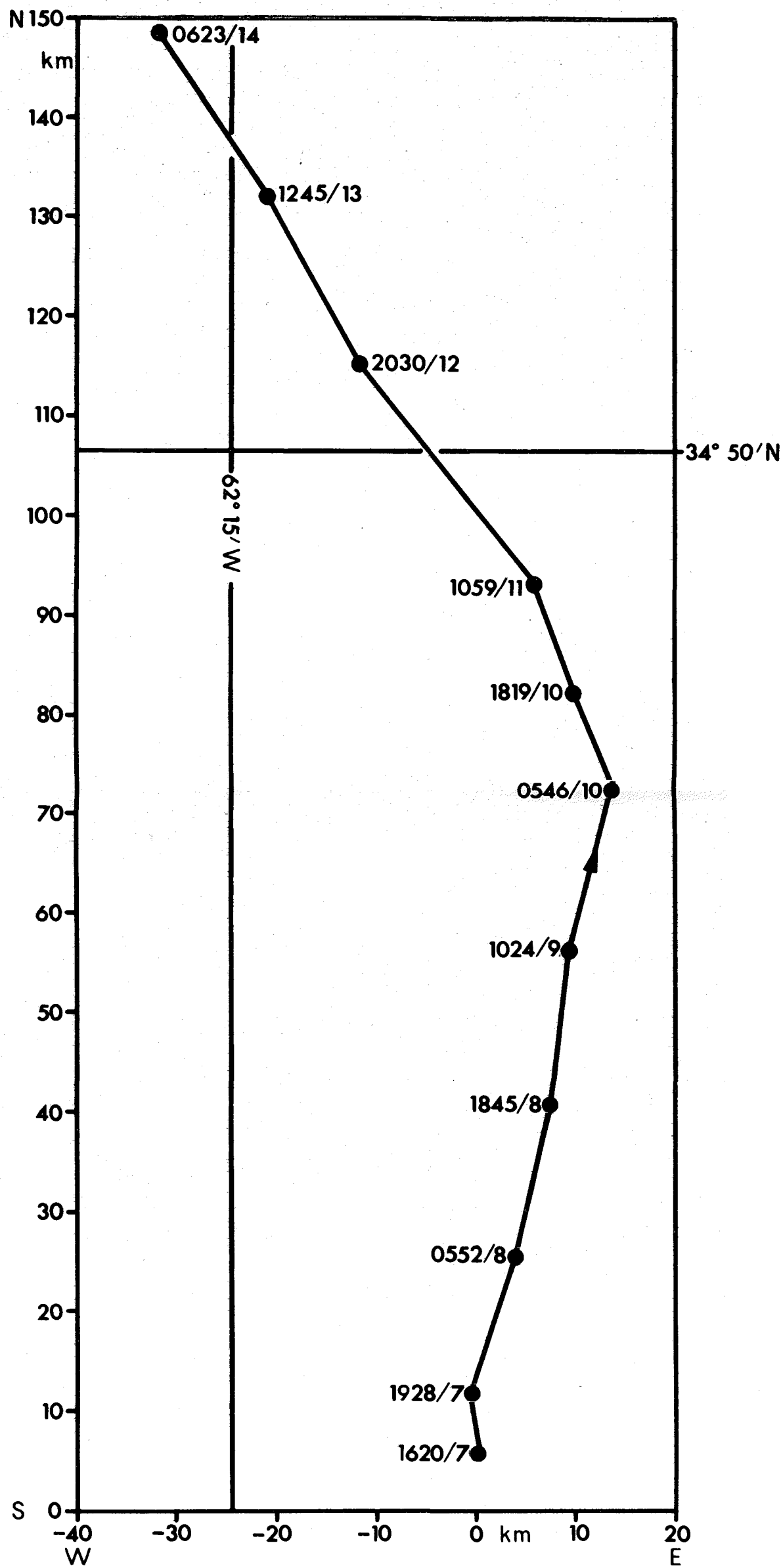
Estimated accuracy of positions: ± 1 km

Depth(m): Nominal Observed S.D.
 2000 1950 $\pm 200^*$

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)	
			Lat.N.	Long.W.		+E-W	+N-S
1	6.VII	1940	33°44'.6	62°08'.20	2.9	+0.4	+0.8
2	7.VII	0730	33°48'.25	62°09'.00	14.7	-0.9	+7.6

Mean velocity, Fixes 1-2, = 16.3cm/sec, 349°T

* Only 2 estimates



FLOAT DESIGNATION: V39 Date and time laid: 1005/7.VII.60.

SERIAL No: 108

FLOAT DESIGNATION: V 39

Date and time laid: 1005/7.VII.60

Position laid: $33^{\circ}52' \cdot 71N$, $61^{\circ}58' \cdot 93W$ Displacement origin: $33^{\circ}52' \cdot 71N$
 $61^{\circ}58' \cdot 93W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.5 km

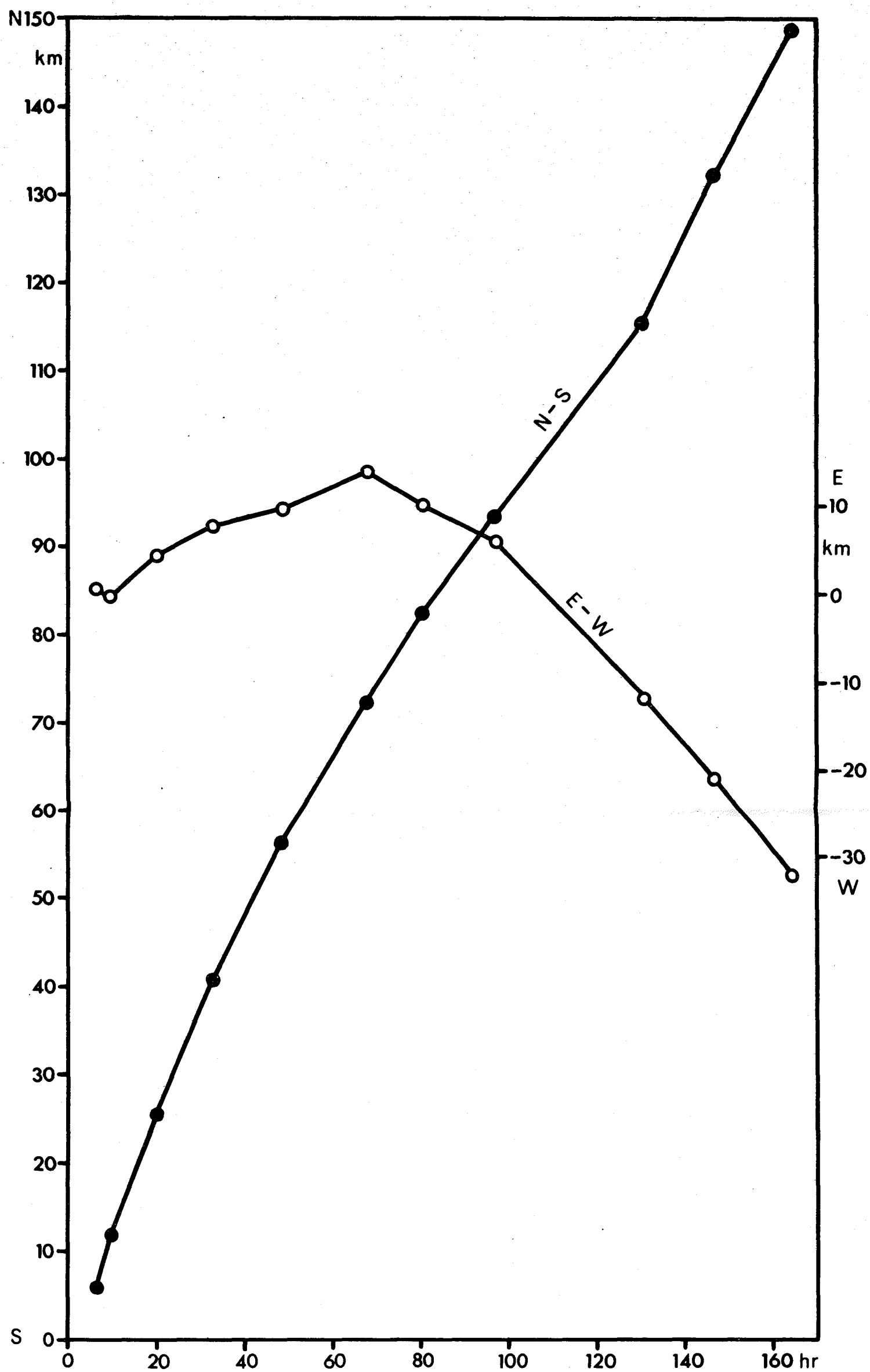
Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	4360	± 900	± 240

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	7.VII	1620	$33^{\circ}55' \cdot 9$	$61^{\circ}58' \cdot 8$	6.2	+0.2	+5.9	0.0	-3.1
2	7.VII	1928	$33^{\circ}59' \cdot 1$	$61^{\circ}59' \cdot 25$	9.4	-0.5	+11.8	-1.4	-0.6
3	8.VII	0552	$34^{\circ}06' \cdot 45$	$61^{\circ}56' \cdot 3$	19.8	+4.0	+25.4	+0.7	+1.7
4	8.VII	1845	$34^{\circ}14' \cdot 7$	$61^{\circ}54' \cdot 0$	32.7	+7.6	+40.7	+1.4	+3.1
5	9.VII	1024	$34^{\circ}23' \cdot 1$	$61^{\circ}52' \cdot 8$	48.3	+9.4	+56.2	-0.3	+1.8
6	10.VII	0546	$34^{\circ}31' \cdot 9$	$61^{\circ}50' \cdot 0$	67.7	+13.7	+72.5	-0.5	-2.9
								-2.6	+0.9
7	10.VII	1819	$34^{\circ}37' \cdot 3$	$61^{\circ}52' \cdot 5$	80.2	+9.8	+82.4	-0.5	+1.2
8	11.VII	1059	$34^{\circ}43' \cdot 2$	$61^{\circ}55' \cdot 2$	96.9	+5.7	+93.4	+3.3	-0.6
9	12.VII	2030	$34^{\circ}55' \cdot 1$	$62^{\circ}06' \cdot 7$	130.4	-11.8	+115.4	+1.8	-4.3
10	13.VII	1245	$35^{\circ}04' \cdot 2$	$62^{\circ}12' \cdot 75$	146.7	-21.0	+132.2	+0.3	-0.1
11	14.VII	0623	$35^{\circ}13' \cdot 15$	$62^{\circ}20' \cdot 05$	164.3	-32.1	+148.7	-2.4	+2.9

Fitted lines: $x = +0.228 t - 1.2$)
 $y = +1.080 t + 2.3$) Fixes 1 - 6

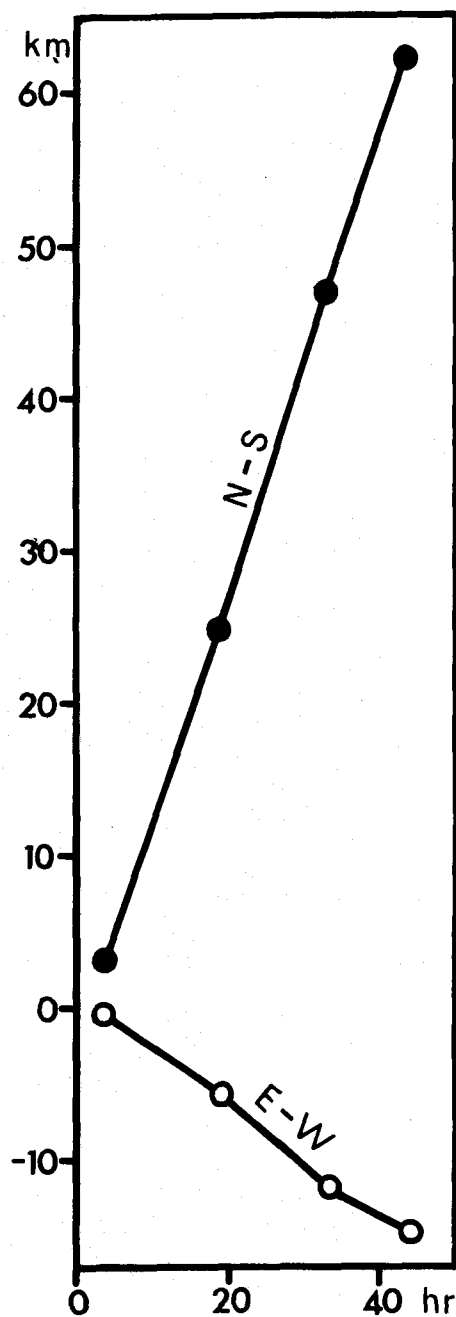
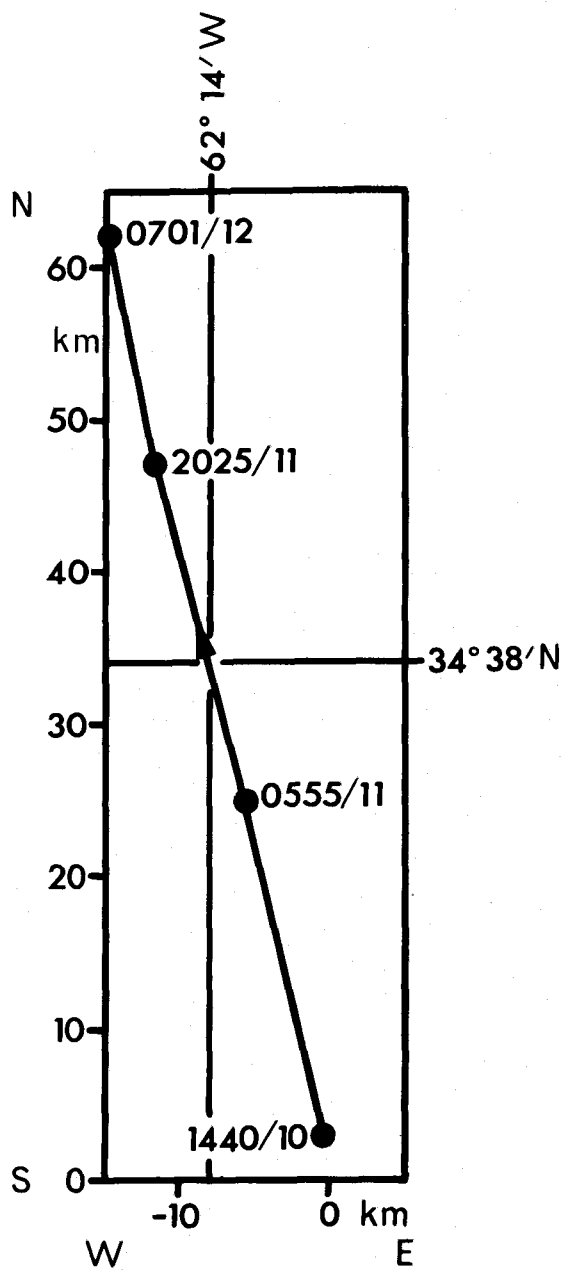
Mean velocity = $30.7(\pm 1.5)$ cm/sec, $012(\pm 0.9)^{\circ}T$
 $x = -0.476 t + 48.4$)
 $y = +0.768 t + 19.6$) Fixes 6 - 11

Mean velocity = $25.1(\pm 0.9)$ cm/sec, $328(\pm 1.2)^{\circ}T$.



FLOAT DESIGNATION: V39 Date and time laid: 1005/7.VII.60.

FLOAT DESIGNATION: V36 Date and time laid: 1112/10.VII.60.



FLOAT DESIGNATION: V 36

Date and time laid: 1112/10.VII.60

Position laid: $34^{\circ} 19' \cdot 6N$, $62^{\circ} 08' \cdot 75 W$ Displacement origin: $34^{\circ} 19' \cdot 6 N$
 $62^{\circ} 08' \cdot 75 W$

Navigation based on: Loran C

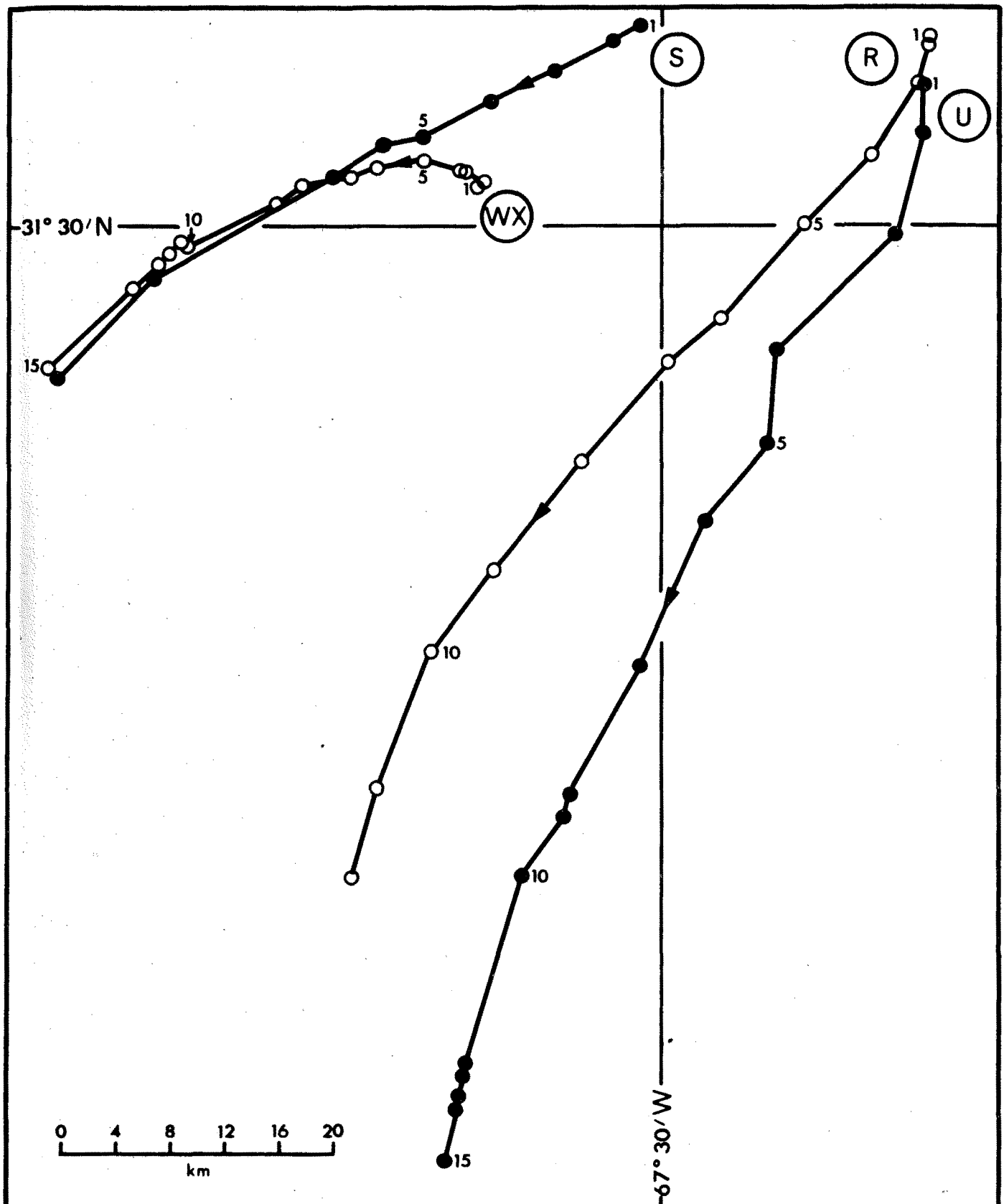
Estimated accuracy of positions: ± 0.5 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	3825	± 800	± 350

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	10.VII	1440	$34^{\circ} 21' \cdot 15$	$62^{\circ} 09' \cdot 1$	3.5	-0.5	+2.9	0.0	+0.2
2	11.VII	0555	$34^{\circ} 33' \cdot 0$	$62^{\circ} 12' \cdot 5$	18.7	-5.7	+24.8	+0.3	-0.4
3	11.VII	2025	$34^{\circ} 45' \cdot 1$	$62^{\circ} 16' \cdot 4$	33.2	-11.7	+47.1	-0.5	+0.4
4	12.VII	0701	$34^{\circ} 53' \cdot 3$	$62^{\circ} 18' \cdot 5$	43.8	-14.8	+62.3	+0.3	-0.1

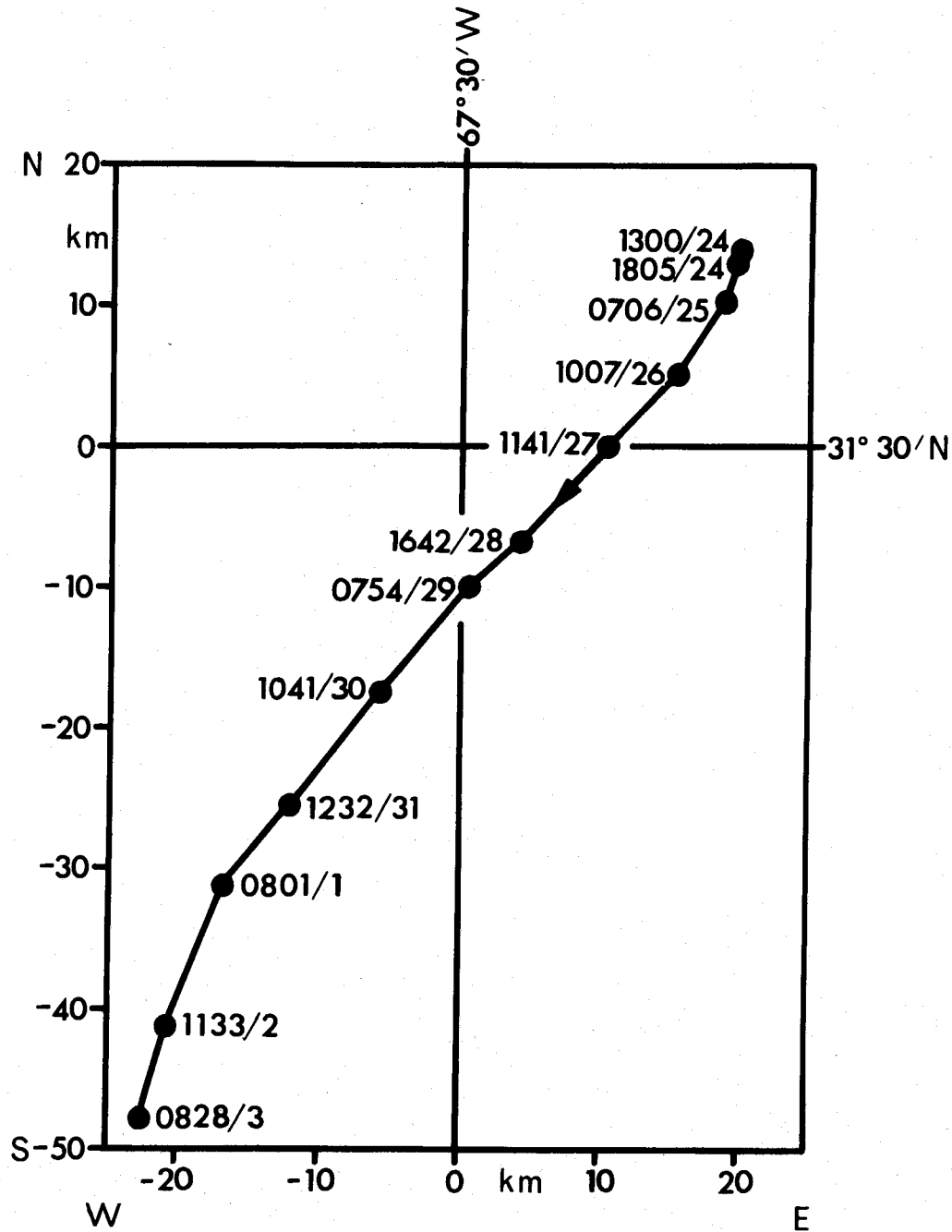
Fitted lines: $x = -0.362 t + 0.8$ $y = +1.481 t - 2.4$ Mean velocity = $42.4(\pm 0.4)$ cm/sec, $346(\pm 0.5)^{\circ} T$

FLOAT DESIGNATIONS: R(1aid 0935/24.VII.60), U(1aid 1338/24.VII.60),
 WX(1aid 1248/25.VII.60), S(1aid 1213/26.VII.60).



FLOAT DESIGNATION: R

Date and time laid: 0935/24.VII.60.



FLOAT DESIGNATION: R

Date and time laid: 0935/24.VII.60

Position laid: $31^{\circ} 37'.72$ N, $67^{\circ} 17'.04$ W
(20.5 km E, 14.3 km N)

Displacement origin: $31^{\circ} 30'$ N
 $67^{\circ} 30'$ W

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.1 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1820	± 280	± 55

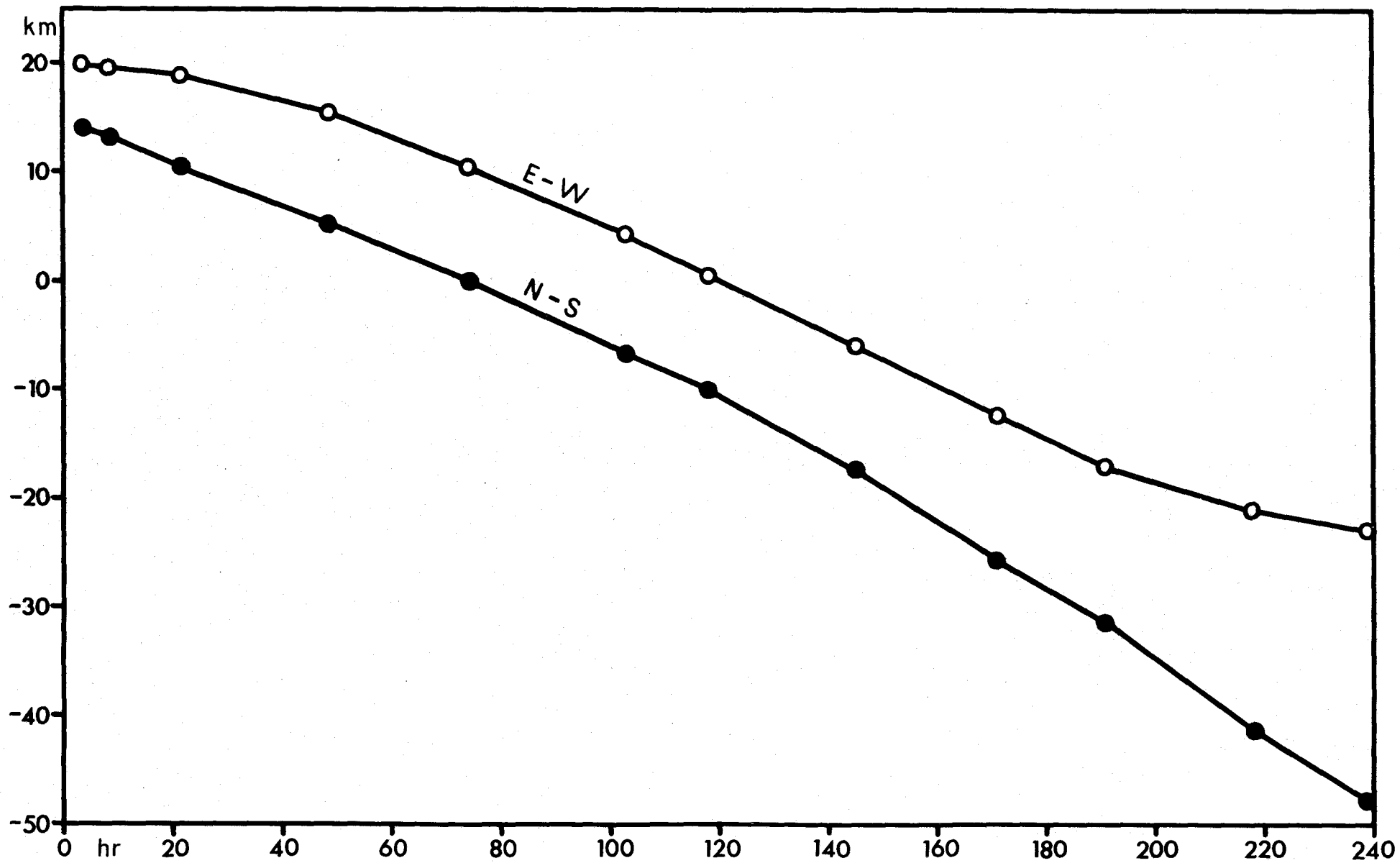
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	24.VII	1300	$31^{\circ} 37'.60$	$67^{\circ} 17'.5$	3.4	+19.8	+14.0	-2.4	-2.6
2	24.VII	1805	$31^{\circ} 37'.19$	$67^{\circ} 17'.65$	8.5	+19.6	+13.3	-1.6	-2.0
3	25.VII	0705	$31^{\circ} 35'.70$	$67^{\circ} 18'.10$	21.5	+18.8	+10.5	+0.2	-1.4
4	26.VII	1007	$31^{\circ} 32'.88$	$67^{\circ} 20'.29$	48.5	+15.4	+5.3	+2.1	+0.4
5	27.VII	1141	$31^{\circ} 30'.03$	$67^{\circ} 23'.44$	74.1	+10.4	+0.1	+2.2	+1.8
6	28.VII	1642	$31^{\circ} 26'.37$	$67^{\circ} 27'.27$	103.1	+4.3	-6.7	+1.8	+2.5
7	29.VII	0754	$31^{\circ} 24'.57$	$67^{\circ} 29'.66$	118.3	+0.5	-10.0	+1.0	+3.1
8	30.VII	1041	$31^{\circ} 20'.57$	$67^{\circ} 33'.74$	145.1	-5.9	-17.4	-0.2	+2.6
9	31.VII	1232	$31^{\circ} 16'.23$	$67^{\circ} 37'.76$	171.0	-12.3	-25.4	-1.5	+1.3
10	1.VIII	0801	$31^{\circ} 13'.04$	$67^{\circ} 40'.61$	190.4	-16.9	-31.3	-2.3	+0.4
11	2.VIII	1133	$31^{\circ} 07'.63$	$67^{\circ} 43'.12$	218.0	-20.9	-41.3	-0.8	-2.5
12	3.VIII	0828	$31^{\circ} 04'.12$	$67^{\circ} 44'.26$	238.9	-22.7	-47.8	+1.5	-3.6

Fitted lines: $x = -0.197 t + 22.8$

$y = -0.258 t + 17.5$

Mean velocity = $9.0(\pm 0.2)$ cm/sec, $217(\pm 0.2)^{\circ}$ T

34



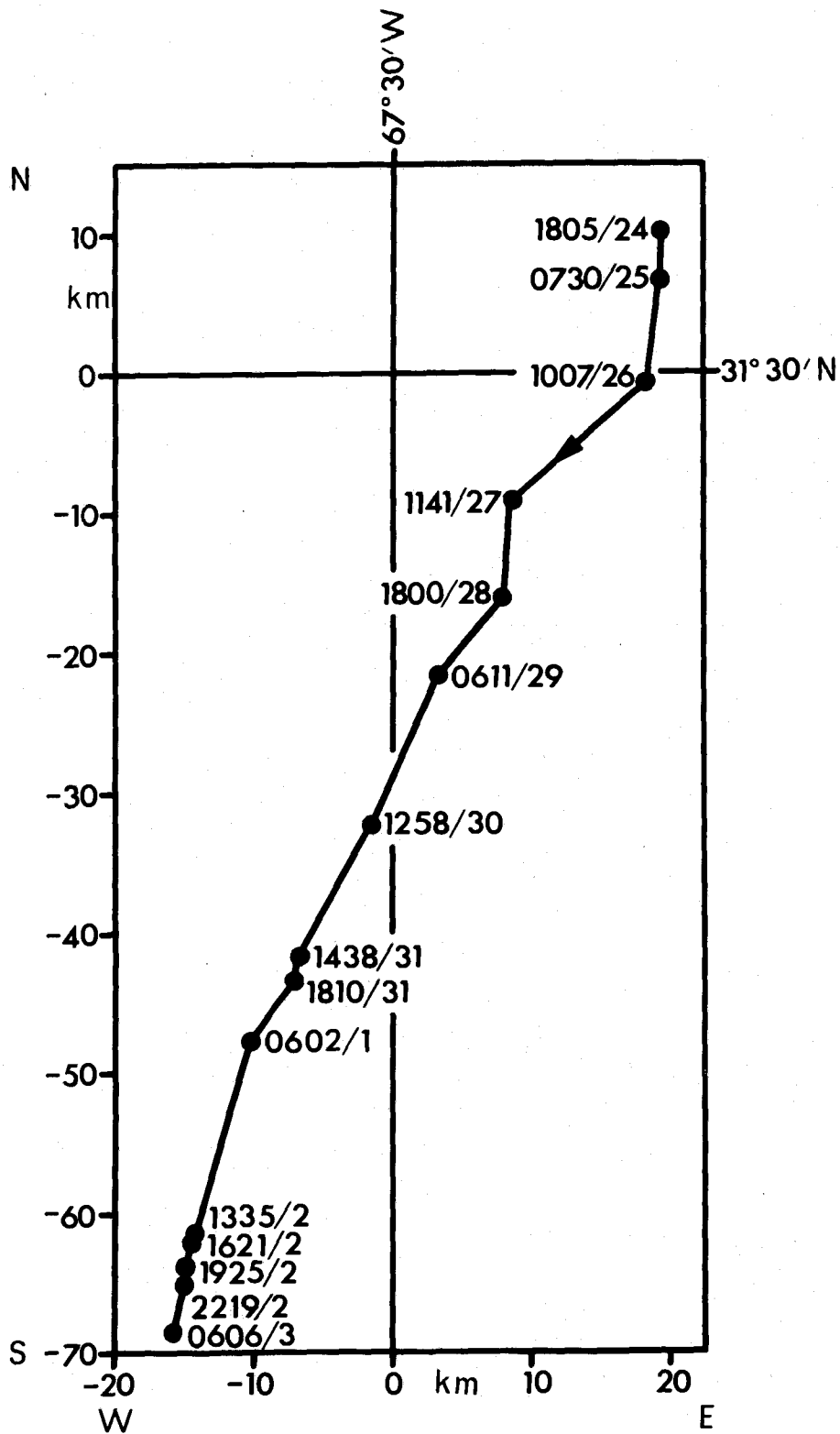
FLOAT DESIGNATION: R

Date and time laid: 0935/24.VII.60.

SERIAL No: 110

FLOAT DESIGNATION: U

Date and time laid: 1338/24.VII.60.



FLOAT DESIGNATION: U

Date and time laid: 1338/24.VII.60

Position laid: $31^{\circ} 35' .96N$, $67^{\circ} 17' .90W$
(19.2km E, 11.0 km N)Displacement origin: $31^{\circ} 30'N$
 $67^{\circ} 30'W$

Navigation based on: Loran C

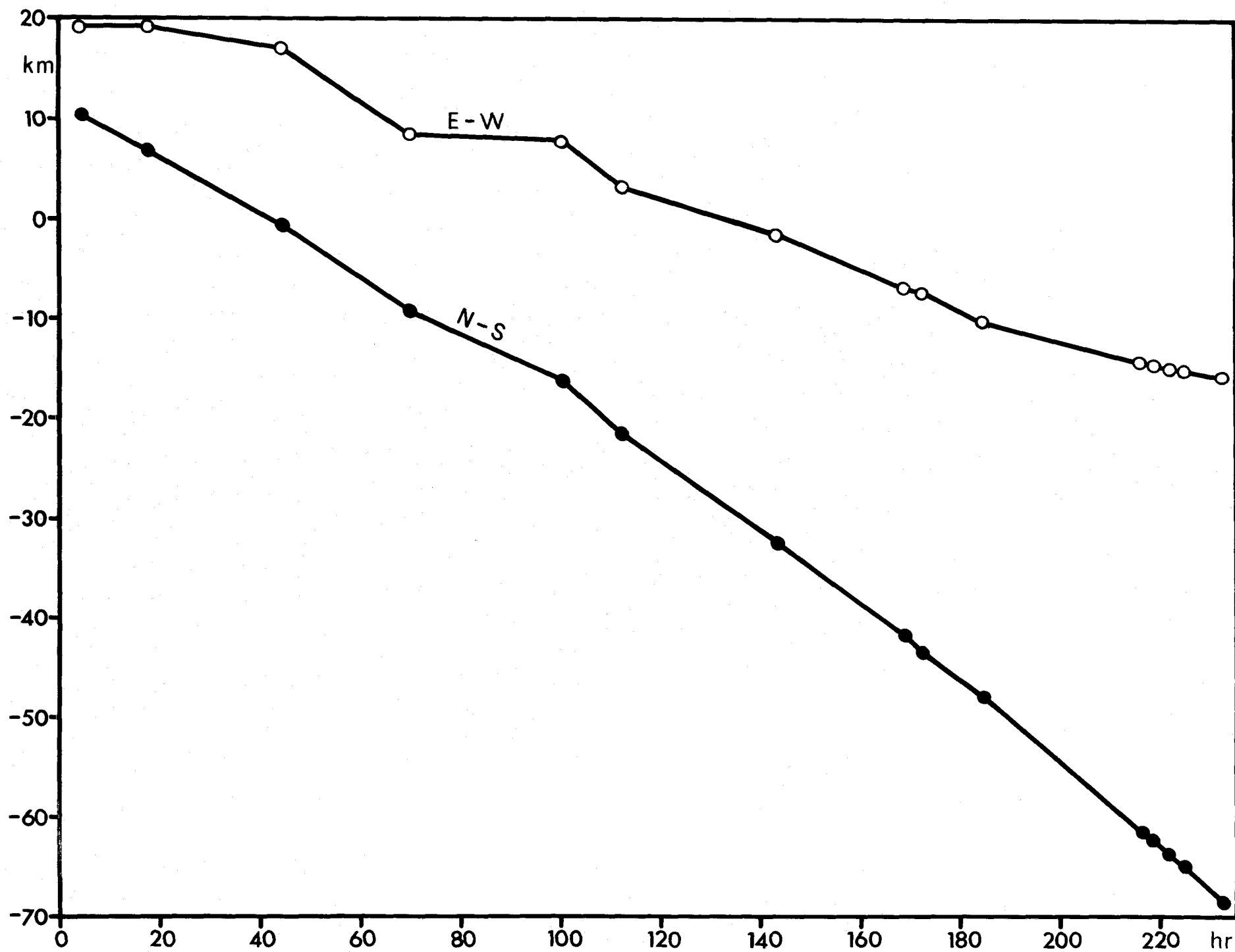
Estimated accuracy of positions: ± 0.2 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	3650	± 660	± 110

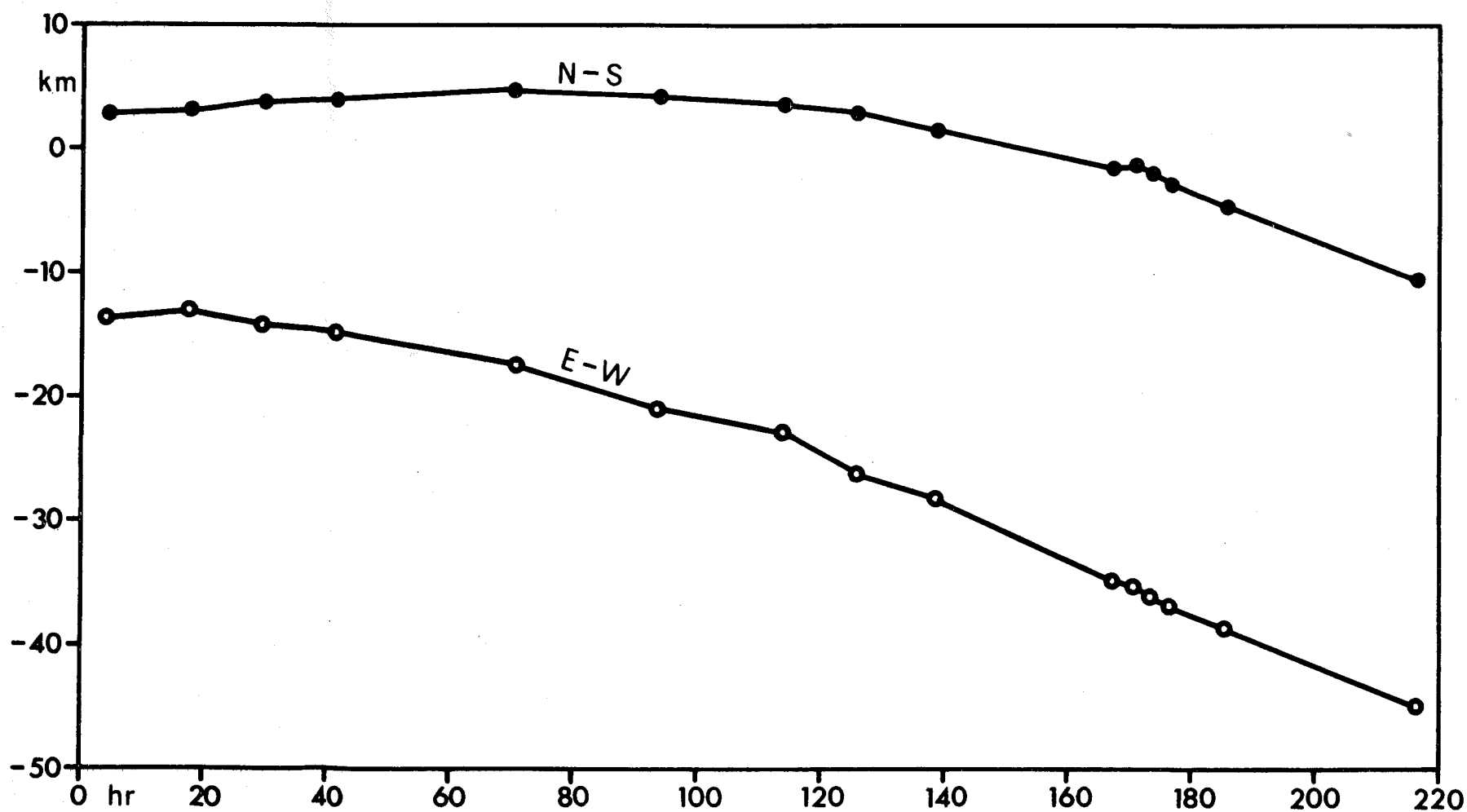
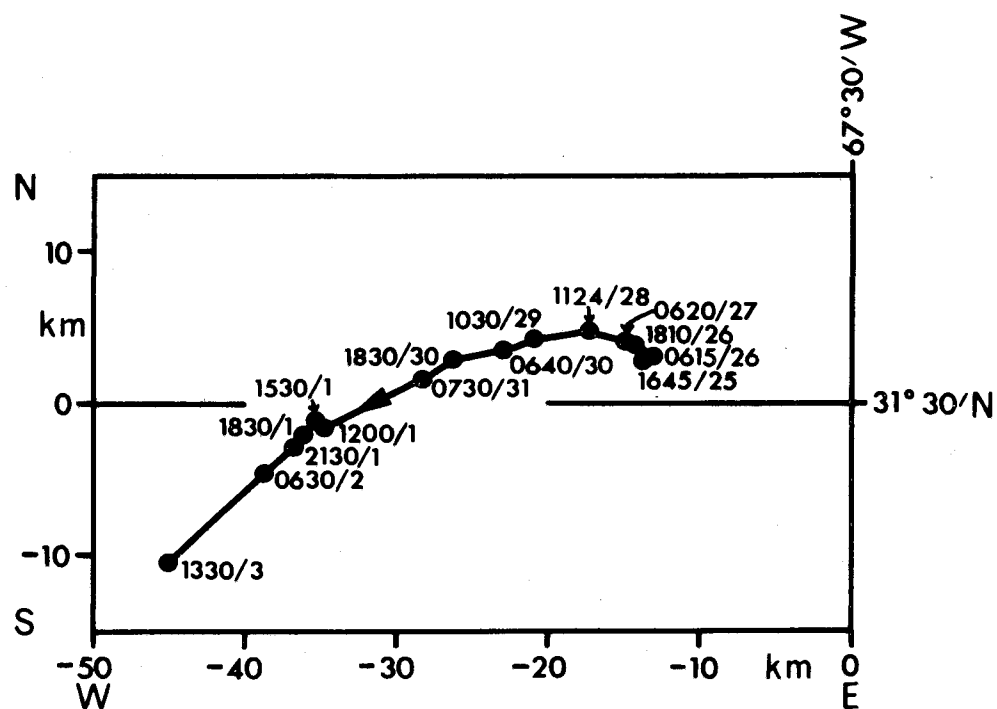
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	24.VII	1805	$31^{\circ} 35' .65$	$67^{\circ} 17' .86$	4.4	+19.2	+10.4	-2.0	-3.3
2	25.VII	0730	$31^{\circ} 35' .70$	$67^{\circ} 17' .90$	17.9	+19.2	+6.8	+0.2	-2.2
3	26.VII	1007	$31^{\circ} 29' .66$	$67^{\circ} 19' .11$	44.5	+17.2	-0.6	+2.6	-0.3
4	27.VII	1141	$31^{\circ} 25' .08$	$67^{\circ} 24' .71$	70.0	+8.4	-9.1	-1.9	+0.1
5	28.VII	1800	$31^{\circ} 21' .28$	$67^{\circ} 25' .00$	100.4	+7.9	-16.1	+2.6	+3.7
6	29.VII	0611	$31^{\circ} 18' .30$	$67^{\circ} 28' .00$	112.6	+3.2	-21.6	0.0	+2.5
7	30.VII	1258	$31^{\circ} 12' .60$	$67^{\circ} 30' .96$	143.3	-1.5	-32.2	+0.4	+2.6
8	31.VII	1438	$31^{\circ} 07' .46$	$67^{\circ} 34' .26$	169.0	-6.8	-41.7	-0.7	+2.1
9	31.VII	1810	$31^{\circ} 06' .49$	$67^{\circ} 34' .54$	172.5	-7.2	-43.4	-0.5	+1.6
10	1.VIII	0602	$31^{\circ} 04' .18$	$67^{\circ} 36' .44$	184.4	-10.3	-47.7	-1.6	+1.5
11	2.VIII	1335	$30^{\circ} 56' .80$	$67^{\circ} 39' .00$	216.0	-14.3	-61.4	-0.4	-1.2
12	2.VIII	1621	$30^{\circ} 56' .30$	$67^{\circ} 39' .14$	218.7	-14.5	-62.3	-0.1	-1.2
13	2.VIII	1925	$30^{\circ} 55' .50$	$67^{\circ} 39' .34$	221.8	-14.9	-63.8	0.0	-1.6
14	2.VIII	2219	$30^{\circ} 54' .86$	$67^{\circ} 39' .44$	224.7	-15.0	-64.9	+0.4	-1.7
15	3.VIII	0606	$30^{\circ} 52' .90$	$67^{\circ} 39' .95$	232.5	-15.8	-68.6	+0.9	-2.7

Fitted lines: $x = -0.166 t + 21.9$ $y = -0.349 t + 15.2$ Mean velocity = $10.7(\pm 0.2)$ cm/sec, $206(\pm 0.4)^{\circ}T$

FLOAT DESIGNATION: U Date and time laid: 1338/24.VII.60.



FLOAT DESIGNATION: WX Date and time laid: 1248/25.VII.60.



FLOAT DESIGNATION: WX

Date and time laid: 1248/25.VII.60

Position laid: $31^{\circ} 31'.30$ N, $67^{\circ} 38'.08$ W Displacement origin: $31^{\circ} 30'$ N
 $(12.8 \text{ km W}, 2.4 \text{ km N})$ $67^{\circ} 30'$ W

Navigation based on: Loran C

Estimated accuracy of positions: $\pm 0.2 \text{ km}$

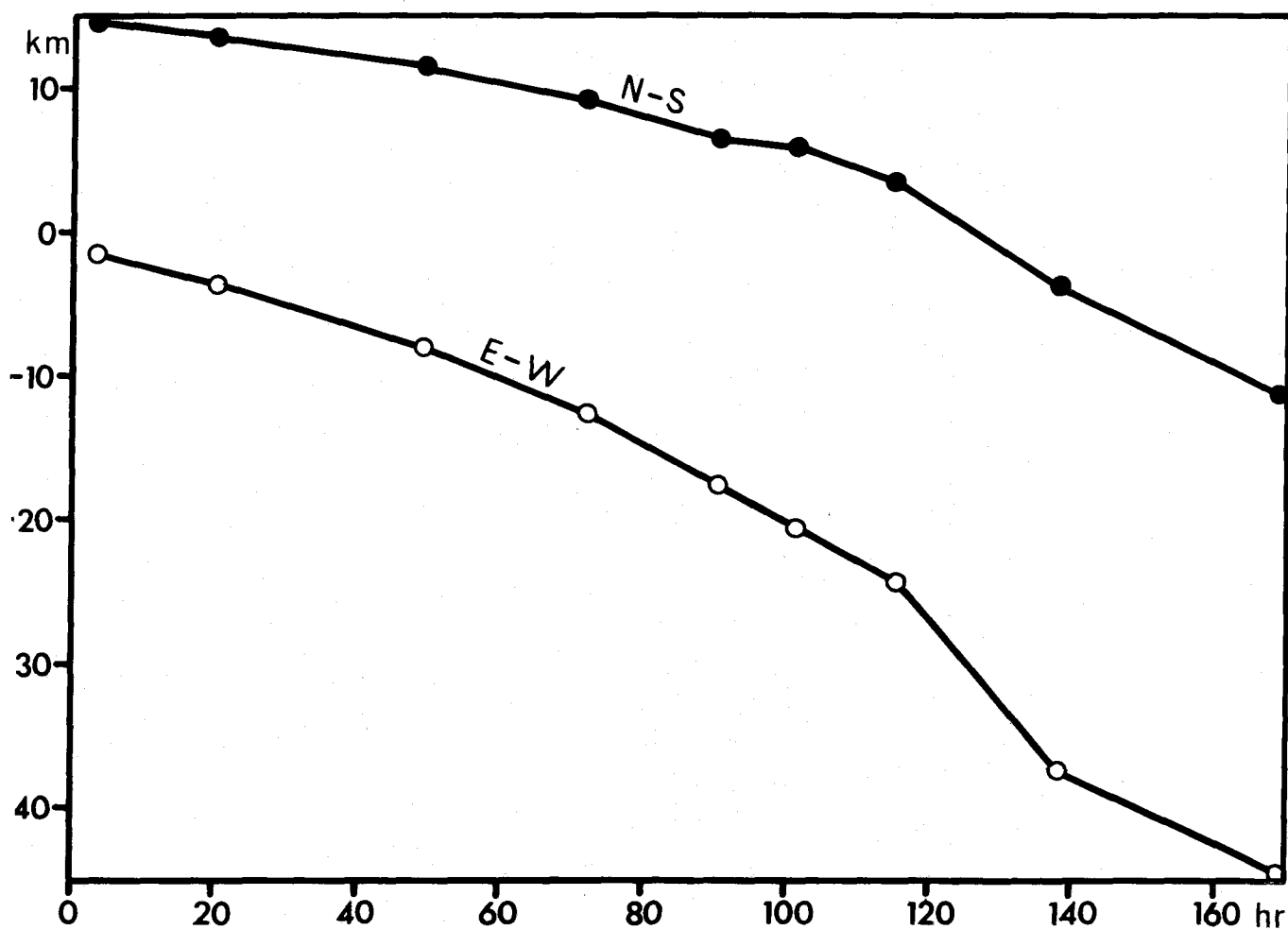
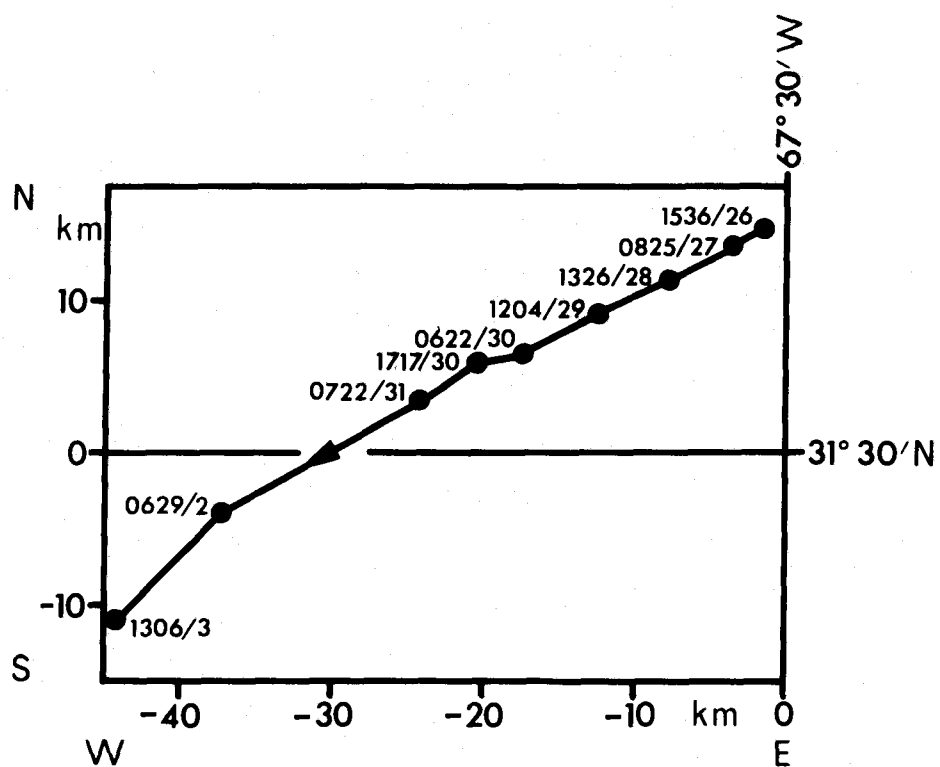
Depth(m): Nominal Observed S.D. S.D. (mean)

 2000 2370 ± 190 ± 50

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	25.VII	1645	$31^{\circ} 31'.49$	$67^{\circ} 38'.63$	4.0	-13.7	+2.8	-4.1	-3.3
2	26.VII	0615	$31^{\circ} 31'.67$	$67^{\circ} 38'.25$	17.4	-13.1	+3.1	-1.4	-2.3
3	26.VII	1810	$31^{\circ} 32'.06$	$67^{\circ} 39'.02$	29.4	-14.3	+3.8	-0.8	-1.0
4	27.VII	0620	$31^{\circ} 32'.16$	$67^{\circ} 39'.35$	41.5	-14.8	+4.0	+0.5	-0.2
5	28.VII	1124	$31^{\circ} 32'.54$	$67^{\circ} 41'.00$	70.6	-17.4	+4.7	+2.4	+2.0
6	29.VII	1030	$31^{\circ} 32'.26$	$67^{\circ} 43'.22$	93.7	-20.9	+4.2	+2.4	+2.6
7	30.VII	0640	$31^{\circ} 31'.92$	$67^{\circ} 44'.43$	113.9	-22.8	+3.5	+3.6	+2.9
8	30.VII	1830	$31^{\circ} 31'.55$	$67^{\circ} 46'.63$	125.7	-26.3	+2.9	+1.9	+2.9
9	31.VII	0730	$31^{\circ} 30'.88$	$67^{\circ} 47'.80$	138.7	-28.2	+1.6	+1.9	+2.3
10	1.VIII	1200	$31^{\circ} 29'.20$	$67^{\circ} 52'.00$	167.2	-34.8	-1.5	-0.3	+0.6
11	1.VIII	1530	$31^{\circ} 29'.31$	$67^{\circ} 52'.23$	170.7	-35.2	-1.3	-0.2	+1.0
12	1.VIII	1830	$31^{\circ} 28'.92$	$67^{\circ} 52'.79$	173.7	-36.1	-2.0	-0.6	+0.4
13	1.VIII	2130	$31^{\circ} 28'.50$	$67^{\circ} 53'.24$	176.7	-36.8	-2.8	-0.9	-0.2
14	2.VIII	0630	$31^{\circ} 27'.50$	$67^{\circ} 54'.46$	185.7	-38.7	-4.6	-1.4	-1.6
15	3.VIII	1330	$31^{\circ} 24'.30$	$67^{\circ} 58'.42$	216.7	-45.0	-10.5	-3.0	-6.0

Fitted lines: $x = -0.152 t - 9.0$ $y = -0.050 t + 6.3$ Mean velocity = $4.4(\pm 0.2) \text{ cm/sec}, 252(\pm 3)^{\circ} \text{T}$

FLOAT DESIGNATION: S Date and time laid: 1213/26.VII.60.



FLOAT DESIGNATION: S

Date and time laid: 1213/26.VII.60

Position laid: $31^{\circ} 38' \cdot 01''$ N, $67^{\circ} 30' \cdot 47''$ W Displacement origin: $31^{\circ} 30'$ N
(0.7 km W, 14.8 km N) $67^{\circ} 30'$ W

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.2 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	1909	± 400	± 130

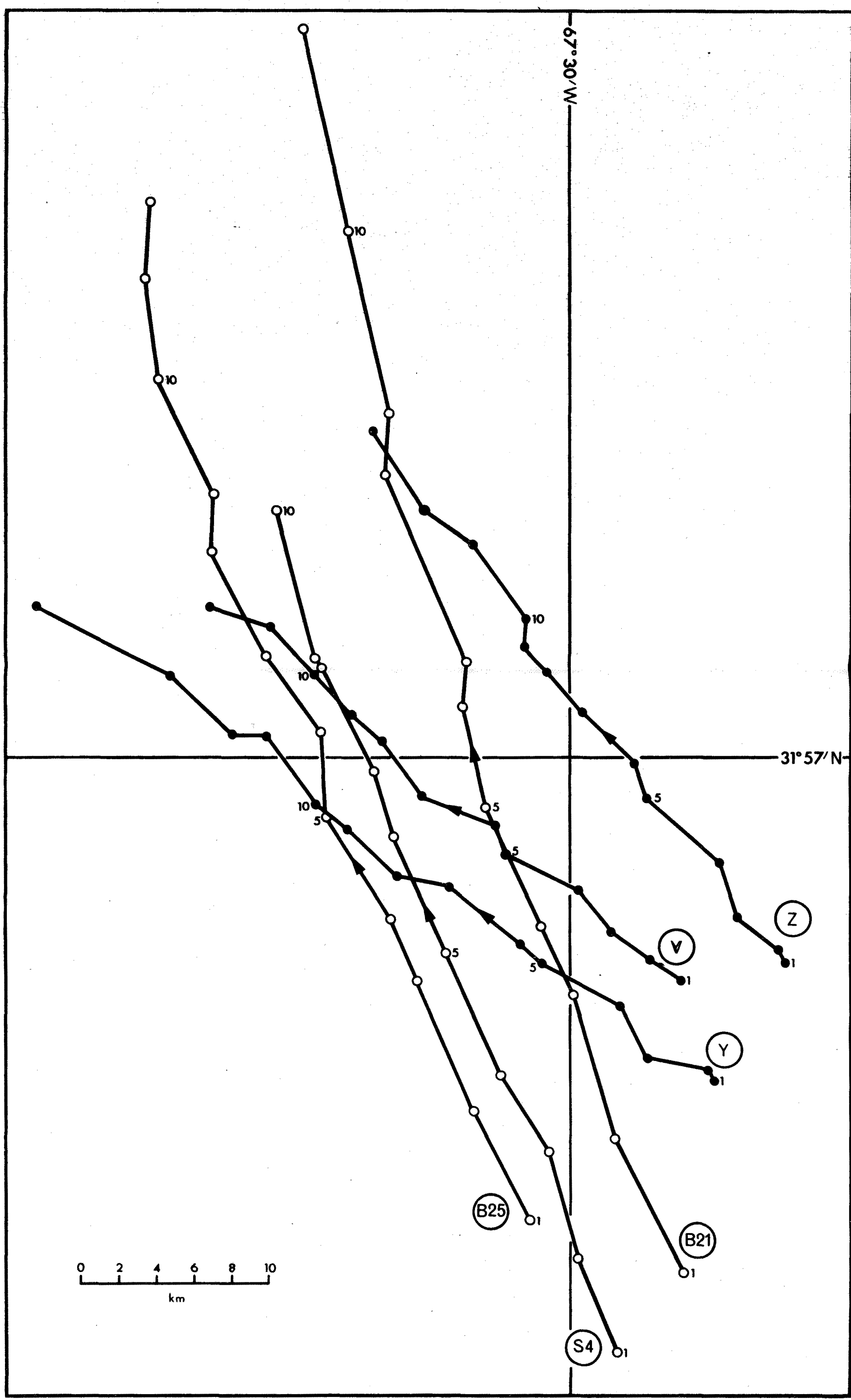
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	26.VII	1536	$31^{\circ} 37' \cdot 96''$	$67^{\circ} 31' \cdot 03''$	3.4	-1.6	+14.7	-2.9	-2.3
2	27.VII	0825	$31^{\circ} 37' \cdot 35''$	$67^{\circ} 32' \cdot 22''$	20.2	-3.5	+13.6	-0.9	-1.1
3	28.VII	1326	$31^{\circ} 36' \cdot 16''$	$67^{\circ} 34' \cdot 98''$	49.2	-7.9	+11.4	+1.5	+0.5
4	29.VII	1204	$31^{\circ} 35' \cdot 00''$	$67^{\circ} 37' \cdot 94''$	71.8	-12.6	+9.2	+2.1	+1.3
5	30.VII	0622	$31^{\circ} 33' \cdot 5''$	$67^{\circ} 41' \cdot 1''$	90.2	-17.6	+6.5	+1.4	+1.0
6	30.VII	1717	$31^{\circ} 33' \cdot 17''$	$67^{\circ} 42' \cdot 97''$	101.1	-20.5	+5.9	+1.0	+1.9
7	31.VII	0722	$31^{\circ} 31' \cdot 96''$	$67^{\circ} 45' \cdot 26''$	115.2	-24.2	+3.6	+0.6	+1.5
8	2.VIII	0629	$31^{\circ} 27' \cdot 94''$	$67^{\circ} 53' \cdot 53''$	162.3	-37.3	-3.8	-1.4	+0.3
9	3.VIII	1306	$31^{\circ} 23' \cdot 92''$	$67^{\circ} 58' \cdot 07''$	192.9	-44.4	-11.2	-1.4	-3.0

Fitted lines: $x = -0.234 t + 2.1$

$y = -0.133 t + 17.4$

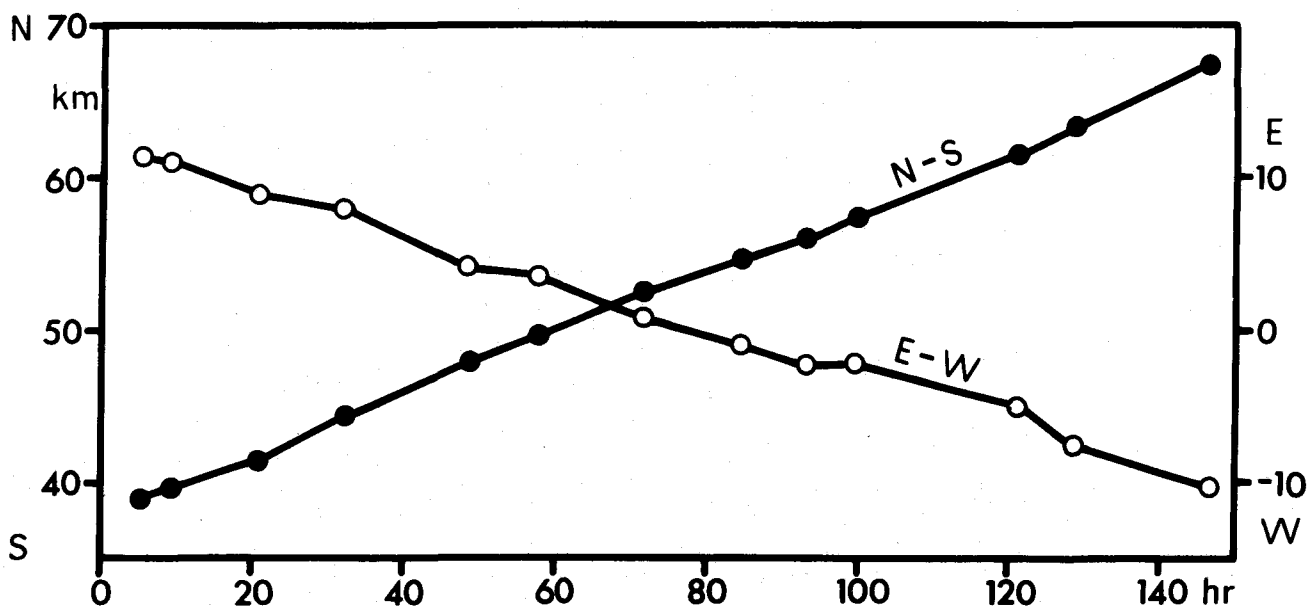
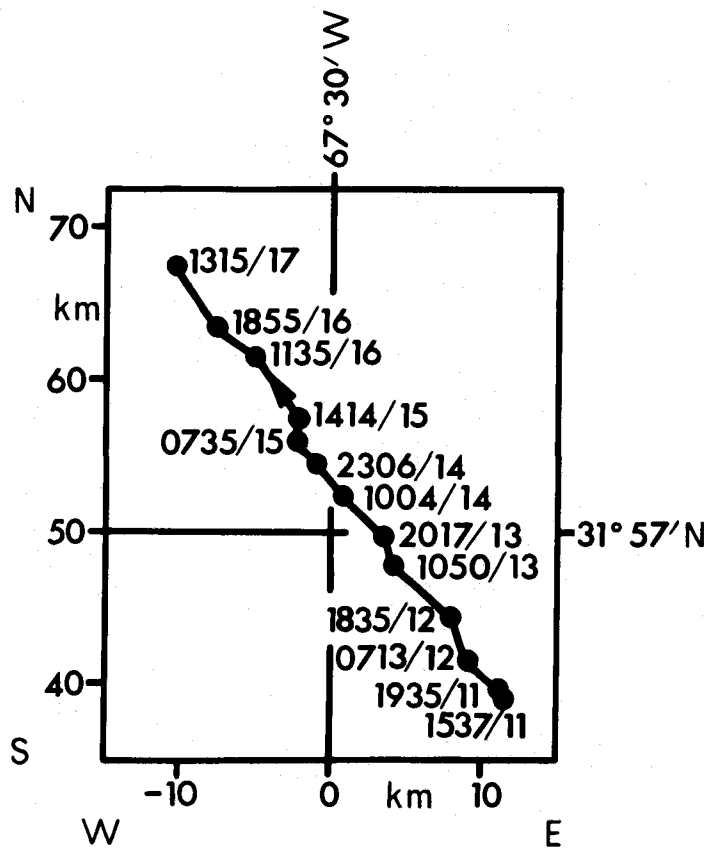
Mean velocity = $7.5(\pm 0.3)$ cm/sec, $240(\pm 1.6)^{\circ}$ T

FLOAT DESIGNATIONS: Z(laid 1032/11.VIII.60), V(laid 1112/11.VIII.60), Y(laid 1150/11.VIII.60), S4(laid 1053/12.VIII.60), B21(1137/12.VIII.60), B25(laid 0955/12.VIII.60).



FLOAT DESIGNATION: Z

Date and time laid: 1032/11.VIII.60.



FLOAT DESIGNATION: Z

Date and time laid: 1032/11.VIII.60

Position laid: 31° 50'.82 N, 67° 21'.70 W Displacement origin: 31° 30' N
(13.1 km E, 38.5 km N) 67° 30' W

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.2 km

Depth(m): Nominal Observed S.D. S.D.(mean)
 2000 2220 ± 450 ± 140

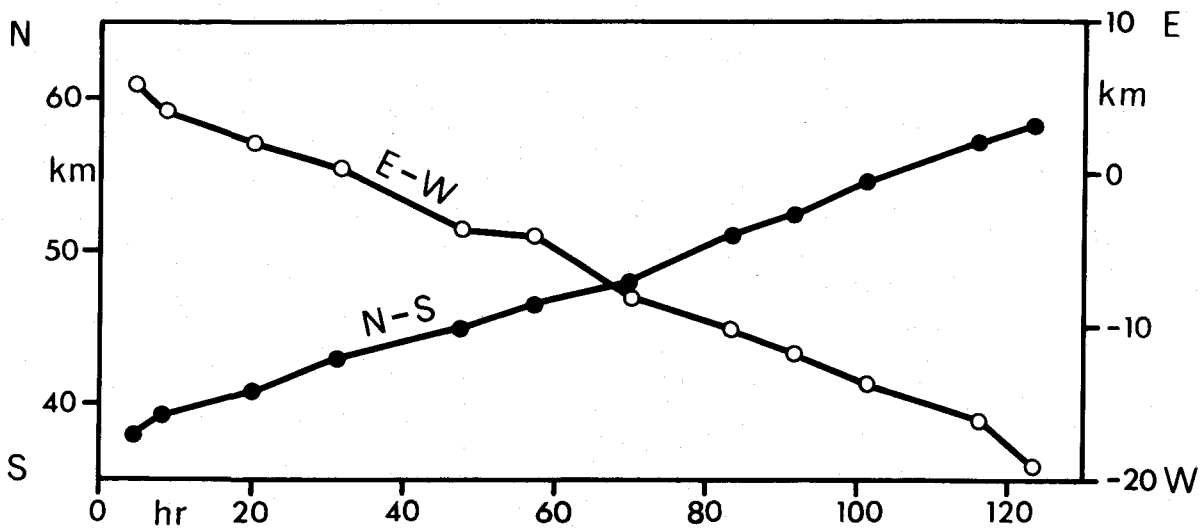
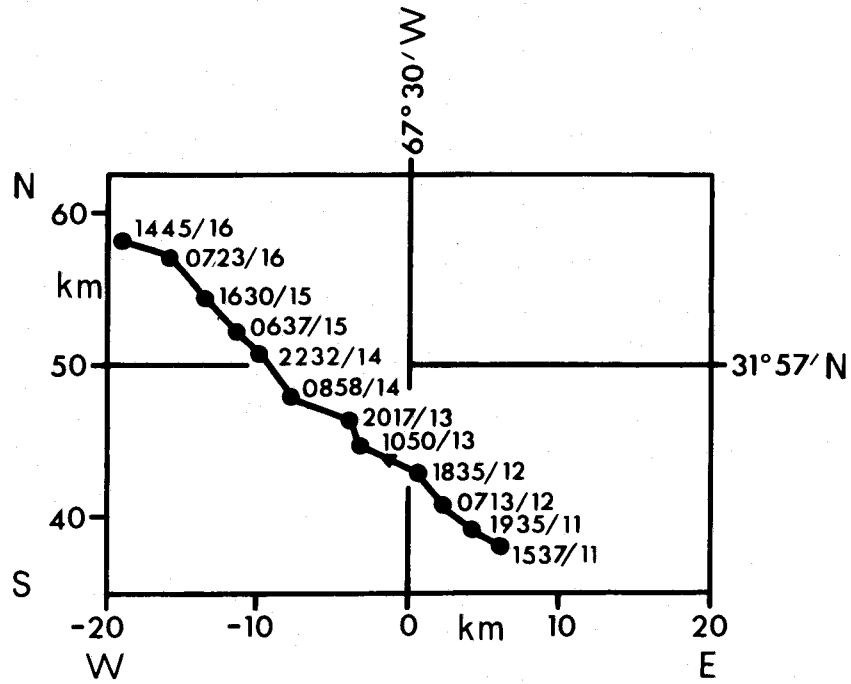
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	11.VIII	1537	31°51'.10	67°22'.71	5.1	+11.5	+39.0	+0.1	+0.1
2	11.VIII	1935	31°51'.48	67°22'.92	9.0	+11.1	+39.7	+0.3	0.0
3	12.VIII	0713	31°52'.48	67°24'.32	20.7	+8.9	+41.5	-0.2	-0.5
4	12.VIII	1835	31°54'.03	67°24'.89	32.0	+8.0	+44.4	+0.7	+0.1
5	13.VIII	1050	31°55'.86	67°27'.42	48.3	+4.1	+47.8	-0.7	+0.3
6	13.VIII	2017	31°56'.89	67°27'.76	57.8	+3.5	+49.7	+0.1	+0.3
7	14.VIII	1004	31°58'.34	67°29'.58	71.5	+0.7	+52.4	-0.6	+0.3
8	14.VIII	2306	31°59'.56	67°30'.70	84.6	-1.1	+54.6	-0.4	-0.1
9	15.VIII	0735	32°00'.30	67°31'.55	93.0	-2.4	+56.0	-0.4	-0.4
10	15.VIII	1414	32°01'.11	67°31'.46	99.7	-2.3	+57.5	+0.7	-0.2
11	16.VIII	1135	32°03'.30	67°33'.24	121.0	-5.1	+61.5	+1.1	-0.4
12	16.VIII	1855	32°04'.26	67°34'.86	128.4	-7.7	+63.3	-0.3	-0.1
13	17.VIII	1315	32°06'.53	67°36'.58	146.7	-10.4	+67.5	-0.2	+0.5

Fitted lines: $x = -0.152 t + 12.2$

$y = +0.198 t + 37.9$

Mean velocity = $7.0(\pm 0.1)$ cm/sec, $322(\pm 0.6)^\circ T$

FLOAT DESIGNATION: V Date and time laid: 1112/II.VIII.60.



FLOAT DESIGNATION: V

Date and time laid: 1112/11.VIII.60

Position laid: $31^{\circ} 50' .69\text{N}$, $67^{\circ} 25' .71\text{W}$ Displacement origin: $31^{\circ} 30' \text{N}$
 $(6.8 \text{ km E}, 38.2 \text{ km N})$ $67^{\circ} 30' \text{W}$

Navigation based on: Loran C

Estimated accuracy of positions: $\pm 0.2 \text{ km}$

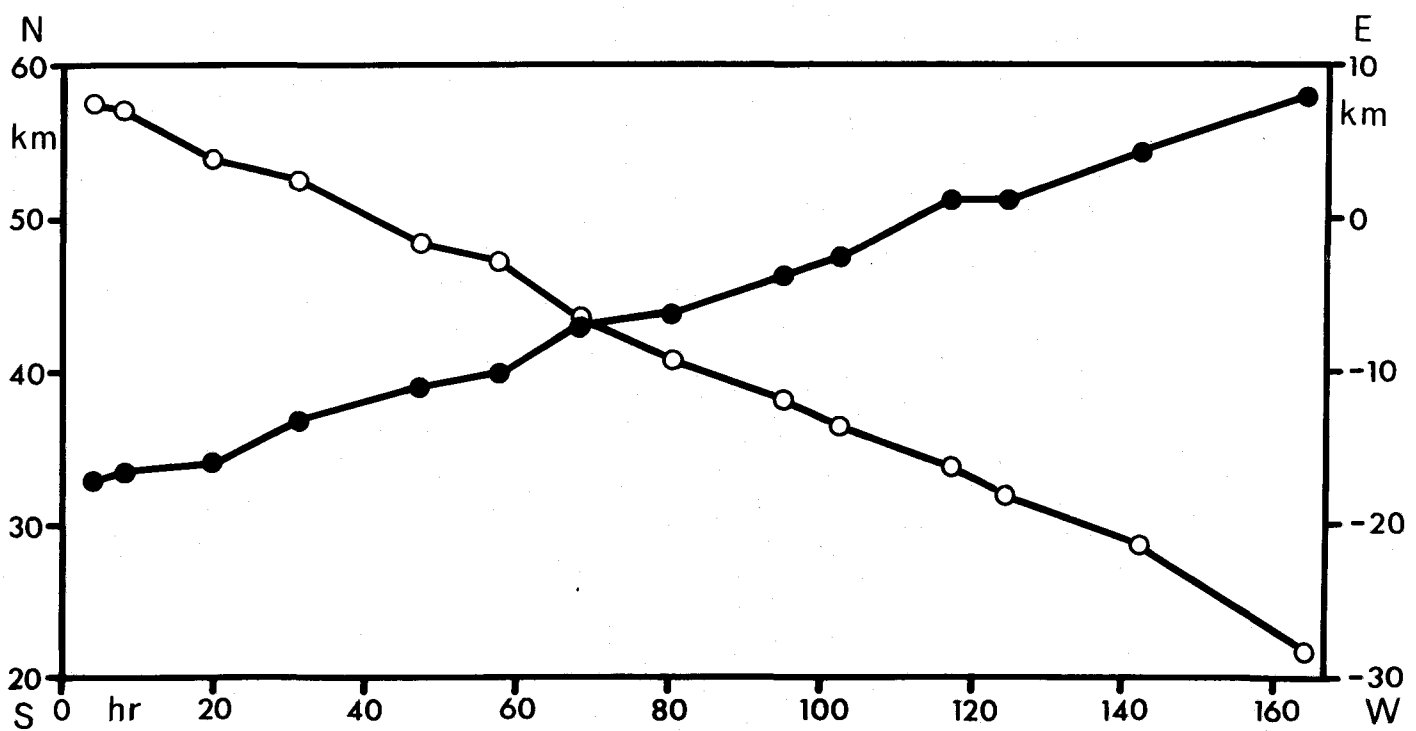
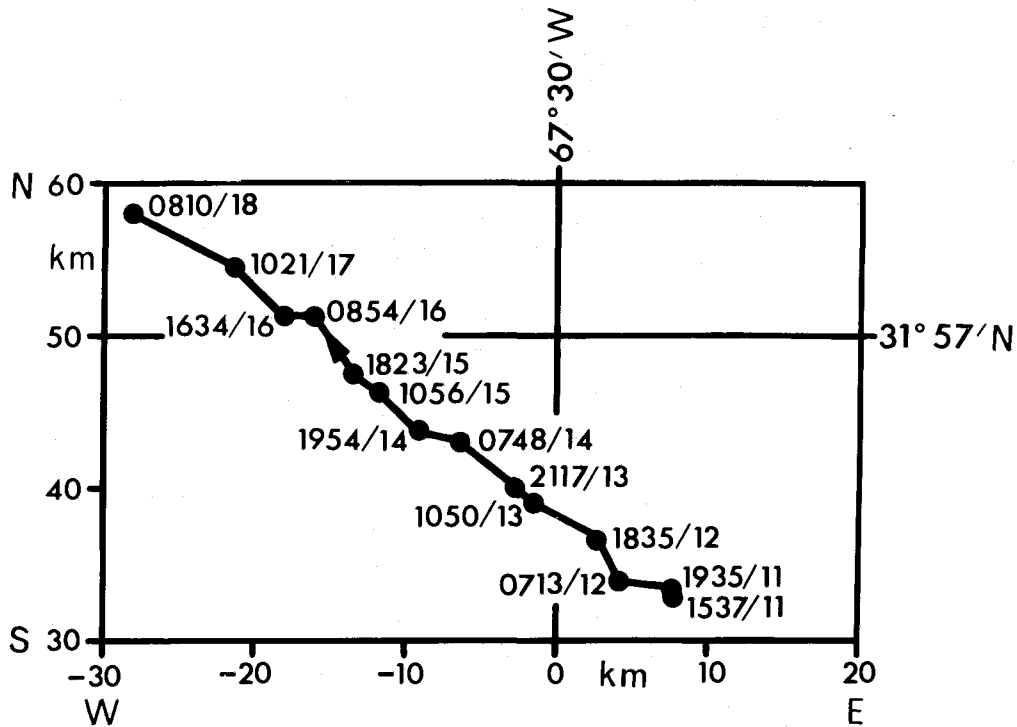
Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	2000	2100	± 290	± 110

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	11.VIII	1537	$31^{\circ} 50' .61$	$67^{\circ} 26' .22$	4.4	+6.0	+38.1	+0.4	+0.1
2	11.VIII	1935	$31^{\circ} 51' .23$	$67^{\circ} 27' .26$	8.4	+4.3	+39.2	-0.5	+0.5
3	12.VIII	0713	$31^{\circ} 52' .05$	$67^{\circ} 28' .62$	20.0	+2.2	+40.7	-0.3	+0.1
4	12.VIII	1835	$31^{\circ} 53' .23$	$67^{\circ} 29' .69$	31.4	+0.5	+42.9	+0.3	+0.4
5	13.VIII	1050	$31^{\circ} 54' .23$	$67^{\circ} 32' .15$	47.6	-3.4	+44.8	-0.4	-0.4
6	13.VIII	2017	$31^{\circ} 55' .10$	$67^{\circ} 32' .50$	57.1	-3.9	+46.4	+1.0	-0.4
7	14.VIII	0858	$31^{\circ} 55' .9$	$67^{\circ} 35' .0$	69.8	-7.9	+47.9	-0.5	-1.0
8	14.VIII	2232	$31^{\circ} 57' .53$	$67^{\circ} 36' .32$	83.3	-10.0	+50.9	+0.1	-0.2
9	15.VIII	0637	$31^{\circ} 58' .29$	$67^{\circ} 37' .39$	91.4	-11.6	+52.3	+0.1	-0.2
10	15.VIII	1630	$31^{\circ} 59' .47$	$67^{\circ} 38' .65$	101.3	-13.6	+54.5	+0.1	+0.4
11	16.VIII	0723	$32^{\circ} 00' .92$	$67^{\circ} 40' .10$	116.2	-15.9	+57.1	+0.8	+0.5
12	16.VIII	1445	$32^{\circ} 01' .43$	$67^{\circ} 42' .10$	123.6	-19.1	+58.1	-1.0	+0.3

Fitted lines: $x = -0.199 t + 6.5$ $y = +0.166 t + 37.3$ Mean velocity = $7.2(\pm 0.1) \text{ cm/sec}$, $310(\pm 0.2)^{\circ}\text{T}$

FLOAT DESIGNATION: Y

Date and time laid: 1150/11.VIII.60.



FLOAT DESIGNATION: Y

Date and time laid: 1150/11.VIII.60

Position laid: $31^{\circ} 47'.73$ N, $67^{\circ} 24'.43$ E Displacement origin: $31^{\circ} 30'$ N
 (8.8 km E, 32'8 km N) $67^{\circ} 30'$ W

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.2 km

Depth(m): Nominal Observed S.D. S.D.(mean)
 2000 1620 ± 510 ± 100

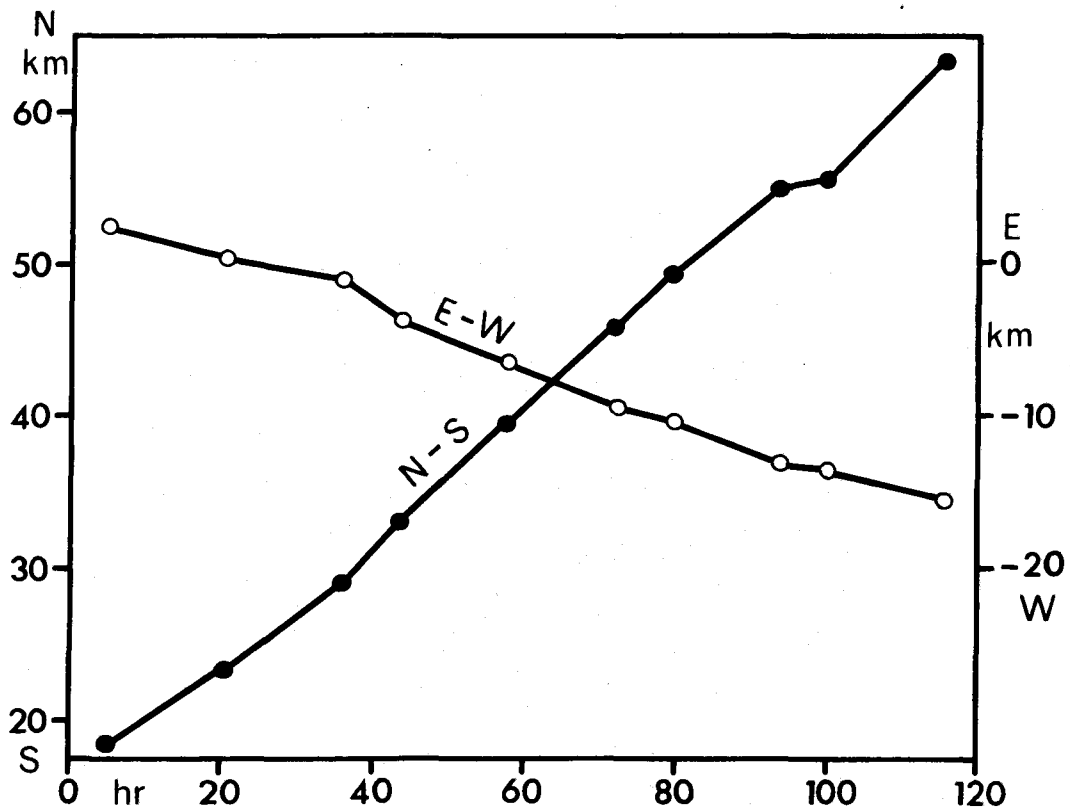
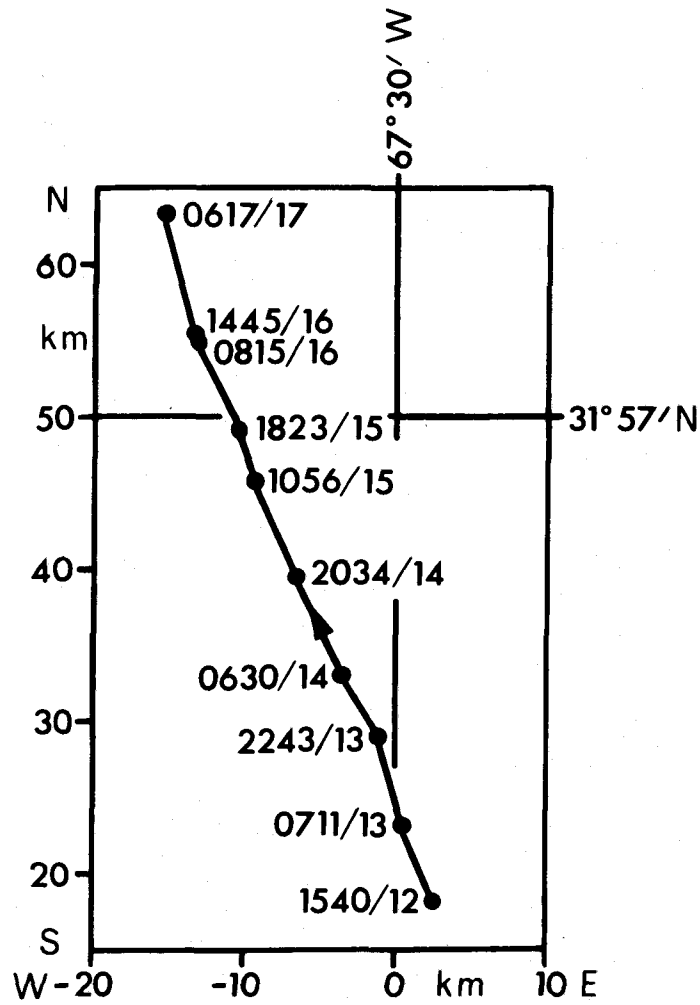
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	11.VIII	1537	$31^{\circ} 47'.76$	$67^{\circ} 25'.08$	3.8	+7.7	+32.8	+0.4	+0.6
2	11.VIII	1935	$31^{\circ} 48'.06$	$67^{\circ} 25'.27$	7.8	+7.4	+33.4	+0.2	+0.5
3	12.VIII	0713	$31^{\circ} 48'.38$	$67^{\circ} 27'.42$	19.4	+4.1	+34.0	-0.6	-0.7
4	12.VIII	1835	$31^{\circ} 49'.91$	$67^{\circ} 28'.26$	30.8	+2.7	+36.8	+0.5	+0.3
5	13.VIII	1050	$31^{\circ} 51'.11$	$67^{\circ} 30'.94$	47.0	-1.5	+39.0	-0.2	-0.1
6	13.VIII	2117	$31^{\circ} 51'.63$	$67^{\circ} 31'.62$	57.4	-2.6	+40.0	+1.0	-0.8
7	14.VIII	0748	$31^{\circ} 53'.31$	$67^{\circ} 34'.04$	68.0	-6.4	+43.1	-0.5	+0.7
8	14.VIII	1954	$31^{\circ} 53'.67$	$67^{\circ} 35'.84$	80.1	-9.2	+43.7	-0.6	-0.7
9	15.VIII	1056	$31^{\circ} 55'.00$	$67^{\circ} 37'.46$	95.1	-11.8	+46.2	0.0	-0.5
10	15.VIII	1823	$31^{\circ} 55'.68$	$67^{\circ} 38'.60$	102.6	-13.5	+47.5	0.0	-0.4
11	16.VIII	0854	$31^{\circ} 57'.70$	$67^{\circ} 40'.23$	117.1	-16.1	+51.2	+0.5	+1.0
12	16.VIII	1634	$31^{\circ} 57'.70$	$67^{\circ} 41'.35$	124.7	-17.9	+51.2	+0.4	-0.3
13	17.VIII	1021	$31^{\circ} 59'.46$	$67^{\circ} 43'.48$	142.5	-21.2	+54.4	+1.0	+0.1
14	18.VIII	0810	$32^{\circ} 01'.44$	$67^{\circ} 47'.94$	164.3	-28.3	+58.1	-1.4	+0.3

Fitted lines: $x = -0.218 t + 8.9$

$y = +0.159 t + 31.6$

Mean velocity = $7.5(\pm 0.1)$ cm/sec, $306(\pm 0.3)^{\circ}$ T

FLOAT DESIGNATION: S4 Date and time laid: 1053/12.VIII.60.



FLOAT DESIGNATION: S4

Date and time laid: 1053/12.VIII.60

Position laid: $31^{\circ} 39' \cdot 19\text{N}$, $67^{\circ} 27' \cdot 68\text{W}$ Displacement origin: $31^{\circ} 30'\text{N}$
 $(3 \cdot 7\text{ km E}, 17 \cdot 0\text{ km N})$ $67^{\circ} 30'\text{W}$

Navigation based on: Loran C

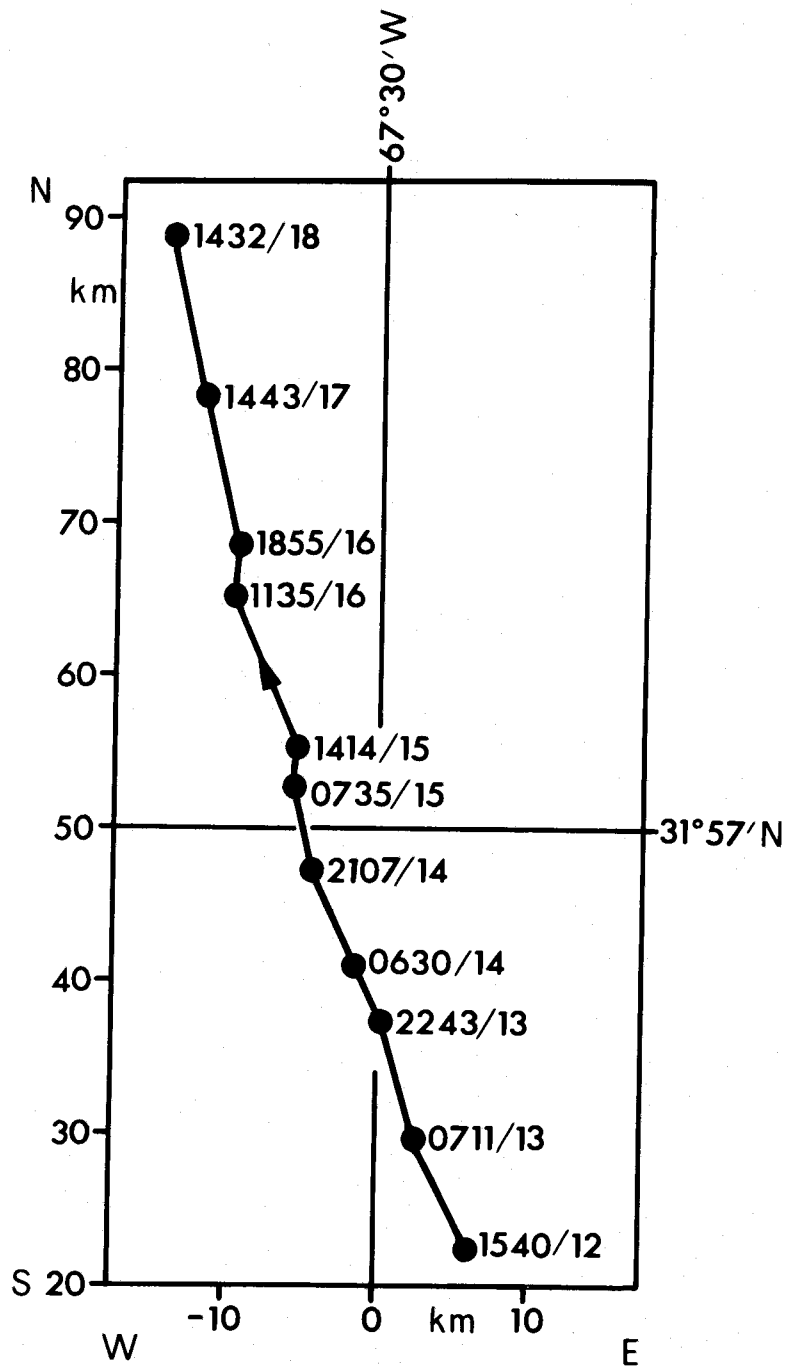
Estimated accuracy of positions: $\pm 0 \cdot 3\text{ km}$

Depth(m): Nominal Observed S.D. S.D.(mean)
 4000 3615 ± 300 ± 100

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	12.VIII	1540	$31^{\circ} 39' \cdot 92$	$67^{\circ} 28' \cdot 41$	4.8	+2.5	+18.3	-0.5	+0.9
2	13.VIII	0711	$31^{\circ} 42' \cdot 60$	$67^{\circ} 29' \cdot 76$	20.3	+0.4	+23.3	+0.1	-0.5
3	13.VIII	2243	$31^{\circ} 45' \cdot 68$	$67^{\circ} 30' \cdot 73$	35.8	-1.1	+29.0	+1.3	-1.2
4	14.VIII	0630	$31^{\circ} 47' \cdot 93$	$67^{\circ} 32' \cdot 33$	43.6	-3.7	+33.1	+0.1	-0.4
5	14.VIII	2034	$31^{\circ} 51' \cdot 42$	$67^{\circ} 34' \cdot 16$	57.7	-6.6	+39.6	-0.3	+0.3
6	15.VIII	1056	$31^{\circ} 54' \cdot 77$	$67^{\circ} 36' \cdot 00$	72.0	-9.4	+45.8	-0.6	+0.6
7	15.VIII	1823	$31^{\circ} 56' \cdot 67$	$67^{\circ} 36' \cdot 63$	79.5	-10.4	+49.3	-0.3	+0.9
8	16.VIII	0815	$31^{\circ} 59' \cdot 70$	$67^{\circ} 38' \cdot 4$	93.4	-13.2	+54.9	-0.7	+0.8
9	16.VIII	1445	$32^{\circ} 00' \cdot 00$	$67^{\circ} 38' \cdot 62$	99.9	-13.6	+55.4	+0.1	-1.4
10	17.VIII	0617	$32^{\circ} 04' \cdot 26$	$67^{\circ} 39' \cdot 88$	115.4	-15.6	+63.3	+0.8	0.0

Fitted lines: $x = -0.175 t + 3.8$ $y = +0.415 t + 15.4$ Mean velocity = $12.5(\pm 0.2)\text{ cm/sec}$, $337(\pm 0.6)^{\circ}\text{T}$

FLOAT DESIGNATION: B21 Date and time laid: 1137/12.VIII.60.



FLOAT DESIGNATION: B 21

Date and time laid: 1137/12.VIII.60

Position laid: $31^{\circ} 41'.51\text{N}$, $25'.40\text{W}$
(7.2 km E, 21.3 km N)Displacement origin: $31^{\circ} 30'\text{N}$
 $67^{\circ} 30'\text{W}$

Navigation based on: Loran C

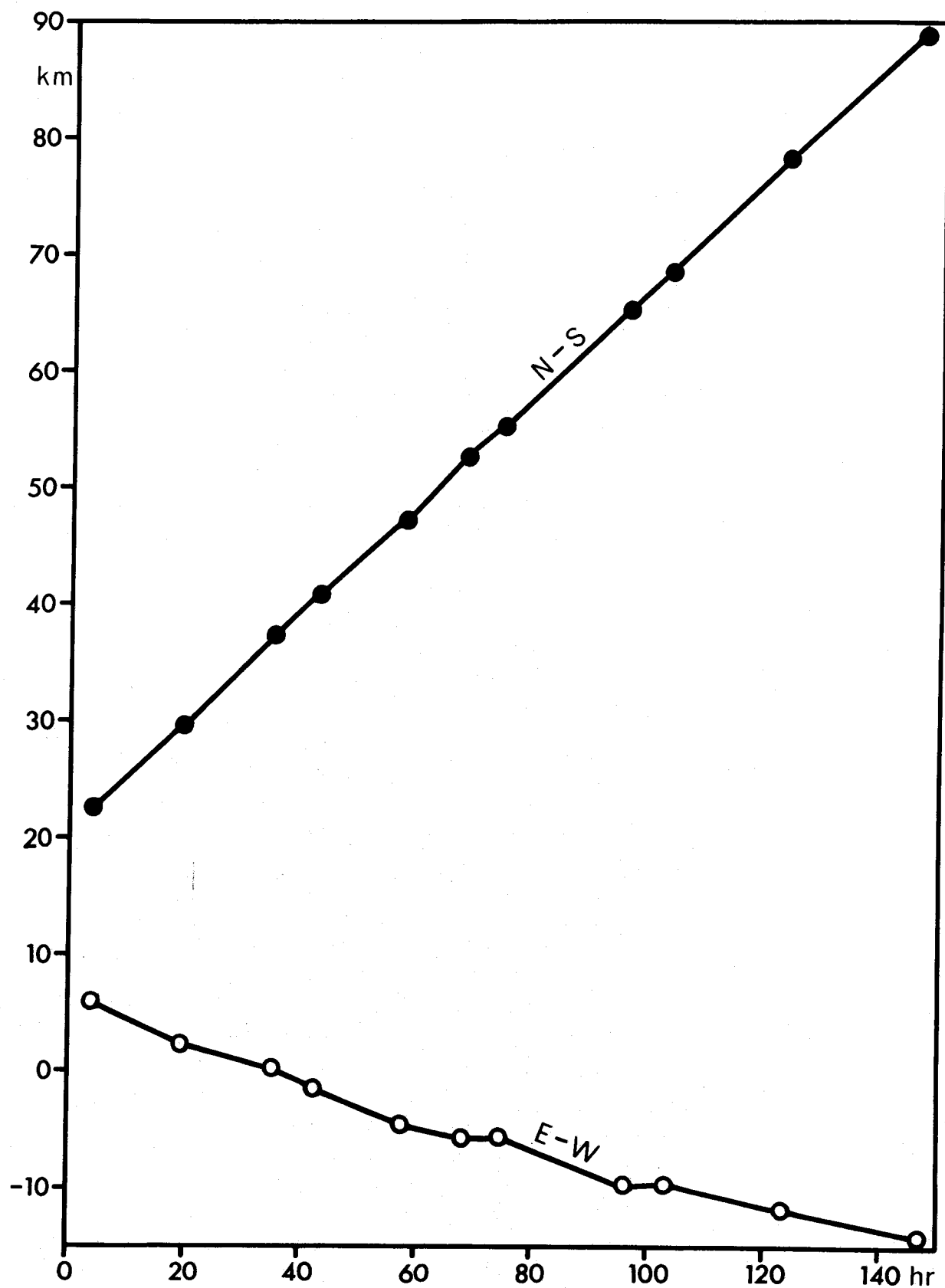
Estimated accuracy of positions: ± 0.2 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	4070	± 500	± 100

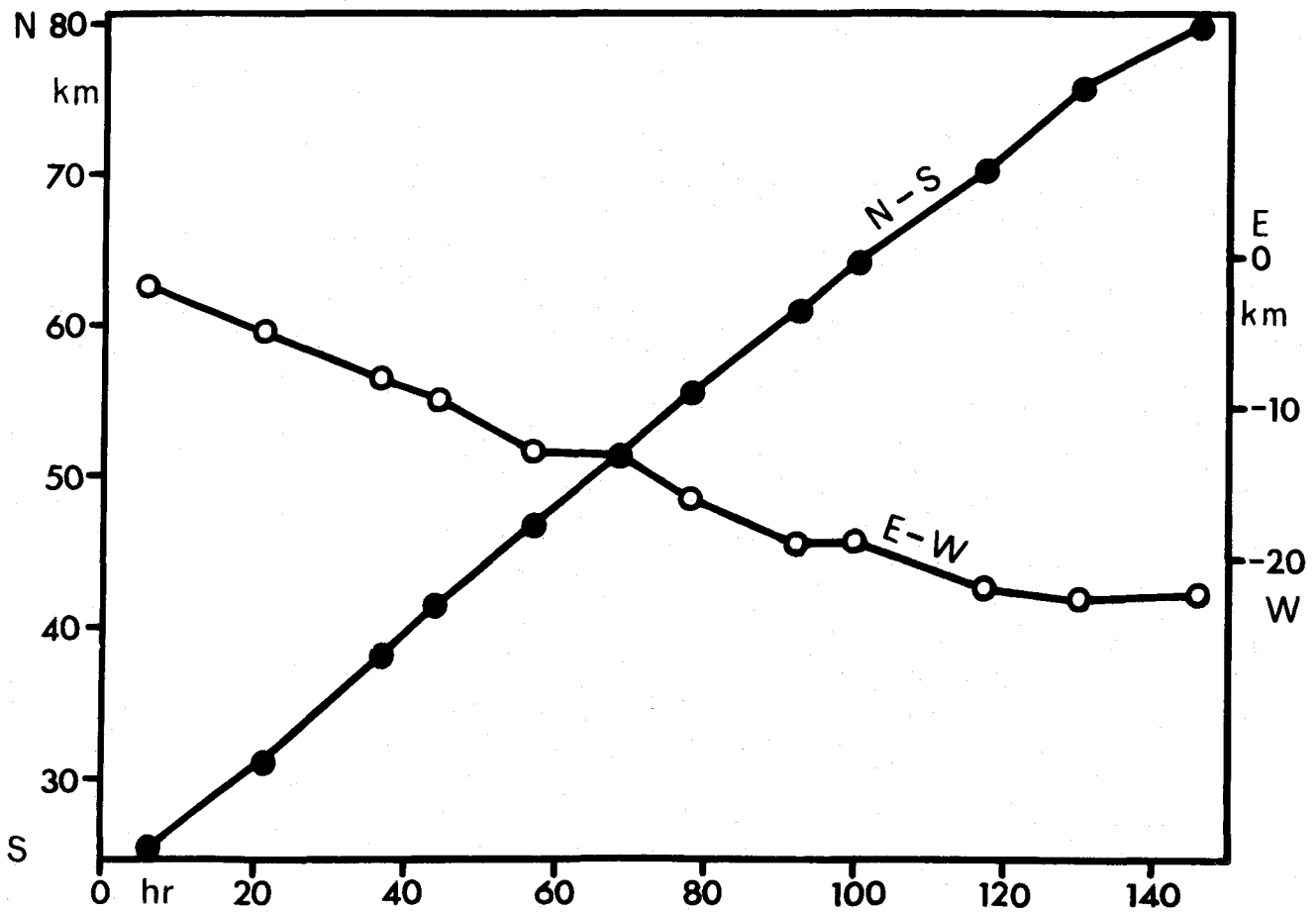
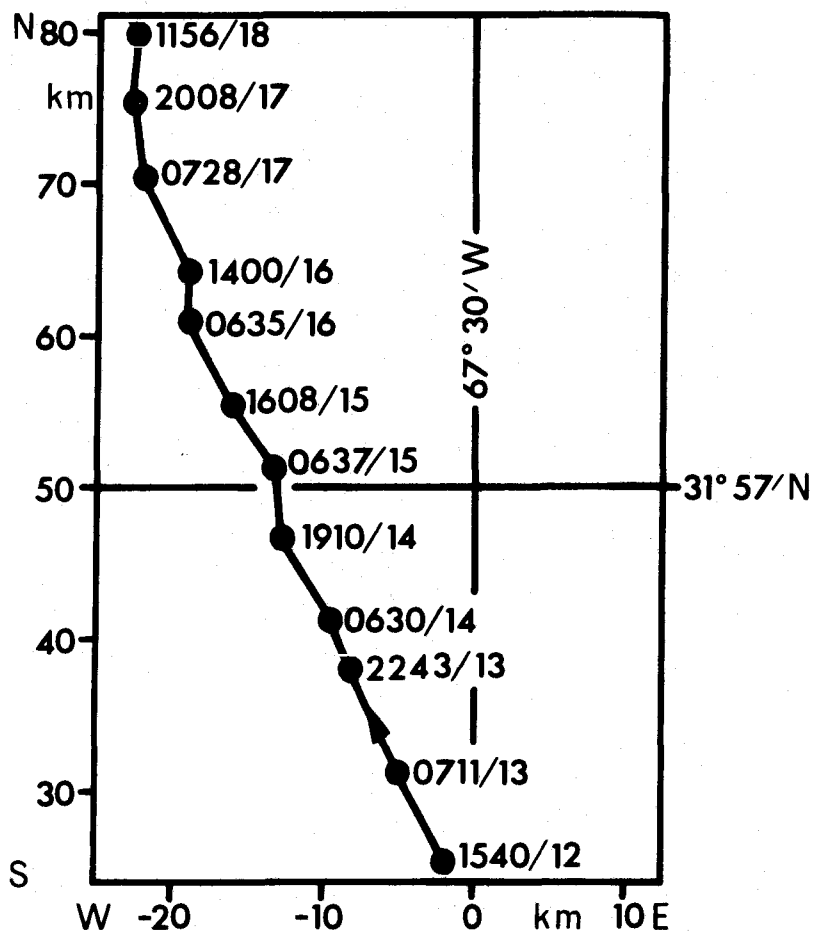
Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	12.VIII	1540	$31^{\circ}42'.24$	$67^{\circ}26'.17$	4.0	+6.0	+22.6	+1.7	-0.1
2	13.VIII	0711	$31^{\circ}46'.06$	$67^{\circ}28'.50$	19.6	+2.4	+29.7	+0.3	-0.2
3	13.VIII	2243	$31^{\circ}50'.26$	$67^{\circ}29'.89$	35.1	+0.2	+37.4	+0.2	+0.3
4	14.VIII	0630	$31^{\circ}52'.19$	$67^{\circ}30'.93$	42.9	-1.5	+41.0	-0.4	+0.3
5	14.VIII	2107	$31^{\circ}55'.60$	$67^{\circ}32'.83$	57.5	-4.5	+47.3	-1.3	-0.2
6	15.VIII	0735	$31^{\circ}58'.53$	$67^{\circ}33'.60$	68.0	-5.7	+52.7	-1.1	+0.3
7	15.VIII	1414	$31^{\circ}59'.87$	$67^{\circ}33'.50$	74.6	-5.5	+55.2	0.0	-0.2
8	16.VIII	1135	$32^{\circ}05'.30$	$67^{\circ}36'.22$	96.0	-9.8	+65.2	-1.3	-0.2
9	16.VIII	1855	$32^{\circ}07'.06$	$67^{\circ}36'.10$	103.3	-9.6	+68.5	-0.1	-0.3
10	17.VIII	1443	$32^{\circ}12'.29$	$67^{\circ}37'.52$	123.1	-11.8	+78.2	+0.5	+0.3
11	18.VIII	1432	$32^{\circ}18'.16$	$67^{\circ}38'.99$	146.9	-14.2	+89.0	+1.4	0.0

Fitted lines: $x = -0.140 t + 4.9$ $y = +0.464 t + 20.8$ Mean velocity = $13.5(\pm 0.1)$ cm/sec, $343(\pm 0.9)^{\circ}\text{T}$

FLOAT DESIGNATION: B21 Date and time laid: 1137/12.VIII.60.



FLOAT DESIGNATION: B25 Date and time laid: 0955/12.VIII.60.



FLOAT DESIGNATION: B 25

Date and time laid: 0955/12.VIII.60.

Position laid: $31^{\circ} 42' .76N$ $67^{\circ} 30' .21W$
(0.3 km E, 23.6 km N)

Displacement origin: $31^{\circ} 30' N$
 $67^{\circ} 30' W$

Navigation based on: Loran C

Estimated accuracy of positions: ± 0.3 km

Depth(m):	Nominal	Observed	S.D.	S.D.(mean)
	4000	4130	± 460	± 120

Fix No.	Date	Time GMT -4	Fix Position		Hours Since Laid (t)	Displacement(km)		Residuals	
			Lat.N.	Long.W.		+E-W x	+N-S y	x	y
1	12.VIII	1540	$31^{\circ} 43' .74$	$67^{\circ} 31' .31$	5.8	-2.1	+25.4	+1.5	-0.5
2	13.VIII	0711	$31^{\circ} 46' .90$	$67^{\circ} 33' .25$	21.3	-5.1	+31.2	+0.9	-0.9
3	13.VIII	2243	$31^{\circ} 50' .61$	$67^{\circ} 35' .18$	36.8	-8.1	+38.1	+0.3	-0.2
4	14.VIII	0630	$31^{\circ} 52' .38$	$67^{\circ} 36' .04$	44.6	-9.5	+41.4	+0.1	0.0
5	14.VIII	1910	$31^{\circ} 55' .30$	$67^{\circ} 38' .19$	57.2	-12.9	+46.8	-1.3	+0.4
6	15.VIII	0637	$31^{\circ} 57' .79$	$67^{\circ} 38' .36$	68.7	-13.2	+51.4	+0.1	+0.5
7	15.VIII	1608	$32^{\circ} 00' .03$	$67^{\circ} 40' .23$	78.2	-16.1	+55.5	-1.3	+0.8
8	16.VIII	0635	$32^{\circ} 03' .08$	$67^{\circ} 42' .04$	92.7	-19.0	+61.1	-1.9	+0.6
9	16.VIII	1400	$32^{\circ} 04' .75$	$67^{\circ} 42' .01$	100.1	-18.9	+64.2	-0.7	+0.8
10	17.VIII	0728	$32^{\circ} 08' .05$	$67^{\circ} 43' .90$	117.6	-21.9	+70.3	-1.0	-0.1
11	17.VIII	2008	$32^{\circ} 10' .95$	$67^{\circ} 44' .34$	130.2	-22.6	+75.7	+0.3	+0.3
12	18.VIII	1156	$32^{\circ} 13' .18$	$67^{\circ} 44' .19$	146.0	-22.3	+79.8	+3.1	-1.8

Fitted lines: $x = - 0.155 t - 2.6$

$y = + 0.397 t + 23.6$

Mean velocity = $11.9(\pm 0.2)$ cm/sec, $339(\pm 1.2)^{\circ} T$

