Proudman
Oceanographic
Laboratory

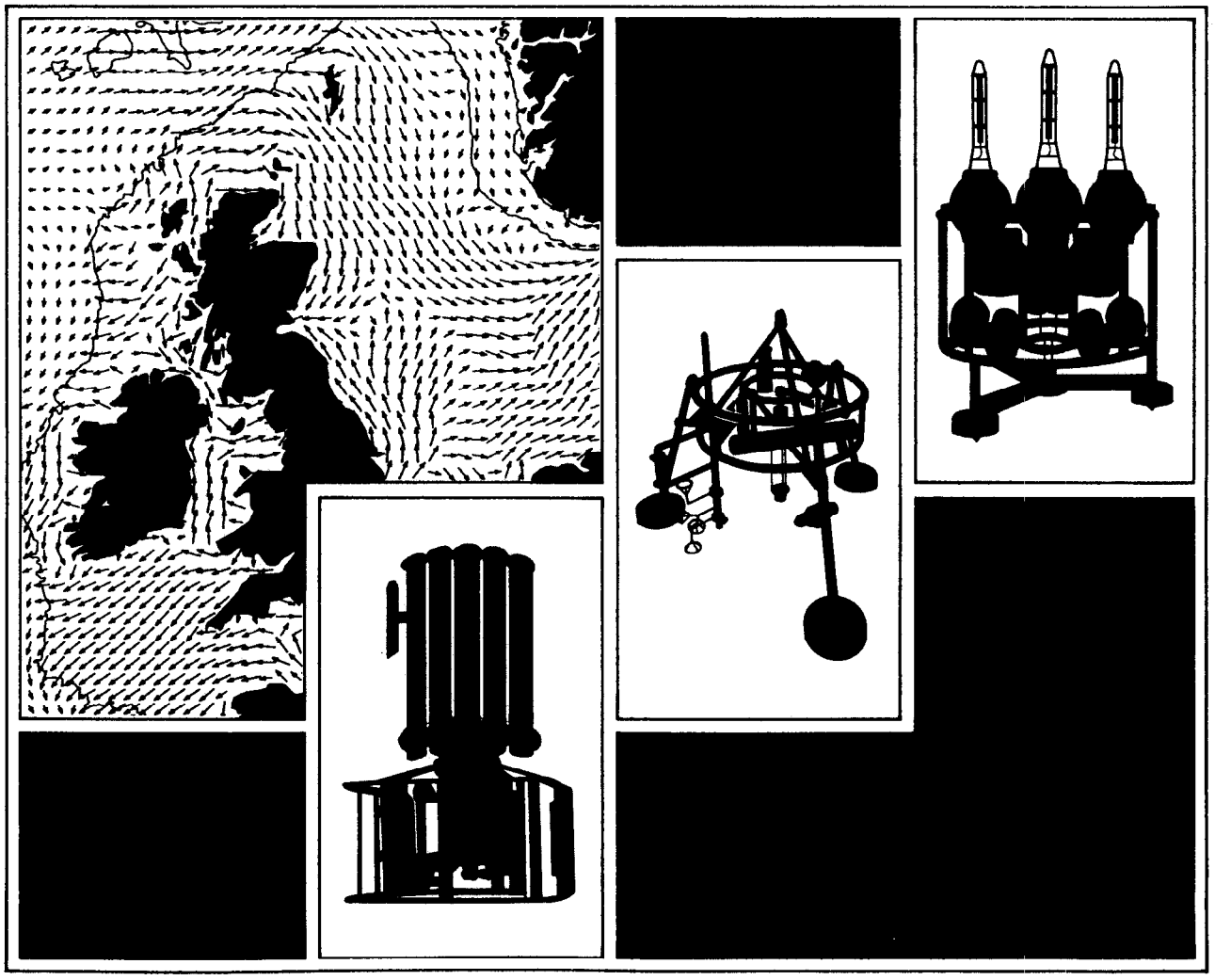
Current Profile and River Bed Pressure and Temperature Records

July 1992

River Mersey

Liverpool - Wallasey Transect

PJ Knight AJ Harrison A Lane M Wilkinson and DG Collen
Report No. 27 1993



Natural Environment Research Council

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REPORT No. 27

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ABSTRACT

This report describes results from six moorings situated along a transect across the River Mersey. Standard plots are shown as well as statistical output from the calibrated current meter records.

The measurements described here were obtained as part of a study of flows through the River Mersey commissioned by the National River Authority.

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CONTRACT

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CONTENTS

1 INTRODUCTION

An experiment was conducted by the National Rivers Authority (NRA) and the Proudman Oceanographic Laboratory (POL) to measure currents and sediment transport in the River Mersey. Included in the experiment were deployments of POL Acoustic Doppler Current Profilers (ADCP's), InterOcean S4 current meters (S4's), a water level recorder (WLR), transmissometers and a ship-borne RDI ADCP. The deployment phase of the survey was carried out on the Mersey Docks and Harbour Company ship Vigilant.

This report describes the records from six moorings situated along a transect across the river at (53° 25'N 3° 1'W), see Figures 1 and 2. ADCP's were deployed at site 2a, site 3 and site 4a. S4 current meters were deployed at site 1, site 2b and site 4b. The WLR was also deployed at site 1. Figure 3 shows a cross-section of the transect with equipment positions. Section 2, summary of deployments, gives an overview of the results obtained.

The ADCP recorded vector averaged North and East components of current at set levels throughout the water column. It also recorded backscatter strength and two components of tilt. The tilts gave an indication of mooring stability and were used to correct for uneven frame positions. The S4's also recorded North and East components of current and were used to correct ADCP compass errors. The WLR recorded pressure and temperature.

It must also be noted that the survey area experienced large tidal ranges during the deployment period. The average spring tide range at Liverpool is 8.4m, whilst the largest is 10.5m. The spring tide ranges were 9.4m and 9.6m on the 3rd and 31st of July respectively.

The recovery phase was successful with all the moorings retrieved and with 100% good quality data return. The EDO transducers worked well with no apparent loss of velocity amplitude, however it is difficult to fully assess this improvement due to the large tidal range at Liverpool, which causes the upper bins to be out of the water during part of the tidal cycle. The ADCP compass errors were corrected using S4 current meter data and channel alignment, with a correction of -18.8° for ADCP No.0010, -28.5° for ADCP No.0001 and -11.9° ADCP No.0004.

2 SUMMARY OF DEPLOYMENTS

The following information gives an overview of the data processed at the six sites during the Mersey survey. The bold letters in the Mooring No. column also indicate site names.

2.1 Deployment details

Mooring No.	Meter No.	Deployment	Recovery	Meter Ht(m)	Data length	Comments
M92**01**	S41196	03-JUL-92	31-JUL-92	0.6	27.9 days	Good data set
M92**01**	WR1038	03-JUL-92	31-JUL-92	0.4	27.9 days	Good data set
M922**A**	DP0010	07-JUL-92	28-JUL-92	0.5	21.2 days	1MHz/MA transducers
M922**B**	S41831	07-JUL-92	28-JUL-92	0.5	21.0 days	Good data set
M92**03**	DP0001	08-JUL-92	28-JUL-92	0.5	19.9 days	1MHz/EDO transducers
M924**A**	DP0004	08-JUL-92	28-JUL-92	0.5	19.9 days	1MHz/MA transducers
M924**B**	S41832	08-JUL-92	28-JUL-92	0.6	19.9 days	Good data set

3 RIG SYSTEM DESCRIPTION

The moorings were deployed along a transect across the river approximately at 53° 25'N longitude 3° 1'W, (see Figures 1, 2 and 3). The ADCP's were mounted on low profile frames positioned on the sea bed with acoustic releases, (see Figure 5). On recovery the release was triggered by sending acoustic signals from the ship so that the frame separated from the ballast weight. The frame under its own buoyancy then rose to the surface ready for picking up. The S4's and WLR were also mounted on bottom frames, see Figure 6. These were recovered by picking up the attached buoys.

The depths noted in rig information details found further into the report are zero or negative. These represent chart datum (Lowest Astronomical Tide) and indicate how deep the water is at low water. For example site 3 depth is -15.0m, therefore 15m depth of water occurs at low water.

The reliability of the mooring systems used was reflected in the 100% return of deployed equipment. Also, the mooring systems remained stable and fixed for the deployed period in extremely large tidal currents. The deployment and recovery phases were carried out by Mersey Docks and Harbour Company's ship Vigilant.

4 ACOUSTIC DOPPLER CURRENT PROFILER (POL 1 MHz)

The POL 1 MHz ADCP measures the vertical profile of currents in bins from the river bed to the surface. The ADCP sends out short acoustic pulses, typically lasting a few thousandths of a second, at a fixed frequency. The acoustic pulses, transmitted in two narrow beams at right angles to each other and 30° to the vertical, are reflected back to the ADCP by small particles, such as plankton or sediment, which move with the water. The frequency of the reflected signal is changed by a small amount proportional to the current speed, the Doppler shift. By measuring the frequency change along the two beams the speed and direction of the currents are determined. The currents at different heights through the water column are obtained by chopping the return signal into segments by time.

The ADCP has a range of 30 m and can measure up to 24 bins. However, the technique has some limitations which reduce the amount of good data return. The bins nearest to the transducers may give erroneous data due to the time taken for transients to decay, whereas the far end bins may be affected by interference from side lobes reflected from the water surface. Hence, the good data return bins are usually between 15% of depth from the surface and 10% of depth from the bottom.

Liverpool experiences a tidal elevation range of up to 10m and it is therefore necessary to relate depths to local chart datum (Lowest Astronomical Tide). It must also be noted that ADCP bins (refer to Section 4.2) above chart datum will at some time during the deployment be measuring "above" the water level, i.e. a signal which is reflected from the water surface. The good bin returns are as follows: M9201/DP0010 bins(1-3) with bins(4-10) above chart datum, M9203/DP0001 bins(1-8) with bins(9-15) above chart datum and M924A/DP0004 bins(1-3) with bins(4-10) above chart datum.

With previous deployments of the ADCP (Knight et al, 1992) a reduction in velocity amplitude with increasing distance from the transducers was experienced. During the experiment EDO transducers were fitted to ADCP No.0001 deployed at site 3, with a view to improving the data quality of the upper bins. The other two ADCP's had Marine Acoustic (MA) transducers, used on earlier deployments.

4.1 Specification

Speed	Range	0 to 350 cm s^{-1}
	Accuracy	$\pm$4 cm s^{-1}
Direction	Refer to Section **9 ANGLE CORRECTION TO ADCP DATA**	
Tilt	Two tilts measured at 90° to each other	

4.2 Set up details

Set up	Sample period	10 minutes
	Number of bins (cells)	16
	Number of pings in ensemble	275
	First bin height/Bin separation	3.9 m / 1.4 m
	Bin heights (range) (1-16)	3.9 m / 5.3 m / 6.7 m / 8.1 m / 9.5 m / 10.9 m / 12.4 m / 13.8 m / 15.2 m / 16.6 m / 18.0 m / 19.4 m / 20.8 m / 22.2 m / 23.6 m / 25.0 m

5 INTEROCEAN S4 CURRENT METER

The InterOcean Systems model S4 electromagnetic current meter is a self-contained 0.25 m diameter sphere, with no protruding sensors. It measures the current by creating a magnetic field and sensing the voltage induced in two orthogonal directions, by the movement of sea water, an electrical conductor, through the field. This information combined with the Flux-Gate compass gives the North and East components of velocity computed. The S4 was used in vector average mode throughout the survey. It sampled every ½ second and averaged the vectors over a 10 minute recording interval.

5.1 Specification

Speed	Range	0 to 350 cm s^{-1}
	Accuracy	$\pm$2 cm s^{-1}
Direction	Range	0 360°
	Accuracy	$\pm$2°

6 WATER LEVEL RECORDER

The Aanderaa WLR Model 5 is a self recording high precision instrument for recording of water level by measurement of hydrostatic pressure. The standard range is 270 metres, corresponding to a sensor range of 0-400 PSI (0-27.2 bars). The effects due to waves are averaged over a 40 second integration time. Temperature is obtained from a thermistor fitted on the top plate of the meter and extending into the water.

6.1 Specification

Pressure	Range	0.0 to 27.2 bars (0-400 PSI)
	Accuracy	0.01% of pressure
Temperature	Range	0.0 to 30.0°C
	Accuracy	±0.03°C

6.2 Conversion from bars to metres of water

The WLR has a sensitive pressure sensor which measures pressure in bars, after calibration. The pressure measured includes water column pressure and atmospheric pressure. In order to produce a value for metres of water above the sensor, instead of bars, the atmospheric pressure must be subtracted from the calibrated value of pressure, and the result multiplied by 9.94.

$$\mathbf{p = \rho * g * h}$$

where
- **p** Pressure at 1 bar (10^5 Pascals)
- ρ Water density (assumed to be 1025 kg m^{-3})
- **g** Gravitational acceleration (9.81 m s^{-1})
- **h** Depth of water equivalent to 1 bar pressure

$$\mathbf{H = (P_{total} - P_{atm}) * 9.94}$$

where
- **H** Height of water in metres
- $\mathbf{P_{total}}$ Total recorded pressure in bars
- $\mathbf{P_{atm}}$ Atmospheric pressure in bars

7 DATA PROCESSING STEPS

7.1 Raw data transfer

The data were brought back to POL on standard cassette (ADCP), 3½ inch disc (S4) and ¼" tape (WLR) formats. The data were then translated and stored on an IBM/PS2, and then transferred to the Silicon Graphics UNIX workstation via PC-NFS on the IBM/PS2.

7.2 Processing stage

Two software systems, CALT and CALP, were developed at POL for quick and efficient processing and display of times series data, such as current meter data. The CALT system calibrates and checks for errors and the CALP system produces standard graphical output, filtered and non-filtered statistical analyses. Before calibrating the data, all the information required for processing were input into an ORACLE data base. All the information could then be accessed easily with FORTRAN programs.

Processing was then initiated by CALTU, which calls a suite of FORTRAN programs for error checking and producing calibrated data. Any errors found from the initial run were edited out of the raw data, and CALTU run again. After successful completion of the CALTU stage another suite of FORTRAN programs, initiated by CALPT/DOPT, were used to produce the output contained in this report. The types of plot obtained, details of filtering and statistics, are explained in more detail in the following sections.

Tidal analysis was carried out using the standard POL package, which was adapted to use current meter data. It was initiated by TITAN, which calls the suite of FORTRAN programs needed for the analysis. The results are listed in the appendix, and were used in connection with the angle correction. (Refer to Section 9)

7.3 Interpolation

Gaps of 30 minutes occurred in M9201/DP0010 which were filled by linear interpolation to the data before producing standard graphical output and statistical analyses.

8 DETAILS OF STATISTICS AND FILTERING

8.1 Simple statistics

A simple statistical analysis was carried out on each calibrated data set. The following statistics were calculated :-

(1) Mean, variance and standard deviation of the East and North components of velocity.
(2) The mean vector speed and direction were calculated from the above statistics.
(3) The maximum ten and minimum ten Northings and Eastings, and the top speeds.

8.2 Variance ellipse statistics

Statistical analysis was also carried out on the current ellipse, which can be graphically represented by a scatter plot. The following statistics were calculated :-

(1) The maximum and minimum variances and their ratio (minimum/maximum). If the ratio is close to 1, the currents have no preferred direction, whilst if it is close to zero, the flow is rectilinear.
(2) The direction associated with the maximum and minimum variance, in the range of -180° to +180°.
(3) The total variance which equals the sum of the North and East component variances or the sum of the maximum and minimum variances.
(4) The average direction for each half of the ellipse, related to the directions of maximum variance. If these directions differ by 180° the scatter plot is symmetrical.

8.3 Filtering

The ten minute calibrated data were also low-pass filtered, see Figure 4 which shows the filters response function, and sub-sampled every 6 hours. Three days of data are lost at the beginning and the end of the record when this filter is applied. The statistical analysis was repeated on the filtered data set.

9 ANGLE CORRECTION TO ADCP DATA

9.1 Direction measurement

Figure 7 shows how Beam 1 and Beam 2 of the ADCP are aligned with respect to the frame and the compass. The compass measures the angle between magnetic North and the frame. The two beams can be converted into East and North components of velocity by using the angle obtained from the compass.

During the Dover Strait Study (Knight et al,1992) the compasses produced errors due to magnetic interference caused by the frame and ballast; this error depended on the mooring orientation. The compasses used in the ADCP's during the River Mersey survey also had these types of errors and have therefore been corrected using the same method, which is outlined below.

9.2 Correction procedure

The ADCP data were first processed using the CALT and CALP software. The statistical analysis gave the angle α of maximum variance as shown in Figure 8(a). This angle α was taken to represent the M_2 major axis tidal ellipse angle β shown in Figure 8(b). The compass, although giving incorrect readings of frame angle, was recording direction relative to an unknown fixed position. It was therefore decided to correct the frame angle by adding a correction angle.

The correction angle was calculated from the difference between β (taken from the closest S4 current meter or an angle representing the channel orientation) and α (found from the initial raw data analysis). The S4 current meter data were used to produce β for Site 2a and Site 4a. There was no S4 current meter deployed at site 3, therefore β was taken to be the channel orientation. The β was taken to be -9.4° for site 2a, -18.0° for site 3 and -9.9 for site 4a. There is a 180° ambiguity in the calculation of α which was resolved by studying the M_2 tidal phase given by the observations.

10 FORMAT OF DATA OUTPUT

All speeds and velocities are in m s^{-1}, directions in degrees true and time in GMT. The results are ordered by mooring number (Refer to Section 2.1). Each mooring result is made up of mooring information, meter information, and graphical output and statistics (both unfiltered and filtered).

10.1 Mooring information

Position latitude	: Latitude of deployment
Position longitude	: Longitude of deployment
Water depth(m)	: Depth measured by ship's echo sounder
Deployed on cruise	: Cruise identifier or ship name
Recovered on cruise	: Cruise identifier or ship name
Site name identification	: Additional site identifier
Magnetic deviation	: Taken from charts
Rig deployed on	: Time frame on the bottom
Rig recovered on	: Time release fired on rig
Period of deployment	: Total time of deployment
Comments	: Details regarding mooring

10.2 Meter information

Rig number	: Unique POL mooring/rig reference
Meter number	: Four digit current meter number
Frame angle correction	: Correction to ADCP frame angle
Sample interval	: Sampling interval in seconds
Meter height from bottom	: Height in metres
Position of meter on rig	: A for attached to frame
Meter type	: DP for ADCP WR for water level recorder
	: S4 for S4 current meter
Meter started	: Date and time
Meter stopped	: Date and time
Time of last valid scan	: Used when good data ends before switch off
Period in days on record	: Total time meter switched on
Total number of scans	: Used to check timing
Timing error	: Error in seconds
Comments	: Details regarding meter

10.3 Combined ADCP profile output

(1) North and East components of velocity against time. The semi-diurnal nature of the tides can be seen as well as the Spring/Neap cycle in both components of velocity.

(2) Scatter diagrams of North components of velocity against the East components. These show the direction and magnitudes of the currents. This plot is often a good check on the quality of the data, in particular regarding direction and possible problems at low speeds.

(3) Stacked filtered stick plot. The filtered data can be displayed in a stick plot in order to see the change of the residual flow with time, and in the vertical.

(4) Combined statistics for each bin, giving vector mean speed and direction, maximum and minimum variance, and directions of maximum and minimum variance.

10.4 Single ADCP bin or S4 current meter output

Two bins with statistics are shown for each ADCP, one representing the bottom bin and the other the nearest bin below chart datum.

(1) North and East components of velocity against time.

(2) Eulerian progressive vector plot. The nature of the residual flow is emphasised, although the semi-diurnal tides are also apparent.

(3) This is followed by simple statistics of the calibrated data and filtered data. A letter 'f' attached to the file name at the top of the individual statistics indicates results from a filtered data set.

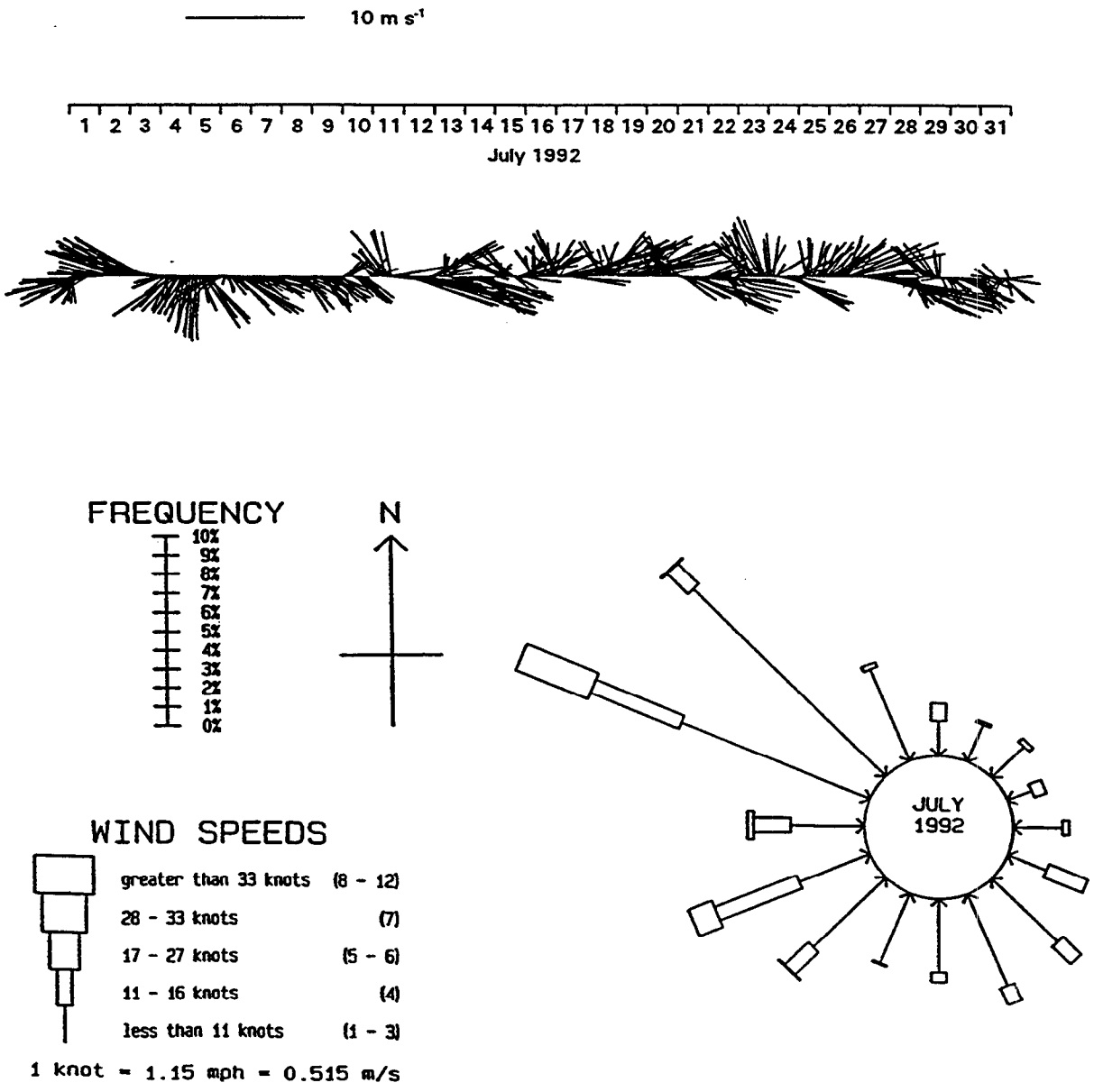
10.5 Temperature and Pressure output

(1) Temperature (°C) and pressure (bars) against time. The semi-diurnal nature of the tides and Spring/Neap cycle can also be seen in the pressure record.

11 WIND RECORD RESULTS

11.1 Graphical wind results

The following results are from wind speeds and directions taken at Bidston Observatory during July 1992. Figure 1 shows the meteorological station with respect to the moorings. The wind record is displayed below using stick plots using hourly means, and a rose diagram using 10 minute means. The stick plots lengths indicate magnitudes and angles the directions of the wind, and can be compared with the filtered current stick plots. The rose diagram shows the data in a quantitative way.



11.2 Weather description for July

General Bidston Observatory recorded the coolest and wettest July for four years.

Rain Rainfall, totalling 53.0mm and amounting to 82% of the 126 year average, was recorded over 13 days, the wettest being the 3rd, when 22.6mm were noted. Total duration for the month was 73.2 hours.

Temperature Mean air temperature was 16.1°C, 0.5° above average, ranging from a minimum of 12.1°C, recorded on the 10th, to a maximum of 25.0°C, recorded on the 31st. The lowest ground temperature was 5.9°C, recorded on the 14th.

Solar Sunshine amounted to 99.5% of the normal for July, being 182.0 hours, a mean of 5.9 hours per day. The sunniest day was the 14th, when 14.4 hours were noted, and there was only one entirely overcast day.

Wind Wind speed averaged 4.6m s^{-1} (9.0 knots). The highest gust was 18.5m s^{-1} (36 knots),recorded on the 12th, and there were only 9 hours of strong wind during July.

Pressure Barometric pressure averaged 1014.4mb, and ranged from a minimum of 997.5mb, recorded on the 11th, to a maximum of 1031.2mb, recorded on the 28th.

ACKNOWLEDGEMENTS

The authors would like to thank Graham Ballard for setting up, deploying and recovering the instruments, Joyce Scoffield for supplying meteorological data and the Mersey Docks and Harbour Company for the use of the ship Vigilant.

The measurements described here were obtained as part of a study of flows through the River Mersey commissioned by the National Rivers Authority.

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KNIGHT, P.J., HOWARTH, M.J., FLATT, D & LOCH, S.G. 1992
Current profile and sea-bed pressure and temperature records. May 1990 - July 1991. Dover Strait. Proudman Oceanographic Laboratory, Report No.22, 234pp.

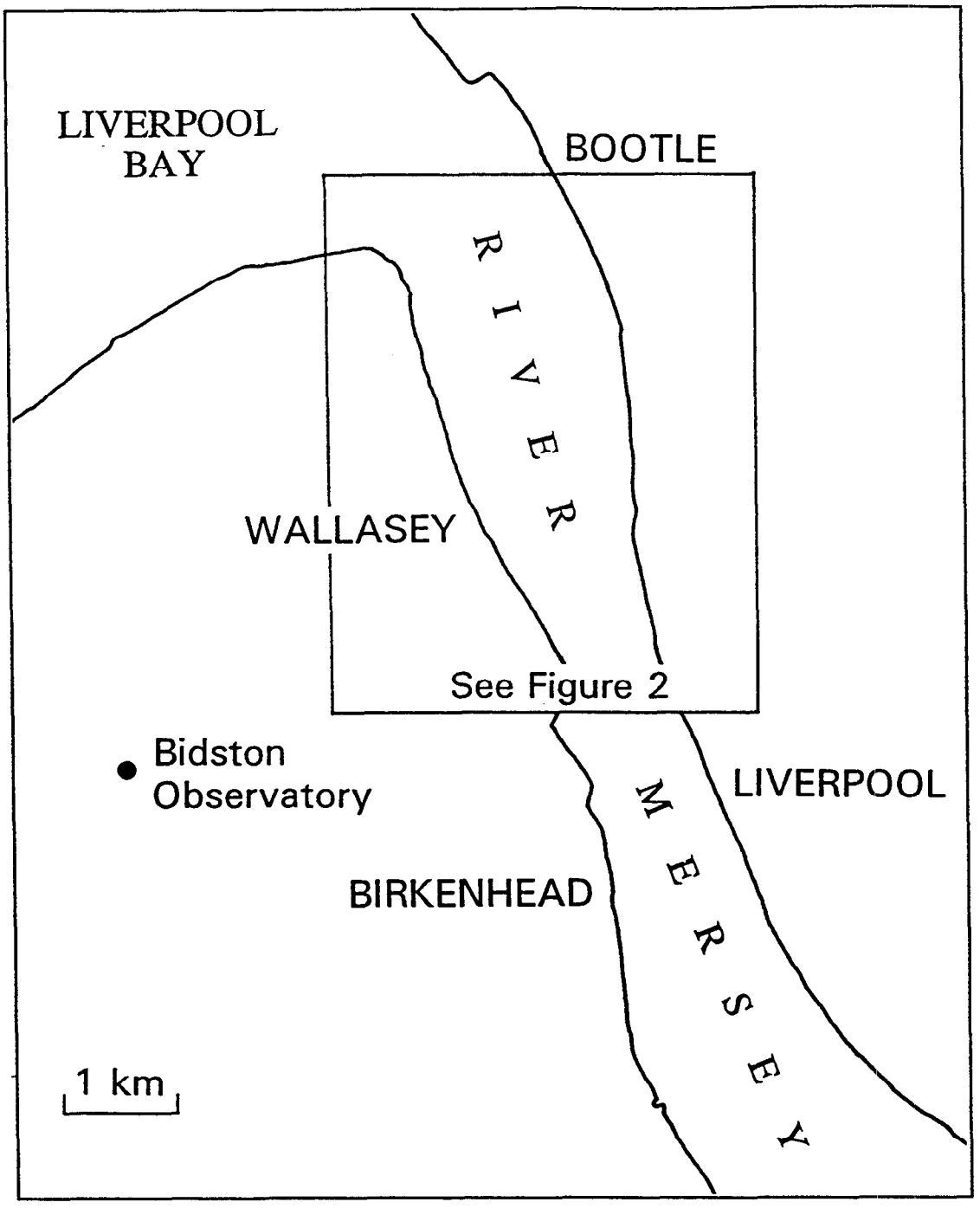


Figure 1. Map of survey area

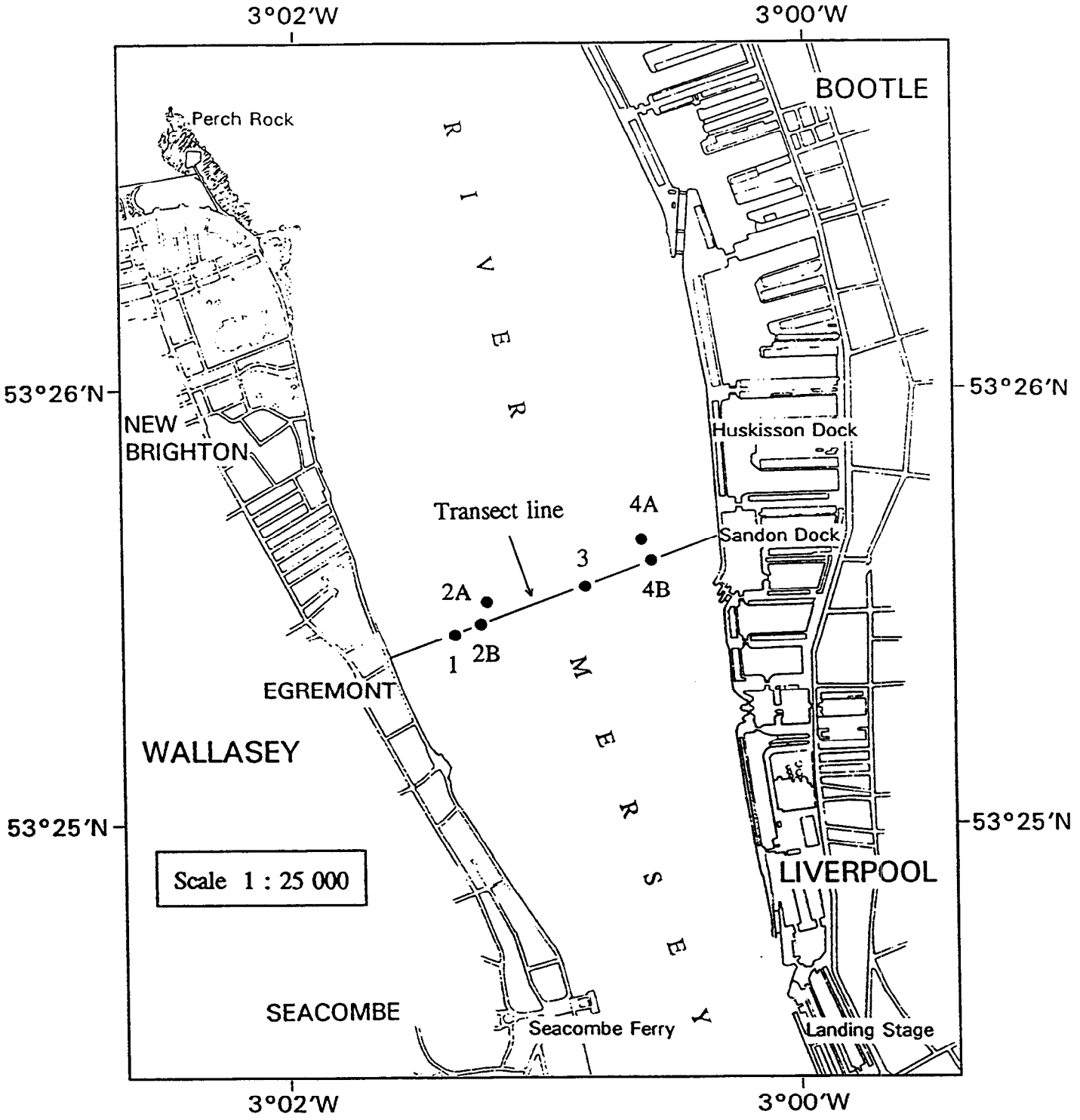


Figure 2. Map of survey ares showing the transect line and mooring positions **1, 2A, 2B, 3, 4A** and **4B**

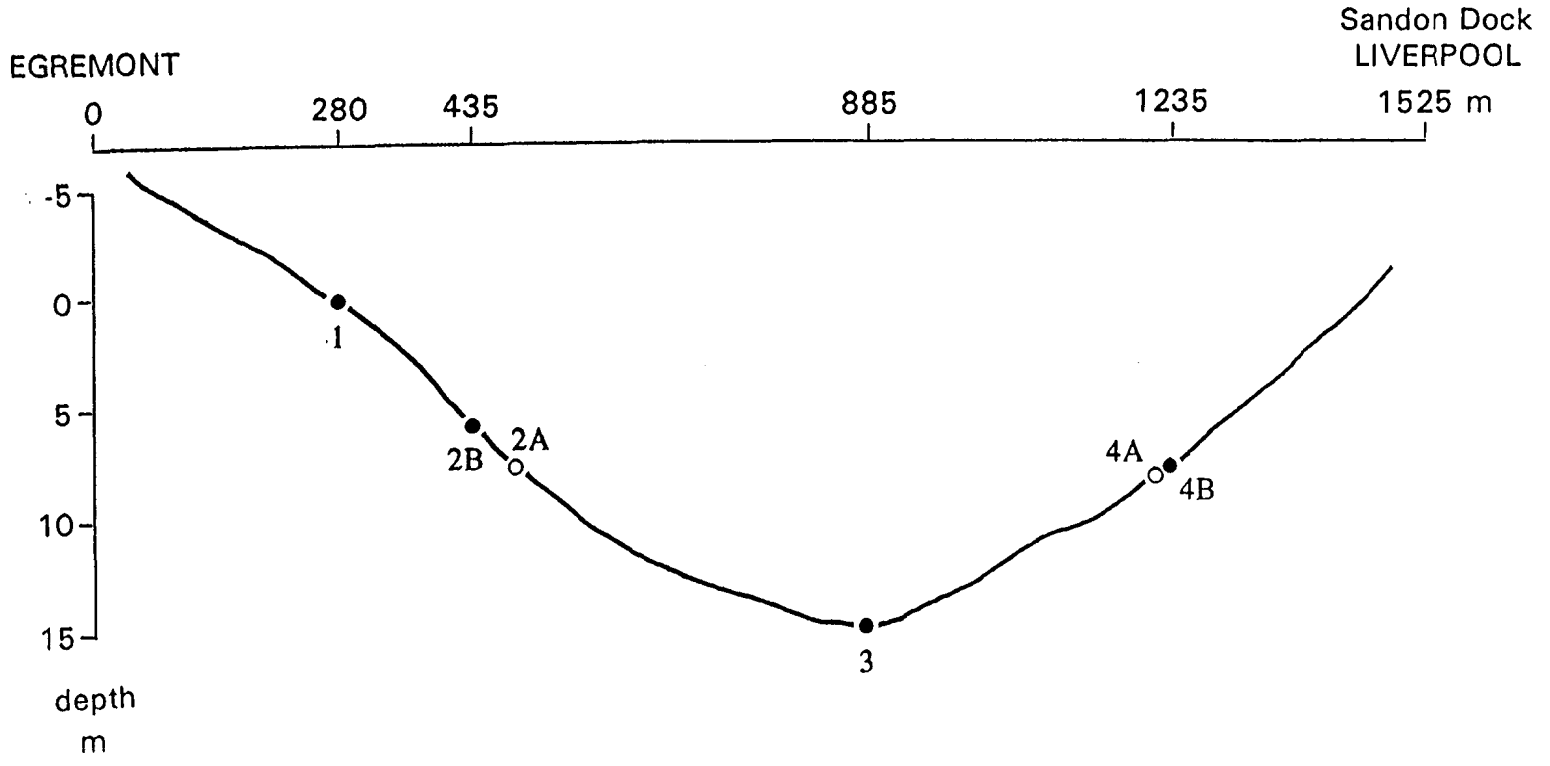


Figure 3. Cross section of transect across the River Mersey from Egremont (Wirral) to Sandon Dock (Liverpool)

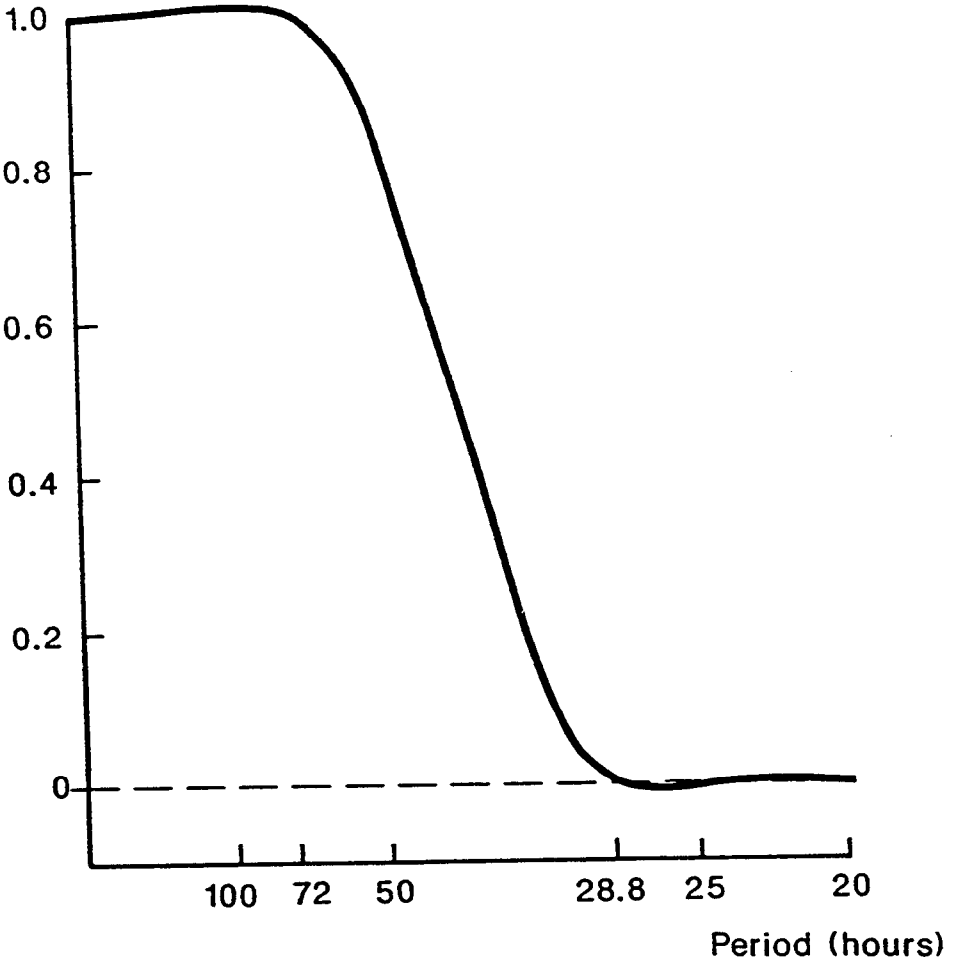


Figure 4. Response of a low pass filter

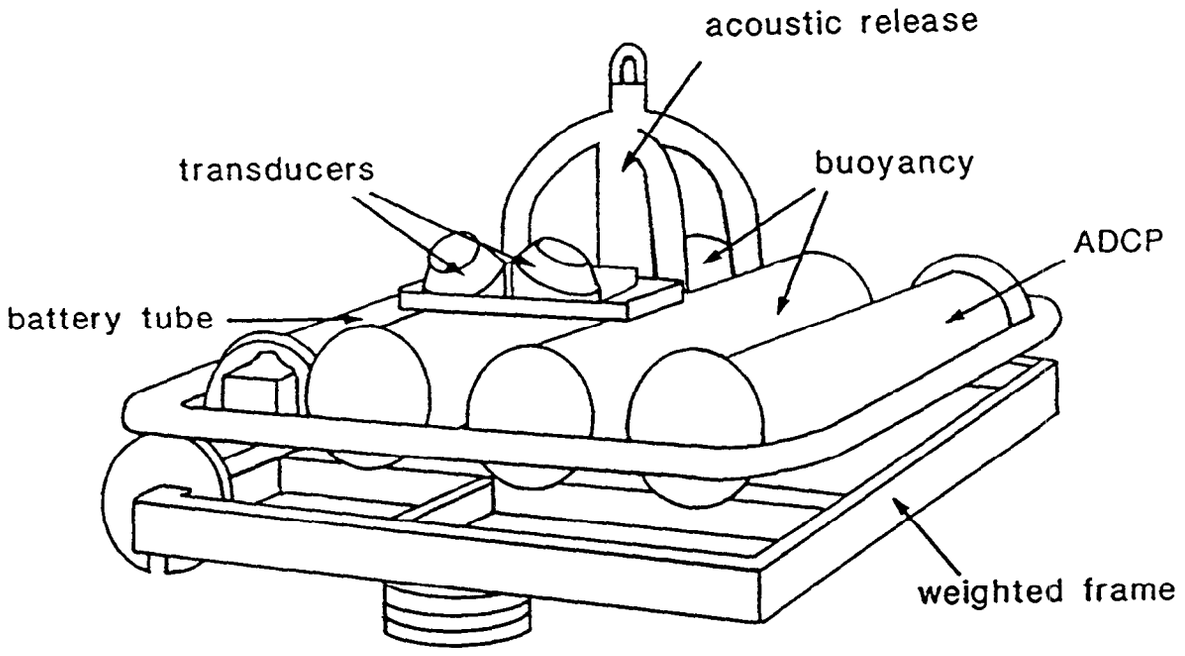


Figure 5. Diagram of low profile frame with ADCP
and attached equipment

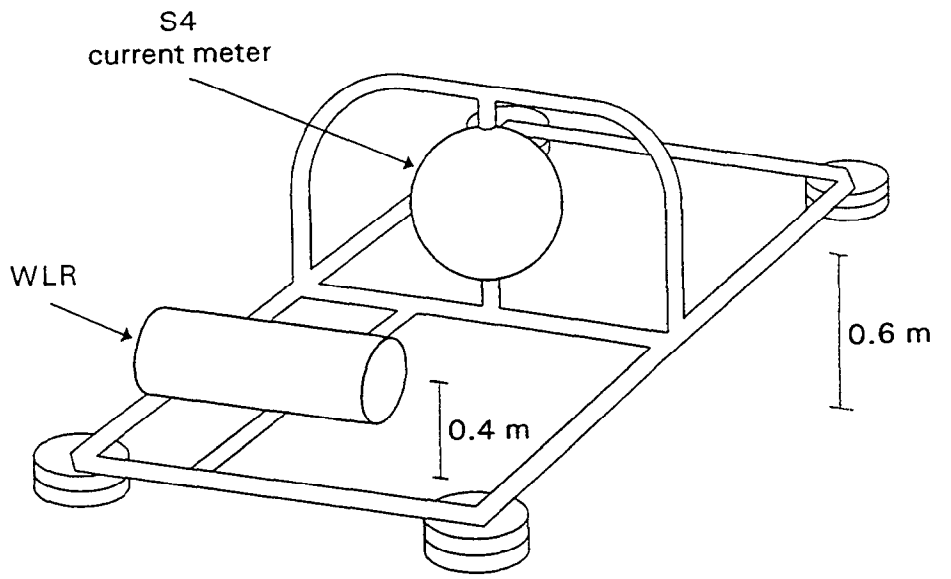


Figure 6a. Diagram of low profile frame with S4 current meter and water level recorder deployed at site 1

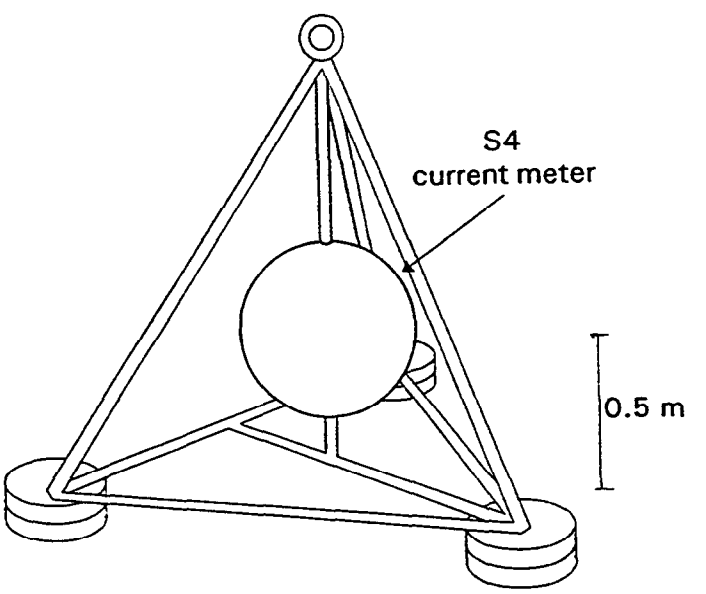


Figure 6b. Diagram of S4 current meter on a triangular frame deployed at sites 2B and 4B

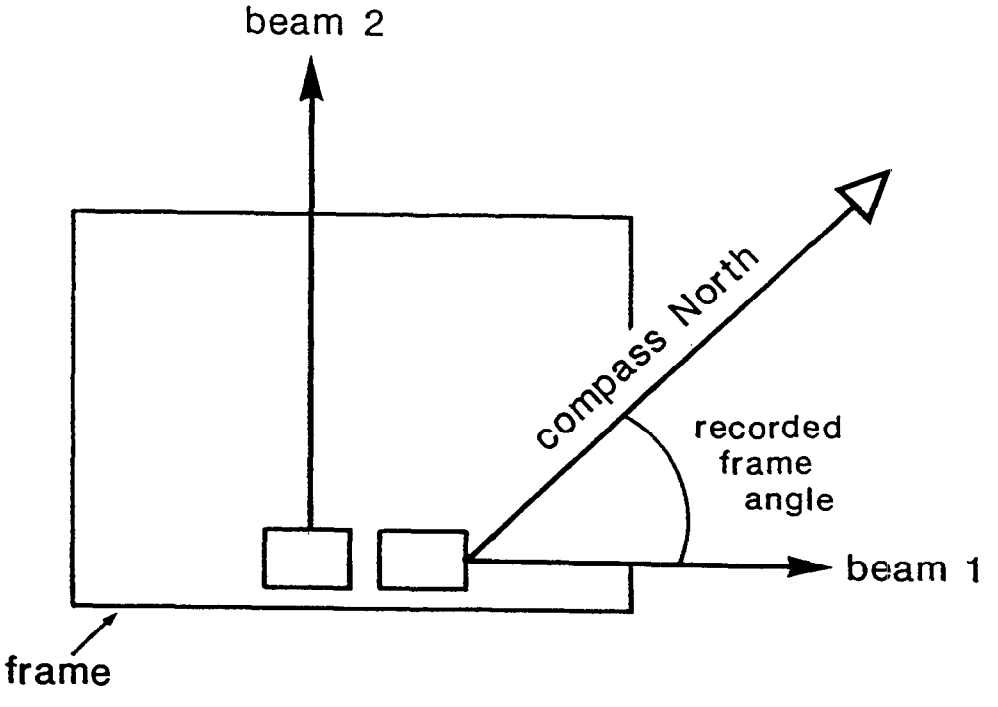


Figure 7. ADCP compass alignment

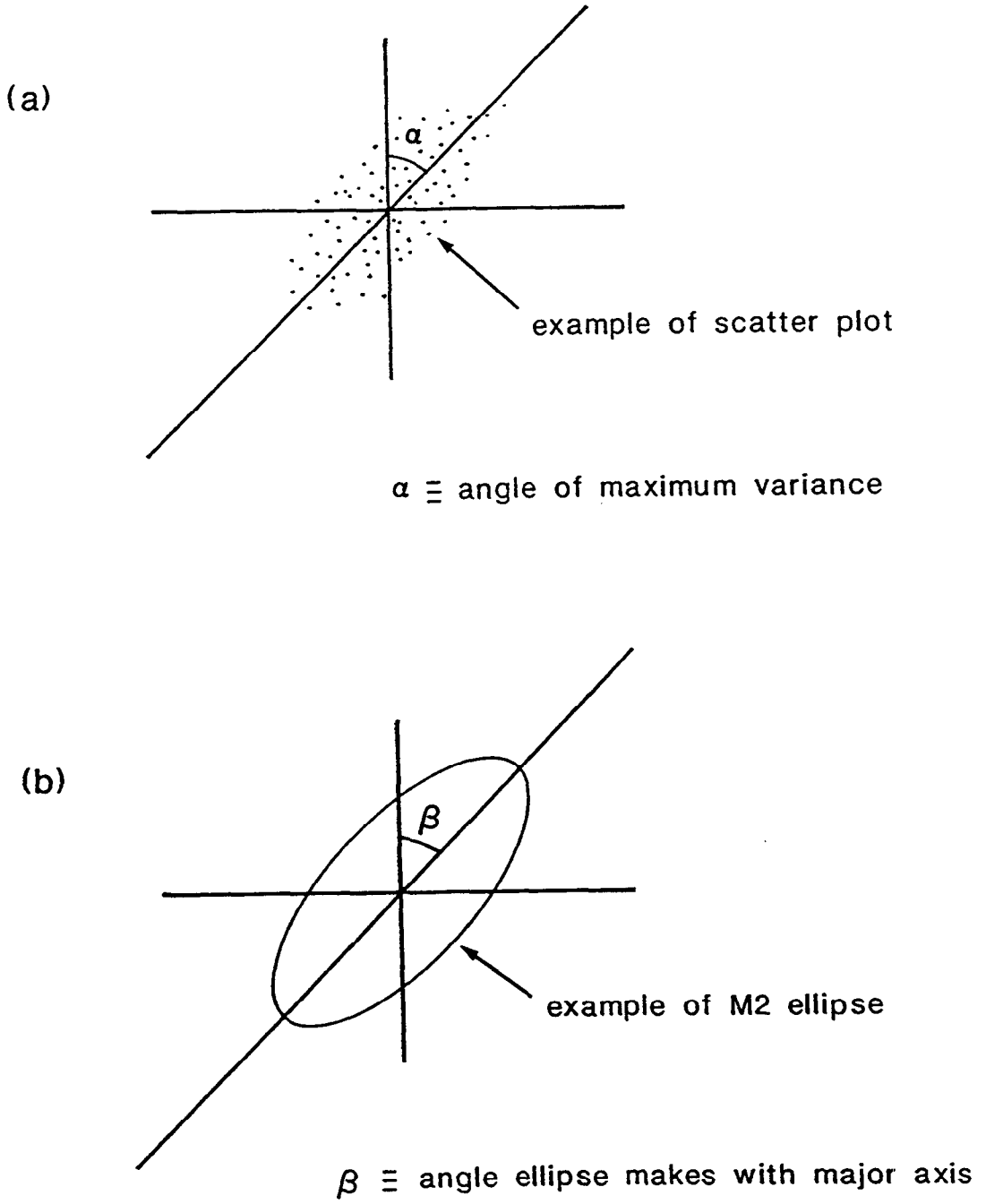


Figure 8. Diagram showing angles used in correction

Rig information details for M9201

Position Latitude	:	53 25.43N
Position Longitude	:	03 01.36W
Water depth	:	0.0 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	1
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	03-JUL-92 07:40:00
Rig recovered on	:	31-JUL-92 06:00:00
Period of deployment	:	27.9 days
Comments	:	Launch and recovery successful

Meter information details for 1196

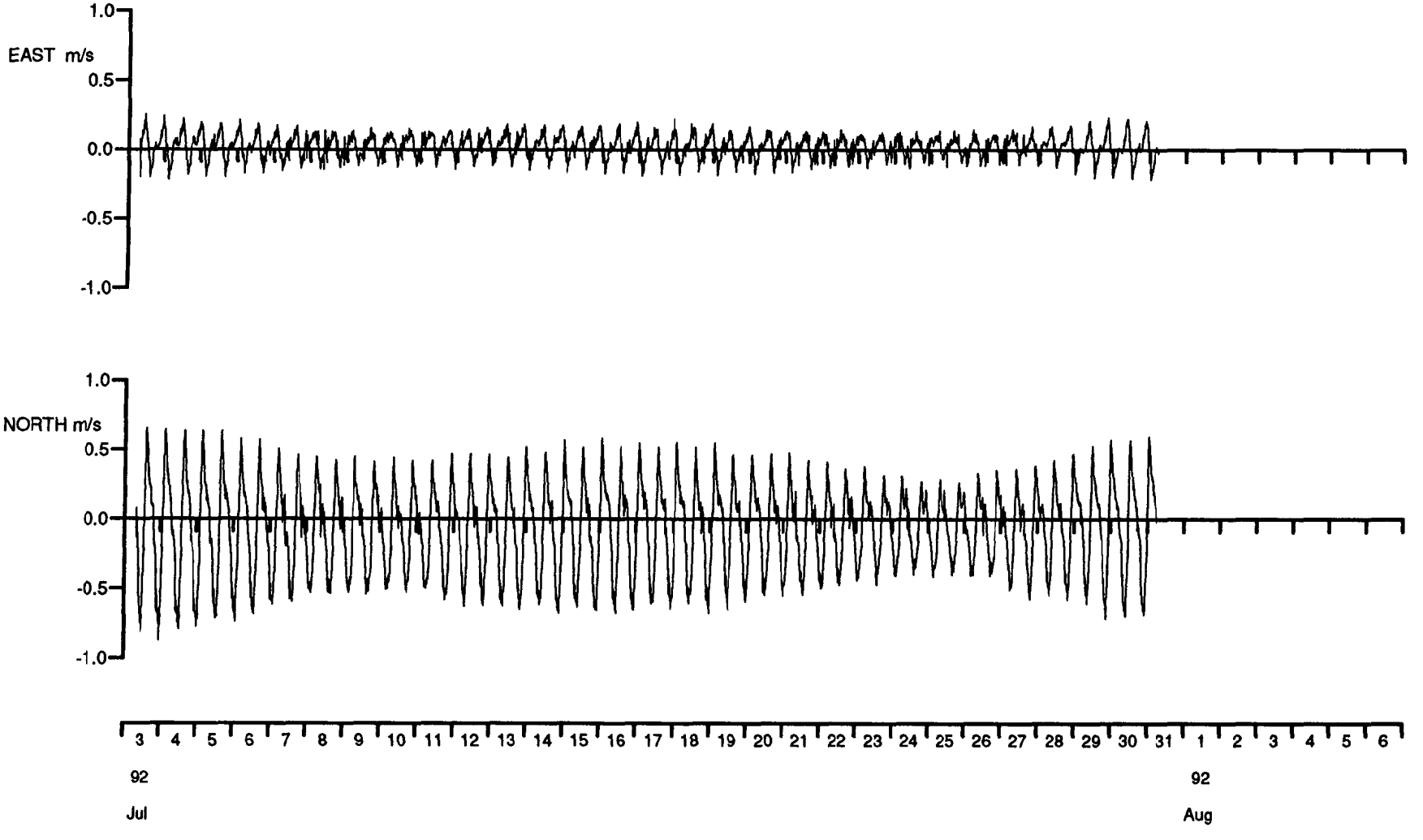
Rig No	:	M9201
Meter No	:	1196
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.6 m
Position of meter on rig	:	T
Meter type	:	S4
Meter started	:	03-JUL-92 06:00:00
Meter stopped	:	03-AUG-92 08:22:00
Period switched on	:	31.1 days
Period of good data	:	27.9 days
Total number of scans	:	4022
Timing error	:	120 seconds slow
Comments	:	Good record obtained Vector progressive plot indicates strong up river residual flow

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 1196 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.6

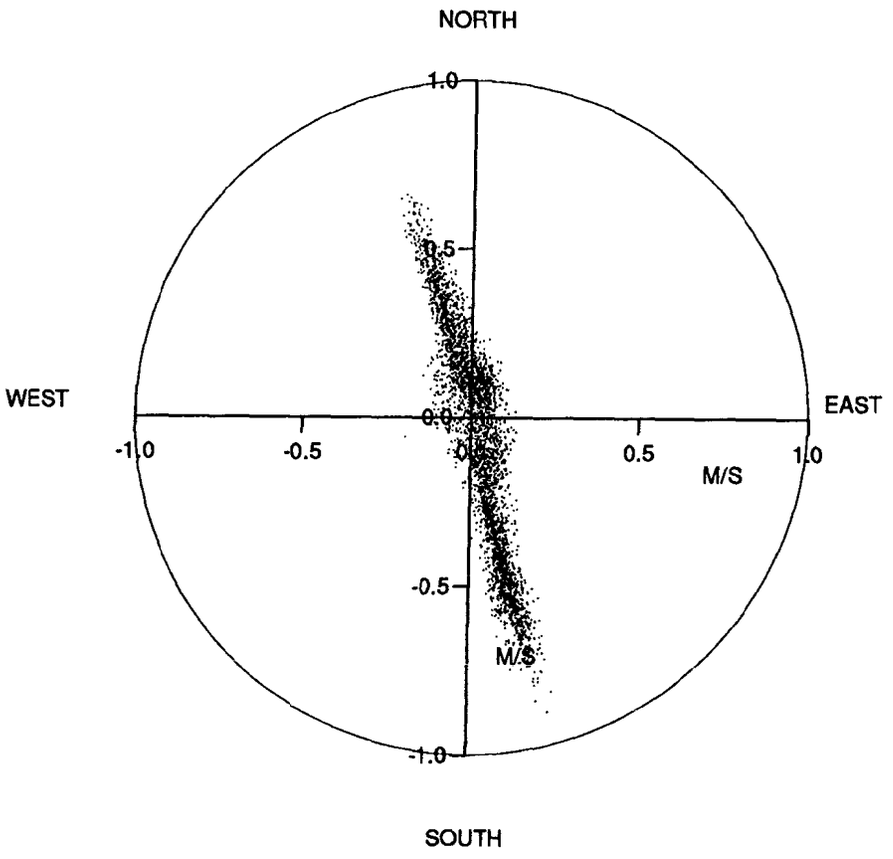


SCATTER PLOT

Meter no. 1196 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.6

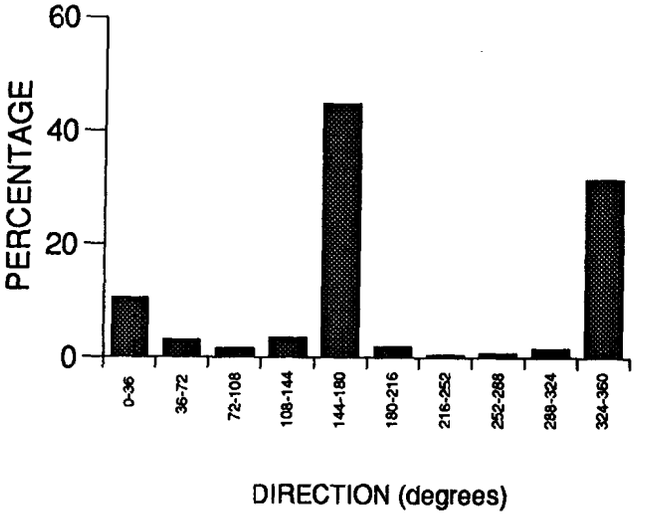


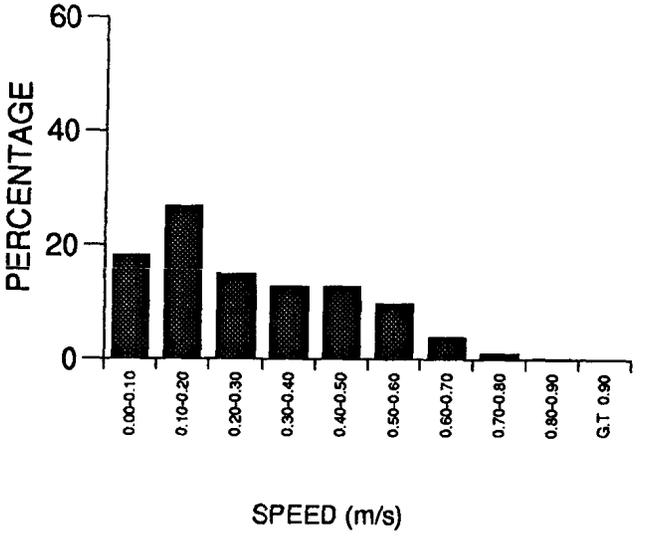
HISTOGRAMS FOR SPEEDS AND DIRECTIONS

Meter no. 1196 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.6



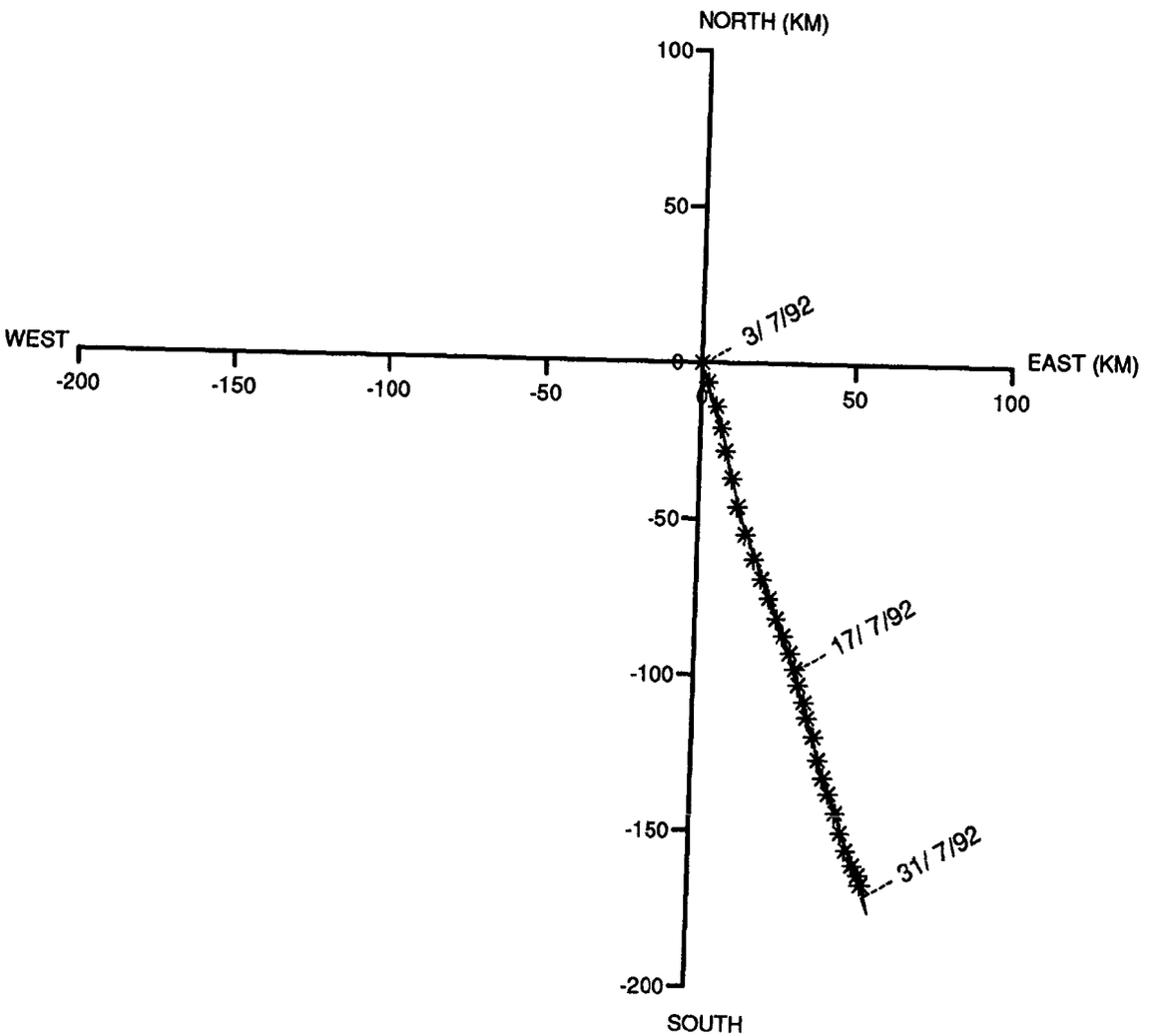


VECTOR PLOT

Meter no. 1196 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.6



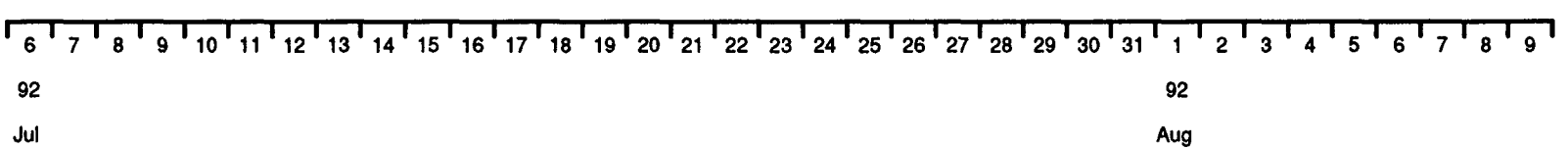
STICK TIME SERIES PLOT

Meter no. 1196 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.6

Filtered series Scale 0.1 m/s



Statistics for s41196t.m9201s

	Mean	Variance	Standard deviation
Eastings	0.0236	0.65284562E-02	0.80798864E-01
Northings	-0.0702	0.96766256E-01	0.31107274E+00
Speed	0.2751	0.33088811E-01	0.18190330E+00

Vector mean speed 0.0740

Vector Mean Direction 161.4

Maximum ten values

Eastings					Northings				
0.254	0.242	0.230	0.224	0.223	0.657	0.650	0.645	0.638	0.636
0.222	0.219	0.217	0.217	0.214	0.635	0.629	0.627	0.623	0.617

Minimum ten values

Eastings					Northings				
-0.196	-0.197	-0.199	-0.199	-0.200	-0.749	-0.750	-0.769	-0.772	-0.780
-0.202	-0.204	-0.208	-0.214	-0.219	-0.781	-0.790	-0.809	-0.838	-0.870

Maximum speeds

0.903	0.862	0.848	0.815	0.809	0.805	0.798	0.797	0.782	0.779
0.777	0.763	0.759	0.759	0.758	0.756	0.755	0.751	0.747	0.745
0.743	0.743	0.742	0.740	0.737	0.735	0.733	0.730	0.728	0.727
0.725	0.720	0.718	0.717	0.717	0.717	0.716	0.716	0.714	0.712
0.706	0.702	0.702	0.702	0.701	0.700	0.698	0.691	0.690	0.688
0.686	0.686	0.684	0.684	0.684	0.684	0.682	0.682	0.682	0.682
0.681	0.681	0.680	0.679	0.678	0.678	0.677	0.676	0.676	0.676
0.675	0.674	0.674	0.673	0.672	0.671	0.669	0.669	0.668	0.668
0.667	0.666	0.666	0.666	0.665	0.664	0.662	0.661	0.661	0.661
0.660	0.659	0.657	0.656	0.656	0.655	0.654	0.654	0.653	0.653

Variance ellipse statistics

Maximum variance	0.1021E+00	Direction	-13.3
Minimum variance	0.1176E-02	Direction	76.7
Total variance	0.1033E+00	Ratio of variances	0.1151E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 9.3

Average direction. maxdir +PI/2 to maxdir -PI/2 176.8

Statistics for s41196t.m9201sf

	Mean	Variance	Standard deviation
Eastings	0.0239	0.55796099E-04	0.74696783E-02
Northings	-0.0718	0.19527206E-03	0.13973977E-01
Speed	0.0759	0.21788004E-03	0.14760760E-01
Vector mean speed	0.0757		
Vector Mean Direction	161.6		

Maximum ten values

Eastings					Northings				
0.038	0.038	0.037	0.036	0.036	-0.046	-0.047	-0.049	-0.050	-0.051
0.036	0.036	0.035	0.035	0.034	-0.051	-0.052	-0.052	-0.055	-0.056

Minimum ten values

Eastings					Northings				
0.015	0.015	0.014	0.014	0.012	-0.089	-0.090	-0.090	-0.090	-0.090
0.012	0.011	0.011	0.011	0.011	-0.090	-0.091	-0.091	-0.092	-0.092

Maximum speeds

0.097	0.097	0.097	0.097	0.096	0.096	0.096	0.096	0.096	0.096
0.096	0.095	0.095	0.095	0.095	0.094	0.093	0.093	0.093	0.092
0.092	0.092	0.090	0.089	0.088	0.087	0.086	0.086	0.086	0.086
0.085	0.085	0.084	0.084	0.082	0.081	0.080	0.080	0.080	0.080
0.079	0.079	0.078	0.077	0.076	0.074	0.074	0.073	0.072	0.072
0.071	0.070	0.068	0.067	0.067	0.067	0.066	0.065	0.065	0.065
0.065	0.064	0.064	0.064	0.064	0.063	0.063	0.062	0.062	0.061
0.061	0.061	0.060	0.060	0.060	0.060	0.058	0.058	0.057	0.056
0.056	0.056	0.055	0.053	0.052	0.052	0.052	0.051		

Variance ellipse statistics

Maximum variance	0.2178E-03	Direction	-20.5
Minimum variance	0.3326E-04	Direction	69.5
Total variance	0.2511E-03	Ratio of variances	0.1527E+00
Average direction. maxdir -PI/2 to maxdir +PI/2	0.0		
Average direction. maxdir +PI/2 to maxdir -PI/2	182.1		

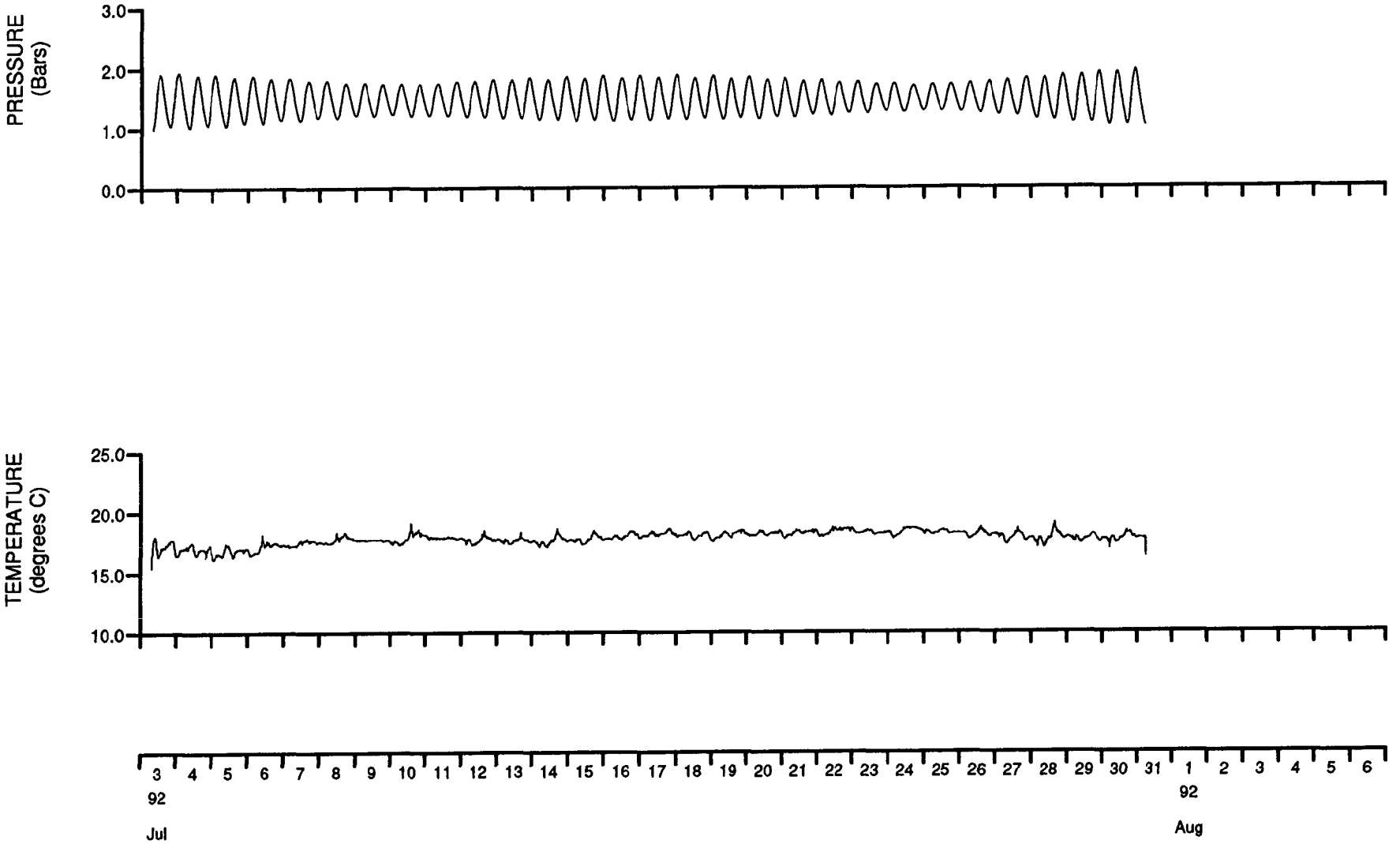
Meter information details for 1038

Rig No	:	M9201
Meter No	:	1038
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.4 m
Position of meter on rig	:	B
Meter type	:	WR
Meter started	:	02-JUL-92 14:10:00
Meter stopped	:	03-AUG-92 08:10:40
Period switched on	:	31.8 days
Period of good data	:	27.9 days
Total number of scans	:	4023
Timing error	:	40 seconds slow
Comments	:	Good record obtained The pressure record indicates that the mooring did not "dry out" during deployment

Meter no. 1038 Rig no. M9201 Depth of water(m) 0.0

Start/End 1992/07/03 AT 07:40:00 1992/07/31 AT 06:00:00

Position 53 25.43N 03 01.36W Meter Height(m) 0.4



Rig information details for M922A

Position Latitude	:	53 25.52N
Position Longitude	:	03 01.21W
Water depth	:	-7.9 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	2A
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	07-JUL-92 10:53:00
Rig recovered on	:	28-JUL-92 15:40:00
Period of deployment	:	21.2 days
Comments	:	Launch and recovery successful

Meter information details for 0010

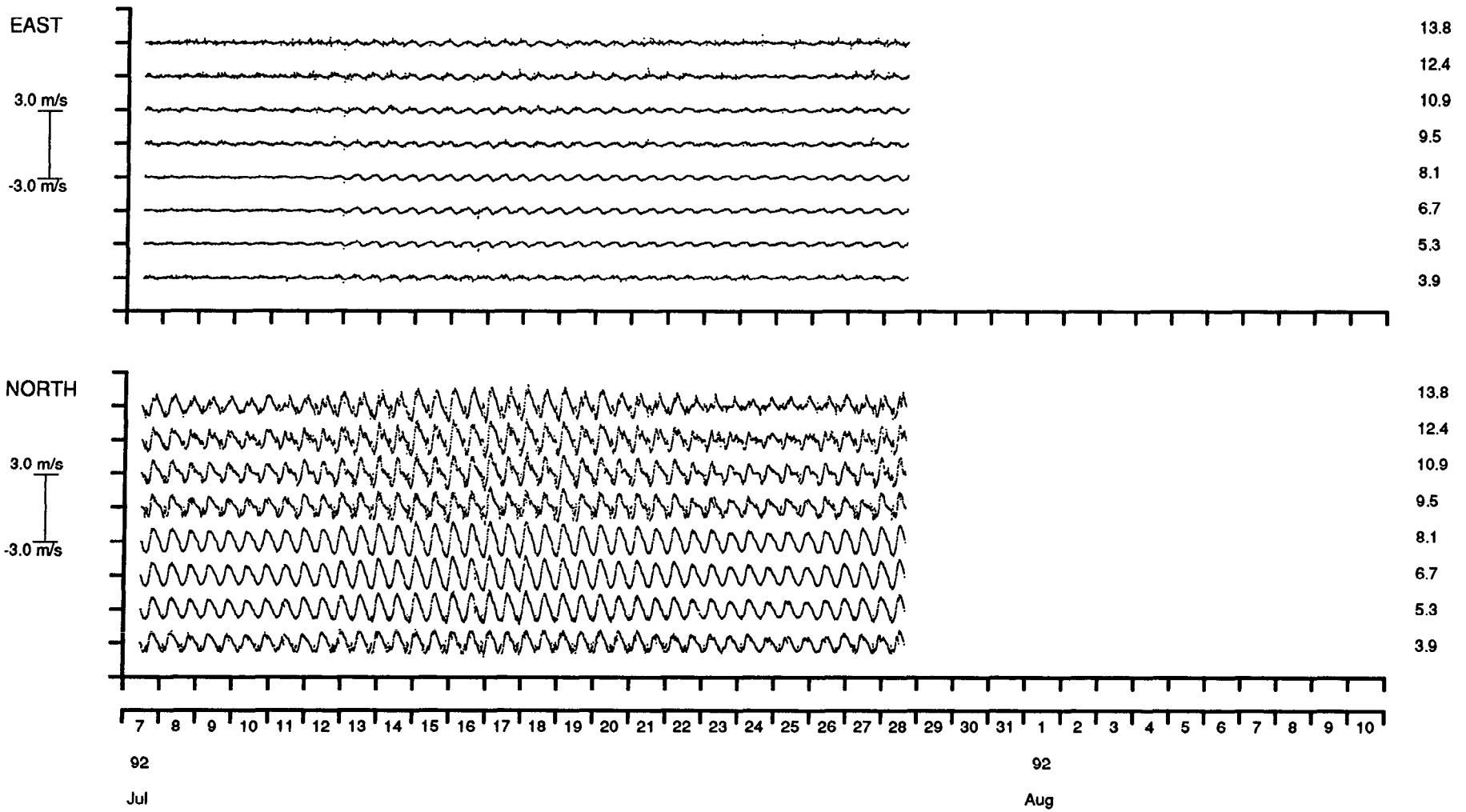
Rig No	:	M922A
Meter No	:	0010
Frame angle correction	:	-18.8 degrees
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.5 m
Meter type	:	DP
Meter started	:	07-JUL-92 08:19:01
Meter stopped	:	28-JUL-92 15:49:19
Period of good data	:	21.2 days
Total number of scans	:	3039
Timing error	:	18 seconds slow
Comments	:	Five increments of 40 minutes instead of 10 minutes

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht

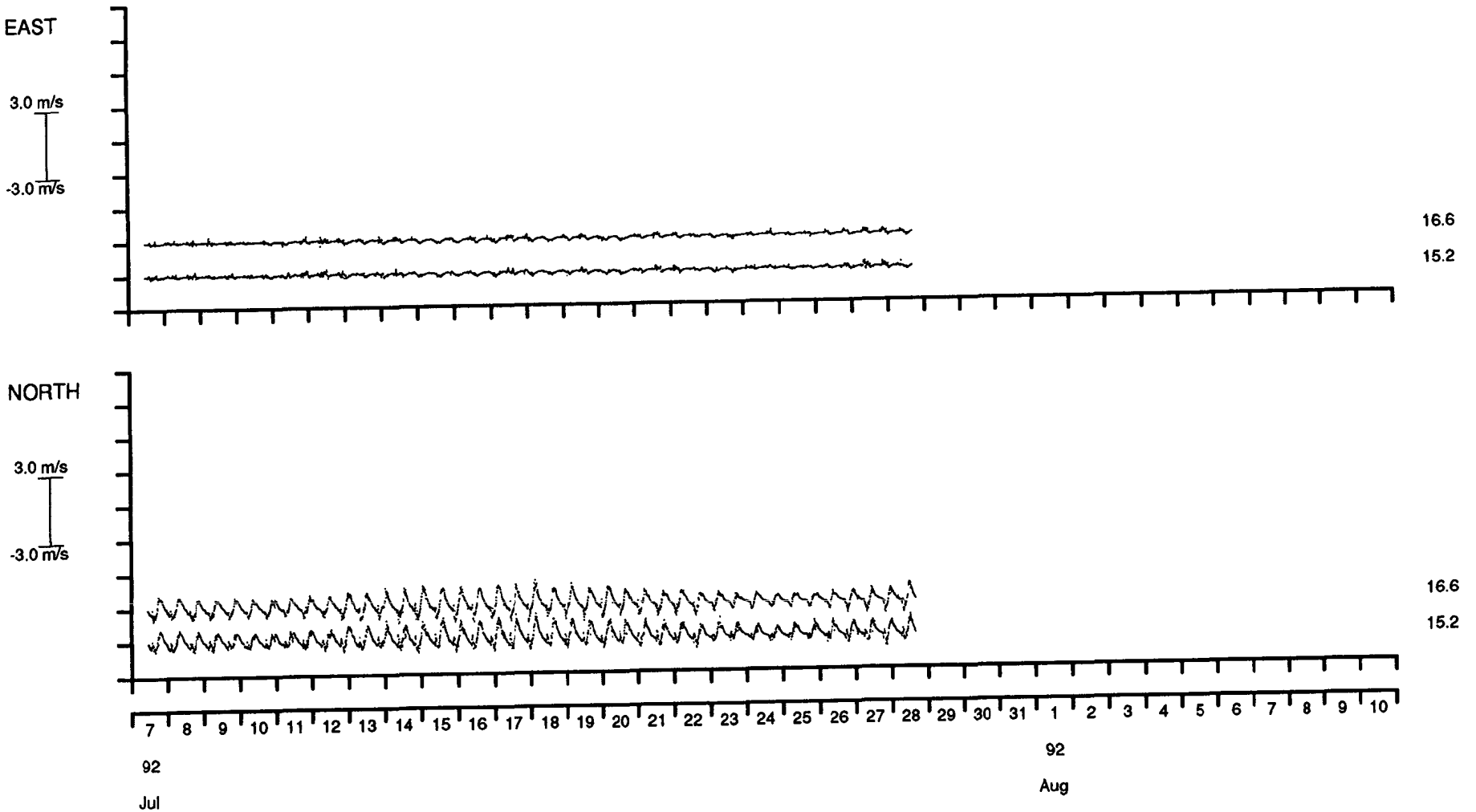


VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht

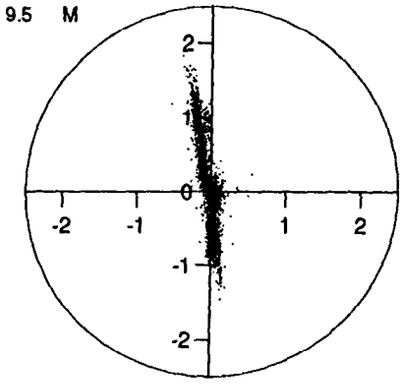


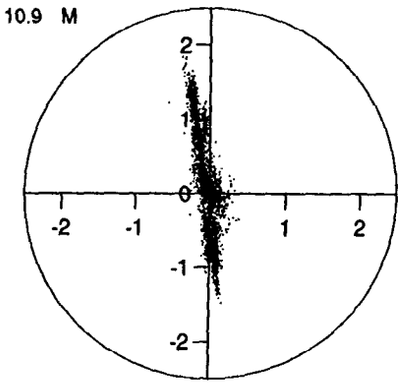
SCATTER PLOT

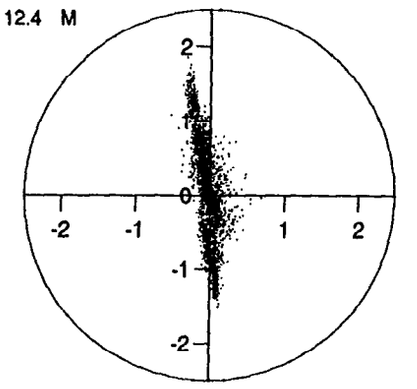
Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

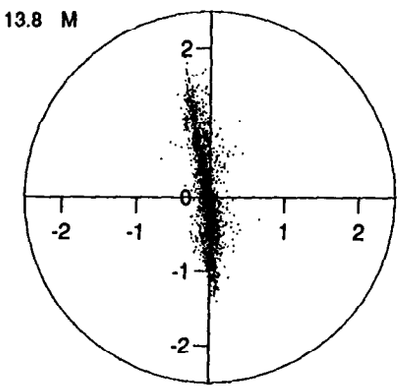
Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

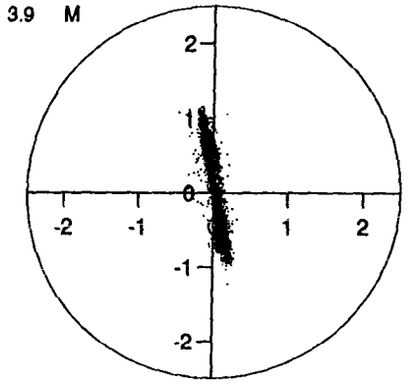
Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht

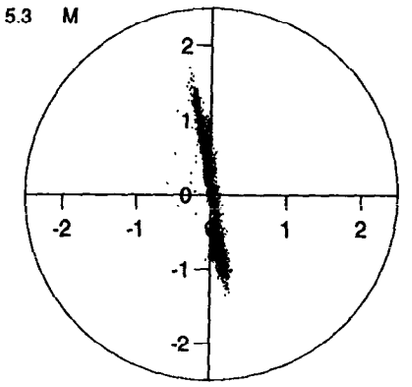


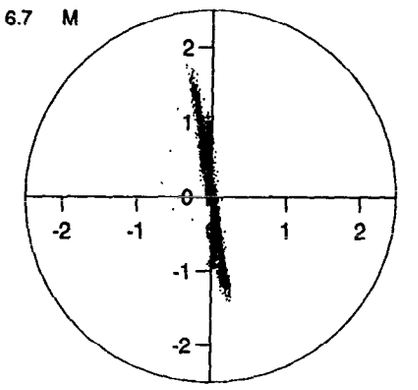


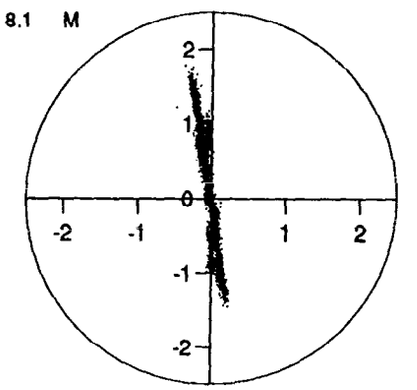










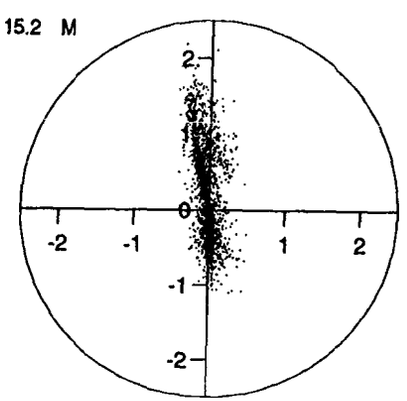


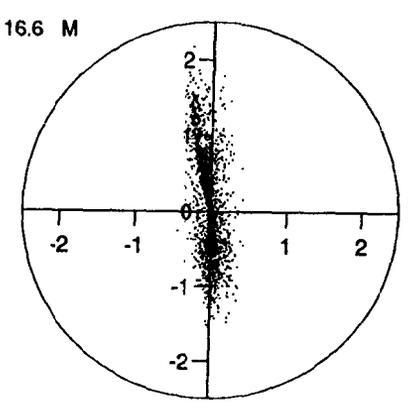
SCATTER PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht





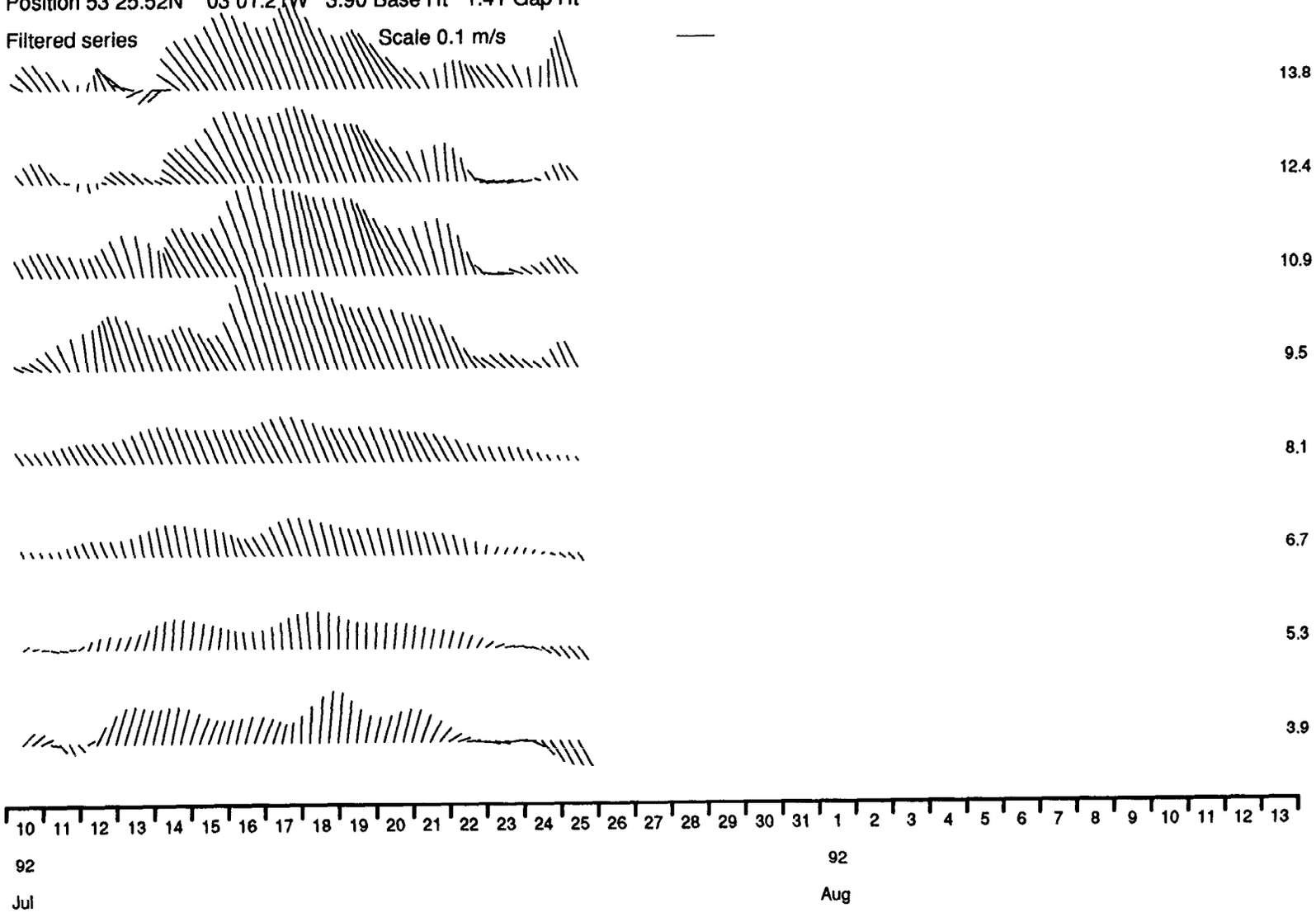
STICK TIME SERIES PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht

Filtered series Scale 0.1 m/s



STICK TIME SERIES PLOT

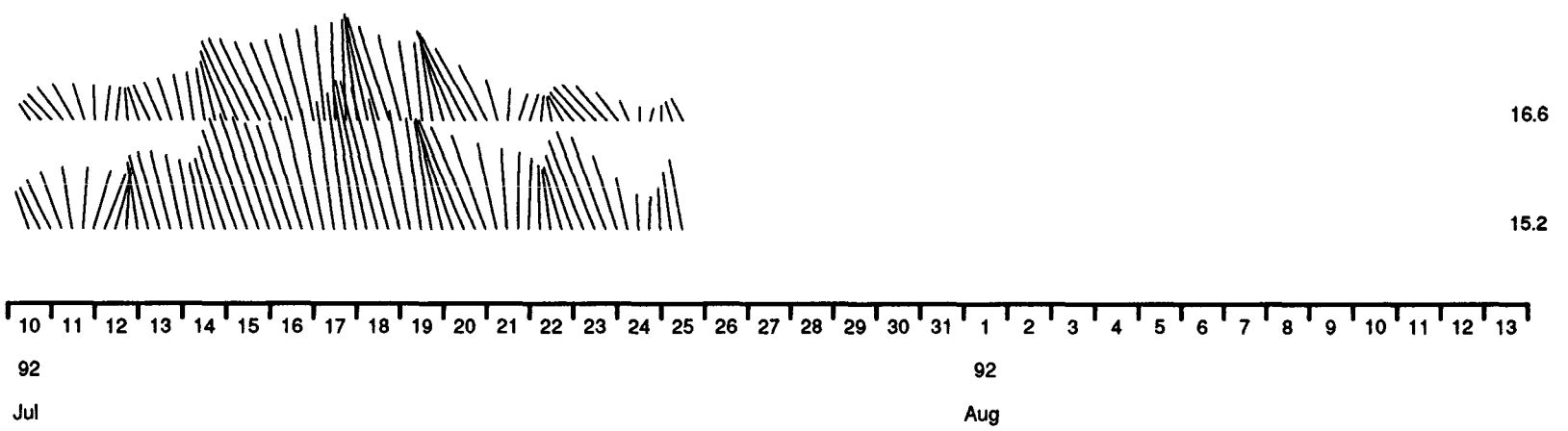
Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht

Bin Ht (m)

Filtered series Scale 0.1 m/s



Statistics for dp0010.m922a

Statistics
For all good data bins

ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.044	34.1	0.2967	-9.4	0.0028	80.6
2	5.3	0.035	17.0	0.5228	-8.5	0.0026	81.5
3	6.7	0.045	-15.2	0.6194	-8.1	0.0026	81.9
4	8.1	0.069	-26.9	0.6649	-7.8	0.0023	82.2
5	9.5	0.109	-22.1	0.3902	-8.5	0.0037	81.5
6	10.9	0.103	-21.5	0.4319	-8.0	0.0055	82.0
7	12.4	0.070	-31.3	0.3930	-7.2	0.0083	82.8
8	13.8	0.091	-28.6	0.3164	-7.4	0.0067	82.6
9	15.2	0.181	-11.2	0.2897	-6.6	0.0082	83.4
10	16.6	0.101	-16.4	0.3377	-6.3	0.0073	83.7

Statistics for dp0010.m922a

Filtered Statistics
For all good data bins

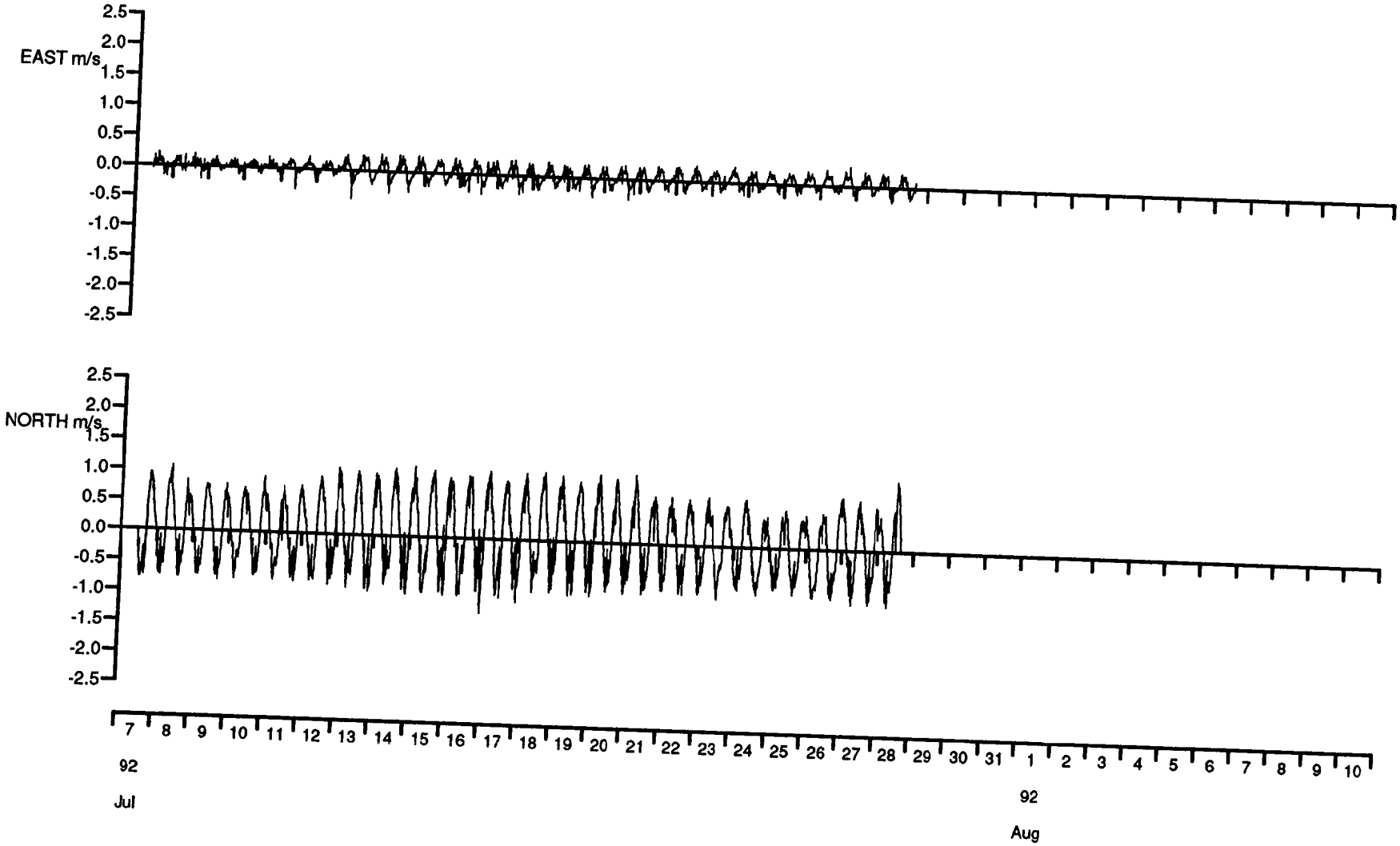
ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.051	27.1	0.0026	-7.0	0.0000	83.0
2	5.3	0.040	13.9	0.0013	-13.6	0.0000	76.4
3	6.7	0.049	-14.2	0.0011	-19.9	0.0000	70.1
4	8.1	0.076	-25.4	0.0011	-21.8	0.0000	68.2
5	9.5	0.125	-21.6	0.0047	-12.5	0.0001	77.5
6	10.9	0.123	-21.2	0.0055	-10.2	0.0002	79.8
7	12.4	0.090	-28.4	0.0055	-16.1	0.0003	73.9
8	13.8	0.108	-27.8	0.0051	-18.2	0.0004	71.8
9	15.2	0.201	-12.9	0.0055	-21.3	0.0006	68.7
10	16.6	0.125	-17.8	0.0047	-15.5	0.0007	74.5

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)

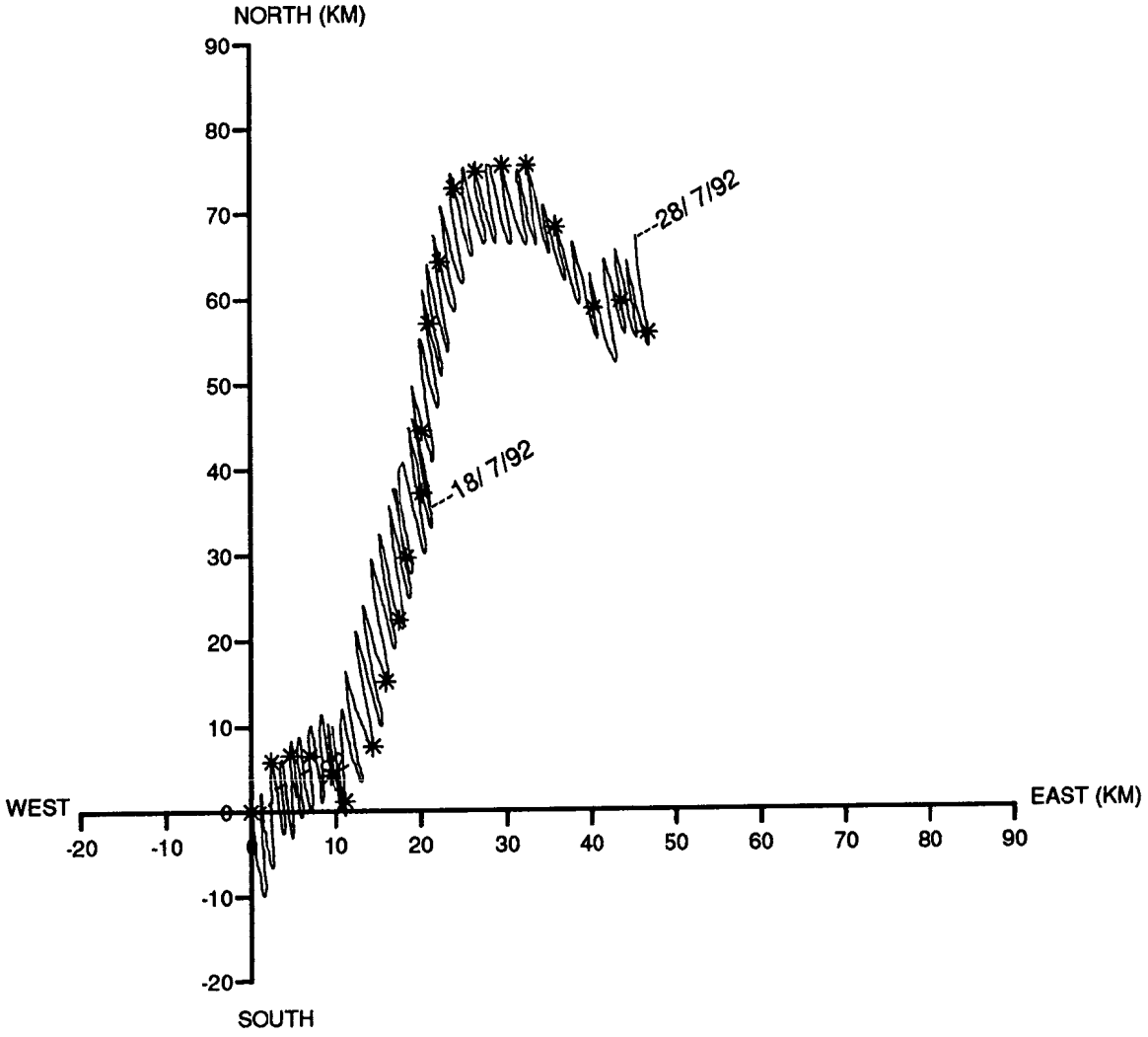


VECTOR PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)



Statistics for dp0010.m922as1

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	0.0248	0.10730450E-01	0.10358789E+00
Northings	0.0366	0.28879282E+00	0.53739446E+00
Speed	0.4820	0.69057822E-01	0.26278853E+00

Vector mean speed 0.0442

Vector Mean Direction 34.1

Maximum ten values

Eastings					Northings				
0.323	0.282	0.279	0.274	0.267	1.155	1.152	1.129	1.128	1.118
0.264	0.263	0.262	0.259	0.258	1.115	1.114	1.102	1.101	1.098

Minimum ten values

Eastings					Northings				
-0.296	-0.300	-0.314	-0.318	-0.327	-0.938	-0.944	-0.946	-0.951	-0.954
-0.328	-0.332	-0.335	-0.354	-0.467	-0.962	-0.970	-0.985	-1.033	-1.230

Maximum speeds

1.247	1.178	1.165	1.164	1.164	1.146	1.136	1.134	1.128	1.120
1.111	1.107	1.103	1.096	1.094	1.091	1.089	1.085	1.083	1.083
1.077	1.077	1.076	1.075	1.070	1.068	1.067	1.060	1.058	1.056
1.056	1.050	1.050	1.048	1.043	1.042	1.038	1.037	1.031	1.027
1.024	1.022	1.022	1.020	1.015	1.015	1.013	1.013	1.013	1.010
1.009	1.008	1.008	1.008	1.007	1.006	1.005	1.003	1.003	1.002
1.001	1.001	0.999	0.998	0.997	0.997	0.996	0.995	0.994	0.993
0.992	0.991	0.991	0.989	0.988	0.988	0.987	0.986	0.986	0.986
0.986	0.984	0.984	0.984	0.984	0.982	0.980	0.980	0.979	0.978
0.977	0.976	0.976	0.975	0.975	0.973	0.971	0.971	0.971	0.971

Variance ellipse statistics

Maximum variance	0.2967E+00	Direction	-9.4
Minimum variance	0.2811E-02	Direction	80.6
Total variance	0.2995E+00	Ratio of variances	0.9473E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 6.2

Average direction. maxdir +PI/2 to maxdir -PI/2 172.5

Statistics for dp0010.m922as1f

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	0.0231	0.88446592E-04	0.94046053E-02
Northings	0.0451	0.25950803E-02	0.50941929E-01
Speed	0.0666	0.78798301E-03	0.28071035E-01

Vector mean speed 0.0507

Vector Mean Direction 27.1

Maximum ten values

Eastings					Northings				
0.039	0.039	0.038	0.038	0.037	0.136	0.131	0.123	0.111	0.098
0.037	0.035	0.035	0.035	0.034	0.097	0.097	0.096	0.094	0.093

Minimum ten values

Eastings					Northings				
0.012	0.012	0.012	0.011	0.011	-0.006	-0.014	-0.017	-0.020	-0.027
0.011	0.009	0.005	0.004	0.002	-0.036	-0.054	-0.064	-0.066	-0.069

Maximum speeds

0.136	0.131	0.123	0.112	0.101	0.099	0.098	0.097	0.097	0.096
0.094	0.093	0.092	0.090	0.089	0.088	0.084	0.084	0.080	0.079
0.077	0.076	0.074	0.074	0.073	0.073	0.072	0.072	0.071	0.069
0.068	0.068	0.065	0.065	0.064	0.062	0.062	0.060	0.055	0.053
0.050	0.049	0.047	0.042	0.040	0.039	0.038	0.038	0.038	0.036
0.035	0.035	0.034	0.033	0.033	0.032	0.030	0.027	0.024	0.022
0.020									

Variance ellipse statistics

Maximum variance	0.2634E-02	Direction	-7.0
Minimum variance	0.4961E-04	Direction	83.0
Total variance	0.2684E-02	Ratio of variances	0.1883E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 27.2

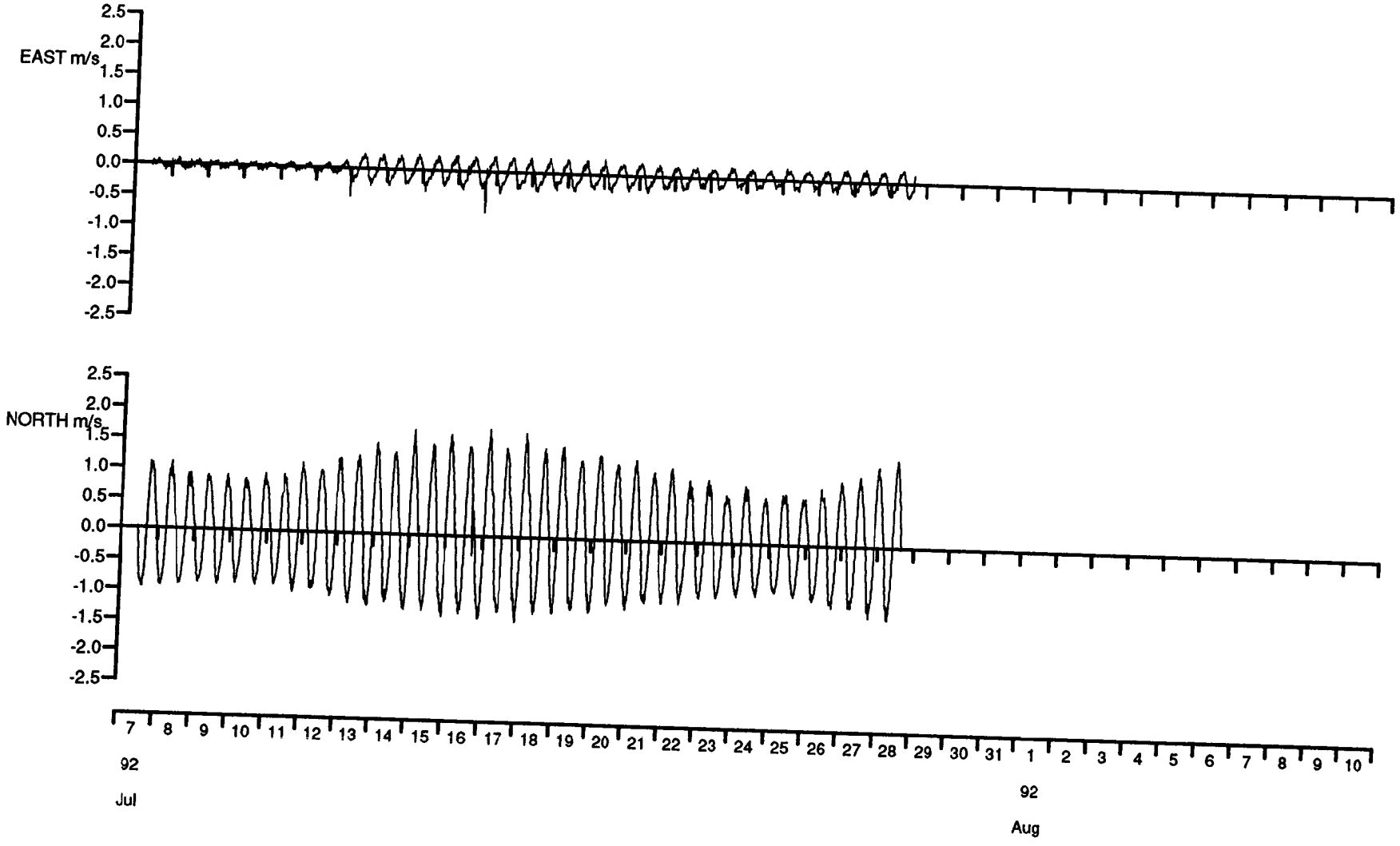
Average direction. maxdir +PI/2 to maxdir -PI/2 125.4

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht 6.7 Bin Ht (m)

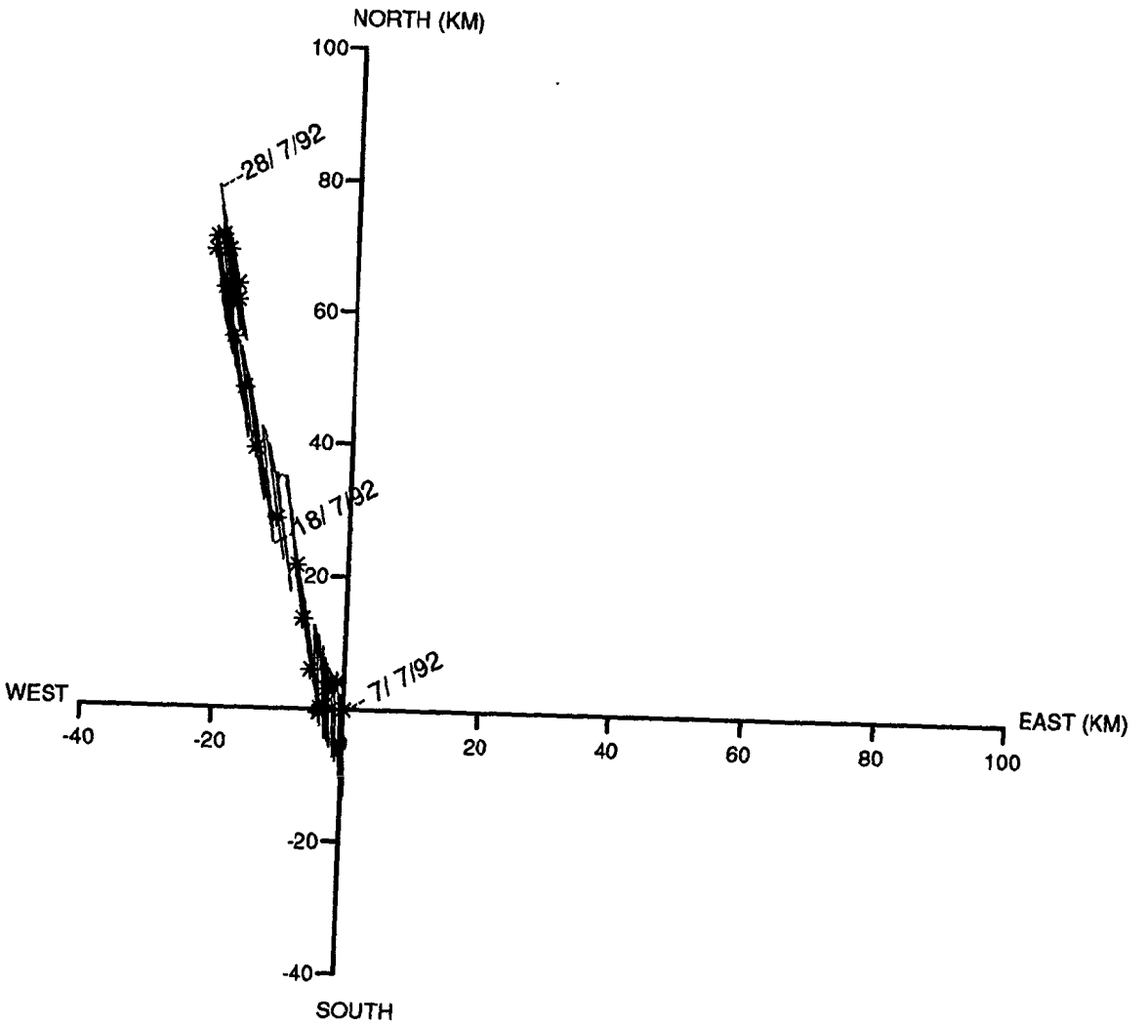


VECTOR PLOT

Meter no. 0010 Rig no. M922A Depth of water(m) -7.9

Start/End 1992/07/07 AT 10:53:00 1992/07/28 AT 15:40:00

Position 53 25.52N 03 01.21W 3.90 Base Ht 1.41 Gap Ht 6.7 Bin Ht (m)



Statistics for dp0010.m922as3

Doppler bin number 3

	Mean	Variance	Standard deviation
Eastings	-0.0117	0.14836847E-01	0.12180659E+00
Northings	0.0430	0.60721850E+00	0.77924228E+00
Speed	0.6980	0.13668041E+00	0.36970314E+00

Vector mean speed 0.0446

Vector Mean Direction -15.2

Maximum ten values

Eastings					Northings				
0.264	0.258	0.256	0.253	0.252	1.764	1.722	1.710	1.676	1.655
0.251	0.250	0.250	0.248	0.247	1.632	1.632	1.621	1.605	1.598

Minimum ten values

Eastings					Northings				
-0.300	-0.302	-0.303	-0.324	-0.348	-1.296	-1.308	-1.321	-1.323	-1.328
-0.349	-0.467	-0.519	-0.563	-0.667	-1.330	-1.337	-1.356	-1.389	-1.401

Maximum speeds

1.798	1.757	1.732	1.696	1.679	1.664	1.646	1.645	1.631	1.623
1.607	1.606	1.604	1.600	1.600	1.581	1.574	1.568	1.565	1.548
1.547	1.540	1.535	1.519	1.517	1.517	1.517	1.517	1.515	1.508
1.507	1.501	1.496	1.491	1.490	1.489	1.489	1.489	1.481	1.479
1.474	1.472	1.471	1.469	1.465	1.458	1.458	1.454	1.453	1.450
1.449	1.446	1.443	1.442	1.441	1.440	1.437	1.431	1.430	1.428
1.425	1.424	1.423	1.423	1.422	1.422	1.419	1.418	1.414	1.413
1.413	1.405	1.405	1.400	1.399	1.397	1.397	1.397	1.396	1.396
1.395	1.392	1.391	1.389	1.386	1.385	1.384	1.381	1.380	1.380
1.378	1.377	1.375	1.375	1.372	1.372	1.369	1.368	1.364	1.363

Variance ellipse statistics

Maximum variance	0.6194E+00	Direction	-8.1
Minimum variance	0.2614E-02	Direction	81.9
Total variance	0.6221E+00	Ratio of variances	0.4220E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 -1.5

Average direction. maxdir +PI/2 to maxdir -PI/2 181.2

Statistics for dp0010.m922as3f

Doppler bin number 3

	Mean	Variance	Standard deviation
Eastings	-0.0121	0.15849578E-03	0.12589511E-01
Northings	0.0478	0.93903352E-03	0.30643653E-01
Speed	0.0522	0.79489540E-03	0.28193889E-01

Vector mean speed 0.0493

Vector Mean Direction -14.2

Maximum ten values

Eastings					Northings				
0.014	0.013	0.013	0.011	0.008	0.099	0.099	0.095	0.090	0.088
0.008	0.008	0.007	0.007	0.007	0.084	0.084	0.081	0.080	0.079

Minimum ten values

Eastings					Northings				
-0.023	-0.024	-0.027	-0.027	-0.031	0.013	0.012	0.011	0.010	0.008
-0.031	-0.033	-0.034	-0.035	-0.035	0.002	-0.004	-0.010	-0.015	-0.019

Maximum speeds

0.104	0.104	0.099	0.097	0.091	0.086	0.085	0.083	0.083	0.082
0.080	0.078	0.077	0.075	0.075	0.074	0.074	0.073	0.072	0.071
0.070	0.069	0.068	0.066	0.065	0.063	0.061	0.060	0.058	0.058
0.057	0.057	0.052	0.051	0.051	0.047	0.043	0.043	0.042	0.041
0.041	0.038	0.030	0.030	0.023	0.022	0.021	0.020	0.017	0.017
0.016	0.016	0.015	0.015	0.014	0.014	0.012	0.011	0.011	0.011
0.008									

Variance ellipse statistics

Maximum variance	0.1057E-02	Direction	-19.9
Minimum variance	0.4075E-04	Direction	70.1
Total variance	0.1098E-02	Ratio of variances	0.3856E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 7.8

Average direction. maxdir +PI/2 to maxdir -PI/2 139.5

Rig information details for M922B

Position Latitude	:	53 25.47N
Position Longitude	:	03 01.22W
Water depth	:	-6.0 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	2B
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	07-JUL-92 10:47:00
Rig recovered on	:	28-JUL-92 10:12:00
Period of deployment	:	21.0 days
Comments	:	Launch and recovery successful

Meter information details for 1831

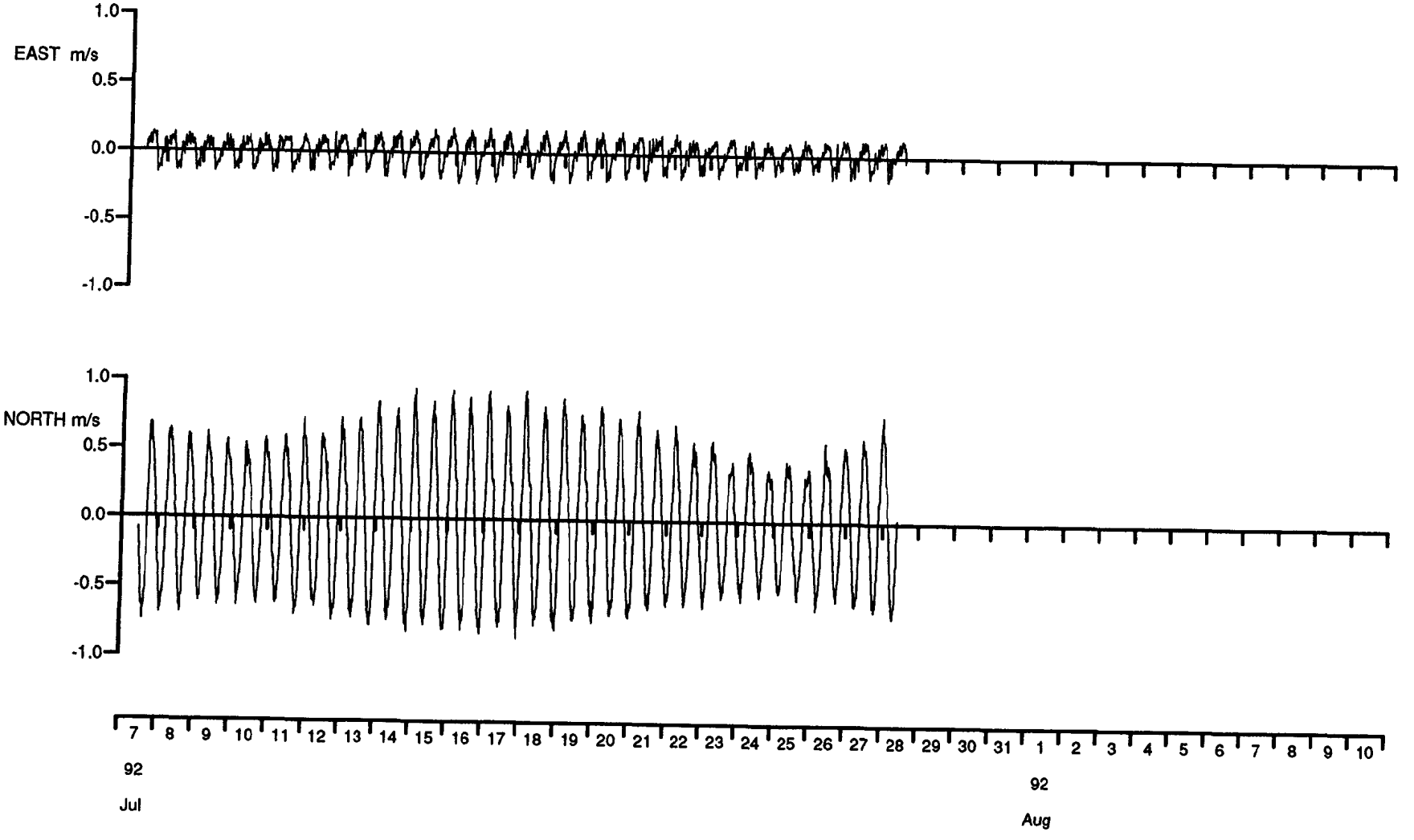
Rig No	:	M922B
Meter No	:	1831
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.5 m
Position of meter on rig	:	B
Meter type	:	S4
Meter started	:	07-JUL-92 09:00:00
Meter stopped	:	03-AUG-92 09:22:00
Period switched on	:	27.0 days
Period of good data	:	21.0 days
Total number of scans	:	3021
Timing error	:	120 seconds slow
Comments	:	Good record obtained Vector progressive plot indicates weak up river residual flow

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 1831 Rig no. M922B Depth of water(m) 6.0

Start/End 1992/07/07 AT 10:47:00 1992/07/28 AT 10:12:00

Position 53 25.47N 03 01.22W Meter Height(m) 0.5

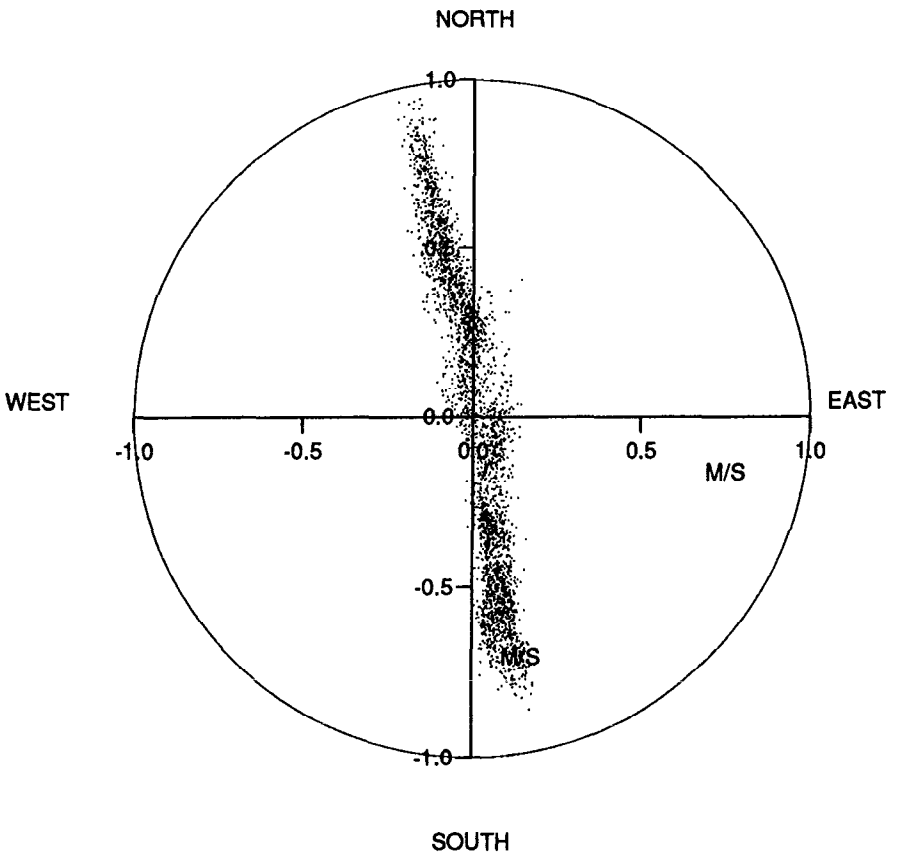


SCATTER PLOT

Meter no. 1831 Rig no. M922B Depth of water(m) 6.0

Start/End 1992/07/07 AT 10:47:00 1992/07/28 AT 10:12:00

Position 53 25.47N 03 01.22W Meter Height(m) 0.5

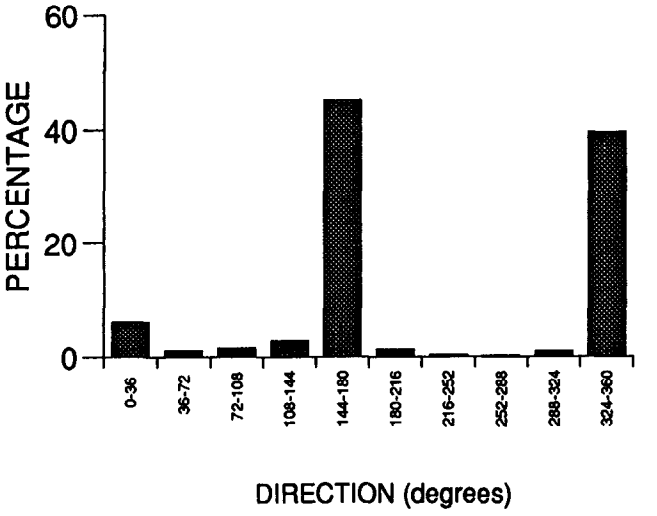


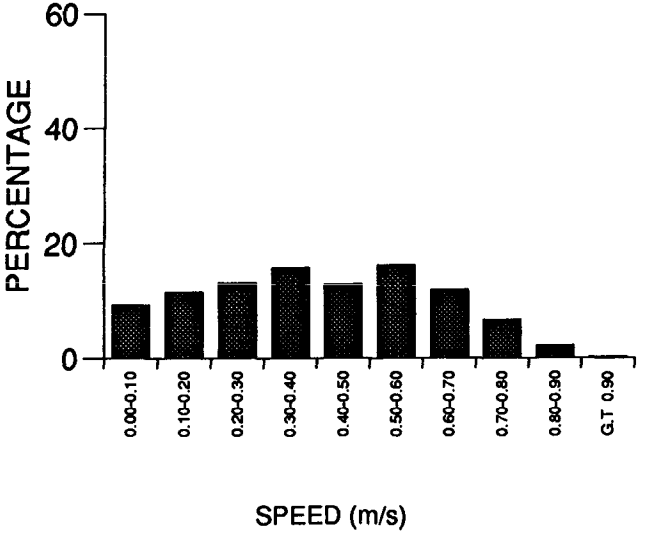
HISTOGRAMS FOR SPEEDS AND DIRECTIONS

Meter no. 1831 Rig no. M922B Depth of water(m) 6.0

Start/End 1992/07/07 AT 10:47:00 1992/07/28 AT 10:12:00

Position 53 25.47N 03 01.22W Meter Height(m) 0.5



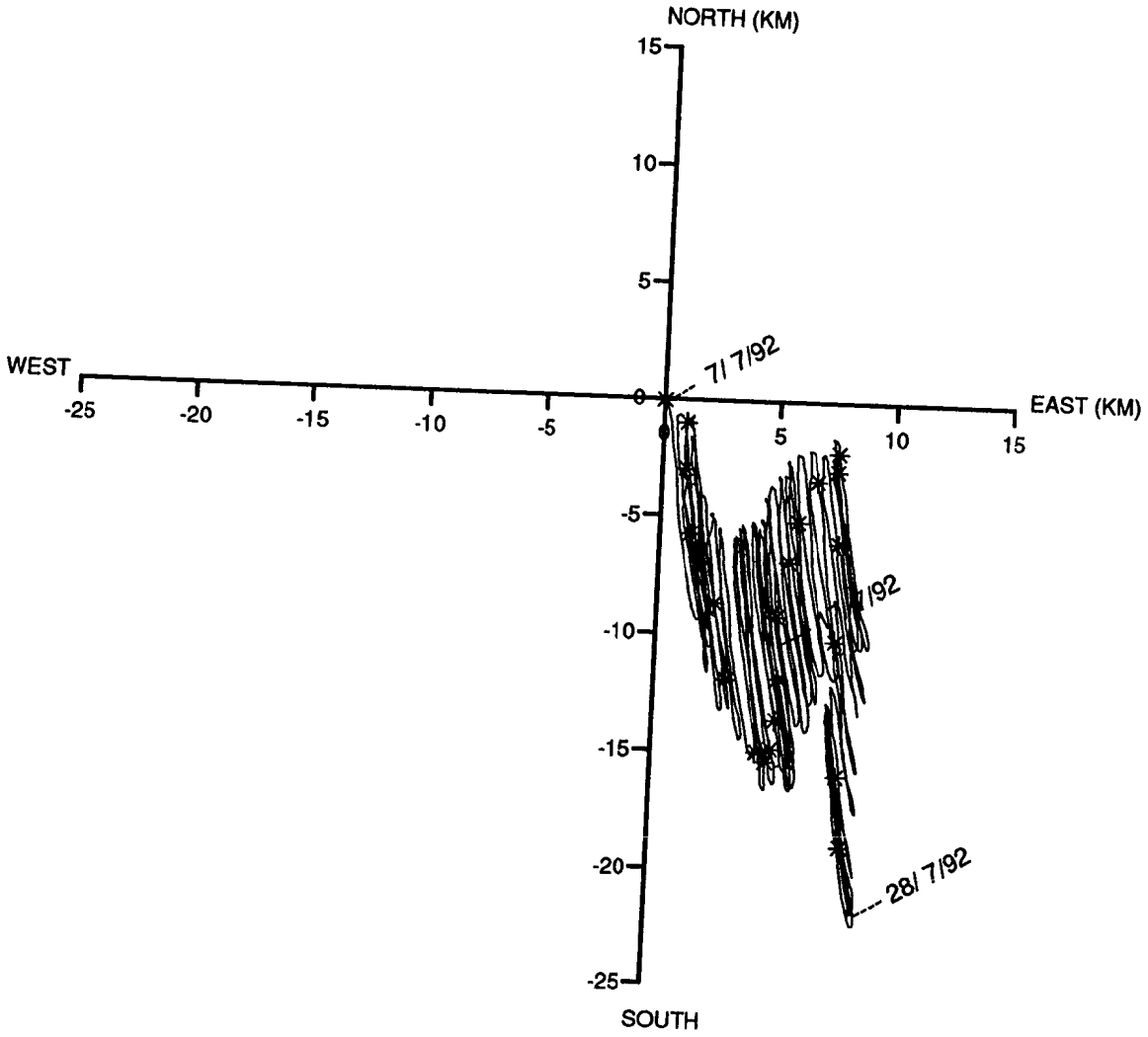


VECTOR PLOT

Meter no. 1831 Rig no. M922B Depth of water(m) 6.0

Start/End 1992/07/07 AT 10:47:00 1992/07/28 AT 10:12:00

Position 53 25.47N 03 01.22W Meter Height(m) 0.5



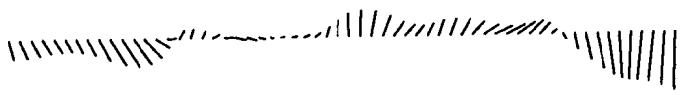
STICK TIME SERIES PLOT

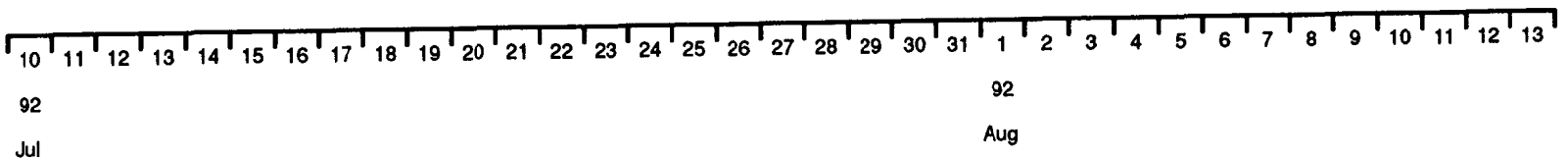
Meter no. 1831 Rig no. M922B Depth of water(m) 6.0

Start/End 1992/07/07 AT 10:47:00 1992/07/28 AT 10:12:00

Position 53 25.47N 03 01.22W Meter Height(m) 0.5

Filtered series Scale 0.1 m/s





Statistics for s41831b.m922bs

	Mean	Variance	Standard deviation
Eastings	0.0049	0.70139137E-02	0.83749115E-01
Northings	-0.0120	0.20478640E+00	0.45253330E+00
Speed	0.4070	0.46272643E-01	0.21511078E+00

Vector mean speed 0.0130

Vector Mean Direction 157.7

Maximum ten values

Eastings					Northings				
0.181	0.180	0.176	0.173	0.172	0.941	0.933	0.932	0.925	0.925
0.170	0.170	0.167	0.164	0.164	0.910	0.910	0.888	0.885	0.883

Minimum ten values

Eastings					Northings				
-0.195	-0.196	-0.196	-0.198	-0.207	-0.792	-0.792	-0.794	-0.798	-0.800
-0.207	-0.209	-0.213	-0.224	-0.225	-0.813	-0.813	-0.817	-0.825	-0.859

Maximum speeds

0.959	0.954	0.950	0.946	0.938	0.928	0.925	0.912	0.908	0.898
0.897	0.893	0.891	0.890	0.890	0.887	0.887	0.881	0.881	0.876
0.875	0.874	0.870	0.867	0.861	0.860	0.855	0.854	0.853	0.853
0.851	0.851	0.850	0.847	0.847	0.841	0.840	0.840	0.839	0.839
0.839	0.839	0.838	0.837	0.836	0.833	0.832	0.831	0.831	0.829
0.828	0.825	0.825	0.823	0.822	0.819	0.819	0.816	0.815	0.815
0.814	0.812	0.811	0.811	0.810	0.809	0.808	0.808	0.805	0.804
0.804	0.803	0.802	0.801	0.801	0.801	0.796	0.796	0.796	0.796
0.796	0.795	0.794	0.793	0.793	0.792	0.791	0.789	0.788	0.788
0.788	0.787	0.786	0.786	0.785	0.785	0.784	0.784	0.784	0.784

Variance ellipse statistics

Maximum variance	0.2103E+00	Direction	-9.4
Minimum variance	0.1470E-02	Direction	80.6
Total variance	0.2118E+00	Ratio of variances	0.6990E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 2.9

Average direction. maxdir +PI/2 to maxdir -PI/2 176.0

Statistics for s41831b.m922bsf

	Mean	Variance	Standard deviation
Eastings	0.0051	0.15953790E-04	0.39942195E-02
Northings	-0.0044	0.23807678E-03	0.15429736E-01
Speed	0.0143	0.91975271E-04	0.95903734E-02

Vector mean speed 0.0067

Vector Mean Direction 130.8

Maximum ten values

Eastings					Northings				
0.013	0.013	0.013	0.012	0.012	0.019	0.018	0.016	0.015	0.012
0.012	0.011	0.011	0.010	0.010	0.011	0.011	0.011	0.010	0.009

Minimum ten values

Eastings					Northings				
0.002	0.002	0.001	0.000	0.000	-0.019	-0.020	-0.026	-0.031	-0.033
-0.001	-0.001	-0.002	-0.003	-0.004	-0.034	-0.035	-0.036	-0.039	-0.043

Maximum speeds

0.043	0.039	0.036	0.035	0.034	0.033	0.031	0.026	0.024	0.023
0.022	0.019	0.019	0.018	0.018	0.017	0.016	0.016	0.015	0.014
0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013
0.012	0.012	0.012	0.011	0.011	0.011	0.011	0.011	0.010	0.010
0.010	0.010	0.009	0.007	0.007	0.007	0.007	0.006	0.006	0.006
0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.003	0.003	0.002

Variance ellipse statistics

Maximum variance	0.2391E-03	Direction	3.9
Minimum variance	0.1492E-04	Direction	93.9
Total variance	0.2540E-03	Ratio of variances	0.6238E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 38.2

Average direction. maxdir +PI/2 to maxdir -PI/2 148.4

Rig information details for M9203

Position Latitude	:	53 25.53N
Position Longitude	:	03 00.9 W
Water depth	:	-15.0 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	3
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	08-JUL-92 11:49:00
Rig recovered on	:	28-JUL-92 10:22:00
Period of deployment	:	19.9 days
Comments	:	Launch and recovery successful

Meter information details for 0001

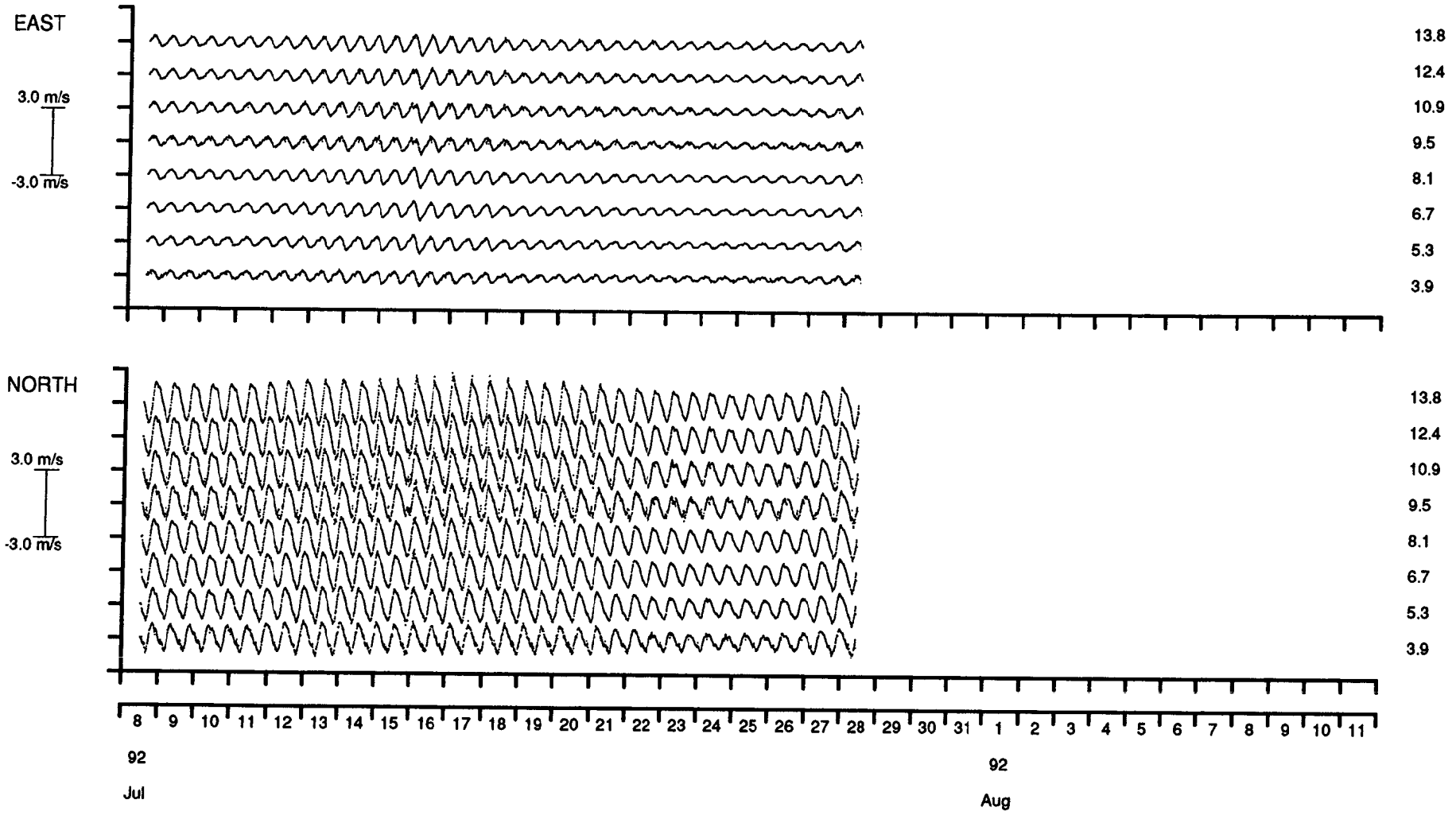
Rig No	:	M9203
Meter No	:	0001
Frame angle correction	:	-28.5 degrees
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.5 m
Meter type	:	DP
Meter started	:	08-JUL-92 08:59:01
Meter stopped	:	28-JUL-92 11:49:19
Period switched on	:	20.1 days
Period of good data	:	19.9 days
Total number of scans	:	2872
Timing error	:	18 seconds slow
Comments	:	Good record obtained

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

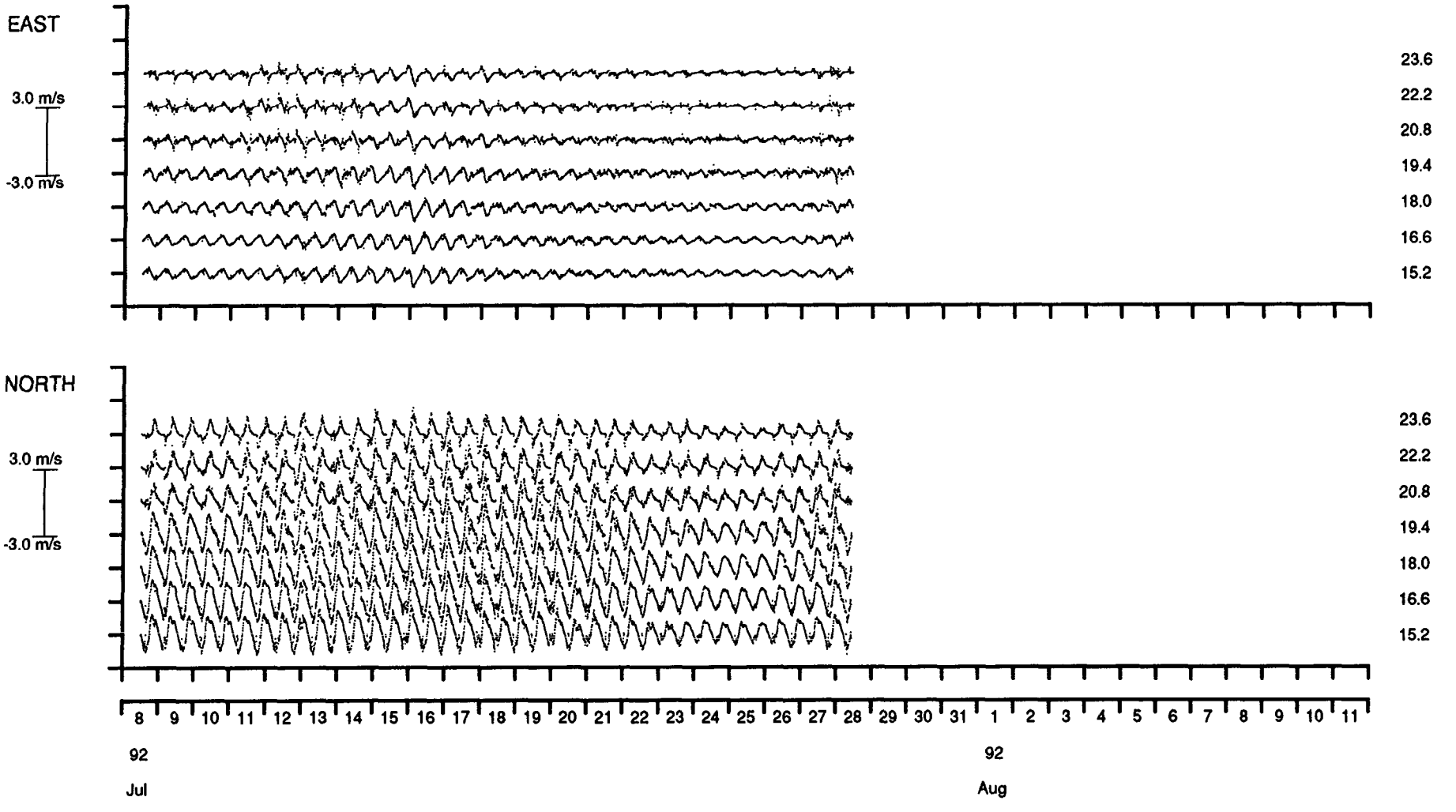


VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

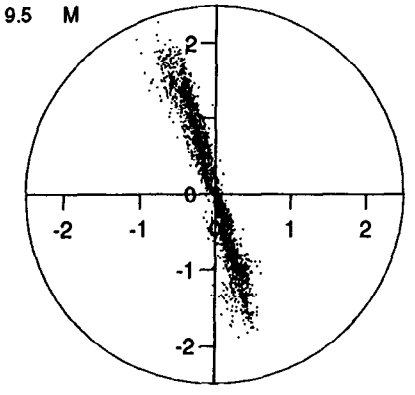


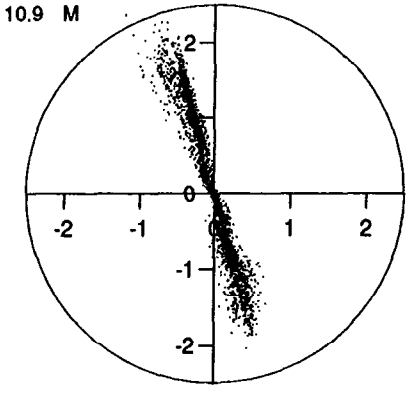
SCATTER PLOT

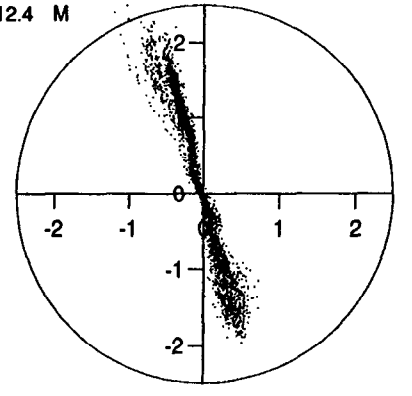
Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

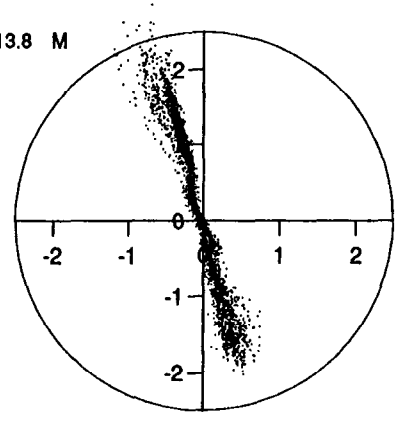
Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

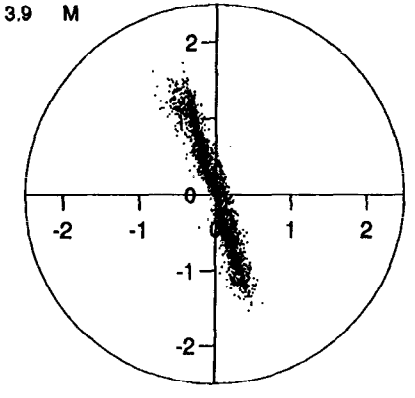
Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

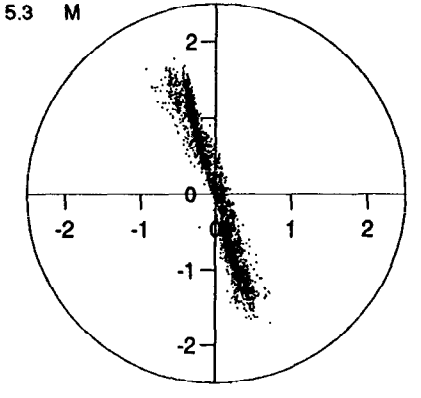


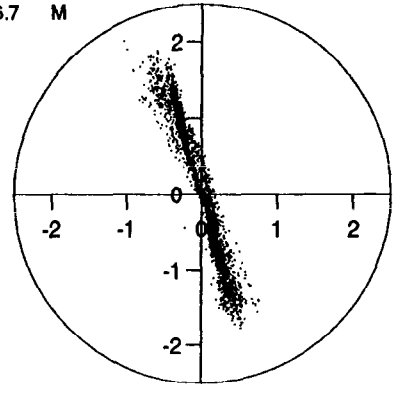


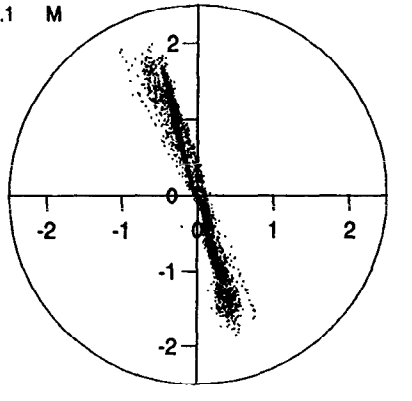










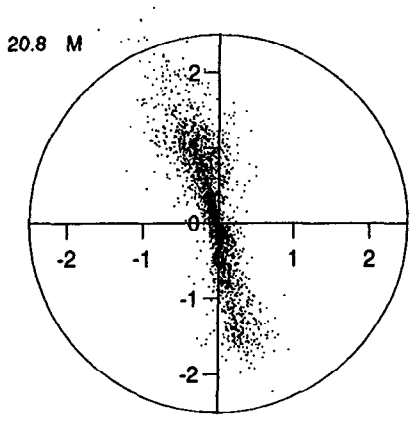


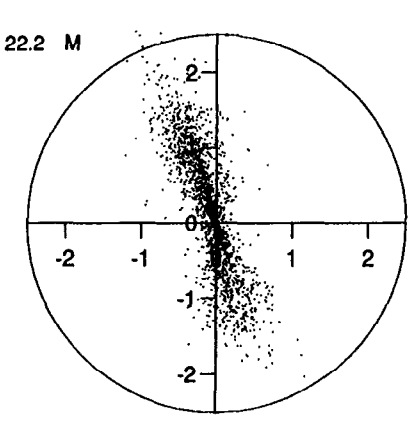
SCATTER PLOT

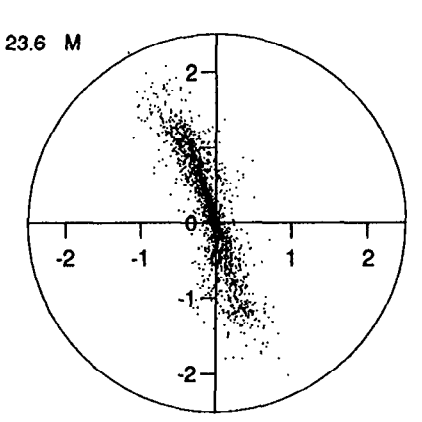
Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

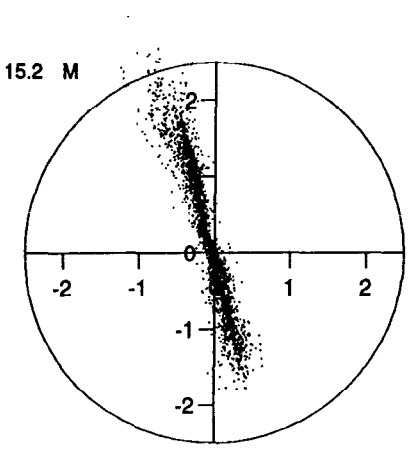
Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

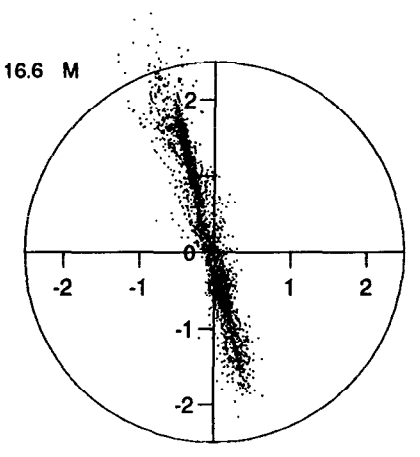
Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

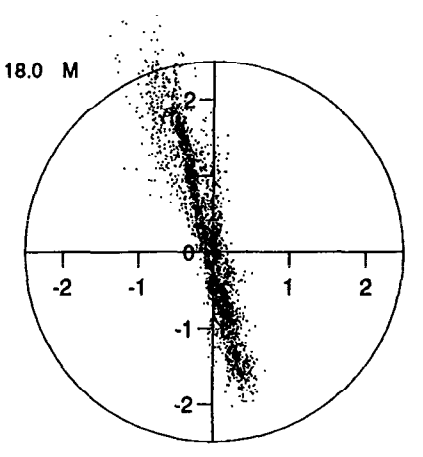


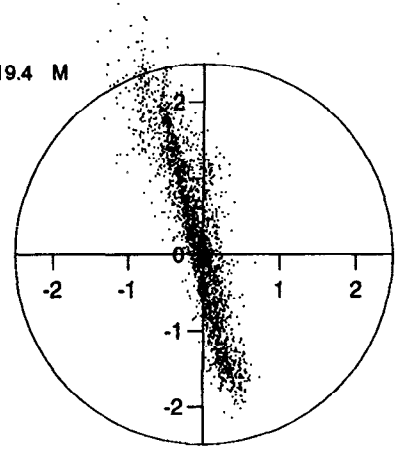












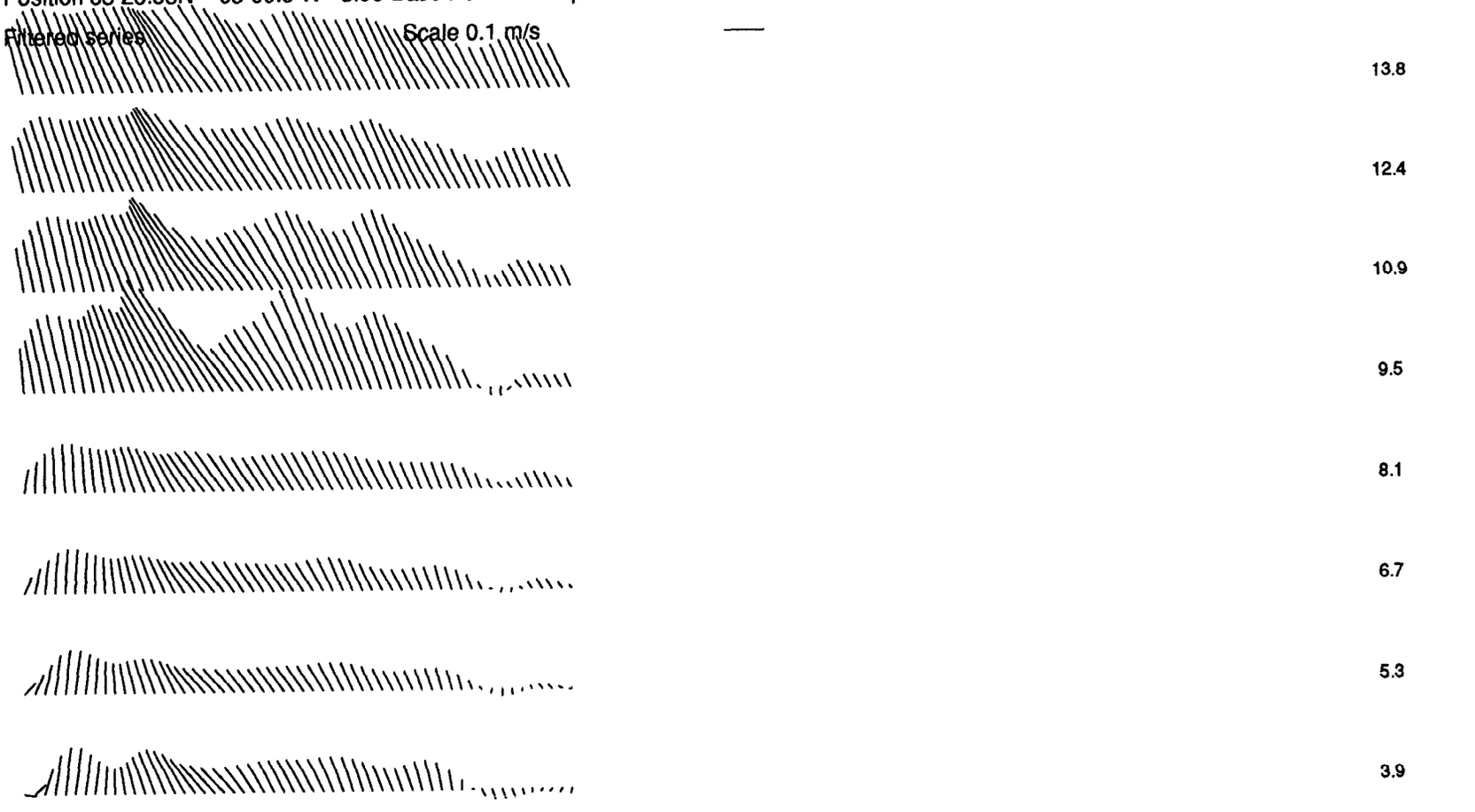
STICK TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

Filtered series Scale 0.1 m/s



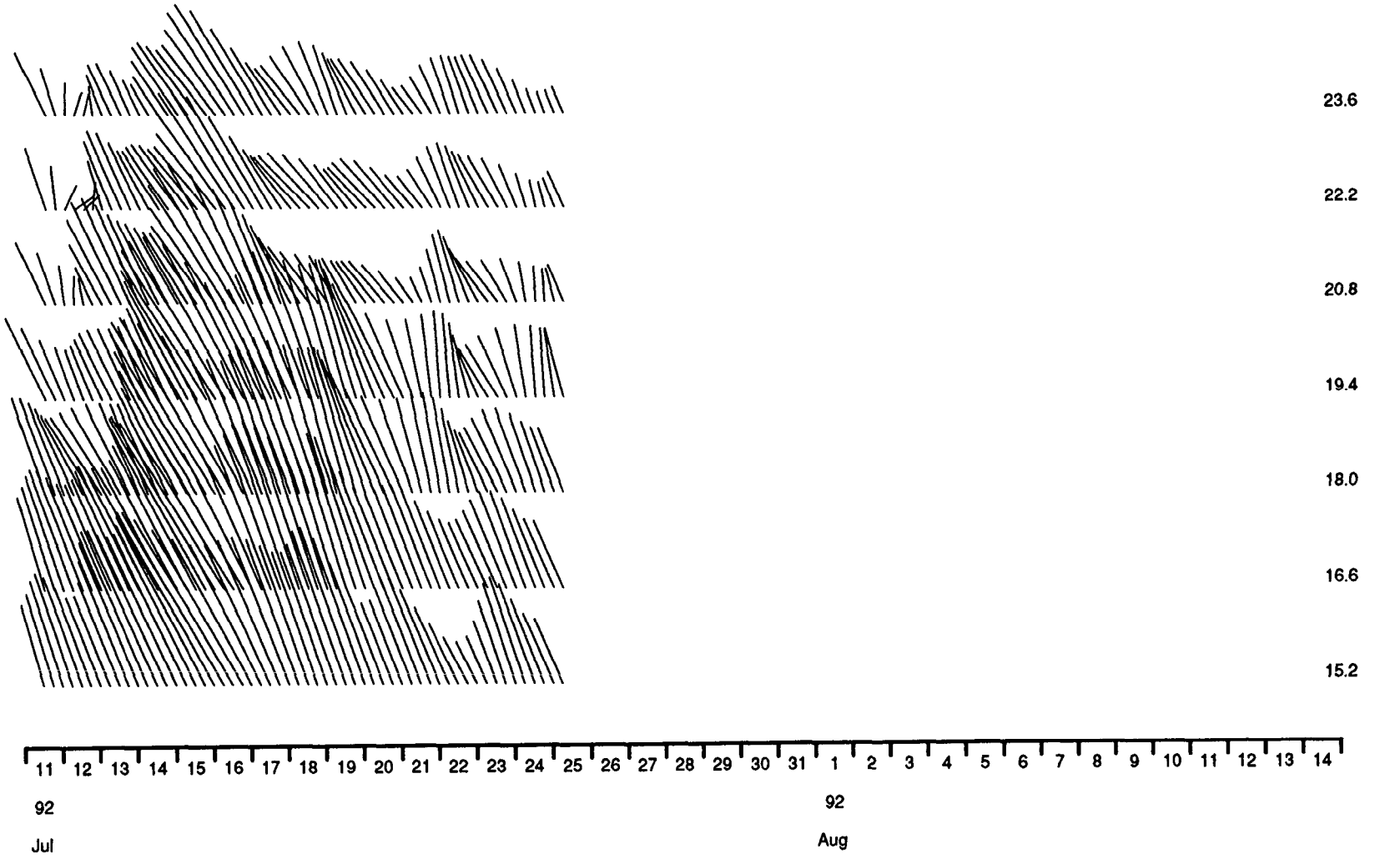
STICK TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht

Filtered series Scale 0.1 m/s



Statistics for dp0001.m9203

Statistics
For all good data bins

ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.042	-9.8	0.5718	-18.0	0.0057	72.0
2	5.3	0.036	-11.7	0.8032	-17.8	0.0059	72.2
3	6.7	0.044	-15.0	0.9362	-17.6	0.0059	72.4
4	8.1	0.060	-19.2	1.0250	-17.5	0.0058	72.5
5	9.5	0.131	-22.0	0.8989	-16.9	0.0064	73.1
6	10.9	0.131	-23.4	1.1066	-16.7	0.0066	73.3
7	12.4	0.140	-25.6	1.2719	-16.2	0.0070	73.8
8	13.8	0.165	-26.3	1.3793	-15.9	0.0074	74.1
9	15.2	0.299	-22.6	0.9547	-15.7	0.0085	74.3
10	16.6	0.304	-22.4	1.1302	-15.6	0.0110	74.4
11	18.0	0.270	-22.4	1.2167	-15.4	0.0171	74.6
12	19.4	0.235	-22.1	1.1642	-15.2	0.0221	74.8
13	20.8	0.176	-25.6	0.6498	-15.3	0.0231	74.7
14	22.2	0.157	-27.8	0.5197	-16.9	0.0222	73.1
15	23.6	0.145	-27.5	0.4083	-18.8	0.0139	71.2

Statistics for dp0001.m9203

Filtered Statistics
For all good data bins

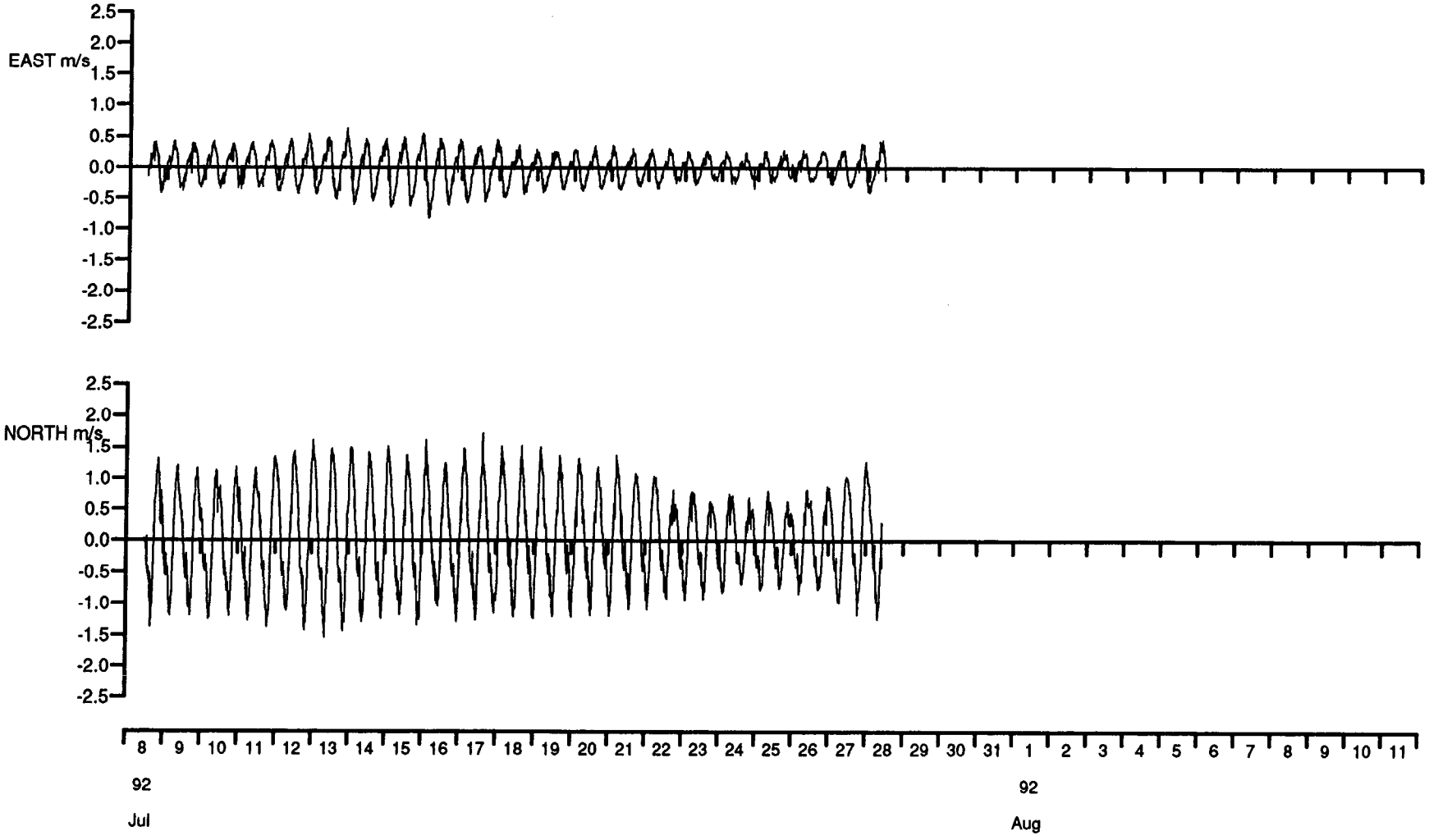
ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.059	-18.8	0.0018	-22.8	0.0004	67.2
2	5.3	0.055	-20.5	0.0009	-13.1	0.0004	76.9
3	6.7	0.065	-21.4	0.0010	-16.9	0.0004	73.1
4	8.1	0.083	-22.9	0.0010	-25.0	0.0003	65.0
5	9.5	0.161	-24.1	0.0073	-25.1	0.0005	64.9
6	10.9	0.159	-24.8	0.0040	-28.4	0.0005	61.6
7	12.4	0.169	-26.1	0.0023	-33.3	0.0003	56.7
8	13.8	0.193	-26.7	0.0018	-33.8	0.0003	56.2
9	15.2	0.333	-23.3	0.0119	-29.4	0.0005	60.6
10	16.6	0.343	-23.3	0.0087	-28.8	0.0008	61.2
11	18.0	0.314	-22.8	0.0100	-28.8	0.0010	61.2
12	19.4	0.274	-22.2	0.0112	-31.7	0.0010	58.3
13	20.8	0.189	-27.1	0.0085	-30.1	0.0005	59.9
14	22.2	0.169	-29.8	0.0060	-41.1	0.0006	48.9
15	23.6	0.156	-28.4	0.0046	-38.9	0.0003	51.1

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)

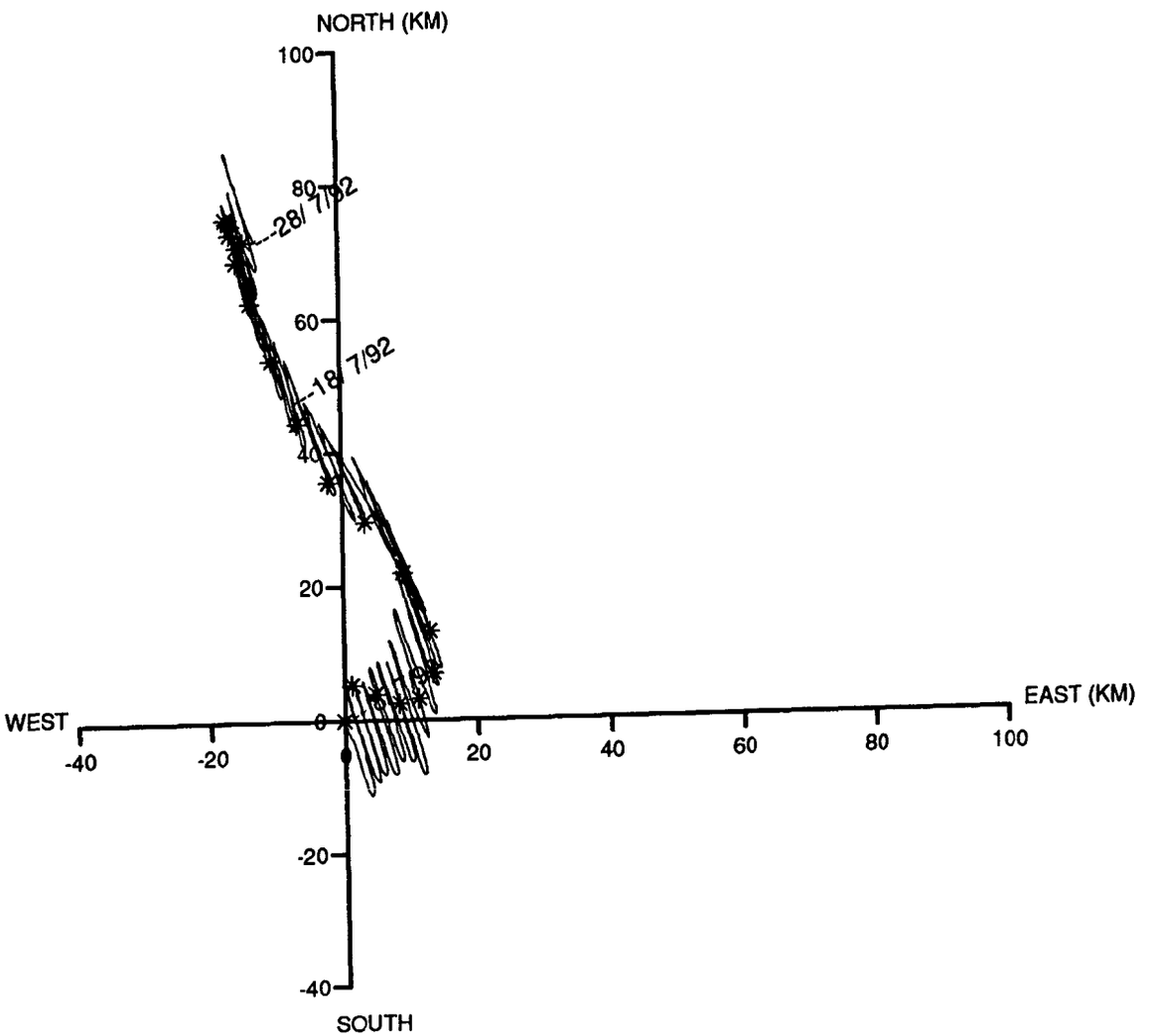


VECTOR PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)



Statistics for dp0001.m9203s1

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	-0.0072	0.59509285E-01	0.24394526E+00
Northings	0.0418	0.51793897E+00	0.71967977E+00
Speed	0.6624	0.14028215E+00	0.37454259E+00

Vector mean speed 0.0424

Vector Mean Direction -9.8

Maximum ten values

Eastings					Northings				
0.631	0.555	0.543	0.534	0.524	1.726	1.619	1.618	1.529	1.526
0.508	0.508	0.508	0.506	0.498	1.519	1.519	1.510	1.507	1.495

Minimum ten values

Eastings					Northings				
-0.640	-0.640	-0.657	-0.687	-0.710	-1.342	-1.343	-1.344	-1.346	-1.368
-0.729	-0.733	-0.780	-0.800	-0.825	-1.376	-1.423	-1.430	-1.452	-1.533

Maximum speeds

1.817	1.781	1.672	1.655	1.632	1.629	1.625	1.601	1.598	1.591
1.585	1.580	1.577	1.563	1.562	1.556	1.556	1.555	1.551	1.549
1.547	1.541	1.541	1.538	1.537	1.536	1.530	1.527	1.504	1.503
1.502	1.500	1.499	1.488	1.485	1.483	1.477	1.474	1.473	1.473
1.471	1.471	1.467	1.464	1.461	1.456	1.454	1.453	1.438	1.428
1.428	1.428	1.425	1.422	1.421	1.420	1.418	1.412	1.409	1.408
1.408	1.408	1.407	1.407	1.406	1.404	1.401	1.401	1.401	1.399
1.398	1.397	1.396	1.394	1.393	1.393	1.392	1.391	1.390	1.390
1.390	1.386	1.384	1.382	1.381	1.379	1.379	1.377	1.376	1.376
1.368	1.368	1.367	1.367	1.366	1.366	1.365	1.361	1.361	1.360

Variance ellipse statistics

Maximum variance	0.5718E+00	Direction	-18.0
Minimum variance	0.5665E-02	Direction	72.0
Total variance	0.5774E+00	Ratio of variances	0.9907E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 3.6

Average direction. maxdir +PI/2 to maxdir -PI/2 177.0

Statistics for dp0001.m9203s1f

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	-0.0190	0.63553872E-03	0.25209894E-01
Northings	0.0559	0.15760143E-02	0.39699048E-01
Speed	0.0674	0.11332323E-02	0.33663515E-01

Vector mean speed 0.0590

Vector Mean Direction -18.8

Maximum ten values

Eastings					Northings				
0.029	0.024	0.019	0.015	0.014	0.115	0.114	0.109	0.106	0.103
0.014	0.014	0.010	0.009	0.009	0.098	0.097	0.096	0.091	0.085

Minimum ten values

Eastings					Northings				
-0.043	-0.047	-0.048	-0.053	-0.054	-0.006	-0.006	-0.008	-0.009	-0.011
-0.057	-0.058	-0.060	-0.061	-0.061	-0.012	-0.016	-0.018	-0.022	-0.023

Maximum speeds

0.119	0.119	0.116	0.115	0.112	0.110	0.103	0.099	0.098	0.096
0.094	0.091	0.090	0.089	0.089	0.089	0.089	0.088	0.088	0.087
0.084	0.084	0.084	0.080	0.080	0.080	0.079	0.077	0.077	0.076
0.074	0.073	0.068	0.066	0.065	0.064	0.064	0.063	0.061	0.057
0.057	0.048	0.033	0.029	0.024	0.024	0.023	0.019	0.017	0.013
0.012	0.010	0.009	0.008	0.007	0.004				

Variance ellipse statistics

Maximum variance	0.1777E-02	Direction	-22.8
Minimum variance	0.4345E-03	Direction	67.2
Total variance	0.2212E-02	Ratio of variances	0.2445E+00

Average direction. maxdir -PI/2 to maxdir +PI/2 5.5

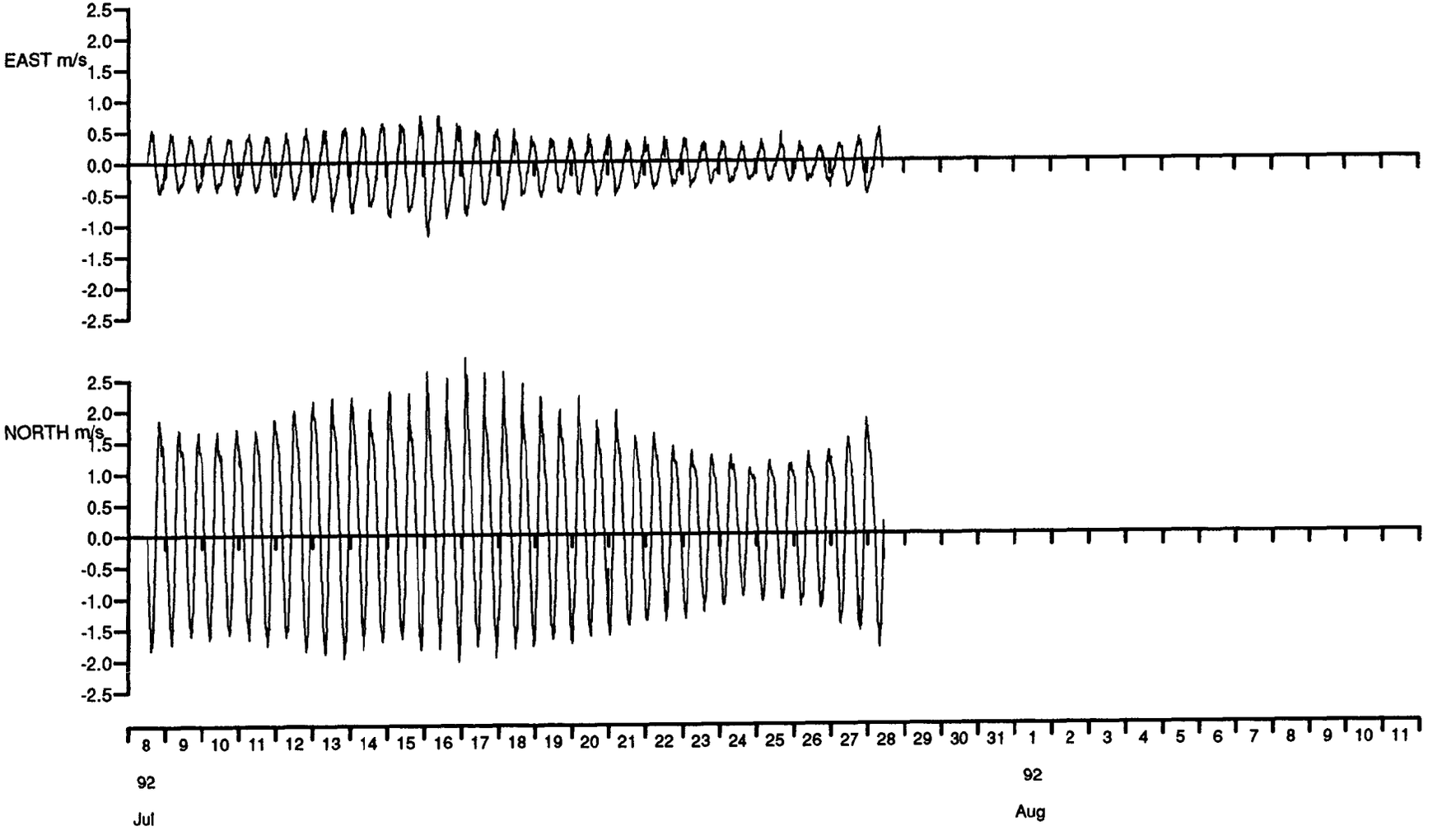
Average direction. maxdir +PI/2 to maxdir -PI/2 189.5

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht 13.8 Bin Ht (m)

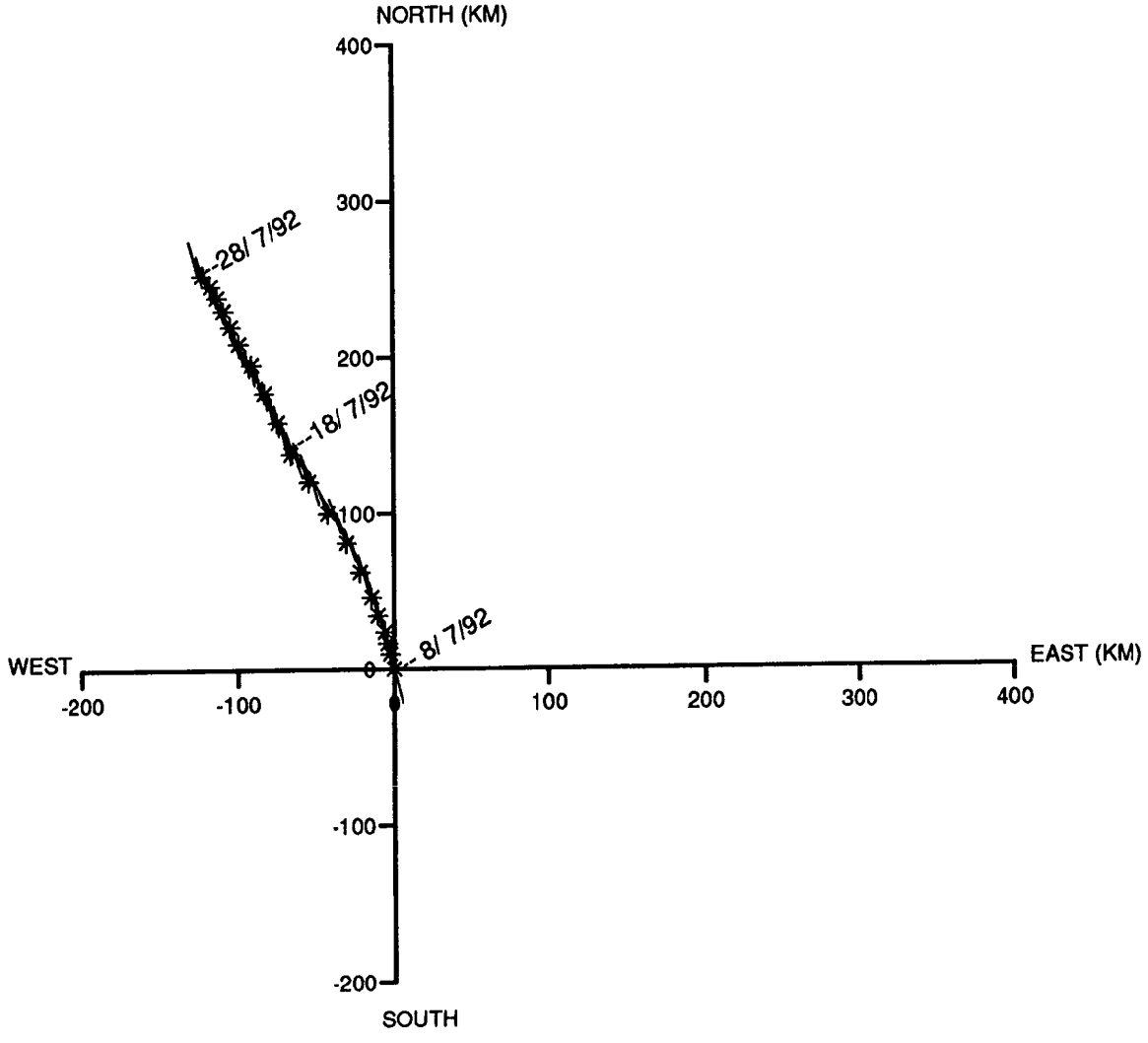


VECTOR PLOT

Meter no. 0001 Rig no. M9203 Depth of water(m) -15.0

Start/End 1992/07/08 AT 11:49:00 1992/07/28 AT 10:22:00

Position 53 25.53N 03 00.9 W 3.90 Base Ht 1.41 Gap Ht 13.8 Bin Ht (m)



Statistics for dp0001.m9203s8

Doppler bin number 8

	Mean	Variance	Standard deviation
Eastings	-0.0730	0.11034885E+00	0.33218801E+00
Northings	0.1477	0.12763826E+01	0.11297710E+01
Speed	1.0459	0.31952709E+00	0.56526726E+00

Vector mean speed 0.1647

Vector Mean Direction -26.3

Maximum ten values

Eastings					Northings				
0.749	0.745	0.744	0.743	0.724	2.856	2.629	2.619	2.604	2.573
0.718	0.680	0.675	0.674	0.668	2.517	2.515	2.452	2.442	2.433

Minimum ten values

Eastings					Northings				
-0.986	-1.008	-1.014	-1.070	-1.070	-1.879	-1.880	-1.880	-1.882	-1.895
-1.104	-1.130	-1.155	-1.175	-1.186	-1.898	-1.922	-1.962	-1.976	-2.024

Maximum speeds

2.938	2.838	2.711	2.710	2.687	2.671	2.653	2.613	2.564	2.537
2.489	2.489	2.482	2.481	2.452	2.405	2.402	2.377	2.359	2.354
2.351	2.348	2.347	2.337	2.332	2.324	2.303	2.302	2.298	2.294
2.289	2.286	2.284	2.279	2.269	2.257	2.256	2.256	2.253	2.245
2.241	2.239	2.236	2.235	2.233	2.233	2.229	2.216	2.212	2.206
2.202	2.201	2.198	2.198	2.197	2.184	2.164	2.160	2.147	2.146
2.134	2.133	2.126	2.124	2.120	2.117	2.114	2.113	2.111	2.100
2.098	2.094	2.090	2.081	2.079	2.076	2.071	2.069	2.063	2.063
2.063	2.053	2.051	2.049	2.047	2.047	2.045	2.045	2.044	2.041
2.036	2.034	2.029	2.023	2.019	2.017	2.013	2.011	2.010	2.004

Variance ellipse statistics

Maximum variance	0.1379E+01	Direction	-15.9
Minimum variance	0.7425E-02	Direction	74.1
Total variance	0.1387E+01	Ratio of variances	0.5383E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 -3.3

Average direction. maxdir +PI/2 to maxdir -PI/2 183.9

Statistics for dp0001.m9203s8f

Doppler bin number 8

	Mean	Variance	Standard deviation
Eastings	-0.0868	0.74515137E-03	0.27297461E-01
Northings	0.1725	0.13464000E-02	0.36693323E-01
Speed	0.1938	0.18320935E-02	0.42802960E-01

Vector mean speed 0.1932

Vector Mean Direction -26.7

Maximum ten values

Eastings					Northings				
-0.039	-0.045	-0.046	-0.049	-0.049	0.215	0.215	0.212	0.212	0.211
-0.050	-0.051	-0.053	-0.053	-0.056	0.211	0.211	0.210	0.209	0.209

Minimum ten values

Eastings					Northings				
-0.115	-0.117	-0.118	-0.123	-0.123	0.125	0.120	0.119	0.118	0.110
-0.132	-0.137	-0.142	-0.146	-0.148	0.109	0.107	0.106	0.100	0.099

Maximum speeds

0.253	0.252	0.252	0.249	0.248	0.245	0.241	0.238	0.237	0.234
0.233	0.232	0.230	0.226	0.225	0.224	0.221	0.219	0.218	0.218
0.217	0.213	0.212	0.212	0.212	0.210	0.210	0.204	0.202	0.202
0.197	0.197	0.197	0.195	0.194	0.193	0.193	0.188	0.179	0.172
0.170	0.163	0.157	0.150	0.149	0.137	0.137	0.137	0.131	0.128
0.123	0.122	0.117	0.116	0.112	0.109				

Variance ellipse statistics

Maximum variance	0.1832E-02	Direction	-33.8
Minimum variance	0.2598E-03	Direction	56.2
Total variance	0.2092E-02	Ratio of variances	0.1418E+00

Average direction. maxdir -PI/2 to maxdir +PI/2 7.3

Average direction. maxdir +PI/2 to maxdir -PI/2 0.0

Rig information details for M924A

Position Latitude	:	53 25.68N
Position Longitude	:	03 00.60W
Water depth	:	-8.2 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	4A
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	08-JUL-92 11:43:00
Rig recovered on	:	28-JUL-92 10:29:00
Period of deployment	:	19.9 days
Comments	:	Ballast frame release bar bent Strong tide prevented immediate recovery

Meter information details for 0004

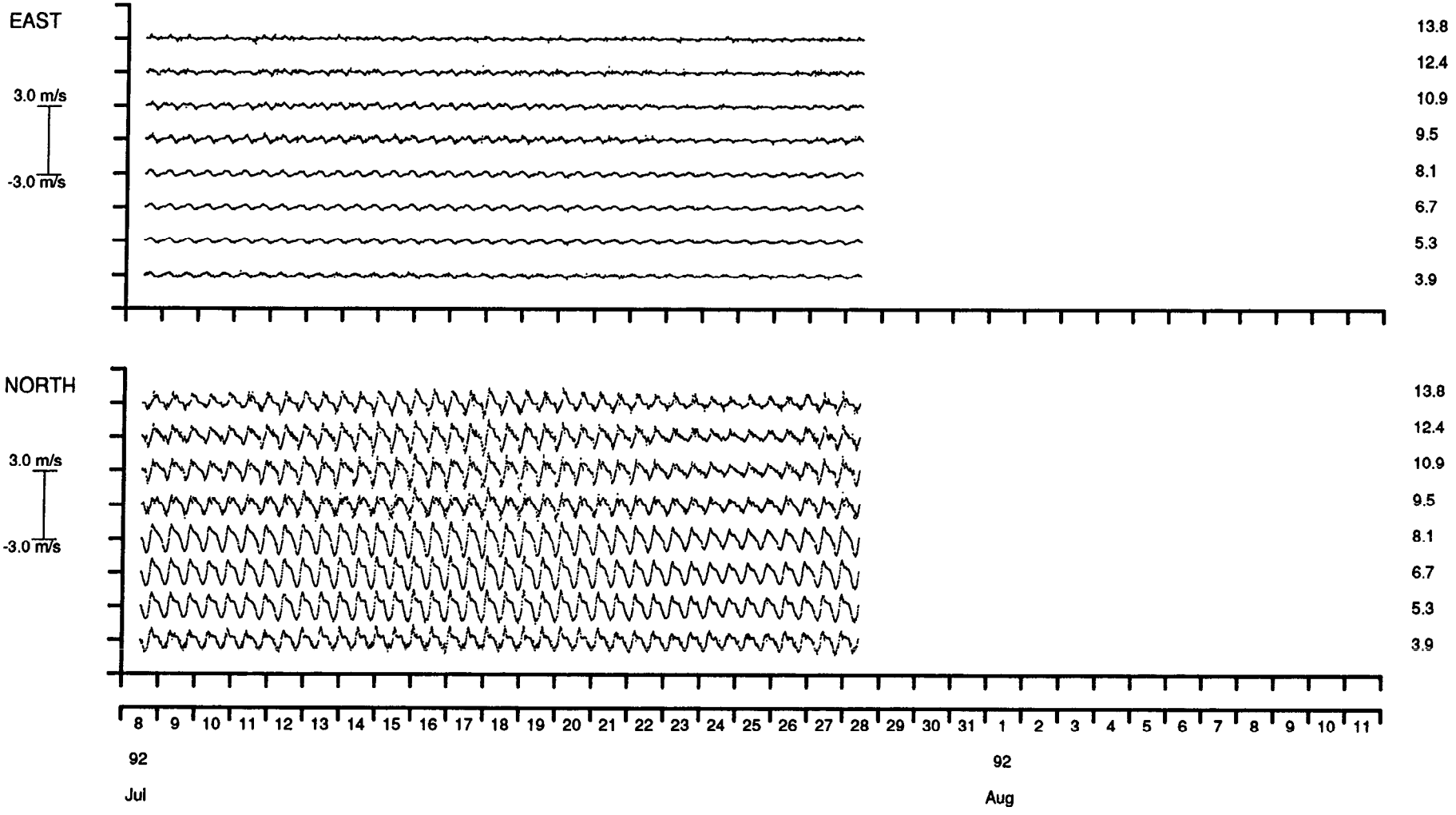
Rig No	:	M924A
Meter No	:	0004
Frame angle correction	:	-11.9 degrees
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.5 m
Meter type	:	DP
Meter started	:	08-JUL-92 08:09:32
Meter stopped	:	28-JUL-92 15:49:23
Period switched on	:	20.3 days
Period of good data	:	19.9 days
Total number of scans	:	2872
Timing error	:	9 seconds fast
Comments	:	Good record obtained

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht

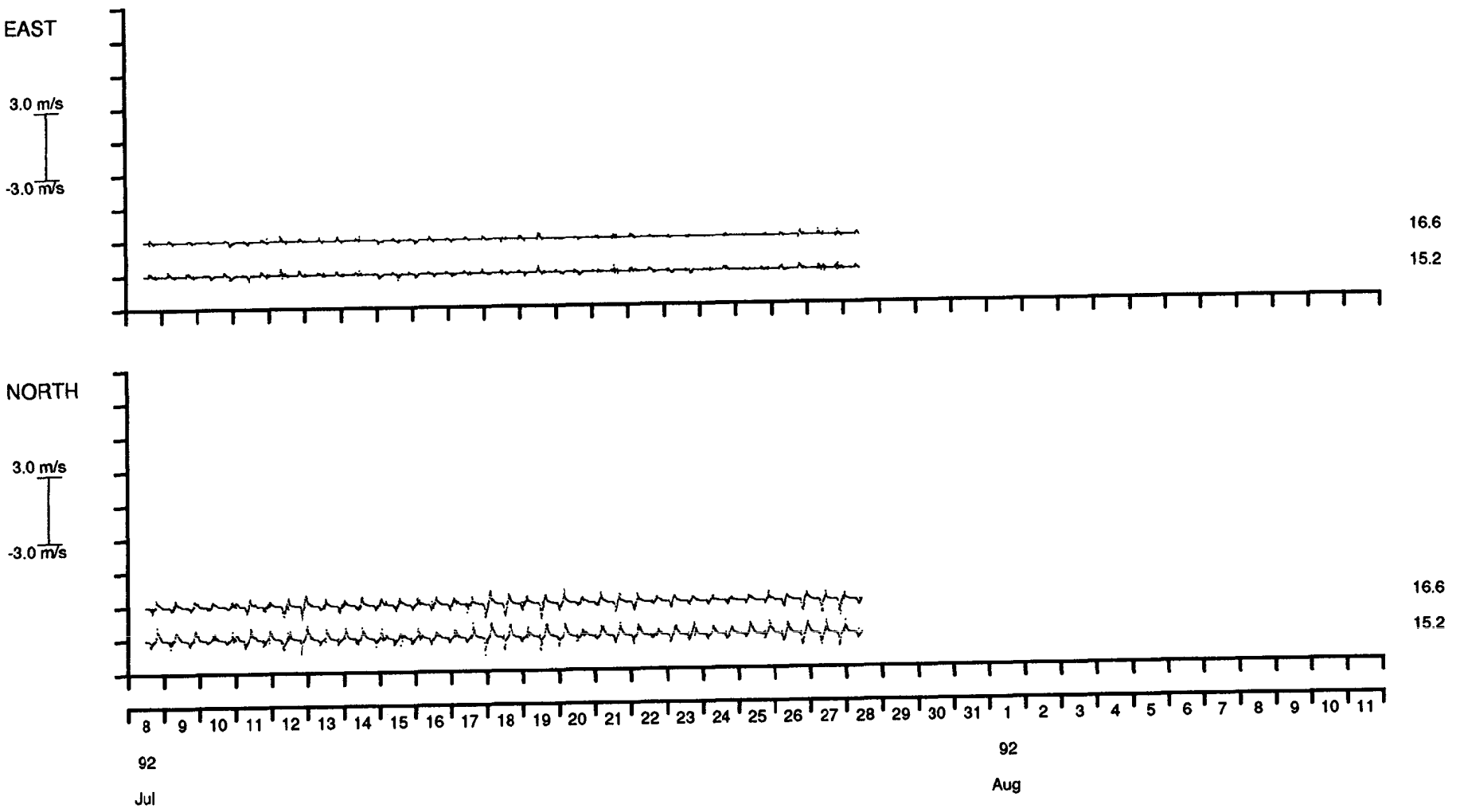


VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht

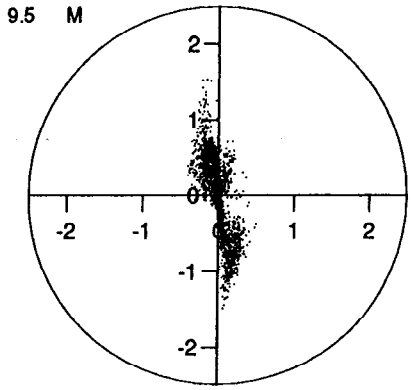


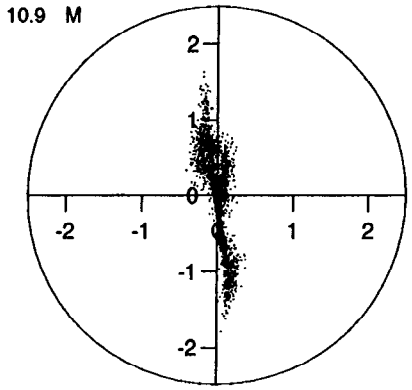
SCATTER PLOT

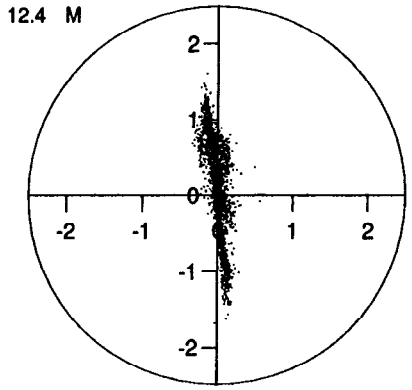
Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

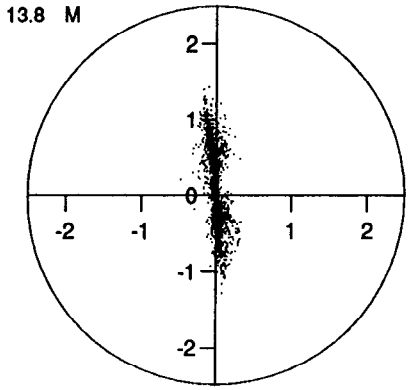
Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

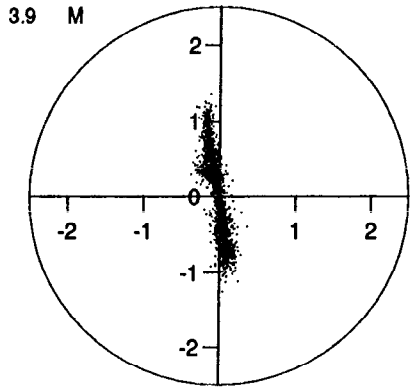
Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht

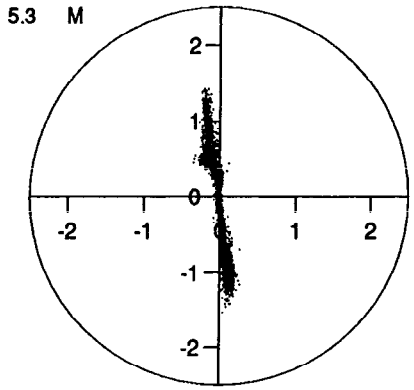


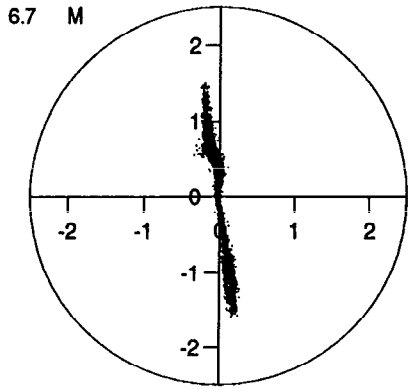


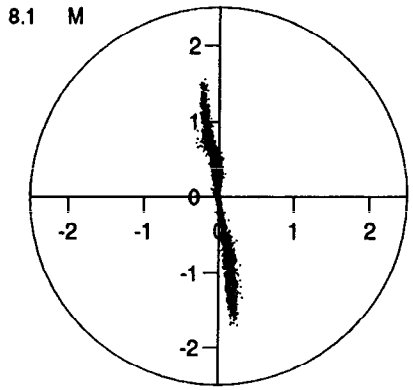










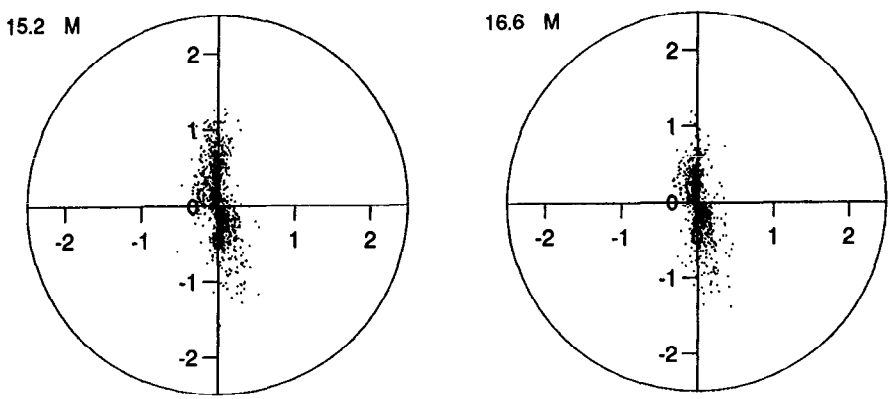


SCATTER PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht



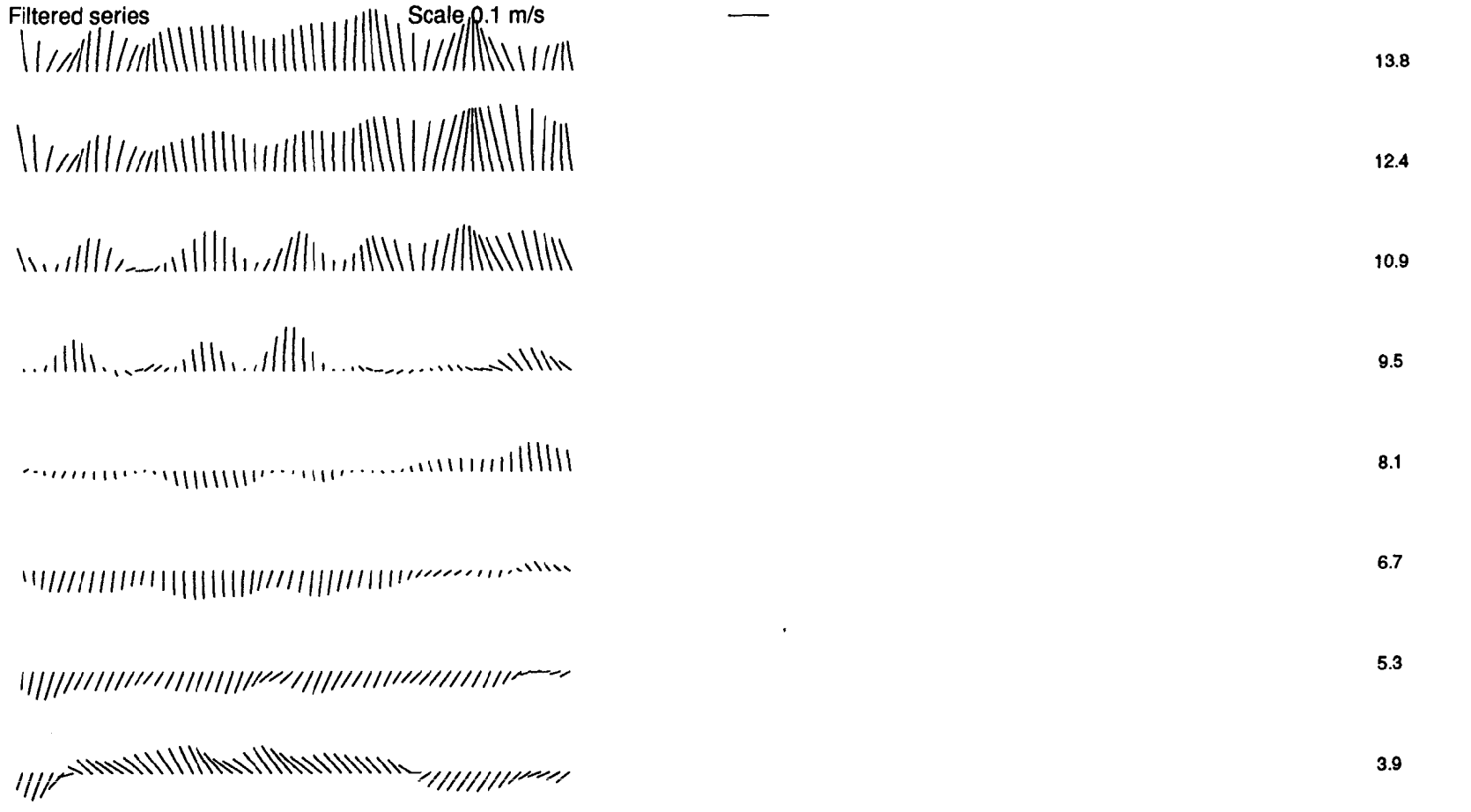
STICK TIME SERIES PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht

Filtered series Scale 0.1 m/s



STICK TIME SERIES PLOT

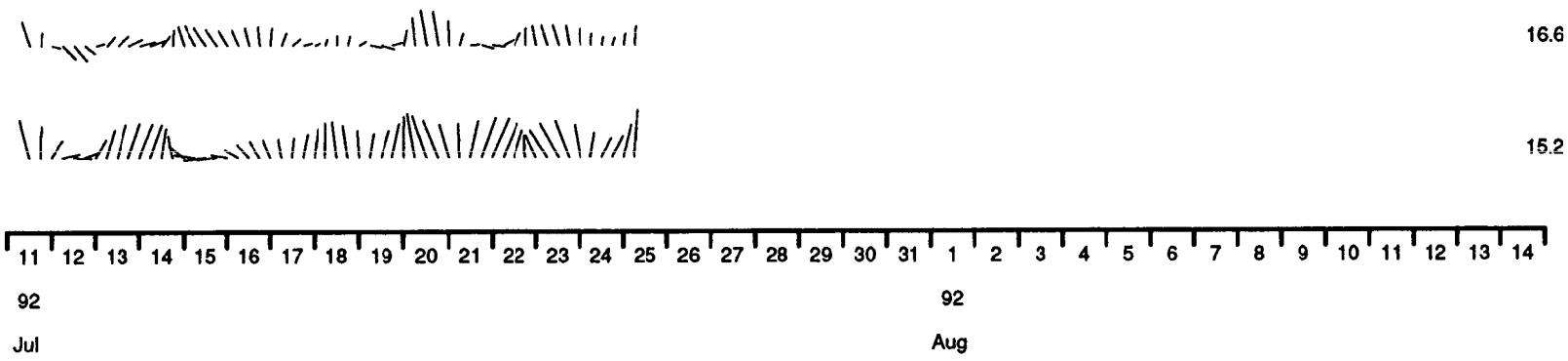
Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht

Filtered series Scale 0.1 m/s

Bin Ht (m)



Statistics for dp0004.m924a

Statistics
For all good data bins

ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.032	-95.1	0.2647	-9.9	0.0033	80.1
2	5.3	0.046	-155.9	0.5069	-8.1	0.0020	81.9
3	6.7	0.037	-171.7	0.6268	-8.0	0.0018	82.0
4	8.1	0.004	140.2	0.6358	-8.7	0.0017	81.3
5	9.5	0.018	-22.7	0.2561	-11.5	0.0078	78.5
6	10.9	0.059	-4.3	0.3336	-8.7	0.0069	81.3
7	12.4	0.100	-0.6	0.2952	-6.7	0.0051	83.3
8	13.8	0.091	0.7	0.1841	-5.4	0.0033	84.6
9	15.2	0.056	2.8	0.0944	-6.8	0.0056	83.2
10	16.6	0.020	18.5	0.0598	-6.8	0.0034	83.2

Statistics for dp0004.m924a

Filtered Statistics
For all good data bins

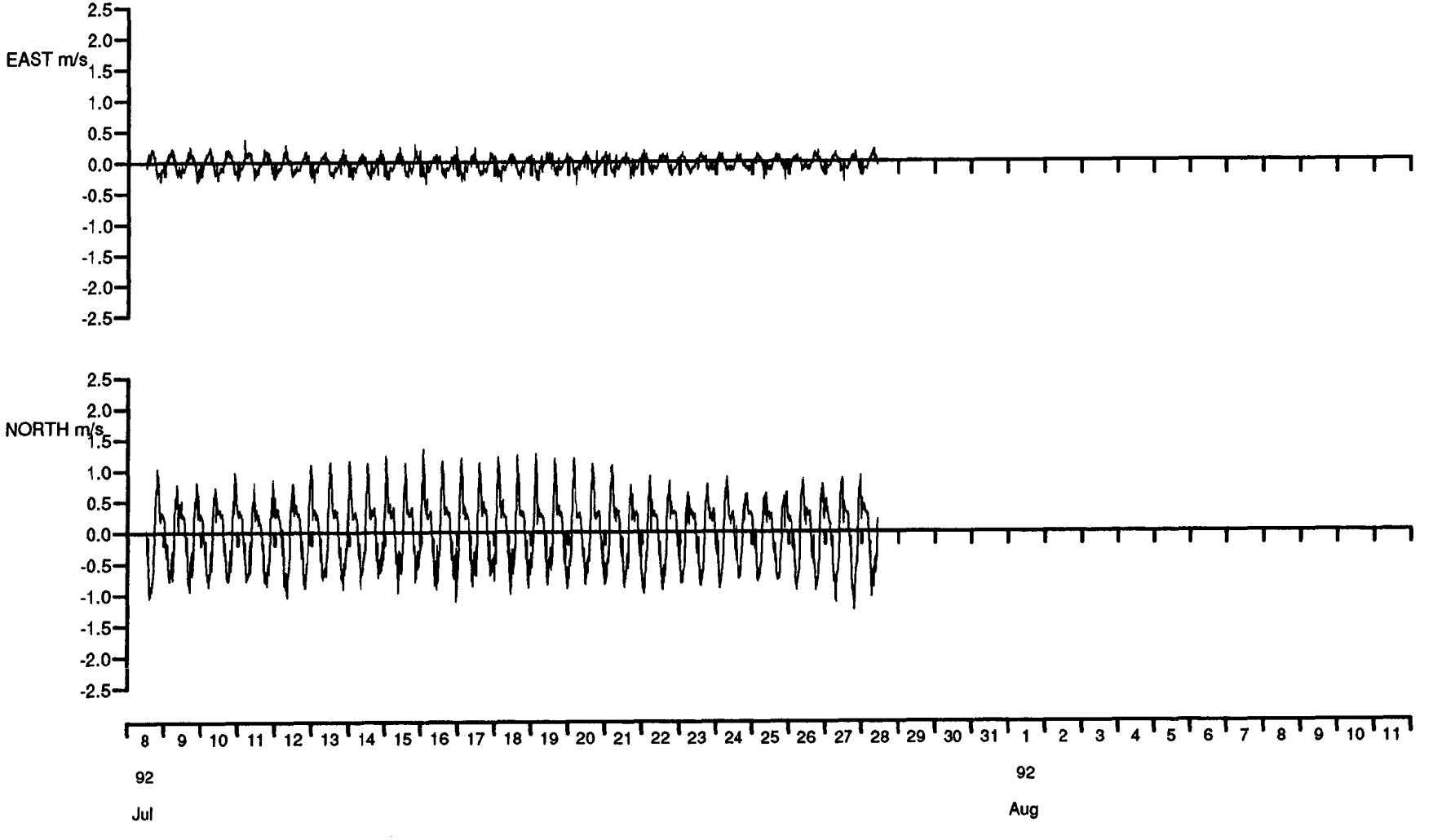
ADCP Bin Number	ADCP Bin Height	Vector Mean Speed	Vector Mean Direction	Maximum Variance	Direction of Maximum Variance	Minimum Variance	Direction of Minimum Variance
1	3.9	0.038	-70.1	0.0017	-8.6	0.0000	81.4
2	5.3	0.043	-150.4	0.0002	-10.1	0.0000	79.9
3	6.7	0.036	-168.4	0.0006	-8.5	0.0000	81.5
4	8.1	0.001	29.7	0.0009	-6.7	0.0000	83.3
5	9.5	0.027	-13.0	0.0009	0.4	0.0002	90.4
6	10.9	0.063	-2.7	0.0010	-16.4	0.0002	73.6
7	12.4	0.102	-0.1	0.0013	-15.0	0.0002	75.0
8	13.8	0.096	-0.1	0.0008	-20.4	0.0002	69.6
9	15.2	0.057	-1.0	0.0008	29.5	0.0005	119.5
10	16.6	0.024	13.5	0.0007	-33.6	0.0001	56.4

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)

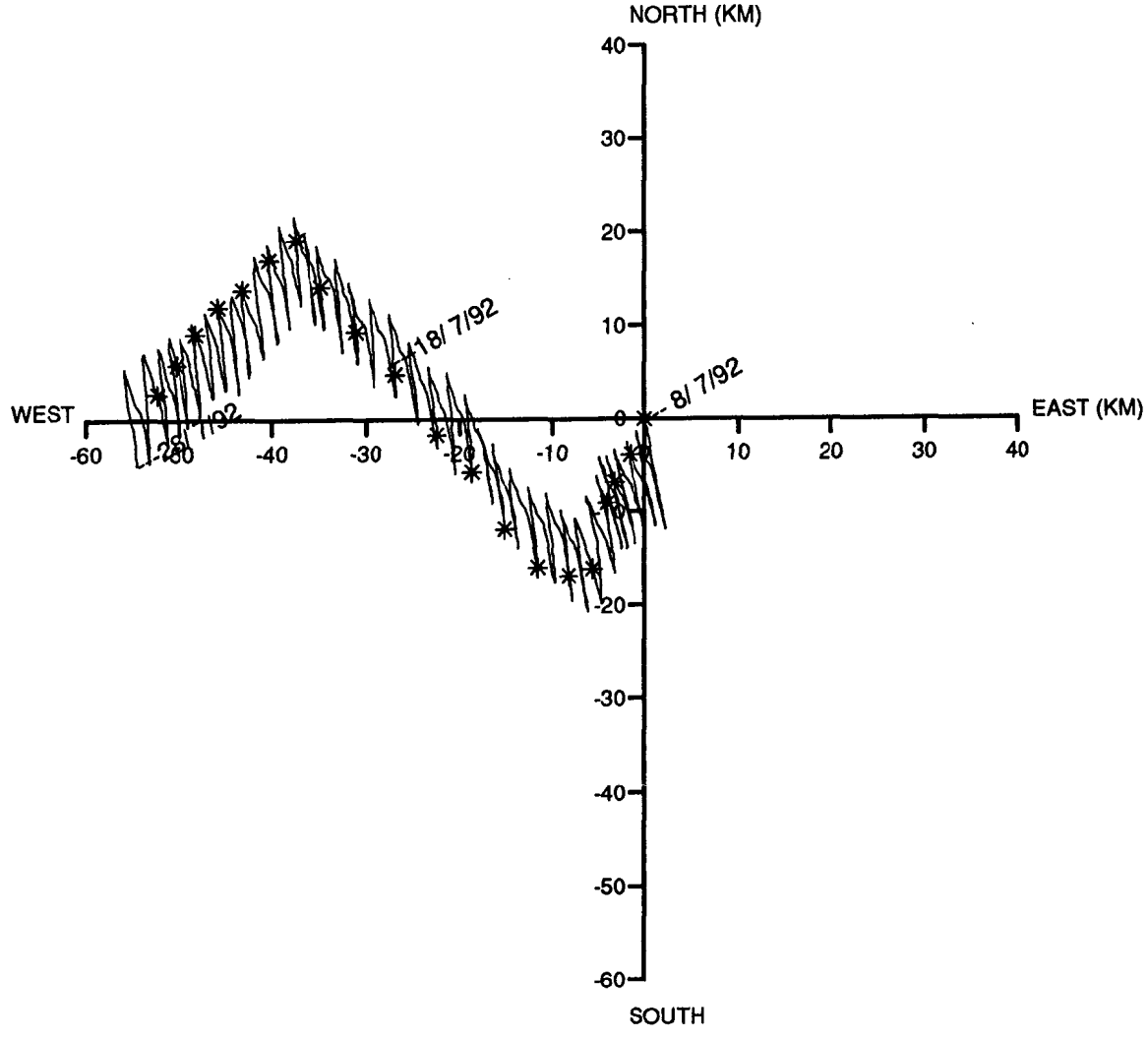


VECTOR PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht 3.9 Bin Ht (m)



Statistics for dp0004.m924as1

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	-0.0316	0.11061699E-01	0.10517461E+00
Northings	-0.0028	0.25689405E+00	0.50684714E+00
Speed	0.4560	0.60914226E-01	0.24680807E+00

Vector mean speed 0.0317

Vector Mean Direction -95.1

Maximum ten values

Eastings					Northings				
0.363	0.289	0.277	0.244	0.243	1.349	1.257	1.239	1.232	1.210
0.239	0.238	0.227	0.226	0.224	1.191	1.190	1.190	1.189	1.180

Minimum ten values

Eastings					Northings				
-0.296	-0.300	-0.302	-0.309	-0.311	-1.028	-1.041	-1.045	-1.053	-1.055
-0.312	-0.321	-0.324	-0.345	-0.372	-1.090	-1.102	-1.117	-1.125	-1.253

Maximum speeds

1.354	1.271	1.254	1.254	1.242	1.228	1.216	1.208	1.206	1.206
1.193	1.186	1.164	1.164	1.155	1.155	1.144	1.143	1.143	1.134
1.134	1.132	1.129	1.128	1.128	1.125	1.124	1.124	1.124	1.116
1.115	1.112	1.111	1.109	1.108	1.102	1.101	1.100	1.099	1.098
1.097	1.095	1.090	1.090	1.088	1.087	1.085	1.079	1.078	1.077
1.067	1.066	1.066	1.061	1.059	1.058	1.056	1.056	1.055	1.054
1.049	1.045	1.044	1.043	1.041	1.040	1.040	1.040	1.033	1.033
1.030	1.028	1.026	1.025	1.023	1.022	1.015	1.015	1.014	1.013
1.013	1.008	1.007	1.003	1.001	1.001	1.000	0.999	0.999	0.998
0.998	0.996	0.995	0.994	0.994	0.991	0.991	0.990	0.986	0.985

Variance ellipse statistics

Maximum variance	0.2647E+00	Direction	-9.9
Minimum variance	0.3299E-02	Direction	80.1
Total variance	0.2680E+00	Ratio of variances	0.1247E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 -6.7

Average direction. maxdir +PI/2 to maxdir -PI/2 183.4

Statistics for dp0004.m924as1f

Doppler bin number 1

	Mean	Variance	Standard deviation
Eastings	-0.0360	0.68832065E-04	0.82965093E-02
Northings	0.0131	0.16793765E-02	0.40980197E-01
Speed	0.0549	0.17764173E-03	0.13328230E-01

Vector mean speed 0.0383

Vector Mean Direction -70.1

Maximum ten values

Eastings					Northings				
-0.014	-0.018	-0.023	-0.027	-0.028	0.069	0.067	0.067	0.063	0.062
-0.028	-0.028	-0.028	-0.029	-0.029	0.061	0.060	0.056	0.052	0.050

Minimum ten values

Eastings					Northings				
-0.045	-0.045	-0.046	-0.046	-0.047	-0.040	-0.042	-0.044	-0.044	-0.045
-0.047	-0.048	-0.050	-0.050	-0.052	-0.046	-0.047	-0.058	-0.060	-0.067

Maximum speeds

0.082	0.078	0.078	0.077	0.074	0.074	0.071	0.071	0.069	0.067
0.067	0.066	0.066	0.065	0.065	0.064	0.062	0.061	0.061	0.061
0.060	0.060	0.058	0.057	0.057	0.056	0.056	0.055	0.055	0.054
0.054	0.053	0.053	0.052	0.051	0.051	0.051	0.050	0.050	0.049
0.048	0.046	0.046	0.043	0.042	0.040	0.040	0.038	0.036	0.036
0.036	0.034	0.033	0.033	0.032	0.029				

Variance ellipse statistics

Maximum variance	0.1717E-02	Direction	-8.6
Minimum variance	0.3146E-04	Direction	81.4
Total variance	0.1748E-02	Ratio of variances	0.1832E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 -35.9

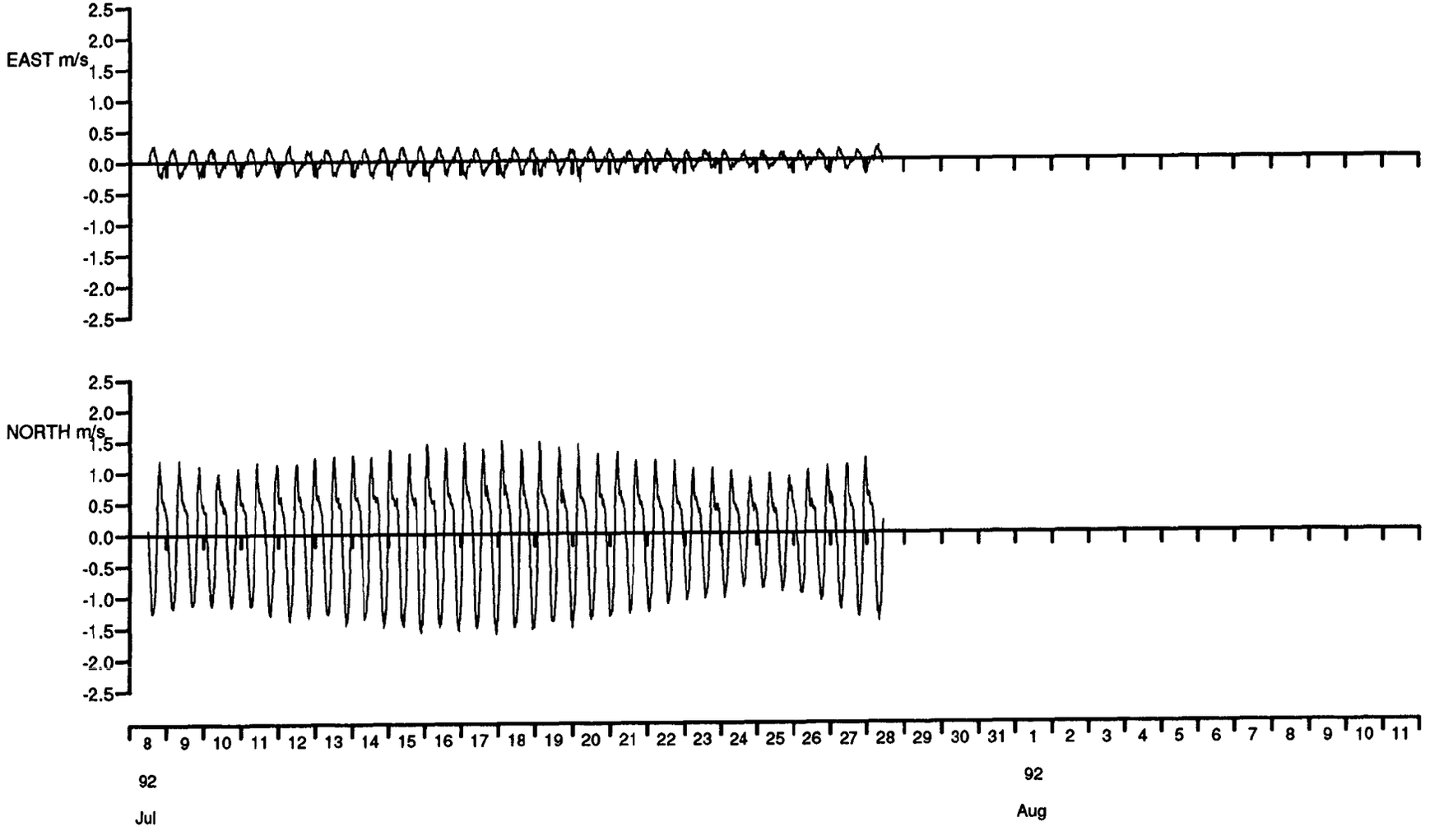
Average direction. maxdir +PI/2 to maxdir -PI/2 230.9

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht 6.7 Bin Ht (m)

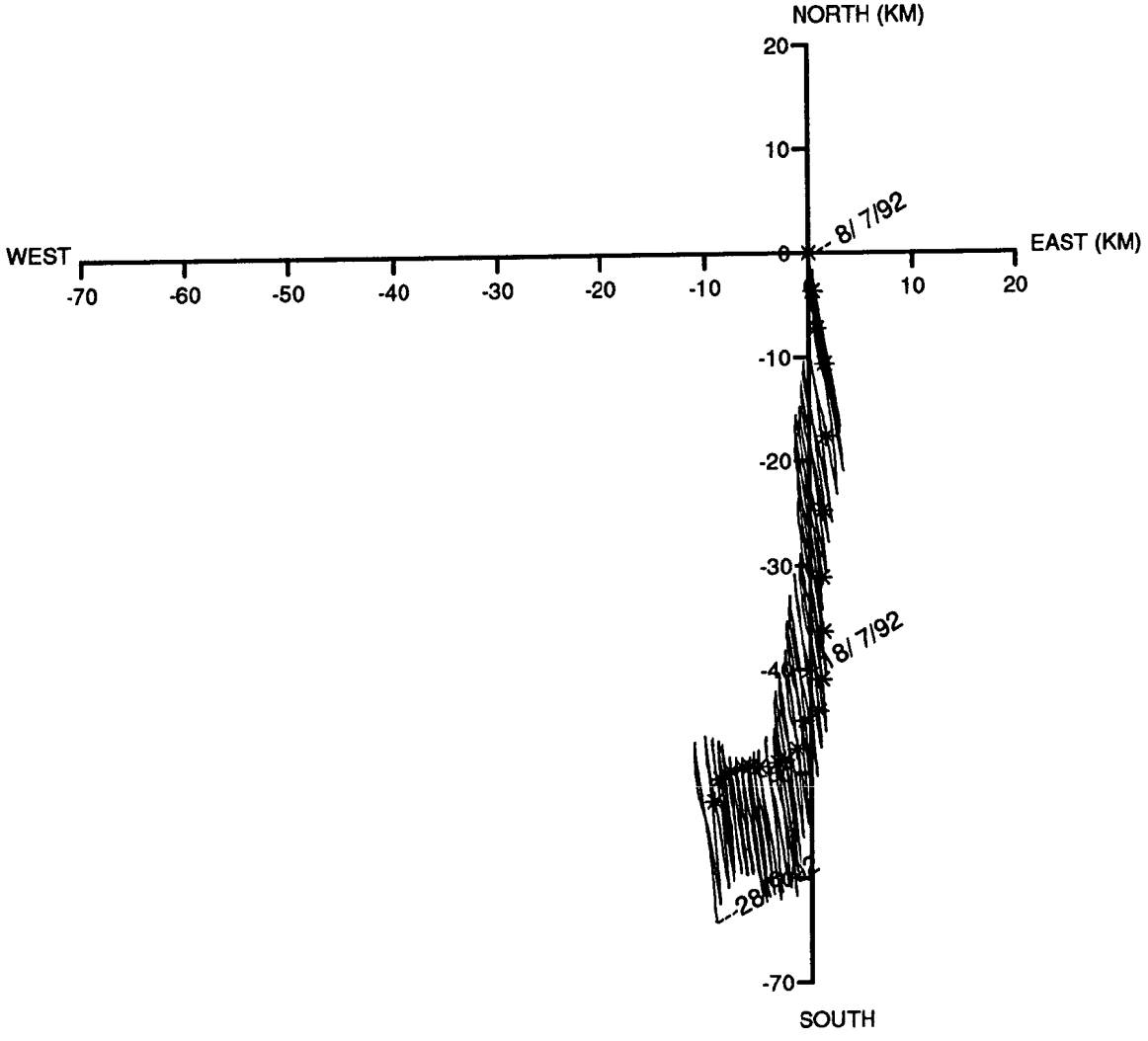


VECTOR PLOT

Meter no. 0004 Rig no. M924A Depth of water(m) -8.2

Start/End 1992/07/08 AT 11:43:00 1992/07/28 AT 10:29:00

Position 53 25.68N 03 00.60W 3.90 Base Ht 1.41 Gap Ht 6.7 Bin Ht (m)



Statistics for dp0004.m924as3

Doppler bin number 3

	Mean	Variance	Standard deviation
Eastings	-0.0054	0.13910695E-01	0.11794361E+00
Northings	-0.0371	0.61472023E+00	0.78404099E+00
Speed	0.6945	0.14756563E+00	0.38414273E+00

Vector mean speed 0.0375

Vector Mean Direction -171.7

Maximum ten values

Eastings					Northings				
0.263	0.261	0.253	0.246	0.240	1.492	1.484	1.467	1.450	1.448
0.236	0.235	0.235	0.234	0.233	1.445	1.438	1.437	1.435	1.433

Minimum ten values

Eastings					Northings				
-0.250	-0.254	-0.257	-0.262	-0.268	-1.523	-1.530	-1.533	-1.547	-1.547
-0.277	-0.287	-0.308	-0.314	-0.340	-1.553	-1.555	-1.577	-1.590	-1.600

Maximum speeds

1.608	1.598	1.597	1.565	1.562	1.562	1.561	1.540	1.540	1.538
1.529	1.523	1.521	1.518	1.517	1.515	1.513	1.511	1.508	1.507
1.506	1.505	1.505	1.501	1.497	1.493	1.486	1.483	1.481	1.481
1.479	1.478	1.476	1.476	1.473	1.471	1.471	1.469	1.465	1.465
1.465	1.463	1.461	1.459	1.458	1.458	1.458	1.455	1.455	1.453
1.450	1.448	1.445	1.445	1.445	1.444	1.443	1.441	1.438	1.438
1.437	1.436	1.433	1.430	1.429	1.428	1.427	1.427	1.426	1.418
1.417	1.413	1.411	1.410	1.410	1.408	1.407	1.406	1.406	1.406
1.406	1.403	1.403	1.402	1.402	1.400	1.399	1.399	1.399	1.398
1.398	1.398	1.397	1.397	1.397	1.395	1.395	1.394	1.393	1.392

Variance ellipse statistics

Maximum variance	0.6268E+00	Direction	-8.0
Minimum variance	0.1786E-02	Direction	82.0
Total variance	0.6286E+00	Ratio of variances	0.2848E-02

Average direction. maxdir -PI/2 to maxdir +PI/2 -0.5

Average direction. maxdir +PI/2 to maxdir -PI/2 183.5

Statistics for dp0004.m924as3f

Doppler bin number 3

	Mean	Variance	Standard deviation
Eastings	-0.0072	0.36290727E-04	0.60241781E-02
Northings	-0.0350	0.58036507E-03	0.24090767E-01
Speed	0.0399	0.29743492E-03	0.17246302E-01

Vector mean speed 0.0358

Vector Mean Direction -168.4

Maximum ten values

Eastings					Northings				
0.005	0.003	0.003	0.003	0.003	0.020	0.018	0.016	0.013	0.009
0.003	0.002	0.001	0.001	-0.001	0.006	-0.006	-0.011	-0.011	-0.012

Minimum ten values

Eastings					Northings				
-0.014	-0.014	-0.014	-0.014	-0.015	-0.059	-0.061	-0.061	-0.063	-0.063
-0.016	-0.016	-0.017	-0.017	-0.018	-0.063	-0.064	-0.066	-0.067	-0.069

Maximum speeds

0.069	0.067	0.066	0.064	0.063	0.063	0.063	0.061	0.061	0.059
0.058	0.057	0.053	0.052	0.052	0.051	0.051	0.050	0.050	0.050
0.049	0.049	0.046	0.045	0.045	0.045	0.043	0.043	0.043	0.043
0.042	0.041	0.039	0.037	0.036	0.032	0.032	0.030	0.026	0.024
0.024	0.023	0.022	0.022	0.021	0.021	0.020	0.019	0.018	0.017
0.016	0.015	0.015	0.015	0.011	0.009				

Variance ellipse statistics

Maximum variance	0.5928E-03	Direction	-8.5
Minimum variance	0.2383E-04	Direction	81.5
Total variance	0.6167E-03	Ratio of variances	0.4019E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 -38.9

Average direction. maxdir +PI/2 to maxdir -PI/2 201.8

Rig information details for M924B

Position Latitude	:	53 25.63N
Position Longitude	:	03 00.56W
Water depth	:	-8.2 m
Deployed on cruise	:	VIGILANT
Recovered on cruise	:	VIGILANT
Site name identification	:	4B
Magnetic deviation	:	5.7 degrees west
Rig deployed on	:	08-JUL-92 11:35:00
Rig recovered on	:	28-JUL-92 09:10:00
Period of deployment	:	19.9 days
Comments	:	Launch and recovery successful

Meter information details for 1832

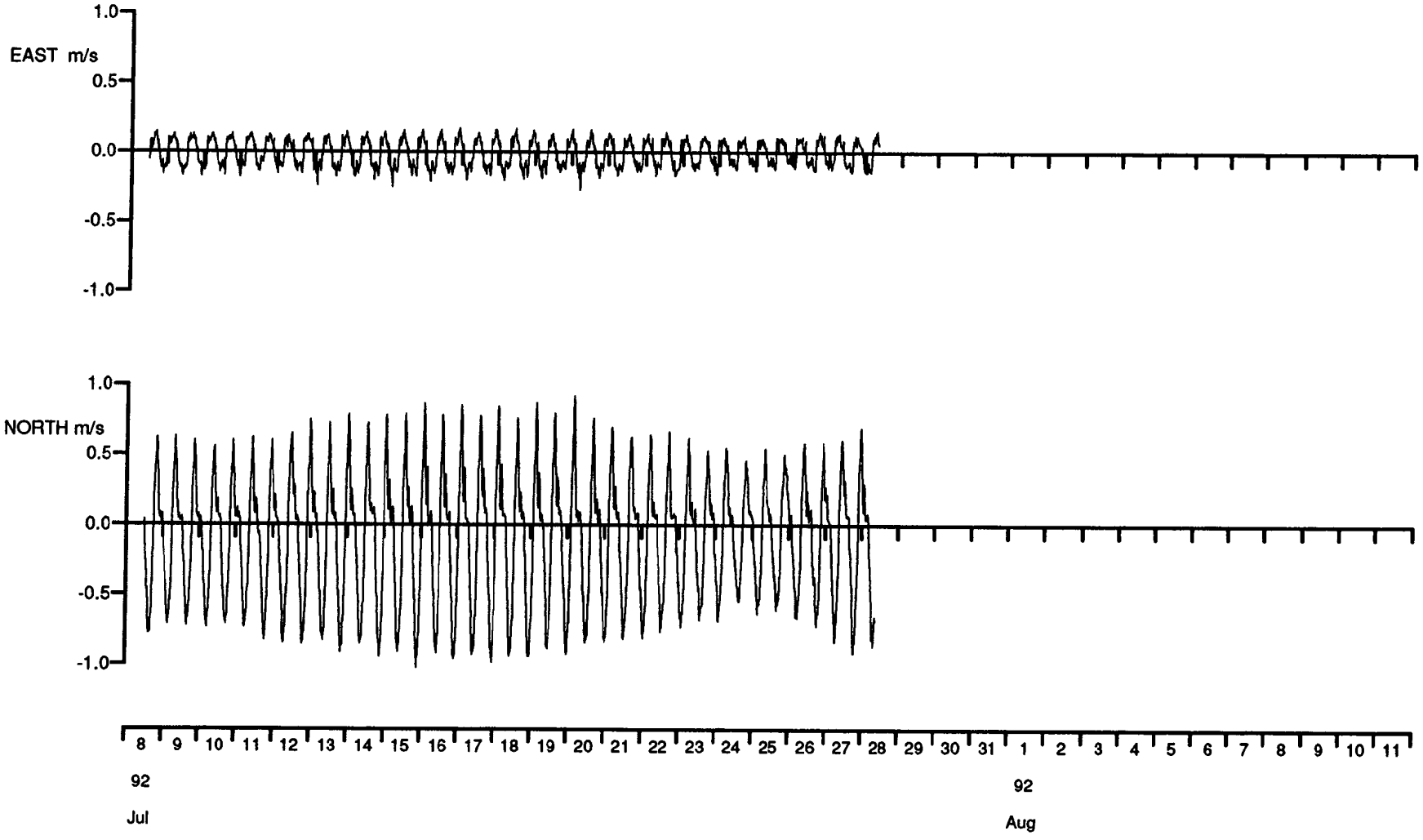
Rig No	:	M924B
Meter No	:	1832
Recording interval	:	600.0 seconds
Meter height from bottom	:	0.6 m
Position of meter on rig	:	B
Meter type	:	S4
Meter started	:	07-JUL-92 09:00:00
Meter stopped	:	03-AUG-92 09:01:00
Period switched on	:	27.0 days
Period of good data	:	19.9 days
Total number of scans	:	2865
Timing error	:	60 seconds slow
Comments	:	Good record obtained Vector progressive plot indicates strong up river residual flow

VELOCITY COMPONENT TIME SERIES PLOT

Meter no. 1832 Rig no. M924B Depth of water(m) 8.2

Start/End 1992/07/08 AT 11:35:00 1992/07/28 AT 09:10:00

Position 53 25.63N 03 00.56W Meter Height(m) 0.6

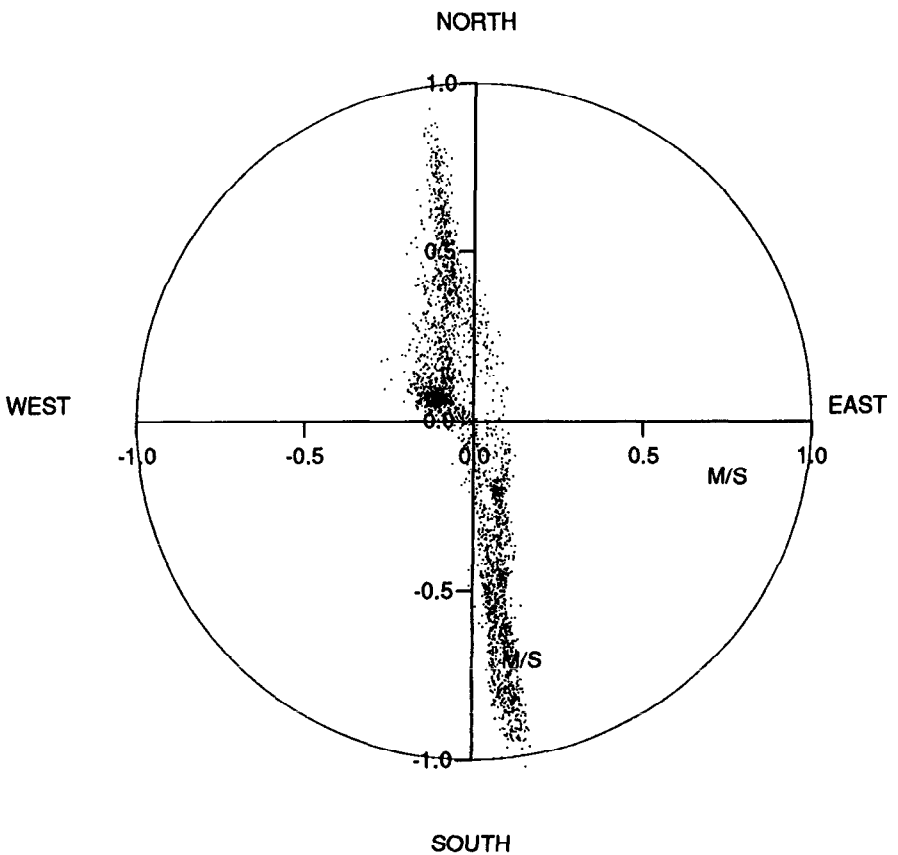


SCATTER PLOT

Meter no. 1832 Rig no. M924B Depth of water(m) 8.2

Start/End 1992/07/08 AT 11:35:00 1992/07/28 AT 09:10:00

Position 53 25.63N 03 00.56W Meter Height(m) 0.6

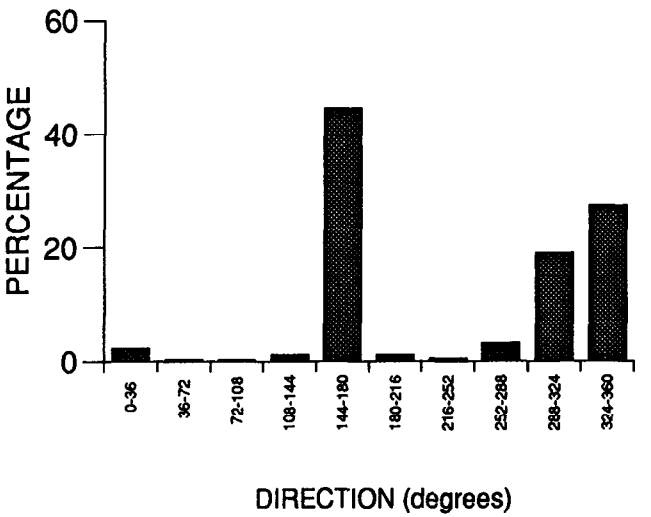


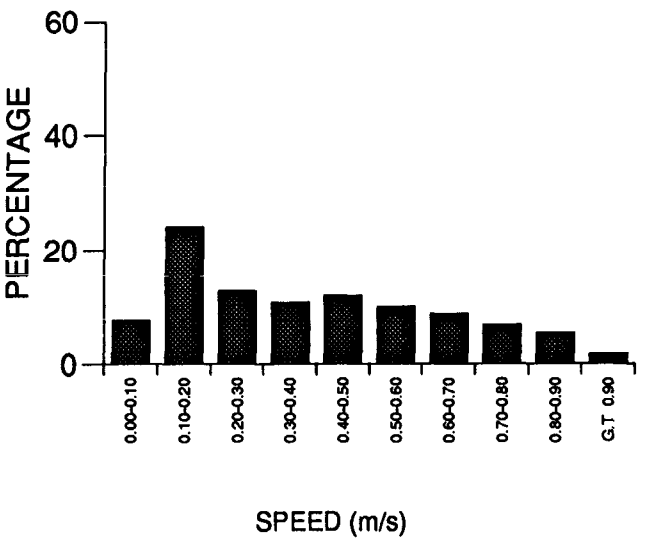
HISTOGRAMS FOR SPEEDS AND DIRECTIONS

Meter no. 1832 Rig no. M924B Depth of water(m) 8.2

Start/End 1992/07/08 AT 11:35:00 1992/07/28 AT 09:10:00

Position 53 25.63N 03 00.56W Meter Height(m) 0.6



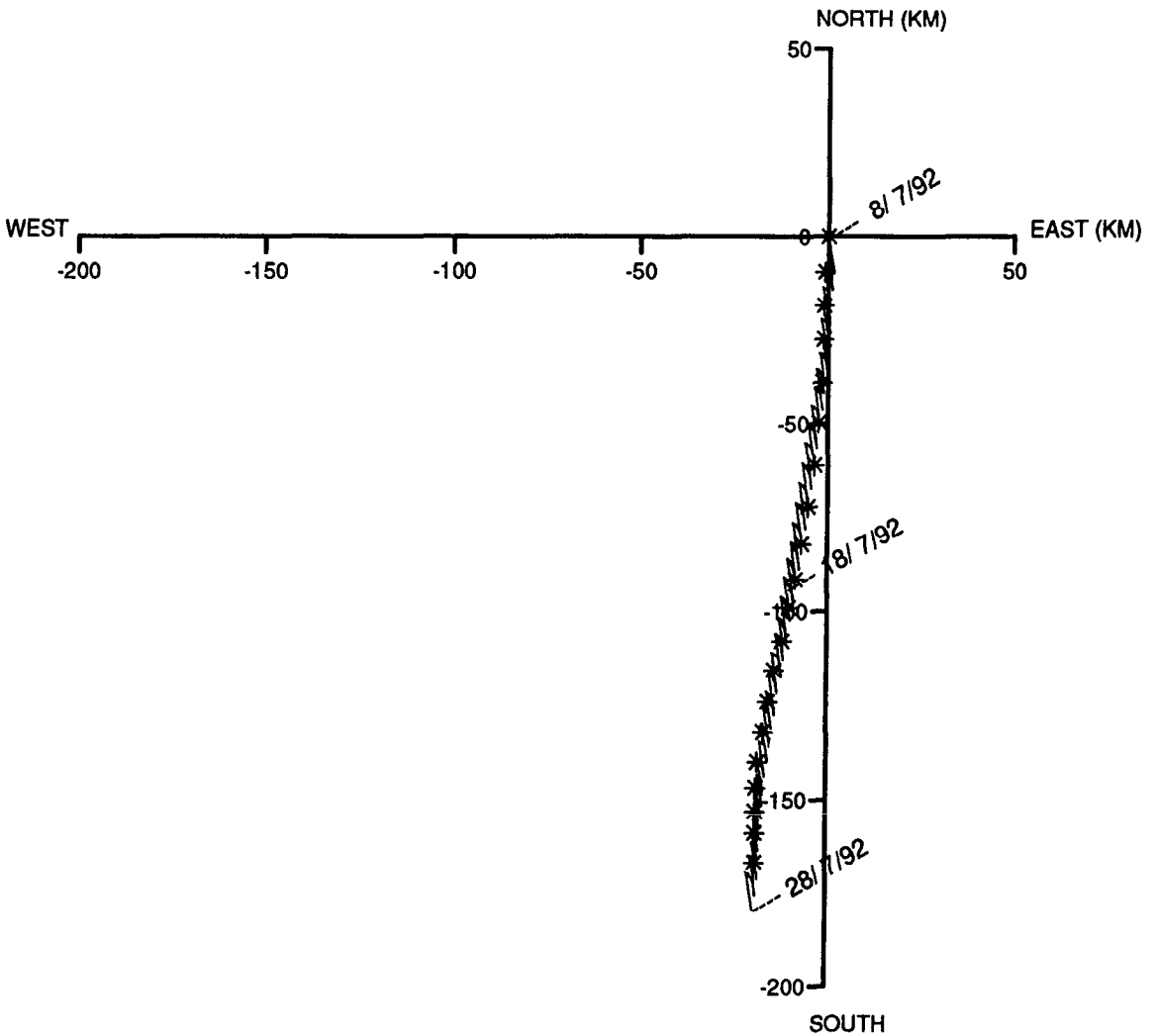


VECTOR PLOT

Meter no. 1832 Rig no. M924B Depth of water(m) 8.2

Start/End 1992/07/08 AT 11:35:00 1992/07/28 AT 09:10:00

Position 53 25.63N 03 00.56W Meter Height(m) 0.6



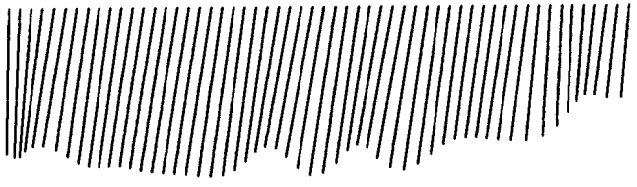
STICK TIME SERIES PLOT

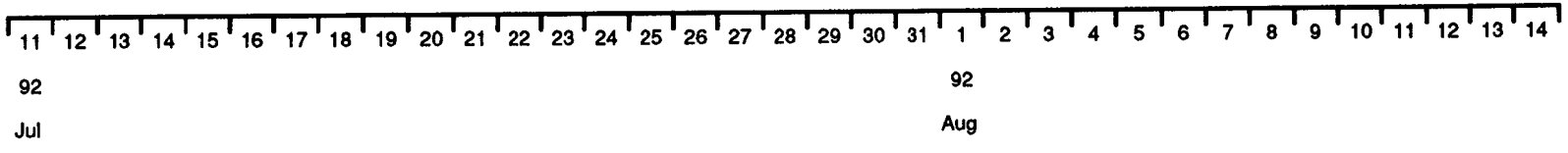
Meter no. 1832 Rig no. M924B Depth of water(m) 8.2

Start/End 1992/07/08 AT 11:35:00 1992/07/28 AT 09:10:00

Position 53 25.63N 03 00.56W Meter Height(m) 0.6

Filtered series Scale 0.1 m/s





Statistics for s41832b.m924bs

	Mean	Variance	Standard deviation
Eastings	-0.0114	0.84497537E-02	0.91922544E-01
Northings	-0.1043	0.19072051E+00	0.43671557E+00
Speed	0.3874	0.60071003E-01	0.24509387E+00

Vector mean speed 0.1049

Vector Mean Direction -173.8

Maximum ten values

Eastings					Northings				
0.168	0.166	0.161	0.158	0.157	0.921	0.877	0.871	0.865	0.862
0.156	0.156	0.155	0.155	0.155	0.850	0.845	0.839	0.839	0.829

Minimum ten values

Eastings					Northings				
-0.193	-0.200	-0.202	-0.205	-0.205	-0.939	-0.941	-0.942	-0.943	-0.943
-0.212	-0.243	-0.255	-0.260	-0.273	-0.960	-0.963	-0.968	-0.986	-1.021

Maximum speeds

1.034	0.997	0.979	0.975	0.968	0.954	0.953	0.952	0.951	0.950
0.949	0.949	0.946	0.945	0.945	0.944	0.940	0.939	0.936	0.934
0.932	0.932	0.931	0.930	0.929	0.928	0.927	0.926	0.925	0.924
0.923	0.923	0.922	0.921	0.920	0.920	0.919	0.919	0.918	0.918
0.917	0.917	0.916	0.916	0.915	0.912	0.910	0.907	0.904	0.904
0.902	0.900	0.898	0.896	0.895	0.895	0.893	0.893	0.892	0.887
0.885	0.884	0.884	0.884	0.883	0.882	0.882	0.882	0.882	0.881
0.879	0.879	0.879	0.879	0.876	0.874	0.874	0.874	0.874	0.872
0.871	0.870	0.868	0.868	0.868	0.868	0.867	0.867	0.866	0.865
0.865	0.863	0.862	0.862	0.861	0.861	0.860	0.859	0.857	0.857

Variance ellipse statistics

Maximum variance	0.1965E+00	Direction	-9.9
Minimum variance	0.2663E-02	Direction	80.1
Total variance	0.1992E+00	Ratio of variances	0.1355E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 -21.0

Average direction. maxdir +PI/2 to maxdir -PI/2 180.3

Statistics for s41832b.m924bsf

	Mean	Variance	Standard deviation
Eastings	-0.0142	0.24242987E-04	0.49237167E-02
Northings	-0.1051	0.24339743E-03	0.15601200E-01
Speed	0.1062	0.25305318E-03	0.15907645E-01

Vector mean speed 0.1061

Vector Mean Direction -172.3

Maximum ten values

Eastings					Northings				
-0.001	-0.003	-0.003	-0.004	-0.005	-0.065	-0.065	-0.067	-0.067	-0.070
-0.006	-0.006	-0.007	-0.008	-0.008	-0.078	-0.088	-0.095	-0.096	-0.096

Minimum ten values

Eastings					Northings				
-0.018	-0.019	-0.019	-0.019	-0.019	-0.119	-0.120	-0.121	-0.121	-0.121
-0.019	-0.019	-0.019	-0.019	-0.020	-0.122	-0.123	-0.123	-0.123	-0.124

Maximum speeds

0.125	0.124	0.124	0.124	0.123	0.123	0.122	0.122	0.122	0.121
0.120	0.120	0.119	0.119	0.118	0.117	0.117	0.117	0.117	0.116
0.115	0.114	0.114	0.112	0.111	0.109	0.109	0.109	0.108	0.107
0.107	0.106	0.105	0.105	0.105	0.105	0.103	0.102	0.102	0.102
0.102	0.099	0.099	0.099	0.098	0.098	0.097	0.097	0.095	0.088
0.078	0.070	0.068	0.067	0.066	0.066				

Variance ellipse statistics

Maximum variance	0.2563E-03	Direction	13.3
Minimum variance	0.1132E-04	Direction	103.3
Total variance	0.2676E-03	Ratio of variances	0.4417E-01

Average direction. maxdir -PI/2 to maxdir +PI/2 0.0

Average direction. maxdir +PI/2 to maxdir -PI/2 174.3

APPENDIX

Tidal Analyses

Data files used - /users/pjk3/mersey/s41196t.m9201t.t1fe
/users/pjk3/mersey/s41196t.m9201t.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.1	64.7	0.2	211.9	0.1	257.3	0.1	334.0	0.2	0.0	0.24	A	218.4	334.4
Q1	0.1	339.5	0.2	174.0	0.1	300.3	0.1	284.1	0.2	0.0	0.09	C	171.9	337.8
RHO1	0.0	339.5	0.0	174.0	0.0	300.3	0.0	284.2	0.0	0.0	0.09	C	171.9	337.8
PI1	0.0	89.5	0.0	266.6	0.0	194.7	0.0	8.2	0.0	0.0	0.01	A	266.7	348.5
P1	0.1	89.5	0.4	266.6	0.2	194.8	0.2	8.3	0.4	0.0	0.01	A	266.7	348.5
S1	0.0	89.5	0.0	266.6	0.0	194.7	0.0	8.2	0.0	0.0	0.01	A	266.7	348.5
PSI1	0.0	89.5	0.0	266.6	0.0	194.7	0.0	8.1	0.0	0.0	0.01	A	266.7	348.6
PHI1	0.0	89.5	0.0	266.6	0.0	194.9	0.0	8.3	0.0	0.0	0.01	A	266.7	348.4
J1	0.2	294.5	0.5	232.2	0.1	196.4	0.4	313.3	0.5	0.2	0.40	C	238.5	15.2
2N2	0.1	321.7	0.2	134.9	0.1	346.5	0.1	260.5	0.3	0.0	0.05	A	137.0	326.5
N2	1.7	221.8	7.2	50.0	3.6	53.4	3.8	152.7	7.4	0.2	0.03	C	49.6	346.9
NU2	0.3	221.8	1.3	50.0	0.7	53.4	0.7	152.7	1.4	0.0	0.03	C	49.6	346.9
L2	0.3	221.8	1.1	50.0	0.5	53.4	0.6	152.7	1.1	0.0	0.03	C	49.6	346.9
T2	0.2	272.6	0.8	99.7	0.4	2.9	0.4	201.7	0.8	0.0	0.03	C	99.4	347.7
K2	0.8	272.6	3.5	99.7	1.7	2.9	1.8	201.7	3.6	0.1	0.03	C	99.4	347.7
Z0	2.3	0.0	7.0	180.0	3.7	288.6	3.7	288.6	7.4	0.0	0.00	A	180.0	341.4
MSF	0.4	295.3	0.6	53.8	0.5	48.3	0.1	189.6	0.6	0.4	0.55	A	70.6	331.0
2Q1	0.1	64.7	0.2	211.9	0.1	257.3	0.1	334.0	0.2	0.0	0.24	A	218.4	334.4
O1	0.3	339.5	0.8	174.0	0.4	300.3	0.5	284.1	0.9	0.1	0.09	C	171.9	337.8
K1	0.2	89.5	1.1	266.6	0.6	194.8	0.6	8.3	1.1	0.0	0.01	A	266.7	348.5
OO1	0.1	294.5	0.3	232.2	0.1	196.4	0.2	313.3	0.3	0.1	0.40	C	238.5	15.2
MU2	0.2	321.7	0.3	134.9	0.2	346.5	0.2	260.5	0.3	0.0	0.05	A	137.0	326.5
M2	8.8	221.8	37.5	50.0	18.6	53.4	19.8	152.7	38.5	1.2	0.03	C	49.6	346.9
S2	2.8	272.6	12.8	99.7	6.4	2.9	6.7	201.7	13.1	0.3	0.03	C	99.4	347.7
M3	0.3	195.6	0.3	60.3	0.1	76.6	0.3	169.2	0.4	0.2	0.38	C	46.3	327.1
M4	4.0	182.7	14.2	345.2	8.0	118.7	6.8	91.6	14.8	1.2	0.08	A	346.4	344.8
MS4	2.7	238.7	7.8	42.8	4.5	64.2	3.8	153.0	8.2	0.7	0.09	A	44.4	341.4
S4	0.0	198.7	0.4	128.0	0.2	320.0	0.2	216.4	0.4	0.0	0.09	C	128.2	1.8
M6	0.6	156.4	3.7	341.8	1.8	116.9	1.9	80.3	3.7	0.1	0.01	C	341.7	351.4
2MS6	0.4	276.8	3.2	41.9	1.8	51.9	1.5	136.5	3.2	0.3	0.10	A	42.3	355.8
2SM6	0.2	44.2	0.4	134.1	0.3	315.9	0.1	224.0	0.4	0.2	0.44	A	134.1	0.0
Mean	2.4		-7.0						7.4					161.4
Sd obs	8.1		31.1											
Sd res	3.6		8.6											

Data files used - /users/pjk3/mersey/dp0010.m922at1.t1fe
/users/pjk3/mersey/dp0010.m922at1.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.0	266.6	0.6	322.6	0.3	125.3	0.3	50.3	0.6	0.0	0.06	A	322.5	2.2
Q1	0.1	351.9	0.1	104.5	0.1	354.3	0.0	225.7	0.1	0.0	0.54	A	115.7	340.0
RHO1	0.0	351.9	0.0	104.5	0.0	354.3	0.0	226.0	0.0	0.0	0.54	A	115.8	339.8
PI1	0.0	81.6	0.0	304.0	0.0	154.3	0.0	40.6	0.0	0.0	0.12	C	303.1	352.6
P1	0.1	81.6	0.7	304.0	0.3	154.3	0.4	40.5	0.7	0.1	0.12	C	303.1	352.6
S1	0.0	81.6	0.0	304.0	0.0	154.4	0.0	40.6	0.0	0.0	0.12	C	303.1	352.5
PSI1	0.0	81.6	0.0	304.0	0.0	154.2	0.0	40.5	0.0	0.0	0.11	C	303.1	352.6
PHI1	0.0	81.6	0.0	304.0	0.0	154.2	0.0	40.5	0.0	0.0	0.11	C	303.1	352.6
J1	0.2	327.7	2.1	325.0	1.0	119.5	1.0	49.6	2.1	0.0	0.00	C	325.1	5.5
2N2	0.7	277.4	2.1	109.7	1.0	0.5	1.2	217.3	2.2	0.1	0.07	C	108.4	341.1
N2	2.4	244.2	14.1	59.9	7.2	39.6	7.1	159.7	14.3	0.2	0.01	A	60.0	350.4
NU2	0.4	244.2	2.6	59.9	1.4	39.6	1.3	159.7	2.7	0.0	0.01	A	60.0	350.4
L2	0.4	244.2	2.1	59.9	1.1	39.6	1.1	159.7	2.2	0.0	0.01	A	60.0	350.4
T2	0.3	287.4	1.5	106.5	0.8	354.7	0.7	207.6	1.5	0.0	0.00	A	106.5	348.9
K2	1.3	287.4	6.8	106.5	3.5	354.7	3.4	207.6	6.9	0.0	0.00	A	106.5	348.9
Z0	2.3	0.0	4.7	0.0	2.6	64.2	2.6	64.2	5.3	0.0	0.00	A	0.0	25.8
MSF	1.0	244.3	5.3	68.3	2.7	32.4	2.7	168.7	5.4	0.1	0.01	C	68.1	349.5
2Q1	0.0	266.6	0.5	322.6	0.3	125.3	0.2	50.3	0.5	0.0	0.06	A	322.5	2.2
O1	0.3	351.9	0.5	104.5	0.4	354.3	0.1	225.8	0.5	0.3	0.54	A	115.7	340.0
K1	0.4	81.6	2.0	304.0	0.9	154.3	1.1	40.5	2.0	0.2	0.12	C	303.1	352.6
OO1	0.1	327.7	1.1	325.0	0.6	119.5	0.6	49.6	1.1	0.0	0.00	C	325.1	5.5
MU2	0.9	277.4	2.5	109.7	1.2	0.5	1.4	217.3	2.6	0.2	0.07	C	108.4	341.1
M2	12.5	244.2	73.4	59.9	37.7	39.6	36.7	159.7	74.4	0.9	0.01	A	60.0	350.4
S2	4.9	287.4	24.9	106.5	12.7	354.7	12.6	207.6	25.4	0.1	0.00	A	106.5	348.9
M3	0.4	349.5	1.0	151.7	0.6	315.0	0.5	262.1	1.1	0.1	0.10	A	153.5	341.5
M4	2.5	243.0	7.9	54.4	4.3	52.3	4.0	162.8	8.3	0.4	0.04	A	55.2	342.4
MS4	1.7	310.5	5.9	133.3	3.1	332.9	3.1	239.1	6.2	0.1	0.01	C	133.1	344.0
S4	0.2	98.2	0.8	183.3	0.5	265.7	0.3	271.5	0.8	0.2	0.27	A	182.9	1.4
M6	1.6	237.2	5.5	31.5	3.2	71.4	2.5	137.8	5.7	0.7	0.12	A	33.2	345.4
2MS6	2.2	303.3	5.6	98.4	3.4	8.9	2.5	212.2	5.9	0.9	0.15	A	101.6	339.4
2SM6	0.8	28.2	2.3	160.9	1.5	300.2	0.9	269.7	2.3	0.6	0.25	A	164.8	345.0
Mean	2.5		3.7						4.4					34.1
Sd obs	10.4		53.7											
Sd res	5.3		18.7											

Data files used - /users/pjk3/mersey/s41831b.m922bt.t1fe
/users/pjk3/mersey/s41831b.m922bt.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.0	33.5	0.0	215.6	0.0	296.0	0.0	4.0	0.0	0.0	0.02	C	34.0	120.0
Q1	0.1	306.8	0.2	145.7	0.1	327.5	0.1	254.0	0.2	0.0	0.11	C	143.3	339.3
RHO1	0.0	306.8	0.0	145.7	0.0	327.4	0.0	254.0	0.0	0.0	0.11	C	143.3	339.3
PI1	0.0	43.6	0.0	291.2	0.0	163.7	0.0	24.7	0.0	0.0	0.17	C	290.5	355.8
P1	0.1	43.6	0.5	291.2	0.2	163.8	0.3	24.7	0.5	0.1	0.17	C	290.5	355.7
S1	0.0	43.6	0.0	291.2	0.0	163.8	0.0	24.7	0.0	0.0	0.18	C	290.5	355.7
PSI1	0.0	43.6	0.0	291.2	0.0	163.9	0.0	24.8	0.0	0.0	0.18	C	290.5	355.7
PHI1	0.0	43.6	0.0	291.2	0.0	163.8	0.0	24.7	0.0	0.0	0.17	C	290.5	355.8
J1	0.5	355.6	0.1	118.0	0.3	359.9	0.2	349.7	0.5	0.1	0.14	A	354.9	95.2
2N2	0.3	291.1	2.0	87.6	1.1	10.0	1.0	186.2	2.1	0.1	0.06	A	88.1	351.9
N2	2.0	234.6	12.5	55.8	6.3	43.3	6.3	154.9	12.6	0.0	0.00	C	55.8	350.9
NU2	0.4	234.6	2.3	55.8	1.2	43.3	1.2	154.9	2.4	0.0	0.00	C	55.8	350.9
L2	0.3	234.6	1.9	55.8	0.9	43.3	1.0	154.9	1.9	0.0	0.00	C	55.8	350.9
T2	0.2	282.2	1.4	101.6	0.7	357.0	0.7	200.3	1.4	0.0	0.00	A	101.6	351.3
K2	1.0	282.2	6.4	101.6	3.2	357.0	3.2	200.3	6.5	0.0	0.00	A	101.6	351.3
Z0	0.4	0.0	0.3	180.0	0.3	329.4	0.3	329.4	0.5	0.0	0.00	A	360.0	120.6
MSF	0.2	104.7	1.7	70.0	0.8	14.5	0.9	155.2	1.7	0.1	0.06	C	70.4	5.1
2Q1	0.0	33.5	0.0	215.6	0.0	296.0	0.0	4.0	0.0	0.0	0.02	C	34.0	120.0
O1	0.3	306.8	0.9	145.7	0.4	327.5	0.5	254.0	0.9	0.1	0.11	C	143.3	339.3
K1	0.3	43.6	1.6	291.2	0.7	163.8	1.0	24.7	1.6	0.3	0.17	C	290.5	355.7
OO1	0.3	355.6	0.0	118.0	0.2	359.9	0.1	349.7	0.3	0.0	0.14	A	354.9	95.2
MU2	0.4	291.1	2.5	87.6	1.3	10.0	1.2	186.2	2.5	0.1	0.06	A	88.1	351.9
M2	10.4	234.6	64.9	55.8	32.8	43.3	33.0	154.9	65.7	0.2	0.00	C	55.8	350.9
S2	3.6	282.2	23.5	101.6	11.9	357.0	11.9	200.3	23.8	0.0	0.00	A	101.6	351.3
M3	0.3	174.5	1.3	26.4	0.6	75.7	0.7	126.1	1.3	0.1	0.11	C	25.2	349.1
M4	3.6	227.5	12.1	15.0	7.2	87.2	5.3	121.6	12.5	1.9	0.15	A	17.2	345.6
MS4	2.4	285.2	8.3	77.5	4.8	25.3	3.7	184.1	8.5	1.1	0.13	A	79.4	345.3
S4	0.4	341.5	2.2	140.9	1.2	318.0	1.1	240.9	2.2	0.1	0.06	A	141.5	350.5
M6	1.0	215.2	2.5	26.0	1.4	85.0	1.3	139.7	2.7	0.2	0.06	A	27.4	337.6
2MS6	1.5	286.6	3.1	79.8	2.0	30.2	1.4	199.7	3.4	0.6	0.19	A	84.7	335.1
2SM6	0.3	15.7	1.4	157.9	0.8	301.3	0.6	260.1	1.4	0.2	0.14	A	159.4	349.3
Mean	0.5		-1.2						1.3					157.6
Sd obs	8.4		45.3											
Sd res	3.6		7.8											

Data files used - /users/pjk3/mersey/dp0001.m9203t1.t1fe
/users/pjk3/mersey/dp0001.m9203t1.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.2	320.4	0.0	10.0	0.1	48.1	0.1	333.4	0.2	0.0	0.21	A	322.6	79.3
Q1	0.2	350.8	0.4	145.6	0.3	321.0	0.2	258.2	0.4	0.1	0.15	A	148.6	340.4
RHO1	0.0	350.8	0.1	145.6	0.0	321.0	0.0	258.2	0.1	0.0	0.15	A	148.6	340.4
PI1	0.0	107.5	0.0	309.2	0.0	163.6	0.0	56.7	0.0	0.0	0.13	C	306.5	339.9
P1	0.3	107.5	0.8	309.2	0.4	163.7	0.5	56.7	0.9	0.1	0.13	C	306.5	339.8
S1	0.0	107.5	0.0	309.2	0.0	163.7	0.0	56.7	0.0	0.0	0.13	C	306.5	339.8
PSI1	0.0	107.5	0.0	309.2	0.0	163.8	0.0	56.7	0.0	0.0	0.13	C	306.5	339.7
PHI1	0.0	107.5	0.0	309.2	0.0	163.6	0.0	56.6	0.0	0.0	0.13	C	306.5	339.9
J1	0.7	347.3	1.0	59.8	0.9	22.8	0.2	113.5	1.1	0.7	0.64	A	45.4	21.9
2N2	2.6	274.8	4.4	113.9	2.2	10.8	2.9	228.9	5.1	0.7	0.15	C	109.1	330.2
N2	6.3	252.5	19.0	63.9	10.4	43.4	9.5	172.8	20.0	0.9	0.04	A	64.7	341.9
NU2	1.2	252.5	3.6	63.9	2.0	43.4	1.8	172.8	3.7	0.2	0.04	A	64.7	341.9
L2	0.9	252.5	2.9	63.9	1.6	43.4	1.4	172.8	3.0	0.1	0.04	A	64.7	341.9
T2	0.7	276.6	2.0	99.0	1.0	10.8	1.1	208.2	2.1	0.0	0.01	C	98.7	340.5
K2	3.3	276.6	9.2	99.0	4.8	10.8	5.0	208.2	9.8	0.1	0.01	C	98.7	340.5
Z0	1.7	180.0	5.6	0.0	2.9	106.3	2.9	106.3	5.9	0.0	0.00	C	360.0	343.7
MSF	3.5	238.2	4.2	33.4	3.3	85.6	2.1	172.1	5.4	1.2	0.22	A	43.2	321.2
2Q1	0.1	320.4	0.0	10.0	0.1	48.1	0.1	333.4	0.1	0.0	0.21	A	322.7	79.3
O1	0.8	350.8	2.2	145.6	1.3	321.0	1.0	258.2	2.3	0.3	0.15	A	148.6	340.4
K1	0.9	107.5	2.4	309.2	1.1	163.7	1.5	56.7	2.6	0.3	0.13	C	306.5	339.8
OO1	0.4	347.3	0.6	59.8	0.5	22.8	0.1	113.5	0.6	0.4	0.64	A	45.4	21.9
MU2	3.2	274.8	5.4	113.9	2.6	10.8	3.5	228.9	6.2	0.9	0.15	C	109.1	330.2
M2	32.7	252.5	98.9	63.9	54.4	43.4	49.7	172.8	104.1	4.7	0.04	A	64.7	341.9
S2	12.0	276.6	34.0	99.0	17.8	10.8	18.3	208.2	36.0	0.5	0.01	C	98.7	340.5
M3	0.8	242.9	2.5	47.9	1.4	58.2	1.2	156.8	2.6	0.2	0.08	A	49.3	342.5
M4	7.4	251.2	18.1	43.4	11.3	63.5	8.0	157.6	19.3	3.2	0.17	A	47.0	339.5
MS4	4.9	310.7	12.1	112.2	7.2	356.6	5.8	225.9	13.0	1.5	0.11	A	114.7	338.7
S4	1.4	12.2	3.2	190.4	1.8	283.6	1.7	305.0	3.5	0.0	0.01	A	190.7	335.7
M6	1.1	173.0	3.2	308.0	2.0	152.9	1.3	55.3	3.3	0.7	0.22	A	311.2	345.9
2MS6	1.1	214.4	4.5	358.3	2.6	101.8	2.0	101.7	4.6	0.7	0.14	A	360.0	348.2
2SM6	0.7	341.7	1.7	134.1	1.0	332.0	0.8	246.7	1.8	0.3	0.16	A	137.3	340.6
Mean	-0.7		4.2						4.2					350.2
Sd obs	24.4		72.0											
Sd res	8.2		20.9											

Data files used - /users/pjk3/mersey/dp0004.m924at1.t1fe
/users/pjk3/mersey/dp0004.m924at1.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.1	213.8	0.4	16.5	0.2	84.6	0.2	119.0	0.4	0.0	0.06	A	17.2	348.2
Q1	0.0	304.7	0.2	141.8	0.1	321.5	0.1	243.4	0.2	0.0	0.06	C	141.0	347.6
RHO1	0.0	304.7	0.0	141.8	0.0	321.5	0.0	243.4	0.0	0.0	0.06	C	140.9	347.5
PI1	0.0	79.1	0.0	270.2	0.0	189.0	0.0	8.9	0.0	0.0	0.03	C	269.9	351.0
P1	0.1	79.1	0.3	270.2	0.2	189.2	0.2	9.0	0.3	0.0	0.03	C	269.9	350.9
S1	0.0	79.1	0.0	270.2	0.0	189.4	0.0	9.2	0.0	0.0	0.03	C	269.9	350.7
PSI1	0.0	79.1	0.0	270.2	0.0	189.3	0.0	9.1	0.0	0.0	0.03	C	269.9	350.8
PHI1	0.0	79.1	0.0	270.2	0.0	189.0	0.0	8.8	0.0	0.0	0.03	C	269.9	351.1
J1	0.3	141.1	1.2	278.7	0.7	181.2	0.5	23.1	1.2	0.2	0.18	A	281.0	347.8
2N2	0.6	12.2	2.0	193.7	1.1	273.3	1.1	300.4	2.1	0.0	0.01	C	193.6	343.1
N2	2.5	246.5	12.3	61.3	6.4	40.0	6.2	162.9	12.5	0.2	0.02	A	61.5	348.5
NU2	0.5	246.5	2.3	61.3	1.2	40.0	1.2	162.9	2.4	0.0	0.02	A	61.5	348.5
L2	0.4	246.5	1.9	61.3	1.0	40.0	0.9	162.9	1.9	0.0	0.02	A	61.5	348.5
T2	0.2	271.2	1.0	99.6	0.5	359.7	0.5	198.4	1.1	0.0	0.02	C	99.4	350.9
K2	0.8	271.2	4.8	99.6	2.4	359.7	2.5	198.4	4.9	0.1	0.02	C	99.4	350.9
Z0	3.5	180.0	1.2	0.0	1.8	161.6	1.8	161.6	3.7	0.0	0.00	C	180.0	108.4
MSF	1.1	229.4	4.7	53.4	2.4	50.2	2.4	156.5	4.8	0.1	0.02	C	53.2	346.7
2Q1	0.1	213.8	0.4	16.5	0.2	84.6	0.2	119.0	0.4	0.0	0.06	A	17.2	348.2
O1	0.2	304.7	0.9	141.8	0.4	321.5	0.5	243.4	0.9	0.1	0.06	C	141.0	347.6
K1	0.2	79.1	1.0	270.2	0.5	189.2	0.5	9.0	1.0	0.0	0.03	C	269.9	350.9
OO1	0.2	141.1	0.7	278.7	0.4	181.2	0.3	23.1	0.7	0.1	0.18	A	281.0	347.8
MU2	0.7	12.2	2.5	193.7	1.3	273.3	1.3	300.4	2.6	0.0	0.01	C	193.6	343.1
M2	13.0	246.5	64.0	61.3	33.2	40.0	32.1	162.9	65.3	1.2	0.02	A	61.5	348.5
S2	2.8	271.2	17.6	99.6	8.7	359.7	9.1	198.4	17.8	0.4	0.02	C	99.4	350.9
M3	0.3	220.7	1.4	346.6	0.8	108.8	0.6	83.8	1.4	0.2	0.15	A	347.5	353.7
M4	1.5	196.1	20.3	353.5	10.5	100.3	9.9	87.4	20.4	0.6	0.03	A	353.6	356.1
MS4	0.8	287.5	11.2	58.1	5.9	34.4	5.3	150.8	11.3	0.6	0.05	A	58.2	357.4
S4	0.3	4.1	2.6	173.8	1.3	281.5	1.3	269.3	2.6	0.0	0.02	A	173.9	354.6
M6	1.1	250.8	6.8	30.2	3.8	66.2	3.1	128.0	6.8	0.7	0.10	A	30.9	352.9
2MS6	1.5	304.7	11.0	95.4	5.9	1.2	5.1	192.9	11.1	0.8	0.07	A	95.9	352.9
2SM6	0.7	16.3	6.0	171.2	3.2	284.5	2.9	267.6	6.1	0.3	0.05	A	171.5	354.0
Mean	-3.2		-0.3						3.2					264.9
Sd obs	10.5		50.7											
Sd res	5.1		17.5											

Data files used - /users/pjk3/mersey/s41832b.m924bt.t1fe
/users/pjk3/mersey/s41832b.m924bt.t1fn
Tidal ellipses - speeds in cm/s

	East		North		A-Clock		Clock						Max amp	
Cons	Amp	Phase	Amp	Phase	Amp	Phase	Amp	Phase	Max amp	Min amp	Ecc	Rot	Phase	Dire
SIG1	0.1	265.2	0.1	59.7	0.1	74.5	0.1	235.4	0.1	0.0	0.18	A	260.5	115.0
Q1	0.0	322.2	0.2	153.5	0.1	307.4	0.1	253.6	0.2	0.0	0.04	C	153.1	349.5
RHO1	0.0	322.2	0.0	153.5	0.0	307.5	0.0	253.7	0.0	0.0	0.04	C	153.1	349.4
PI1	0.0	115.9	0.0	273.4	0.0	190.0	0.0	20.1	0.0	0.0	0.10	A	275.0	344.9
P1	0.1	115.9	0.3	273.4	0.1	190.1	0.1	20.2	0.3	0.0	0.10	A	275.0	344.8
S1	0.0	115.9	0.0	273.4	0.0	190.4	0.0	20.7	0.0	0.0	0.11	A	275.1	344.4
PSI1	0.0	115.9	0.0	273.4	0.0	190.3	0.0	20.5	0.0	0.0	0.10	A	275.1	344.6
PHI1	0.0	115.9	0.0	273.4	0.0	190.1	0.0	20.2	0.0	0.0	0.10	A	275.0	344.8
J1	0.3	196.8	1.0	217.4	0.6	218.9	0.5	290.9	1.0	0.1	0.09	A	216.0	15.1
2N2	0.2	321.3	1.8	98.6	1.0	356.3	0.8	194.4	1.8	0.2	0.08	A	99.0	354.6
N2	2.4	247.2	10.9	57.3	5.8	44.5	5.4	160.0	11.2	0.4	0.04	A	57.8	347.8
NU2	0.4	247.2	2.0	57.3	1.1	44.5	1.0	160.0	2.1	0.1	0.04	A	57.8	347.8
L2	0.4	247.2	1.6	57.3	0.9	44.5	0.8	160.0	1.7	0.1	0.04	A	57.8	347.8
T2	0.2	290.5	1.2	101.8	0.6	358.6	0.6	202.9	1.2	0.0	0.03	A	102.1	349.3
K2	1.0	290.5	5.3	101.8	2.8	358.6	2.6	202.9	5.4	0.2	0.03	A	102.1	349.3
Z0	1.4	180.0	10.3	180.0	5.2	262.5	5.2	262.5	10.4	0.0	0.00	A	180.0	7.5
MSF	0.7	239.6	1.8	235.7	0.9	193.5	1.0	305.8	1.9	0.0	0.02	C	236.2	20.3
2Q1	0.1	265.2	0.1	59.7	0.1	74.5	0.0	235.4	0.1	0.0	0.18	A	260.5	115.1
O1	0.2	322.2	0.8	153.5	0.4	307.3	0.4	253.6	0.8	0.0	0.04	C	153.1	349.5
K1	0.2	115.9	0.8	273.4	0.4	190.2	0.4	20.3	0.8	0.1	0.10	A	275.0	344.8
OO1	0.2	196.8	0.5	217.4	0.3	218.9	0.3	290.9	0.6	0.1	0.09	A	216.0	15.1
MU2	0.3	321.3	2.2	98.6	1.2	356.3	1.0	194.4	2.2	0.2	0.08	A	99.0	354.6
M2	12.5	247.2	56.8	57.3	30.1	44.5	28.0	160.0	58.1	2.1	0.04	A	57.8	347.8
S2	3.8	290.5	19.6	101.8	10.2	358.6	9.7	202.9	19.9	0.6	0.03	A	102.1	349.3
M3	0.2	206.3	1.2	342.4	0.7	114.8	0.5	81.9	1.2	0.2	0.14	A	343.5	351.6
M4	0.7	105.9	21.2	353.6	10.3	97.2	10.9	84.3	21.2	0.7	0.03	C	353.5	359.3
MS4	0.5	214.8	13.9	52.7	6.9	39.4	7.0	144.8	13.9	0.2	0.01	C	52.7	357.9
S4	0.3	280.9	2.7	143.6	1.2	311.4	1.4	238.0	2.7	0.2	0.07	C	143.3	355.3
M6	1.1	203.5	4.8	357.8	2.7	103.1	2.2	101.0	4.9	0.5	0.10	A	359.0	348.0
2MS6	1.3	259.7	5.8	58.7	3.2	41.9	2.8	161.0	6.0	0.4	0.07	A	59.5	348.6
2SM6	0.3	320.6	2.2	141.5	1.1	317.4	1.1	240.3	2.3	0.0	0.00	C	141.5	351.1
Mean	-1.1		-10.4						10.5					186.2
Sd obs	9.2		43.7											
Sd res	3.4		11.7											