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*SACLANT UNDERSEA
RESEARCH CENTRE
MEMORANDUM*



**Atlantic Inflow Experiment
GIN Sea
Cruise '87**

**Data Report
Part II: Circulation**

T.S. Hopkins, P. Giannecchini,
L. Gualdesi, A.M. Mouchet
and P. Zanasca

December 1991

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NORTH ATLANTIC TREATY ORGANIZATION

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Executive Summary: This memorandum summarises the oceanographic data of the Atlantic Inflow Experiment. Its purpose is to provide a complete data report that serves as a reference for the experiment and for subsequent analyses to satisfy the scientific objectives of the GIN Sea project.

The Atlantic Inflow Experiment was designed to provide information on the entrance of Atlantic waters into the Arctic Ocean through the Faeroe-Shetland Channel. The sampling design was unique and the instrumentation was more advanced technologically than that used in previous oceanographic samplings of the area.

Detailed sampling of the oceanographic environment provides information to researchers on three levels: exploration of the environment in both space and time frames not yet observed; assessment of our understanding of the physical dynamics governing the ocean environment; and utilization of these data and dynamics to produce models that allow environmental prediction. Such descriptions and assessments of the ocean environment are a primary goal of ASW research, especially in the critical northern seas.

This memorandum is the second in a sequence of reports from the 1987 Field Programme and summarizes the data resulting from instrumentation deployed at the beginning of the experiment, during the cruise of R/V *Maria Paolina G.* in June, and the recovery of this instrumentation by the GNS *Fehmarn* in September. Part I reports on the hydrographic data taken earlier in May aboard the HNLMS *Tydeman*; Part III reports on the hydrographic data taken aboard the R/V *Belgica* in September.

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GIN Sea Cruise '87**

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Abstract: This data report summarizes results of the Atlantic Inflow Experiment, a part of the GIN Sea '87 project. The Atlantic Inflow Experiment was designed to investigate the causes and effects of the inflow of North Atlantic Water into the Greenland-Norwegian-Iceland Sea. In June 1987 an array of eight moorings (30 current meters) and a sequence of six submerged floats and two meteorological (ASID) buoys were deployed. Six of the moorings provided a grid of float listening stations for the first ~ 500 km of the Norwegian Atlantic Current. The other two moorings were located to provide a downstream and an inflow condition (with an Acoustic Doppler Current Profiler). One mooring was lost but all the current meters performed well. The float data return was good but with some intermittency. The ASID buoy data time series was marred by malfunctions in the thermistor chains. The data are presented in the form of instrument statistics, histograms, velocity scatter diagrams, time-series plots, progressive vector diagrams, velocity stick diagrams, and velocity spectra.

Keywords: Atlantic Inflow ◦ Faeroe Channel ◦ GIN Sea ◦ Greenland-Iceland-Norwegian Sea ◦

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1

Introduction

1.1. GIN SEA PROJECT

The GIN Sea observational programme was initiated in 1985 by the Applied Oceanography Group (AOG) to acquire an extensive set of oceanographic data in the Greenland–Iceland–Norwegian (GIN) Sea. The data was subjected to state-of-the-art quantitative analyses to serve the purposes of SACLANTCEN and the NATO scientific communities. The responsibility for the acquisition, implementation and maintenance of the instrumentation belongs to the Ocean Engineering Department. The GIN Sea field experiments attempted to employ as many techniques as feasible in order to maximize the potential for interpretation and assessment. To achieve this, the observational programmes have employed high-quality standard instrumentation (e.g. CTDs, current meters) and new or experimental instrumentation (e.g. acoustic doppler current profilers, SOFAR subsurface floats, meteorological/thermistor chains, ARGOS buoys). These were augmented with biological and chemical sampling techniques (e.g. chemical tracers, planktonic species counts). Both the experimental instrumentation and biological and chemical sampling open avenues of collaboration with other research institutions and elarge the potential for utilisation of the latest techniques in interpretative analysis.

The SACLANTCEN GIN Sea project proposed two major observational experiments: the Atlantic Inflow Experiment (AIE) in 1986–87 and the Icelandic Boundary Current Experiment (ICE) conducted in 1988–89. The AIE deals with the water-mass input to the GIN Sea via the Faeroe–Shetland Channel and its subsequent transitions northward within the Norwegian Atlantic Current system. The ICE deals with the large-scale forcing controlling the Icelandic Current which transports waters of the Denmark Strait to the Faeroe Channel and which establishes the dynamic boundary forming the Iceland–Faeroe Front. The two experiments were designed to provide a substantial database and a more complete physical understanding of this important region.

1.2. ATLANTIC INFLOW EXPERIMENT

The Arctic Ocean receives large quantities ($\sim 4-8$ Sv) of North Atlantic surface waters. Most of this inflow derives from a portion of the North Atlantic Current which crosses the Wyville-Thomson Ridge and flows through the Faeroe-Shetland Channel. Smaller inflows arrive via the Iceland-Faeroe Ridge and the Denmark Strait. Virtually all of the salt and heat input to the Arctic Ocean enters with this input. These Atlantic Water inputs constitute the source waters of the Norwegian Atlantic Current (NwAtC) that flows northward along the eastern boundary of the GIN Sea, eventually entering the Polar Sea through Fram Strait. Considerable observational effort has been spent in attempting to quantify this input and the transport of the NwAtC, with inconsistent results that are not in accord with the input values deduced from thermohaline balances of the Arctic Ocean (see Hopkins, 1988a). In part, these inconsistent results have been explained by the historical need to rely on the dynamic method, which uses an unknown reference level, i.e. Tait (1957). The more recent use of current meters has provided better direct information on the flow field (i.e. Saunders and Gould, 1989; Gould, Loynes, Backhaus, 1987; Dooley and Meincke, 1981). No comprehensive data set exists that provides a satisfactory description of the inflow and its relationship to the NwAtC. Hopkins (1988a) reviews observational attempts to establish this inflow and its general relevance to Arctic oceanography.

This memorandum summarises the data taken from the instrumentation deployed in June and recovered in September of 1987. For information and data concerning the other portions of the Atlantic Inflow Experiment see Hopkins (1988b); Hopkins, Gualdesi, Giannecchini and Zanasca (1990); Hopkins, Baldasserini, Ribera and Zanasca (1991); Hopkins, Baldasserini, Goffart, Povero and Zanasca (1991).

This is Part II of the data report of the Atlantic Inflow Experiment, a part of the GIN Sea project. It provides data on ocean circulation in the southeastern GIN Sea. The oceanographic data obtained from the cruises of the HNLMS *Tydeman* and the R/V *Belgica* constitute Parts I and III, respectively, of this data report.

Data acquisition systems

2.1. ARRAY AND MOORING DESIGN

The locations of the eight current meter moorings (referred to as Buoys 1–8 or B1–B8) are shown in Fig. 1. The geographic coordinates and dates of deployment and recovery are given in Table 1. The current meter moorings, the submerged floats and air-sea interaction drifting (ASID) buoys were deployed from the R/V *Maria Paolina G*. The current meter moorings and the ASID buoys were recovered by the GNS *Fehmarn*.

Buoys 2–4 and 6–8 comprised the grid of listening stations for the submerged floats which were deployed towards the southern end of the grid. They were expected to move with the northward flow of the Norwegian Atlantic Current (NwAtC). In addition to the listening stations, Buoys 2–4, in shallower water, were each instrumented with three current meters; Buoys 1, 6, 7 and 8, in deeper water, were instrumented with four current meters (Table 2).

Buoy 1 was instrumented with an Acoustic Doppler Current Profiler (ADCP) and a current meter for control. It was deployed on the east side of the Faeroe–Shetland Channel (Fig. 1) on the same transect repeated in all of the GIN Sea cruises. The purpose was to monitor the inflow at approximately the depth of maximum flow. Buoy 5 was instrumented with three current meters and was deployed downstream of the grid of moorings. The primary scientific objective of the series of Buoys 1–5, all situated along the 800 m isobath of the Norwegian slope, was to provide information on the alongstream coherence of the NwAtC over its first ~ 800 km. Likewise the deeper moorings were all placed along the ~ 1700 m isobath to provide data on alongstream coherence at that depth. In addition, Buoy 8 was to provide information on the input from the Icelandic Current.

All moorings were single point, taut-wire, sub-surface moorings, deployed by free-fall and recovered by acoustic release. Figure 2 shows mooring design and Table 2 the instrument depths.

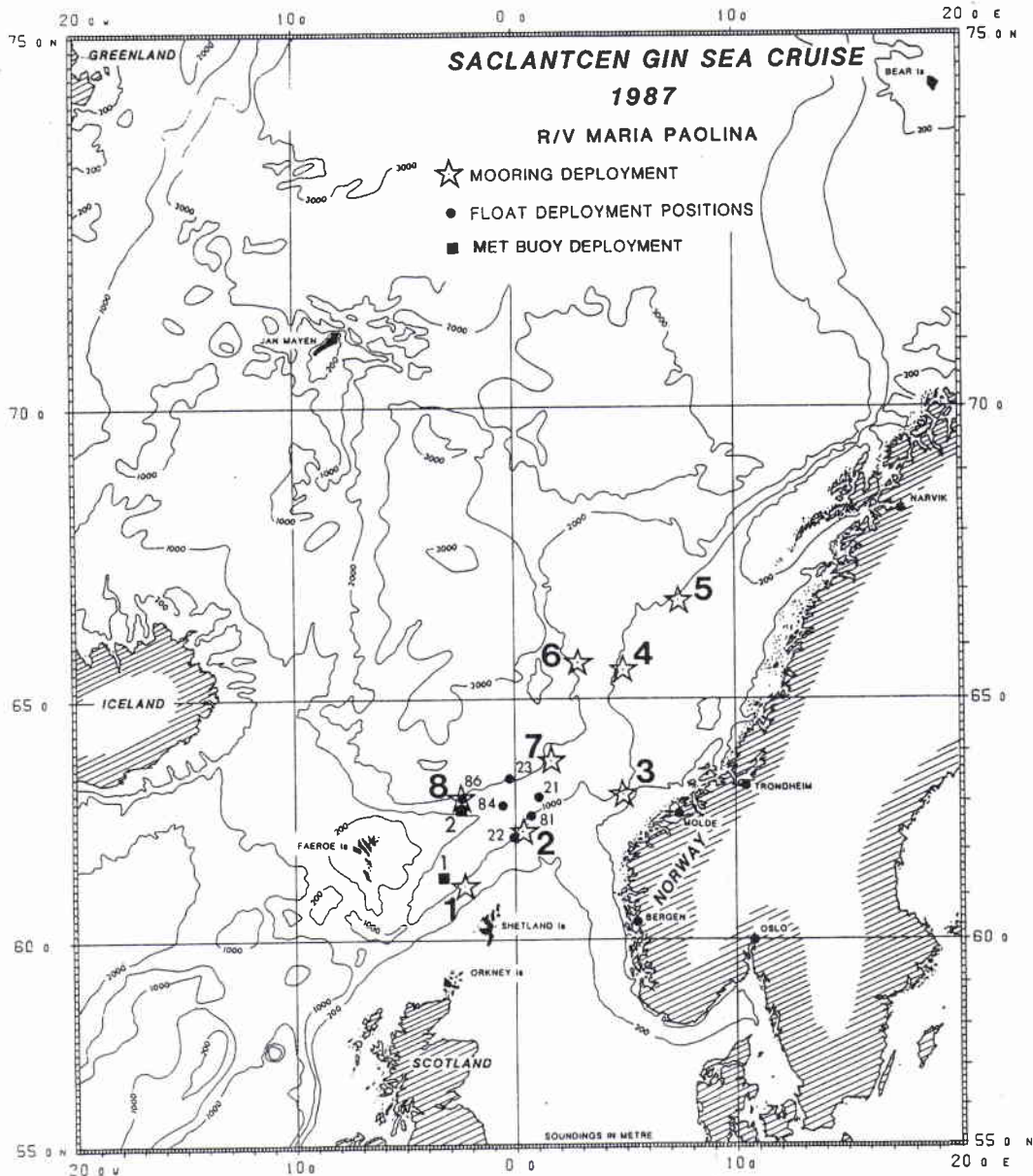


Figure 1 Current meter moorings, floats, and ASID buoys deployed during the GIN '87 cruise from the R/V Maria Paolina G..

2.2. MOORING INSTRUMENTATION

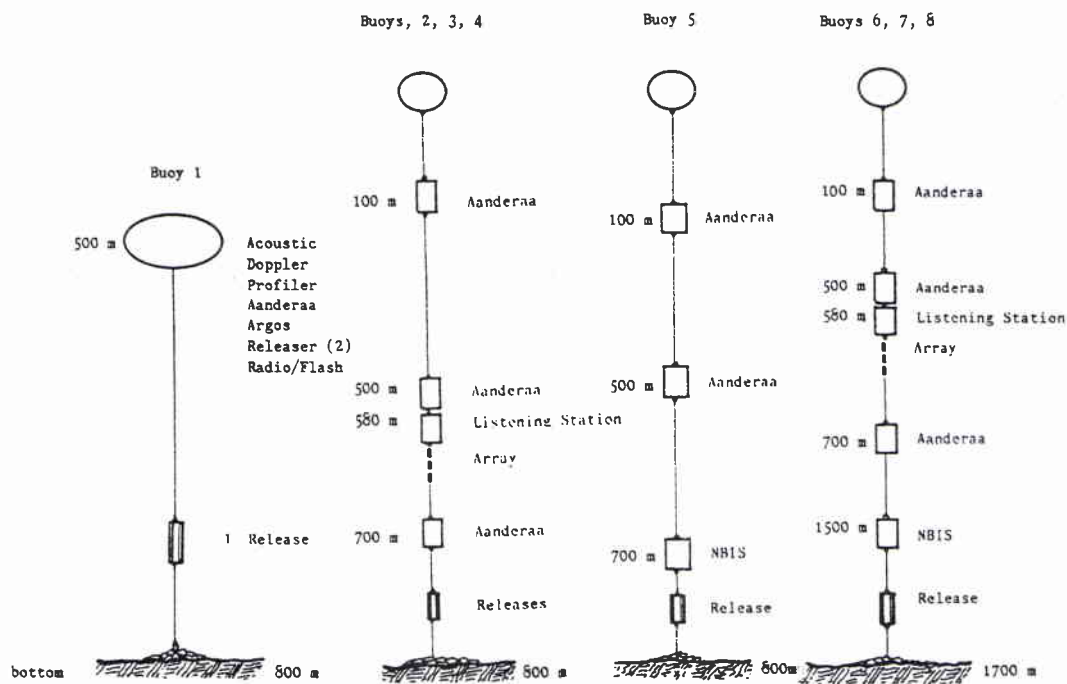
The instrumentation used in the experiment is summarized in Table 2 according to depth and mooring. The three types of current meters are described in the following paragraphs:

Aanderaa current meter (RCM-7)

The RCM-7, a modification of the standard RCM-5 current meter, includes a vector-

SACLANTCEN SM-250**Table 1** *Mooring deployment data*

Mooring	Location	Depth (m)	Deployed	Recovered
B-1	61°14.7'N,002°21.4'W	802	1 Jun 87	7 Sept 87
B-2	62°15.7'N,000°02.7'E	802	3 Jun 87	8 Sept 87
B-3	63°05.5'N,004°51.9'E	762	4 Jun 87	8 Sept 87
B-4	65°29.9'N,004°53.7'E	800	5 Jun 87	9 Sept 87
B-5	66°48.7'N,007°27.9'E	805	6 Jun 87	10 Sept 87
B-6	65°39.7'N,002°49.2'E	1701	7 Jun 87	9 Sept 87
B-7	63°44.7'N,001°45.1'E	1695	3 Jun 87	(lost)
B-8	62°56.9'N,002°21.2'W	1677	2 Jun 87	7 Sept 87

**Figure 2** *Mooring configurations for Buoys 1-8 after deployment.*

averaging capacity combined with a solid state memory. The number of rotor (Savonius-type) revolutions and the direction (magnetic compass/potentiometer) every $1/50$ of the preset sampling interval are resolved into north and south components and then averaged for the sampling interval and stored as speed and direction. The instrument is also equipped with a thermistor (Fenwall), a conductivity cell

Table 2 *Instrument information*

Instrument		Variables recorded*	Sampling interval (min)	Length of record (days)
type	depth			
B-1				
ADCP	510	tilt,S,D	15	99
RCM-7	510	C,T,P,S,D	20	100
B-2				
RCM-7	130	C,T,P,S,D	20	98
}	500			
	700			
B-3				
RCM-7	107	C,T,P,S,D	20	97
}	480			
	677			
B-4				
RCM-7	133	C,T,P,S,D	20	97
}	497			
	708			
B-5				
RCM-7	141	C,T,P,S,D	20	97
}	487			
	ACM2	689	T,S,D	4
B-6				
RCM-7	97	C,T,P,S,D	20	95
}	460			
	617			
ACM2	1479	T,S,D	4	98
B-7**				
B-8				
RCM-7	79	C,T,P,S,D		98
}	438			
	646			
ACM2	1460	T,S,D	4	98

*C – conductivity; T – temperature; P – pressure; S – speed;
D – direction.

**Lost, not recovered.

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(inductive), and a pressure sensor (Bourdon tube). The internal clock is a quartz crystal and the CMOS RAM memory has a capacity of 150 days at a sampling interval of 20 min for all sensors.

Neil Brown Acoustic Current Meter (ACM2)

This instrument measures the difference of phase shift, created by the water flowing past the instrument, between a pair of high-frequency (1.6 MHz) sound transducers. The phase difference is converted to a frequency, which is counted and stored for each orthogonal component. Absolute orientation is achieved by a flux-gate compass. At the recorded time interval the average values of the orthogonal components are recorded on a data cassette along with instrument temperature. The instrument has a resolution of $\sim \text{mm s}^{-1}$ and an accuracy of $\pm 1 \text{ cm s}^{-1}$; thus it is ideally suited for deployments in low-flow environments.

RDI Acoustic Doppler Current Profiler (ADCP SC075)

This instrument measures the Doppler frequency shift between the backscattered signal from transmitted acoustic pulses. The backscattering is caused by small particles that are presumed to be moving at the speed of the water. Four directional high-power transducers (75 kHz), oriented at 30° to the vertical, produce the pulses and then record the return at sequential times corresponding to longer distances from the instrument. The vertical distance over which the scattered signals are averaged is called a bin: in the present application there were 64 bins of 8 m thickness. The returns are then resolved into north and east velocity components by reference to the flux-gate compass, averaged over the 15 min sampling interval, and stored on a magnetic tape of 60 mbyte capacity. Accuracy: $\pm 0.5 \text{ cm s}^{-1}$ (in speed); $\pm 2^\circ$ (in direction).

2.3. SUBSURFACE FLOATS

Deployment locations of the 6 submerged floats are shown in Fig. 1. The floats and the moored listening stations were intended to be located at the depth of the sound speed minimum to optimize the acoustic signal propagation. This depth was estimated using an average taken from the hydrographic data of the GIN'86 cruise (Hopkins, 1988b); the range of propagation (horizontal separation of the listening stations) was estimated from tests conducted during the GIN 86 cruise. The instrumentation is described as follows:

Webb turbillon listening station

This listening station consists of a 4-hydrophone array, an amplifier, a microprocessor with a correlator, and a tape recorder. The amplifier has automatic gain control and amplifies the received signal to a level equal to the reference level. It receives acoustic signals and makes correlations continuously with a dummy reference signal that matches that of the floats. During this process, a heterodyne mixer converts the transmission frequency range of 1562.5–1572.5 Hz to a 1–10 Hz range. The microprocessor orders the correlations using the criteria of best correlation and earliest

Table 3 *Float deployment information*

Location	Day (no.)	Time	Mean depth (m)	Duration (days)
<i>Float 21</i> 63°04.25'N,001°05.19'E	159	1400	634	49
<i>Float 22</i> 62°17.94'N,000°00.83'E	153	2010	614	40
<i>Float 23</i> 63°26.44'N,000°09.61'W	159	0520	651	93
<i>Float 83</i> 62°42.97'N,000°38.63'E	160	1951	579	64
<i>Float 84</i> 62°58.33'N,000°34.09'W	160	0750	642	92
<i>Float 86</i> 62°56.74'N,002°22.24'W	153	0845	599	99

time delay. Every four minutes the four highest correlated signals are stored in a data block along with housekeeping information. The listening stations also have an acoustic transmitter which transmits the correlation information from the memory register of the microprocessor every 4 min; the transmitter information can be received by a normal echo-sounding receiver tuned to 12 kHz.

Shipboard acoustic receiver

A shipboard receiver, similar in electronic design to the moored listening stations, is connected and lowered via the ship's CTD cable. The receiver monitored transmissions from the float during deployment to determine its arrival at the equilibrium depth.

Webb acoustic swallow floats

These floats are equipped with acoustic pingers housed in 50 cm glass spheres or 30 cm diameter aluminum cylinders. They also contain transducers which monitor pressure and temperature. The floats are designed to remain at constant pressure, but due to indeterminacy of the compressibility of the rubber and plastic components, some variation in depth usually occurs during the first six hours or so after deployment. Table 3 indicates both the target depth and the initial stable depth. During the course of the experiment the depth changed as can be seen in some of the data (Figs. A14, A15). Both the glass and aluminum floats have the following specifications: autonomy, 3 months; power, 18 acoustic watts; maximum depth, 2000 m; temperature accuracy, $\pm 0.01^\circ\text{C}$; pressure, $\pm 1\%$ of full scale.

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2.4. AIR-SEA INTERACTION DRIFTING BUOYS

Air-sea interaction drifting buoys (ASID) were deployed from the R/V *Maria Paolina G.* in the Faeroe-Shetland Channel (ASID Buoy 4126) and over the northern Faeroe slope (ASID Buoy 4125). The deployment positions (see Fig. 1) dates and times are:

- ASID Buoy 4126: 61°19'N, 003°03'W, 1 June 87, 0645;
- ASID Buoy 4125: 62°57'N, 002°22'W, 2 June 87, 0930.

These buoys were constructed by Polar Research Laboratory under a technical supervisory contract of the US National Data Buoy Center (Bay St. Louis, MS). The buoy consists of a small surface spar buoy, with a flotation collar in the shape of an inverted cone, that supports a 300 m long thermistor chain. A small Savonius rotor anemometer is mounted near the top of the spar at a height of ~ 1 m above the sea surface; a small sail rotates the buoy into the wind and a magnetic compass reading provides wind direction. Air temperature is measured by two thermometers at about 1 m height and sea-surface temperature by a thermistor that is mounted in the buoy at a depth of about 1 m.

Two pressure sensors were mounted on the chain at depths of 130 and 300 m. Table 4 provides the sensor characteristics and Fig. 3 gives the sensor distribution with depth and the data length of the various sensors. The chain-mounted sensors were connected on three independent power and data buses so that the failure of one bus does not affect the data from the others. Sensor data were organized into 32 8-bit words. The data were stored as 8 min running data averages and compiled for transmission to the data collection and location system of the NOAA series of polar orbiting weather satellites. Since the data are transmitted in bursts but received only when the satellite is overhead, the data are irregularly spaced. The position of the buoys, and the time of data reception are added to the data, which are distributed by Service ARGOS Receiving Station (Toulouse, France).

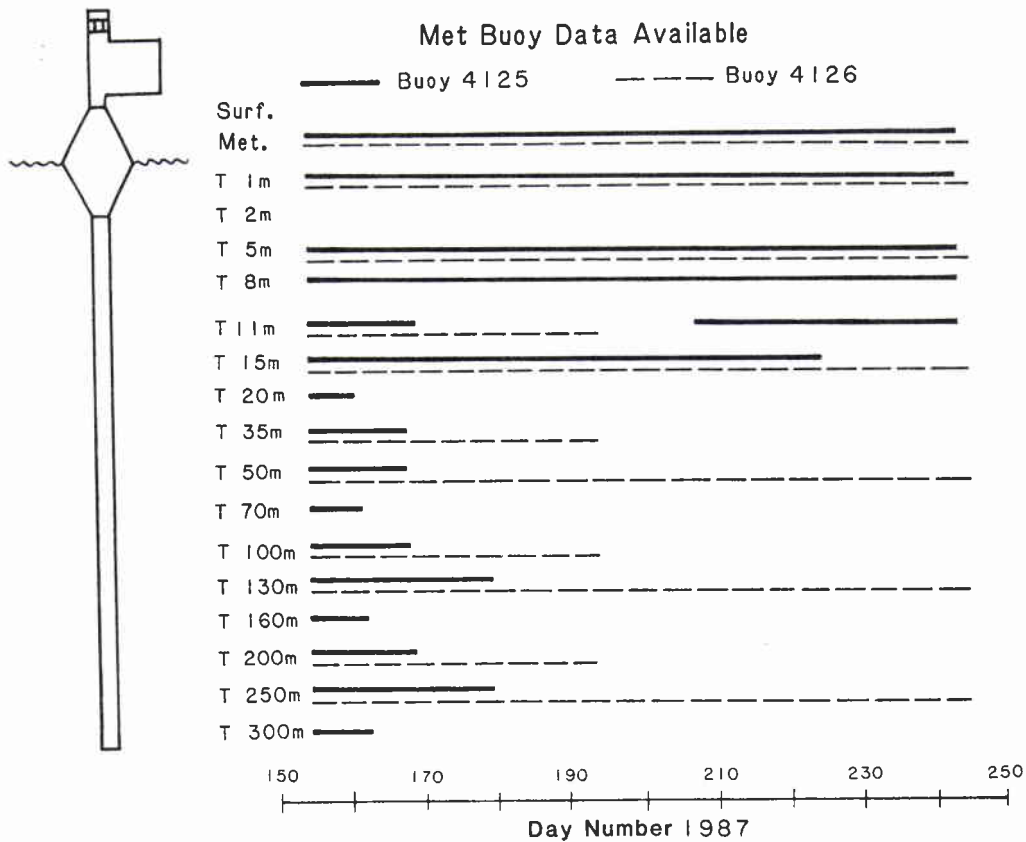


Figure 3 ASID buoy sensor distribution with depth and duration of the data series.

Table 4 Characteristics of the Air-Sea Interaction Drifting (ASID) buoy sensors

Variable	Range	Resolution	Accuracy	Sample
air temperature	-20-31°C	0.2 K	±1 K	1 min ⁻¹
wind speed	0-40.8 m s ⁻¹	0.16 m s ⁻¹	±0.25 m s ⁻¹	0.4-1 min ⁻¹
wind direction	0-360°	1.41°		1 min ⁻¹
surface temperature	-3-22.5°C	0.1 K	±1 K	1 min ⁻¹
water temperature	-3-22.5°C	0.1 K	±1 K	1 min ⁻¹
sub-surface	110-148.25 m	0.15 m	±1 m	1 min ⁻¹
pressure	190-317.5 m	0.5 m	±1 m	1 min ⁻¹

Data processing

3.1. CURRENT METER DATA

Data reduction

For the Aanderaa current meters the recorded data were transferred from the memory to a MicroVAX; during transfer the data were converted to engineering units and the calibration factors entered. The number of data samplings were checked with the lapsed time, and valid start and end times were determined. The data were then edited visually to eliminate data gaps or spikes. Missing data from both current meters, if not exceeding one hour, were replaced with linearly interpolated data. The velocity vectors were rotated to a true north reference. The temperature and conductivity were edited with the standard that they fall within three standard deviations of the theoretical relationship between T and C for constant depth and salinity. Bad points were replaced with calculated values using the same T-C relationship. The T and C data were then subjected to a 7-point running-average filter to reduce spikes created due to the mismatch in response times between the two sensors. The RCM-7 records instantaneously T and C sensors within each sampling interval so that the different responses of the two sensors are reflected also in the average over the interval. The variables of salinity, density and sound speed were then calculated. At this stage the data were stored in the SACLANTCEN oceanographic database (labelled as 'MEASURED').

The raw data tapes from the Neil Brown current meters were transferred to the MicroVAX and were edited similarly but with no calibration inputs.

The data transfer and conversion to engineering units for the ADCP was done by RDI to IBM diskettes. These were then transferred to the VAX 8600, rotated to true north, and stored in the SACLANTCEN oceanographic database.

Two other files were generated for the purpose of producing the data report. A low-pass filtered file was created from each type of current meter (based on the sampling interval) (see Fig. 4). Since certain displays were better made in a bathymetric coordinate system, the directional reference for the velocity vectors were rotated from north to the parabath. The parabath is defined as tangent to the local bathymetry (~ 10 km scale) such that the shallower water lies to the right, in the direction of the diabath.

Calibration

For the RCM-7 current meters, calibration factors from the manufacturer were used

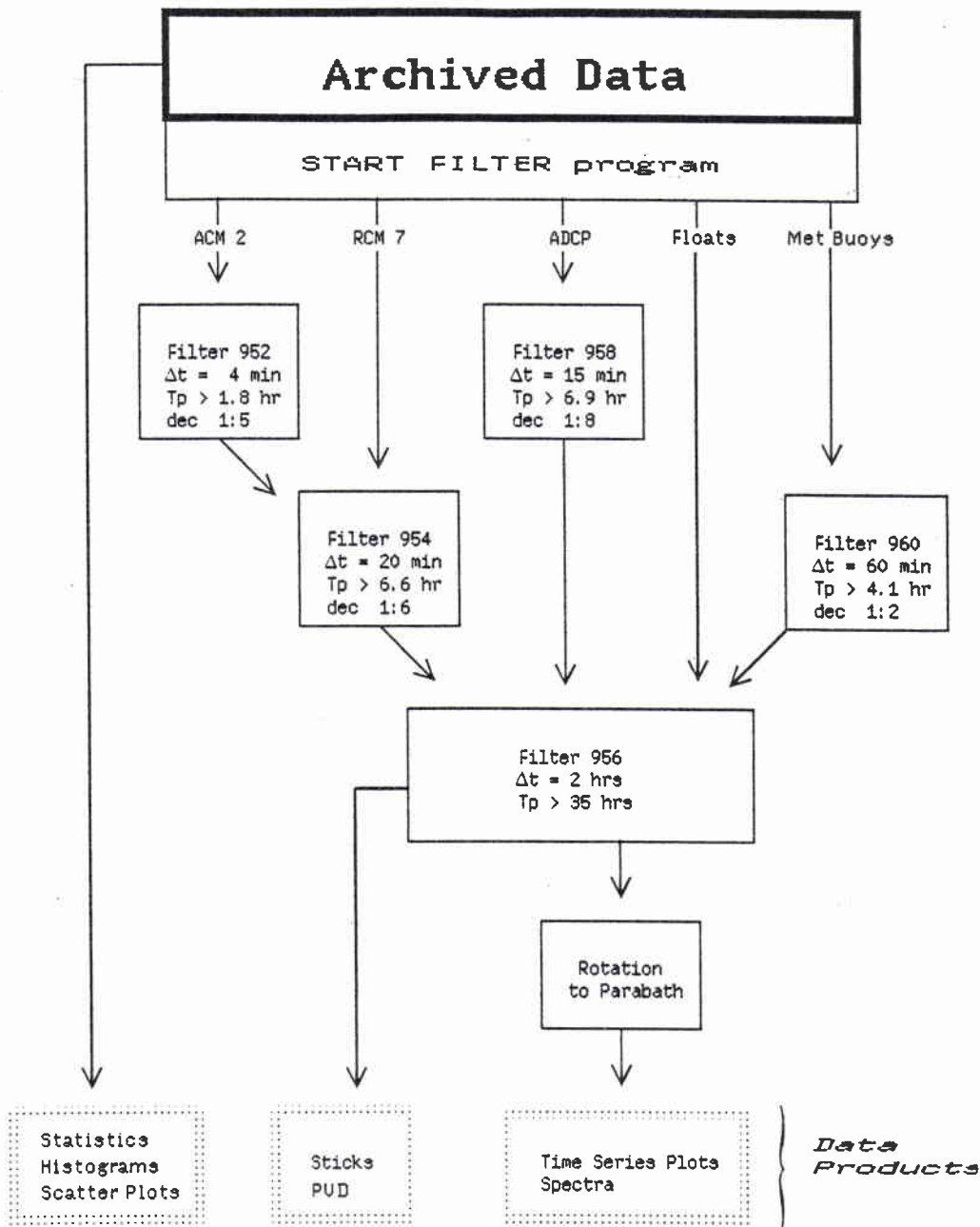


Figure 4 *Filters and decimation used in the pre-processing of the different time series.*

for the speed and direction after checking that the speed threshold and compass performance were within specifications. Pre- and post-calibration factors for temperature, conductivity, and pressure were obtained at the SACLANTCEN calibration laboratory. Calibration corrections for temperature were all less than the manufacturer's stated accuracy ($<0.05^\circ\text{C}$) for the sensor. However the salinities, as calculated after application of the laboratory calibrated temperature and conductivity

SACLANTCEN SM-250**Table 5** *Salinity calibration information*

Mooring	Instr. depth	Salinity		Δ
		CTD	CM	
B-1	510	35.001	35.004	+0.003*
B-2	130	35.212	35.213	+0.001
	500	34.921	34.901	-0.020
	700	34.913	34.915	+0.002
B-3	107	35.305	35.307	+0.002
	480	35.087	35.055	-0.032
	677	34.914	34.932	+0.018
B-4	133	35.213	35.206	-0.007
	497	34.948	34.941	-0.007
	708	34.918	34.905	-0.013
B-5	141	35.260	35.252	-0.008
	487	35.066	35.033	-0.033
B-6	97	35.221	35.197	-0.024
	460	34.964	34.946	-0.018
	617	34.899	34.886	-0.013
B-8	79	35.189	35.183	-0.006*
	438	34.913	34.915	+0.002
	646	34.896	34.903	+0.007

*No adjustment made.

values, appeared to be in error (up to 0.3 ppt) relative to temperature-salinity (T-S) information in the region. A data comparison with CTD data from the GIN 87-T (Hopkins et al., 1991) was conducted by comparing the salinity averaged over the current meter time-series with a set of CTD stations taken in the locale of the mooring. The salinities were calculated by a least squares T-S relationship from the CTD data selected from within the envelope of temperatures observed from the current meter. These values are shown in Table 5. The offset in the average of the pre- and post-calibration regression for conductivity (C vs counts) was adjusted to bring the mean current meter salinity to within 0.03 ppt (sensor accuracy) of the CTD salinities (see Table 5).

No in situ calibration was necessary for the ACM2 because the output depends only on the acoustic frequency, the transducer integrity, and the spacing between transducers. The fixed parameters were: calibration factor, $K = 0.94$ (depending on the electrical and mechanical transducer characteristics); the two-axis spacing $D = 11.4$ cm and the acoustic excitation frequency $f = 1.605$ MHz. Prior to each cruise, the following adjustments were made: full scale range, $\pm 2.5 \text{ ms}^{-1} = \pm 2000$ mV output with half scale; zero off-set stability, $\leq +2$ mV. The zero stability on the velocity output was observed during 24 h or more and continuously adjusted as necessary.

The instrument sensors were submerged in one cubic meter of still, bubble-free, fresh water. Compass output, clock and timing, and temperature conversion, were also accurately verified according to the operating and instruction manual.

For in situ calibration of the ADCP, a RCM-7 was mounted on the flotation package (de Strobel, Hopkins, Gualdesi, 1990). However, the direction sampling of the Aanderaa current meter was coupled to the orientation of the flotation package and therefore did not match that of the lowest bin of the ADCP (see Fig. F4) particularly during weak and variable flows. However at speeds greater than $\sim 20 \text{ cm s}^{-1}$ the speed agreement was very good (see Figs. B5, B6). The temperature and conductivity data were used to calculate the sound speed at the transducer level; the pressure data was used to monitor the depth of the instrument package for comparison with the tilt recorded by the ADCP.

3.2. FLOATS

Raw data treatment

After recovery, the listening station data were transferred from the original cassette tapes to a microVAX. This raw data information contains the four highest-valued correlations and is formatted into a data record containing twenty number-coded fields covering the station number, experiment number, day and the time (to the nearest millisecond) for each of the four correlations.

The floats transmitted for 20 s every 2 hours. The times of transmission for the 6 floats were separated by 15 min. In order to identify the data of individual floats a program created separate data files for each float according to whether the correlation times were from -1 to $+13$ min of the individual float transmission times. For each float, the highest correlation time was chosen on the basis that it fell within a reasonable range of time delays, in order to exclude spuriously high correlations. The selected time delays for each float were then used to create another file which constituted a time series of the distance to each of the listening stations for each float. The transmission interval for Webb float was once every 24 h, alternating between temperature and pressure.

Float fix computation

To compute the sequence of fixes for a given float, an interactive program was used. The previous positions of each float, and the distance arcs from the individual listening stations, were displayed on a 12×12 n.mi Mercator grid. If there were three arcs, an area was defined in which the operator fixed a point with a cursor. A new file was then created with a time series of fixes (latitudes and longitudes). The operator chose the median position unless one arc was unreasonably located relative to the previous fix. If there were only two arcs, the point was again taken within reasonable limits. In cases where there was only one arc, the fix was placed on the intersection of an extension of the float track and the arc favouring an isobathymetric track. Clearly, the floats having the greatest number of 3-arc fixes can be considered

SACLANTCEN SM-250**Table 6** *Distribution of multiple-arc fixes expressed as a percentage of total possible fixes*

No. of arcs	Float no.					
	21	22	23	83	84	86
0	47.9	68.1	1.7	27.4	0.3	1.8
1	44.2	31.4	60.2	54.3	47.0	22.9
2	6.4	0.5	35.9	16.0	50.1	55.0
3	1.5	0	2.2	2.3	2.6	19.8
4	0	0	0	0	0	0.5
5	0	0	0	0	0	0

as having the most reliable data, those having mostly 2-arc fixes less so, and so forth. We have compiled Table 6 with the distribution of fixes by number of arcs involved. Float 22 had the least amount of good fixes and Float 86 the most. We note, however, that in all cases the number of multiple-arc fixes lessened with time.

The number of valid arcs tended to degenerate as the distance from the listening station increased. To edit the fixes resulting from this treatment, we took the mean and the standard deviation of the incremental changes in latitude and longitude between sequential fixes (Table 7). Points that changed by more than 3 standard deviations were replaced by an increment in latitude or longitude equal to 3 standard deviations. After this treatment the data, a time series of latitudes and longitudes were considered as raw, edited data. These were converted to Cartesian coordinates and a time series of east-west and north-south components was constructed. At this stage the data were transferred to the oceanographic database and treated as a velocity time series. Hopkins and Zanasca (1988) discuss error in the float fixes.

Calibration

A method of calibration has been developed by the Ocean Engineering Division in which an empirical curve of the float density *vs* depth is constructed. In order to be within ± 20 m of the required deployment depth, the precision in the density of the surface float must be of the order of 2×10^{-5} g cm⁻³. This was obtained by:

- Weighting the float in air with an accuracy of ± 0.02 g on an electronic balance (Sauter Model K.120). The glass Webb floats weight about 44.85 kg and the aluminium ones about 100 kg.
- Weighting the float totally submerged (in a specially designed tank filled with sea water) to an accuracy of better than ± 0.2 g (with the same electronic balance).
- Accurately measuring the tank sea water density to an accuracy of 0.8×10^{-5} g cm⁻³ with a temperature/conductivity standard (Neil Brown Instrument Systems).

Table 7 *Mean and standard deviation of incremental changes in latitude and longitude between sequential fixes and the number of points outside the limit of the three standard deviations*

Latitude change		Points outside limit		Longitude change		Points outside limit		Total of points
mean (deg)	St.dev. (deg)	(no.)	(%)	mean (deg)	St.dev. (deg)	(no.)	(%)	(no.)
<i>Float 21</i>								
0.0046	0.0042	5	0.86	0.0084	0.0079	6	1.03	584
<i>Float 22</i>								
0.0061	0.0056	15	3.17	0.0133	0.0107	14	2.95	474
<i>Float 23</i>								
0.0036	0.0028	9	0.82	0.0065	0.0065	15	1.37	1099
<i>Float 83</i>								
0.0042	0.0039	13	1.72	0.0093	0.010	10	1.32	756
<i>Float 84</i>								
0.0036	0.0031	11	1.01	0.0069	0.0069	19	1.75	1087
<i>Float 86</i>								
0.0039	0.0037	9	0.76	0.0088	0.0073	7	0.59	1188

The density of the float ρ_f was then calculated from the formula

$$\rho_f = \left[\frac{m}{M - m} + 1 \right] \rho_w,$$

where m is the weight in sea water, M the weight in air and ρ_w the density of sea water computed from salinity and temperature, for $P = 0$. Pistek, de Strobel and Montanari (1984) discuss the possible errors and provide more details on the employment of these floats.

3.3. ASID BUOYS

ASCII tapes containing the raw data as received by ARGOS were read into the VAX. The data contained many values (spikes) which were presumed caused by transmission errors. These erroneous values were eliminated and replaced, using linear interpolation, before the data were reduced by block averaging into one-hour intervals. Short data gaps were also filled by linear interpolation.

Six of the 15 thermistors on ASID Buoy 4126 failed immediately on deployment, and another 4 after about 40 days. Only one sensor from ASID Buoy 4125 failed immediately, but all of those below 15 m failed in the following few weeks; only two thermistors survived as long as the surface sensors, which functioned for 90 days.

SACLANTCEN SM-250

The data return for both buoys is shown diagrammatically in Fig. 3. No specific calibration factors were applied during the processing of the data. Both buoys underwent a sensor quality check as a part of the acceptance test conducted by the Naval Data Buoy Center. Further discussion of the performance and interpretation of the data can be found in Minnett and Hopkins (1990).

4

Data presentation

All of the data products were generated from the SACLANTCEN oceanographic database. Some were better displayed after filtering. Figure 4 summarizes the sequence of processing. Data products having a version labelled as **MEASURED.CUR** have been generated directly from the archives of the oceanographic database; those labelled as **H35.CUR** have been subjected to a 35 h low pass filter; and those labelled as **H35ROT₀₀₀CUR** have been rotated to the bathymetric reference frame (the amount of clockwise rotation is indicated by the three digits preceding the letters **CUR**).

The data are presented in the figures of Appendices A–G.

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Appendix A

Statistical tables

The statistics (minimum, maximum, mean, standard deviation and skewness) of the current meter records are presented in tabular form for all measured and calculated variables. The current meter data are given for the three files (MEASURED, H35, and H35ROT) along with the start and end times. The statistics for the floats are given only for the MEASURED file; the statistics for the ASID Buoys are given for both the MEASURED and H35 files.

- Figures A1–A12: Current meter Buoy 1.
- Figures A13–A33: Current meter Buoys 2–8.
- Figures A34–A39: Floats .
- Figures A40–A41: ASID (Met) Buoys.

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA1_043 Inst. Num : 0173_043
 Water Depth : 802m Inst. Depth : 170m

Data File : HIST_DIRROOT:[GINSEA_87.BOA1_043]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	75.8352	24.3618	12.6931	0.6090
Current Velocity X	-45.6030	74.9408	6.1474	18.5366	0.2603
Current Velocity Y	-57.8887	61.6906	1.3065	19.2760	-0.0616

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_043]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4987	52.4169	20.3904	11.2144	0.4798
Current Velocity X	-28.8831	51.5766	6.5898	14.6046	0.4828
Current Velocity Y	-36.3206	40.1290	0.2590	16.8845	0.1029

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_043]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4987	52.4169	20.3904	11.2144	0.4798
Current Velocity X	-35.4239	47.0699	3.7590	15.1652	0.0261
Current Velocity Y	-30.6219	48.8348	5.4187	16.3829	0.2211

Figure A3

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA1_037 Inst. Num : 0173_037
 Water Depth : 802m Inst. Depth : 210m

Data File : HIST_DIRROOT:[GINSEA_87.BOA1_037]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3000	67.2477	23.1735	12.3186	0.5526
Current Velocity X	-45.7818	66.2748	6.0612	17.5672	0.2695
Current Velocity Y	-54.2267	60.8760	0.9682	18.5075	-0.0838

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_037]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4161	50.1089	19.2712	10.7031	0.4397
Current Velocity X	-26.6997	49.4442	6.3916	13.8770	0.5013
Current Velocity Y	-34.6802	38.8991	-0.1377	15.8996	0.0815

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_037]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4161	50.1089	19.2712	10.7031	0.4397
Current Velocity X	-33.7552	46.5956	3.9565	14.4396	0.0171
Current Velocity Y	-29.6500	46.2709	5.0217	15.3905	0.1892

Figure A4

Cruise	: GINSEA_87	Version	: MEASURED
Station	: BOA1_031	Inst. Num	: 0173_031
Water Depth	: 802m	Inst. Depth	: 265m

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

Data File : H1ST DIRUSER:[GINSEA 87.BOAL 031]H35.CUR

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.5599	47.7919	17.9438	9.9678	0.3983
Current Velocity X	-26.5681	47.3933	5.7945	13.1221	0.4722
Current Velocity Y	-32.5915	35.2822	-0.7857	14.6704	0.0661

Statistics for the period From : 05-JUN-1987 05:28:18.00
To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.5599	47.7919	17.9438	9.9678	0.3983
Current Velocity X	-29.1247	46.1859	4.1147	13.4888	0.0277
Current Velocity Y	-28.5268	41.9115	4.1548	14.3340	0.1252

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Current Meter Statistics

```
Cruise      : GINSEA_87          Version     : MEASURED
Station     : BOA1_019          Inst. Num  : 0173_019
Water Depth : 802m             Inst. Depth : 360m
```

Data File : HIST DIRROOT:[GINSEA 87.BOAL 019]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:28:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	56.1742	19.0624	10.1594	0.5168
Current Velocity X	-35.0183	49.6225	4.3795	14.7438	0.2417
Current Velocity Y	-49.7297	47.6588	-0.8246	15.1454	-0.1187

Data File : H1ST DIRUSER:[GINSEA_87.BOAL_019]H35.CUR

[illegible]

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4095	40.4180	15.4487	7.8509	0.3516
Current Velocity X	-27.0982	40.1516	4.5393	11.5008	0.2965
Current Velocity Y	-29.9448	29.8321	-1.9496	11.9927	0.0311

Data File : HIST DIRUSER:[GINSEA_87.BOAL_019]H3SPOT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4095	40.4180	15.4487	7.8509	0.3516
Current Velocity X	-23.3354	36.2322	4.2889	11.1204	-0.1760
Current Velocity Y	-24.8237	34.8546	2.4519	12.3462	-0.0965

Figure A7

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 --Version : MEASURED
 Station : BOA1_010 Inst. Num : 0173_010
 Water Depth : 802m Inst. Depth : 431m

Data File : HIST_DIRROOT:[GINSEA_87,BOA1_010]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3000	47.9818	16.8424	8.6859	0.5464
Current Velocity X	-39.3140	40.8935	2.5725	13.1130	0.2287
Current Velocity Y	-45.0710	39.3436	-2.3859	13.2242	-0.0608

Data File : HIST_DIRUSER:[GINSEA_87,BOA1_010]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4262	31.6483	13.6007	6.6730	0.2684
Current Velocity X	-28.1721	31.2027	2.6710	10.1730	0.0836
Current Velocity Y	-27.2513	27.2635	-3.3883	10.3709	0.1216

Data File : HIST_DIRUSER:[GINSEA_87,BOA1_010]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4262	31.6483	13.6007	6.6730	0.2684
Current Velocity X	-22.4640	28.5071	4.3135	9.4297	-0.4593
Current Velocity Y	-22.0486	28.2569	0.0941	11.0511	-0.1489

Figure A9

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA1_007 Inst. Num : 0173_007
 Water Depth : 802m Inst. Depth : 455m

Data File : HIST_DIRFOOT:[GINSEA_87.BOA1_007]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	46.2800	16.0122	8.4226	0.5116
Current Velocity X	-34.8504	41.5664	1.7057	12.4772	0.2340
Current Velocity Y	-44.8977	38.4864	-3.1601	12.6008	0.0029

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_007]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6476	28.0282	13.0736	6.5182	0.2373
Current Velocity X	-27.3116	27.3921	1.7304	9.8052	0.0520
Current Velocity Y	-24.9476	27.0487	-4.1327	9.8655	0.1680

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_007]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6476	28.0282	13.0736	6.5182	0.2373
Current Velocity X	-21.9192	26.4312	4.3419	8.7557	-0.5559
Current Velocity Y	-23.6584	24.8364	-1.1052	10.8078	-0.2053

Figure A10

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA1_004 Inst. Num : 0173_004
 Water Depth : 802m Inst. Depth : 478m

Data File : HIST_DIRROOT:[GINSEA_87.BOA1_004]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:28:00.00
 To : 07-SEP-1987 04:58:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3000	46.2088	15.1229	8.1743	0.6342
Current Velocity X	-35.1505	37.2850	0.9119	11.8241	0.2177
Current Velocity Y	-41.9114	37.8506	-3.8529	11.8347	0.0051

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_004]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6150	30.0193	12.3632	6.5906	0.3694
Current Velocity X	-28.2843	23.9817	0.8811	9.3131	-0.0483
Current Velocity Y	-25.9998	27.3732	-4.8170	9.2568	0.1754

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_004]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6150	30.0194	12.3632	6.5906	0.3694
Current Velocity X	-21.3632	21.1768	4.3773	7.9627	-0.8055
Current Velocity Y	-28.6433	21.4213	-2.1953	10.4412	-0.2895

Figure A11

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA1_001 Inst. Num : 0173_001
 Water Depth : 802m Inst. Depth : 502m

Data File : HIST_DIRROOT:[GINSEA_87.BOA1_001]MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 14:13:00.00
 To : 07-SEP-1987 04:43:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	44.9694	14.3156	7.9779	0.6811
Current Velocity X	-36.7592	37.0544	-0.2934	11.0376	0.2357
Current Velocity Y	-41.3838	34.1992	-4.8343	11.1047	0.0471

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_001]H35.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4238	32.0434	11.7712	6.4921	0.7381
Current Velocity X	-26.2802	19.3282	-0.4121	8.6119	-0.1013
Current Velocity Y	-29.1924	22.1477	-5.7685	8.5554	0.1211

Data File : HIST_DIRUSER:[GINSEA_87.BOA1_001]H35ROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:28:18.00
 To : 03-SEP-1987 13:28:18.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.4238	32.0434	11.7712	6.4921	0.7381
Current Velocity X	-19.5988	17.9428	4.3589	7.1388	-0.7457
Current Velocity Y	-30.0735	18.5469	-3.8007	9.8183	-0.4286

Figure A12

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOAI_000 Inst. Num : 9018
 Water Depth : 802m Inst. Depth : 510m
 Data File : HIST_DIRFOOT:(GINSEA_87.BOAI_000)MEASURED.CUR;1

Statistics for the period From : 01-JUN-1987 15:05:00.00
 To : 07-SEP-1987 03:45:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	39.8500	13.5696	8.4084	0.5509
Current Velocity X	-37.9530	30.1614	-1.6889	11.4955	-0.1363
Current Velocity Y	-32.9811	33.5997	-0.7811	10.9203	0.0855
Temperature	-0.1974	6.9427	3.7902	1.6107	-0.2604
Pressure	498.6666	517.3153	500.5250	1.7451	5.1337
Conductivity	29.0308	35.6475	32.4898	1.4441	-0.1364
Salinity	34.8922	35.3567	35.0041	0.0684	1.1136
Sound Velocity	1456.3198	1486.9174	1473.2682	6.6615	-0.3183
Potential Temp	-0.2168	6.8949	3.6218	1.5538	-0.2394
Sigma(S, T, 0)	27.5887	28.0529	27.8099	0.1041	0.2127
Sigma(S, PT, 0)	27.5953	28.0539	27.8135	0.1029	0.2009
Sigma(S, T, P)	29.8705	30.4674	30.1330	0.1276	0.3566

Data File : HIST_DIRGROUP:(GINSEA_87.BOAI_000)HIS.CUR

Statistics for the period From : 05-JUN-1987 05:05:17.00
 To : 03-SEP-1987 11:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.7233	32.9728	11.4613	6.7429	0.8609
Current Velocity X	-28.7387	18.8049	-1.8420	9.8634	-0.3844
Current Velocity Y	-24.4637	21.9054	-1.6802	8.5698	0.0856
Pressure	499.4412	511.2939	500.5493	1.6679	4.2747
Temperature	-0.1757	6.8043	3.6962	1.6105	-0.2116
Conductivity	29.0482	35.4183	32.3679	1.3996	-0.1595
Salinity	34.8998	35.1937	34.9977	0.0620	1.8980
Sound Velocity	1456.4304	1485.9955	1472.7211	6.4973	-0.3428
Potential Temp	-0.1953	6.6647	3.4927	1.5120	-0.2577
Sigma(S, T, 0)	27.6116	28.0423	27.8185	0.1018	0.2057
Sigma(S, PT, 0)	27.6179	28.0433	27.8220	0.1006	0.2564
Sigma(S, T, P)	29.8945	30.4364	30.1434	0.1251	0.3731

Data File : HIST_DIRGROUP:(GINSEA_87.BOAI_000)HISROT_053.CUR

Statistics for the period From : 05-JUN-1987 05:05:17.00
 To : 03-SEP-1987 11:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.7233	32.9728	11.4613	6.7429	0.8609
Current Velocity X	-24.5507	16.1427	0.2333	6.8931	-0.7307
Current Velocity Y	-32.9551	17.3361	-2.4823	11.1001	-0.5767

Figure A13

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA2_000 Inst. Num : 9022
 Water Depth : 802m Inst. Depth : 130m
 Data File : HIST_DIRROOT:[GINSEA_87,BOA2_000]MEASURED.CUR;1

Statistics for the period From : 03-JUN-1987 06:55:00.00
 To : 08-SEP-1987 02:55:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	54.3812	15.8979	8.2557	0.4633
Current Velocity X	-30.1547	42.4942	7.5158	11.5492	-0.0300
Current Velocity Y	-29.9596	36.8005	3.5707	10.8767	-0.0227
Temperature	5.1747	8.6563	7.1778	0.6006	-0.8173
Pressure	130.9686	173.0937	133.3768	2.8156	6.1022
Conductivity	33.6895	37.2287	35.6968	0.6070	-0.7771
Salinity	35.0183	35.6244	35.2134	0.0584	-0.4619
Sound Velocity	1473.6301	1487.6001	1481.7419	2.3958	-0.7011
Potential Temp	5.1642	8.6419	7.1566	0.6017	-0.7923
Sigma(S, T, 0)	27.4538	27.8191	27.5613	0.0448	0.6215
Sigma(S, PT, 0)	27.4560	27.8211	27.5631	0.0447	0.5497
Sigma(S, T, P)	28.0537	28.4338	28.1712	0.0501	0.5952

Data File : HIST_DIRUSER:[GINSEA_87,BOA2_000]H35.CUR

Statistics for the period From : 06-JUN-1987 20:55:40.00
 To : 04-SEP-1987 08:55:40.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.9690	45.1409	13.7314	7.6160	1.0485
Current Velocity X	-22.1031	35.3455	6.6039	10.0451	0.1444
Current Velocity Y	-17.3731	28.4953	3.4395	9.5043	0.2379
Pressure	130.2190	153.4865	133.2881	2.3937	4.6851
Temperature	5.2731	8.7087	7.1926	0.5875	-0.8638
Conductivity	33.7884	37.2772	35.7118	0.5930	-0.8295
Salinity	35.0295	35.3657	35.2137	0.0527	-0.6964
Sound Velocity	1474.0367	1487.7507	1481.8041	2.3443	-0.9503
Potential Temp	5.2625	8.6945	7.1725	0.5894	-0.8368
Sigma(S, T, 0)	27.4499	27.6670	27.5594	0.0430	-0.4342
Sigma(S, PT, 0)	27.4522	27.6682	27.5612	0.0428	0.7947
Sigma(S, T, P)	28.0543	28.3276	28.1692	0.0477	-0.1008

Data File : HIST_DIRUSER:[GINSEA_87,BOA2_000]H35ROT_049.CUR

Statistics for the period From : 06-JUN-1987 20:55:40.00
 To : 04-SEP-1987 08:55:40.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.9690	45.1409	13.7314	7.6160	1.0485
Current Velocity X	-23.2348	32.9323	1.7367	9.0123	0.1144
Current Velocity Y	-21.3239	45.1019	7.2406	10.4888	0.0669

Figure A14

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA 87 Version : MEASURED
 Station : BOA2_002 Inst. Num : 9004
 Water Depth : 802m Inst. Depth : 500m
 Data File : HIST DIRROOT:(GINSEA_87.BOA2_002)MEASURED.CUR;1

Statistics for the period From : 03-JUN-1987 06:55:00.00
 To : 08-SEP-1987 02:15:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	29.1938	10.0842	5.7537	0.2607
Current Velocity X	-26.4044	24.2572	-5.2388	7.7785	0.2175
Current Velocity Y	-20.1441	19.8362	-0.3082	6.8382	-0.1399
Temperature	-0.5335	3.6849	1.0328	1.0874	0.4131
Pressure	503.4728	521.4392	511.9261	1.7455	-5.2263
Conductivity	28.7572	32.3789	30.0403	0.9266	0.5179
Salinity	34.8419	34.9424	34.9011	0.0153	10.1823
Sound Velocity	1454.9318	1473.5100	1461.7169	4.7956	0.4554
Potential Temp	-0.5519	3.6490	0.9477	1.0730	0.5066
Sigma(S, T, 0)	27.6997	28.0848	27.9603	0.0868	-0.7044
Sigma(S, PT, 0)	27.7034	28.0856	27.9620	0.0862	-0.7138
Sigma(S, T, P)	30.0774	30.5206	30.3719	0.1008	-0.6682

Data File : HIST DIRUSER:(GINSEA_87.BOA2_002)H3S.CUR

Statistics for the period From : 06-JUN-1987 20:55:40.00
 To : 04-SEP-1987 08:55:40.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1527	21.3671	7.8916	3.8773	0.4146
Current Velocity X	-19.7996	10.7147	-5.5318	5.8584	0.4095
Current Velocity Y	-10.4230	12.1658	-0.4122	3.4996	0.2425
Pressure	507.2764	516.4525	512.1764	1.1113	-11.8176
Temperature	-0.6308	3.3907	1.0115	1.0368	0.5163
Conductivity	28.6731	32.1314	30.0654	0.9180	0.5483
Salinity	34.8660	34.9272	34.9014	0.0146	-37.7470
Sound Velocity	1454.4354	1472.2914	1461.8513	4.7427	0.4828
Potential Temp	-0.6486	3.3560	0.9761	1.0633	0.5368
Sigma(S, T, 0)	27.7423	28.0762	27.9588	0.0870	-0.6762
Sigma(S, PT, 0)	27.7457	28.0770	27.9605	0.0863	-0.7832
Sigma(S, T, P)	30.1237	30.5073	30.3712	0.1016	-0.6364

Data File : HIST DIRUSER:(GINSEA_87.BOA2_002)H3SPOT 049.CUR

Statistics for the period From : 06-JUN-1987 20:55:40.00
 To : 04-SEP-1987 08:55:40.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1527	21.3671	7.8916	3.8773	0.4146
Current Velocity X	-12.9623	8.4862	-3.3181	4.1957	0.2544
Current Velocity Y	-20.5887	11.6977	-4.4453	5.3819	0.4272

Figure A15

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA2_001 Inst. Num : 9005
 Water Depth : 802m Inst. Depth : 700m
 Data File : HIST_DIRROOT:[GINSEA_87,BOA2_001]MEASURED.CUR;1

Statistics for the period From : 03-JUN-1987 07:34:00.00
 To : 29-AUG-1987 21:14:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	33.0687	12.9461	6.7069	0.2467
Current Velocity X	-32.0513	24.0055	-7.4048	9.6394	0.2346
Current Velocity Y	-24.0241	20.4026	-1.2106	7.9615	-0.0712
Temperature	-0.9476	-0.3582	-0.8066	0.0857	1.8435
Pressure	705.7549	714.6910	711.8826	1.5121	-3.7758
Conductivity	28.5070	28.9804	28.6155	0.0724	1.6452
Salinity	34.8919	34.9436	34.9154	0.0075	106.4827
Sound Velocity	1456.3531	1459.0049	1456.9636	0.4063	5.9012
Potential Temp	-0.9559	-0.3861	-0.8224	0.0861	1.9347
Sigma(S, T, 0)	28.0442	28.0999	28.0764	0.0082	-99.8457
Sigma(S, PT, 0)	28.0456	28.1009	28.0775	0.0081	-103.9095
Sigma(S, T, P)	31.4204	31.4811	31.4582	0.0097	13.0663

Data File : HIST_DIRUSER:[GINSEA_87,BOA2_001]H35.CUR

Statistics for the period From : 06-JUN-1987 20:54:14.00
 To : 26-AUG-1987 02:54:14.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6684	24.6241	11.3169	5.0512	0.3180
Current Velocity X	-23.6890	20.2003	-7.6296	8.2600	0.7024
Current Velocity Y	-14.5744	14.4250	-1.3504	5.0393	0.1517
Pressure	706.7362	712.8834	712.0399	1.3065	-8.2247
Temperature	-0.9233	-0.4052	-0.7987	0.0821	2.0270
Conductivity	28.5111	28.9429	28.6196	0.0731	1.6682
Salinity	34.9047	34.9270	34.9150	0.0054	211.7022
Sound Velocity	1456.3865	1458.7919	1456.9893	0.4075	30.2629
Potential Temp	-0.9478	-0.4328	-0.8175	0.0869	1.7964
Sigma(S, T, 0)	28.0507	28.0874	28.0759	0.0069	73.5574
Sigma(S, PT, 0)	28.0521	28.0884	28.0770	0.0069	-34.2971
Sigma(S, T, P)	31.4273	31.4728	31.4584	0.0085	-13.3767

Data File : HIST_DIRUSER:[GINSEA_87,BOA2_001]H35ROT_049.CUR

Statistics for the period From : 06-JUN-1987 20:54:14.00
 To : 26-AUG-1987 02:54:14.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.6684	24.6241	11.3169	5.0512	0.3180
Current Velocity X	-20.6140	65.7670	-3.9140	6.6950	1.4235
Current Velocity Y	-21.3165	15.0800	-6.6441	7.3352	0.4464

Figure A16

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA3_001 Inst. Num : 9021
 Water Depth : 762m Inst. Depth : 107m

Data File : HIST_DIRROOT:[GINSEA_87.BOA3_001]MEASURED.CUR;1

Statistics for the period From : 04-JUN-1987 15:16:00.00
 To : 07-SEP-1987 01:16:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	58.2562	24.0810	10.4273	0.5468
Current Velocity X	-18.7459	55.0820	16.7704	10.6654	0.1941
Current Velocity Y	-19.5739	57.2433	14.1224	9.7056	-0.3269
Temperature	6.0692	9.3559	8.2549	0.5300	-0.7297
Pressure	106.9973	174.3420	116.7062	10.4712	2.1829
Conductivity	34.3682	37.9361	36.7893	0.5589	-0.8126
Salinity	34.8742	35.4309	35.3066	0.0705	-1.8333
Sound Velocity	1476.7098	1490.1694	1485.7104	2.0941	-0.6030
Potential Temp	6.0595	9.3437	8.2429	0.5294	-0.7297
Sigma(S, T, 0)	27.3706	27.5773	27.4746	0.0352	-0.3246
Sigma(S, PT, 0)	27.3727	27.5793	27.4765	0.0351	-0.3007
Sigma(S, T, P)	27.8772	28.3639	28.0059	0.0601	1.3289

Data File : HIST_DIRUSER:[GINSEA_87.BOA3_001]H35.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 03-SEP-1987 08:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.7512	51.3067	22.8484	9.3069	0.3783
Current Velocity X	-16.0816	47.1528	15.9882	9.6378	0.0329
Current Velocity Y	-18.3969	32.8697	13.4039	8.9763	-0.6938
Pressure	105.6003	162.6977	115.4868	8.5224	1.9405
Temperature	6.6037	9.2927	8.2646	0.4944	-0.5905
Conductivity	35.0139	37.8576	36.7980	0.5202	-0.6547
Salinity	35.0449	35.4118	35.3070	0.0629	-1.3533
Sound Velocity	1479.0776	1489.6555	1485.7290	1.9548	-1.1569
Potential Temp	6.5932	9.2807	8.2527	0.4938	-0.5904
Sigma(S, T, 0)	27.3880	27.5658	27.4736	0.0330	-1.1777
Sigma(S, PT, 0)	27.3899	27.5673	27.4755	0.0329	-1.0583
Sigma(S, T, P)	27.8777	28.2559	27.9993	0.0497	1.1732

Data File : HIST_DIRUSER:[GINSEA_87.BOA3_001]H35ROT_052.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 03-SEP-1987 08:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.7512	51.3067	22.8484	9.3069	0.3783
Current Velocity X	-17.8872	37.4964	-0.7191	7.5996	1.2095
Current Velocity Y	-21.2564	49.8538	20.8512	10.7568	-0.3109

Figure A17

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA3_002 Inst. Num : 9006
 Water Depth : 762m Inst. Depth : 480m
 Data File : HIST_DIRROOT:(GINSEA_87.BOA3_002)MEASURED.CUR;1

Statistics for the period From : 04-JUN-1987 15:16:00.00
 To : 08-SEP-1987 15:36:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	53.4125	20.0244	8.2457	0.1994
Current Velocity X	-21.3693	34.5399	13.3540	7.1611	-0.2756
Current Velocity Y	-24.3352	43.0726	13.1125	8.2115	-0.0206
Temperature	2.4331	6.4769	4.9648	0.7811	-0.4053
Pressure	483.7185	509.5399	488.3388	3.6421	2.0680
Conductivity	31.3438	35.1591	33.6918	0.7659	-0.3288
Salinity	34.9011	35.1799	35.0550	0.0605	0.2544
Sound Velocity	1468.0525	1484.7981	1478.6165	3.2938	-0.2939
Potential Temp	2.4032	6.4322	4.9217	0.7897	-0.4044
Sigma(S, T, 0)	27.6114	27.9209	27.7198	0.0477	0.7767
Sigma(S, PT, 0)	27.6174	27.9235	27.7244	0.0471	1.1745
Sigma(S, T, P)	29.8341	30.2719	29.9688	0.0634	1.1837

Data File : HIST_DIRUSER:(GINSEA_87.BOA3_002)H35.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 04-SEP-1987 22:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0953	44.3948	19.1640	7.3695	0.0878
Current Velocity X	-5.3427	27.3815	12.8812	5.9776	-0.3870
Current Velocity Y	-14.6276	34.9555	12.7194	7.6268	-0.1672
Pressure	484.3980	503.9716	487.9417	3.1645	2.2656
Temperature	2.3848	6.4536	4.9744	0.7851	-0.4504
Conductivity	31.2765	35.1580	33.7372	0.7648	-0.4826
Salinity	34.9146	35.1757	35.0585	0.0593	-0.2263
Sound Velocity	1467.8937	1484.7452	1478.8092	3.2923	-0.6212
Potential Temp	2.3547	6.4089	4.9683	0.7892	-0.5550
Sigma(S, T, 0)	27.6323	27.8789	27.7172	0.0474	1.3678
Sigma(S, PT, 0)	27.6383	27.8815	27.7218	0.0468	1.5250
Sigma(S, T, P)	29.8580	30.2322	29.9650	0.0632	1.2997

Data File : HIST_DIRUSER:(GINSEA_87.BOA3_002)H35ROT_052.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 04-SEP-1987 22:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0953	44.3948	19.1640	7.3695	0.0878
Current Velocity X	-13.2735	12.8289	-2.0926	5.4543	0.3151
Current Velocity Y	-9.7360	43.0871	17.9813	8.0094	-0.3540

Figure A18

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA3_003 Inst. Num : 9007
 Water Depth : 762m Inst. Depth : 677m
 Data File : HIST_DIRROOT:[GINSEA_87,BOA3_003]MEASURED.CUR;1

Statistics for the period From : 04-JUN-1987 15:36:00.00
 To : 08-SEP-1987 15:36:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	37.9125	11.3410	8.6234	0.5986
Current Velocity X	-32.0911	28.4835	4.2718	8.8209	-0.5811
Current Velocity Y	-12.6587	31.0711	7.1000	7.5183	0.4611
Temperature	-0.9710	0.0538	-0.8414	0.1199	3.3796
Pressure	682.3652	692.6093	684.3717	0.8110	42.8207
Conductivity	28.4655	29.3428	28.5721	0.0928	2.6891
Salinity	34.8789	35.1735	34.9324	0.0318	-1.4639
Sound Velocity	1455.7371	1460.4857	1456.2926	0.4883	-0.6048
Potential Temp	-0.9942	0.0241	-0.8725	0.1035	3.4339
Sigma(S, T, 0)	28.0435	28.2904	28.0924	0.0260	-2.9488
Sigma(S, PT, 0)	28.0451	28.2914	28.0934	0.0259	2.4691
Sigma(S, T, P)	31.2767	31.5446	31.3456	0.0265	1.4519

Data File : HIST_DIRUSER:[GINSEA_87,BOA3_003]H35.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 04-SEP-1987 22:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1499	36.6305	11.2584	8.4259	0.6495
Current Velocity X	-29.8708	25.8795	4.2721	8.7183	-0.6443
Current Velocity Y	-5.8292	27.1970	7.0341	7.3530	0.4742
Pressure	682.3820	689.1075	684.3342	0.6968	7.7553
Temperature	-0.9907	-0.2948	-0.8566	0.0813	2.6207
Conductivity	28.4469	29.0350	28.5660	0.0733	2.1321
Salinity	34.8803	35.0054	34.9314	0.0215	16.1136
Sound Velocity	1455.6260	1458.8464	1456.2612	0.3869	-84.2268
Potential Temp	-1.0137	-0.3218	-0.8788	0.0813	2.6001
Sigma(S, T, 0)	28.0534	28.1542	28.0919	0.0174	-3.5270
Sigma(S, PT, 0)	28.0543	28.1552	28.0929	0.0173	17.3030
Sigma(S, T, P)	31.2951	31.4093	31.3450	0.0180	-7.5072

Data File : HIST_DIRUSER:[GINSEA_87,BOA3_003]H35POT_052.CUR

Statistics for the period From : 08-JUN-1987 04:56:37.00
 To : 04-SEP-1987 22:56:37.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1499	36.6305	11.2584	8.4259	0.6495
Current Velocity X	-18.0007	3.9465	-2.9128	3.5073	-1.4901
Current Velocity Y	-26.6088	36.2038	7.6970	10.8523	-0.0111

Figure A19

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA 87 Version : MEASURED
 Station : BOM 001 Inst. Num : 9024
 Water Depth : 800m Inst. Depth : 133m
 Data File : HIST_DIRROOT:(GINSEA 87.BOM 001)MEASURED.CUR;1

Statistics for the period From : 05-JUN-1987 07:40:00.00
 To : 09-SEP-1987 05:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	55.3500	19.8456	10.6187	0.4563
Current Velocity X	-34.6215	34.3160	-2.4659	13.7537	0.3191
Current Velocity Y	-34.0154	49.1257	7.6003	15.9262	-0.0229
Temperature	5.9575	8.3005	7.0899	0.5127	0.0396
Pressure	133.8244	191.3346	138.9424	8.2515	3.0785
Conductivity	34.4798	36.8383	35.6316	0.5192	-0.0349
Salinity	35.0278	35.3101	35.2057	0.0429	-1.4328
Sound Velocity	1476.9449	1486.1882	1481.5823	2.0699	0.0012
Potential Temp	5.9458	8.2865	7.0913	0.5193	-0.0119
Sigma(S, T, 0)	27.4665	27.6481	27.5649	0.0439	-0.4815
Sigma(S, PT, 0)	27.4686	27.6496	27.5668	0.0438	-0.5336
Sigma(S, T, P)	28.0788	28.4598	28.2014	0.0568	0.7254

Data File : HIST_DIRUSER:(GINSEA 87.BOM 001)H05.CUR

Statistics for the period From : 08-JUN-1987 21:00:00.00
 To : 05-SEP-1987 11:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2725	49.6066	19.0988	11.0084	0.4751
Current Velocity X	-30.8412	32.2454	-1.4018	13.1200	0.3519
Current Velocity Y	-28.6836	44.0685	7.4506	16.0195	0.0810
Pressure	133.2667	183.1085	139.0746	8.2408	2.7196
Temperature	6.0245	8.1760	7.1130	0.5182	-0.0655
Conductivity	34.5446	36.7083	35.6791	0.5022	-0.1512
Salinity	35.1067	35.2925	35.2094	0.0404	1.4639
Sound Velocity	1477.2086	1485.7068	1481.7737	2.0002	-1.0900
Potential Temp	6.0128	8.1621	7.1387	0.5031	-0.1232
Sigma(S, T, 0)	27.4769	27.6352	27.5613	0.0430	-0.1233
Sigma(S, PT, 0)	27.4790	27.6367	27.5632	0.0429	0.3936
Sigma(S, T, P)	28.0905	28.4130	28.1985	0.0568	0.6544

Data File : HIST_DIRUSER:(GINSEA 87.BOM 001)H3SPOT 015.CUR

Statistics for the period From : 08-JUN-1987 21:00:00.00
 To : 05-SEP-1987 11:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2725	49.6066	19.0988	11.0084	0.4751
Current Velocity X	-28.3436	25.2811	-3.2824	11.9442	0.1705
Current Velocity Y	-31.4161	48.3774	6.8339	16.9143	0.1837

Figure A20

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA 87 Version : MEASURED
 Station : BOM4_000 Inst. Num : 9008
 Water Depth : 800m Inst. Depth : 497m
 Data File : HIST_DIRCOT:GINSEA 87.BOM4_000)MEASURED.CUR;1

Statistics for the period From : 05-JUN-1987 17:00:00.00
 To : 09-SEP-1987 12:20:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	36.9437	13.0056	7.0087	0.5437
Current Velocity X	-32.0612	32.8828	-3.2710	9.5655	0.0901
Current Velocity Y	-21.5801	34.4815	3.2033	10.2873	0.3358
Temperature	-0.4708	6.1237	2.4055	1.8263	0.3336
Pressure	500.1550	522.7405	503.5365	2.7314	3.2131
Conductivity	28.7658	34.7996	31.4226	1.6733	0.2887
Salinity	34.8262	35.1118	34.9405	0.0600	0.9116
Sound Velocity	1454.9606	1483.6437	1468.2806	7.9999	0.1871
Potential Temp	-0.4889	6.0787	2.4765	1.8313	0.2404
Sigma(S, T, 0)	27.6081	28.0527	27.8604	0.1185	-0.5110
Sigma(S, PT, 0)	27.6139	28.0537	27.8632	0.1171	-0.5221
Sigma(S, T, P)	29.9187	30.4349	30.2130	0.1405	-0.4549

Data File : HIST_DIRUSER:GINSEA 87.BOM4_000)H35.CUR

Statistics for the period From : 09-JUN-1987 07:00:29.00
 To : 05-SEP-1987 19:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1173	34.9905	12.6060	6.5978	0.6694
Current Velocity X	-23.2096	28.9355	-3.3792	8.7808	0.0835
Current Velocity Y	-18.4151	33.6221	3.1401	10.2073	0.4172
Pressure	501.3463	520.9819	503.5733	2.7453	3.0387
Temperature	-0.3639	6.1110	2.5287	1.8413	0.2335
Conductivity	28.9708	34.7881	31.6112	1.6105	0.2543
Salinity	34.8623	35.1069	34.9458	0.0592	1.1372
Sound Velocity	1456.1086	1483.5919	1469.2100	7.6476	0.1373
Potential Temp	-0.2456	6.0660	2.6857	1.7575	0.2056
Sigma(S, T, 0)	27.6204	28.0155	27.8481	0.1159	-0.4885
Sigma(S, PT, 0)	27.6262	28.0165	27.8510	0.1145	-0.4533
Sigma(S, T, P)	29.9218	30.3969	30.1981	0.1369	-0.4267

Data File : HIST_DIRUSER:GINSEA 87.BOM4_000)H35ROT_015.CUR

Statistics for the period From : 09-JUN-1987 07:00:29.00
 To : 05-SEP-1987 19:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1173	34.9905	12.6060	6.5978	0.6694
Current Velocity X	-23.9650	25.4509	-4.0768	8.3617	0.1443
Current Velocity Y	-17.8504	30.0384	2.1585	10.5534	0.2321

Figure A21

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOM_002 Inst. Num : 9009
 Water Depth : 800m Inst. Depth : 708m
 Data File : HIST_DIRCOT:([GINSEA_87.BOM_002]MEASURED.CUR;1

Statistics for the period From : 05-JUN-1987 14:40:00.00
 To : 09-SEP-1987 12:40:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	41.7875	12.4919	7.4835	0.8622
Current Velocity X	-35.0989	36.7726	-0.4363	9.5787	-0.1190
Current Velocity Y	-23.2683	39.7460	4.1266	10.1538	0.5507
Temperature	-0.9887	0.3356	-0.7772	0.2232	1.6956
Pressure	713.6191	722.5827	715.7883	0.9753	21.9666
Conductivity	28.4495	29.5879	28.6342	0.1939	1.6224
Salinity	34.8730	34.9302	34.9054	0.0071	207.7516
Sound Velocity	1456.0853	1462.2734	1457.1456	1.0628	7.3731
Potential Temp	-1.0129	0.3035	-0.7944	0.2260	1.6084
Sigma(S, T, 0)	28.0130	28.0919	28.0669	0.0120	-40.2676
Sigma(S, PT, 0)	28.0147	28.0929	28.0680	0.0118	41.3389
Sigma(S, T, P)	31.3948	31.5010	31.4668	0.0160	0.0366

Data File : HIST_DIRUSER:([GINSEA_87.BOM_002]H35.CUR

Statistics for the period From : 09-JUN-1987 04:59:30.00
 To : 05-SEP-1987 18:59:30.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3118	36.1440	11.7833	7.0588	1.3122
Current Velocity X	-34.0391	34.0025	-0.5514	8.2696	-0.1036
Current Velocity Y	-17.7974	35.4919	3.9391	10.2265	0.6807
Pressure	713.6324	722.0909	715.7914	0.9544	2.1038
Temperature	-0.9863	-0.0740	-0.7676	0.2278	1.4628
Conductivity	28.4511	29.2284	28.6456	0.1963	1.3926
Salinity	34.8947	34.9138	34.9060	0.0042	-1071.7950
Sound Velocity	1456.1322	1460.3813	1457.2064	1.0786	6.9089
Potential Temp	-1.0105	-0.1037	-0.7816	0.2291	1.3849
Sigma(S, T, 0)	28.0330	28.0831	28.0668	0.0112	16.0368
Sigma(S, PT, 0)	28.0346	28.0840	28.0679	0.0112	-47.4416
Sigma(S, T, P)	31.4203	31.4875	31.4664	0.0155	-15.6256

Data File : HIST_DIRUSER:([GINSEA_87.BOM_002]H35ROT_015.CUR

Statistics for the period From : 09-JUN-1987 04:59:30.00
 To : 05-SEP-1987 18:59:30.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3118	36.1440	11.7833	7.0588	1.3122
Current Velocity X	-35.9711	31.5641	-1.5522	7.5682	-0.1460
Current Velocity Y	-17.5122	36.0588	3.6622	10.7560	0.6521

Figure A22

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA 87 Version : MEASURED
 Station : BOA5_002 Inst. Num : 9020
 Water Depth : 805m Inst. Depth : 141m
 Data File : HIST_DIRROOT:(GINSEA_87,BOA5_002)MEASURED.CUR;1

Statistics for the period From : 06-JUN-1987 10:05:00.00
 To : 10-SEP-1987 03:25:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	62.1312	20.1602	10.2488	0.6069
Current Velocity X	-24.4446	61.9799	13.0575	13.5130	-0.0895
Current Velocity Y	-27.3136	40.5456	7.6384	10.0025	-0.0036
Temperature	6.0722	8.7422	7.6046	0.5866	-0.5230
Pressure	141.9202	219.6790	147.0234	7.7676	4.3602
Conductivity	34.6342	37.3005	36.1114	0.5871	-0.4076
Salinity	35.1371	35.4310	35.2518	0.0415	-0.8720
Sound Velocity	1477.6493	1488.0095	1483.5535	2.2642	-0.4308
Potential Temp	6.0583	8.7271	7.5559	0.5930	-0.4272
Sigma(S, T, 0)	27.4263	27.6612	27.5339	0.0565	0.3444
Sigma(S, PT, 0)	27.4287	27.6629	27.5360	0.0564	0.3149
Sigma(S, T, P)	28.0727	28.6391	28.2056	0.0812	1.0128

Data File : HIST_DIRUSER:(GINSEA_87,BOA5_002)H35.CUR

Statistics for the period From : 09-JUN-1987 23:05:17.00
 To : 06-SEP-1987 09:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2458	55.2377	19.8791	10.3918	0.6297
Current Velocity X	-20.0954	55.1906	12.7054	13.7319	-0.0183
Current Velocity Y	-24.5132	34.8596	7.3862	9.9394	0.0754
Pressure	141.3223	206.1949	147.0749	7.7038	3.8579
Temperature	6.0695	8.7408	7.6122	0.5896	-0.5978
Conductivity	34.6200	37.2974	36.1248	0.5963	-0.4810
Salinity	35.1424	35.3495	35.2520	0.0415	-0.0572
Sound Velocity	1477.5471	1488.0083	1483.6084	2.2973	-0.8543
Potential Temp	6.0571	8.7256	7.5699	0.6022	-0.5005
Sigma(S, T, 0)	27.4339	27.6566	27.5319	0.0567	0.4853
Sigma(S, PT, 0)	27.4363	27.6582	27.5340	0.0565	0.3361
Sigma(S, T, P)	28.0806	28.5492	28.2041	0.0823	0.9761

Data File : HIST_DIRUSER:(GINSEA_87,BOA5_002)H35ROT_045.CUR

Statistics for the period From : 09-JUN-1987 23:05:17.00
 To : 06-SEP-1987 09:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2458	55.2377	19.8791	10.3918	0.6297
Current Velocity X	-23.4924	38.5732	3.7613	10.0209	0.2987
Current Velocity Y	-16.5802	45.1815	14.2069	13.6724	-0.2020

Figure A23

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA5_000 Inst. Num : 9010
 Water Depth : 805m Inst. Depth : 487m
 Data File : HIST_DIRROOT:(GINSEA_87,BOA5_000)MEASURED.CUR;1

Statistics for the period From : 06-JUN-1987 10:05:00.00
 To : 10-SEP-1987 03:25:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	35.9750	13.3629	5.9103	0.2540
Current Velocity X	-23.3389	29.1926	5.4528	8.2924	-0.8016
Current Velocity Y	-22.8455	30.5804	7.4521	7.7125	-0.4005
Temperature	2.1404	6.1341	4.8876	0.9375	-1.0659
Pressure	490.9022	526.6624	492.4925	3.4880	5.0607
Conductivity	31.1131	34.7679	33.5735	0.8760	-0.9513
Salinity	34.9689	35.1521	35.0329	0.0221	-6.2680
Sound Velocity	1466.7784	1483.4182	1478.1901	3.9450	-0.9889
Potential Temp	2.1118	6.0903	4.8091	0.9528	-0.9737
Sigma(S, T, 0)	27.5806	27.9500	27.7137	0.0908	0.7530
Sigma(S, PT, 0)	27.5862	27.9523	27.7183	0.0900	0.7600
Sigma(S, T, P)	29.8303	30.3040	29.9852	0.1115	0.8343

Data File : HIST_DIRUSER:(GINSEA_87,BOA5_000)H35.CUR

Statistics for the period From : 09-JUN-1987 23:05:17.00
 To : 06-SEP-1987 09:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1299	28.0951	12.6688	5.5505	0.2969
Current Velocity X	-21.4928	21.5392	5.0877	8.1076	-0.9027
Current Velocity Y	-19.1752	24.5758	7.0804	7.0453	-0.5000
Pressure	490.3140	521.5427	492.5230	3.5023	4.6952
Temperature	2.3375	6.0951	4.8736	0.9671	-1.0262
Conductivity	31.2918	34.7340	33.5518	0.9012	-0.9090
Salinity	34.9847	35.0742	35.0315	0.0208	-12.6575
Sound Velocity	1467.6300	1483.2666	1478.0934	4.0617	-0.9193
Potential Temp	2.3082	6.0515	4.7863	0.9809	-0.9307
Sigma(S, T, 0)	27.5921	27.9365	27.7149	0.0935	0.7703
Sigma(S, PT, 0)	27.5977	27.9389	27.7194	0.0926	0.7007
Sigma(S, T, P)	29.8424	30.2640	29.9871	0.1148	0.8210

Data File : HIST_DIRUSER:(GINSEA_87,BOA5_000)H35ROT_045.CUR

Statistics for the period From : 09-JUN-1987 23:05:17.00
 To : 06-SEP-1987 09:05:17.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1299	28.0951	12.6688	5.5505	0.2969
Current Velocity X	-18.3189	22.7204	-1.4090	6.2020	0.4992
Current Velocity Y	-16.9883	27.2300	8.6042	8.7695	-0.4742

Figure A24

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA5_001 Inst. Num : 1280
 Water Depth : 805m Inst. Depth : 689m

Data File : HIST_DIRROOT:[GINSEA_87.BOA5_001]MEASURED.CUR

Statistics for the period From : 06-JUN-1987 12:40:00.00
 To : 10-SEP-1987 07:16:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	35.1225	11.5074	6.6866	0.7003
Current Velocity X	-17.0143	31.1714	7.6461	8.9440	-0.1816
Current Velocity Y	-11.2163	22.6909	3.1758	5.3470	0.2614
Temperature	-1.0500	1.6500	-0.5231	0.4838	1.7736

Data File : HIST_DIRUSER:[GINSEA_87.BOA5_001]H35.CUR

Statistics for the period From : 10-JUN-1987 03:00:00.00
 To : 06-SEP-1987 15:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1527	28.7890	10.8555	6.3595	0.5381
Current Velocity X	-14.0815	27.5760	7.8823	8.5592	-0.3262
Current Velocity Y	-5.8430	15.4254	3.2467	3.5209	0.1455
Temperature	-0.9935	1.4985	-0.5239	0.4755	1.7315

Data File : HIST_DIRUSER:[GINSEA_87.BOA5_001]H35ROT_045.CUR

Statistics for the period From : 10-JUN-1987 03:00:00.00
 To : 06-SEP-1987 15:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1527	28.7890	10.8555	6.3595	0.5381
Current Velocity X	-12.6914	13.6522	3.2778	4.9663	-0.6888
Current Velocity Y	-10.0633	25.9198	7.8694	7.8098	-0.0236

Figure A25

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : B046_002 Inst. Num : 9017
 Water Depth : 1701m Inst. Depth : 97m
 Data File : HIST_DIRROOT:(GINSEA_87.B046_002)MEASURED.CUR;1

Statistics for the period From : 07-JUN-1987 07:00:00.00
 To : 09-SEP-1987 07:20:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	36.9437	16.2095	7.9512	0.0636
Current Velocity X	-36.9201	32.0998	7.2056	13.8147	-0.7525
Current Velocity Y	-19.4239	27.9756	3.9636	8.2172	-0.1785
Temperature	6.4941	7.7823	7.2235	0.2449	-0.4479
Pressure	97.3992	117.7350	100.7912	4.2875	1.6634
Conductivity	34.9719	36.2672	35.7132	0.2507	-0.4685
Salinity	35.1020	35.2705	35.1970	0.0245	-2.3276
Sound Velocity	1478.6097	1483.5264	1481.3972	0.9518	-3.5597
Potential Temp	6.4844	7.7726	7.2115	0.2511	-0.4148
Sigma(S, T, 0)	27.4737	27.6222	27.5428	0.0224	-0.0314
Sigma(S, PT, 0)	27.4751	27.6236	27.5442	0.0224	1.4074
Sigma(S, T, P)	27.9182	28.1417	28.0029	0.0370	0.8152

Data File : HIST_DIRUSER:(GINSEA_87.B046_002)H35.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 13:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0855	33.1864	15.4518	7.8192	0.0233
Current Velocity X	-32.6436	28.6887	8.6122	12.3291	-0.6862
Current Velocity Y	-14.5206	21.7828	4.2067	7.4944	-0.2504
Pressure	97.0481	115.6646	100.3156	3.7785	1.8218
Temperature	6.6912	7.7367	7.2413	0.2287	-0.3615
Conductivity	35.1458	36.2089	35.7294	0.2349	-0.4243
Salinity	35.1129	35.2303	35.1974	0.0217	6.4220
Sound Velocity	1479.2328	1483.3750	1481.4597	0.8934	-13.3247
Potential Temp	6.6821	7.7268	7.2287	0.2347	-0.3306
Sigma(S, T, 0)	27.4824	27.5751	27.5407	0.0195	-6.5844
Sigma(S, PT, 0)	27.4838	27.5766	27.5420	0.0194	10.7025
Sigma(S, T, P)	27.9368	28.0990	27.9994	0.0325	-0.2750

Data File : HIST_DIRUSER:(GINSEA_87.B046_002)H35ROT_343.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 13:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0855	33.1864	15.4518	7.8192	0.0233
Current Velocity X	-29.4696	29.8450	9.4658	11.3231	-0.6164
Current Velocity Y	-19.6203	17.4649	1.5049	8.9420	-0.2350

Figure A26

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : B0V6_003 Inst. Num : 9011
 Water Depth : 1701m Inst. Depth : 460m
 Data File : HIST_DIRROOT:(GINSEA_87.B0V6_003)MEASURED.CUR;1

Statistics for the period From : 07-JUN-1987 08:00:00.00
 To : 09-SEP-1987 07:40:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	23.3913	7.4531	4.7560	0.3856
Current Velocity X	-18.4601	22.7400	3.5057	6.3554	-0.0132
Current Velocity Y	-18.8591	16.8415	0.5832	5.0154	-0.2253
Temperature	0.9206	4.7003	2.7592	0.9473	0.1303
Pressure	464.0221	482.5327	467.7427	3.1962	1.9442
Conductivity	29.9557	33.4165	31.6213	0.8648	0.1644
Salinity	34.8766	35.0486	34.9464	0.0353	0.5600
Sound Velocity	1460.8439	1477.1885	1468.9181	4.0883	0.1526
Potential Temp	0.8982	4.6639	2.7300	0.9438	0.1303
Sigm(S, T, 0)	27.7241	27.9709	27.8587	0.0602	-0.2196
Sigm(S, PT, 0)	27.7281	27.9726	27.8613	0.0595	-0.2125
Sigm(S, T, P)	29.8775	30.2291	30.0408	0.0785	-0.0343

Data File : HIST_DIRUSER:(GINSEA_87.B0V6_003)HRS.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 17:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1862	16.1152	6.5406	3.6583	0.4786
Current Velocity X	-9.7535	14.7312	3.5757	5.3370	-0.0859
Current Velocity Y	-9.2797	9.6978	1.0403	3.7201	-0.1168
Pressure	464.2107	479.4408	467.3718	2.7525	2.2404
Temperature	1.2521	4.6145	2.8568	0.9126	0.0759
Conductivity	30.2598	33.3359	31.7095	0.8345	0.1105
Salinity	34.8939	35.0372	34.9493	0.0342	1.7914
Sound Velocity	1462.3965	1476.8323	1469.3381	3.9381	0.0509
Potential Temp	1.2283	4.5785	2.8272	0.9093	0.0759
Sigm(S, T, 0)	27.7353	27.9525	27.8526	0.0580	0.1862
Sigm(S, PT, 0)	27.7393	27.9542	27.8554	0.0574	-0.0828
Sigm(S, T, P)	29.8887	30.1827	30.0318	0.0740	0.0254

Data File : HIST_DIRUSER:(GINSEA_87.B0V6_003)HRSOT_343.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 17:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1862	16.1152	6.5406	3.6583	0.4786
Current Velocity X	-7.9961	15.8979	3.7237	5.2571	0.0233
Current Velocity Y	-9.7256	7.7669	-0.0506	3.8322	-0.3643

Figure A27

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA 87 Version : MEASURED
 Station : BOP6_001 Inst. Num : 9012
 Water Depth : 1701m Inst. Depth : 617m
 Data File : HIST_DIRROOT:[GINSEA_87.BOP6_001]MEASURED.CUR;1

Statistics for the period From : 07-JUN-1987 07:20:00.00
 To : 09-SEP-1987 07:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	24.3500	7.2604	5.3958	0.6160
Current Velocity X	-15.9032	21.5395	2.7082	6.2984	0.3245
Current Velocity Y	-24.0825	10.5574	-2.3755	5.4025	-0.8645
Temperature	-0.3165	0.8803	0.2710	0.2668	0.1688
Pressure	622.3186	678.2914	657.4379	8.4107	-1.1561
Conductivity	28.9919	30.0185	29.4851	0.2309	0.2379
Salinity	34.8169	34.9408	34.8860	0.0151	-14.5356
Sound Velocity	1457.7838	1463.8337	1460.9802	1.2594	-0.7224
Potential Temp	-0.3407	0.8479	0.2442	0.2642	0.1696
Sigma(S, T, 0)	27.9475	28.0718	27.9986	0.0186	-1.3757
Sigma(S, PT, 0)	27.9491	28.0730	28.0003	0.0185	-2.5167
Sigma(S, T, P)	30.9472	31.2056	31.1035	0.0359	-1.0241

Data File : HIST_DIRUSER:[GINSEA_87.BOP6_001]H35.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 13:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1679	19.7136	5.8821	4.1498	0.8324
Current Velocity X	-8.7277	15.6911	2.3545	5.0356	0.4069
Current Velocity Y	-19.4672	5.5771	-2.0566	4.0882	-1.4350
Pressure	622.7275	673.1230	656.7831	7.4815	-1.4662
Temperature	-0.2081	0.8346	0.2972	0.2560	0.1823
Conductivity	29.0754	29.9844	29.5076	0.2224	0.2402
Salinity	34.8602	34.9283	34.8864	0.0111	32.8403
Sound Velocity	1458.5291	1463.6517	1461.0896	1.2186	-4.6185
Potential Temp	-0.2336	0.8024	0.2702	0.2532	0.1905
Sigma(S, T, 0)	27.9734	28.0363	27.9975	0.0156	-5.3066
Sigma(S, PT, 0)	27.9752	28.0376	27.9992	0.0154	-8.5294
Sigma(S, T, P)	30.9533	31.1687	31.0989	0.0304	2.3298

Data File : HIST_DIRUSER:[GINSEA_87.BOP6_001]H35ROT_343.CUR

Statistics for the period From : 10-JUN-1987 21:00:00.00
 To : 05-SEP-1987 13:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1679	19.7136	5.8821	4.1498	0.8324
Current Velocity X	-9.3219	14.9050	1.6503	4.8452	0.3268
Current Velocity Y	-17.7415	4.4759	-2.6551	4.3122	-1.0097

Figure A28

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOP6_000 Inst. Num : 1296
 Water Depth : 1701m Inst. Depth : 1479m

Data File : HIST_DIRROOT:[GINSEA_87.BOP6_000]MEASURED.CUR;1

Statistics for the period From : 07-JUN-1987 10:00:00.00
 To : 09-SEP-1987 11:16:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	41.6282	7.7786	4.9413	1.8916
Current Velocity X	-14.4008	40.8699	-0.5221	6.7699	1.3688
Current Velocity Y	-21.0099	14.9436	-1.0857	6.1352	-0.6100
Temperature	-1.3500	-1.0500	-1.1892	0.0398	3.0199

Data File : HIST_DIRUSER:[GINSEA_87.BOP6_000]H35.CUR

Statistics for the period From : 11-JUN-1987 01:00:29.00
 To : 05-SEP-1987 19:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1918	17.5252	6.6781	3.5620	0.6915
Current Velocity X	-11.4914	16.6721	-1.4016	5.0535	0.4862
Current Velocity Y	-17.1824	11.7355	-0.6943	5.4167	-0.8018
Temperature	-1.2099	-1.1442	-1.1893	0.0107	0.7484

Data File : HIST_DIRUSER:[GINSEA_87.BOP6_000]H35ROT_343.CUR

Statistics for the period From : 11-JUN-1987 01:00:29.00
 To : 05-SEP-1987 19:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1918	17.5252	6.6781	3.5620	0.6915
Current Velocity X	-13.2991	14.3644	-1.5434	4.5397	0.2403
Current Velocity Y	-17.4073	12.5751	-0.2542	5.8541	-0.7148

Figure A29

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA8_002 Inst. Num : 9026
 Water Depth : 1677m Inst. Depth : 79m
 Data File : HIST_DIRROOT:[GINSEA_87,BOA8_002]MEASURED.CUR;1

Statistics for the period From : 02-JUN-1987 09:30:00.00
 To : 07-SEP-1987 12:10:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	66.9750	20.3031	10.5280	0.5759
Current Velocity X	-50.1273	66.4758	0.9062	17.0989	0.0987
Current Velocity Y	-38.6468	42.0647	8.8665	12.3001	-0.1651
Temperature	4.9370	8.5430	7.2076	0.8446	-0.8954
Pressure	78.8403	176.9883	85.3132	10.6910	3.4798
Conductivity	33.3704	37.0120	35.6096	0.8579	-0.8815
Salinity	34.9071	35.4096	35.1828	0.1067	-0.9651
Sound Velocity	1471.6781	1486.0073	1480.7402	3.3759	-0.9241
Potential Temp	4.9309	8.4691	7.1179	0.8274	-0.8778
Sigma(S, T, 0)	27.4020	27.6562	27.5414	0.0418	0.4385
Sigma(S, PT, 0)	27.4032	27.6570	27.5425	0.0417	-0.2477
Sigma(S, T, P)	27.7671	28.3933	27.9341	0.0658	1.7192

Data File : HIST_DIRGROUP:[GINSEA_87,BOA8_002]H35.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 03-SEP-1987 19:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.7902	55.4473	18.9818	10.1538	0.7156
Current Velocity X	-42.0983	51.4310	1.2888	16.5512	0.0260
Current Velocity Y	-20.7185	33.6151	9.0516	10.3019	-0.0422
Pressure	78.3132	151.0281	85.7357	10.0952	3.0915
Temperature	5.2238	8.2620	7.1552	0.8414	-0.8260
Conductivity	33.6515	36.7397	35.5536	0.8610	-0.7664
Salinity	34.9102	35.3181	35.1760	0.1074	-0.8860
Sound Velocity	1472.8744	1485.0225	1480.5317	3.3979	-1.0126
Potential Temp	5.2175	8.2245	7.0639	0.8292	-0.7613
Sigma(S, T, 0)	27.4584	27.6331	27.5436	0.0403	-0.7216
Sigma(S, PT, 0)	27.4596	27.6340	27.5448	0.0402	0.0636
Sigma(S, T, P)	27.8302	28.2638	27.9387	0.0602	1.8283

Data File : HIST_DIRUSER:[GINSEA_87,BOA8_002]H35ROT_086.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 27-AUG-1987 07:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.7902	55.4473	19.8686	10.1124	0.6297
Current Velocity X	-34.9431	24.2557	-9.1165	11.4087	0.0626
Current Velocity Y	-40.5365	49.8605	1.7203	16.7662	0.0635

Figure A30

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA8_001 Inst. Num : 9015
 Water Depth : 167m Inst. Depth : 438m
 Data File : HIST_DIRROOT:(GINSEA_87.BOA8_001)MEASURED.CUR;1

Statistics for the period From : 02-JUN-1987 09:30:00.00
 To : 07-SEP-1987 12:10:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	30.1625	8.4647	5.3396	0.5741
Current Velocity X	-28.5923	23.3285	1.0003	7.0267	-0.0818
Current Velocity Y	-24.0634	29.2918	2.5909	6.5639	-0.0189
Temperature	-0.0818	4.0785	1.4153	1.1584	0.3326
Pressure	440.9502	510.5822	447.6683	8.3415	2.8519
Conductivity	29.0963	32.7810	30.3613	1.0262	0.4488
Salinity	34.8571	35.1605	34.9147	0.0206	10.0244
Sound Velocity	1455.8551	1474.1376	1462.4108	5.1480	0.4268
Potential Temp	-0.0991	4.0463	1.3381	1.1611	0.4497
Sigma(S, T, 0)	27.7303	28.0723	27.9431	0.0802	-0.7575
Sigma(S, PT, 0)	27.7337	28.0745	27.9448	0.0796	-0.8001
Sigma(S, T, P)	29.7837	30.4386	30.0501	0.1081	-0.3471

Data File : HIST_DIRUSER:(GINSEA_87.BOA8_001)H35.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 03-SEP-1987 19:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2752	15.4429	6.4411	3.5750	0.3601
Current Velocity X	-13.9318	13.4536	1.2984	5.6277	-0.0954
Current Velocity Y	-8.0678	13.1156	2.4601	3.8587	0.3923
Pressure	441.5520	494.6286	448.0312	7.7913	2.6132
Temperature	-0.0106	3.6909	1.3060	1.1282	0.4922
Conductivity	29.1534	32.4137	30.2594	0.9967	0.6298
Salinity	34.8752	34.9483	34.9129	0.0174	-11.3409
Sound Velocity	1456.1738	1472.5045	1461.9060	5.0104	0.5724
Potential Temp	-0.0281	3.6600	1.2233	1.1283	0.6319
Sigma(S, T, 0)	27.7563	28.0256	27.9504	0.0779	-0.9502
Sigma(S, PT, 0)	27.7594	28.0265	27.9520	0.0772	-1.0194
Sigma(S, T, P)	29.8177	30.3520	30.0606	0.1033	-0.5932

Data File : HIST_DIRUSER:(GINSEA_87.BOA8_001)H35POT_086.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 03-SEP-1987 19:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2752	15.4429	6.4411	3.5750	0.3601
Current Velocity X	-13.6043	8.4351	-2.3636	3.9947	-0.4013
Current Velocity Y	-13.4918	13.2645	1.4669	5.5321	-0.0726

Figure A31

SACLANTCEN SM-250Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : B0A8_003 Inst. Num : 9016
 Water Depth : 1677m Inst. Depth : 646m
 Data File : HIST_DIRROOT:(GINSEA_87.B0A8_003)MEASURED.CUR;1

Statistics for the period From : 02-JUN-1987 09:30:00.00
 To : 07-SEP-1987 12:10:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.1000	18.5375	5.9663	3.7612	0.5242
Current Velocity X	-17.3351	15.9421	0.5236	4.6692	0.0347
Current Velocity Y	-18.3872	17.6302	0.9963	5.1653	0.1309
Temperature	-0.5336	0.5718	-0.1729	0.2642	0.5454
Pressure	651.5073	704.5031	656.3531	5.8535	3.4376
Conductivity	28.7955	29.7795	29.1010	0.2338	0.7190
Salinity	34.8672	34.9672	34.9025	0.0114	28.9644
Sound Velocity	1457.2177	1462.3273	1458.8650	1.2244	0.3998
Potential Temp	-0.5579	0.5416	-0.2149	0.2643	0.7033
Sigma(S, T, 0)	27.9986	28.0796	28.0370	0.0095	-23.9794
Sigma(S, PT, 0)	28.0002	28.0810	28.0383	0.0093	36.2681
Sigma(S, T, P)	31.0785	31.3912	31.1461	0.0345	1.8486

Data File : HIST_DIRUSER:(GINSEA_87.B0A8_003)H35.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 03-SEP-1987 19:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1087	13.0894	4.6352	2.6983	0.6788
Current Velocity X	-8.7295	10.8614	0.6459	3.7212	0.0814
Current Velocity Y	-8.8372	11.9242	0.9821	3.6819	0.3826
Pressure	651.6976	693.4144	656.5987	5.5793	3.2366
Temperature	-0.5213	0.3795	-0.2041	0.2419	0.5328
Conductivity	28.8076	29.6044	29.0724	0.2125	0.7279
Salinity	34.8833	34.9272	34.9014	0.0069	-163.7359
Sound Velocity	1457.2756	1461.4680	1458.7181	1.1194	-0.4574
Potential Temp	-0.5456	0.3503	-0.2473	0.2404	0.7171
Sigma(S, T, 0)	28.0231	28.0521	28.0379	0.0075	80.8557
Sigma(S, PT, 0)	28.0246	28.0534	28.0392	0.0074	-8.2705
Sigma(S, T, P)	31.1046	31.3386	31.1489	0.0319	4.0922

Data File : HIST_DIRUSER:(GINSEA_87.B0A8_003)H35ROT_086.CUR

Statistics for the period From : 05-JUN-1987 23:09:35.00
 To : 03-SEP-1987 19:09:35.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1087	13.0894	4.6352	2.6983	0.6788
Current Velocity X	-11.8536	9.4860	-0.9346	3.7728	-0.3730
Current Velocity Y	-8.6022	10.8297	0.7128	3.6290	0.0702

Figure A32

Current Meter Statistics

Cruise : GINSEA_87 Version : MEASURED
 Station : BOA8_000 Inst. Num : 1294
 Water Depth : 1677m Inst. Depth : 1460m

Data File : HIST_DIRROOT:[GINSEA_87.BOA8_000]MEASURED.CUR;1

Statistics for the period From : 02-JUN-1987 10:20:00.00
 To : 07-SEP-1987 14:16:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	20.3236	6.7903	3.6736	0.6529
Current Velocity X	-16.2043	16.1250	1.2526	4.7770	-0.1213
Current Velocity Y	-20.3230	18.1541	-0.7091	5.8917	-0.0462
Temperature	-1.0500	-0.7500	-0.8594	0.0696	0.7642

Data File : HIST_DIRUSER:[GINSEA_87.BOA8_000]H35.CUR

Statistics for the period From : 06-JUN-1987 01:00:29.00
 To : 03-SEP-1987 21:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2898	19.4178	5.9921	3.5323	0.7722
Current Velocity X	-13.4620	12.5092	1.2830	4.3006	-0.2156
Current Velocity Y	-16.2266	12.4308	-0.6955	5.2715	-0.0644
Temperature	-0.9378	-0.7679	-0.8620	0.0383	0.4728

Data File : HIST_DIRUSER:[GINSEA_87.BOA8_000]H35ROT_086.CUR

Statistics for the period From : 06-JUN-1987 01:00:29.00
 To : 03-SEP-1987 21:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2898	19.4178	5.9921	3.5323	0.7722
Current Velocity X	-12.4398	16.3727	0.7833	5.3733	0.0731
Current Velocity Y	-13.5381	11.4463	1.2314	4.1727	-0.2601

Figure A33

SACLANTCEN SM-250Statistics

FLOAT

Cruise : GINSEA 87

Version : VEL

Inst. Num : 21

Data File : HIST_DIRUSER:(GINSEA_87.FLOAT_21)VEL.CUR

Statistics for the period From : 08-JUN-1987 13:45:00.00
 To : 27-JUL-1987 03:45:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3851	47.6964	10.3305	7.2619	1.3974
Current Velocity X	-27.8278	16.7758	-3.5809	7.4687	-0.6850
Current Velocity Y	-42.7951	22.3072	-4.2140	8.5571	-0.5504

Data File : HIST_DIRUSER:(GINSEA_87.FLOAT_21)H35VEL.CUR

Statistics for the period From : 11-JUN-1987 21:44:38.00
 To : 23-JUL-1987 19:44:38.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1854	34.3980	9.0573	6.4605	1.5471
Current Velocity X	-23.6804	6.6793	-3.8173	5.8404	-0.7096
Current Velocity Y	-30.8759	10.2065	-3.9063	7.7419	-0.7583

Figure A34

SACLANTCEN SM-250StatisticsFLOAT

Cruise : GINSEA_87

Version : VEL

Inst. Num : 22

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_22]VEL.CUR

Statistics for the period From : 02-JUN-1987 13:15:00.00
 To : 11-JUL-1987 23:15:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	1.3945	57.7220	14.0377	11.1013	1.9922
Current Velocity X	-34.7072	40.6250	-3.1741	12.1610	1.0880
Current Velocity Y	-35.5066	41.0054	-2.7142	12.4636	0.9037

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_22]H3SVEL.CUR

Statistics for the period From : 05-JUN-1987 21:14:23.00
 To : 08-JUL-1987 15:14:23.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0290	68.9307	12.4478	11.9236	2.0529
Current Velocity X	-24.6921	48.1767	-2.3980	11.7409	1.4032
Current Velocity Y	-25.4669	49.2995	-2.2559	12.1982	1.2155

Figure A35

SACLANTCEN SM-250StatisticsFLOAT

Cruise : GINSEA_87

Version : VEL

Inst. Num : 23

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_23]VEL.CUR

Statistics for the period From : 08-JUN-1987 13:30:00.00
 To : 07-SEP-1987 23:30:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3794	38.9971	8.1257	5.0611	1.5874
Current Velocity X	-33.4547	21.0529	-0.4716	6.4444	-0.9444
Current Velocity Y	-24.1617	18.9278	-1.2128	6.9625	-0.2131

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_23]H3SVEL.CUR

Statistics for the period From : 11-JUN-1987 21:30:14.00
 To : 04-SEP-1987 15:30:14.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1953	27.4995	5.4171	4.1940	2.1285
Current Velocity X	-26.9032	5.7506	-0.5304	4.2697	-2.6583
Current Velocity Y	-20.9048	10.9001	-1.2547	5.1842	-0.3398

Figure A36

Statistics

FLOAT

Cruise : GINSEA_87

Version : VEL

Inst. Num : 83

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_83]VEL.CUR

Statistics for the period From : 09-JUN-1987 14:15:00.00
 To : 11-AUG-1987 12:15:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.3851	65.2361	10.2009	8.2393	2.0510
Current Velocity X	-47.2785	32.1417	-2.7370	9.3554	-0.3386
Current Velocity Y	-47.5109	23.9262	-2.5858	8.3883	-0.8715

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_83]H3SVEL.CUR

Statistics for the period From : 12-JUN-1987 22:14:52.00
 To : 08-AUG-1987 04:14:52.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.1015	21.1793	7.0511	4.8257	0.7237
Current Velocity X	-17.1166	12.0091	-1.9621	5.5165	-0.2727
Current Velocity Y	-16.8963	14.3687	-1.9832	5.9037	0.0083

Figure A37

SACLANTCEN SM-250StatisticsFloat

Cruise : GINSEA_87

Version : VEL

Inst. Num : 84

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_84]VEL.CUR

Statistics for the period From : 09-JUN-1987 14:00:00.00
 To : 08-SEP-1987 00:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	39.4610	8.1318	5.9210	1.6026
Current Velocity X	-28.3973	32.6035	-0.0048	6.8575	-0.0485
Current Velocity Y	-23.5435	37.7202	-0.1834	7.3611	0.2841

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_84]H3SVEL.CUR

Statistics for the period From : 12-JUN-1987 22:00:29.00
 To : 04-SEP-1987 16:00:29.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0891	18.4935	4.0498	3.0270	1.9967
Current Velocity X	-14.2736	11.5572	0.3481	3.5400	0.1479
Current Velocity Y	-11.3926	16.4834	-0.3880	3.5743	0.7441

Figure A38

SACLANTCEN SM-250StatisticsFloat

Cruise : GINSEA_87

Version : VEL

Inst. Num : 86

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_86]VEL.CUR

Statistics for the period From : 02-JUN-1987 13:00:00.00
 To : 09-SEP-1987 09:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.2155	86.7598	9.4943	6.0919	3.2844
Current Velocity X	-19.8819	37.9471	2.0196	7.4280	0.4692
Current Velocity Y	-86.6853	28.7774	3.1087	7.6419	-2.3715

Data File : HIST_DIRUSER:[GINSEA_87.FLOAT_86]H3SVEL.CUR

Statistics for the period From : 05-JUN-1987 21:00:00.00
 To : 06-SEP-1987 01:00:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.9672	26.3300	7.4424	3.4435	1.4849
Current Velocity X	-7.8188	18.1715	1.9965	5.4551	0.2550
Current Velocity Y	-26.3157	16.5826	3.3624	4.7152	-2.1355

Figure A39

SACLANTCEN SM-250Statistics

MET BUOY

Cruise : GINSEA_87

Version : VEL

Station : 4125_000

Inst. Num : 4125

Data File : HIST_DIRUSER:(GINSEA_87.4125_000)VEL.CUR

Statistics for the period From : 03-JUN-1987 02:30:00.00
 To : 31-AUG-1987 17:30:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	447.8117	40.6058	43.2506	2.9982
Current Velocity X	-361.7997	420.3775	3.7334	43.1624	0.3815
Current Velocity Y	-308.6620	277.8005	0.1721	40.5370	-0.2368
Temperature 0m	8.2000	14.5000	11.2647	1.5342	-0.4638
Air temperature	6.0300	16.2600	10.4436	1.8735	-0.2191
Wind Velocity Y	-22.1477	18.7396	2.3725	5.3060	-0.1150
Wind Velocity X	-21.8888	16.1803	1.0167	4.4494	-0.1915
Temperature 5m	7.8400	13.3300	10.8525	1.5289	-0.5102
Temperature 8m *	7.5300	9.0200	8.3976	0.2655	0.1507
Temperature 11m *	7.6100	8.8600	8.2242	0.2297	0.1376
Temperature 15m *	7.3700	8.7100	8.1918	0.2089	-0.2438
Temperature 20m **	8.0800	8.5500	8.2496	0.1020	0.4888
Temperature 35m ***	7.2200	8.6300	7.8860	0.2360	-0.9256
Temperature 50m *	6.2000	8.0800	7.5609	0.3669	-1.0382
Temperature 70m **	6.9000	8.0000	7.2832	0.2233	1.1719
Temperature 100m ***	6.2000	7.4500	6.9818	0.1661	-1.1681
Temperature 130m *	3.1400	7.2200	6.5956	0.8029	-3.2003
Temperature 160m **	6.3500	6.8200	6.5875	0.0822	-0.1996
Temperature 200m ***	3.6100	6.7500	5.9942	0.5546	-2.3863
Temperature 250m *	1.9600	6.3500	5.2043	1.1428	-1.5429
Temperature 300m **	4.1600	5.5700	4.7316	0.3615	0.3154

* From : 03-JUN-1987 02:30:00.00
 To : 18-JUN-1987 18:30:00.00

** From : 03-JUN-1987 02:30:00.00
 To : 09-JUN-1987 08:30:00.00

*** From : 03-JUN-1987 02:30:00.00
 To : 17-JUN-1987 14:30:00.00

Figure A40

Statistics

MET BUOY

Cruise : GINSEA_87

Version : VEL

Station : 4126_000

Inst. Num : 4126

Data File : HIST_DIRUSER:[GINSEA_87.4126_000]VEL.CUR

Statistics for the period From : 01-JUN-1987 12:30:00.00
 To : 31-AUG-1987 14:30:00.00

	Min	Max	Mean	Std. Dev	Skewness
Velocity Modulus	0.0000	299.5426	32.8853	34.8772	2.3411
Current Velocity X	-203.6731	235.4255	5.0346	32.3299	0.5443
Current Velocity Y	-246.9390	216.0775	-2.0465	34.9798	-0.0207
Temperature 0m	8.5100	15.4000	12.0051	1.6988	-0.2513
Air temperature	6.7300	17.3300	11.0500	2.0787	-0.0687
Wind Velocity Y	-14.9164	17.4487	2.4968	5.3173	0.0681
Wind Velocity X	-12.2060	14.9603	0.0921	3.2016	0.5059
Temperature 5m	8.6400	14.3200	11.8512	1.5968	-0.3296
Temperature 11m *	8.5600	11.7600	9.9861	0.7583	0.2993
Temperature 15m	8.3200	14.2400	11.5372	1.4409	-0.1593
Temperature 35m *	7.9200	10.4800	9.4188	0.3770	-1.1619
Temperature 50m	7.4400	11.6800	9.3744	0.4032	-0.8300
Temperature 100m *	7.0400	9.2800	8.6107	0.4787	-1.9904
Temperature 130m	6.1600	9.2800	8.5965	0.3867	-2.2798
Temperature 200m *	6.5600	8.9600	8.3450	0.6280	-1.9342
Temperature 250m	5.7600	8.8800	7.7589	0.6438	-0.6495

* From : 01-JUN-1987 12:30:00.00
 To : 10-JUL-1987 19:30:00.00

Figure A41

Appendix B

Histograms

Histograms of the archived data for all relevant parameters are given for the current meters, the floats, and for the Met (ASID) Buoys. To facilitate comparisons the same scales on the plots are used wherever possible.

- Figures B1–B8: Buoy 1.
- Figures B9–B50: Buoys 2–8.
- Figures B51–B52: ASID (Met) Buoys.

Note: Velocity scatter diagrams are included in Fig. B7 from the Aanderaa current meter of Buoy 1 and, in Figs. B51 and B52, from the anemometers of the ASID buoys.

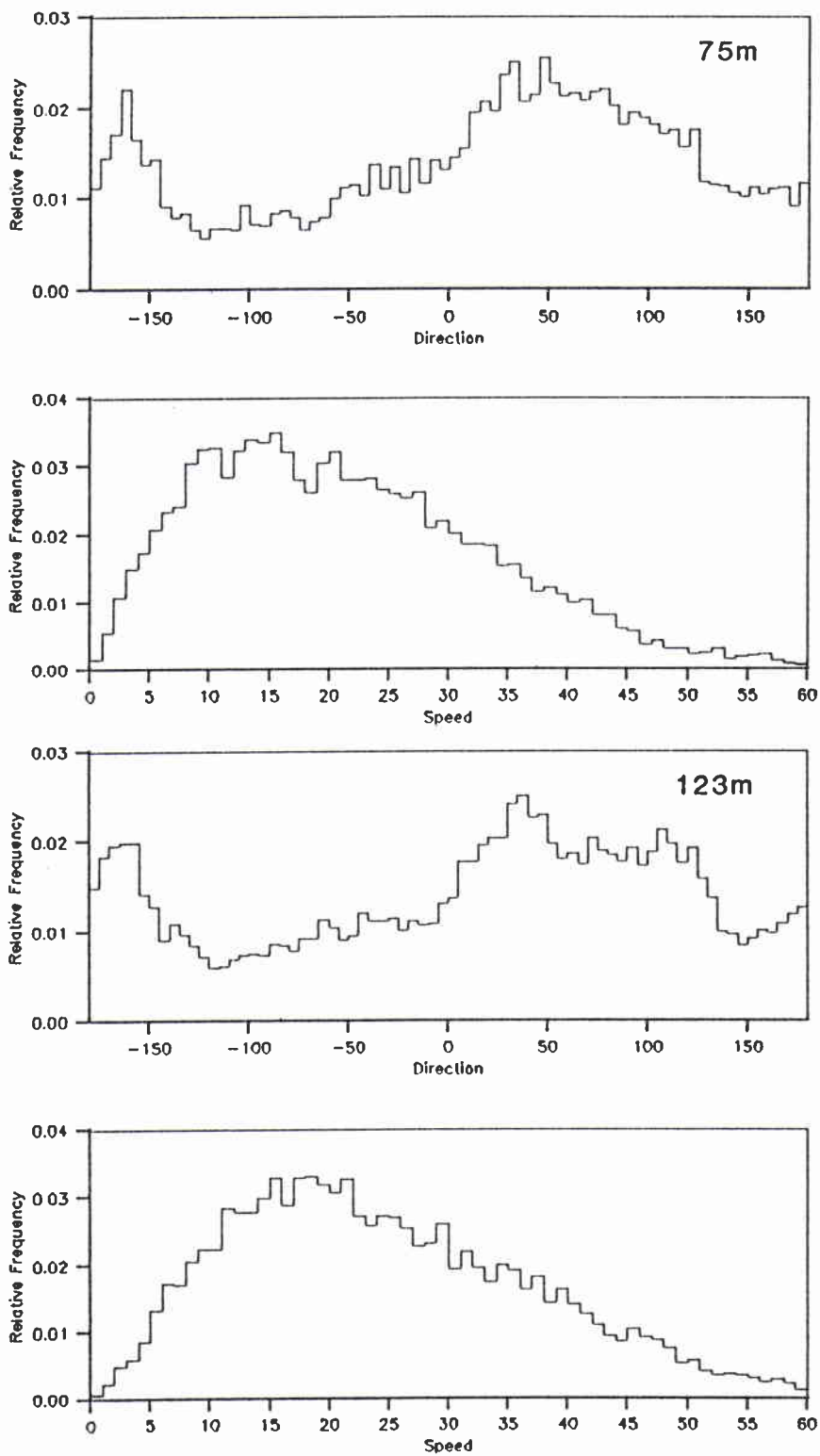


Figure B1

SACLANTCEN SM-250

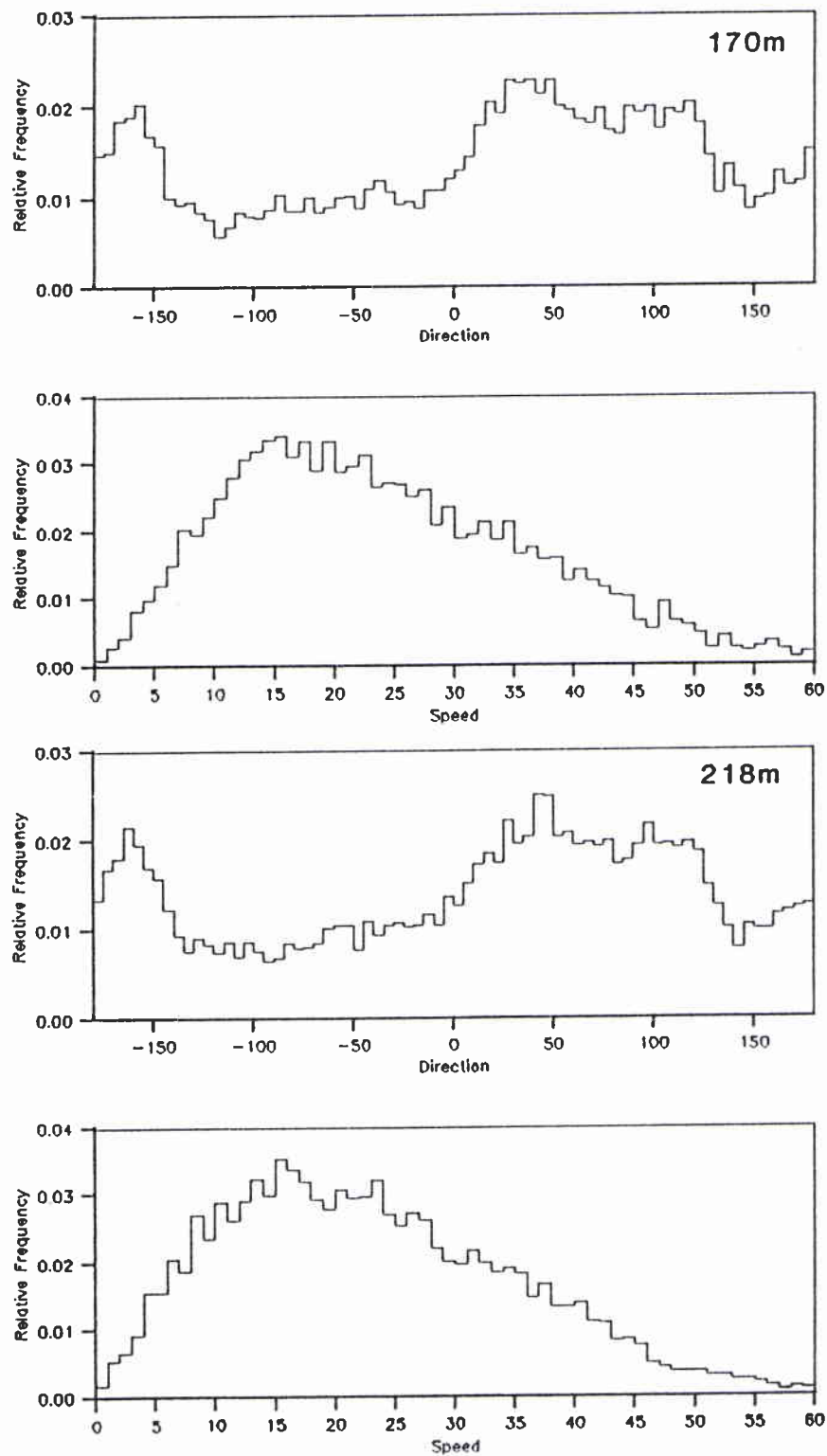


Figure B2

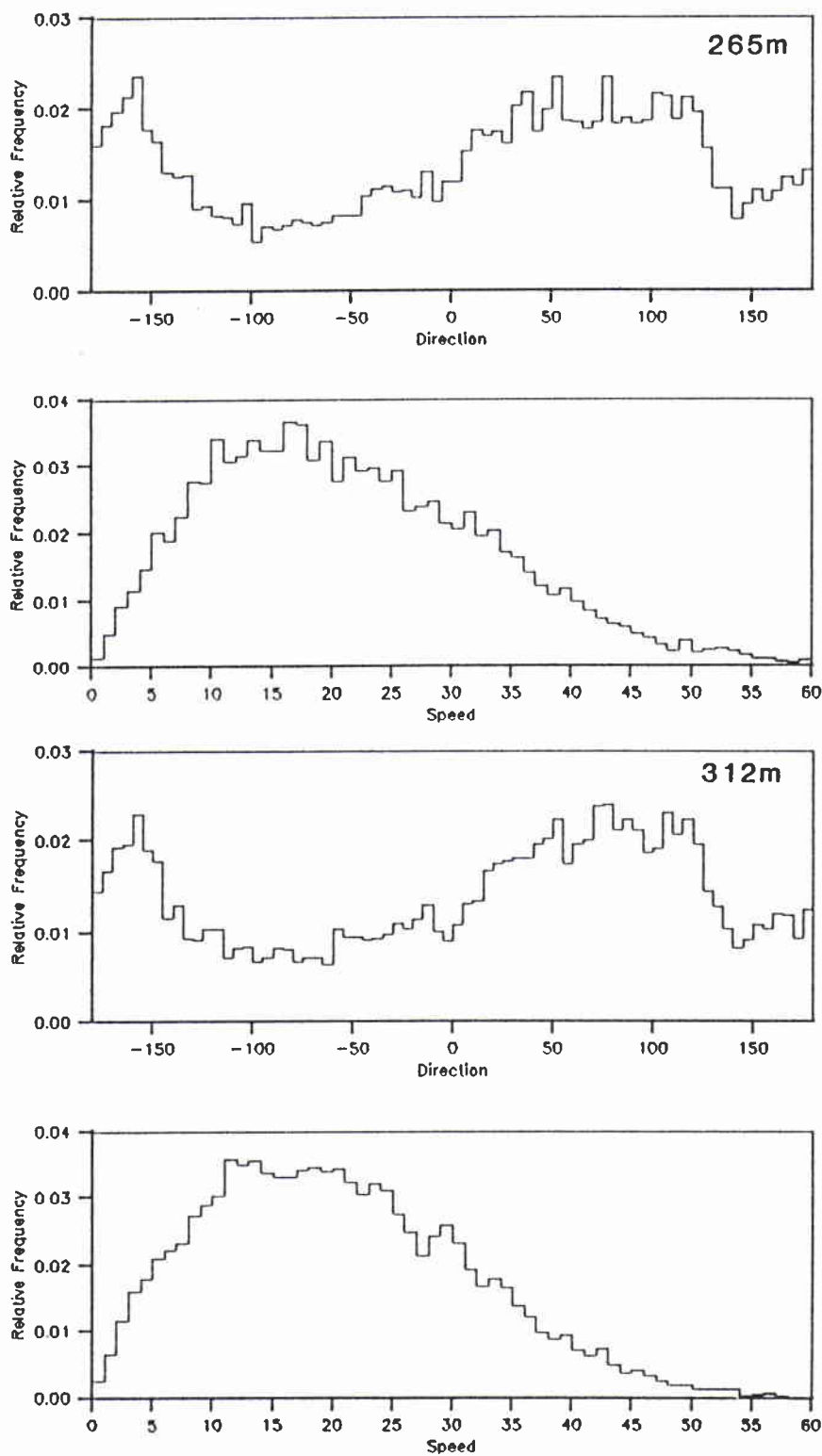


Figure B3

SACLANTCEN SM-250

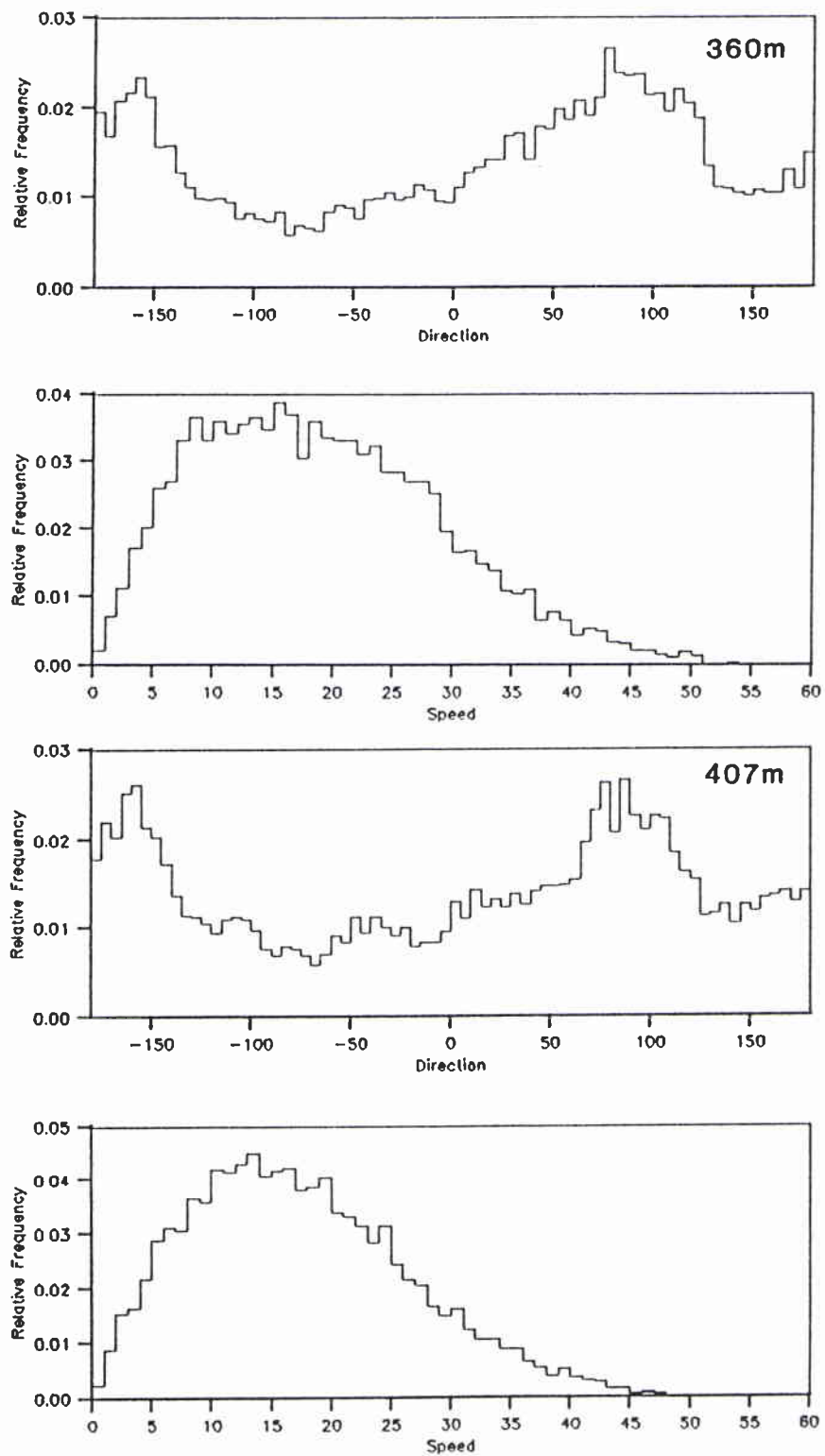


Figure B4

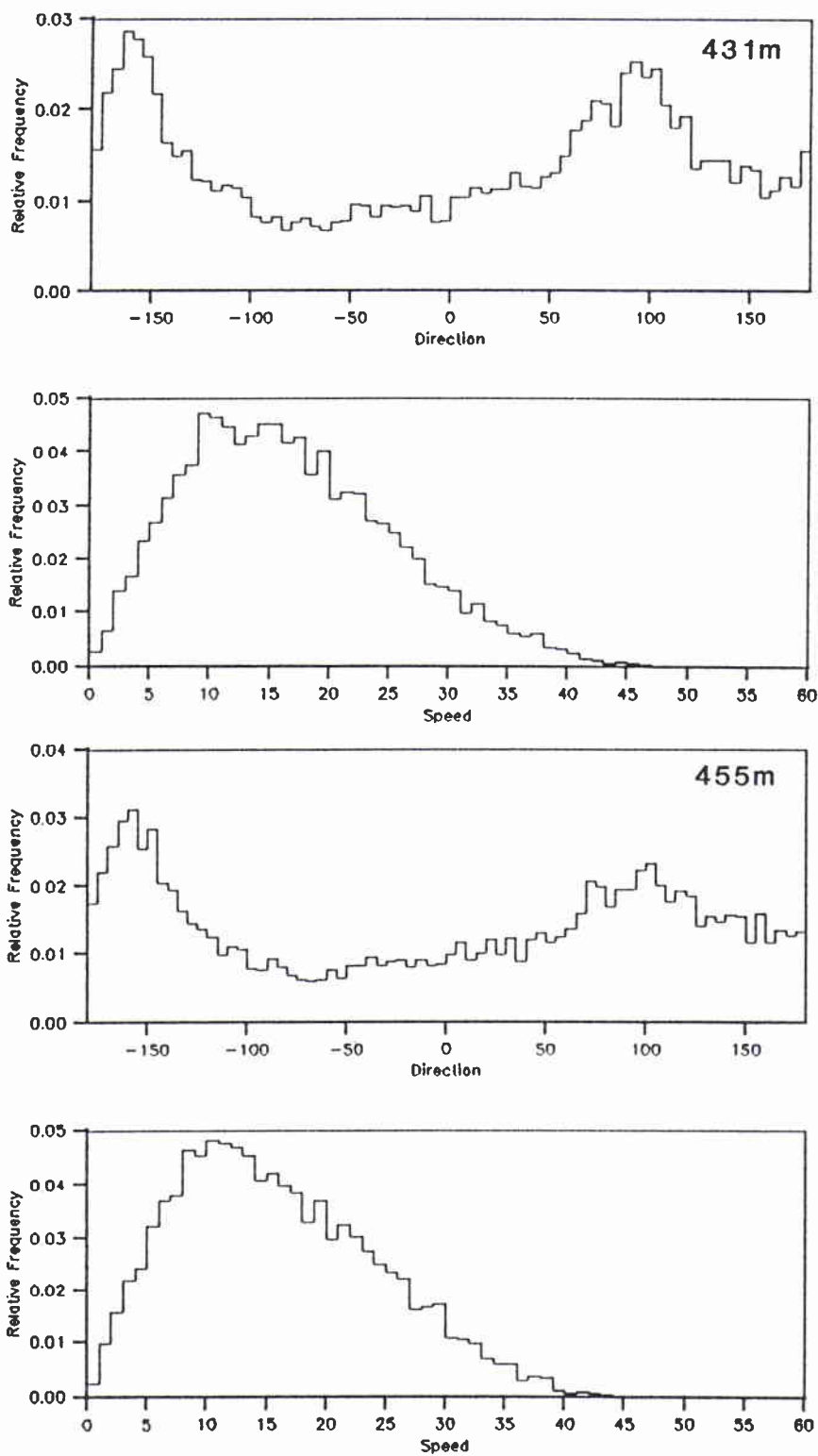


Figure B5

SACLANTCEN SM-250

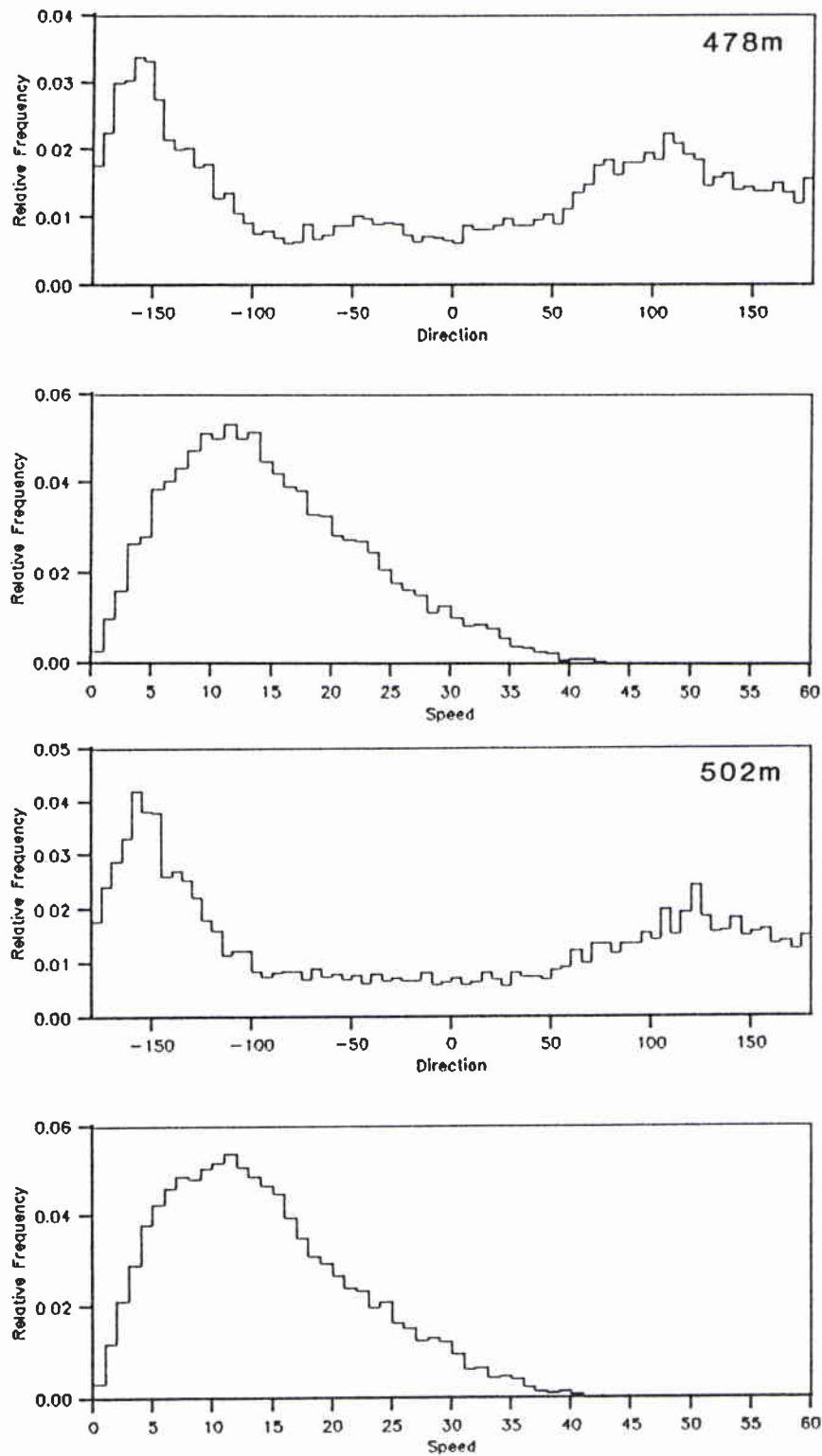


Figure B6

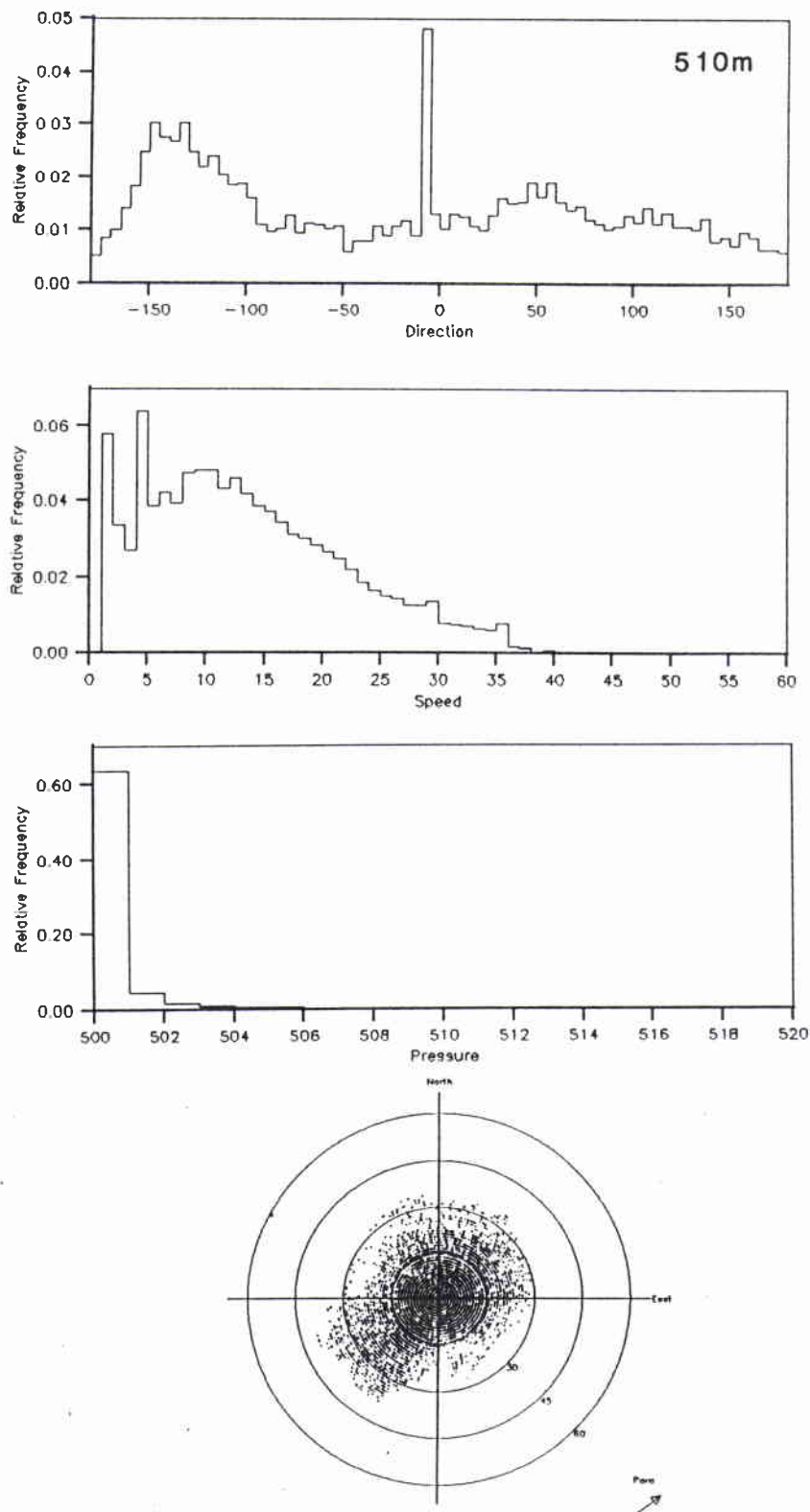


Figure B7

SACLANTCEN SM-250

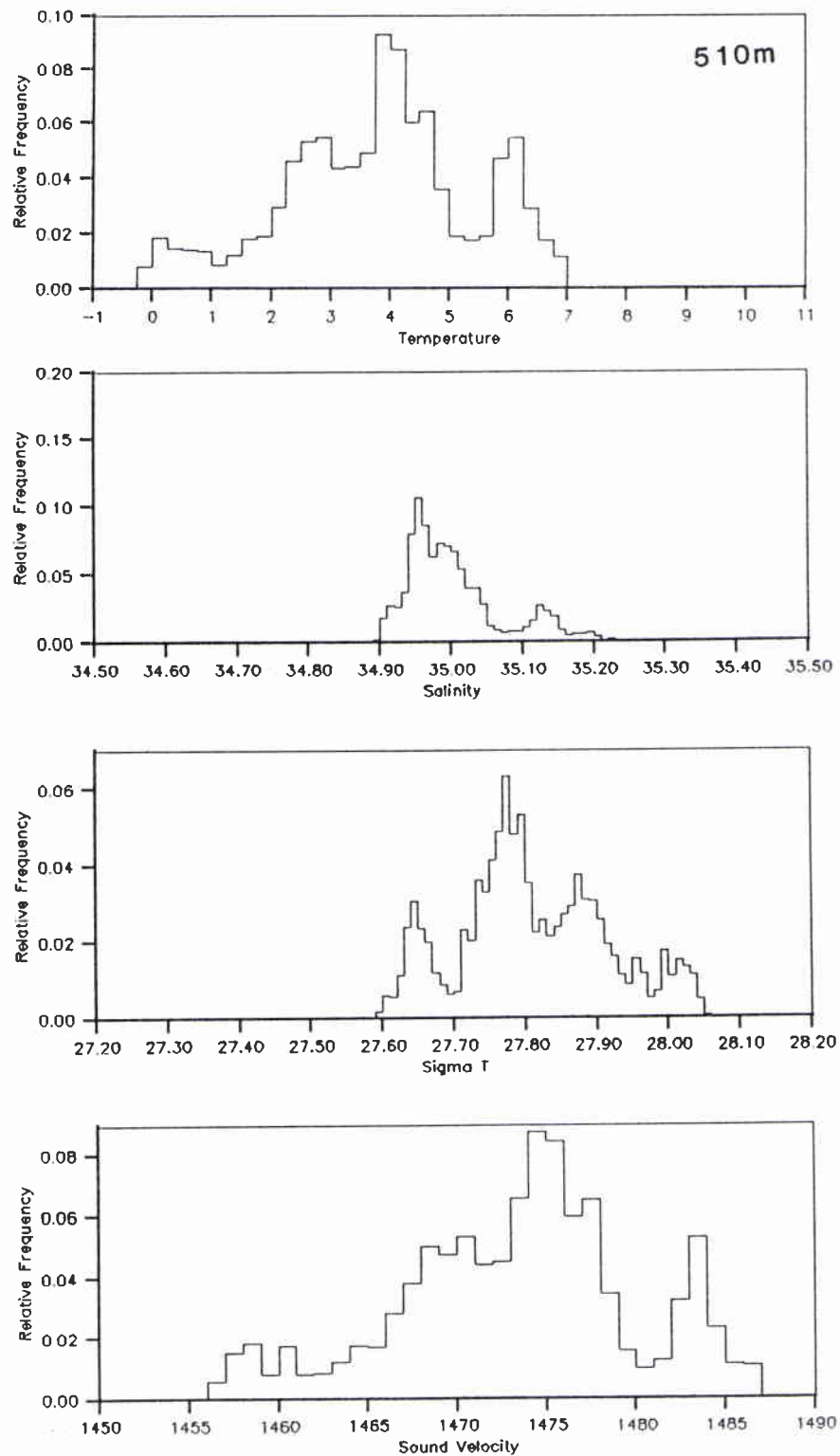


Figure B8

Cruise	: GINSEA_87	Instrument No.	: 9022
Station	: BOA2_000	Instrument Depth	: 130
Version	: MEASURED	Water Depth	: 802
Latitude	: 62 15.7'N	From	: 03-JUN-1987 06:55
Longitude	: 0 2.7'E	To	: 08-SEP-1987 02:55

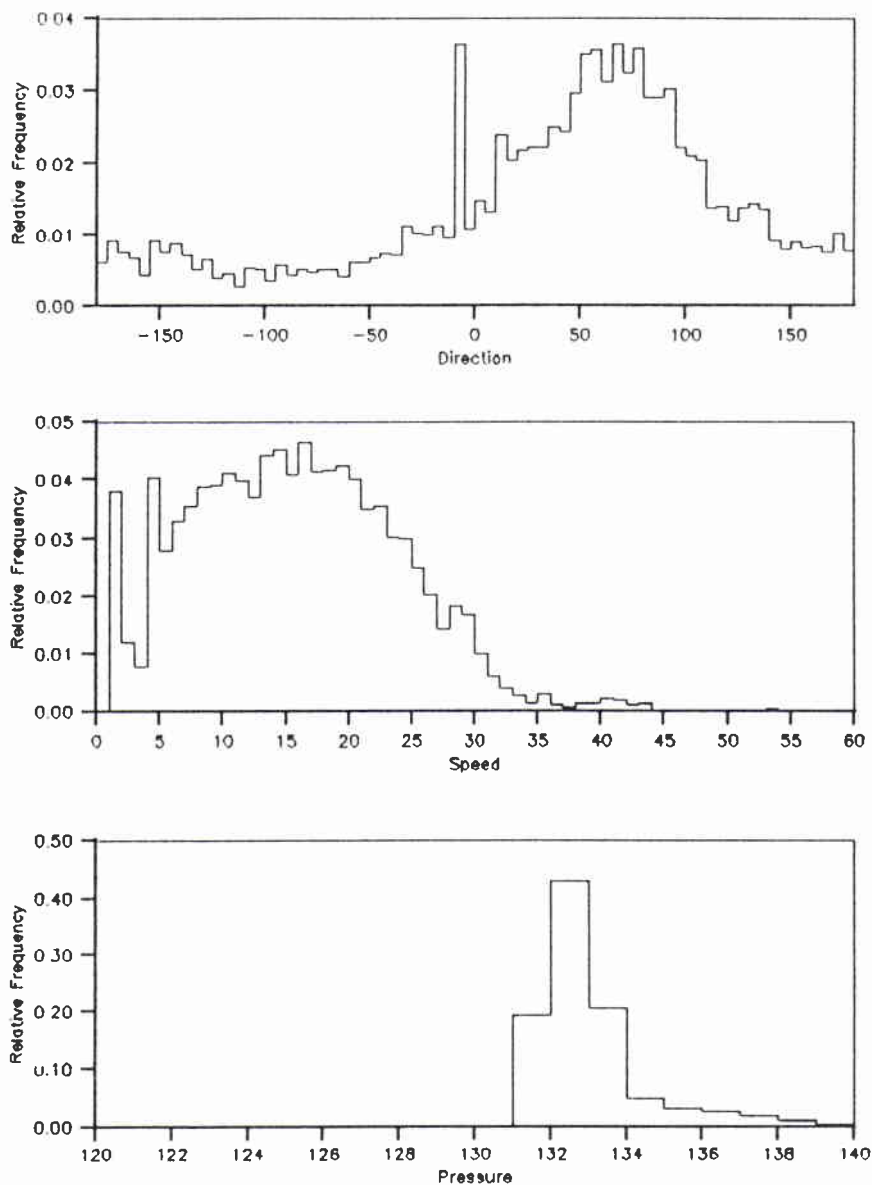


Figure B9

SACLANTCEN SM-250

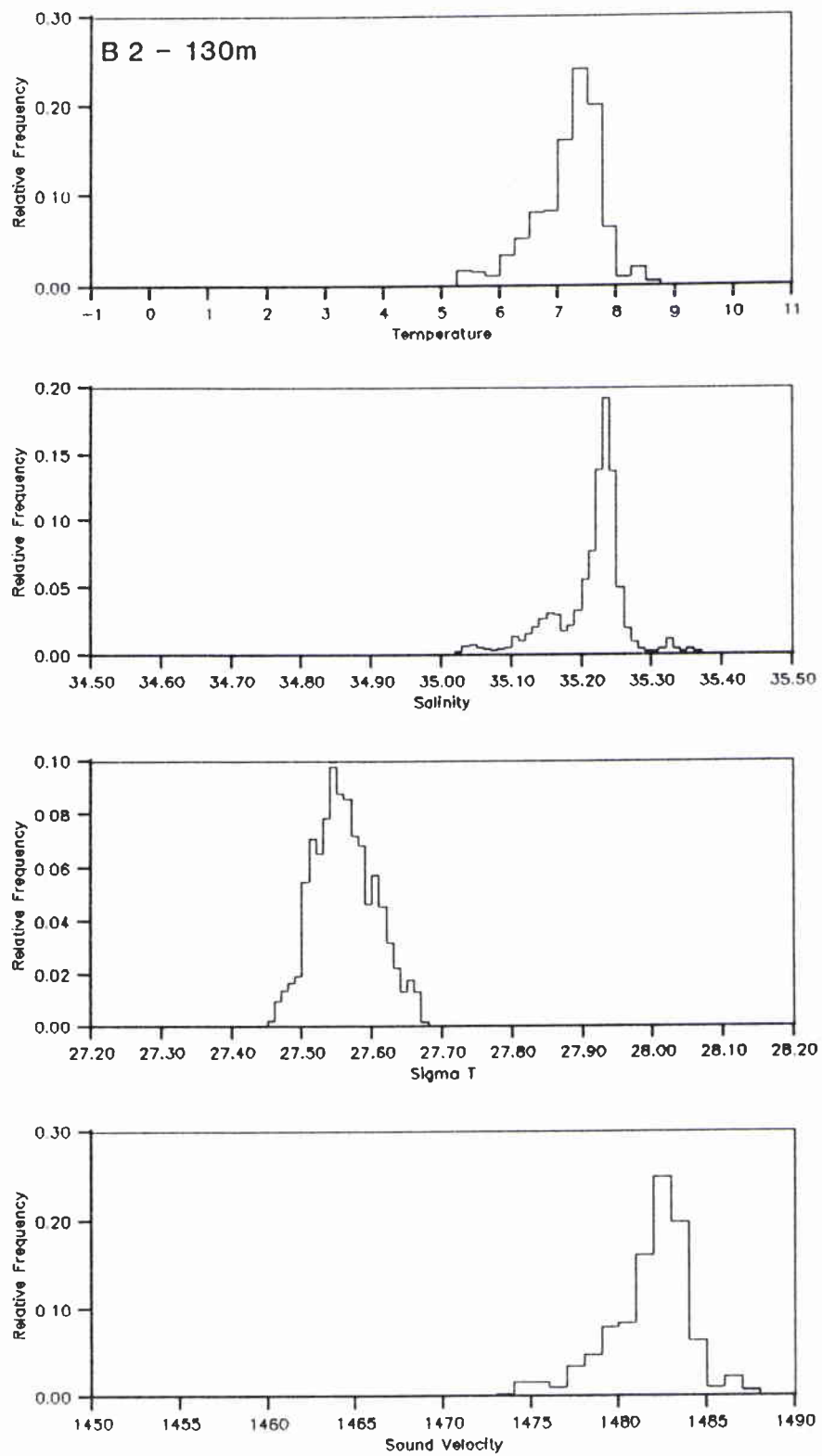
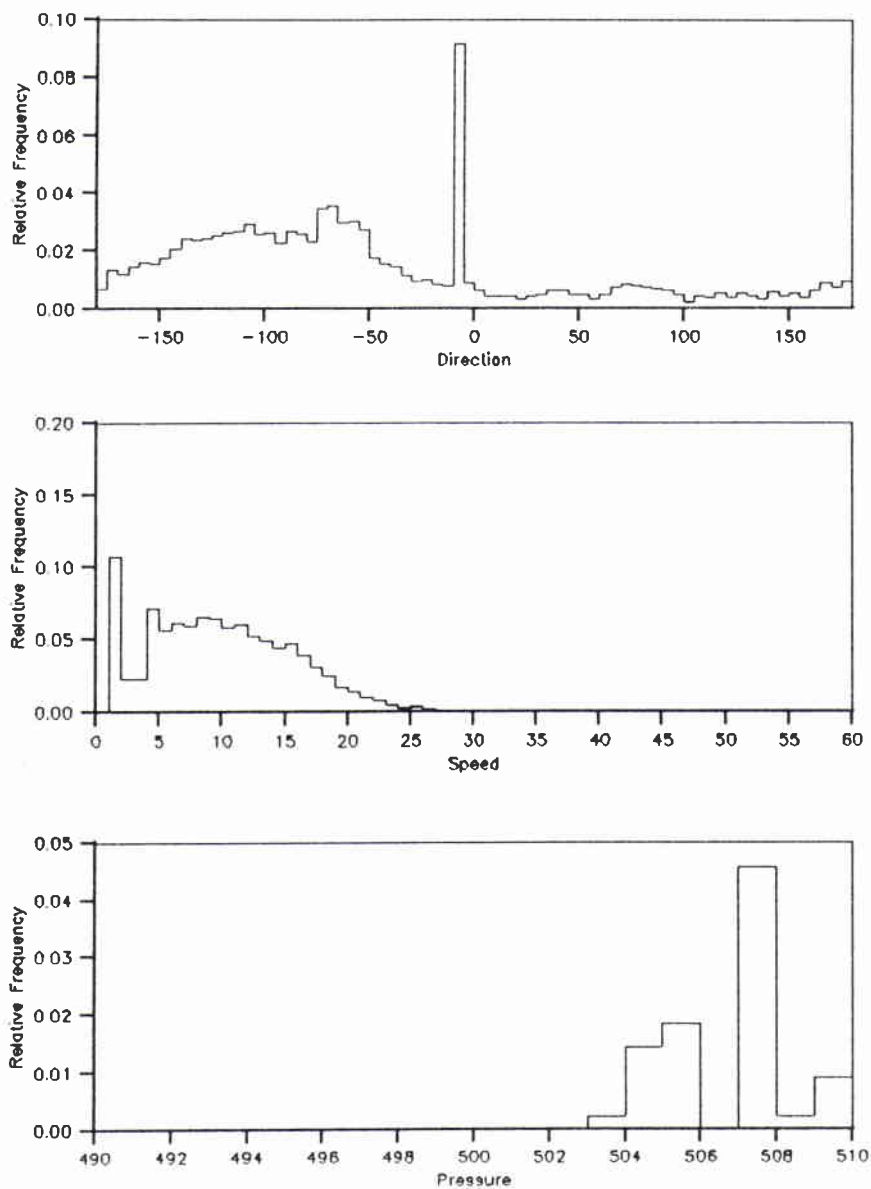


Figure B10

Cruise	: GINSEA_87	Instrument No.	: 9004
Station	: BDA2_002	Instrument Depth	: 500
Version	: MEASURED	Water Depth	: 802
Latitude	: 62 15.7'N	From	: 03-JUN-1987 06:55
Longitude	: 0 2.7'E	To	: 08-SEP-1987 02:15

**Figure B11**

SACLANTCEN SM-250

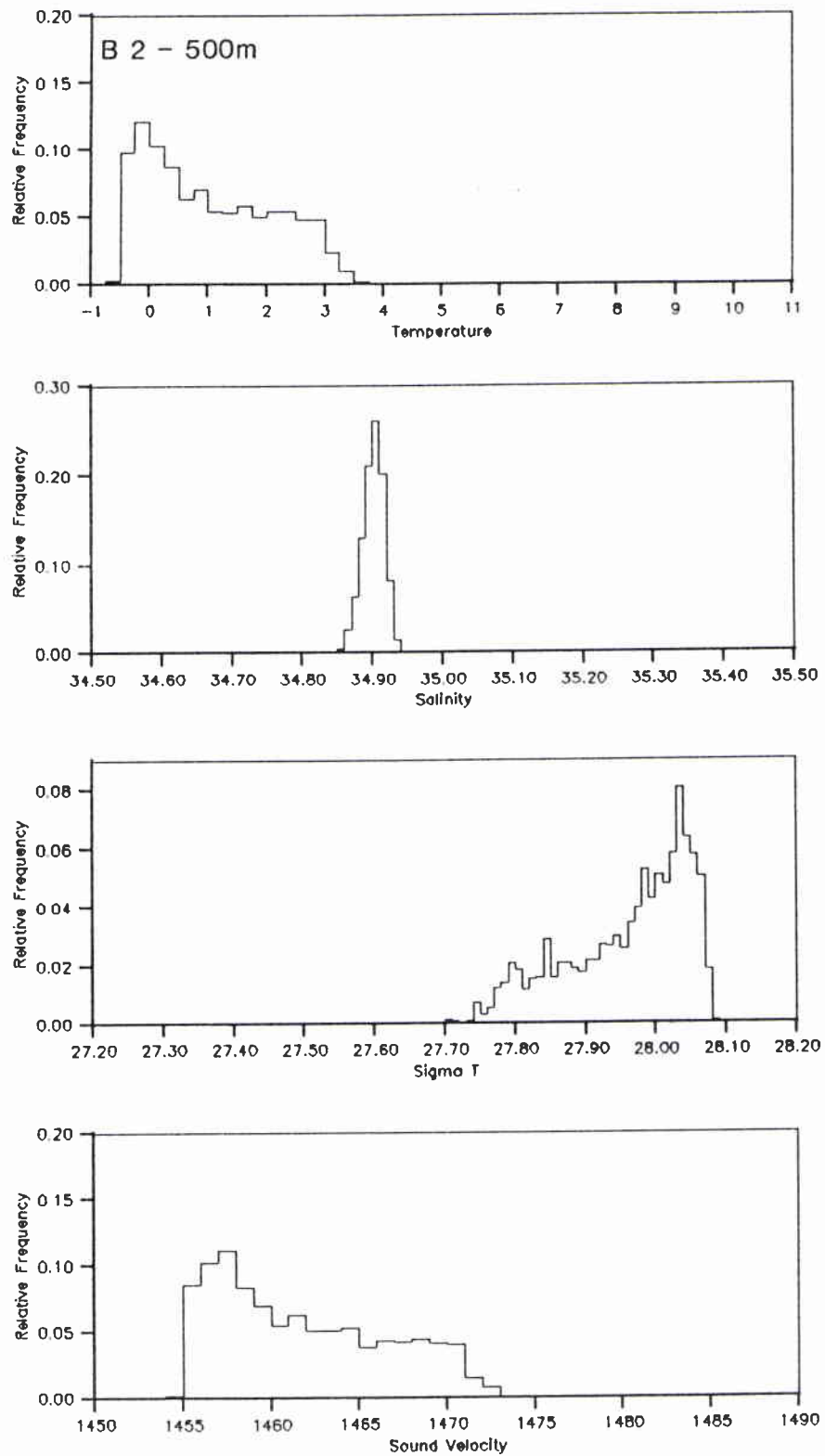


Figure B12

Cruise	: GINSEA_B7	Instrument No.	: 9005
Station	: BOA2_001	Instrument Depth	: 700
Version	: MEASURED	Water Depth	: 802
Latitude	: 62 15.7'N	From	: 03-JUN-1987 07:34
Longitude	: 0 2.7'E	To	: 29-AUG-1987 21:14

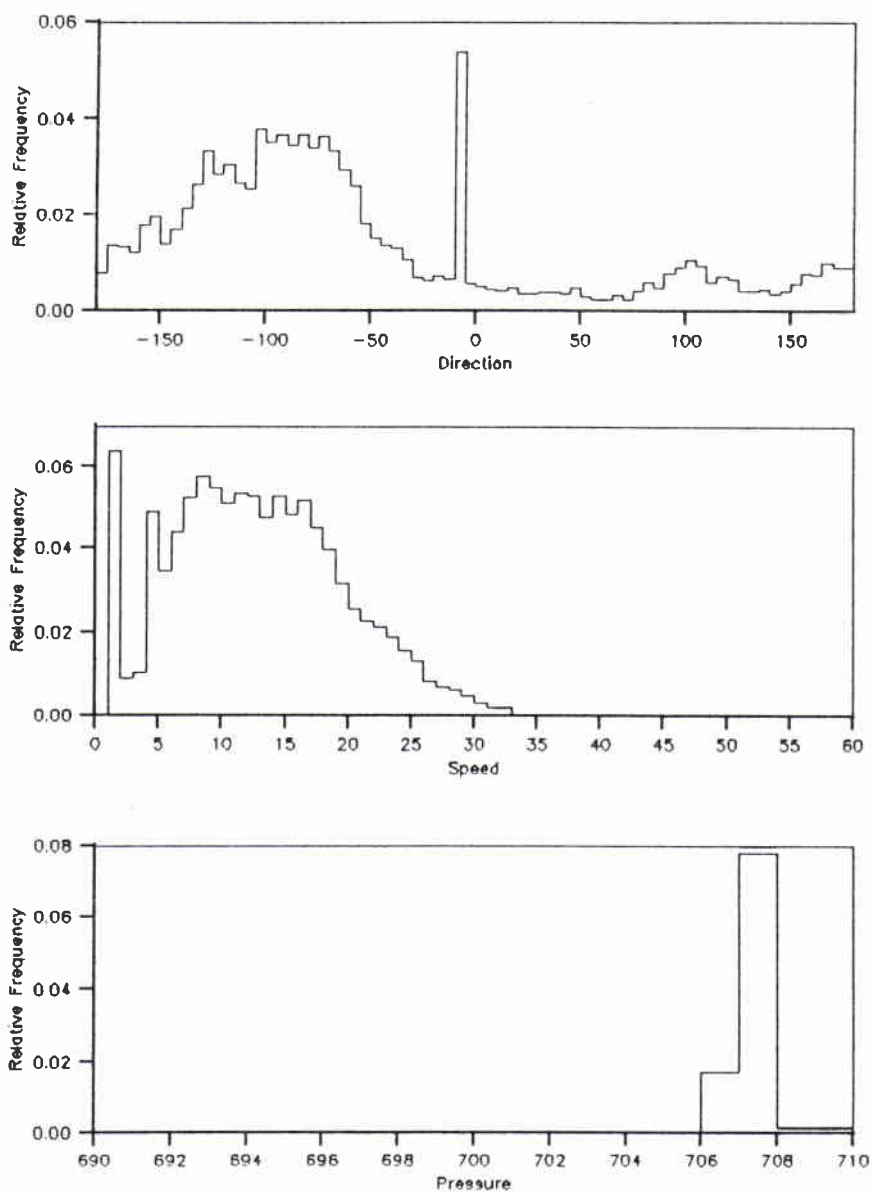


Figure B13

SACLANTCEN SM-250

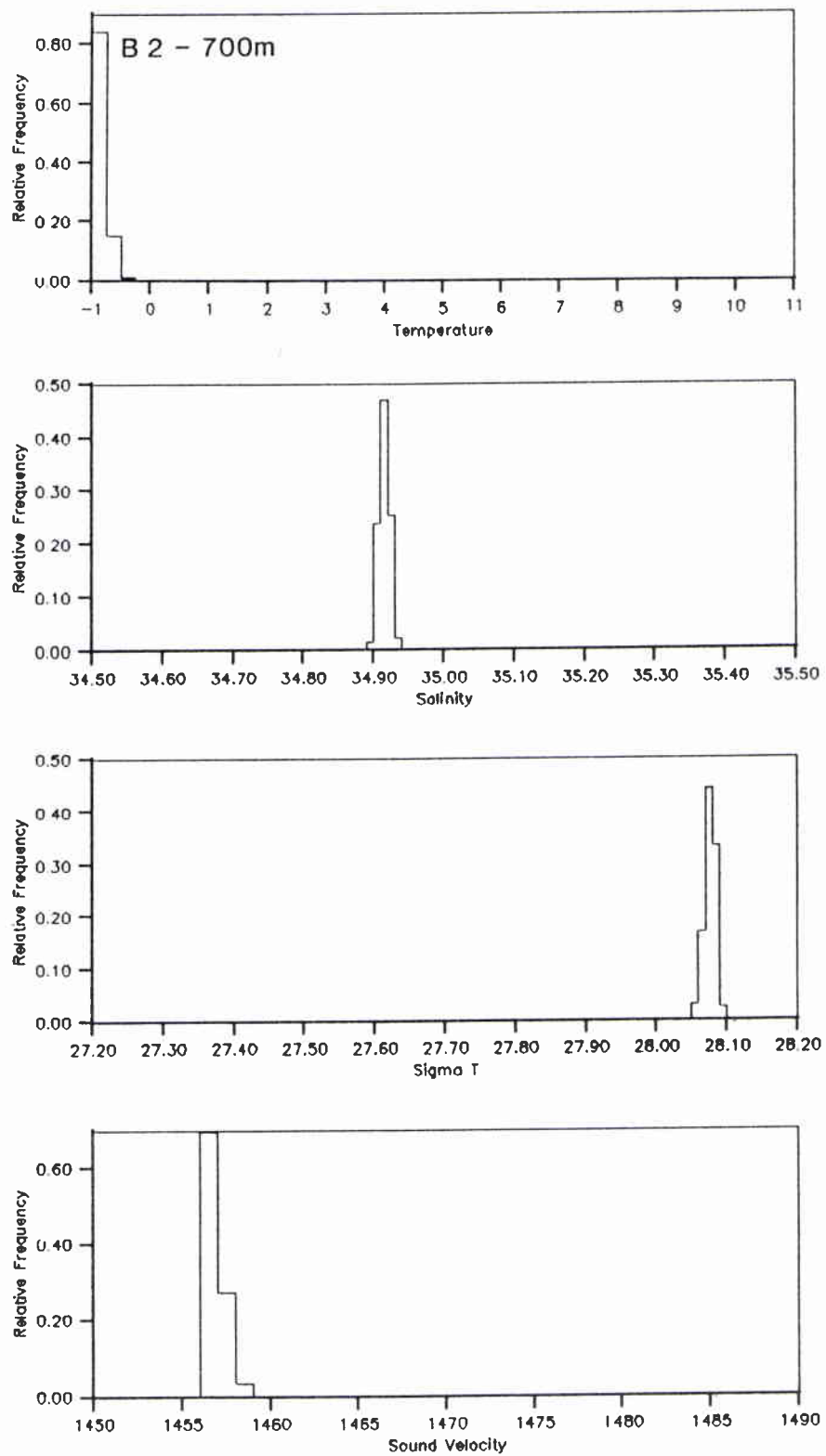
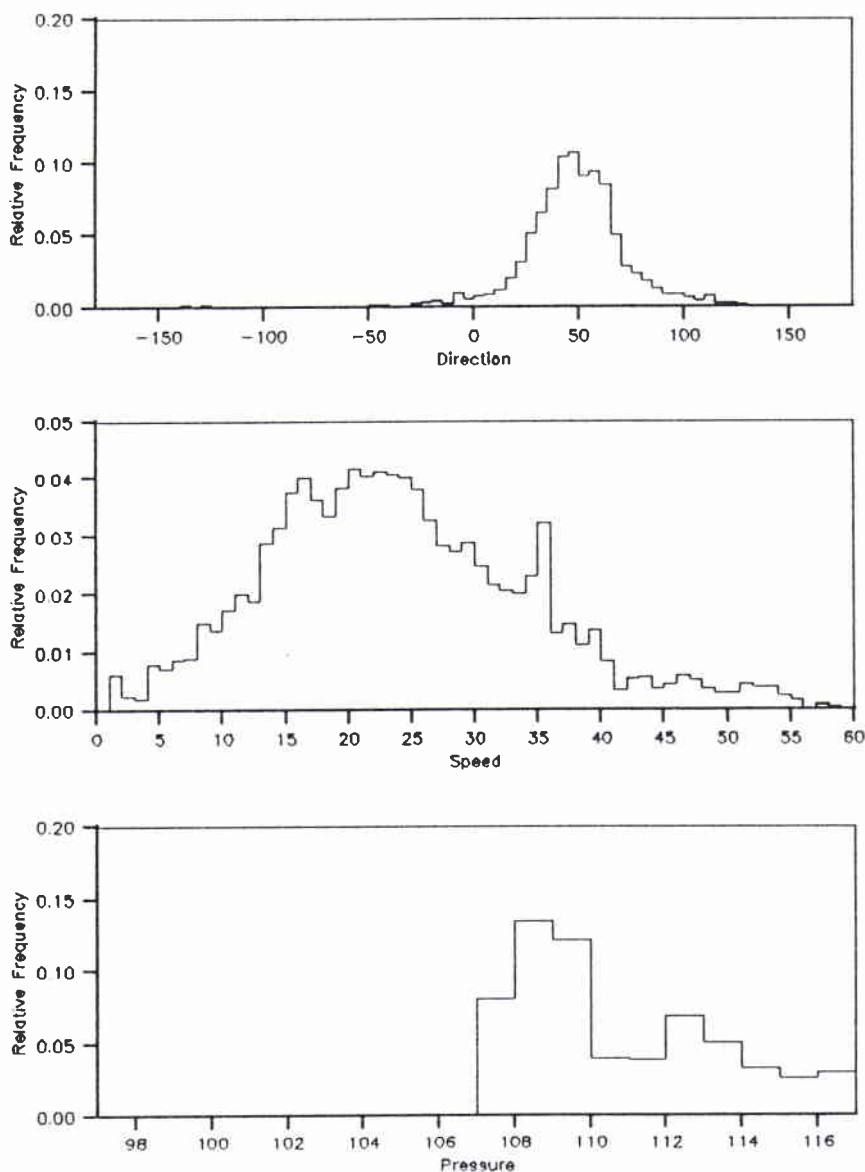


Figure B14

Cruise	: GINSEA_87	Instrument No.	: 9021
Station	: BOA3_001	Instrument Depth	: 107
Version	: MEASURED	Water Depth	: 762
Latitude	: 63 5.5'N	From	: 04-JUN-1987 15:16
Longitude	: 4 51.9'E	To	: 07-SEP-1987 01:16

**Figure B15**

SACLANTCEN SM-250

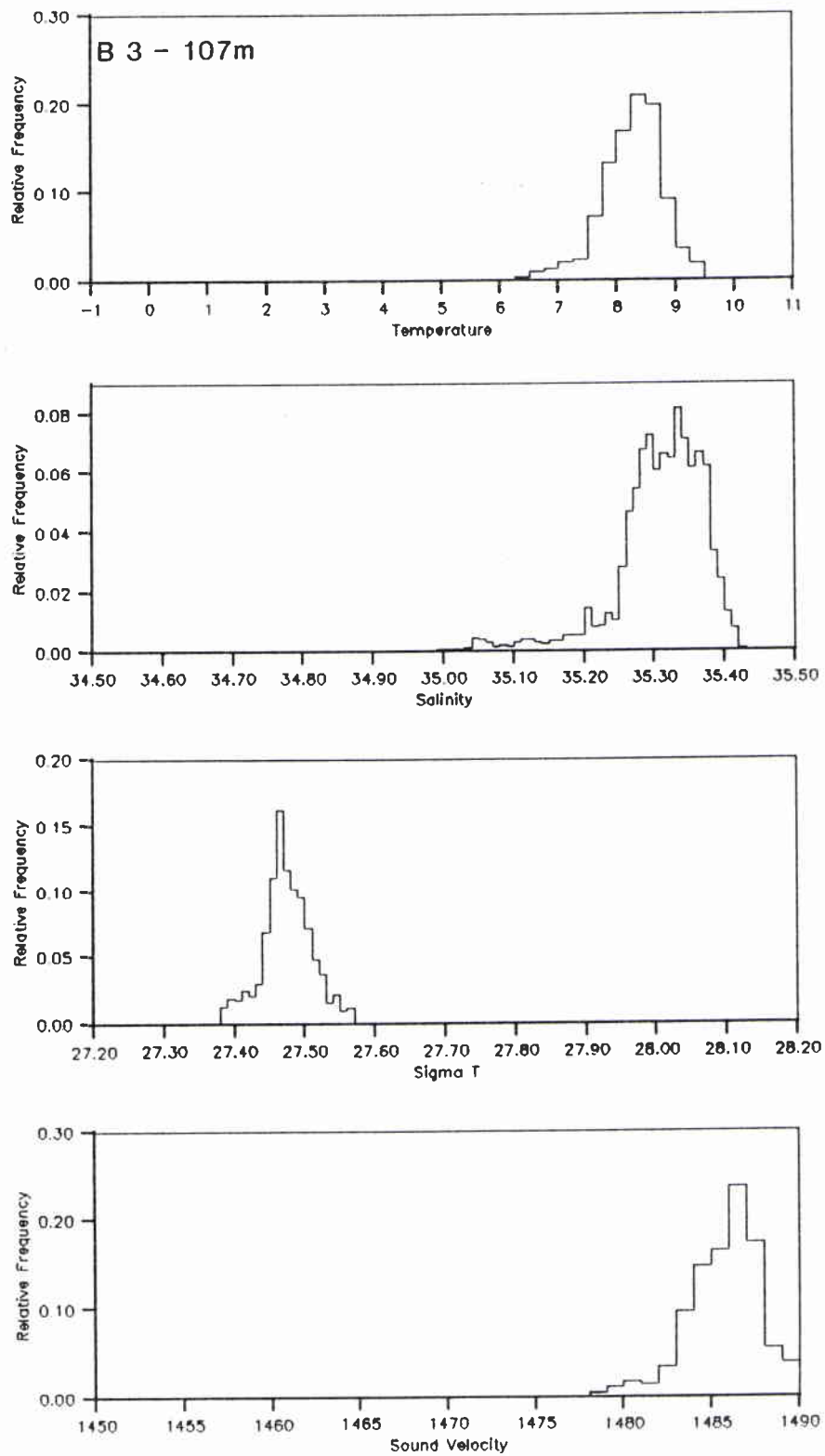


Figure B16

Cruise	: GINSEA_B7	Instrument No.	: 9006
Station	: BOA3_002	Instrument Depth	: 480
Version	: MEASURED	Water Depth	: 762
Latitude	: 63 5.5'N	From	: 04-JUN-1987 15:16
Longitude	: 4 51.9'E	To	: 08-SEP-1987 15:36

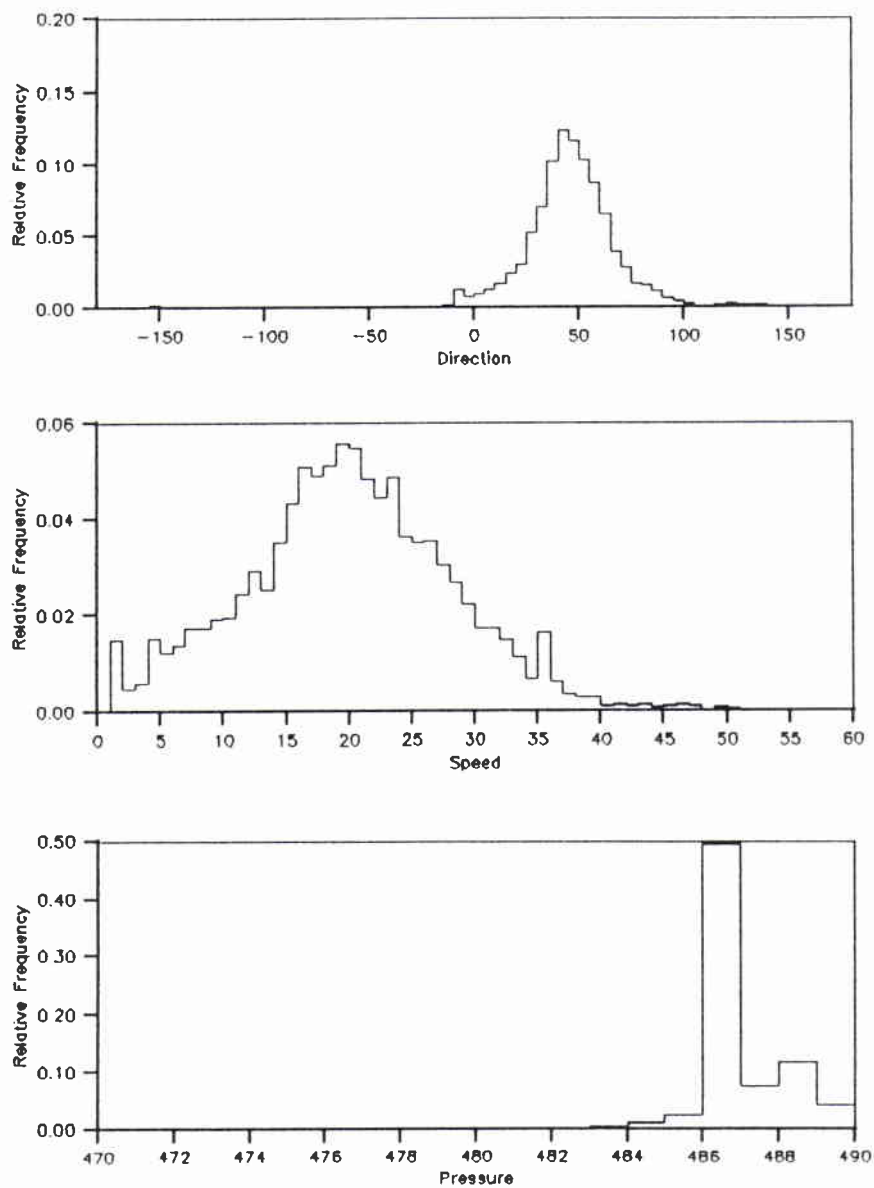


Figure B17

SACLANTCEN SM-250

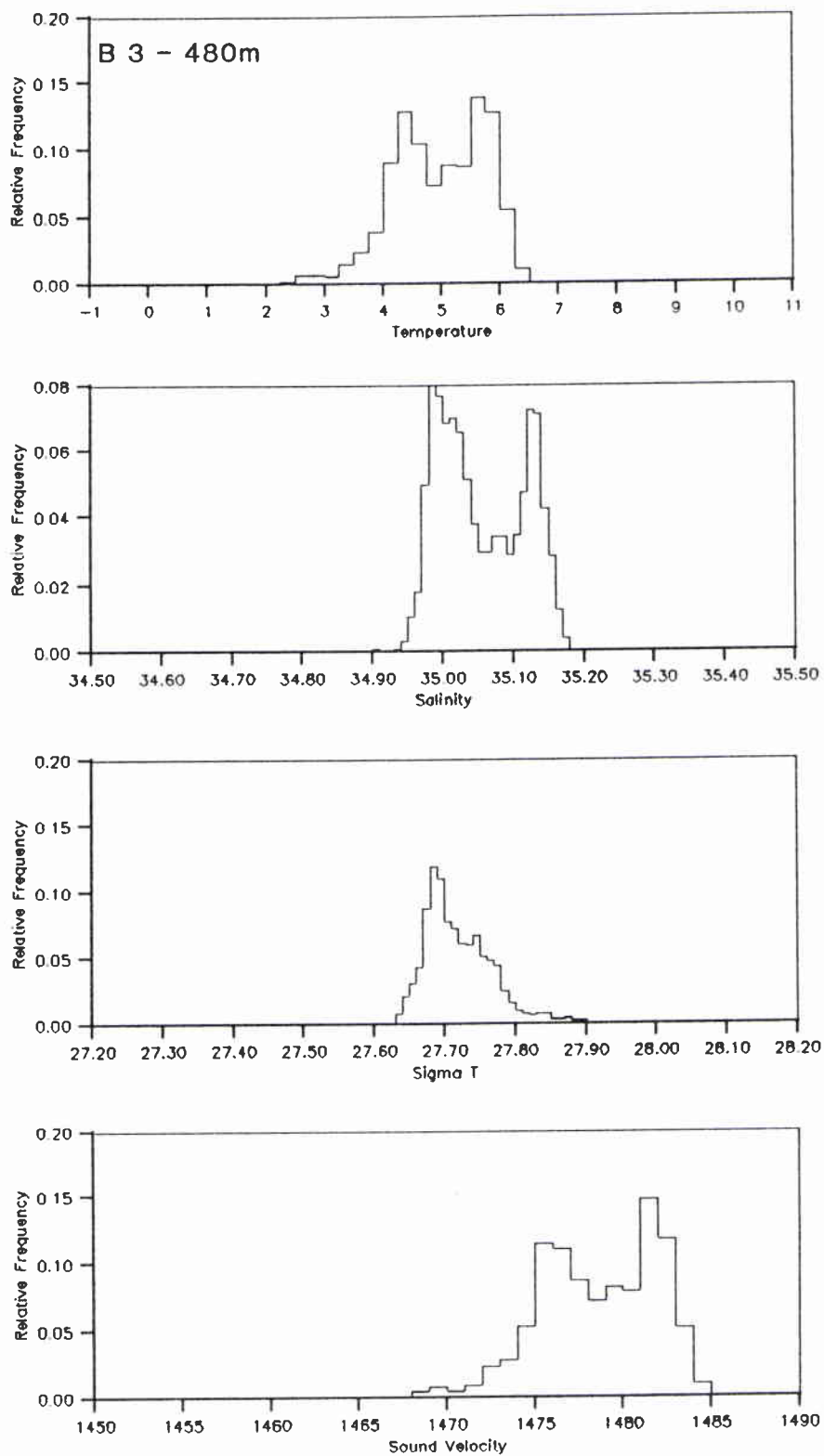
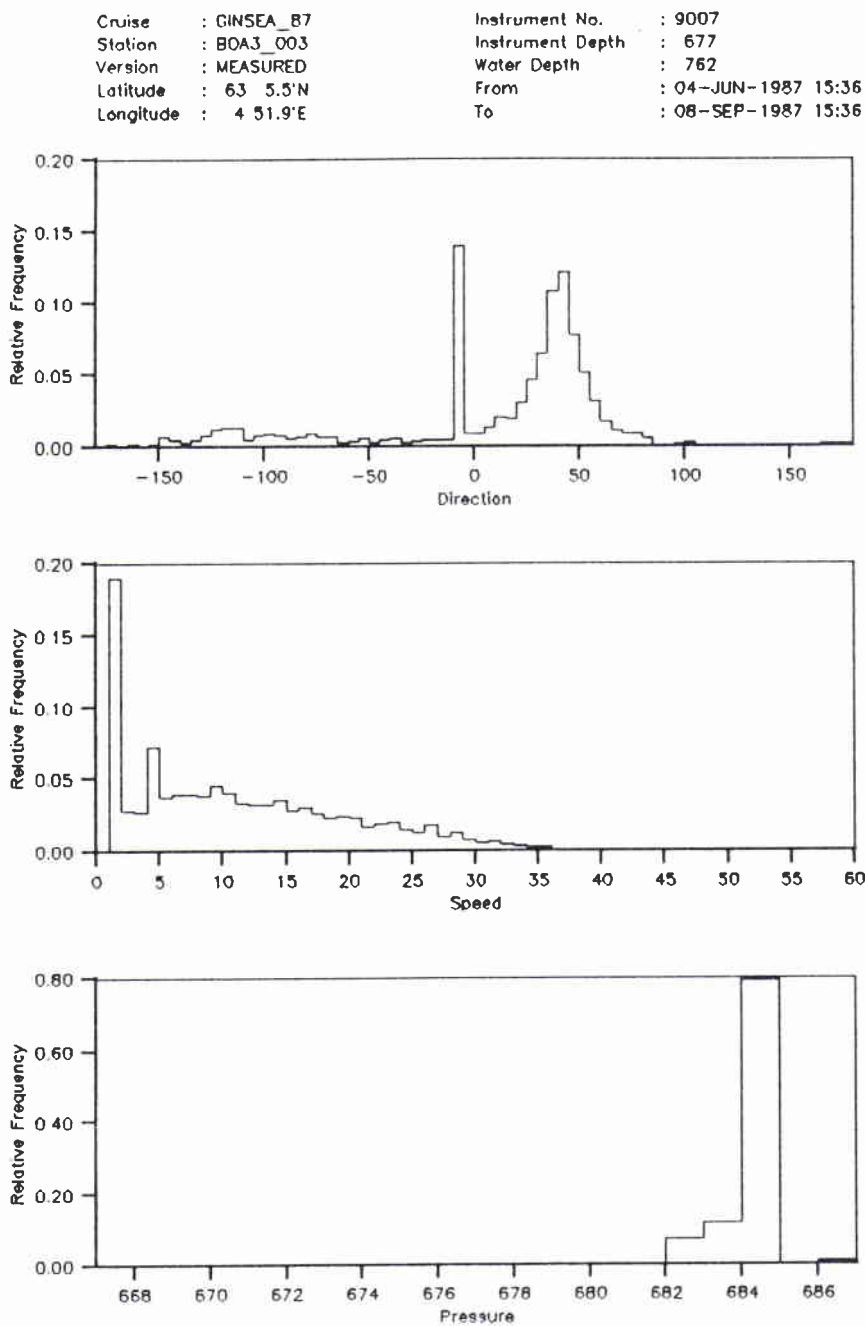


Figure B18

**Figure B19**

SACLANTCEN SM-250

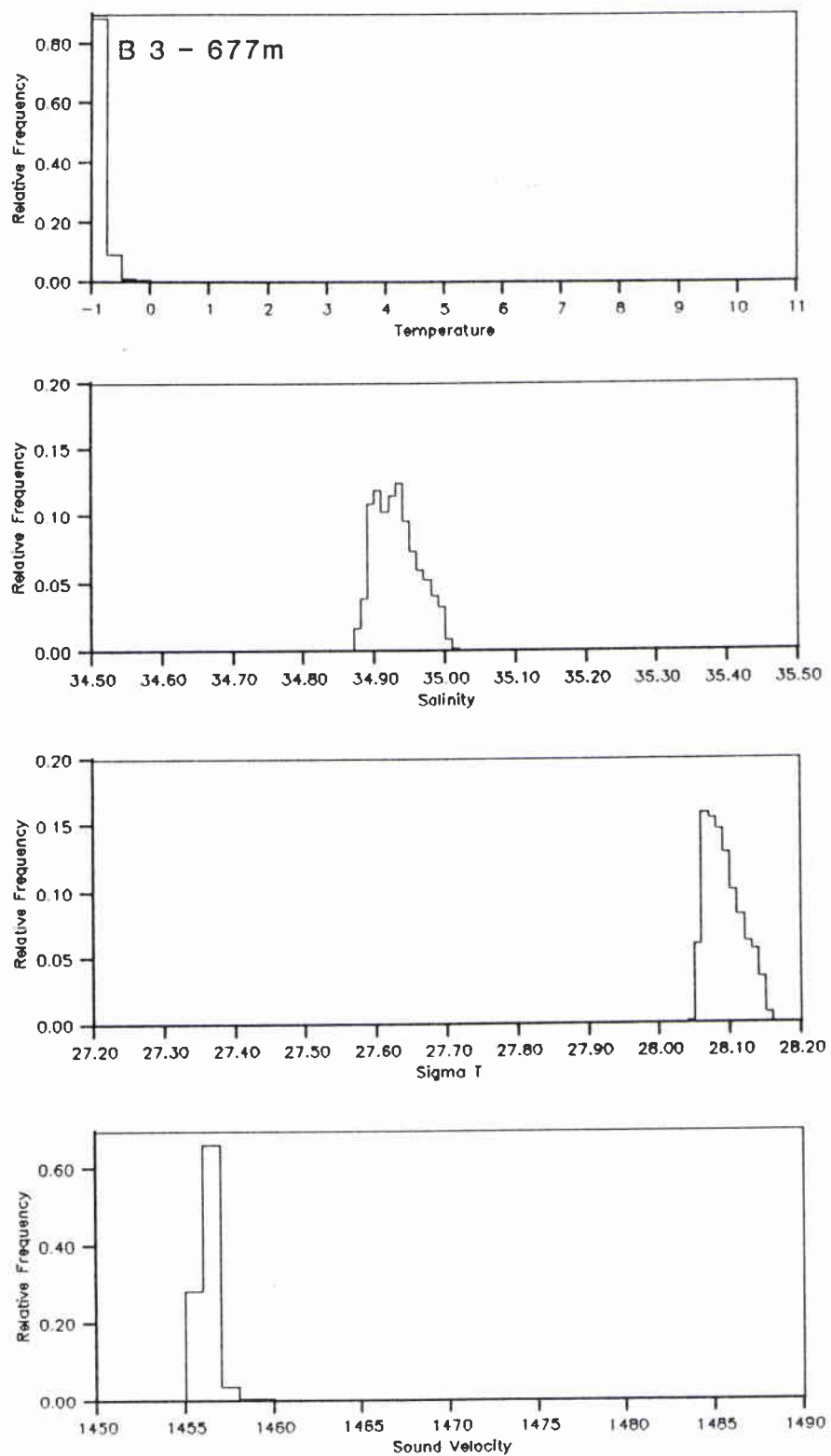
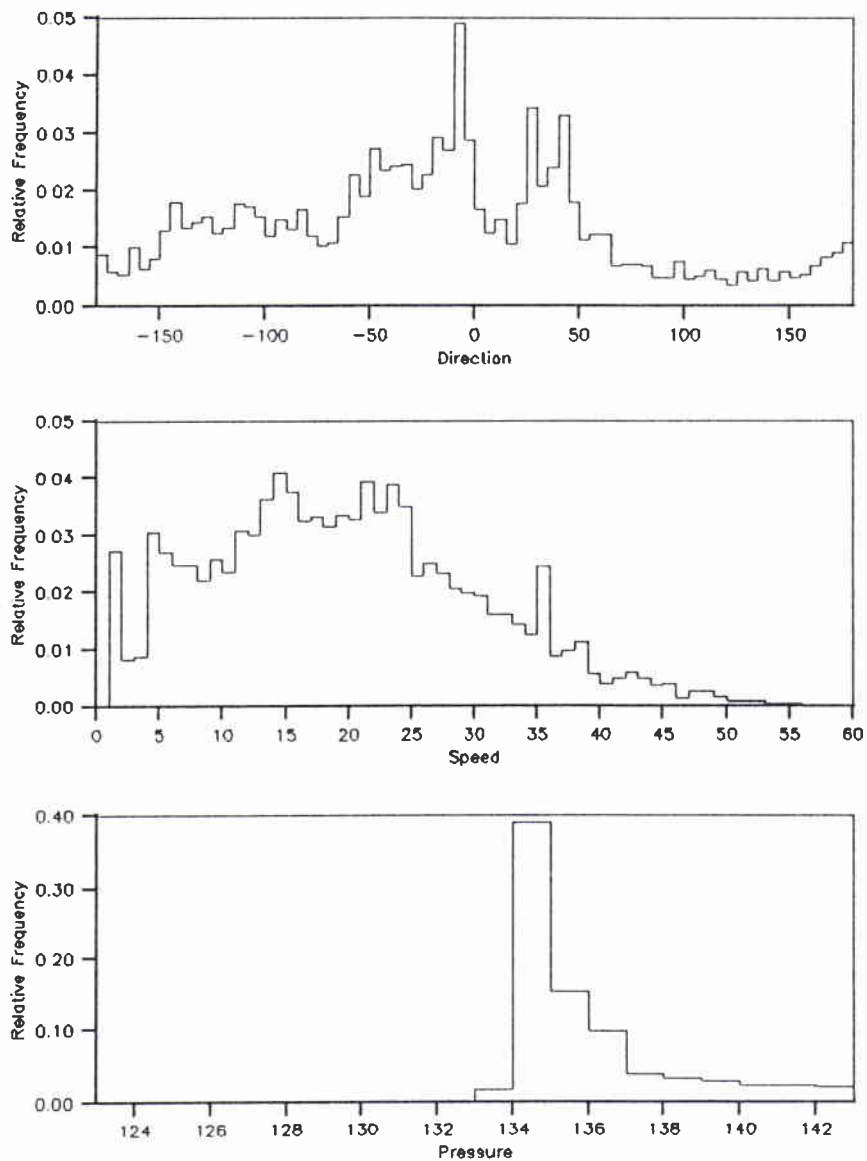


Figure B20

Cruise	: GINSEA_87	Instrument No.	: 9024
Station	: BOA4_001	Instrument Depth	: 133
Version	: MEASURED	Water Depth	: 800
Latitude	: 65 29.9'N	From	: 05-JUN-1987 00:00
Longitude	: 4 53.7'E	To	: 09-SEP-1987 00:00

**Figure B21**

SACLANTCEN SM-250

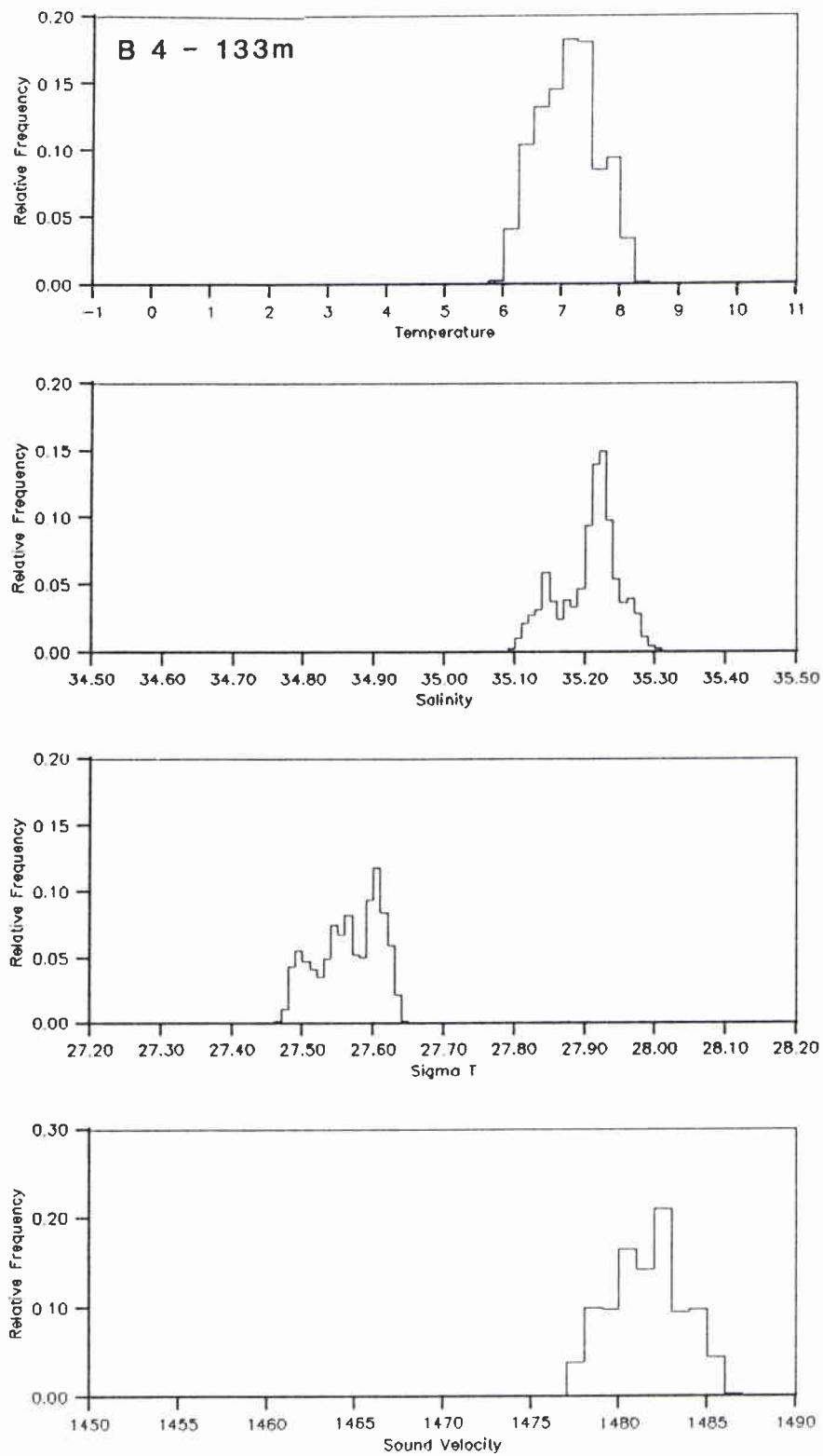
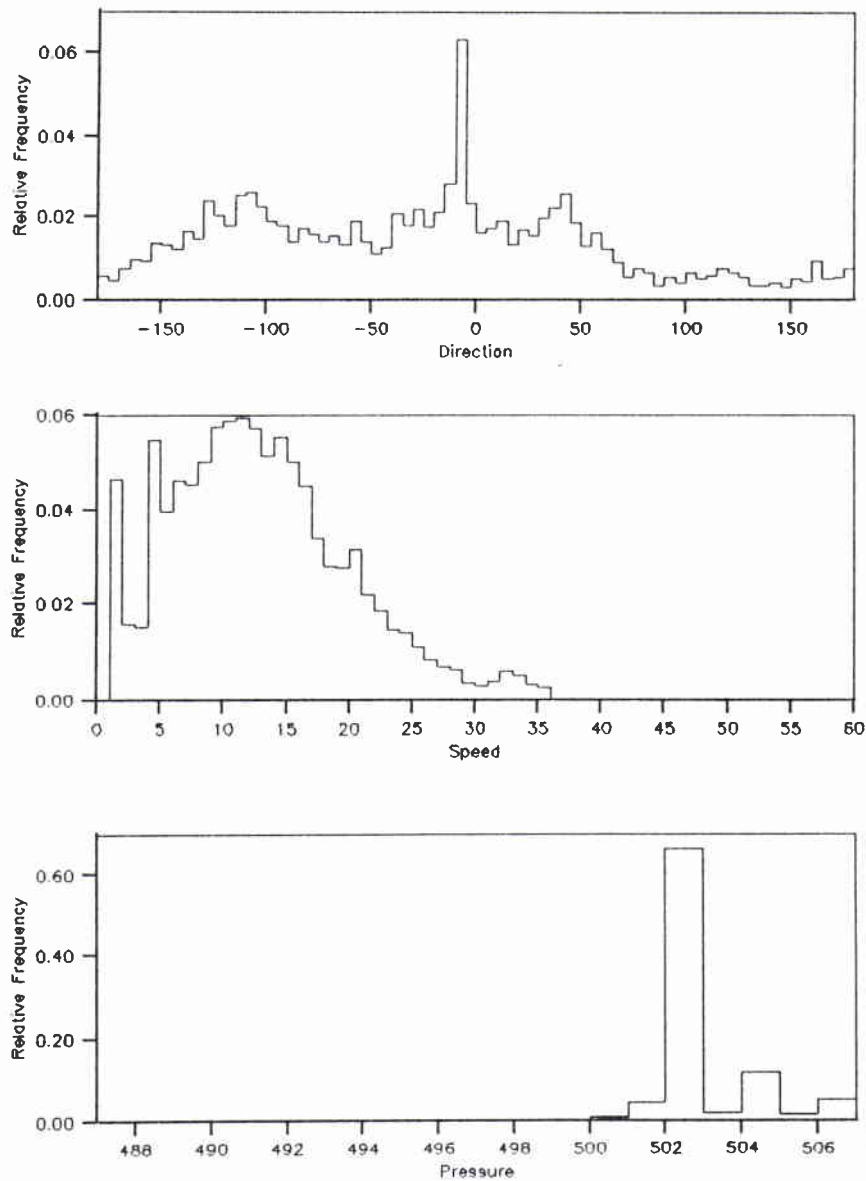


Figure B22

Cruise	: GINSEA_87	Instrument No.	: 9008
Station	: BOA4_000	Instrument Depth	: 497
Version	: MEASURED	Water Depth	: 800
Latitude	: 65 29.9'N	From	: 05-JUN-1987 00:00
Longitude	: 4 53.7'E	To	: 09-SEP-1987 00:00

**Figure B23**

SACLANTCEN SM-250

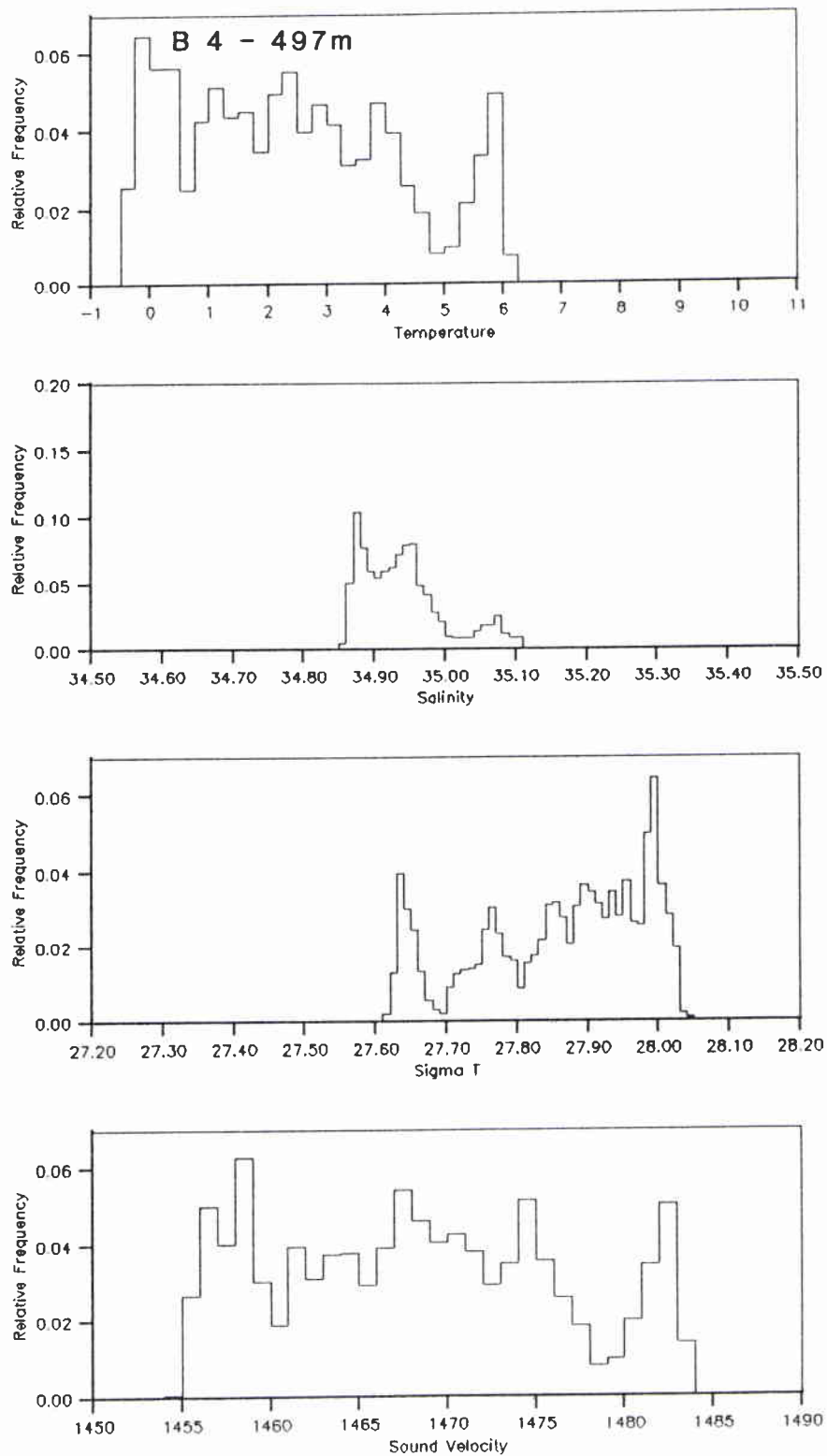


Figure B24

Cruise	: GINSEA_B7	Instrument No.	: 9009
Station	: BOA4_002	Instrument Depth	: 708
Version	: MEASURED	Water Depth	: 800
Latitude	: 65 29.9'N	From	: 05-JUN-1987 00:00
Longitude	: 4 53.7'E	To	: 09-SEP-1987 00:00

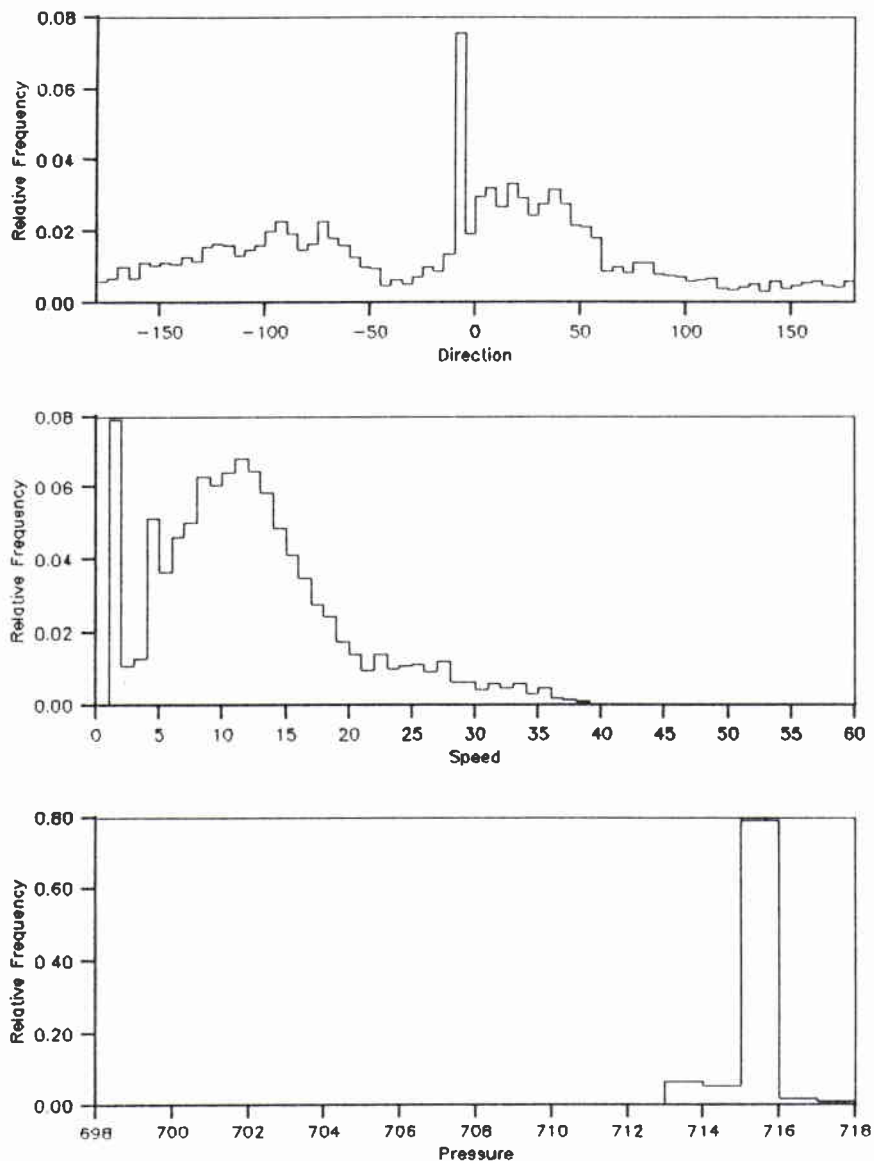


Figure B25

SACLANTCEN SM-250

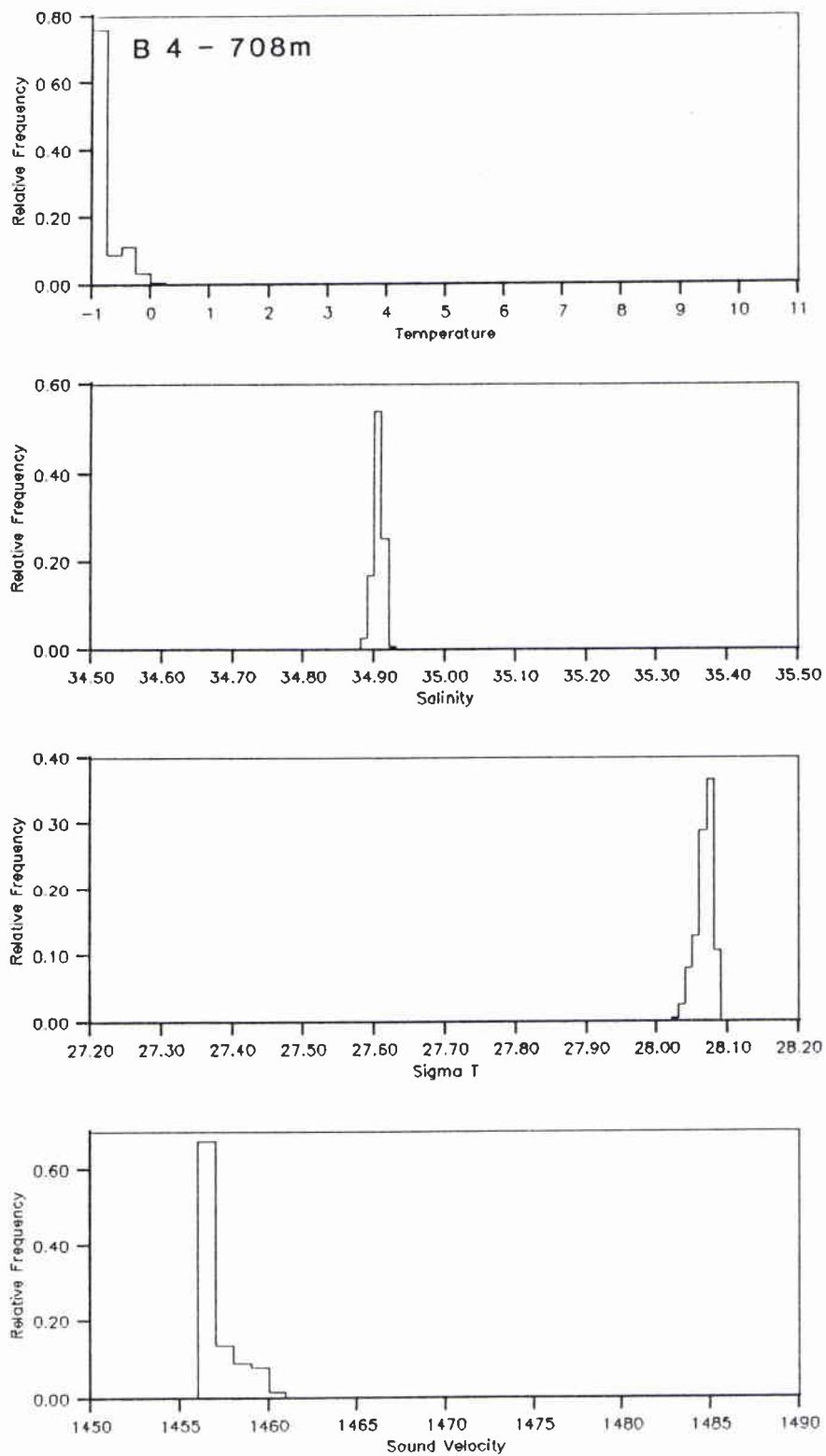


Figure B26

Cruise	: GINSEA_B7	Instrument No.	: 9020
Station	: BOAS_002	Instrument Depth	: 141
Version	: MEASURED	Water Depth	: 805
Latitude	: 66 48.7'N	From	: 06-JUN-1987 10:05
Longitude	: 7 27.9'E	To	: 10-SEP-1987 03:25

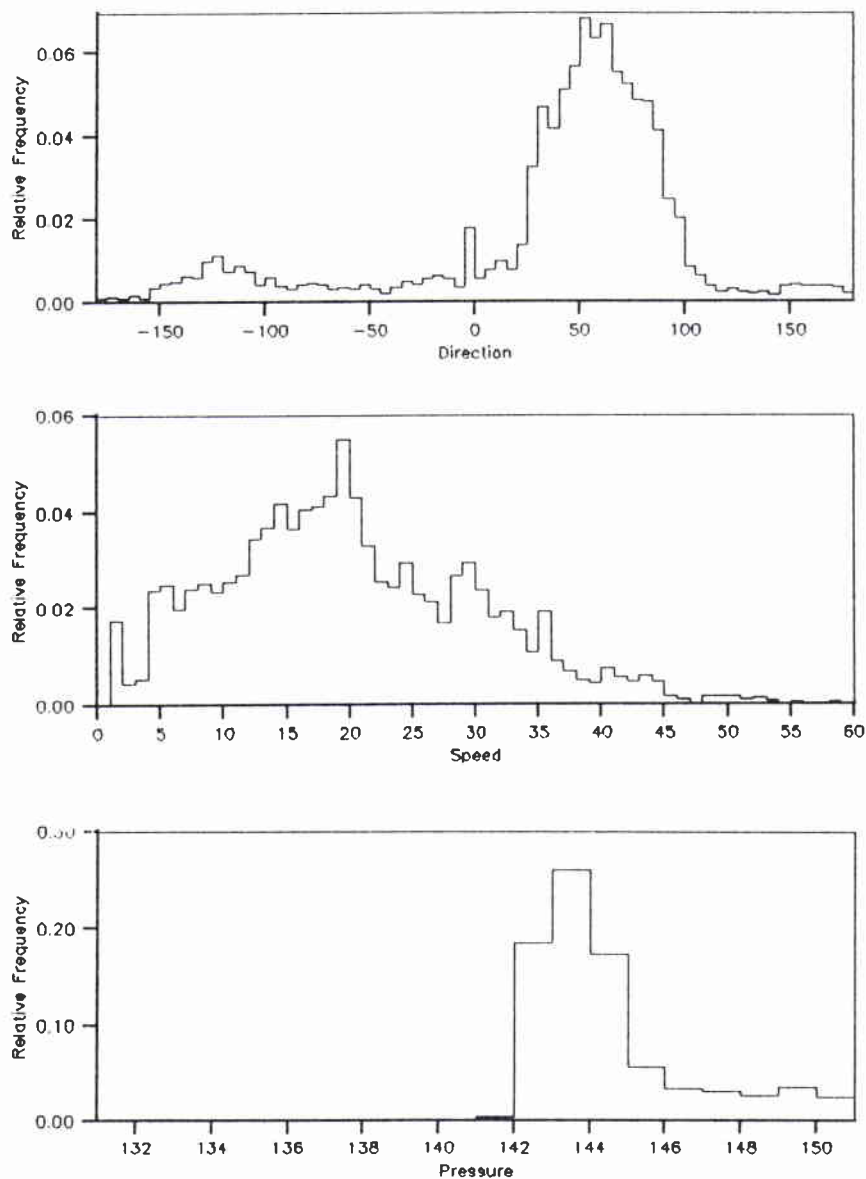


Figure B27

SACLANTCEN SM-250

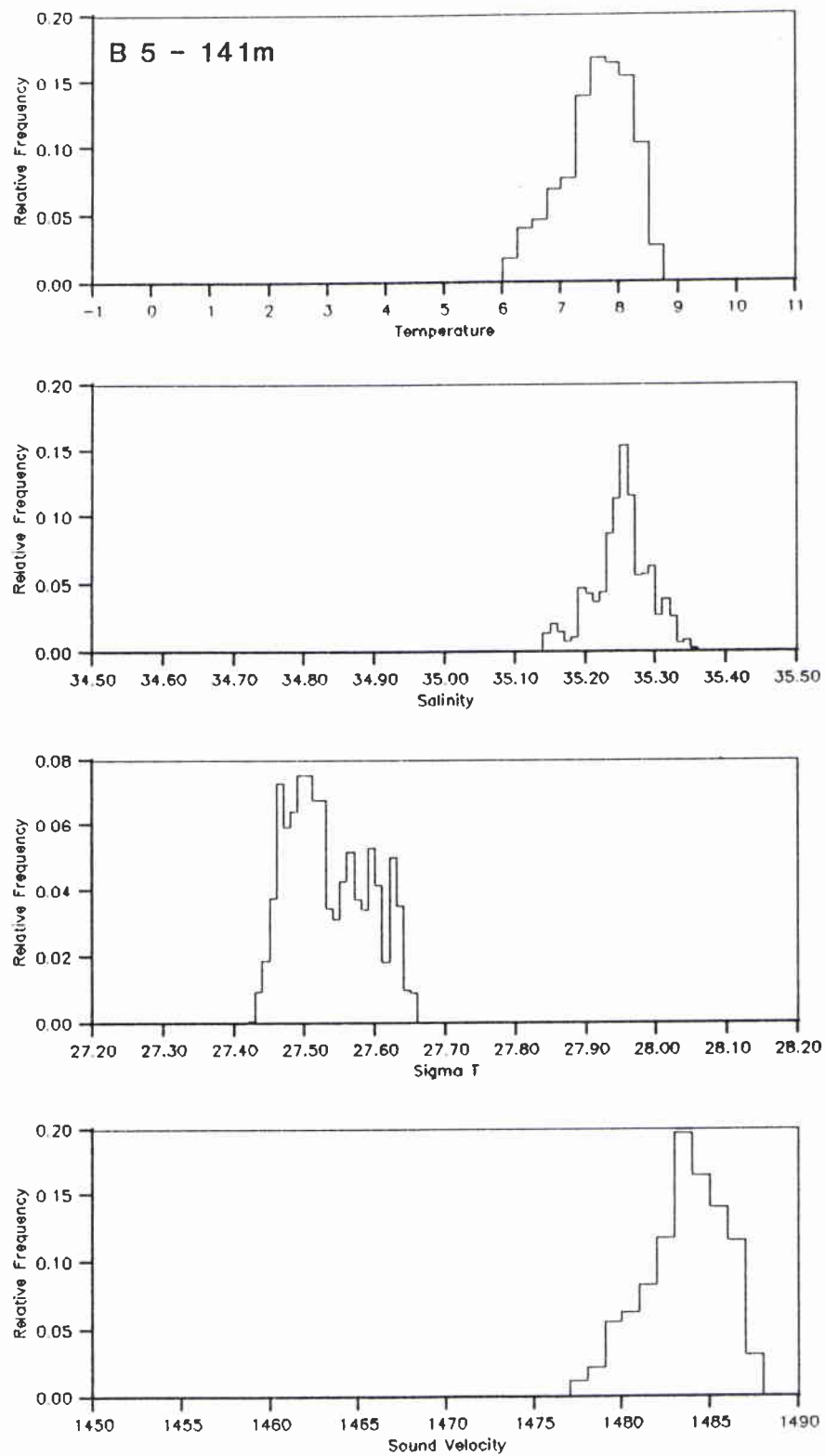
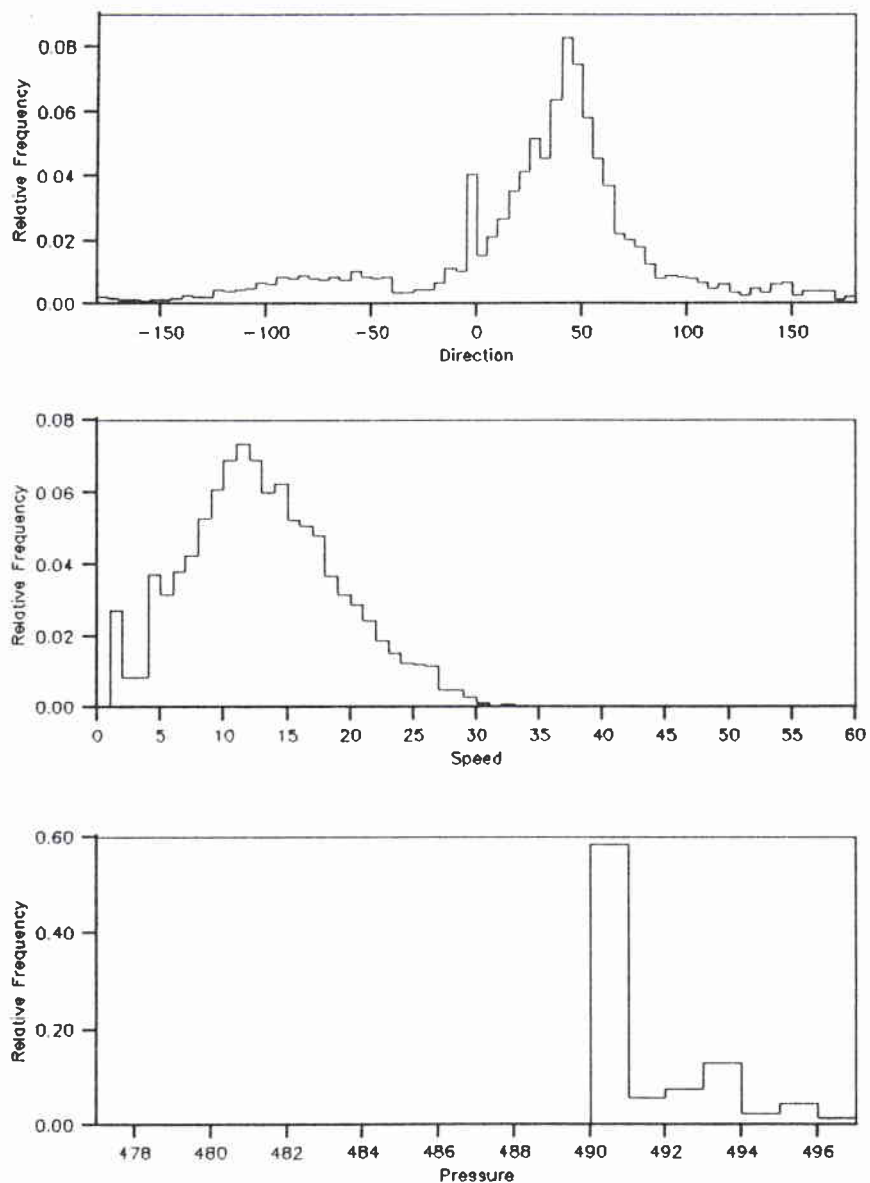


Figure B28

Cruise	: GINSEA_B7	Instrument No.	: 9010
Station	: BOA5_000	Instrument Depth	: 487
Version	: MEASURED	Water Depth	: 805
Latitude	: 66 48.7'N	From	: 06-JUN-1987 10:05
Longitude	: 7 27.9'E	To	: 10-SEP-1987 03:25

**Figure B29**

SACLANTCEN SM-250

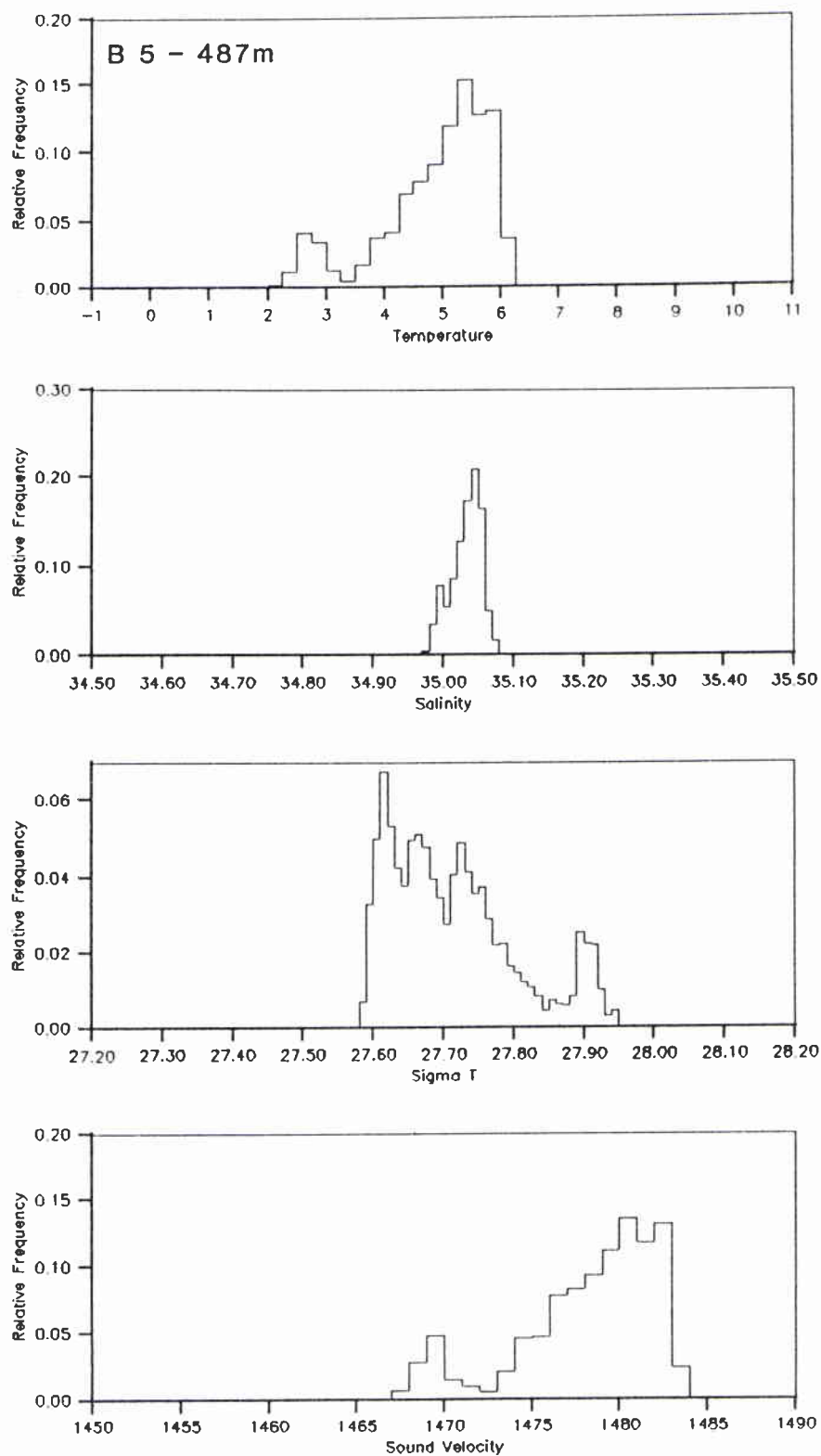
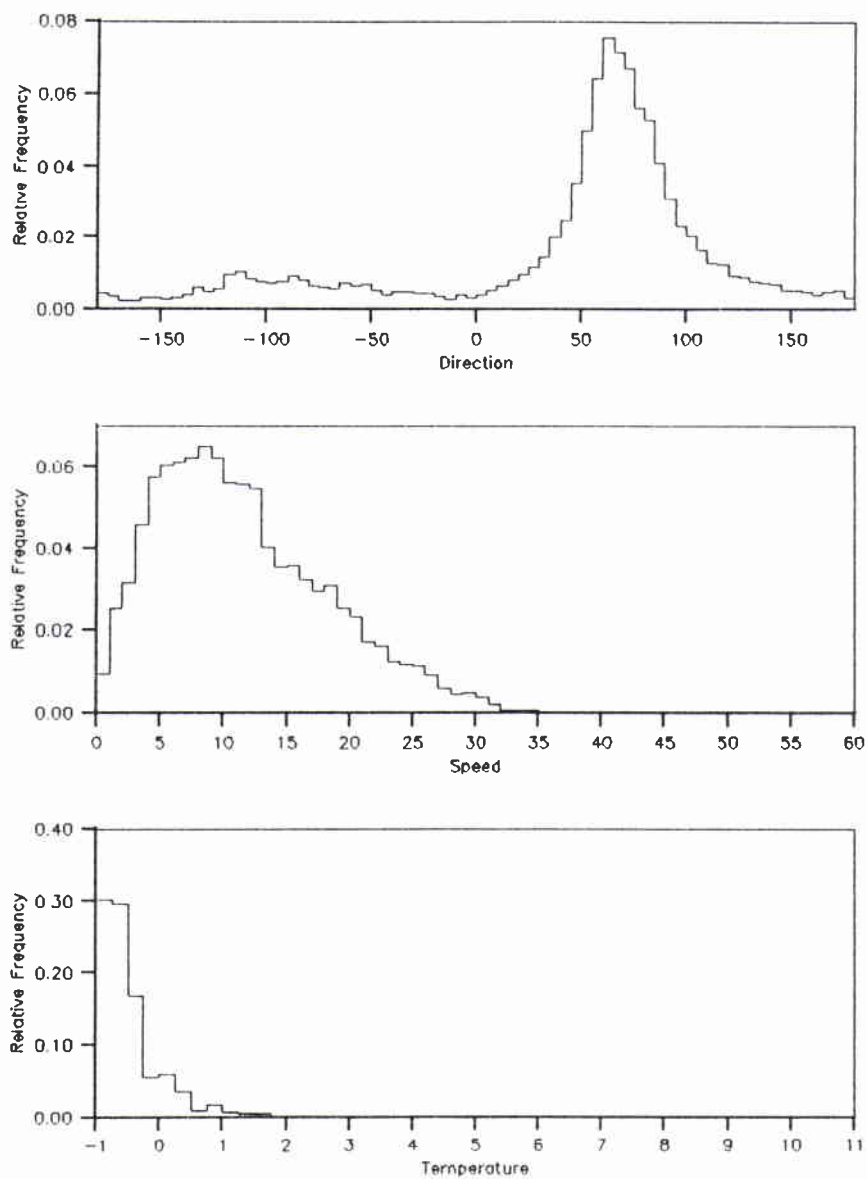


Figure B30

Cruise	: GINSEA_87	Instrument No.	: 1280
Station	: BOA5_001	Instrument Depth	: 689
Version	: MEASURED	Water Depth	: 805
Latitude	: 66 48.7'N	From	: 06-JUN-1987 12:40
Longitude	: 7 27.9'E	To	: 10-SEP-1987 07:16

**Figure B31**

SACLANTCEN SM-250

Cruise	: GINSEA_87	Instrument No.	: 9017
Station	: BOA6_002	Instrument Depth	: 97
Version	: MEASURED	Water Depth	: 1701
Latitude	: 65 39.7'N	From	: 07-JUN-1987 07:00
Longitude	: 2 49.2'E	To	: 09-SEP-1987 07:20

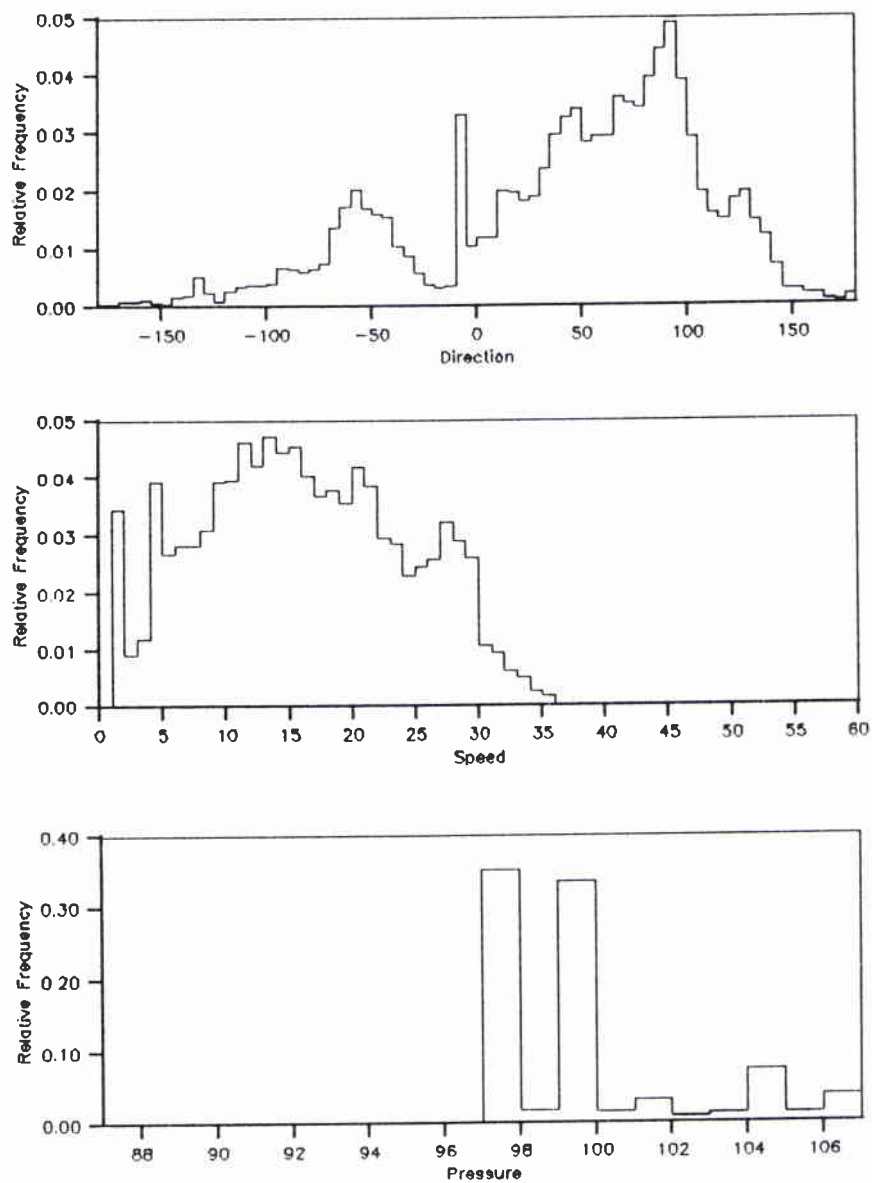
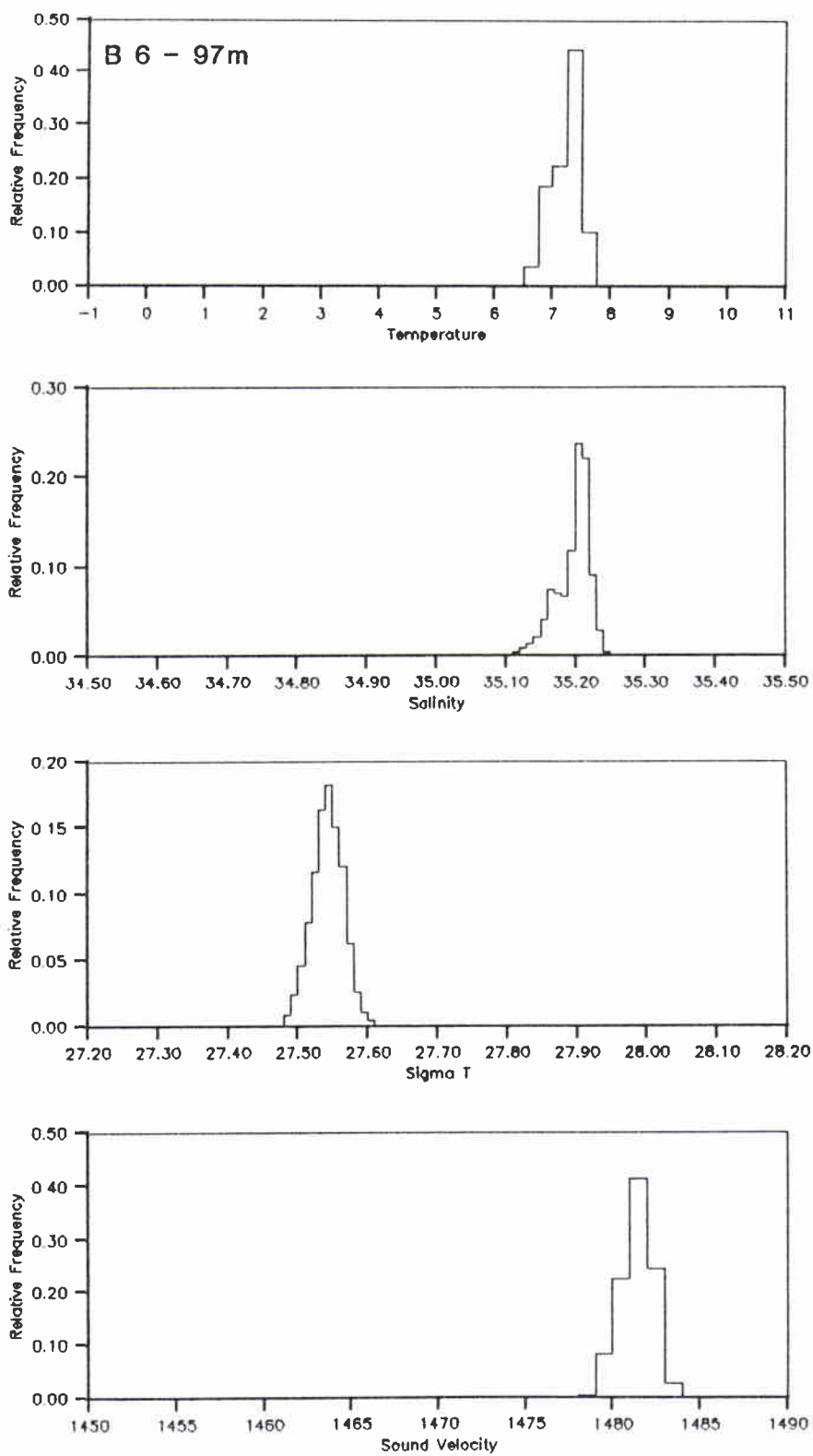


Figure B32

**Figure B33**

SACLANTCEN SM-250

Cruise	: GINSEA_B7	Instrument No.	: 9011
Station	: B0A6_003	Instrument Depth	: 460
Version	: MEASURED	Water Depth	: 1701
Latitude	: 65 39.7'N	From	: 07-JUN-1987 08:00
Longitude	: 2 49.2'E	To	: 09-SEP-1987 07:40

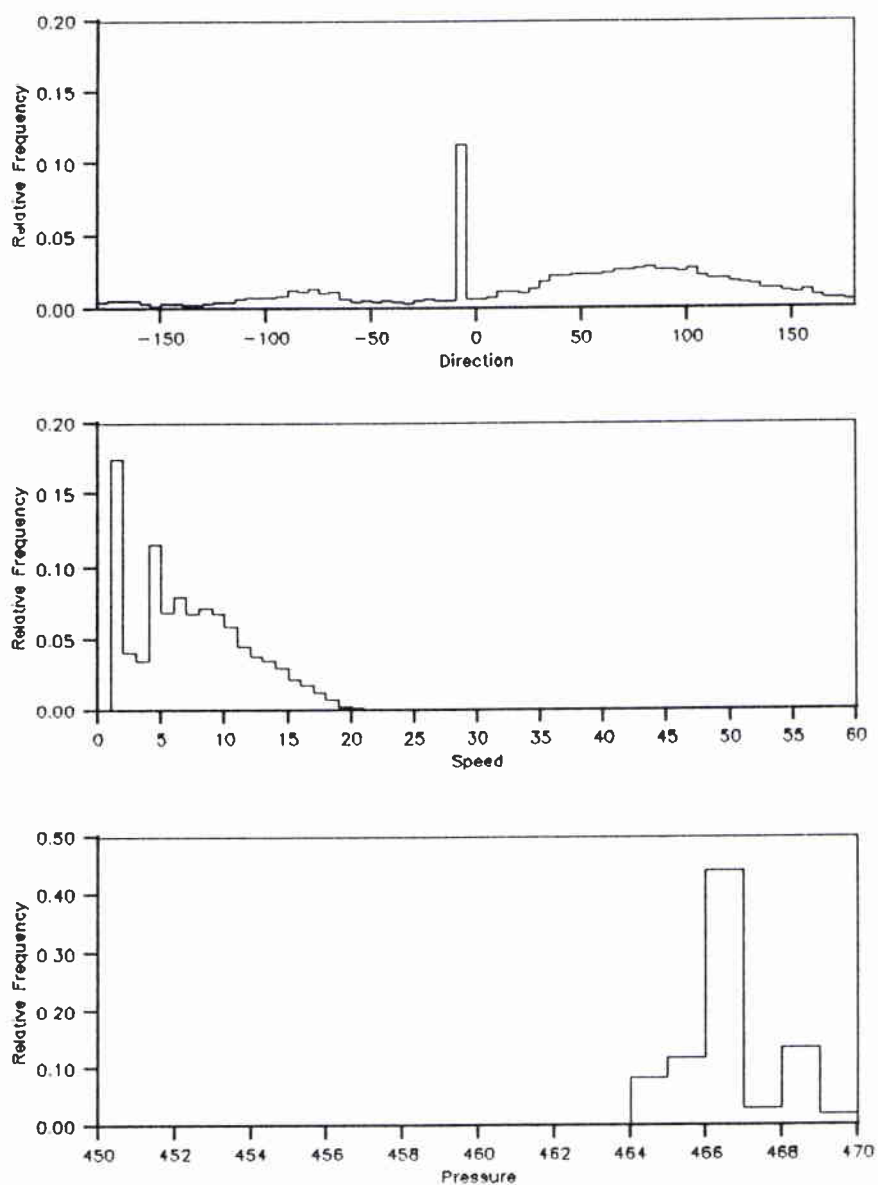


Figure B34

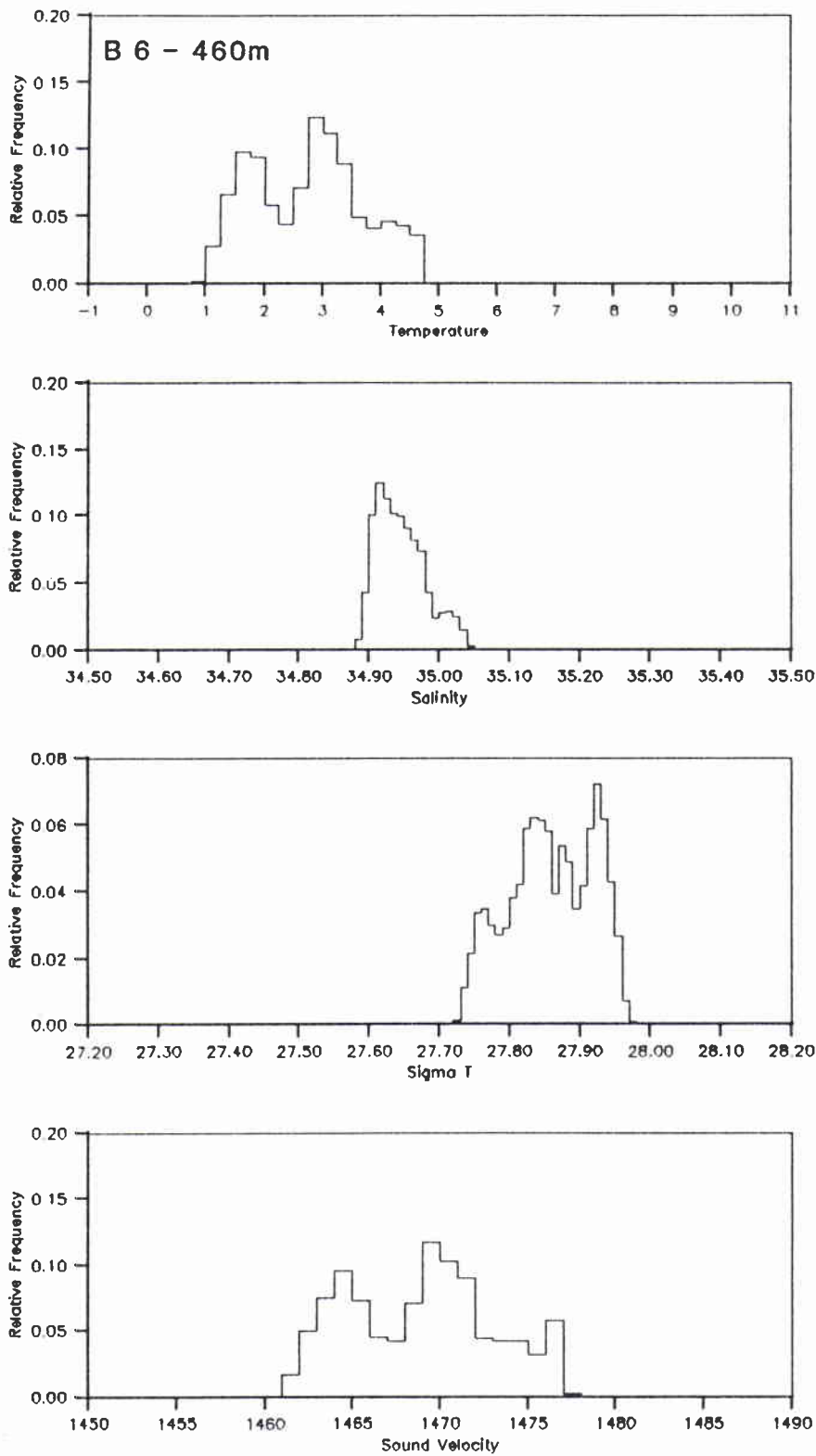


Figure B35

SACLANTCEN SM-250

Cruise	: GINSEA_87	Instrument No.	: 9012
Station	: B0A6_001	Instrument Depth	: 617
Version	: MEASURED	Water Depth	: 1701
Latitude	: 65 39.7'N	From	: 07-JUN-1987 07:20
Longitude	: 2 49.2'E	To	: 09-SEP-1987 07:00

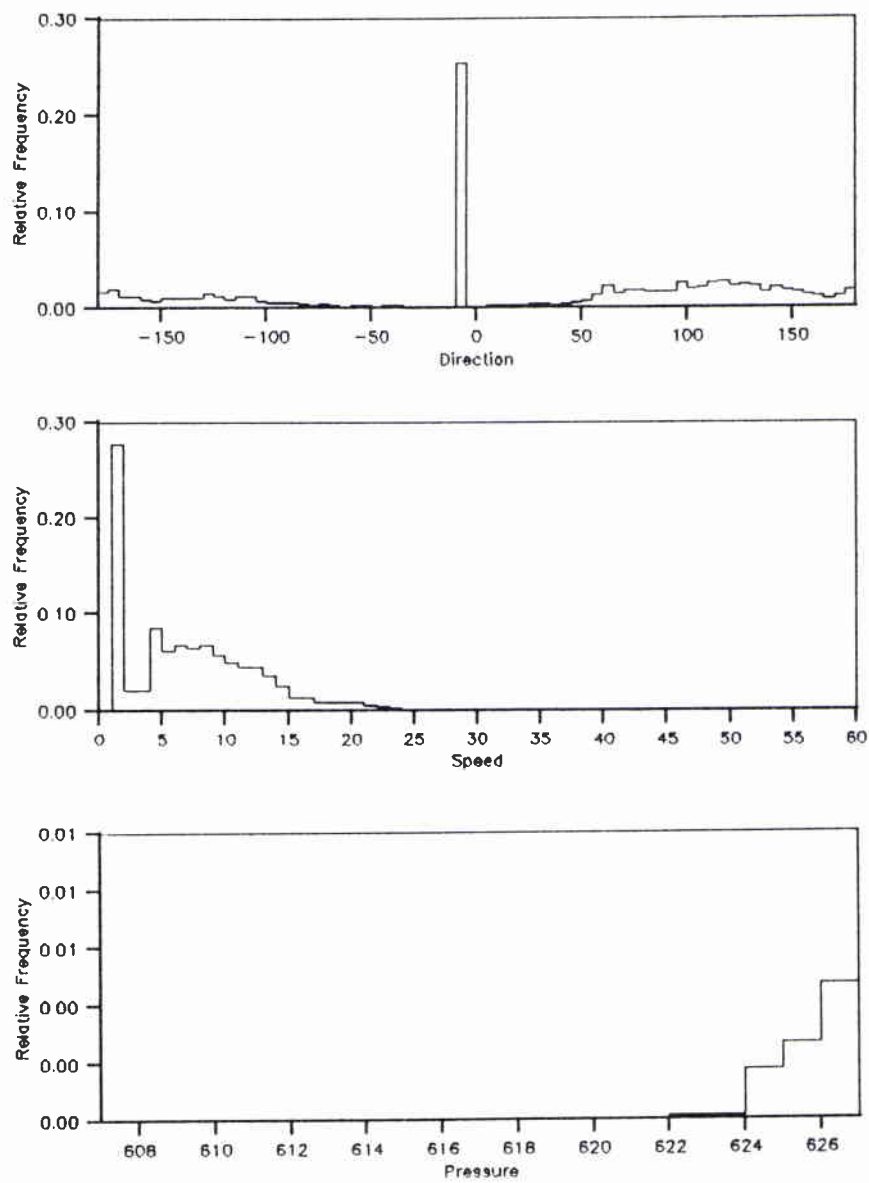
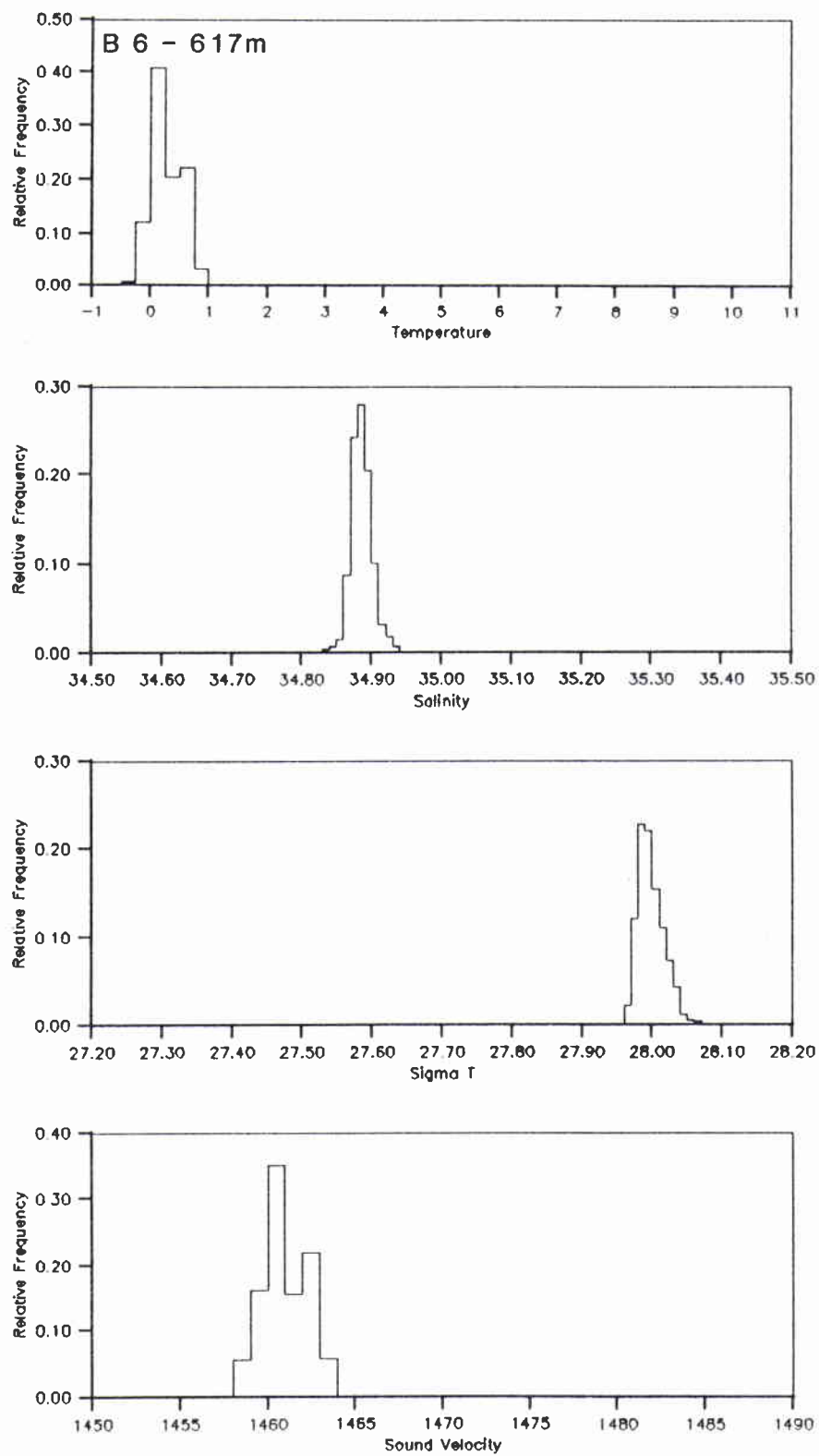
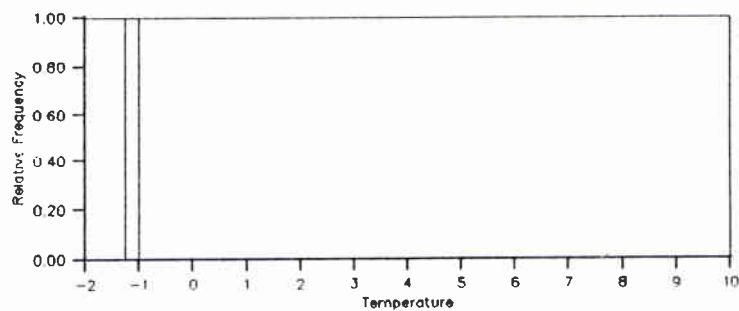
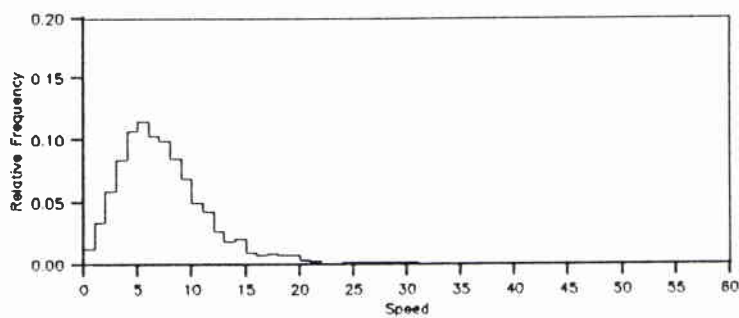
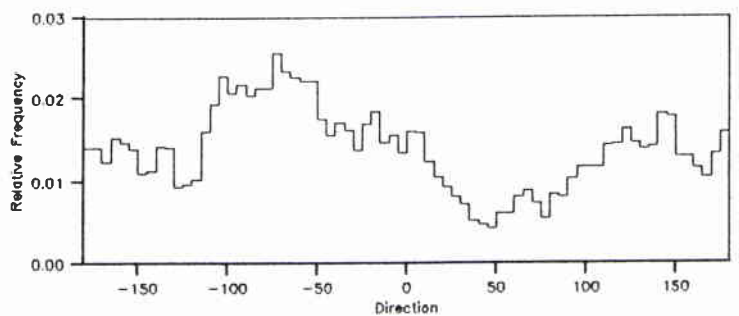


Figure B36

**Figure B37**

SACLANTCEN SM-250

Cruise	: GINSEA_87	Instrument No.	: 1296
Station	: BDA6_000	Instrument Depth	: 1479
Version	: MEASURED	Water Depth	: 1701
Latitude	: 65 39.7'N	From	: 07-JUN-1987 10:00
Longitude	: 2 49.2'E	To	: 09-SEP-1987 11:16



Cruise	: GINSEA_87	Instrument No.	: 1296
Station	: BDA6_000	Instrument Depth	: 1479
Version	: F133	Water Depth	: 1701
Latitude	: 65 39.7'N	From	: 11-JUN-1987 01:00
Longitude	: 2 49.2'E	To	: 09-SEP-1987 10:00

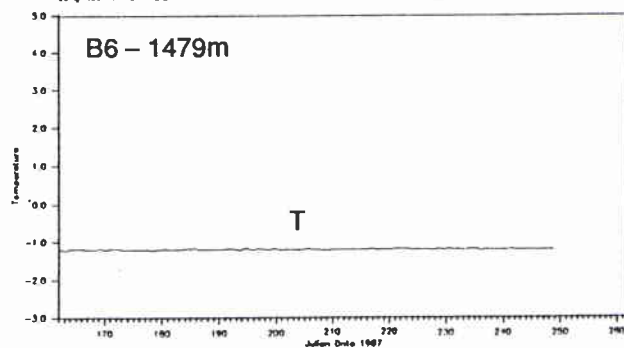
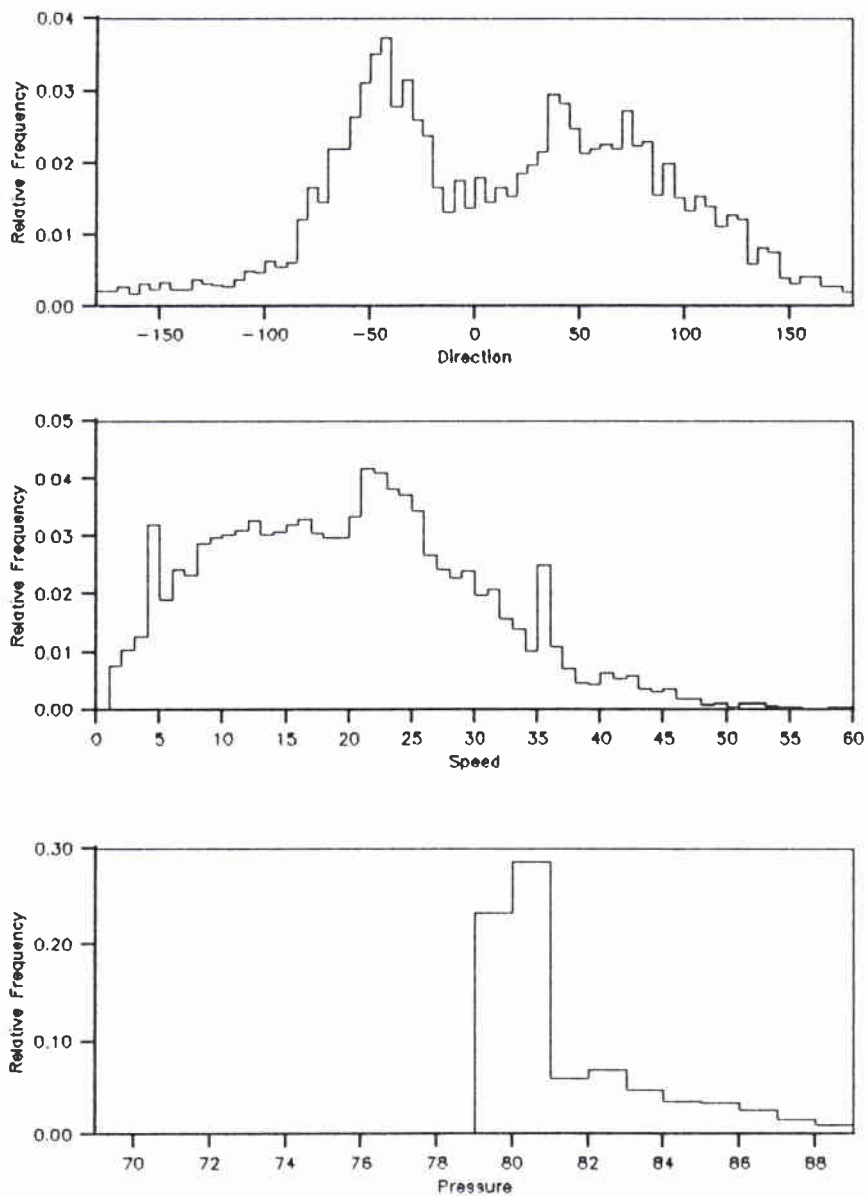


Figure B38

Cruise	: GINSEA_87	Instrument No.	: 9026
Station	: BOA8_002	Instrument Depth	: 79
Version	: MEASURED	Water Depth	: 1677
Latitude	: 62 56.9'N	From	: 02-JUN-1987 09:30
Longitude	: 2 21.2'W	To	: 07-SEP-1987 12:10

**Figure B39**

SACLANTCEN SM-250

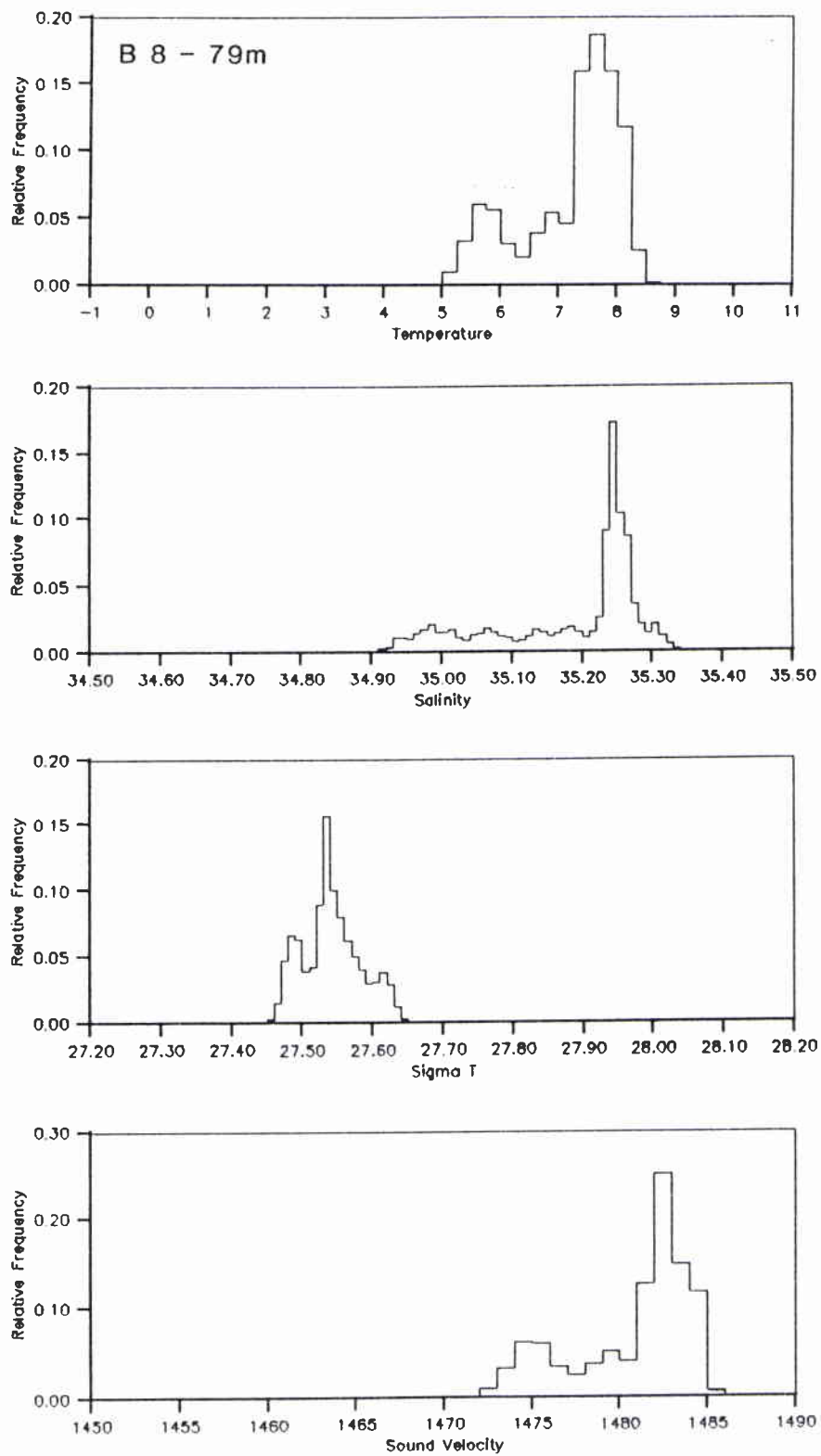


Figure B40

Cruise	: GINSEA_87	Instrument No.	: 9015
Station	: BOA8_001	Instrument Depth	: 438
Version	: MEASURED	Water Depth	: 1677
Latitude	: 62 56.9'N	From	: 02-JUN-1987 09:30
Longitude	: 2 21.2'W	To	: 07-SEP-1987 12:10

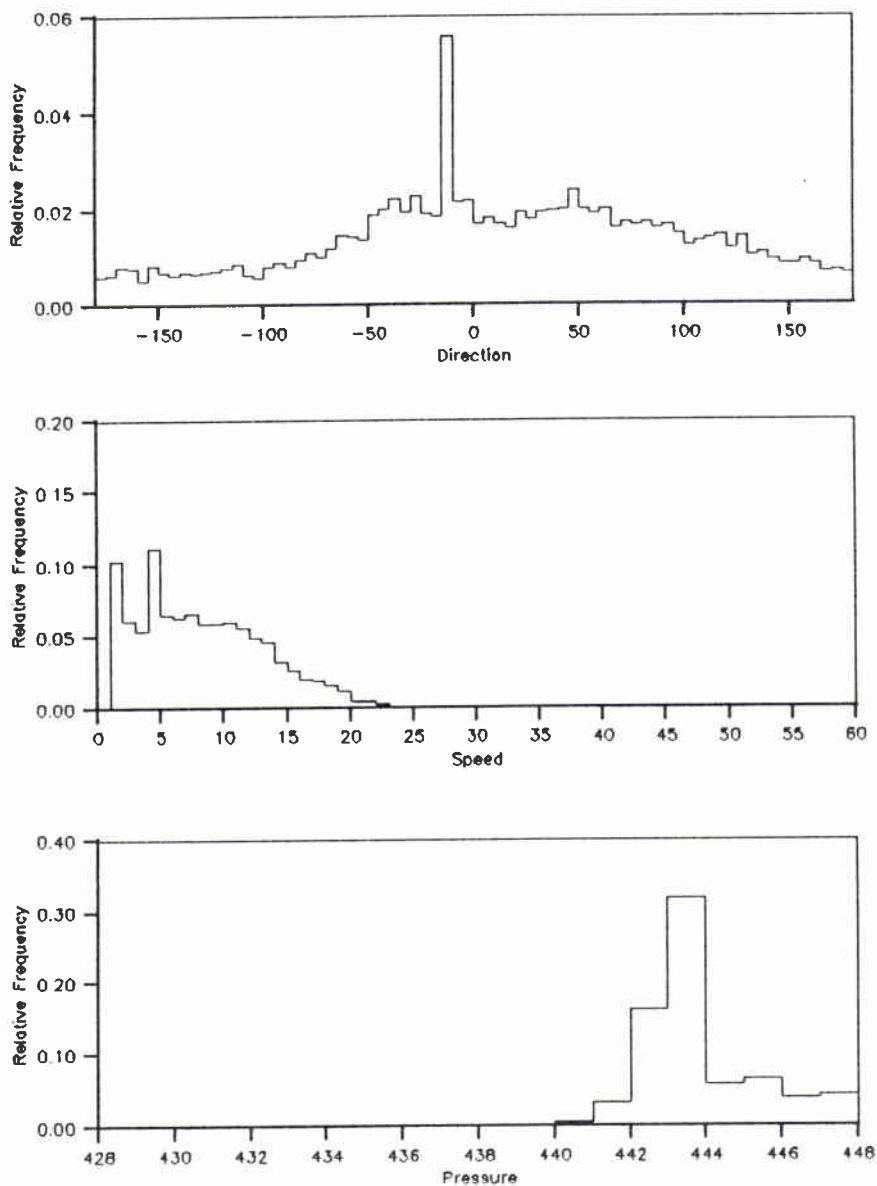


Figure B41

SACLANTCEN SM-250

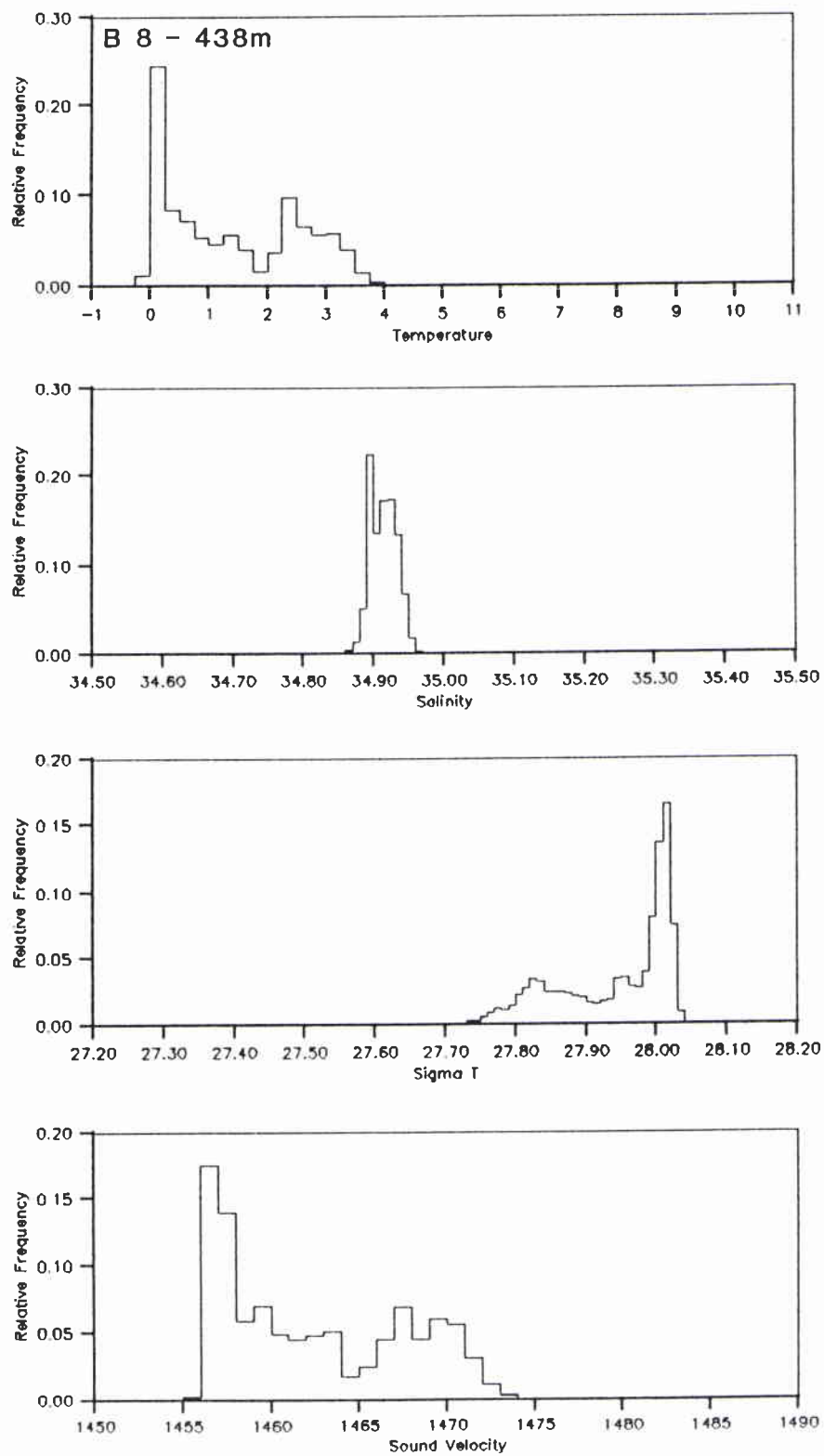


Figure B42

Cruise	: GINSEA_B7	Instrument No.	: 9016
Station	: BOA8_003	Instrument Depth	: 646
Version	: MEASURED	Water Depth	: 1677
Latitude	: 62 56.9'N	From	: 02-JUN-1987 09:30
Longitude	: 2 21.2'W	To	: 07-SEP-1987 12:10

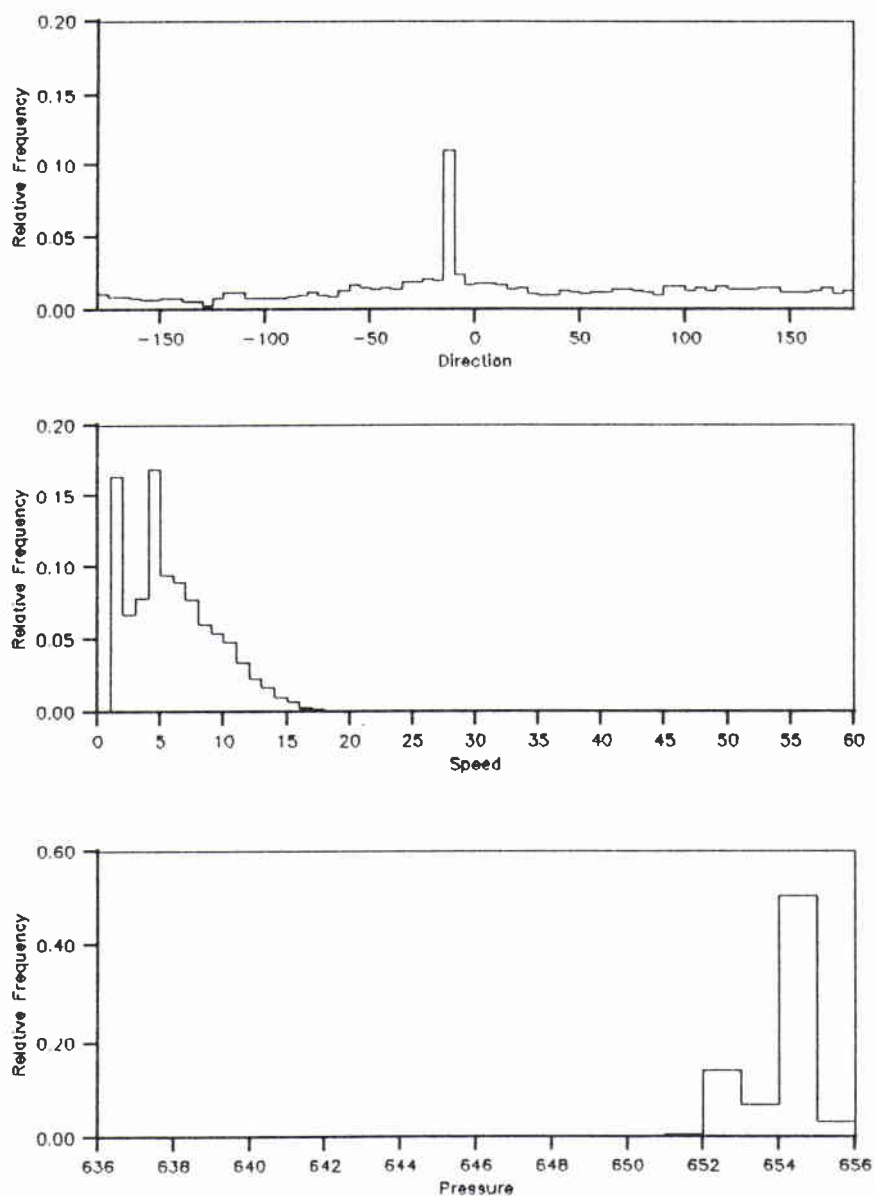


Figure B43

SACLANTCEN SM-250

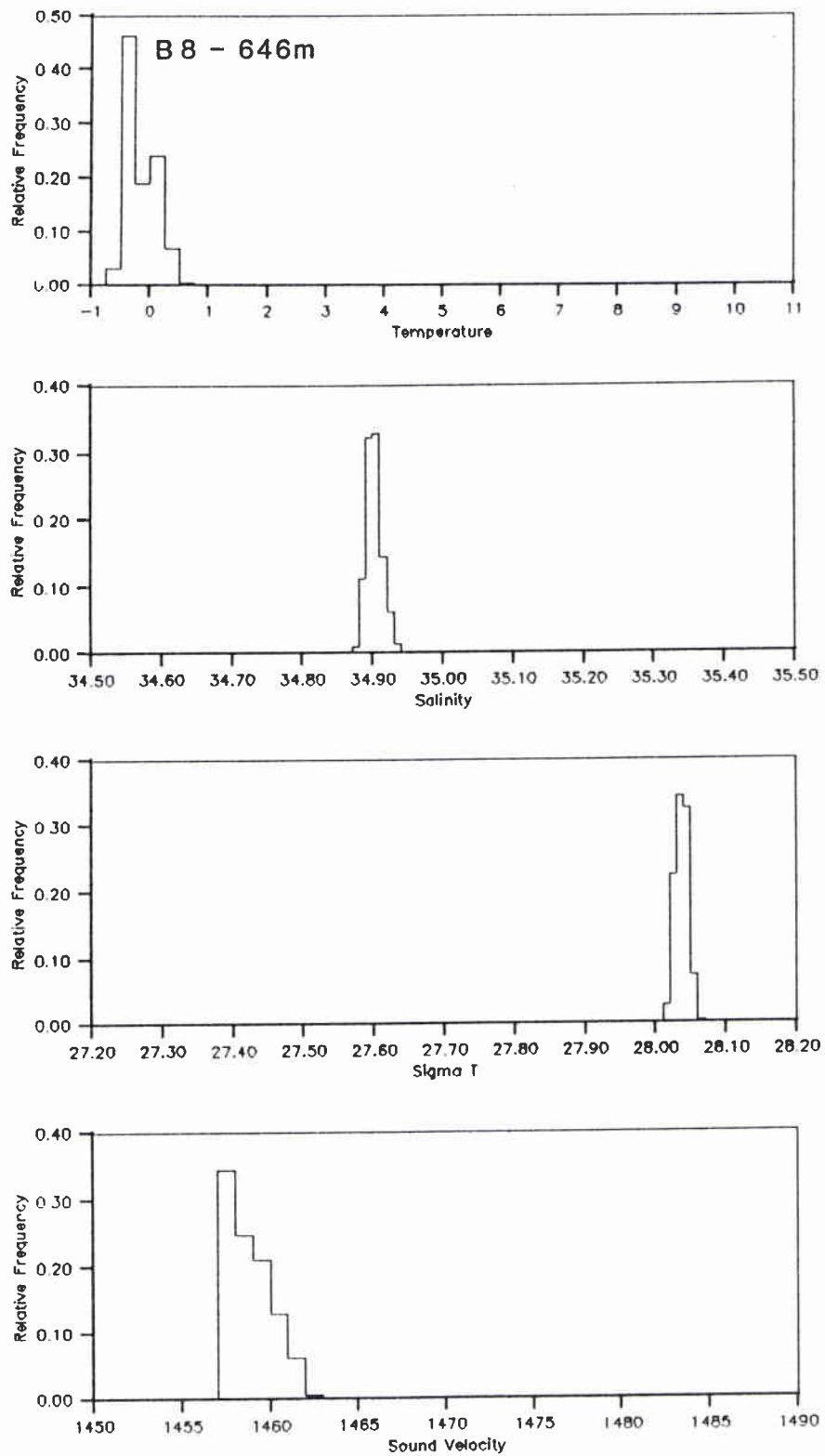
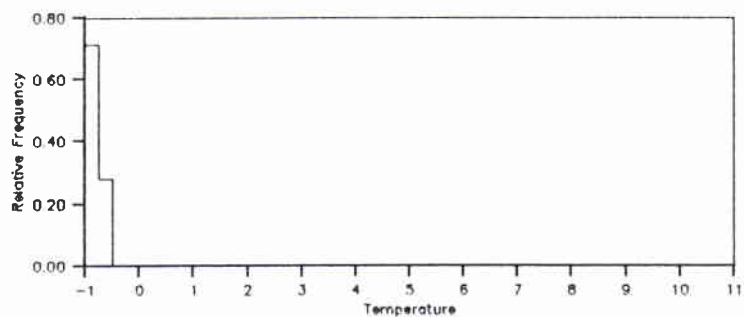
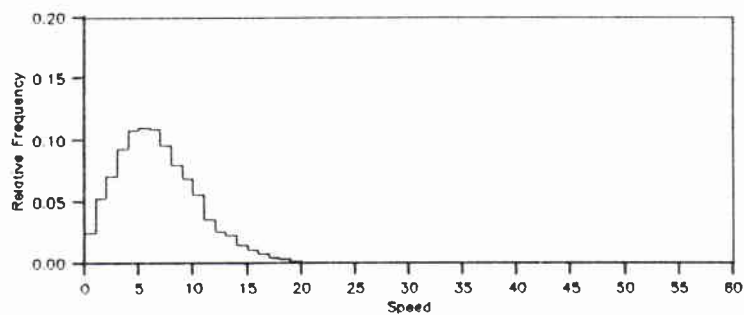
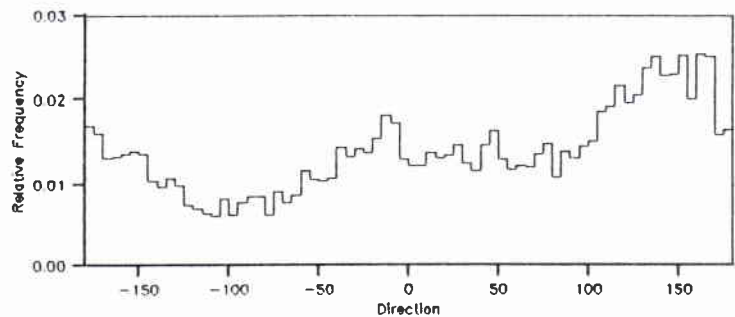


Figure B44

SACLANTCEN SM-250

Cruise	: GINSEA_87	Instrument No.	: 1294
Station	: BDA8_000	Instrument Depth	: 1460
Version	: MEASURED	Water Depth	: 1677
Latitude	: 62 56.9'N	From	: 02-JUN-1987 10:20
Longitude	: 2 21.2'W	To	: 07-SEP-1987 14:16



Cruise	: GINSEA_87	Instrument No.	: 1294
Station	: BDA8_000	Instrument Depth	: 1460
Version	: H55	Water Depth	: 1677
Latitude	: 62 56.9'N	From	: 06-JUN-1987 01:00
Longitude	: 2 21.2'W	To	: 03-SEP-1987 21:00

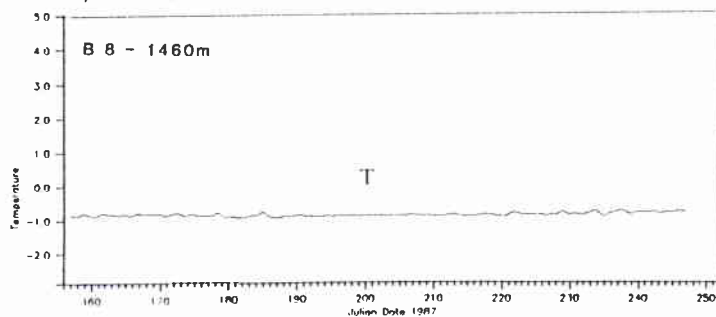


Figure B45

SACLANTCEN SM-250

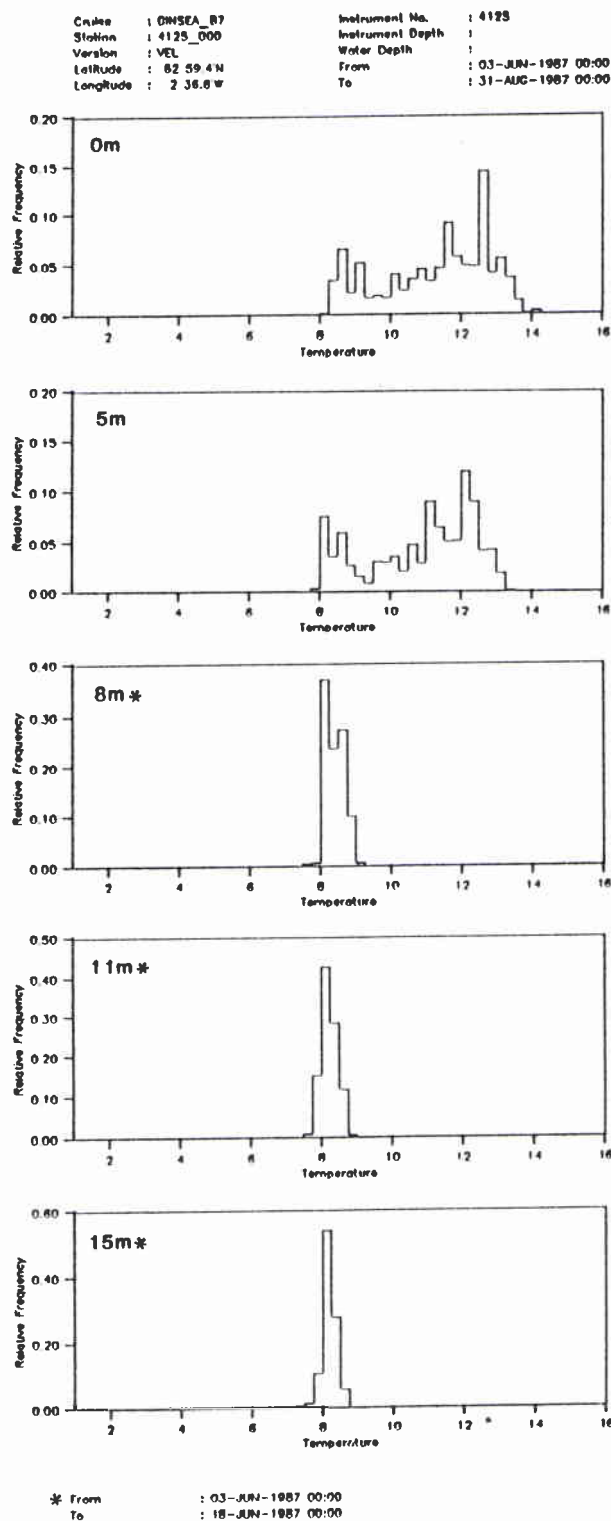


Figure B46

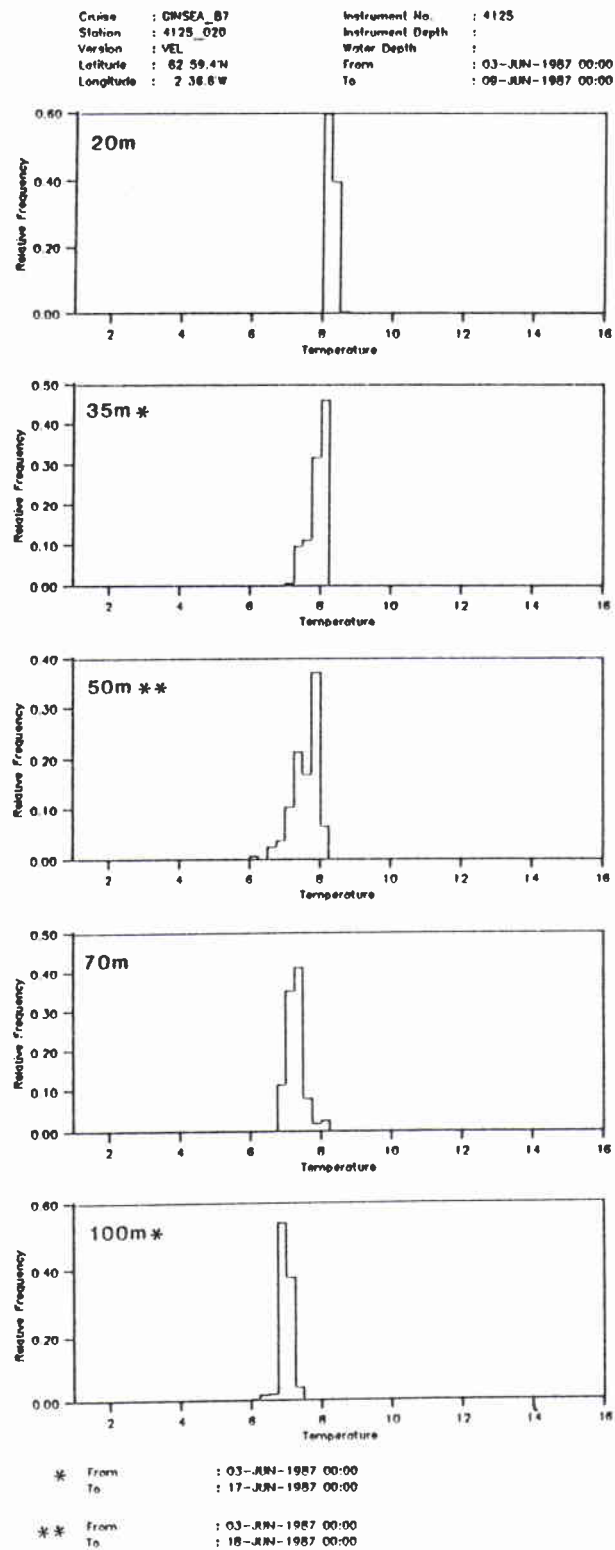


Figure B47

SACLANTCEN SM-250

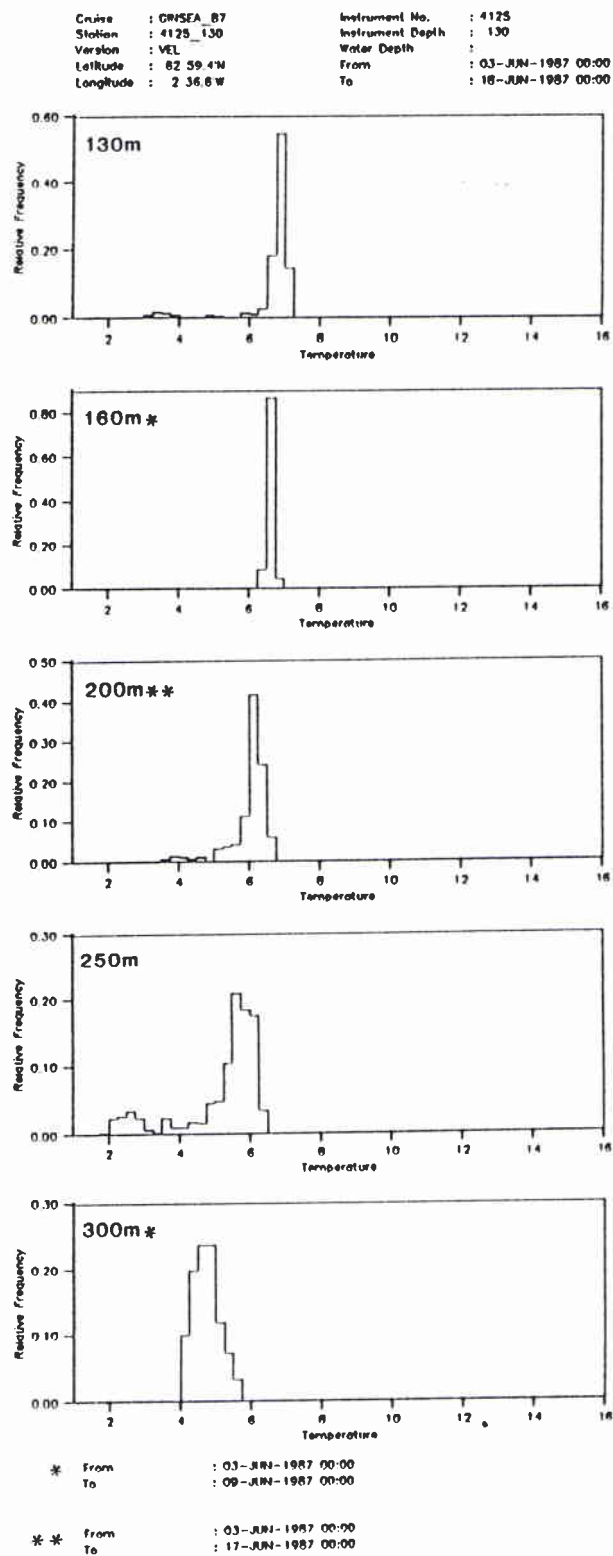


Figure B48

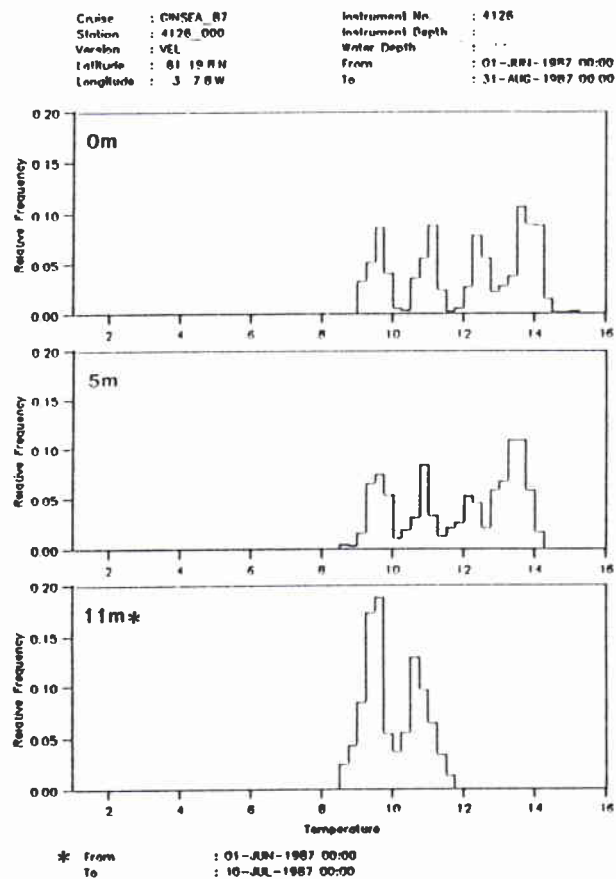


Figure B49

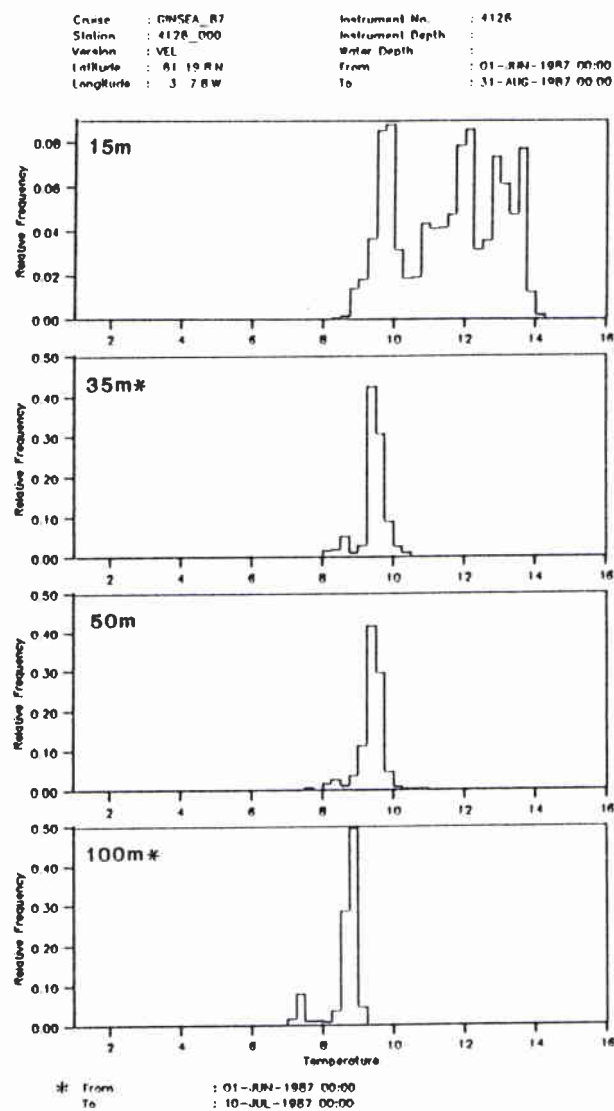
SACLANTCEN SM-250

Figure B50

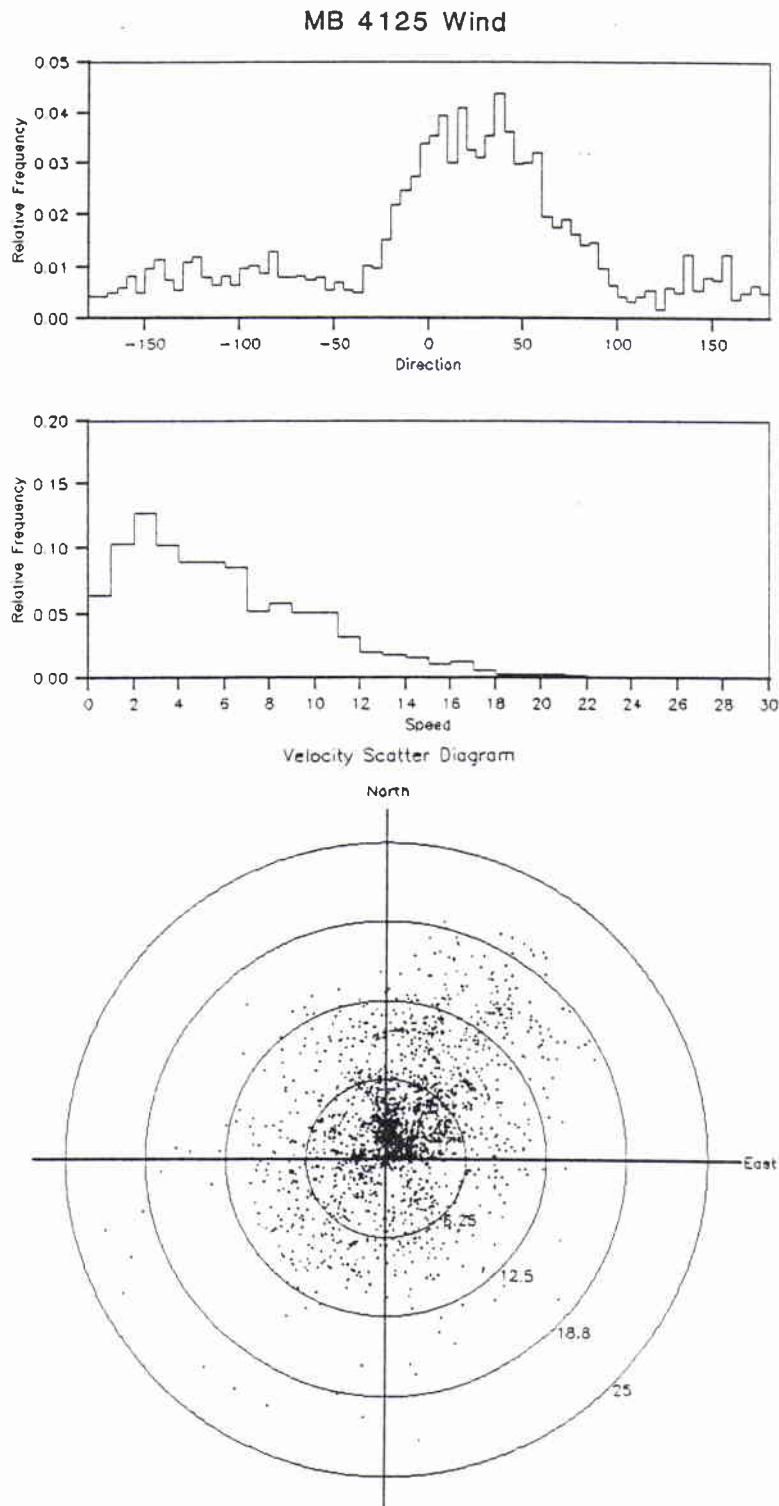


Figure B51

SACLANTCEN SM-250

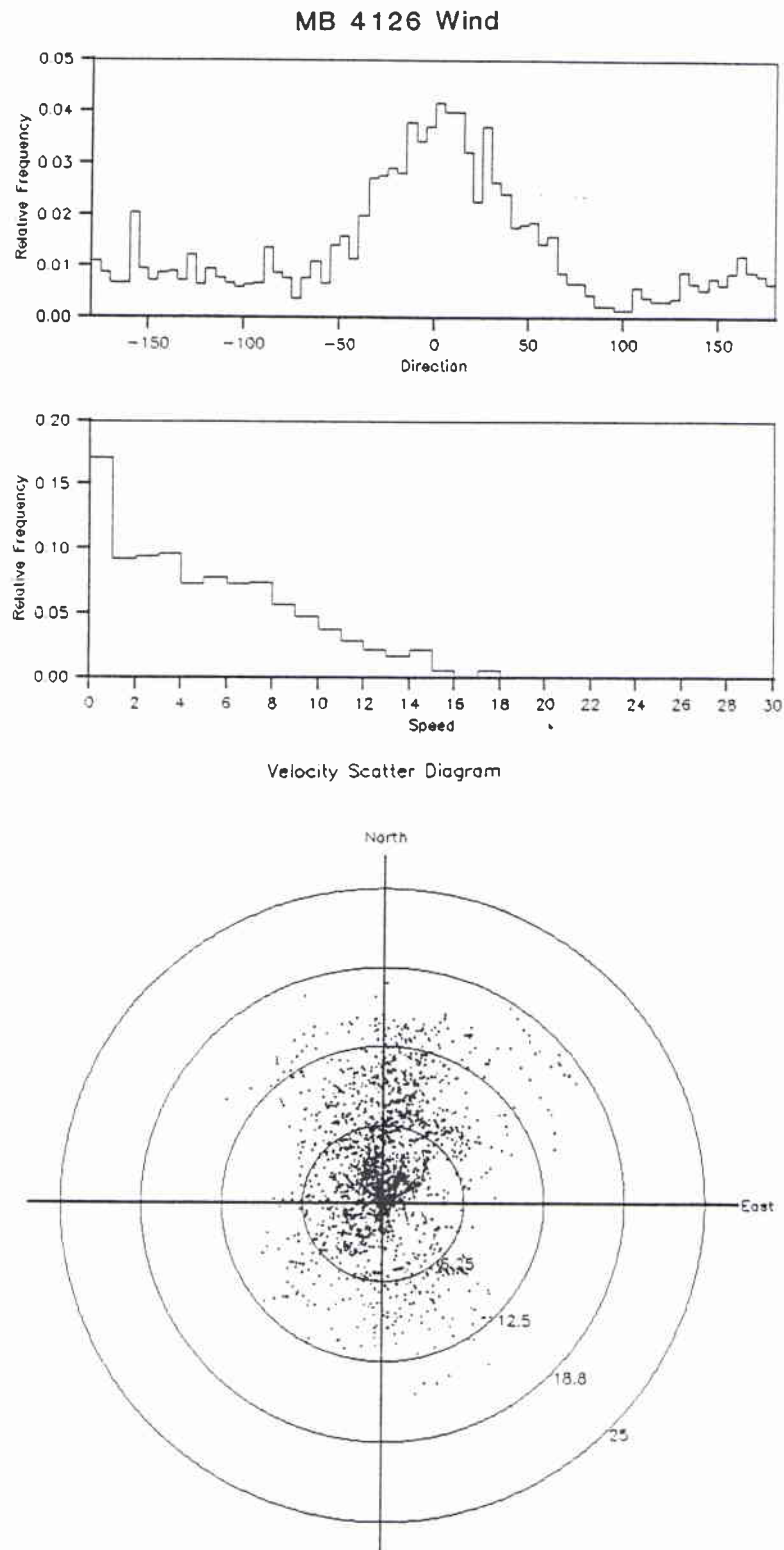


Figure B52

SACLANTCEN SM-250

SACLANTCEN SM-250

Appendix C

Scatter diagrams

Scatter plots of the velocity vectors from the various instruments are given. The north and east axes are indicated and the radii are labeled in cm s^{-1} . For the current meter data, the direction of the parabath is indicated at the bottom of the figure.

- Figures C1–C2: Buoy 1.
- Figures C3–C8: Buoys 2–8.
- Figure C9: Float.

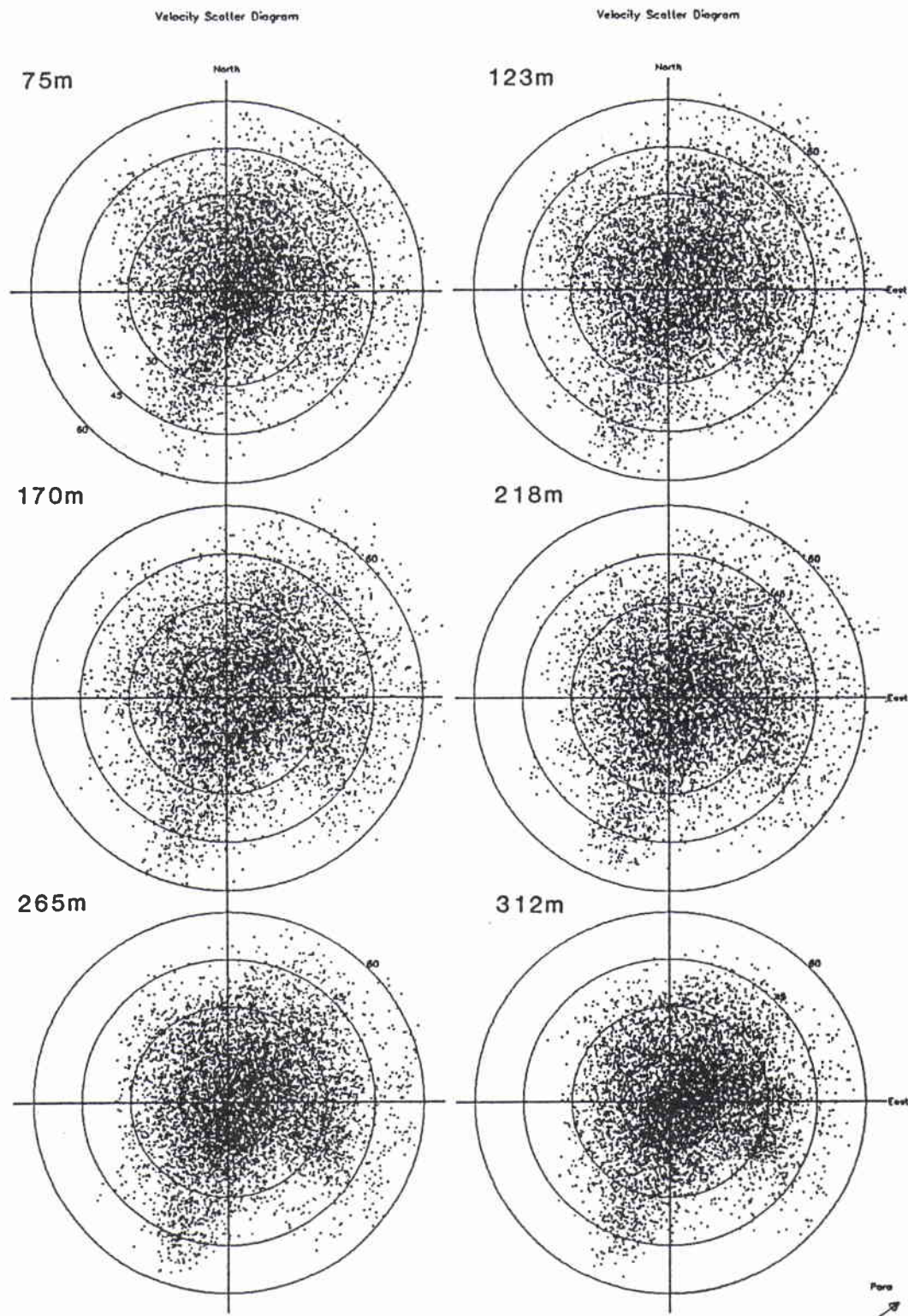


Figure C1

SACLANTCEN SM-250

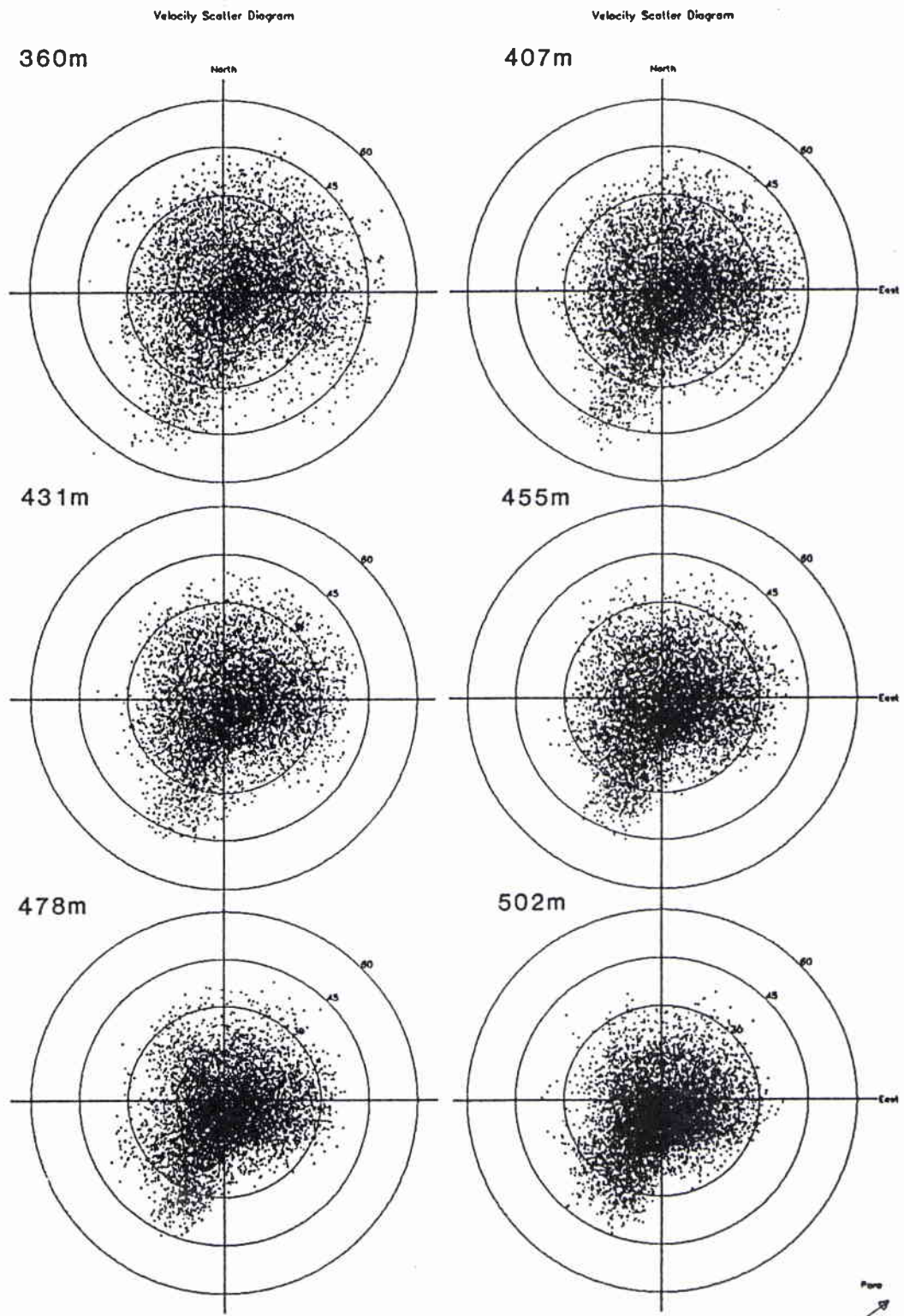


Figure C2

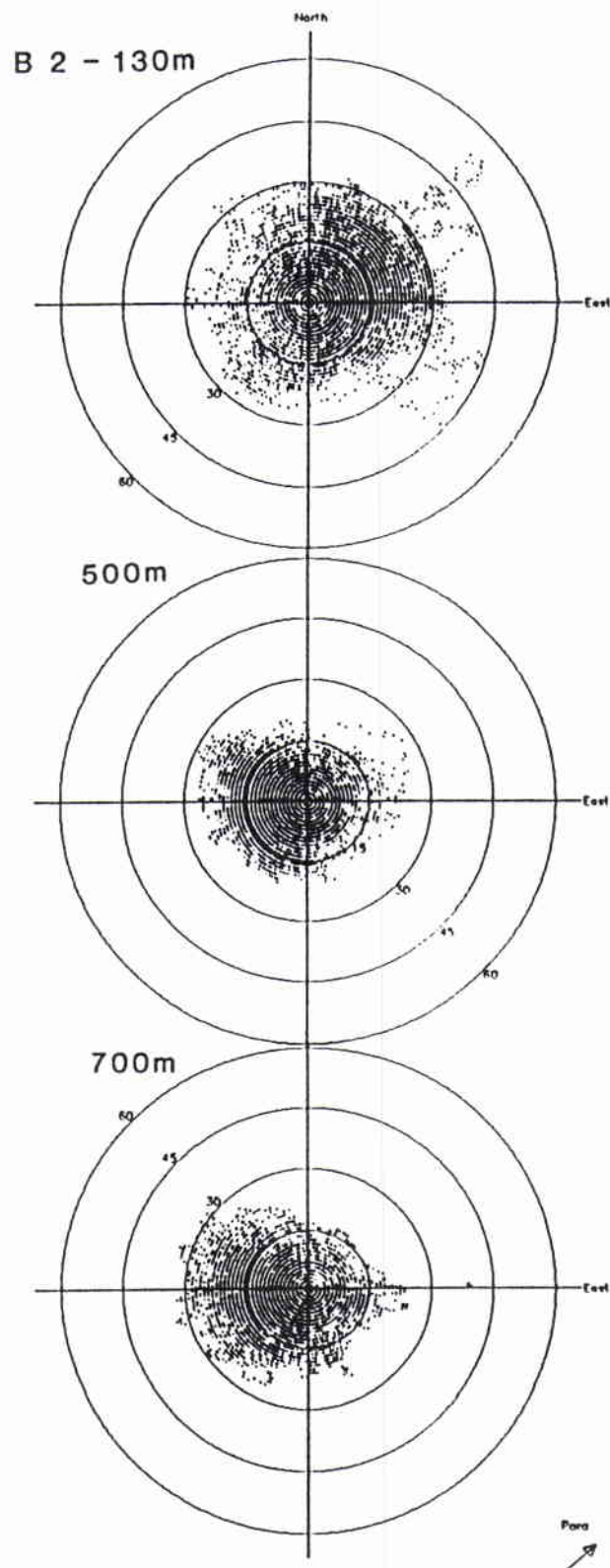


Figure C3

SACLANTCEN SM-250

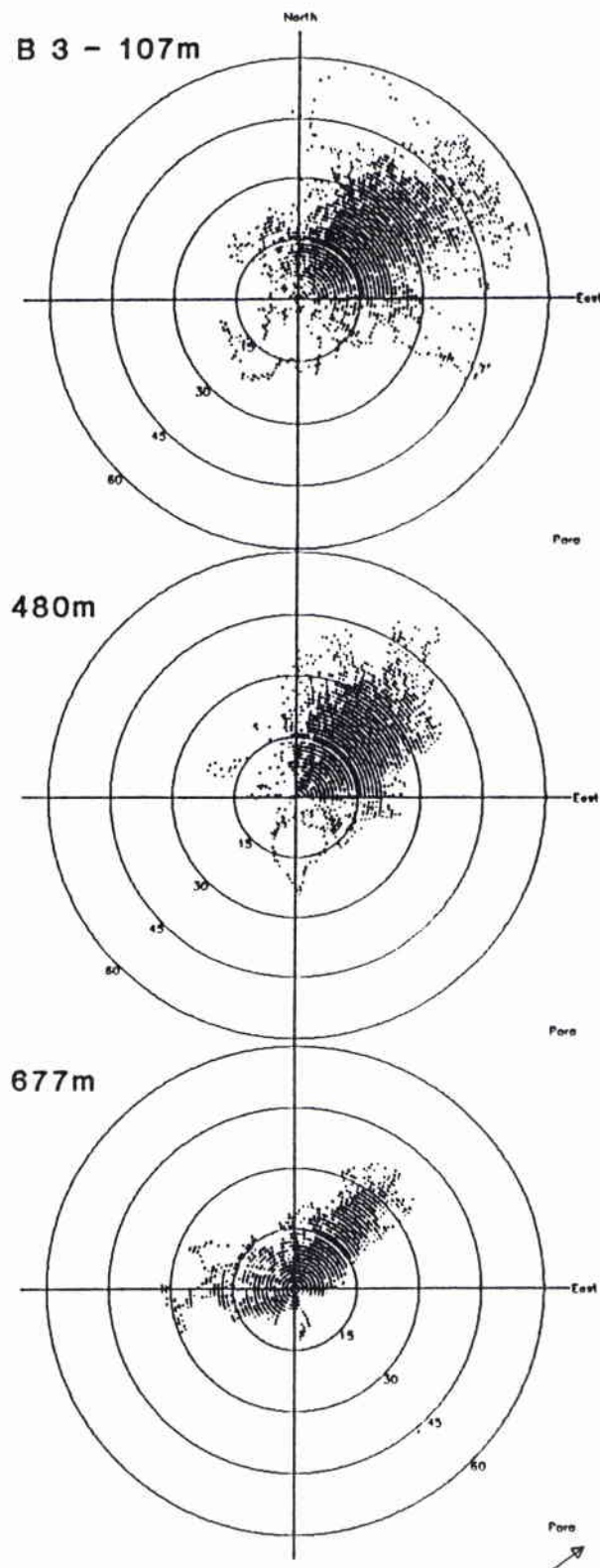


Figure C4

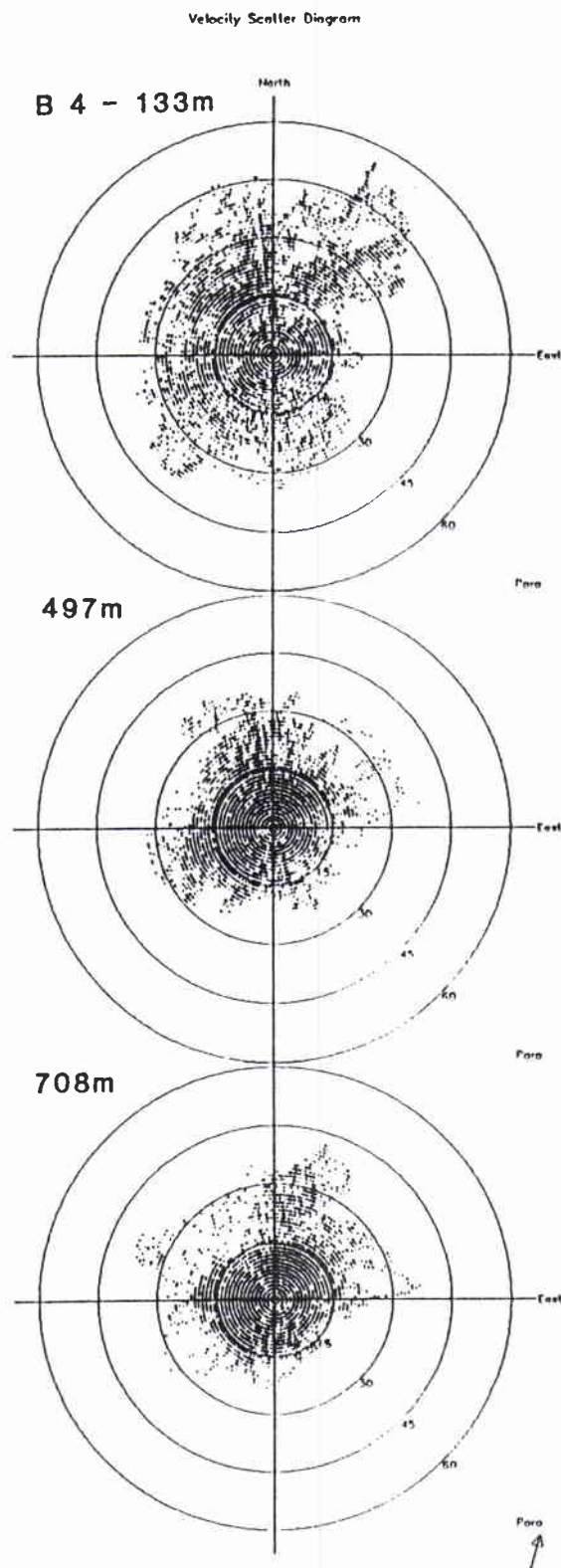


Figure C5

SACLANTCEN SM-250

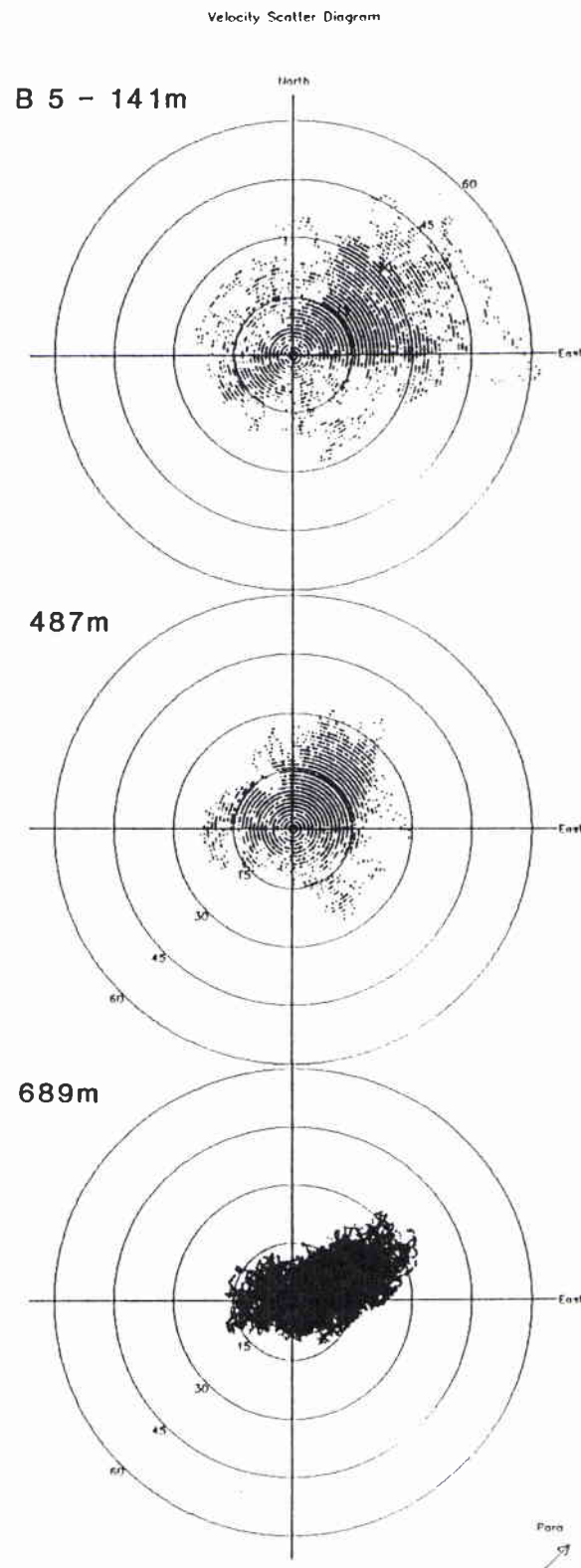


Figure C6

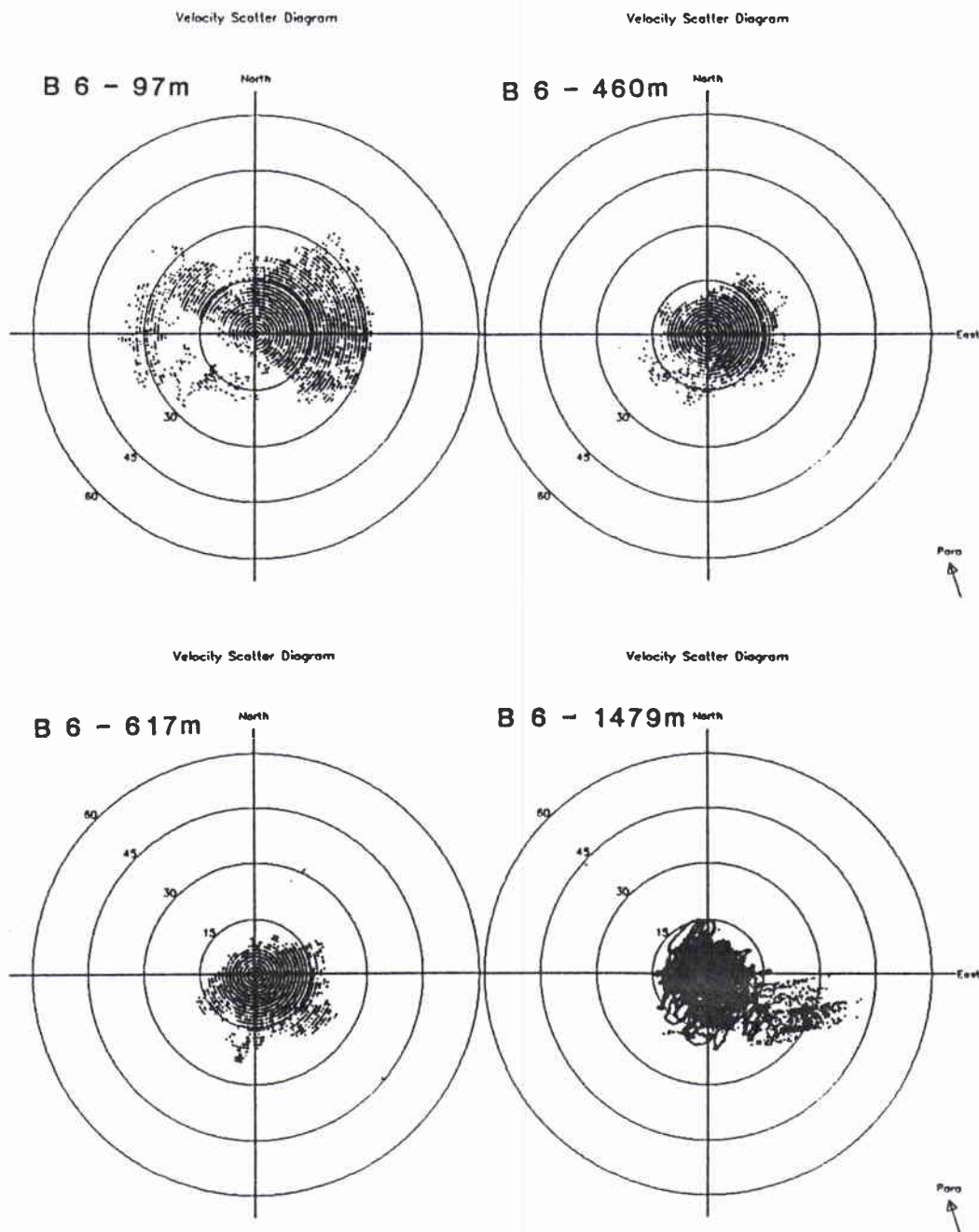


Figure C7

SACLANTCEN SM-250

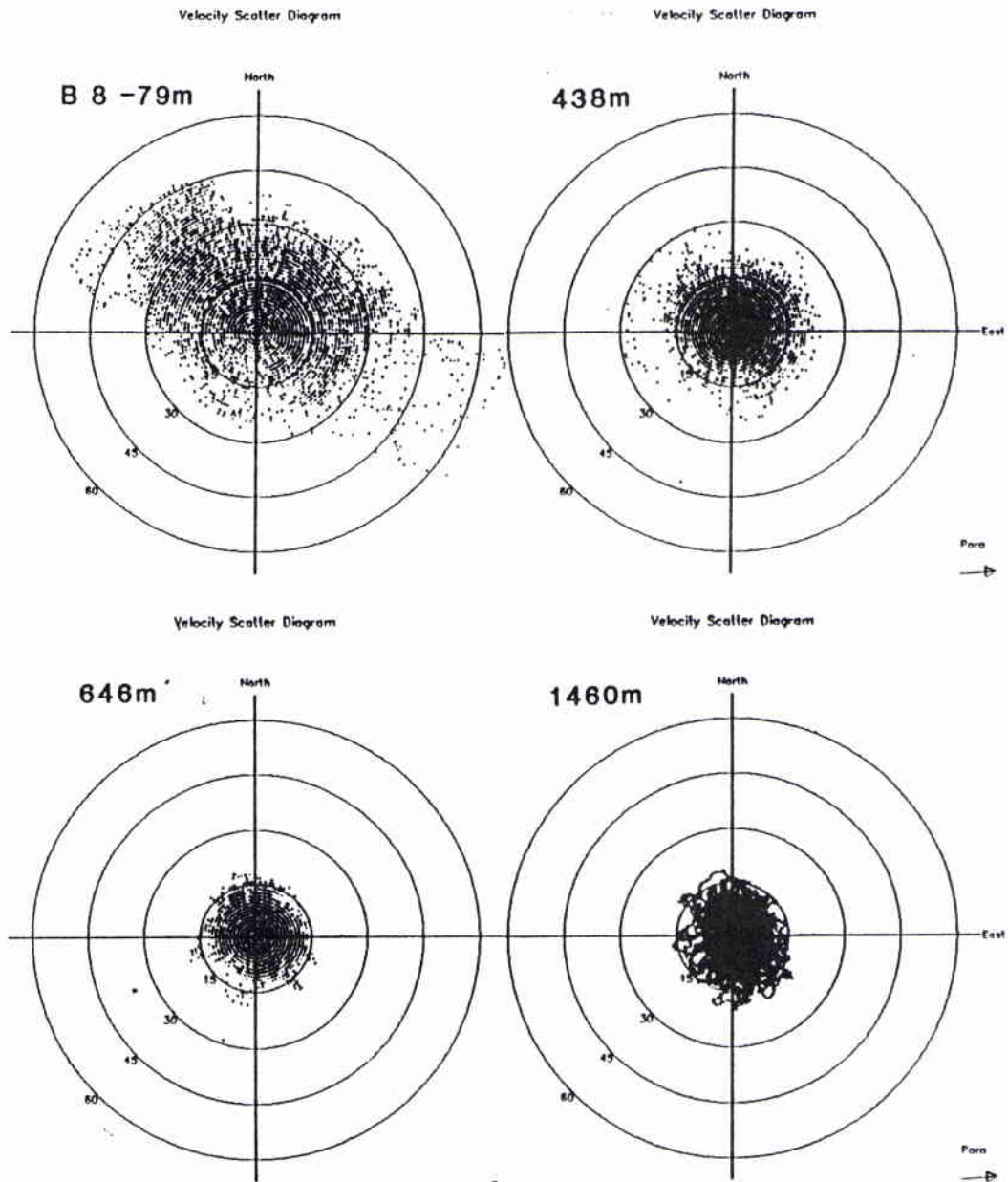


Figure C8

Velocity Scatter Diagram

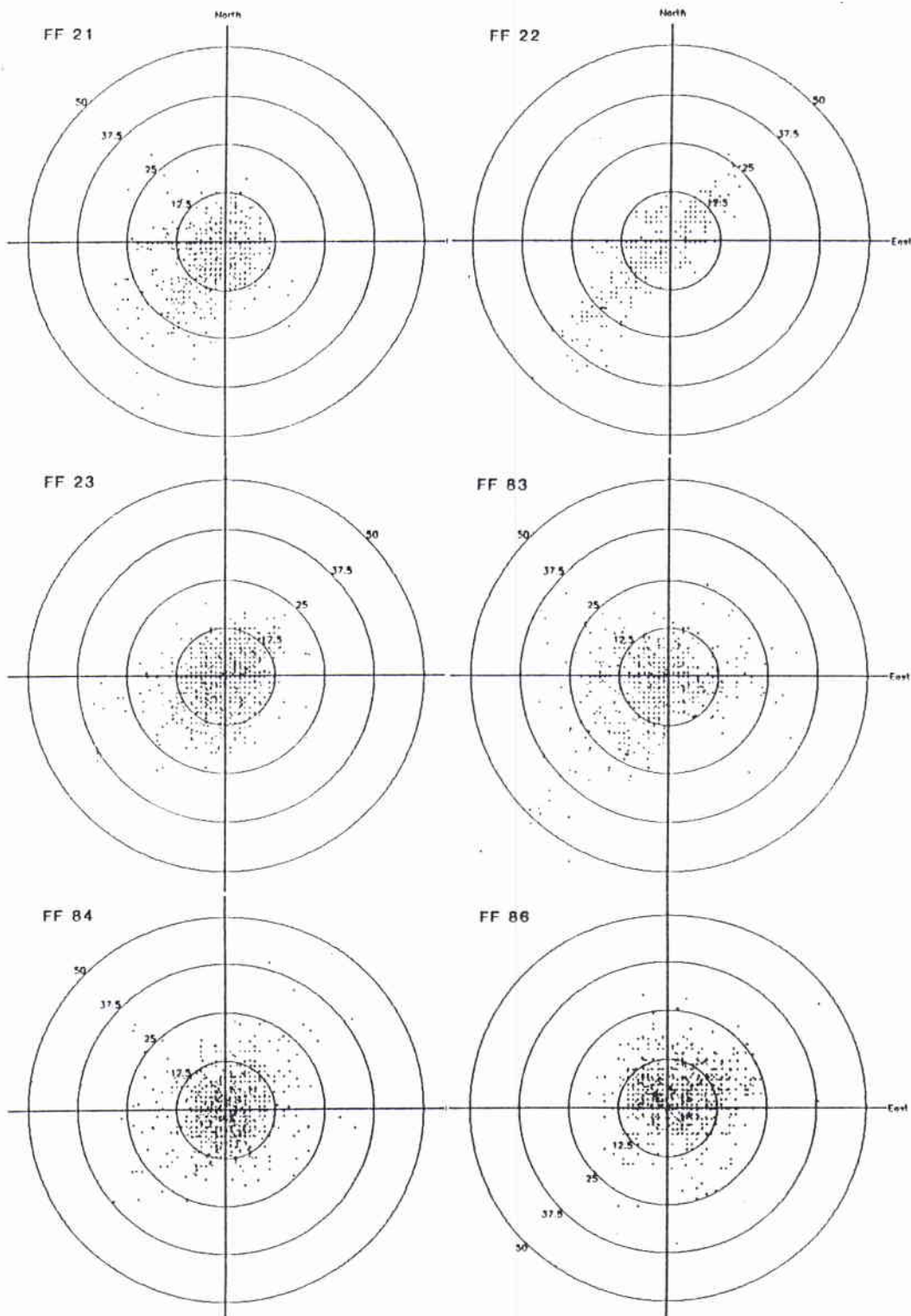


Figure C9

Appendix D

Time-series plots

The velocity data from the currentmeters were generated from the filtered-rotated (H35ROT file) and given for the parabathic (downstream/upstream) and diabathic (onshore/offshore) components. The time series from the other current meter variables are from the H35 file. The abscissa is scaled in days from Jan 1. The reader may find the exact start and end times in the figure header of the statistics or in Table 1 in text. To facilitate visual comparison, the scale of the ordinate for each variable in all the plots is the same.

In general the time-series plots of the float data are from the MEASURED file due to the smaller number of total data points. The same is true for the time series of the float data, except that the velocity is plotted as northward and eastward. The sampling interval of the temperature and pressure data, which was constructed from the filtered time series, is much longer (48 h).

For the ASID buoys, the time series of the wind vector (the stick diagrams), the air temperature, and the water temperature, are given. Only data taken at 6 h intervals by functioning thermistors are plotted (see Table 4 in text).

- Buoy 1 (Figs. D1–D7).
- Buoys 2–8 (Figs. D8–D36).
- Floats (Figs. D37–D48).
- ASID Buoys (Figs. D49–D52).

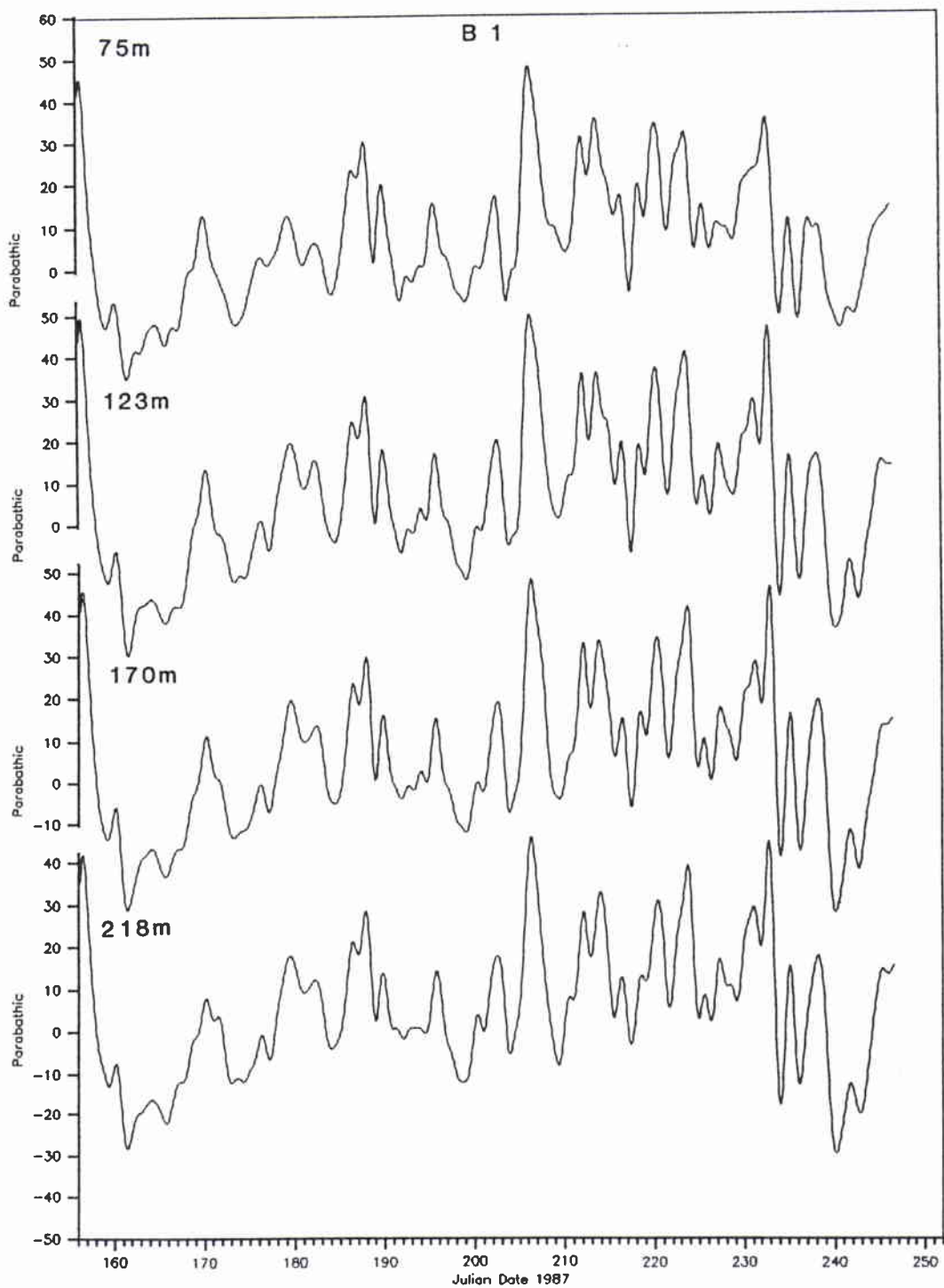


Figure D1

SACLANTCEN SM-250

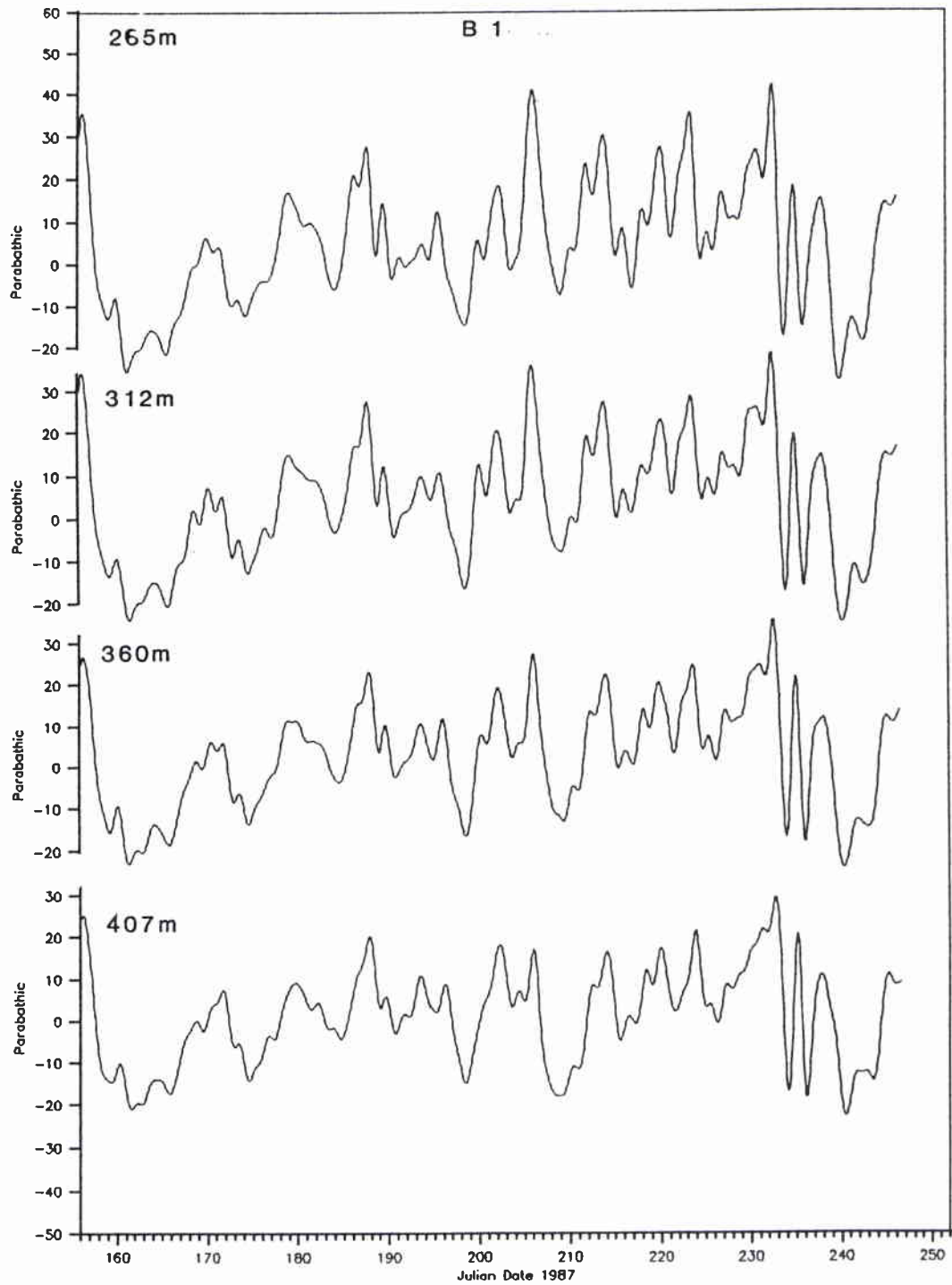


Figure D2

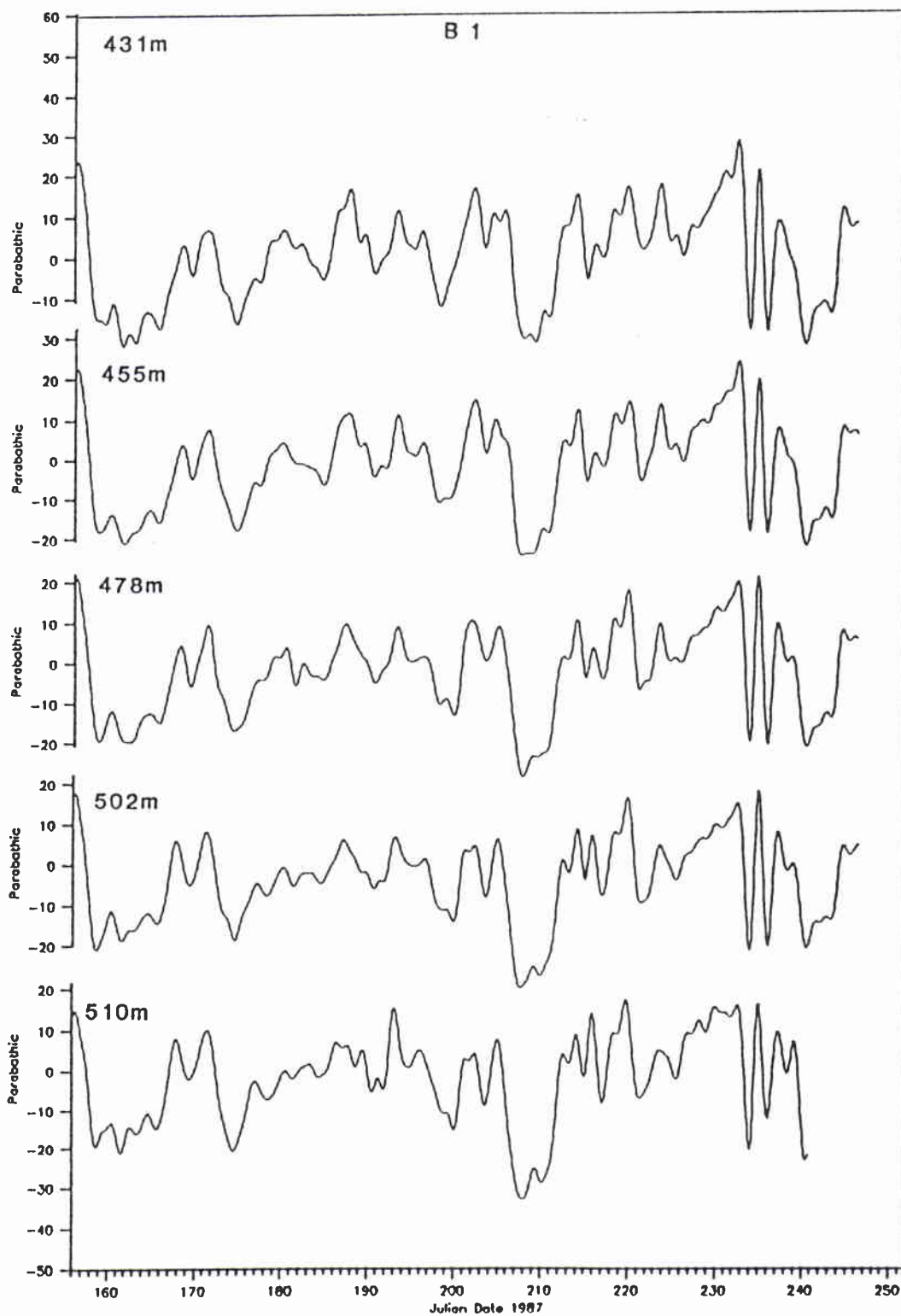


Figure D3

SACLANTCEN SM-250

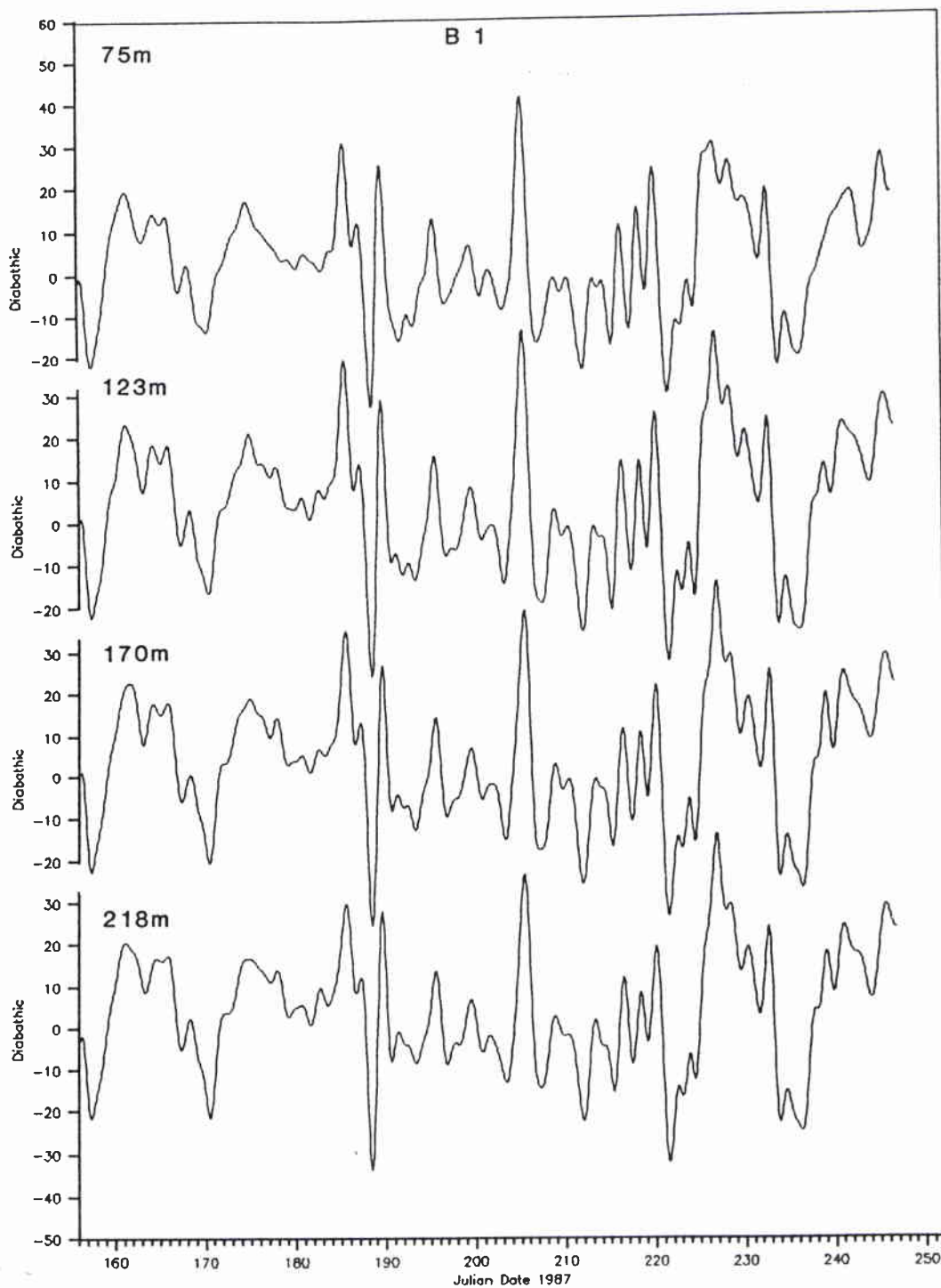


Figure D4

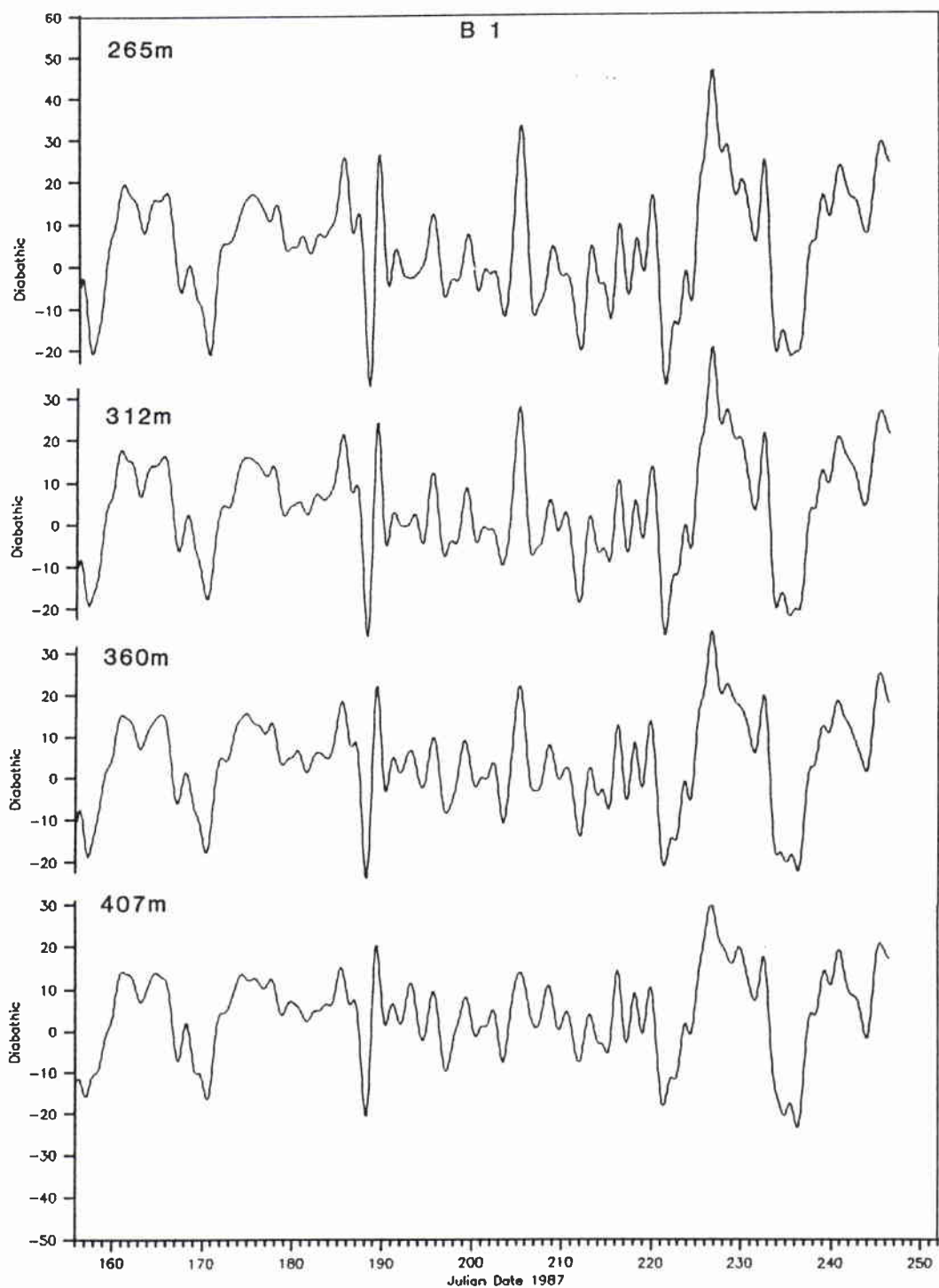


Figure D5

SACLANTCEN SM-250

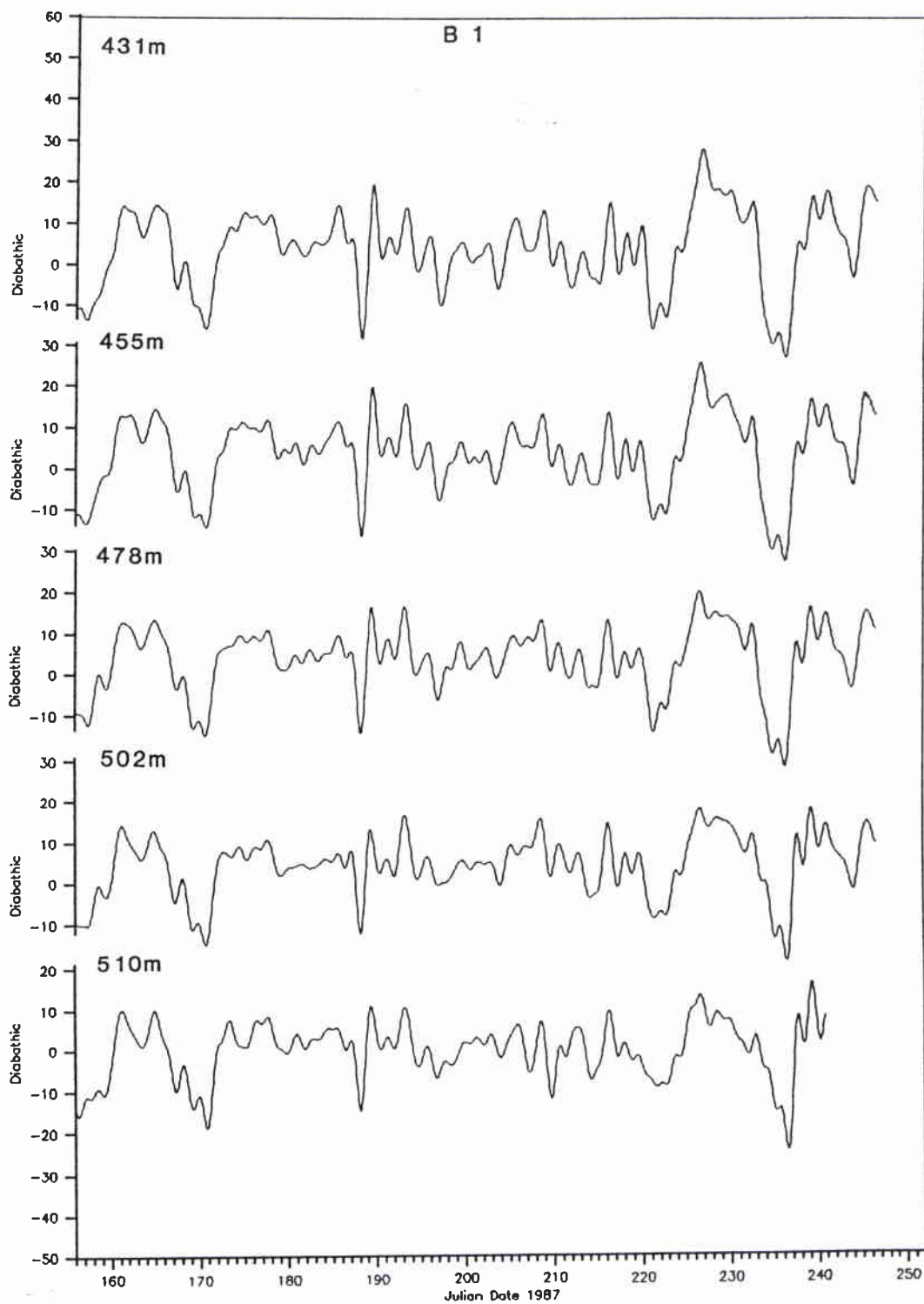


Figure D6

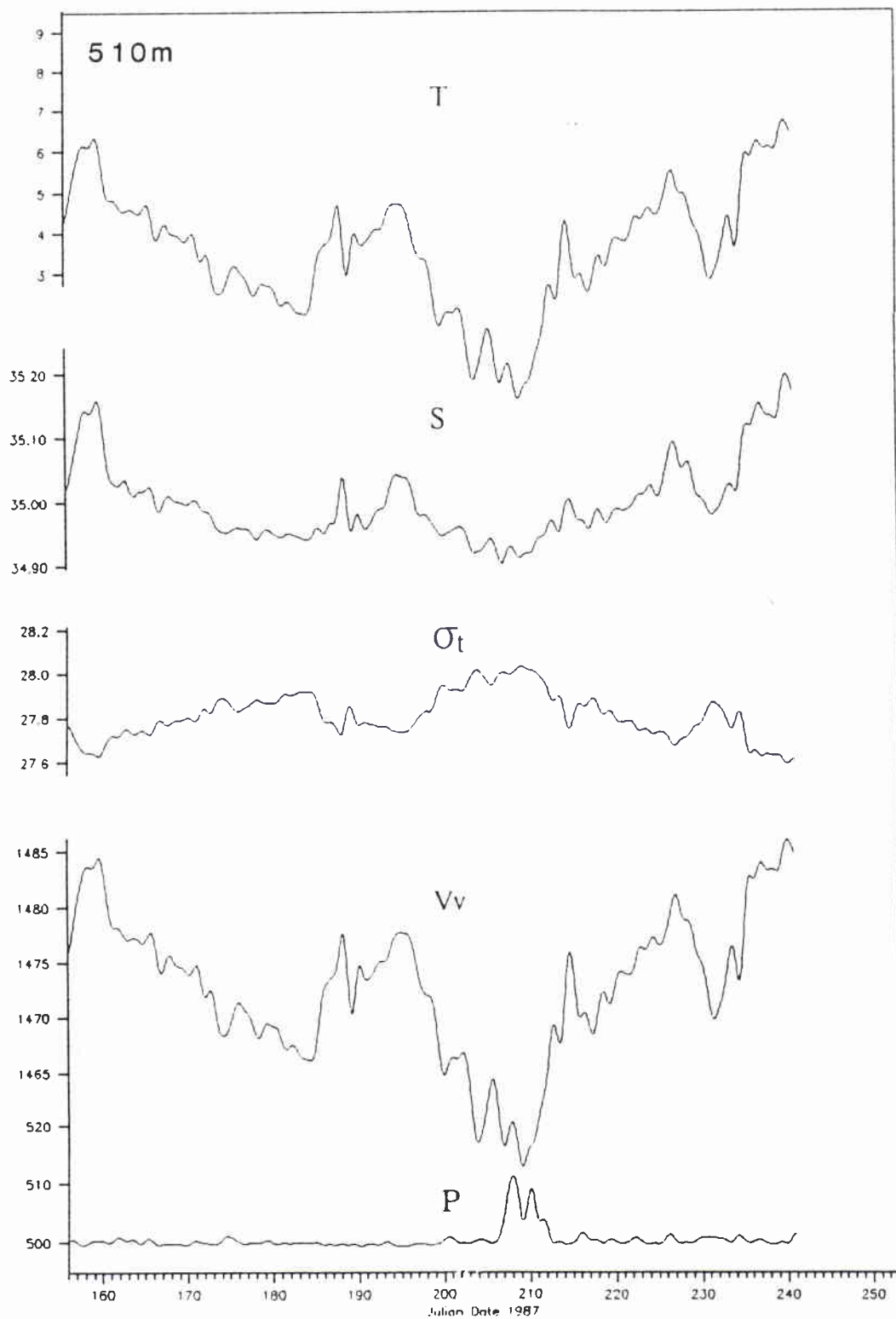


Figure D7

SACLANTCEN SM-250

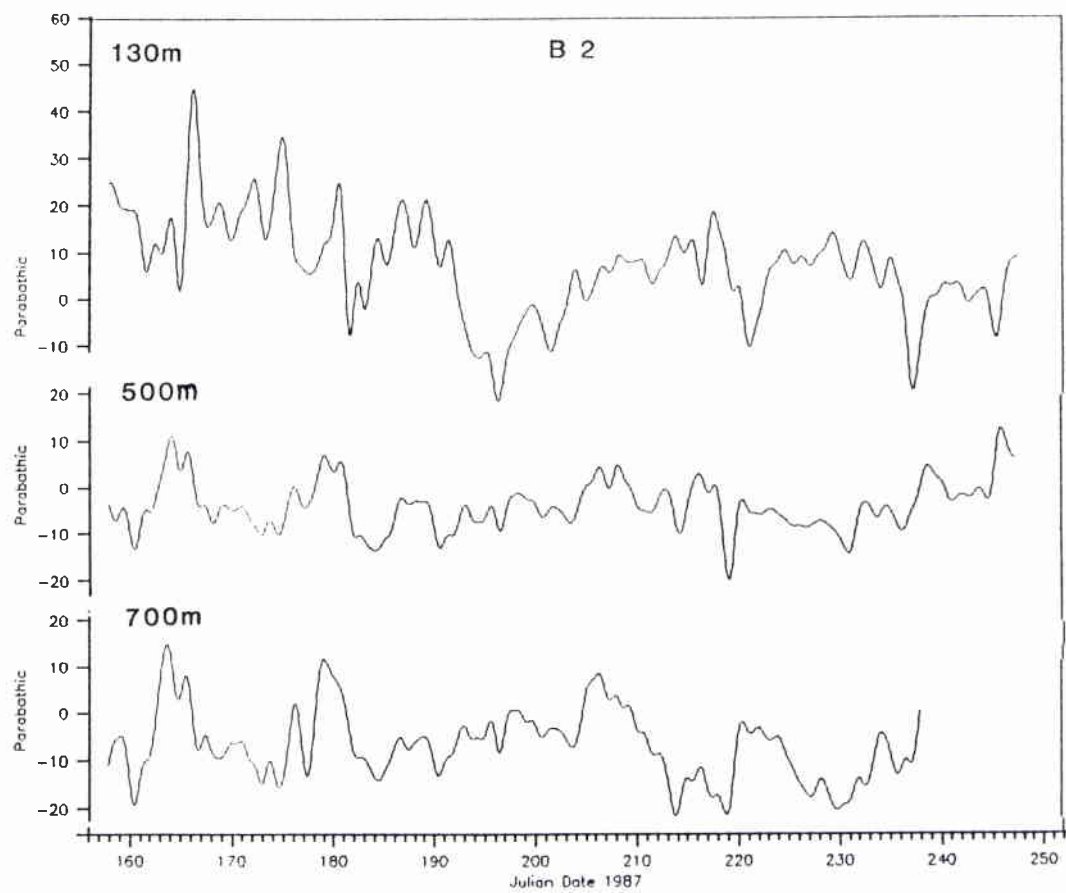


Figure D8

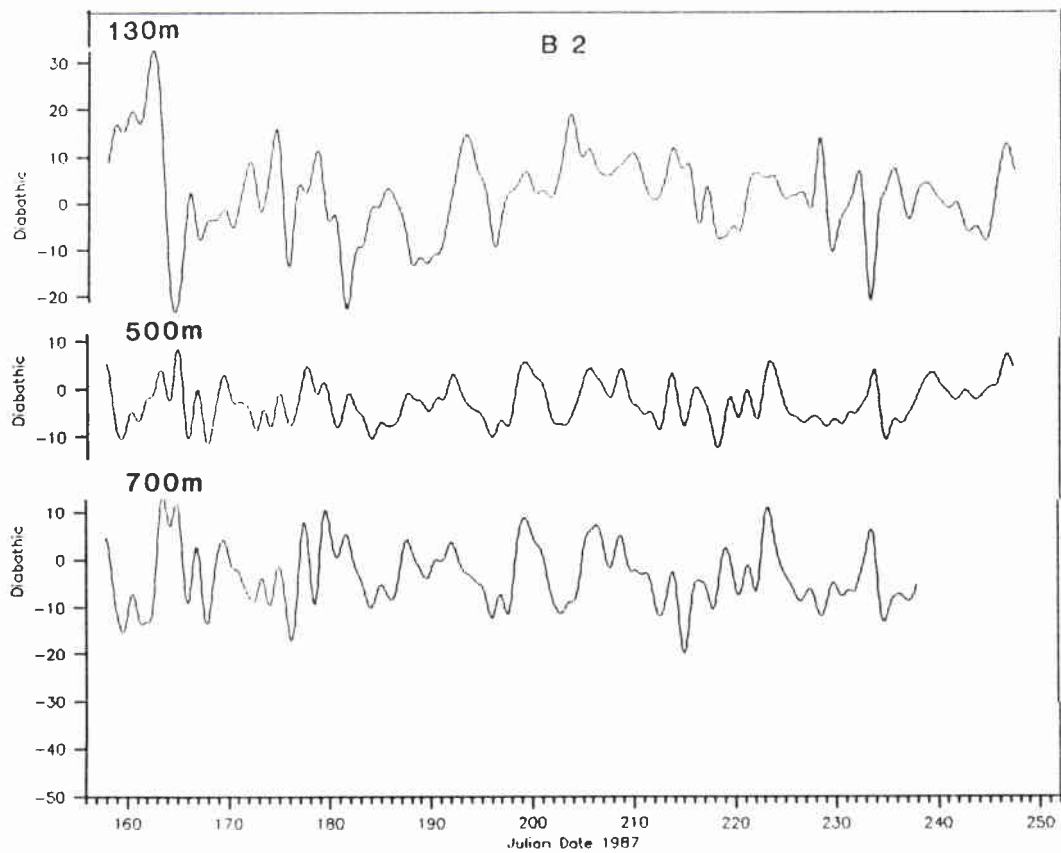


Figure D9

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BDA2_000
 Version : H35
 Latitude : 62 15.7N
 Longitude : 0 27'E

Instrument No. : 9022
 Instrument Depth : 130
 Water Depth : 802
 From : 06-JUN-1987 20:55
 To : 04-SEP-1987 10:55

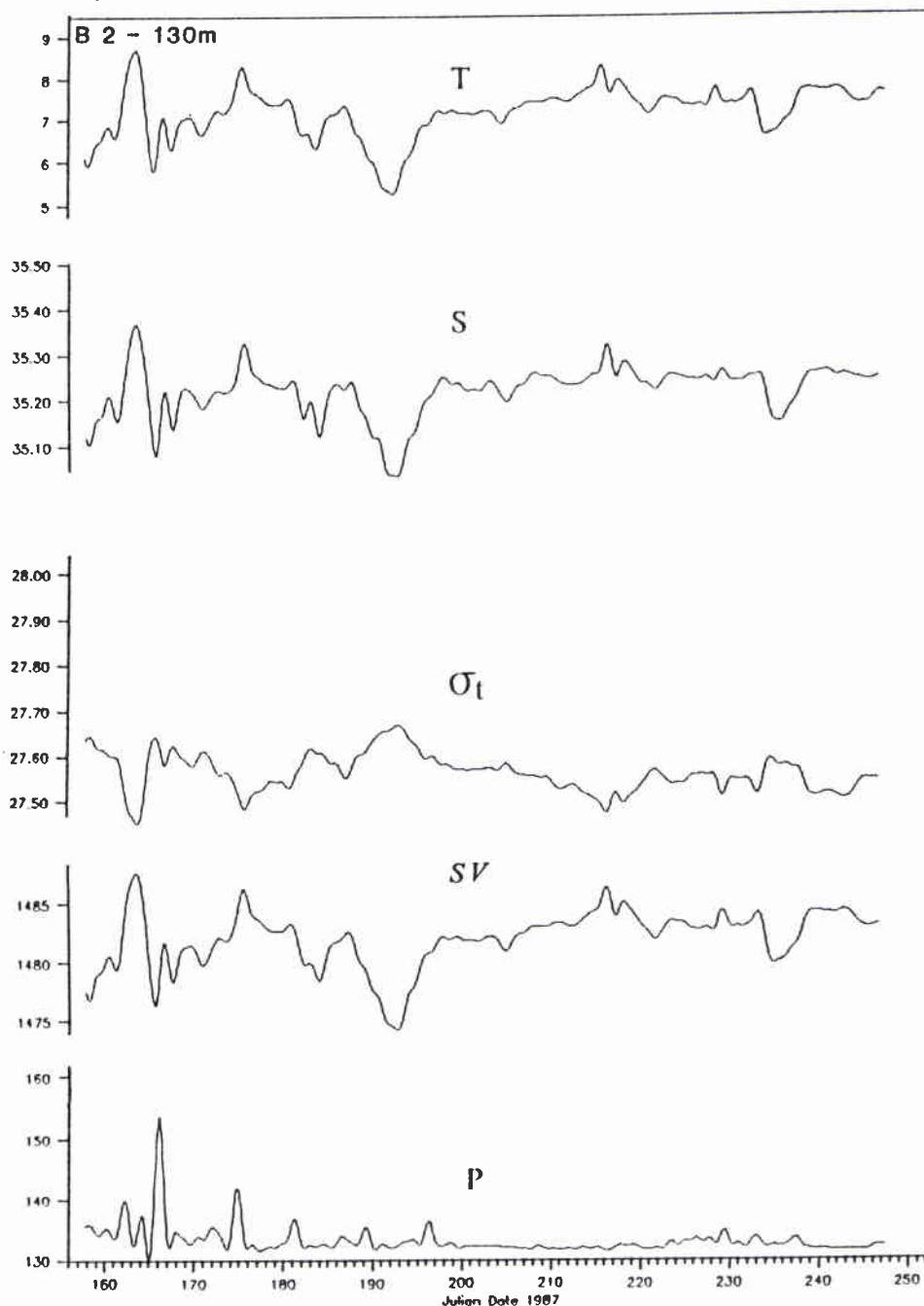


Figure D10

SACLANTCEN SM-250

Cruise : GINSEA_R7
 Station : BDA2_002
 Version : H35
 Latitude : 62 15.7N
 Longitude : 0 2 7E

Instrument No. : 9004
 Instrument Depth : 500
 Water Depth : 802
 From : 06-JUN-1987 20:53
 To : 04-SEP-1987 06:55

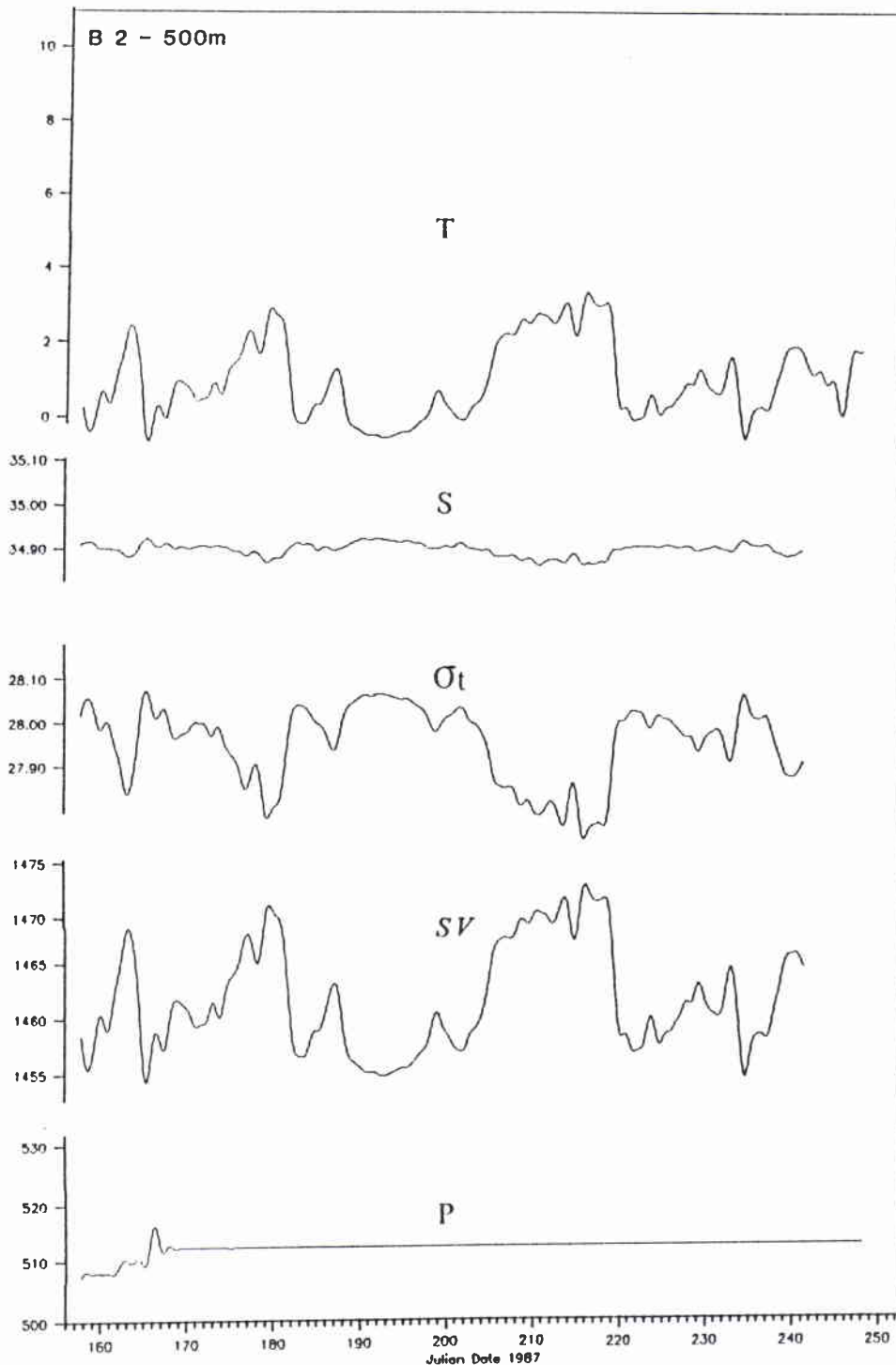


Figure D11

SACLANTCEN SM-250

Cruise : GHSEA_87
 Station : B0A2_001
 Version : H35
 Latitude : 62 15.7N
 Longitude : 0 2 7'E

Instrument No. : 9005
 Instrument Depth : 700
 Water Depth : 802
 From : 06-JUN-1987 20:54
 To : 26-AUG-1987 02:54

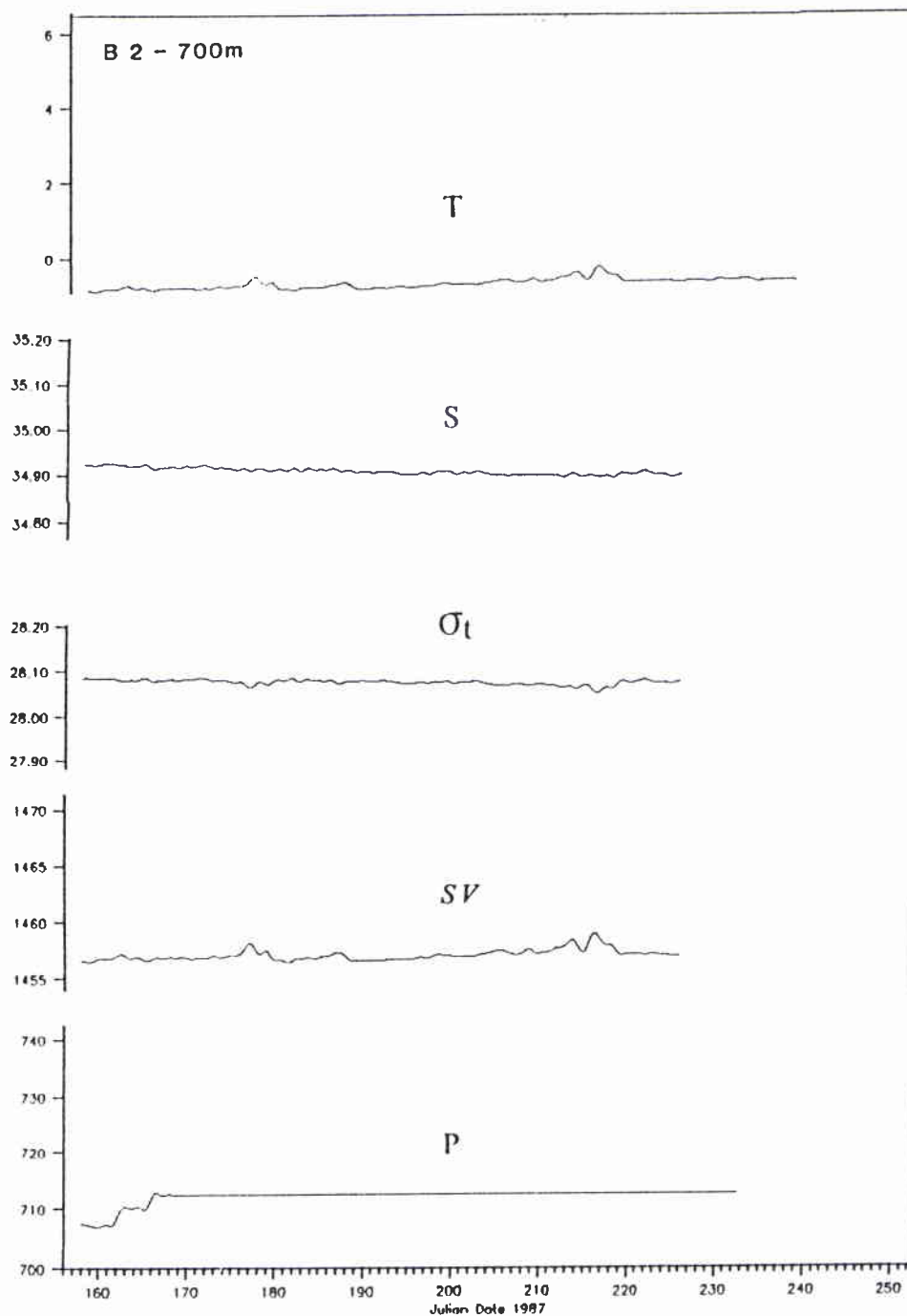


Figure D12

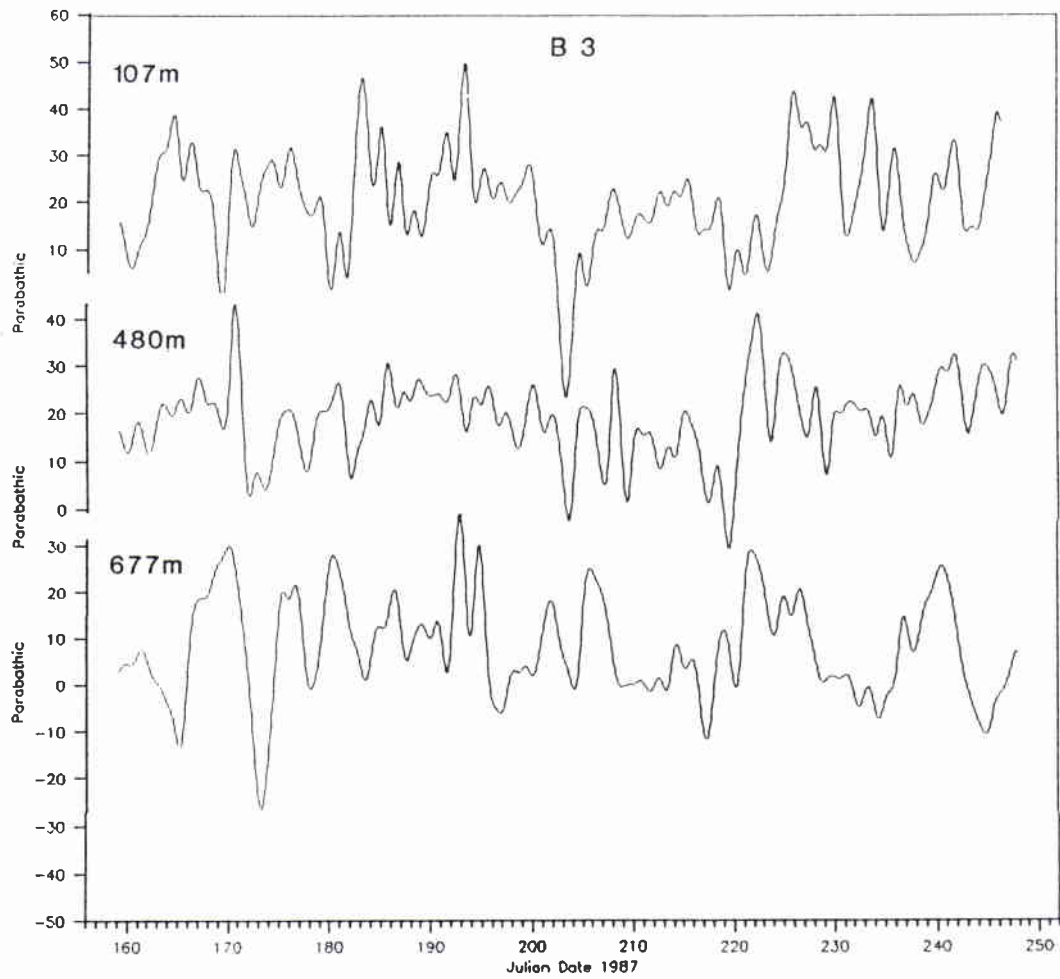


Figure D13

SACLANTCEN SM-250

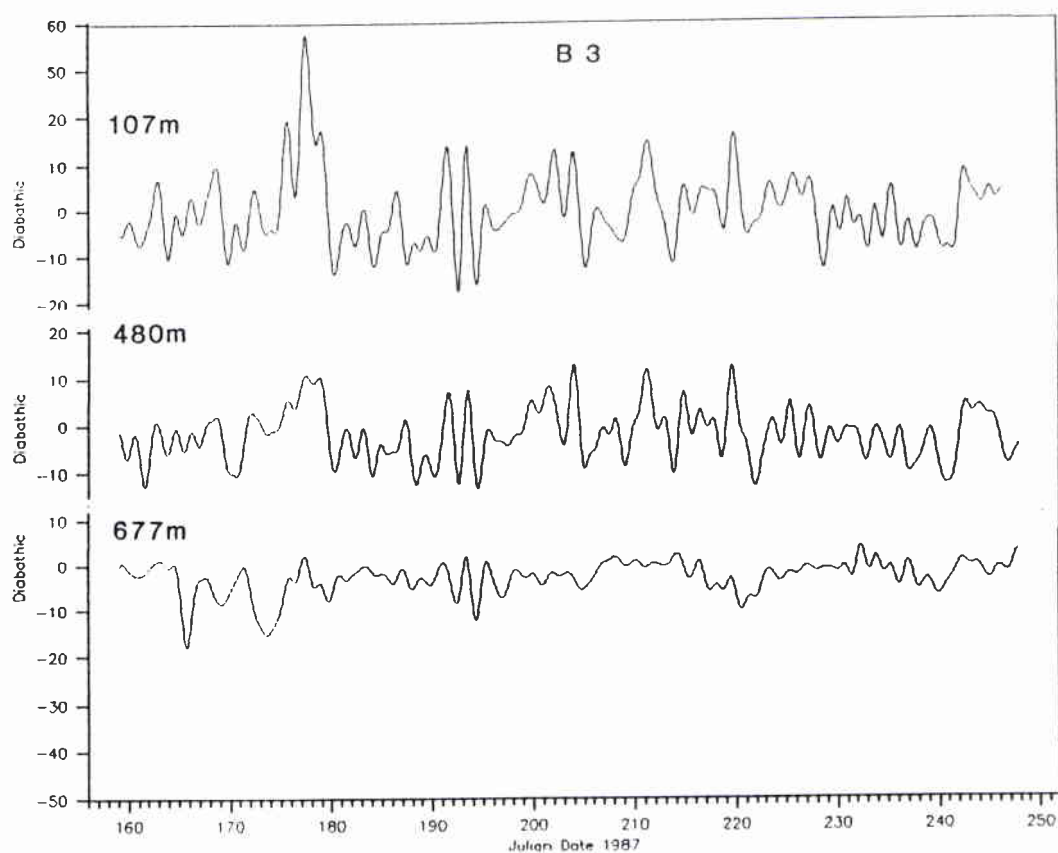


Figure D14

Cruise : GINSEA_87
 Station : BOAJ_001
 Version : H35
 Latitude : 63 5.5 N
 Longitude : 4 51.9'E

Instrument No. : 9021
 Instrument Depth : 107
 Water Depth : 762
 From : 06-JUN-1987 04:56
 To : 03-SEP-1987 08:56

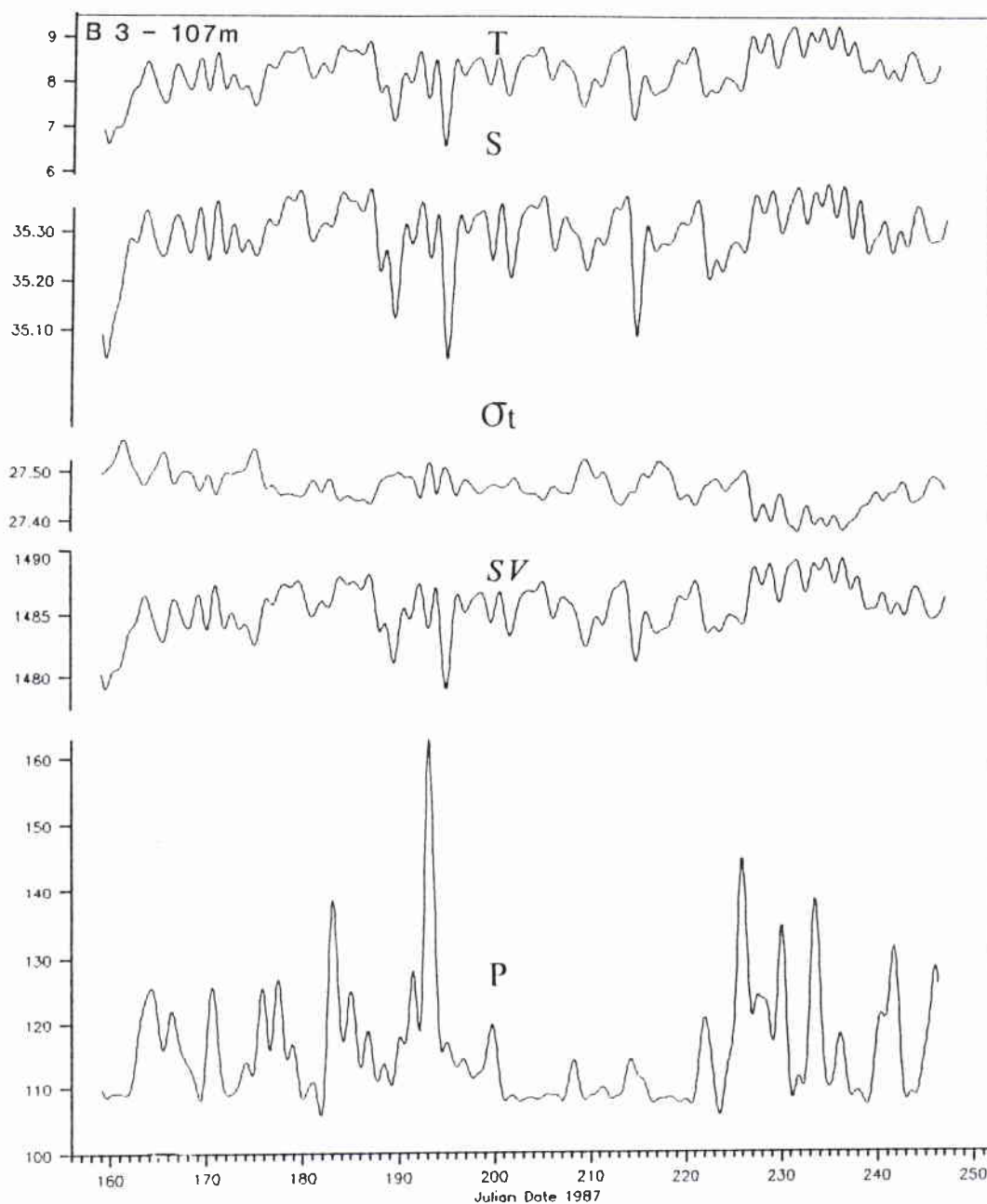


Figure D15

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : B0A3_002
 Version : H35
 Latitude : 63 5.5'N
 Longitude : 4 51.9'E

Instrument No. : 9006
 Instrument Depth : 480
 Water Depth : 762
 From : 08-JUN-1987 04:56
 To : 04-SEP-1987 22:56

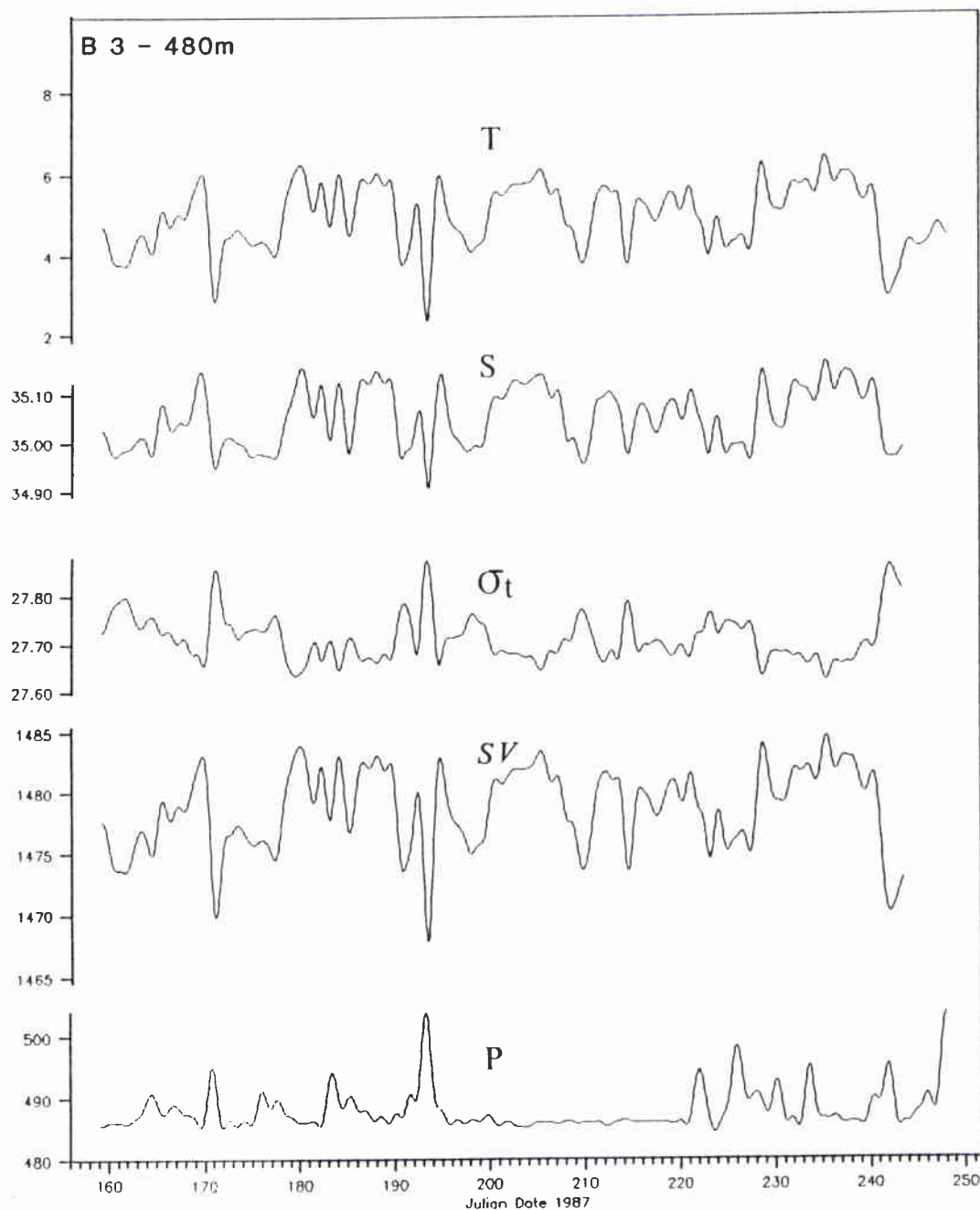


Figure D16

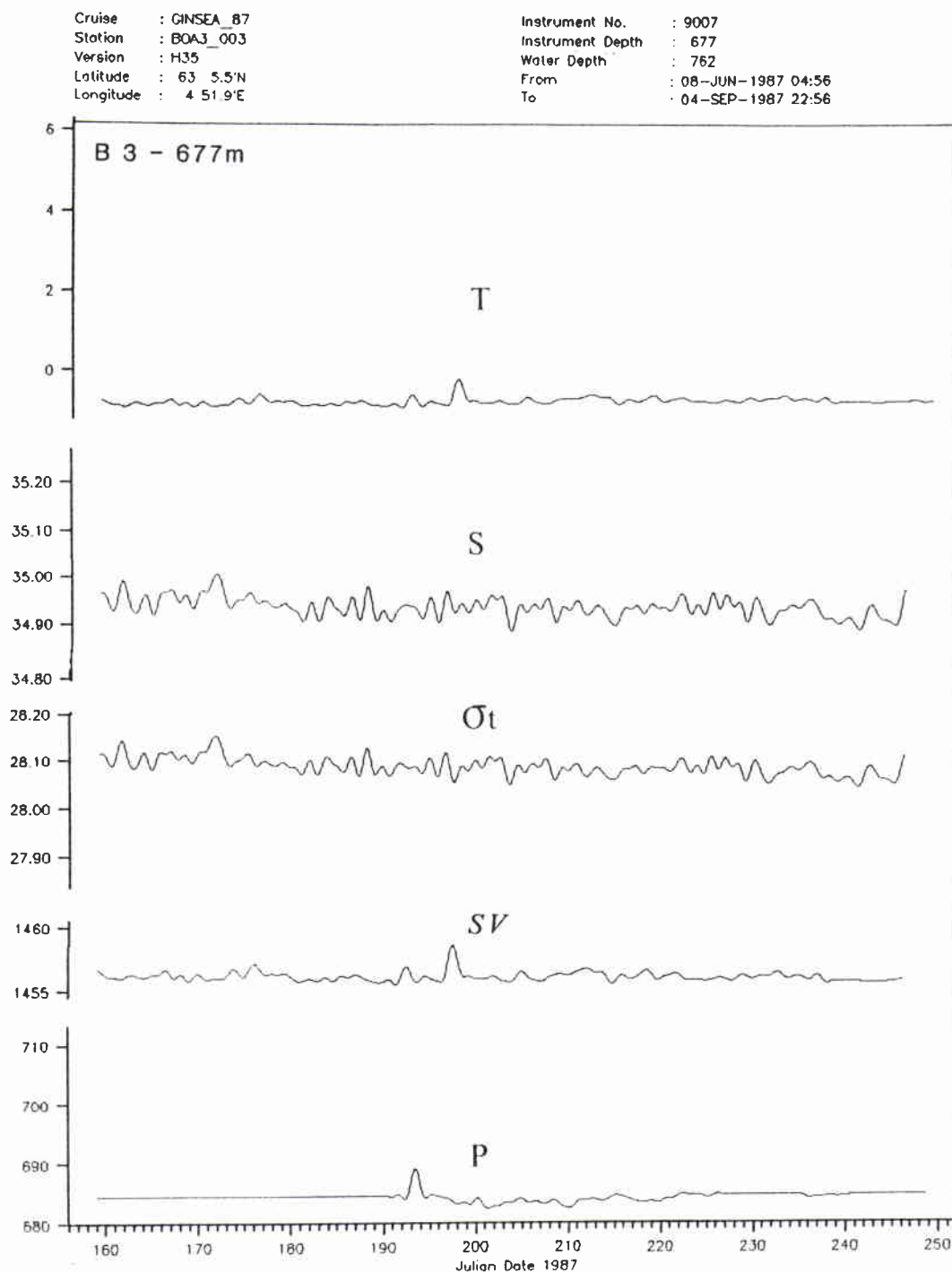
SACLANTCEN SM-250

Figure D17

SACLANTCEN SM-250

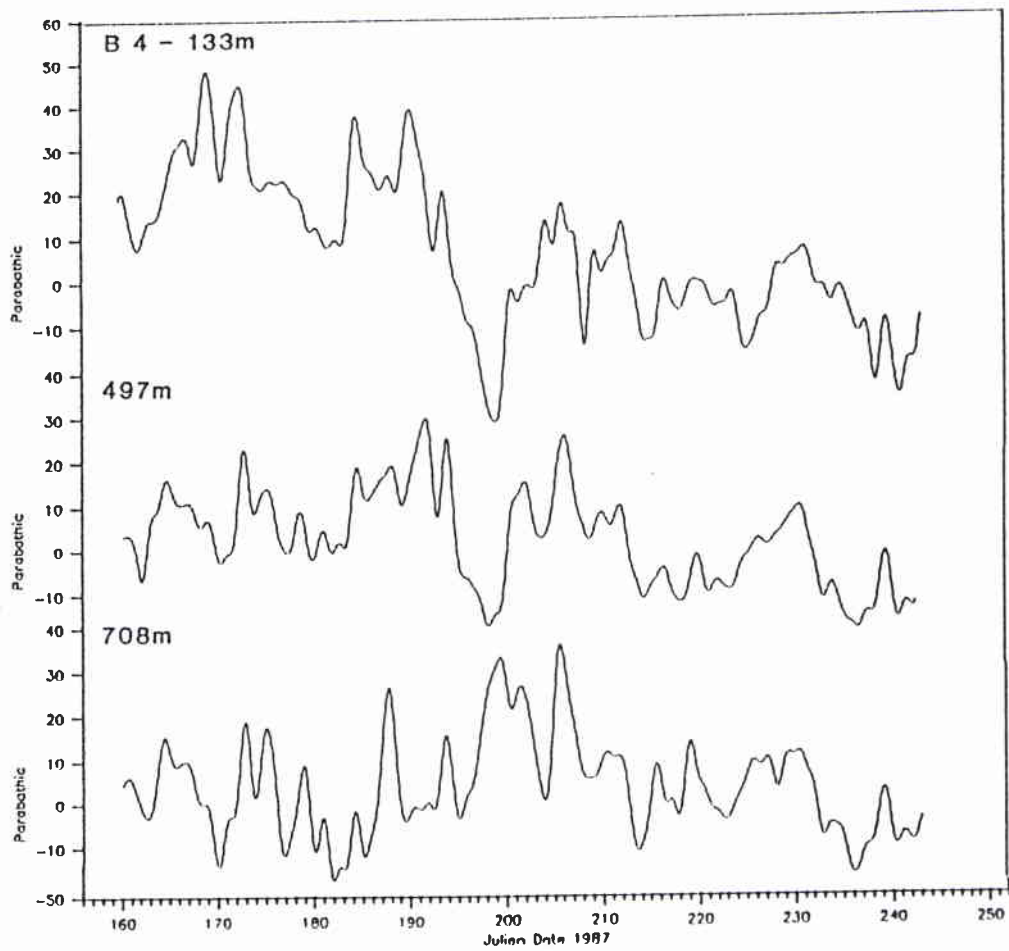


Figure D18

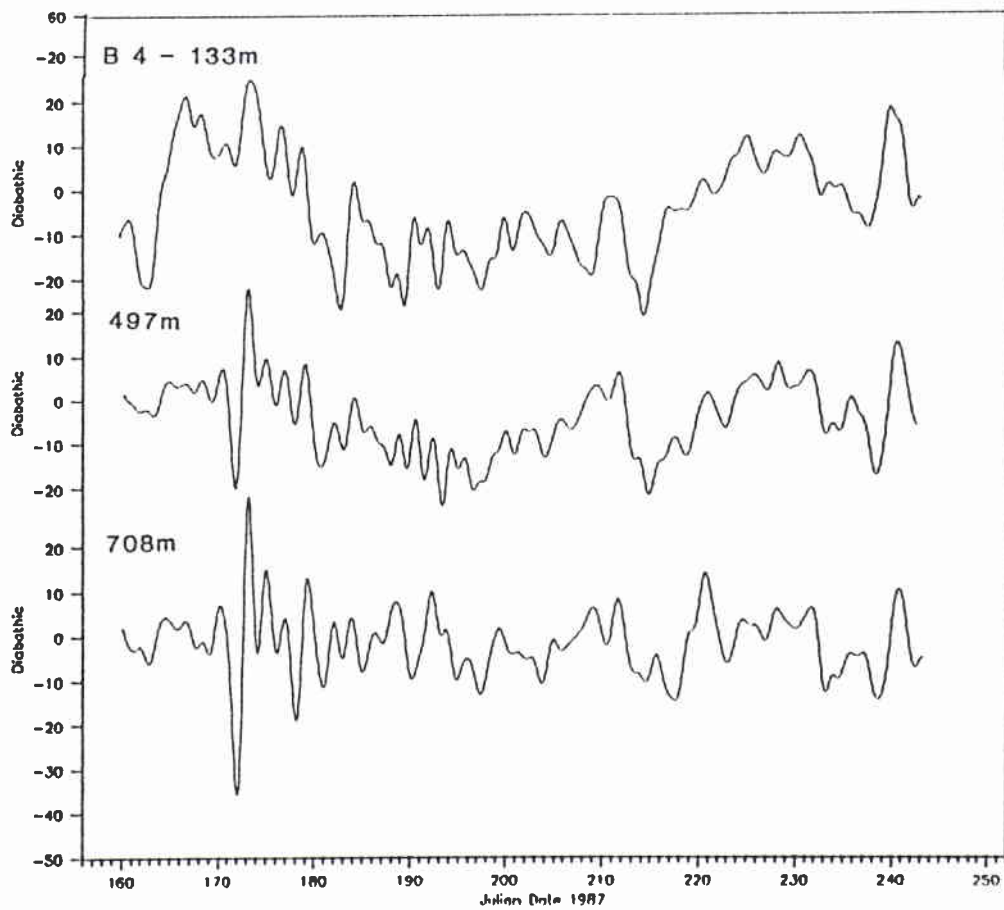


Figure D19

SACLANTCEN SM-250

Cruise : CINSEA_87
Station : BOA4_001
Version : H35
Latitude : 65 29.9'N
Longitude : 4 53.7'E

Instrument No. : 9024
Instrument Depth : 133
Water Depth : 800
From : 06-JUN-1987 21:00
To : 05-SEP-1987 11:00

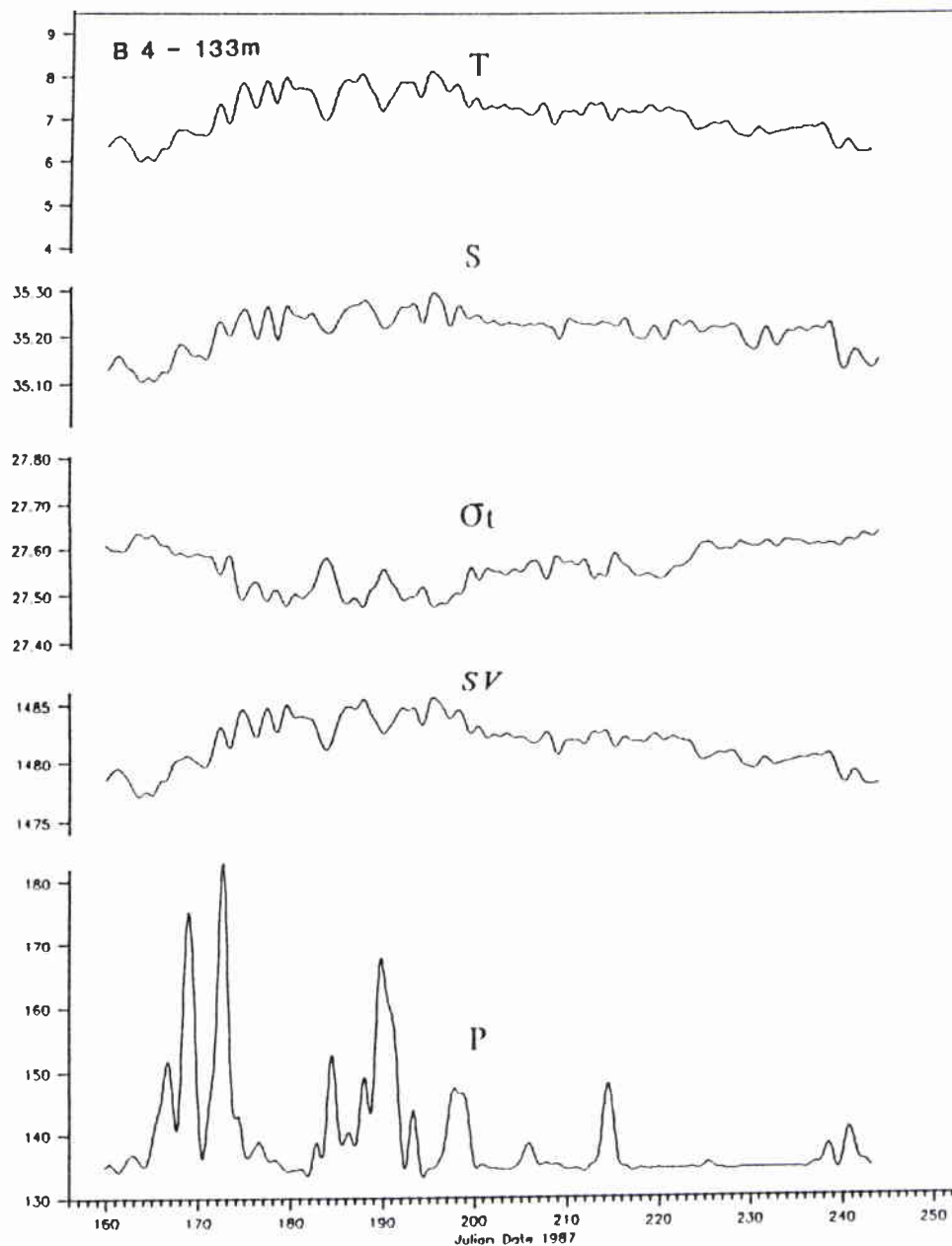


Figure D20

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BOA4_000
 Version : H35
 Latitude : 65 29.8'N
 Longitude : 4 53.7'E

Instrument No. : 9008
 Instrument Depth : 497
 Water Depth : 800
 From : 09-JUN-1987 07:00
 To : 05-SEP-1987 19:00

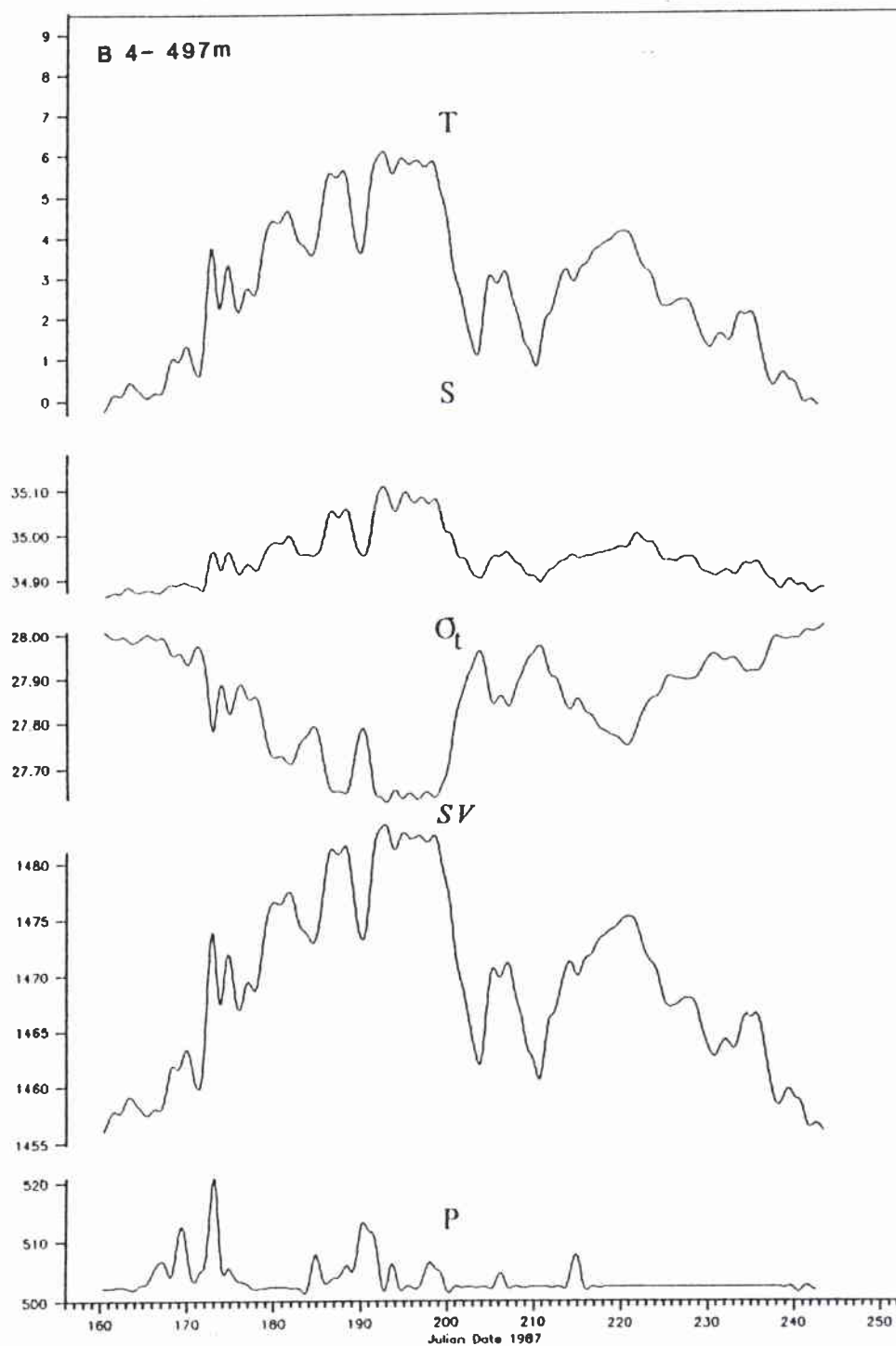


Figure D21

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BDA4_002
 Version : H35
 Latitude : 65 29.9 N
 Longitude : 4 53.7 E

Instrument No. : 9009
 Instrument Depth : 708
 Water Depth : 800
 From : 09-JUN-1987 04:59
 To : 05-SEP-1987 18:59

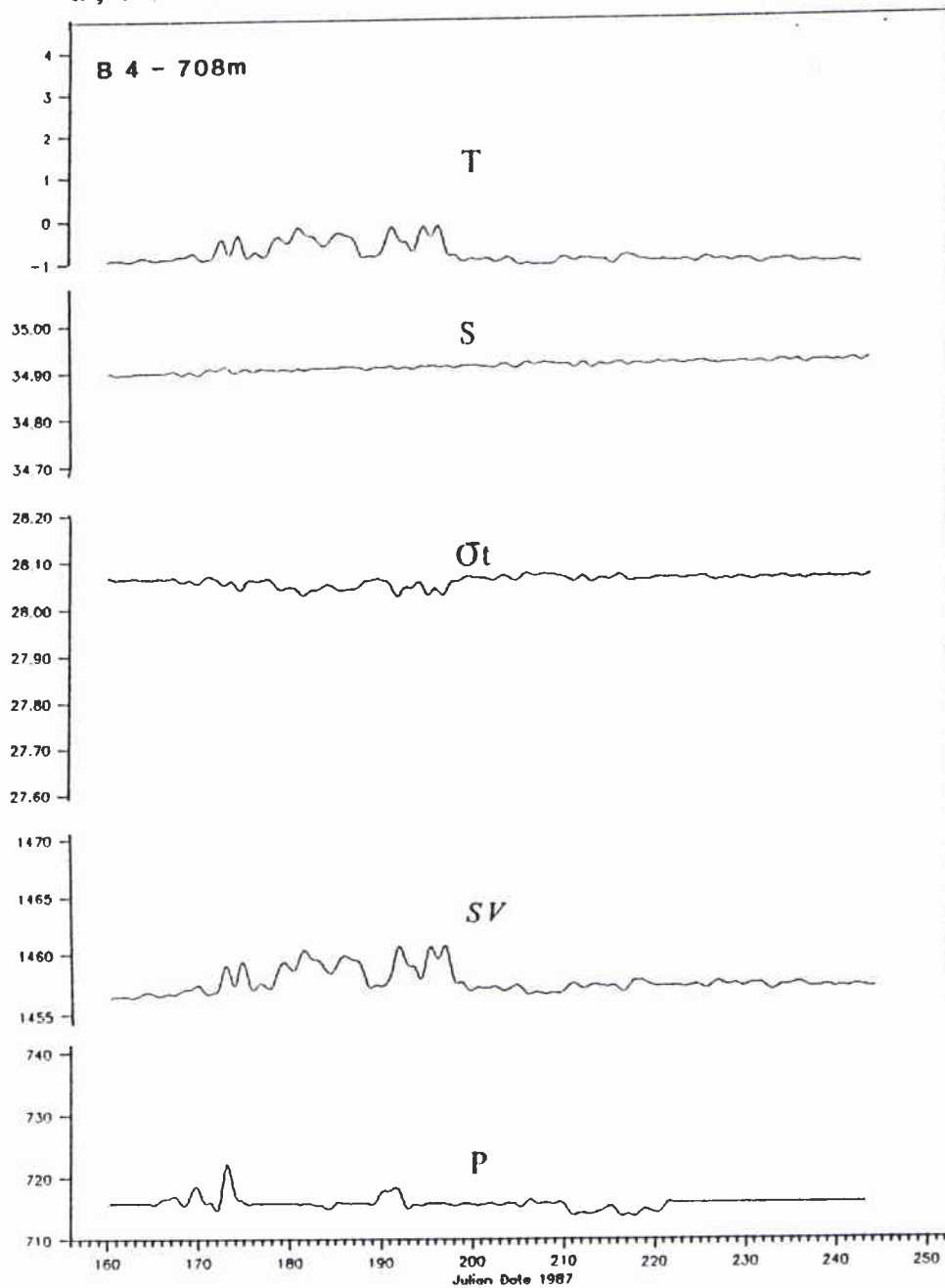


Figure D22

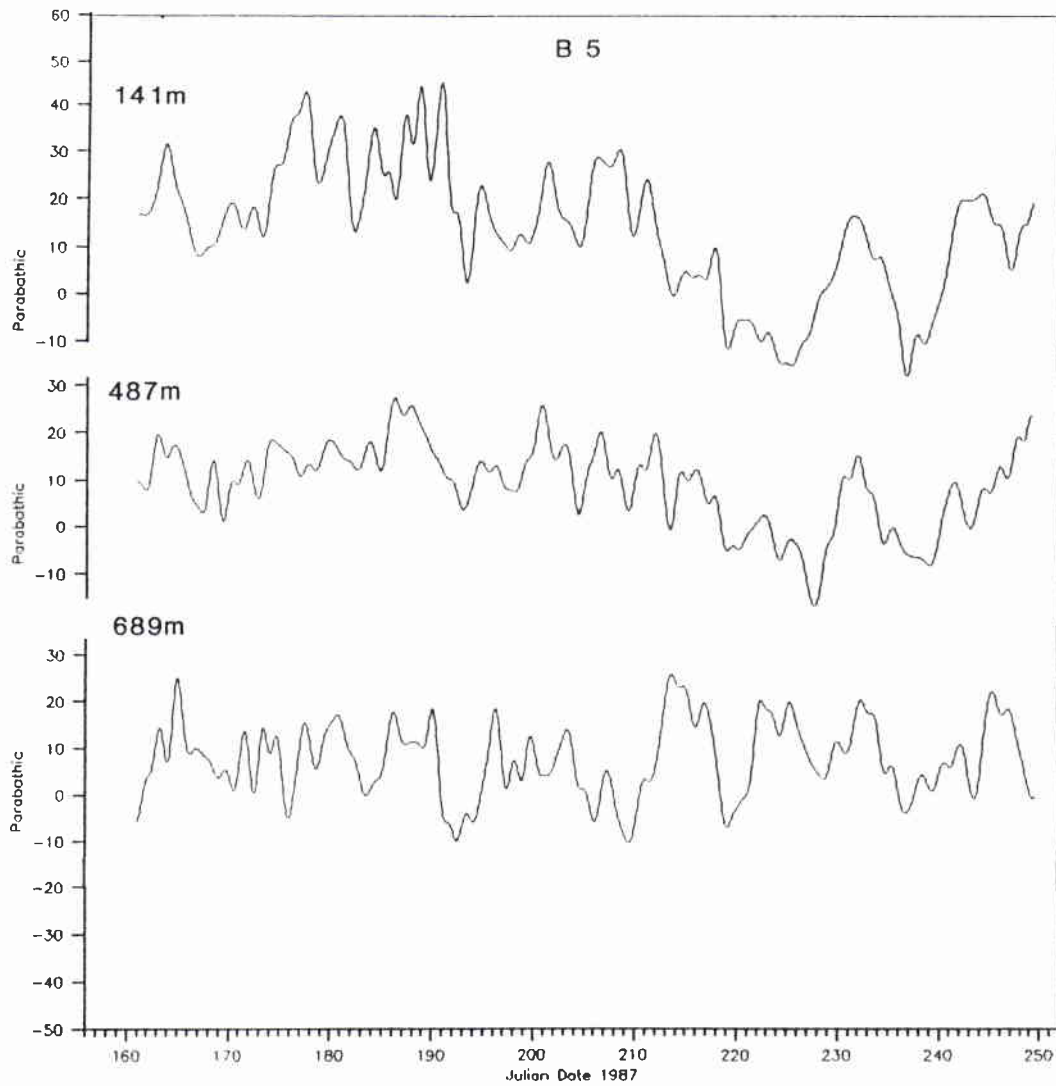


Figure D23

SACLANTCEN SM-250

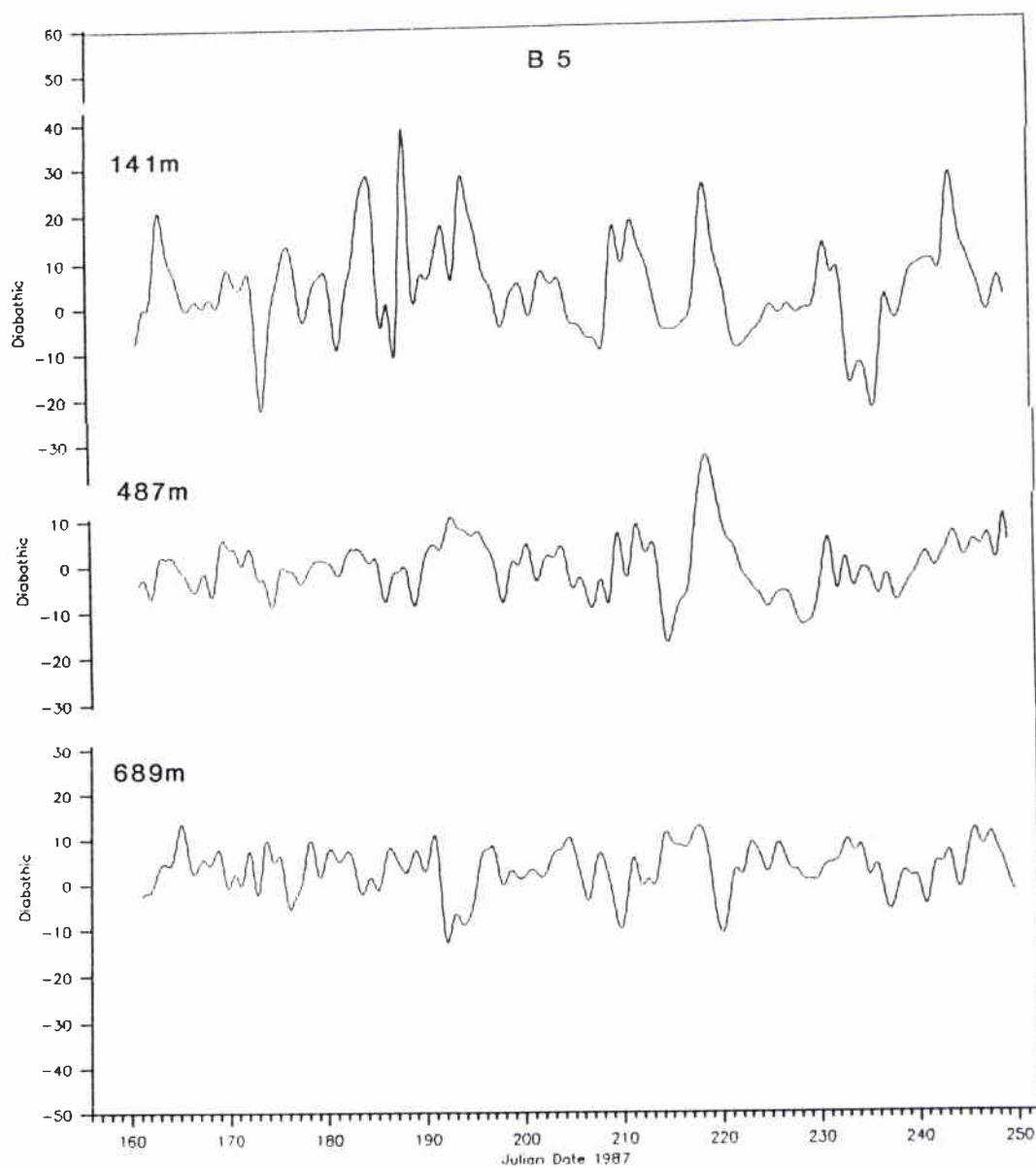


Figure D24

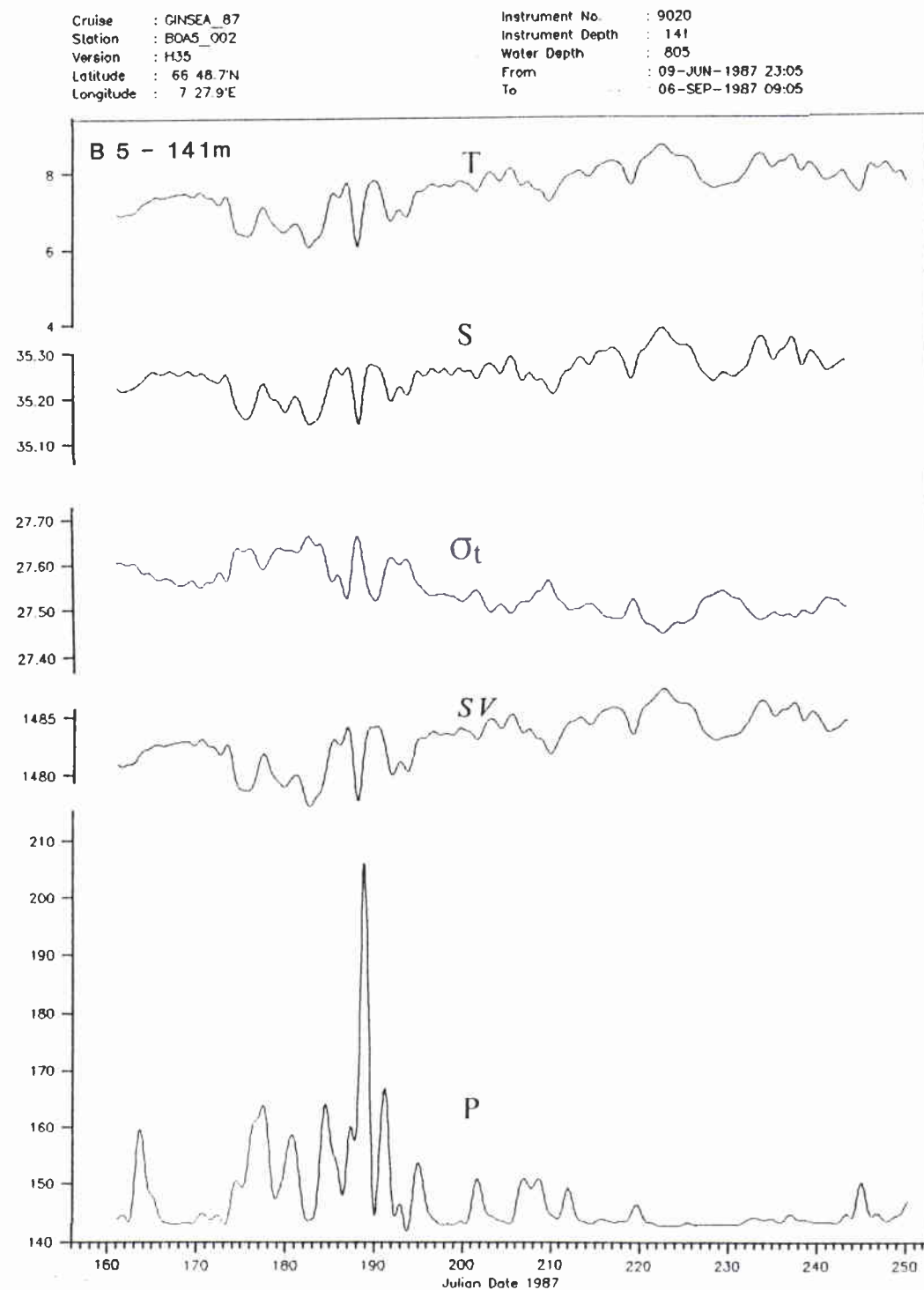


Figure D25

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BOA5_000
 Version : H35
 Latitude : 66 48.7'N
 Longitude : 7 27.9'E

Instrument No. : 9010
 Instrument Depth : 487
 Water Depth : 805
 From : 09-JUN-1987 23:05
 To : 06-SEP-1987 09:05

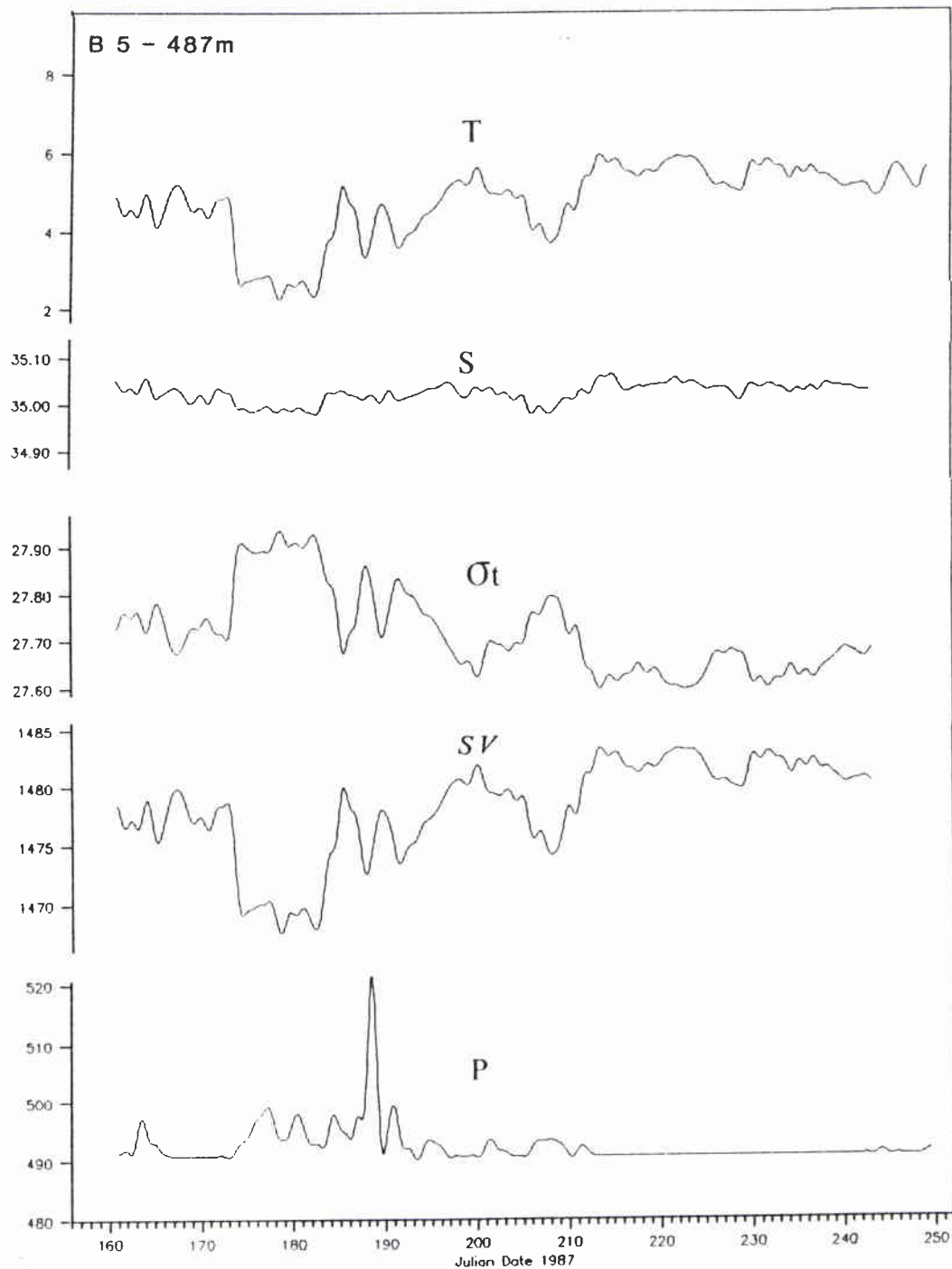


Figure D26

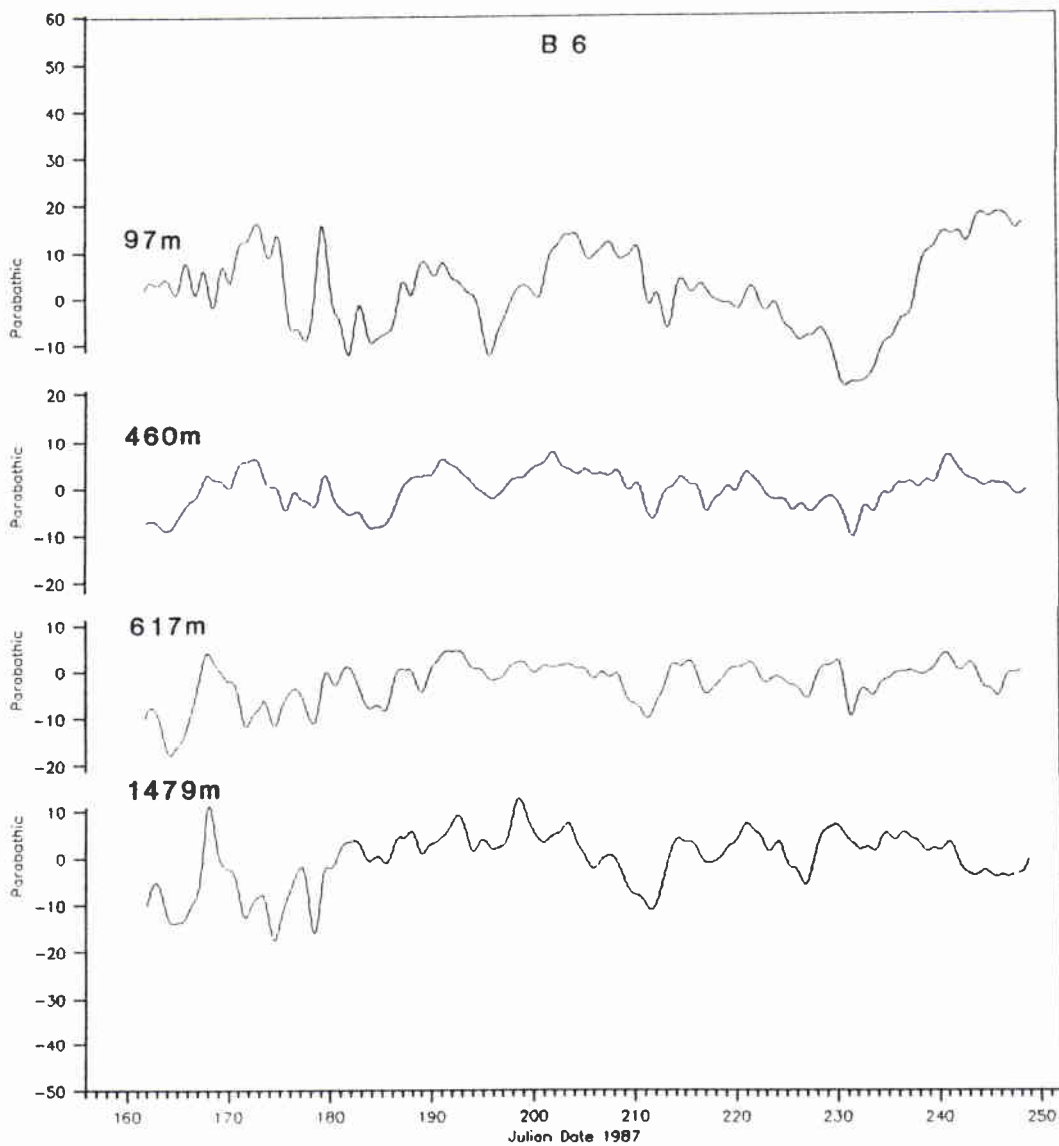


Figure D27

SACLANTCEN SM-250

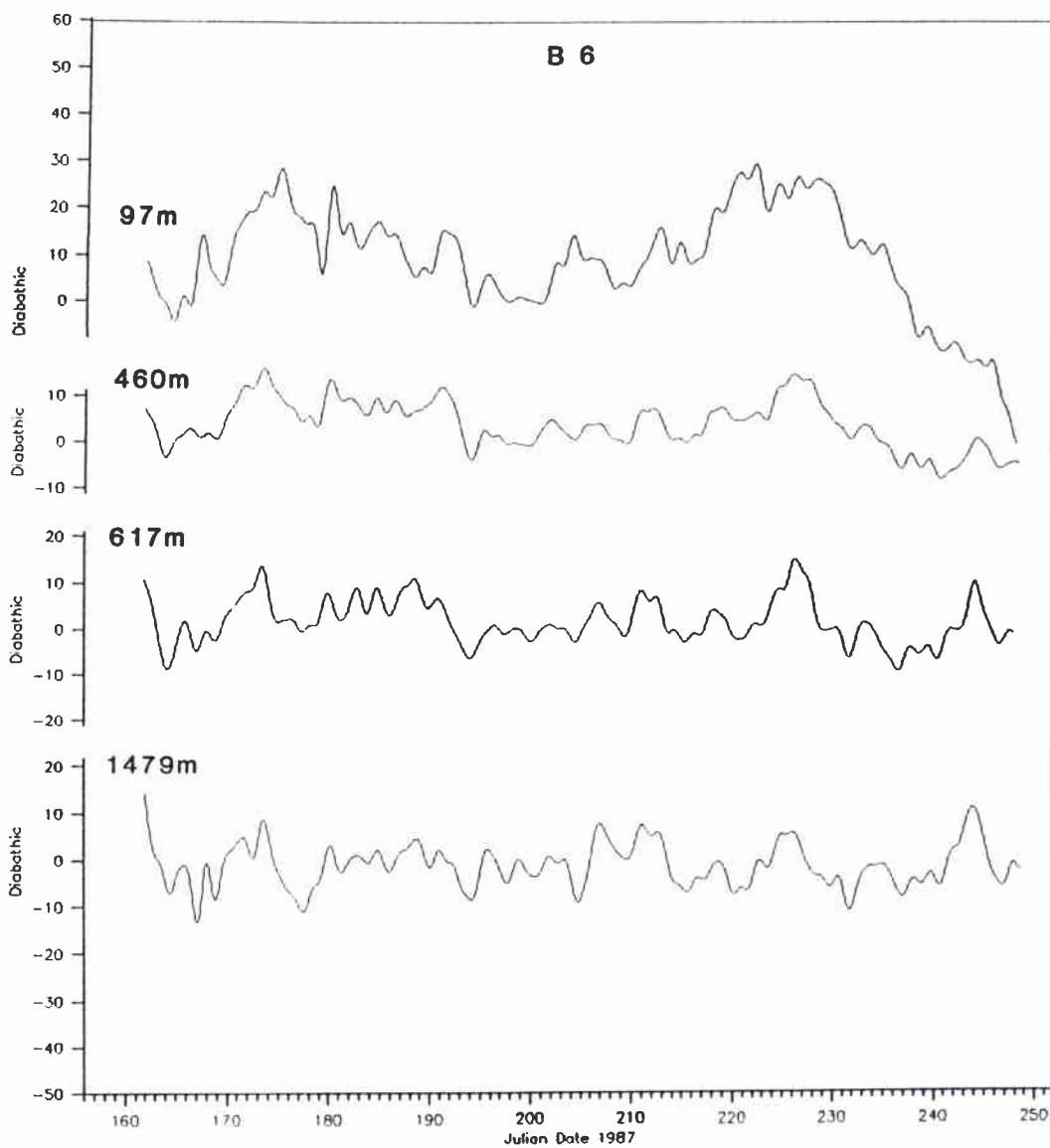
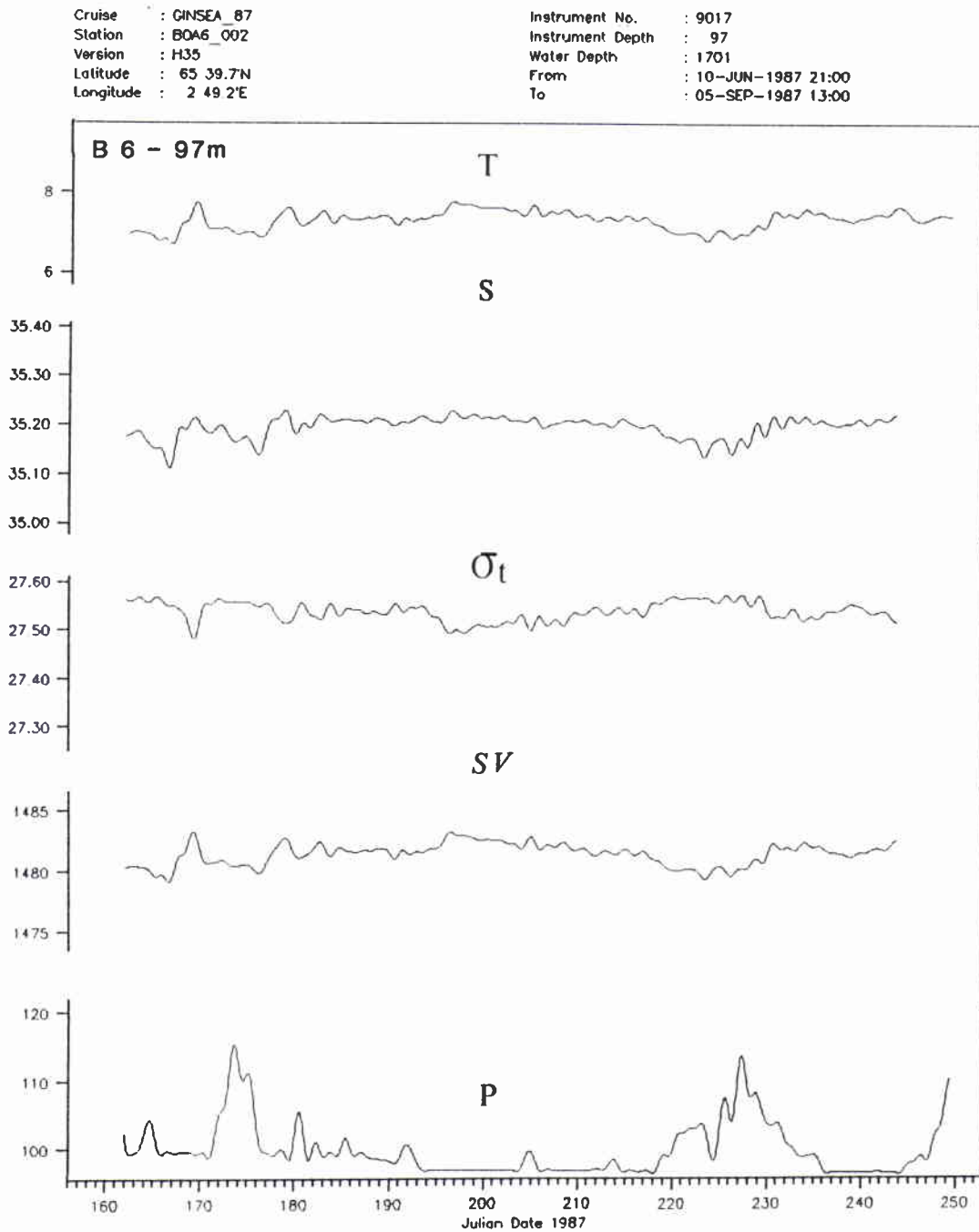


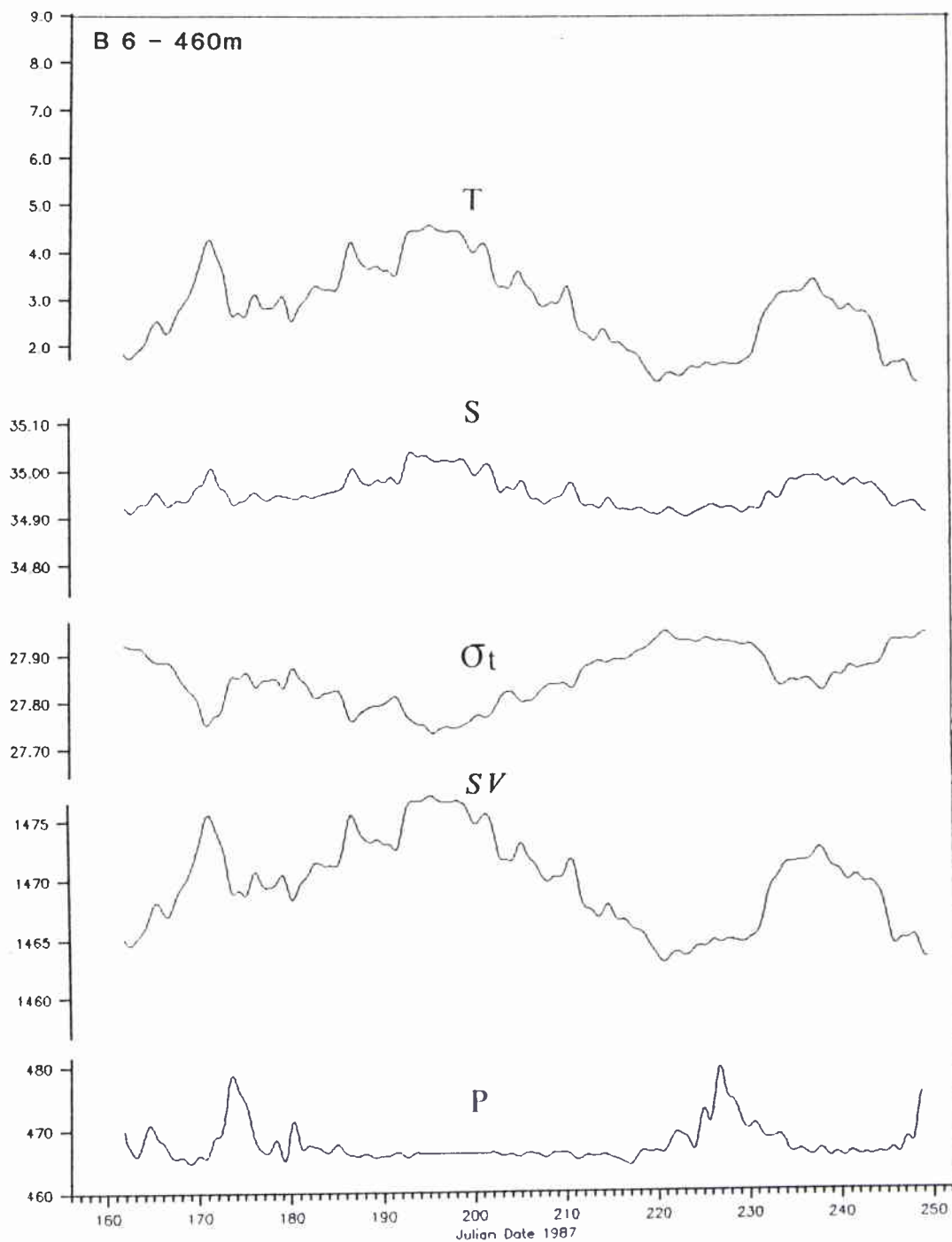
Figure D28

SACLANTCEN SM-250**Figure D29**

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BQA6_003
 Version : H35
 Latitude : 65 39.7'N
 Longitude : 2 49 2'E

Instrument No. : 9011
 Instrument Depth : 460
 Water Depth : 1701
 From : 10-JUN-1987 21:00
 To : 05-SEP-1987 17:00

**Figure D30**

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BOA6_001
 Version : H35
 Latitude : 65 39.7'N
 Longitude : 2 49 2'E

Instrument No. : 9012
 Instrument Depth : 617
 Water Depth : 1701
 From : 10-JUN-1987 21:00
 To : 05-SEP-1987 13:00

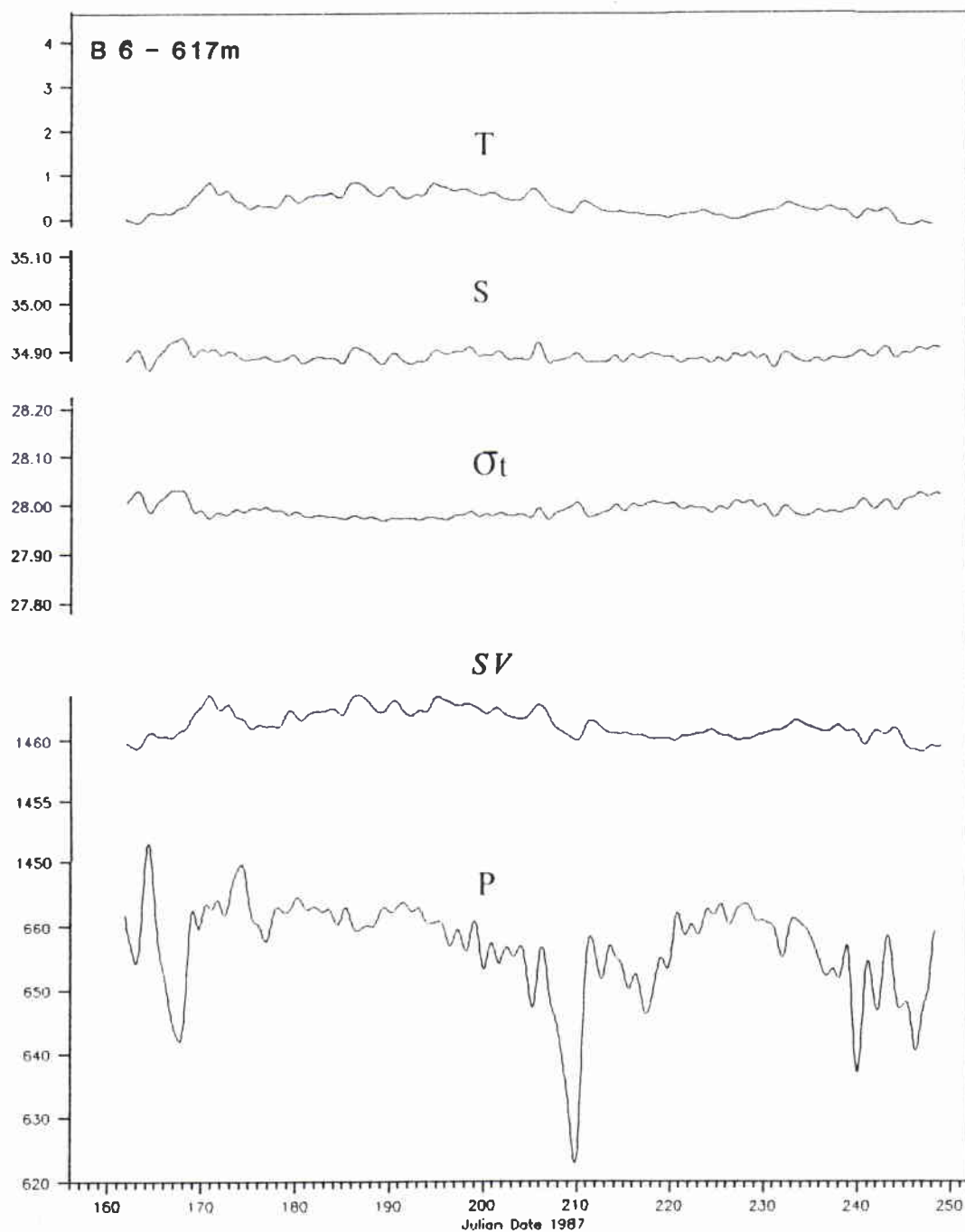


Figure D31

SACLANTCEN SM-250

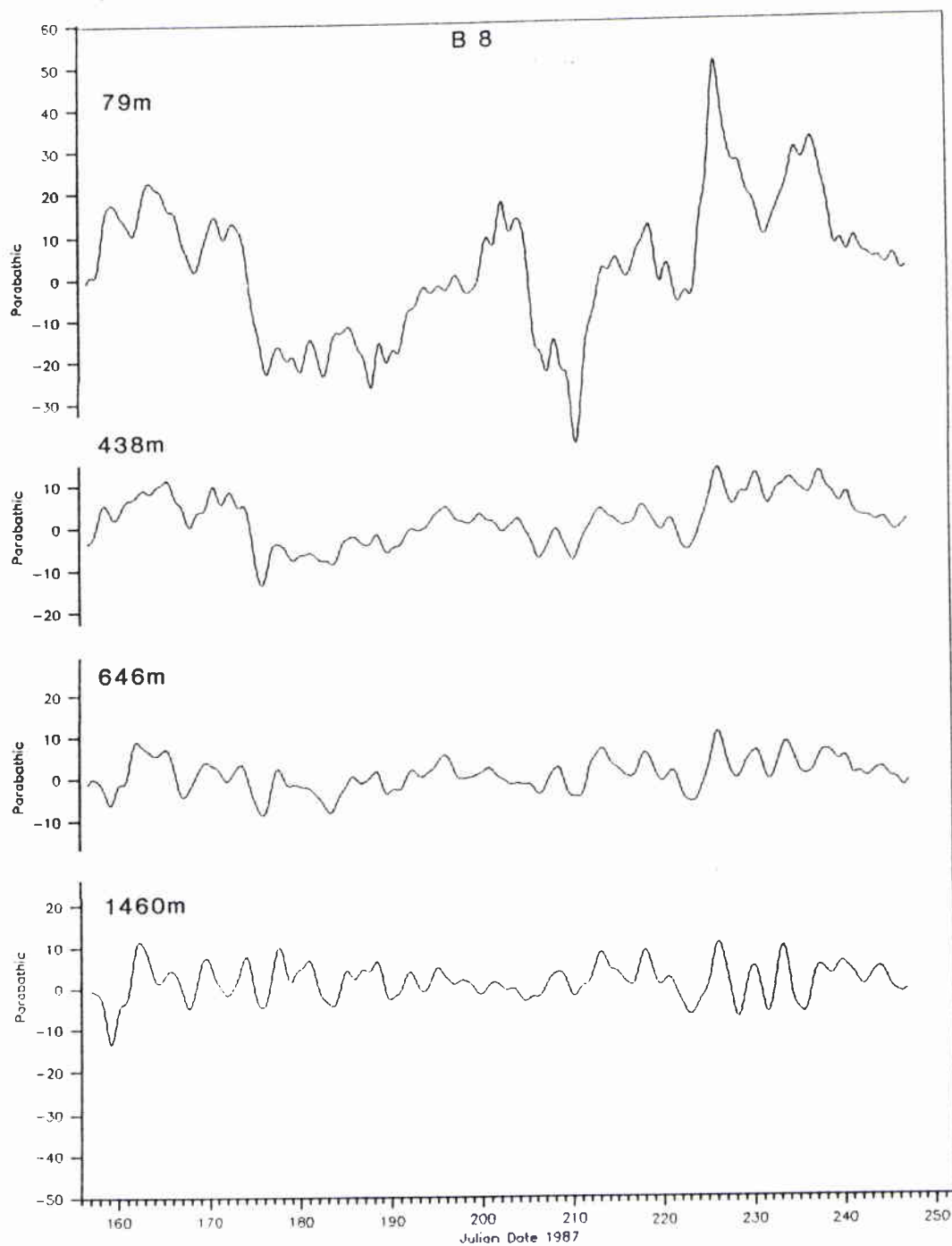


Figure D32

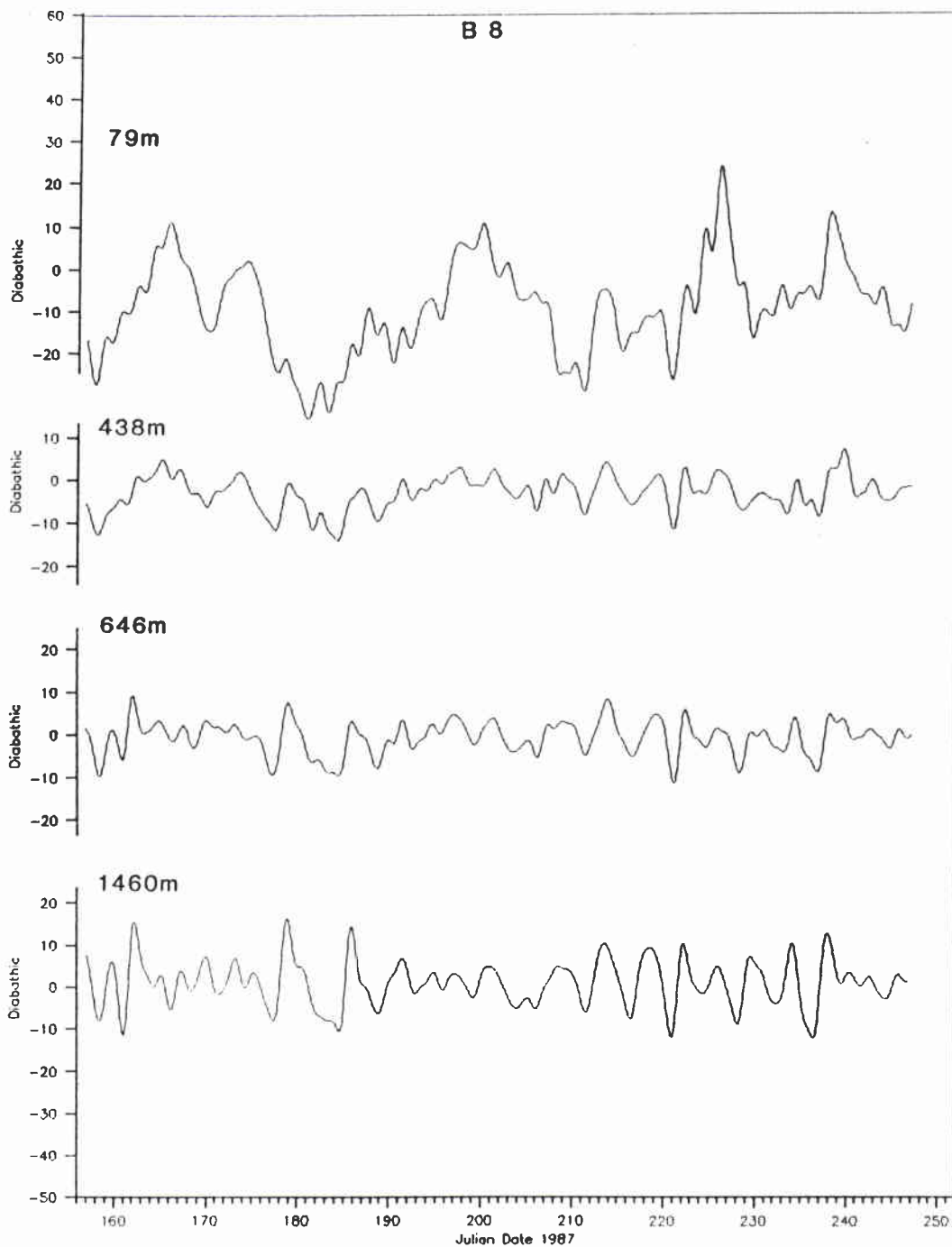


Figure D33

SACLANTCEN SM-250

Cruise : GINSEA_87
 Station : BOAB_002
 Version : H35
 Latitude : 62 56.9'N
 Longitude : 2 21.2'W

Instrument No. : 9026
 Instrument Depth : 79
 Water Depth : 1677
 From : 05-JUN-1987 23:09
 To : 03-SEP-1987 19:09

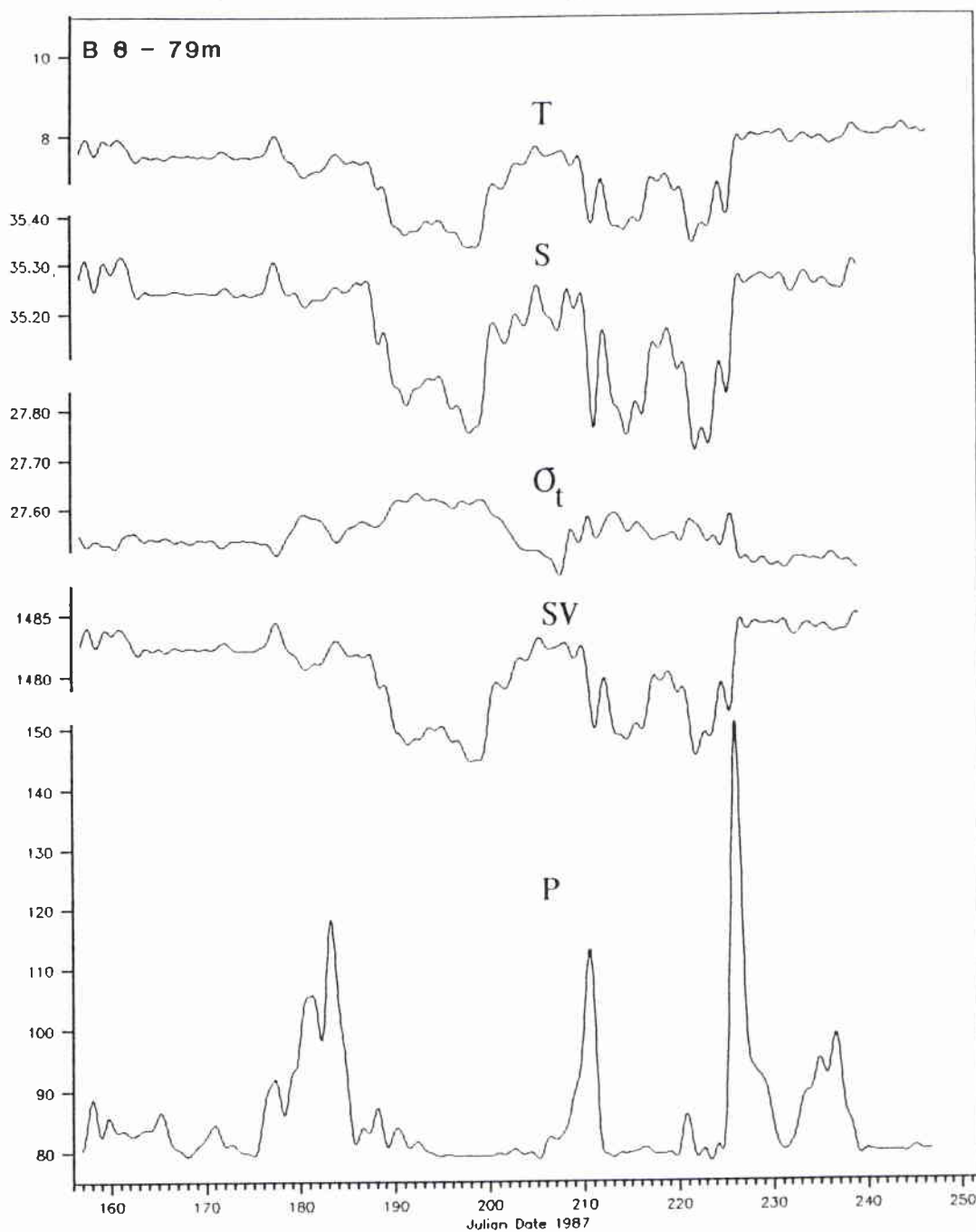


Figure D34

SACLANTCEN SM-250

Cruise : CHASEA_R7
 Station : B0A0_001
 Version : H35
 Latitude : 62 56.9N
 Longitude : 2 21.2W

Instrument No. : 9015
 Instrument Depth : 438
 Water Depth : 1677
 From : 05-JUN-1987 23:09
 To : 03-SEP-1987 19:09

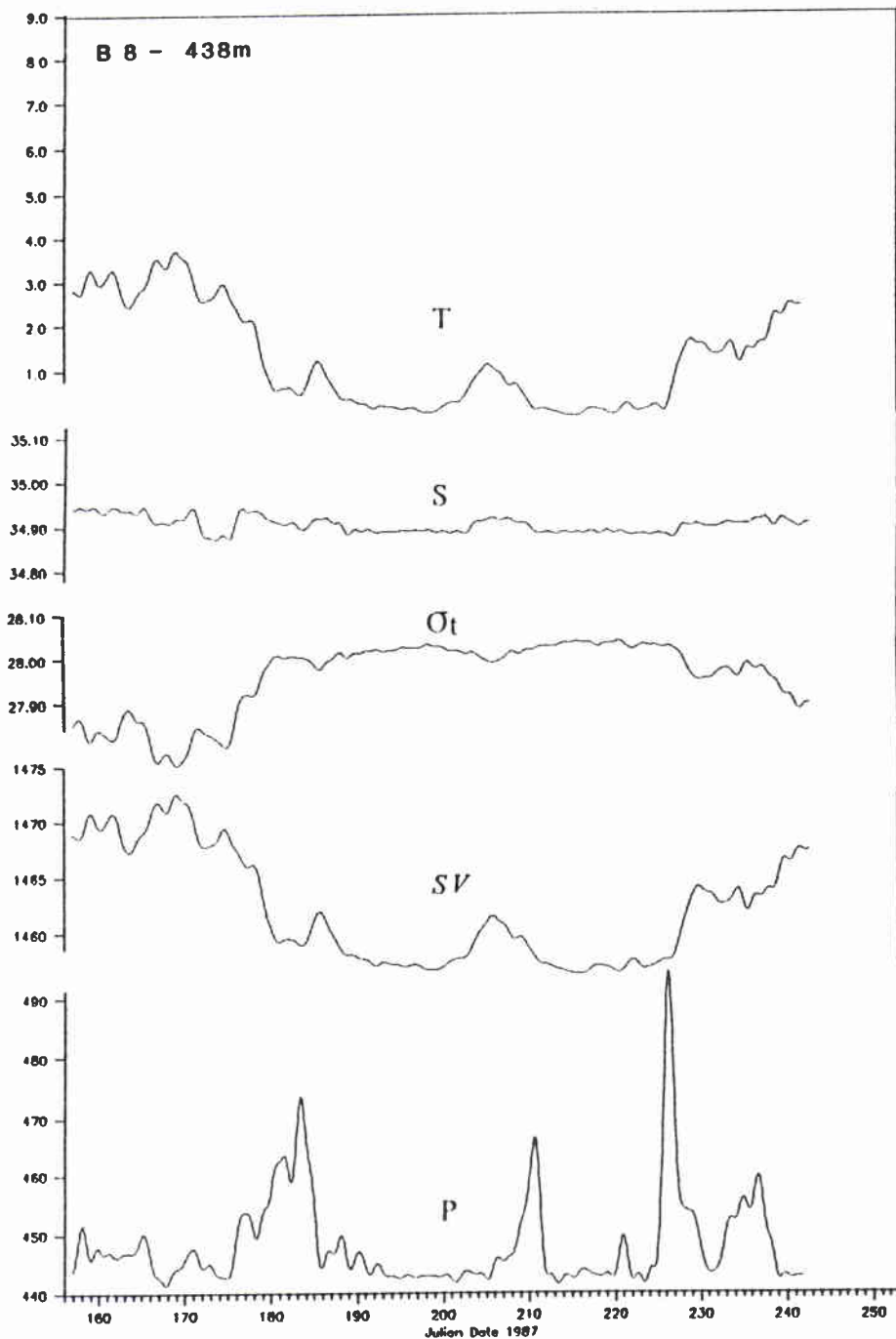


Figure D35

SACLANTCEN SM-250

Cruise : GINSEA 87
 Station : BOAR_003
 Version : H35
 Latitude : 62 56.9'N
 Longitude : 2 21 2'W

Instrument No. : 9016
 Instrument Depth : 646
 Water Depth : 1677
 From : 05-JUN-1987 23:09
 To : 03-SEP-1987 19:09

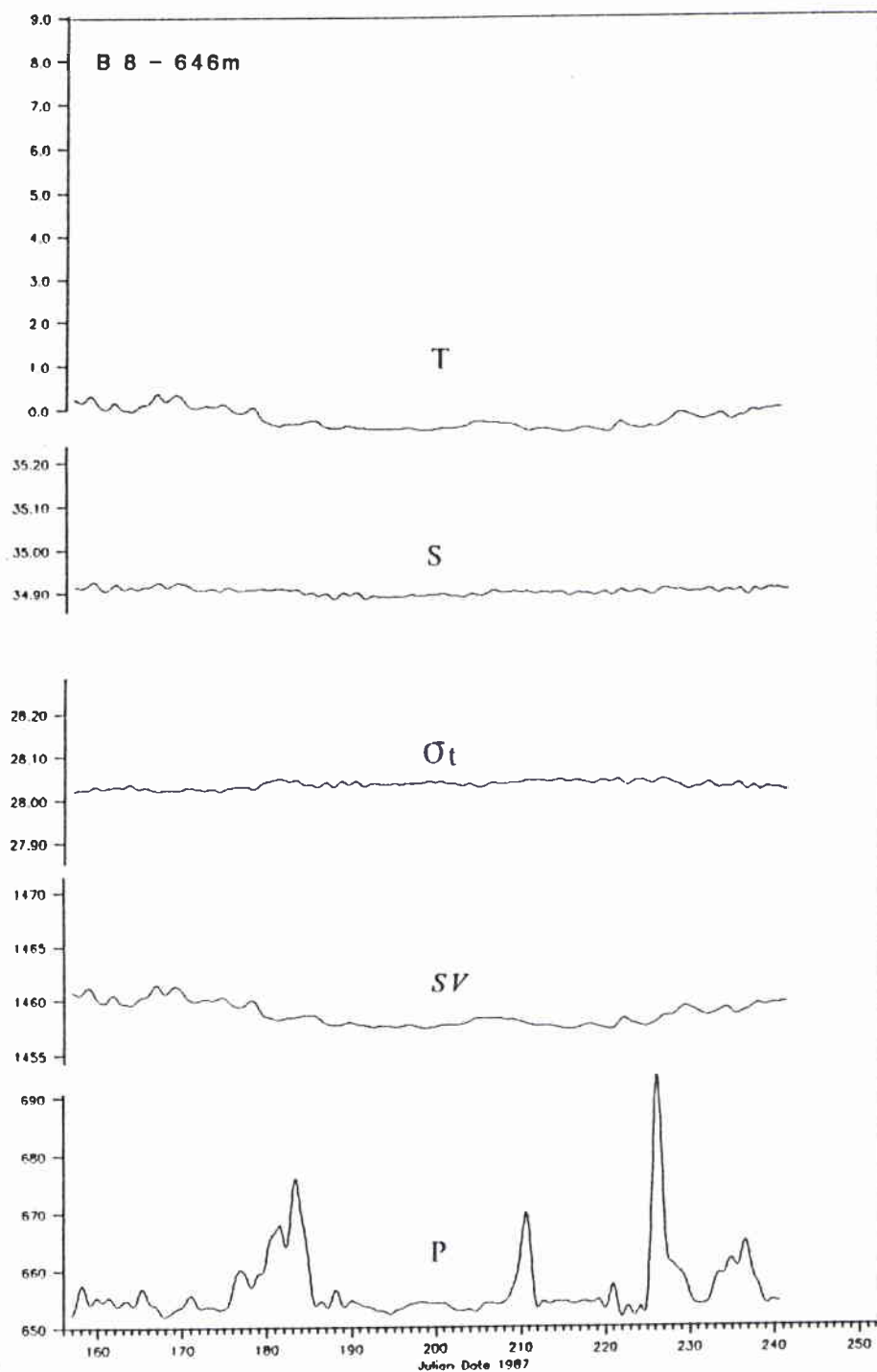


Figure D36

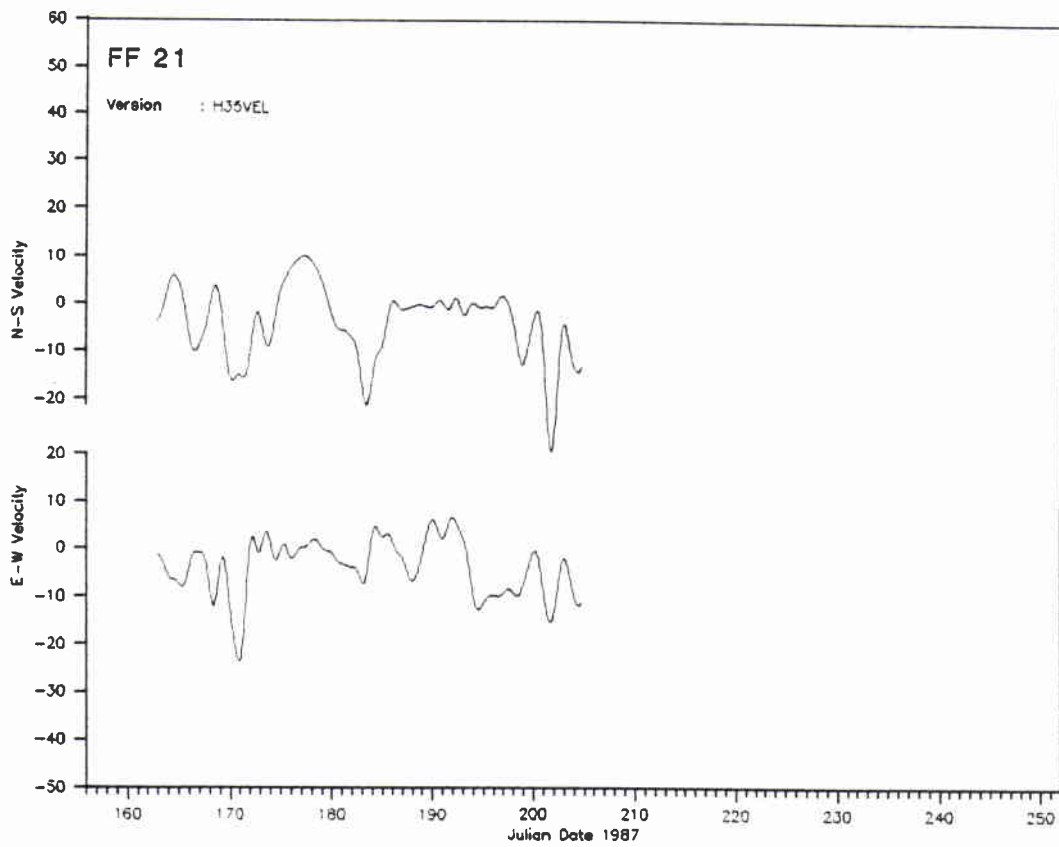


Figure D37

SACLANTCEN SM-250

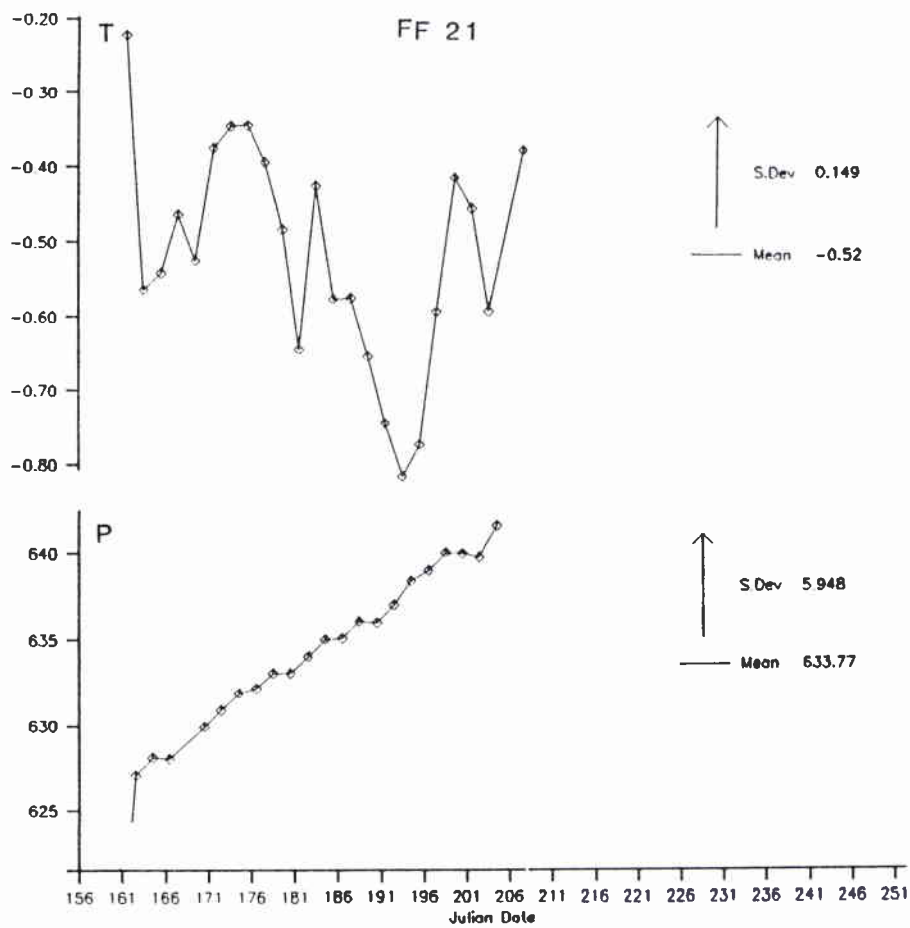


Figure D38

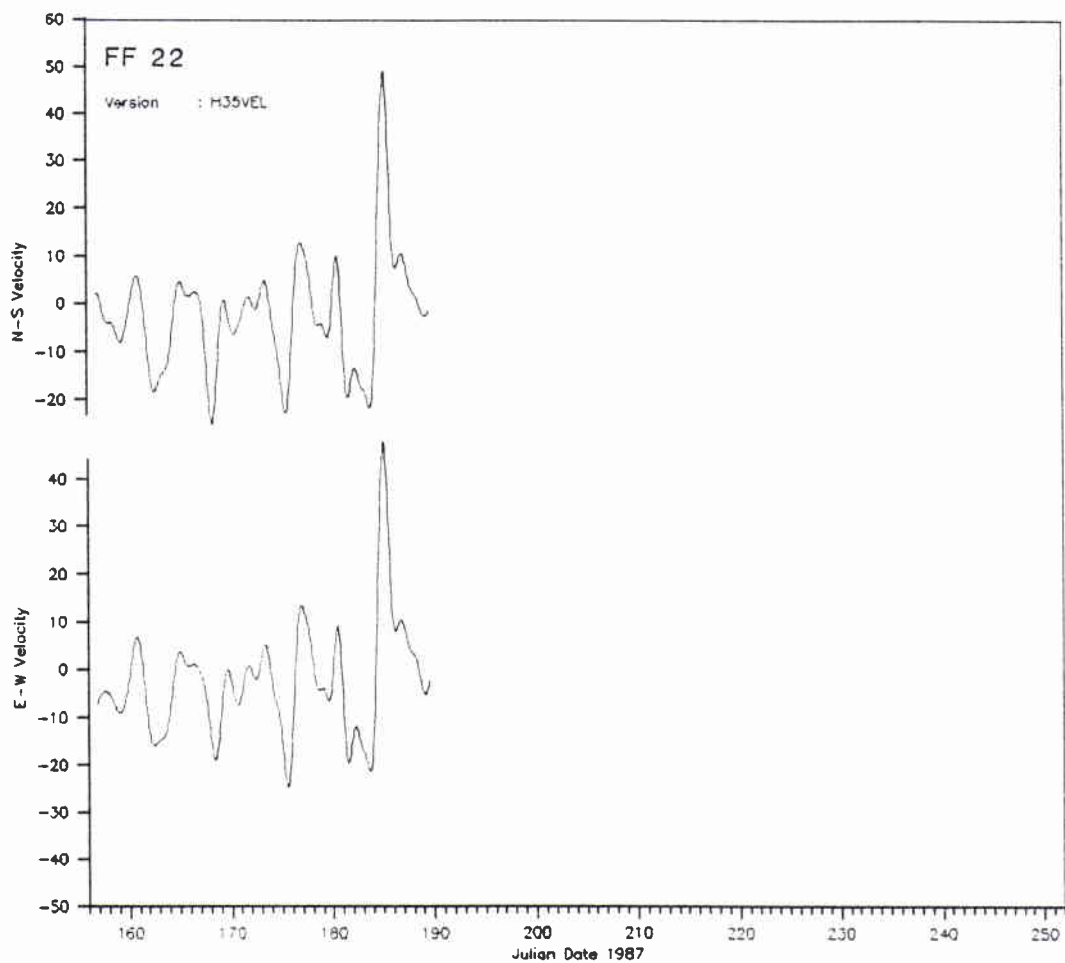


Figure D39

SACLANTCEN SM-250

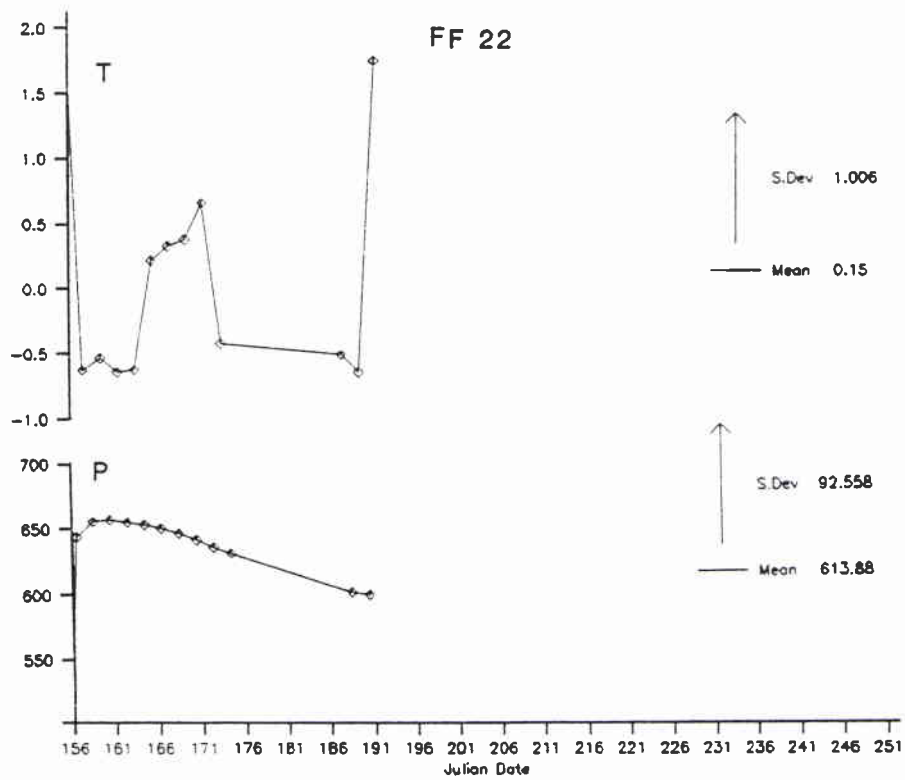


Figure D40

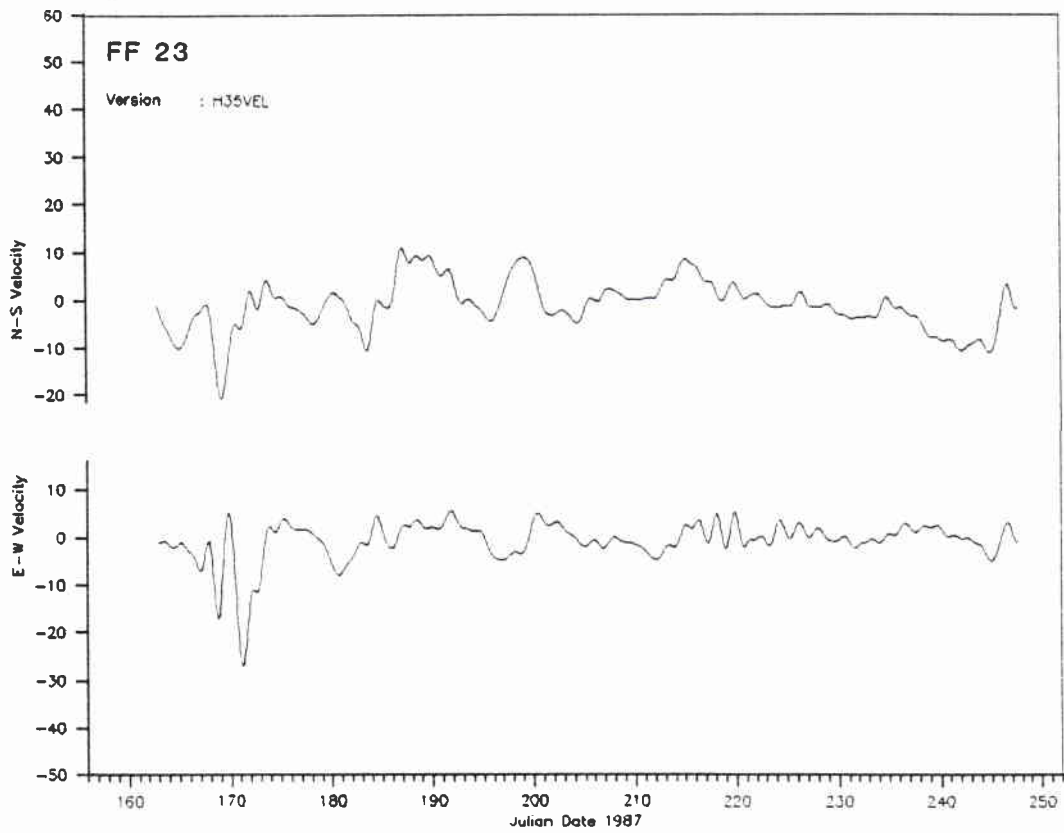


Figure D41

SACLANTCEN SM-250

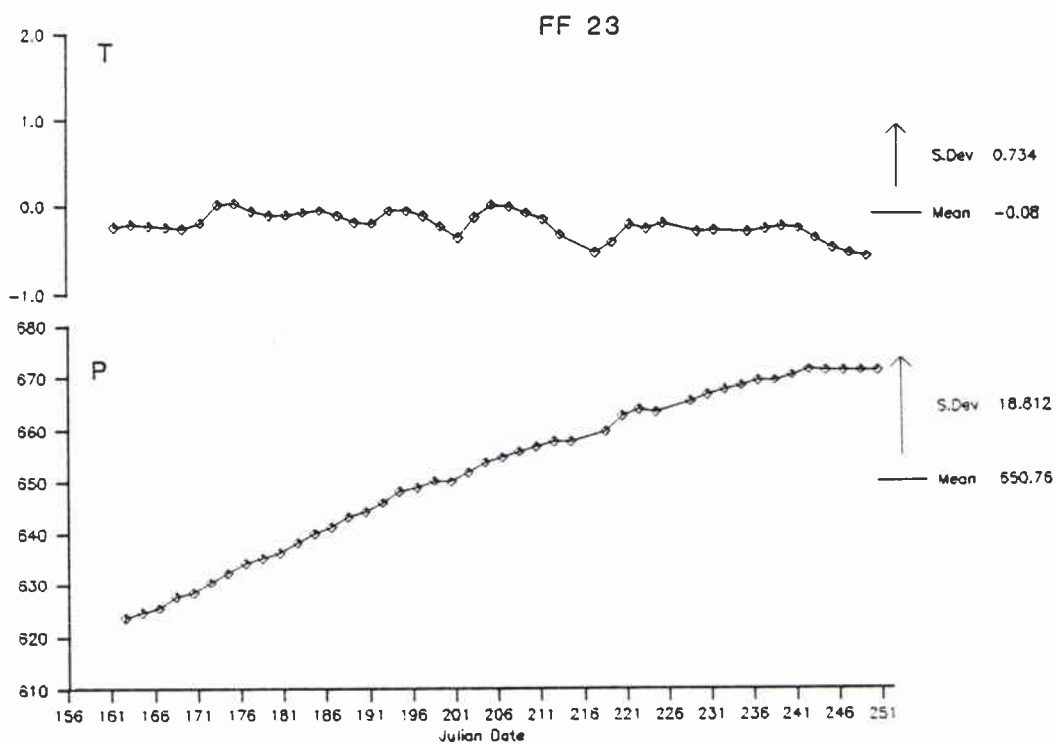


Figure D42

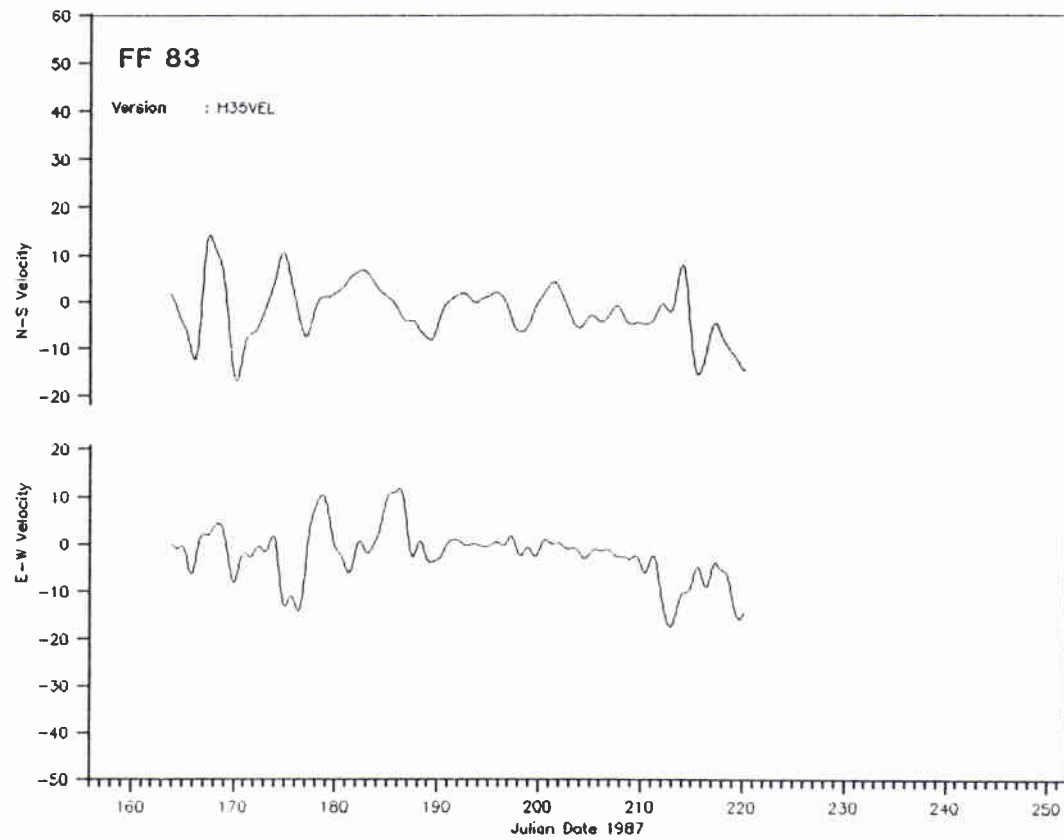


Figure D43

SACLANTCEN SM-250

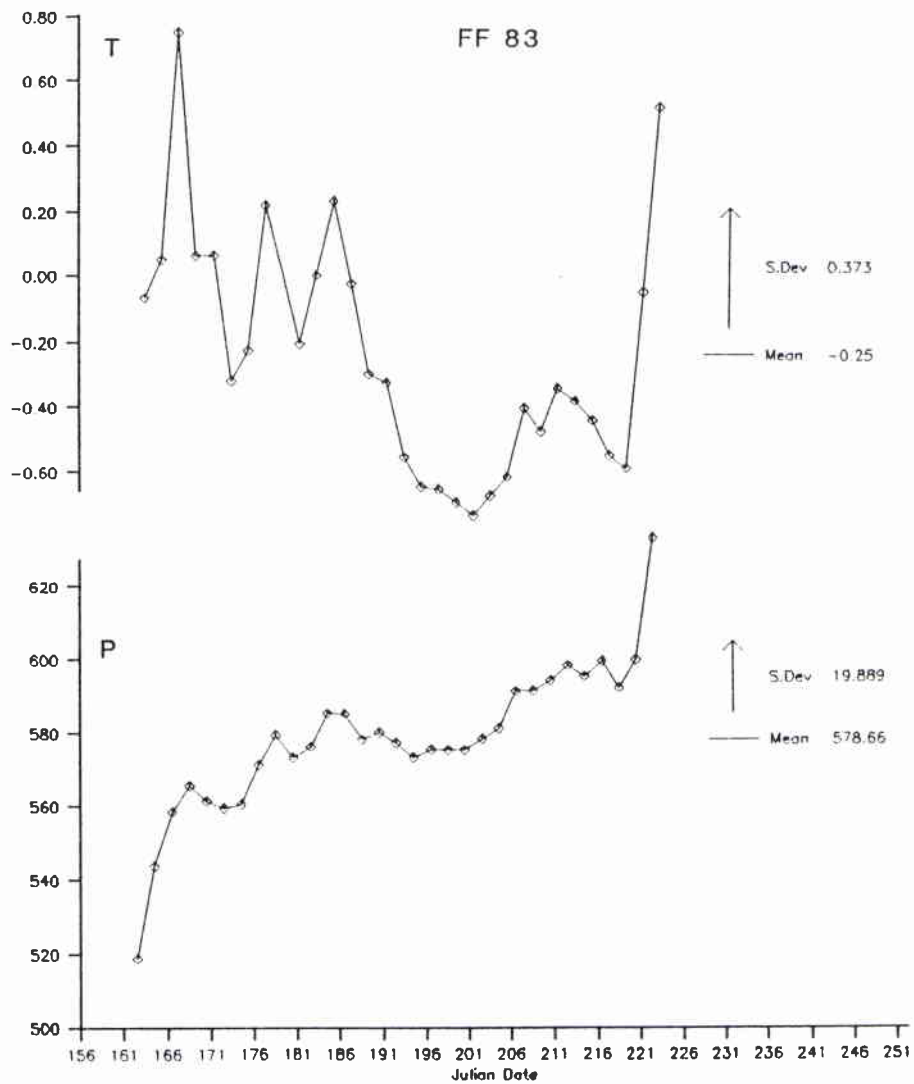


Figure D44

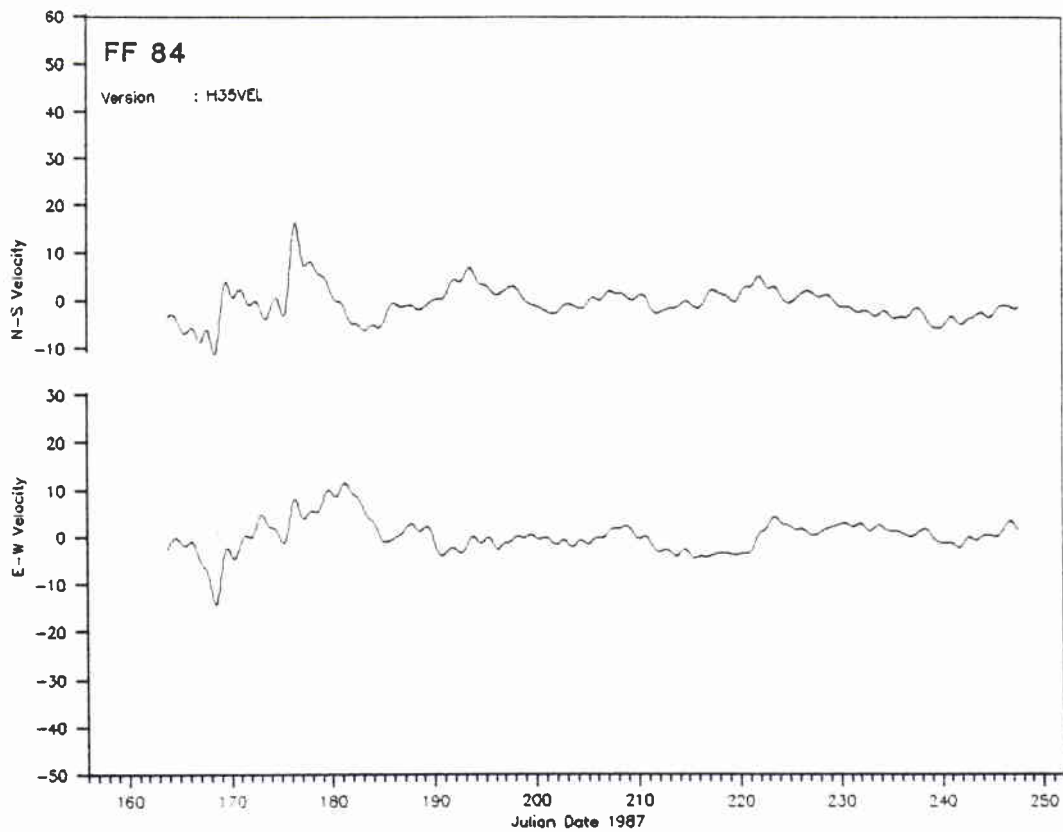


Figure D45

SACLANTCEN SM-250

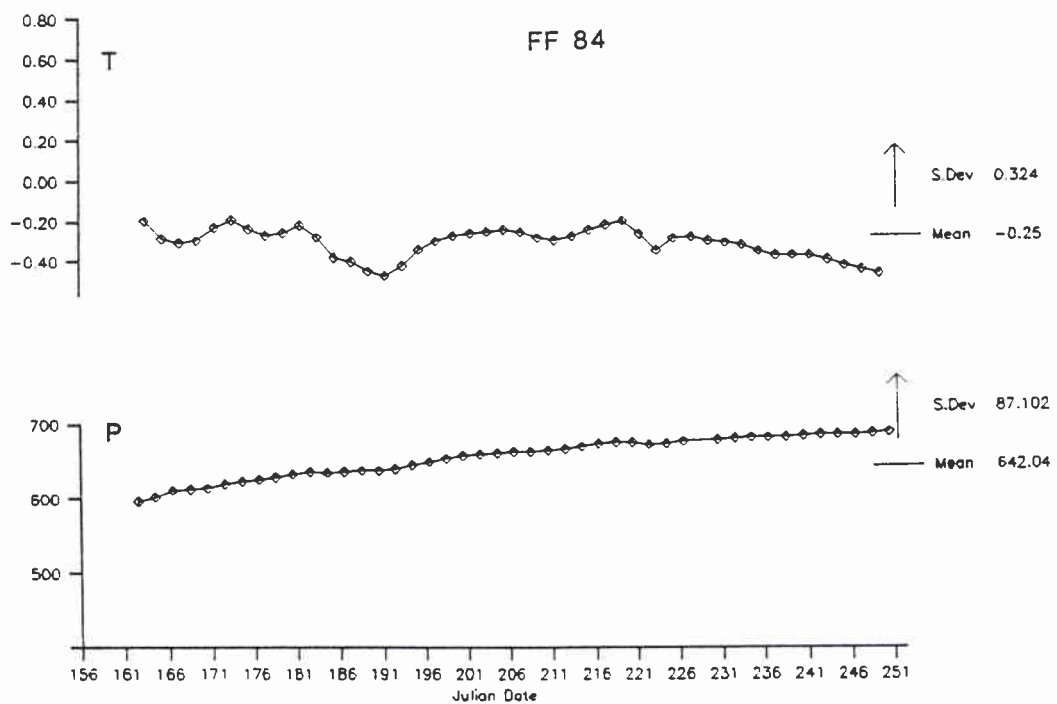


Figure D46

SACLANTCEN SM-250

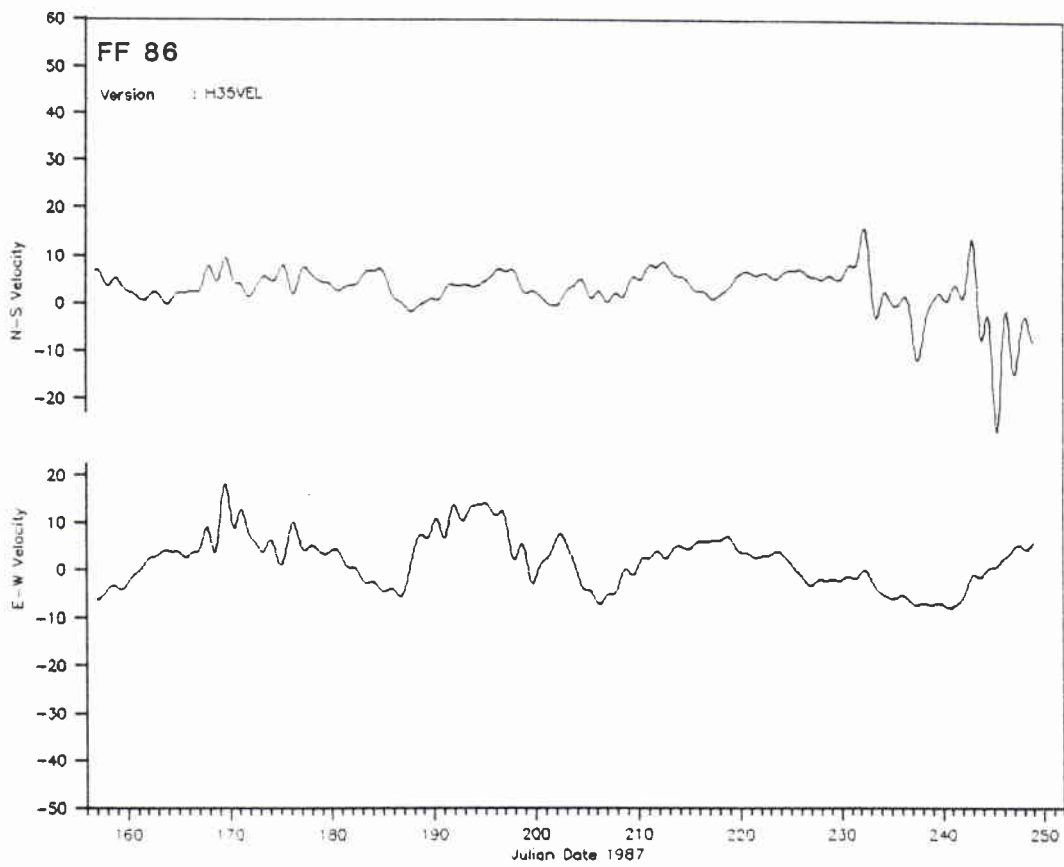


Figure D47

SACLANTCEN SM-250

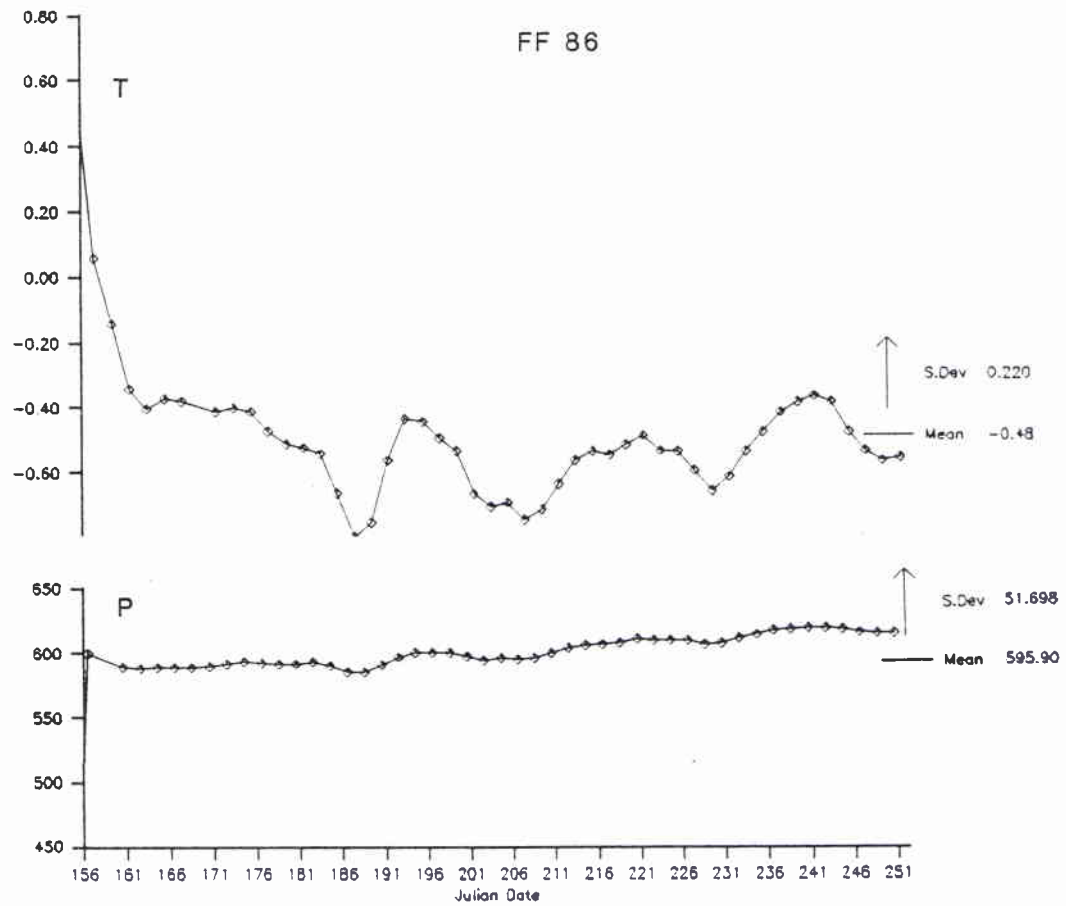
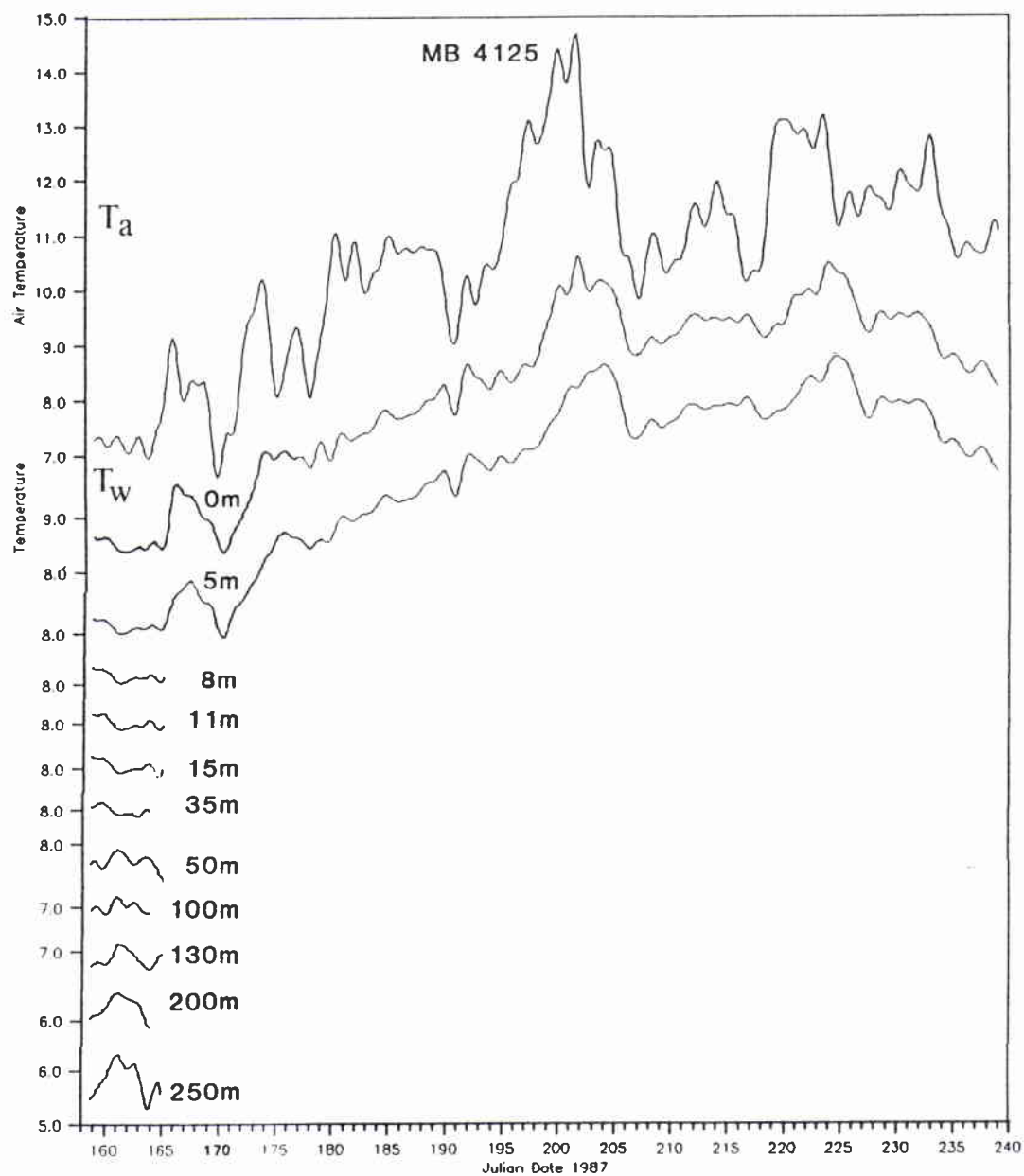


Figure D48

**Figure D49**

SACLANTCEN SM-250

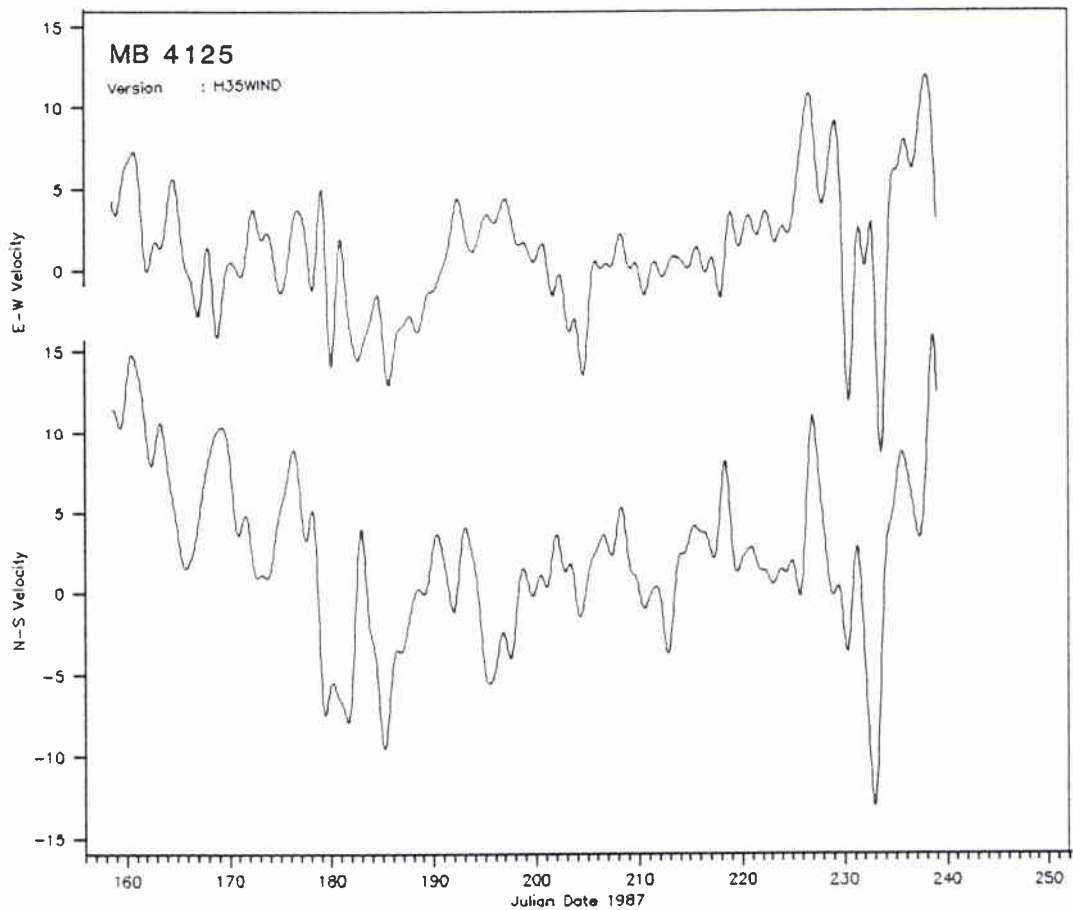
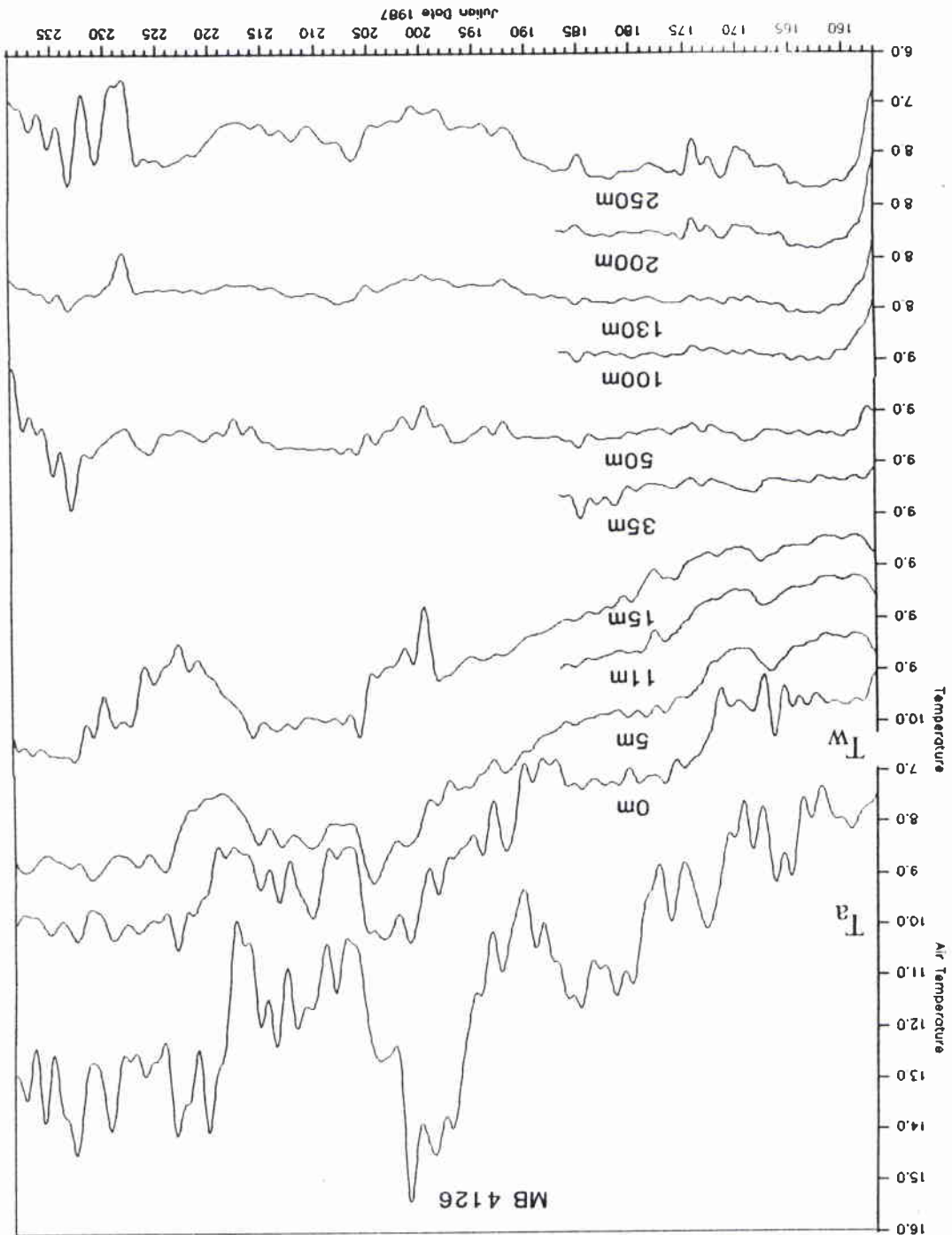


Figure D50

- 178 -

Figure D51



SACLANTCEN SM-250

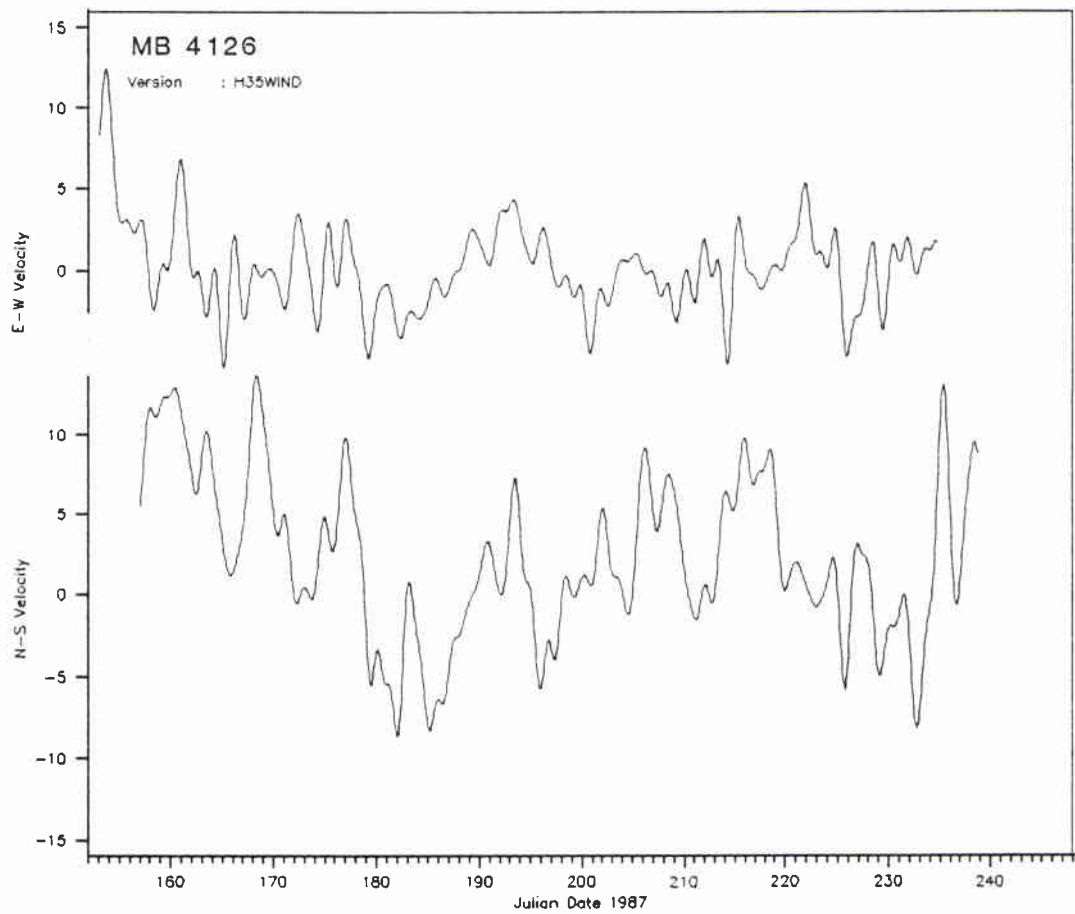


Figure D52

SACLANTCEN SM-250

Appendix E

Progressive vector diagrams

The progressive vector diagrams from the H35 file are given. Tick marks indicate the start of each day. Arrows indicate both true north and the parabathic direction. For the floats, these were constructed in the same manner as those from the current meter data, i.e. from the filtered velocity components, but are in fact identical to the actual float trajectory. Similarly, the diagrams for the ASID (Met) Buoys can be considered as representing their trajectory. The progressive vector diagrams for the wind are not corrected for the buoy motion.

- Figures E1–E3: Buoy 1.
- Figures E4–E9: Buoys 2–8 (B7 missing).
- Figures E10–E12: Floats.
- Figures E13–E14: ASID Buoys.

SACLANTCEN SM-250

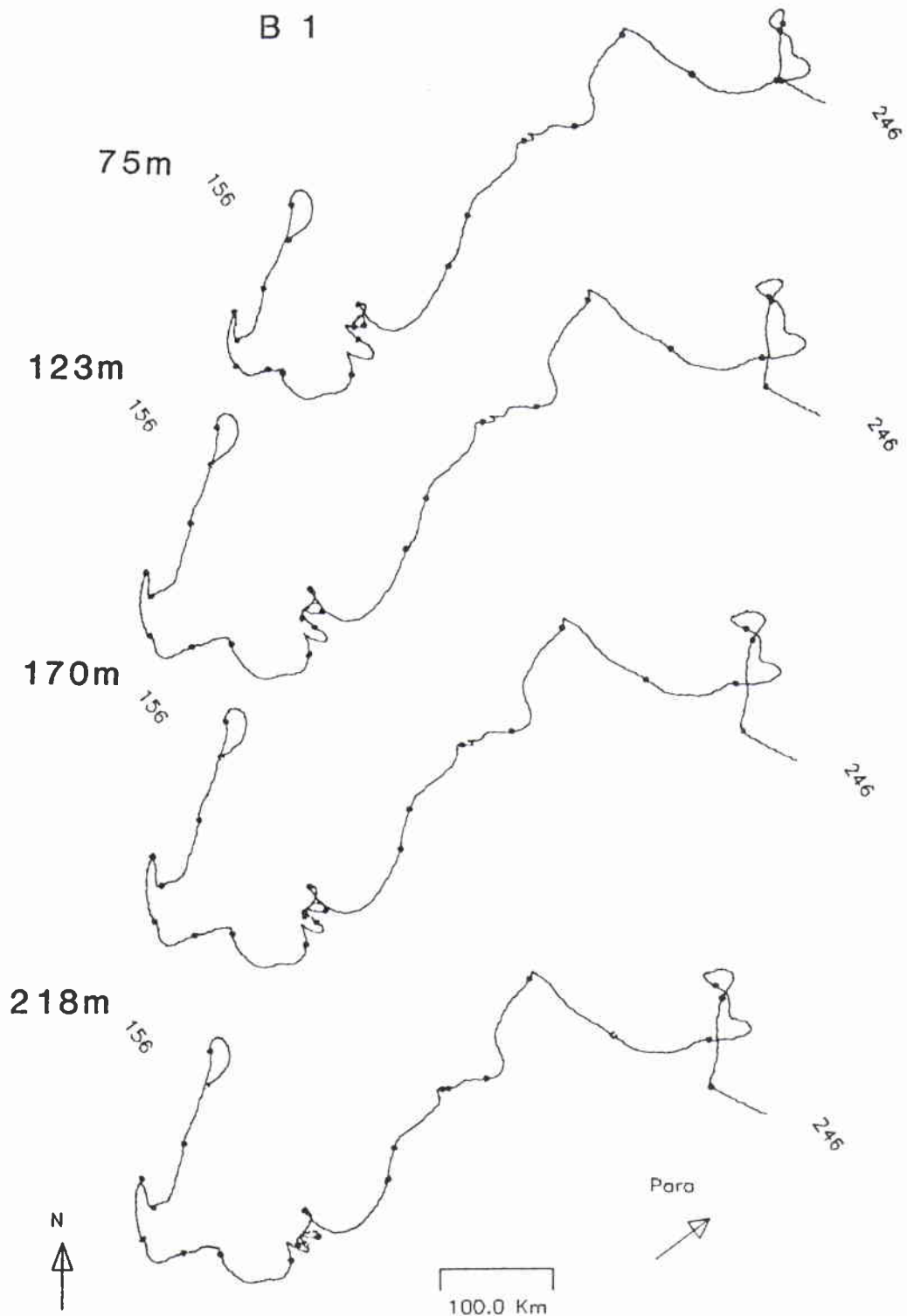


Figure E1

SACLANTCEN SM-250

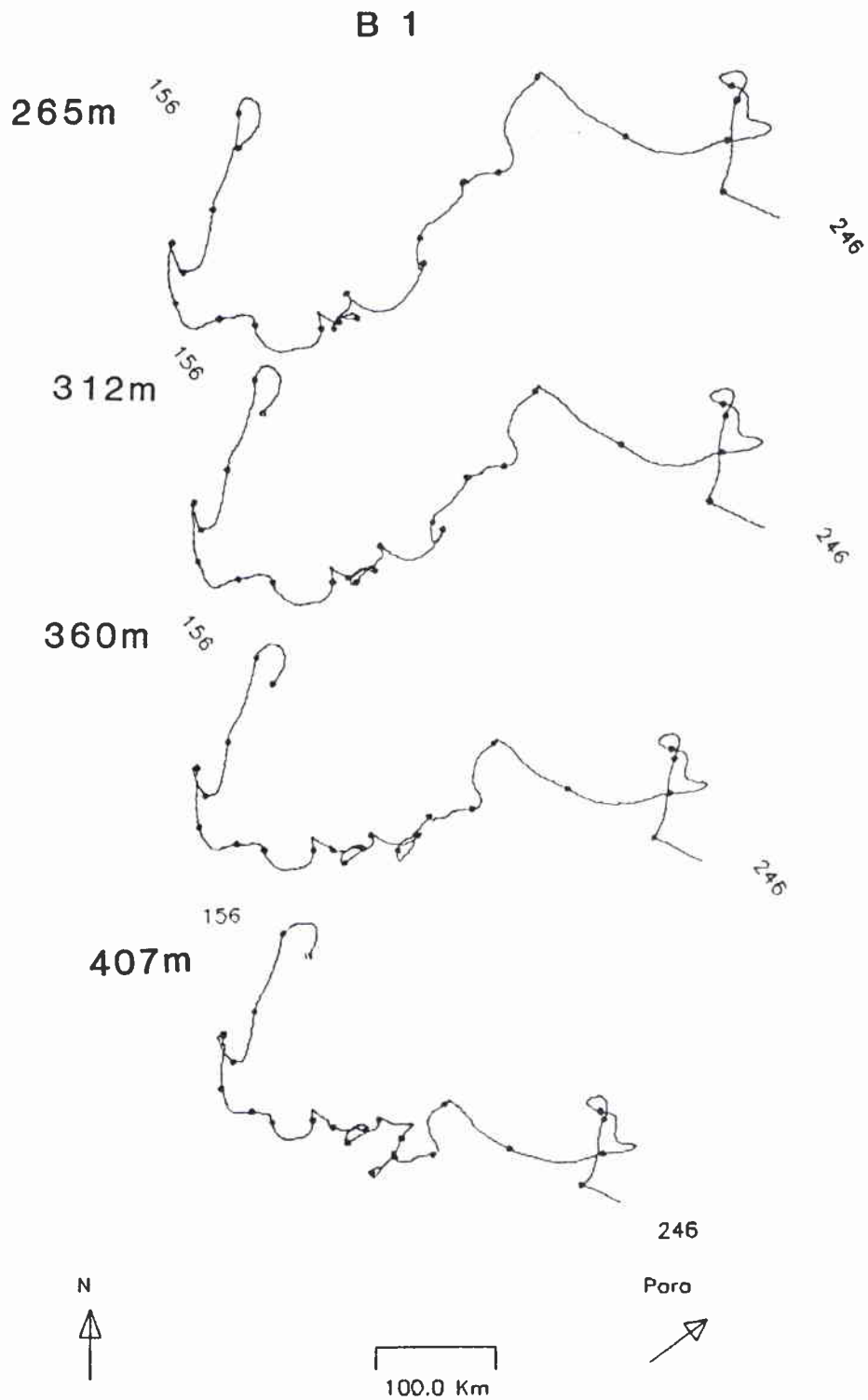


Figure E2

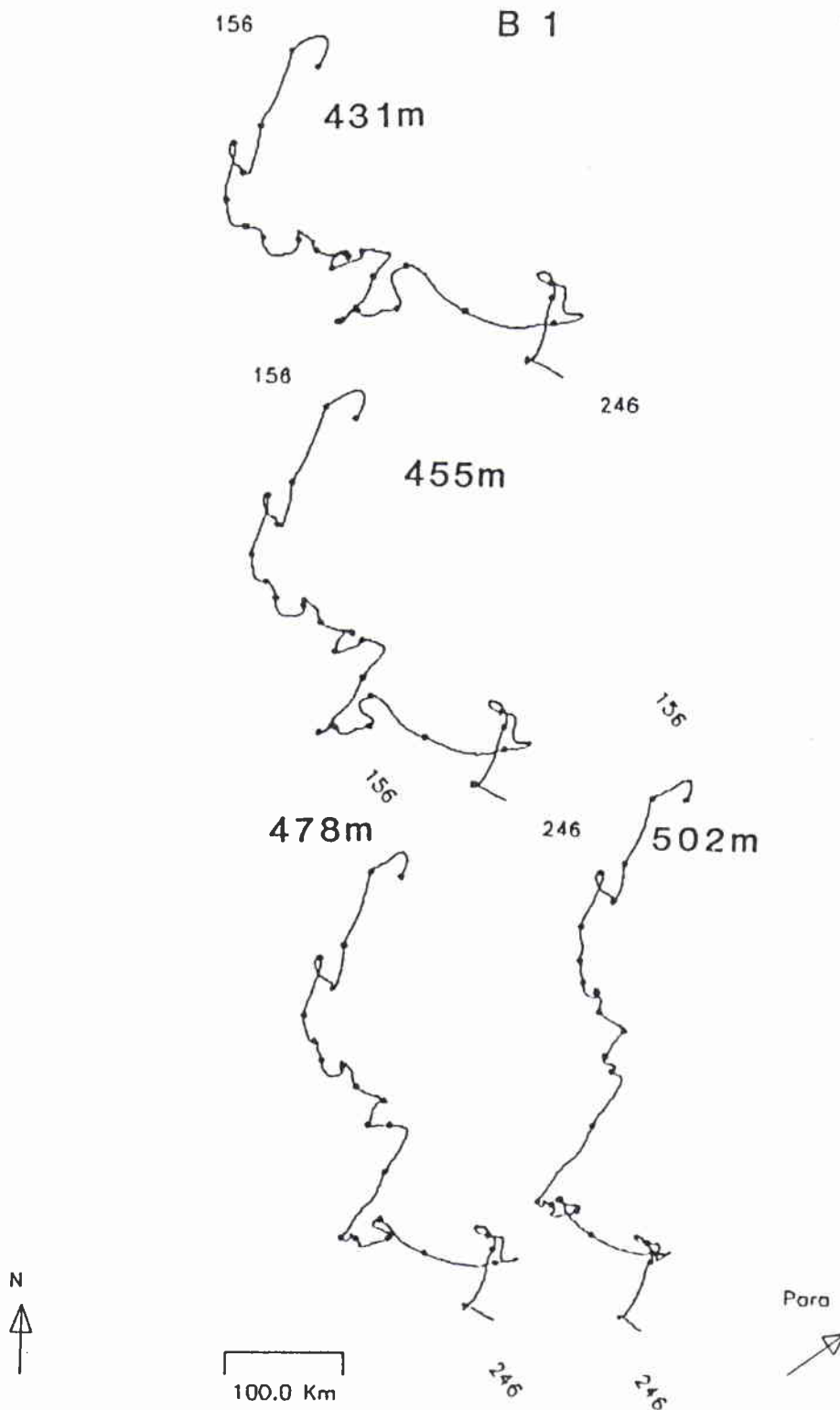


Figure E3

SACLANTCEN SM-250

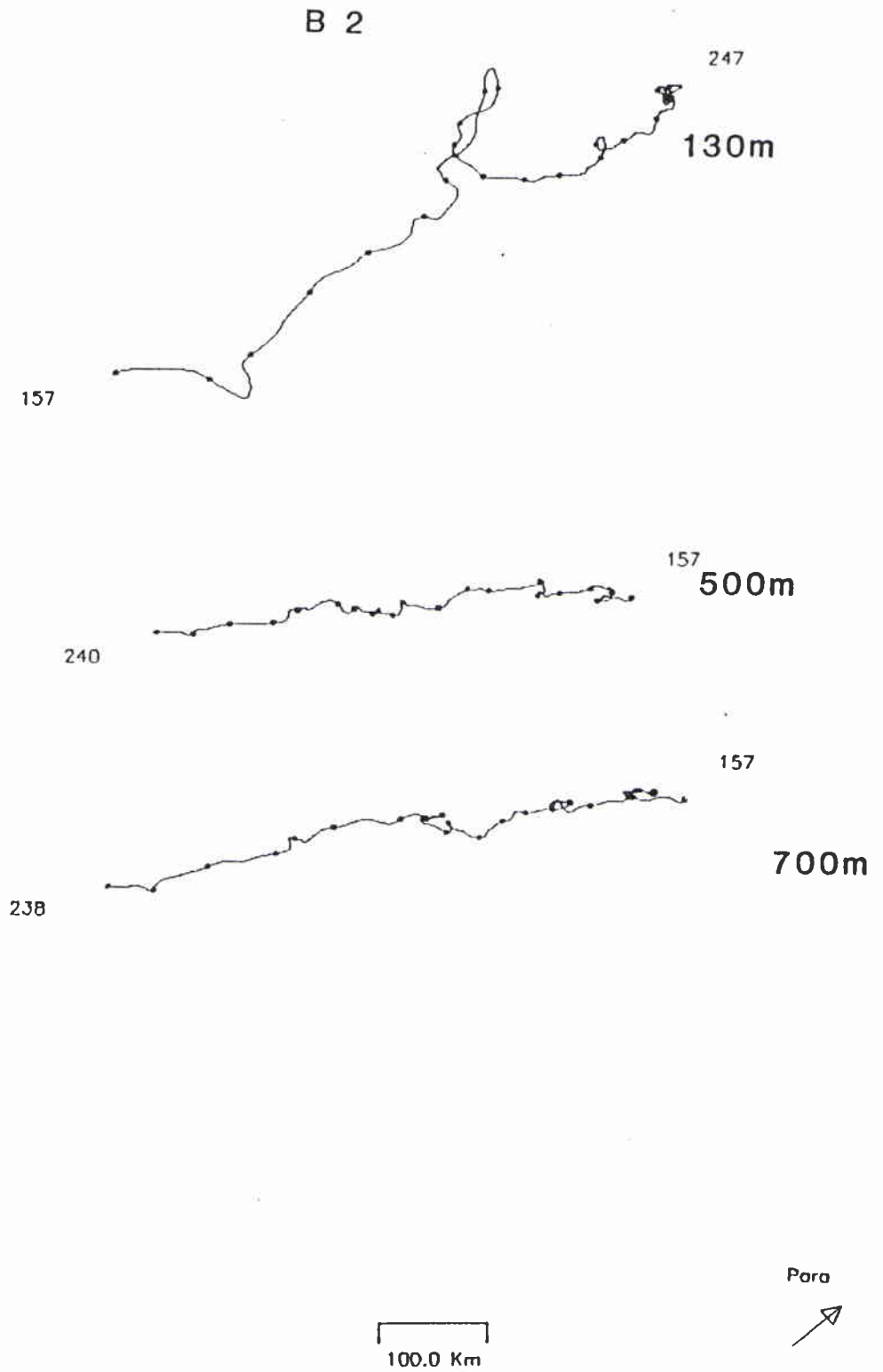


Figure E4

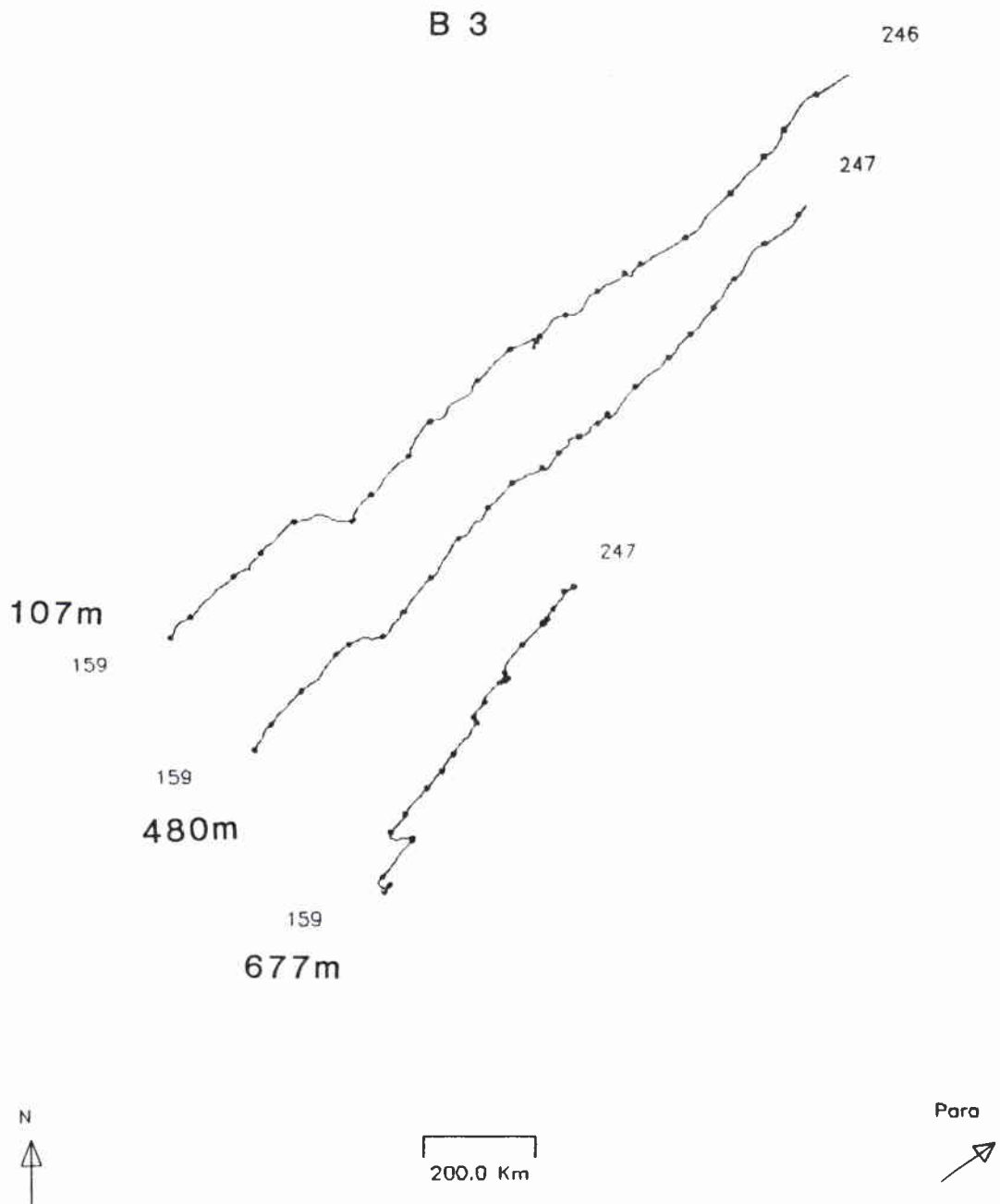


Figure E5

SACLANTCEN SM-250

B 4

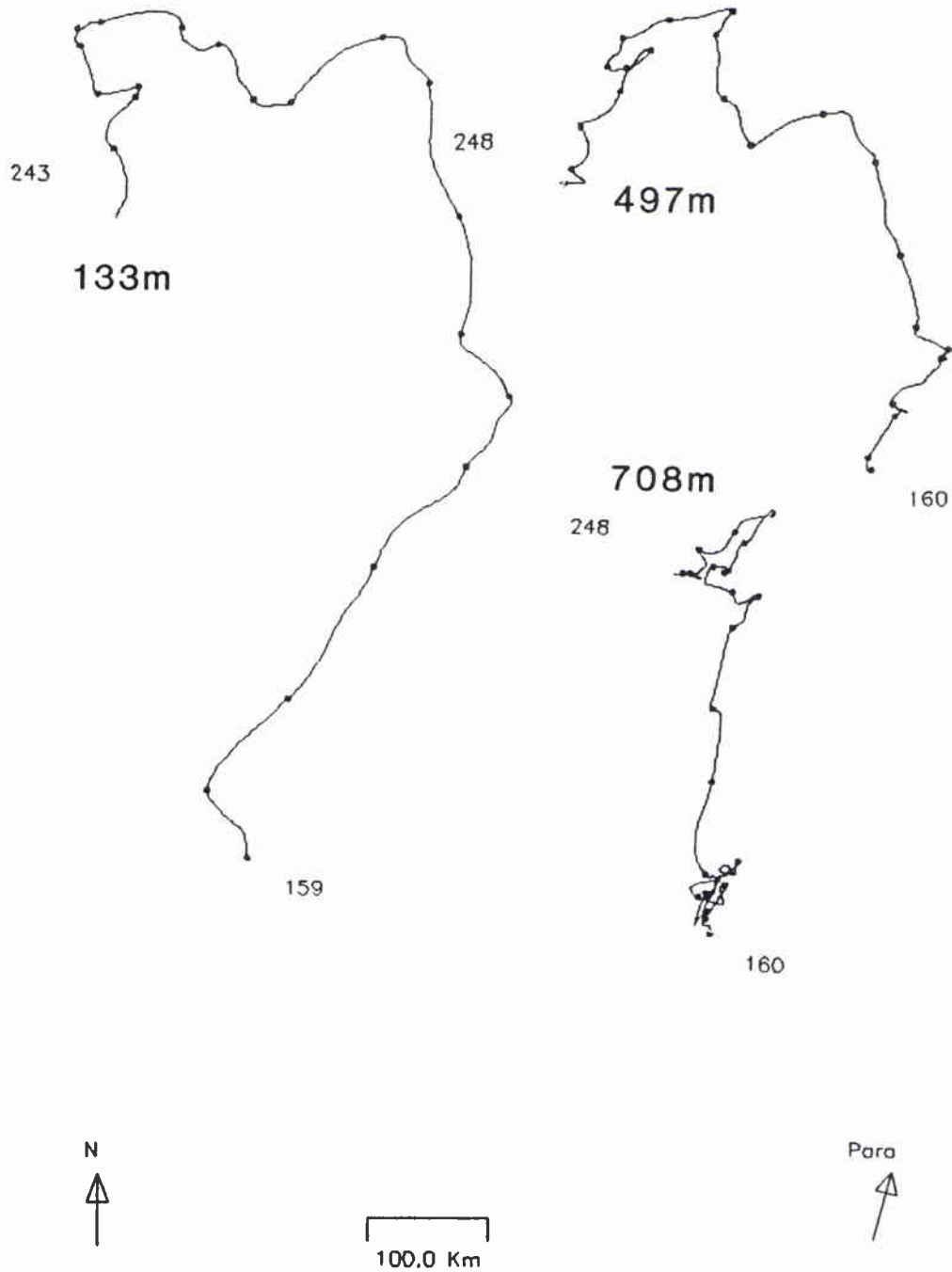


Figure E6

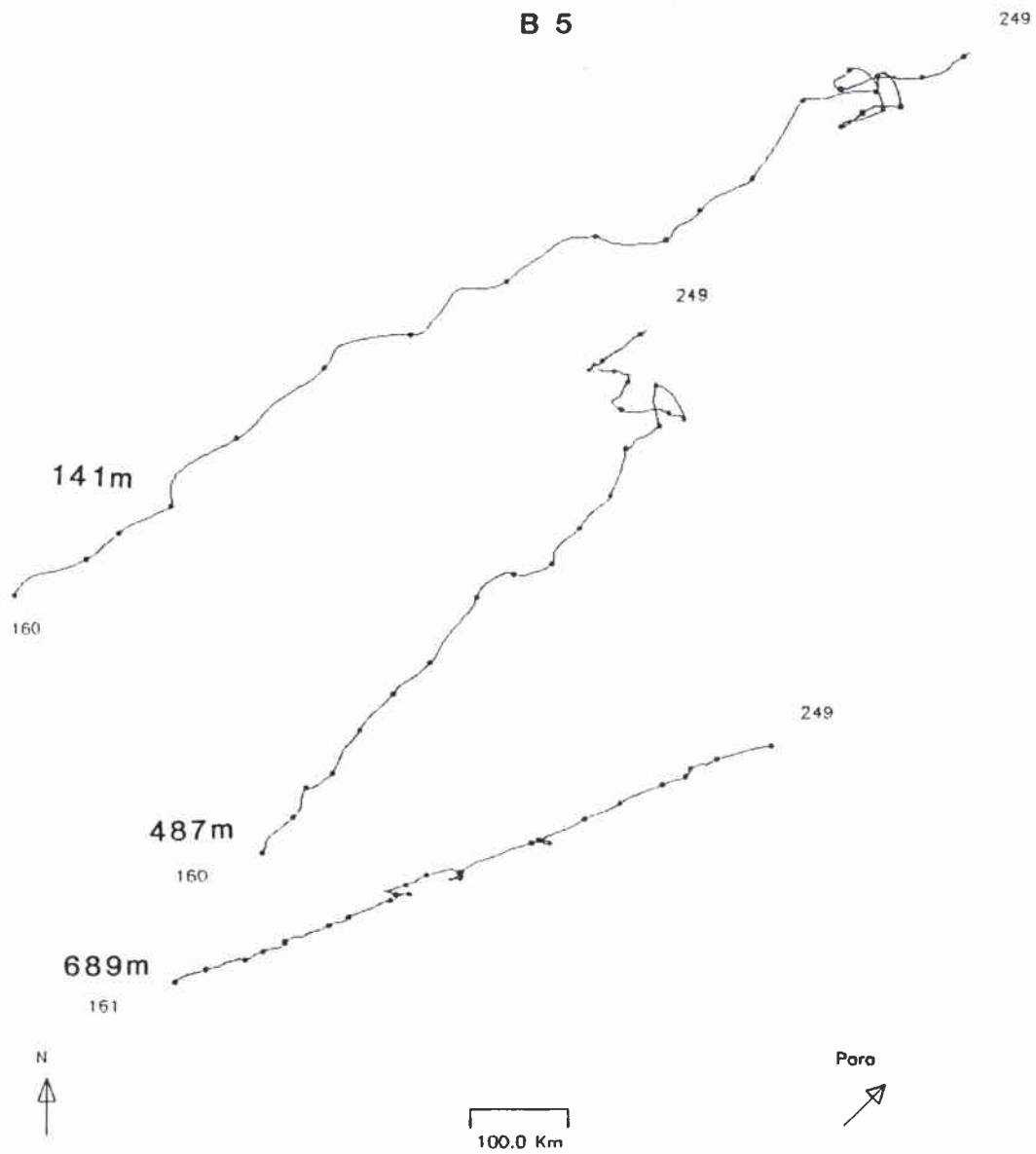


Figure E7

SACLANTCEN SM-250

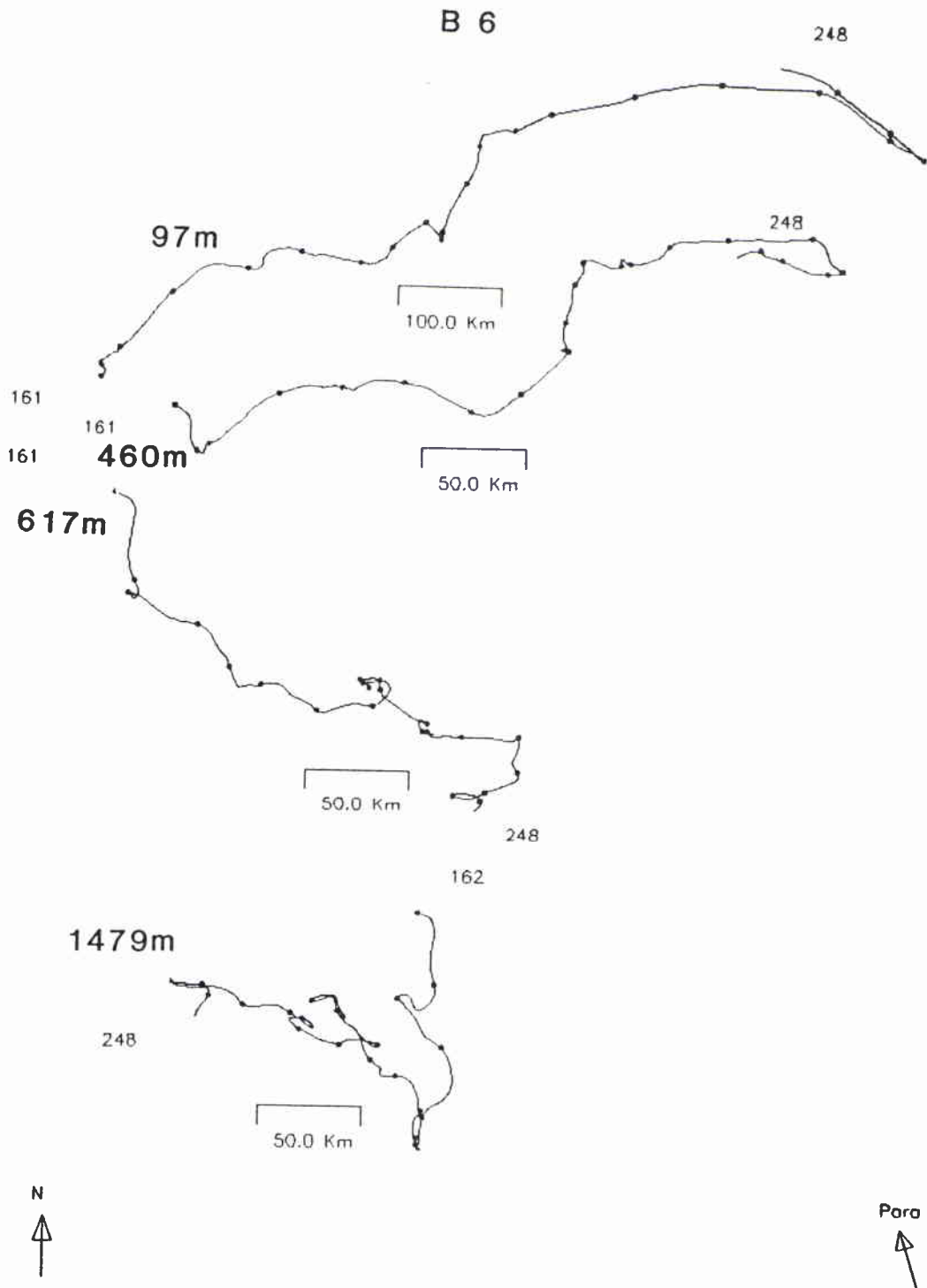


Figure E8

SACLANTCEN SM-250

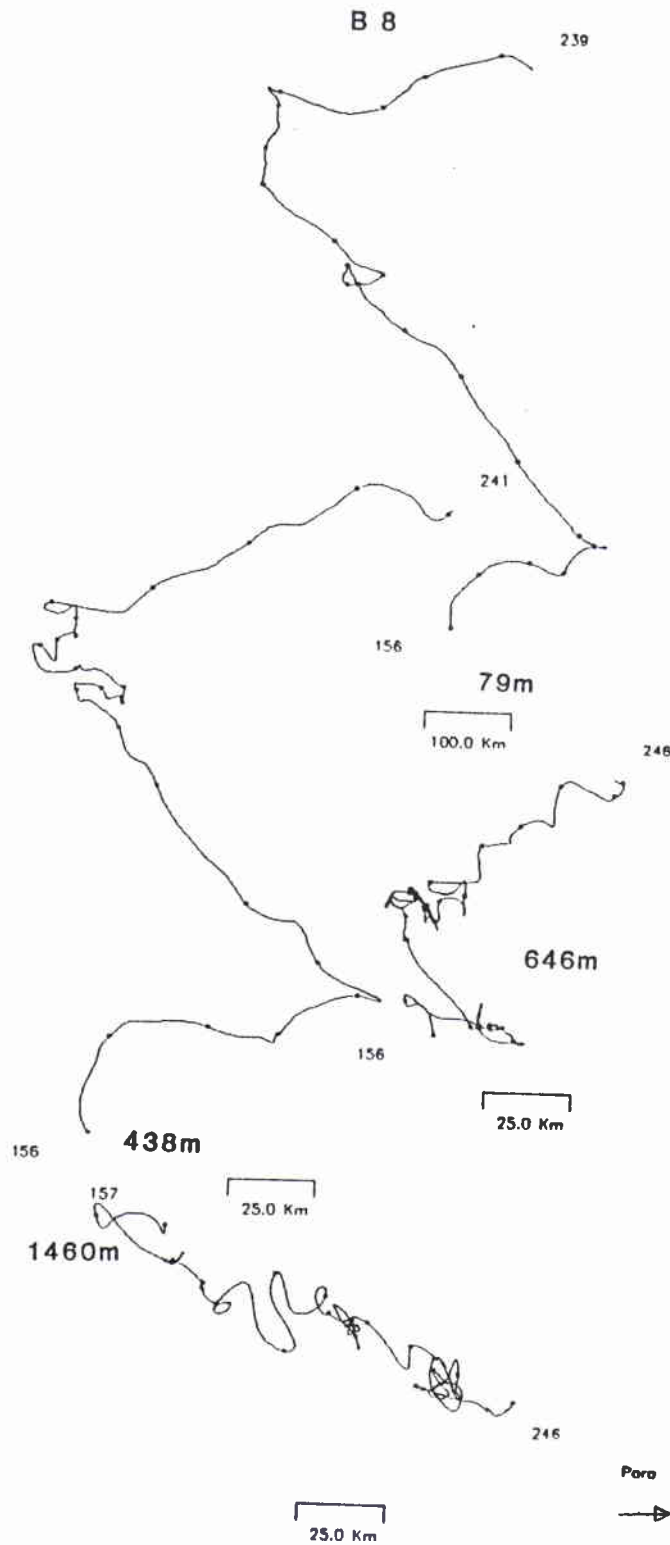


Figure E9

SACLANTCEN SM-250

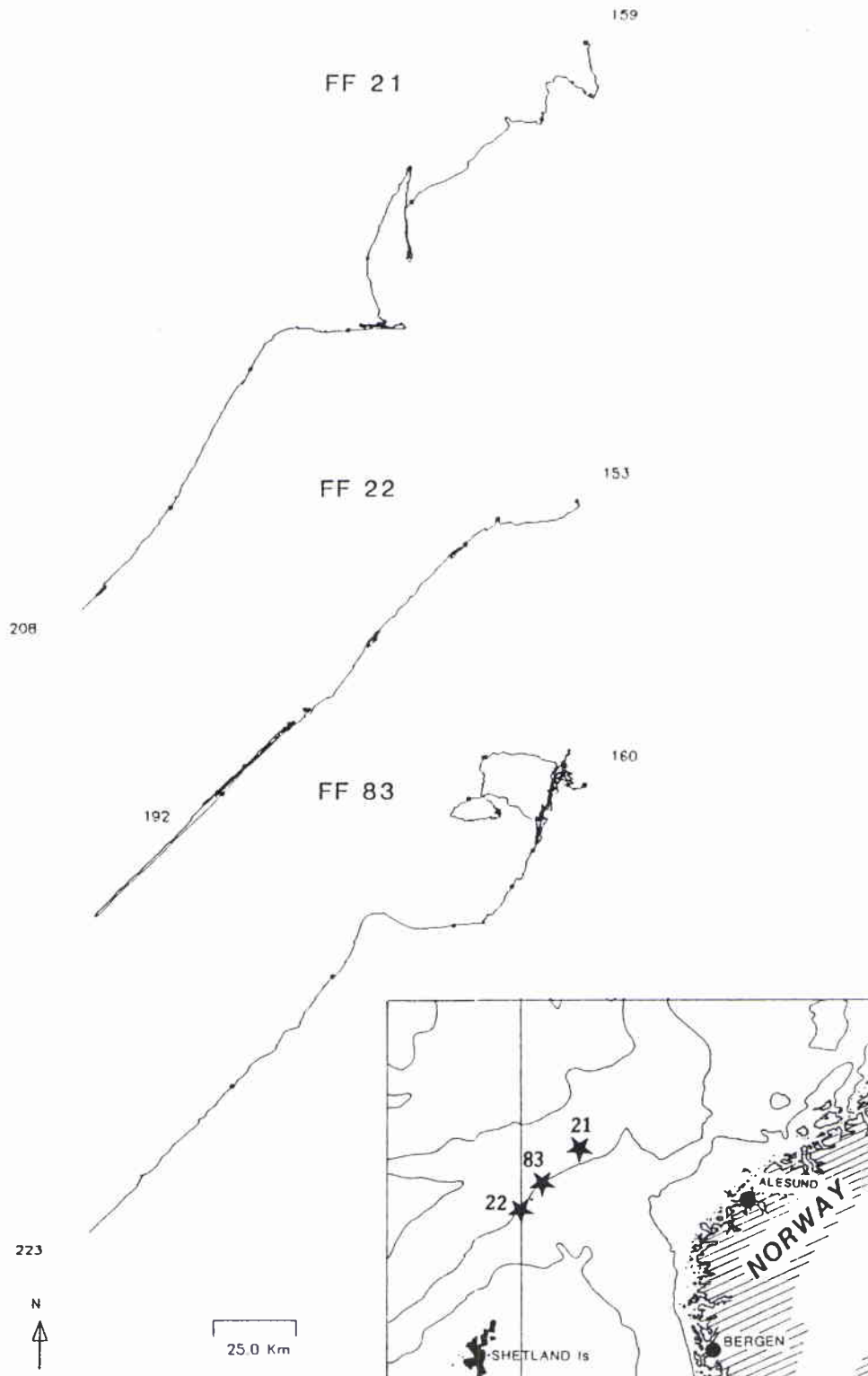


Figure E10

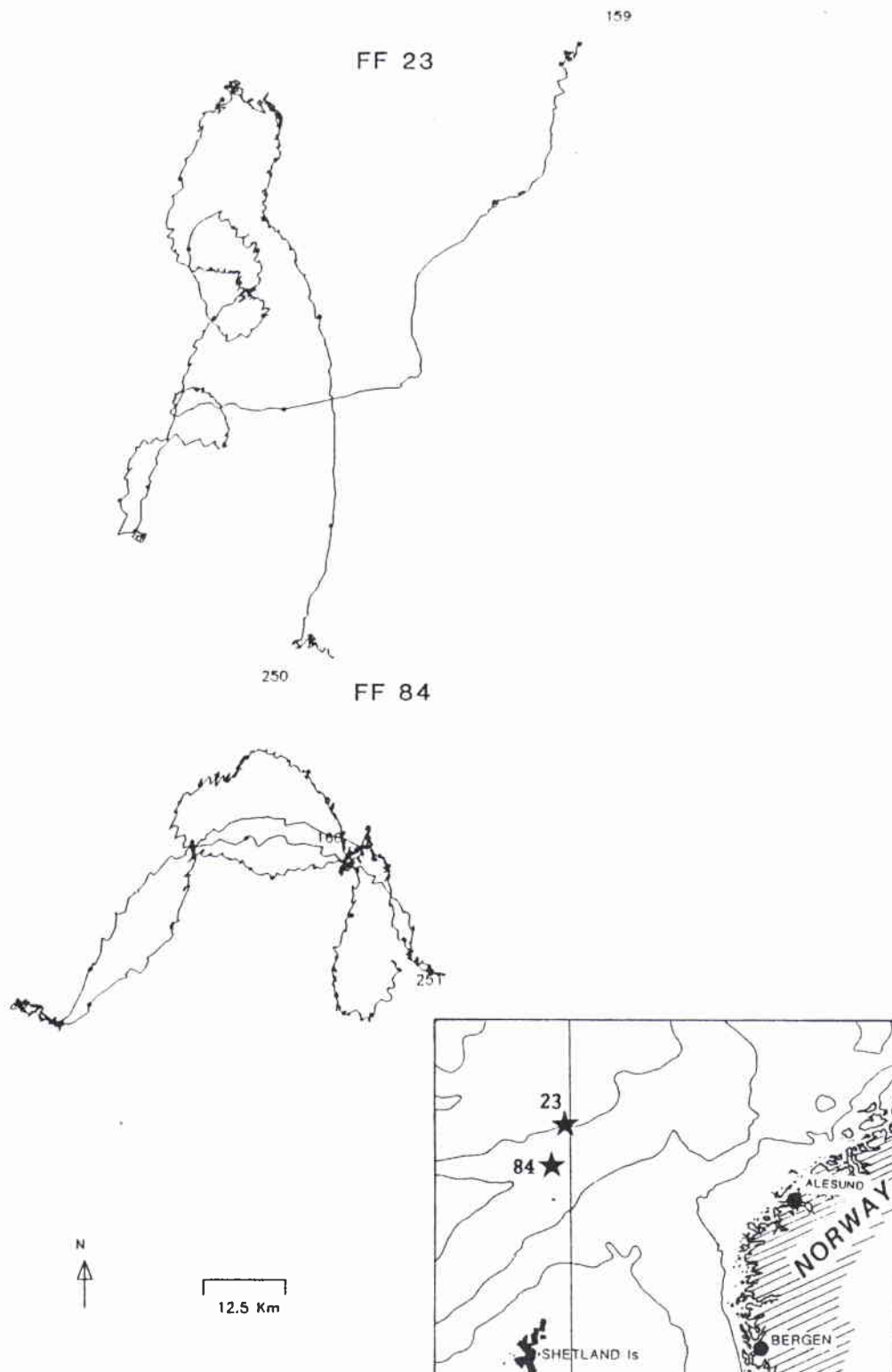


Figure E11

SACLANTCEN SM-250

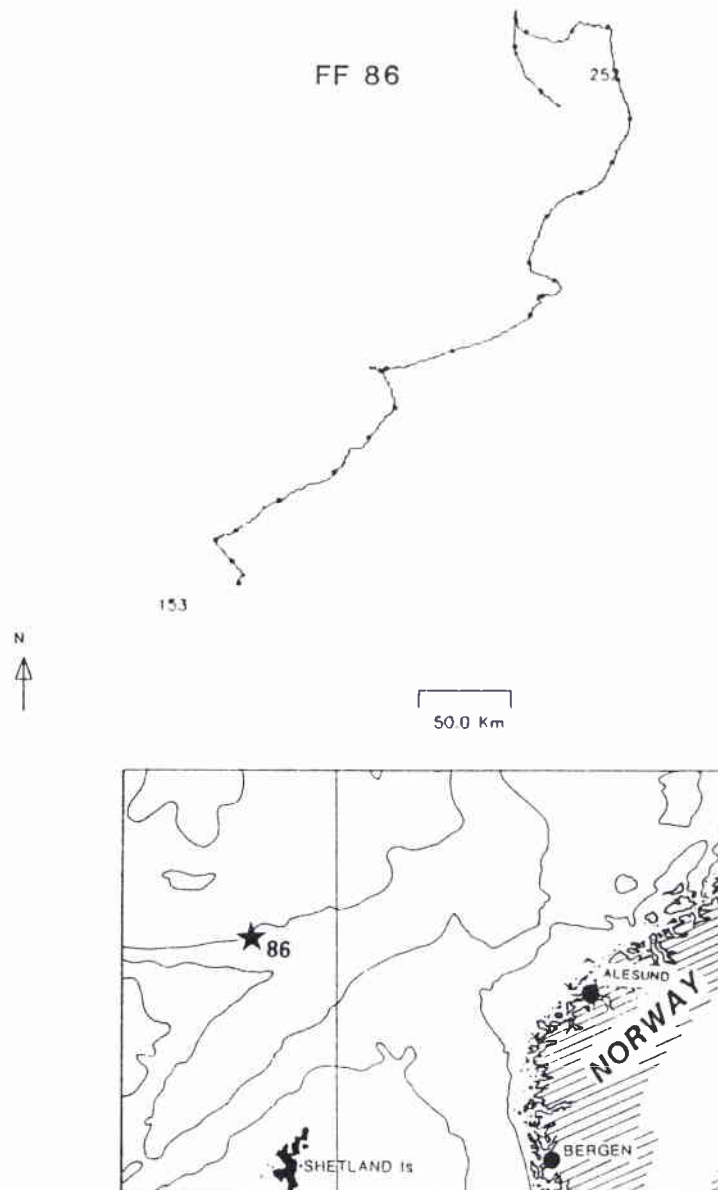


Figure E12

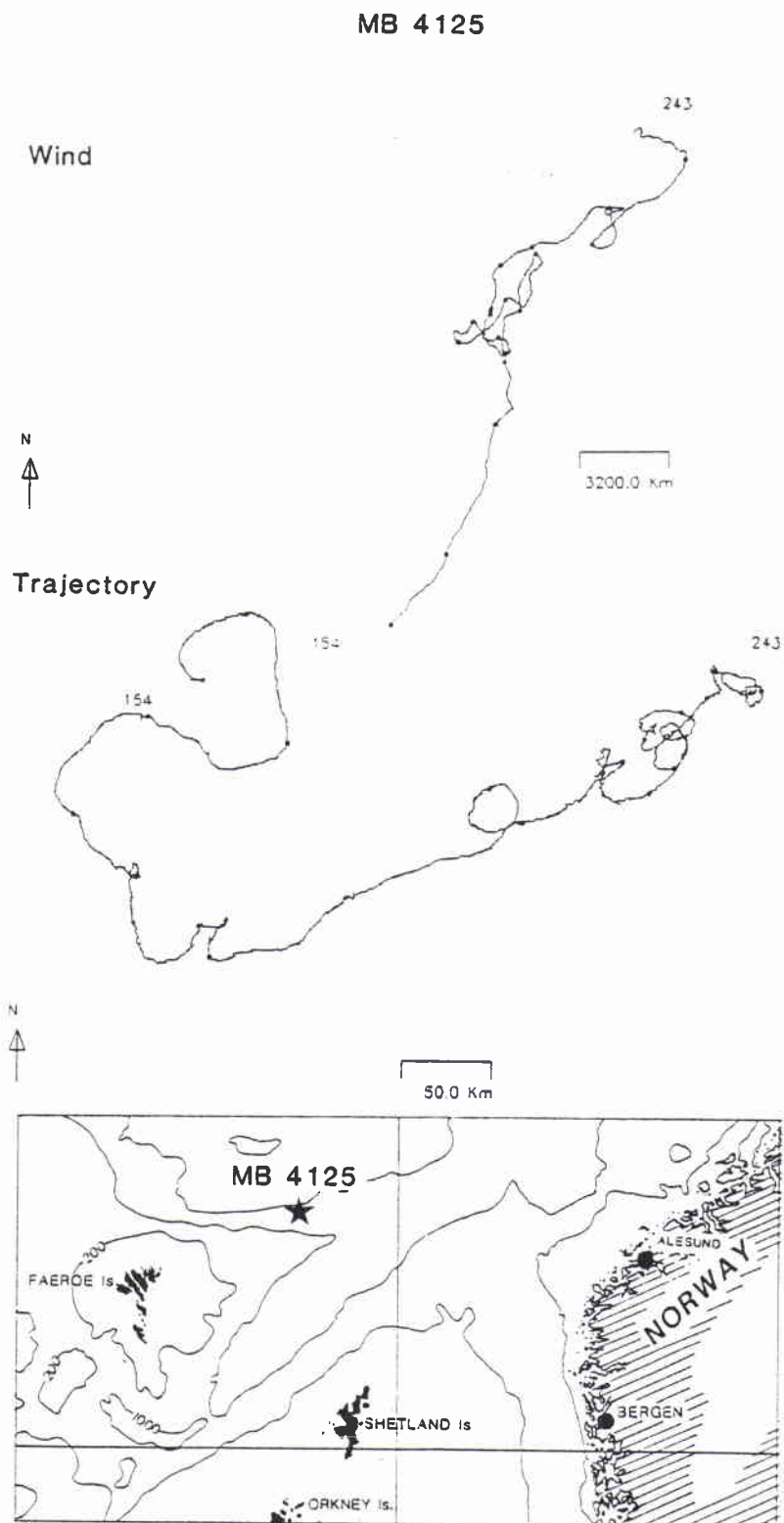


Figure E13

SACLANTCEN SM-250

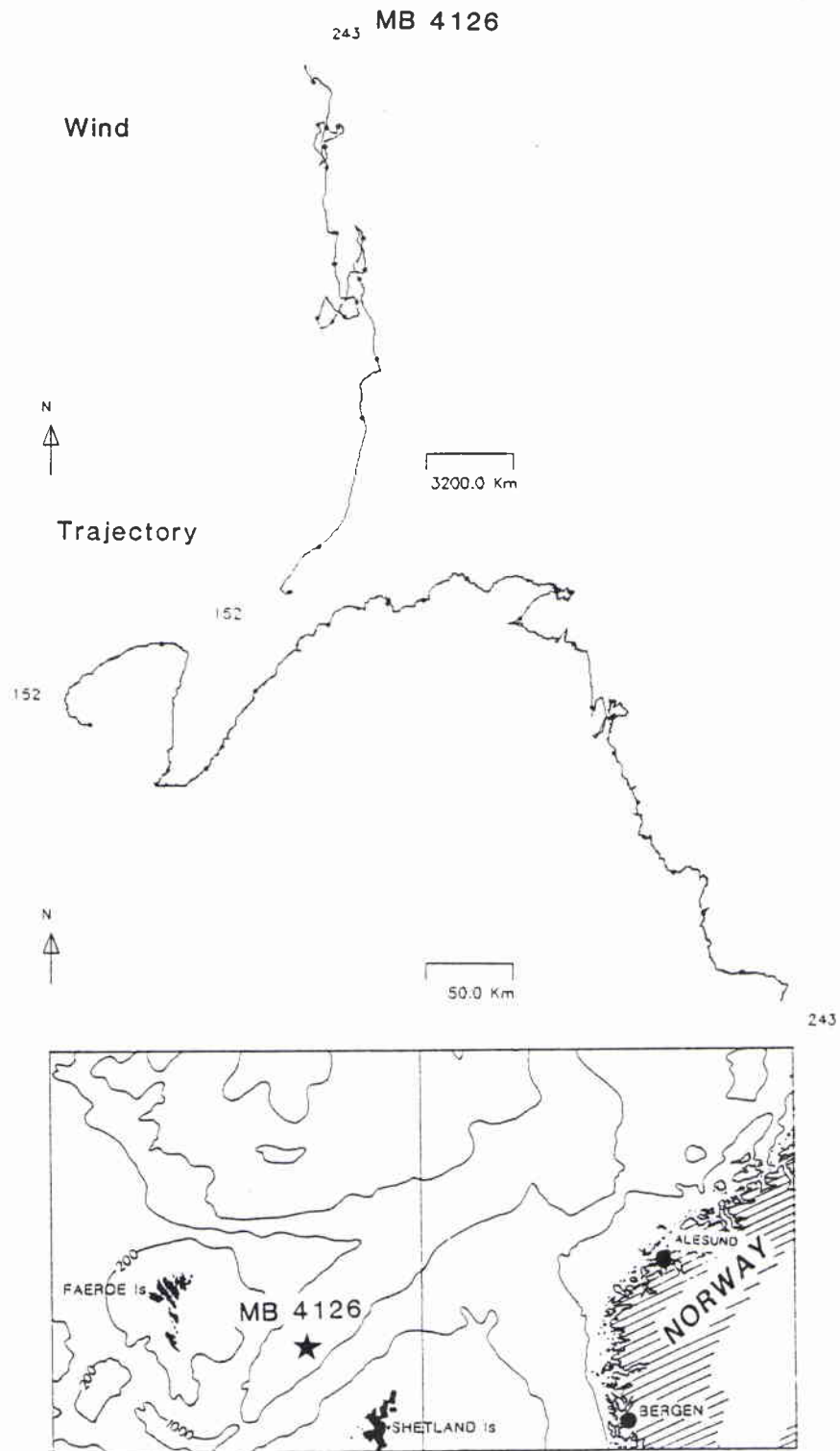


Figure E14

SACLANTCEN SM-250

Appendix F

Stick diagrams

The stick diagrams were produced from a sub-sampling of the filtered (H35) current meter data once every 6 h. Again those for the floats and those for the ASID Buoys were done in the same manner.

- Figures F1–F4: Buoy 1.
- Figures F5–F10: Buoys 2–8.
- Figure F11: Floats.
- Figure F12: ASID Buoys.

Note: Figure F4 has a comparison of PVD from the bottom-most bin of the ADCP and the Aanderaa current meter of Buoy 1.

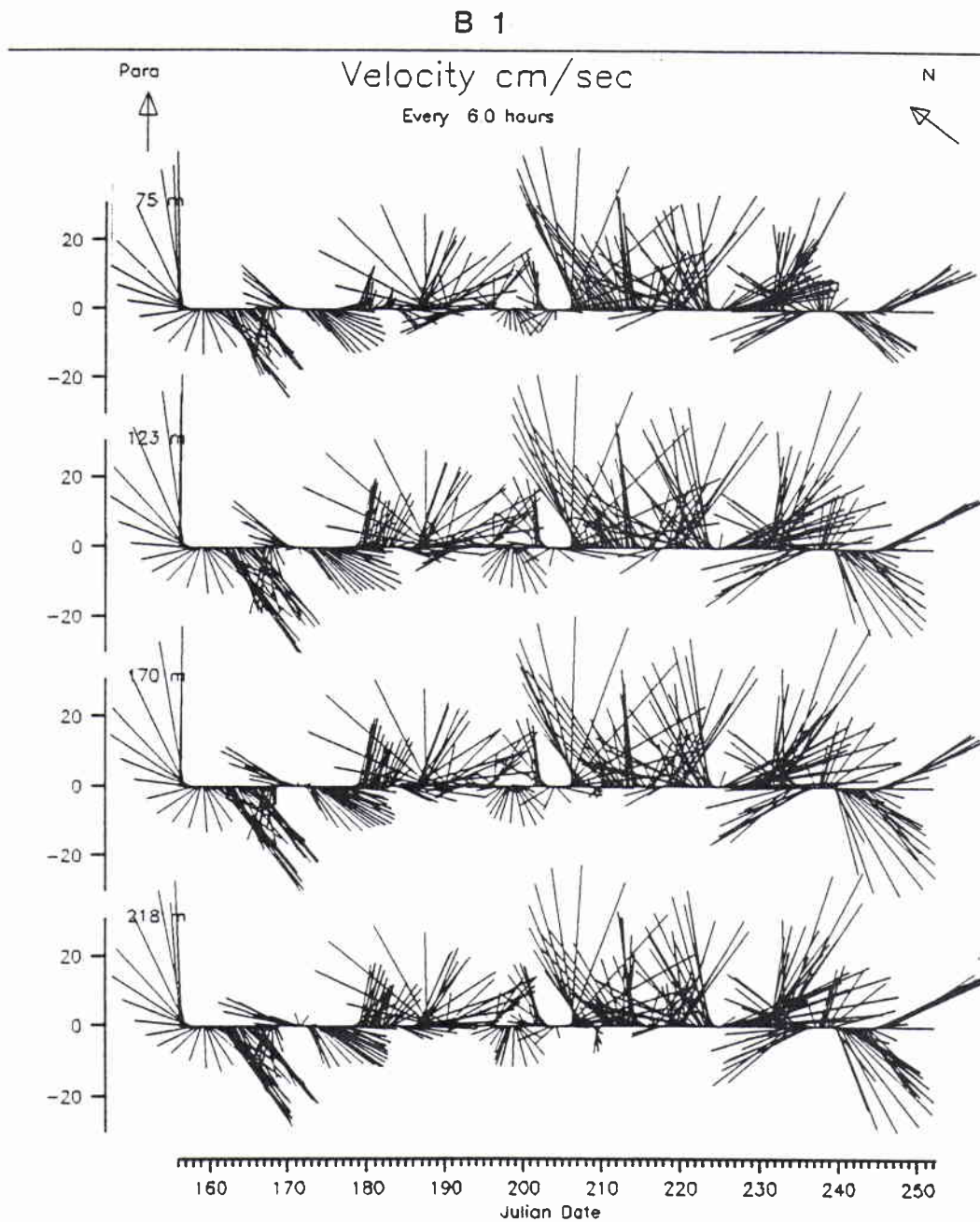


Figure F1

SACLANTCEN SM-250

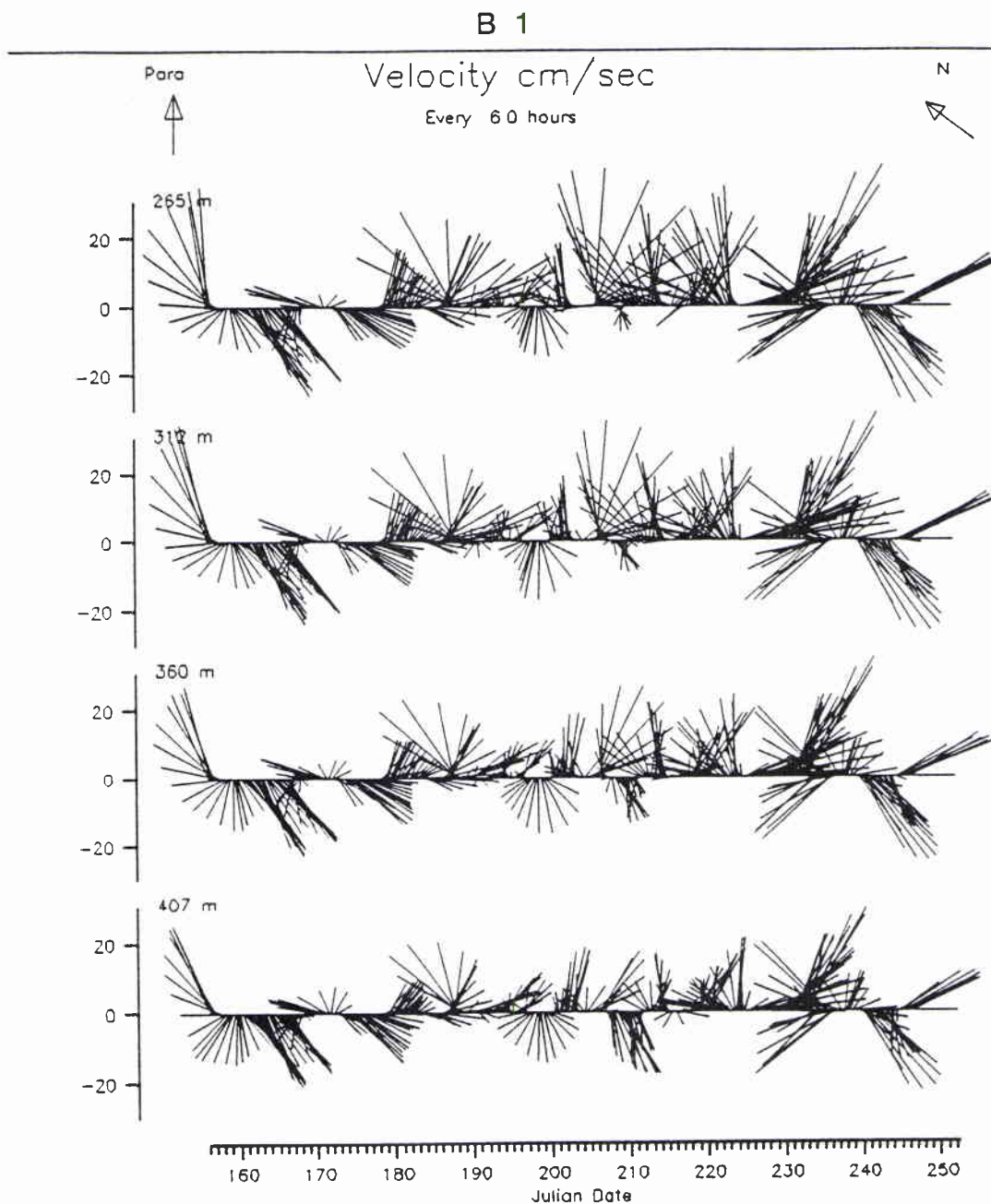


Figure F2

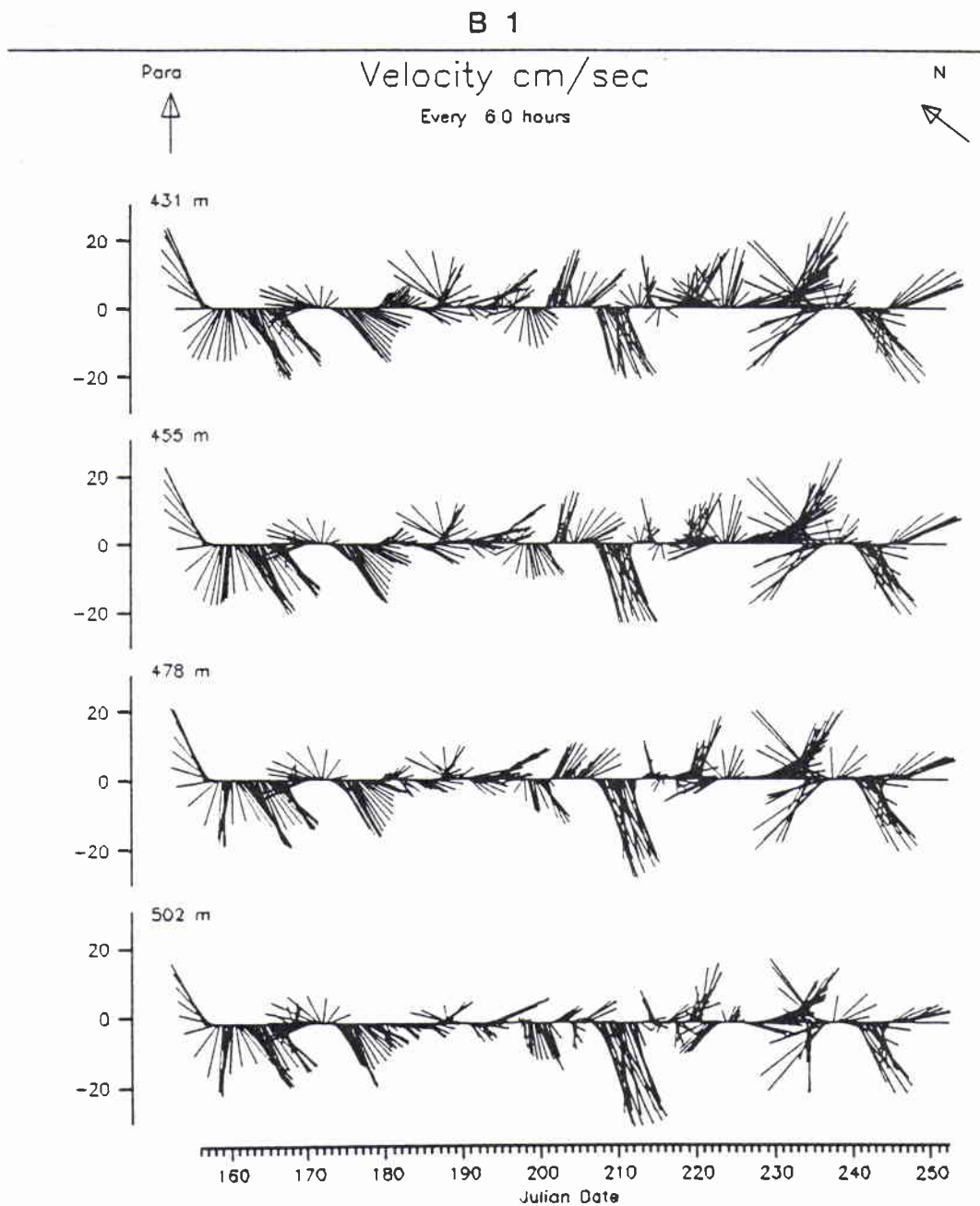


Figure F3

SACLANTCEN SM-250

B 1

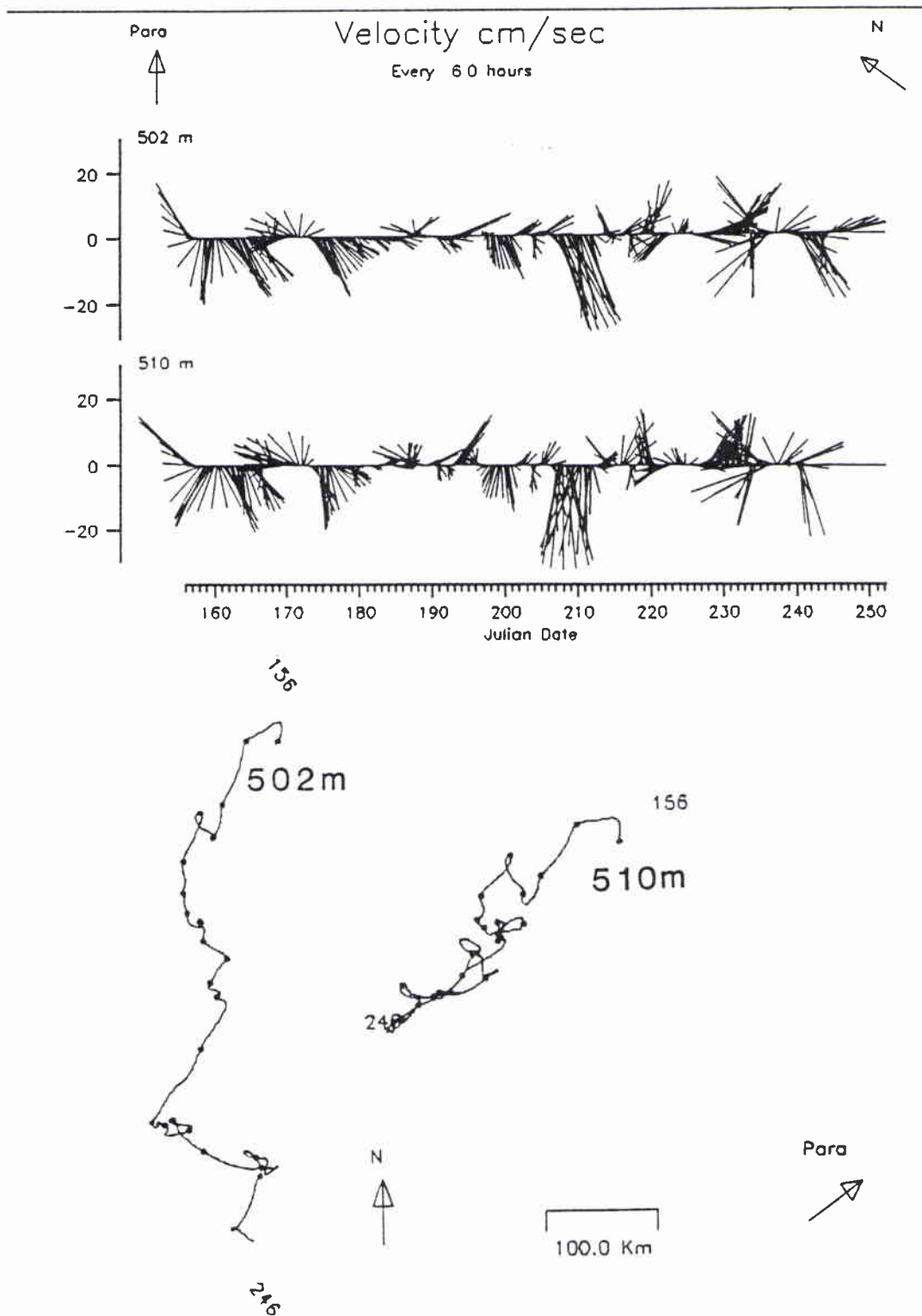


Figure F4

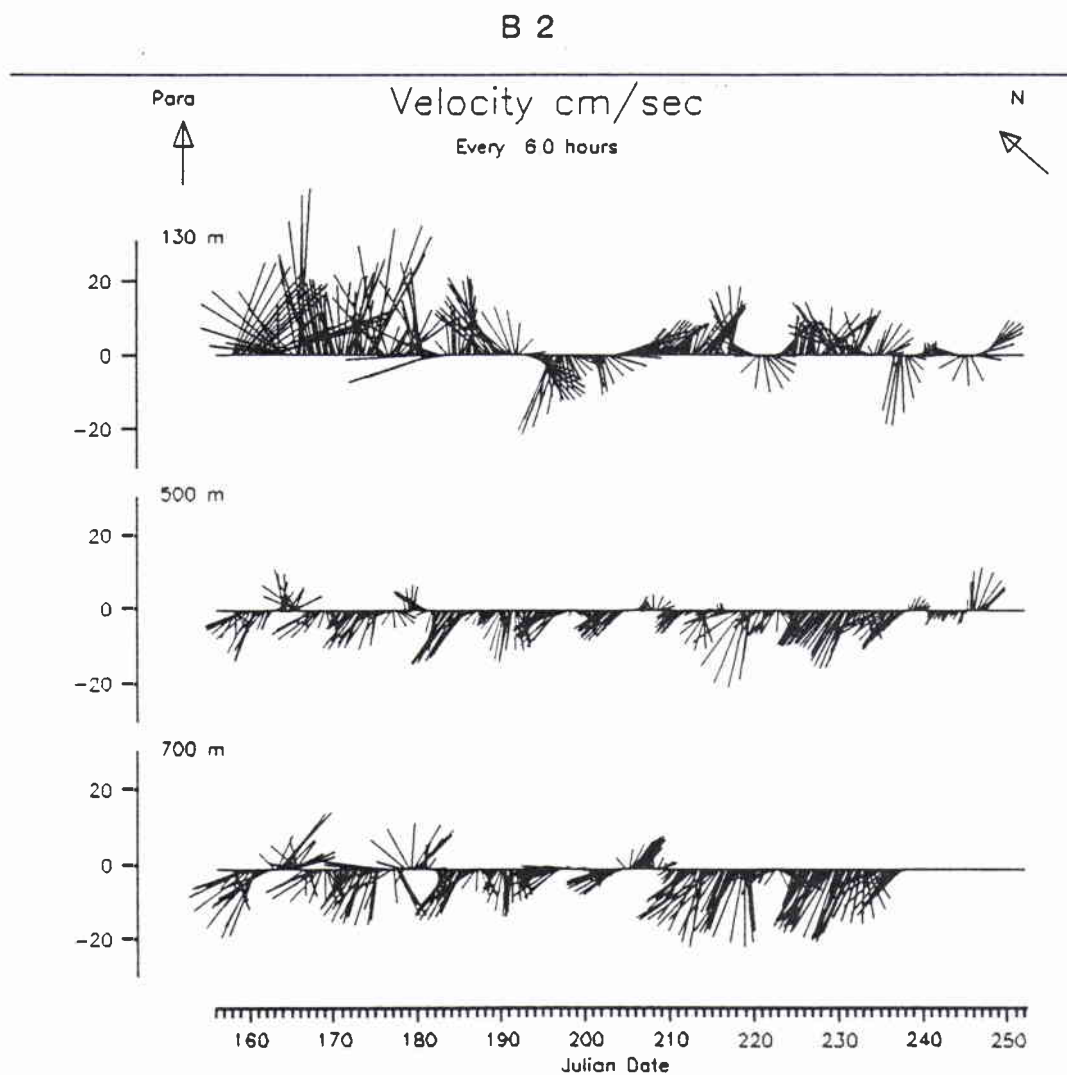


Figure F5

SACLANTCEN SM-250

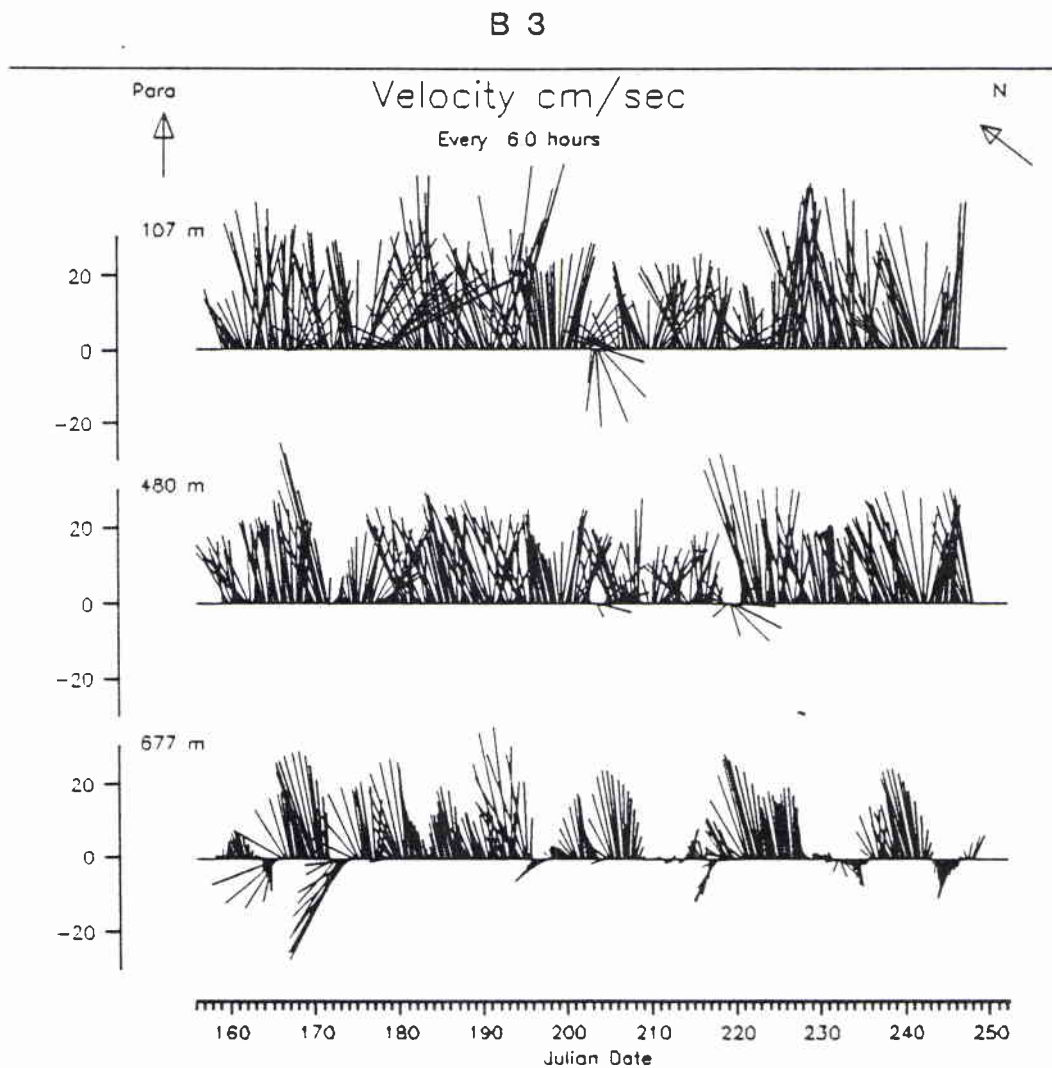


Figure F6

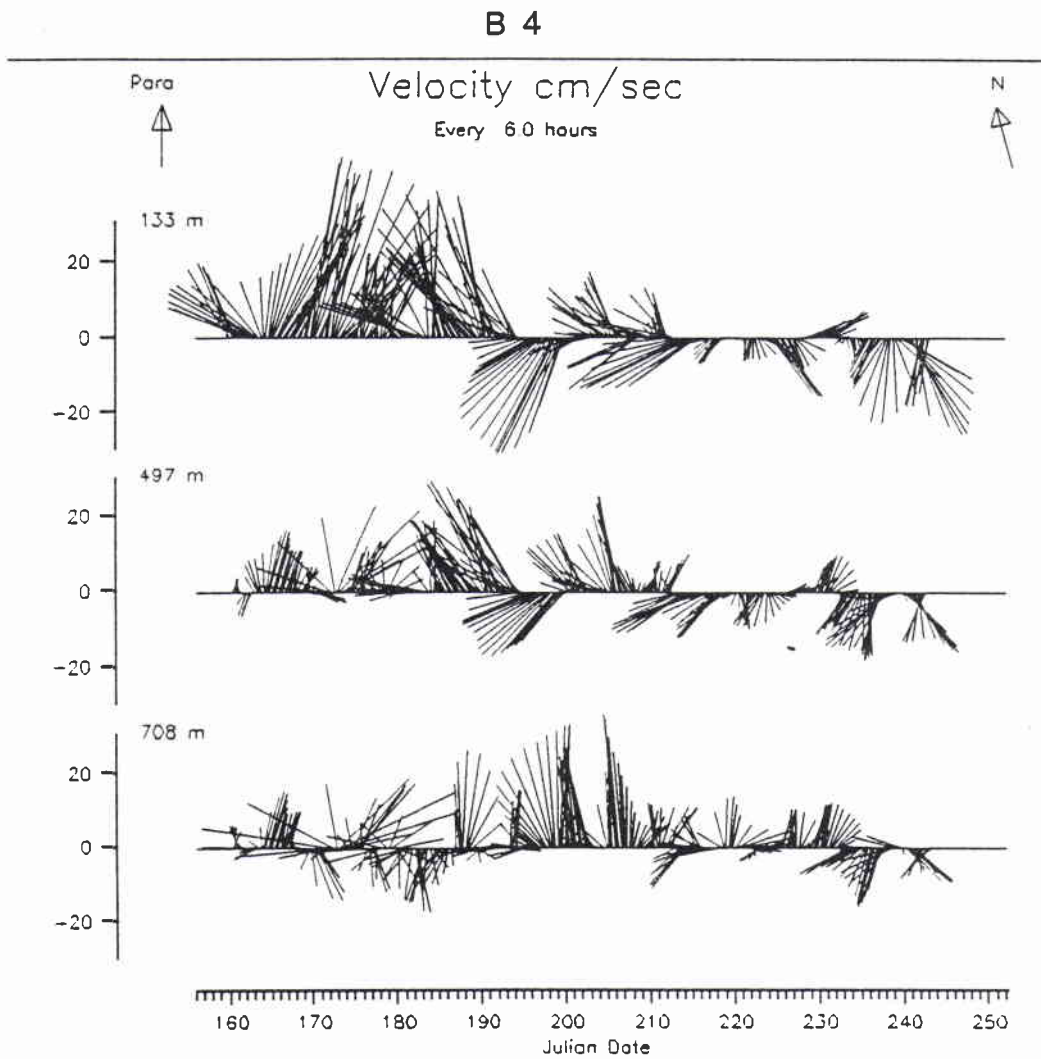


Figure F7

SACLANTCEN SM-250

B 5

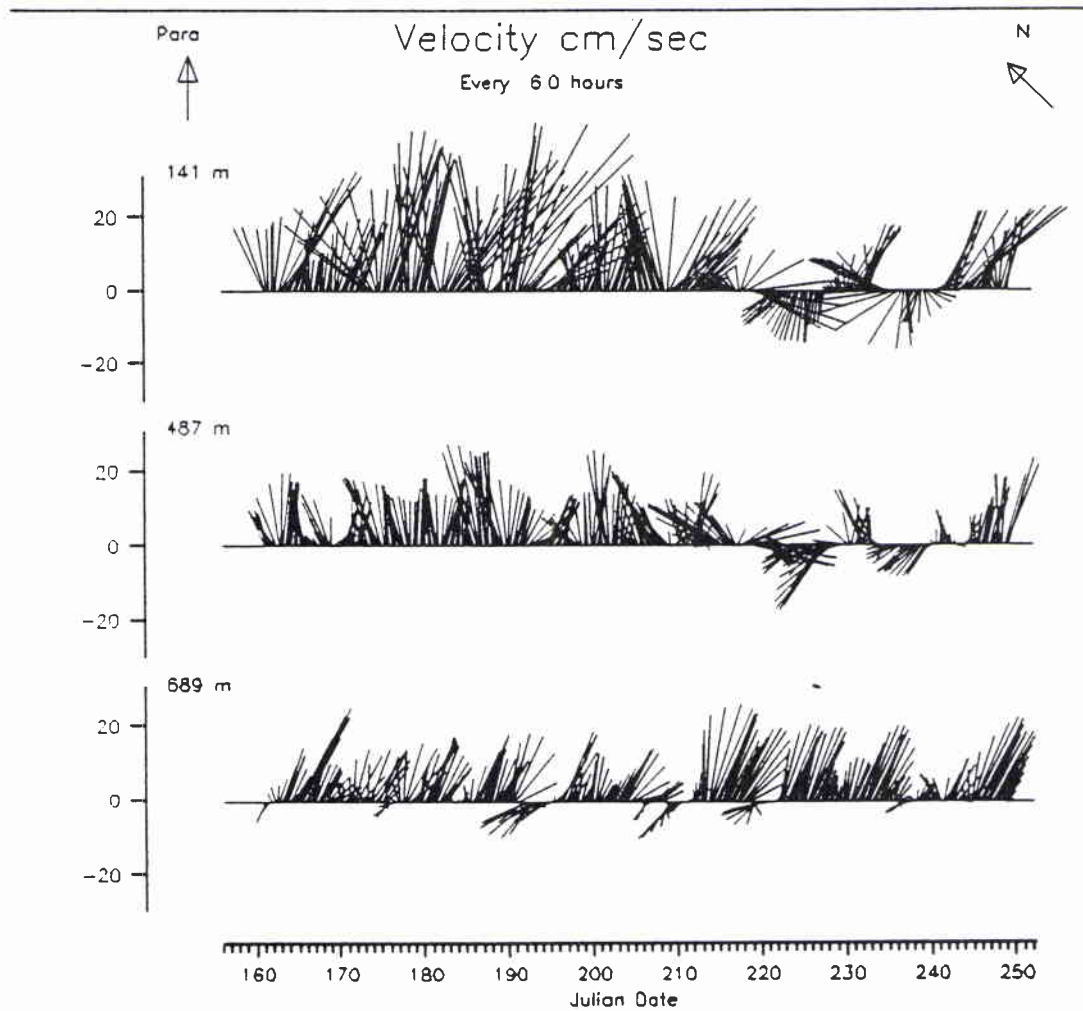


Figure F8

B 6

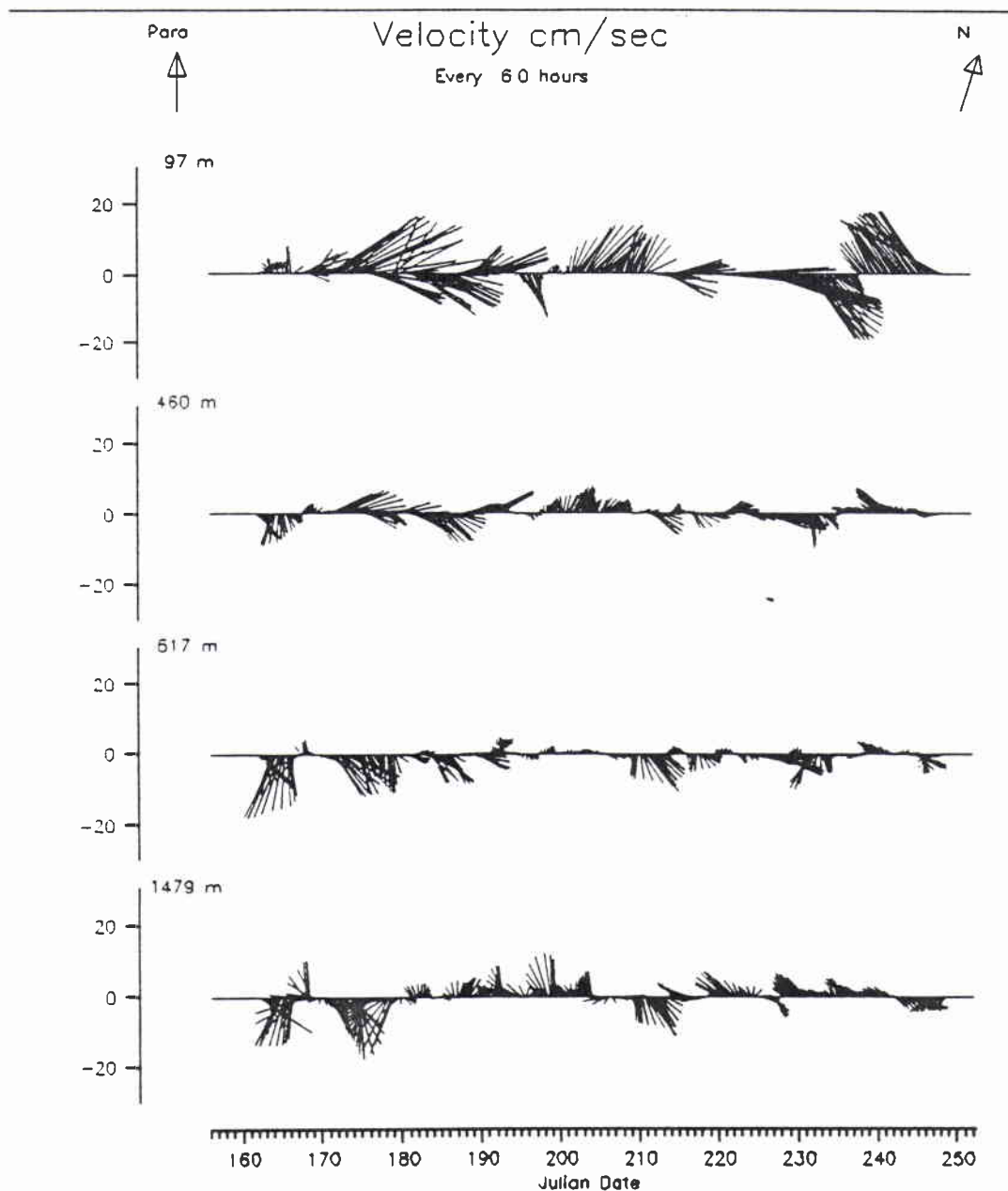


Figure F9

SACLANTCEN SM-250

B 8

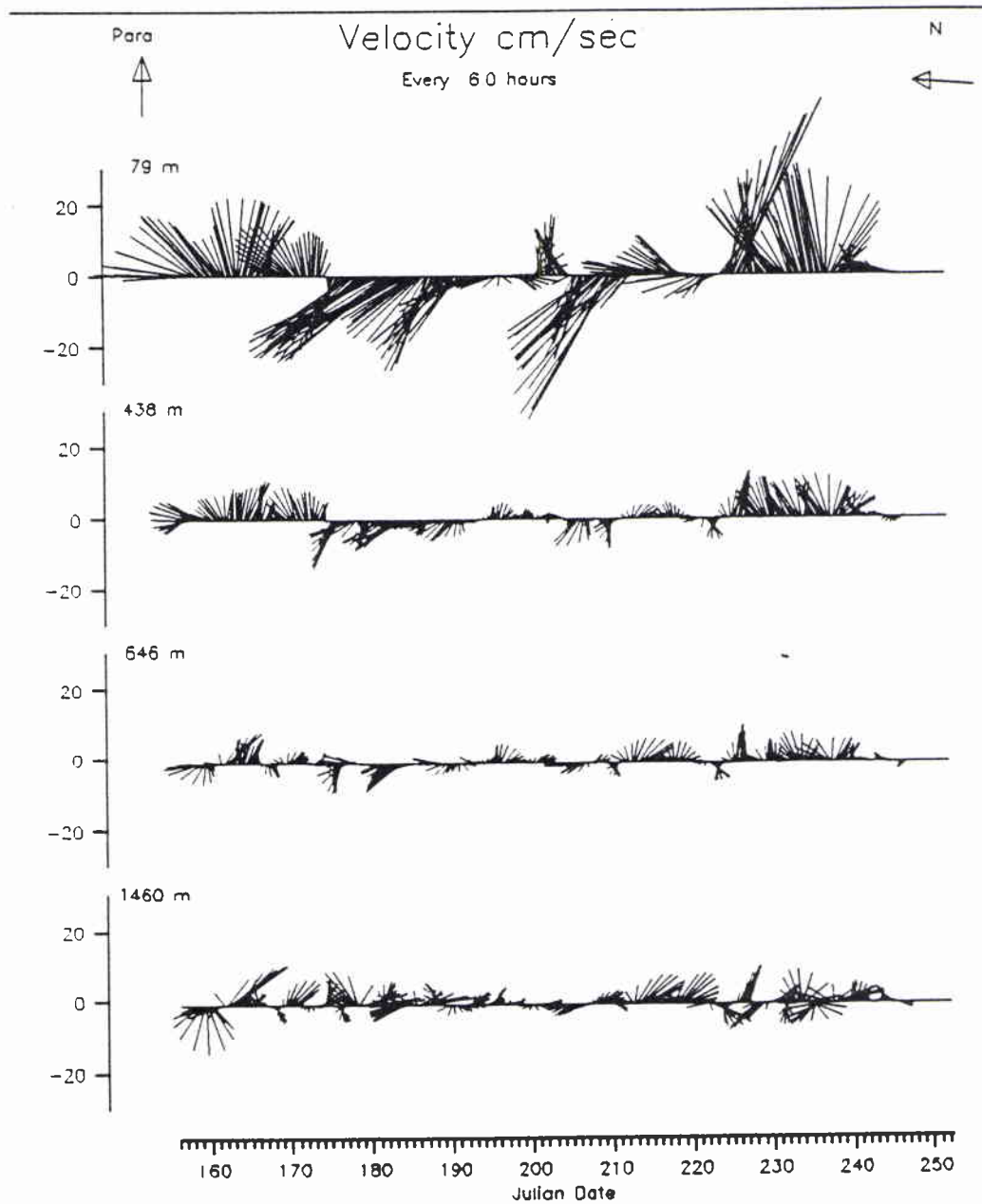
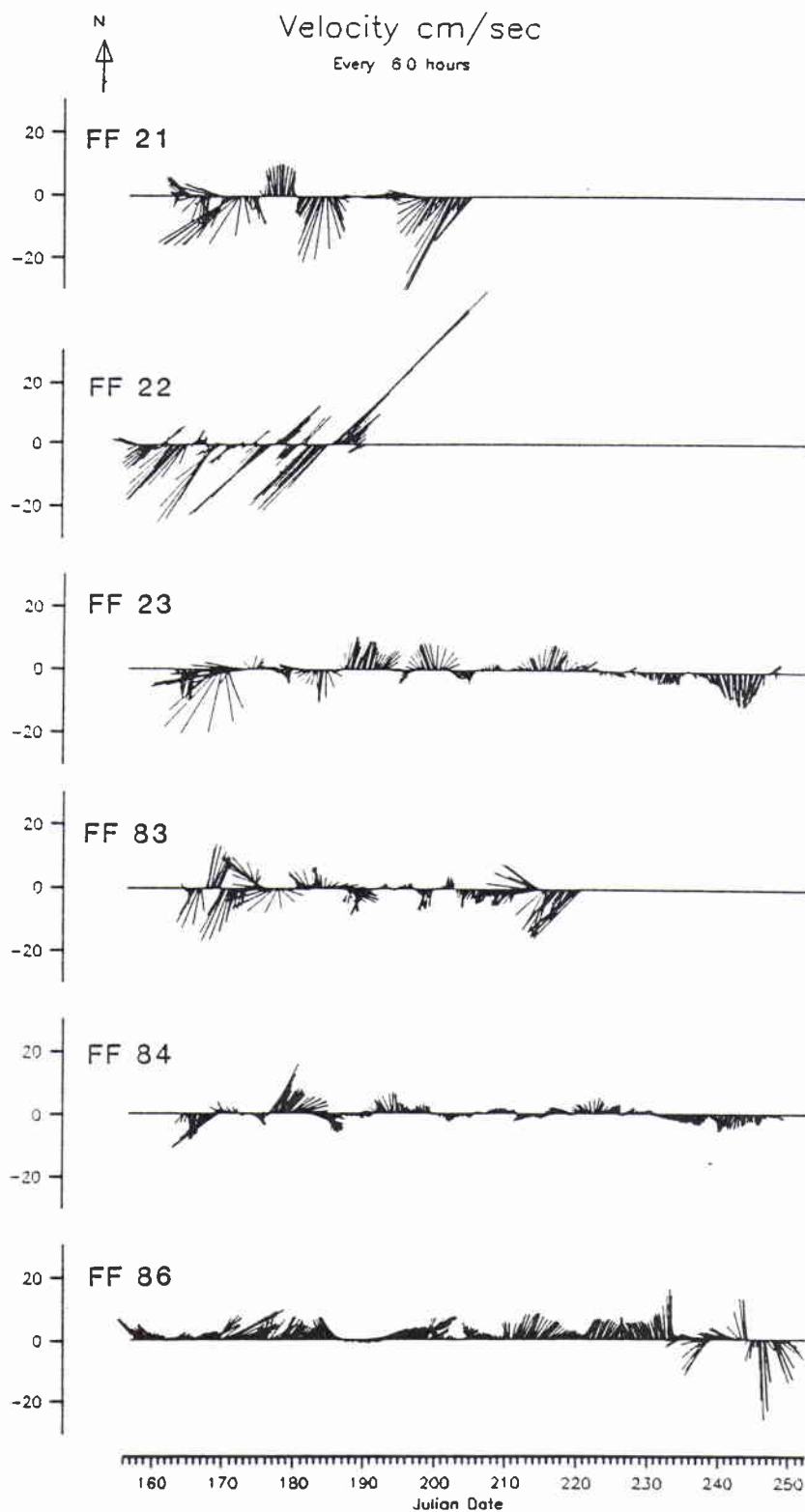


Figure F10

**Figure F11**

SACLANTCEN SM-250

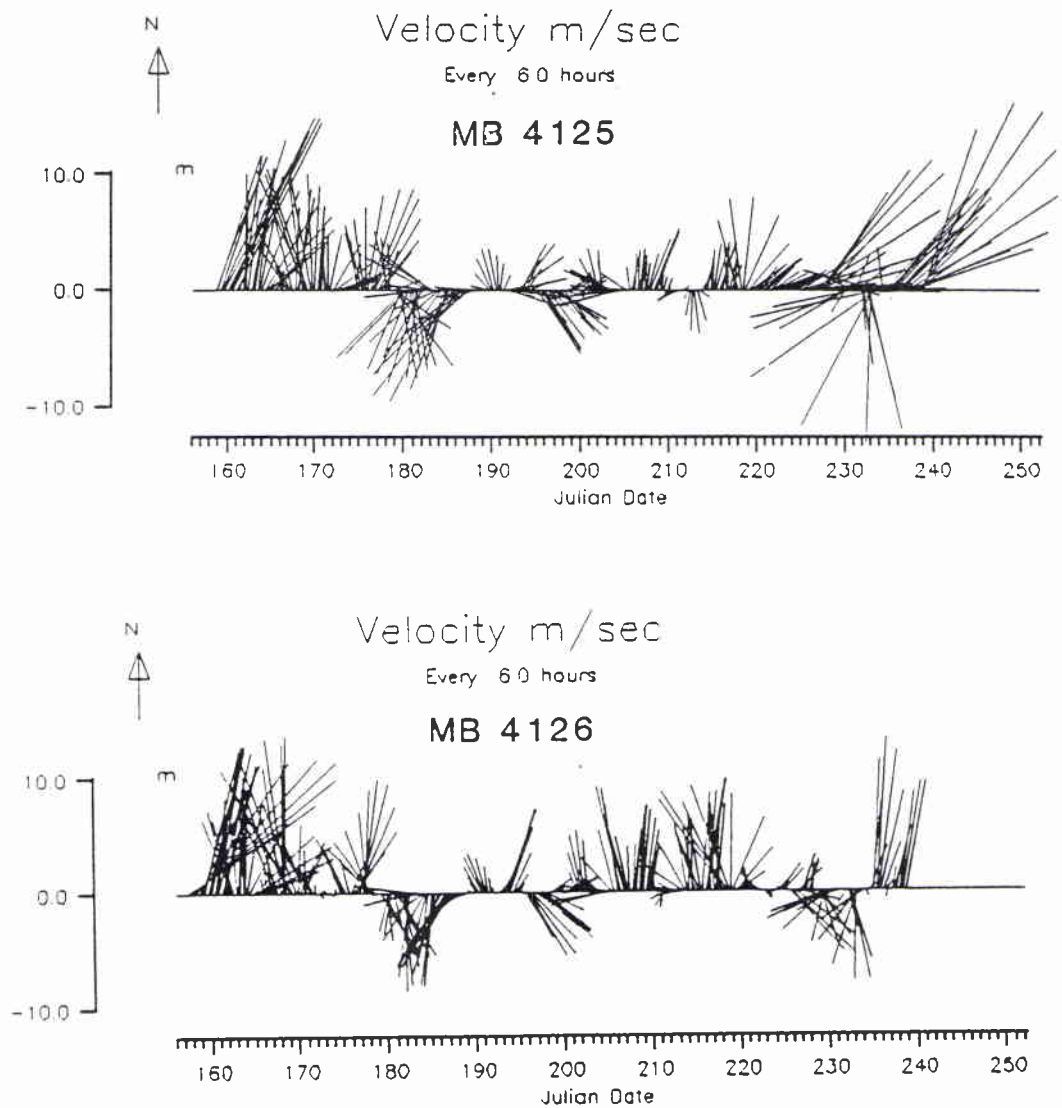


Figure F12

SACLANTCEN SM-250

Appendix G

Spectra

Autospectra and rotary spectra are given for the current meters, the floats, and the ASID (Met) Buoy wind data. For the current meters, the autospectra are computed for the bathymetric coordinates, and for the floats and ASID (Met) Buoys for the geographic coordinates. The autospectra are in a log-log format and the rotary spectra in a log-linear format. The 80% confidence limits and the frequency resolution for the rotary spectra are indicated in the upper right corner.

- Figures G1–G13: Buoy 1.
- Figures G14–G33: Buoys 2–8.
- Figures G34–G35: ASID (Met) Buoys.

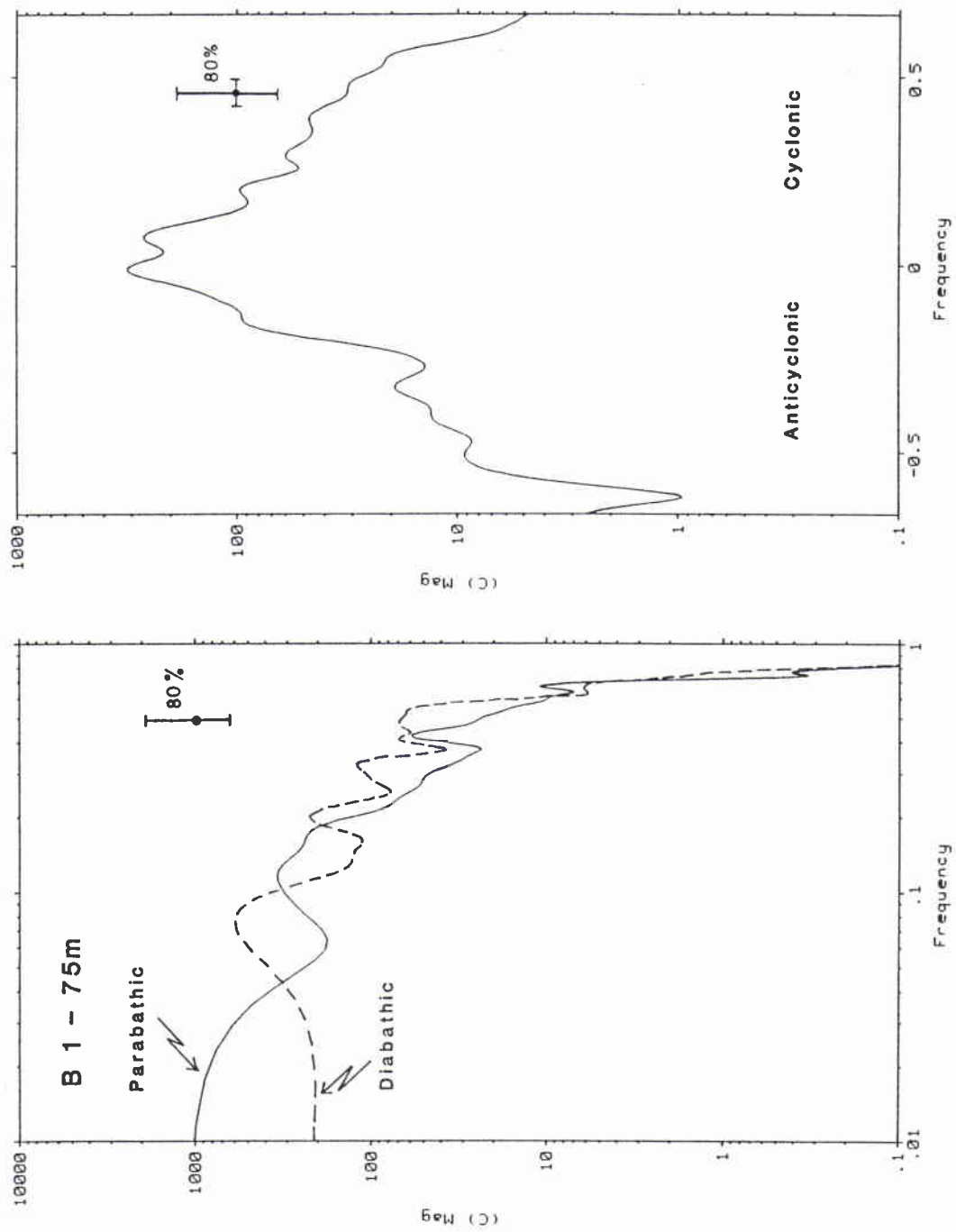


Figure G1

SACLANTCEN SM-250

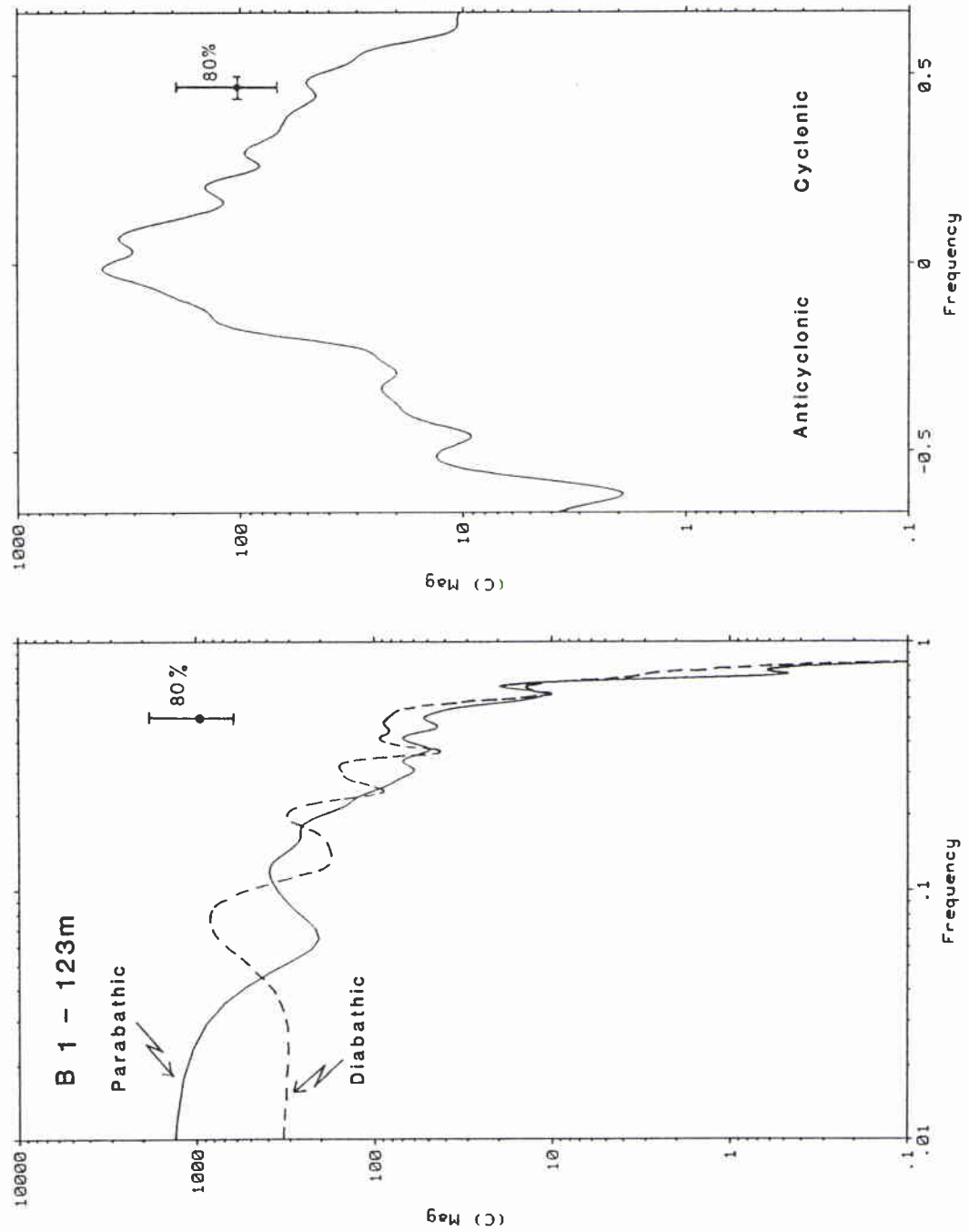


Figure G2

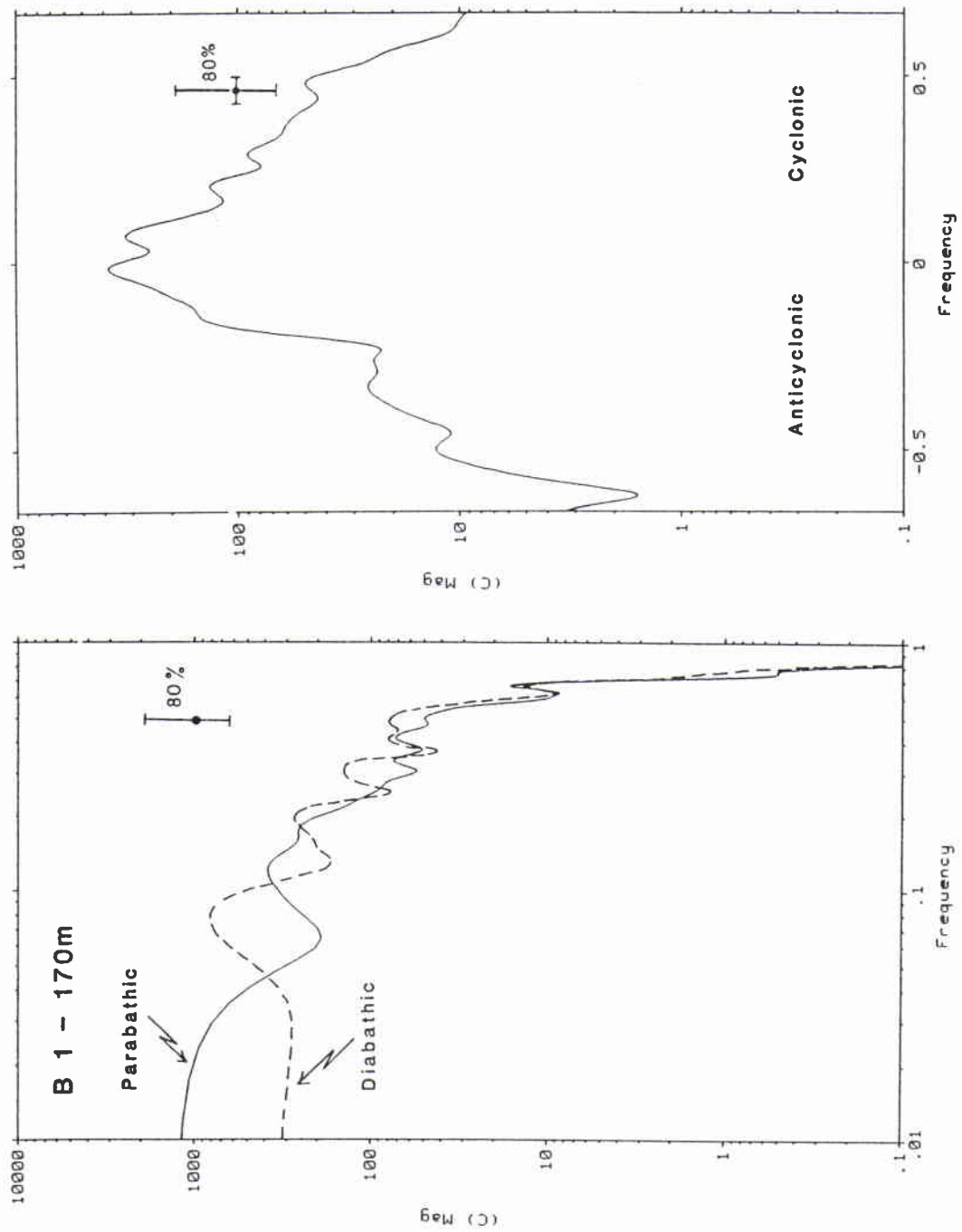


Figure G3

SACLANTCEN SM-250

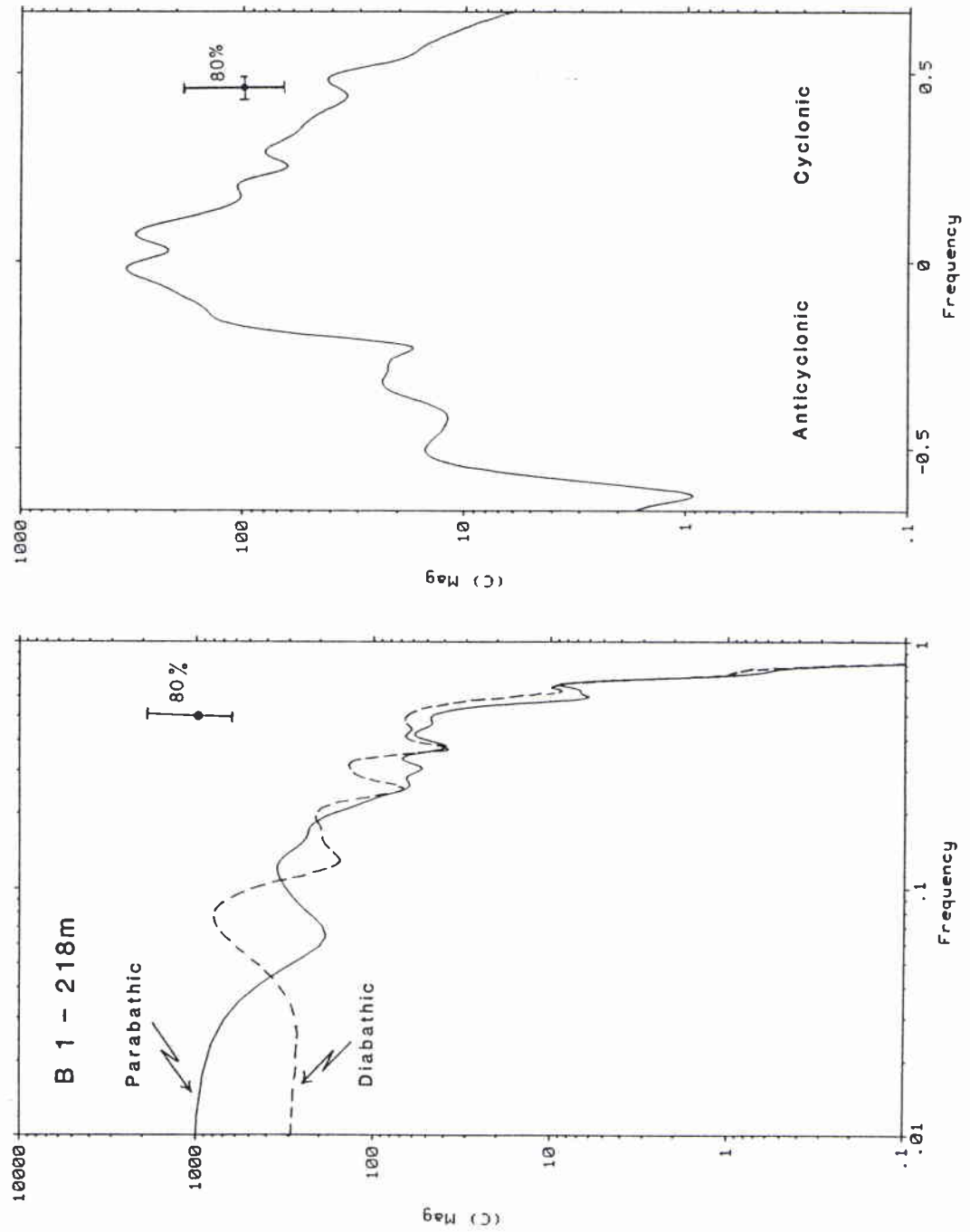


Figure G4

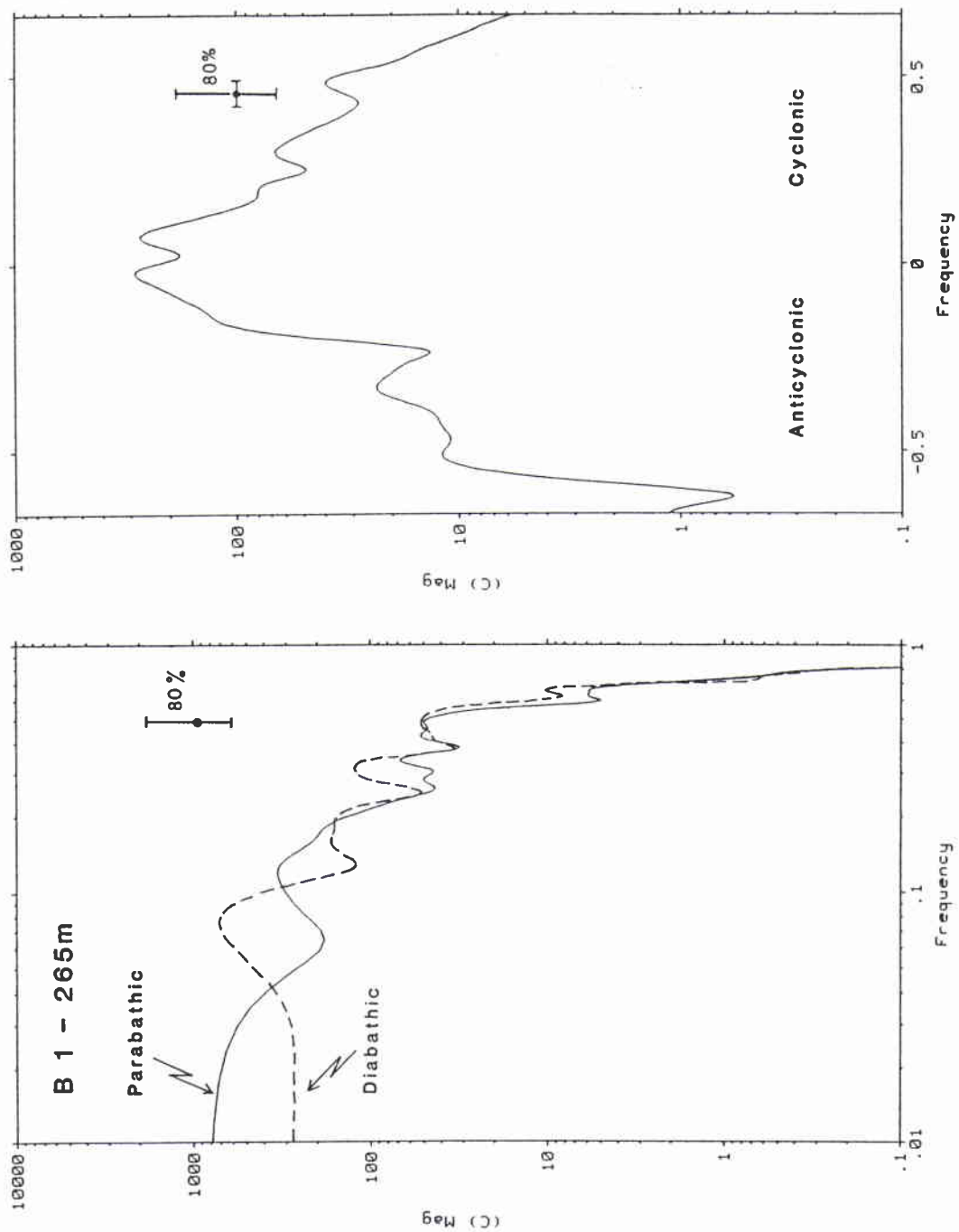


Figure G5

SACLANTCEN SM-250

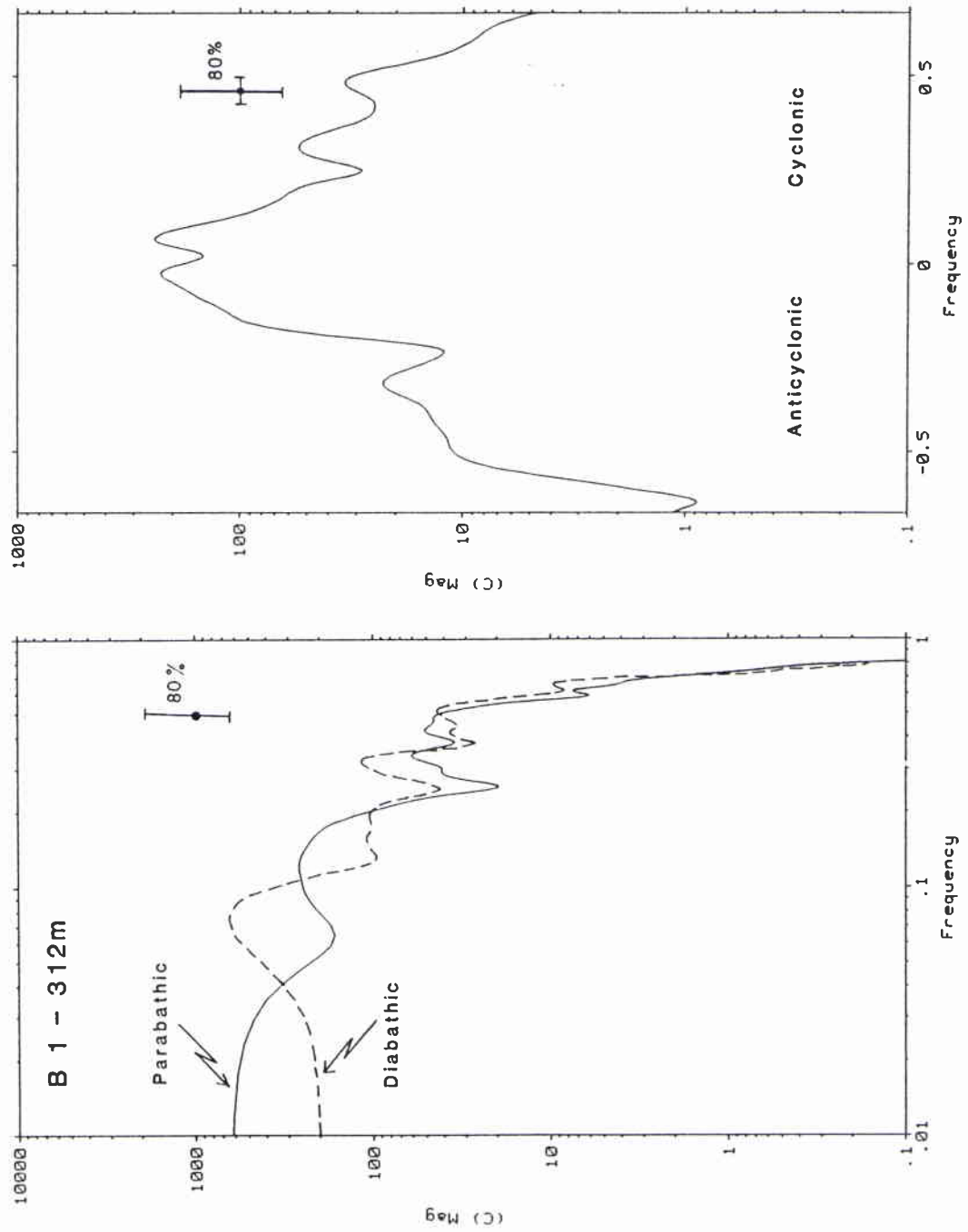


Figure G6

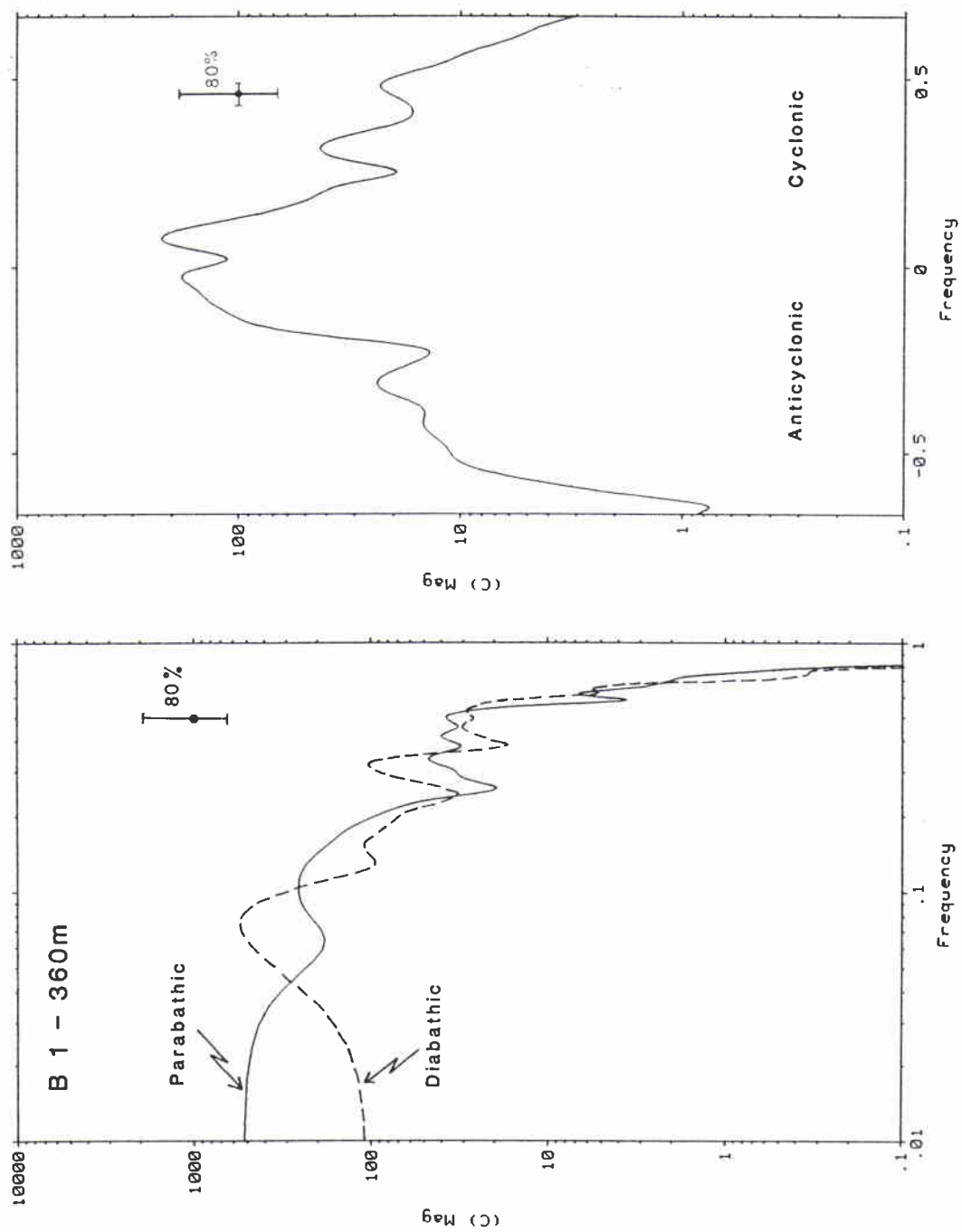


Figure G7

SACLANTCEN SM-250

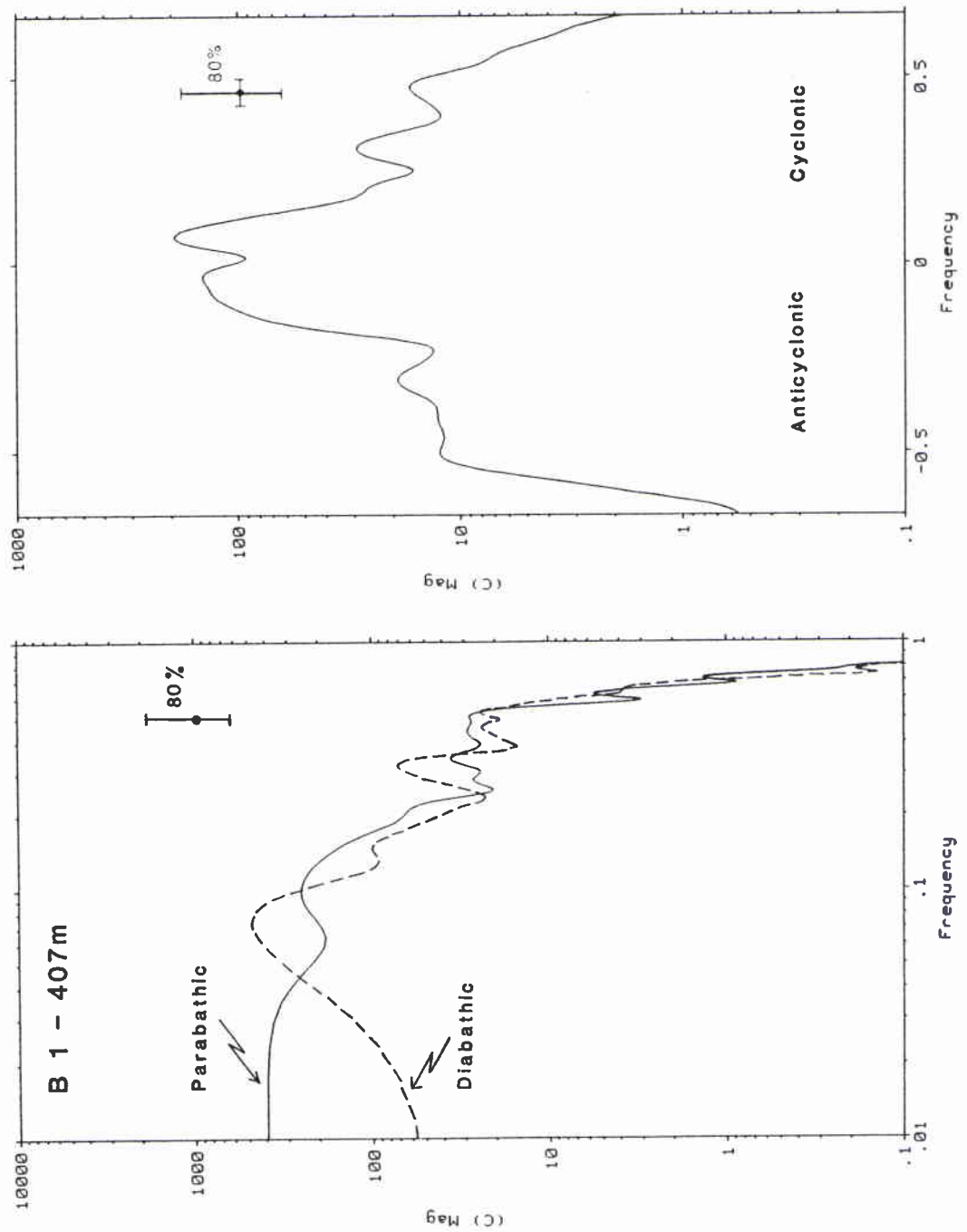


Figure G8

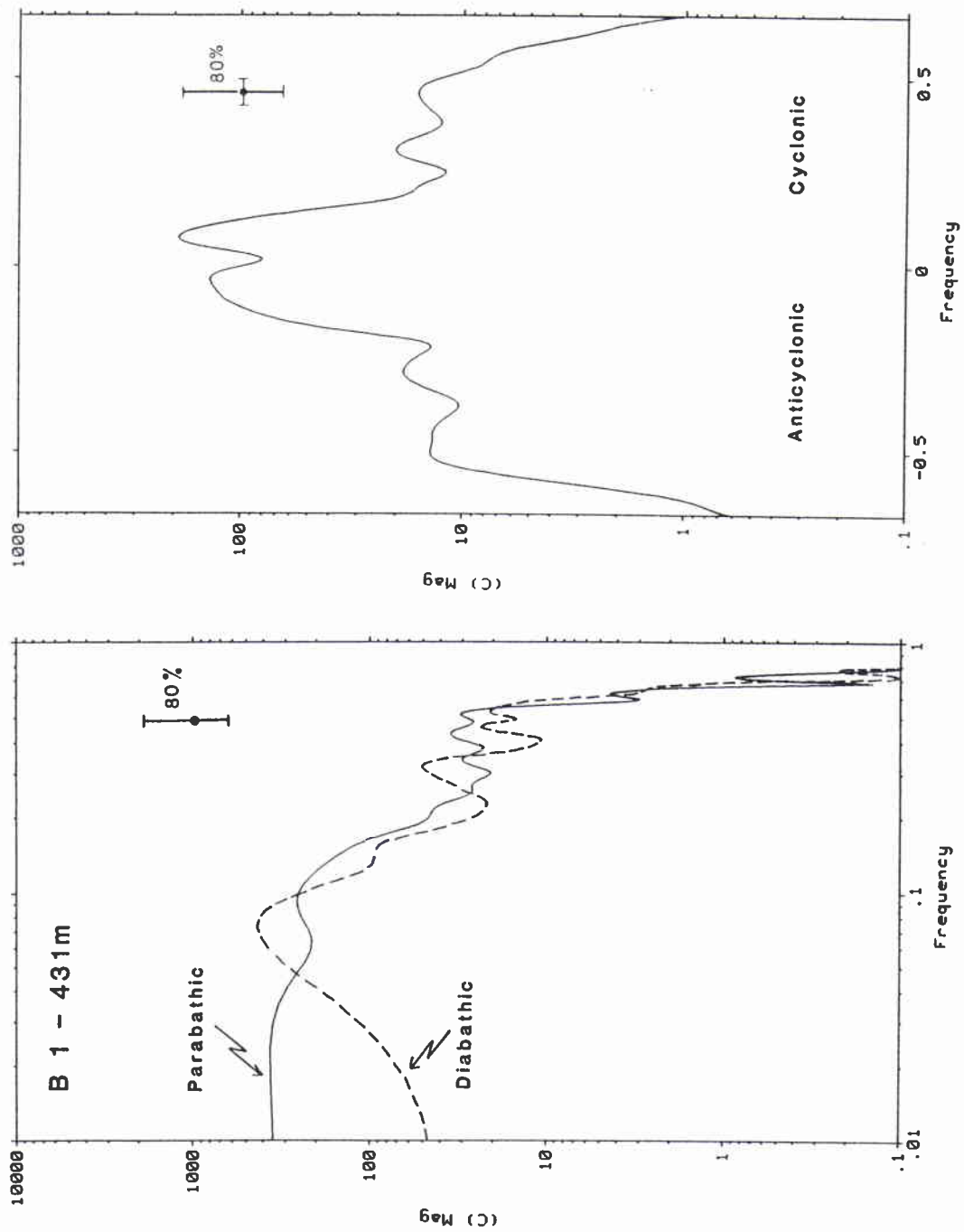


Figure G9

SACLANTCEN SM-250

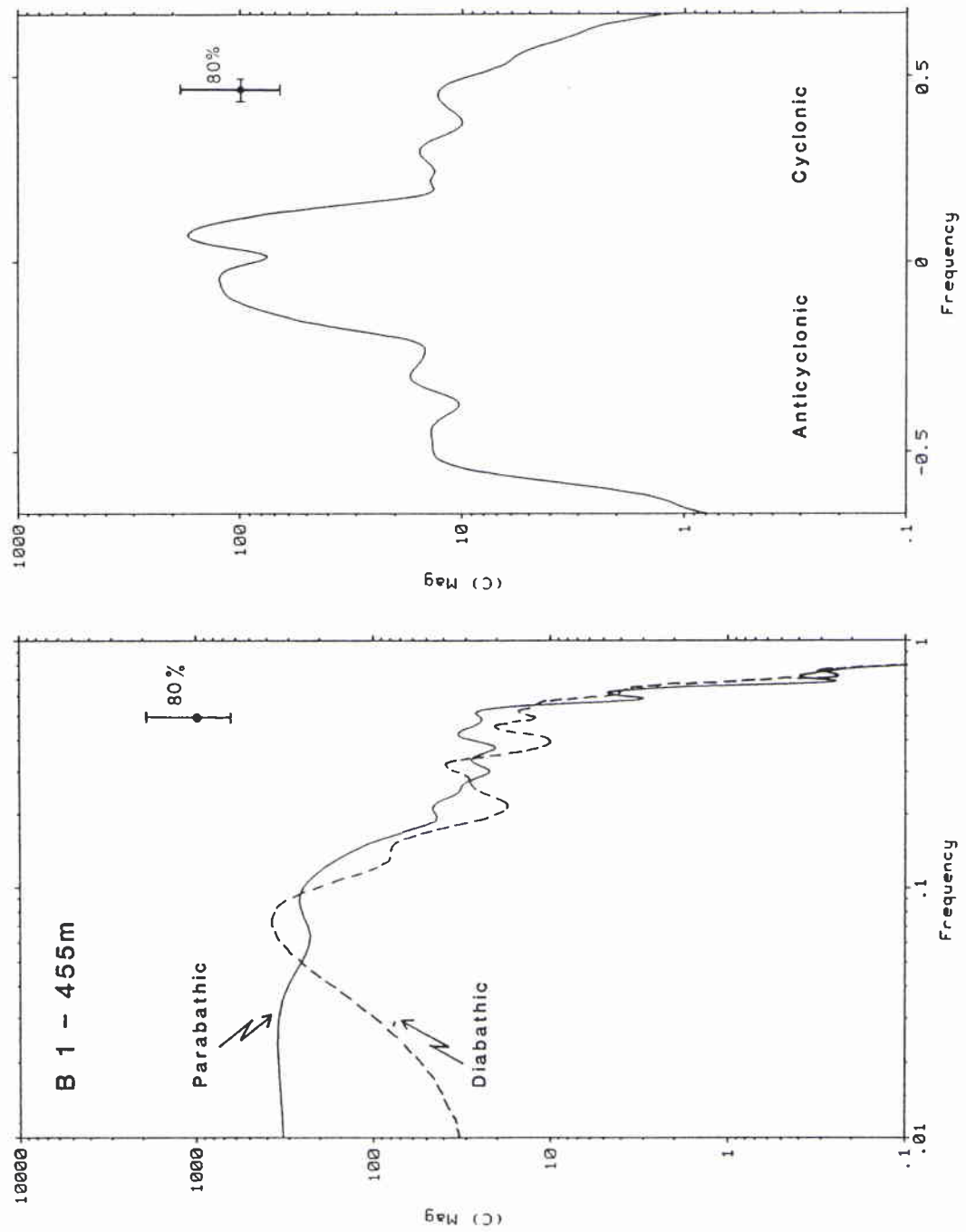


Figure G10

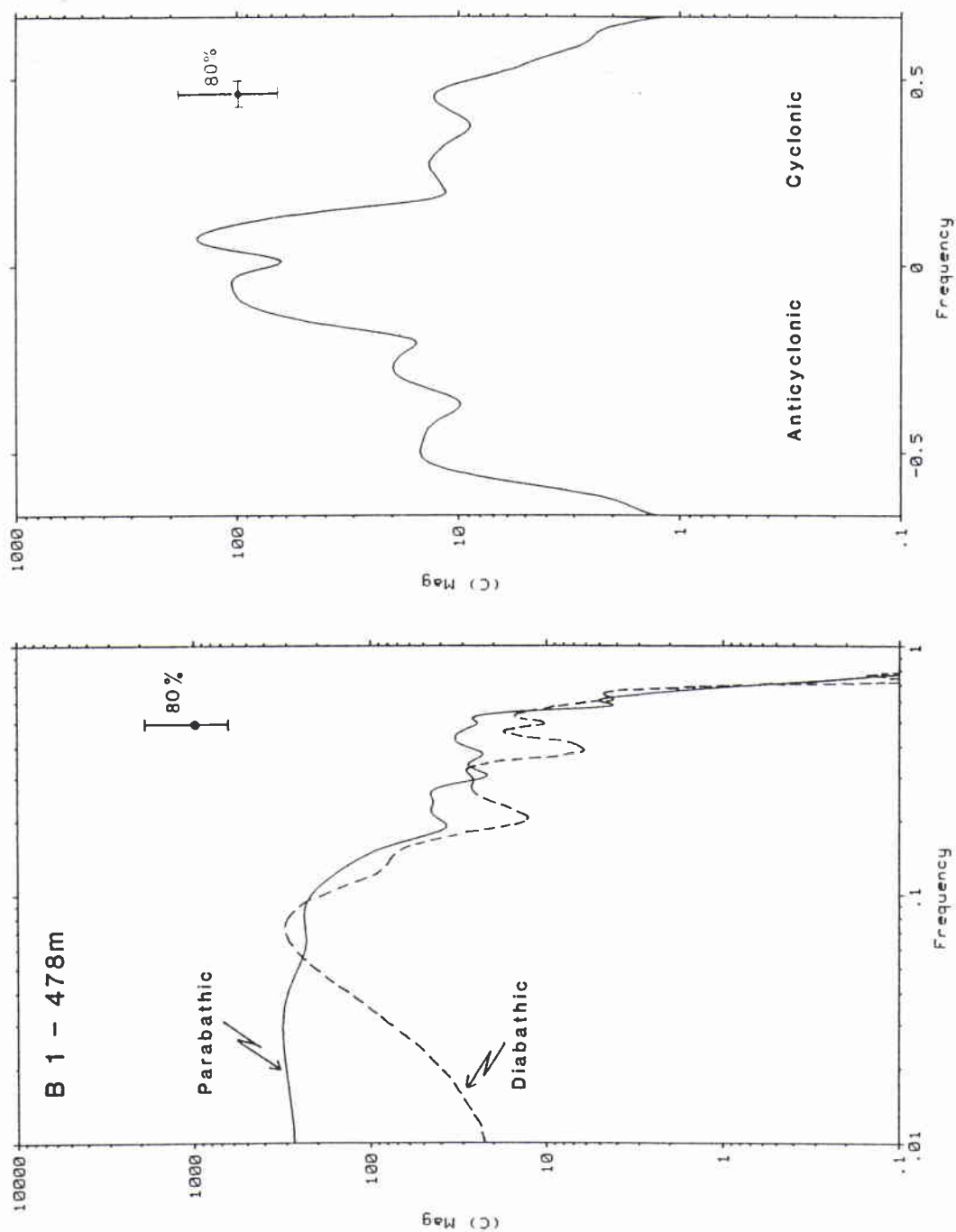


Figure G11

SACLANTCEN SM-250

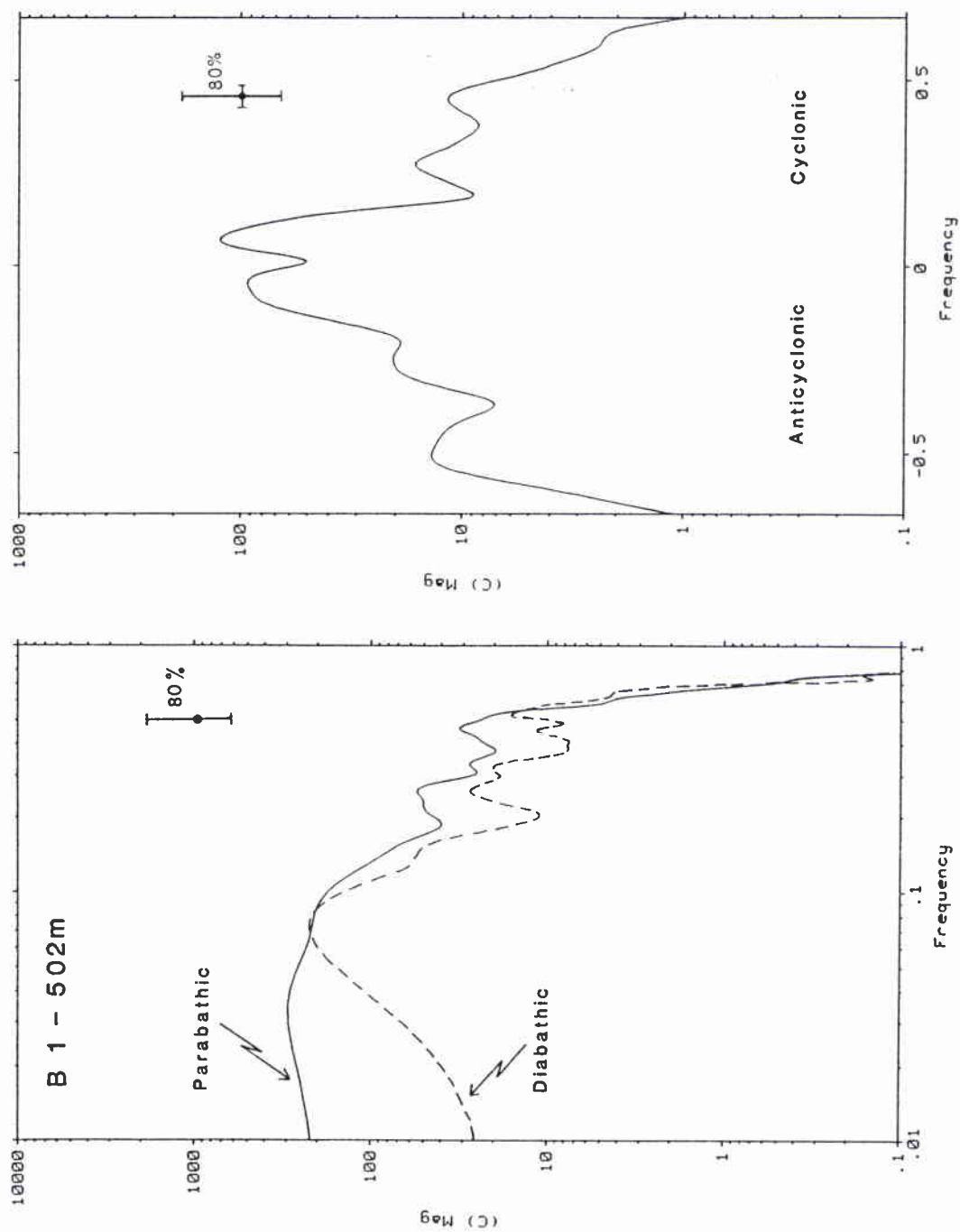


Figure G12

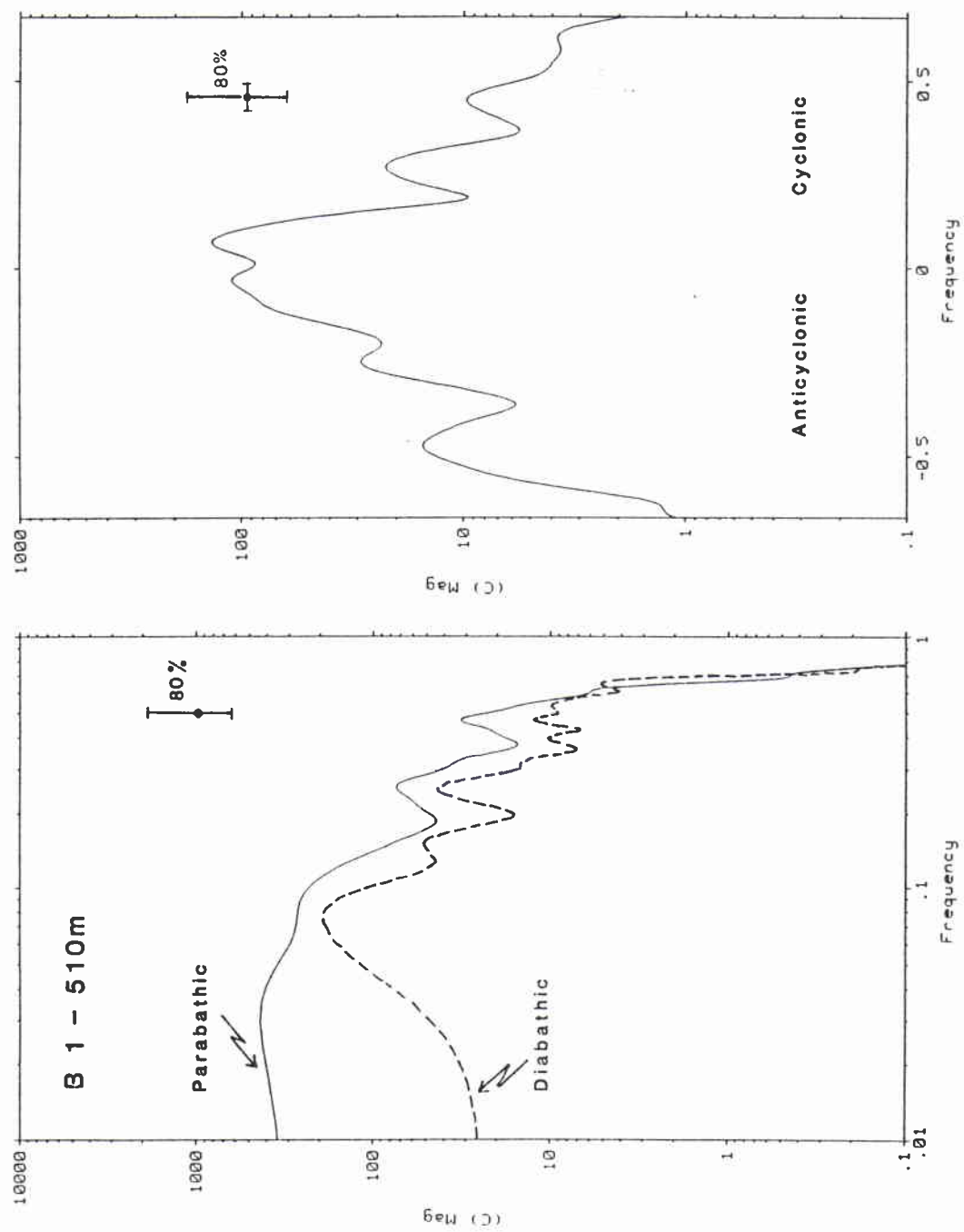


Figure G13

SACLANTCEN SM-250

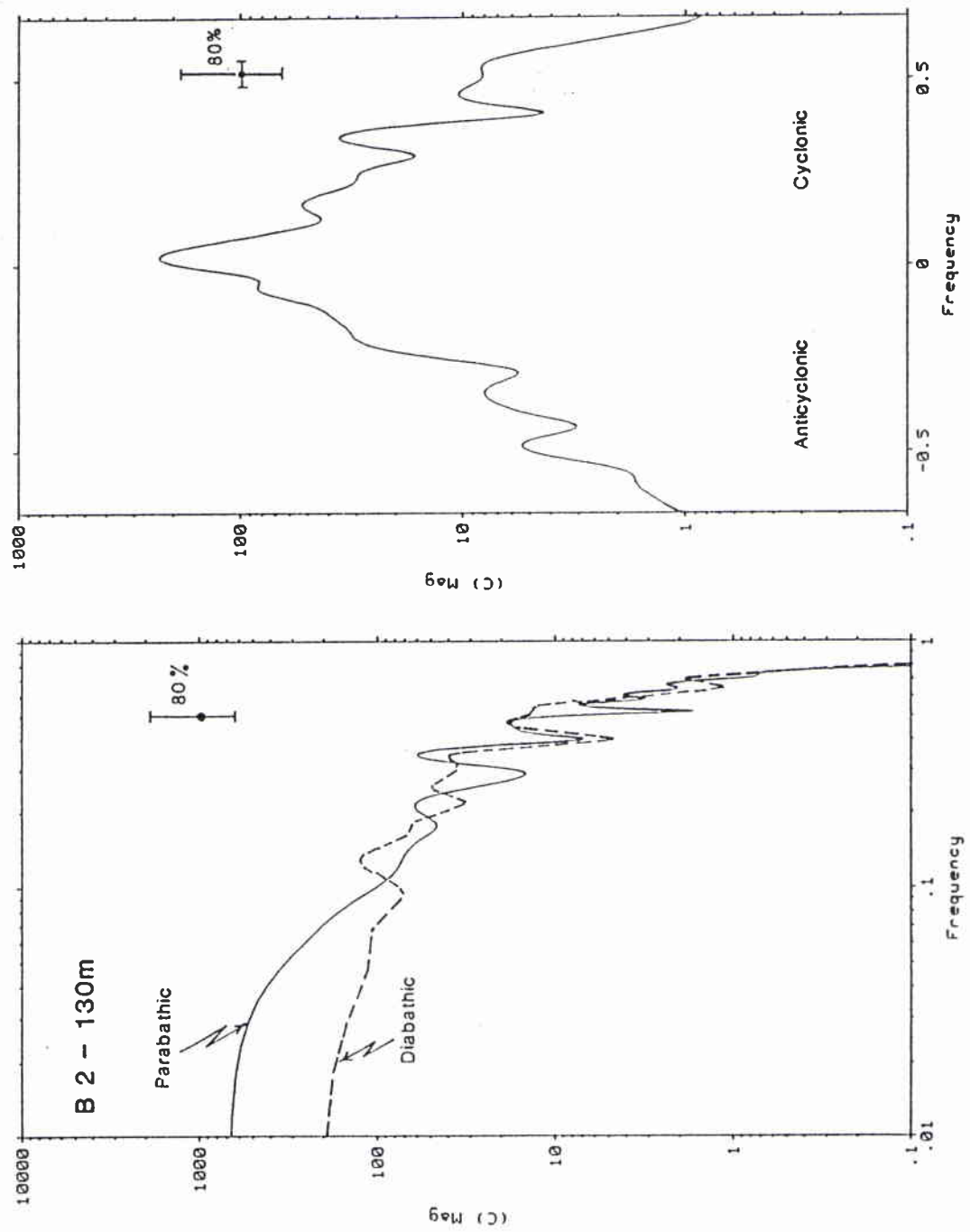


Figure G14

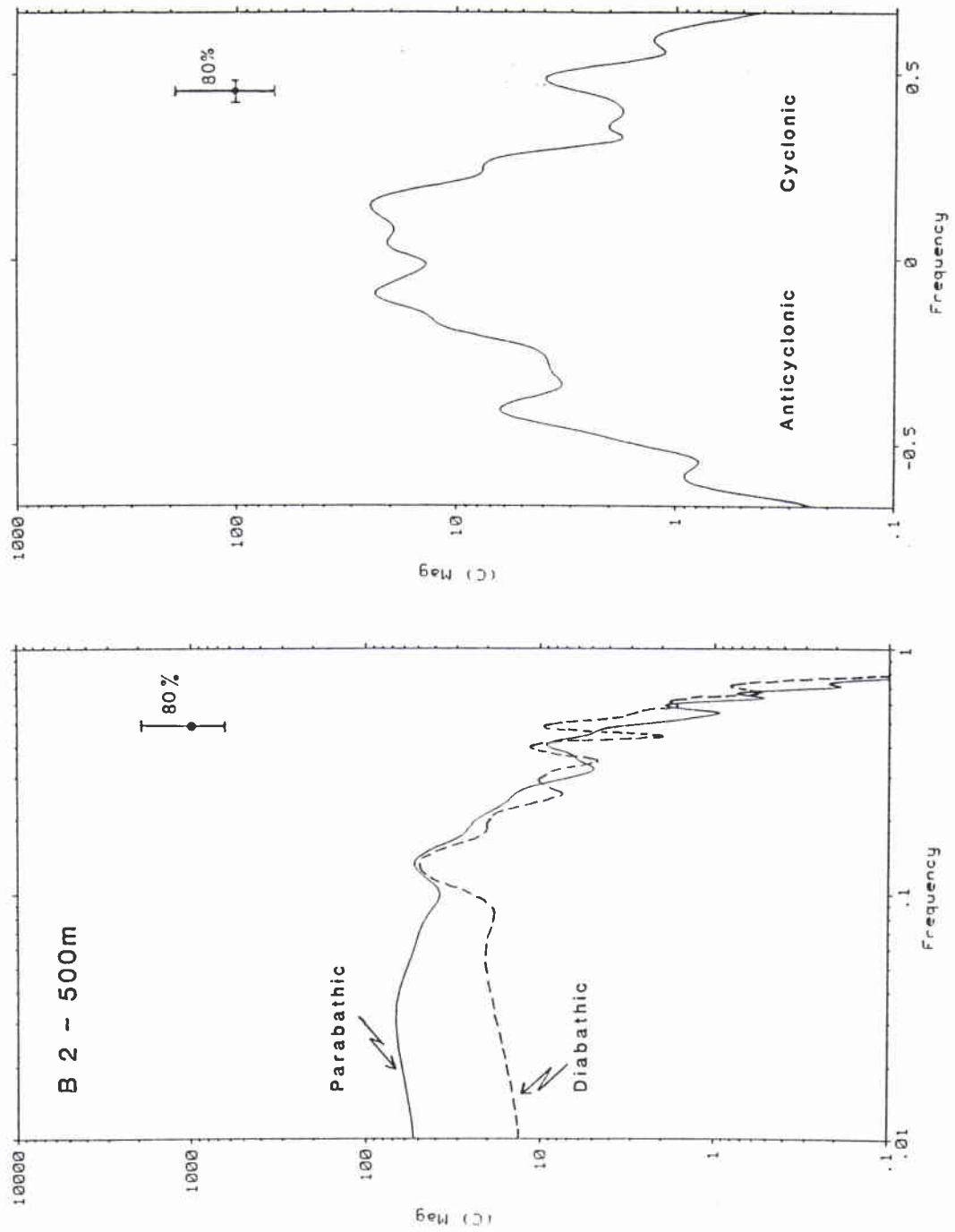


Figure G15

SACLANTCEN SM-250

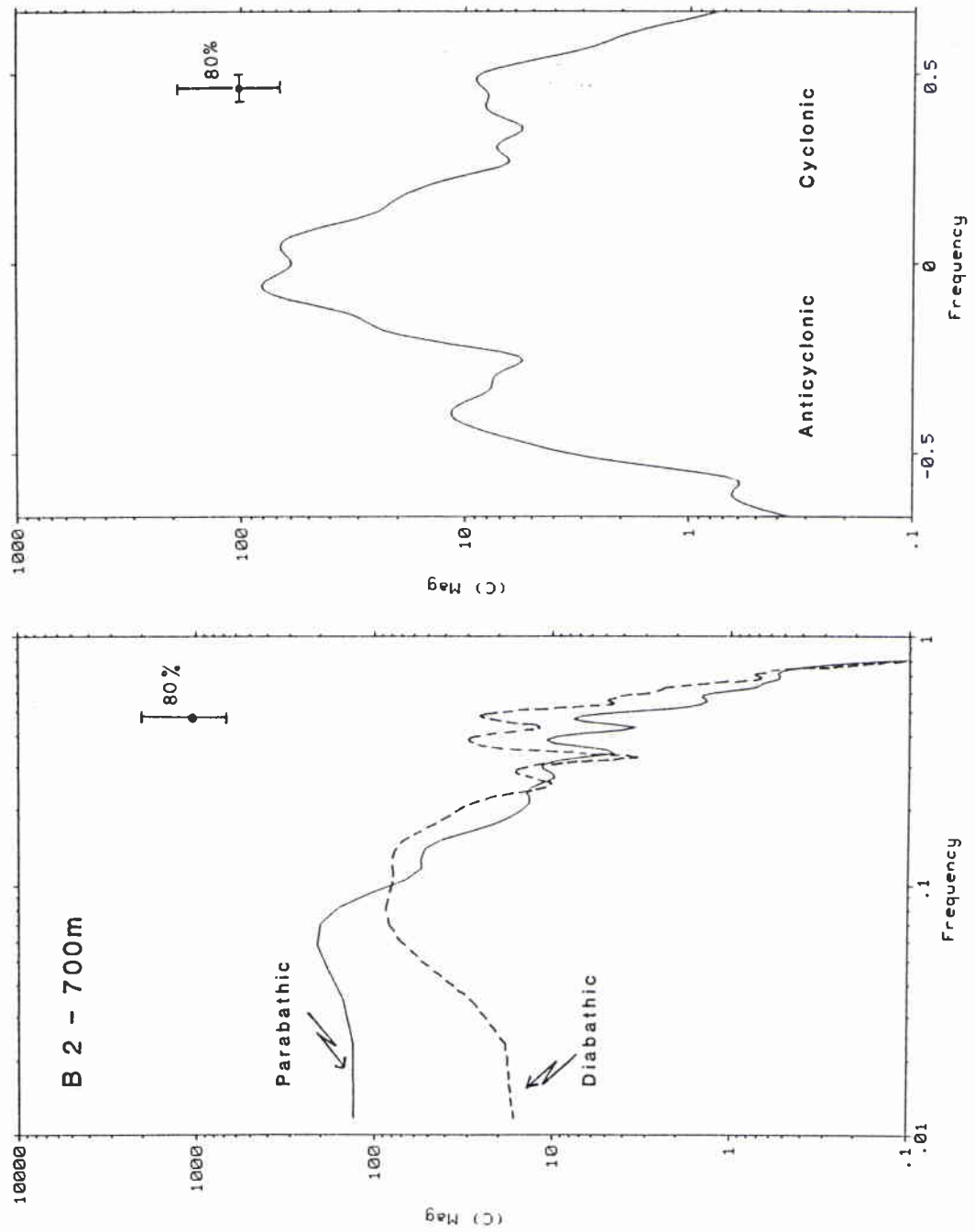


Figure G16

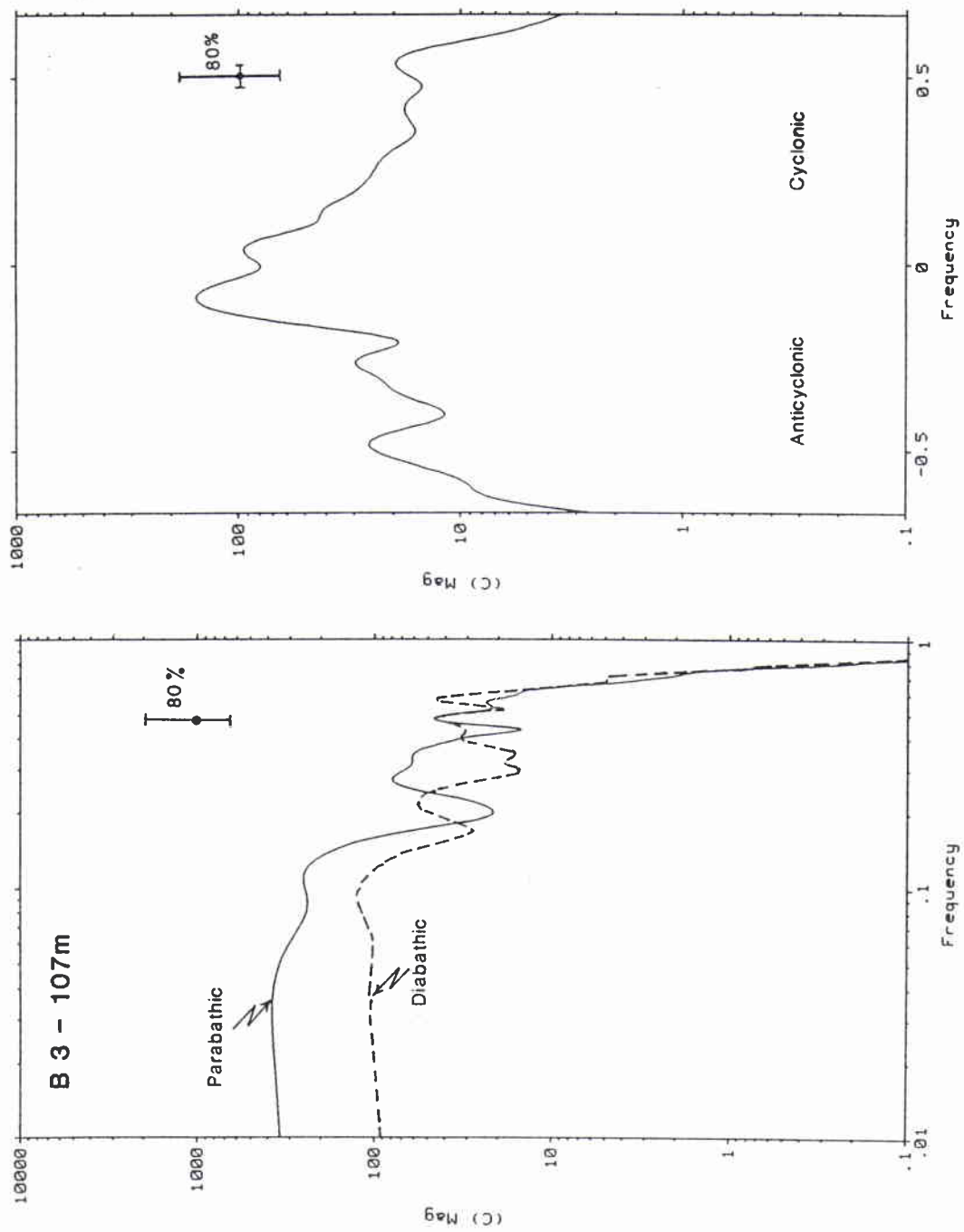


Figure G17

SACLANTCEN SM-250

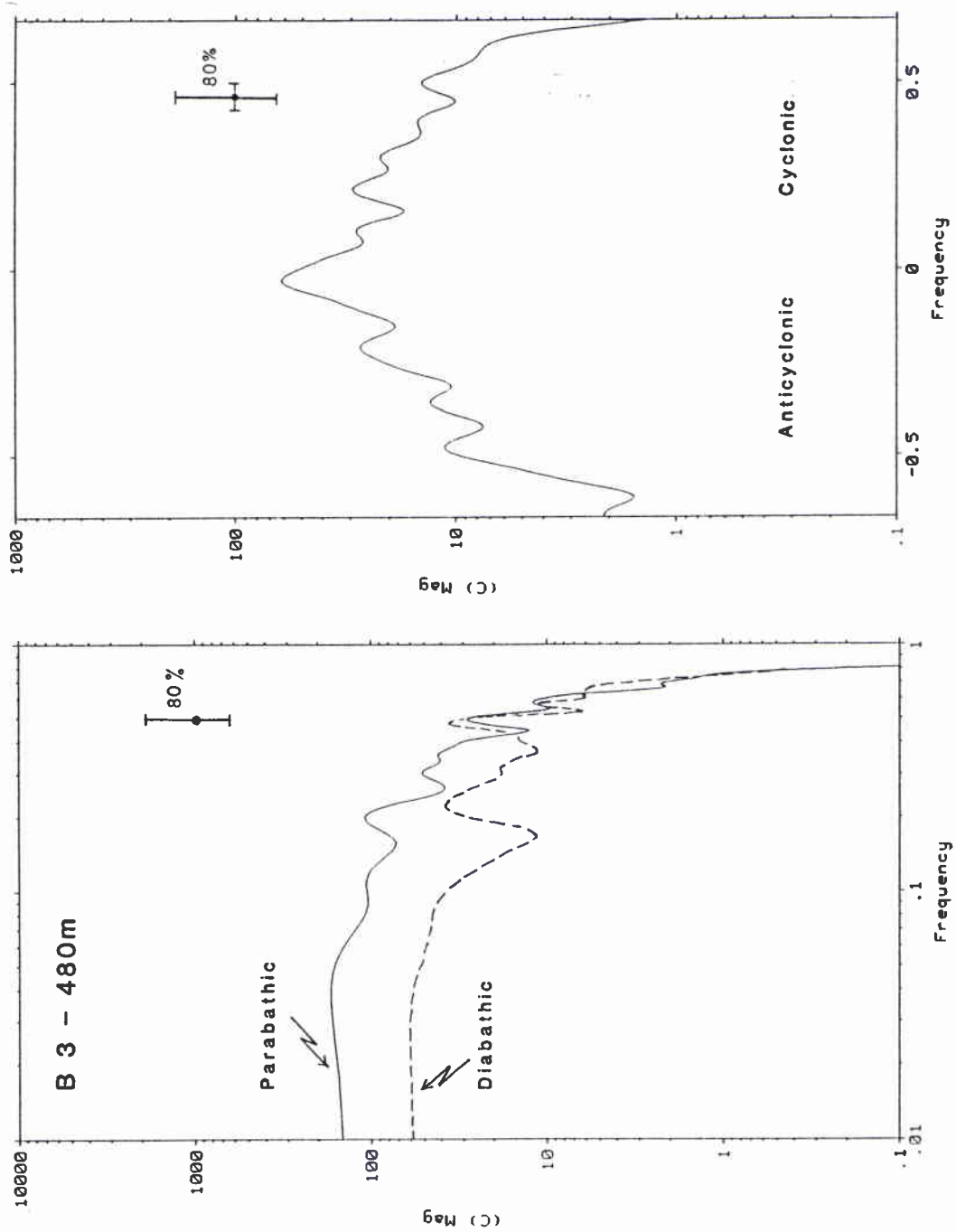


Figure G18

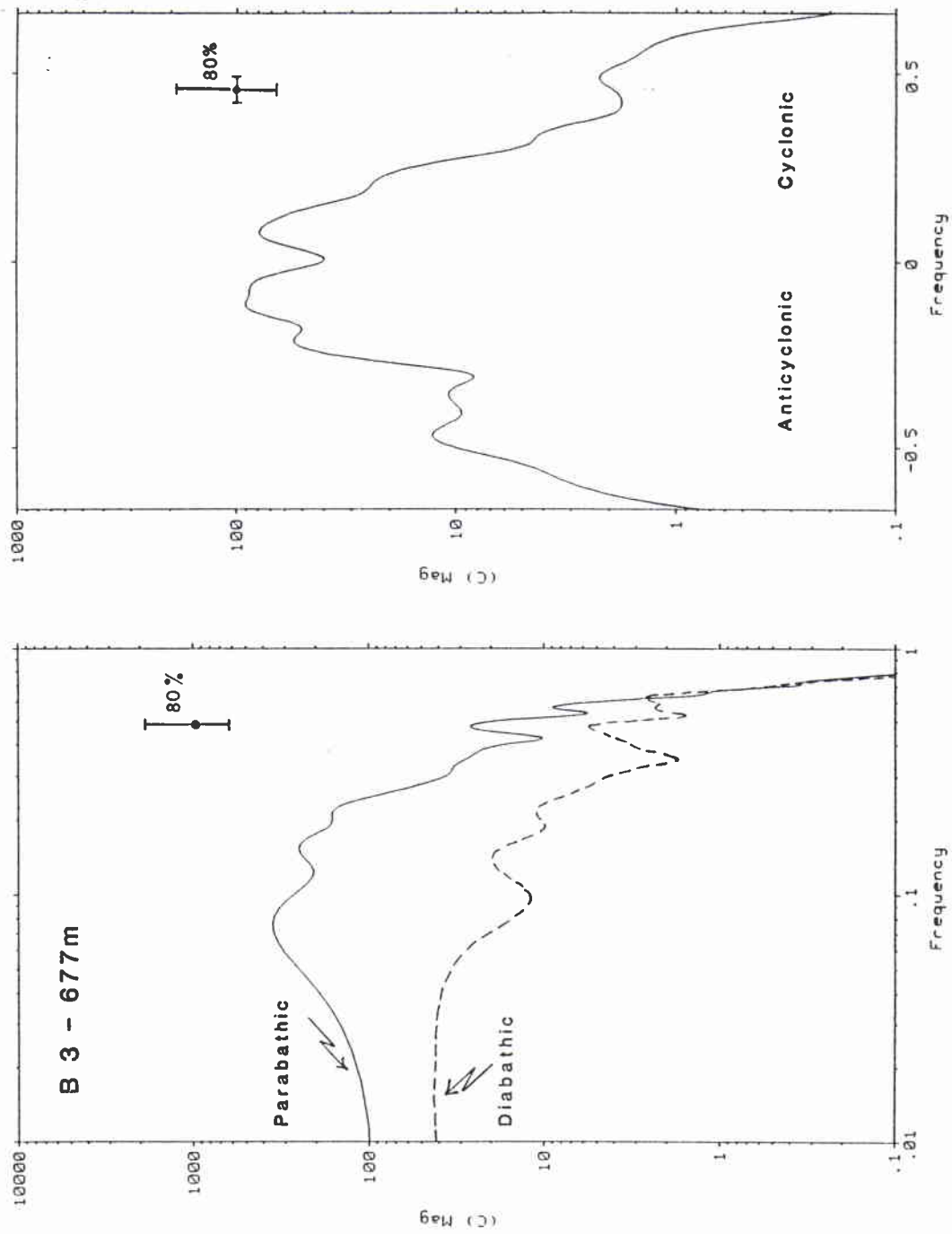


Figure G19

SACLANTCEN SM-250

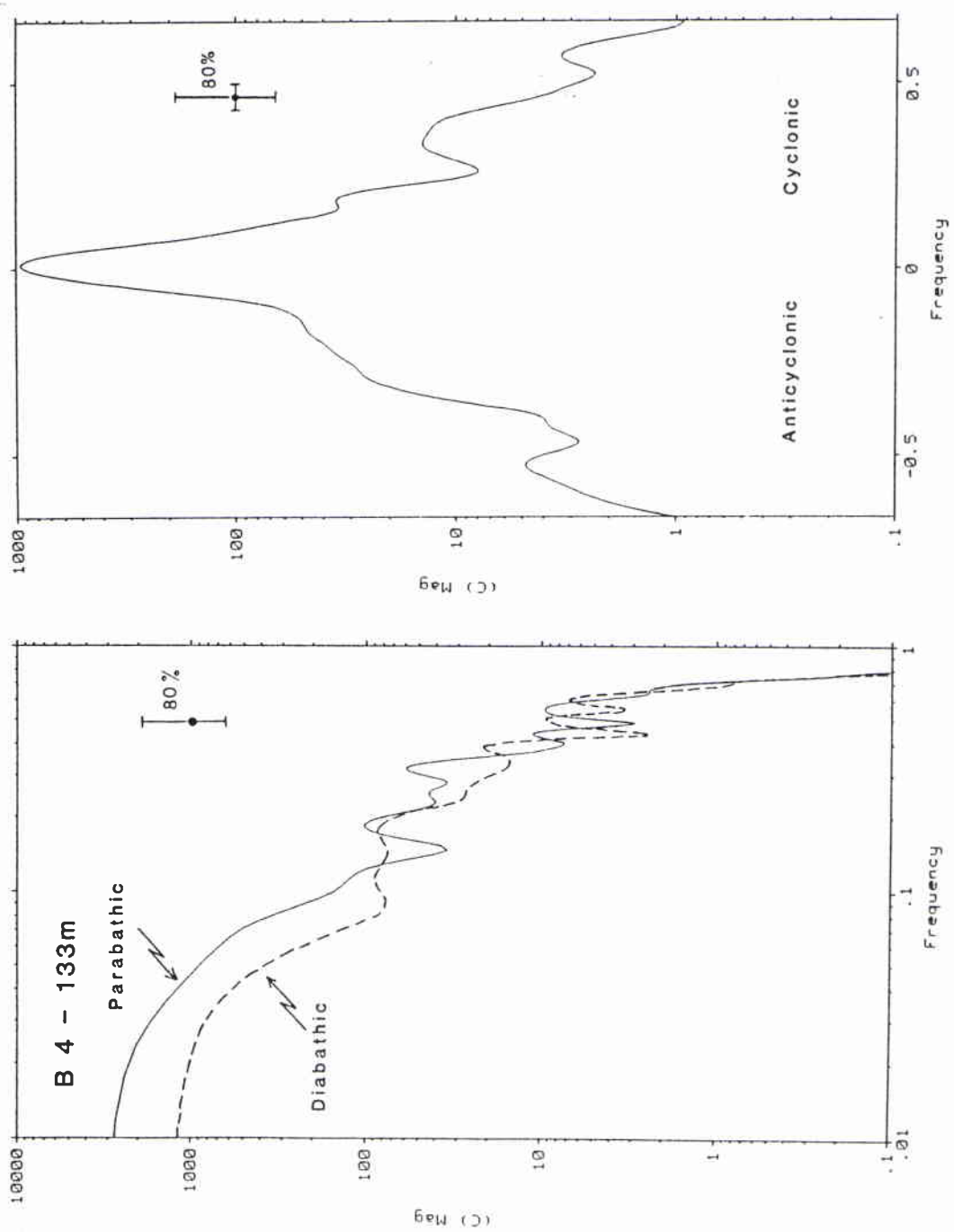


Figure G20

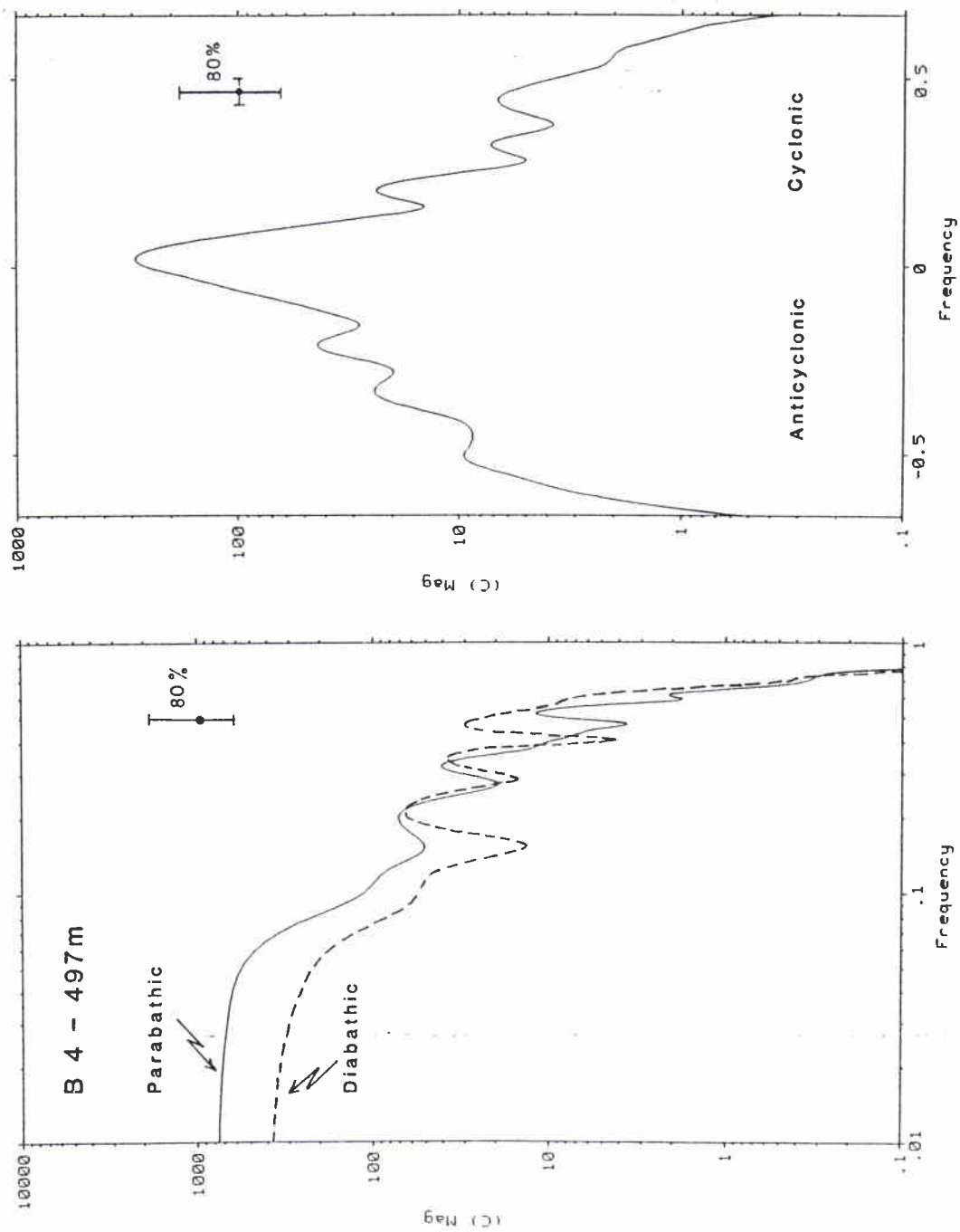


Figure G21

SACLANTCEN SM-250

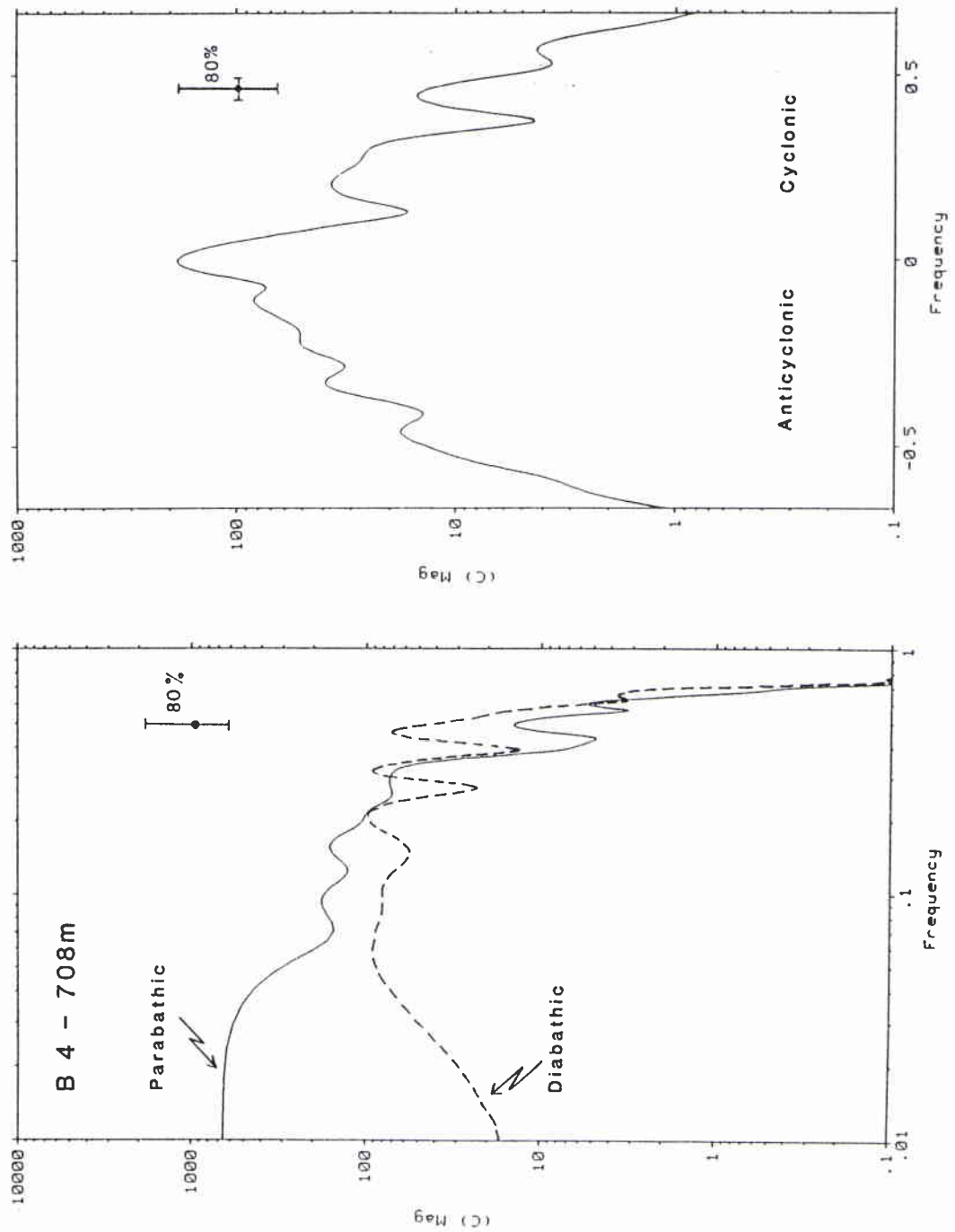


Figure G22

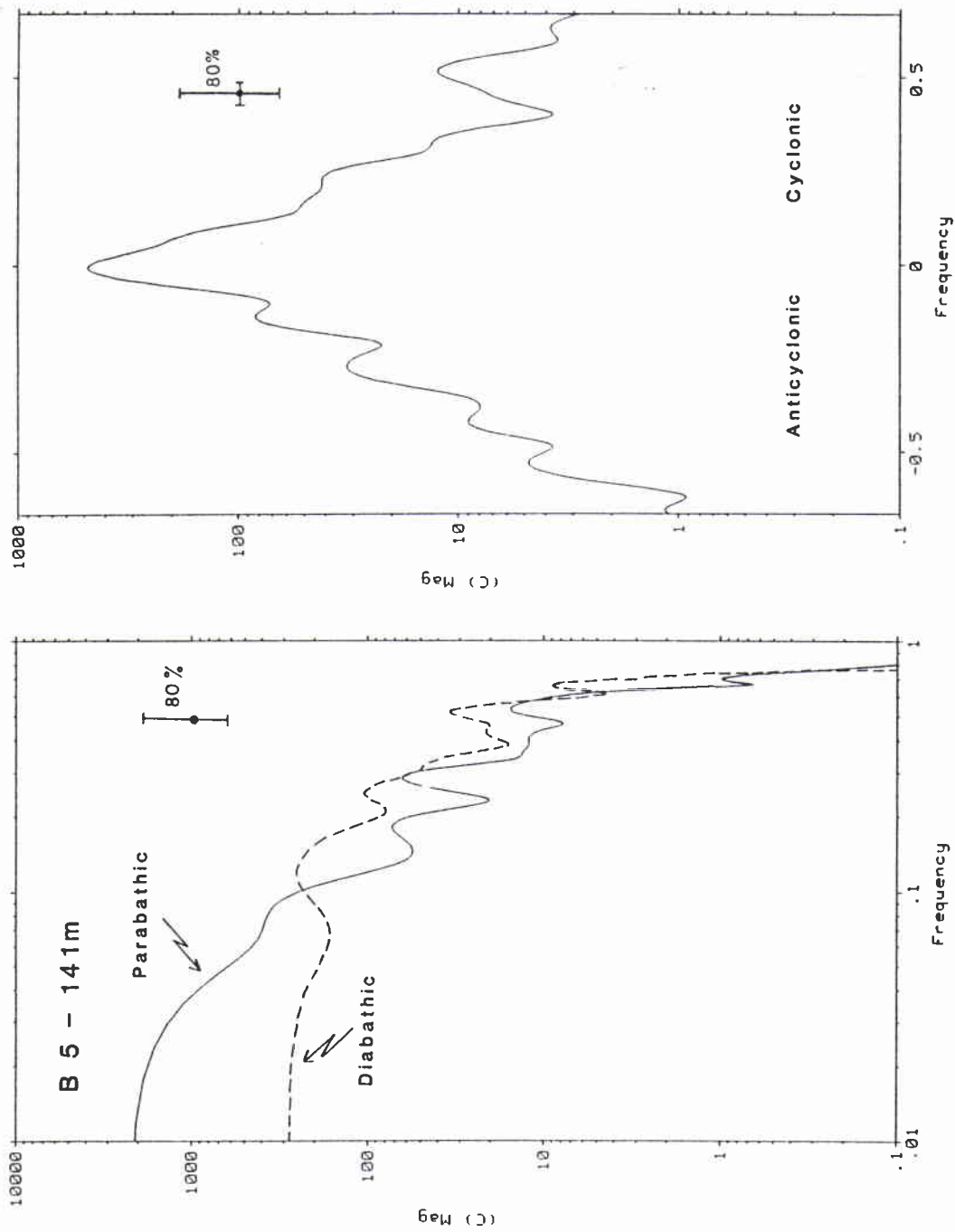


Figure G23

SACLANTCEN SM-250

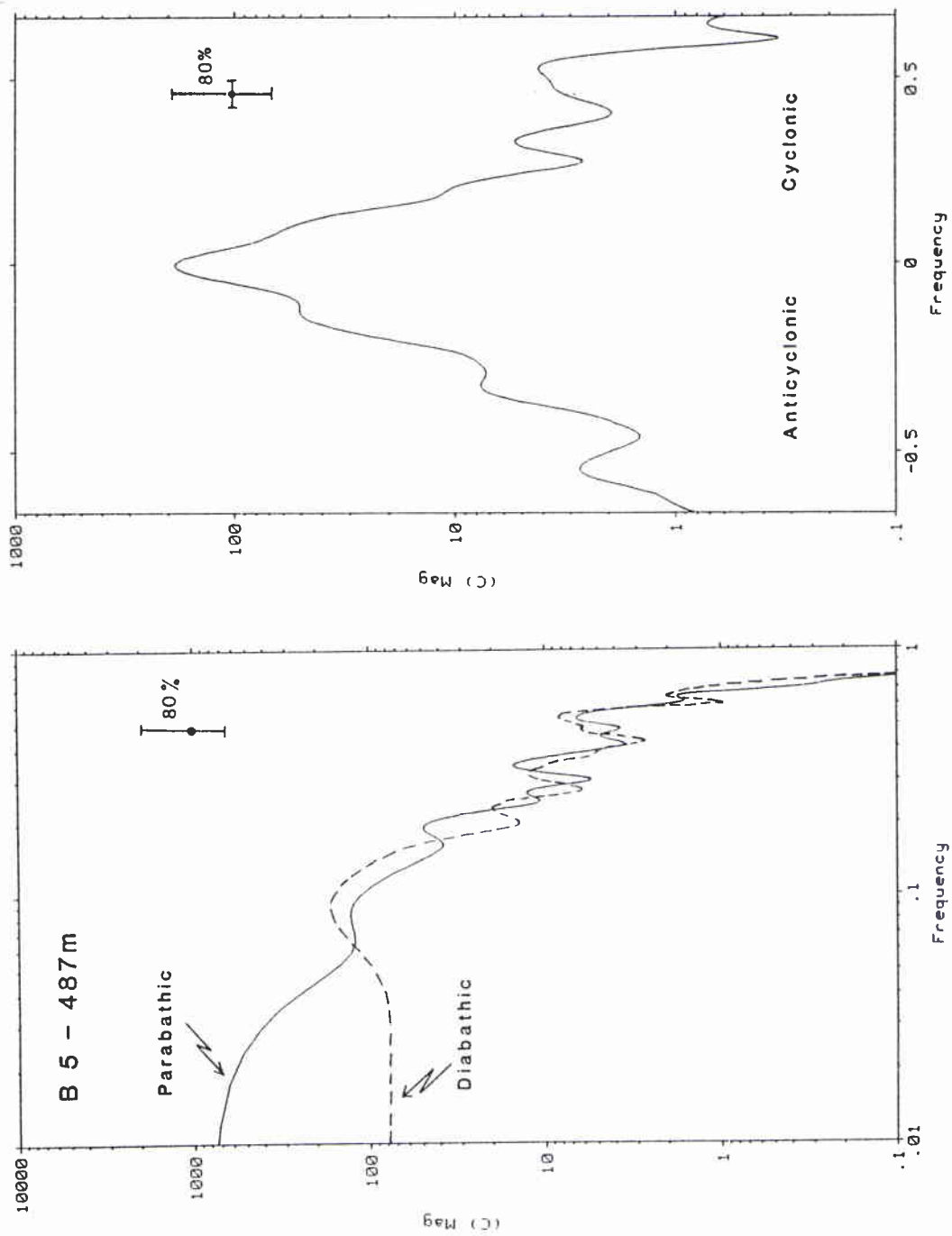


Figure G24

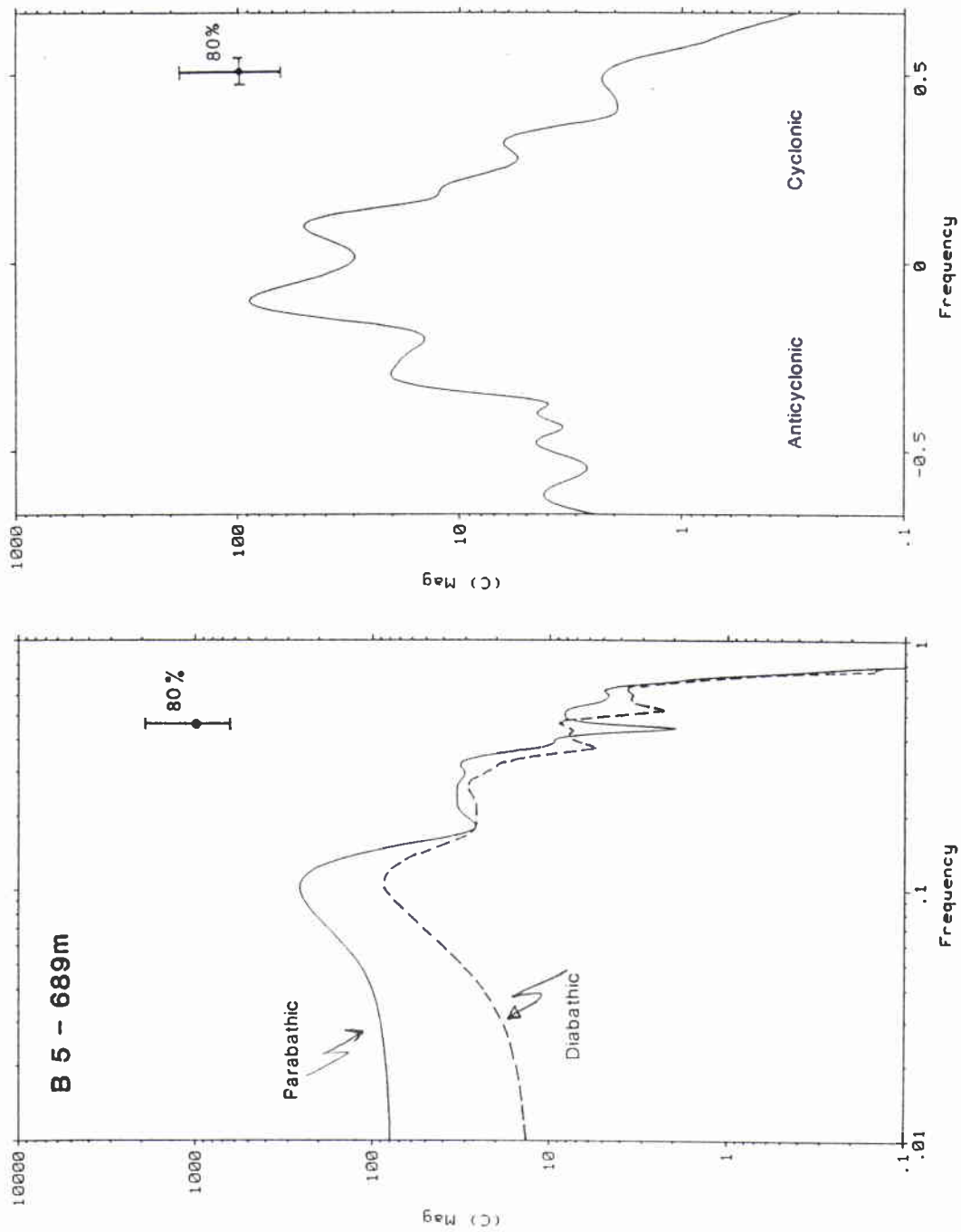


Figure G25

SACLANTCEN SM-250

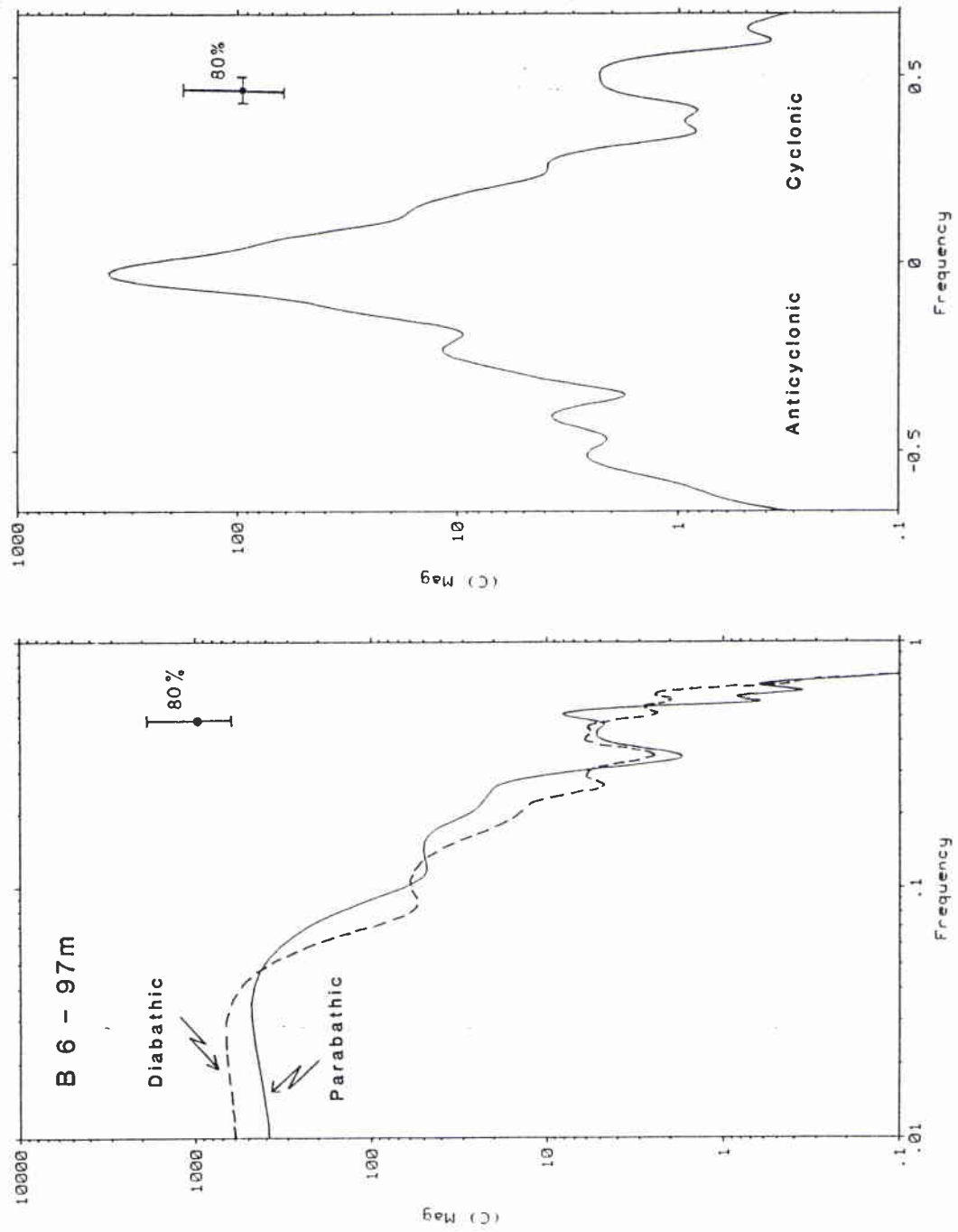


Figure G26

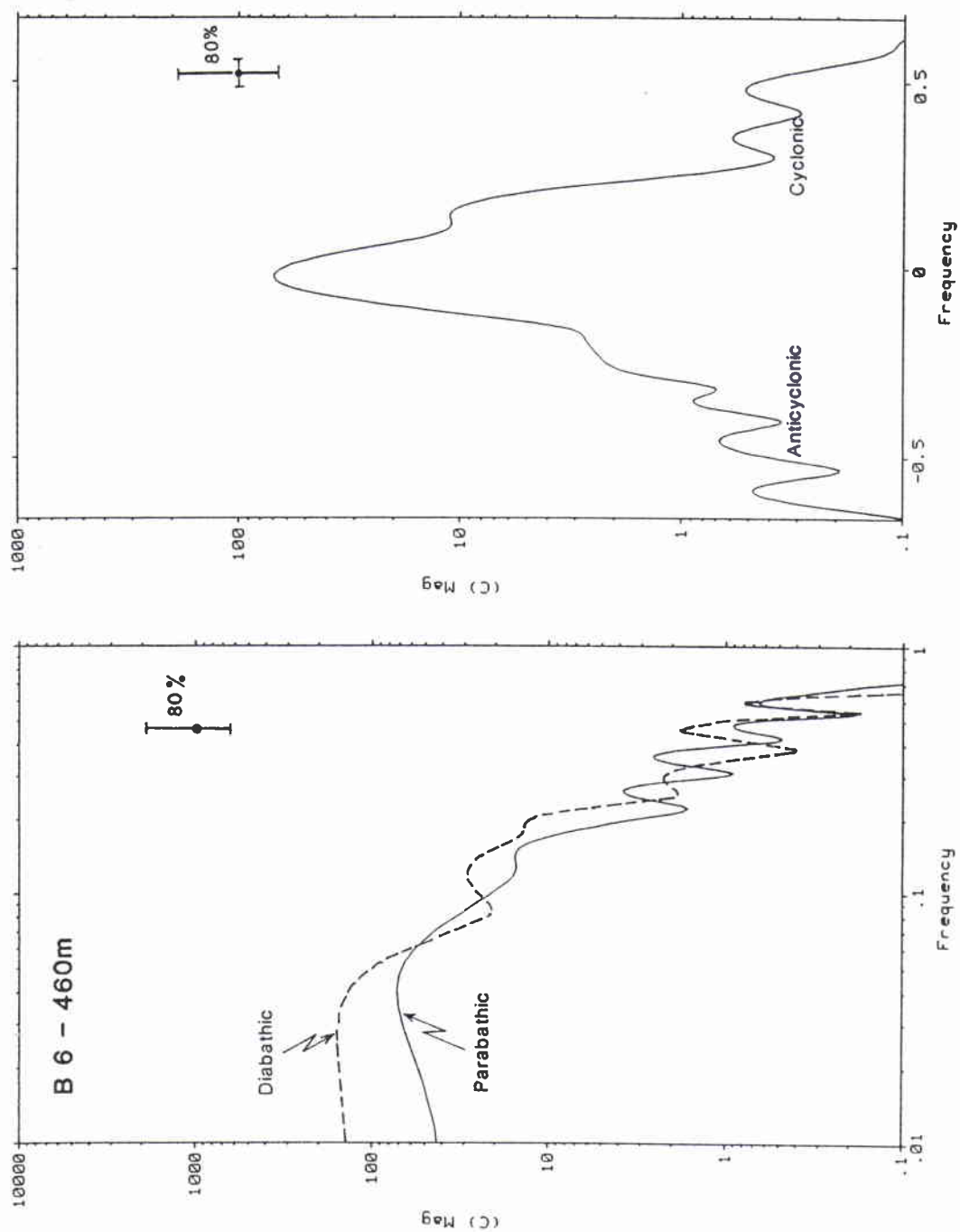


Figure G27

SACLANTCEN SM-250

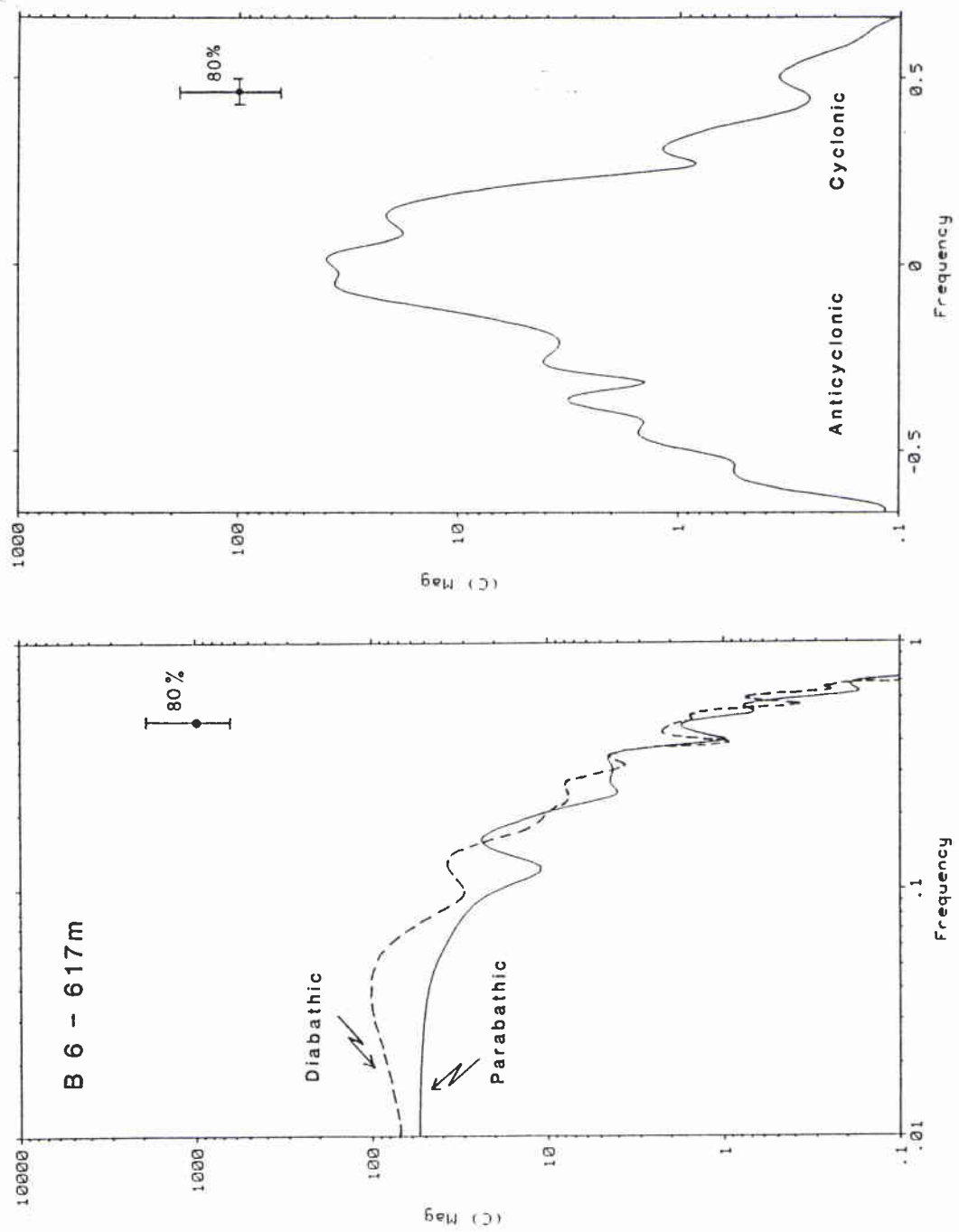


Figure G28

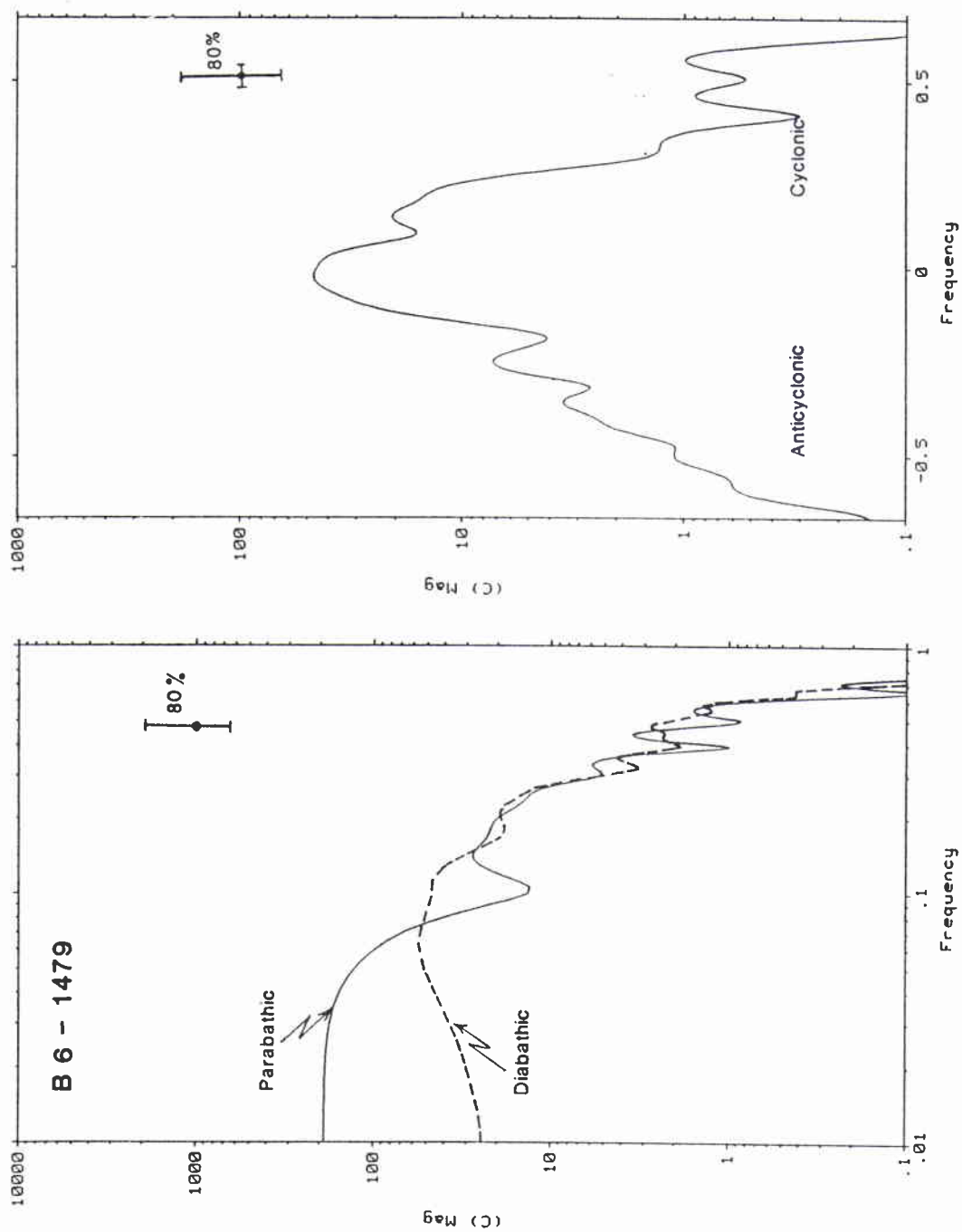


Figure G29

SACLANTCEN SM-250

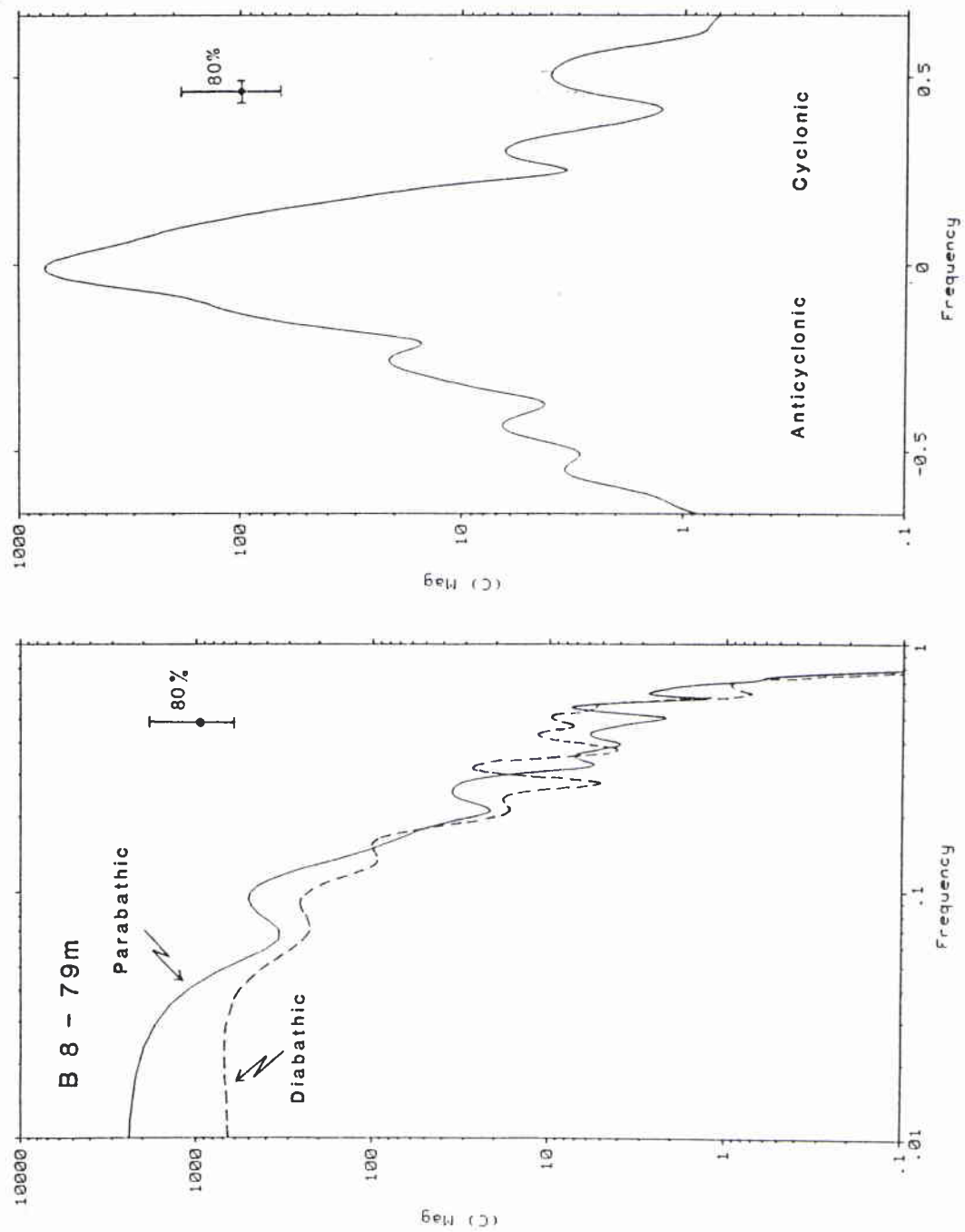


Figure G30

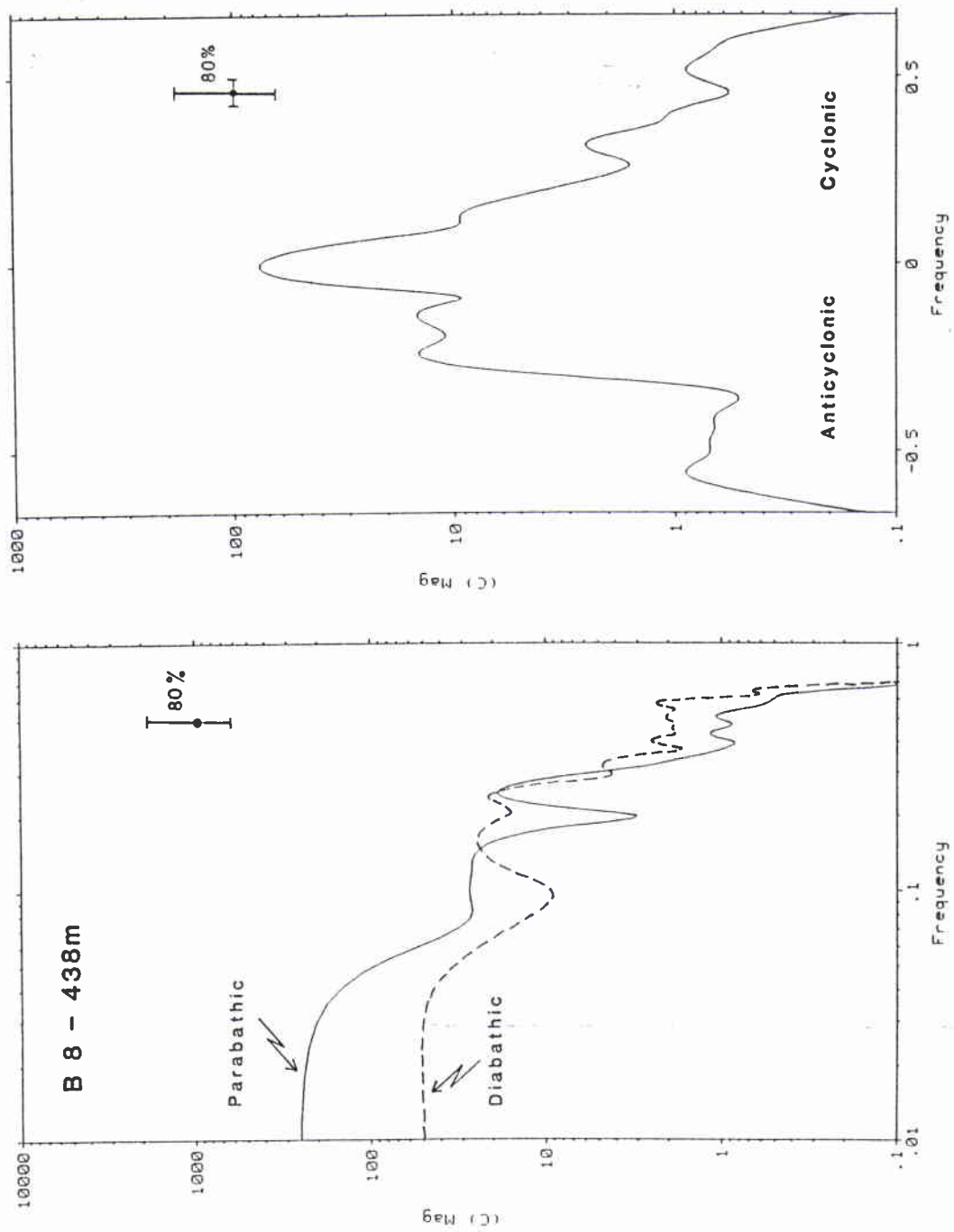


Figure G31

SACLANTCEN SM-250

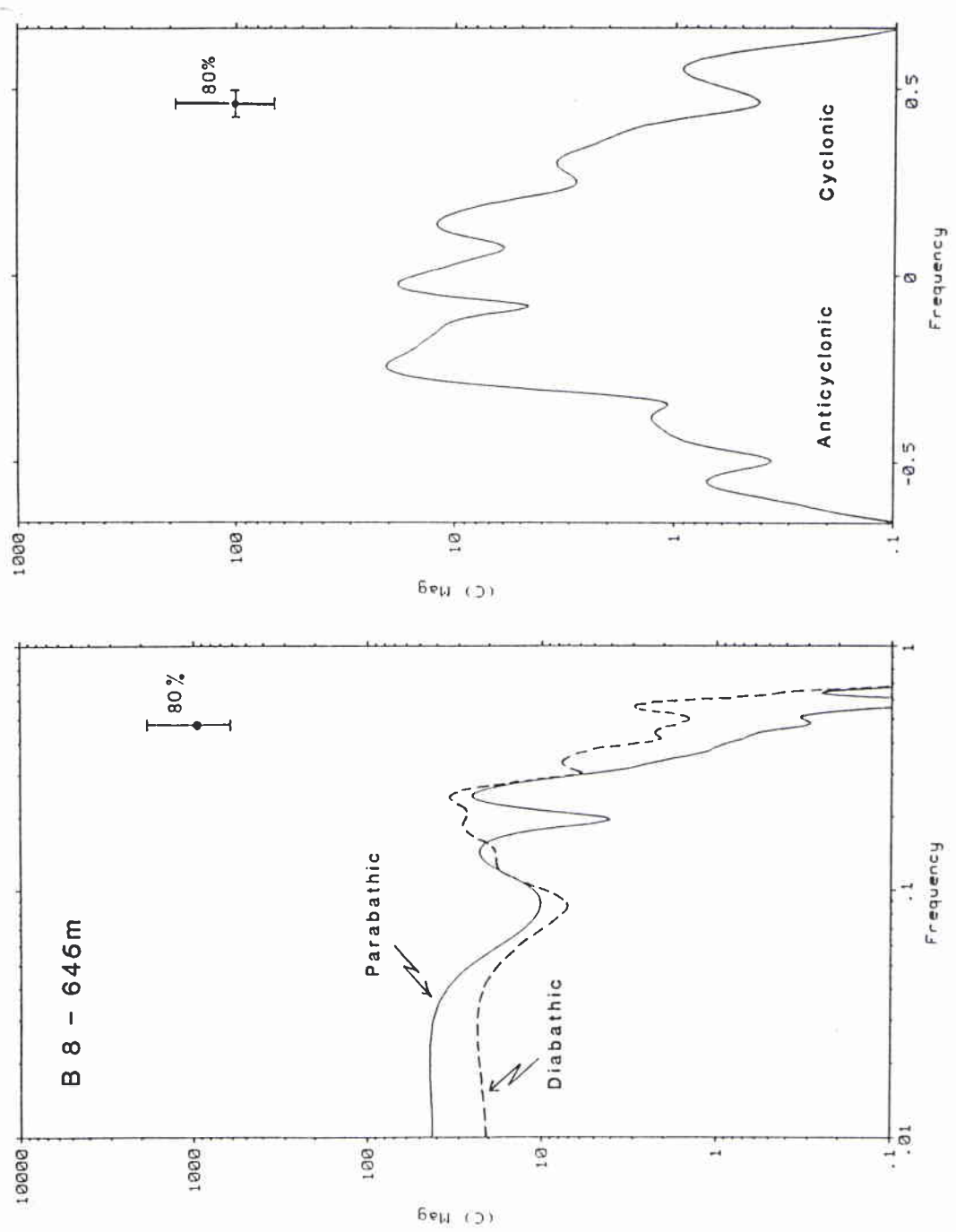


Figure G32

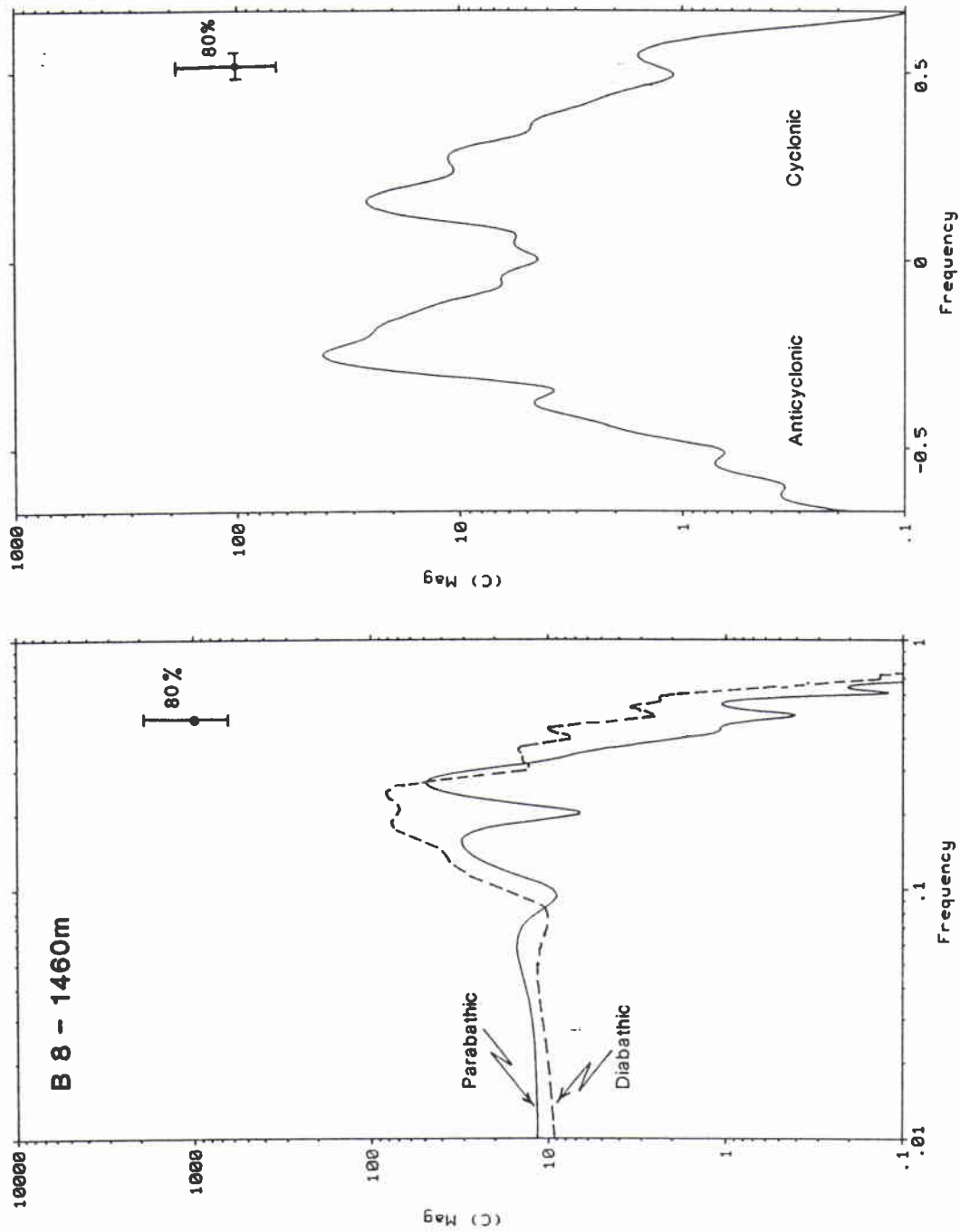


Figure G33

SACLANTCEN SM-250

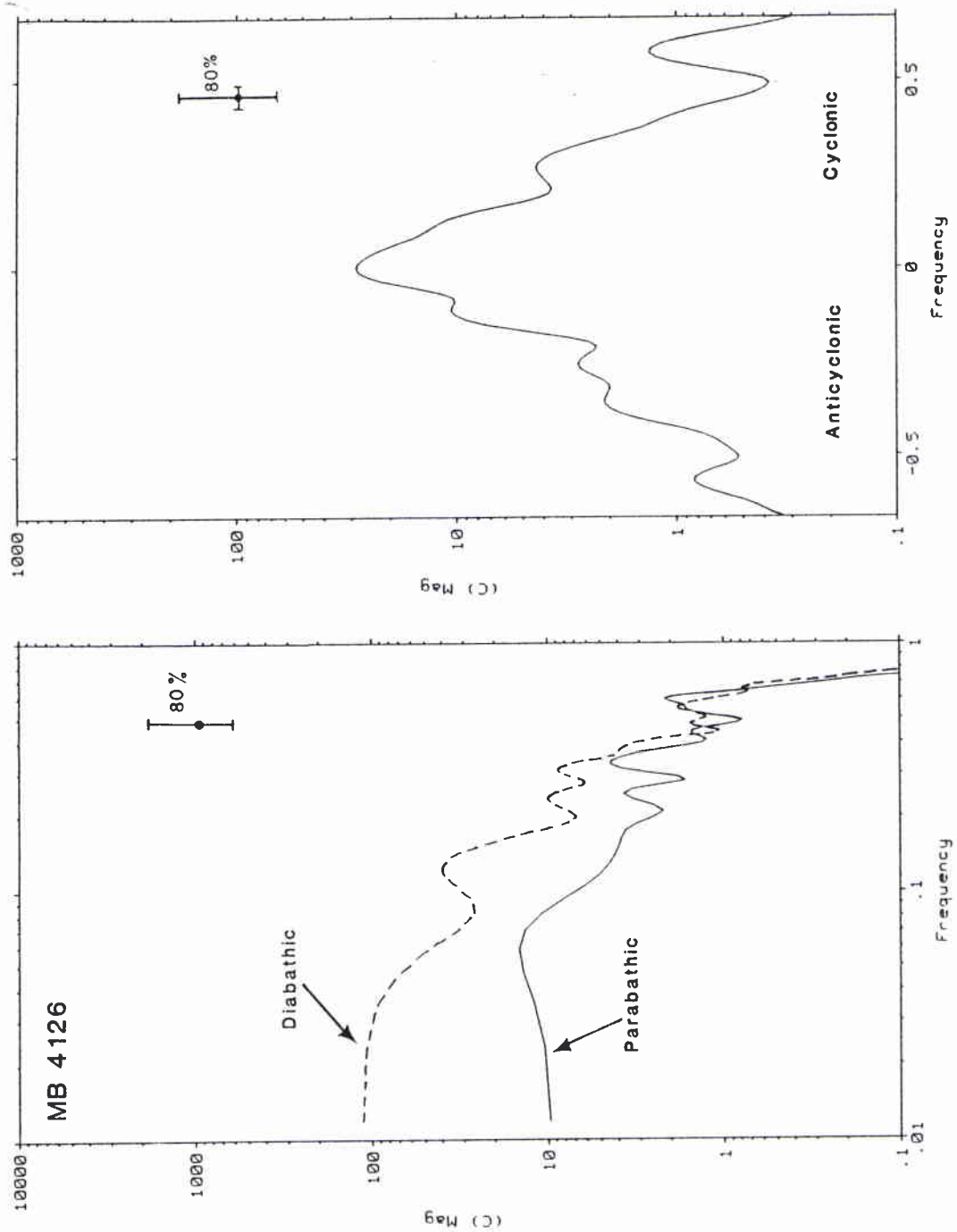


Figure G34

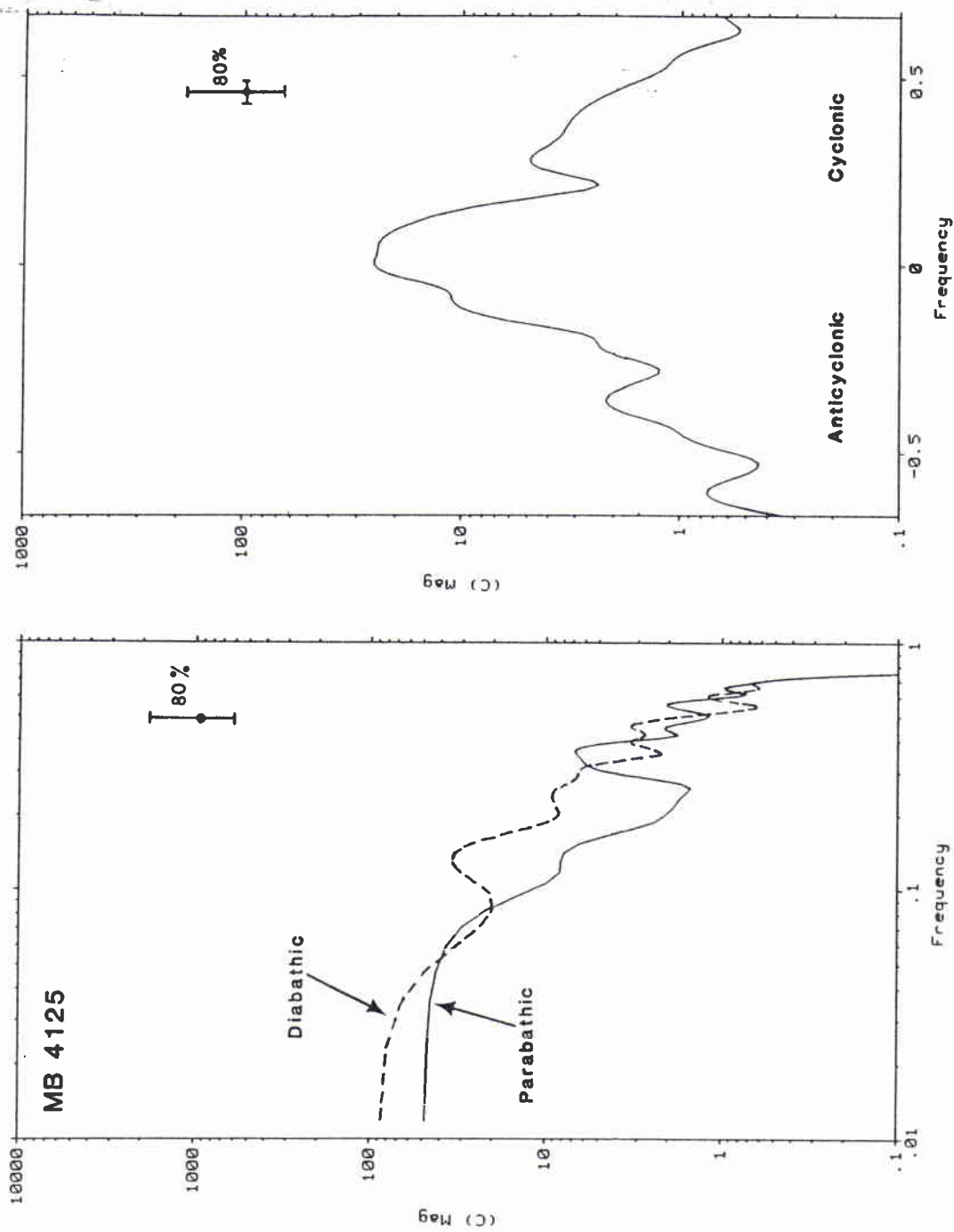


Figure G35

Initial Distribution for SM-250

SCNR for SACLANTCEN

SCNR Belgium	1
SCNR Canada	1
SCNR Denmark	1
SCNR Germany	1
SCNR Greece	1
SCNR Italy	1
SCNR Netherlands	1
SCNR Norway	1
SCNR Portugal	1
SCNR Spain	1
SCNR Turkey	1
SCNR UK	1
SCNR US	2
SECGEN Rep. SCNR	1
NAMILCOM Rep. SCNR	1

National Liaison Officers

NLO Canada	1
NLO Denmark	1
NLO Germany	1
NLO Italy	1
NLO Netherlands	1
NLO UK	1
NLO US	4
Total external distribution	26
SACLANTCEN Library	10
Stock	24
Total number of copies	60