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Woods Hole Oceanographic Institution

Southern Ocean GLOBEC Moored Array and Automated Weather Station Data Report

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Technical Report

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Approved for Distribution:

Nelson G. Hogg, Chair

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Abstract

As part of the U.S. Southern Ocean GLOBEC program, moored time series measurements of temperature, conductivity (salinity), pressure, velocity, and acoustic backscatter were made from March 2001 to March 2003 in and near Marguerite Bay, located on the Antarctic Peninsula western shelf. To monitor surface forcing during the moored array observations, two automatic weather stations (AWSs) were deployed on islands in Marguerite Bay and time series of wind, air temperature, pressure, and relative humidity were collected from May 2001 through March 2003. This report describes the individual moorings, their locations and local bathymetry, the instrumentation used and measurement depths, calibration and data processing steps taken to produce final time series, and basic plots of the final time series. The AWS data acquisition and processing are also described and basic plots of the final meteorological time series presented. Directions are given about how to access the raw and processed moored and AWS data via the SO GLOBEC website (http://globec.whoi.edu/jg/dir/globec/soglobec/).
Keywords: SO GLOBEC, Antarctica, Coastal Oceanography

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1 Introduction

The U.S. Southern Ocean (SO) GLOBEC program conducted an intensive two-year field program during 2001-2003 to investigate the central hypothesis that a unique combination of physical and biological factors contribute to the enhanced growth, reproduction, recruitment and survivorship of Antarctic krill (*Euphausia superba*) near Marguerite Bay on the west Antarctic Peninsula shelf (Figure 1). In particular, this region was thought to be especially favorable for winter survival of larval and adult krill due to: (a) a clockwise shelf circulation that retains the krill population in a favorable environment for extended periods of time; (b) an early and long-lasting ice cover that provides dependable food and protection for larval krill to grow and survive over winter; and (c) on-shelf intrusions of warm, salty, nutrient-rich Upper Circumpolar Deep Water which affects hydrographic and ice properties and enhances biological production (Hofmann et al., 2004).

As part of the SO GLOBEC field program, the Woods Hole Oceanographic Institution (WHOI) deployed an array of instrumented subsurface moorings near Marguerite Bay during March 2001-March 2002 and a second array during March 2002-March 2003 (Figure 1). The moored measurements included pressure, temperature, conductivity, velocity, acoustic backscatter, and ice thickness. The primary goals of this effort were to measure the temporal and spatial variability of currents and physical and biological water properties in the study area on time scales from hours to seasonal, improve our description and understanding of the regional general circulation, and identify and describe those physical processes that make this region well suited for krill production and survival. At the start of the SO GLOBEC program, very little was known about the regional circulation and physical regime, and the only direct current data available were several drifter tracks from 1979 and some more recent shipboard ADCP observations. The WHOI moored array measurements presented here are the first long-term in-situ data collected in this region.

To help interpret the moored array data and monitor the surface forcing during the SO GLOBEC field program, Raytheon Polar Services Corporation (RPSC) technicians and WHOI investigators deployed Automatic Weather Stations (AWSs) on Kirkwood and Dismal Islands, located near the center of Marguerite Bay (Figure 1). The two self-contained AWSs, provided by the University of Wisconsin Antarctic Automatic Weather Station Project (AWSP), transmitted vector-averaged wind speed and direction, air temperature, relative humidity and barometric pressure data back to AWSP via ARGOS, where the raw data were decoded and sent to WHOI for final processing. The two AWSs were deployed in May 2001 and produced high-quality data through March 2003, with only a few short periods of zero wind speed or constant wind direction thought due to anemometer icing. The AWS data are self-consistent, and compare favorably with that from the British research station Rothera located on the southeastern side of Adelaide Island (Figure 1), except for wind speed and direction at Rothera which differ strongly from the AWS winds due to the rugged coastal topography around Rothera.

This report describes the SO GLOBEC moored array and AWS deployments and presents a summary of the final moored array and AWS data sets. The report is organized as follows: Section 2.1 is a description of the moored array and AWSs and their locations in the study area; Section 2.2 summarizes the processing done to the data organized by deployment site; Section 3 summarizes the AWS data. Finally, section 4 shows, for each site, a table with basic statistics for each mooring and plots of the final, hourly averaged data sets.

The basic hourly moored array and AWS data are available at the SO GLOBEC Data System at http://globec.whoi.edu/jg/dir/globec/soglobec/. Links and instructions are also provided to obtain the raw data and processing codes used to obtain the final data sets.

2 WHOI Moored Array

2.1 Description

The WHOI SO GLOBEC mooring locations are shown in Figure 1. The 2001-2002 array consisted of one transect (the "A-line") of three moorings (A1-A3) deployed across the shelf west of Adelaide Island and a second transect (the "B-line") of three moorings (B1-B3) deployed west of the mouth of Marguerite Bay. The 2002-2003 array consisted of a L-shaped transect (the "C-line") of three moorings (C1-C3) deployed slightly inshore of the B-line.

Prior hydrographic survey data and dynamic topography (Smith et al., 1999) suggested the presence of a surface-intensified flow of fresher (lighter) water southward along the west coast of Adelaide Island in austral summer/fall and flow towards the northeast along the outer shelf, thus forming a clockwise gyre over the shelf north of Marguerite Bay. The A-line was designed to investigate this flow pattern, with A1 in the coastal southwestward flow and A3 on the outer shelf in the northeastward flow. A2 was located between A1 and A2 on the eastern side of Marguerite Trough, where deep intrusions of Upper Circumpolar Deep Water (UCDW) were thought to occur. The B-line was deployed across Marguerite Basin, with B1 and B3 on the east and west flanks and B2 in the center. This line was designed to look for clockwise flow around the basin, the southward continuation of the surface coastal current towards the mouth of Marguerite Bay, and the filling and flushing of the deepest part of the basin. Based in part on the preliminary results of surface drifters deployed during 2001 austral summer/fall plus a desire to learn more about flow and water properties within the mouth of Marguerite Bay, the C-line array was set across Marguerite Trough, with C1 and C2 aligned with the mouth of the Bay and C2 and C3 on the east and west sides of the Trough. The C3 was deployed at the B2 site to provide a two-year data set at this central location.

The moorings were originally designed to measure the following physical variables at common depths: (a) temperature at 50, 100, 150, 200, 250, 400 m and close to the bottom using SeaBird (SBE) temperature sensors; (b) conductivity (salinity) at 50, 100, 250, and 400 m using SBE conductivity sensors; and (c) currents at 250 and 400 m using Vector Averaging Current Meters (VACMs). To obtain vertical profiles of currents and acoustic back-scatter intensity in the upper water column where krill are commonly found (Lascara et al., 1999), 300-kHz broadband RDI Acoustic Doppler Current Profilers (ADCPs) would be deployed at 100 m on all moorings except the B2/C3 moorings which would feature a 150-kHz broadband RD Instruments (RDI) ADCP moored at 250 m. These design depths were chosen based on regional mean profiles of T and S (Figure 2), the desire to better sample the upper water column, the idea from hydrography that the deeper flow would be more barotropic, and the instrumentation and mooring resources available.

Additional temperature and conductivity sensors would be deployed to improve vertical resolution through the pycnocline at A3 and B2 where internal tides and waves may be strong. At most moorings, SBE Paroscientific bottom pressure gauges would be deployed to obtain across- and along-shelf measurements of the pressure field. This bottom array would capture the surface tide and shelf-scale wind-driven response, plus with the co-located water column density measurements, allow investigation of the internal pressure field.

Two approaches were used to observe the seasonal ice cover. The moored ADCPs were configured to enable estimation of ice presence and ice draft (Hyatt et al., 2005), and two ASL Environmental Sciences ice-profiling sonars (IPSs) were deployed at the top of the A2 and B3 moorings to measure ice thickness with high-resolution.

The basic mooring design at each site was based on the key assumption that only shallow icebergs (<50m deep) traverse the mooring sites. There was very little quantitative information on icebergs in the study area prior to 2001, but anecdotal information (E. Hofmann, personal communication) suggested that this assumption was reasonable. For this reason, the top instrument on each mooring was located near 50 m and two primary flotation spheres were used, one near the top of the mooring and one just above the 250-m instrument. Each sphere had sufficient buoyancy to lift the entire mooring, so that if the top sphere became flooded, the lower sphere would continue to support the rest of the mooring below it. The top sphere was equipped with an ARGOS transmitter and light to facilitate location and recovery if the mooring surfaced prematurely. The weak anticipated depth-averaged currents (<25 cm/s) and overall shortness of the mooring allowed 1/4" jacketed wire rope to be used without a significant penalty in mooring performance (e.g., lift, drag, tilt).

The A- and B-line moorings were deployed on the RVS *L.M. Gould* SO GLOBEC mooring cruise LMG01-03 (Limeburner et al., 2001) . At each mooring site, a bottom survey was conducted using the ship's Knudsen fathometer to map the local bathymetry and identify a position that matched the design depth for that mooring. This survey was facilitated using a MATLAB program that updated, every 1 min during the survey, a plot showing the ship's GPS position, its track, and a contour map of the depth measured along the ship's track. Once a suitable position was selected, the mooring was deployed and a CTD profile taken using the ship's SBE 911 Plus CTD for later use in checking the calibrations of the moored temperature and conductivity sensors.

The A- and B-line recovery and C-line deployment were conducted on RVS *L.M. Gould* SO GLOBEC mooring cruise LMG02-1A (Beardsley et al., 2002). A CTD cast was made before each mooring recovery for later use in checking temperature and conductivity sensor performance and drift. The three A-line moorings were successfully recovered with very little biofowling and no apparent damage. The two southernmost moorings B2 and B3 were recovered in patchy ice, with damage to the upper instruments due to passing icebergs. The B1 mooring was lost with no trace. An extensive acoustic search was conducted to locate the acoustic release and dragging was done at the mooring deployment site with no luck. The recovered instruments were quickly cleaned on deck and the data downloaded to determine which instruments had worked successfully for the entire deployment. Some of these instruments were then refurbished, equipped with new batteries and antifowling material, and prepared for redeployment in the C moorings. After bottom surveys at each site, the three C moorings were successfully deployed and CTD profiles taken.

The C-line array was recovered on RVS *L.M. Gould* SO GLOBEC mooring cruise LMG03-02 (Beardsley et al., 2003) . At each site, a CTD profile was obtained before mooring recovery. The C2 and C3 moorings were recovered first and showed no apparent damage. The C1 mooring acoustic release would not release, so a drag line was set and pulled around the mooring, cutting the mooring line near the bottom on the first pass. Subsequent dragging for the rest of C1 was unsuccessful, so the acoustic release was left disabled.

Since much of the study area was uncharted prior to 2001, the SO GLOBEC program collected as much multibeam bathymetric data as possible during the field program using the RVIB *N.B. Palmer* SeaBeam swath mapping system. These data were then merged with other available digital along-track and multibeam data to create a high-resolution digital bathymetric data set for the study area (Bolmer et al., 2004). Given the rugged bottom relief and the coarse resolution of the pre-deployment surveys made at each WHOI mooring site, high-resolution SeaBeam surveys were conducted around these sites after the moorings were deployed. The site maps presented in this report are based on the composite digital bathymetric data set. At each mooring site, the bottom depth varied by 10s of meters on short horizontal scales. In order to determine the final bottom and instrument depth, a combination of multibeam bottom depth, ADCP depth based on surface acoustic reflection range, pressure measurements made with the IPSs, some inline VACM and SBE instruments, and the SBE bottom pressure gauges together with the known mooring configuration were used. The final position, bottom depth and deployment and recovery times for each mooring are listed in Table 1. The basic instrumentation used in the mooring array is listed in Table 2

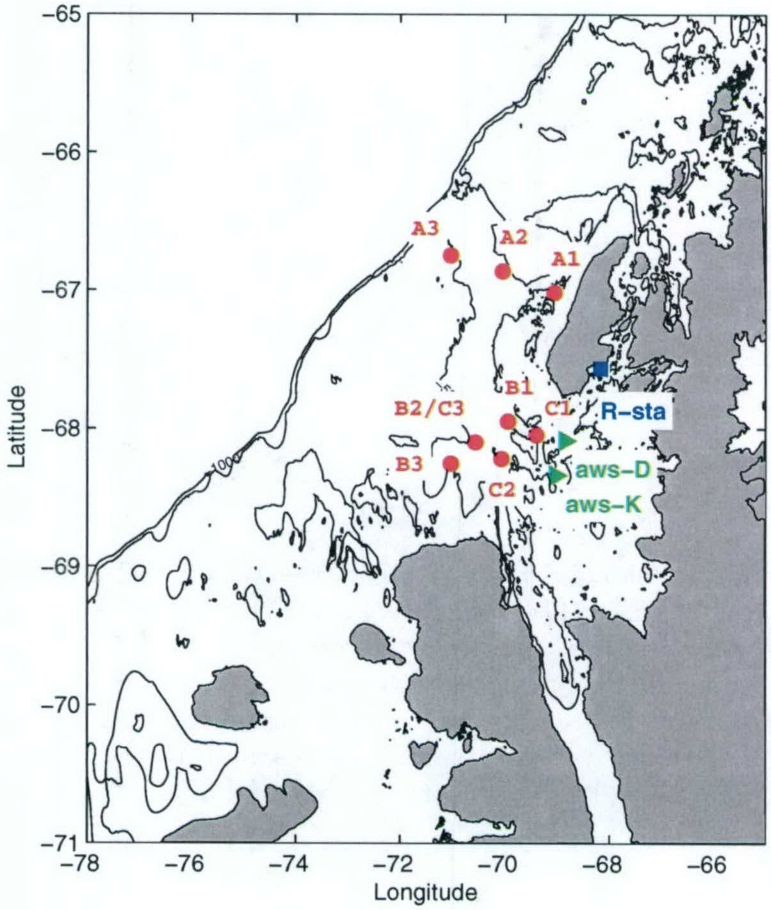

Figure 1: Map of the western Antarctic Peninsula shelf region showing the locations of the WHOI SO GLOBEC moored arrays and the AMRC Automated Weather Stations. The A- and B-line moorings were deployed during 2001/02 and the C-line moorings was deployed during 2002/03. B1, shown in the figure, was not recovered. The two AWSs at Dismal Island (D-aws) and Kirkwood Island (K-aws) were deployed in 2001. Also shown in the figure is the location of Rothera station (R-sta) of the British Antarctic Survey.

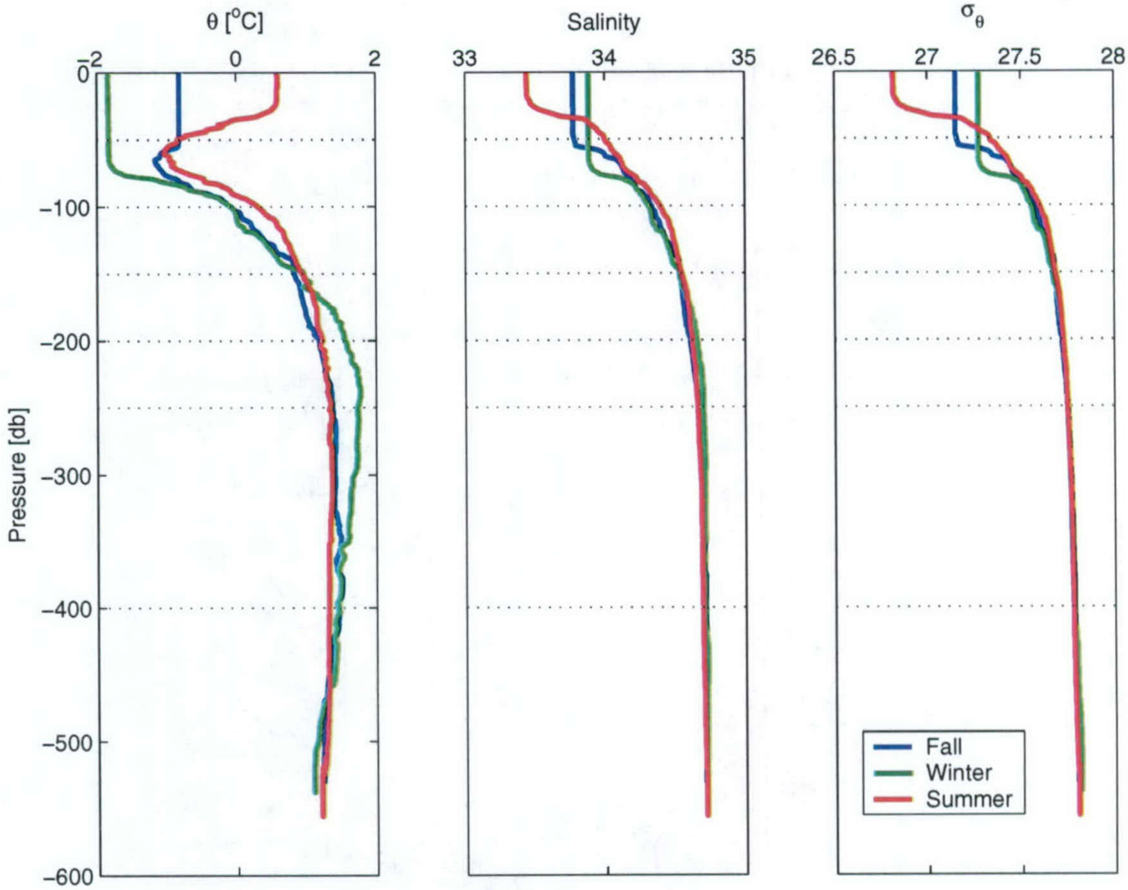

Figure 2: Vertical Profiles of potential temperature, salinity and potential density obtained during 2001 and early 2002. The CTD profiles were taken near the A2 mooring during fall (blue), winter (green) and summer (red). At these cold temperatures, density is determined primarily by salinity. Note the cooling and increase in salinity and density of the surface 50 m from summer to fall/winter; the deep winter surface mixed layer; the summer and fall temperature minimum layer at 80/100 m, the remnant of last winter's mixed layer; the permanent pycnocline (120 to 150 m); and the deeper UCDW. The dotted lines indicate the design measurement depths in the moored array.

2.2 Data Processing

Processing of the moored current, temperature, conductivity and pressure time series data included checking for clock errors, application of post-deployment calibrations when available, and removal of trends and/or outliers in the data when present. For some records, comparison with the CTD profiles taken during the mooring deployment and recovery, and with other instruments in the mooring line led to the application of small constant offsets, mostly in the conductivity data.

In some of the SBE MicroCat records, a considerable reduction in the noise in the salinity calculation was achieved by displacing the conductivity and temperature records by 1 sample record interval (dt = 150 or 300 s). This suggests that the conductivity cells were not being flushed properly due to the very slow flows in the area (around 5 cm/s on average). Therefore, this correction was applied when it caused a noticeable reduction in the salinity time series noise.

Table 1: WHOI SO GLOBEC Mooring Locations

Mooring	Latitude	Longitude	Bottom Depth	Deployment	Recovery
A1	67°01.134'	69°01.217'	509	3/26/01	2/13/02
A2	66°51.883'	70°00.683'	561	3/30/01	2/13/02
A3	66°45.002'	70°59.991'	480	3/31/01	2/13/02
B1	67°56.890'	69°54.398'	444	3/30/01	Not Recovered
B2	68°06.091'	70°31.675'	811	3/29/01	2/14/02
B3	68°15.345'	70°59.853'	447	3/29/01	2/14/02
C1	68°02.940'	69°21.790'	432	2/18/02	2/22/03
C2	68°13.331'	70°01.730'	859	2/19/02	2/26/03
C3	68°06.006'	70°31.799'	806	2/21/02	2/26/03

Table 2: Instruments used in the moorings. The acronyms listed in the second column are used throughout the rest of this report and in the data files used to store the data. The physical variables are T = Temperature; C = Conductivity; P = Pressure; UV = Horizontal velocity; W = Vertical velocity; B = Backscatter intensity; and I = Ice draft.

Type	Acronym	Variables	Sample Rate (s)
RDI ADCP (WorkHorse)	WH	UV, W, B	1800
RDI ADCP (BroadBand)	BB	UV, W, B	3600
ALS Ice Profiler	IP	I	50
SBE MicroCat	MC	T, C	150 †
SBE SeaCat	SC	T,C,P	900
SBE TempRecorder	TR	T	225
VACM	VA	UV, T, P‡,C‡	900
SBE SeaGauge	SG	P, T, P	300

† Except A1 at 309m and A3 at 250. Both sampled at 300s

‡ Only when indicated

After initial processing, the time stamp (i.e., the time associated with each variable value) was set to be centered on the center of the time period over which that variable was measured. This step was necessary because to save memory, many instruments record just one time stamp even if more that one variable is measured during the record interval. Figure 3 describes graphically the problem for the SeaGauge and VACM. The ADCP velocity is recorded as the pressure of the SeaGauge, so it also needs to be centered.

After creating the correct centered time stamp for the individual current, temperature, conductivity and pressure time series, hourly-averaged time series were created for each variable using a common time stamp starting at 00 GMT. Thus, the value of any variable at say 12 GMT is the average of data collected between 11:30 and 12:30 GMT. The final hourly-averaged time series for all measurements made at a mooring site were then stored in a single MATLAB .mat file for that mooring for subsequent data analysis, presentation in this report, and public distribution as explained in section 5. Due to their size, the final basic time series for these variables are not posted on the web with the hourly time series, however, the basic records are freely available from the SO GLOBEC website.

The Ice Profiling Sonars (IPSs) deployed at the top of A2 and B2 measured the acoustic range to the surface (the sea surface or ice bottom when present) every 2 secs and water temperature, pressure, and x- and y-tilt every 120 secs. The raw data were first edited, then the vertical distance from the IPS to the surface reflector computed every 120 sec by subtracting the height of the water column above the IPS from the tilt-corrected acoustic range. The water column height was computed by dividing the measured pressure minus the surface barometric pressure by the in-situ density (determined using the closest MicroCat or SeaCat temperature and conductivity data)

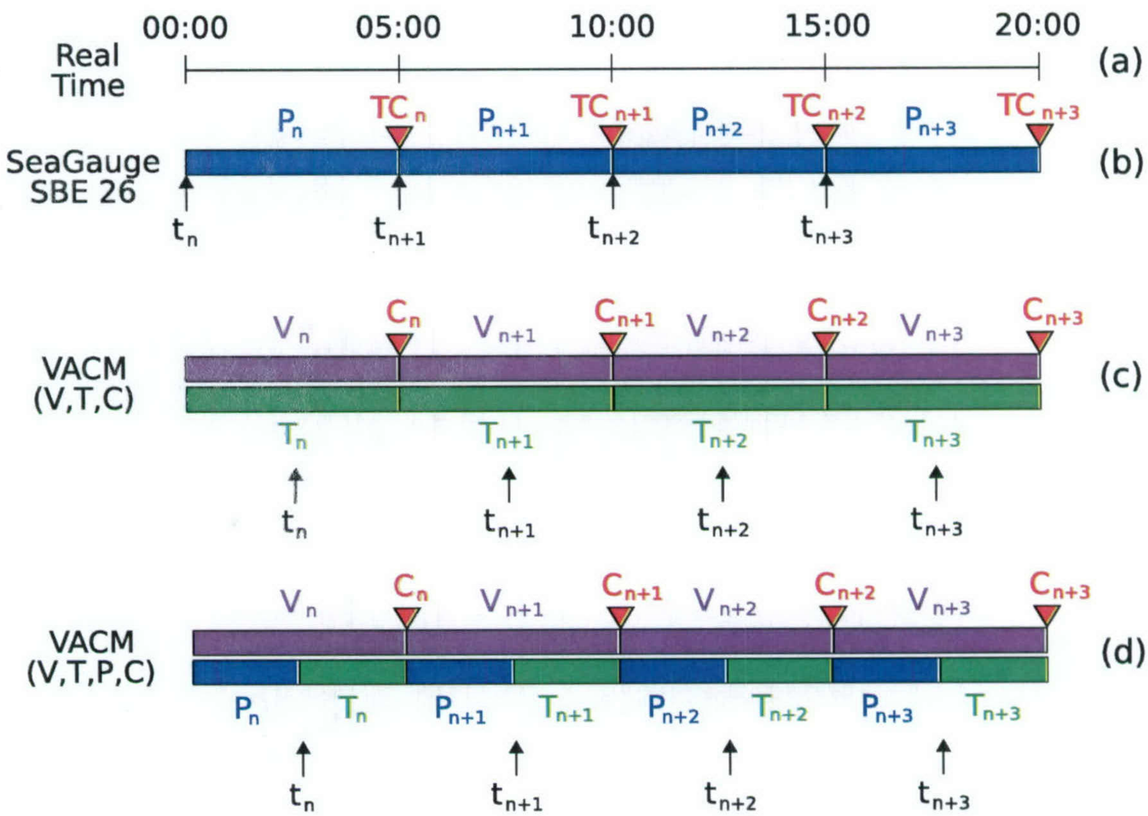

Figure 3: The figure illustrates the way the SBE 26/26plus and VACM stores data in memory. Panel (a) shows a time base for a sampling interval of five minutes. The SeaGauge (panel b) stores the pressure (P), the temperature (T) and the conductivity (C) of the nth measurement with time stamp t_n. All the variables need to be corrected if the time stamp is to be centered. Panel (c) shows the output for the VACM, where the velocity (V) is always stored with the correct time stamp, and so is the temperature (T) when there's no pressure (P) measurement. If pressure is measured (panel d), both the pressure and the temperature time stamp need to be corrected. The optional conductivity (C) measurement of the VACM always needs to have its time stamp corrected.

times gravity. The surface barometric time series was constructed using linear interpolation and the British Antarctic Survey station Rothera 3-hr surface pressure time series. Both the 120-sec time series and hourly averaged time series are presented here.

The data processing and quality analysis are summarized next. For each mooring, a diagram of the mooring as deployed with final instrument depths is presented, followed by a table and notes that list for each instrument, the serial number, variables measured, depth and processing steps including the applied post-deployment calibrations as obtained from SeaBird as well as corrections to drifts in the clock of the instrument. Other offsets or corrections made to the data are described in individual notes for each instrument. Most of the measured clock drifts were within manufacturer's specifications. As mentioned above, the final instrument depths given here are based on the mooring design, the moored pressure measurements and ADCP and IPS distances to the surface, atmospheric pressure, and the high-resolution multibeam bottom survey and other digital data collected at each mooring site, which is shown next for each mooring site.

2.2.1 A1 Mooring

The A1 mooring design depth was 450 m, but the deployed mooring depth was 509 m, about 59-m deeper than the design. The pre-deployment A1 mooring site survey showed the local bathymetry to be highly variable. A target deployment location was chosen and the mooring was deployed anchor last as the ship arrived at the target location. Comparison of two A1 pressure sensors showed that after the mooring settled, the bottom depth was 509 m. Later SeaBeam bathymetry data showed a 200-m by 600-m hole deeper than 500 m within 200 m of the target drop point, so the deeper 509-m bottom depth is considered correct. The corrected mooring design is shown in Figure 5, and the bathymetry around the site is shown in Figure 4. A summary of the instruments used in the A1 mooring and the processing details of the data recovered are shown in table 3.

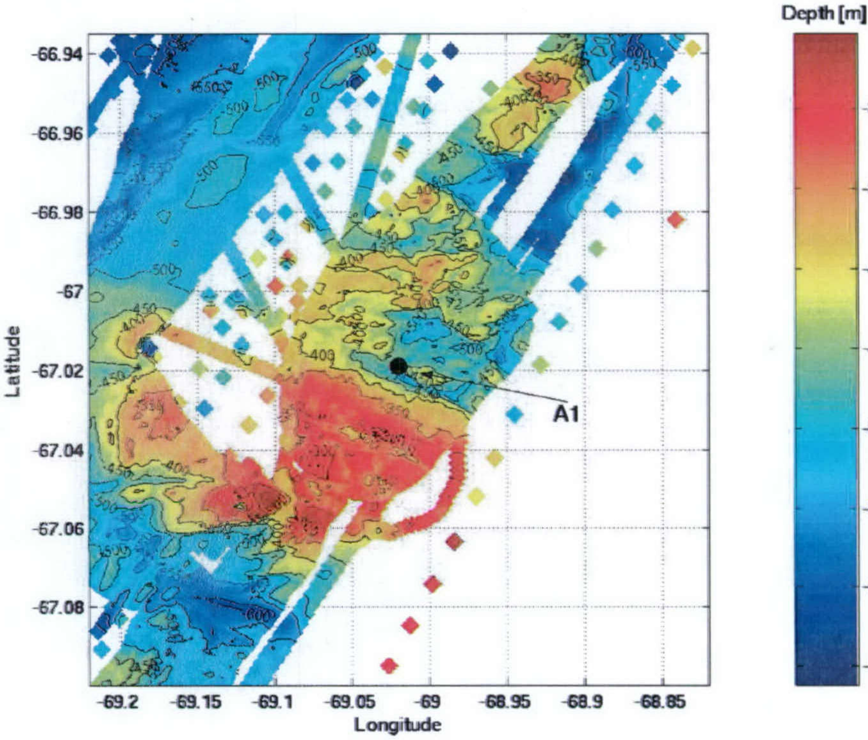

Figure 4: Bathymetry of the A1 Mooring site, constructed using multi-beam and single-track cruise data.

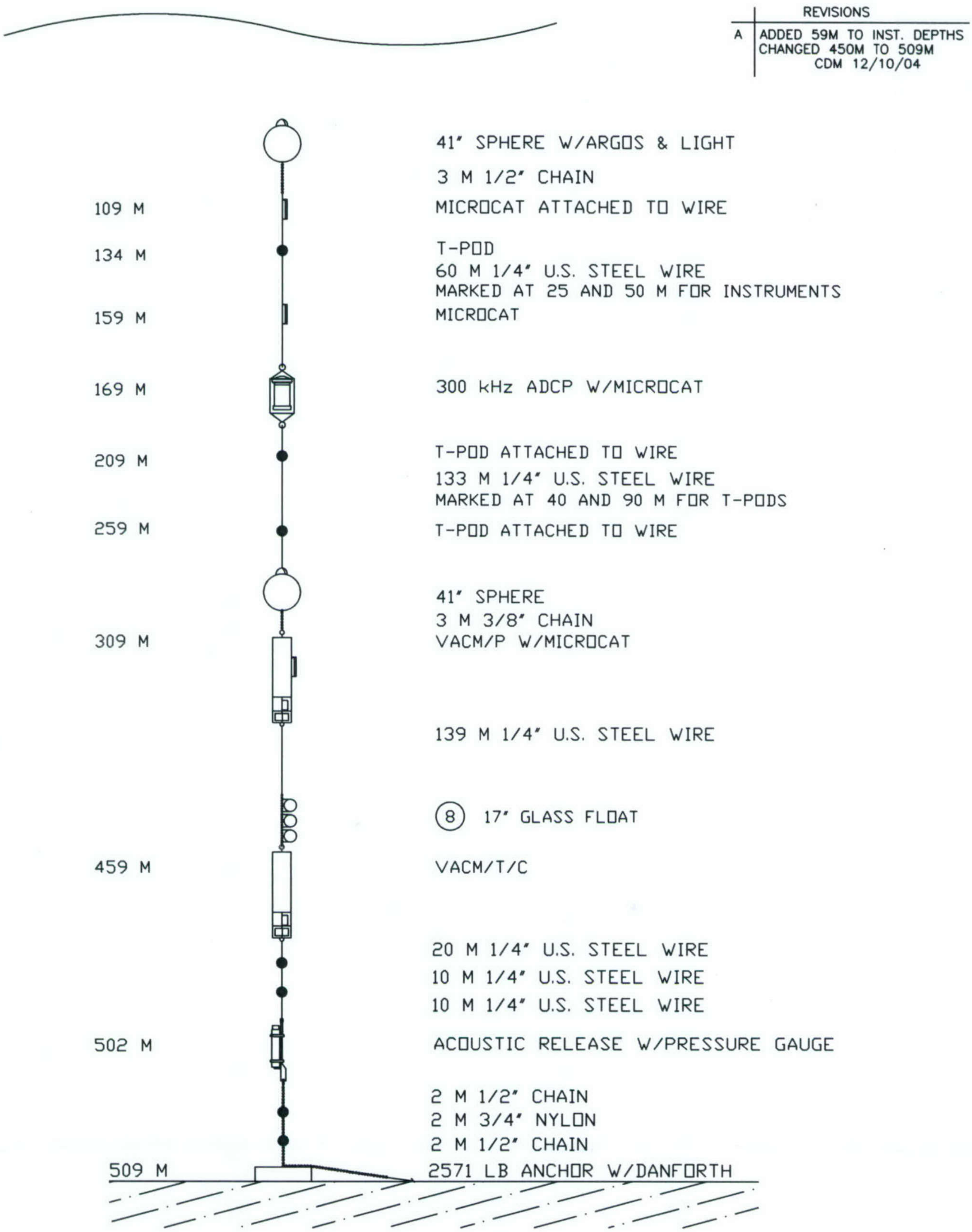

Figure 5: A1: Mooring Design.

Table 3: Summary of processing of the A1 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, W: Vertical velocity, B: Backscatter Intensity, P: pressure,

Type	Serial Number	Variable	Depth	Applied Residual		Clock	Processing
				[C]	[psu]	[s]	Details
MC	SBE 39-1646	T†,C†	109	-	-	-	
TR	SBE 39-339	T	134	-.001	-	-59	1
MC	SBE 37-1638	T,C	159	-.001	-.006	+104	2
WH	RDI300kHz 1698	UV,W,B	169	-	-	+225	3
TR	SBE 39-344	T	209	-.001	-	-74	4
TR	SBE 39-340	T	259	-.002	-	-56	5
VA	10597	UV,P,T	309	-.001	-	-	6
MC	SBE 37-1648	T,C	310	.000	.002	+106	7
VA	10599	UV,C,T	459	-	-.002	-	8
SG	SBE 26-175	P,C,T	502	-	.008	+2400	9

† No data was recovered from instrument

1. The temperature recorder at 134 m returned good data throughout the entire deployment. No editing was done.
2. The MicroCat at 159 m returned good data throughout the entire deployment. The data were corrected for what appears to be a flushing problem described before in section 2.2. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.
3. The RDI WorkHorse ADCP provided good data throughout the entire deployment. It was configured with 60 2-m bins, giving velocity measurements from 47 to 165 m. Four bins, corresponding to depths of 107, 109, 159 and 161 m were removed and replaced by vertical, linear interpolation using adjacent data. Contamination in these bins is likely due to the presence of other instruments above the ADCP, and was readily identified as unusually high and low values in the backscatter and velocity records, respectively.
4. The temperature recorder at 209 m returned good data throughout the entire deployment. Five records missing after uploading the data from the instruments were filled in using linear interpolation. No other editing was done.
5. The temperature recorder at 259 m returned good data throughout the entire deployment. After uploading the data from the instruments, record gaps adding to an hour and a few minutes were filled using linear interpolation. No other editing was done.
6. The VACM at 309 m returned good data throughout the entire deployment. One outlier in temperature and a few in pressure were removed and replaced by linear interpolation.
7. The MicroCat at 310 m returned good data throughout the entire deployment. The raw data during about 4 hours on 5/2/01 and 5 hours on 9/5/01 were replaced by linear interpolation

of adjacent data due to problems in the conductivity data. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

8. The VACM at 459 m returned good data throughout the entire deployment. A number of outliers both in temperature and pressure were removed. Comparison with CTD data taken at deployment and recovery and other instruments on the mooring suggested an offset correction to the temperature of +0.0356 and to the conductivity of +0.01. These corrections were made to the final data.

9. The SeaGauge provided good pressure, conductivity and temperature data throughout the entire deployment. Comparison with CTD data and other instruments on the mooring suggested an offset correction of +0.0218 and removal of a trend with slope of $2 \cdot 10^{-8}$.

2.2.2 A2 Mooring

The A2 mooring design depth was 564 m, but estimations of the final bottom depth of the mooring from the predeployment and SeaBeam bathymetric surveys and the moored pressure records lead to a correction of -3 m on the design, yielding a bottom depth of 561 m as shown in Figure 7. The bathymetric survey around the mooring site is shown in Figure 6. A summary of the instruments used in the A2 mooring and the processing details of the data recovered are shown in Table 4.

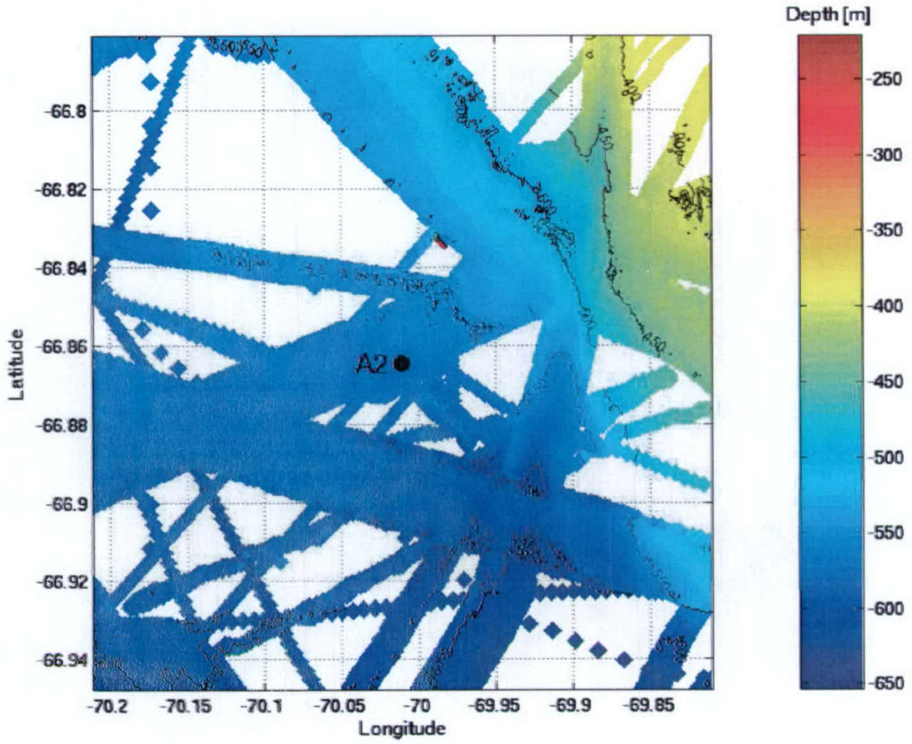

Figure 6: Bathymetry of the A2 Mooring site, constructed using multi-beam and single-track cruise data.

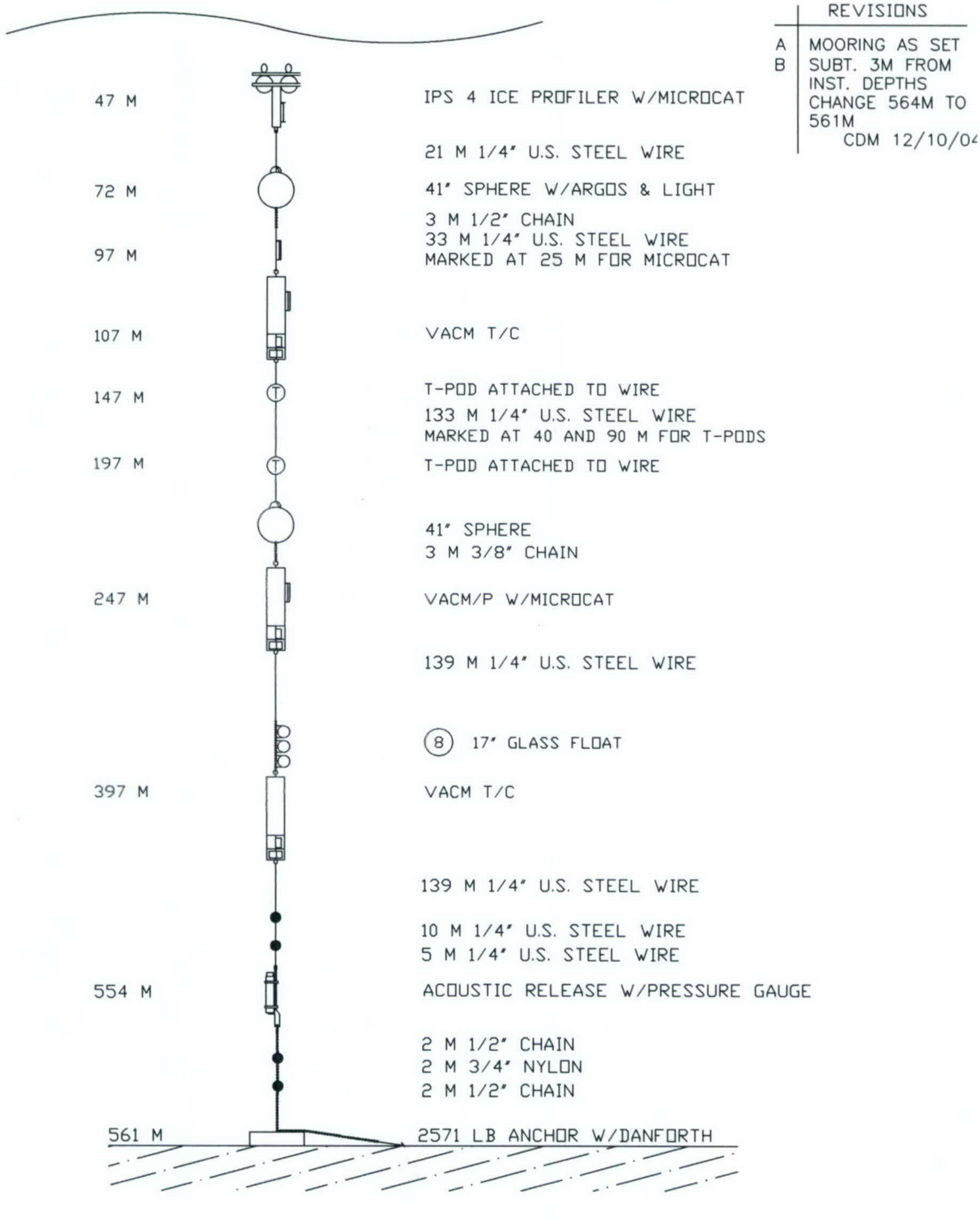

Figure 7: A2: Mooring Design.

Table 4: Summary of processing of the A2 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, P: pressure, IR: Ice Range, ID: Ice Draft

Type	Serial Number	Variable	Depth	Applied Residual [C]	Applied Residual [psu]	Clock [s]	Processing Details
IP	1023	IR, ID, P	47	-	-	-	1
MC	SBE 37-1649	T,C	48	.000	.001	+131	2
MC	SBE 37-1650	T,C	97	-.001	.001	+122	3
VA	10634	UV,C,T	107	-	-	-	4
TR	SBE 39-347	T	147	-.002	-	-56	5
TR	SBE 39-342	T	197	-.001	-	-66	6
VA	10637	UV,P,T	247	-	-	-	7
MC	SBE 37-1651	T,C	248	-.001	-.001	+62	8
VA	10639	UV,C,T	397	-	.002	-	9
SG	SBE 26-67	P,C,T	554	.002	.002	-453	10

1. The IPS at 47 m returned good data throughout the entire deployment. Two short (4-min and 2-min) gaps in the raw 2-sec acoustic range time series and clear outliers (range = 0 or >400 m) were filled by linear interpolation of neighboring values. Water column density was computed using the MicroCat data at 48 m.

2. The MicroCat at 48 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

3. The MicroCat at 97 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

4. The VACM at 107 m returned good data throughout the entire deployment. Eighteen hours on 10/30/02 were removed and the gap filled with linear interpolation.

5. The temperature recorder at 147 m returned good data throughout the entire deployment. No editing was done.

6. The temperature recorder at 197 m returned good data throughout the entire deployment. A 6-record gap was filled by linear interpolation, and outliers were removed.

7. The VACM at 247 m returned good velocity, temperature and pressure data throughout the entire deployment. A number of outliers in temperature and conductivity were removed. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

8. The MicroCat at 248 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

9. The VACM at 397 m returned good velocity, temperature, and conductivity data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

10. The SeaGauge at 554 m provided good pressure, conductivity and temperature data throughout the entire deployment. A few periods in the conductivity record showed sudden jumps and were corrected as follows: +.1901 was added to a 10-hr long period on 10/29/01; +.0320 was added to a 5-day long period starting on 10/29/01; and +.0153 was added to a 15-day long period starting on 11/04/01. A period of 2 hr on 10/28 could not be corrected and was filled by linear interpolation.

2.2.3 A3 Mooring

The A3 mooring design depth was 490 m. A small correction of -3m from the detailed bathymetric survey (shown in Figure 8) of the mooring location and the pressure sensors are reflected in the mooring design shown in Figure 9. A summary of the instruments used in the A3 mooring and the processing details of the data recovered are shown in Table 5.

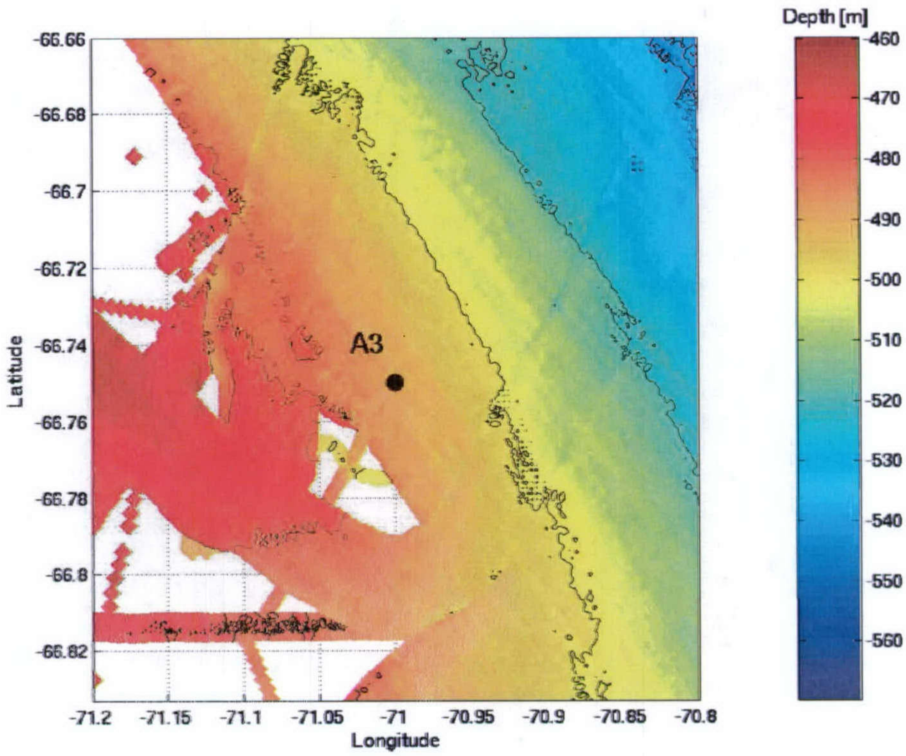

Figure 8: Bathymetry of the A3 Mooring site, constructed using multi-beam and single-track cruise data.

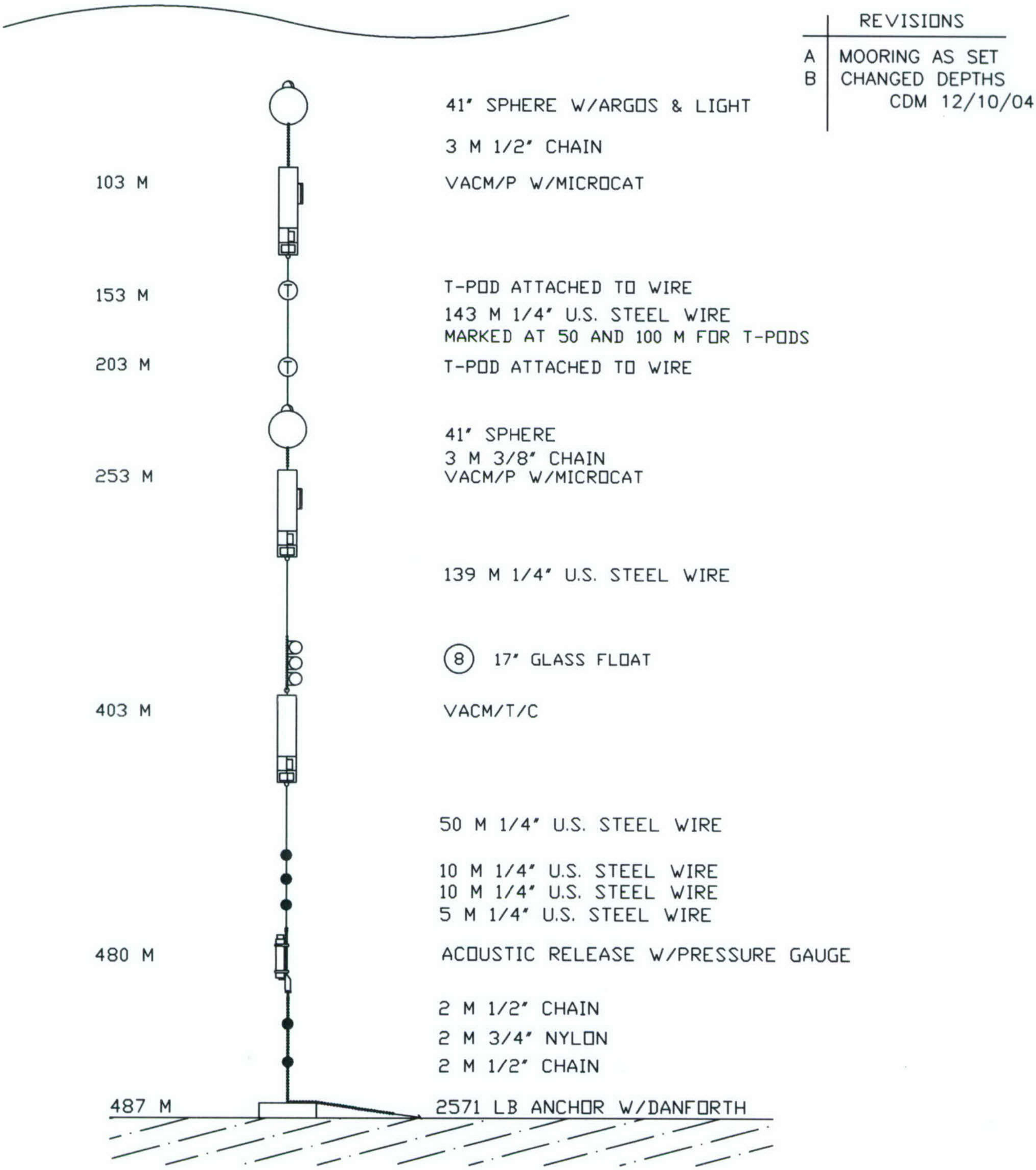

Figure 9: A3: Mooring Design.

Table 5: Summary of processing of the A3 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, P: pressure

Type	Serial Number	Variable	Depth	Applied Residual		Clock	Processing
				[C]	[psu]	[s]	Details
VA	10641	UV,P,T†	103	-	-	-	1
MC	SBE 39-137	T†,C†	104	-	-	-	2
TR	SBE 39-346	T	153	-.001	-	-57	3
TR	SBE 39-349	T	203	-.001	-	-134	4
VA	10645	UV,P,T	253	-	-	-	5
MC	SBE 37-0138	T,C	254	-.001	-.003	+124	6
VA	10647	UV,C,T	403	-	-	-	7
SG	SBE 26-67	P,C,T	480	-.002	.004	-70	8

† No data recovered from instrument.

1. The VACM at 103 m returned good velocity and pressure data. The temperature sensor returned bad data which was discarded.

2. Attempts to retrieve the data from the MicroCat at 104m failed.

3. The temperature recorder at 153 m returned good data throughout the entire deployment. No editing was done.

4. The temperature recorder at 203 m returned good data throughout the entire deployment. No editing was done.

5. The VACM at 253m returned good temperature, pressure and velocity data throughout the entire deployment.

6. The MicroCat at 254 m returned good data throughout the entire deployment. Four periods approximately 1-hr long were replaced in July and August with linear interpolation. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

7. The VACM at 403 m returned good velocity, temperature and pressure data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

8. The SeaGauge at 480 m provided good pressure, conductivity and temperature data throughout the entire deployment. A few periods of bad conductivity data were removed on 10/24/01 and replaced with linear interpolation. Outliers in temperature were replaced with linear interpolation.

2.2.4 B1 Mooring

The B1 mooring was never recovered. An extensive acoustic survey was conducted around the deployment position with no response heard from the acoustic release. We then conducted dragging over the deployment site with no success. For completeness, the original B1 mooring design is shown in Figure 11, and the bottom bathymetry shown in Figure 10.

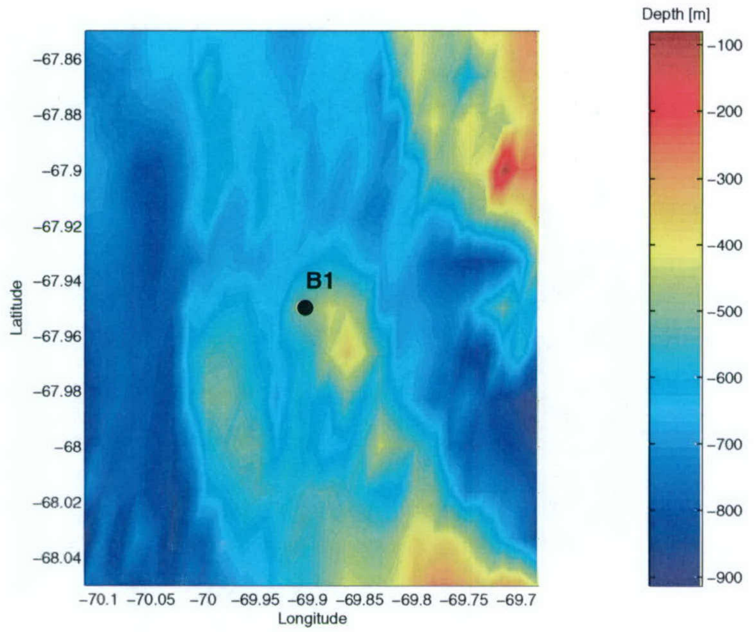

Figure 10: Bathymetry of the B1 Mooring site, constructed using multi-beam and single-track cruise data. [Note: the data shown in the figure is a low-resolution version of the bathymetric data].

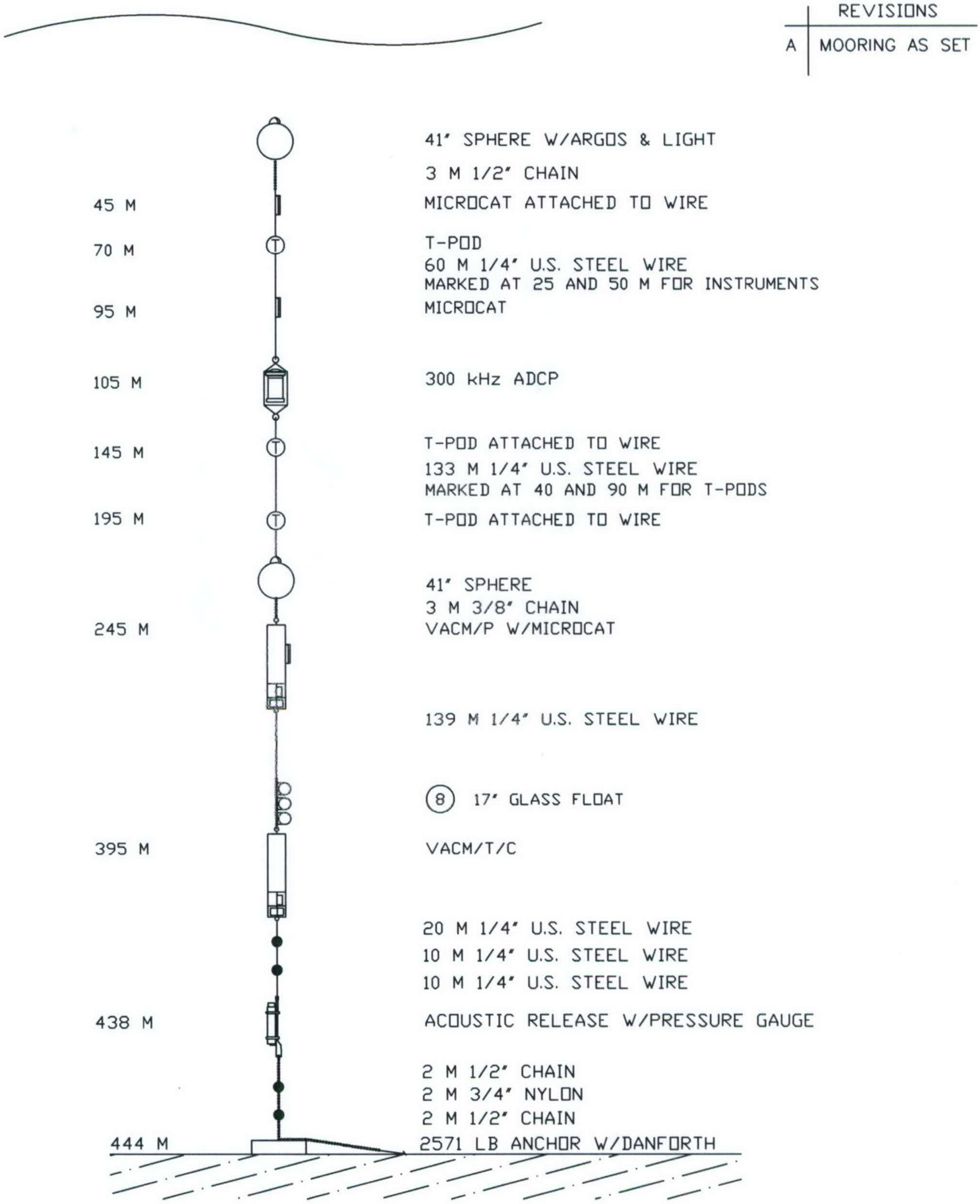

Figure 11: B1: Mooring Design.

2.2.5 B2 Mooring

The B2 mooring design depth is 811 m. Comparison of the site bathymetry (Figure 12) surveys with the moored pressure data suggest the depth of the site coincides with the design.

On 7/14/01, the IPS at 50 m lost its buoyancy, presumably due to being hit by an iceberg. As a result, the mooring line and components above 97 m sank and hung inverted below the 97-m flotation sphere, which had sufficient reserve buoyancy to support this upper part of the mooring. The bottom pressure recorder on the B2 release showed pressure to increase 0.15 db when the IPS lost buoyancy.

The three instruments above the 97 m flotation sphere recorded good data at their new depths, which were calculated from the mooring design and confirmed with the pressure records from both the IPS and the attached SeaCat. The raw data for these instruments contain the entire data series, but the edited basic time series were divided into before and after the lost of IPS buoyancy. These time series were then processed as separate records and the results stored in the final hourly time series presented here.

A summary of the instruments used in the B2 mooring and the processing details of the data recovered are shown in Table 6.

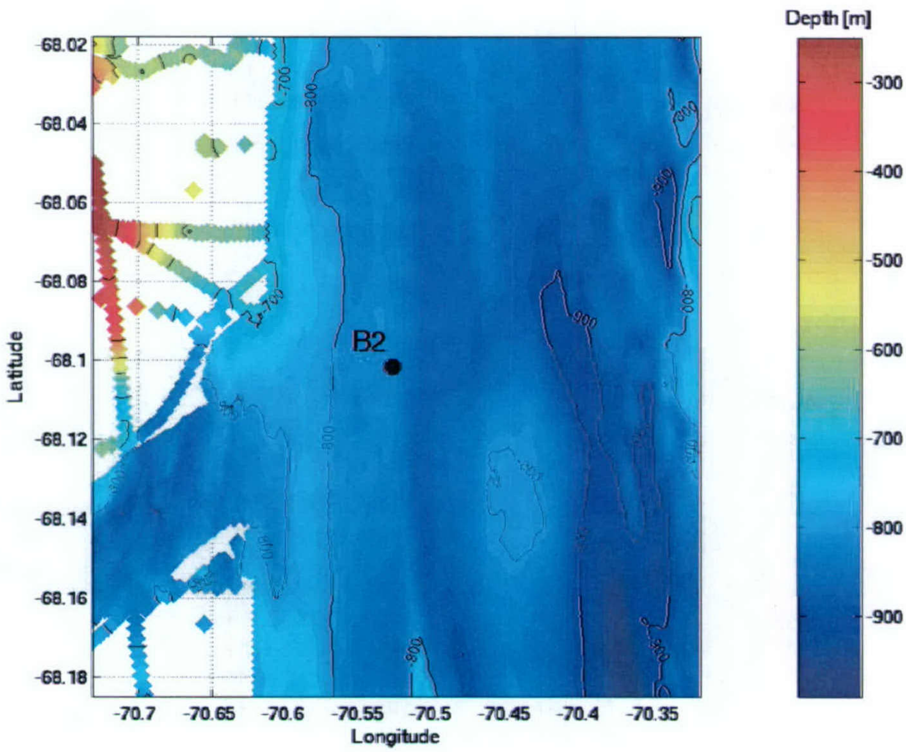

Figure 12: Bathymetry of the B2 Mooring site, constructed using multi-beam and single-track cruise data.

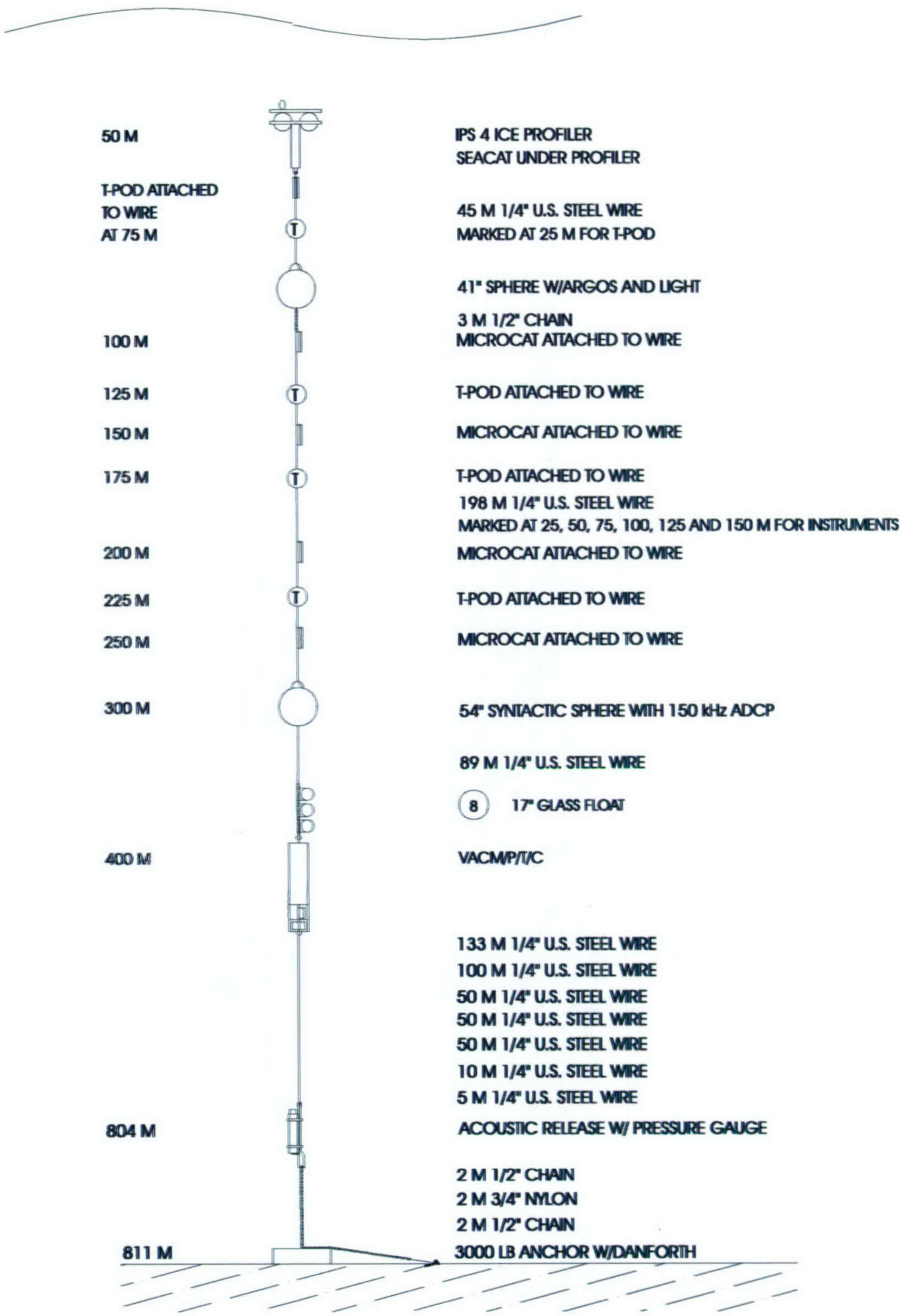

Figure 13: B2: Mooring Design.

Table 6: Summary of processing of the B2 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, W: Vertical velocity, B: Backscatter intensity, P: pressure, IR: Ice Range, ID: Ice Draft

Type	Serial Number	Variable	Depth	Applied Residual		Clock	Processing
				[C]	[psu]	[s]	Details
IP	1024	IR, ID, P	50/140				1
SC	1497	T,C,P	50/140				2
TR	SBE 39-332	T	75/120	-.002	-	-62	3
MC	SBE 37-1642	T,C	100	.000	-.003	+117	4
TR	SBE 39-337	T	125	-.001	-	-377	5
MC	SBE 37-1645	T,C	150	-.002	-.002	+170	6
TR	SBE 39-333	T	175	.000	-	-52	7
MC	SBE 37-1640	T,C	200	-.001	-.002	+39	8
TR	SBE 39-334	T	225	-.002	-	-73	9
MC	SBE 37-1637	T,C	250	-.001	-.006	+111	10
BB		UV,W,B	300	-	-		11
VA	10612	UV,C†,T†	400	-	-	-	12
SG	SBE 26-301	P,C,T	804	-.002	.009	-75	13

† Data not recovered or bad

1. The IPS at 50 m returned good data to 7/14/01, when it lost buoyancy and sank to a depth of 140 m before the pressure sensor failed and the instrument stopped working. The raw 2-sec acoustic range time series was complete and clear outliers (range = 0 or > 400 m) were filled by linear interpolation of neighboring values. Water column density was computed using the SeaCat data at 49 m (and 139m after 7/14/01).

2. The SeaCat at 50 m returned good data throughout the full deployment. Due to the loss of the IPS buoyancy on 7/14/01, the MicroCat depth increased from 50 prior to 140 m after this date. Conductivity and temperature were detected using the salinity time series and replaced with linear interpolation.

3. The temperature recorder at 75m returned good data throughout the entire deployment. The instrument depth increased on 7/14/01 from 75 m to 120 m. Outliers were replaced with linear interpolation.

4. The MicroCat at 100 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

5. The temperature recorder at 125 m returned good data until 8/21/01. A 6-record gap was filled using linear interpolation. Outliers were replaced with linear interpolation.

6. The MicroCat at 150 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

7. The temperature recorder at 175 m returned good data throughout the entire deployment. A 6-record gap was filled using linear interpolation, and outliers were replaced with linear interpolation.

8. The MicroCat at 200 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

9. The temperature recorder at 225 m returned good data throughout the entire deployment. A 1-record gap was filled using linear interpolation. Outliers were replaced with linear interpolation.

10. The MicroCat at 250 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

11. The 150-kHz Broad Band ADCP at 300 m was configured with 55 6-m velocity bins, of which 44 were shown to return good data. The final depth span of the data is 31.7-289.7m. The bin at 157.7m was contaminated and replaced by interpolating adjacent vertical bins.

12. The VACM at 400 m returned good velocity data throughout the entire deployment. Although it was possible to retrieve the temperature and conductivity data from the instrument, both data sets showed jumps of 1.5 degrees and .4 mS/m respectively, suggesting an electronic failure of the recording circuits of the VACM.

13. The SeaGauge at 804 m provided good pressure, conductivity and temperature data throughout the entire deployment. A +0.15db jump in pressure when the top elements of the mooring tipped over was corrected, and the pressure record over the hours immediately after the failure were replaced using linear interpolation. A linear trend in the conductivity was also removed. Outliers were replaced with linear interpolation.

2.2.6 B3 Mooring

The B3 mooring design depth was 450 m. A -3 m correction was applied to the design and is reflected in Figure 15.

On 6/19/01, the top flotation sphere at 50 m flooded, due to a small crack presumably caused by a collision with an iceberg. After this occurred, the mooring components above 247 m hung below the second primary flotation sphere at 246 m. The pressure recorder attached to the B3 release showed pressure to increase 0.06 db when the top flotation sphere flooded.

The six instruments above the 245-m flotation sphere recorded good data at their new depths, which were calculated from the mooring design, pressure data and site bathymetric surveys. Jason Hyatt (personal communication) confirmed this calculation by using the backscatter data of the inverted ADCP to estimate the distance of the instrument to the bottom.

The raw data for these instruments contain the entire data series, but the edited basic time series were divided into before and after the top flotation sphere flooded. These time series were then processed as separate records and the results stored in the final hourly time series presented here. A summary of the instruments used in the B3 mooring and the processing details of the data recovered are shown in Table 7, and the bathymetry of the mooring site is shown in Figure 14.

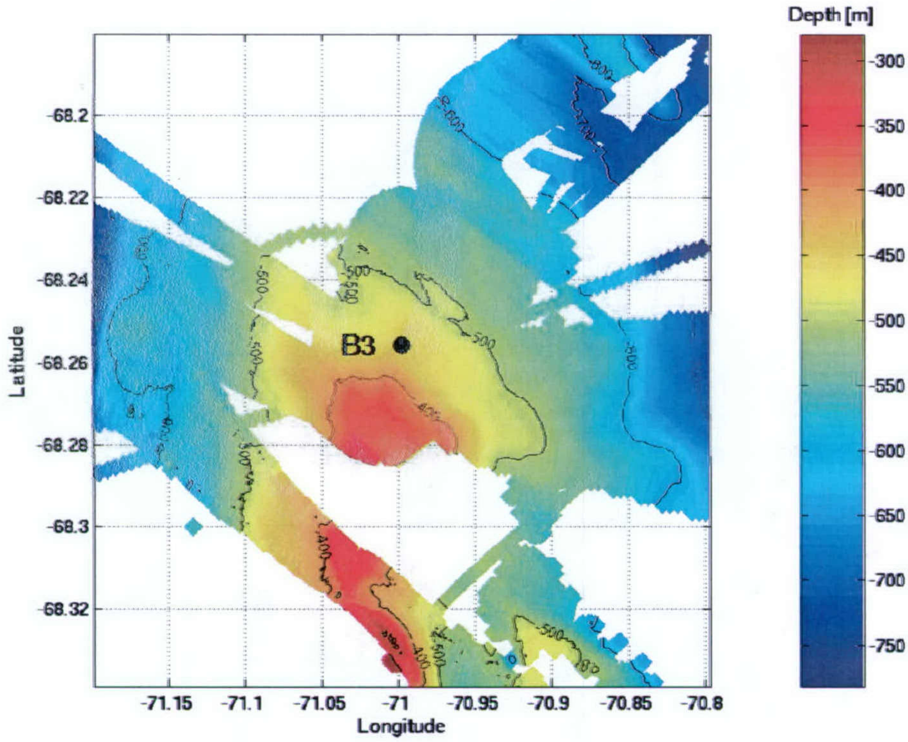

Figure 14: Bathymetry of the B3 Mooring site, constructed using multi-beam and single-track cruise data.

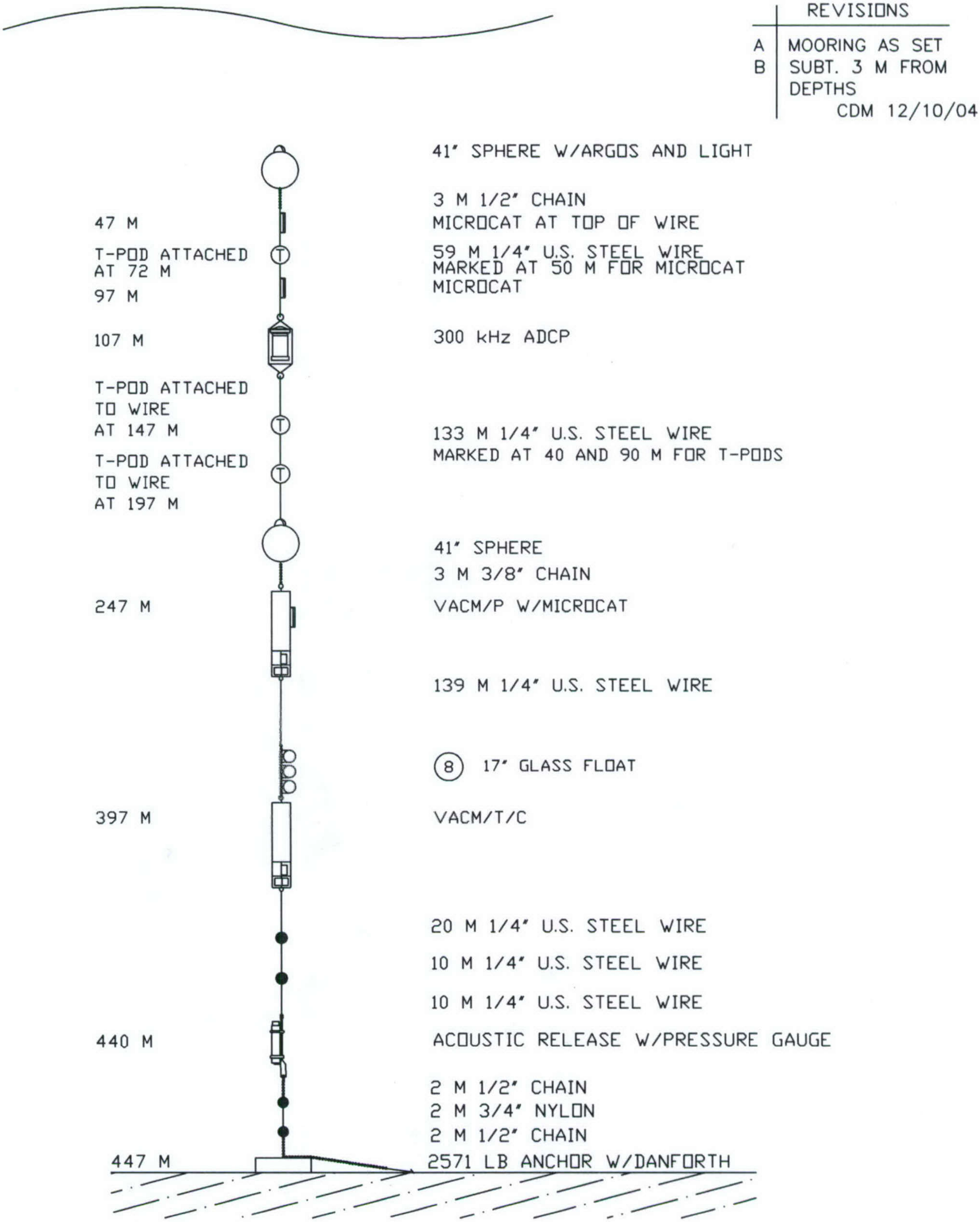

Figure 15: B3: Mooring Design.

Table 7: Summary of processing of the B3 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, W: Vertical velocity, B: Backscatter intensity, P: pressure

Type	Serial Number	Variable	Depth	Applied Residual		Clock	Processing
				[C]	[psu]	[s]	Details
MC	SBE 37-1643	T,C	47/437	-.002	-.005	+117	4
TR	SBE 39-0350	T	72/412	-.002	-	-65	5
MC	SBE 37-1641	T,C	97/387	-.001	-.005	+150	6
WH	RDIWH - 1397	UV,W,B	107/378	-	-	96	7
TR	SBE 39-336	T	147/337	.000	-	-56	8
TR	SBE 39-341	T	197/287	-.001	-	-63	9
VA	10607	UV,P,T	247	-	-	-	10
MC	SBE 37-1644	T,C	248	-.002	.002	+150	11
VA	10609	UV,C,T	397	-	.005	-	12
SG	SBE 26-176	P,C,T	440	-.002	.002	-145	13

1. The MicroCat at 47 m returned good data throughout the entire deployment. The instrument depth increased to 437 m on 6/19/01. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

2. The temperature recorder at 72 m returned good data throughout the entire deployment. The instrument depth increased to 412 m on 6/19/01.

3. The MicroCat at 97 m returned good data throughout the entire deployment. The instrument depth increased to 387 m on 6/19/01. An offset of -0.02 in conductivity was applied to the entire record. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

4. The 300-KHz WorkHorse ADCP at 107 m was configured with 60 2-m velocity depth bins. Before the top sphere lost buoyancy, the ADCP returned good data in 46 bins, from 16 to 106 m, although bins at 50, 100 and 102 m were contaminated and replaced by vertical linear interpolation. After 6/19/01, the ADCP hung down from 378m. The ADCP continued to work correctly (based on the good comparison with the currents recorded with the VACM at 400 m), and good data were returned from 382 to 442 m. In that depth span, 7 bins (depths: 386, 388, 396, 398, 400 and 438) had to be replaced by linear interpolation due to contamination of the data thought to be due to reflection from the instruments suspended below the ADCP.

5. The temperature recorder at 147 m returned good data throughout the entire deployment. The instrument depth increased to 337 m on 6/19/01.

6. The temperature recorder at 197 m returned good data throughout the entire deployment. The instrument depth increased to 287 m on 6/19/01.

7. The VACM at 247 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers were removed.

8. The MicroCat at 248m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

9. The VACM at 397 m returned good velocity and temperature data throughout the entire deployment. The conductivity sensor started to return bad data on 10/13/01. Outliers in the temperature and conductivity data were removed.

10. The SeaGauge at 440 m provided good pressure, conductivity and temperature data throughout the entire deployment. Outliers were removed.

2.2.7 C1 Mooring

The C1 mooring design depth was 450 m. After deployment, the SeaBeam bathymetric survey showed the depth at the mooring deployment position to be 18 m shallower, which coincides with the bottom depth estimation based on the pressure recorder at 232 m, and with the local bathymetry (Figure 16). The corrected mooring design is shown in Figure 17.

The C1 acoustic release did not drop the anchor when the release command was sent. The release responded that the release command had been received, however, the mooring did not surface. After repeated attempts to fire the release, dragging for the mooring was conducted, and the drag trawl-line cut the mooring wire at 310 m (just below the temperature recorder at 307 m), allowing recovery of all instrumentation above 310 m without damage.

A summary of the instruments used in the C1 mooring and the processing details of the data recovered are shown in Table 8.

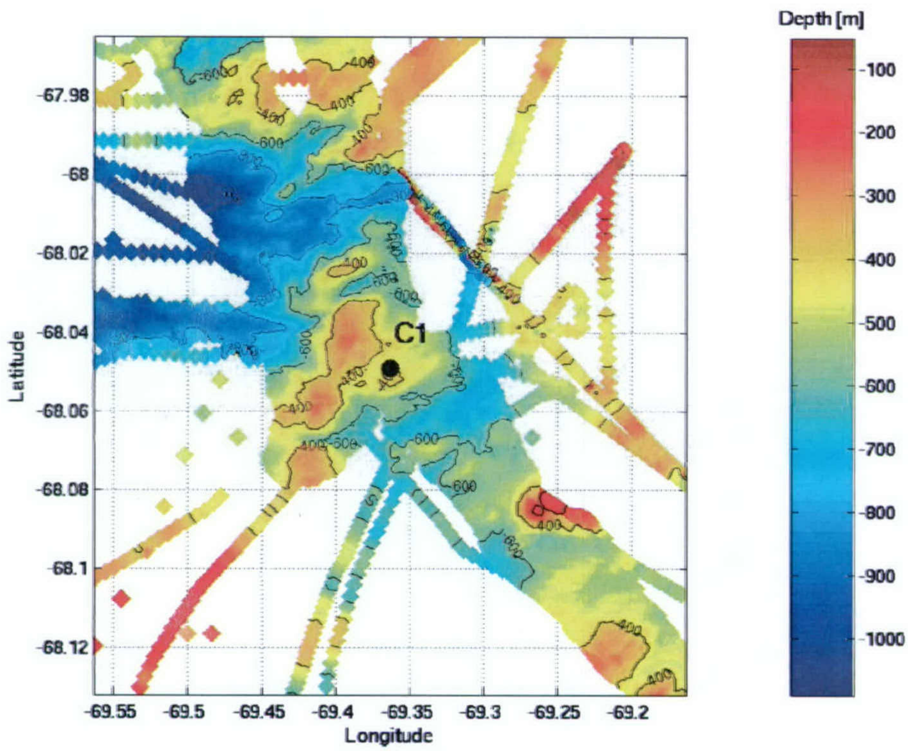

Figure 16: Bathymetry of the C1 Mooring site, constructed using multi-beam and single-track cruise data.

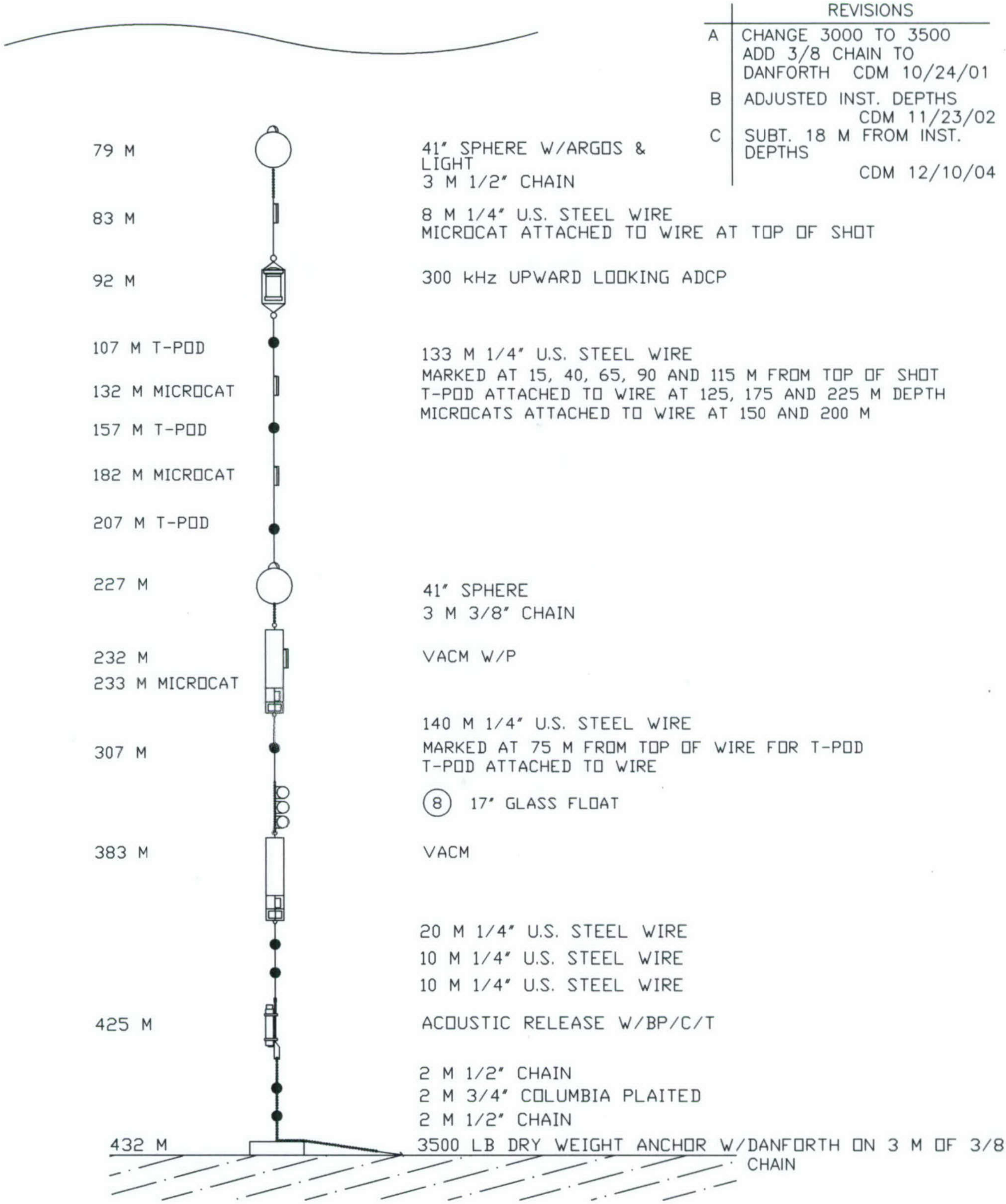

Figure 17: C1: Mooring Design.

Table 8: Summary of processing of the C1 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, W: Vertical velocity, B: Backscatter intensity, P: pressure

Type	Serial Number	Variable	Depth	Applied Residual [C]	Applied Residual [psu]	Clock [s]	Processing Details
MC	SBE 37-2033	T,C	83	.000	+.015	+164	1
WH	RDIWH - 1698	UV,W,B	92	-	-	-	2
TR	SBE 39-648	T	107	-.001	-	-71	3
MC	SBE 37-2034	T,C	132	.000	+.009	+74	4
TR	SBE 39-628	T	157	.000	-	-71	5
MC	SBE 37-2031	T,C	182	-.000	+.013	+152	6
TR	SBE 39-623	T	207	-.001	-	-27	7
VA	10607	UV,P,T	232	-	-	-	8
MC	SBE 37-2032	T,C	233	.001	.007	+105	9
TR	SBE 39-644	T	307	-.001	-	-62	10
VA	Lost	-	-	-	-	-	
SG	Lost	-	-	-	-	-	

1. The MicroCat at 83 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

2. The 300-KHz WorkHorse ADCP at 92 m was configured with 60 2-m velocity depth bins; 41 bins, from 8 to 88 m, provided good data. Bins at 80, 84 and 86 m showed contamination and were replaced by vertical interpolation.

3. The temperature recorder at 107 m returned good data throughout the entire deployment. Outliers were removed.

4. The MicroCat at 132 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

5. The temperature recorder at 157 m returned good data throughout the entire deployment. Outliers were removed.

6. The MicroCat at 182 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

7. The temperature recorder at 207 m returned good data throughout the entire deployment. Outliers were removed.

8. The VACM at 232 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers in the pressure were removed.

9. The MicroCat at 233 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

10. The temperature recorder at 307 m returned good data throughout the entire deployment. Outliers were removed.

2.2.8 C2 Mooring

The C2 mooring design depth was 850 m. Based on the SeaBeam survey data (Figure 18) and the bottom pressure data, the final bottom depth at C2 was set as 859 m. The final mooring design is shown in Figure 19. A summary of the instruments used in the C2 mooring and the processing details of the data recovered are shown in Table 9.

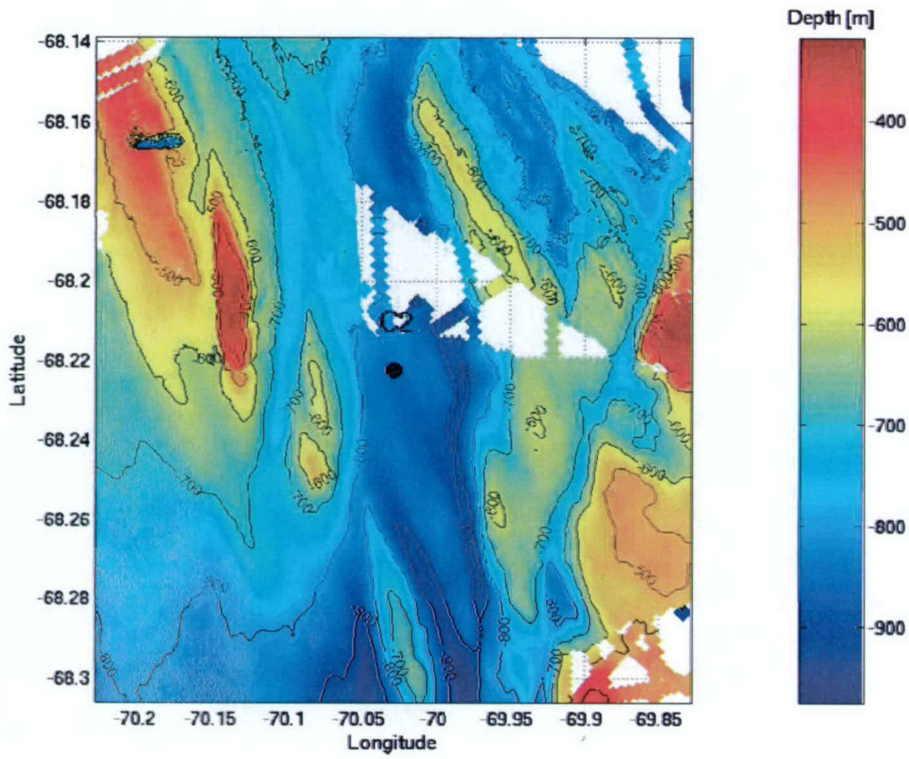

Figure 18: Bathymetry of the C2 Mooring site, constructed using multi-beam and single-track cruise data.

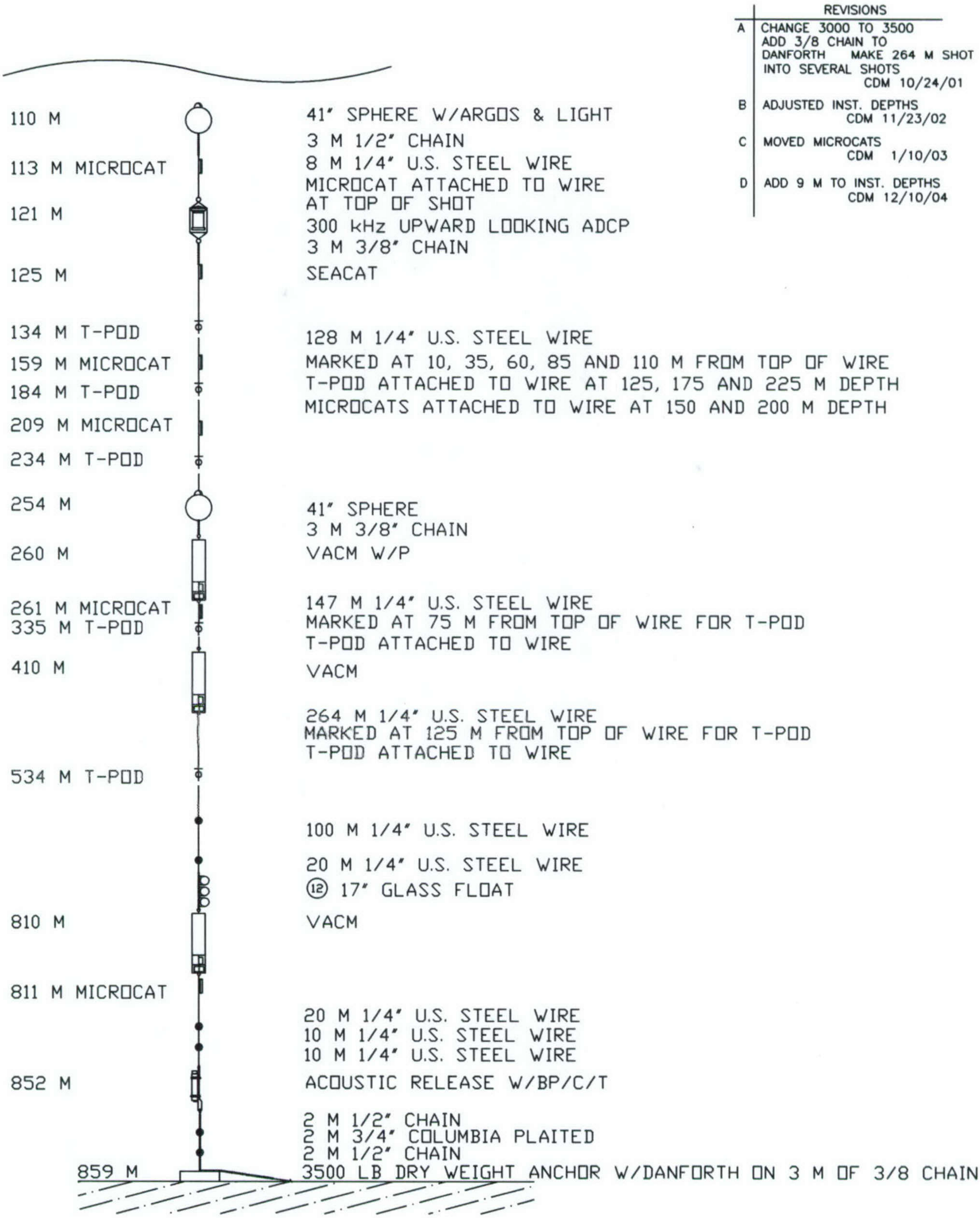

Figure 19: C2: Mooring Design.

Table 9: Summary of processing of the C2 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, P: pressure

Type	Serial Number	Variable	Depth	Applied Residual		Clock	Processing
				[C]	[psu]	[s]	Details
MC	SBE 37-2037	T,C	113	.000	+.005	+59	1
WH	1700	UV†,W†,B†	121	-	-	-	2
SC	1504	T†,C†,P†	125	-	-	-	3
TR	SBE 39-630	T	134	.000	-	-64	4
MC	SBE 37-2036	T,C	159	.000	+.01	+123	5
TR	SBE 39-649	T	184	-.001	-	-64	6
MC	SBE 37-2035	T,C	209	.001	+.008	+94	7
TR	SBE 39-645	T	234	.000	-	-72	8
VA	10889	UV,P,T	260	-	-	-	9
MC	SBE 37-2029	T,C	261	-.001	.007	+88	10
TR	SBE 39-629	T	335	.000	-	-70	11
MC	SBE 37-2028	T,C	409	-	-	+117	12
VA	10812	UV,T	410	-	-	-	13
TR	SBE 39-624	T	534	-.001	-	-70	14
VA	108814	UV,T	810	-	-	-	15
MC	SBE 37-2030	T,C	811	-.001	.012	+174	16
SG	SBE 26-301	P,T,C†	852	-	-	-198	17

† Data not recovered or bad

1. The MicroCat at 113 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

2. The 300-kHz Workhorse ADCP at 121 m failed to return any data. All attempts to communicate with the instrument failed.

3. The SeaCat at 125 m did not return any data. Upon recovery, communications attempts with the instrument failed and the software returned a "low voltage" error for the instrument's battery.

4. The temperature recorder at 134 m returned good data throughout the entire deployment. Outliers were removed.

5. The MicroCat at 159 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

6. The temperature recorder at 184 m returned good data throughout the entire deployment. Outliers were removed.

7. The MicroCat at 209 m returned good data throughout the entire deployment. Several hours of data on 06/07/02 and 08/23/02 were removed and filled by interpolation. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

8. The temperature recorder at 234 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

9. The VACM at 260 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers in the pressure were removed.

10. The MicroCat at 261 m returned good data throughout the entire deployment. 61 records on 7/10 were removed and filled by interpolation. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

11. The temperature recorder at 335 m returned good data throughout the entire deployment. Outliers were removed.

12. The MicroCat at 409 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

13. The VACM at 410 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers in the pressure were removed.

14. The temperature recorder at 534 m returned good data throughout the entire deployment. Outliers were removed.

15. The VACM at 810 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers in the pressure were removed.

16. The MicroCat at 811 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

17. The SeaGauge at 852 m provided good temperature and pressure data throughout the entire deployment.

2.2.9 C3 Mooring

The C3 mooring design depth was 815m. The revised depth, based on the detailed bathymetric survey (Figure 20) and pressure data, and reflected in Figure 21, is 811m. A summary of the instruments used in the C3 mooring and the processing details of the data recovered are shown in Table 10.

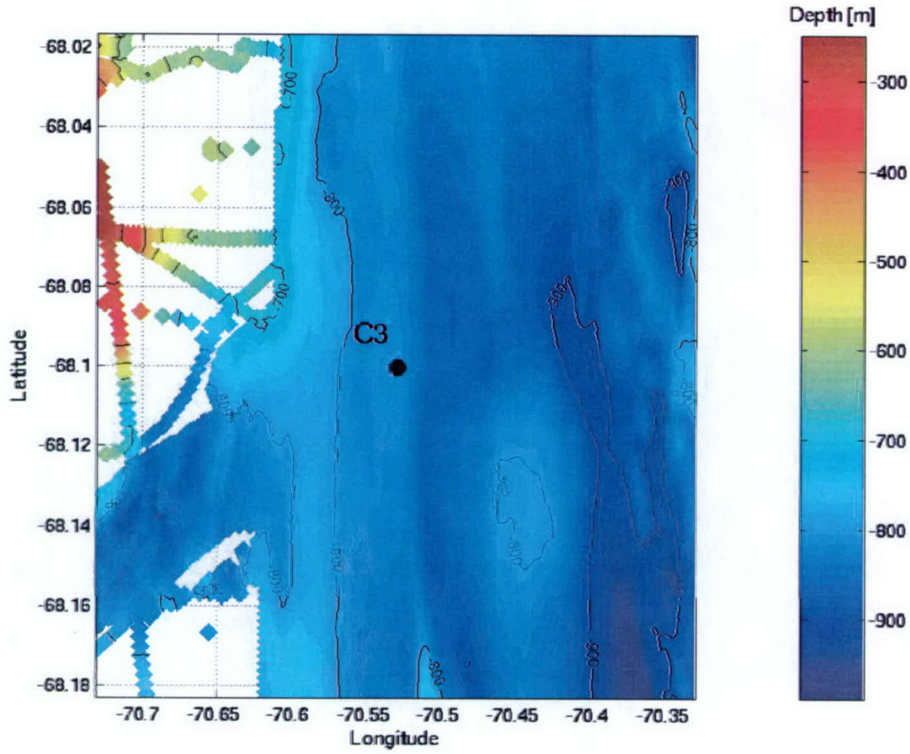

Figure 20: Bathymetry of the C3 Mooring site, constructed using multi-beam and single-track cruise data.

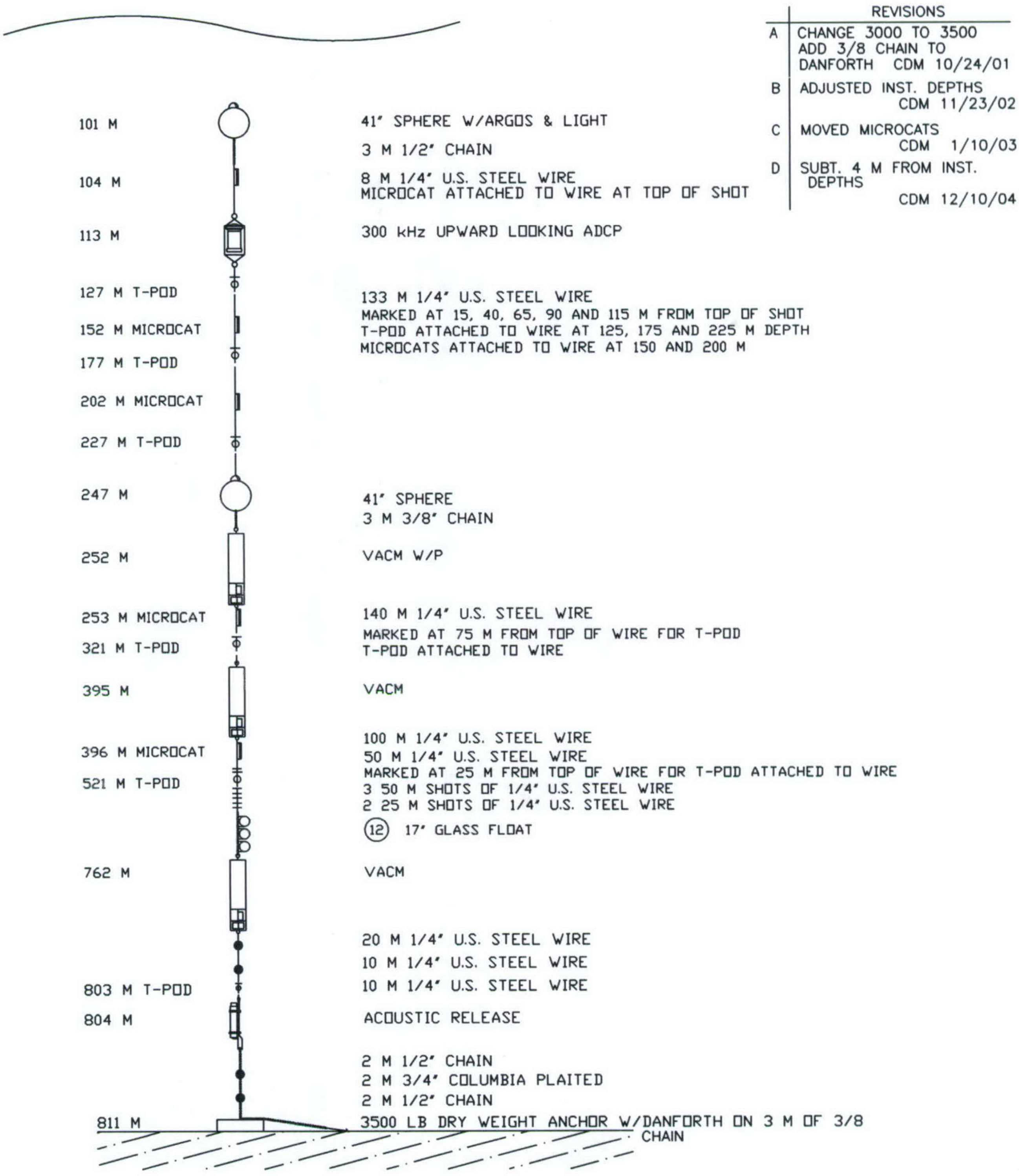

Figure 21: C3: Mooring Design.

Table 10: Summary of processing of the C3 mooring. T: temperature, C: conductivity, UV: Horizontal velocity, W: Vertical velocity, B: Backscatter intensity, P: pressure

Type	Serial Number	Variable	Depth	Applied [C]	Residual [psu]	Clock [s]	Processing Details
MC	SBE 37-2041	T,C	104	.000	+.01	+136	1
WH	RDIWH 1397	UV,W,B	113	-	-	-205	2
TR	SBE 39-651	T	127	-.001	-	-77	3
MC	SBE 37-2042	T,C	152	.001	+.004	-4742	4
TR	SBE 39-626	T	177	.001	-	-68	5
MC	SBE 37-2040	T,C	202	-.002	+.001	+101	6
TR	SBE 39-650	T	227	-.001	-	-59	7
VA	10898	UV,P,T	252	-	-		8
MC	SBE 37-2038	T,C	253	-.002	-.001	+91	9
TR	SBE 39-652	T	321	.000	-	-53	10
VA	108911	UV,T	395	-	-	-	11
MC	SBE 37-2039	T,C	396	-.001	+.002	+172	12
TR	SBE 39-646	T	521	-.001	-	-54	13
VA	108914	UV,T	762	-	-	-	14
TR	SBE 39-647	T	803	.000	-	-48	15

1. The MicroCat at 104 m returned good data throughout the entire deployment. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

2. The 300-KHz WorkHorse ADCP at 113 was configured with 60 2-m velocity depth bins; 49 bins, from 8 to 104 m, provided good data. Bins at 94, 96, 100 and 102 m showed contamination and were replaced by vertical interpolation.

3. The temperature recorder at 127 m returned good data throughout the entire deployment.

4. The MicroCat at 152 m returned good data throughout the entire deployment. Noise attributed to poor flushing of the conductivity sensor was reduced by lagging the temperature record in computing salinity. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

5. The temperature recorder at 177 m returned good data throughout the entire deployment. 12 records on 1/12/03 were removed and replaced using interpolation. Outliers were removed.

6. The MicroCat at 202m returned good data throughout the entire deployment. A conductivity jump of +0.09 from 03/01/12 to 03/01/28 was corrected. Linear trends in the conductivity between 11/28 and 12/4 were removed.

7. The temperature recorder at 227 m returned good data throughout the entire deployment. Outliers were removed.

8. The VACM at 252 m returned good velocity, pressure and temperature data throughout the entire deployment. Outliers in the pressure were removed.

9. The MicroCat at 253 m returned good throughout the entire deployment. Flushing correction was applied. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

10. The temperature recorder at 321m returned good data throughout the entire deployment.

11. The VACM at 395m returned good velocity, pressure and temperature data throughout the entire deployment.

12. The MicroCat at 396m returned good throughout the entire deployment. Linear trends on conductivity from 7/1/02 to 7/3/02 and from 6/29/02 to 7/1/02 were removed. Flushing correction applied. Temperature and conductivity outliers were detected in the salinity time series and replaced with linear interpolation.

13. The temperature recorder at 521 m returned good data throughout the entire deployment.

14. The VACM at 762 m returned good velocity and temperature data throughout most of the deployment. Velocity data from 12/7 to 12/12 and from 12/14 to 1/27 were removed due to what was interpreted as an error of the registration of rotor counts in the VACM.

15. The temperature recorder at 803 m returned good data throughout the entire deployment.

3 Automatic Weather Stations

3.1 Description

Two Automatic Weather Stations (AWSs) supplied by the U. Wisconsin Antarctic Automatic Weather Station Project (AWSP) were deployed in Marguerite Bay on RV/IB *Palmer* cruise NBP01-03. AWS 8930 (AWS-K) was installed on Kirkwood Island on May 25, 2001, and AWS 8932 (AWS-D) was installed on Dismal Island on May 27, 2001 (Table 11). The AWS sensors were connected to a Campbell Scientific controller CR10X, which used in turn a Telonics ARGOS transmitter ST-13 to send the data back to the U. Wisconsin Antarctic Automatic Weather Station Project. (This information kindly provided by G. Weidner, AAWSP). Each station was equipped with an R. M. Young wind monitor, air temperature, relative humidity, and barometric pressure sensors, an electronics controller, and ARGOS telemetry link to AWSP mounted on an 8-ft tower (Figure 22). Table 12 shows a summary of the sensors used in the stations, their range and accuracy.

Power was supplied by a combination of lead acid batteries and a solar panel. The tower was secured at the base to the battery case and aligned vertical using three guy wires under tension. Since the wind direction is measured relative to the tower heading, the latter was measured using a hand-held compass and checked using relative bearing measurements of the tower and ship. The raw 10-min data were transmitted to AWRC which decoded the data, converted the direction to true N and placed the data onto an AWSP ftp site for this program.

Each AWS started producing useful data within an hour of deployment. Monitoring of the raw ARGOS data by AWRC indicated that a software error prevented the AWS-K controller to record wind speeds in excess of 5 m/s (wind direction and other scalar variables were unaffected). This AWS was revisited on May 30 and the software error fixed.

Table 11: Location of the AWSs

Name	Latitude	Longitude	Height above sea level	Station Orientation	Installation Date
AWS 8930 (AWS-K) (Kirkwood Island)	-68°20.397'	-69°00.444'	~75 ft (~25m)†	77°N	May 25, 2001[a]
AWS 8932 (AWS-D) (Dismal Island)	-68°05.243'	-68°49.480'	~35 ft (~12m)†	124°N	May 27, 2001

† Crude estimate

[a] Reprogrammed May 27, 2001

3.2 Data Processing

The basic AWS data obtained from AWSP had the following steps done to produce final 1-hr time series of air temperature, relative humidity, barometric pressure, and east and north components of wind and wind stress. Pad values and outliers (detected using a median detector) were removed and linear interpolation used to create a uniform 1-hr time series of the scaler variables. High frequency noise was then removed from the east and north wind components using a low-pass filter with a half-amplitude period of 8 hrs. The resulting filtered wind components were next

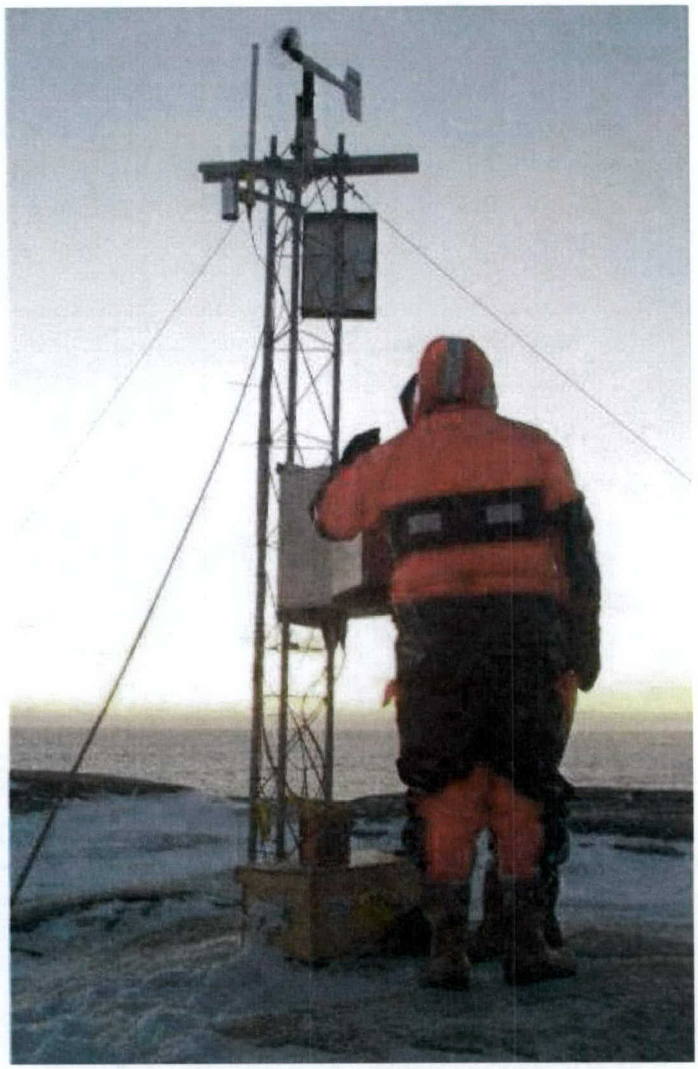

Figure 22: The photo shows the AWS station used at Kirkwood Island, equipped with an R. M. Young wind monitor, air temperature, relative humidity, and barometric pressure sensors, an electronics controller, and ARGOS telemetry link to AWSP mounted on an 8-ft tower.

Table 12: The SO GLOBEC AWS variables, sensors and their range, resolution and accuracy.

Variable	Sensor	Range	Resolution/Accuracy
Air Pressure	Paroscientific Model 215A	0-1100 mb	0.50 mb/ $\pm$0.2 mb Long-term drift $<$ 0.2 mb/yr
Air Temperature	Weed PRT in 2-wire bridge	-100°C minimum	0.125 °C/ $\pm$ 0.5°C over range -75°C to 20°C
Humidity	Väisälä HMP45	0-100%	1.0% /$\pm$5.0% max over temperature range -40°C to 20°C
Wind Speed	R.M.Young Wind Monitor 05103	0-60 m/s	0.195 m/s / $\pm$ 0.5 m/s
Wind Direction	10 Kohm Potentiometer	0-360	1.5°/ $\pm$3.0°

converted into hourly wind speed and direction. The wind stress magnitude was then computed using the COARE 2.6a bulk formulation (Fairall et al., 2003), the wind speed, air temperature, relative humidity, barometric pressure, a constant sea surface temperature value of 0°C, and the estimated anemometer heights of 25 m (AWS-K) and 12 m (AWS-D). The wind stress is assumed to be aligned with the wind. The use of land-based winds to estimate wind stress is problematic, but this approach was taken to provide at least a qualitative description of the wind stress and its variability.

4 Data Presentation

This section contains a timeline of the observations collected in the mooring array, and then, for each mooring, a table of basic statistics for the variables collected as well as plots of the final, hourly-averaged time series.

Figure 23: Timeline, A line

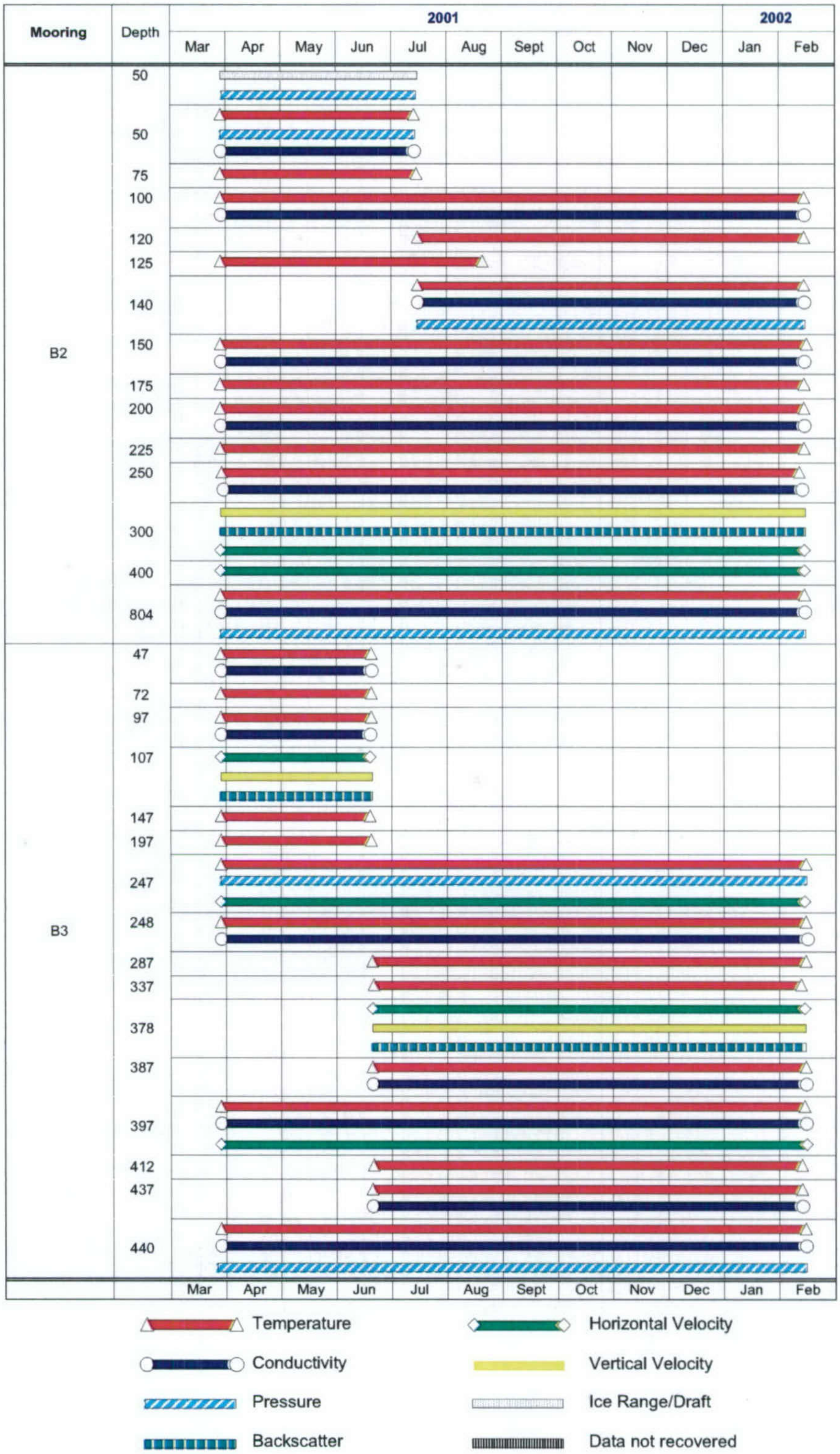

Figure 24: Timeline, B line

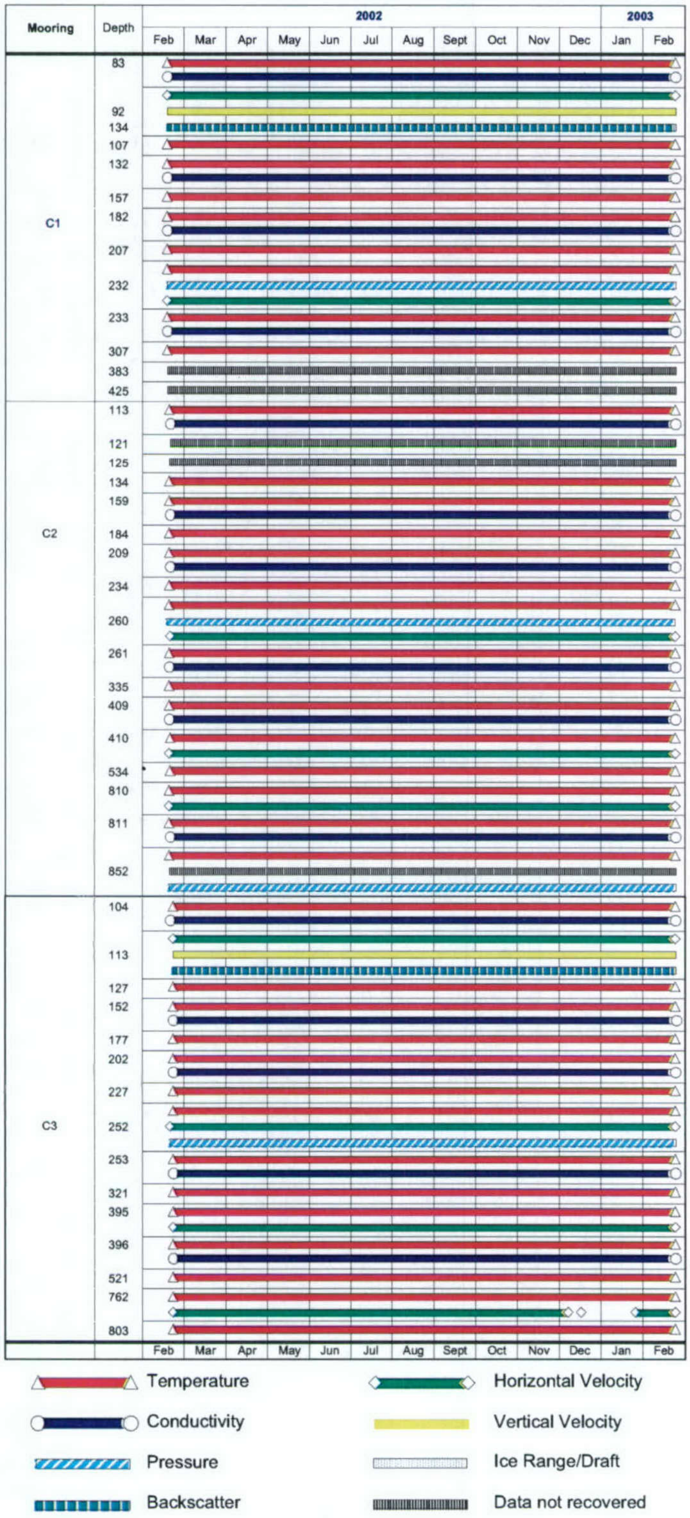

Figure 25: Timeline, C line

4.1 A1 Mooring

Table 13: Summary of processing of the A1 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, W: Vertical Velocity P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	134	.26	-1.58	1.18	.46
	159	.67	-.53	1.32	.31
	209	1.11	.53	1.58	.17
	259	1.33	.95	1.57	.09
	309	1.38	1.14	1.58	.05
	310	1.38	1.14	1.58	.05
	459	1.40	1.32	1.50	.04
	502	1.40	1.32	1.50	.04
S [psu]	159	34.47	34.24	34.65	.08
	310	34.67	34.59	34.70	.02
	459	34.72	34.67	34.73	.01
	502	34.72	34.69	34.74	.01
P [db]	309	312.00	310.91	313.03	.39
	502	507.21	505.21	508.16	.39

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
U $[\mathrm{cm} \cdot s^{-1}]$	47	-5.56	-86.36	47.63	11.35	109	-2.41	-21.36	22.37	4.72
	49	-5.05	-62.99	74.96	11.73	111	-2.44	-43.02	22.71	4.90
	51	-4.81	-48.39	57.23	10.17	113	-2.40	-26.21	22	4.82
	53	-5.09	-59.31	74.85	10.54	115	-2.39	-25.42	25.75	4.73
	55	-5.03	-78.04	42.57	10.41	117	-2.40	-23.92	16.25	4.66
	57	-4.78	-55.09	84.86	10.24	119	-2.37	-22.41	14.12	4.60
	59	-4.95	-56.83	37.52	9.85	121	-2.34	-22.44	31.71	4.56
	61	-4.63	-67.10	97.60	9.82	123	-2.28	-22.34	14.84	4.48
	63	-4.62	-65.18	48.08	9.41	125	-2.25	-22.58	13.26	4.43
	65	-4.59	-53.94	52.06	9.89	127	-2.20	-22.89	14.24	4.39
	67	-4.60	-70.86	47.63	9.72	129	-2.16	-20.77	13.25	4.35
	69	-4.63	-62.96	63.60	9.79	131	-2.14	-21.82	13.80	4.32
	71	-4.41	-56.60	43.94	9.20	133	-2.10	-24.27	12.58	4.29
	73	-4.24	-46.53	47.14	9.03	135	-2.07	-19.38	12.95	4.23
	75	-4.19	-60.18	61.08	8.79	137	-2.07	-19.73	14.53	4.23
	77	-3.98	-49.28	41.65	8.33	139	-2.08	-19.84	14.21	4.23
	79	-3.89	-43.90	38.57	8.23	141	-2.05	-18.14	14.99	4.19
	81	-3.87	-55.60	30.31	8.08	143	-2.03	-19.49	14.02	4.15
	83	-3.58	-49.64	53.57	8.06	145	-2.02	-20.93	13.64	4.12
	85	-3.44	-88.12	48.05	7.83	147	-1.99	-22.08	15.21	4.06
	87	-3.14	-87.53	83.29	7.69	149	-1.97	-22.69	14.52	4
	89	-2.90	-63.65	43.25	7.44	151	-1.93	-22.13	16.54	3.93
	91	-2.74	-53.35	47.50	7.08	153	-1.91	-21.72	17.97	3.88
	93	-2.67	-52.32	41.58	6.59	155	-1.86	-22.02	16.40	3.82
	95	-2.53	-50.20	46.87	6.38	157	-1.83	-22.34	17.03	3.75
	97	-2.46	-34.43	34.52	5.98	159	-1.82	-21.58	15.56	3.64
	99	-2.40	-41.50	52.05	5.78	161	-1.81	-20.82	15.65	3.59
	101	-2.41	-38	27.76	5.56	163	-1.80	-20.06	16.28	3.59
	103	-2.41	-38.48	31.40	5.46	165	-1.80	-18.72	15.92	3.54
	105	-2.43	-47.77	41.58	5.32	309	-2.19	-15.57	8.25	2.43
	107	-2.42	-34.03	31.98	4.89	459	-0.39	-15.94	12.45	2.77

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
V [$\mathrm{cm} \cdot s^{-1}$]	47	-5.85	-80.14	58.34	12.25	109	-3.58	-28.23	19.37	6.08
	49	-6.06	-62.54	86.04	11.49	111	-3.41	-31.51	48.96	6.21
	51	-6.25	-74.40	54.12	10.88	113	-3.33	-31.84	18.63	6.02
	53	-6.39	-99.96	29.62	10.47	115	-3.28	-33.75	17.45	5.99
	55	-6.21	-59.72	59.87	10.53	117	-3.21	-40.86	23.67	5.86
	57	-7.14	-152.35	44.29	11.02	119	-3.11	-30.48	25	5.76
	59	-7.27	-89.42	52.26	10.64	121	-3.02	-29.77	17.12	5.65
	61	-7.37	-103.15	50.21	10.41	123	-2.96	-29.88	17.26	5.59
	63	-7.20	-46.78	34.02	9.83	125	-2.87	-25.97	18.22	5.49
	65	-7.59	-92.85	44.67	10.42	127	-2.77	-25.25	18.06	5.42
	67	-7.48	-59.55	39.98	10.01	129	-2.70	-25.20	19.05	5.36
	69	-7.58	-57.31	35.40	9.91	131	-2.62	-23.80	18.92	5.29
	71	-7.31	-56.82	55.50	9.93	133	-2.54	-23.60	17.81	5.22
	73	-7.19	-57.48	40.89	9.82	135	-2.47	-22.79	18.20	5.12
	75	-7.22	-54	53	9.31	137	-2.41	-22.90	16.69	5.11
	77	-6.98	-50.05	43.22	9.22	139	-2.37	-23.90	16.61	5.07
	79	-6.96	-63.44	37.97	9.07	141	-2.28	-23.19	15.87	5.03
	81	-6.67	-43.22	48.83	8.94	143	-2.21	-23.59	16.38	4.97
	83	-6.47	-52.74	60.51	8.80	145	-2.15	-23.20	16.07	4.94
	85	-6.02	-52.63	39.53	8.69	147	-2.08	-22.81	16.78	4.89
	87	-5.75	-52.52	34.29	8.72	149	-2.02	-22.58	16.80	4.82
	89	-5.48	-73.66	46.70	8.37	151	-1.95	-21.67	17.08	4.75
	91	-5.14	-44.31	87.96	8.32	153	-1.88	-21.75	16.78	4.68
	93	-4.85	-60.76	52.35	7.96	155	-1.84	-23.53	15.63	4.60
	95	-4.64	-49.07	35.56	7.55	157	-1.77	-22.80	15.38	4.54
	97	-4.34	-31.02	55.65	7.32	159	-1.71	-22.06	14.83	4.43
	99	-4.21	-40.17	37.90	7.05	161	-1.66	-22.48	14.27	4.38
	101	-4.03	-35.37	36.90	6.94	163	-1.60	-22.91	14.03	4.37
	103	-3.90	-37.31	39.60	6.75	165	-1.52	-21.65	14.54	4.29
	105	-3.78	-39.28	29.83	6.61	309	0.09	-9.51	11.78	2.33
	107	-3.68	-28.16	22.85	6.25	459	0.33	-8.99	14.37	1.46

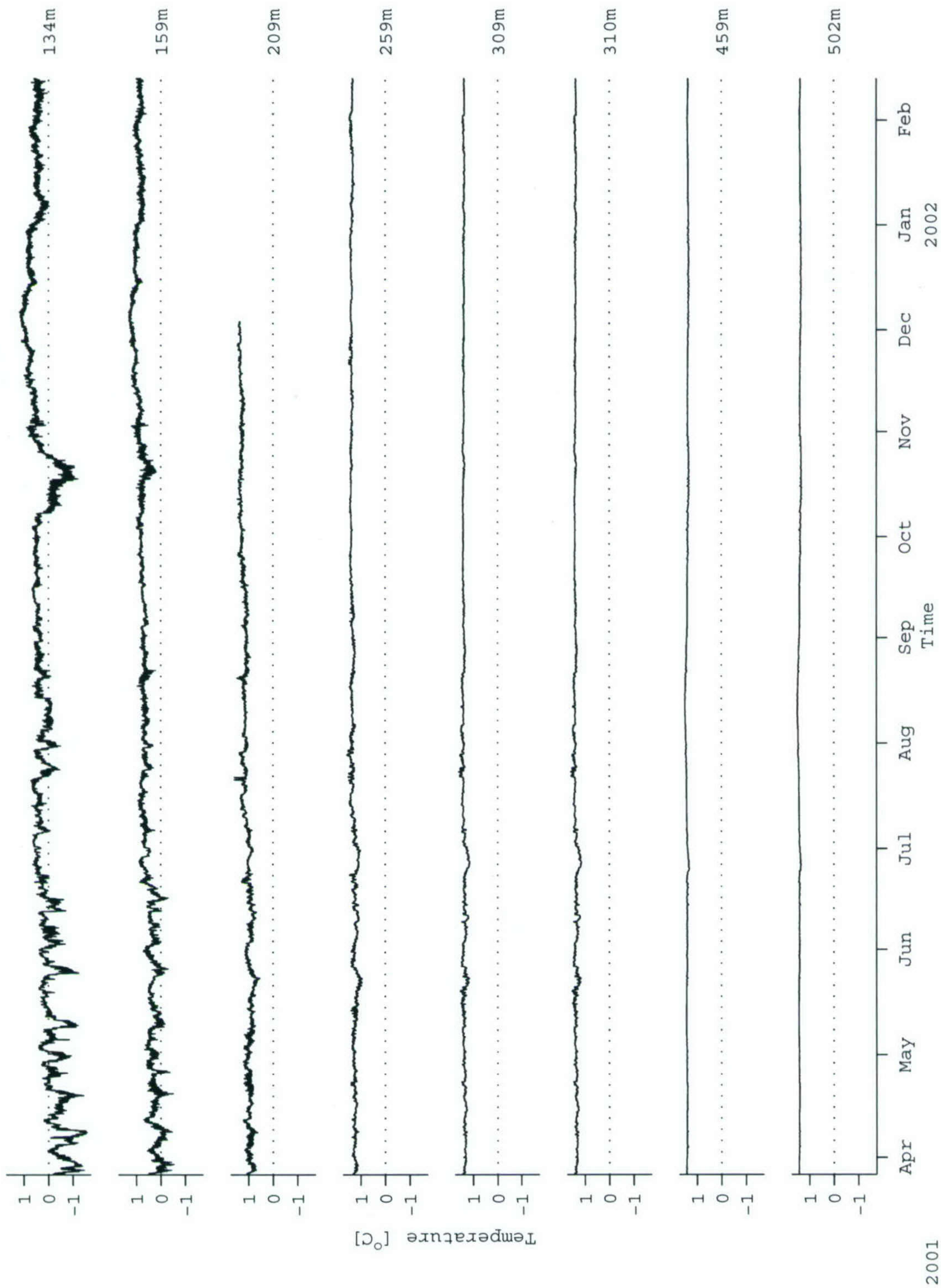

Figure 26: A1: Temperature records

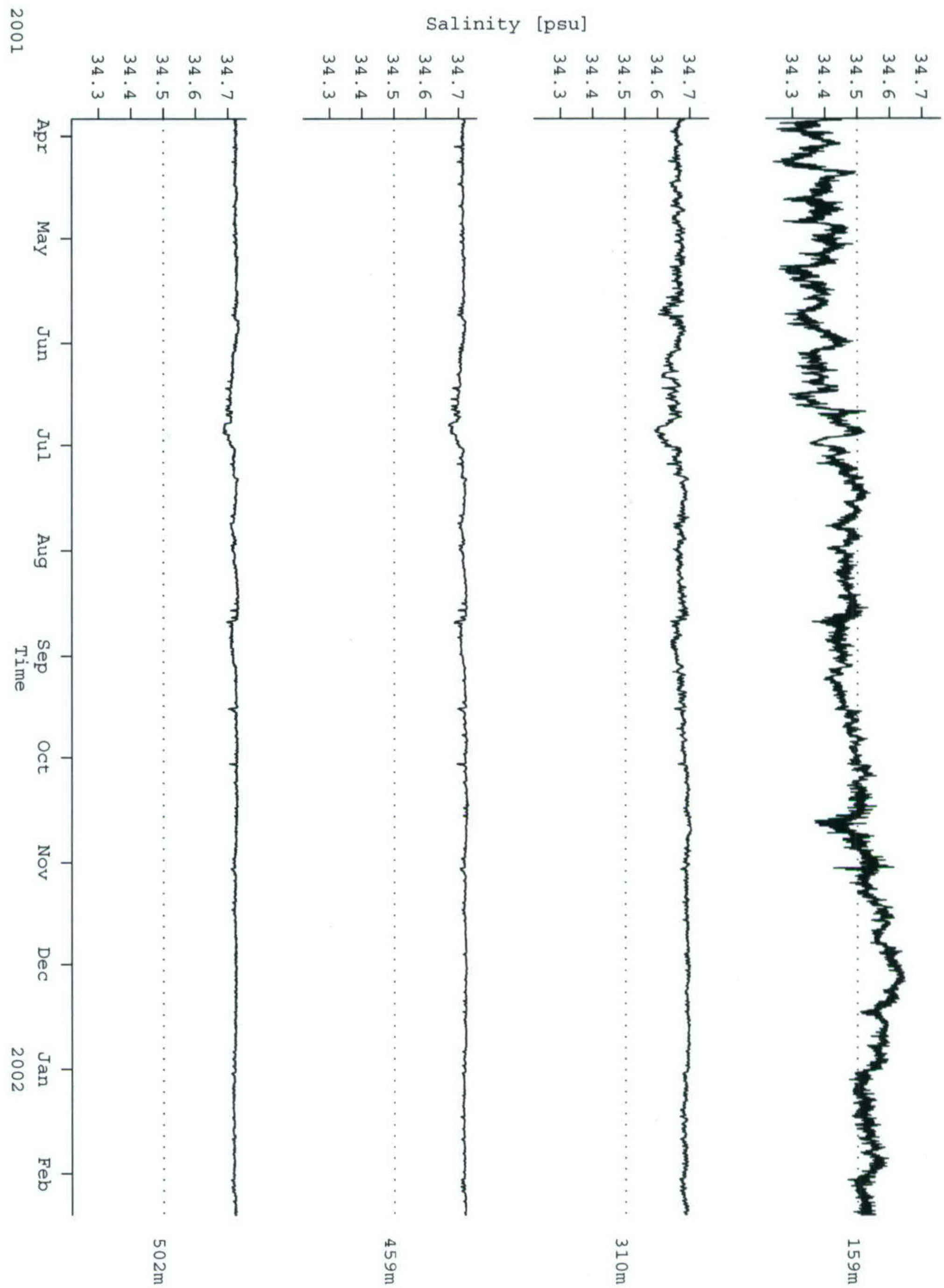

Figure 27: A1: Salinity records

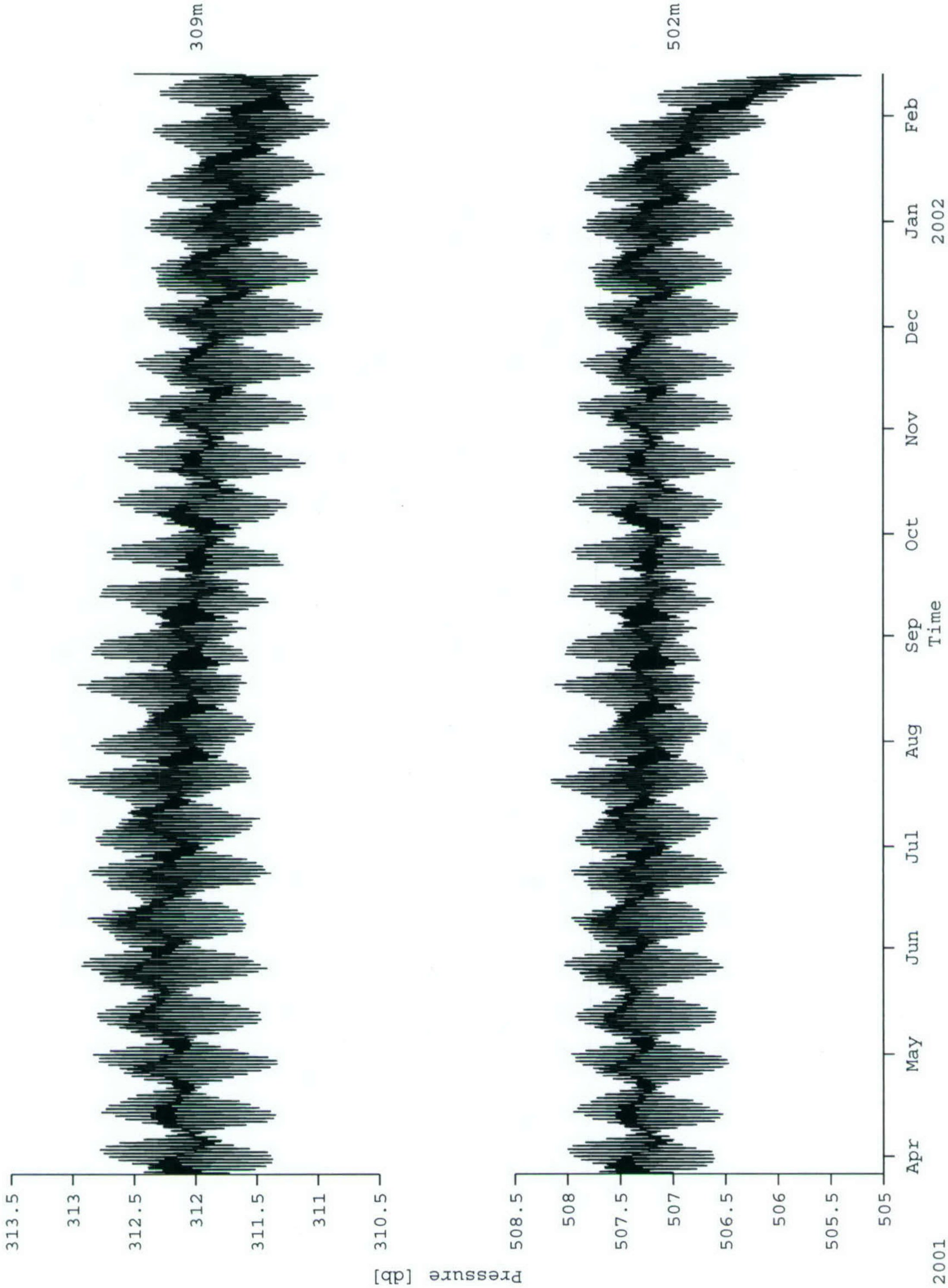

Figure 28: A1: Pressure records

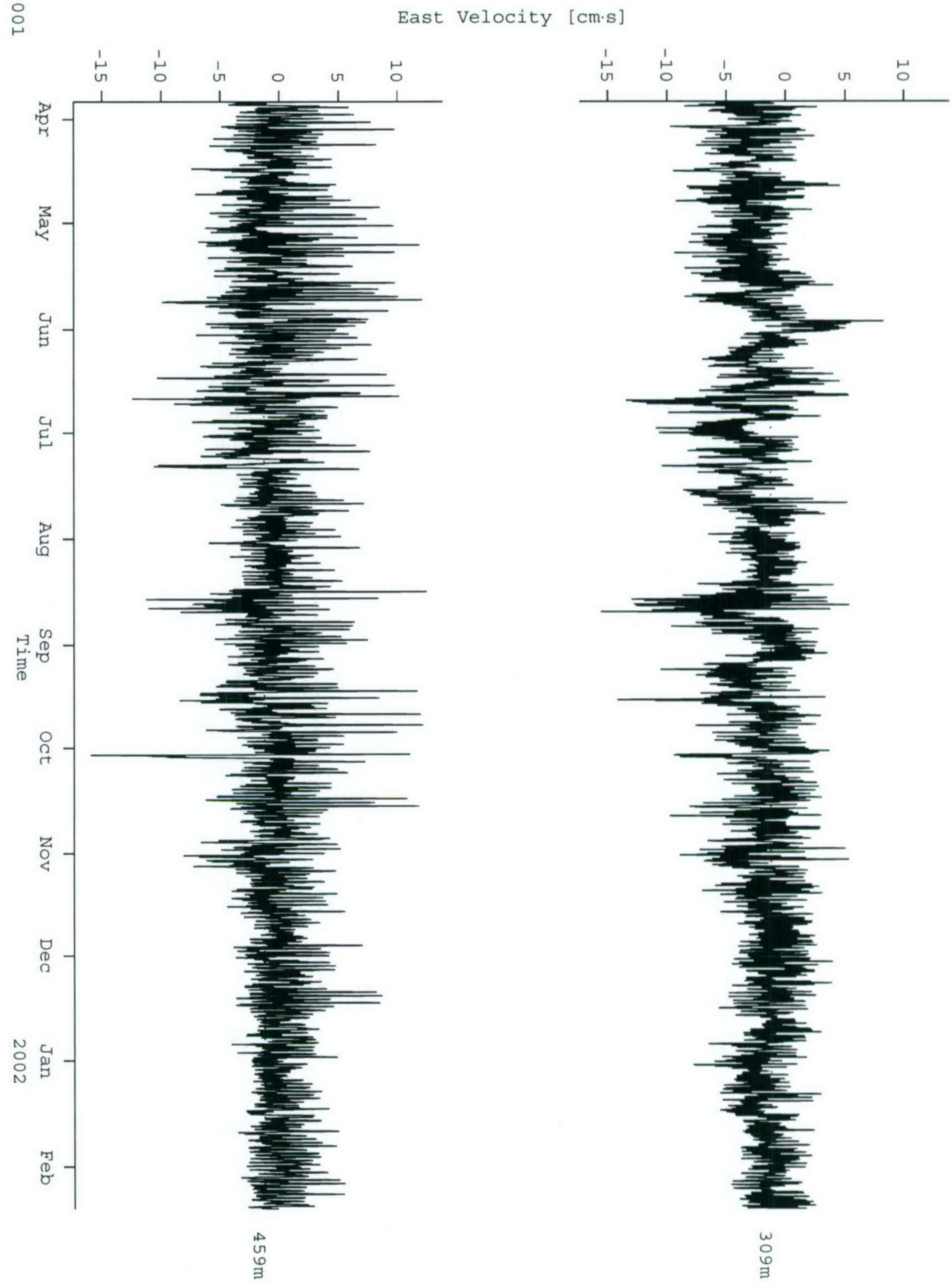

Figure 29: A1: VACM Velocities (East)

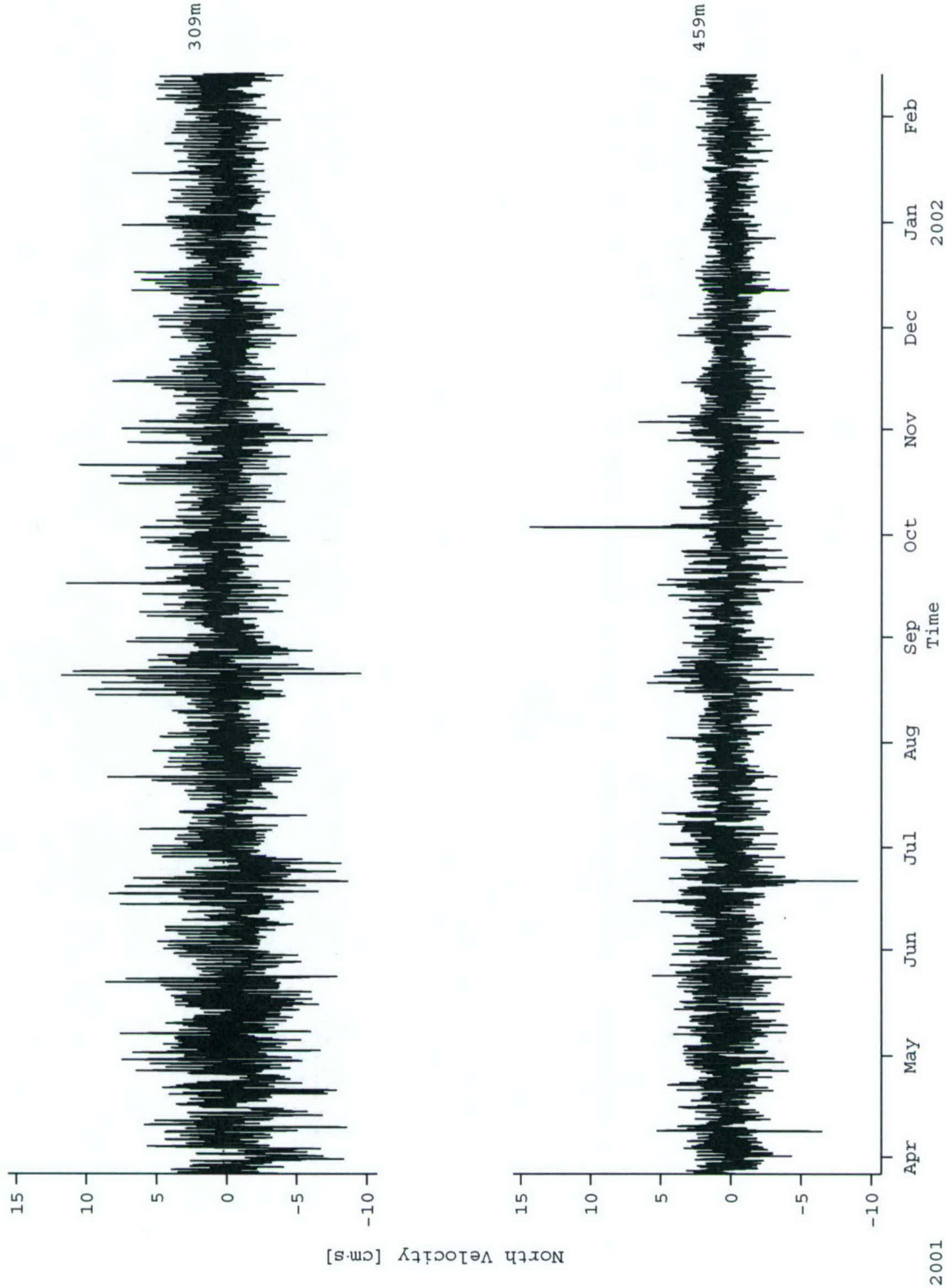

Figure 30: A1: VACM Velocities (North)

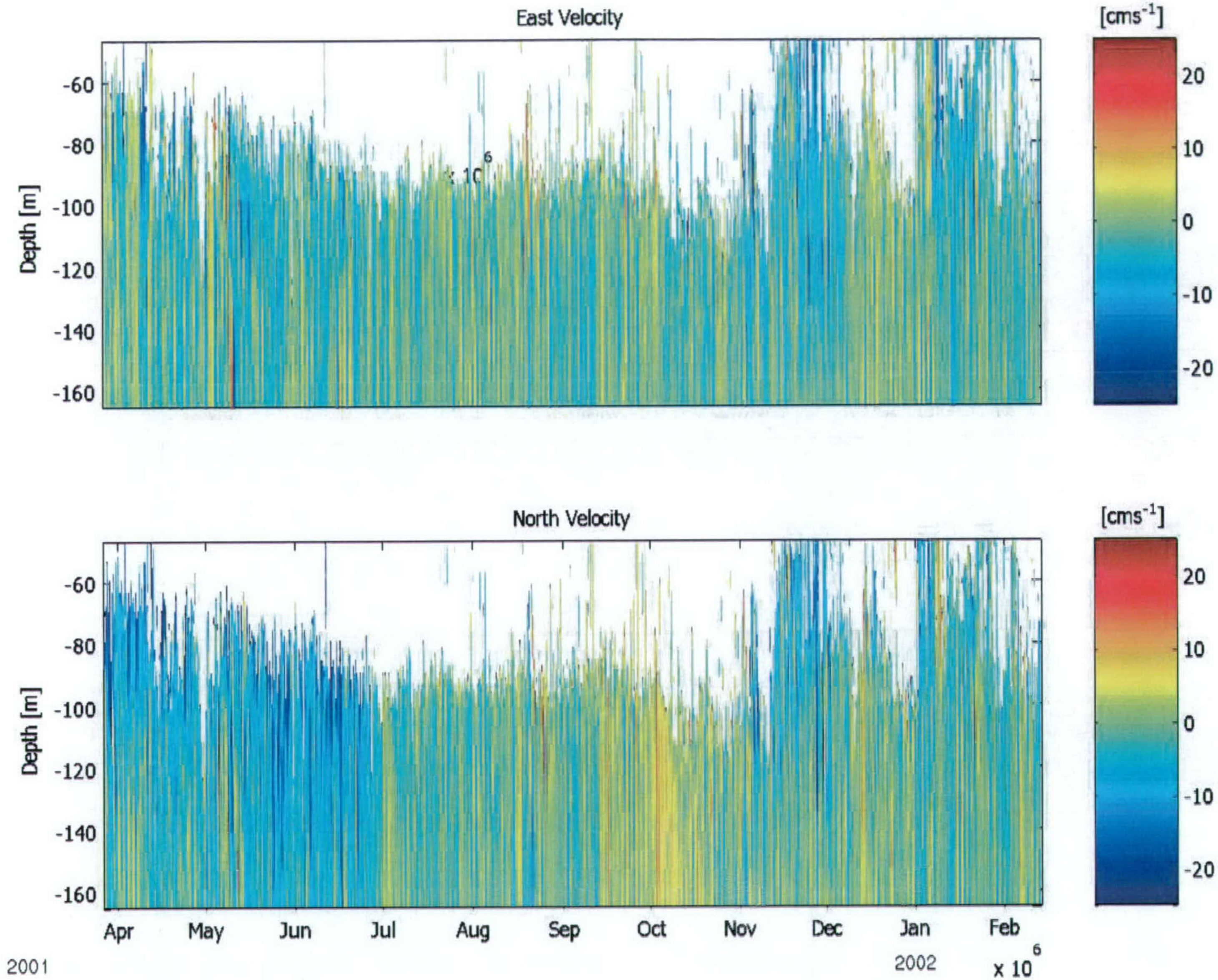

Figure 31: A1: ADCP Velocities

4.2 A2 Mooring

Table 14: Summary of processing of the A2 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, P: Pressure, IR: Ice Range, ID: Ice Draft

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	48	-1.21	-1.85	1.23	0.71
	97	-0.67	-1.84	0.55	0.62
	107	-0.32	-1.82	1	0.57
	147	0.70	-0.78	1.62	0.26
	197	1.23	0.67	1.87	0.18
	247	1.41	1.10	1.86	0.12
	248	1.41	1.11	1.86	0.11
	397	1.41	1.33	1.66	0.05
	554	1.22	0.93	1.44	0.08
S [psu]	48	33.87	33.68	34.07	0.07
	97	34.20	33.88	34.47	0.14
	107	34.29	33.82	34.53	0.13
	248	34.67	34.60	34.72	0.02
	397	34.71	34.69	34.74	0.01
	554	34.72	34.68	34.74	0.01
P [db]	47	45.19	44.11	46.21	0.36
	247	250.75	249.85	251.61	0.33
	554	560.53	559.67	561.39	0.33
IR [m]	47	44.28	39.13	45.90	0.76
ID [m]	47	0.49	-0.53	5.56	0.66
U [$cm \cdot s^{-1}$]	107	3.85	-22.09	27.27	5.33
	247	4.04	-12.00	17.77	3.43
	397	4.60	-9.81	17.90	3.61
V [$cm \cdot s^{-1}$]	107	-4.09	-25.01	22.18	5.58
	247	-4.24	-19.24	12.54	3.79
	397	-3.67	-21.08	10.09	3.74

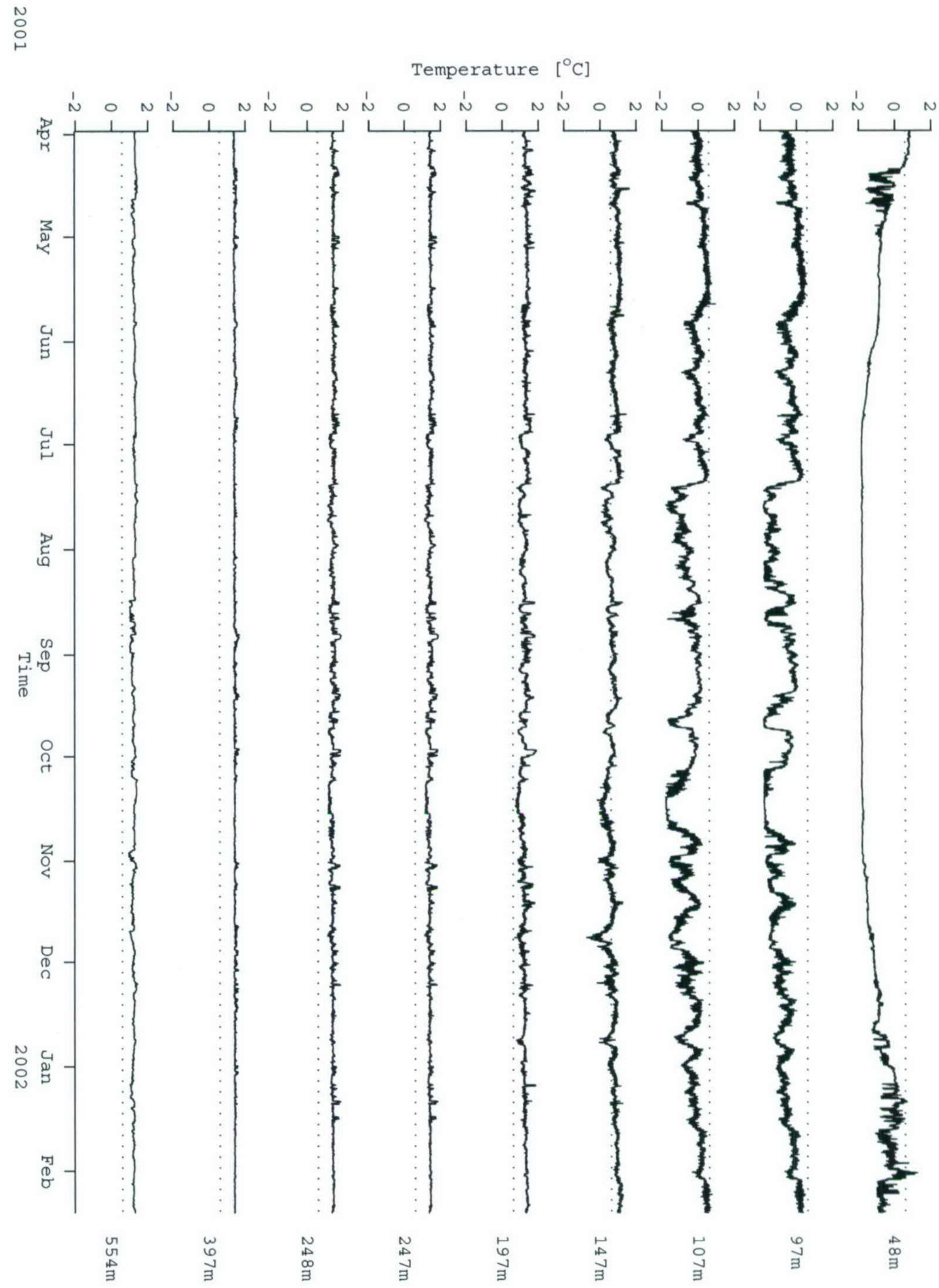

Figure 32: A2: Temperature records

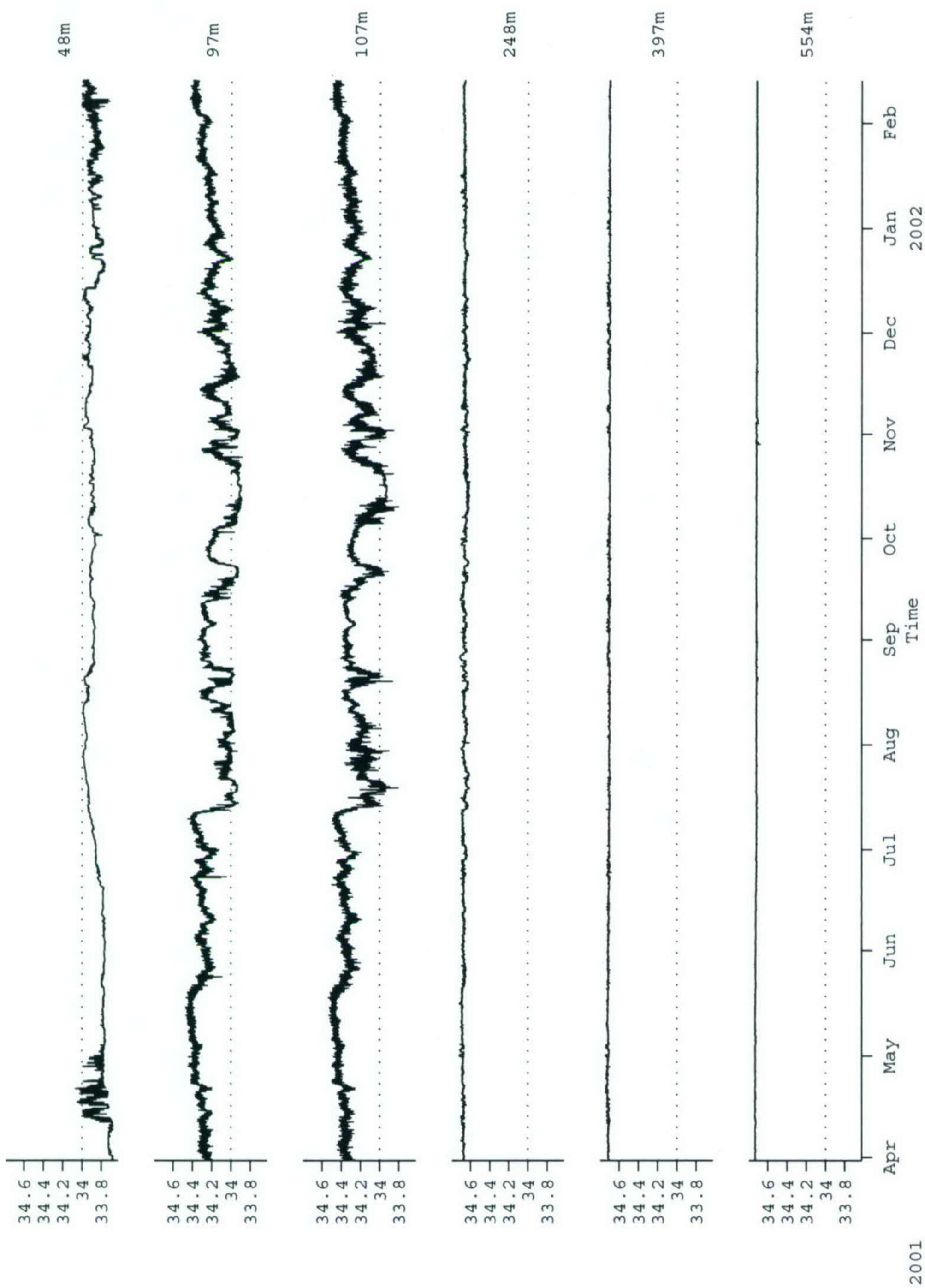

Figure 33: A2: Salinity records

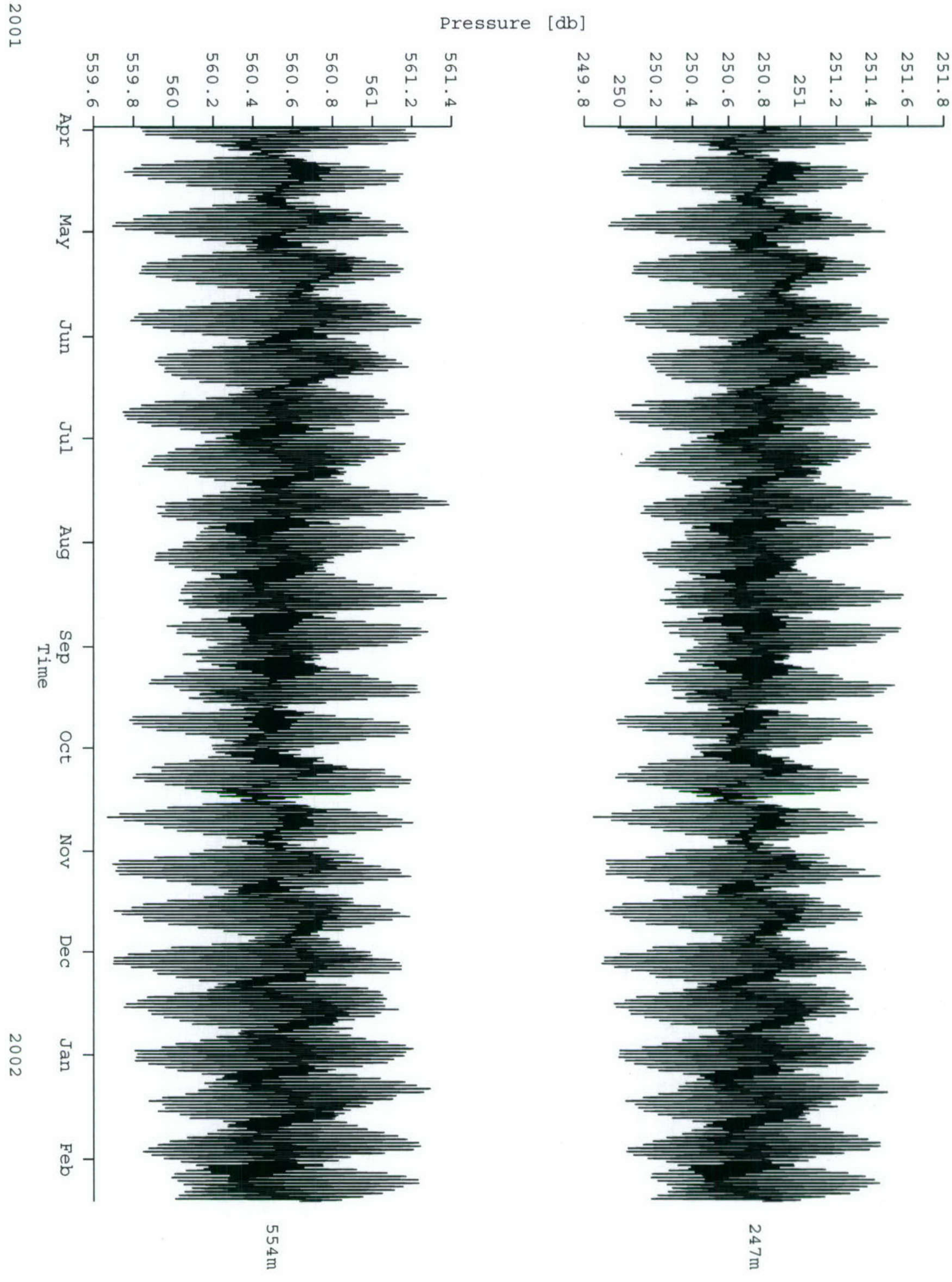

Figure 34: A2: Pressure records

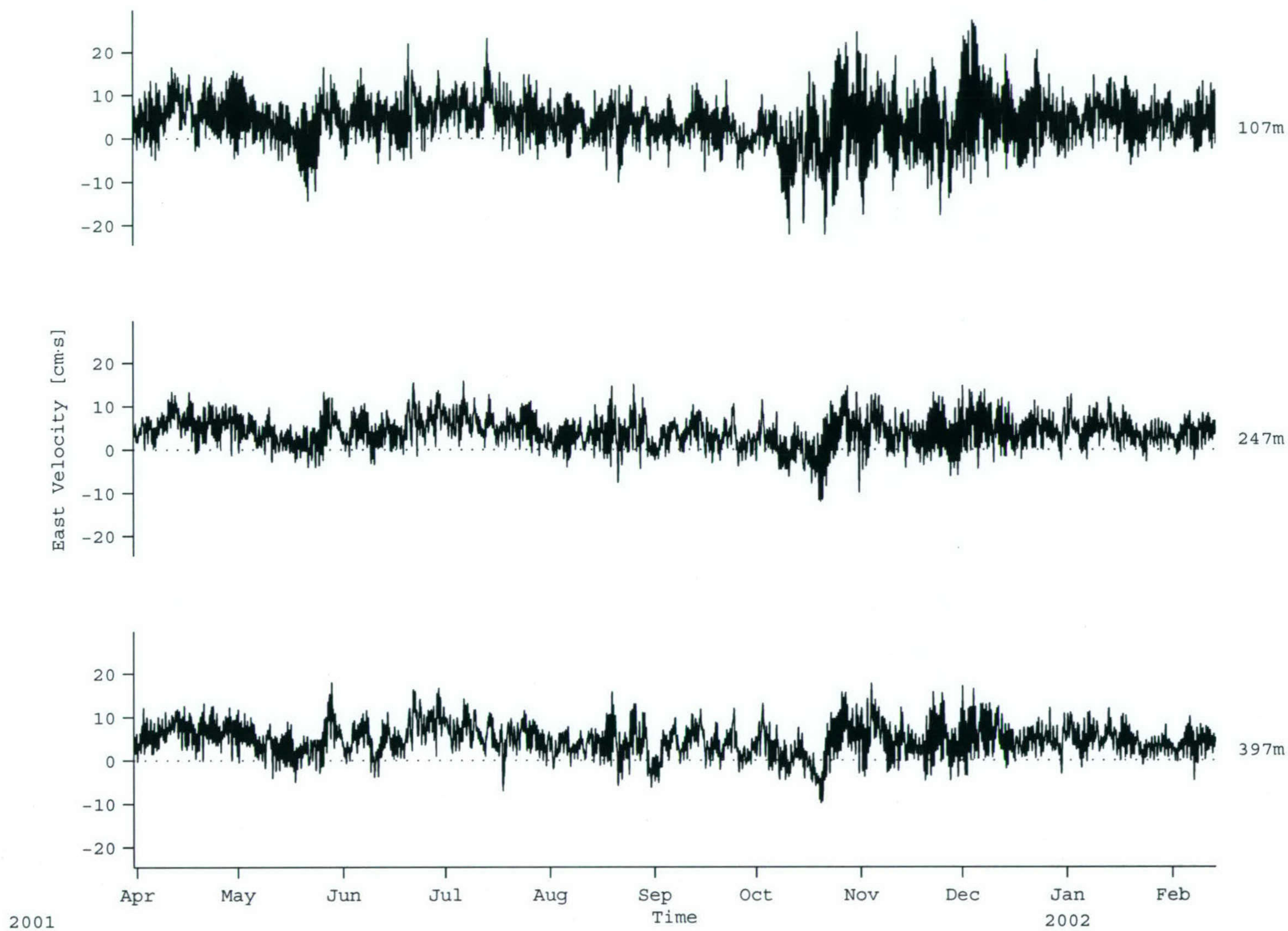

Figure 35: A2: VACM Velocity (East)

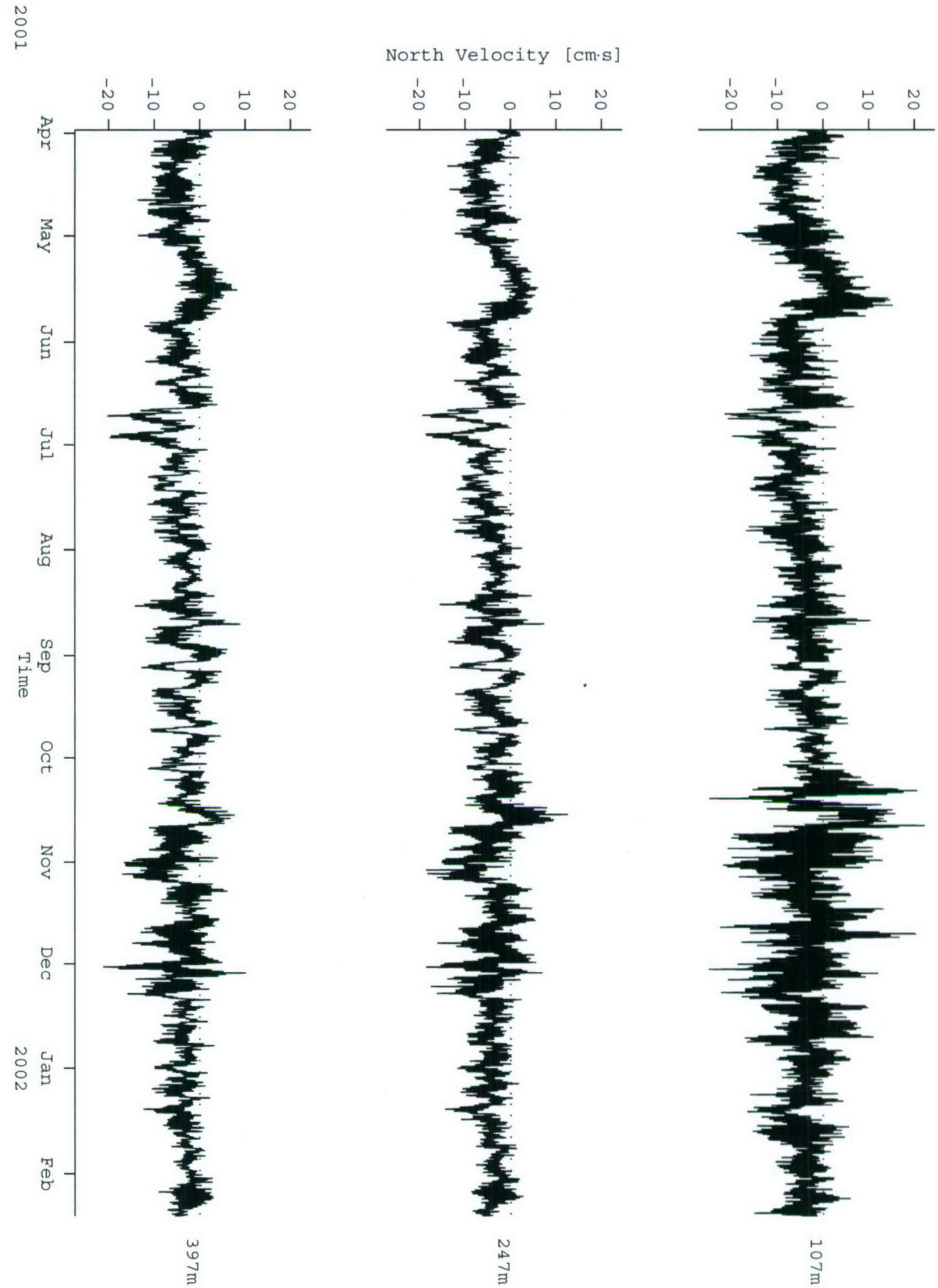

Figure 36: A2: VACM Velocity (North)

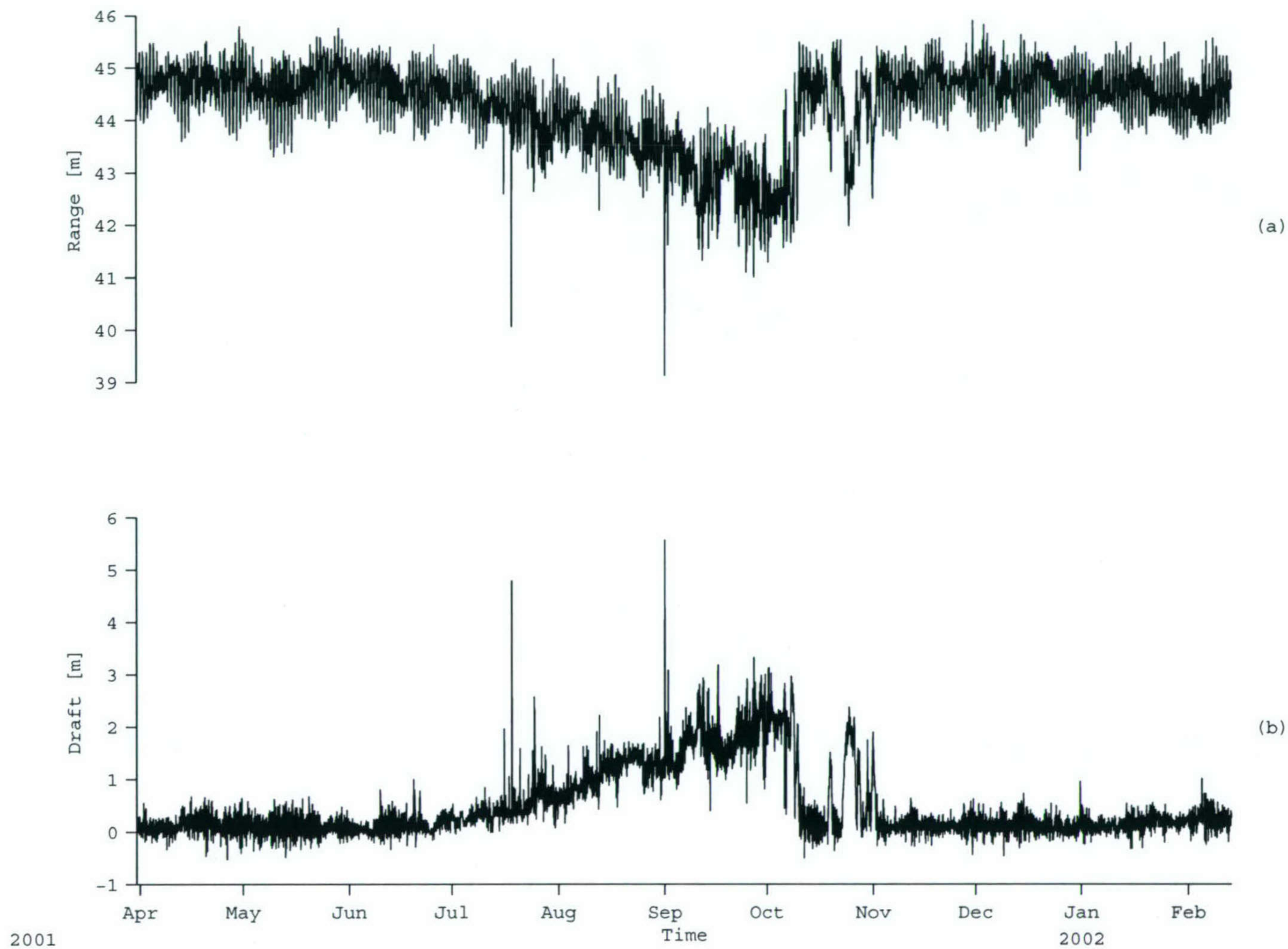

Figure 37: A2: Ice Profiler range (top panel) and draft (bottom panel)

4.3 A3 Mooring

Table 15: Summary of processing of the A3 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, W: Vertical Velocity P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	153	0.91	0.03	1.40	0.17
	203	1.32	1	1.72	0.09
	253	1.39	1.21	1.75	0.06
	254	1.39	1.21	1.75	0.06
	403	1.37	1.31	1.57	0.03
	480	1.31	1.10	1.38	0.03
S [psu]	254	34.68	34.64	34.73	0.01
	403	34.71	34.70	34.74	0.01
	480	34.71	34.70	34.73	0.01
P [db]	103	103.13	102.19	104.03	0.34
	253	255.74	254.09	256.80	0.46
	480	485.52	484.67	486.38	0.33
U [cm $\cdot s^{-1}$]	103	-0.26	-35.91	25.26	6.80
	253	-0.19	-16.47	18.88	4.22
	403	-0.26	-18.14	16.45	4.26
V [cm $\cdot s^{-1}$]	103	1.54	-24.66	29.87	6.22
	253	0.82	-13.84	17.68	3.77
	403	0.91	-12.87	18.6	3.92

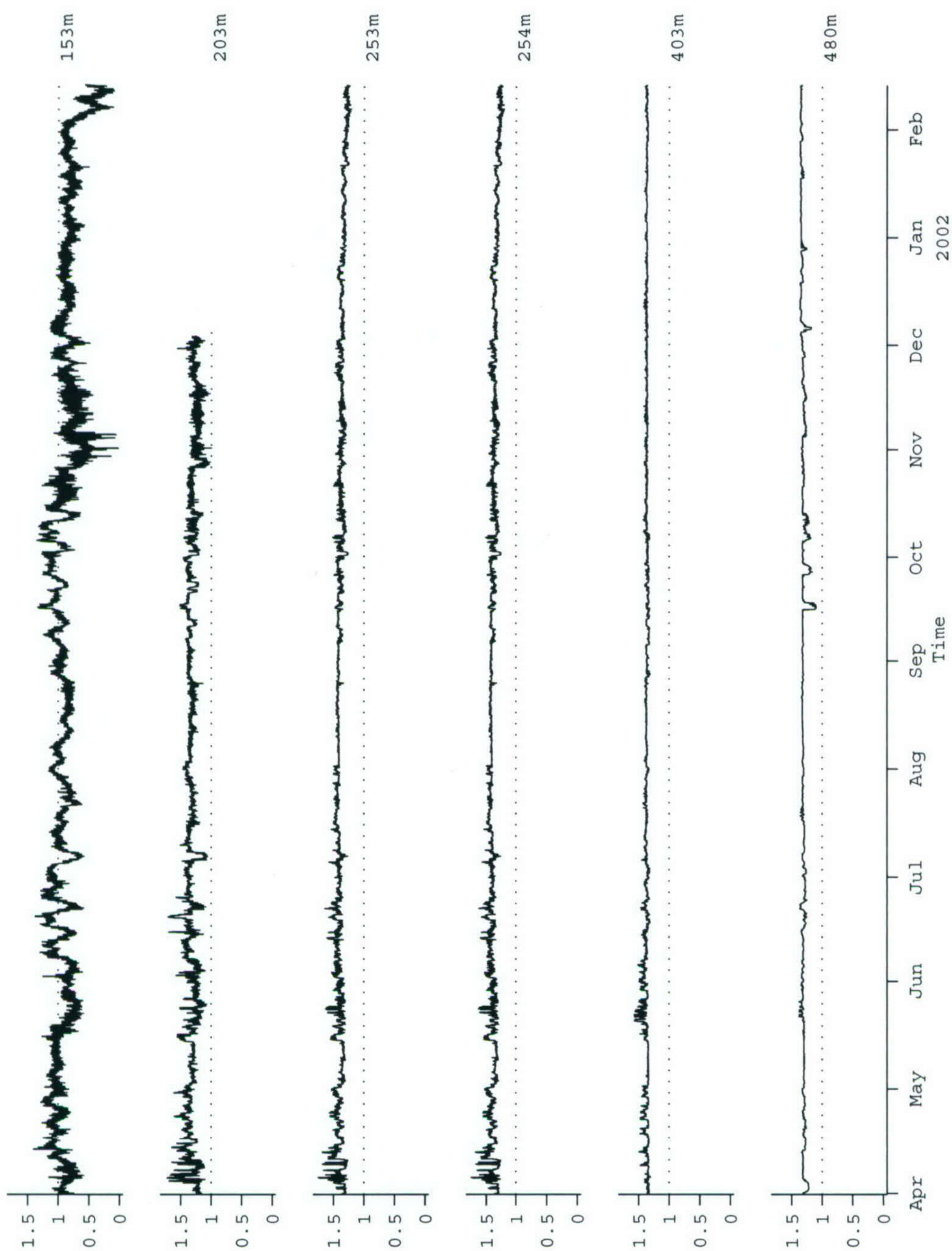

Figure 38: A3: Temperature records

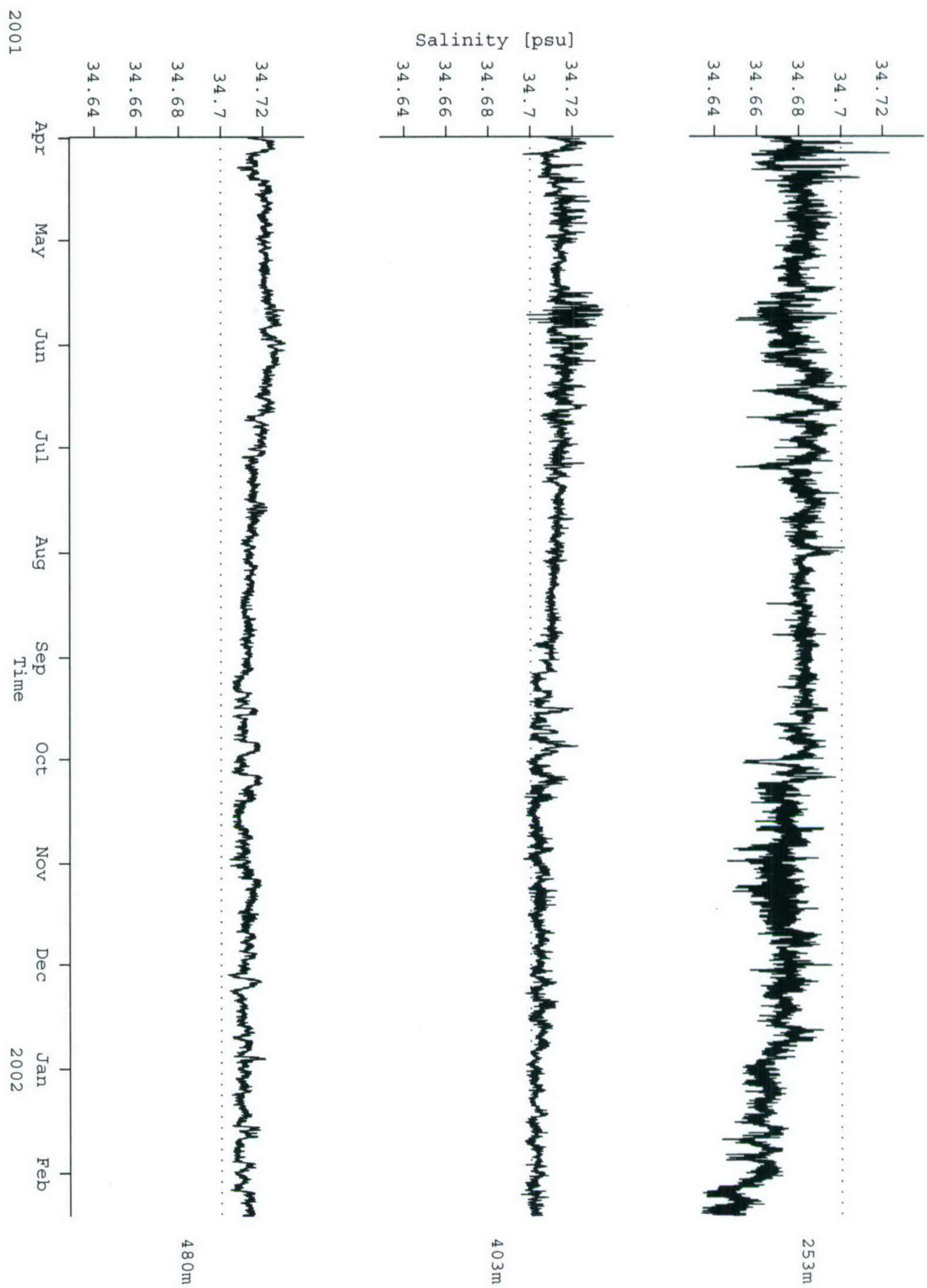

Figure 39: A3: Salinity records

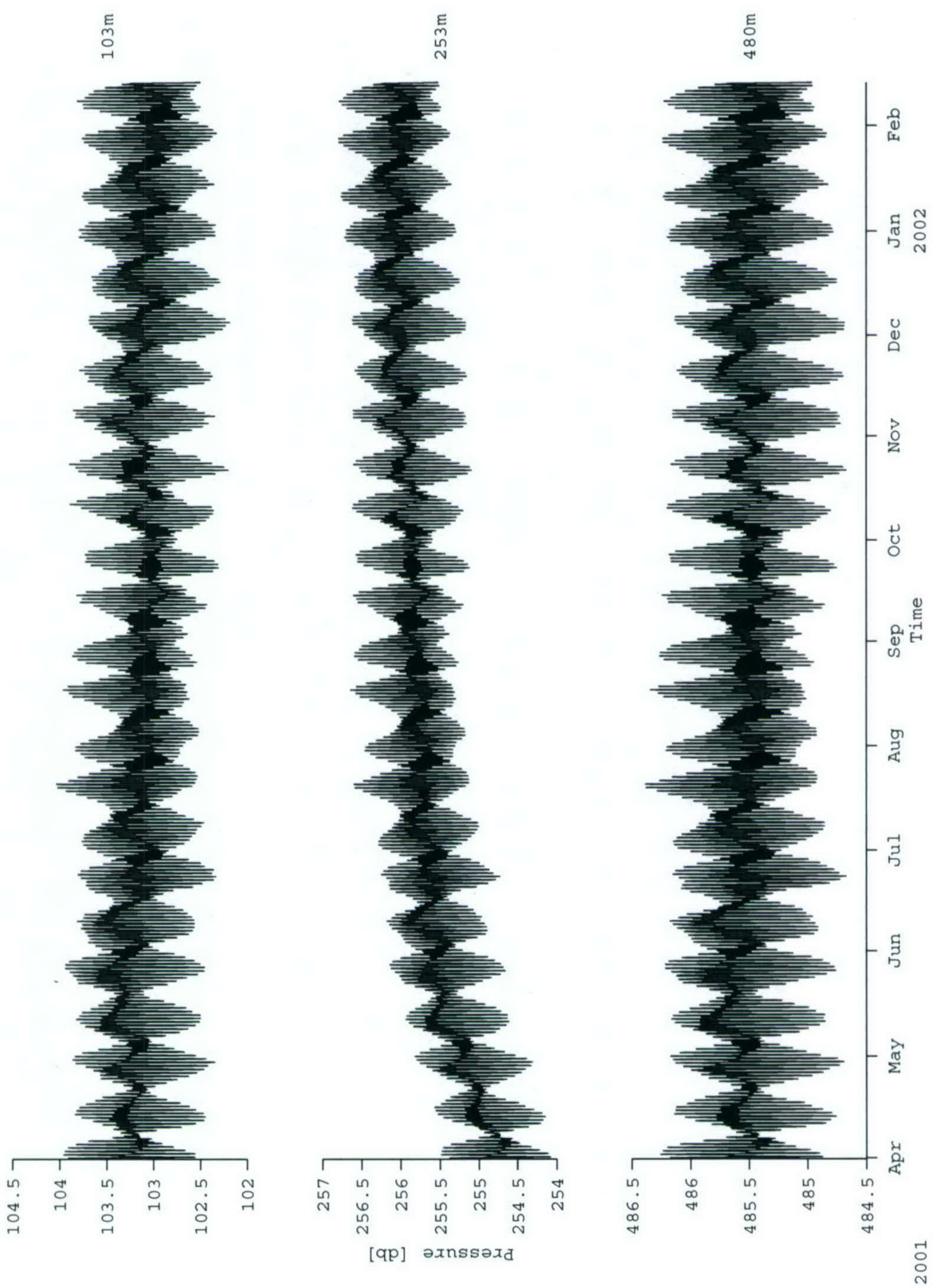

Figure 40: A3: Pressure records

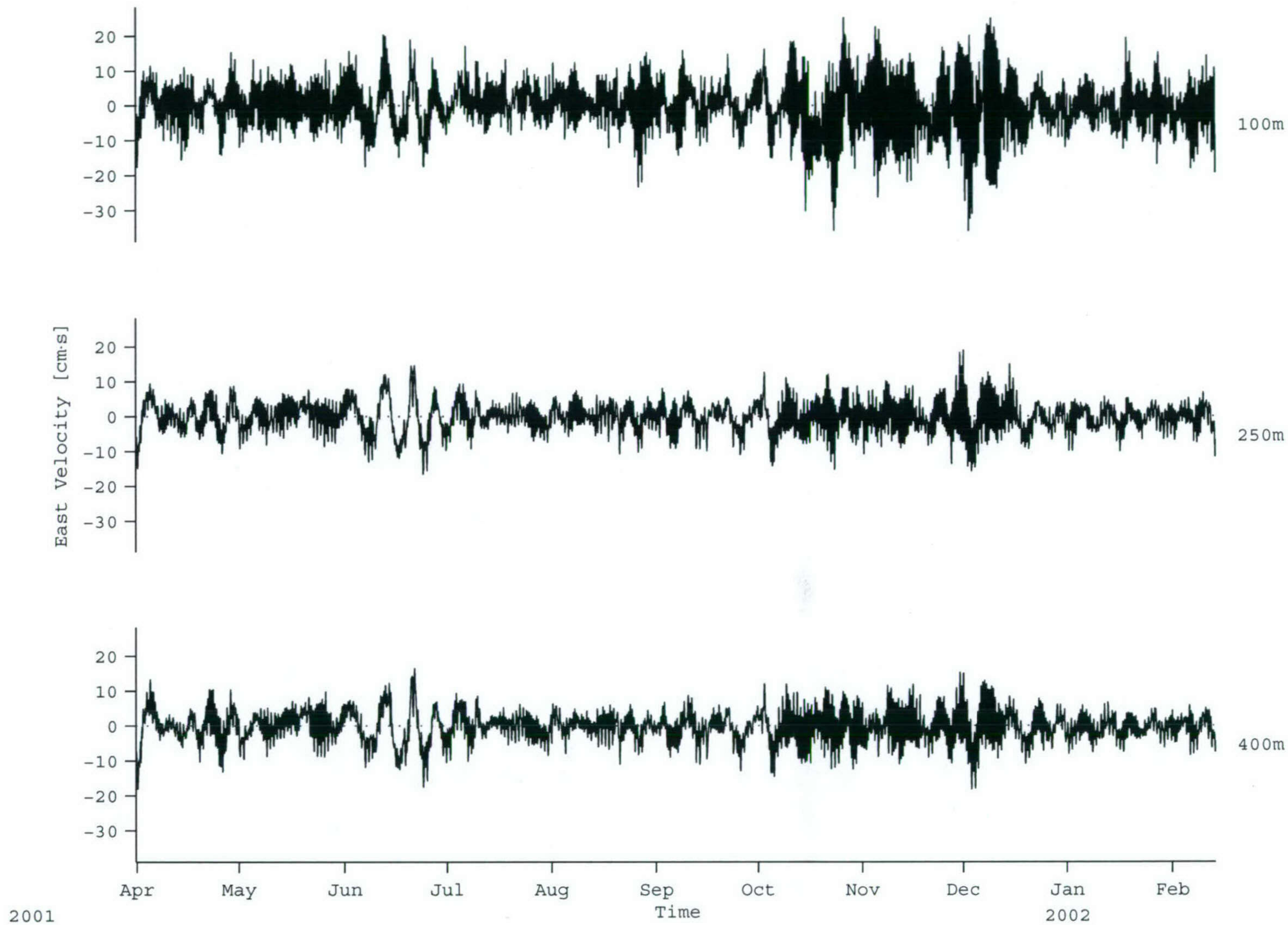

Figure 41: A3: VACM Velocity (East)

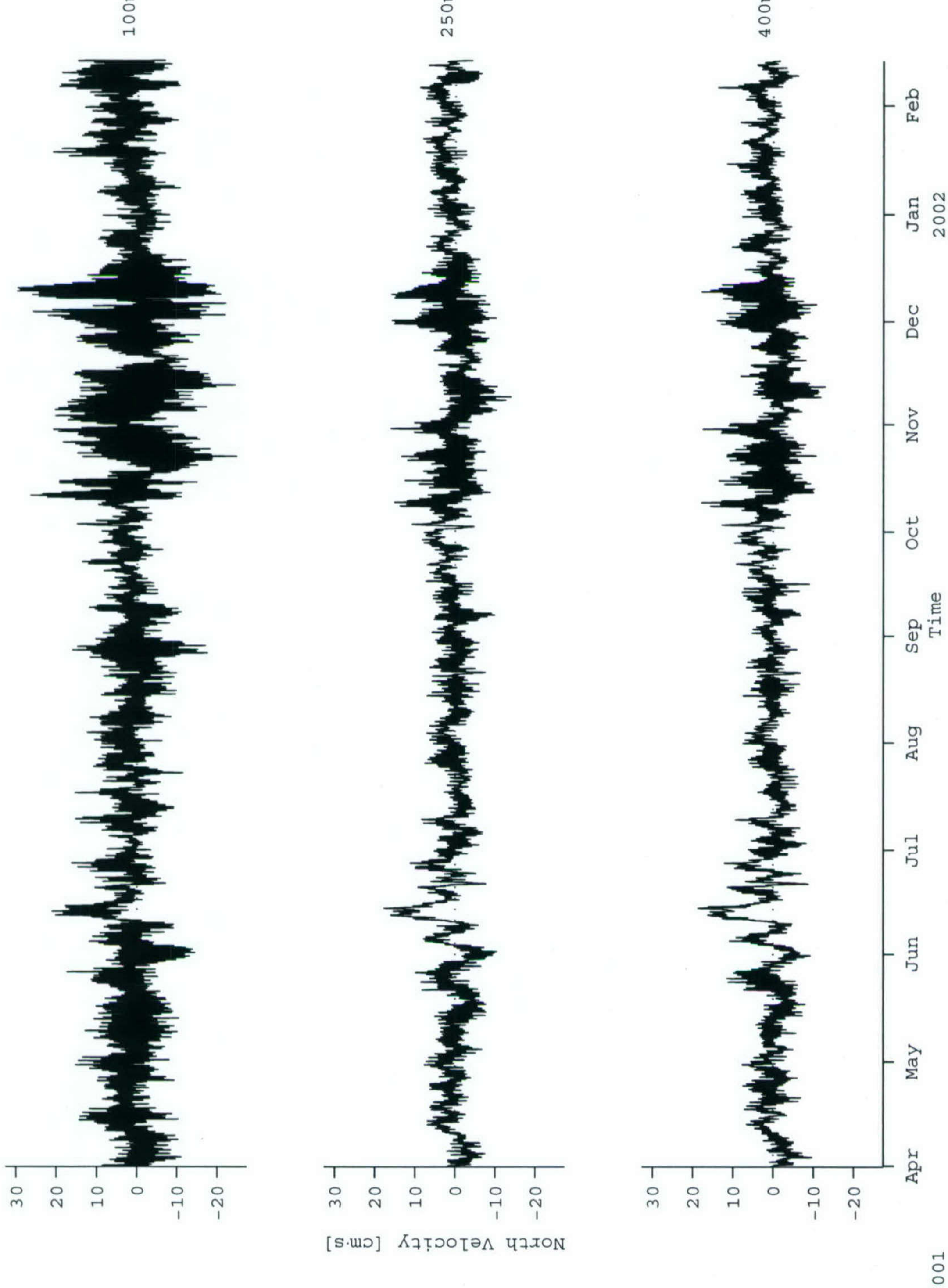

Figure 42: A3: VACM Velocity (North)

4.4 B2 Mooring

Table 16: Summary of processing of the B2 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, W: Vertical Velocity P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [°C]	50	-0.99	-1.85	0.53	0.61
	75	-0.87	-1.83	-0.01	0.37
	100	-1.03	-1.85	0.38	0.61
	120	-1.12	-1.85	0.34	0.48
	125	0.11	-1.01	0.72	0.35
	140	-0.45	-1.78	0.77	0.52
	150	0.08	-1.35	1.01	0.56
	175	0.52	-0.43	1.21	0.41
	200	0.83	0.25	1.35	0.30
	225	1.05	0.58	1.47	0.21
	250	1.20	0.79	1.50	0.14
	804	1.30	1.27	1.33	0.01
S [psu]	50	33.72	33.50	33.97	0.08
	100	34.03	33.75	34.41	0.18
	140	34.17	33.95	34.51	0.13
	150	34.32	34.04	34.56	0.15
	200	34.52	34.35	34.65	0.08
	250	34.62	34.52	34.68	0.04
	804	34.71	34.70	34.73	0.01
P [db]	50	48.62	47.68	49.54	0.34
	140	141.41	140.52	142.32	0.33
	804	813.21	812.34	814.07	0.33
IR [m]	50	46.41	24.25	47.71	0.78
ID [m]	50	0.23	-0.61	22.32	0.69

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
U [$\mathrm{cm} \cdot s^{-1}$]	31.70	-0.42	-36.74	50.82	7.16	169.70	0.24	-13.04	14.42	3.47
	37.70	-0.22	-26.92	55.01	6.71	175.70	0.26	-13.17	11.92	3.37
	43.70	-0.24	-23.13	46.89	6.54	181.70	0.29	-12.50	13.01	3.34
	49.70	-0.34	-34.71	42.10	6.52	187.70	0.30	-13.46	12.55	3.33
	55.70	-0.27	-32.06	38.33	6.27	193.70	0.33	-11.49	11.03	3.27
	61.70	-0.50	-25.86	35.04	5.89	199.70	0.35	-12.48	12.92	3.14
	67.70	-0.48	-22.05	32.32	5.67	205.70	0.35	-12.93	13.59	3.05
	73.70	-0.41	-19.79	26.25	5.48	211.70	0.35	-11.58	11.13	3
	79.70	-0.38	-24.24	23.92	5.30	217.70	0.32	-11.10	10.40	2.94
	85.70	-0.40	-20.57	18.67	5.06	223.70	0.32	-12.60	10	2.89
	91.70	-0.31	-23.56	17.87	4.91	229.70	0.34	-12.09	10.45	2.81
	97.70	-0.30	-28.32	22.50	4.72	235.70	0.32	-10	9.64	2.77
	103.70	-0.18	-17.42	21.71	4.43	241.70	0.36	-9.40	9.87	2.71
	109.70	-0.13	-17.71	18.33	4.39	247.70	0.32	-9.62	11.02	2.64
	115.70	-0.11	-19.47	20.60	4.27	253.70	0.33	-8.90	9.92	2.55
	121.70	-0.14	-19.09	21.52	4.24	259.70	0.36	-9.61	9.44	2.53
	127.70	-0.09	-16.46	19.26	4.20	265.70	0.38	-8.84	15.52	2.48
	133.70	-0.04	-17.24	19.41	4.17	271.70	0.35	-8.34	14.49	2.46
	139.70	-0.01	-16.58	17.72	4.10	277.70	0.37	-8.67	8.96	2.41
	145.70	-0.02	-15.39	15.83	3.73	283.70	0.36	-8.58	9.86	2.38
	151.70	0.06	-15.32	16.24	3.11	289.70	0.33	-9.04	9.28	2.37
	157.70	0.12	-15.02	13.53	3.11	400	0.37	-5.20	8.02	1.34
	163.70	0.19	-14.72	12.92	3.58					

V [cm $\cdot s^{-1}$]	31.70	3.40	-28.52	41.19	6.54	169.70	3.10	-9.74	18.50	4.04
	37.70	3.22	-22.25	25.02	6.07	175.70	3.08	-10.10	16.27	3.97
	43.70	3.15	-22.17	24.34	6.27	181.70	3.09	-10.33	17.52	3.89
	49.70	3.01	-25.82	36.74	6.31	187.70	3.12	-10.06	15.81	3.85
	55.70	3.01	-21.54	29.22	6.15	193.70	3.13	-9.16	20.03	3.78
	61.70	2.91	-22.02	27.34	5.93	199.70	3.13	-10.30	15.43	3.67
	67.70	2.80	-17.39	28.94	5.66	205.70	3.13	-10.54	15.68	3.58
	73.70	2.80	-19.85	26.63	5.59	211.70	3.14	-8.72	16.14	3.49
	79.70	2.57	-28.55	27.98	5.50	217.70	3.16	-9.02	15.70	3.47
	85.70	2.66	-18.39	27.25	5.38	223.70	3.13	-9.66	15.53	3.43
	91.70	2.73	-19.65	24.34	5.14	229.70	3.11	-9.30	17.11	3.35
	97.70	2.60	-21.13	25.60	5.10	235.70	3.14	-6.73	16	3.31
	103.70	2.63	-16.95	20.39	4.89	241.70	3.14	-7.43	14.88	3.26
	109.70	2.65	-22.28	21.06	4.86	247.70	3.15	-6.83	16.68	3.22
	115.70	2.76	-15.82	21.64	4.77	253.70	3.11	-6.93	17.20	3.10
	121.70	2.73	-16.85	21.57	4.70	259.70	3.16	-6.08	14.04	3.10
	127.70	2.77	-15.76	21.02	4.61	265.70	3.14	-5.74	15.08	3.07
	133.70	2.82	-16.84	19.37	4.57	271.70	3.11	-6.53	14.59	2.99
	139.70	2.84	-16.48	20.26	4.59	277.70	3.13	-6.92	15.66	2.99
	145.70	2.79	-15.62	20.56	4.25	283.70	3.14	-6.02	15.49	2.99
	151.70	2.53	-12.61	17.94	3.70	289.70	3.13	-7.29	14.07	2.99
	157.70	2.79	-10.84	18.26	3.70	400	2.23	-3.77	11.77	2.30
	163.70	3.06	-11.48	19.24	4.12					

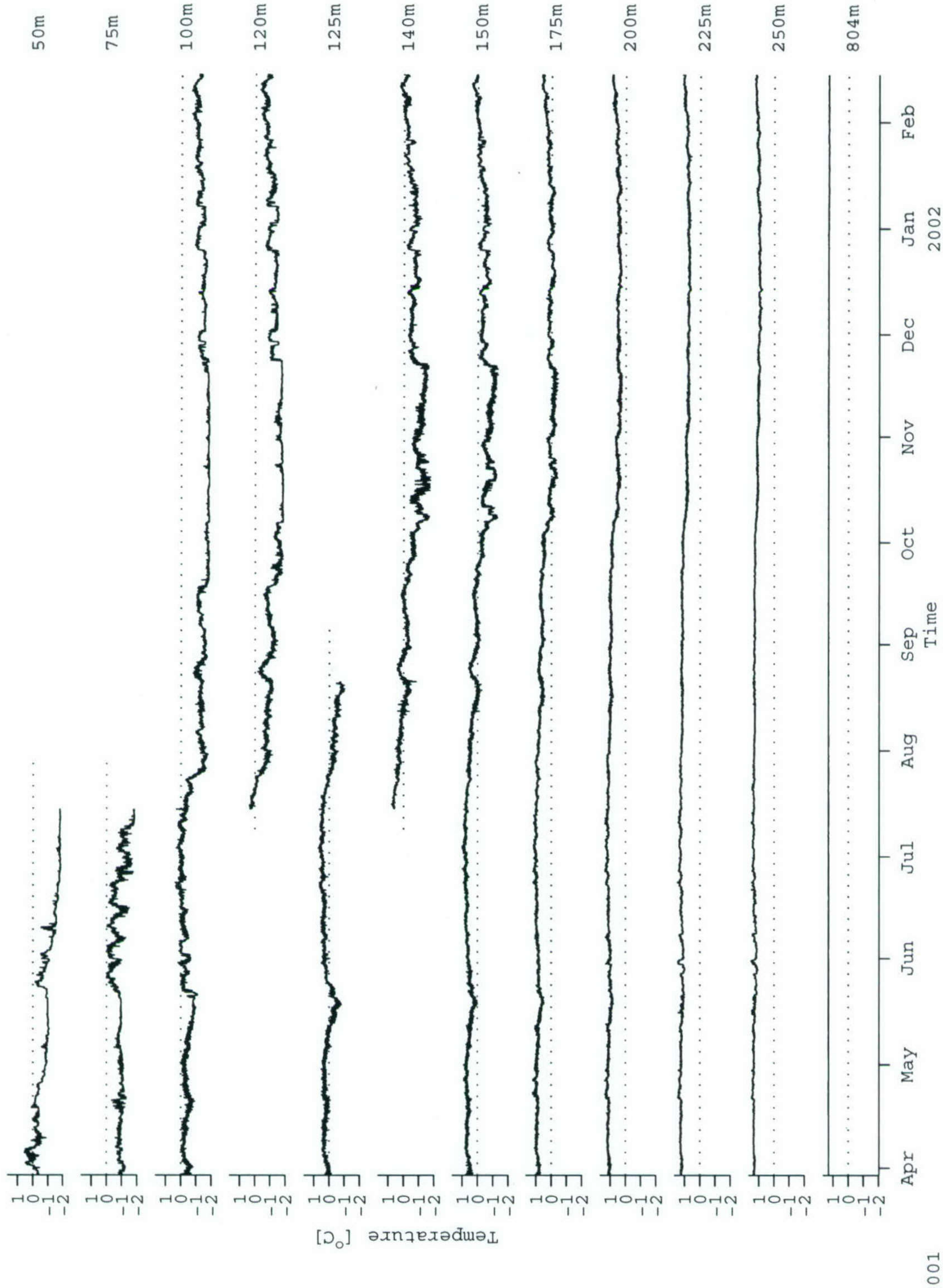

Figure 43: B2: Temperature records

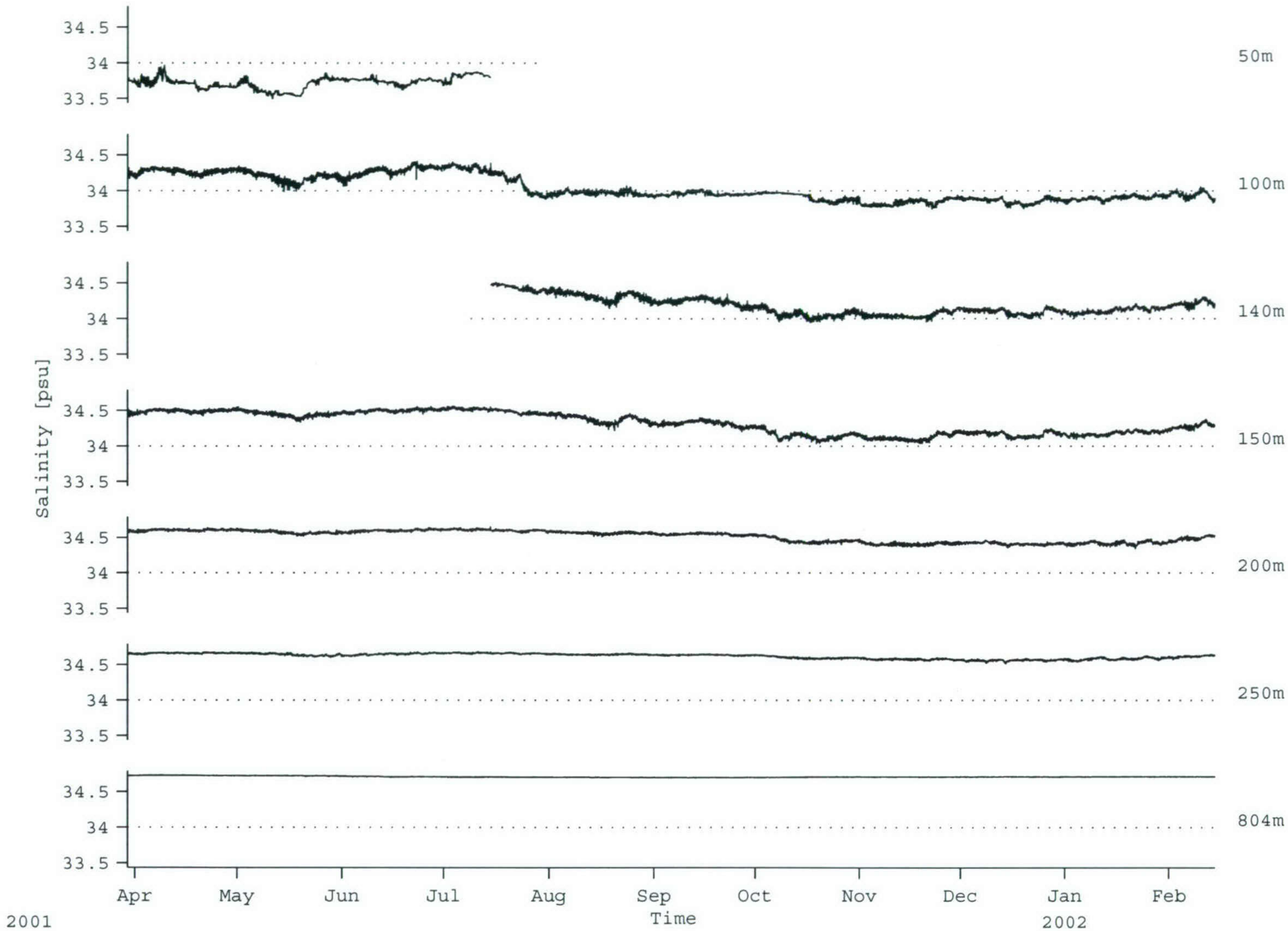

Figure 44: B2: Salinity records

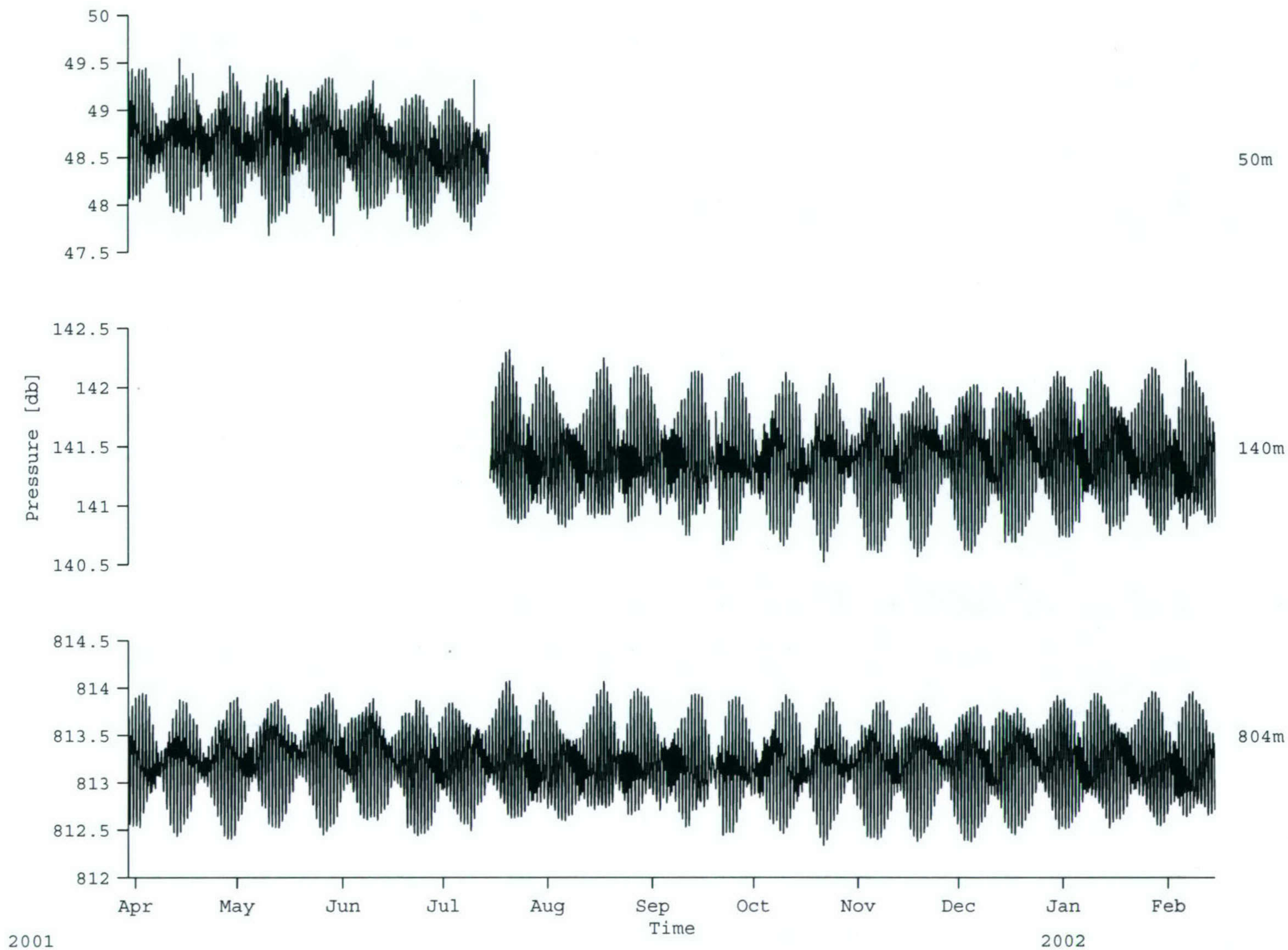

Figure 45: B2: Pressure records

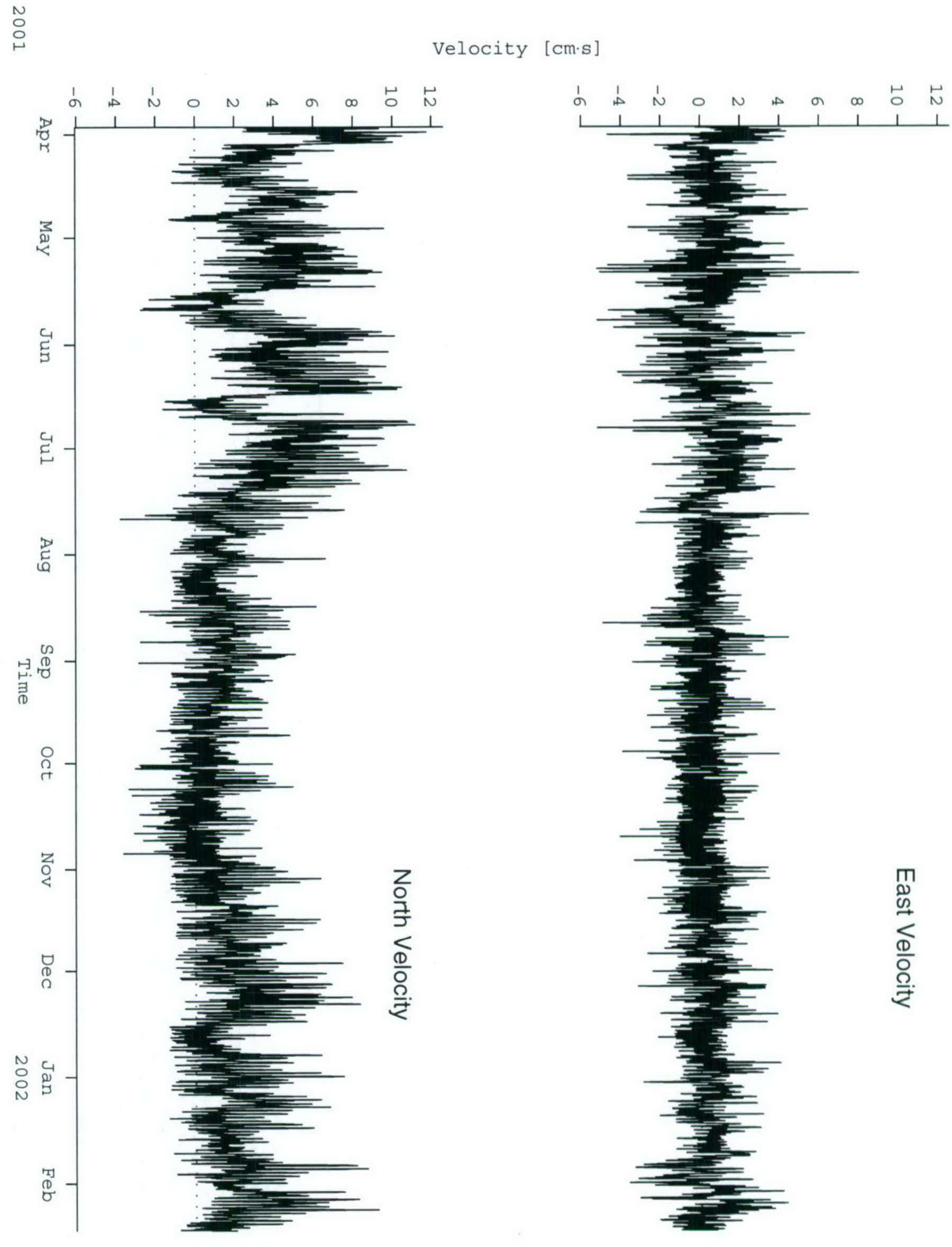

Figure 46: B2: VACM Velocity

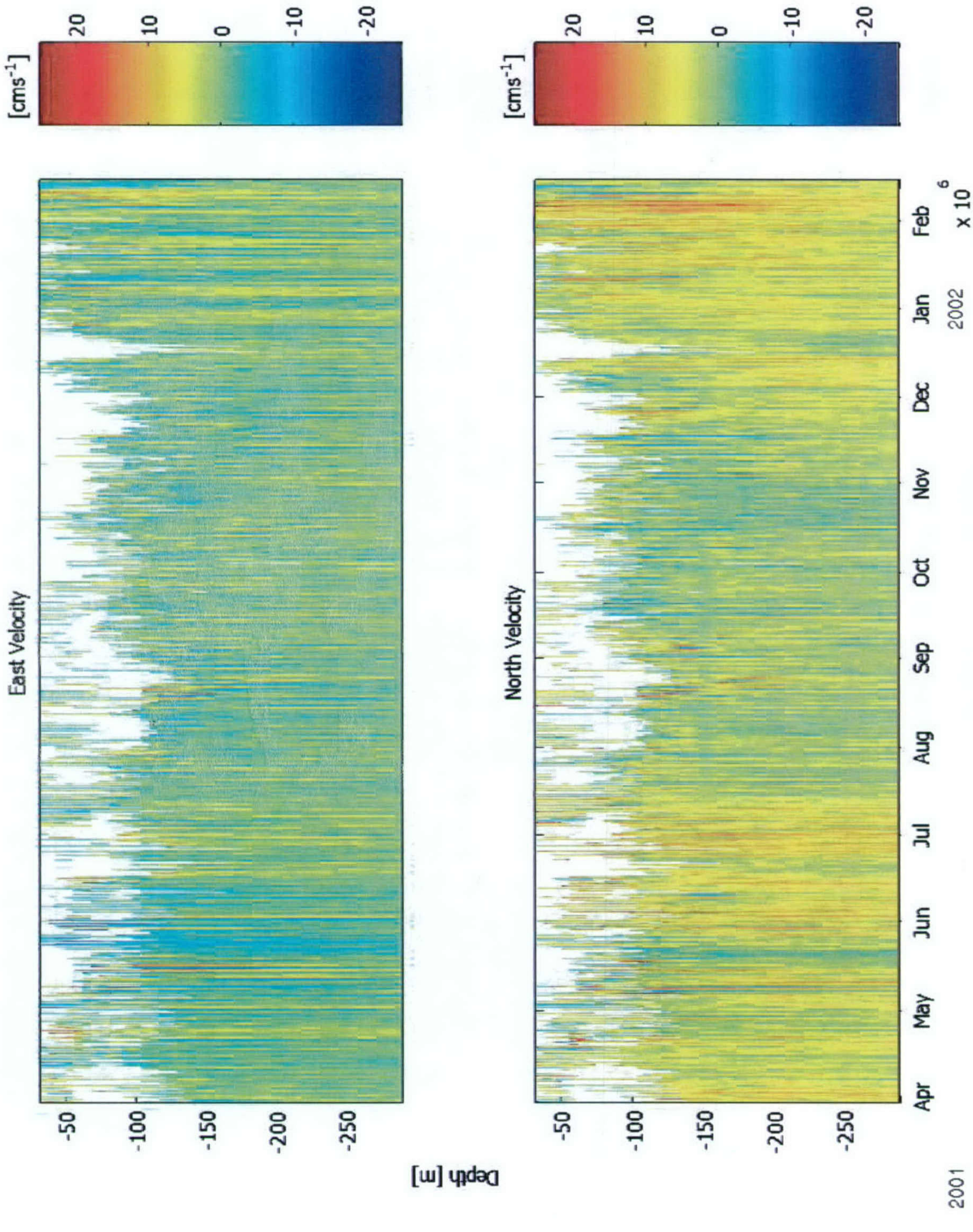

Figure 47: B2: ADCP Velocities

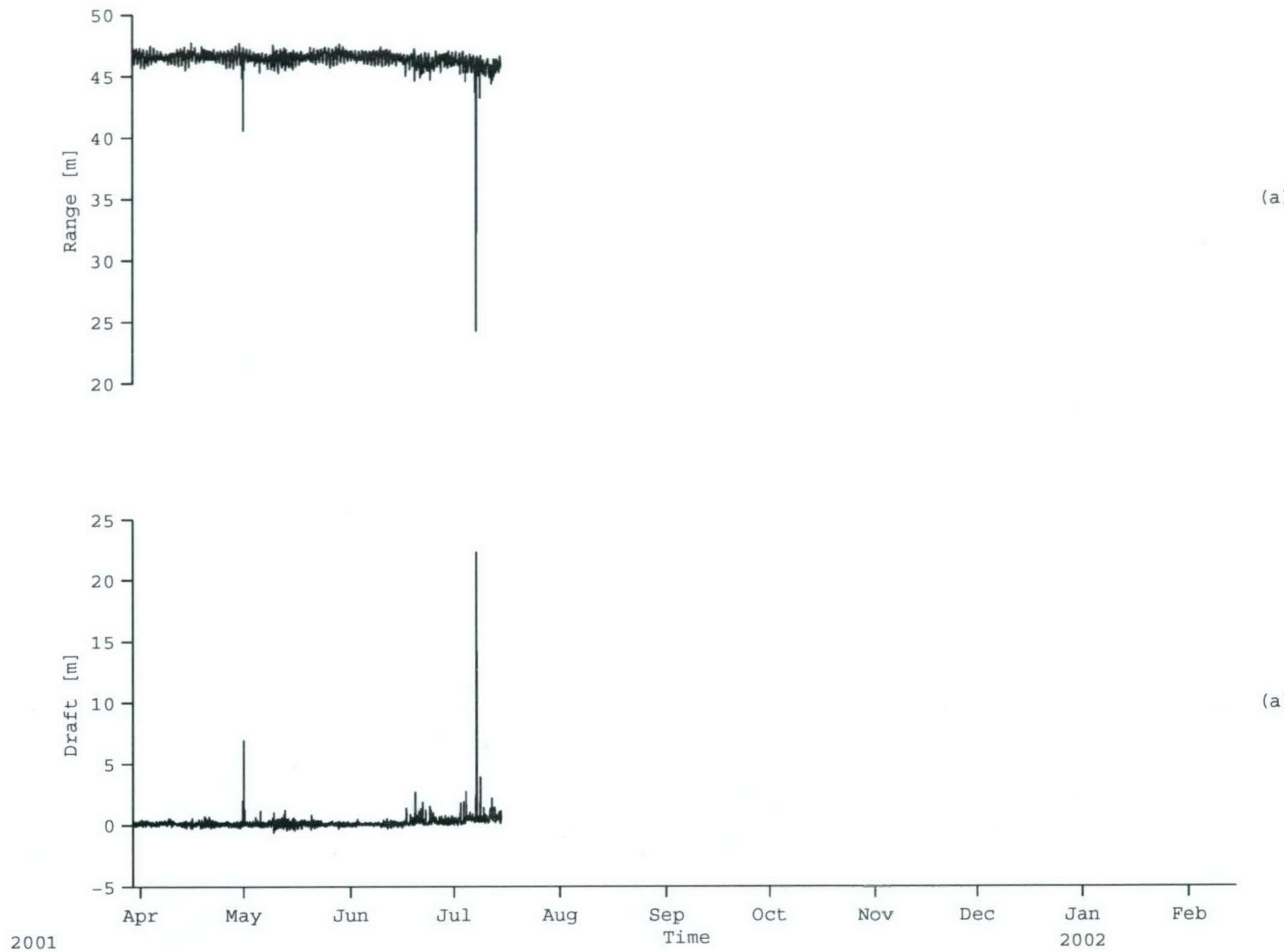

Figure 48: B2: Ice Profiler range (top panel) and draft (bottom panel)

4.5 B3 Mooring

Table 17: Summary of processing of the B3 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	47	-0.57	-1.73	0.80	0.56
	72	-0.69	-1.56	0.48	0.26
	97	-0.54	-1.29	0.06	0.21
	147	0.35	-0.45	0.82	0.21
	197	0.94	0.35	1.29	0.17
	247	1.09	0.47	1.44	0.16
	248	1.09	0.49	1.44	0.16
	287	1.20	0.84	1.44	0.09
	337	1.30	1.07	1.45	0.05
	387	1.33	1.21	1.41	0.03
	397	1.33	1.22	1.40	0.02
	412	1.34	1.24	1.40	0.02
	437	1.34	1.29	1.38	0.01
	440	1.33	1.28	1.37	0.01
S [psu]	47	33.63	33.27	33.84	0.11
	97	34.10	33.72	34.30	0.12
	247	34.59	34.44	34.68	0.04
	387	34.67	34.62	34.69	0.01
	397	34.69	34.65	34.72	0.01
	437	34.69	34.67	34.71	0.01
	440	34.70	34.67	34.73	0.01
P [db]	247	250.75	249.09	252.02	0.54
	440	444.46	443.60	445.33	0.33

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
U [$\mathrm{cm} \cdot s^{-1}$]	13	-13.11	-104.83	111.58	17.19	91	-6.82	-32.81	22.58	7.48
	15	-12.74	-151.71	169.57	17.67	93	-6.60	-32.51	20.61	7.35
	17	-12.79	-102.44	99.38	15.88	95	-6.38	-31.47	20.16	7.24
	19	-12.63	-109.59	176.99	16.75	97	-6.16	-30.62	20.18	7.05
	21	-12.86	-146.61	78.79	15.10	99	-5.94	-30.35	20.20	6.92
	23	-11.93	-91.00	116.60	14.49	101	-5.72	-30.21	20.21	6.87
	25	-11.73	-128.67	97.21	13.82	103	-5.52	-30.16	19.63	6.81
	27	-11.29	-84.66	43.13	12.61	247	0.22	-22.20	13.61	4.38
	29	-11.24	-62.96	73.84	11.90	382	-0.13	-22.80	19.15	5.57
	31	-10.91	-70.25	67.85	11.70	384	-0.16	-21.94	19.37	5.48
	33	-10.99	-63.24	23.65	11.18	386	-0.20	-22.66	18.75	4.90
	35	-10.64	-52.91	68.70	11.10	388	-0.25	-23.38	18.33	4.43
	37	-10.48	-50.44	38.15	10.46	390	-0.29	-24.09	18.48	4.11
	39	-10.50	-50.02	40.39	10.64	392	-0.35	-24.34	18.30	3.99
	41	-10.29	-48.82	23.32	10.09	394	-0.40	-24.90	21.12	4.19
	43	-10.15	-48.60	51.11	10.05	396	-0.44	-24.62	18.11	4.51
	45	-9.99	-66.65	49.34	10.15	398	-0.48	-24.66	18.11	4.91
	47	-9.91	-46.56	23.15	9.65	400	-0.81	-26.14	18.73	5.75
	49	-9.81	-45.13	15.91	9.54	402	-0.55	-24.74	18.10	5.90
	51	-9.71	-45.25	16.94	9.39	404	-0.59	-24.48	17.93	5.98
	53	-9.59	-43.66	16.87	9.32	406	-0.62	-23.73	17.30	6.05
	55	-9.50	-41.83	16.02	9.17	408	-0.67	-24.97	17.20	6.09
	57	-9.34	-41.17	16.60	9.10	410	-0.70	-25.08	16.01	5.95
	59	-9.19	-40.28	16.68	9.01	412	-0.72	-24.85	16.05	6.17
	61	-9.06	-39.87	16.89	8.96	414	-0.78	-24.88	17.21	6.20
	63	-8.85	-39.26	17.37	8.90	416	-0.79	-24.32	16.22	6.21
	65	-8.72	-38.21	17.91	8.80	418	-0.86	-23.93	15.93	6.15
	67	-8.56	-38.09	17.25	8.72	420	-0.92	-25.50	15.84	6.25
	69	-8.40	-37.69	16.45	8.59	422	-0.95	-24.59	16.38	6.29
	71	-8.29	-36.69	16.71	8.41	424	-1.00	-24.40	16.56	6.29
	73	-8.09	-36.80	16.29	8.21	426	-1.06	-24.40	16.01	6.31
	75	-7.86	-36.28	16.76	7.90	428	-1.11	-25.27	15.30	6.30
	77	-7.93	-35.60	18.10	8.04	430	-1.16	-24.63	16.30	6.34
	79	-7.77	-34.82	19.01	7.94	432	-1.19	-24.86	16.19	6.38
	81	-7.64	-33.78	20.25	7.83	434	-1.22	-23.98	17.06	6.39
	83	-7.54	-33.84	20.66	7.74	436	-1.16	-22.81	16.74	6.11
	85	-7.34	-33.68	20.58	7.66	438	-1.23	-22.08	15.71	6.19
	87	-7.23	-33.43	21.36	7.63	440	-1.30	-23.61	15.22	6.35
	89	-6.99	-32.78	21.83	7.58	442	-1.25	-21.63	19.13	6.29

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
V $[\mathrm{cm} \cdot s^{-1}]$	13	5.31	-197.85	214.79	18.70	91	2.25	-21.37	23.87	6.52
	15	4.75	-103.16	153.93	17.03	93	2.20	-19.63	25.12	6.42
	17	4.12	-127.46	133.41	15.15	95	2.13	-18.63	24.25	6.30
	19	3.73	-94.59	127.63	15.18	97	2.06	-17.61	23.80	6.11
	21	3.95	-65.80	164.27	14.75	99	1.99	-16.59	23.94	6.00
	23	3.69	-151.55	121.27	13.84	101	1.93	-16.83	24.09	5.99
	25	3.50	-149.47	78.49	12.84	103	1.88	-14.83	23.15	5.90
	27	3.40	-77.18	120.86	12.22	247	-0.32	-9.49	16.08	2.84
	29	3.59	-50.30	62.89	11.46	382	0.09	-12.40	18.47	3.08
	31	3.38	-74.80	94.92	11.82	384	0.03	-26.14	17.74	3.07
	33	3.57	-71.40	80.01	10.94	386	0.02	-17.62	17.34	2.76
	35	3.54	-26.57	45.40	10.18	388	0.00	-10.78	16.95	2.57
	37	3.37	-36.39	39.82	9.96	390	-0.01	-15.76	16.65	2.53
	39	3.41	-45.88	75.93	10.16	392	0.02	-12.72	17.41	2.45
	41	3.45	-25.75	42.27	9.49	394	0.04	-21.55	18.96	2.72
	43	3.45	-55.73	39.40	9.42	396	0.08	-17.23	18.28	2.81
	45	3.54	-38.90	81.46	9.47	398	0.13	-12.90	18.38	3.00
	47	3.50	-22.96	42.77	8.98	400	0.33	-9.15	19.97	3.32
	49	3.53	-22.57	42.01	8.87	402	0.22	-9.39	18.59	3.57
	51	3.46	-22.24	32.06	8.75	404	0.26	-9.42	19.08	3.63
	53	3.50	-20.60	31.33	8.68	406	0.29	-8.88	19.51	3.70
	55	3.36	-19.82	31.24	8.56	408	0.34	-9.00	21.11	3.74
	57	3.29	-19.11	30.24	8.43	410	0.37	-8.25	20.49	3.64
	59	3.20	-18.94	30.78	8.39	412	0.38	-8.93	22.36	3.80
	61	3.14	-18.85	37.89	8.34	414	0.41	-8.62	21.79	3.81
	63	3.05	-18.11	28.45	8.19	416	0.45	-9.01	21.94	3.81
	65	3.01	-18.29	26.92	8.10	418	0.47	-9.29	19.19	3.78
	67	2.92	-19.14	26.78	8.00	420	0.50	-10.15	22.57	3.79
	69	2.87	-19.00	25.69	7.87	422	0.51	-8.43	20.02	3.74
	71	2.79	-20.28	26.78	7.74	424	0.53	-9.26	20.44	3.72
	73	2.75	-19.64	25.74	7.55	426	0.55	-9.93	19.08	3.65
	75	2.65	-21.26	24.53	7.25	428	0.57	-8.50	19.04	3.58
	77	2.71	-21.52	24.60	7.32	430	0.60	-8.93	18.66	3.52
	79	2.69	-22.47	24.91	7.16	432	0.61	-8.71	17.61	3.46
	81	2.64	-23.32	24.82	6.98	434	0.64	-8.91	20.19	3.38
	83	2.58	-24.75	24.15	6.85	436	0.63	-8.55	17.68	3.17
	85	2.52	-25.29	24.18	6.77	438	0.66	-10.92	15.96	3.10
	87	2.40	-24.69	23.25	6.68	440	0.69	-24.21	22.98	3.22
	89	2.35	-23.60	24.51	6.61	442	0.63	-15.65	14.99	3.16

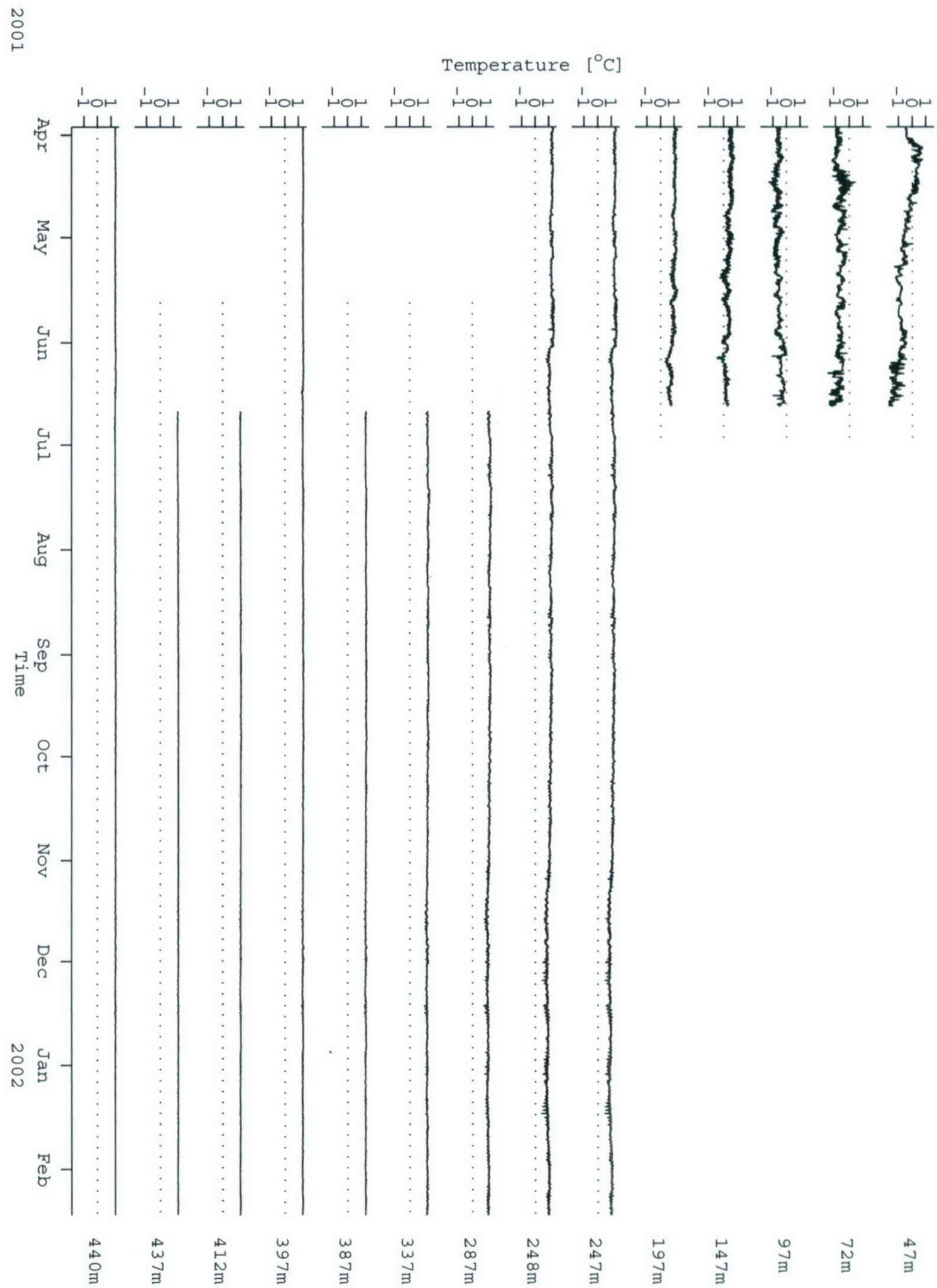

Figure 49: B3: Temperature records

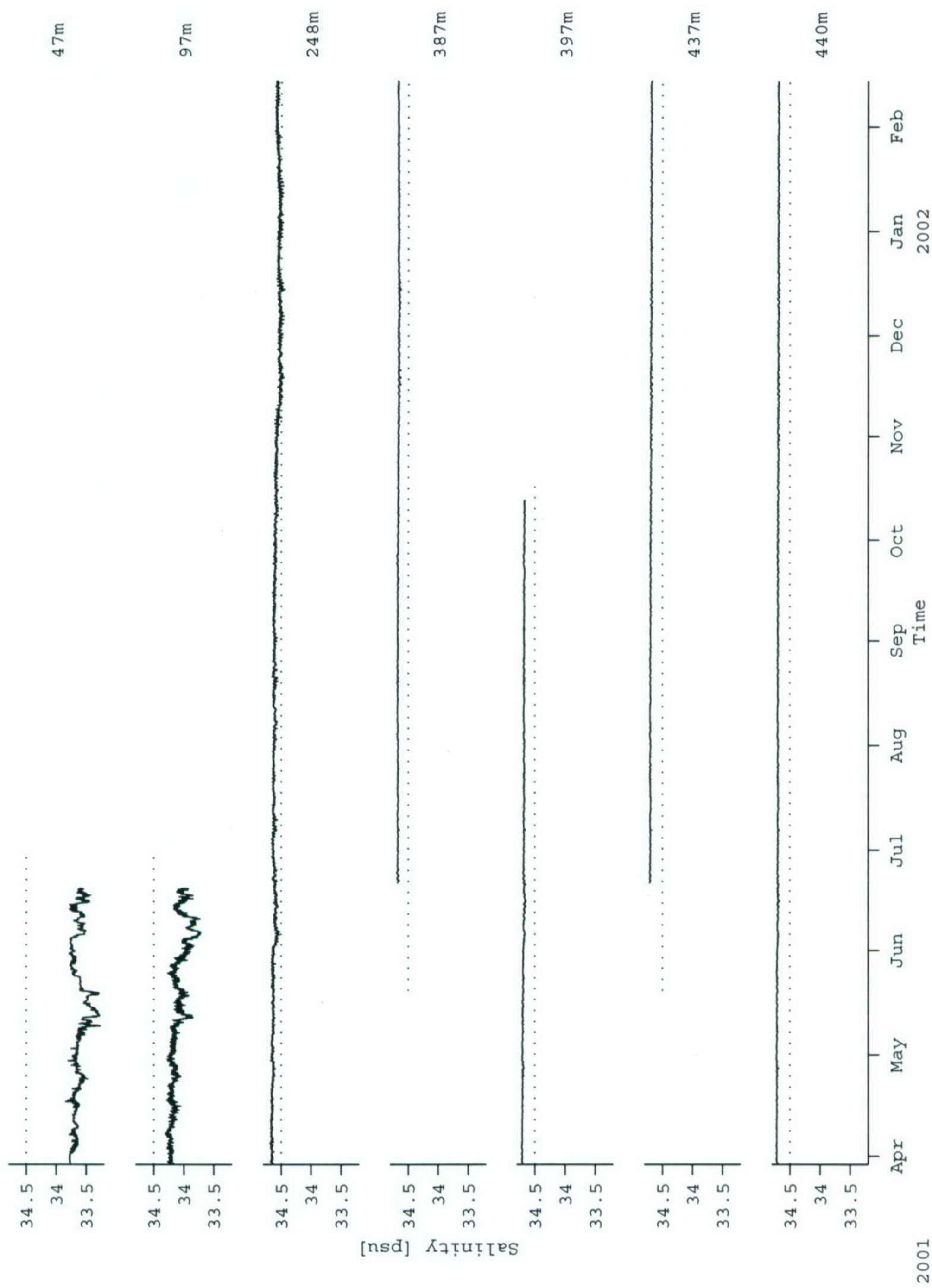

Figure 50: B3: Salinity records

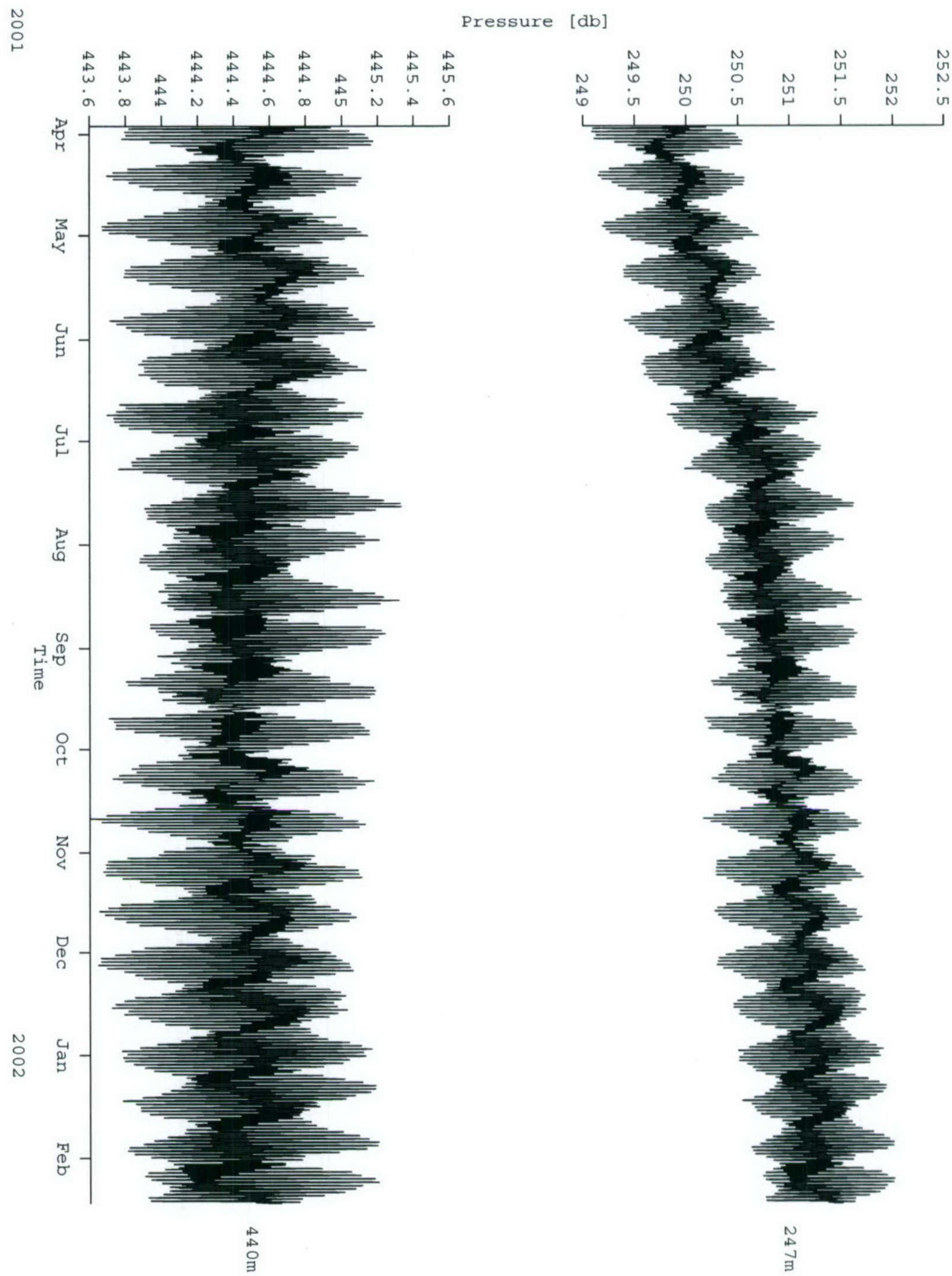

Figure 51: B3: Pressure records

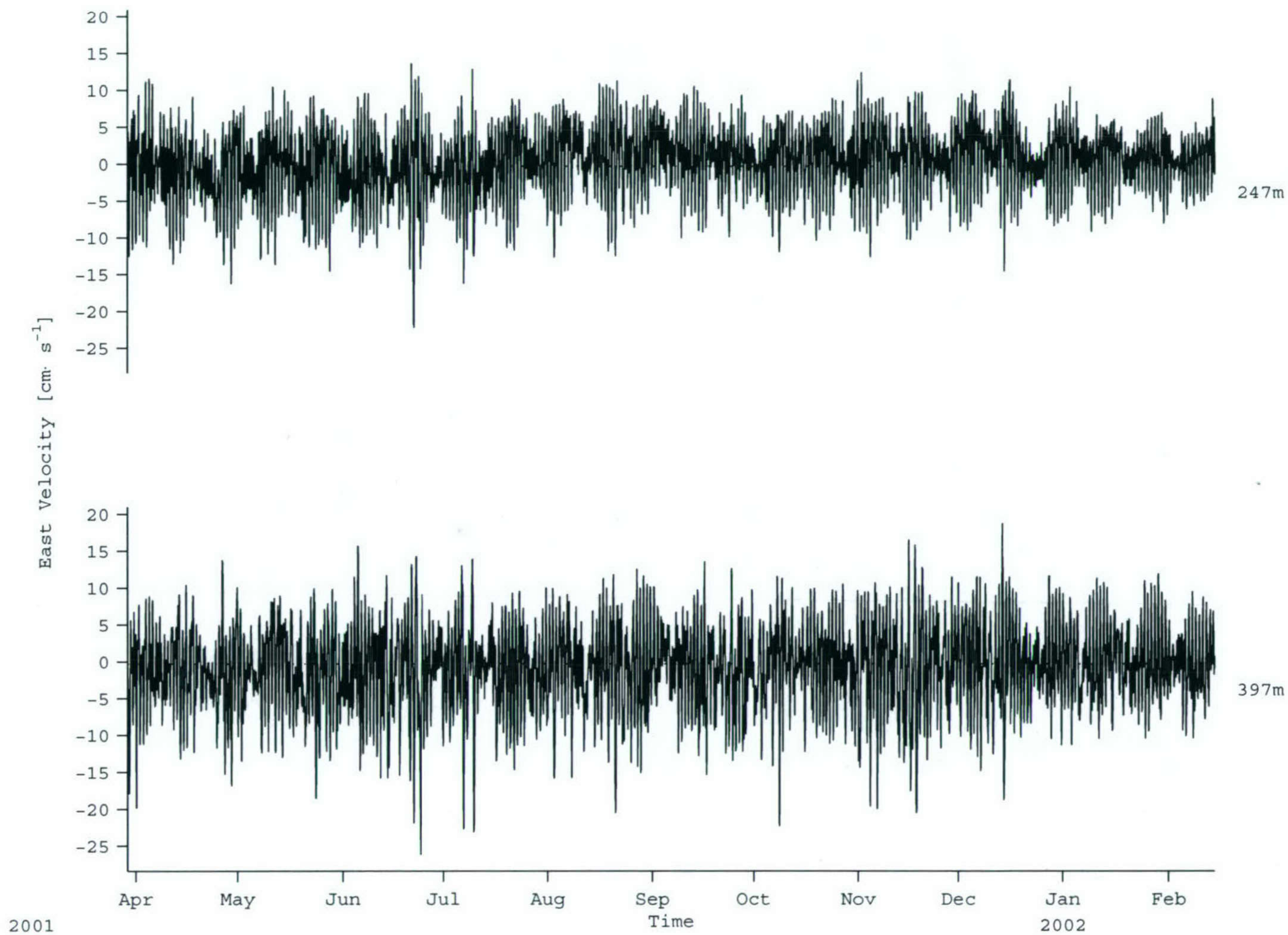

Figure 52: B3: VACM Velocity (East)

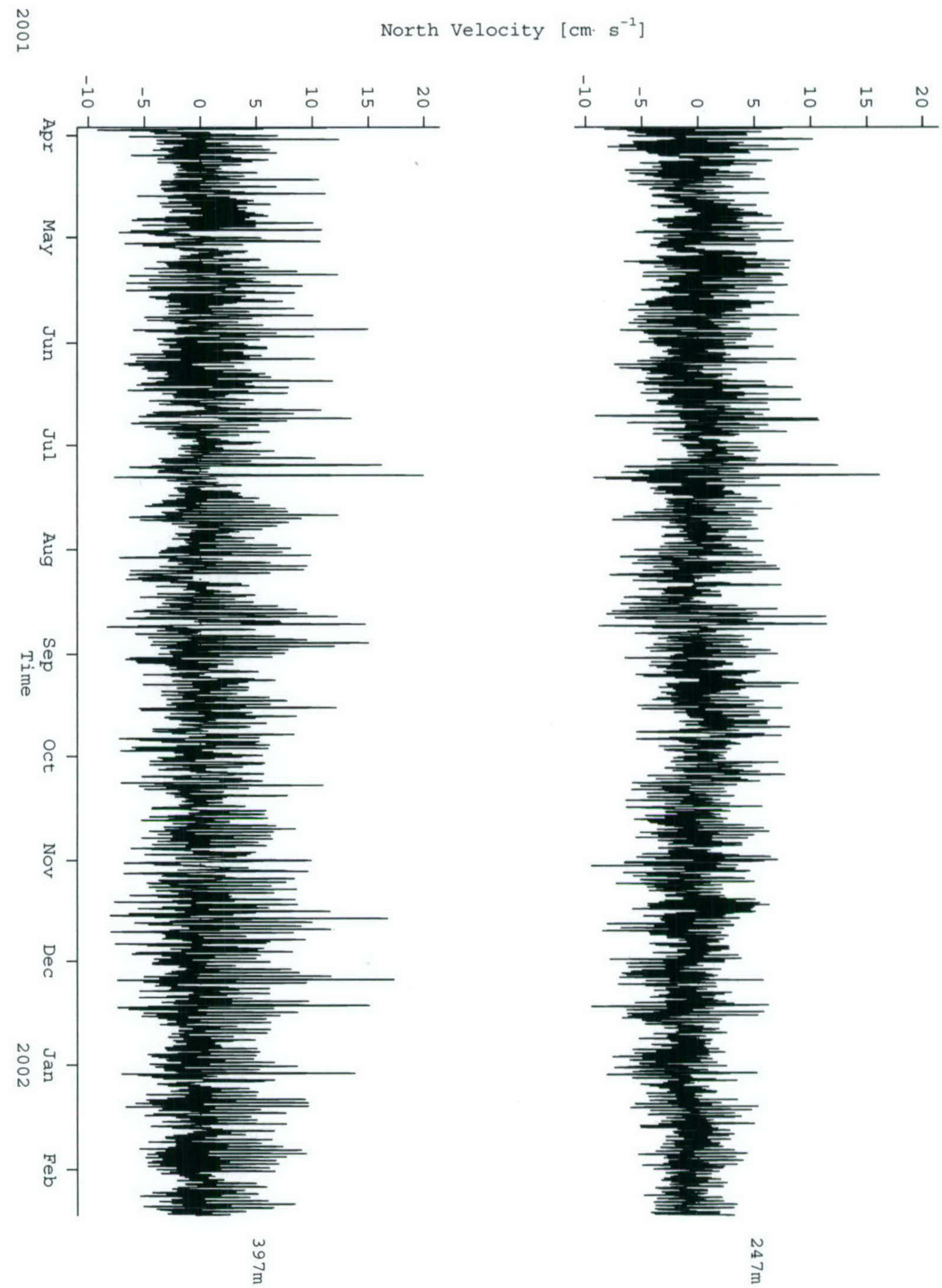

Figure 53: B3: VACM Velocity (North)

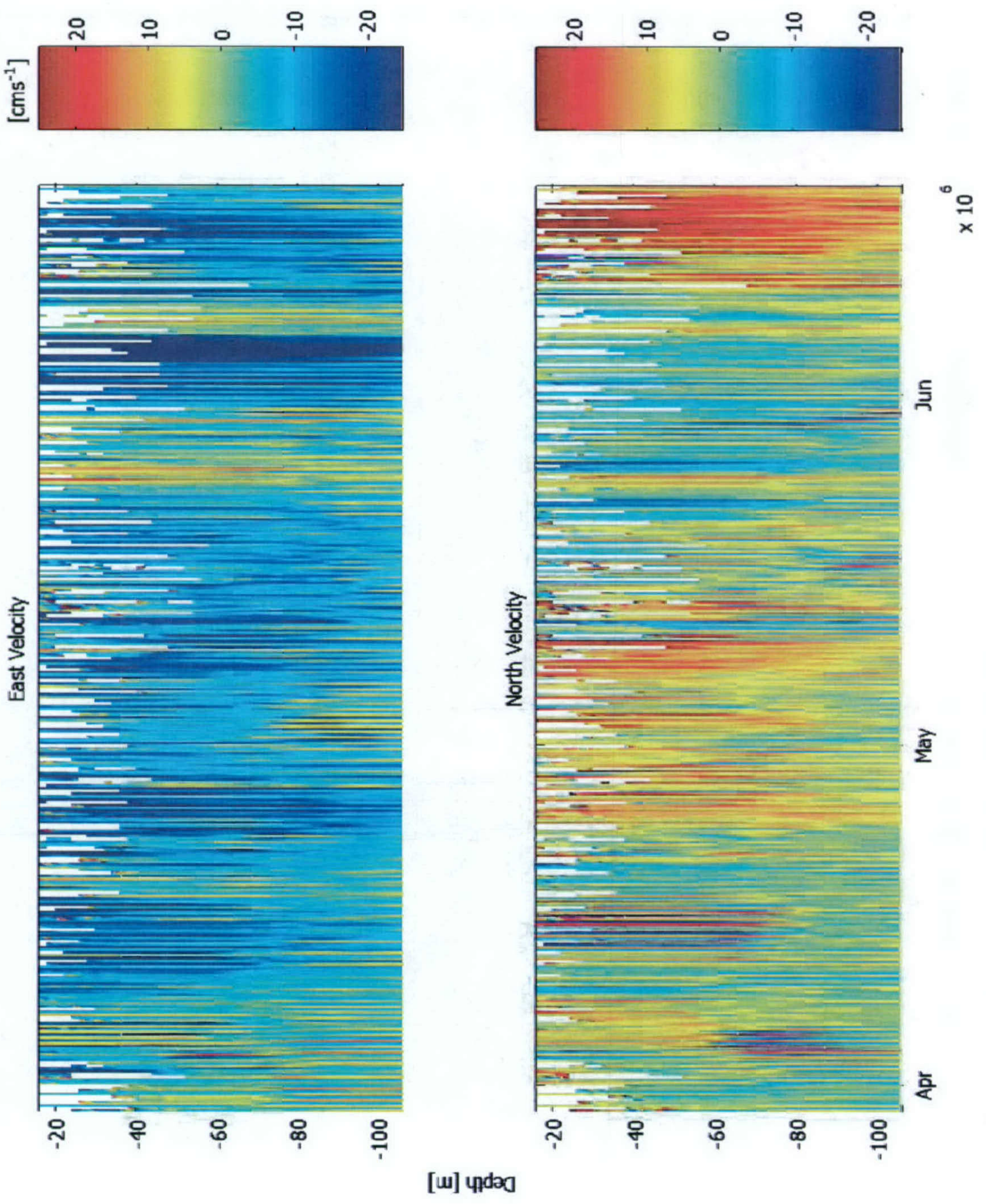

Figure 54: B3: ADCP Velocities, 110m

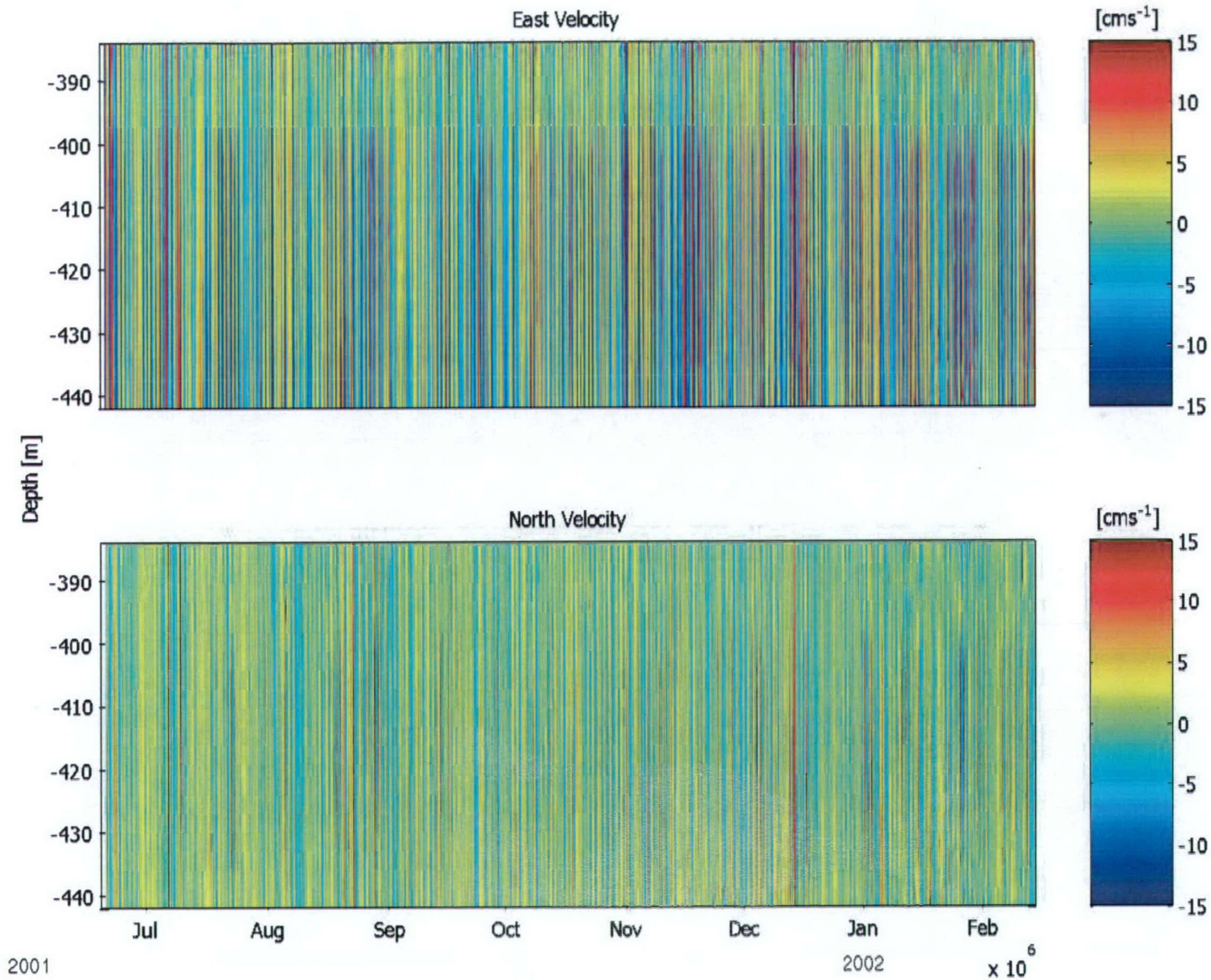

Figure 55: B3: ADCP Velocities, 378m

4.6 C1 Mooring

Table 18: Summary of processing of the C1 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	83	-0.92	-1.78	0.84	0.63
	107	-0.59	-1.73	0.74	0.57
	132	-0.14	-1.46	0.98	0.51
	182	0.69	-0.32	1.25	0.24
	207	0.95	0.25	1.27	0.14
	232	1.10	0.71	1.37	0.09
	233	1.11	0.73	1.36	0.09
	307	1.31	1.16	1.43	0.03
S [psu]	83	33.94	33.42	34.32	0.17
	132	34.26	33.89	34.56	0.12
	182	34.46	34.21	34.62	0.06
	233	34.59	34.46	34.65	0.03
P [db]	232	236.23	235.32	237.13	0.35

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
U [cm $\cdot s^{-1}$]	7.99	1.22	-128.78	75.75	9.06	49.99	1.72	-23.69	32.60	6.03
	9.99	1.41	-61.47	94.93	8.78	51.99	1.63	-38.40	33.38	6.01
	11.99	1.70	-58.64	85.51	8.63	53.99	1.59	-37.22	33.11	5.94
	13.99	1.91	-40.64	70.28	8.25	55.99	1.55	-23.80	32.25	5.87
	15.99	1.88	-40.58	39.93	7.80	57.99	1.51	-26.08	31.05	5.76
	17.99	1.91	-33.54	50.51	7.54	59.99	1.48	-26.88	28.75	5.69
	19.99	2.08	-31.83	46.02	7.37	61.99	1.44	-23.93	28.10	5.60
	21.99	2.07	-28.98	90.47	7.35	63.99	1.42	-22.28	28.44	5.51
	23.99	2.06	-34.82	51.32	7.03	65.99	1.36	-22.63	28.59	5.44
	25.99	2.10	-27.67	45.09	6.83	67.99	1.31	-22.56	27.66	5.38
	27.99	2.06	-28.05	32.63	6.70	69.99	1.28	-21.56	28.78	5.33
	29.99	2.04	-29.91	38.68	6.68	71.99	1.21	-22.63	28.51	5.30
	31.99	2.06	-38.67	56.24	6.73	73.99	1.17	-23.23	28.81	5.28
	33.99	2.02	-24.40	43.49	6.50	75.99	1.14	-23.59	28.60	5.26
	35.99	2.00	-28.00	35.66	6.50	77.99	1.08	-24.05	26.63	5.20
	37.99	1.94	-34.49	32.38	6.42	79.99	1.13	-23.14	26.93	5.26
	39.99	1.86	-28.28	32.67	6.38	81.99	1.17	-23.03	27.41	5.54
	41.99	1.82	-34.38	31.33	6.40	83.99	1.16	-23.77	26.93	5.30
	43.99	1.76	-32.51	38.76	6.29	85.99	1.14	-25.29	26.45	5.19
	45.99	1.75	-26.04	31.46	6.20	87.99	1.13	-26.82	25.97	5.22
	47.99	1.77	-40.04	32.96	6.14	232.00	0.61	-11.79	13.89	3.06

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
V [$\mathrm{cm} \cdot s^{-1}$]	7.99	-3.74	-82.53	117.58	9.50	49.99	-2.88	-27.57	23.60	6.95
	9.99	-3.87	-76.49	48.80	9.42	51.99	-2.84	-30.06	23.47	6.87
	11.99	-3.76	-111.74	104.24	9.57	53.99	-2.80	-33.43	23.16	6.77
	13.99	-3.61	-71.22	50.91	9.09	55.99	-2.74	-30.73	37.34	6.67
	15.99	-3.46	-48.96	64.09	8.78	57.99	-2.71	-29.23	20.87	6.57
	17.99	-3.36	-45.92	50.72	8.71	59.99	-2.69	-29.07	22.22	6.47
	19.99	-3.24	-51.50	35.85	8.57	61.99	-2.65	-28.00	22.15	6.37
	21.99	-3.24	-46.87	28.97	8.34	63.99	-2.63	-29.11	27.02	6.30
	23.99	-3.06	-54.12	54.14	8.28	65.99	-2.61	-29.59	20.11	6.23
	25.99	-3.09	-46.03	23.37	8.05	67.99	-2.60	-27.22	19.86	6.16
	27.99	-3.12	-41.44	25.15	7.94	69.99	-2.59	-26.45	19.52	6.11
	29.99	-3.04	-52.17	27.31	7.89	71.99	-2.55	-25.80	19.17	6.02
	31.99	-3.04	-74.75	27.75	7.84	73.99	-2.52	-26.41	20.94	5.94
	33.99	-3.02	-33.26	23.59	7.66	75.99	-2.49	-26.08	21.35	5.88
	35.99	-2.99	-33.19	27.33	7.55	77.99	-2.47	-26.74	21.63	5.77
	37.99	-2.96	-32.37	25.32	7.50	79.99	-2.47	-26.44	19.58	5.74
	39.99	-2.94	-46.18	27.78	7.47	81.99	-2.47	-26.15	19.79	5.88
	41.99	-2.97	-34.06	48.52	7.38	83.99	-2.41	-24.58	18.08	5.62
	43.99	-2.93	-30.20	31.01	7.27	85.99	-2.34	-24.88	17.90	5.47
	45.99	-2.89	-29.15	32.51	7.15	87.99	-2.28	-26.01	18.05	5.45
	47.99	-2.90	-32.25	25.89	7.01	232.00	0.39	-11.39	11.54	2.79

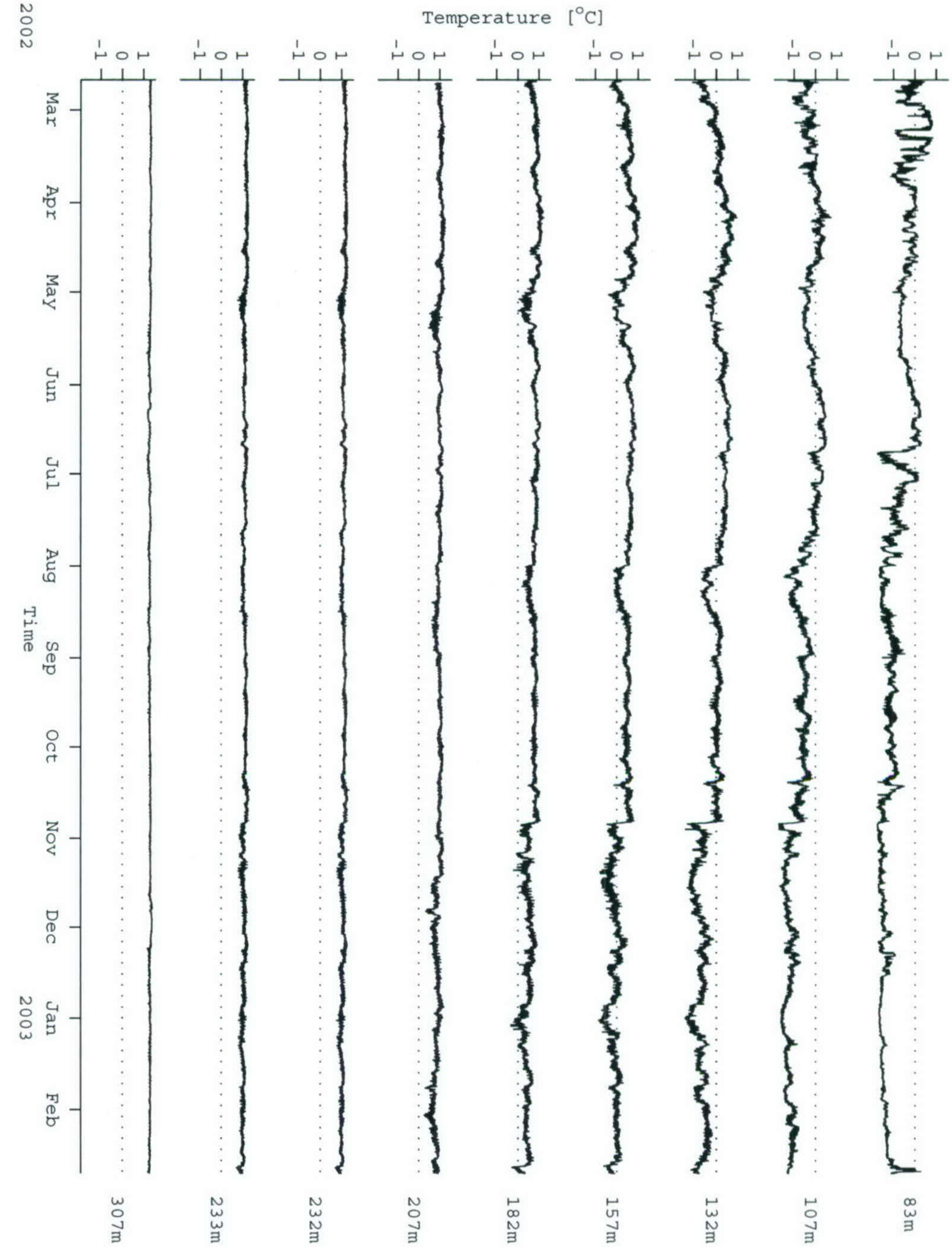

Figure 56: C1: Temperature records

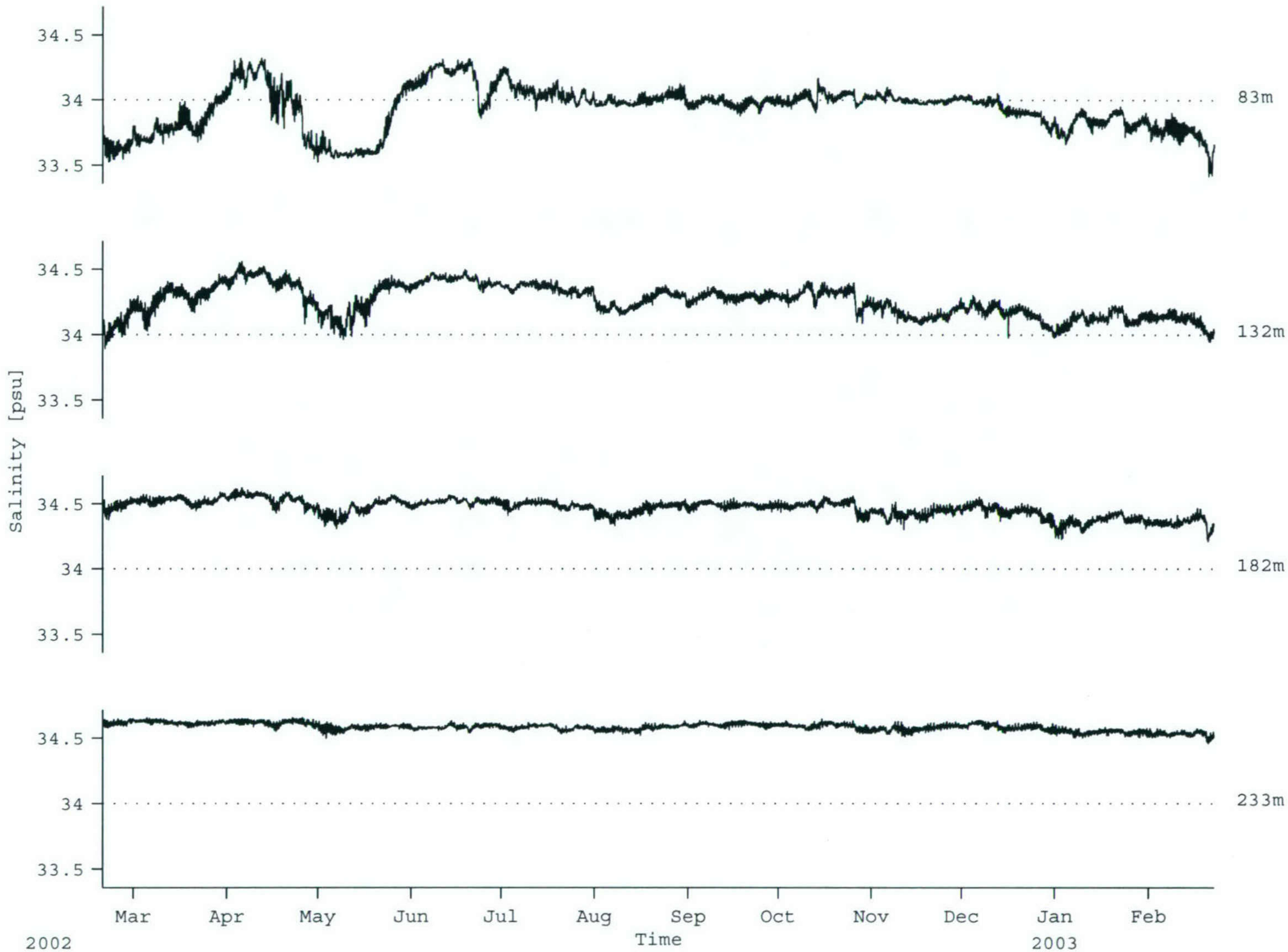

Figure 57: C1: Salinity records

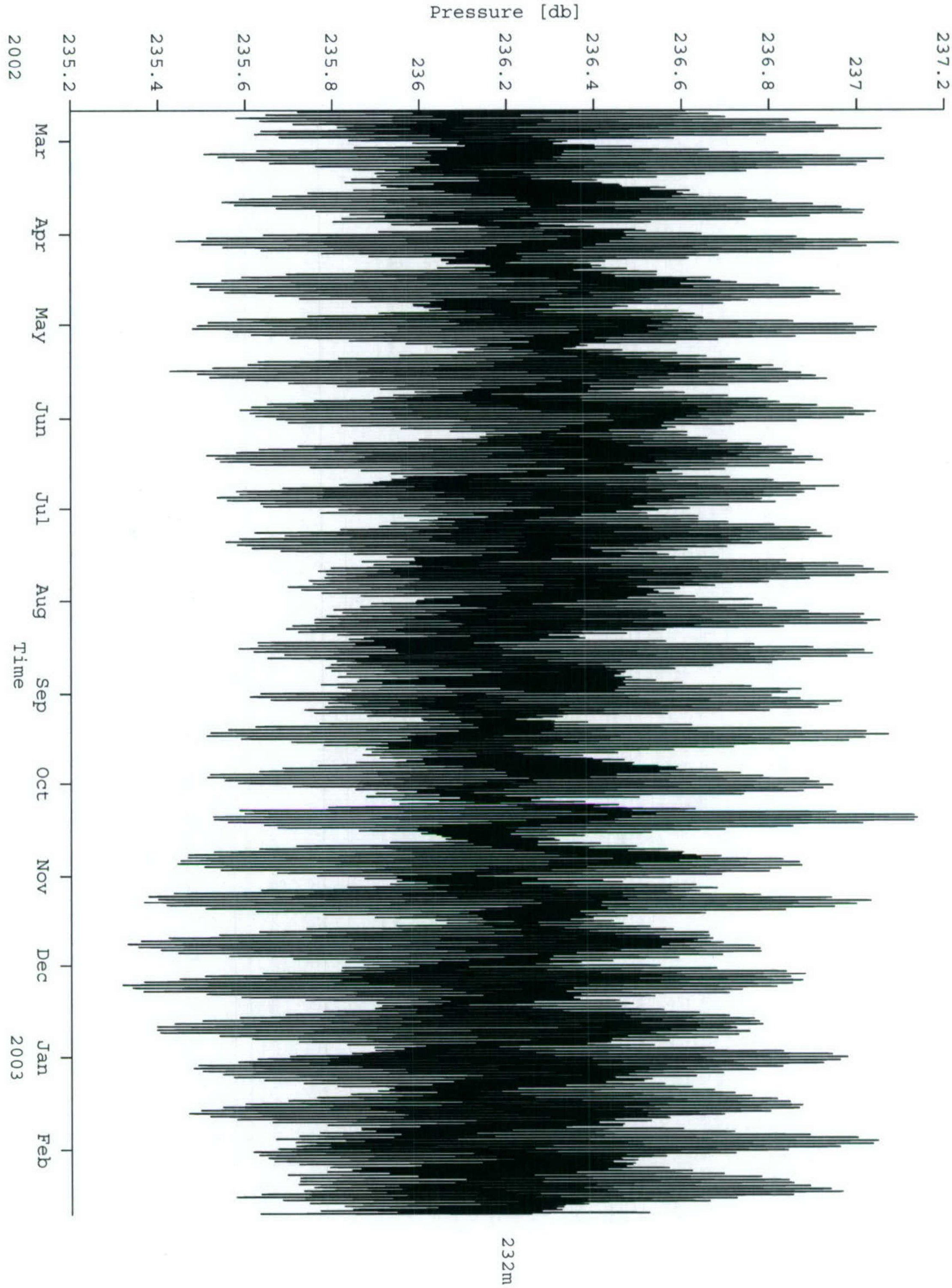

Figure 58: C1: Pressure records

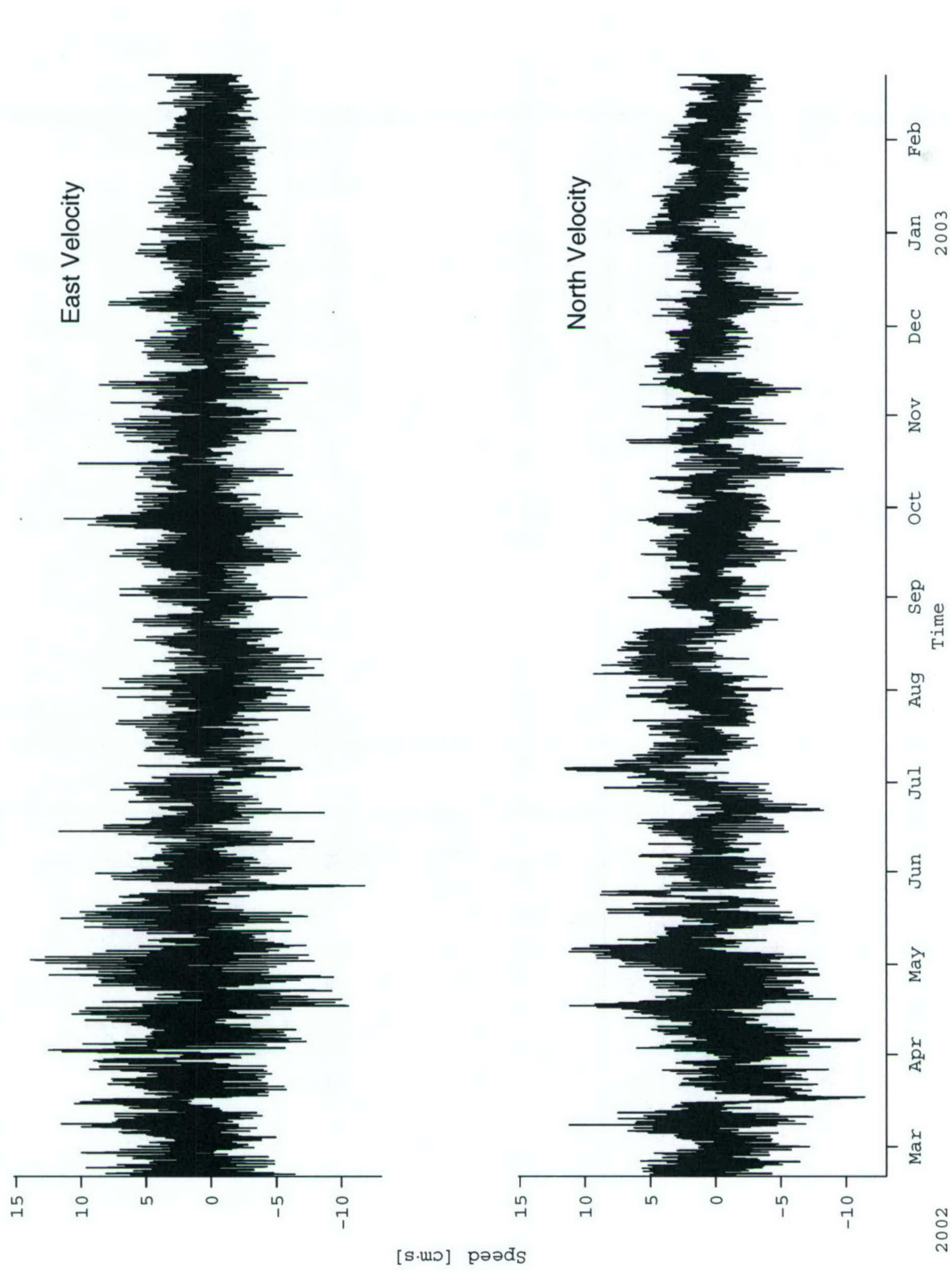

Figure 59: C1: VACM velocity. East Velocity (Top panel), North Velocity (Bottom Panel)

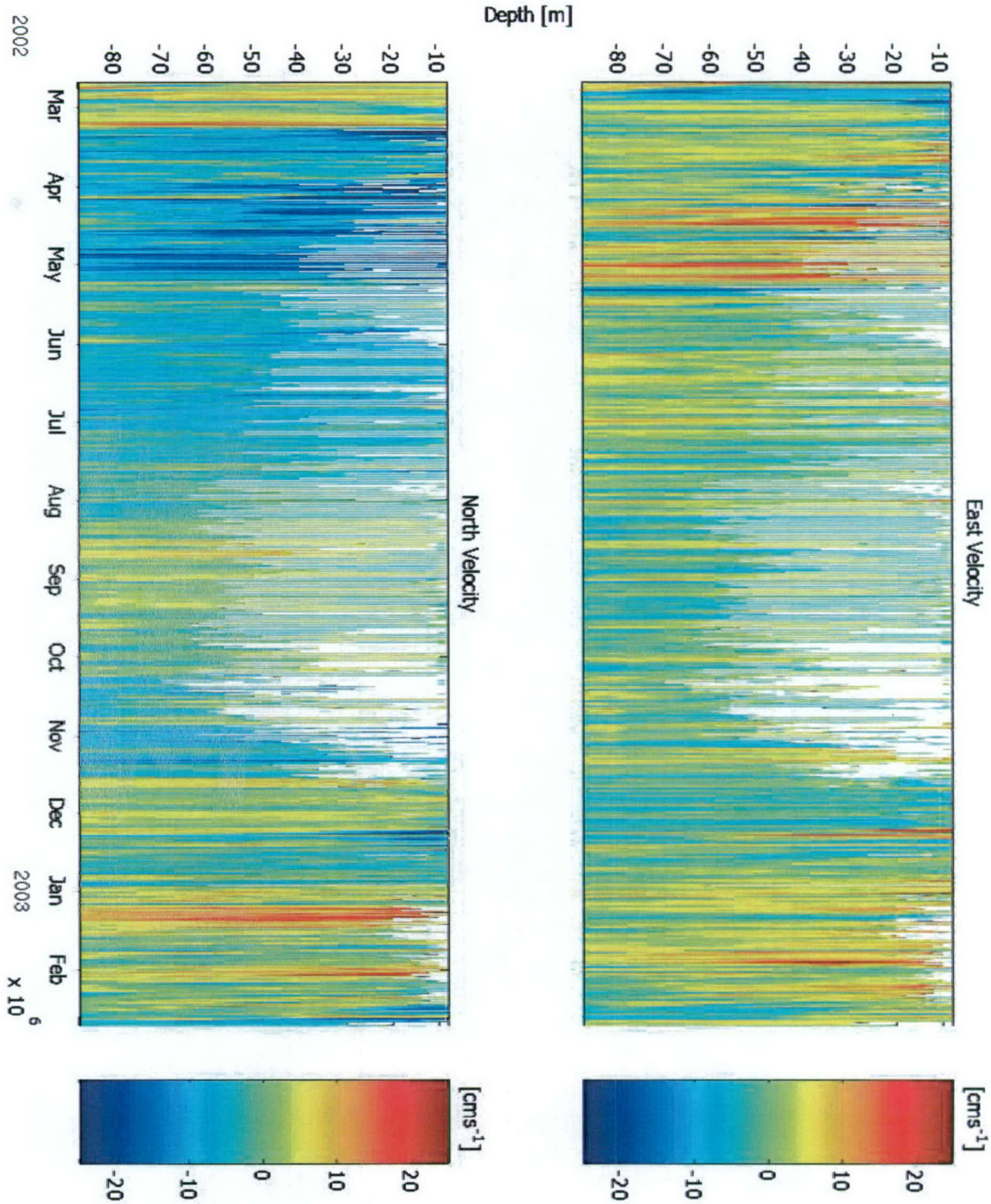

Figure 60: C1: ADCP Velocities

4.7 C2 Mooring

Table 19: Summary of processing of the C2 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	113.00	-0.47	-1.74	0.77	0.62
	134.00	0.06	-1.32	0.98	0.53
	159.00	0.54	-0.56	1.28	0.38
	184.00	0.87	0.13	1.39	0.27
	209.00	1.07	0.42	1.47	0.20
	234.00	1.21	0.67	1.50	0.15
	260.00	1.29	0.83	1.48	0.11
	261.00	1.30	0.84	1.48	0.11
	335.00	1.39	1.21	1.49	0.04
	409.00	1.39	1.25	1.47	0.03
	410.00	1.39	1.26	1.48	0.03
	534.00	1.35	1.22	1.42	0.03
	810.00	1.30	1.24	1.35	0.02
	811.00	1.30	1.24	1.35	0.02
	852.00	1.30	1.24	1.34	0.02
S [psu]	113.00	34.19	33.85	34.50	0.14
	159.00	34.43	34.19	34.59	0.09
	209.00	34.56	34.38	34.66	0.05
	261.00	34.63	34.50	34.68	0.03
	409.00	34.68	34.65	34.70	0.01
	811.00	34.70	34.68	34.71	0.00
P [db]	260.00	262.41	261.56	263.36	0.35
	852.00	859.79	858.91	860.68	0.35
U [$cm \cdot s^{-1}$]	260.00	-0.23	-13.43	10.25	2.05
	410.00	-0.12	-8.02	7.67	1.95
	810.00	0.29	-6.67	8.08	1.49
V [$cm \cdot s^{-1}$]	260.00	-1.40	-11.81	8.43	2.72
	410.00	-0.62	-9.92	12.81	3.01
	810.00	-0.26	-14.39	19.21	4.08

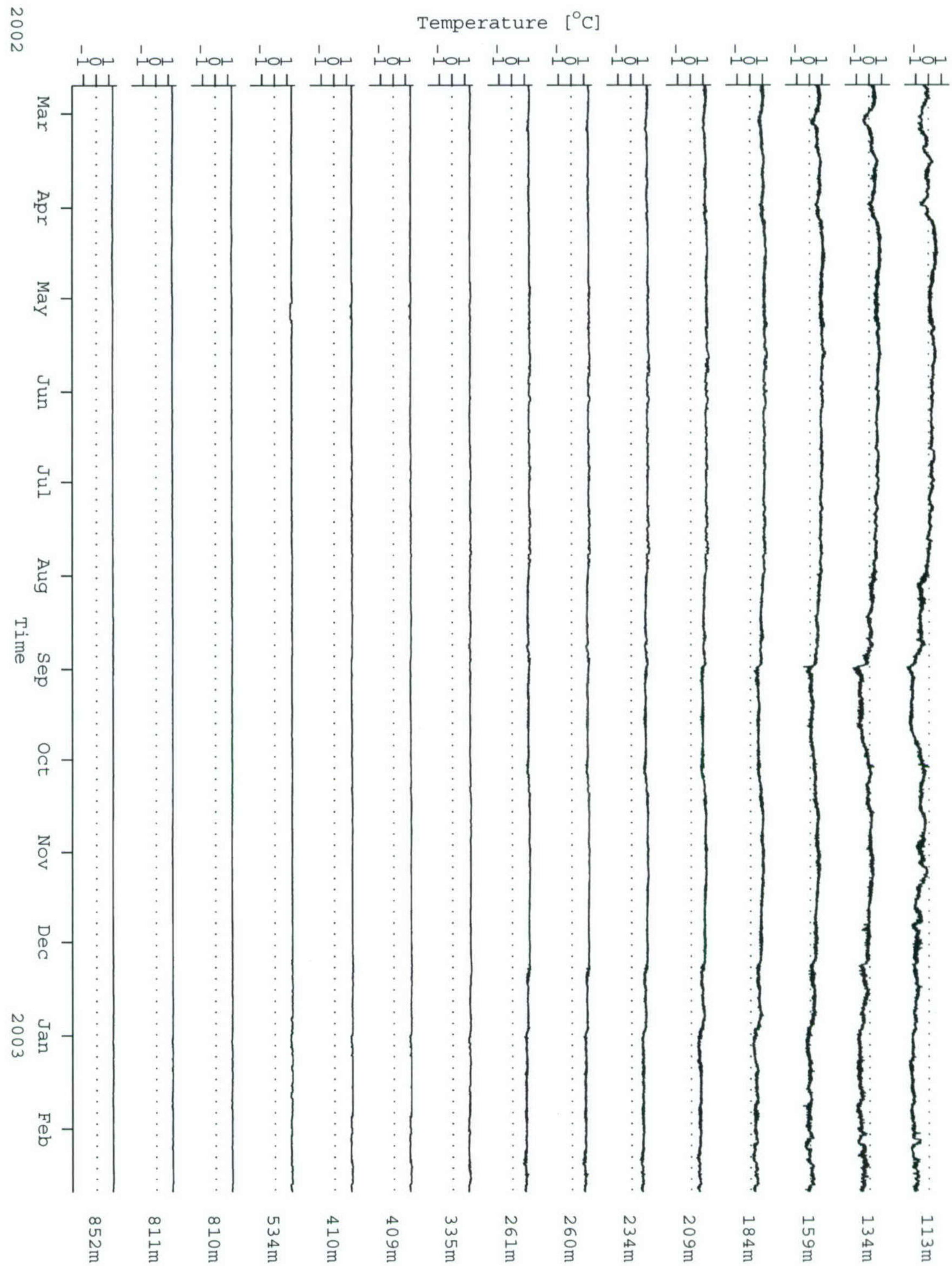

Figure 61: C2: Temperature records

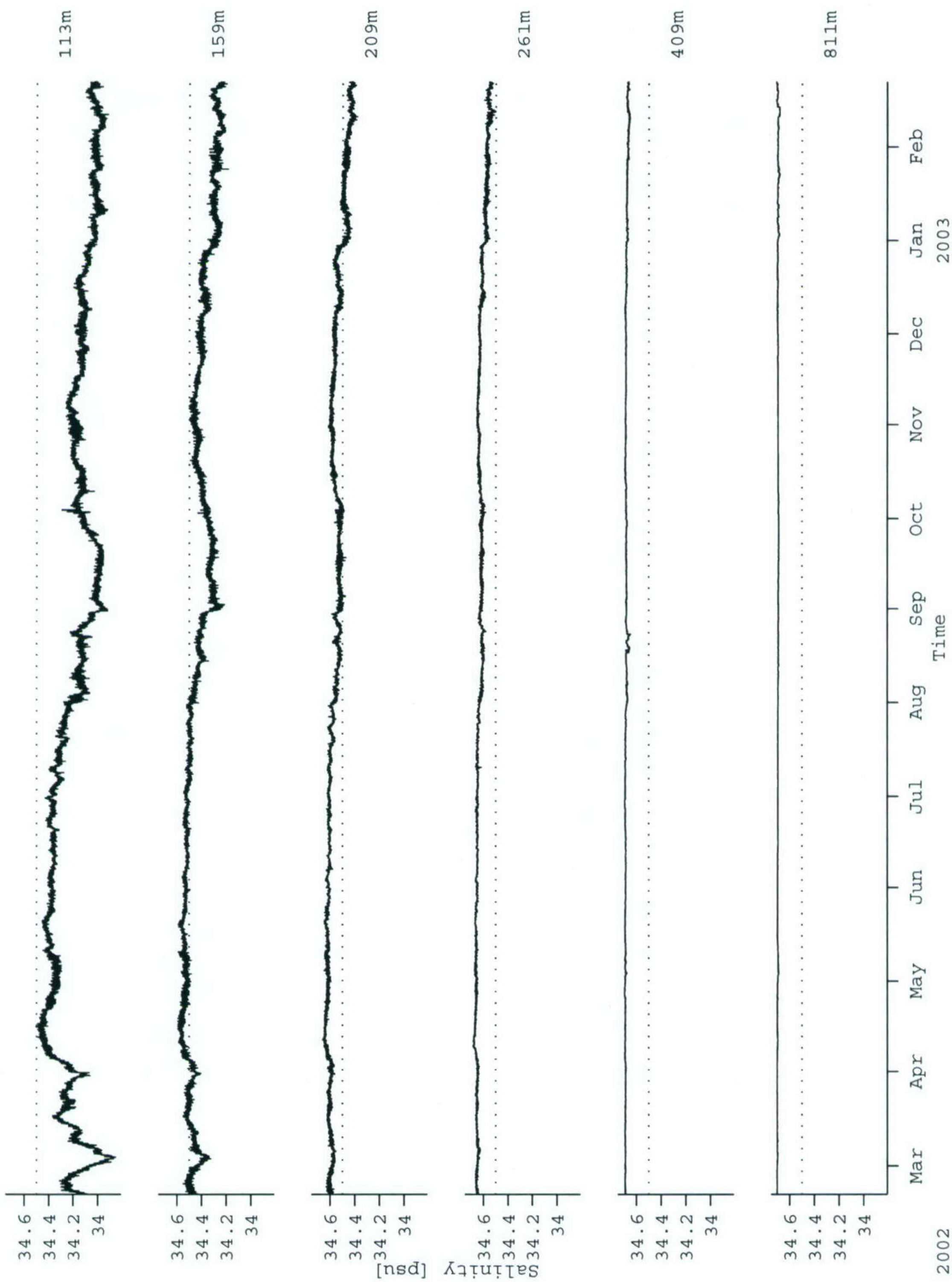

Figure 62: C2: Salinity records

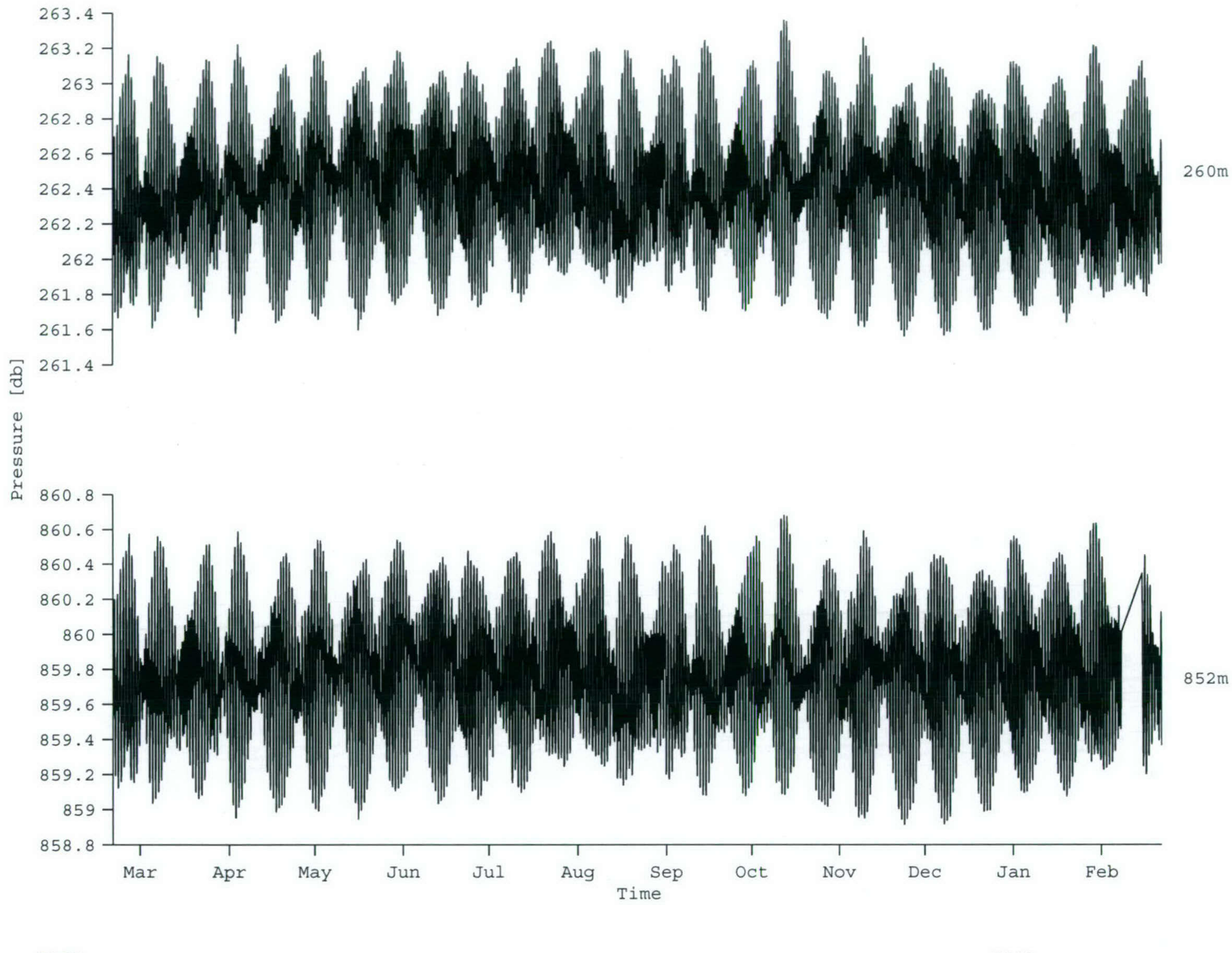

Figure 63: C2: Pressure records

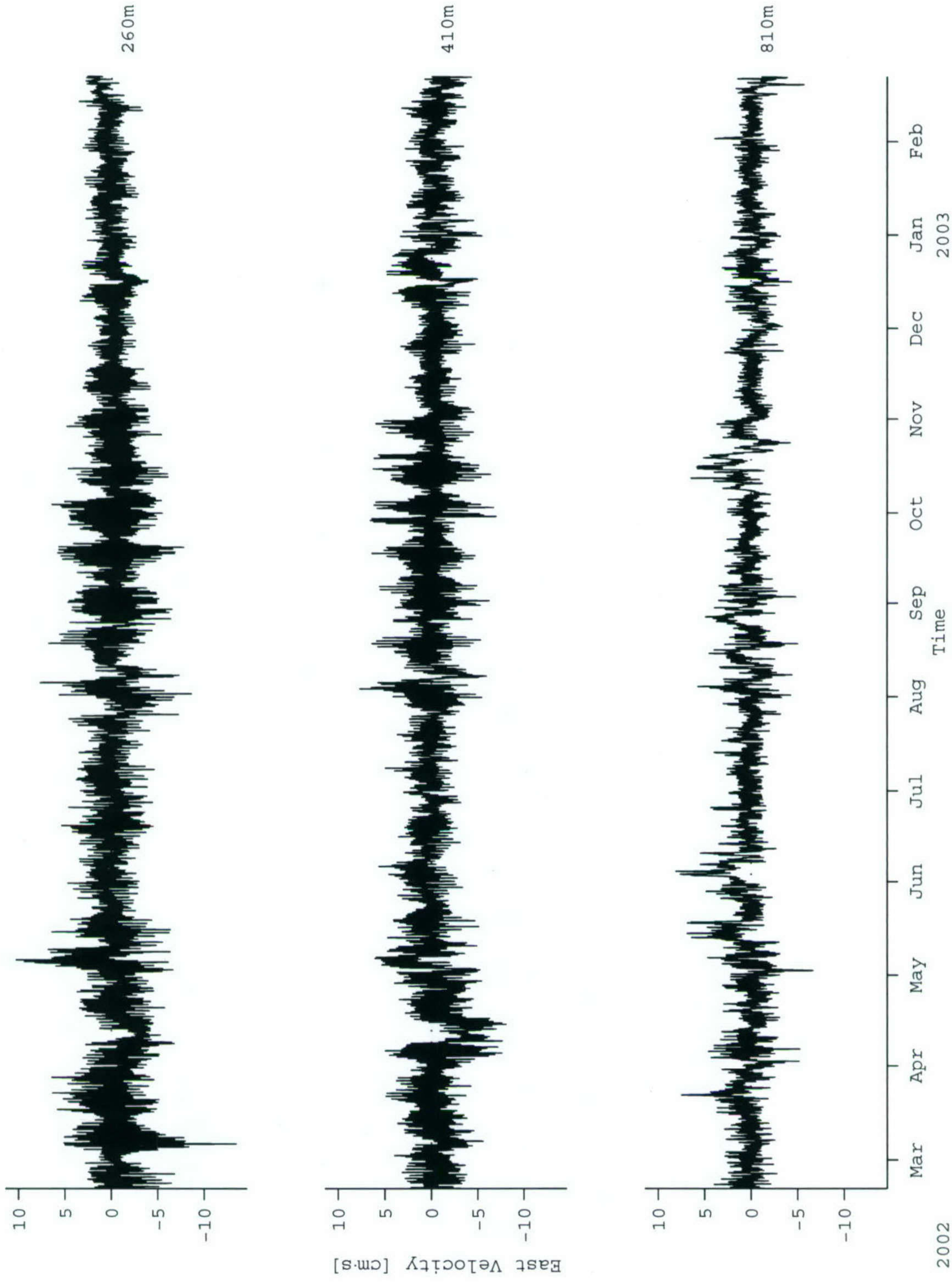

Figure 64: C2: VACM Velocity (East)

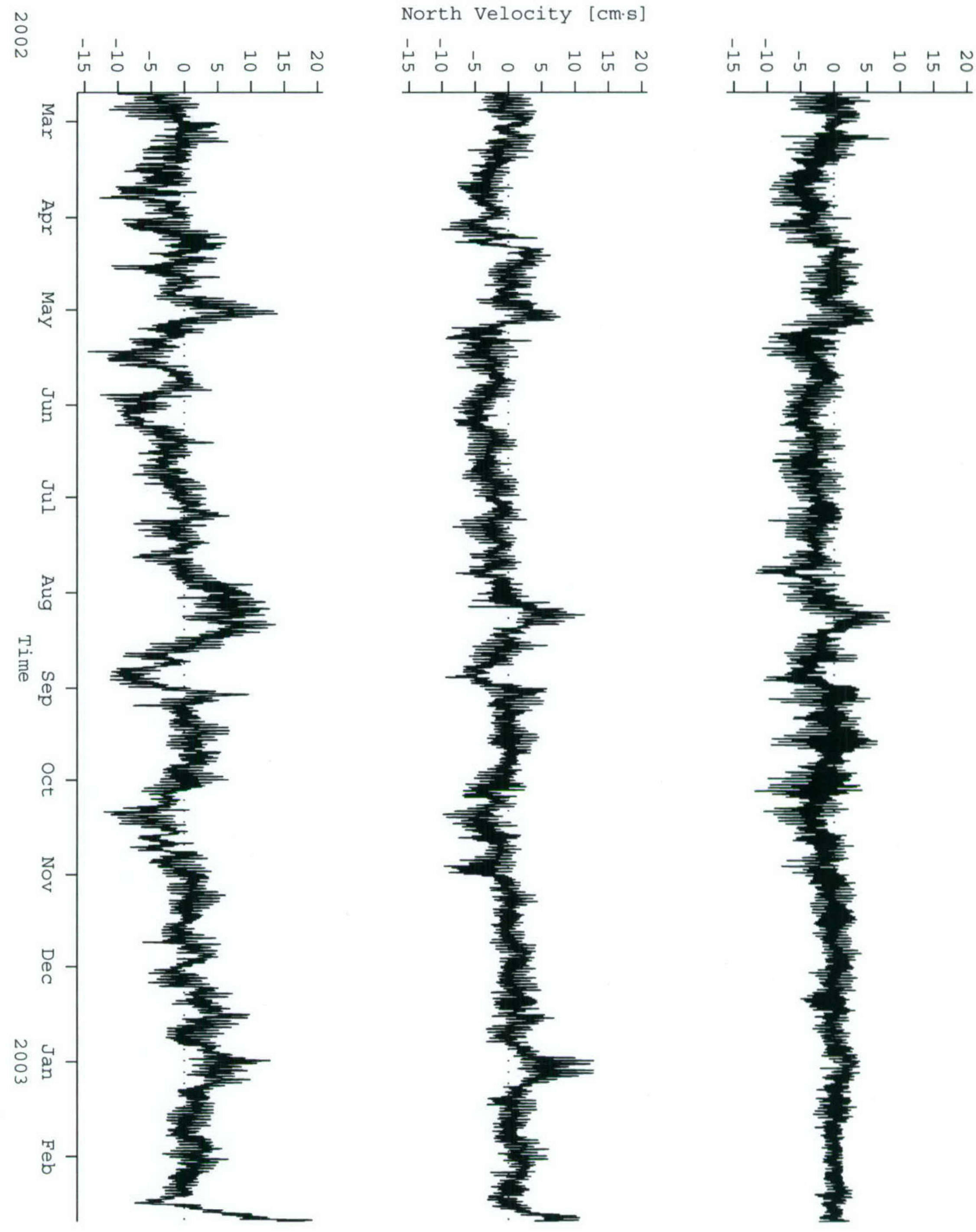

Figure 65: C2: VACM Velocity (North)

4.8 C3 Mooring

Table 20: Summary of processing of the C3 mooring. T: Temperature, S: Salinity, U,V: East and North Velocity, P: Pressure

Variable	Depth	Mean	Min	Max	Std
T [^{o}C]	104	-0.79	-1.79	0.49	0.70
	127	-0.29	-1.50	0.81	0.69
	152	0.23	-1.21	1.08	0.55
	177	0.65	-0.69	1.27	0.40
	202	0.94	-0.10	1.37	0.28
	227	1.14	0.37	1.41	0.18
	252	1.27	0.72	1.45	0.11
	253	1.27	0.74	1.45	0.11
	321	1.39	1.23	1.48	0.03
	395	1.39	1.24	1.46	0.02
	396	1.39	1.23	1.46	0.02
	521	1.35	1.19	1.40	0.02
	762	1.32	1.27	1.36	0.01
	803	1.30	1.26	1.33	0.01
S [psu]	104	34.10	33.62	34.44	0.17
	152	34.37	34.05	34.59	0.13
	202	34.54	34.30	34.65	0.07
	253	34.64	34.51	34.69	0.03
	396	34.70	34.65	34.71	0.01
P [db]	252	255.11	253.43	256.34	0.52

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
U $[\mathrm{cm} \cdot s^{-1}]$	13	0.81	-94.87	96.66	9.56	65	1.20	-29.87	31.89	5.59
	15	0.92	-118.08	72.11	9.24	67	1.18	-21.53	32.36	5.46
	17	1.12	-175.54	69.80	9.59	69	1.17	-15.79	32.27	5.35
	19	1.50	-86.18	84.10	9.05	71	1.08	-26.52	31.71	5.28
	21	1.44	-52.54	67.53	8.72	73	1.06	-27.39	30.58	5.18
	23	1.49	-57.63	107.95	8.72	75	1	-17.97	29.79	5.09
	25	1.57	-47.90	120.43	8.73	77	0.99	-20.02	28.14	5.02
	27	1.70	-57.23	137.28	8.62	79	1	-17.22	27.09	4.94
	29	1.72	-47.69	51.64	8.17	81	0.98	-17.71	25.02	4.87
	31	1.74	-35.97	65.64	8.09	83	0.94	-16.11	23.46	4.81
	33	1.82	-33.34	44.48	7.87	85	0.92	-15.65	23.20	4.72
	35	1.76	-62.48	71.27	7.70	87	0.89	-14.88	22.37	4.63
	37	1.77	-30.16	38.45	7.50	89	0.87	-14.68	22.64	4.54
	39	1.75	-40.02	38.31	7.40	91	0.85	-14.16	22.37	4.44
	41	1.66	-38.97	46.46	7.22	93	0.86	-13.91	21.48	4.36
	43	1.59	-36.62	45.12	7.11	95	0.85	-14.25	20.11	4.27
	45	1.55	-40.20	31.49	6.89	97	0.86	-14.60	17.96	4.19
	47	1.44	-27.80	39.05	6.84	99	0.86	-13.69	17.29	4.05
	49	1.41	-34.19	36.07	6.71	101	0.87	-12.79	16.63	3.98
	51	1.42	-21.18	41.37	6.59	103	0.88	-12.65	16.36	3.97
	53	1.41	-21.88	32.96	6.44	105	0.89	-12.87	15.92	3.81
	55	1.36	-22	32.43	6.27	107	0.90	-13.08	16.38	3.73
	57	1.30	-20.49	31.99	6.13	109	0.91	-13.53	16.85	3.72
	59	1.28	-20.55	43.60	6	247	0.48	-7.88	8.79	1.82
	61	1.26	-20.78	31.43	5.83	395	0.29	-5.88	7.52	1.18
	63	1.24	-20.85	30.82	5.71	762	0.20	-7.52	9.35	2.06

Variable	Depth	Mean	Min	Max	Std	Depth	Mean	Min	Max	Std
V $[\mathrm{cm} \cdot s^{-1}]$	13	0.81	-94.87	96.66	9.56	65	1.20	-29.87	31.89	5.59
	15	0.92	-118.08	72.11	9.24	67	1.18	-21.53	32.36	5.46
	17	1.12	-175.54	69.80	9.59	69	1.17	-15.79	32.27	5.35
	19	1.50	-86.18	84.10	9.05	71	1.08	-26.52	31.71	5.28
	21	1.44	-52.54	67.53	8.72	73	1.06	-27.39	30.58	5.18
	23	1.49	-57.63	107.95	8.72	75	1	-17.97	29.79	5.09
	25	1.57	-47.90	120.43	8.73	77	0.99	-20.02	28.14	5.02
	27	1.70	-57.23	137.28	8.62	79	1	-17.22	27.09	4.94
	29	1.72	-47.69	51.64	8.17	81	0.98	-17.71	25.02	4.87
	31	1.74	-35.97	65.64	8.09	83	0.94	-16.11	23.46	4.81
	33	1.82	-33.34	44.48	7.87	85	0.92	-15.65	23.20	4.72
	35	1.76	-62.48	71.27	7.70	87	0.89	-14.88	22.37	4.63
	37	1.77	-30.16	38.45	7.50	89	0.87	-14.68	22.64	4.54
	39	1.75	-40.02	38.31	7.40	91	0.85	-14.16	22.37	4.44
	41	1.66	-38.97	46.46	7.22	93	0.86	-13.91	21.48	4.36
	43	1.59	-36.62	45.12	7.11	95	0.85	-14.25	20.11	4.27
	45	1.55	-40.20	31.49	6.89	97	0.86	-14.60	17.96	4.19
	47	1.44	-27.80	39.05	6.84	99	0.86	-13.69	17.29	4.05
	49	1.41	-34.19	36.07	6.71	101	0.87	-12.79	16.63	3.98
	51	1.42	-21.18	41.37	6.59	103	0.88	-12.65	16.36	3.97
	53	1.41	-21.88	32.96	6.44	105	0.89	-12.87	15.92	3.81
	55	1.36	-22	32.43	6.27	107	0.90	-13.08	16.38	3.73
	57	1.30	-20.49	31.99	6.13	109	0.91	-13.53	16.85	3.72
	59	1.28	-20.55	43.60	6	247	0.48	-7.88	8.79	1.82
	61	1.26	-20.78	31.43	5.83	390	0.29	-5.88	7.52	1.18
	63	1.24	-20.85	30.82	5.71	757	0.20	-7.52	9.35	2.06

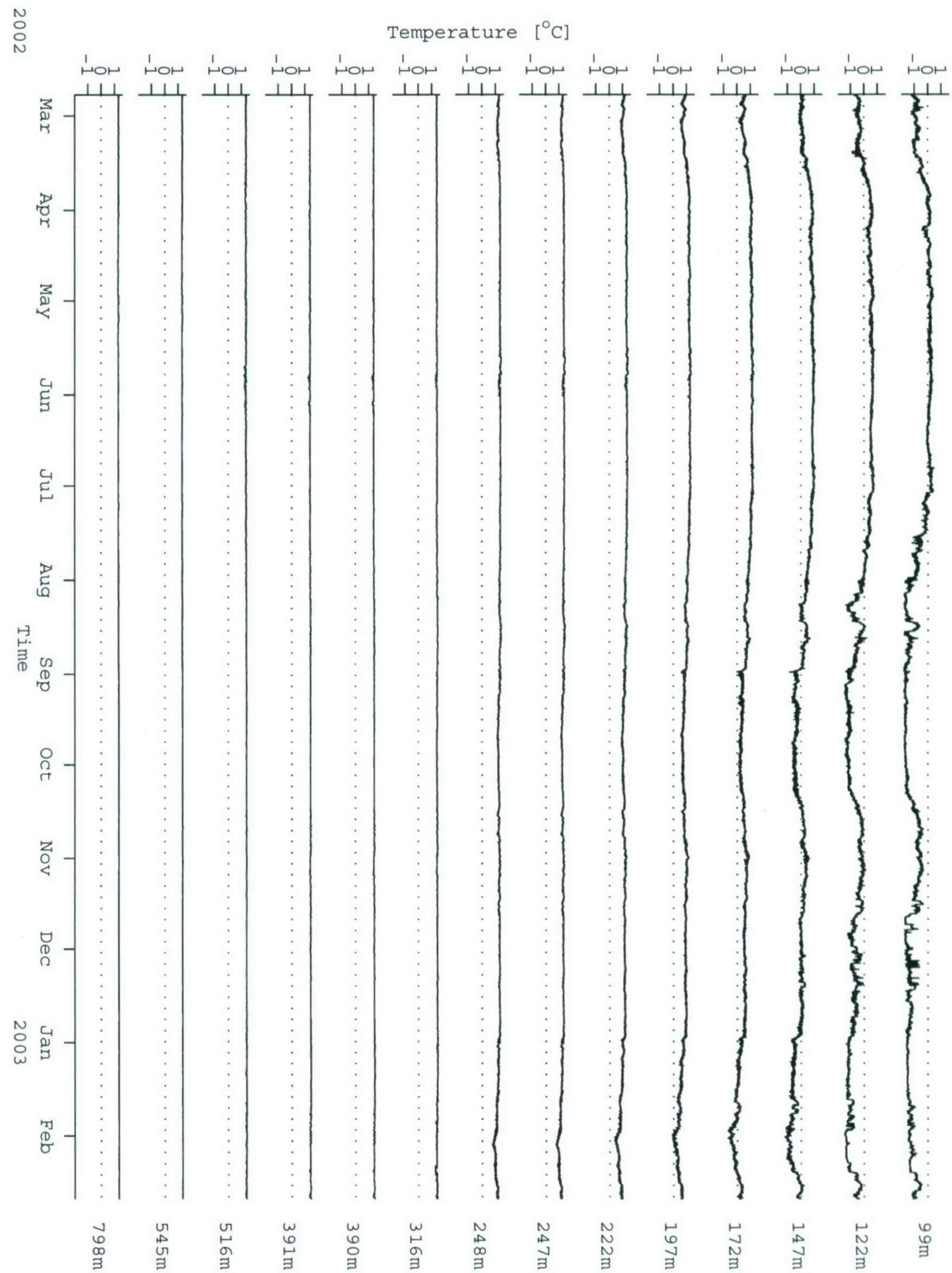

Figure 66: C3: Temperature records

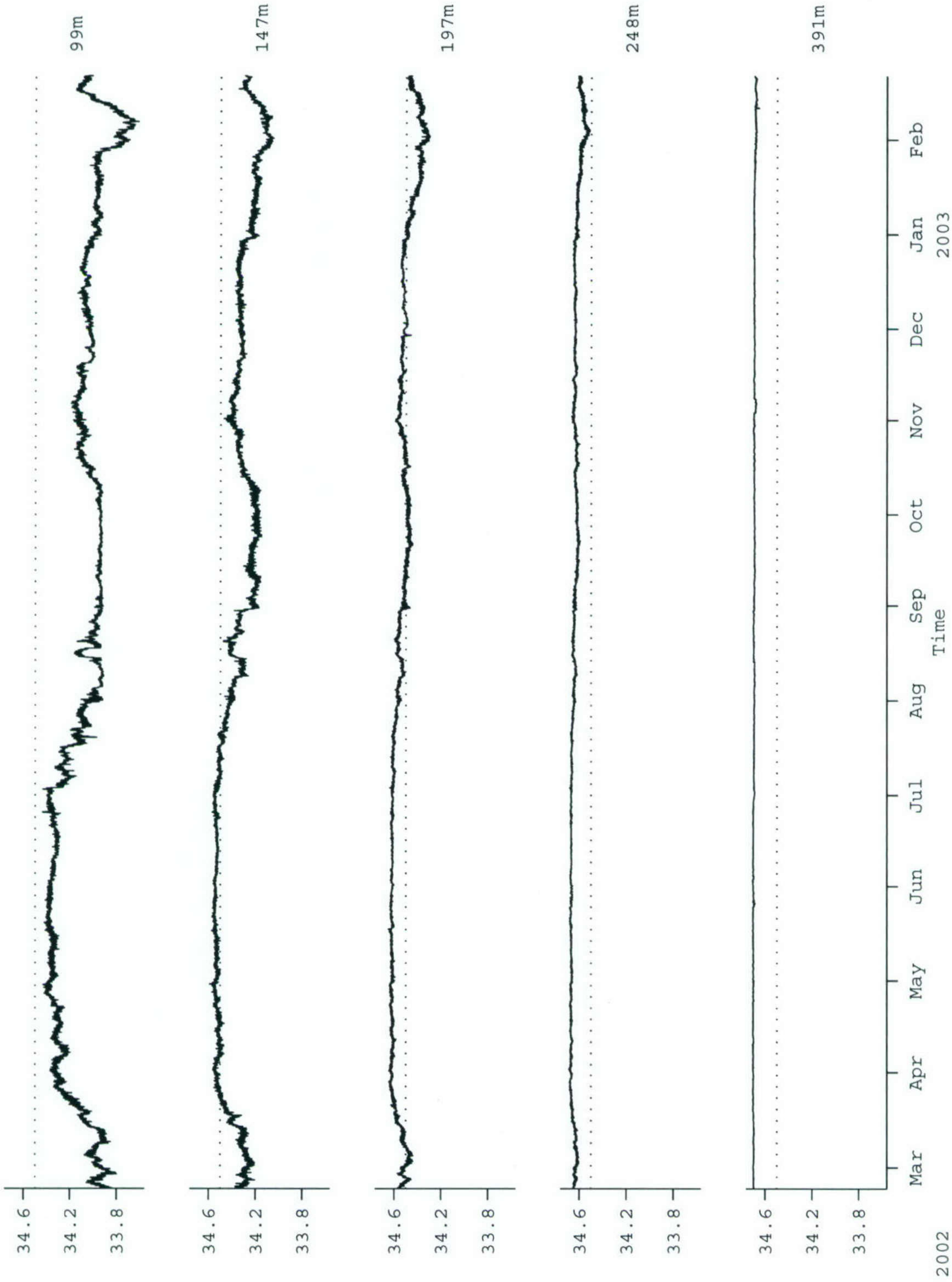

Figure 67: C3: Salinity records

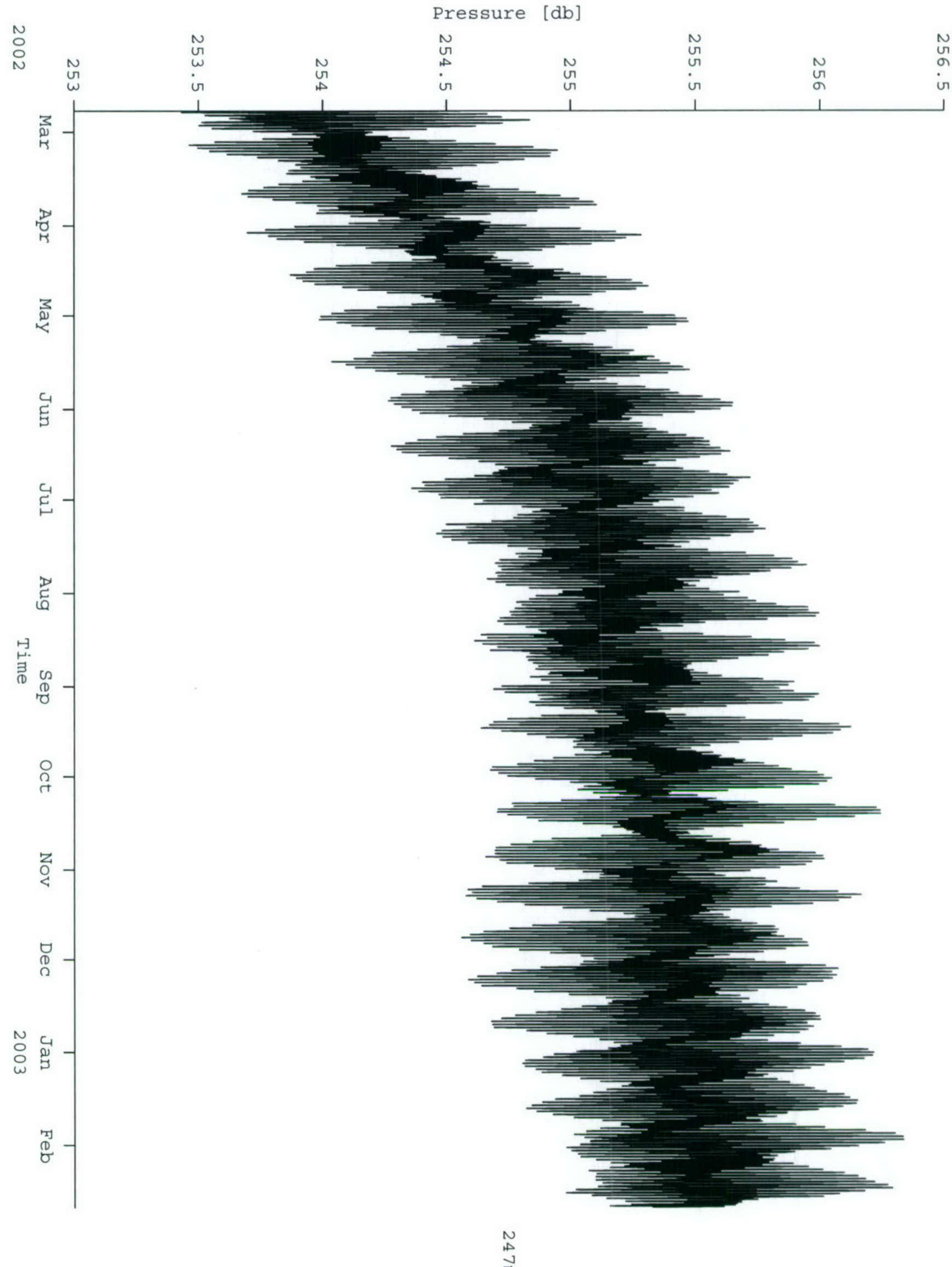

Figure 68: C3: Pressure records

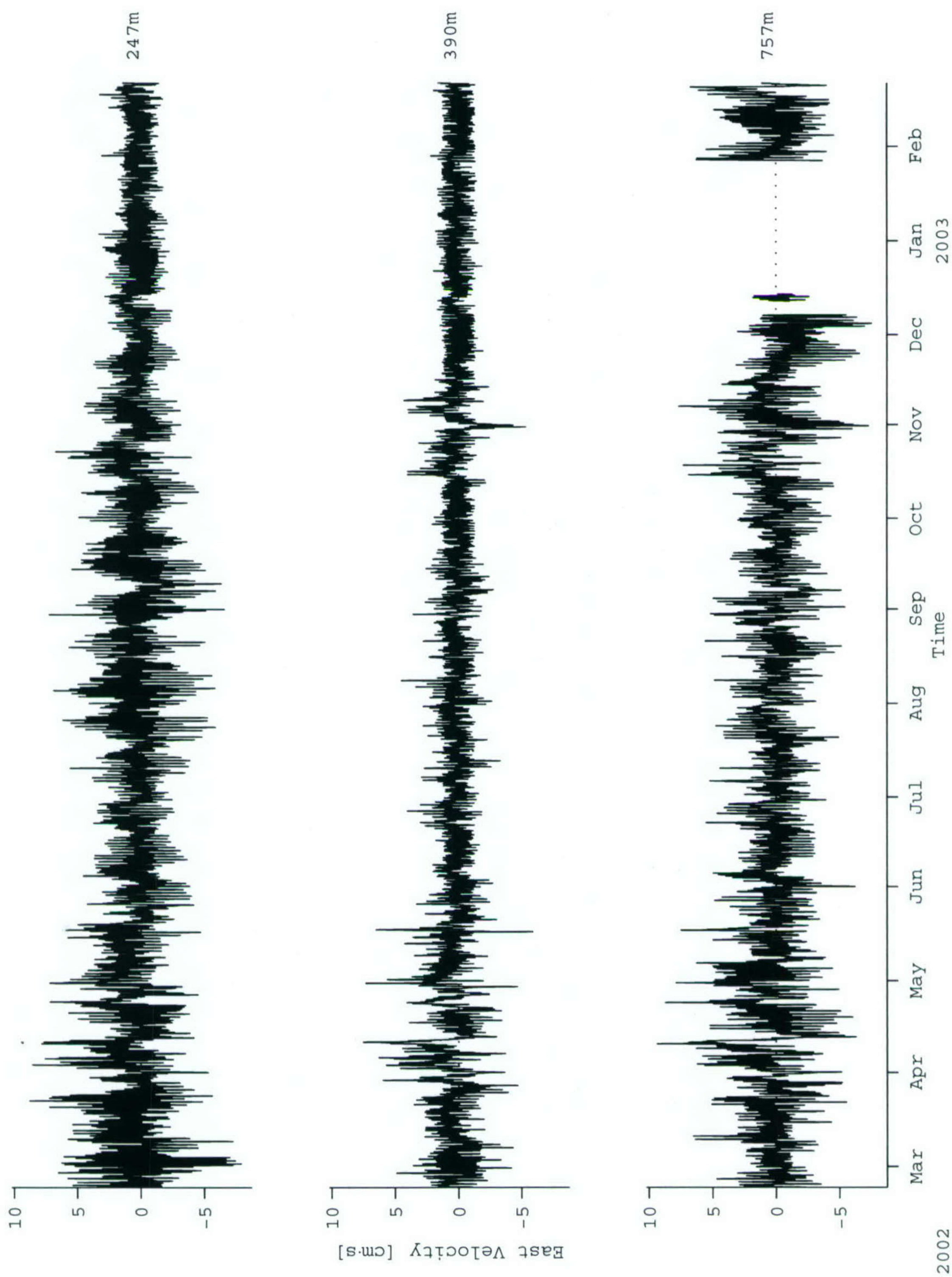

Figure 69: C3: VACM Velocity (East)

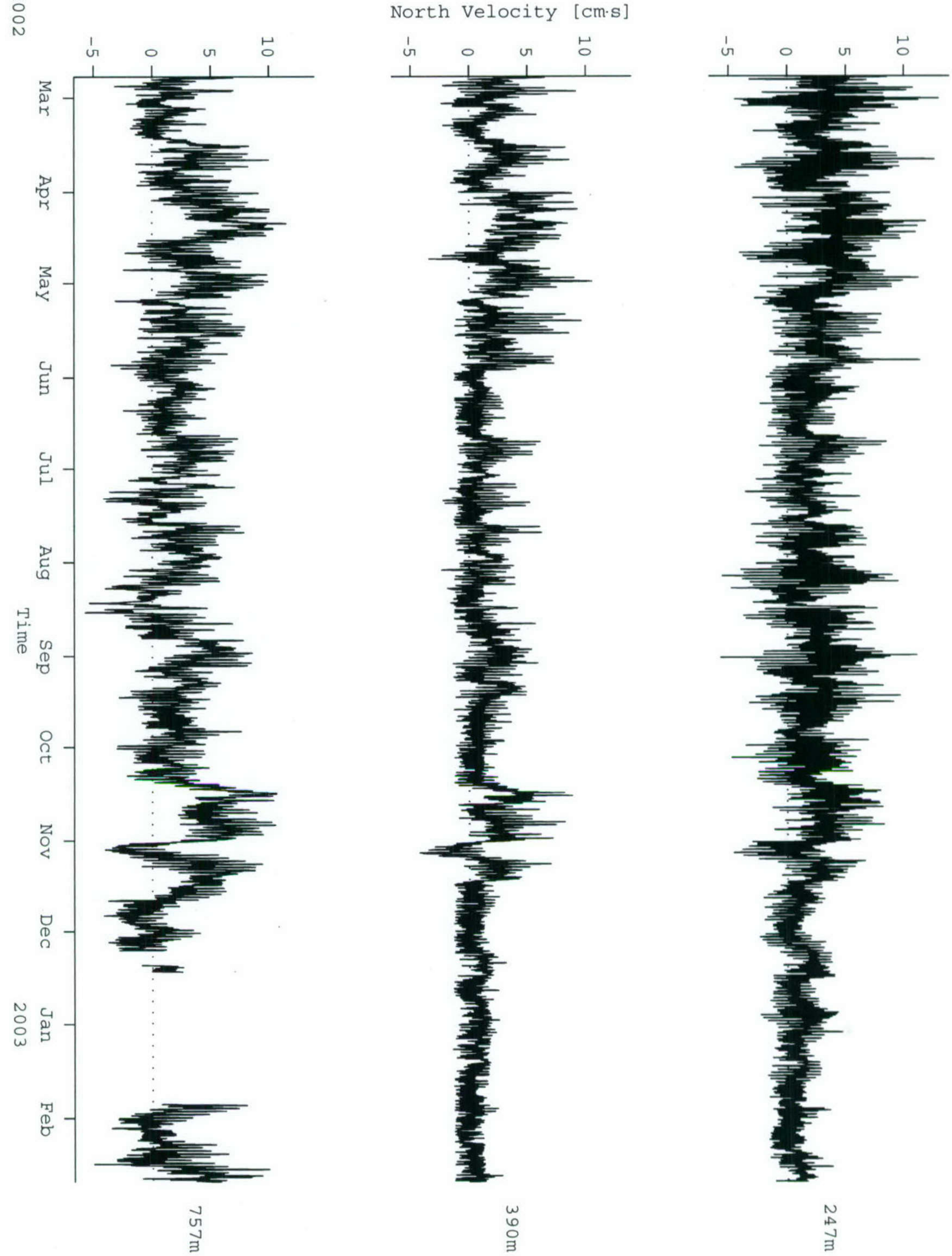

Figure 70: C3: VACM Velocity (North)

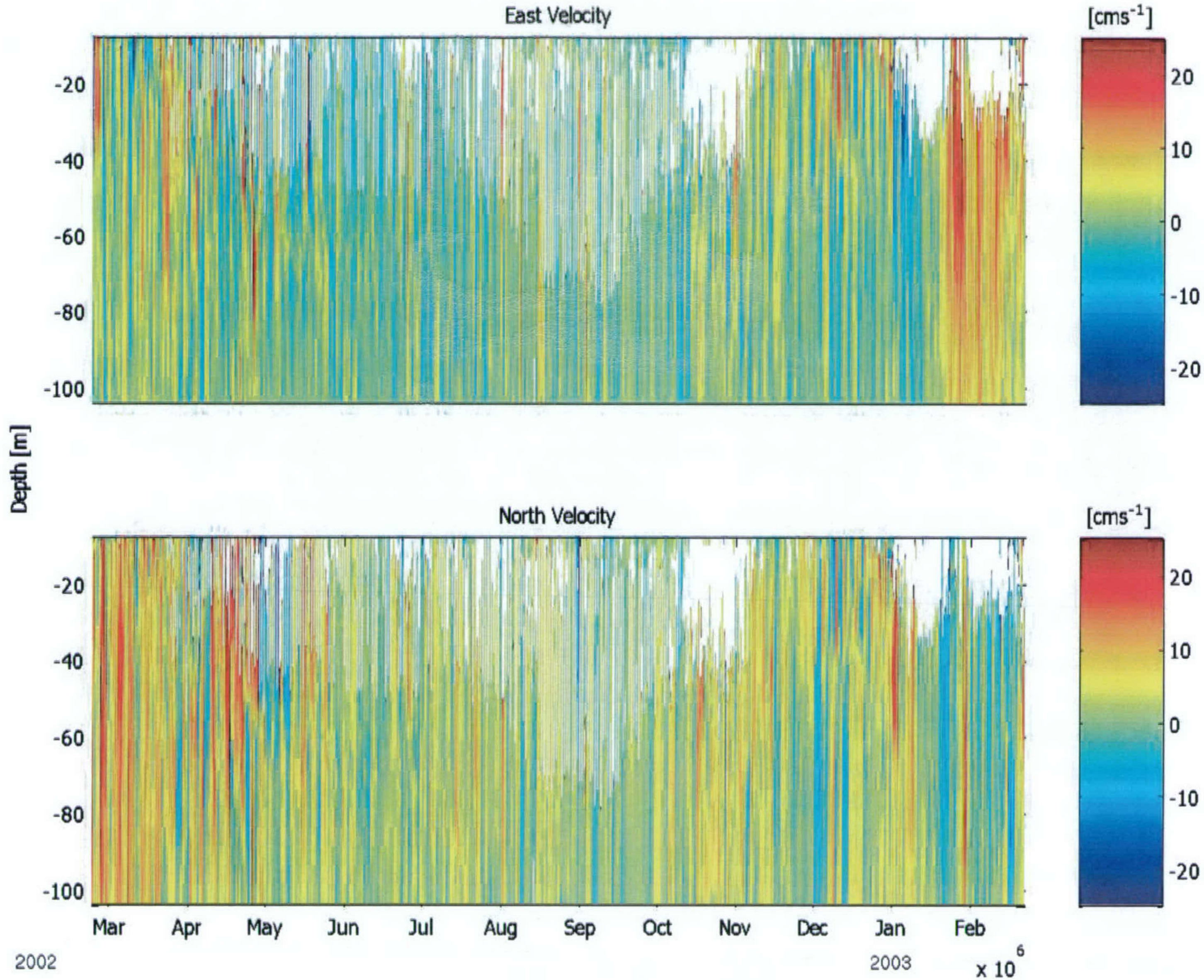

Figure 71: C3: ADCP Velocity. East Velocity (Top Panel), North Velocity (Bottom Panel)

4.9 AWS Data

Table 21: Summary of processing of the AWSs: AT: Air Temperature, RH: Relative Humidity, U,V: East and North Wind Velocity, BP: Barometric Pressure

Station	Variable	Mean	Min	Max	Std
Kirkwood I.	T [°C]	-6.27	-34.75	4.78	7.31
	RH [%]	81.64	38.00	99.60	10.40
	U [m/s]	-1.24	-28.55	28.09	5.77
	V [m/s]	-1.66	-25.26	14.07	5.01
	P [mb]	982.58	940.41	1014.90	13.48
Dismal I.	T [°C]	-5.31	-34.34	7.41	7.35
	RH [%]	83.53	37.18	101.64	10.04
	U [m/s]	-1.04	-22.55	23.06	4.45
	V [m/s]	-3.35	-28.46	14.36	5.74
	P [mb]	985.01	941.21	1017.70	13.50

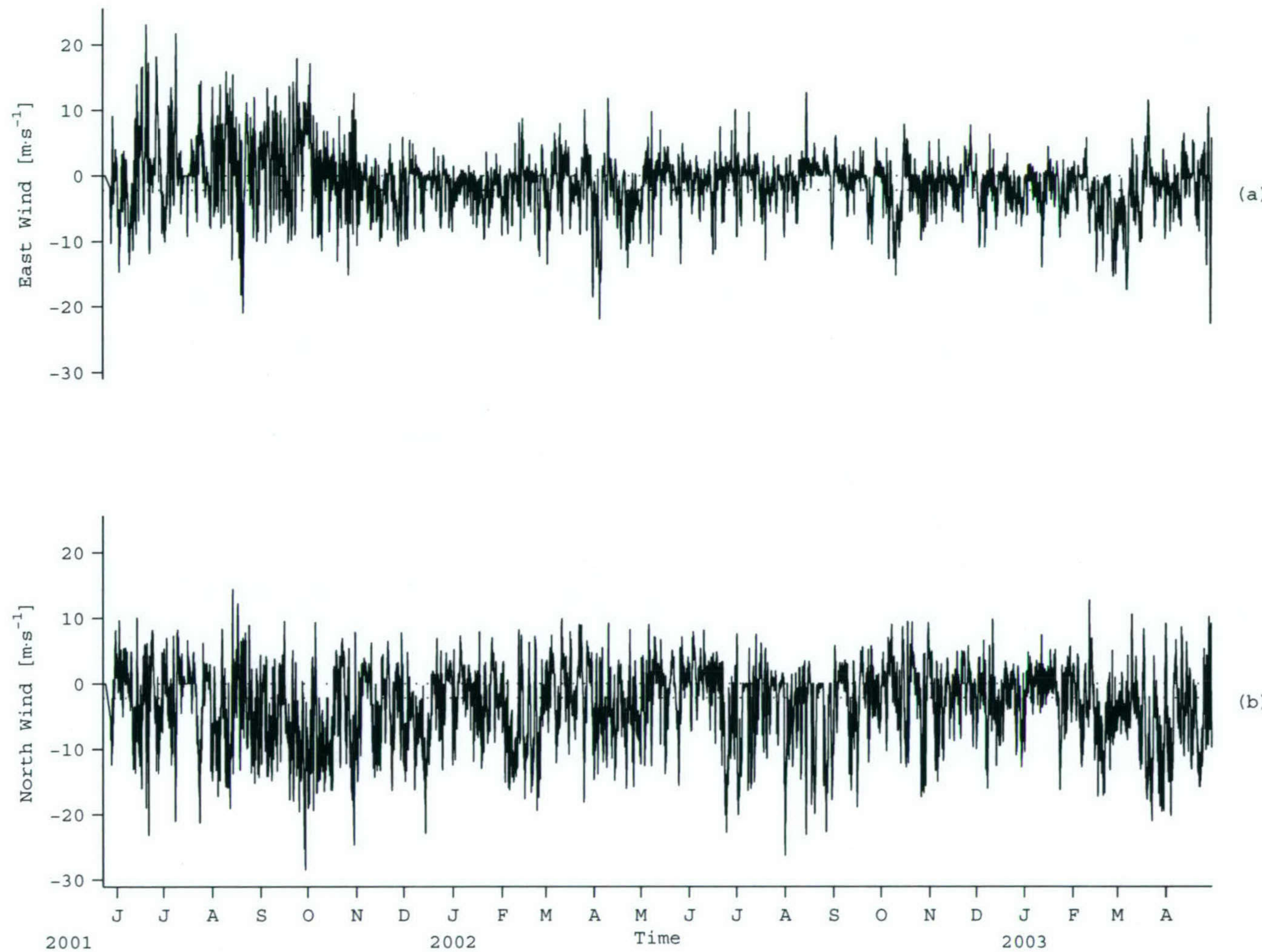

Figure 72: Wind speed in the East (a) and North (b) directions measured with the AWS at Dismal Island

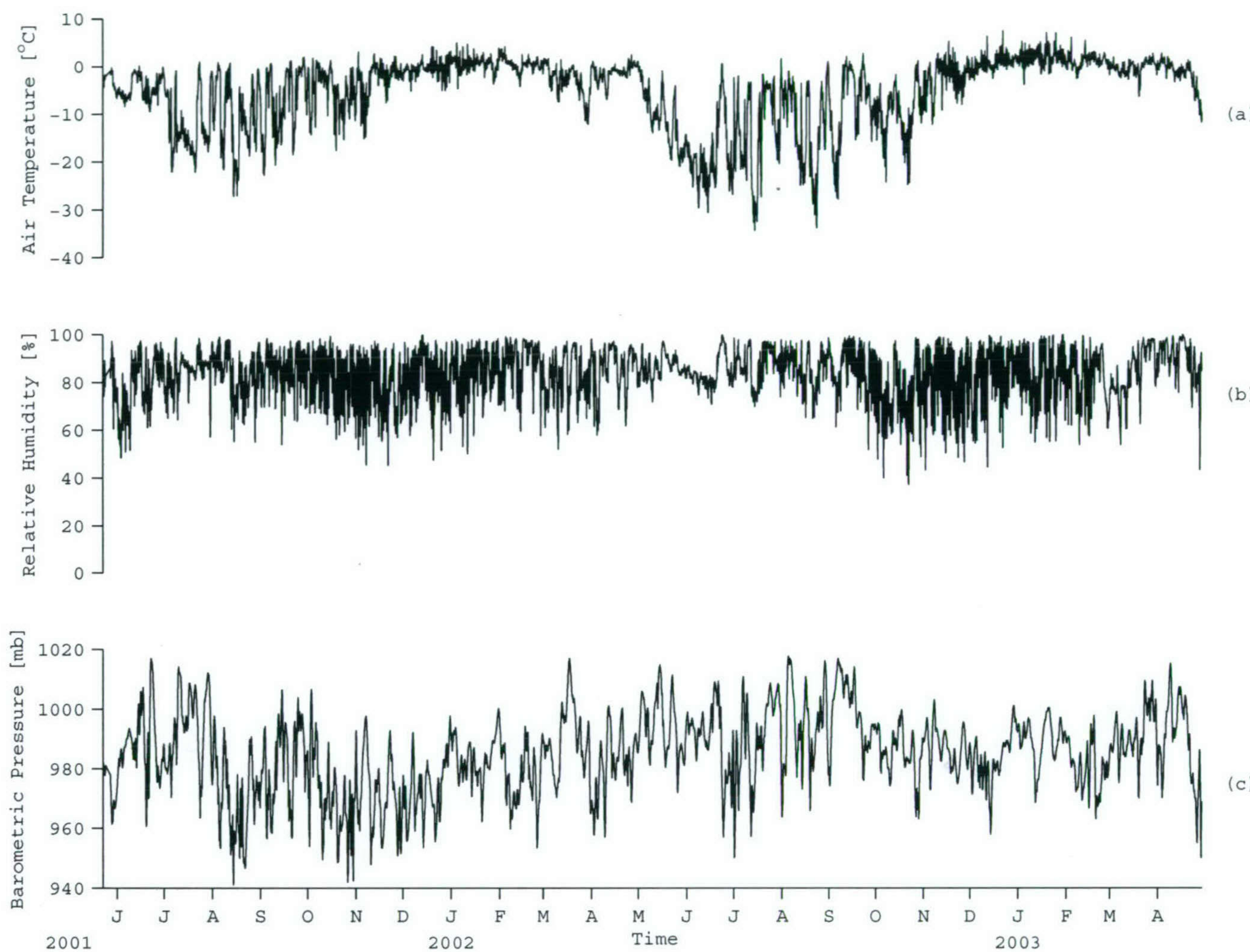

Figure 73: Air temperature (a), relative humidity (b) and barometric pressure (c) measured with the AWS at Dismal Island

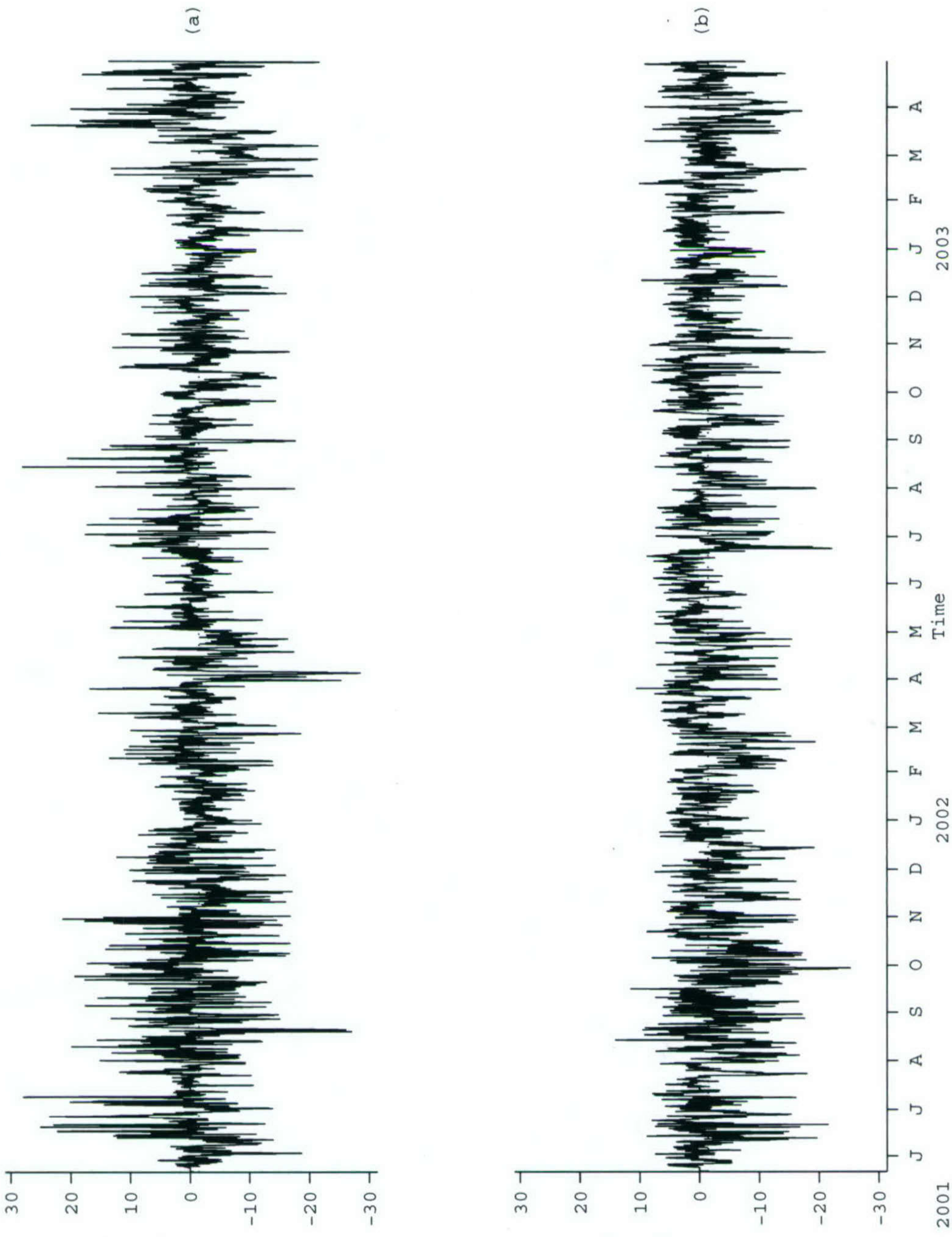

Figure 74: Wind speed in the East (a) and North (b) directions measured with the AWS at Kirkwood Island

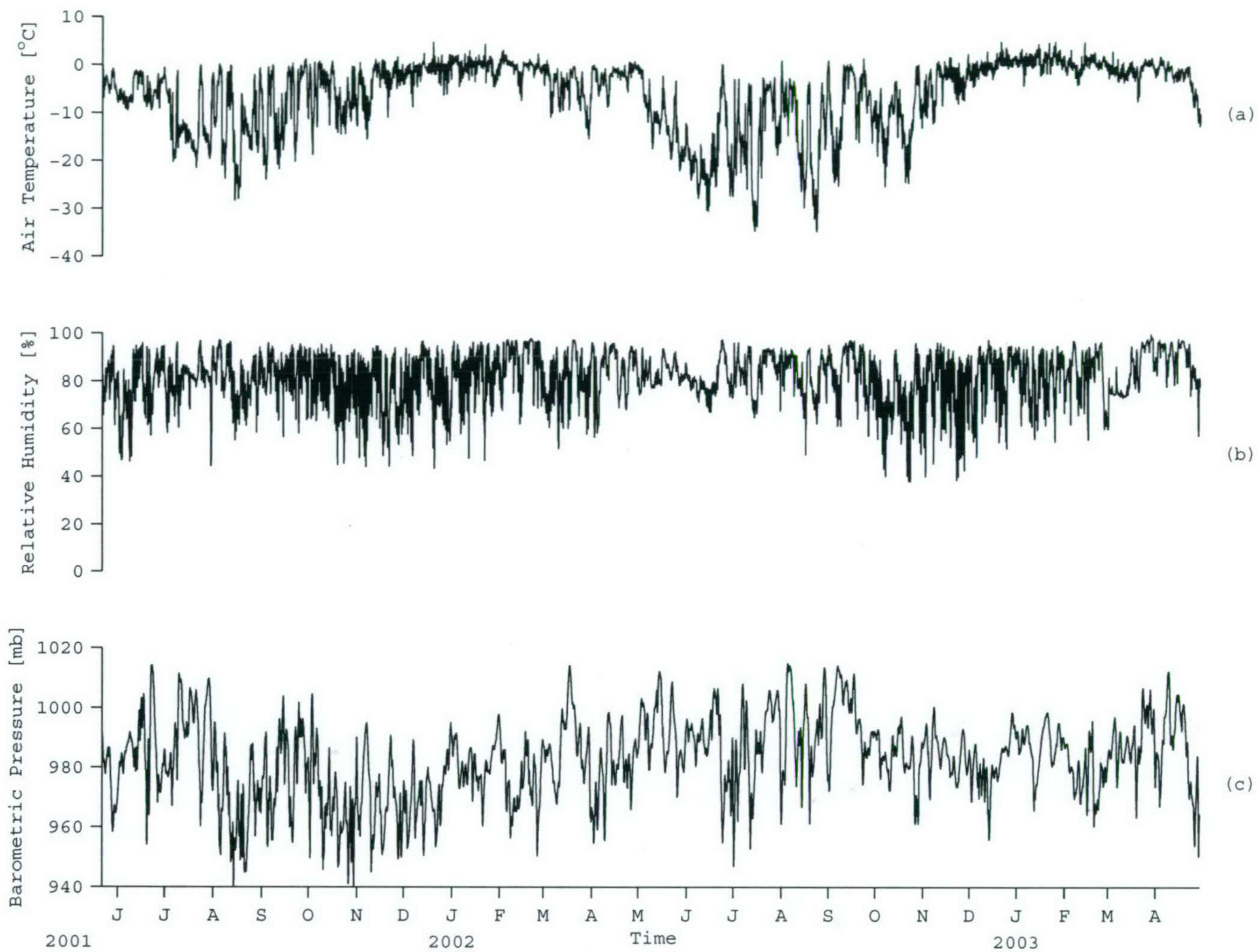

Figure 75: Air temperature (a), relative humidity (b) and barometric pressure (c) measured with the AWS at Kirkwood Island

5 Data Access

All the data, including the raw data uploaded from each instrument and all the MATLAB codes necessary to repeat the steps leading to the final, hourly-averaged data, can be found at http://globec.whoi.edu/jg/dir/globec/soglobec/. The data is organized as follows:

```
|-- aws
|-- ctd
|   |-- deployment
|   `-- recovery
|-- data2002
|   |-- codes
|   |-- process
|   |   |-- a1
|   |   |-- a2
|   |   |-- a3
|   |   |-- b2
|   |   `-- b3
|   `-- rawdata
|       |-- a2iceprofiler
|       |-- b2iceprofiler
|       |-- bb150
|       |-- calibmooring
|       |-- microcat
|       |-- readadcp
|       |-- seacat
|       |-- seagauge
|       |-- tr
|       |-- vacm
|       `-- whadcp
|-- data2003
|   |-- codes
|   |-- process
|   |   |-- c1
|   |   |-- c2
|   |   `-- c3
|   `-- rawdata
|       |-- anal
|       |-- calib
|       |-- ctd
|       |-- microcat
|       |-- seagauge
|       |-- tr
|       |-- vacm
|       `-- whadcp
`-- report
```

The "ctd" folder contains the CTD casts taken during the deployment and recovery of the moorings. The data folder contain the mooring rawdata uploaded from the different instruments. The aws folder contains the data and MATLAB codes necessary to process the AWS data.

A few codes required to process most of the mooring data are stored in the "codes" folder. The folders containing the processed mooring data are organized as

```
a1
|-- a1mc159m150s
|-- a1mc309m300s
|-- a1sg502m300s
|-- a1tr134m225s
|-- a1tr209m225s
|-- a1tr259m225s
|-- a1va309m900s
|-- a1va459m900s
`-- a1wh169m1800s
```

Each instrument has its own subdirectory that includes the raw (in MATLAB format), hourly and filtered data as well as the MATLAB .m file programs that created and edited the raw data from the data originally uploaded from the instrument, which is stored in the /rawdata folder. The folder names and the .mat files in the folders are long but contain useful information about the data location, type, depth, and sampling interval. For instance, the name c2mc113m150s indicates data comes from the C2 mooring Microcat (temperature and conductivity) at a depth of 113m sampling every 150 seconds. Typically, there are two .m files and four .mat files in each folder[1]:

```
c2mc113m150s/
|-- c2mc113m150s.jpg (plot of raw data)
|-- c2mc113m150s.mat
|-- c2mc113m150s_e.mat
|-- c2mc113m150s_r.mat
|-- c2mc113m_1hr.mat
|-- editc2mc113m.m
`-- readc2mc113m.m
```

The read*****.m code reads the data from the /rawdata directory, applies the clock corrections and post-cruise calibrations, and writes the data into the _r.mat file. The edit.m file loads the _r.mat (raw) file, applies all other corrections (offsets, trends, etc.) and saves the _e.mat (edited) file. The code then interpolates the data into a common time base, which is stored in the /codes directory. This data is stored with no subscript (i.e. c2mc113m150s.mat). Finally, the data is hourly averaged and stored in the _1hr.mat file. Similar names refer to data from the temperature recorder (tr), VACM (va), Seacat (sc), Workhorse ADCP (wh), Broadband ADCP (BB), and SeaGauge (sg).

The variables in each of the mat files are typically:

1. jday the time word in decimal julian day. Julian day 2440000 begins at 0000 hours, May 23, 1968. See julian.m and gregorian.m at http://woodshole.er.usgs.gov/operations/sea-mat/ (Under "RPStuff").

[1]Some of the instruments change depth during the deployment, and in those cases two edit files are used.

2. temp = temperature [°C]
3. cond = conductivity [mS/cm]
4. pres = sea water pressure [db]
5. u or east = eastward current [cm/s]
6. v or north = northward current [cm/s]
7. w = vertical current [cm/s]
8. depth = total depth [m]
9. instdepth = instrument depth [m]

In the case of the aws data, the variable names are:

1. jd [decimal Julian day]
2. time [year,day,month,hour]
3. tuv0 Julian day times when raw sp = 0
4. ws wind speed [m/s]
5. wd wind direction [°] (East=0°)
6. u east wind component [m/s]
7. v north wind component [m/s]
8. at temperature [°C]
9. rh relative humidity [%]
10. bp barometric pressure [mb]
11. tau wind stress [N/m^2]
12. taux east wind stress [N/m^2]
13. tauy north wind stress [N/m^2]
14. qsen sensible heat flux [W/m^2]
15. qlat latent heat flux [W/m^2]

The final, hourly averaged data sets (_1hr) are loaded and saved in one .mat file per mooring, by a code named compile.m in the /processing directory (there's one for each year). The variable names in those files should be self explanatory, and they are:

1. jd: Julian Day the time word in decimal julian day. Julian day 2440000 begins at 0000 hours, May 23, 1968. See julian.m and gregorian.m at http://woodshole.er.usgs.gov/operations/sea-mat/ under "RPStuff".
2. temp: Temperature, [°C] (ITPS-68)
3. cond: Conductivity, [mS/cm]
4. salt: Salinity, [psu] (PSS-78)
5. pres: pressure, [db]
6. dens: Density, [kg/m^3]
7. pden: Potential Density[1], [kg/m^3]
8. iprange: Ice Profiler range [m]
9. ipdraft: Ice Profiler draft [m]
10. u: Eastward current [cm/s] - Includes both ADCP and VACM data
11. v: Northward current [cm/s] - Includes both ADCP and VACM data
12. lat, lon: Latitude and Longitude [°]
13. depthb: bottom depth [m]
14. depthuv: depth of the horizontal velocities [m]
15. depthp: depth of the pressure records [m]
16. depthts: depth of the temp/cond/salt/dens/pden records [2] [m]

For all the measured variables, the columns are depth, and rows are time. Notice that the matrices for horizontal velocities include both VACM and ADCP data, when both are present.

[1]Calculated with in-situ pressure, if available, or with an estimation of the pressure from the instrument depth, using "sw_dpth".

[2]The size of the matrices containing temp, cond and derived quantities (salinity, density, potential density) are the same. However, when no conductivity was present at a given depth, the corresponding column of the matrix is filled with NaNs.

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The raw data recorded in the WHOI SeaBird and RDI instruments were downloaded onto PC's at sea and basic processing started during the cruises and completed at WHOI after post-cruise calibration data were obtained. The VACMs were left running until the end of each cruise when they were opened and the data cassettes removed to be hand carried back to WHOI. The VACM records were decoded using a new MATLAB-based processing system and basic edited time series generated by C. Alessi and M. Pacheco, with input from N. Hogg and R. Goldsmith. T. Bolmer supplied the final composite high-resolution SeaBeam bathymetry data presented here around each mooring site.

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16. Abstract (Limit: 200 words)

As part of the U.S. Southern Ocean GLOBEC program, moored time series measurements of temperature, conductivity (salinity), pressure, velocity, and acoustic backscatter were made from March 2001 to March 2003 in and near Marguerite Bay, located on the Antarctic Peninsula western shelf. To monitor surface forcing during the moored array observations, two automatic weather stations (AWSs) were deployed on islands in Marguerite Bay and time series of wind, air temperature, pressure, and relative humidity were collected from May 2001 through March 2003. This report describes the individual moorings, their locations and local bathymetry, the instrumentation used and measurement depths, calibration and data processing steps taken to produce final time series, and basic plots of the final time series. The AWS data acquisition and processing are also described and basic plots of the final meteorological time series presented. Directions are given about how to access the raw and processed moored and AWS data via the SO GLOBEC website (http://globec.whoi.edu/jg/dir/globec/soglobec/).

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