



# MOORED INSTRUMENT OBSERVATIONS FROM BARROW STRAIT, 2005-2006

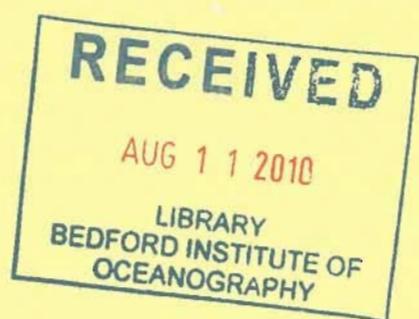
DOCUMENTS

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**Canadian Data Report of  
Hydrography and Ocean Sciences**

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## **Abstract**

Pettipas, R., J. Hamilton, and S. Prinsenberg. 2010. Moored instrument observations from Barrow Strait, 2005-2006. Can. Data Rep. Hydrogr. Ocean Sci. 190: vii + 139 p.

Instrumented moorings deployed in the eastern end of Barrow Strait from August 2005 to August 2006 provide yearlong records of current, temperature, salinity, bottom pressure, ice drift and ice thickness, extending a data time series started in August of 1998. The presented current and ice drift data have been collected with acoustic Doppler current profilers (ADCPs) and specialised instrumentation for near-pole direction measurement. Temperature, salinity and density for fixed depths from moored CTDs, bottom pressure and temperature from water level recorders (WLRs), and ice draft from an ice profiling sonar (IPS) are also presented. The current and ctd data are presented as filtered and unfiltered time series, spectral and tidal analyses products, and statistical summaries.

Finally, two CTD sections across Barrow Strait based on a 2006 ship-based survey are presented.

## **Résumé**

Pettipas, R., J. Hamilton, and S. Prinsenberg. 2010. Moored instrument observations from Barrow Strait, 2005-2006. Can. Data Rep. Hydrogr. Ocean Sci. 190: vii + 139 p.

Batteries d'instruments ancrées dans l'embouchure est du détroit de Barrows d'août 2005 à août 2006 ont fourni sur l'année des mesures des courants, de la température, de la salinité, de la pression au fond, de la dérive et de l'épaisseur de la glace, qui viennent prolonger une série chronologique de données commencée en août 1998. Les données sur les courants et la dérive de la glace qui sont présentées ont été recueillies au moyen de profileurs de courant à effet Doppler (ADCP) et d'instruments spécialisés pour la mesure des directions près du pôle. Sont également présentées des données sur la température, la salinité et la densité à des profondeurs fixes mesurées avec des sondes CTP ancrées, des données sur la température et la pression au fond obtenues à l'aide de limnigraphes et des données sur la dérive de la glace obtenues à l'aide d'un

sonar profileur de glace. Les données sur les courants et les données des sondes CTP sont présentées sous forme de séries chronologiques lissées et brutes, de produits issus d'analyses des marées et d'analyses spectrales, et de résumés statistiques.

Enfin, deux coupes transversales d'enregistrements des sondes CTP dans le détroit de Barrows provenant d'un relevé réalisé à partir d'un navire en 2006 sont aussi présentées.



## Introduction

A field program to quantify and examine the inter-annual variability of the exchange through Barrow Strait (a principal pathway between the Arctic and North Atlantic Oceans), was started by BIO investigators in August of 1998. Data from the first 7 years of this study, along with a description of the methods used, have previously been reported [Pettipas et al., 2008, 2006, 2005; Hamilton et al., 2008, 2004, 2003, 2002]. Described here are moored instrument data from the eighth year of the study.

Yearlong records of temperature, salinity and density information derived from moored microcat CTD data are presented as unfiltered and low-pass filtered time series, and also as power spectra. Current rate and direction (from ADCPs and custom pole compasses) are also presented as unfiltered and low-pass filtered contour plots, and as time series plots for depths corresponding to the moored CTDs. Seasonally averaged statistical summaries for both the CTD and current data are provided as graphs and/or in tabular form. Results of tidal analyses of the current data give tidal amplitudes, phase, and ellipse orientation as a function of depth for each of the 5 main tidal constituents (K1, M2, O1, S2, P1). Separate tidal analyses have been done for periods of solid ice cover and periods of open water.

Ice drift velocity, obtained from the acoustic Doppler current profilers (ADCPs), are presented as yearlong time series. Ice draft measurements were acquired with a moored ASL ice profiling sonar (IPS), and a statistical summary of these data is presented in graphical form. This is the second year for ice draft measurements. They were also collected at the same location in 2003-2004 (Hamilton et al, 2008). Water level and bottom temperature from water level recorders (WLRs) in 4 locations to provide along and cross-strait slopes are also presented. The Icycler profiler was once again moored on the South side of the strait but stopped working early in the deployment when a connector flooded. The ten near-surface profiles of salinity, temperature, fluorescence and density collected before this failure are shown as contour plots.

Finally, hydrographic sections at the eastern and western ends of Barrow Strait are presented. These cross-sectional diagrams are created from a CTD survey conducted during the field study. A line across Wellington Channel that is usually done was not

attempted this year due to heavy ice conditions there. These CTD lines have been completed each summer since 1998 when ice conditions allowed.

## **Mooring Locations and Description**

Instrumented moorings were distributed over 4 sites across the eastern end of Barrow Strait (Figure 1) as in the previous 4 years, but sensors were combined on these moorings where possible, reducing the total number of moorings along this main line from 10 to 8. Three moorings were located at the 150 m contour on the south side, 3 moorings were halfway between this Southern site and the center of the strait (the “South Central” site), 1 moorings was in the middle of the strait (the Central site), and 1 mooring was at the 200 m contour on the north side. An illustration of the 8 moorings deployed along the main line is shown in Figure 2. A ninth mooring to support a water level recorder was also deployed 95 km to the west (see Figure 1).

ADCPs manufactured by Teledyne RD Instruments and precision heading references (Watson Industries, Inc.) were mounted in streamlined buoyancy packages to provide current rate and direction information. The technique used to obtain reliable direction measurements here, where conventional compass technology is inadequate due to the proximity of the site to the magnetic pole, is described in detail by Hamilton [2004, 2001]. The upward looking ADCPs logged average speeds from 100 pings over a 5 minute on-period every 2 hours, and also provided a simultaneous ice drift speed over the yearlong deployment. 307 KHz Workhorse Sentinel ADCPs were used at the Southern, Central and Northern sites. A “Workhorse Long Ranger” (75 kHz) was used at the South-Central site. Concurrent direction measurements were logged separately with the precision heading reference systems, and have been merged with the ADCP speed data for presentation here. All 5 ADCP/compass systems were successfully recovered with full data sets, although the Long Ranger at the South-Central site did not provide ice drift data due to instrument setup issues.

An IPS was moored at the South-Central site, and provided good quality ice draft data for the duration of the yearlong deployment. Ice draft is the distance between the bottom of the ice and mean sea level.

SeaBird MicroCat CTDs were used to measure temperature, conductivity and pressure at targeted depths of 40, 80 and 160 m across the Strait, as well as the near-bottom at the South-Central site. These CTDs recorded temperature, conductivity and pressure at a single depth every 30 minutes. All 13 microcat CTDs were recovered and returned good data.

Water level recorders were attached to anchors of moorings at the Southern, Central and Northern sites along the main mooring line, in addition to the water level recorder deployed in the middle of the strait south of Resolute. This was the third year that the water level recorders were used in the array but the first year that all returned good pressure data, providing a good data set for quantifying and examining the geostrophic flow through the strait.

The “Icycler” profiler (the prototype Icycler50) was moored at the Southern site to obtain water property information in the upper water column where conventional mooring technology can not be used due to the high risk of loss to ice. Icycler is described in Fowler et al, [2008], and yearlong records at this site from a successful deployment in 2003-2004 are presented in Hamilton et al, 2008.

A summary of the 2005-2006 moorings and instrumentation, including mooring positions, instrument depths and acquired data records, is presented in Table 1.

## Data Processing

### Current Speed and Direction Data

The 307 kHz ADCPs were mounted in streamlined buoyancy packages (A2 "SUBs" manufactured by Open Seas Inc.) and set up to measure current relative to the instrument axes, ignoring their own compass information. These instruments were set up to average over a depth interval of 4 m. Typically, the highest useful depth average in the data sets from the 3 upper (about 80 m) ADCP instruments was centered around 10 m.

Current data above this level were rejected based on RDI's standard echo intensity quality criterion. These acoustic Doppler current profilers also record ice drift velocity when there is solid or near-solid ice cover.

At the Southern site, two 307 kHz ADCPs at different depths (76 m and 144 m) and separated by 460 m, are combined to provide currents for most of the water column. A comparison of current direction at the 70 m level where the ranges of these 2 instruments overlap indicates that there was a 25° difference in the vector mean current direction. No problem with either ADCP/pole compass combination could be identified, so all data are reported. At the South-Central site where the bottom depth is 264 m, the 75 kHz Long Ranger ADCP moored near bottom provided near full water column coverage with a single instrument. At the Central and Northern sites, currents for the upper water column only are provided by the 307 kHz ADCPs moored at 76 m depth.

Direction was provided using an independent compass package mounted in the buoyancy package tail to give the orientation of the ADCP relative to magnetic north. Initiation of a compass sample cycle was triggered by the commencement of the bihourly ADCP measurement by making use of Teledyne RDI's "RDS3 interface" to provide a turn-on pulse to the compass. The compass was programmed to take a 10 s sample in the middle of the 5 minute ADCP sampling interval. This conserved compass battery power, and took advantage of previous experience that current direction does not change significantly over 5 minutes at the study location [Hamilton et al., 2003]. Direction records were then adjusted for the variation in magnetic declination using magnetic observatory data from the NRCAN observatory in Resolute to get direction relative to true north.

Vertical excursions of the ADCPs caused by current drag forces acting on the mooring were similar to previous years, rarely exceeding 2 meters.

### Moored CTD Data

SeaBird MicroCat CTDs were set up to measure temperature, conductivity and pressure every 30 minutes for the yearlong deployments. The mooring supporting the 40 m level CTD at the South-Central site was subjected to the greatest dip due to current

drag forces acting on the mooring. The largest observed dip was 9 m, with a standard deviation in instrument depth over the yearlong deployment of just 0.8 m.

### Low-Pass Filtering

Some of the data series presented have been filtered to remove the semidiurnal and diurnal tides using the technique described by Godin (1972). The technique uses three simple averaging filters applied in sequence. Godin, working with hourly observations, recommends two consecutive applications of a filter that averages over 24 samples, followed by one that averages over 25 samples. Here for the bi-hourly current data, we sequentially apply 12,12, and 13 sample averaging filters, while for the semi-hourly MicroCat CTD data we sequentially apply 48, 48 and 50 sample averaging filters.

### Tidal Analysis

Harmonic tidal analyses of current data using Foreman's (1978) method is presented separately for a period of solid ice cover (23 weeks), and a period of broken or no ice (8 weeks). These ice conditions are similar to those seen the previous year (2004-2005) and the earlier years of the study (1998-2002) when ice was land fast for at least 4 months each winter at all ADCP stations. Years 2002-2003 and 2003-2004 were more anomalous, as ice was far more mobile through the winters, limiting or preventing tidal analysis for the solid ice case. Tidal ellipse axes amplitudes, orientations and phases for the main tidal constituents (K1, M2, O1, P1 and S2) are plotted as a function of depth.

The periodic vector function describing a particular constituent, traces an ellipse over a tidal cycle with major and minor amplitudes defined by the length of the semi-major and semi-minor axes. The major axis amplitude is always positive. The sign of the minor axis amplitude defines the rotation sense of the current ellipse. When positive the vector traces the ellipse in a counter-clockwise direction; when negative, the rotation sense is clockwise.

Ellipse orientation is the angle measured counter-clockwise from east to the semi-major axis.

The phase is a measure of the timing of high water referenced to astronomic positions over the Greenwich meridian. Phase is measured counter-clockwise from this chosen reference.

## Data Presentation

Yearlong time series of half-hourly sampled temperature, salinity and density from the moored CTDs are shown in Figures 3 - 6. At the Southern site, the expected freshening we see at the 40m level due to summer melting is evident from the deployment in August through to mid-January. At the South-Central and Central sites, the freshening does not develop until the first of November, but persists into January as at the Southern site.

Power spectra of the moored CTD measurements are shown in Figures 7-10. Results are similar to the previous year. Diurnal and weaker semi-diurnal signals are typically observed in the records, except at the Central site where the spectra show little in the way of distinguishing features.

Current data are shown as contour plots in Figures 11-18. Data are presented in along-strait and cross-strait components, where positive values are defined as flow towards 105° true and 15° true, respectively. Data from the deep and mid-water ADCPs at the Southern site which were moored ½ km apart have been combined in Figure 11. The discontinuity in the cross-strait component of this figure occurring at the 72 m level where the data source transitions from the deeper to upper ADCP, is larger than seen in previous years suggesting an instrumentation problem. Rates measured by the 2 ADCPs through the depth overlap interval compare well indicating the discrepancy is possibly related to disagreement between the pole compasses. However, neither post-deployment compass calibrations nor data analyses could point to either instrument as a source of the discrepancy so all data are reported as valid. The discontinuity does not show up in the along-strait component, which of course is typified by much higher current speeds.

Figures 11-14 display a month of unsmoothed data in which a strong tidal signal is apparent. Low-pass filtered data (tides removed) are shown in Figures 15-18. Mean flow is predominantly eastward at the South, South-central and Central sites throughout the year, and near-zero or weakly westward on the North side, repeating the pattern of the previous 4 years.

Missing data near the surface through the winter and spring (Figures 15, 17) are caused by a decrease in the effective range of the ADCPs when the water is at its clearest, and contains a minimum of acoustic reflectors. (The manufacturer's suggested data quality acceptance criteria have been applied.) The smoothing method used has smeared the impact of missing raw data over the filter length.

Data from the Icycler profiler are shown in Figure 19. Ten daily profiles of salinity, temperature, fluorescence and density are presented as contour plots. Although the data returned by this instrument are very limited due to its early malfunction, the fluorescence record indicates a mid-August phytoplankton bloom as was seen in each of the 2 previous years (Hamilton et al., 2008, Pettipas et. al, 2008).

Smoothed temperature, salinity and current data (where available) are shown for each moored CTD level in Figures 20-32. Tables 2 through 25 provide a summary of the CTD and ADCP data at the CTD depths, with statistics computed over each season, and for the entire year. Density has been included in these statistical summaries.

Annual and seasonal mean flows are summarised in Figures 33-38. Each 4 m binned value for the 307 kHz ADCPs (8 m for the 75 kHz ADCP) is shown. Seasonal current patterns are similar to the previous years, although late summer (2005) currents in the top 100 m at the South-Central are weaker (50 to 75% less) than in each of the previous 3 early summer seasons. Another noticeable difference is seen at the Central site in early summer of 2006 when the mean current is about 10 cm/s eastward over the top 80 m of the water column, compared to the previous 2 early summers when currents were near zero. The yearlong averages at all 4 sites however, are quite similar to previous years.

As in the previous 4 years there is significant seasonal variation but mean flow is predominately eastward, and strongest at the Southern site becoming progressively

weaker moving north to the South Central and Central sites, and near-zero or westward on the North side.

The variance in the bi-hourly, and low-pass filtered current data for the yearlong ADCP records are shown in Figure 39. On the south side, tides account for only half of the total variance in the along-strait current speeds. At the South-Central site, tides account for  $\frac{3}{4}$  of the variance near the surface to virtually all of the variance near bottom. A peak in the variance of the bi-hourly data at 215m at this South-Central site suggests the possibility of bottom-trapped shelf waves (Pettipas et al, 2008).

Tidal analysis results for the ADCP data collected at all 4 sites are presented as profiles for the 5 largest tidal constituents in figures 40 – 59. Separate analyses have been done for ice-free and solid ice periods. Ellipse orientations are generally along-strait as expected. Tidal constants are summarised in Tables 26 - 30.

Ice velocities through the year at the 4 sites were derived from the upper ADCPs, and are shown in Figures 60 - 63. No data were returned for the 75 kHz ADCP at the South-Central Site because of an instrument setup issue. Since the ice drift measurement quality is degraded by the presence of open water, there are periods in the time series at all 3 of the other sites where no data are presented. The manufacturer's suggested data quality standards have been applied to the ice drift data. An additional criterion applied here is that where the magnitude of the "error velocity" for a particular ensemble is greater than 1 cm/s, the ice drift velocity estimate and the adjacent estimates are rejected.

Ice was landfast right across the strait from late January through to early July, repeating the pattern of the previous year (04-05). In 2002-2003 and 2003-2004 ice remained mobile throughout the winter at all but the Southern site, but these 2 years appear to be anomalous since in the 4 years prior to that (1998-2002) an extended landfast period similar to this year was observed.

Ice draft was measured at the South-Central site for only the second time in this program, the first year being 2003-2004. Monthly mean, standard deviation, and maximum ice draft for 2005-2006 are shown in Figure 64 and Table 31, while histograms of draft distribution by month (based on the data presented in Table 32), are shown in Figure 65. Over the February to May period in Figure 64, the growth rate of the immobile ice can be seen in the increasing monthly mean draft.

In 2005-2006 ice was immobile for over 5 months, while in 2003-2004 the ice remained in motion throughout the winter. Ignoring months when open water dominates, we find the mean draft over 8 months in 2005-2006 (1.05 m) is 40% lower than in 2003-2004, suggesting that rafting of ice in a mobile ice pack builds ice volume. The very low standard deviations from February to June, 2006 are expected for a landfast ice pack, and were not observed in 2003-2004.

A station map for the August 2006 ship-based CTD survey is shown in Figure 66. Three lines were intended, but the Wellington Channel line (stations 18-23) was not attempted due to heavy ice conditions. Results for the 2 Barrow Strait lines appear as contoured sections in Figures 67 and 68 and indicate an eastward geostrophic flow along the southern half of the Strait as the August survey typically reveals.

Anchor-mounted water level recorders were deployed at the South, Central and North sites of the Barrow Strait mooring line (at approximately 91 °W). Time series plots of pressure and temperature from these instruments are shown in Figures 69, 70 and 71, with statistical summaries provided in Tables 33, 34 and 35. The pressure records from these 3 units will be used to compute the geostrophic current. A fourth water level recorder was deployed on a separate mooring in the center of the strait 95 km to the west of the Eastern Barrow Strait mooring line (Figure 72, Table 36), to provide along-strait surface slope for interpretation of the geostrophic calculations obtained from the water level recorders along the main mooring line. Although the identical array of water level recorders was deployed in each of the two previous seasons, this is the first year when all four instruments were recovered with high quality data sets.

## Acknowledgements

We thank Adam Drozdowski and Kumiko Azetsu-Scott for their reviews of this report, and Lorne McKee (NRCCAN) for providing the Resolute Observatory magnetic declination data.

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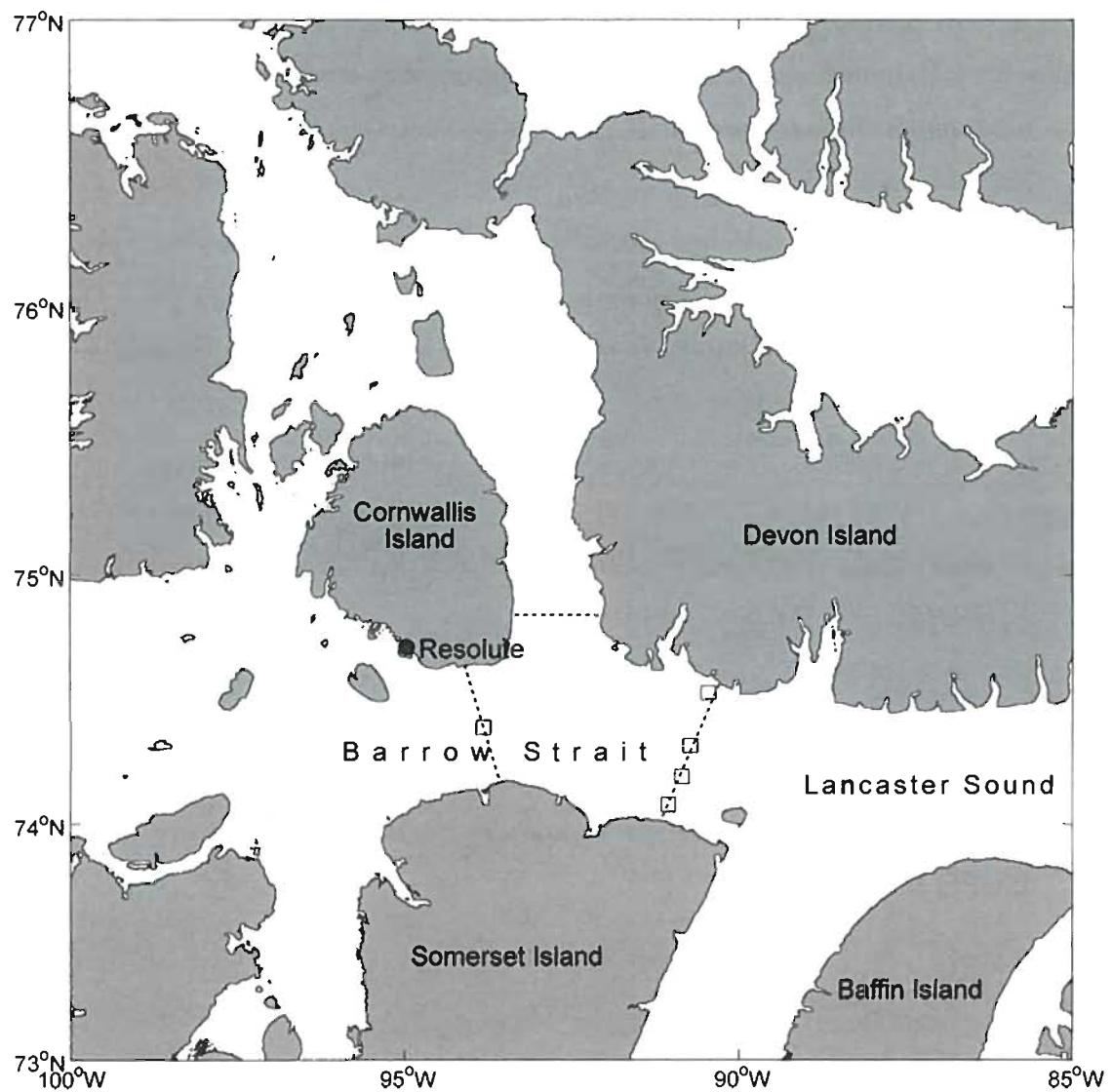
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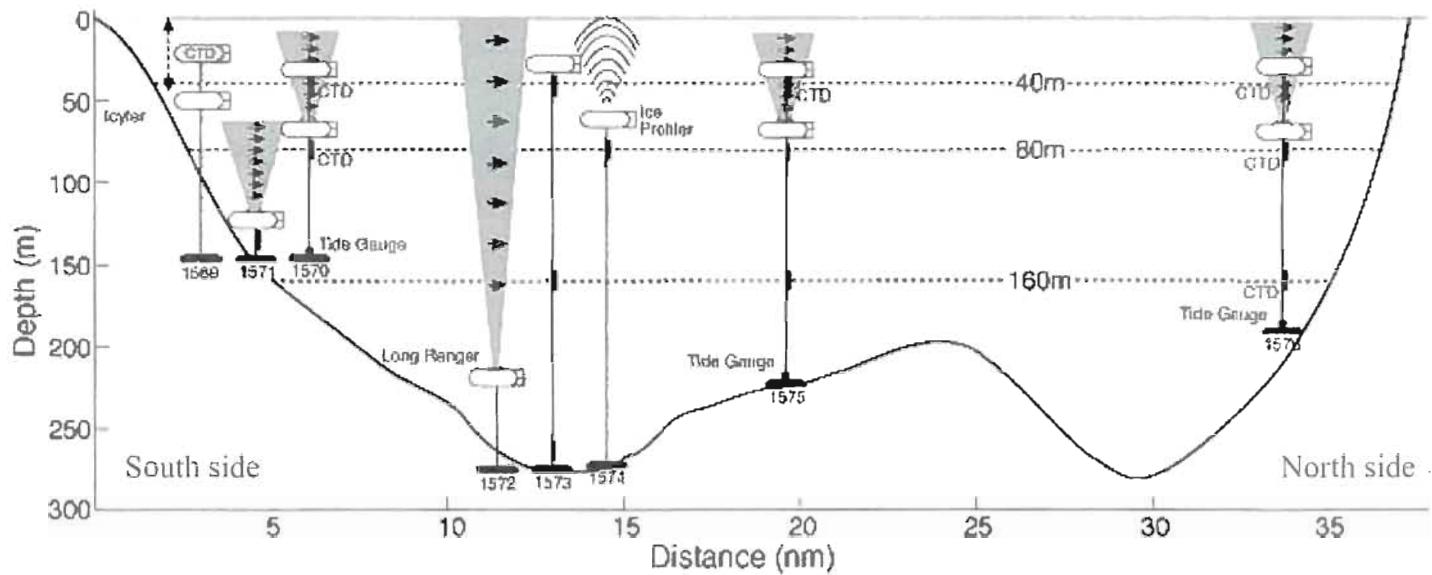
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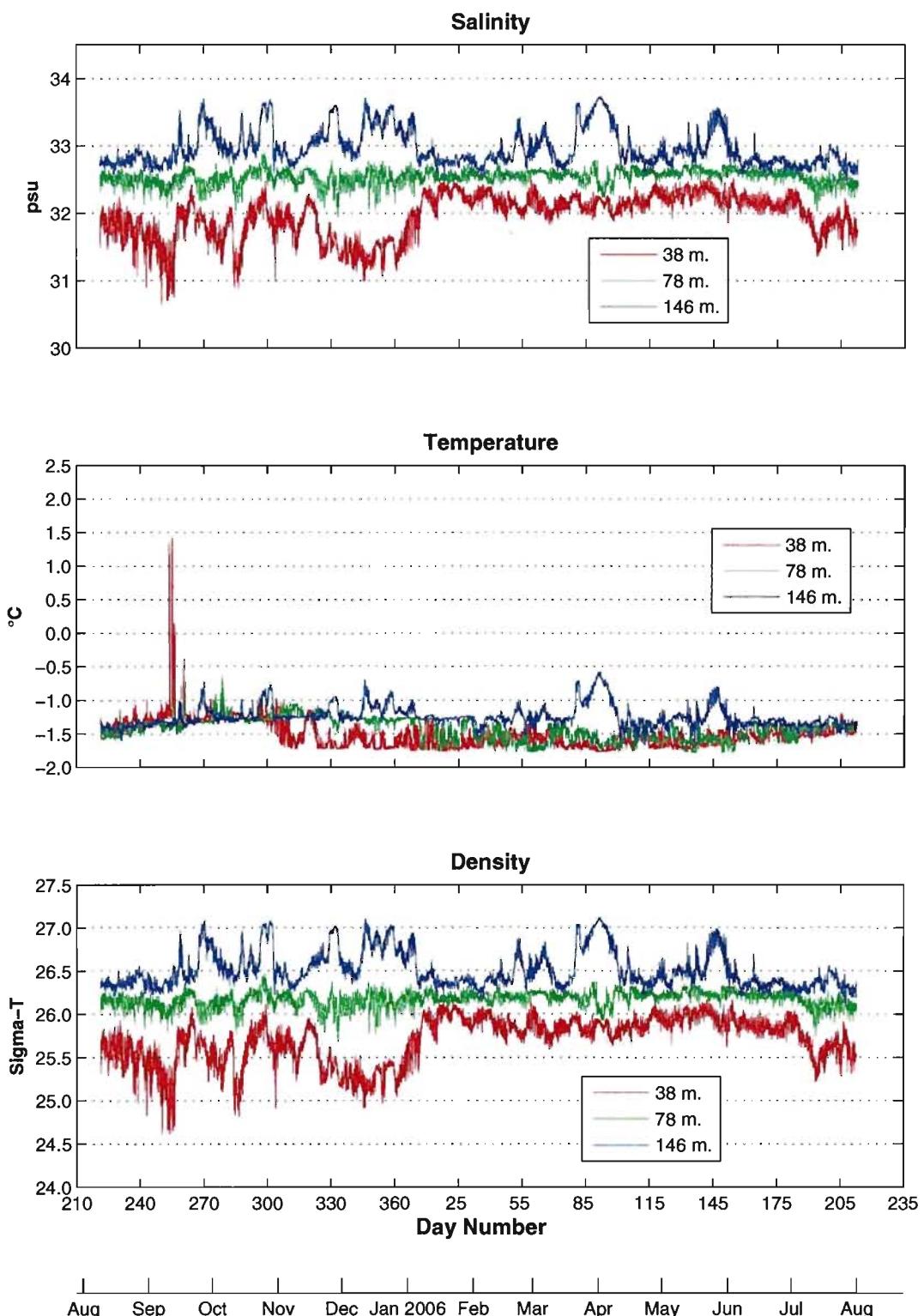
**Figure 1** A map of the work area showing the location of the mooring sites (the open boxes), and the hydrographic survey lines (the dashed lines)



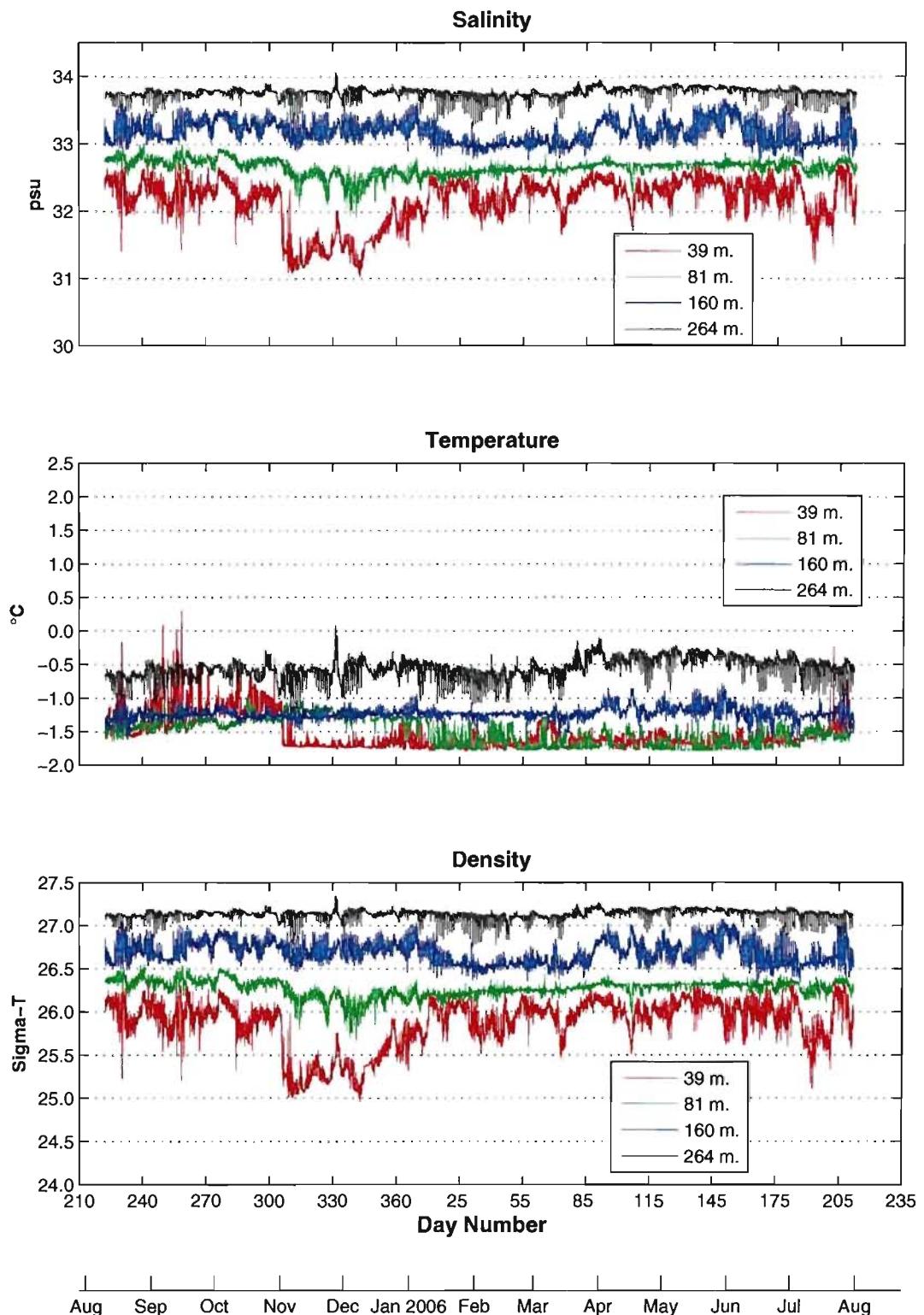
**Figure 2** Illustration of the instrumented moorings across eastern Barrow Strait.



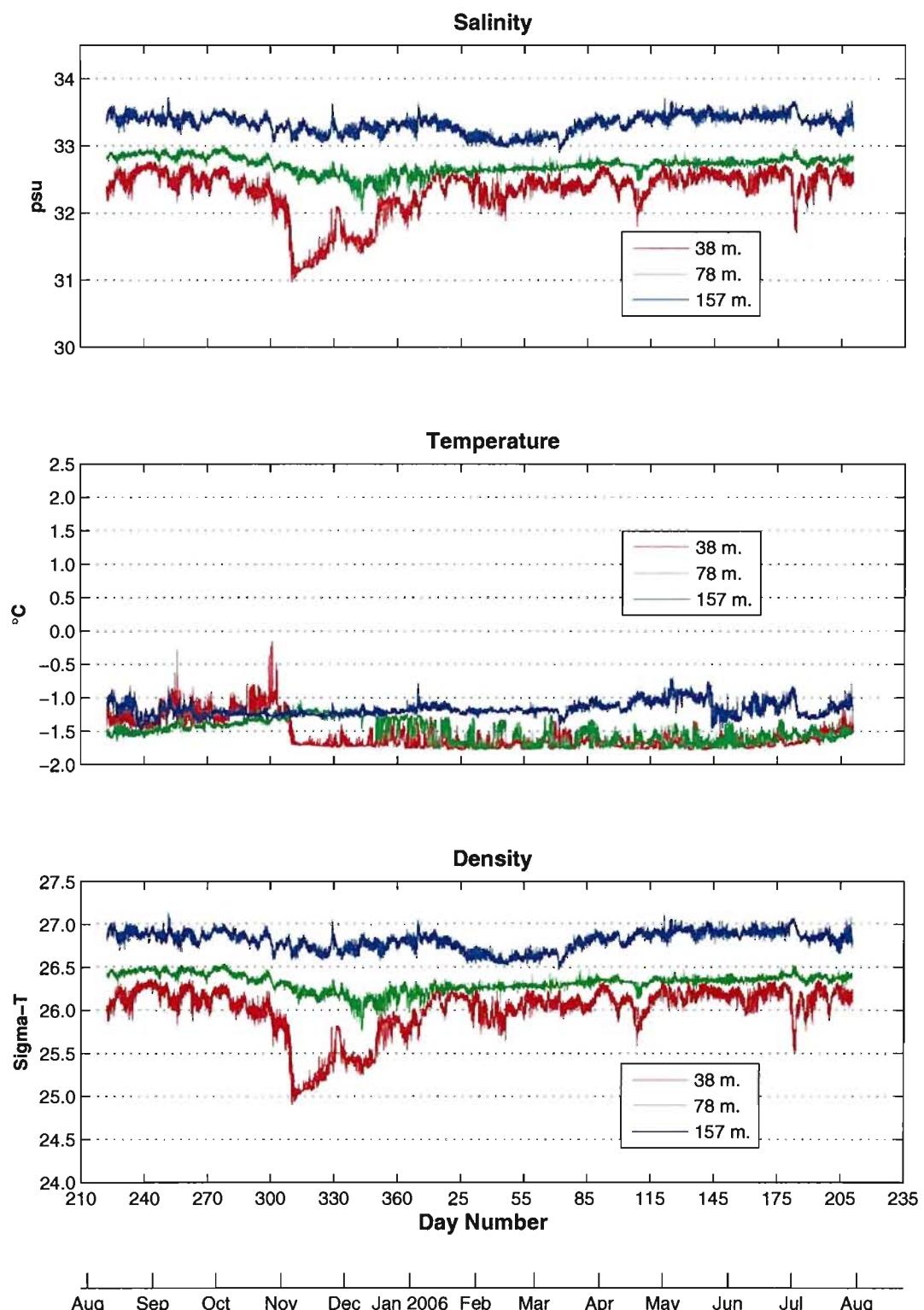
**Figure 3 – Moored 30 min. CTD data, South Side Barrow Strait.  
August 2005 – July 2006**



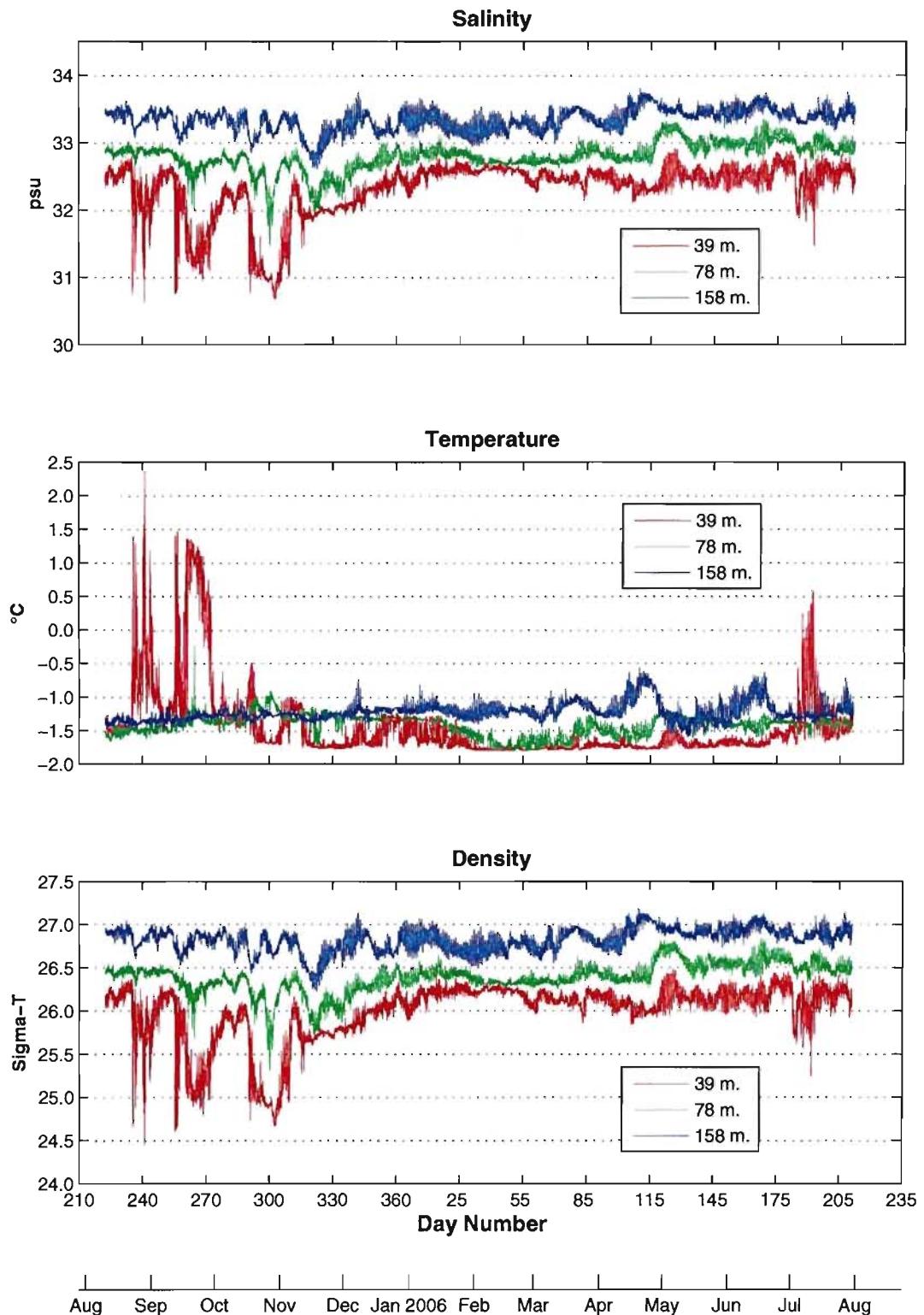
**Figure 4 - Moored 30 min. CTD data, South Central Barrow Strait.  
August 2005 – July 2006**



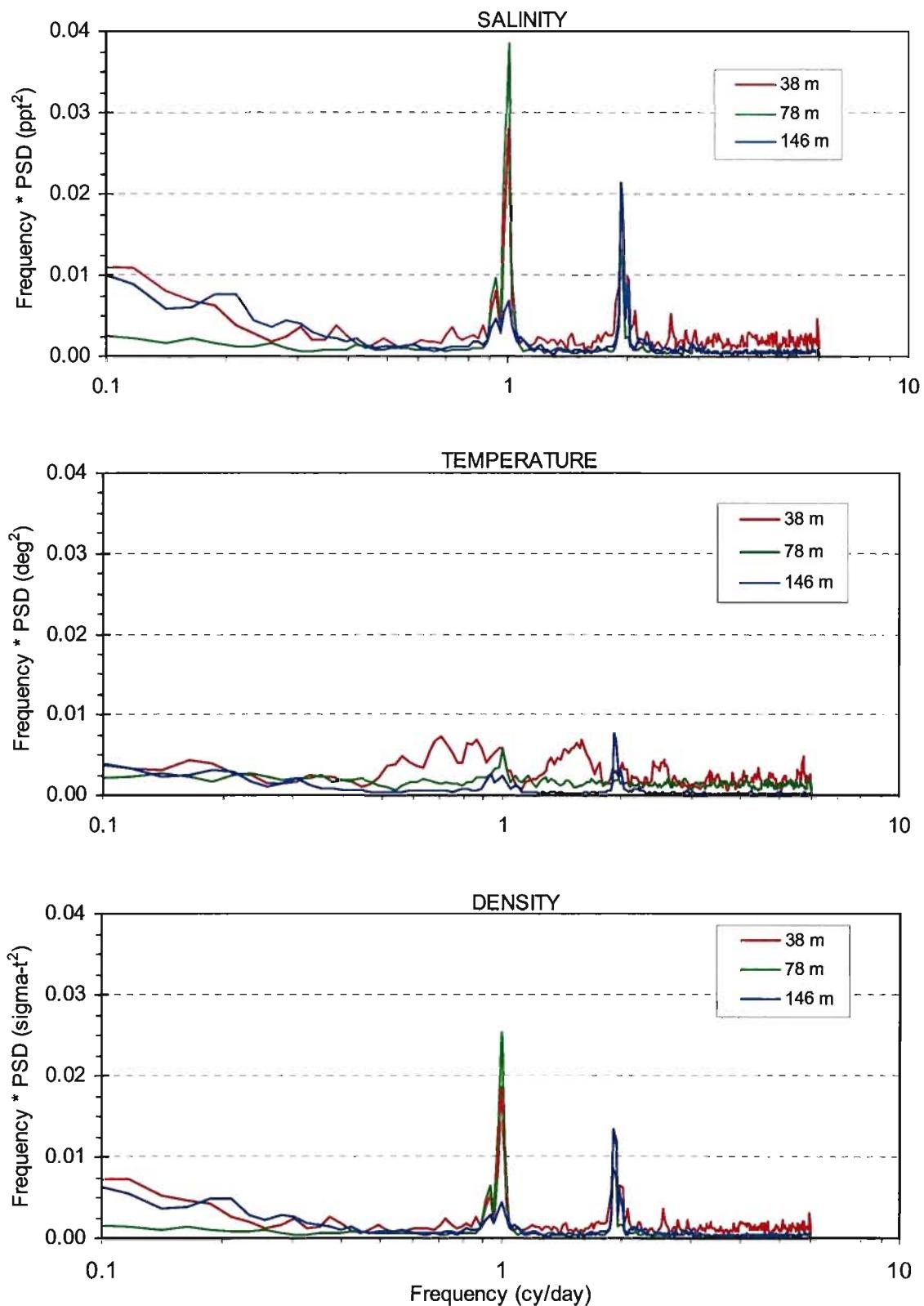
**Figure 5 – Moored 30 min. CTD data, Central Barrow Strait.  
August 2005 - July 2006**



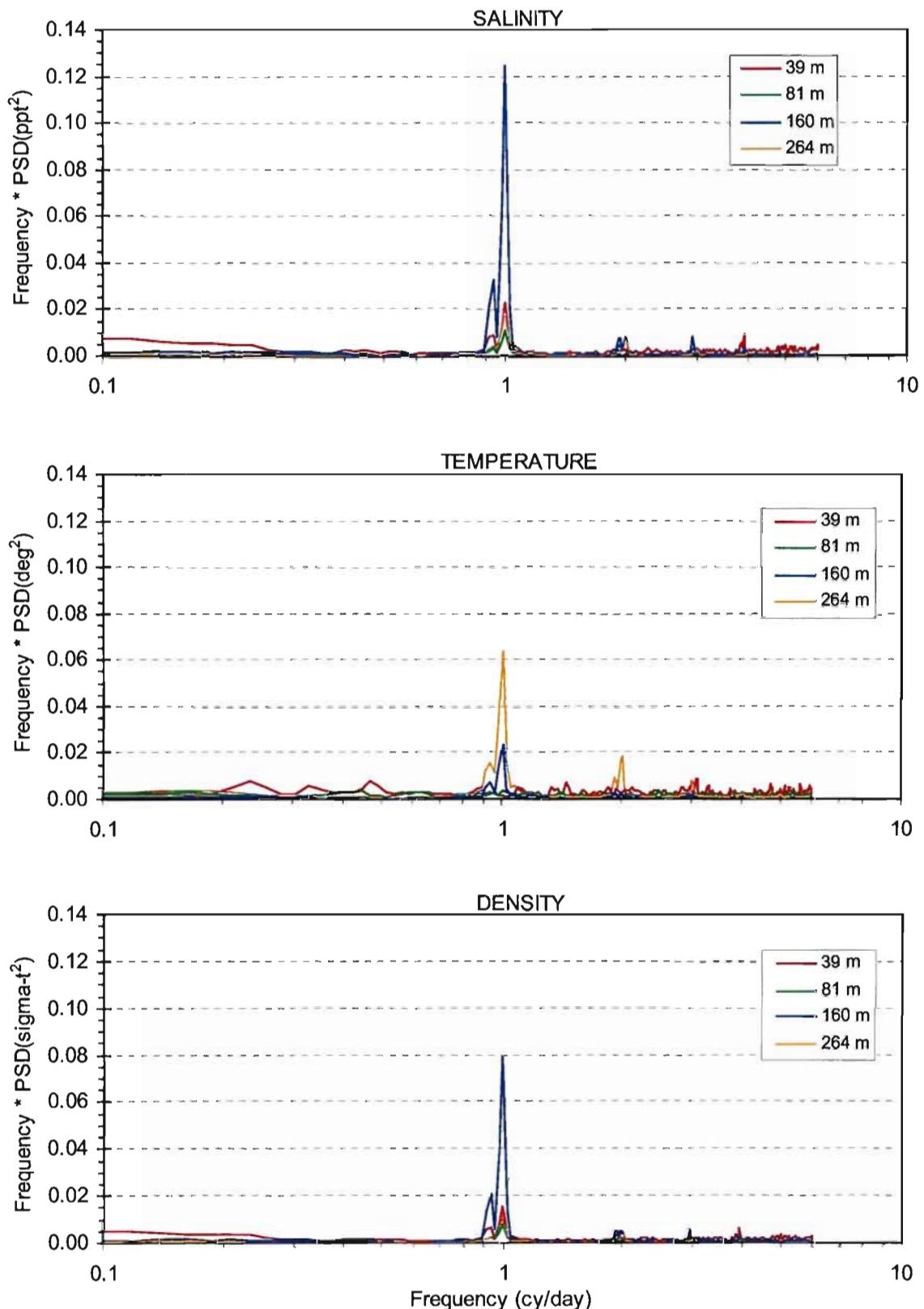
**Figure 6 - Moored 30 min. CTD data, North Side Barrow Strait.  
August 2005 – July 2006**



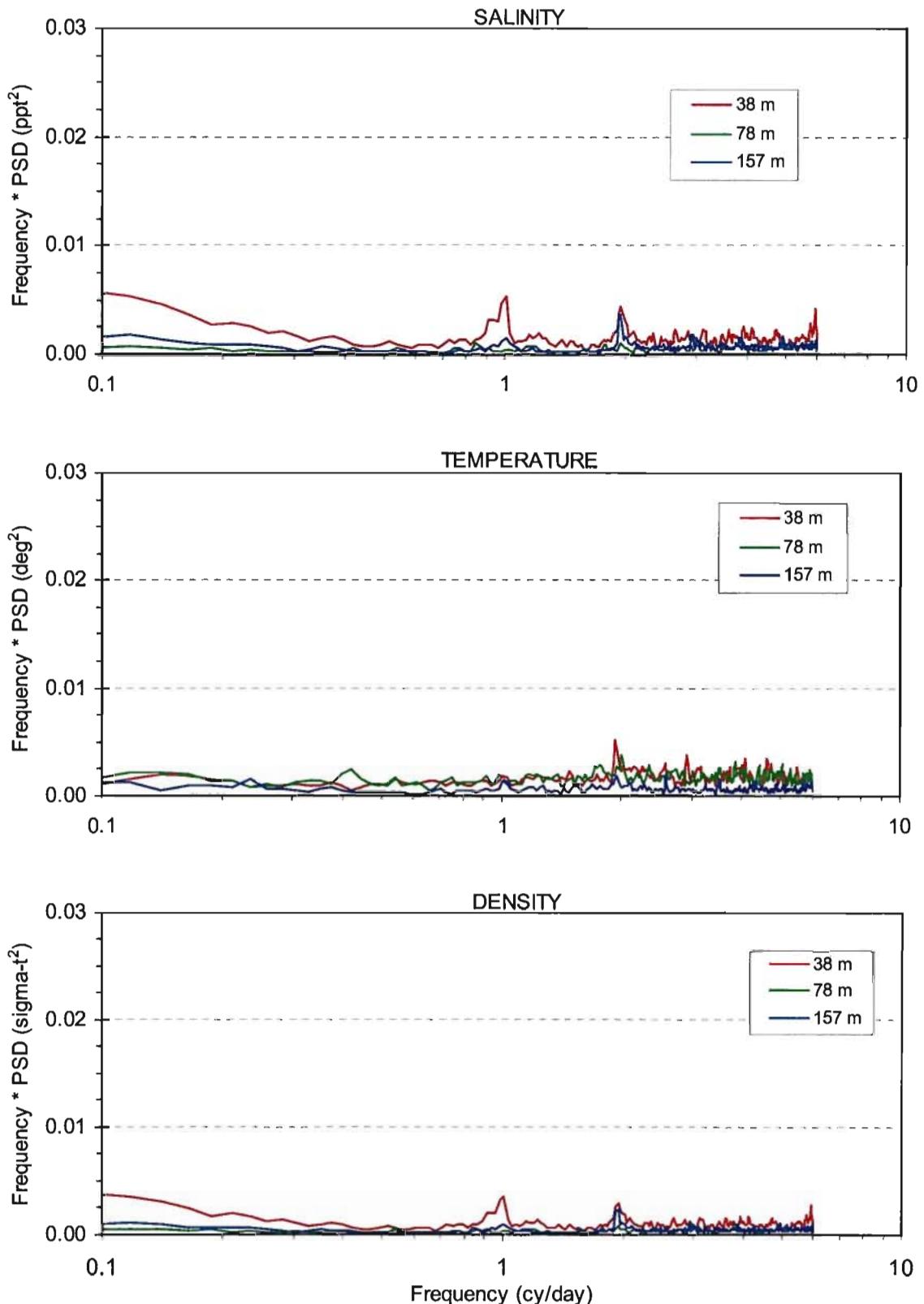
**Figure 7 – Power Spectra of moored bi-hourly CTD data.  
South Side Barrow Strait: Aug. 2005 – July 2006.**



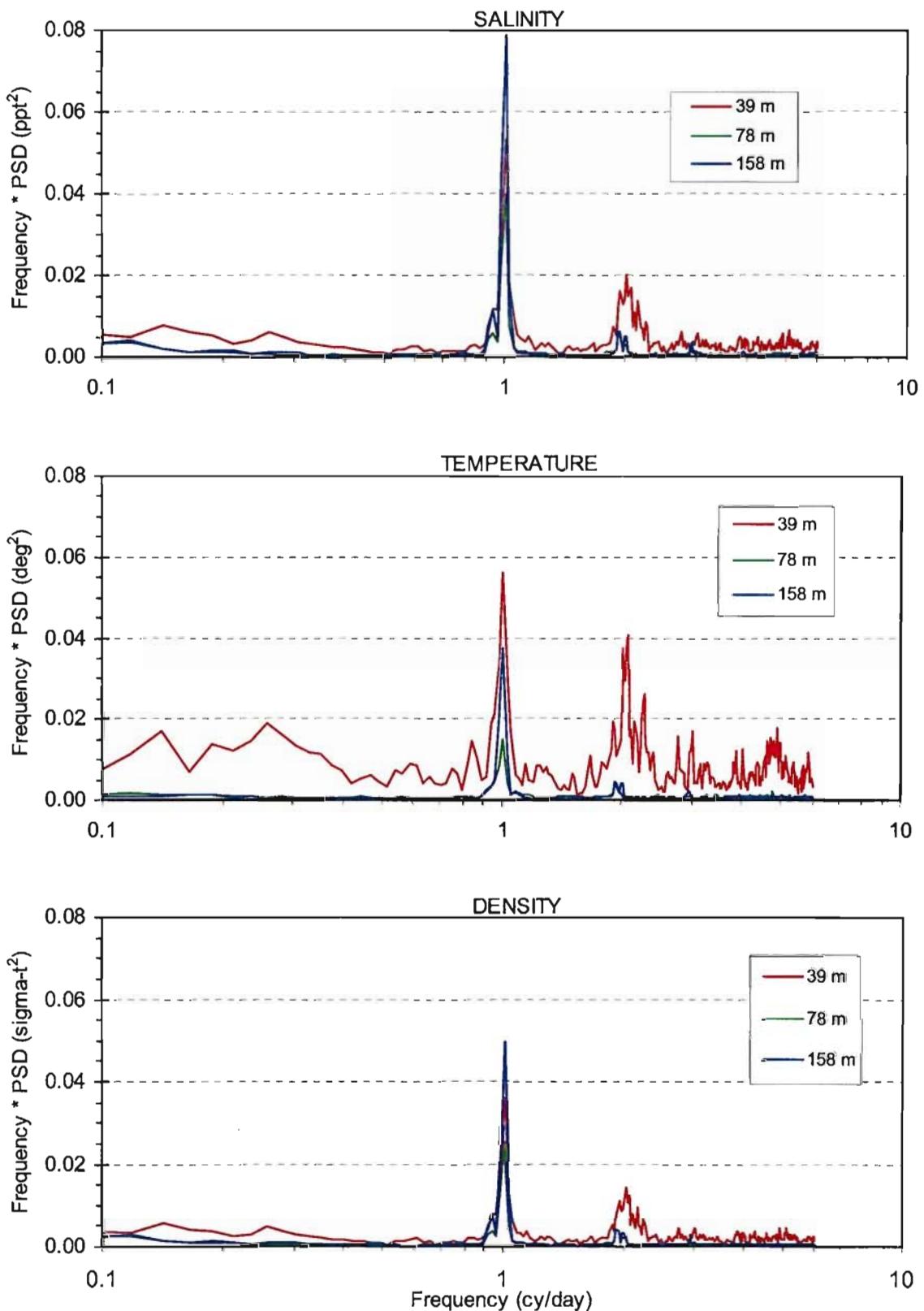
**Figure 8 – Power Spectra of moored bi-hourly CTD data.  
South Central Barrow Strait: Aug. 2005 – July 2006.**



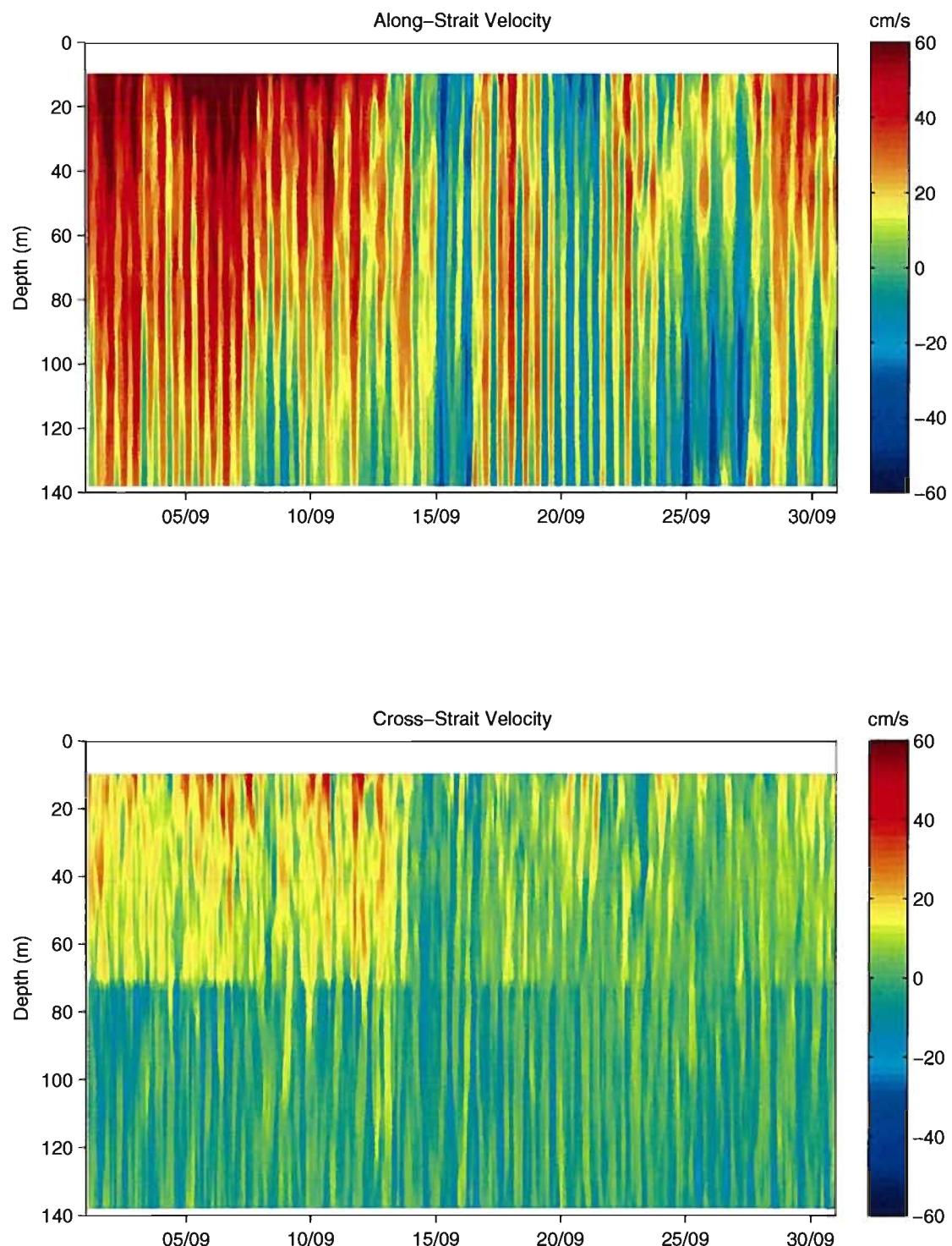
**Figure 9 - Power Spectra of moored bi-hourly CTD data.  
Central Barrow Strait: Aug. 2005 – July 2006.**



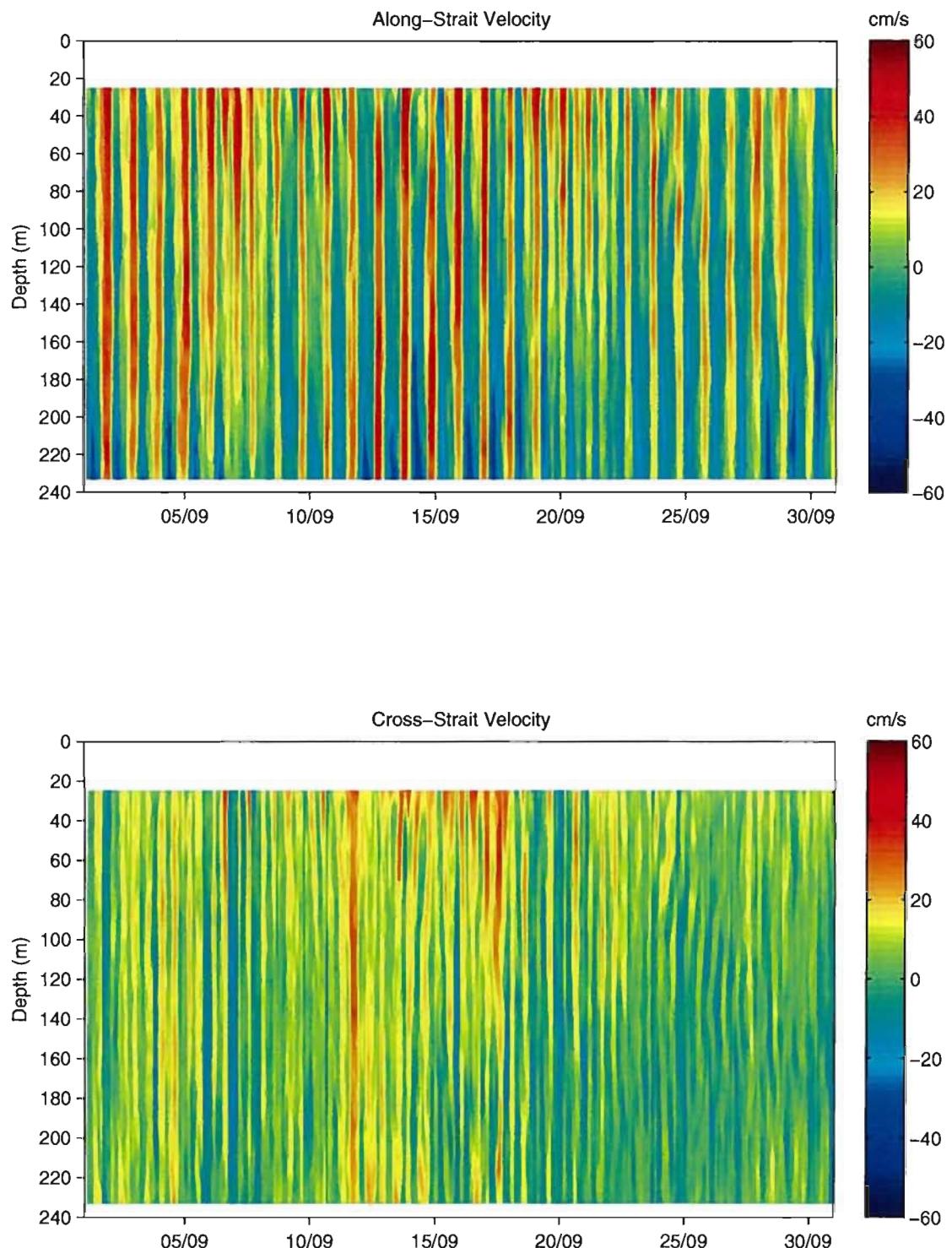
**Figure 10 – Power Spectra of moored bi-hourly CTD data.  
North Barrow Strait: Aug. 2005 – July. 2006.**



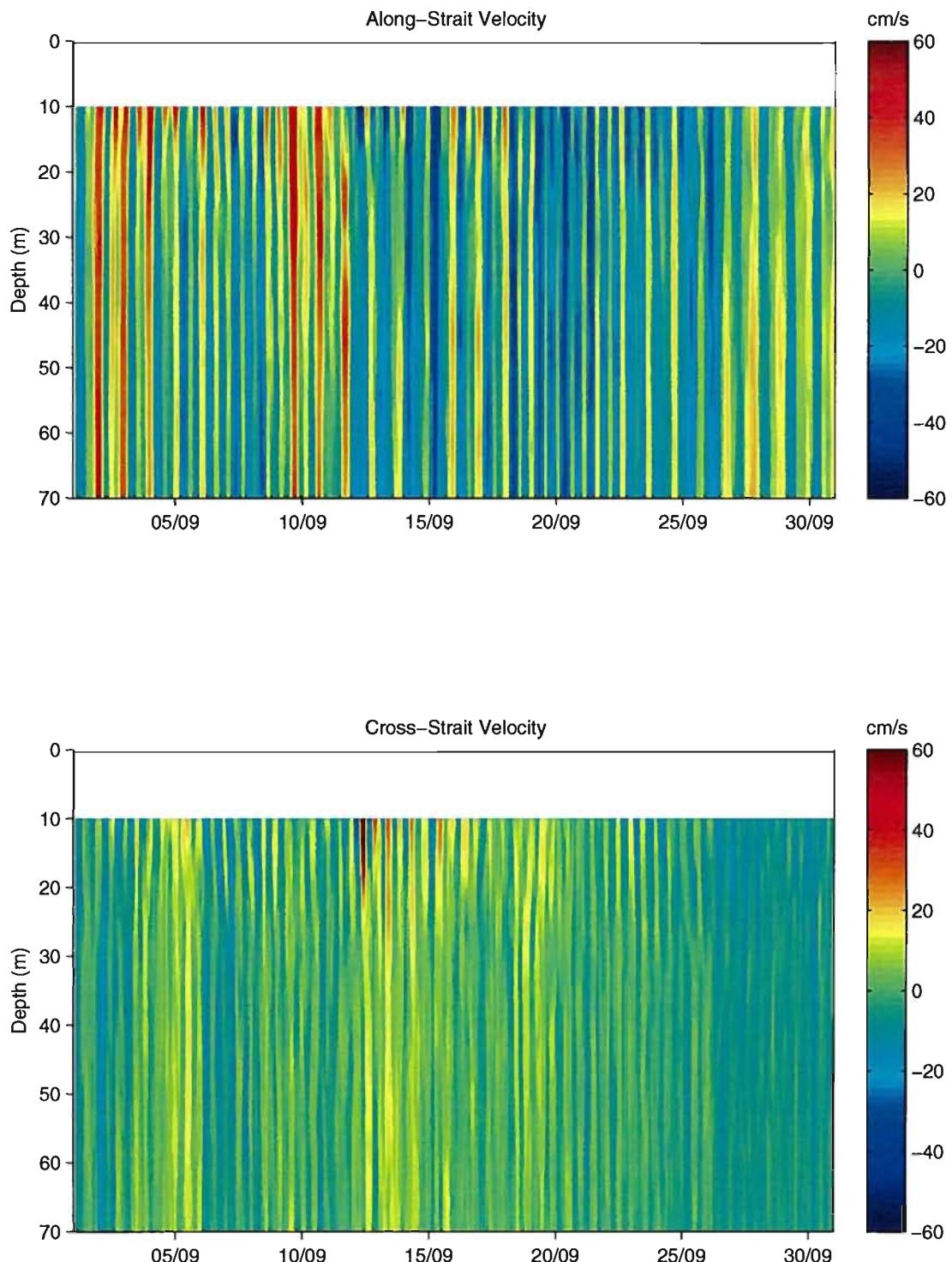
**Figure 11 – Bi-hourly current data, South Side Barrow Strait.  
Sep. 1, 2005 – Sep. 30, 2005**



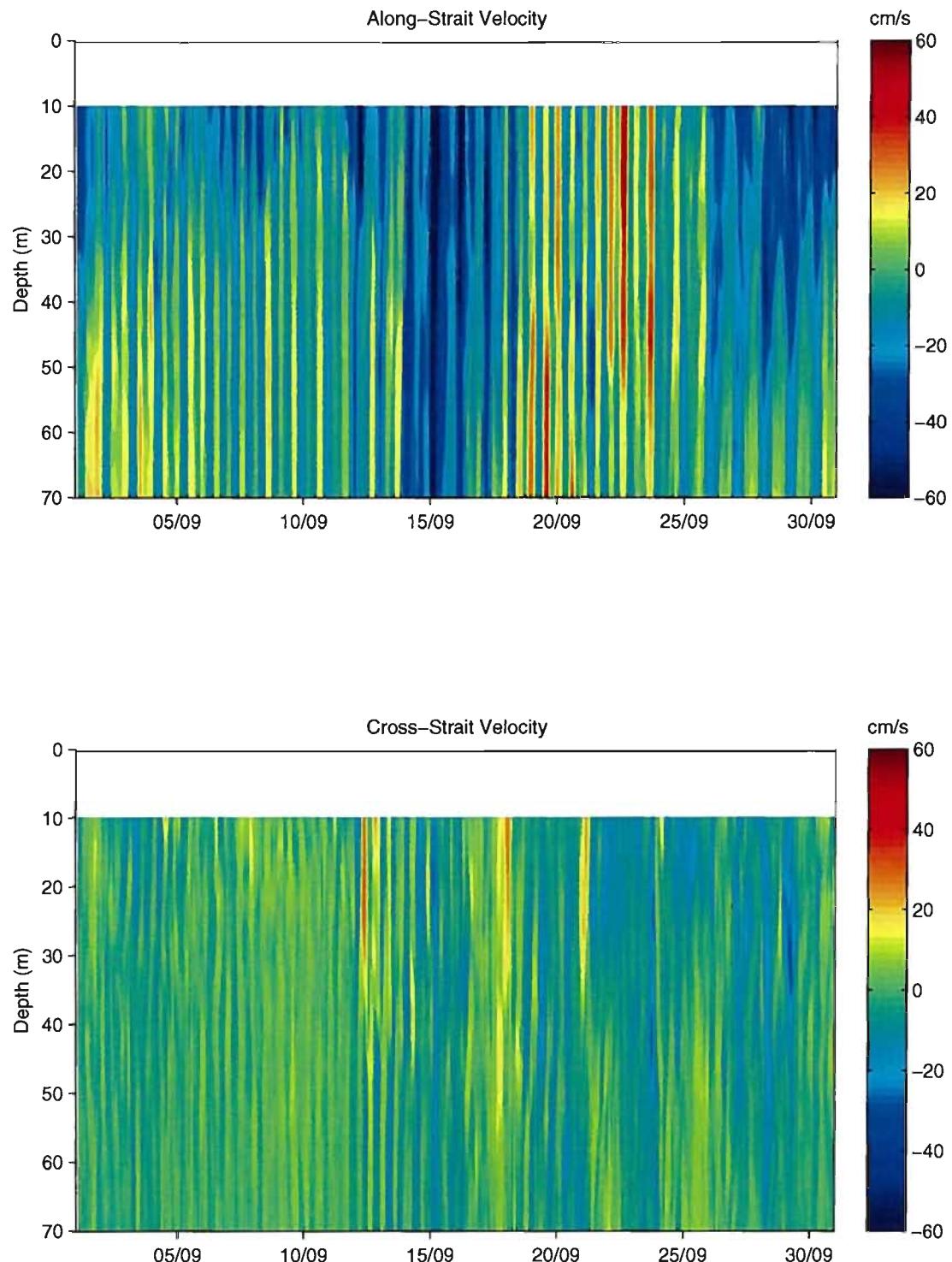
**Figure 12 – Bi-hourly current data, South Central Barrow Strait.  
Sep. 1, 2005 – Sep. 30, 2005**



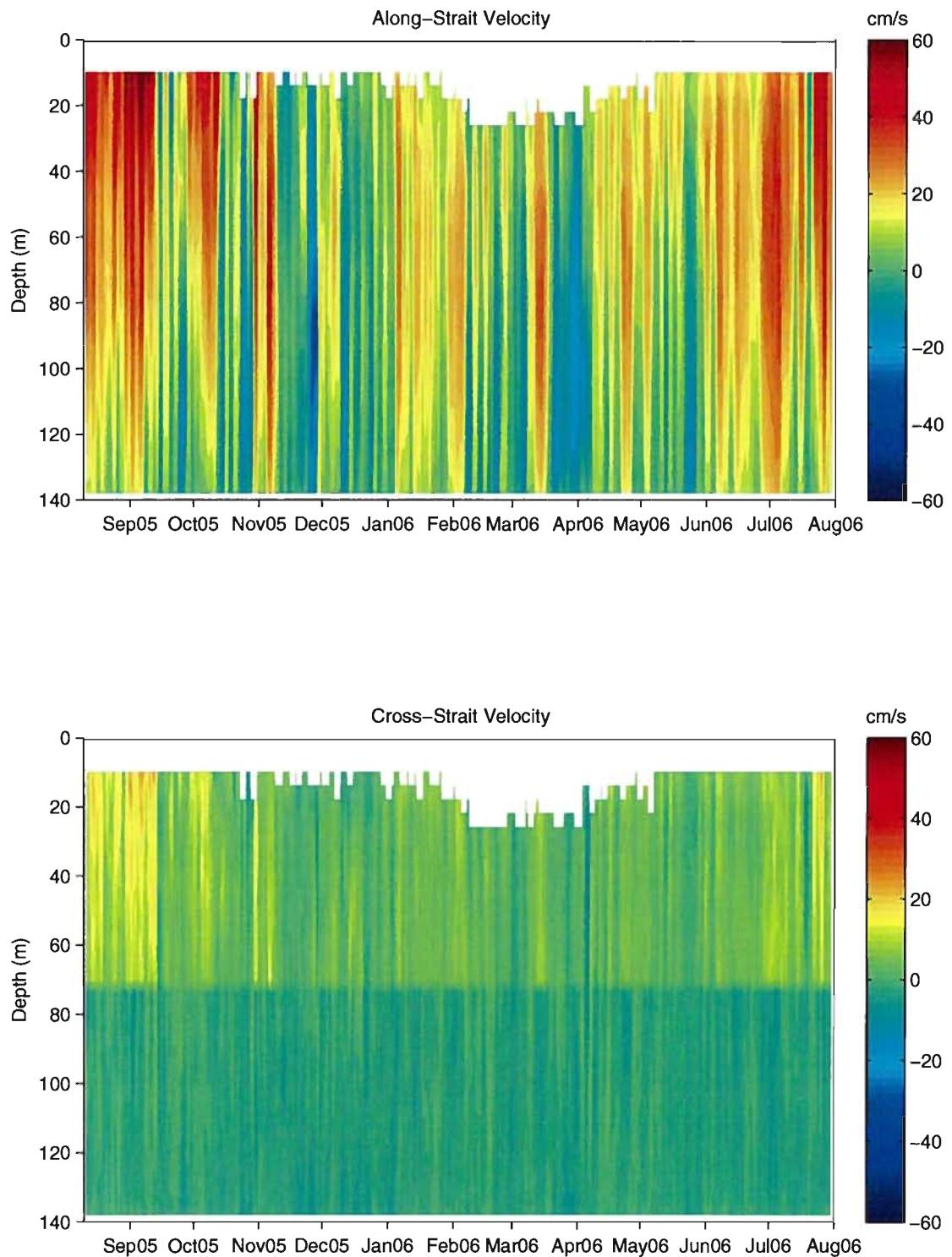
**Figure 13 – Bi-hourly current data, Central Barrow Strait.  
Sep. 1, 2005 – Sep. 30, 2005**



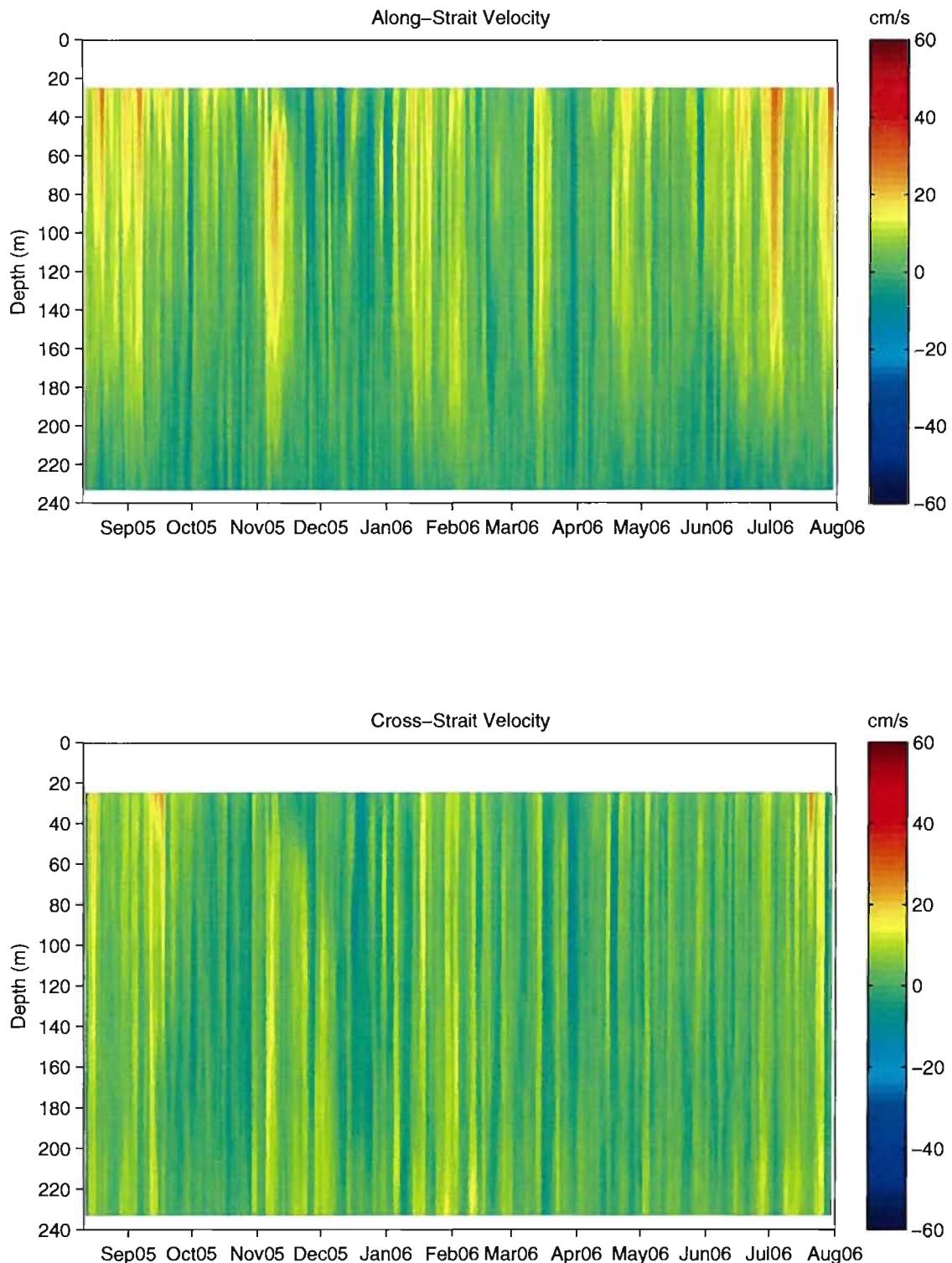
**Figure 14 – Bi-hourly current data, North Side Barrow Strait.  
Sep. 1, 2005 – Sep. 30, 2005**



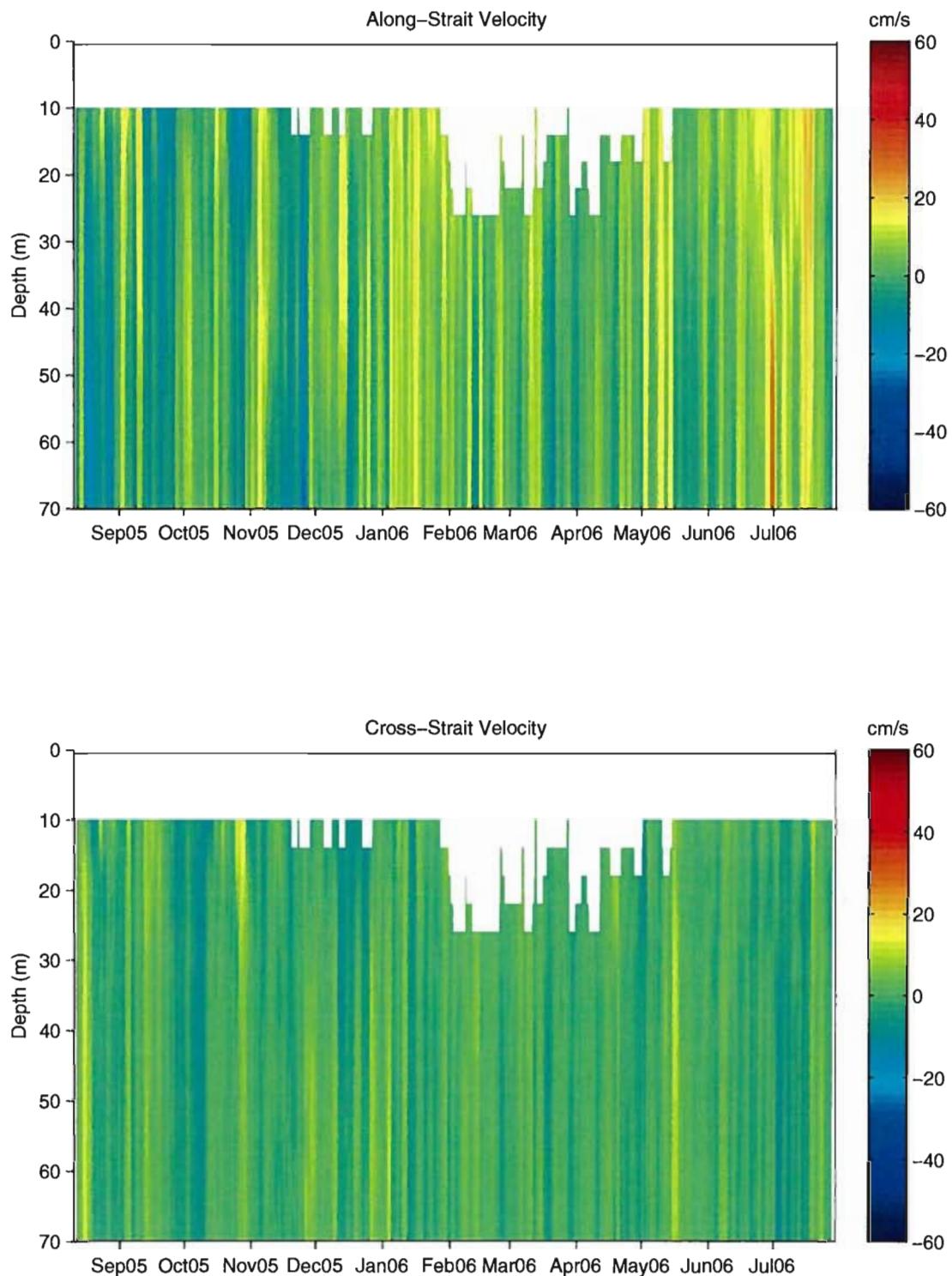
**Figure 15 - Low-pass filtered currents, South Side Barrow Strait.  
August 2005 – July 2006**



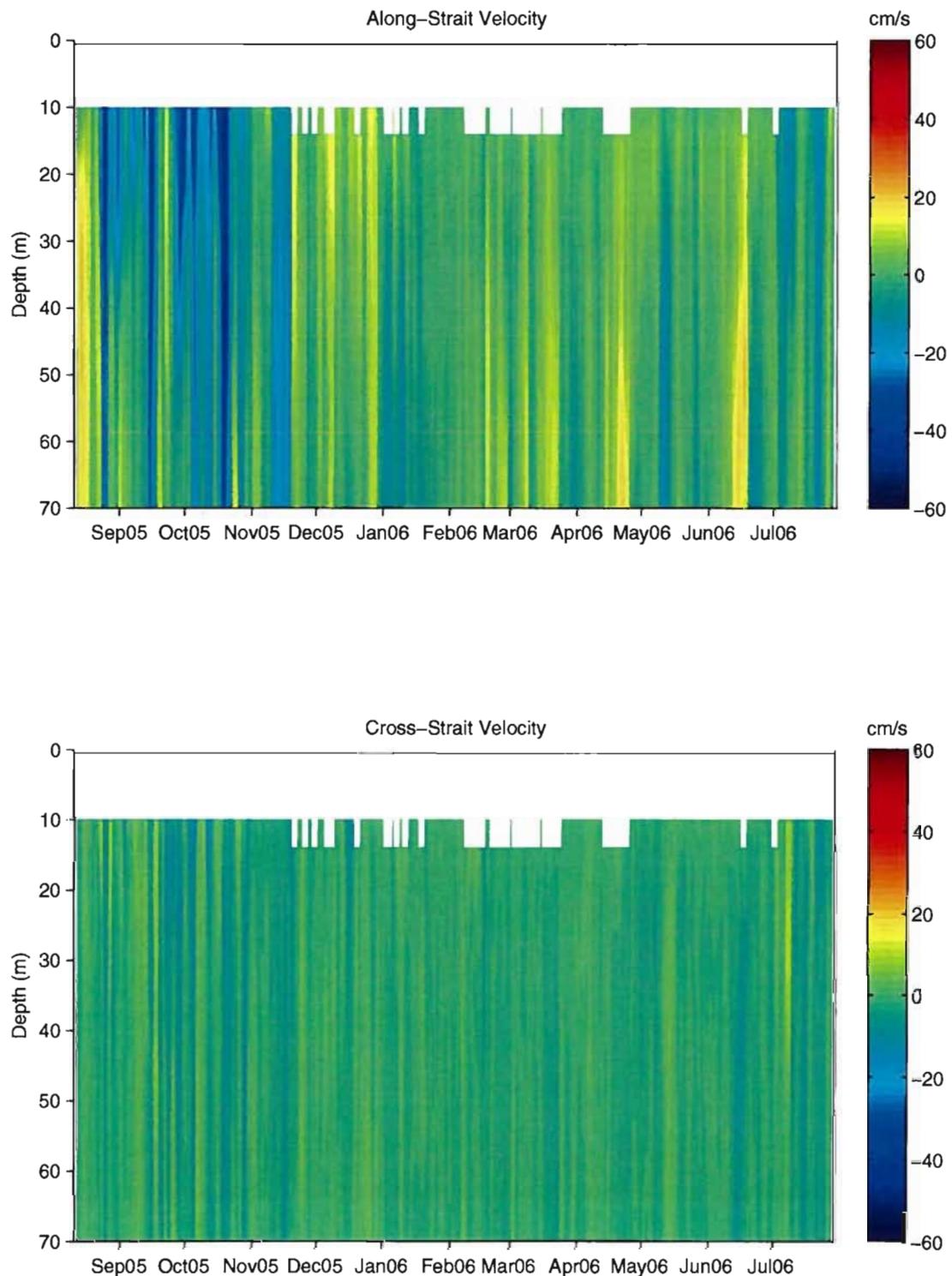
**Figure 16 - Low-pass filtered currents, South Central Barrow Strait.  
August 2005 – July 2006**



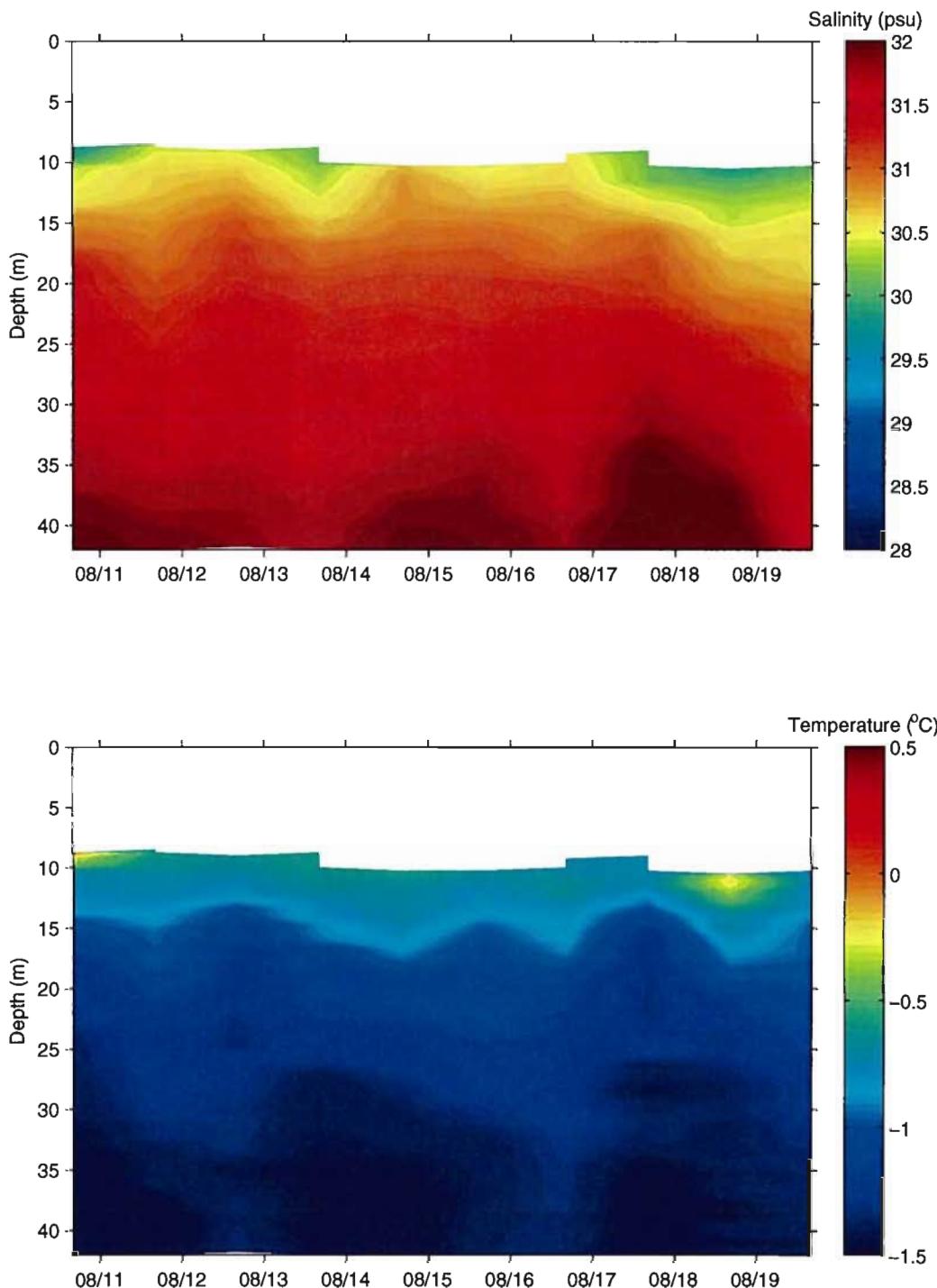
**Figure 17 - Low-pass filtered currents, Central Barrow Strait.  
August 2005 - July 2006**



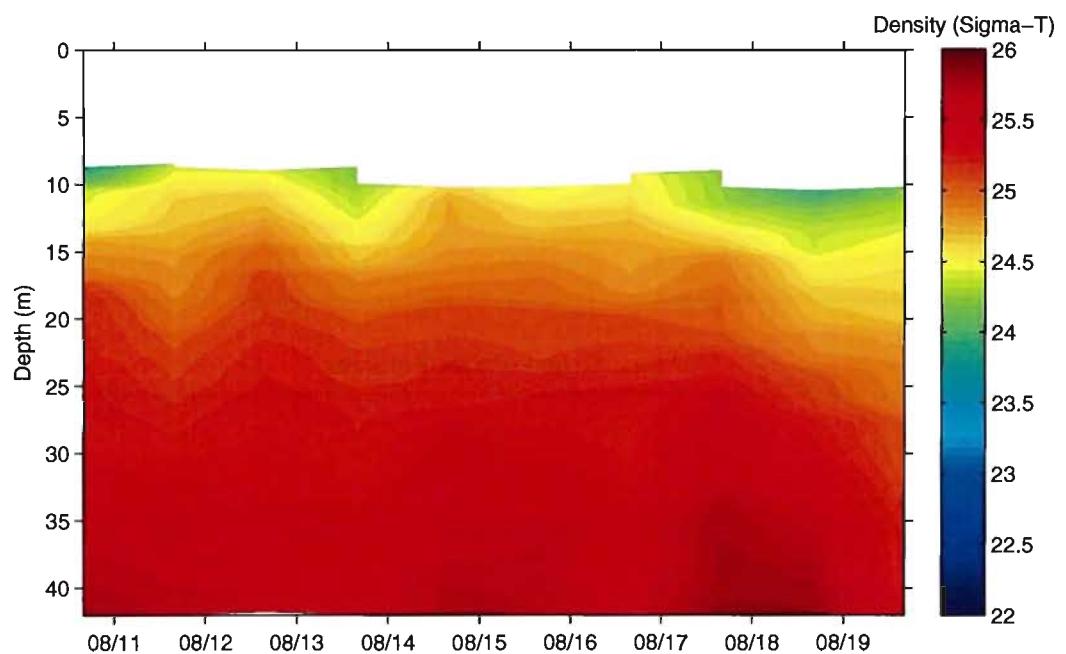
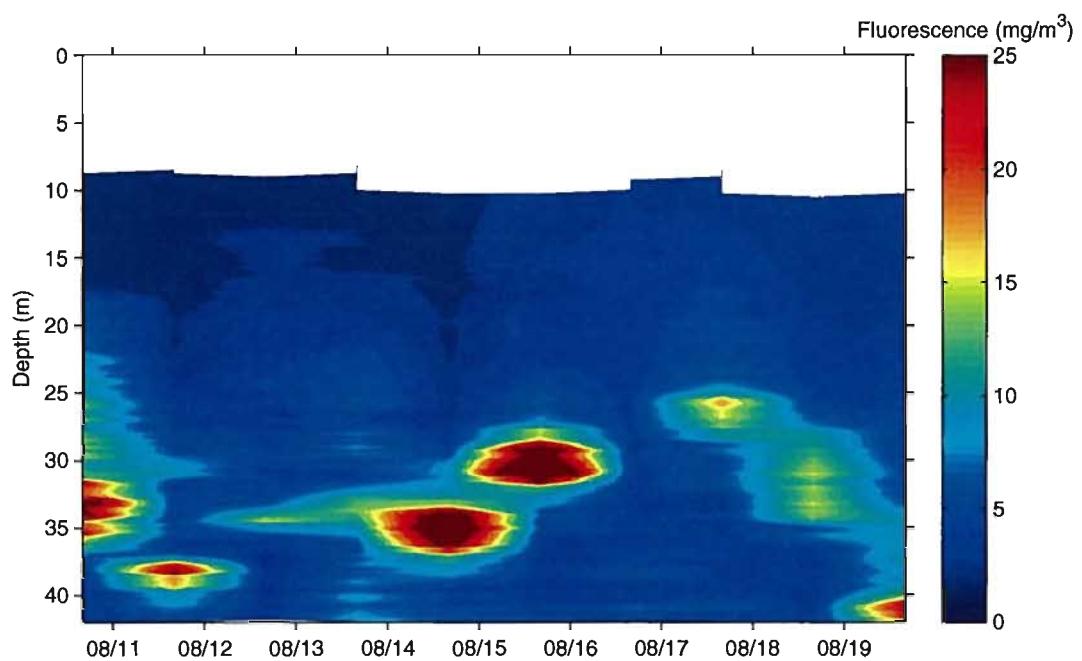
**Figure 18 - Low-pass filtered currents, North Side Barrow Strait.  
August 2005 – July 2006**



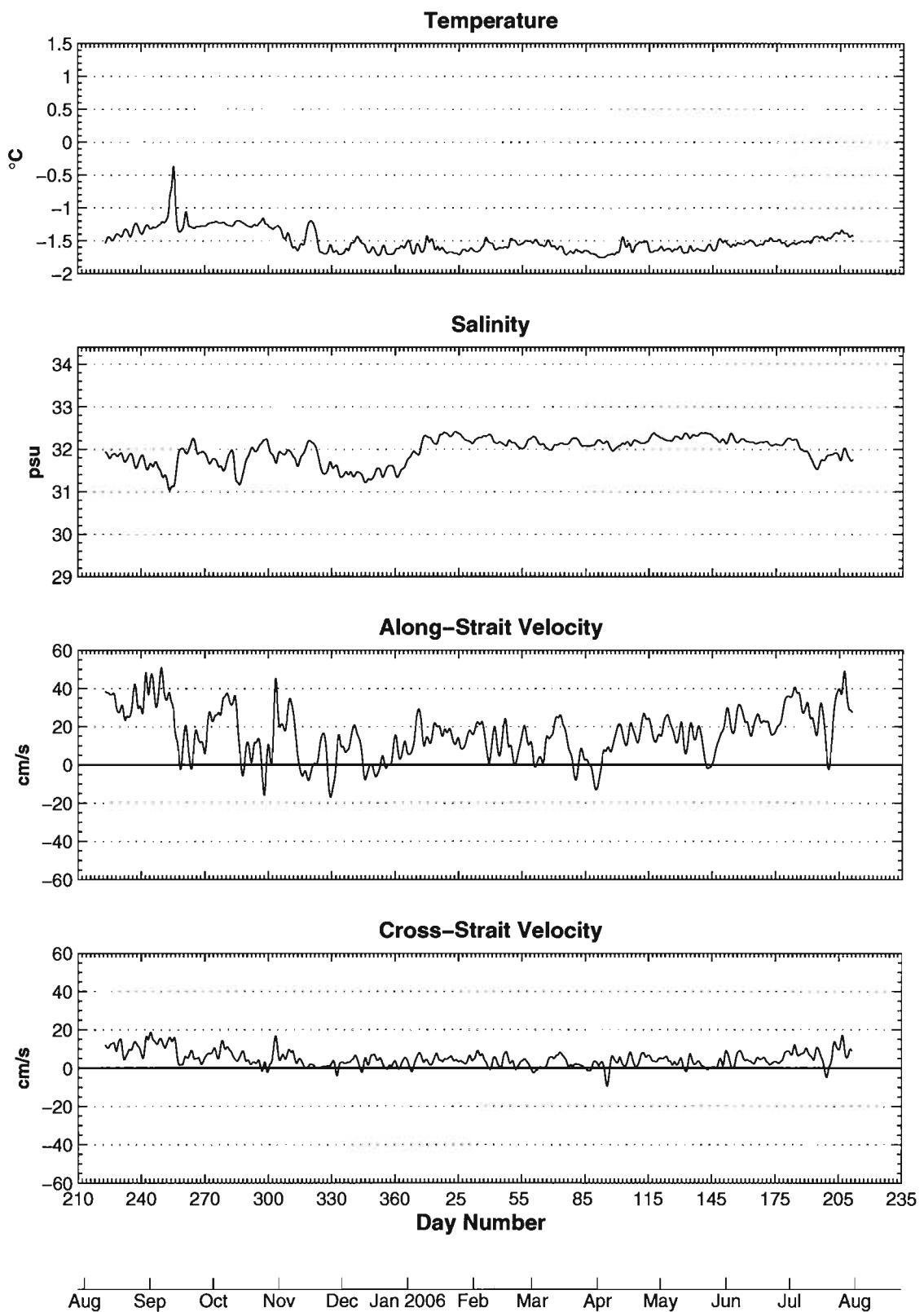
**Figure 19 – Daily Icycler Measurements:  
South Side Barrow Strait, August 10, 2005 – August 19, 2005**



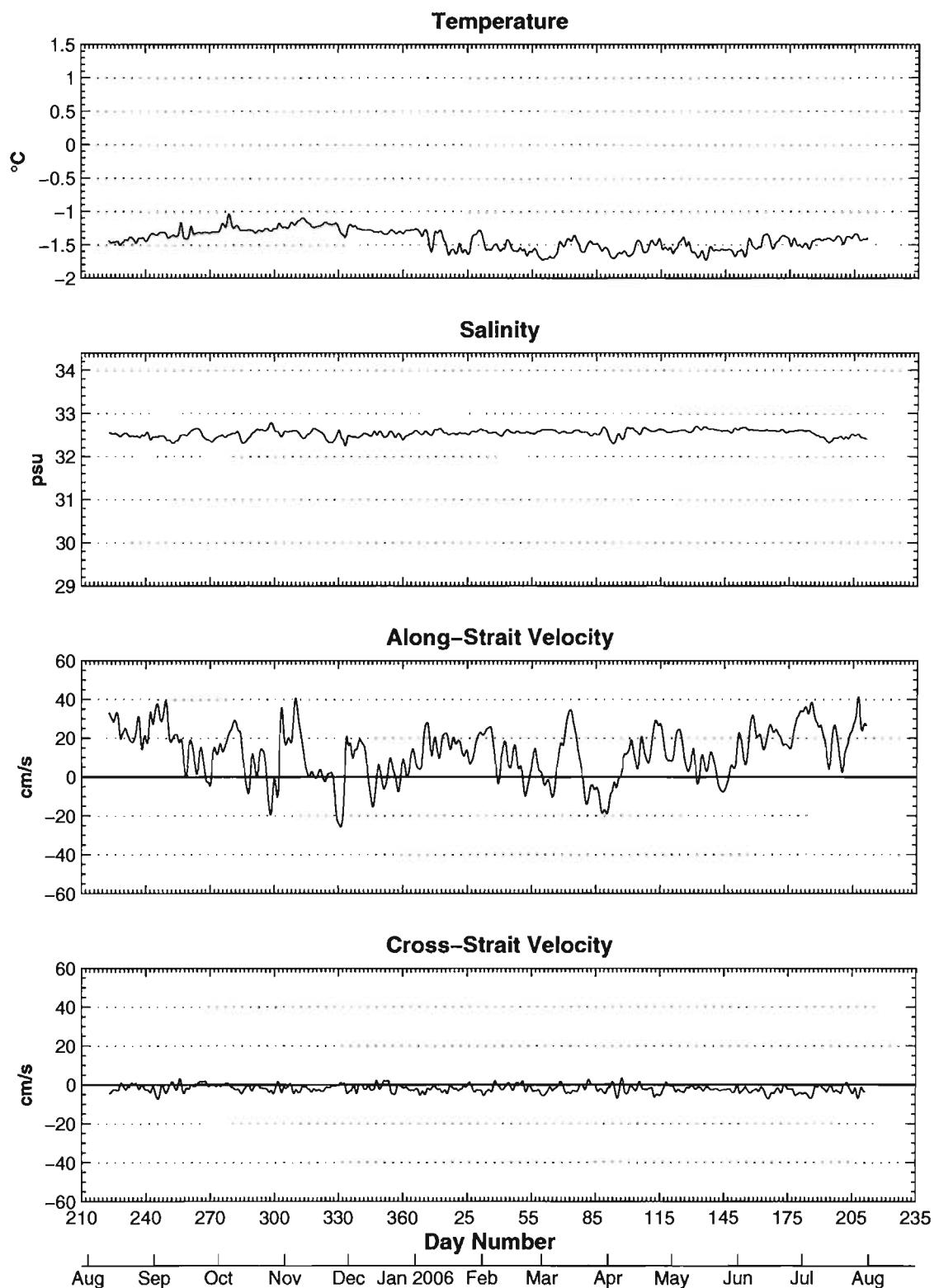
**Figure 19 (continued) – Daily Icycler Measurements:  
South Side Barrow Strait, August 10, 2005 – August 19, 2005**



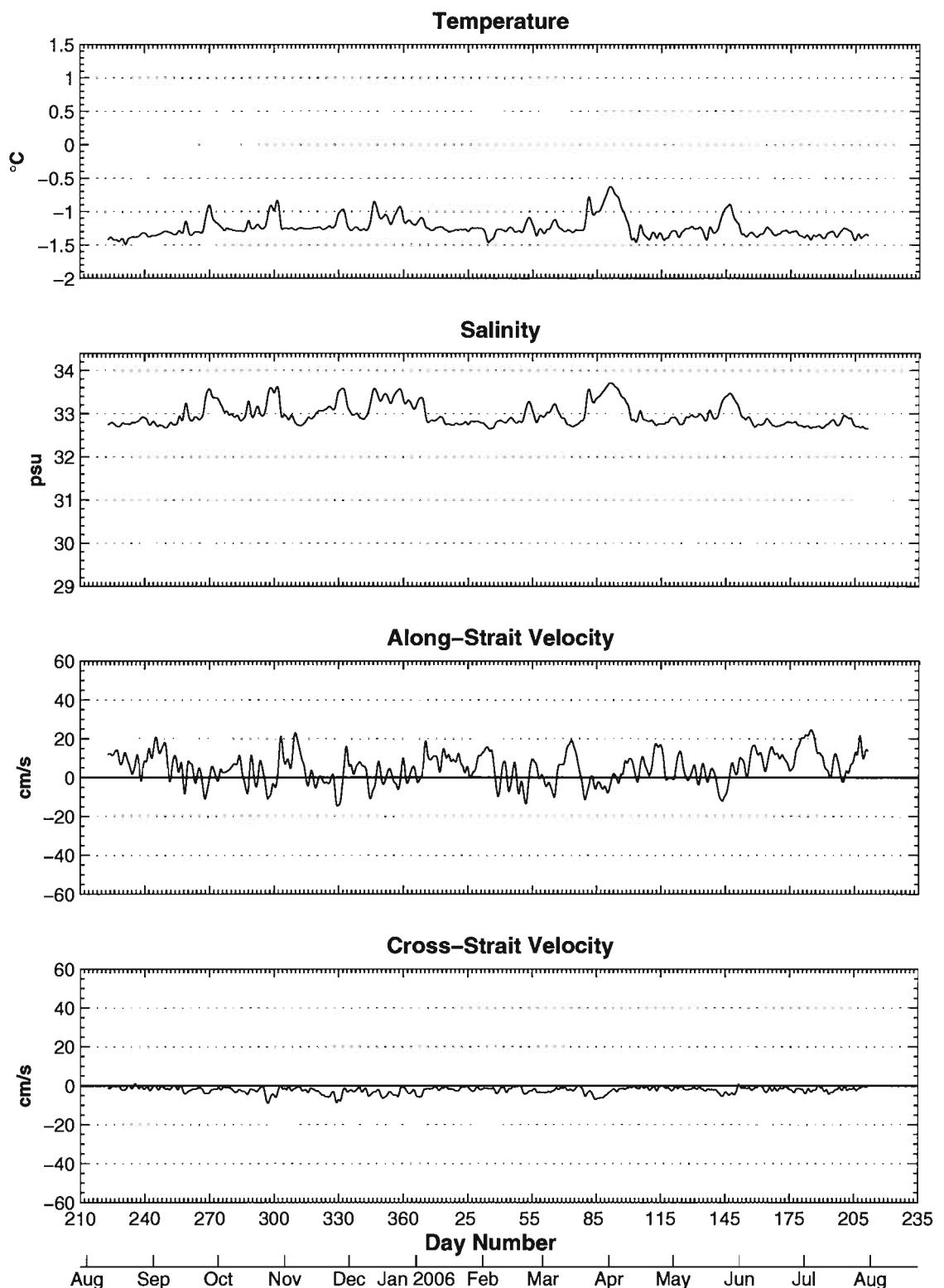
**Figure 20 - Low-pass filtered T,S (38 m.) and current data (38 m.).**  
**South Side Barrow Strait: August 2005 - July 2006.**



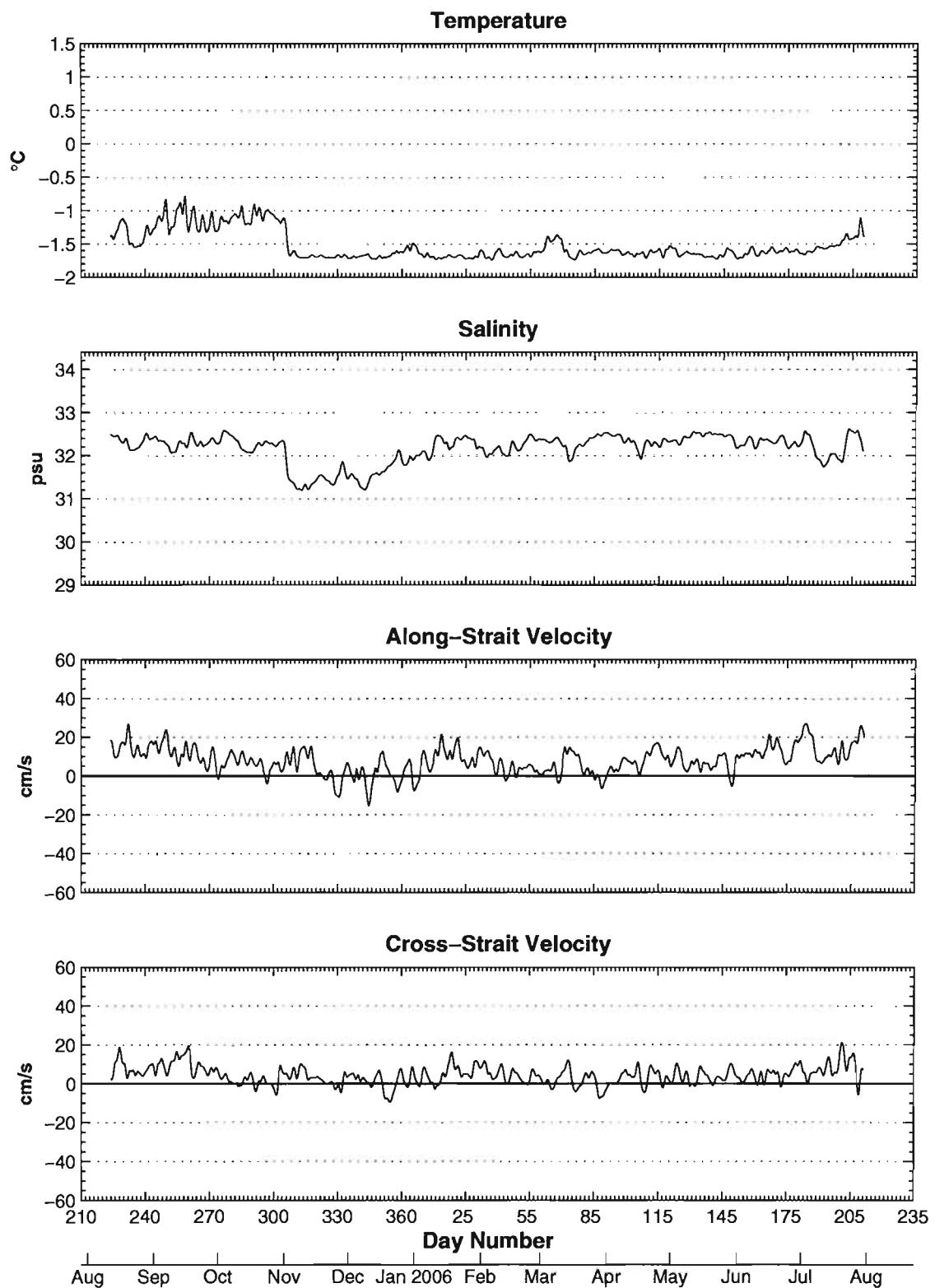
**Figure 21 - Low-pass filtered T,S (78 m.) and current data (78 m.).**  
**South Side Barrow Strait: August 2005 – July 2006.**



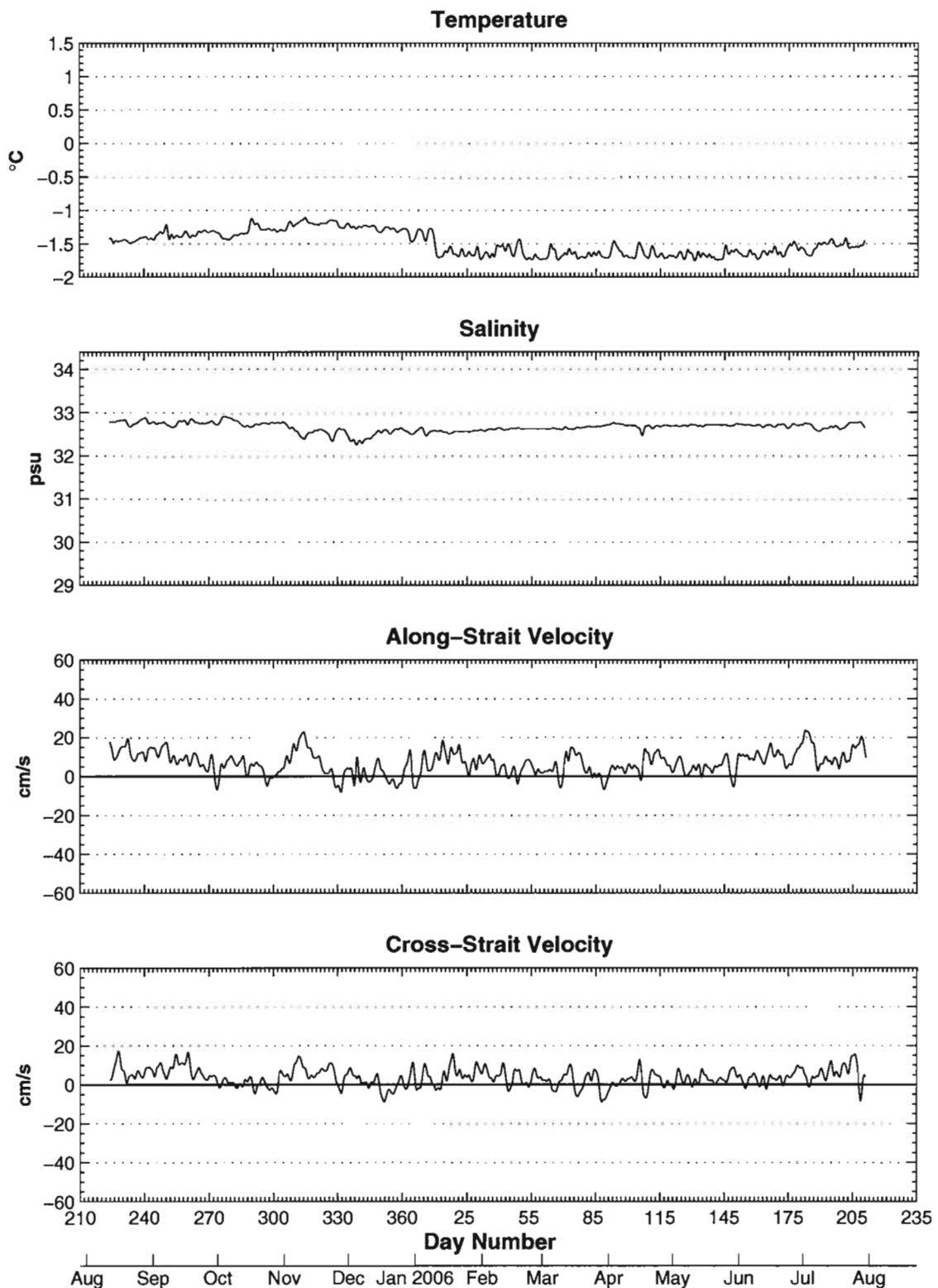
**Figure 22 - Low-pass filtered T,S (146 m.) and current data (138 m.).**  
**South Side Barrow Strait: August 2005 – July 2006.**



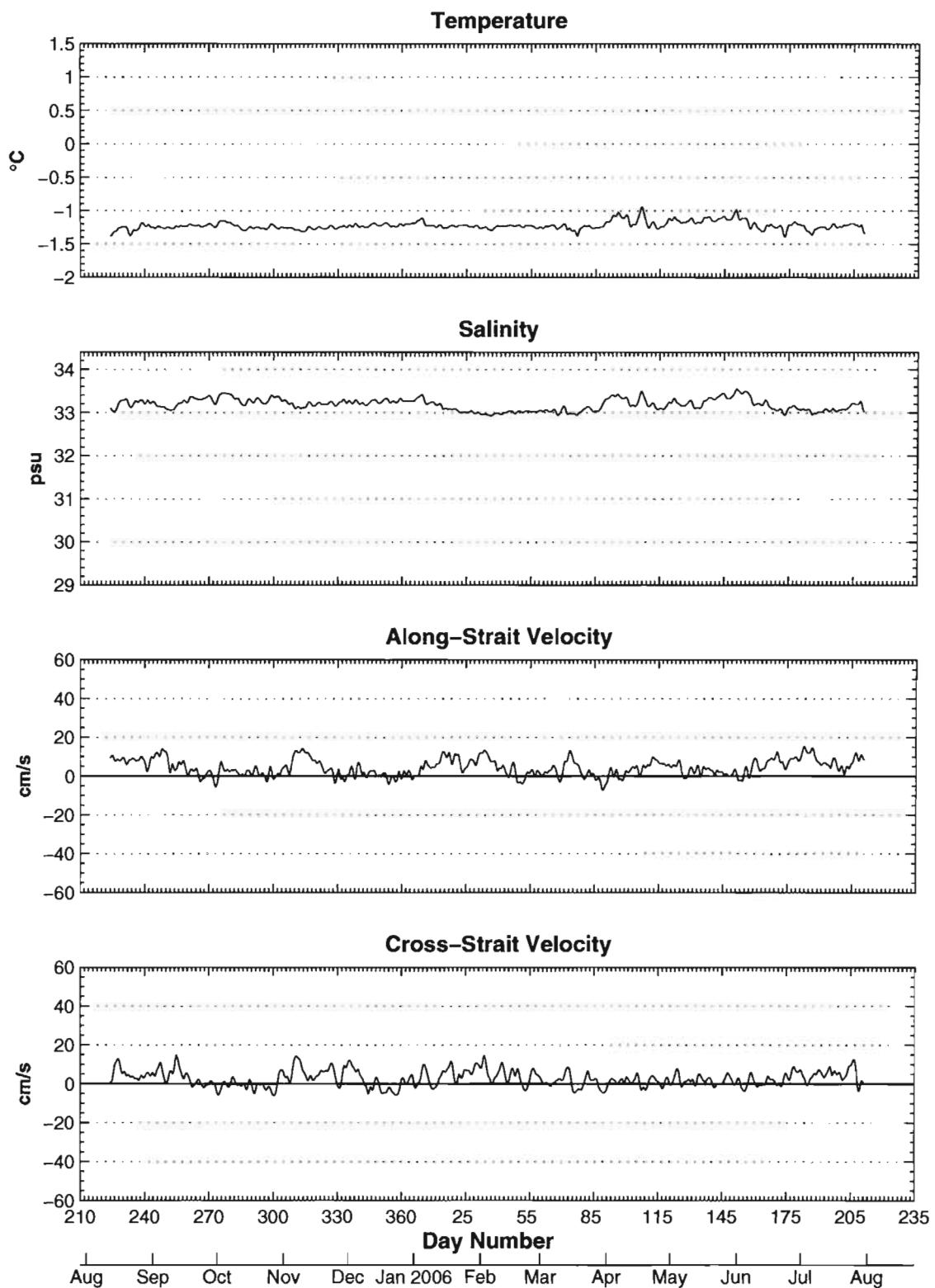
**Figure 23 - Low-pass filtered T,S (39 m.) and current data (41 m.).**  
**South Central Barrow Strait: August 2005 – July 2006.**



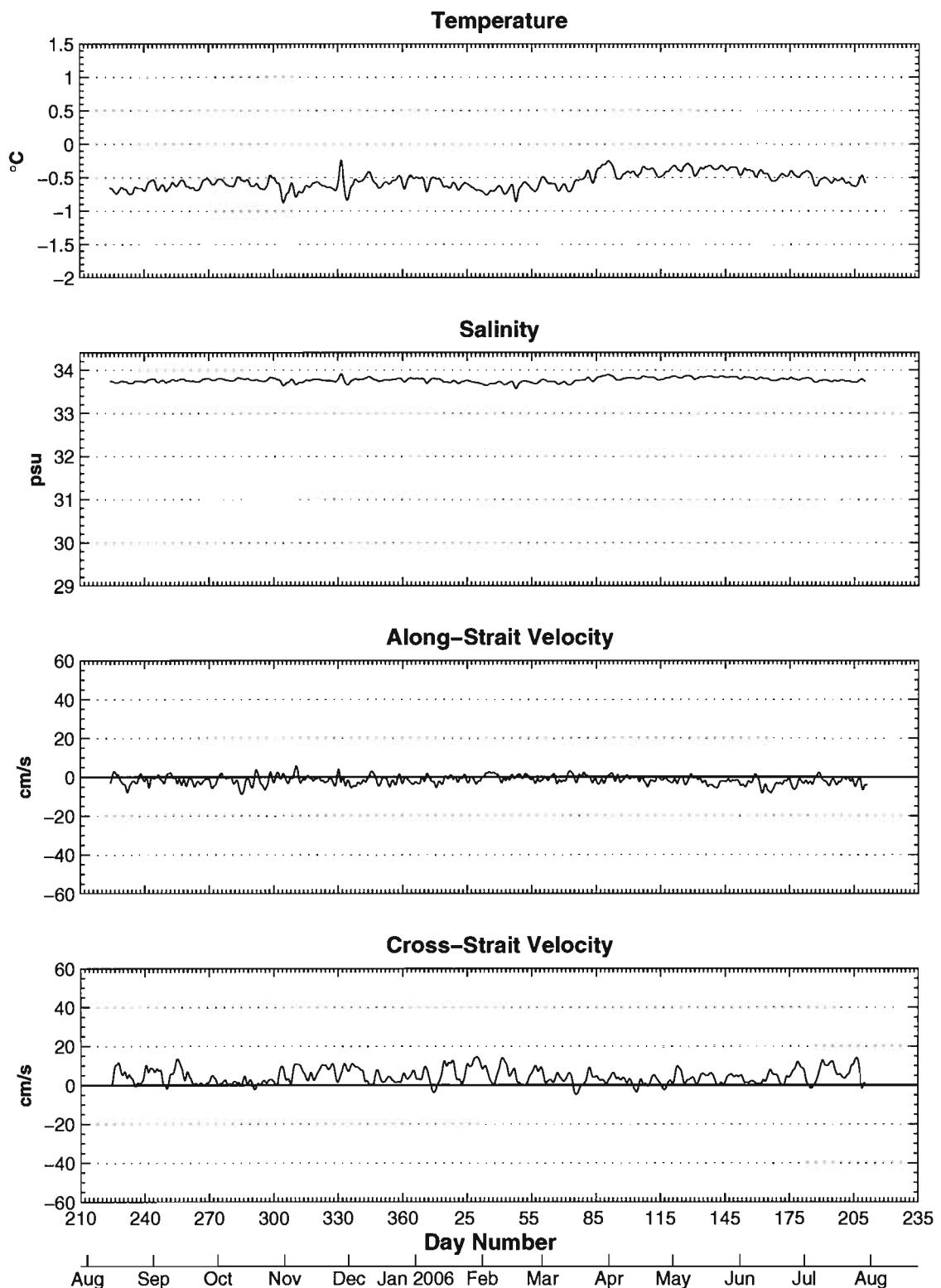
**Figure 24 - Low-pass filtered T,S (81 m.) and current data (81 m.).**  
**South Central Barrow Strait: August 2005 - July 2006.**



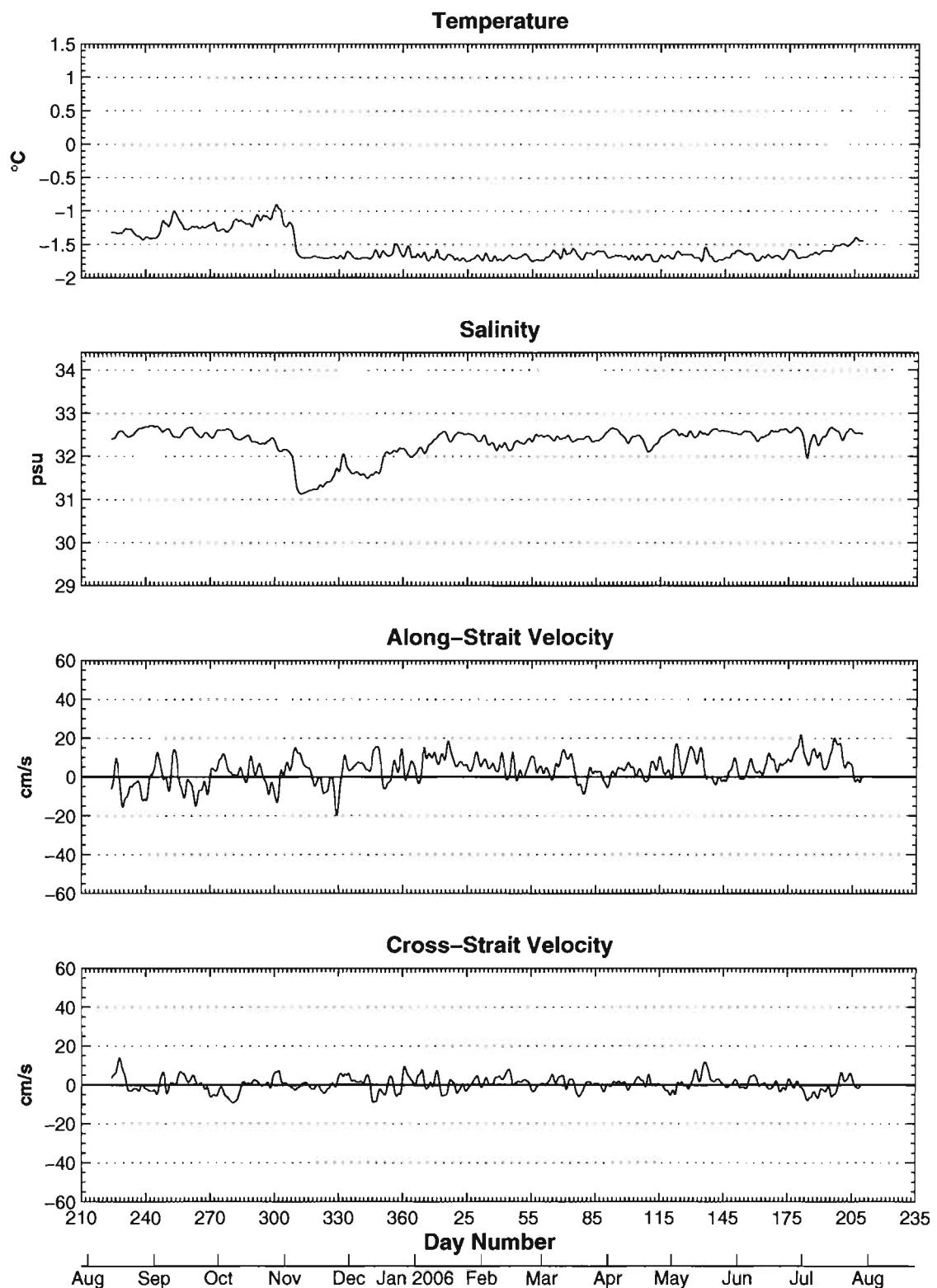
**Figure 25 - Low-pass filtered T,S (160 m.) and current data (161 m.).**  
**South Central Barrow Strait: August 2005 - July 2006.**



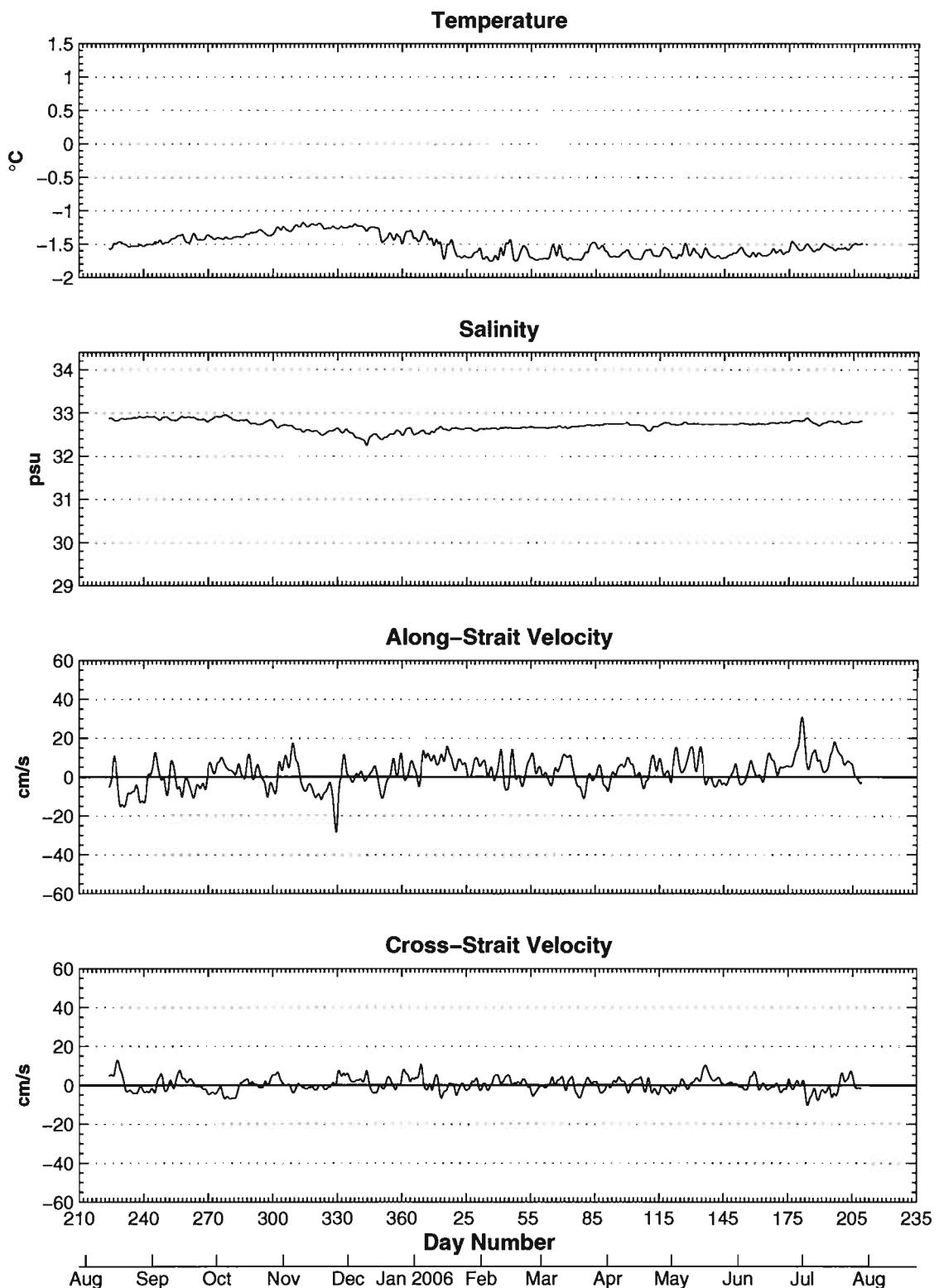
**Figure 26 - Low-pass filtered T,S (264 m.) and current data (233 m).  
South Central Barrow Strait: August 2005 – July 2006.**



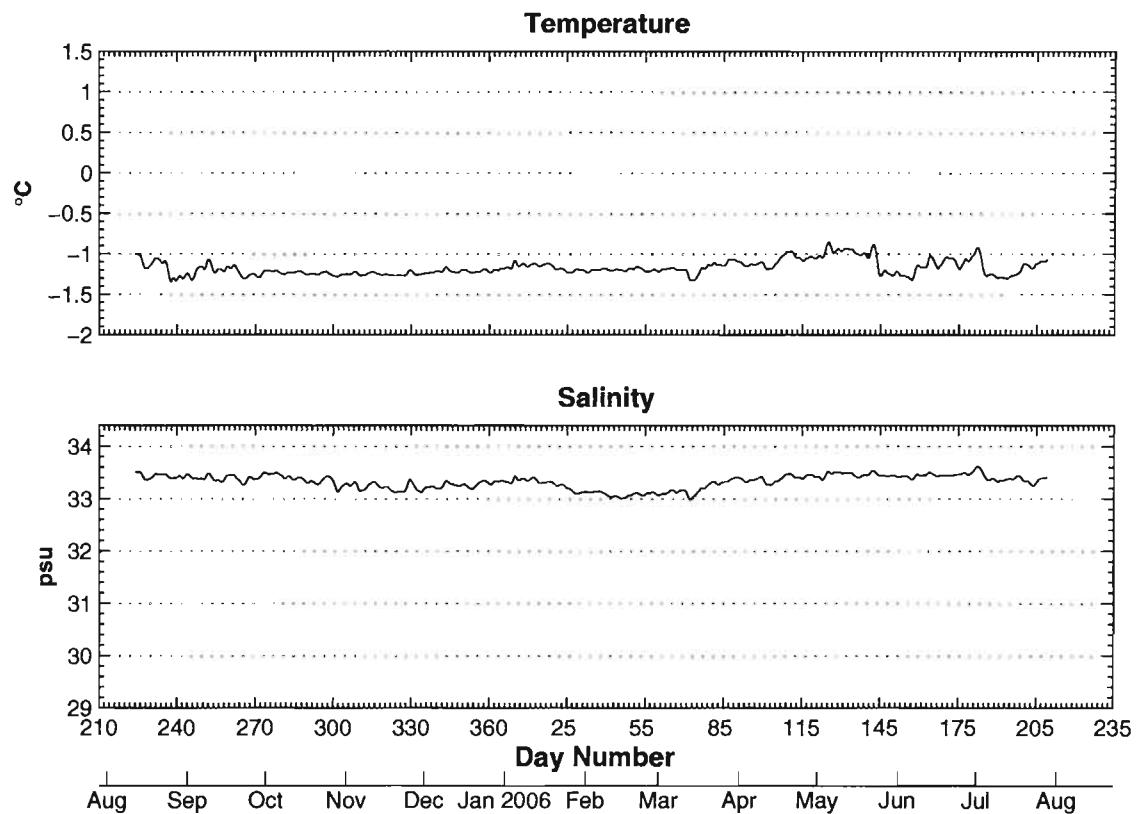
**Figure 27 - Low-pass filtered T,S (38 m.) and current data (38 m.).**  
**Central Barrow Strait: August 2005 – July 2006.**



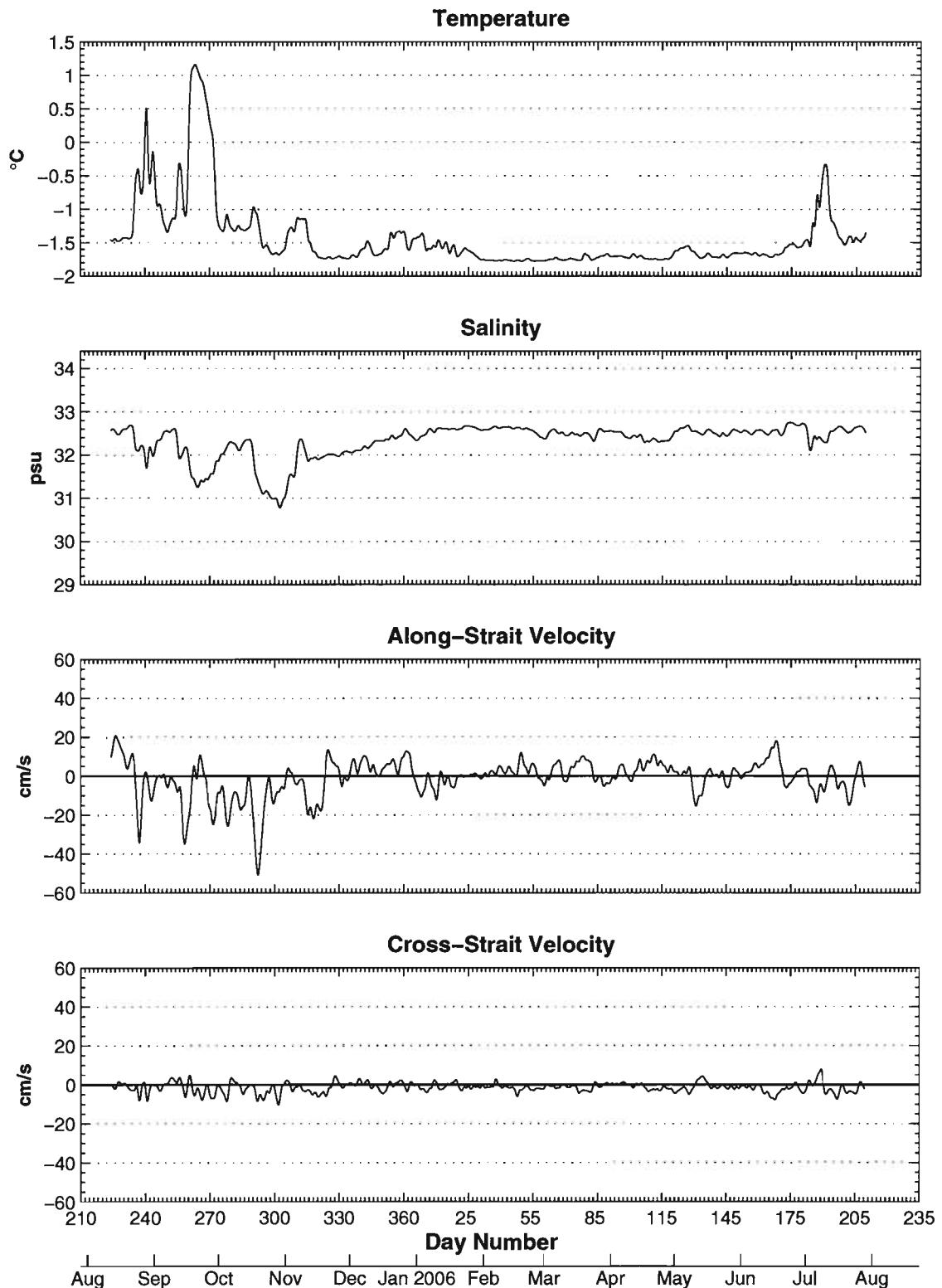
**Figure 28 - Low-pass filtered T,S (78 m.) and current data (70 m.).**  
**Central Barrow Strait: August 2005 – July 2006.**



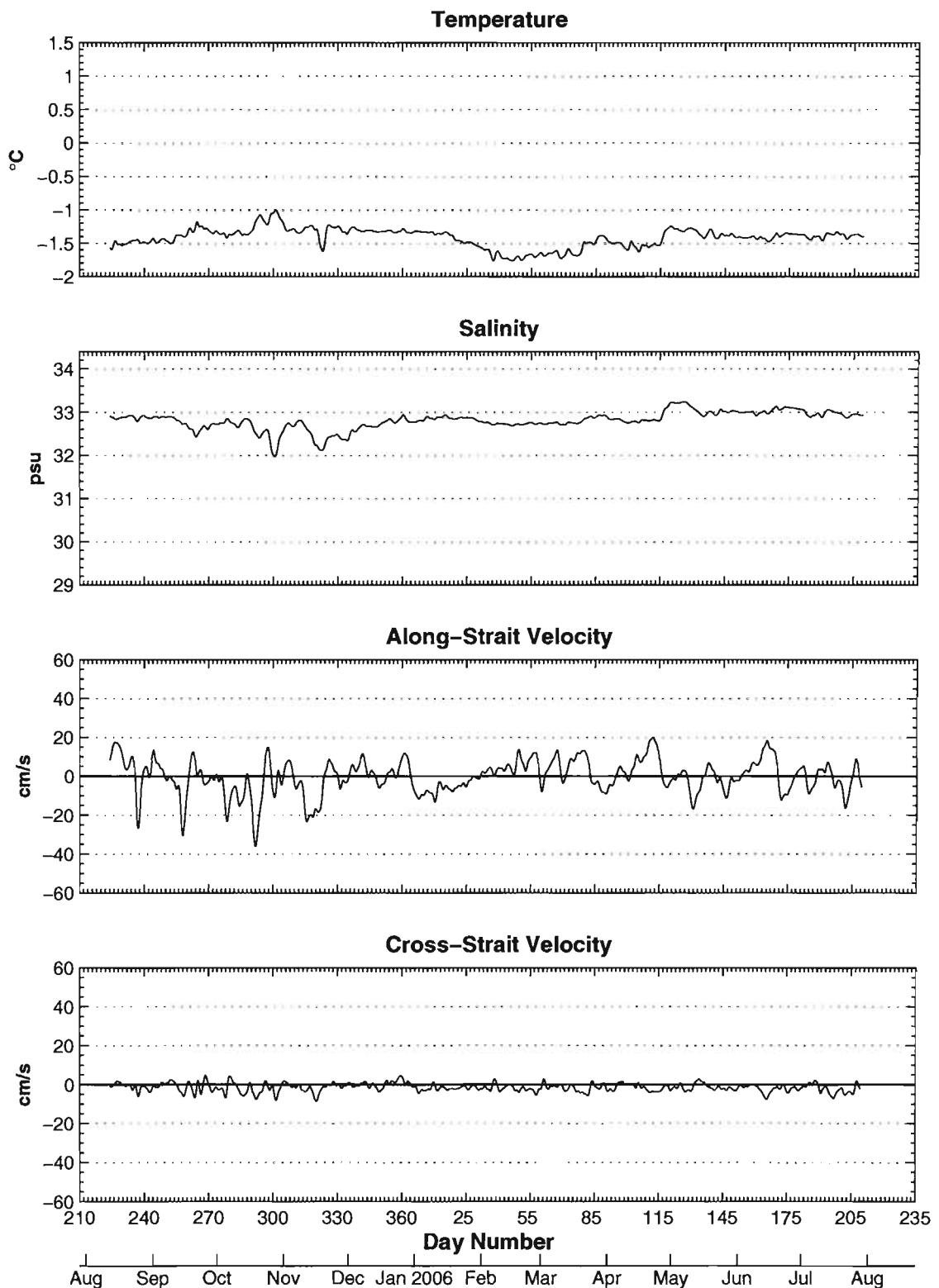
**Figure 29 - Low-pass filtered T,S (157 m.).**  
**Central Barrow Strait: August 2005 – July 2006.**



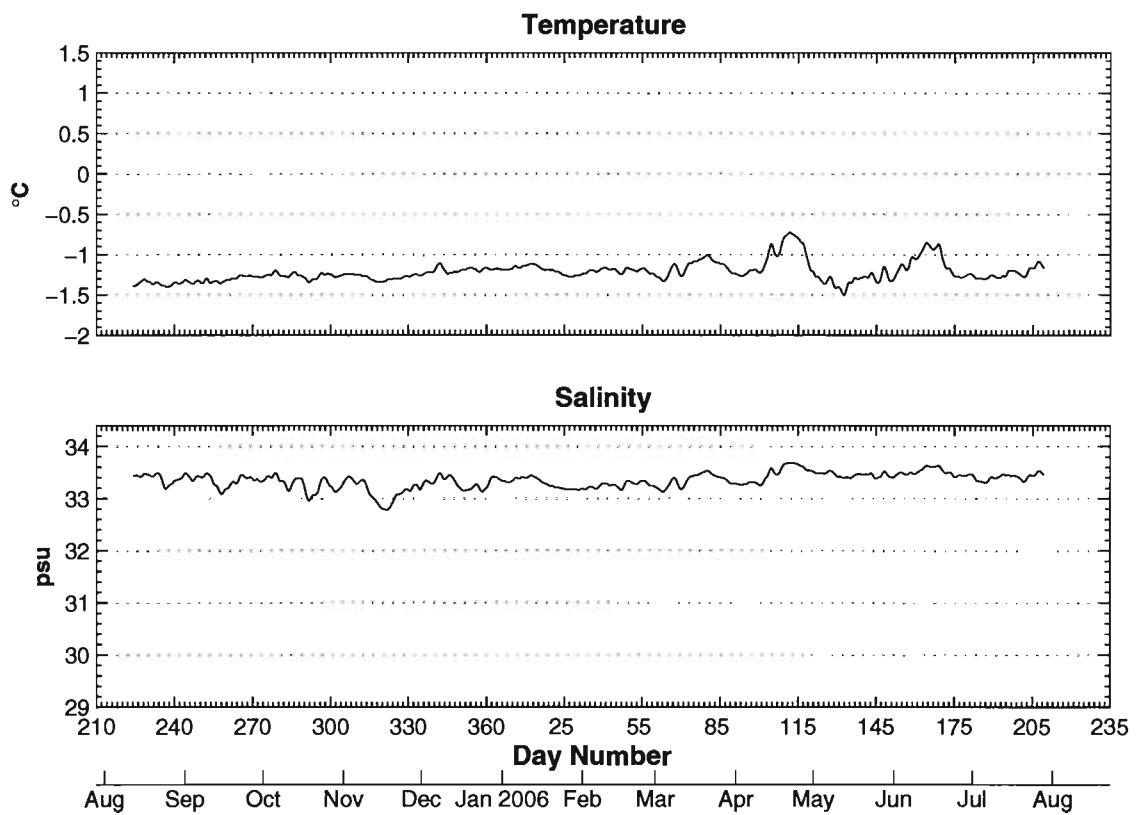
**Figure 30 - Low-pass filtered T,S (39 m.) and current data (38 m.).**  
**North Side Barrow Strait: August 2005 - July 2006.**



**Figure 31 - Low-pass filtered T,S (78 m.) and current data (70 m.)**  
**North Side Barrow Strait: August 2005 – July 2006.**

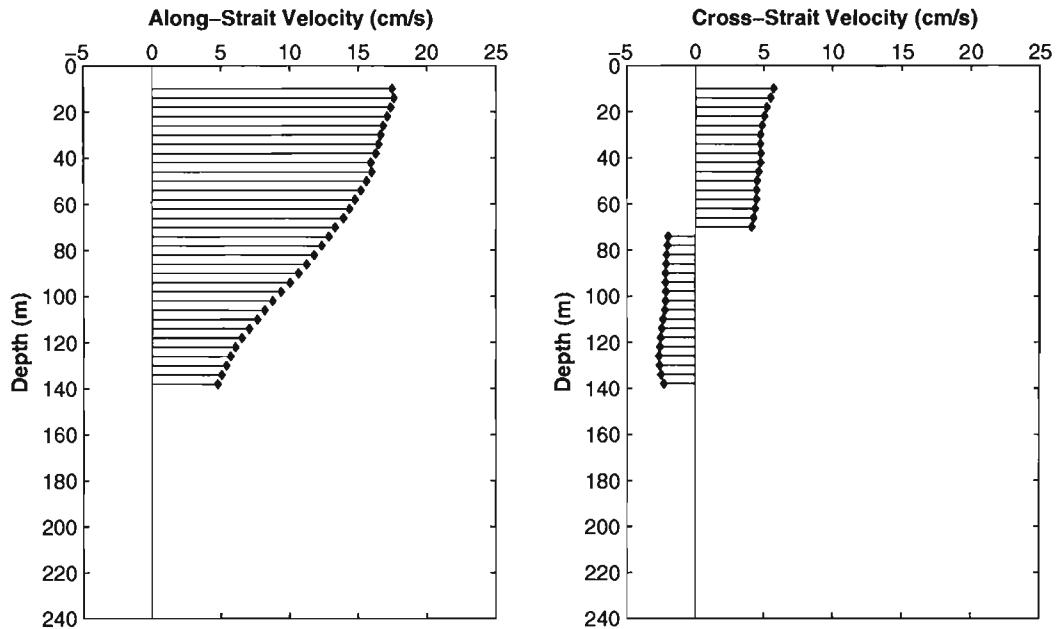


**Figure 32 - Low-pass filtered T,S (158 m.).**  
**North Side Barrow Strait: August 2005 – July 2006.**

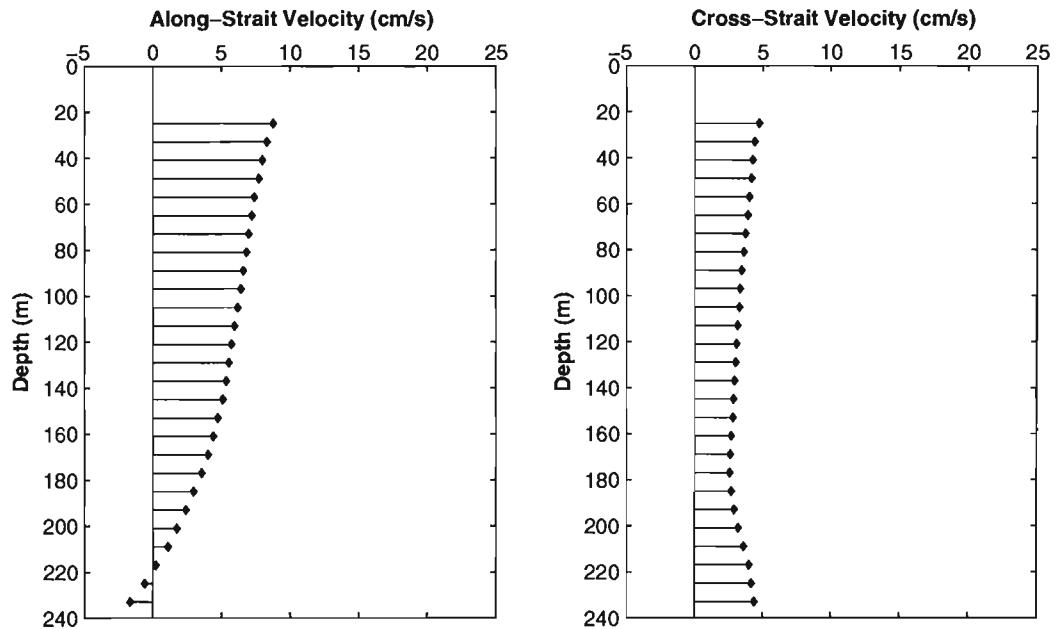


**Figure 33: Mean Flows, Aug. 10, 2005 to Jul. 31, 2006.**

**South side of Barrow Strait**

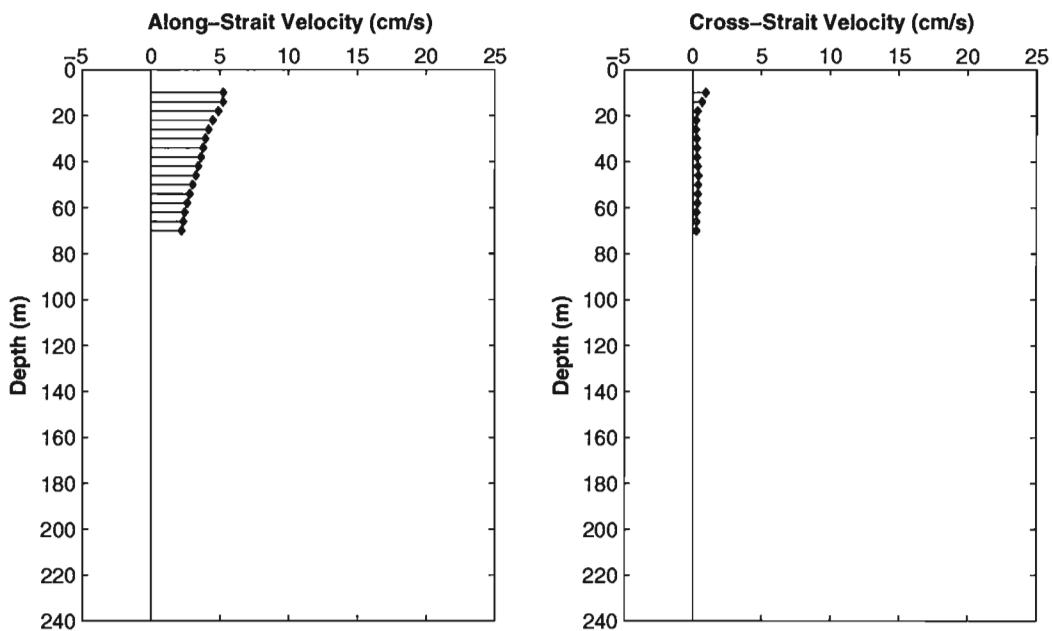


**South-Central Barrow Strait**

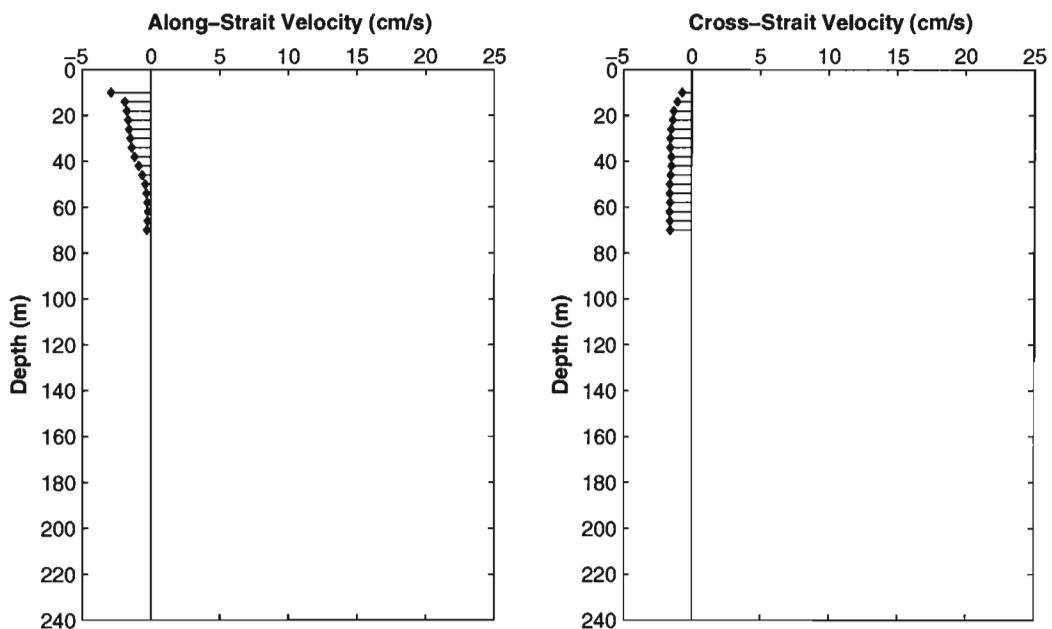


**Figure 33: Mean Flows, Aug. 10, 2005 to Jul. 29, 2006. (continued)**

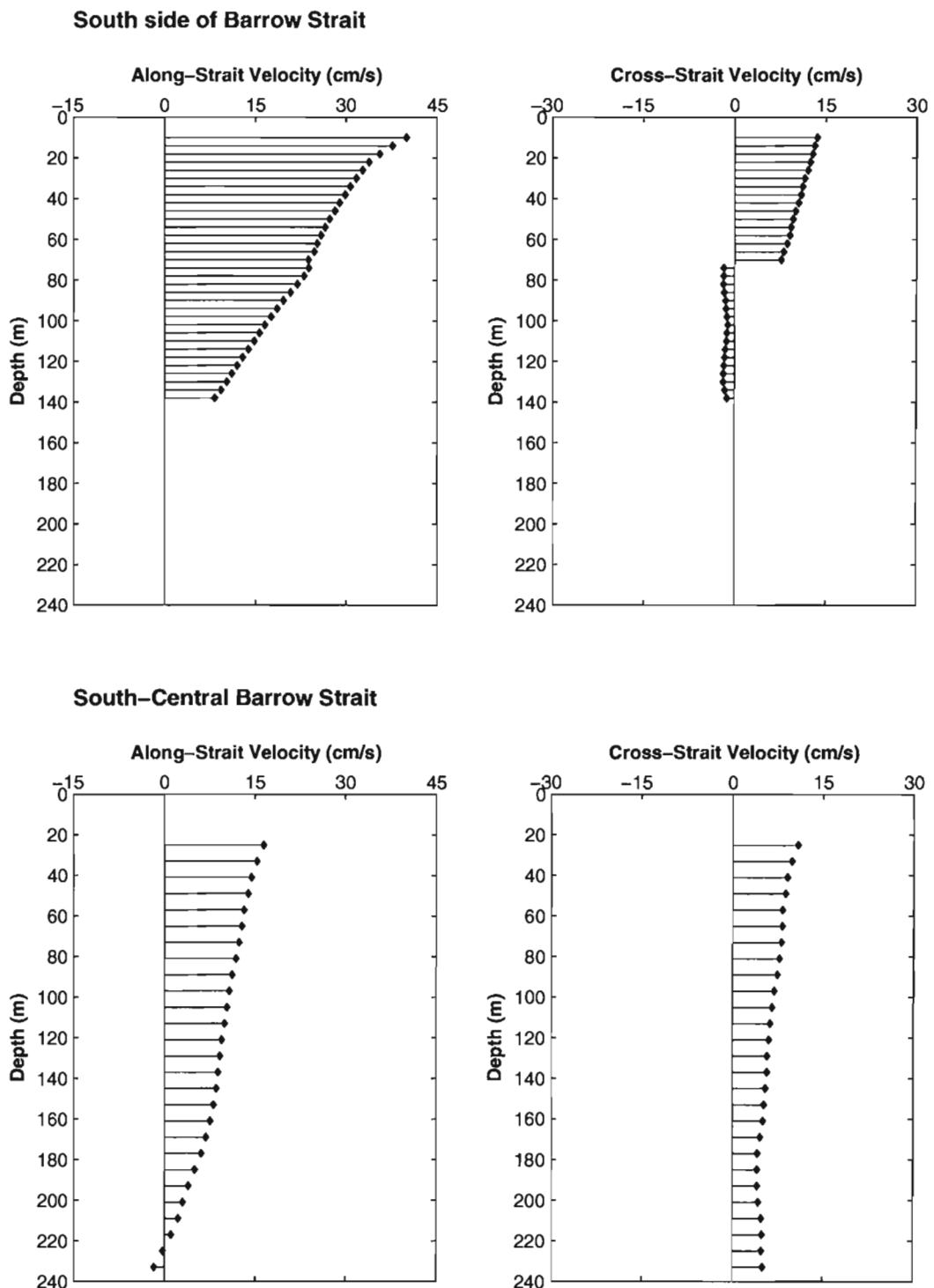
**Central Barrow Strait**



**North side of Barrow Strait**

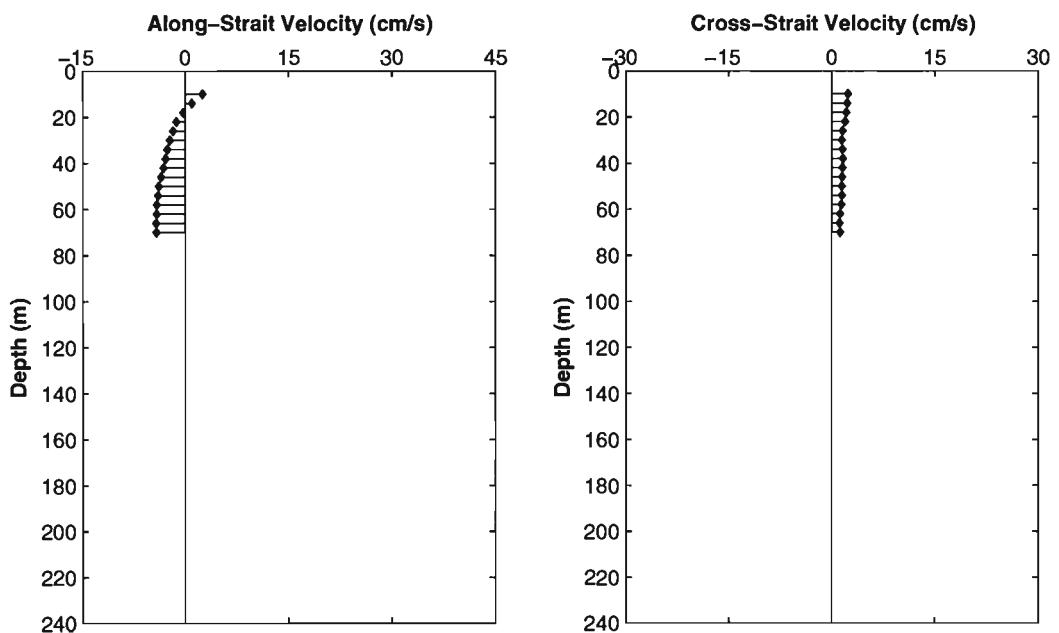


**Figure 34: Mean Flows, Late Summer: Aug. 2005 to Sep. 2005.**

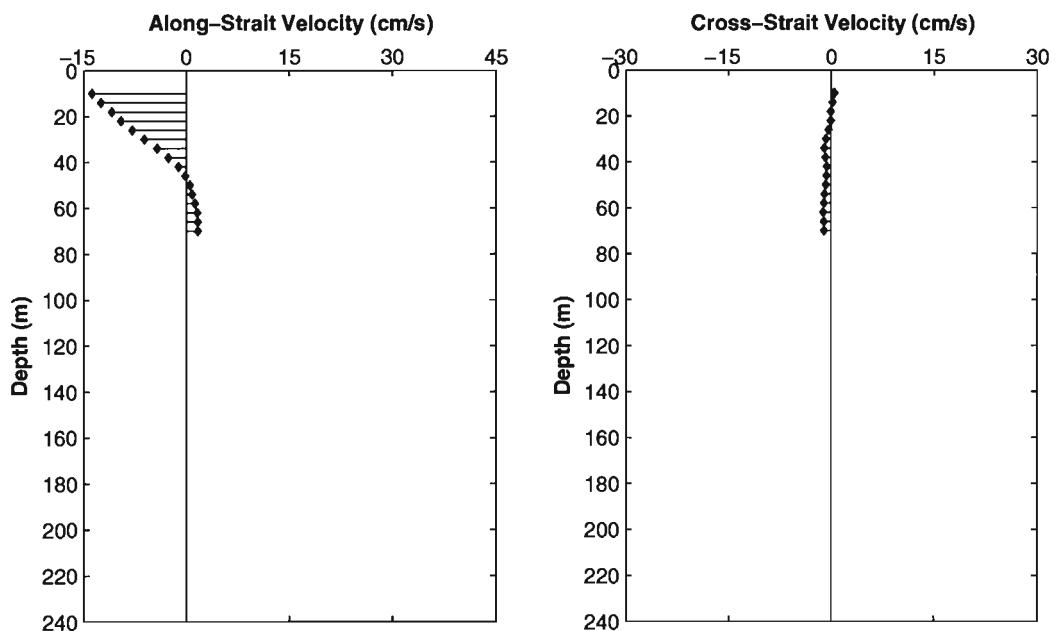


**Figure 34: Mean Flows, Late Summer: Aug. 2005 to Sep. 2005 (continued)**

**Central Barrow Strait**

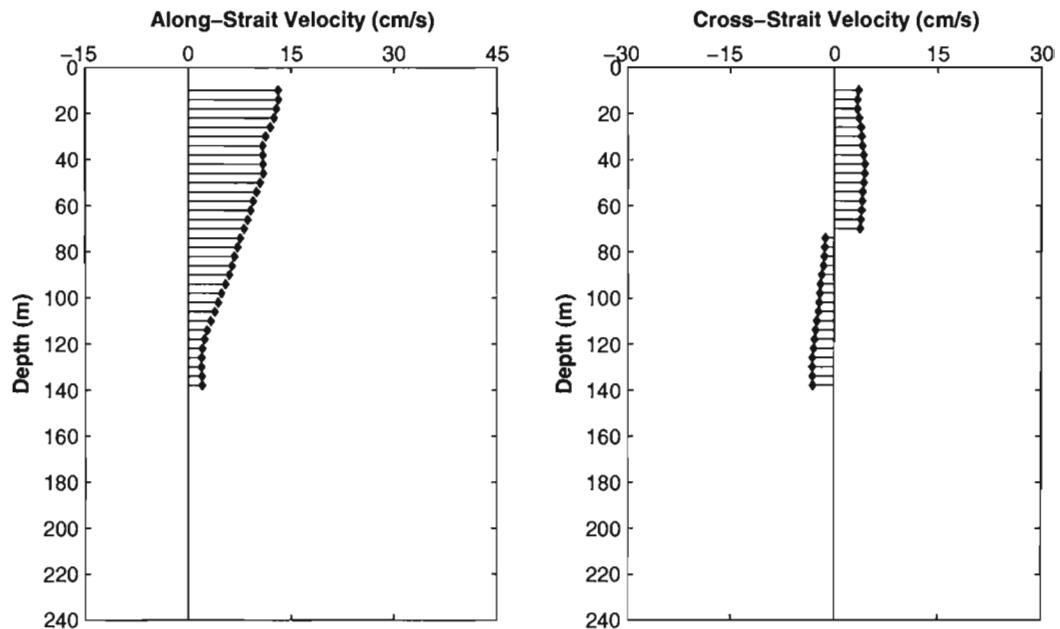


**North side of Barrow Strait**

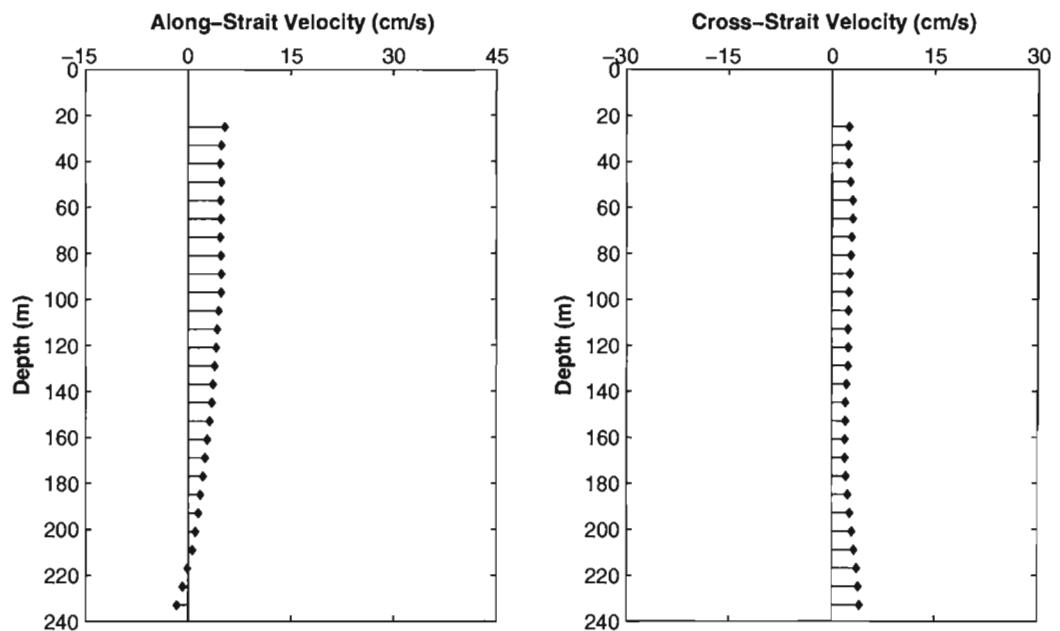


**Figure 35: Mean Flows, Fall: Sep. 2005 to Dec. 2005.**

**South side of Barrow Strait**

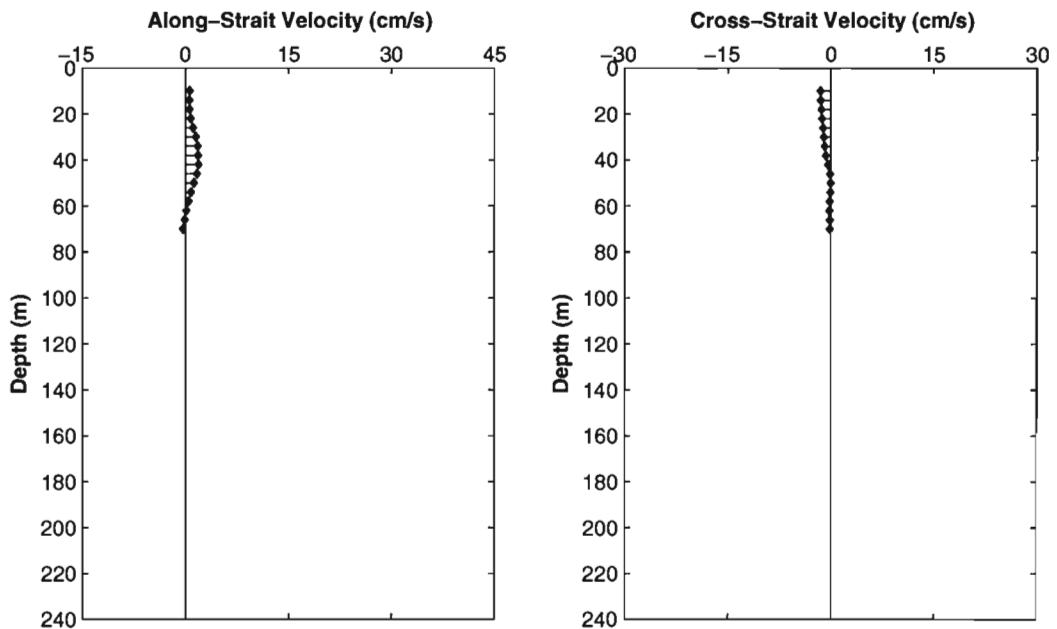


**South-Central Barrow Strait**

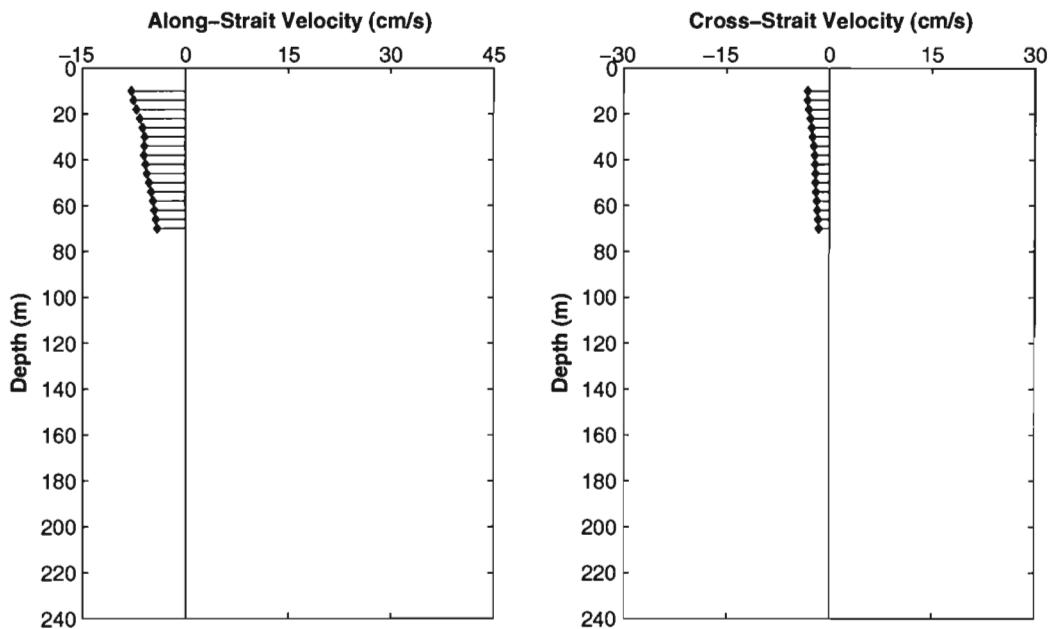


**Figure 35: Mean Flows, Fall: Sep. 2005 to Dec. 2005 (continued).**

**Central Barrow Strait**

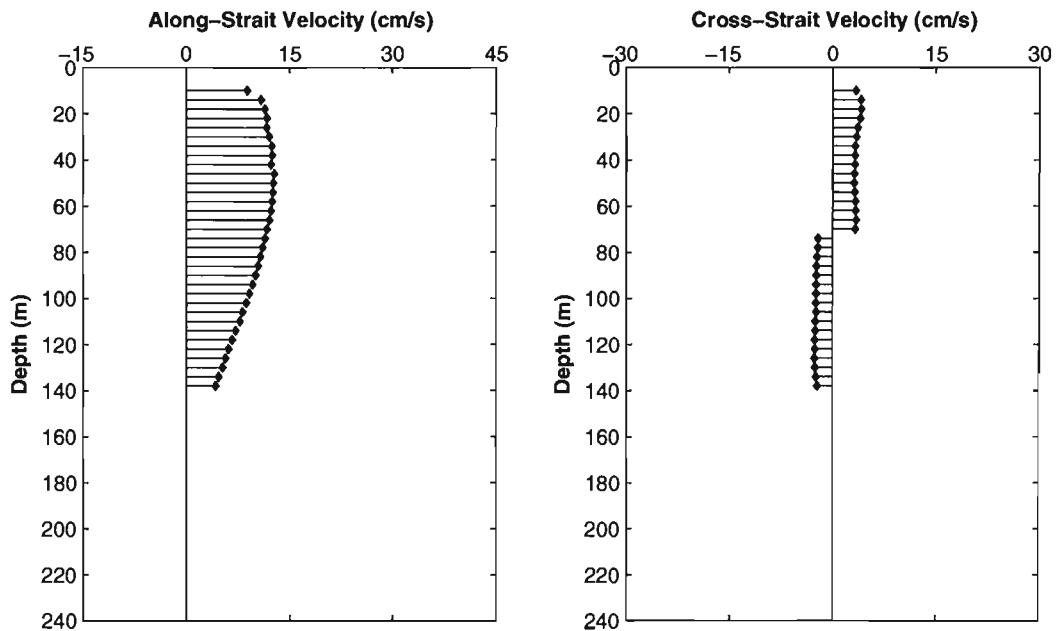


**North side of Barrow Strait**

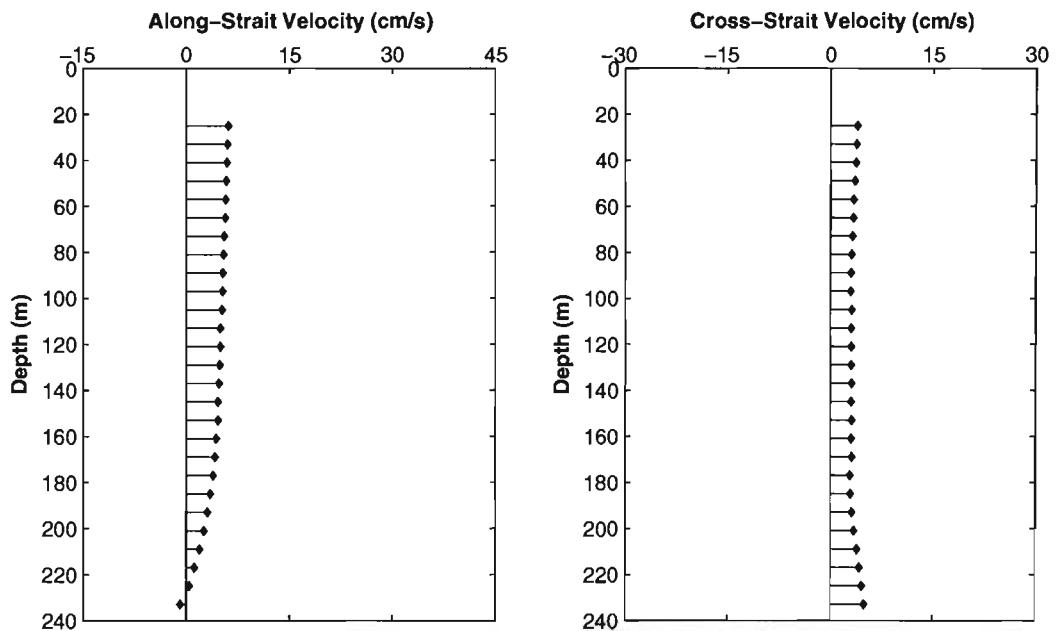


**Figure 36: Mean Flows, Winter: Dec. 2005 to Mar. 2006.**

**South side of Barrow Strait**

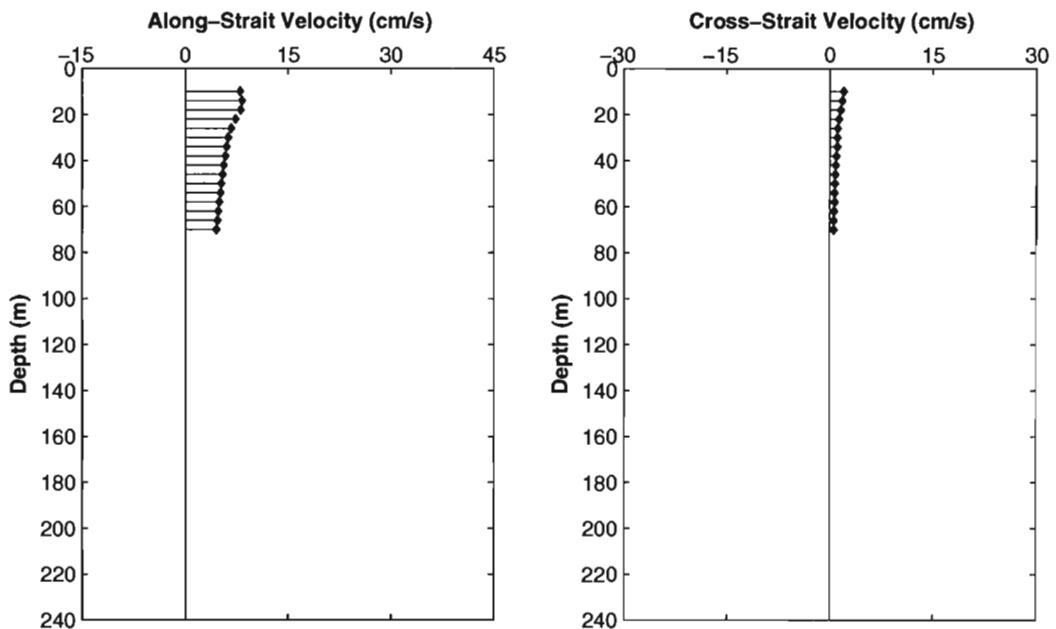


**South-Central Barrow Strait**

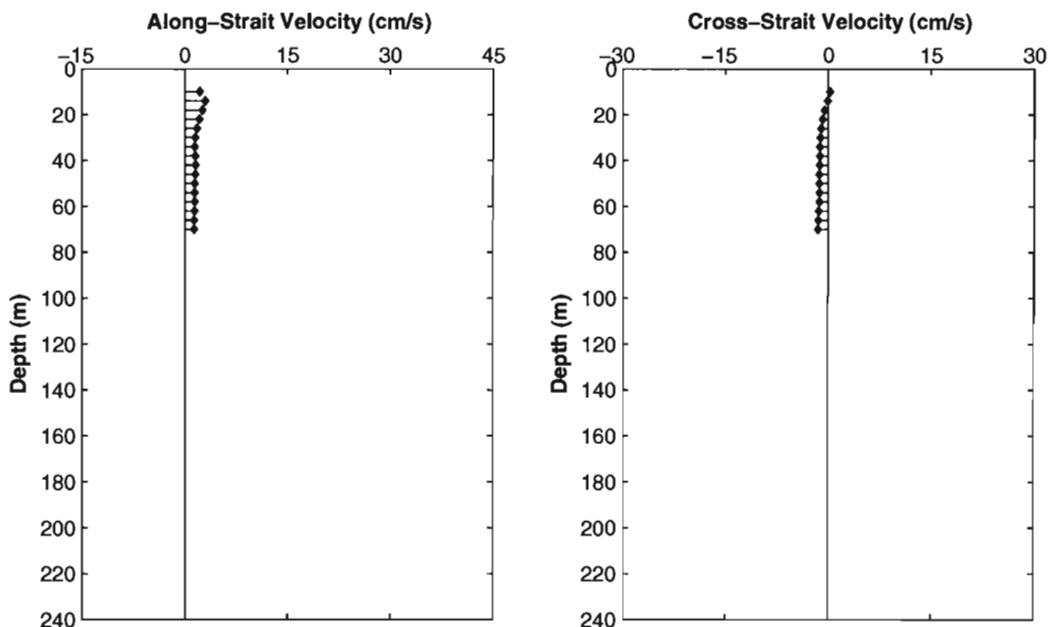


**Figure 36: Mean Flows, Winter: Dec. 2005 to Mar. 2006 (continued).**

**Central Barrow Strait**

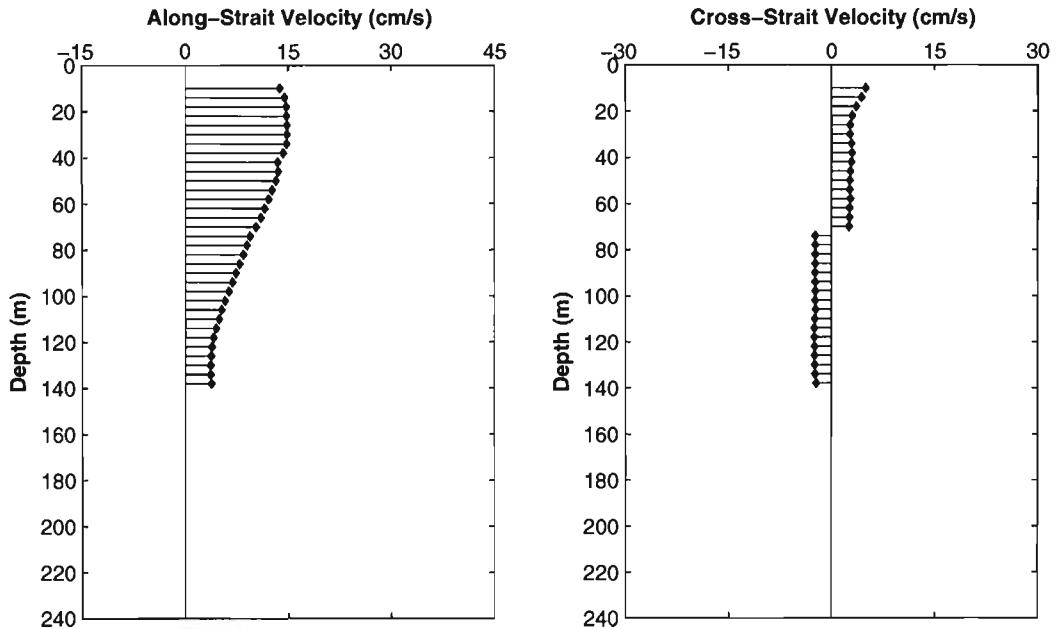


**North side of Barrow Strait**

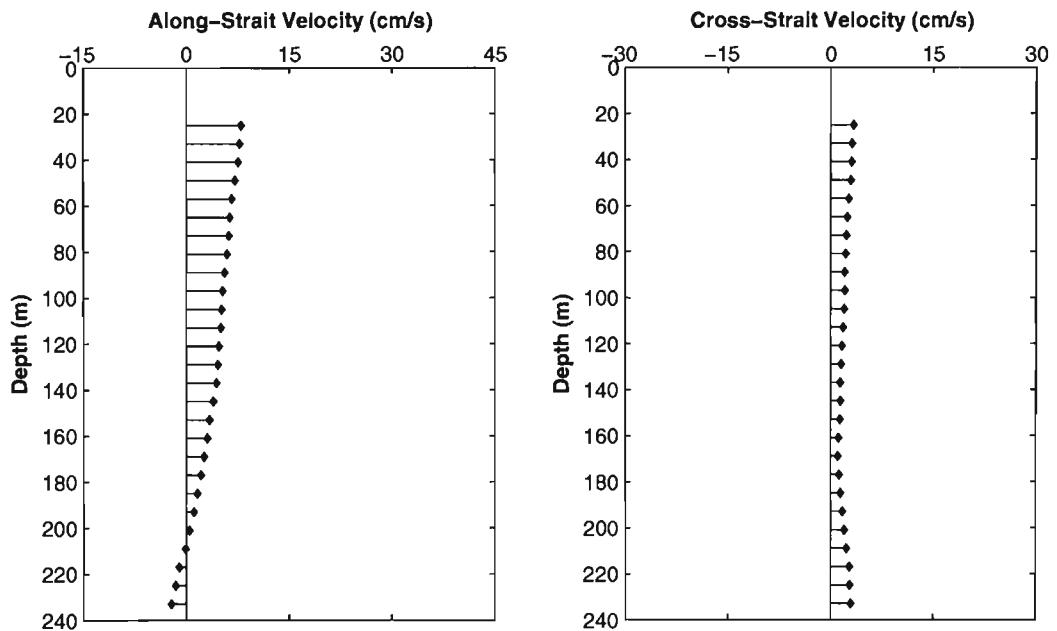


**Figure 37: Mean Flows, Spring: Mar. 2006 to Jun. 2006.**

**South side of Barrow Strait**

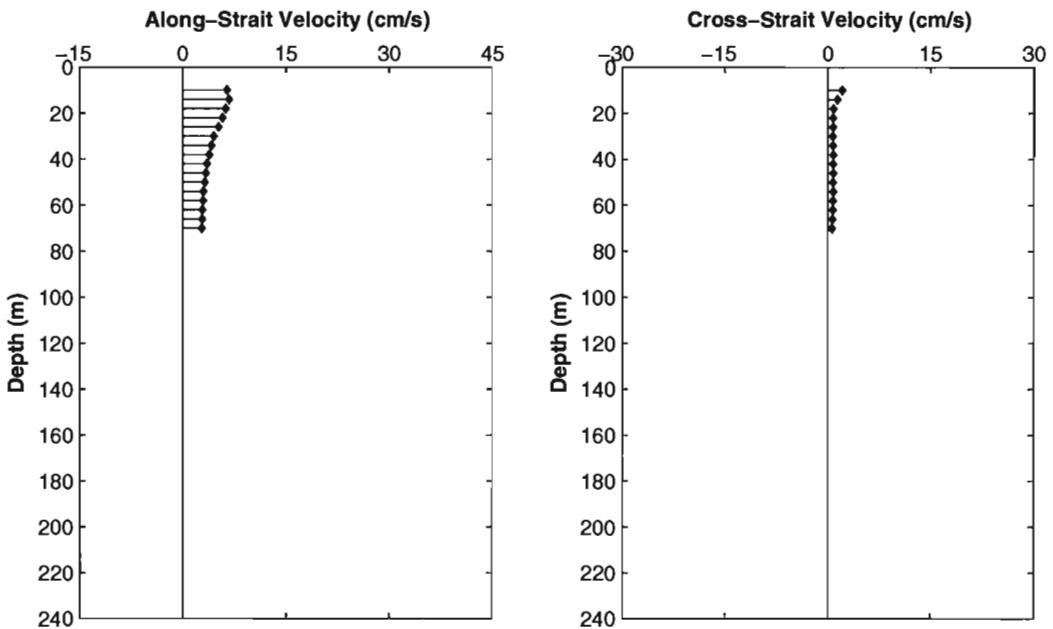


**South-Central Barrow Strait**

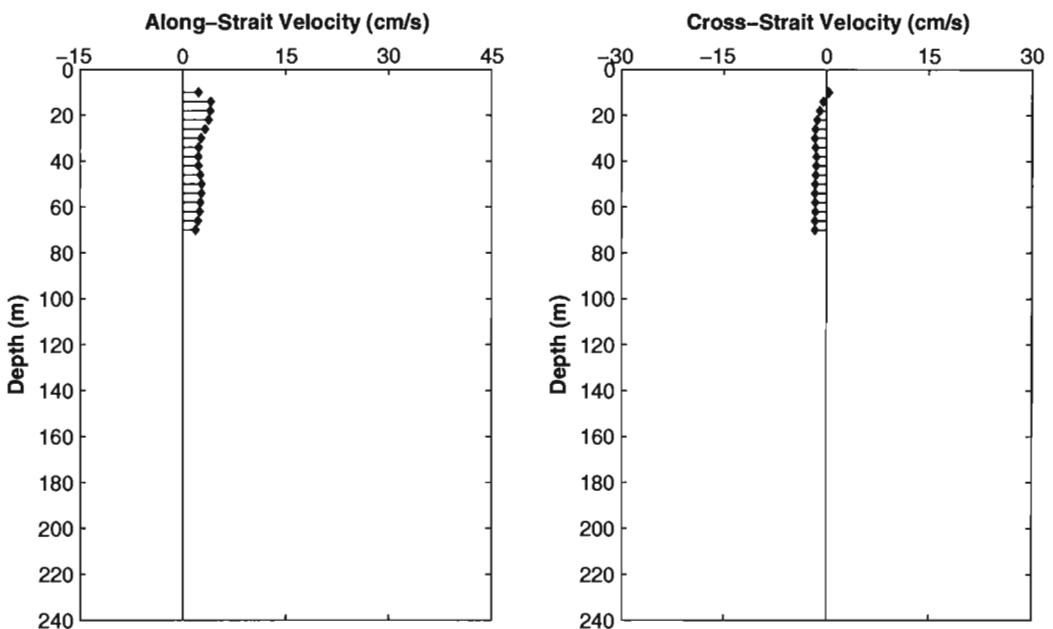


**Figure 37: Mean Flows, Spring: Mar. 2006 to Jun. 2006 (continued).**

**Central Barrow Strait**

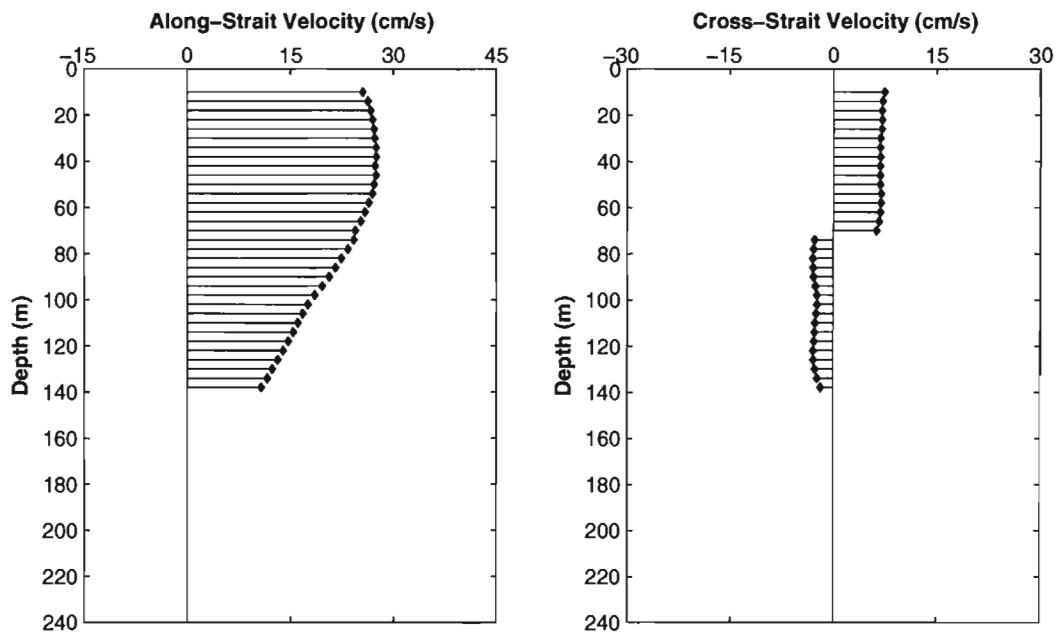


**North side of Barrow Strait**

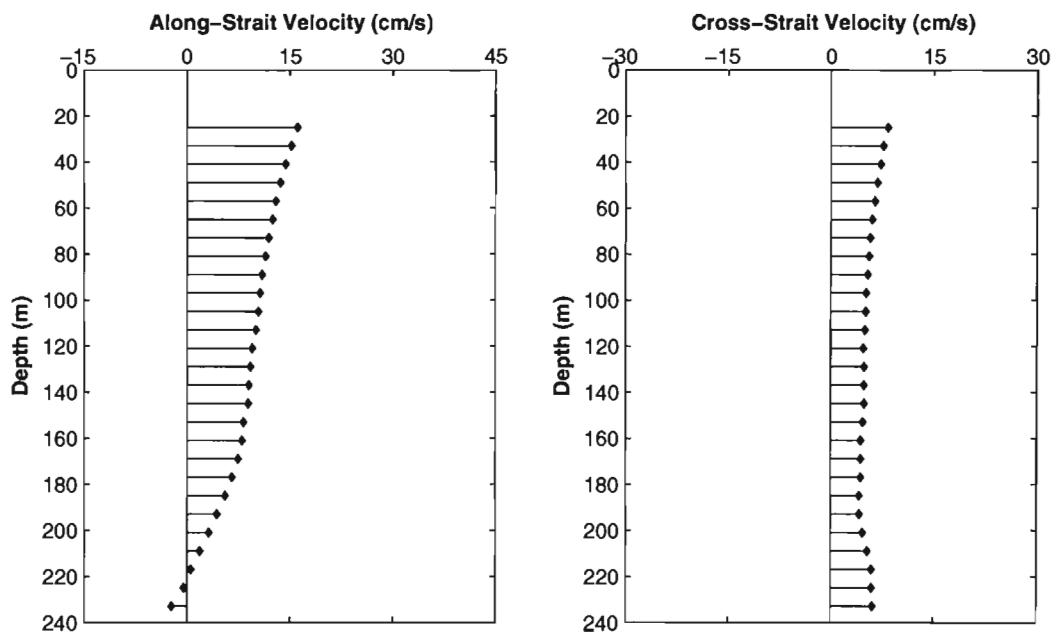


**Figure 38: Mean Flows, Early Summer: Jun. 2006 to Jul. 2006.**

**South side of Barrow Strait**

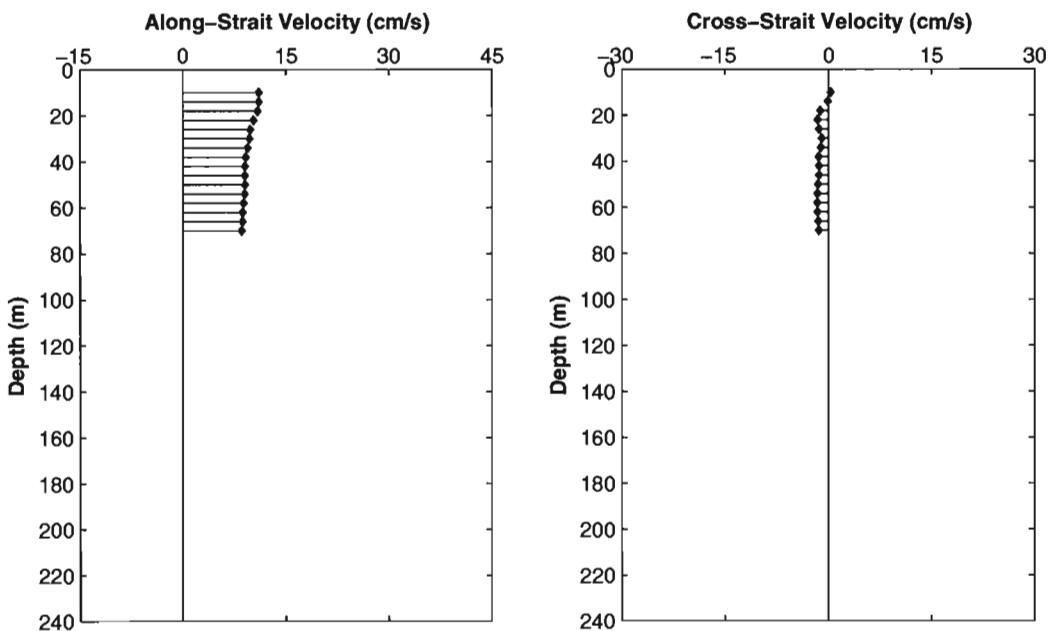


**South-Central Barrow Strait**

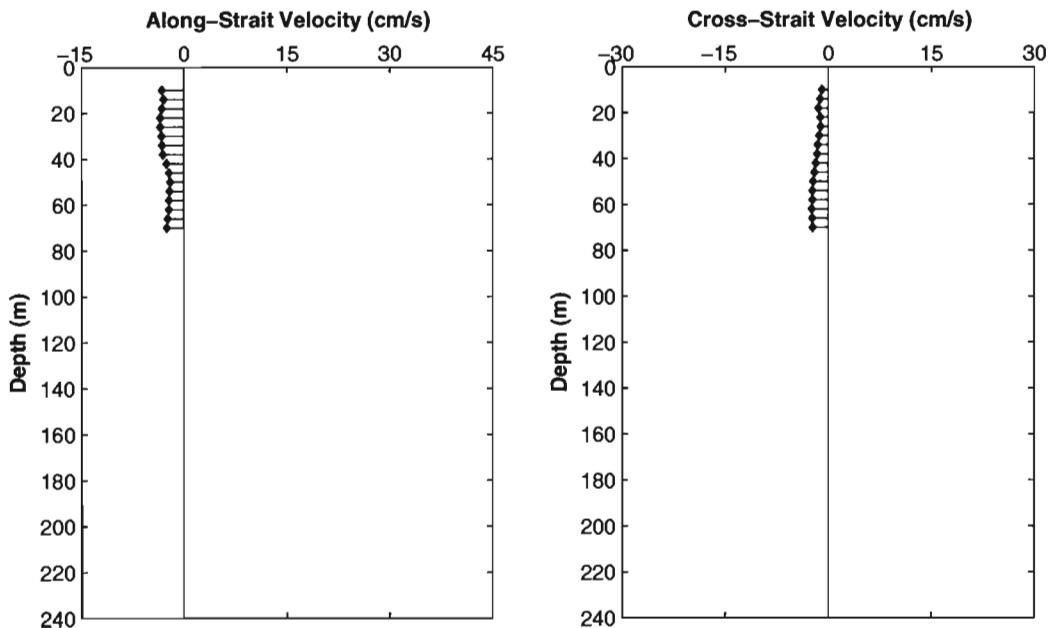


**Figure 38: Mean Flows, Early Summer: Jun. 2006 to Jul. 2006 (continued).**

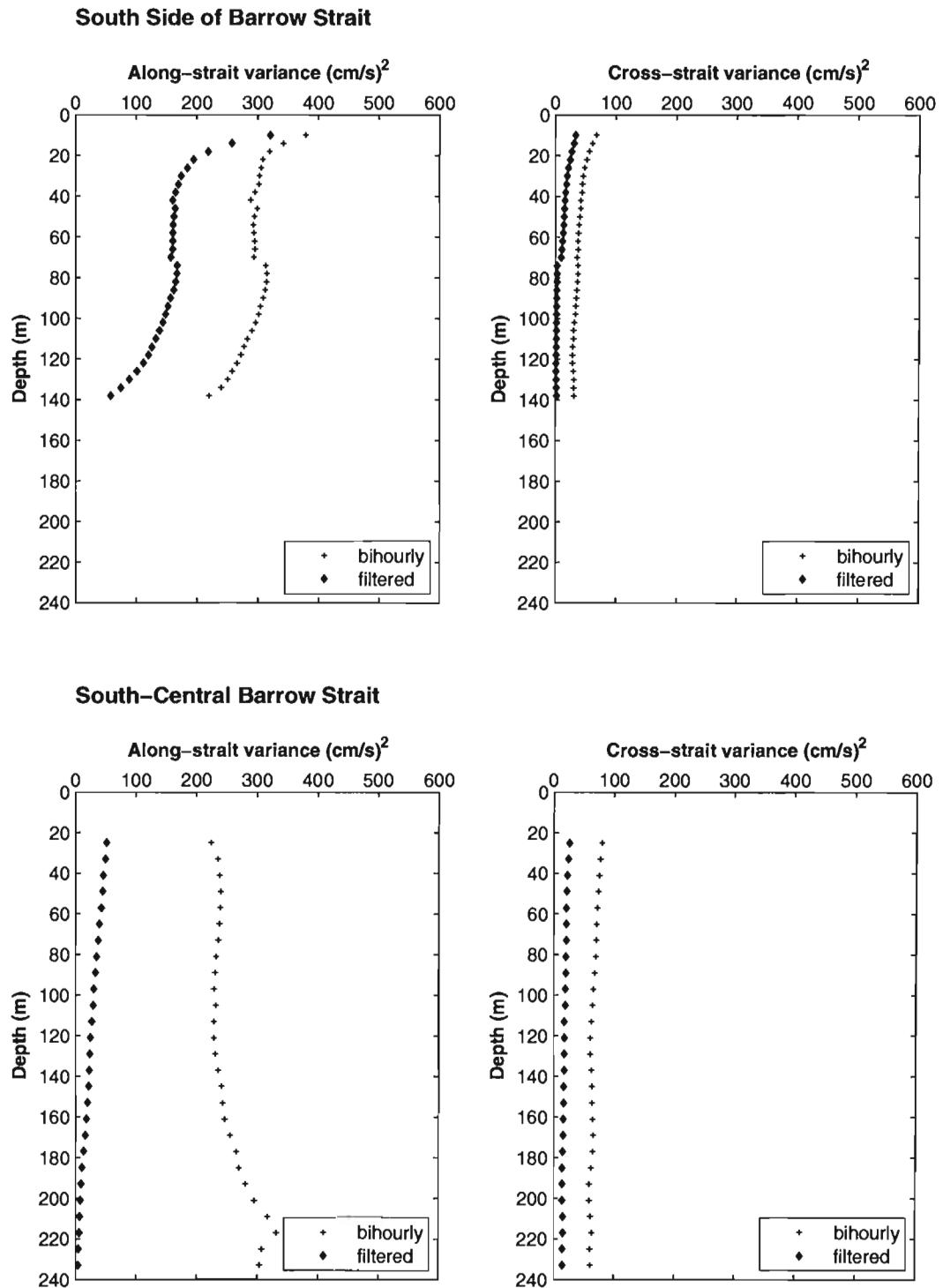
**Central Barrow Strait**



**North side of Barrow Strait**

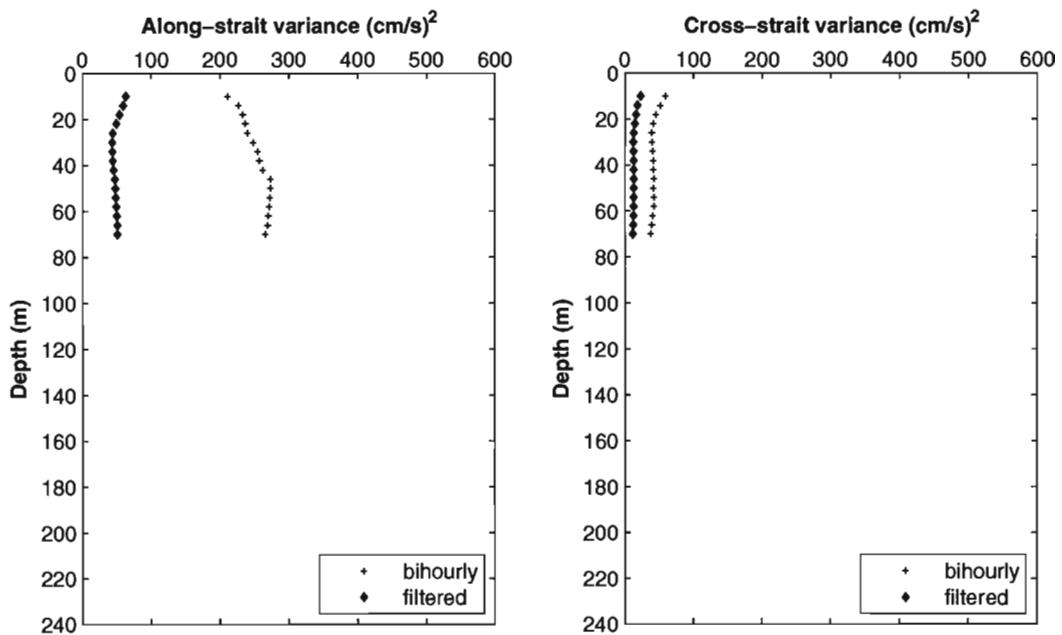


**Figure 39: Variance in bi-hourly and low-pass filtered currents.  
Aug. 2005 to Jul. 2006.**

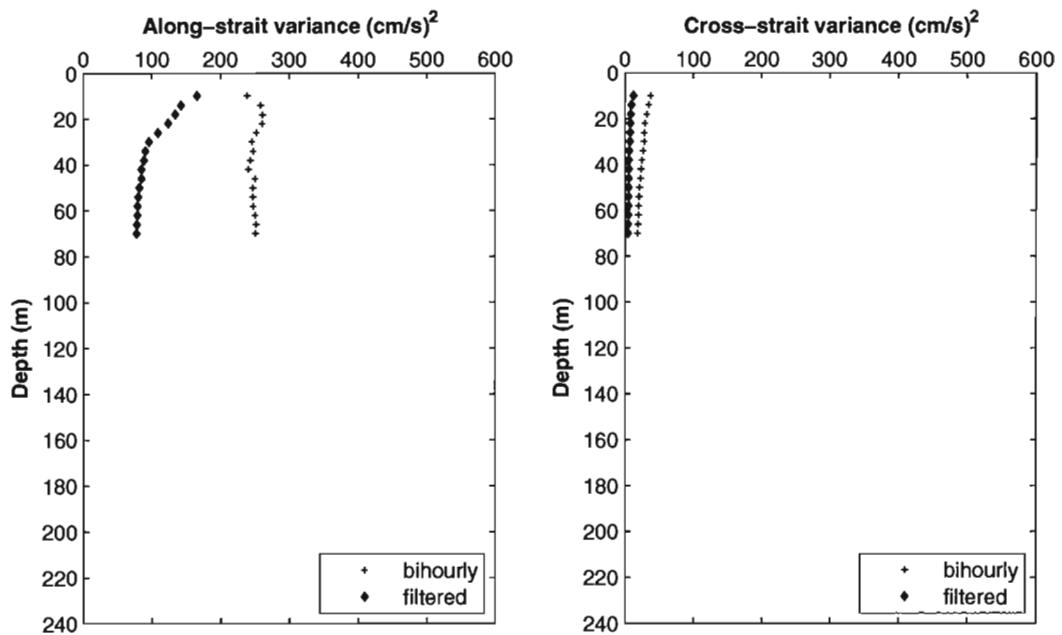


**Figure 39: Variance in bi-hourly and low-pass filtered currents  
Aug. 2005 to Jul. 2006 (continued).**

**Central Barrow Strait**

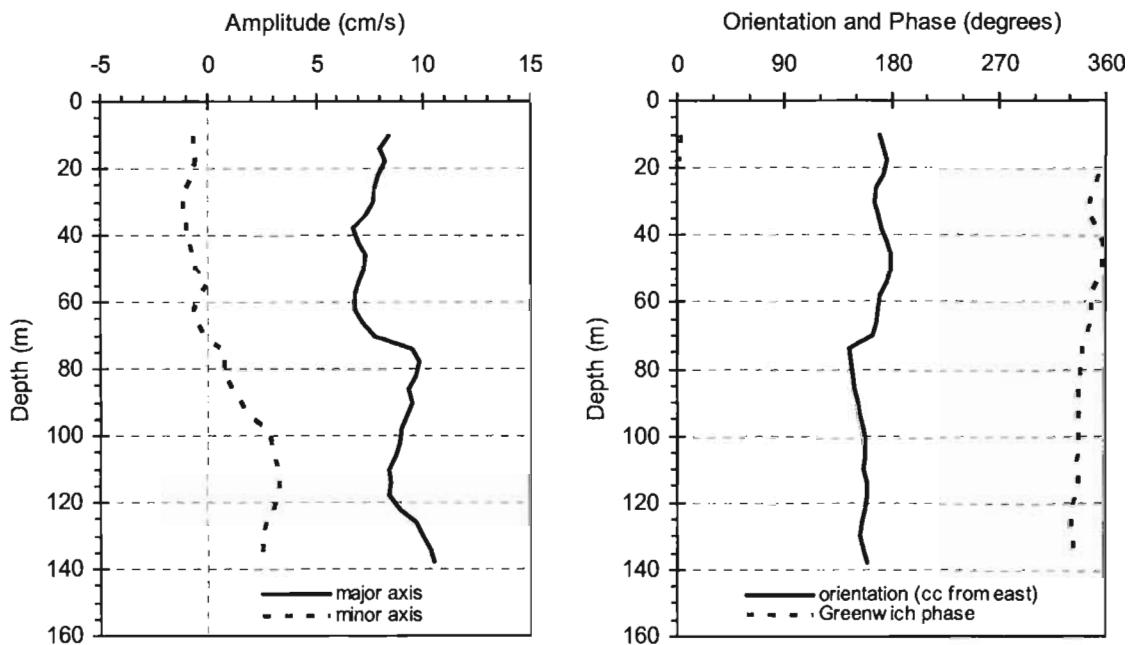


**North Side of Barrow Strait**

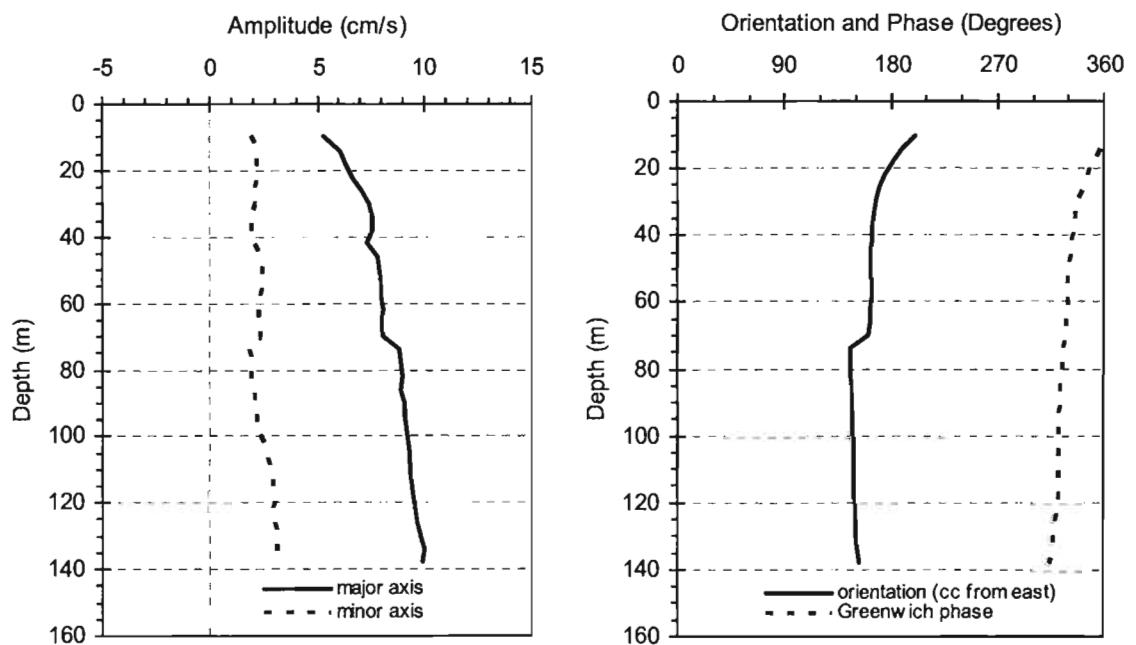


**Figure 40 – K1 Tidal Constituent, South Side of Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 to Oct. 2, 2005):**

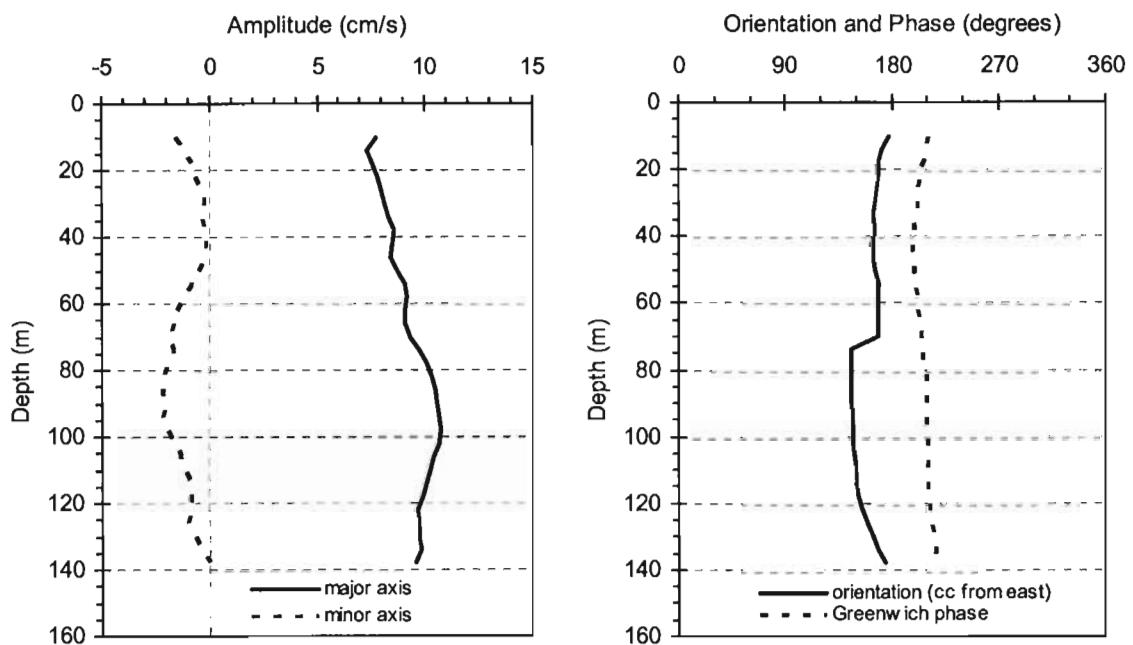


**For Solid Ice Period (Jan. 21, 2006 to Jun 28, 2006):**

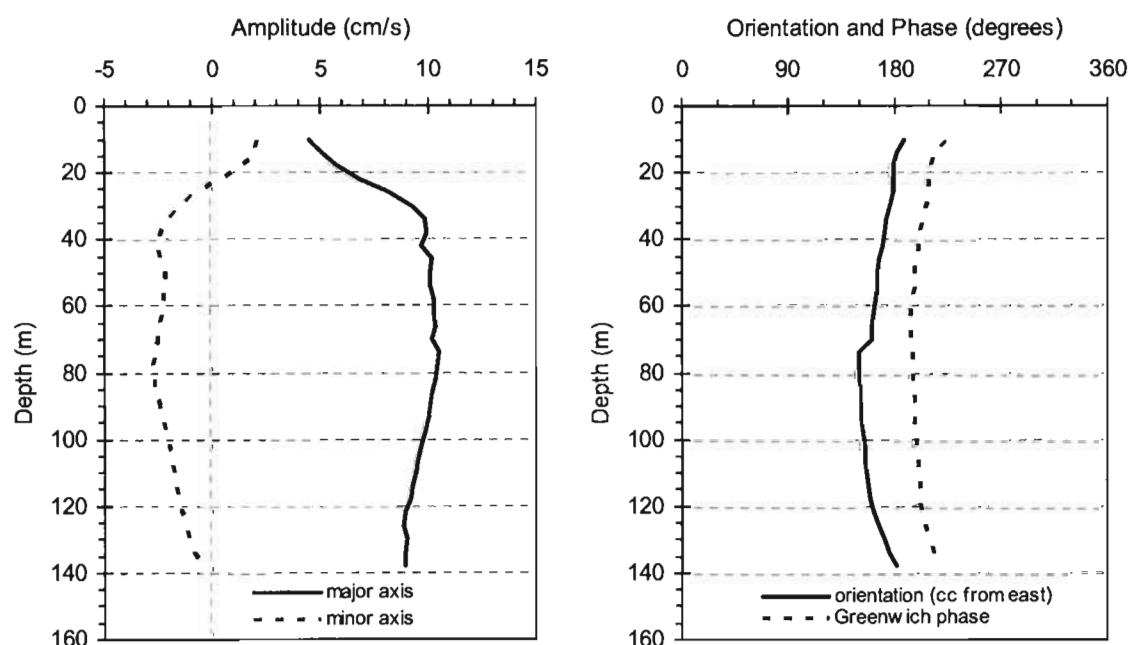


**Figure 41 – M2 Tidal Constituent, South Side of Barrow Strait**

**For Ice Free Period (Aug. 9, 2005 to Oct. 2, 2005):**

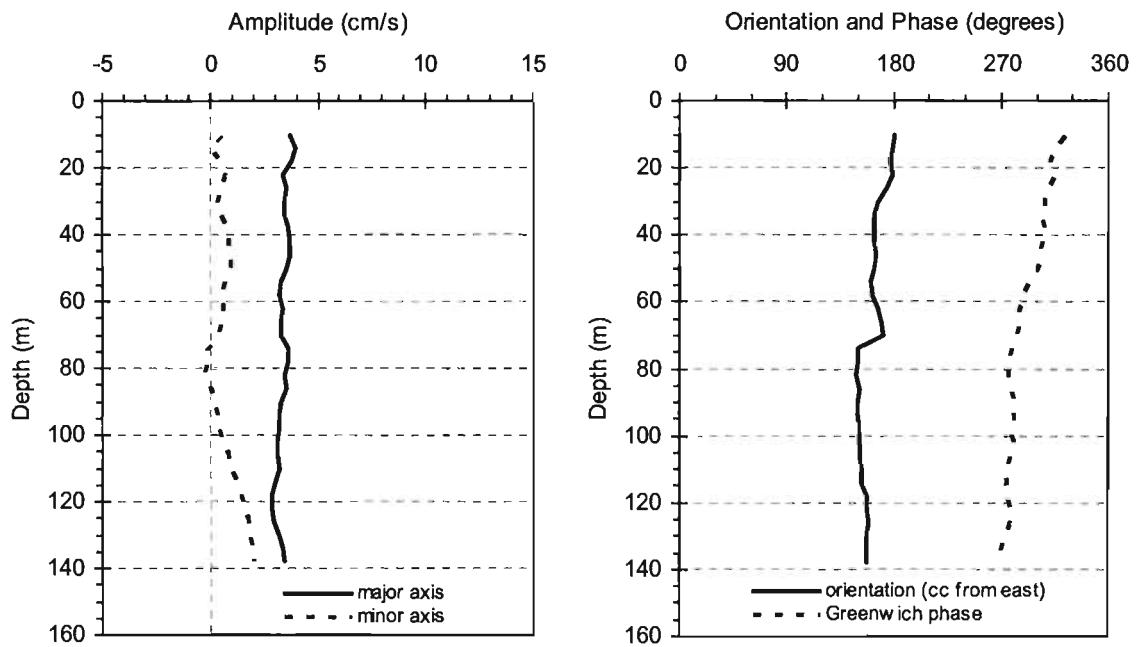


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

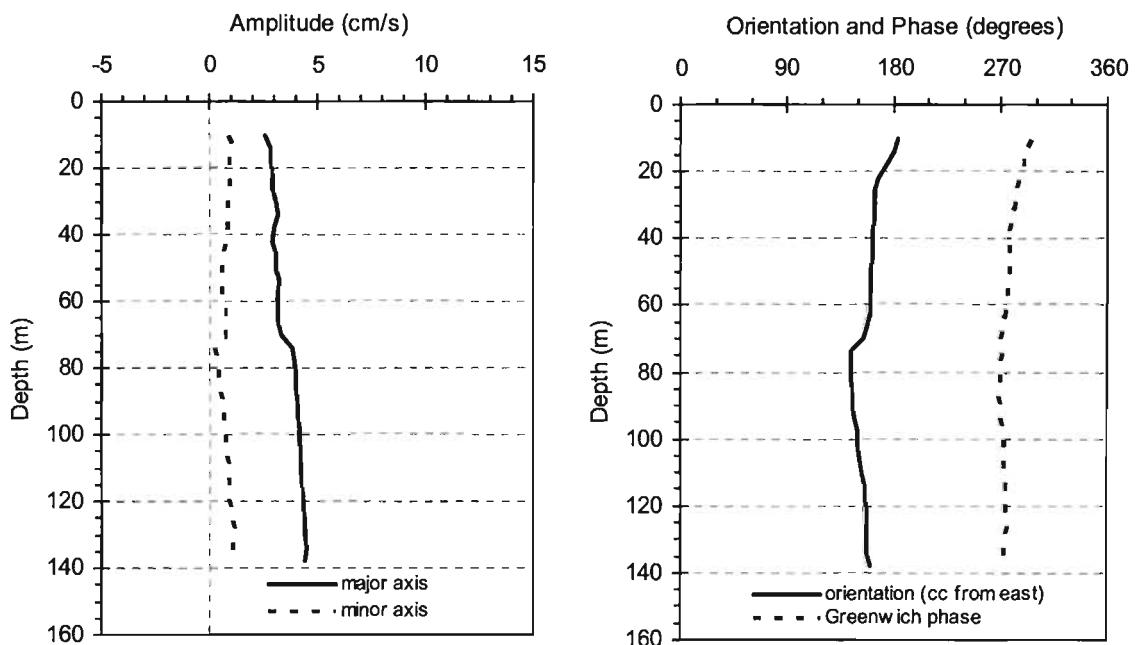


**Figure 42 – O1 Tidal Constituent, South Side of Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 to Oct. 2, 2005):**

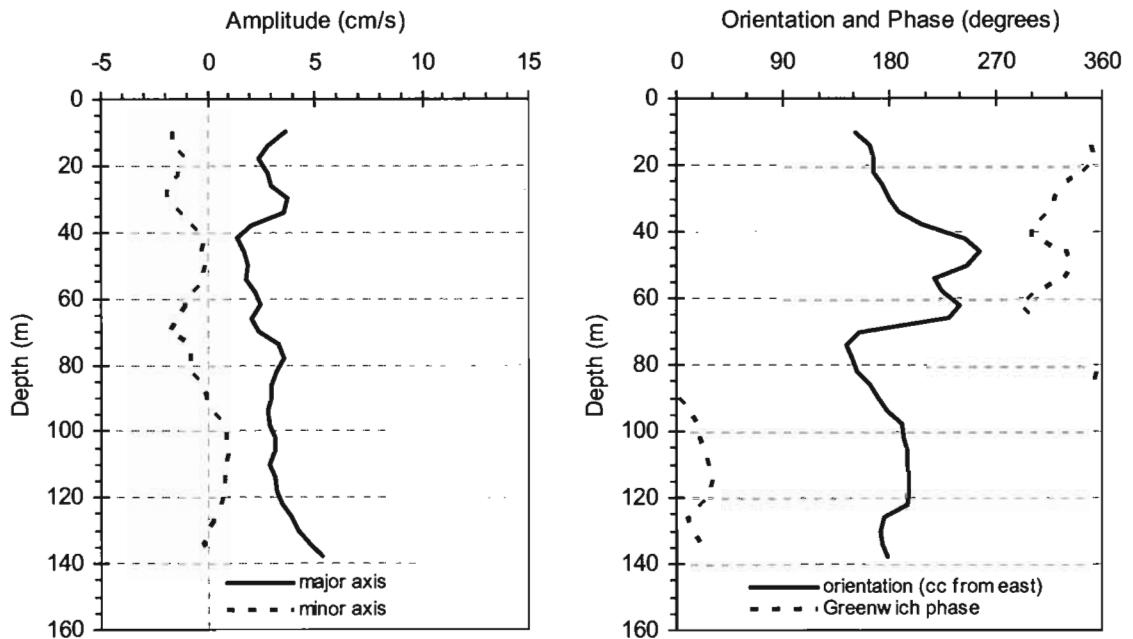


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

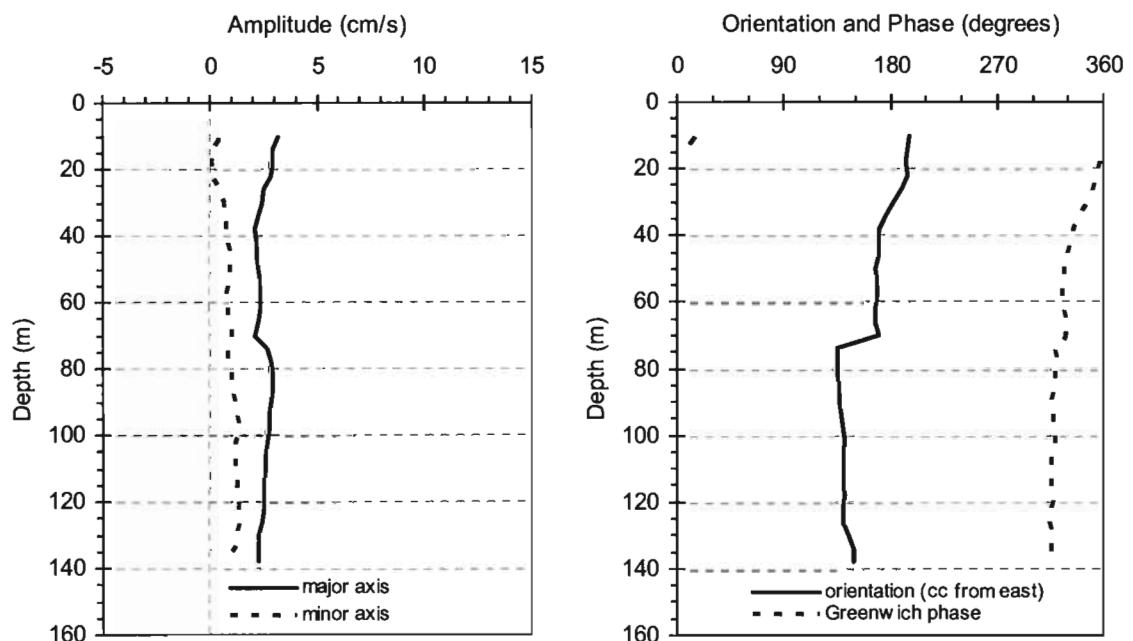


**Figure 43 – P1 Tidal Constituent, South Side of Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 to Oct. 2, 2005):**

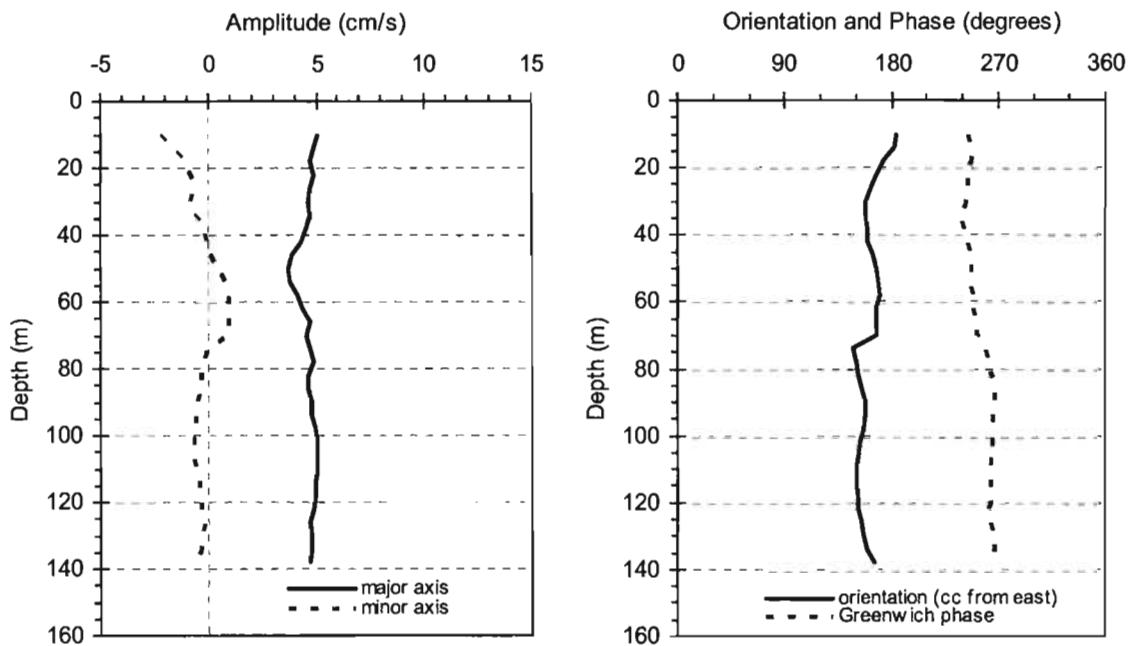


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

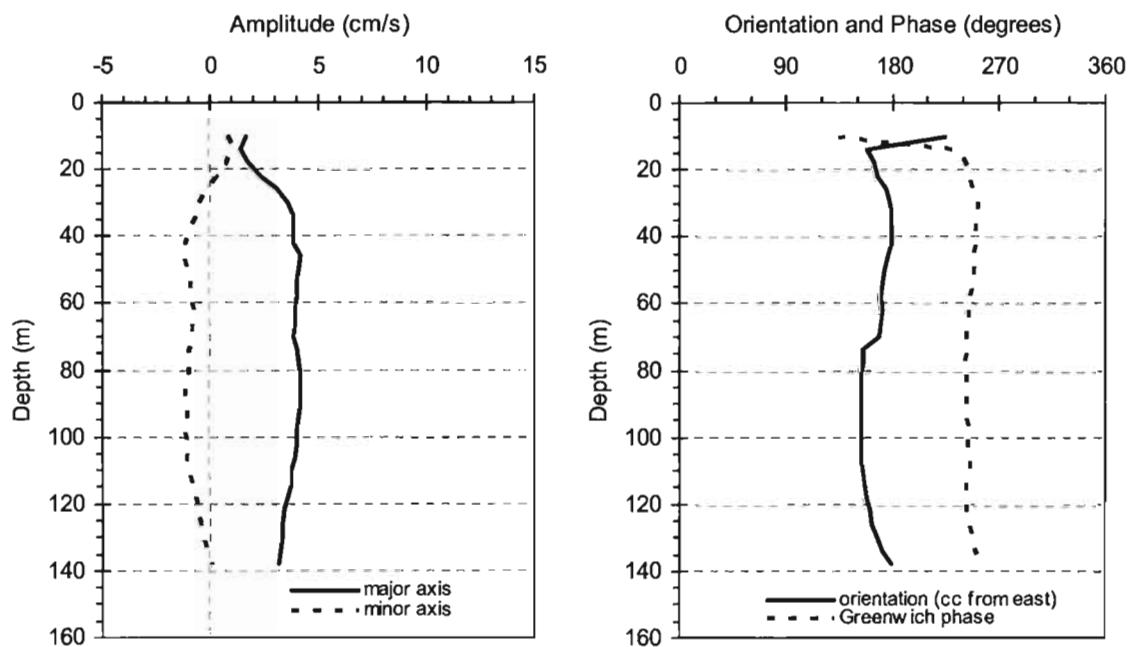


**Figure 44 – S2 Tidal Constituent, South Side of Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 to Oct. 02, 2005):**

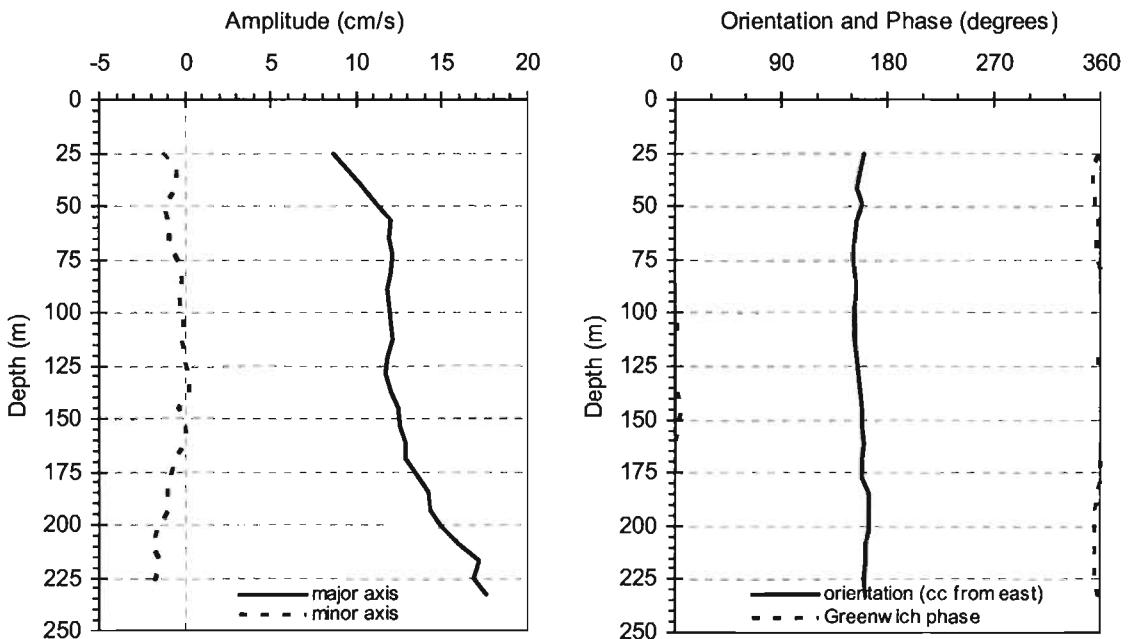


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

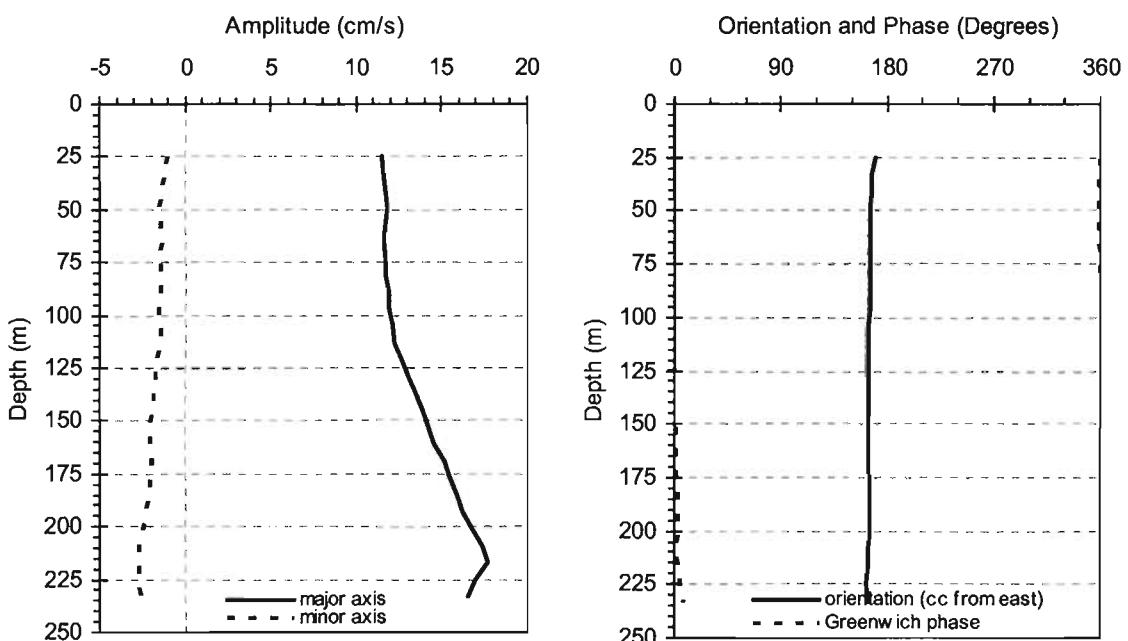


**Figure 45 - K1 Tidal Constituent, South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 02, 2005):**

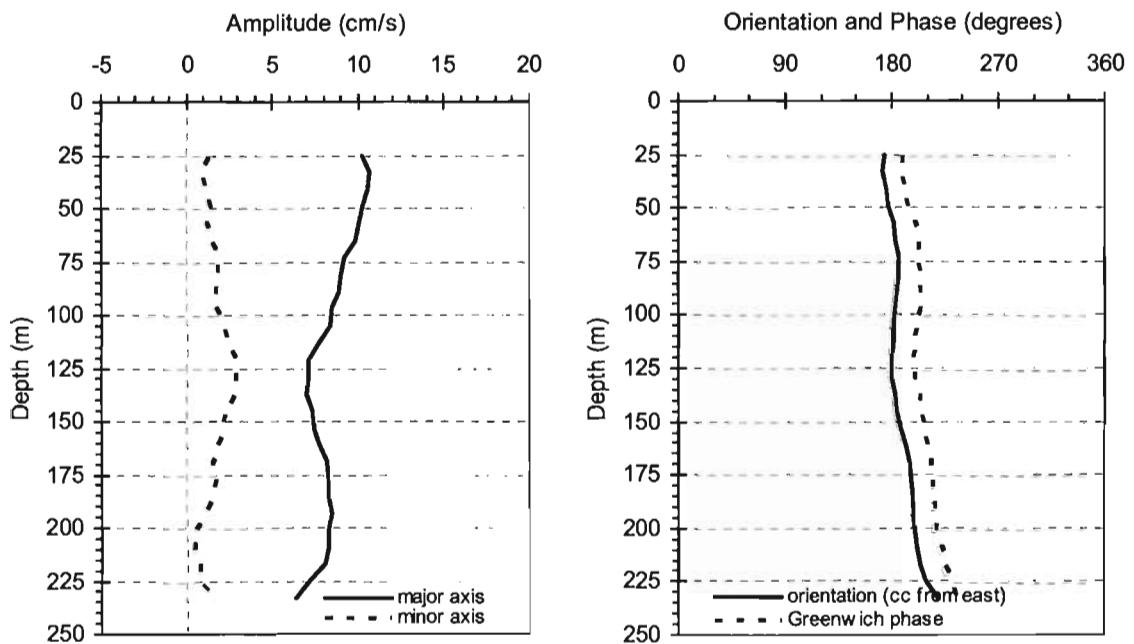


**For Solid Ice Period (Jan. 21, 2006 to Jun 28, 2006):**

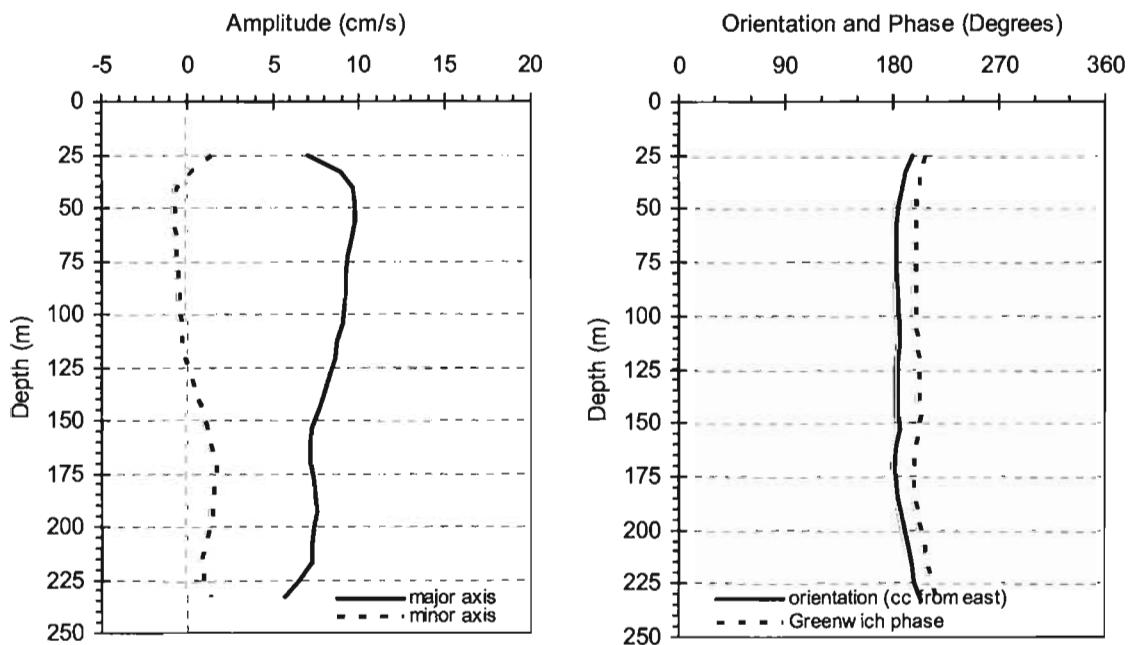


**Figure 46 – M2 Tidal Constituent, South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 02, 2005):**

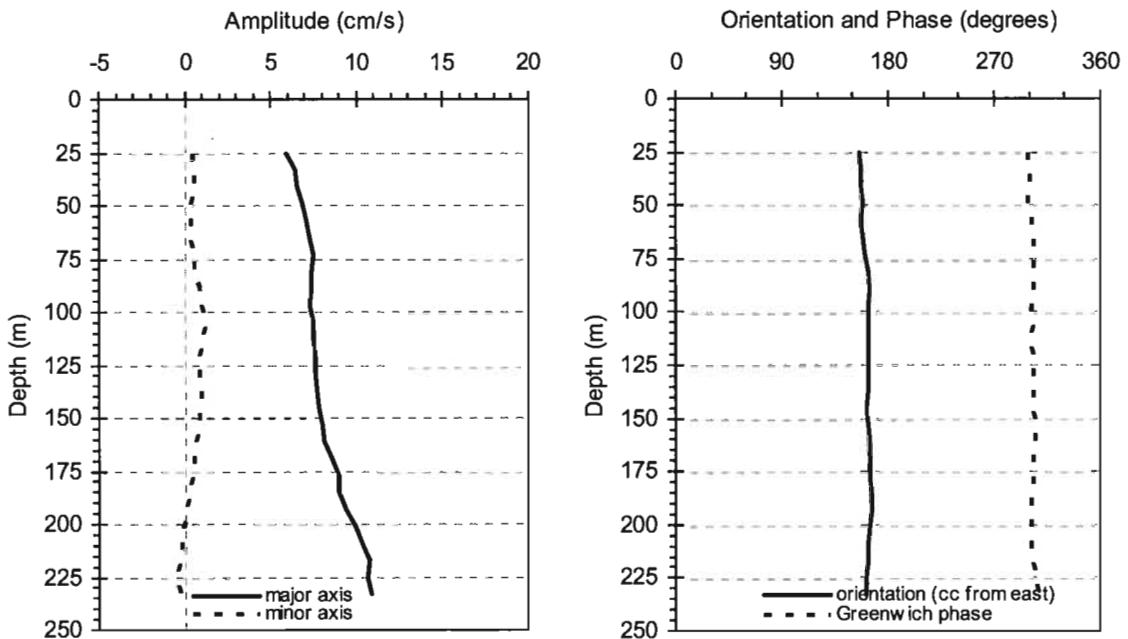


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

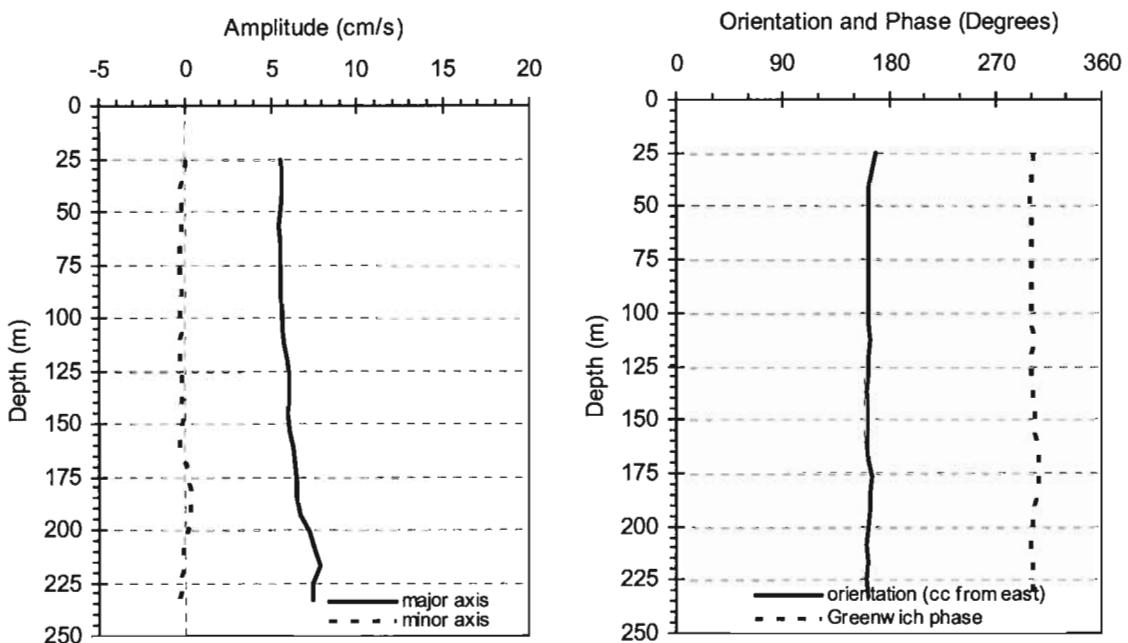


**Figure 47 – O1 Tidal Constituent, South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 02, 2005):**

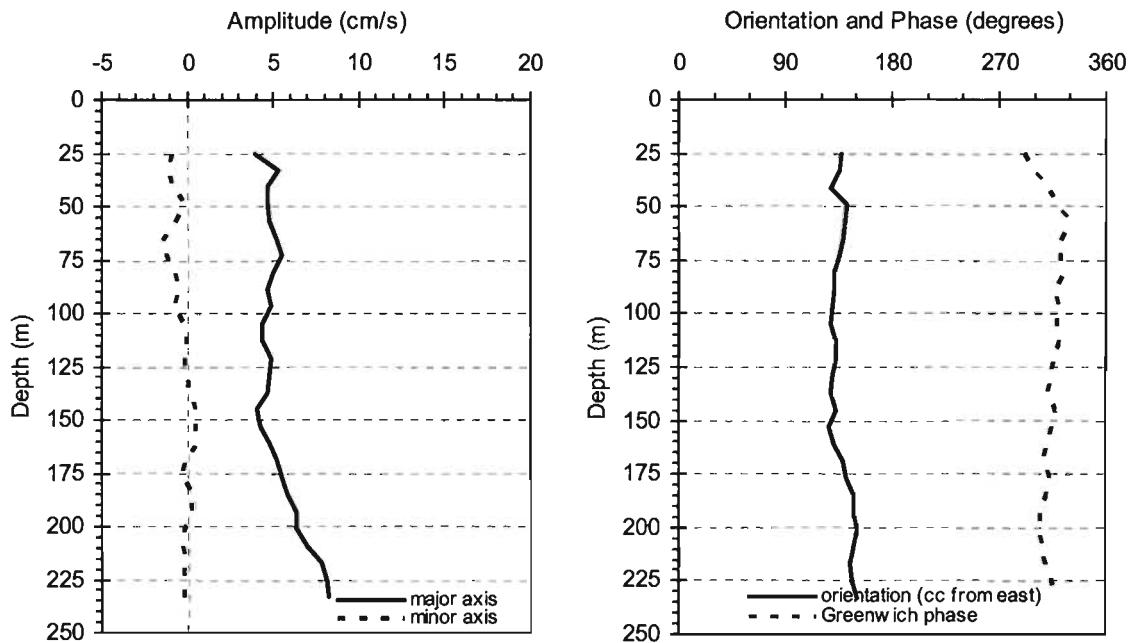


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

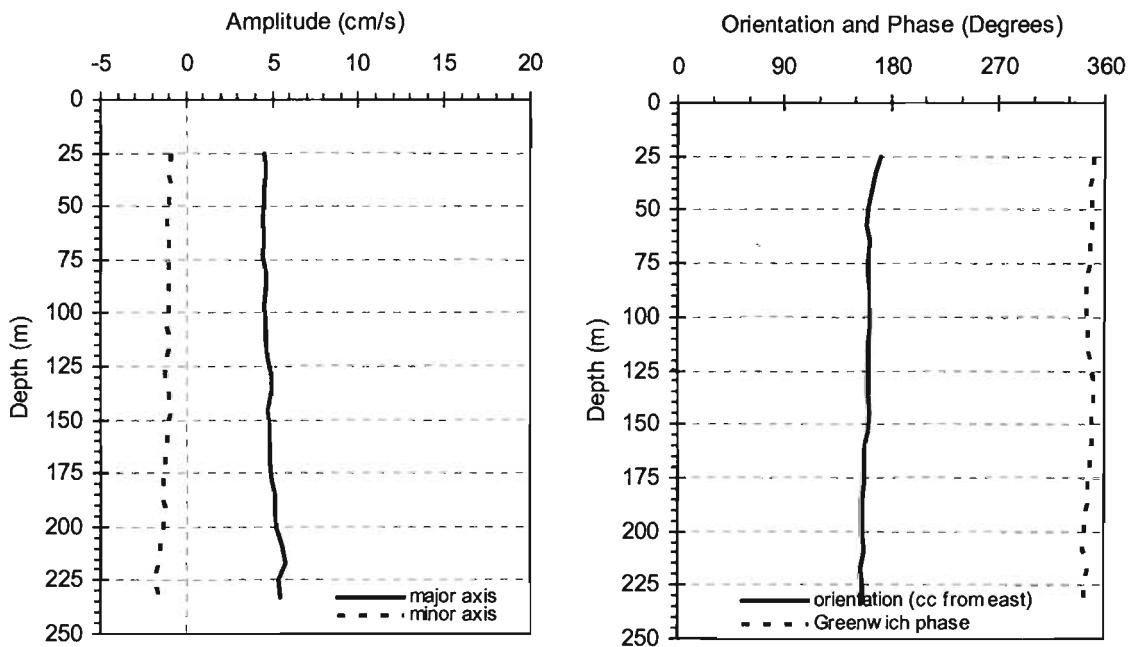


**Figure 48 – P1 Tidal Constituent, South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 2, 2005):**

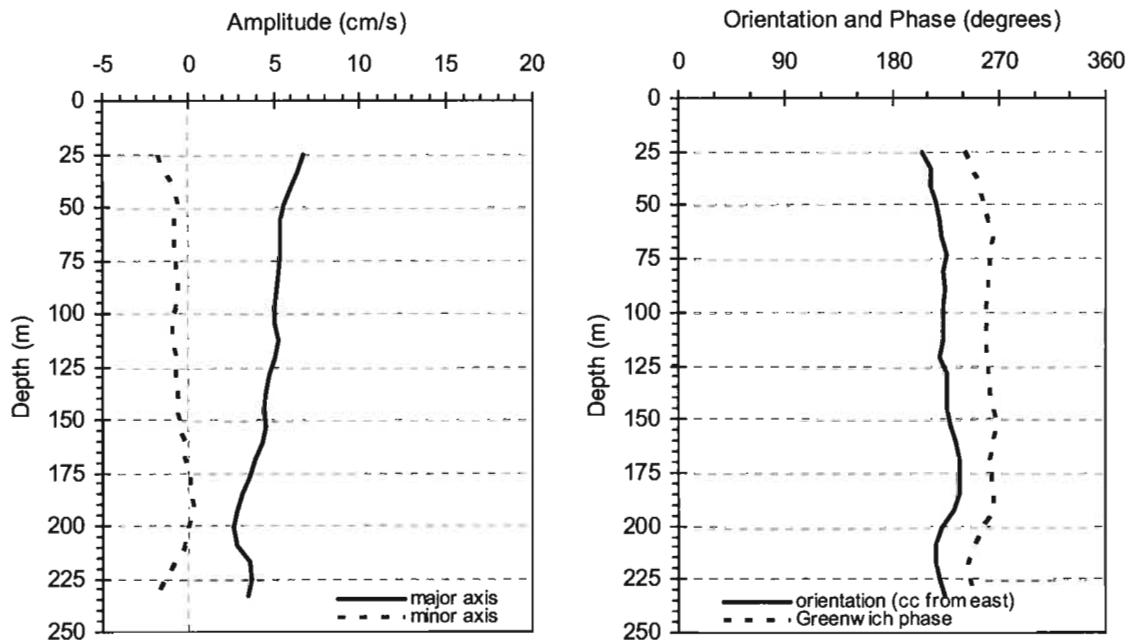


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

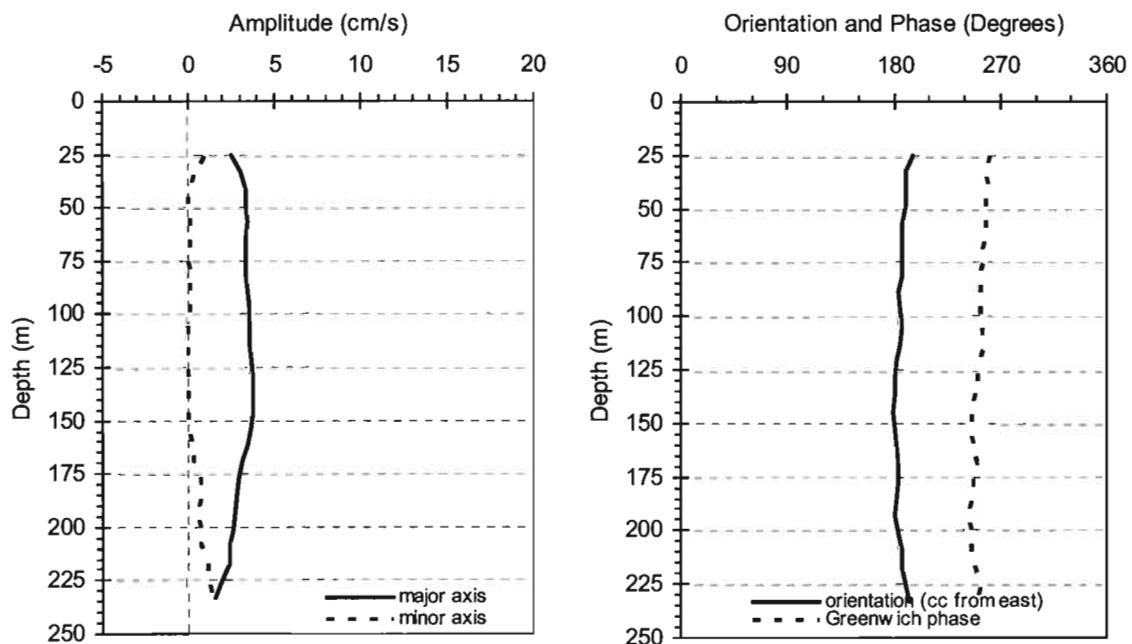


**Figure 49 – S2 Tidal Constituent, South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 02, 2005):**

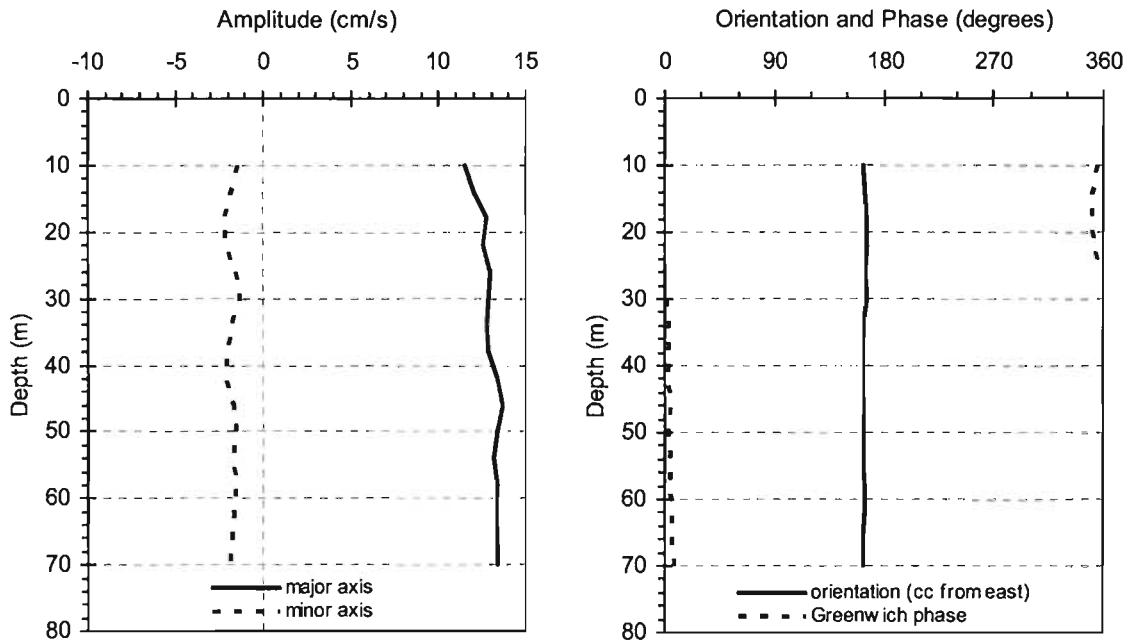


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

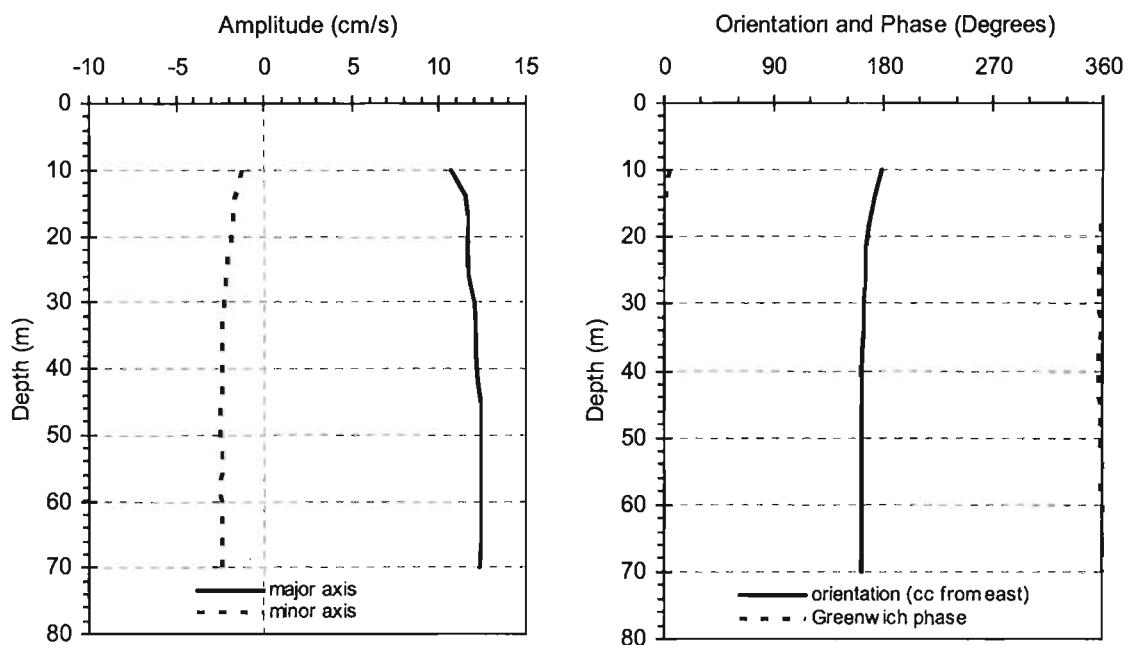


**Figure 50 – K1 Tidal Constituent, Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

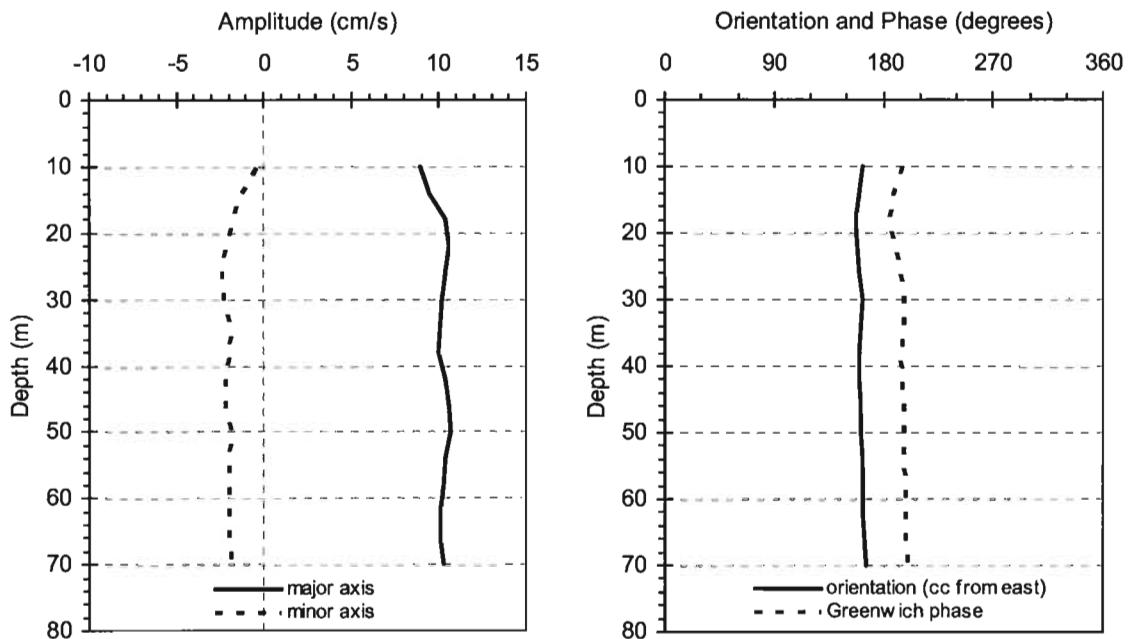


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

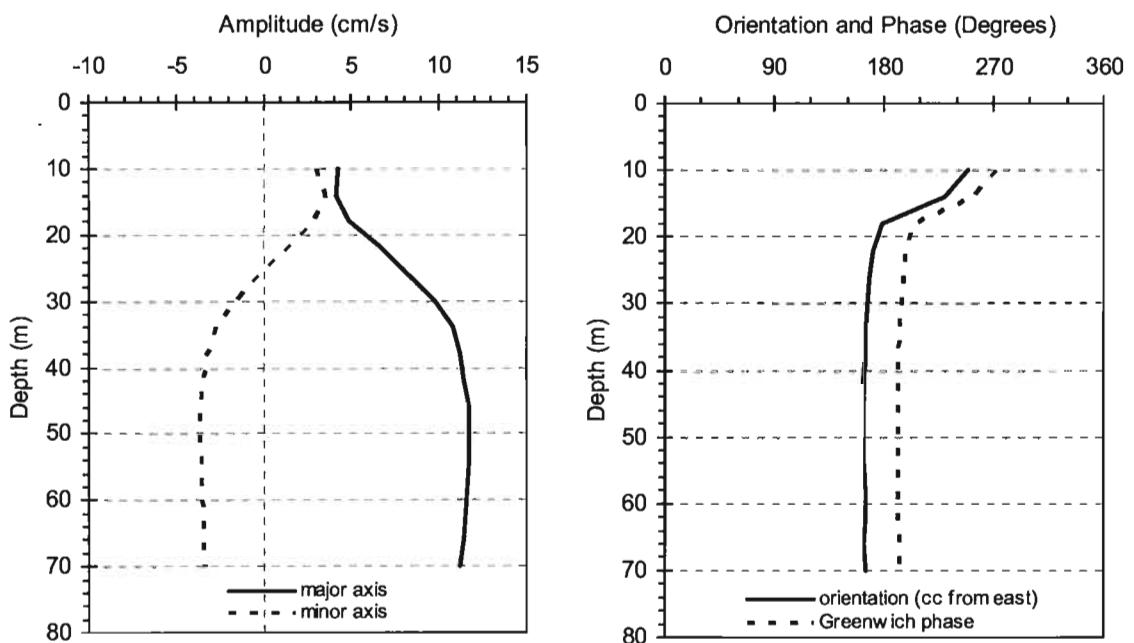


**Figure 51 – M2 Tidal Constituent, Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

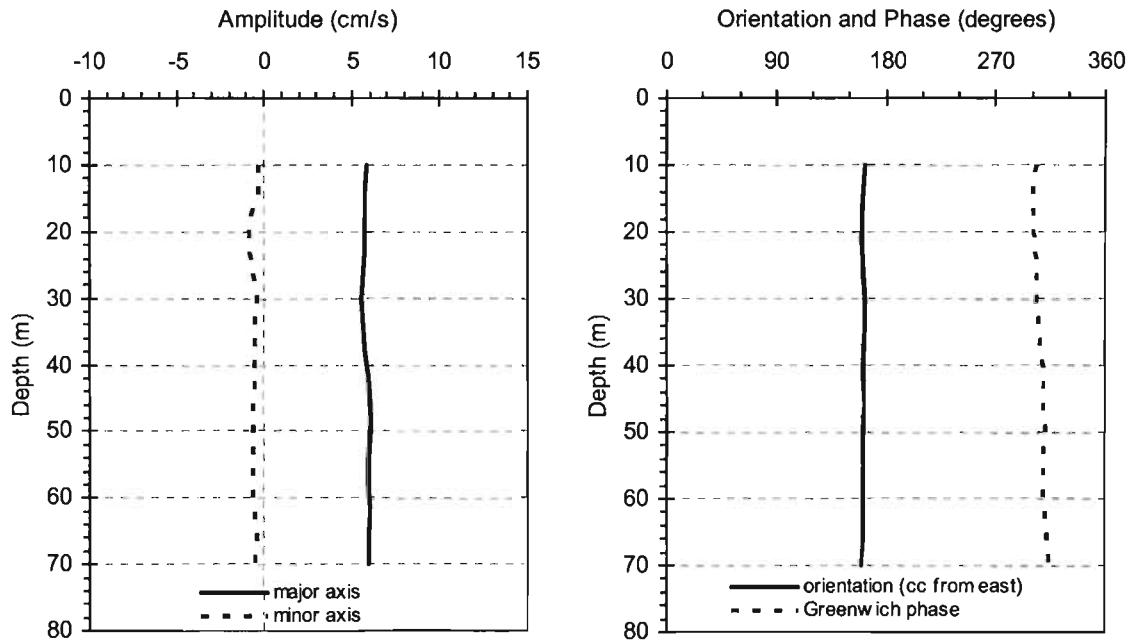


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

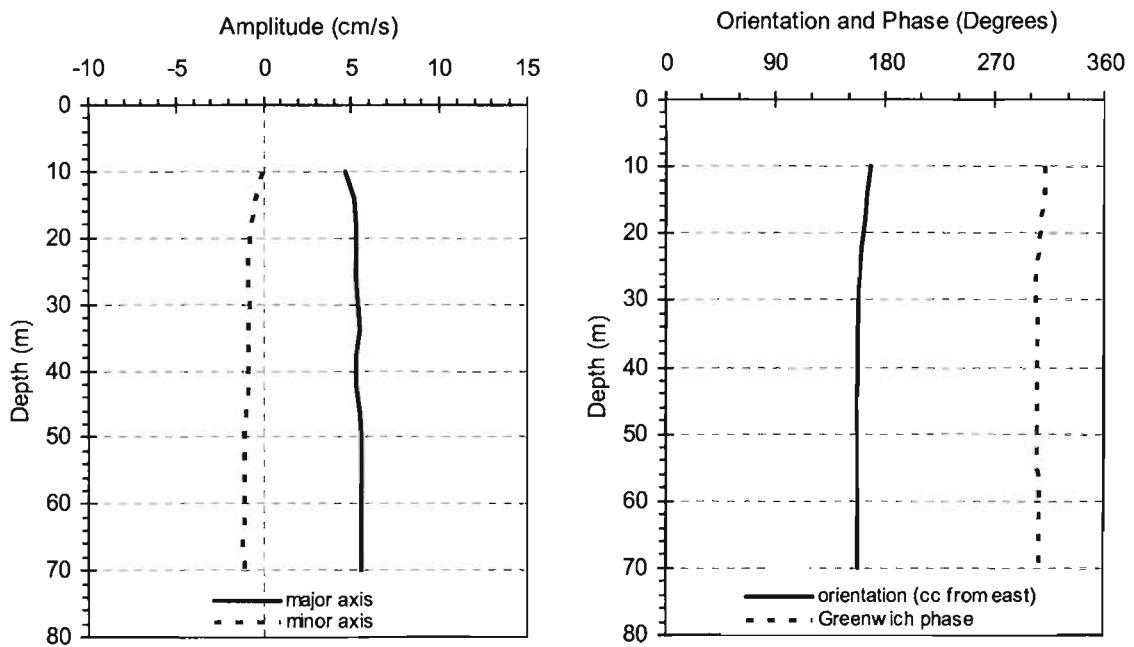


**Figure 52 – O1 Tidal Constituent, Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

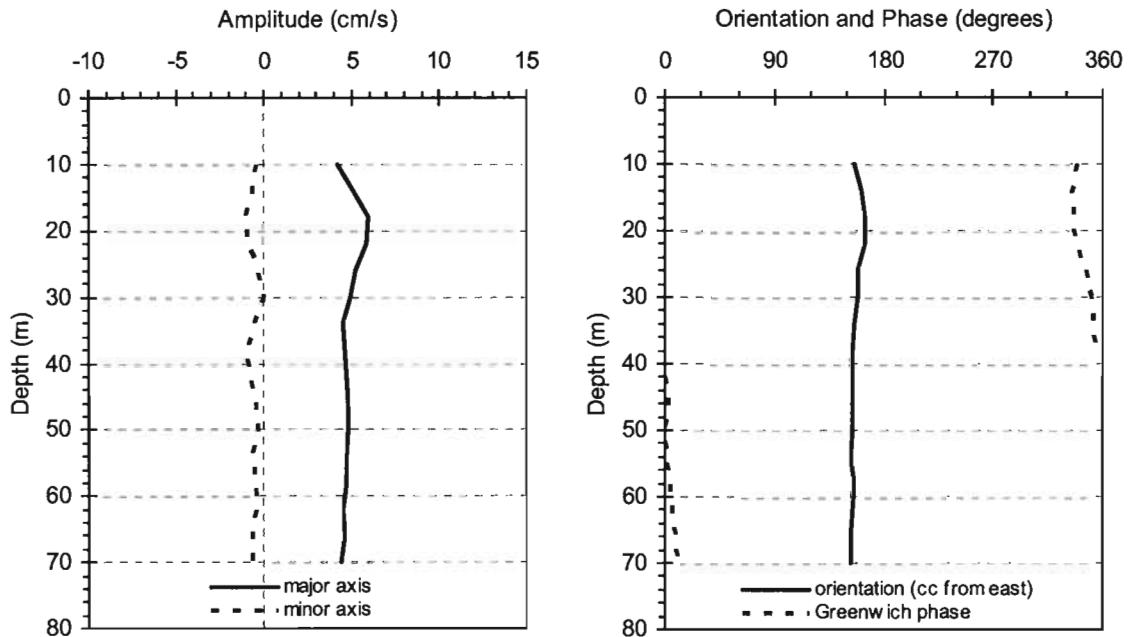


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

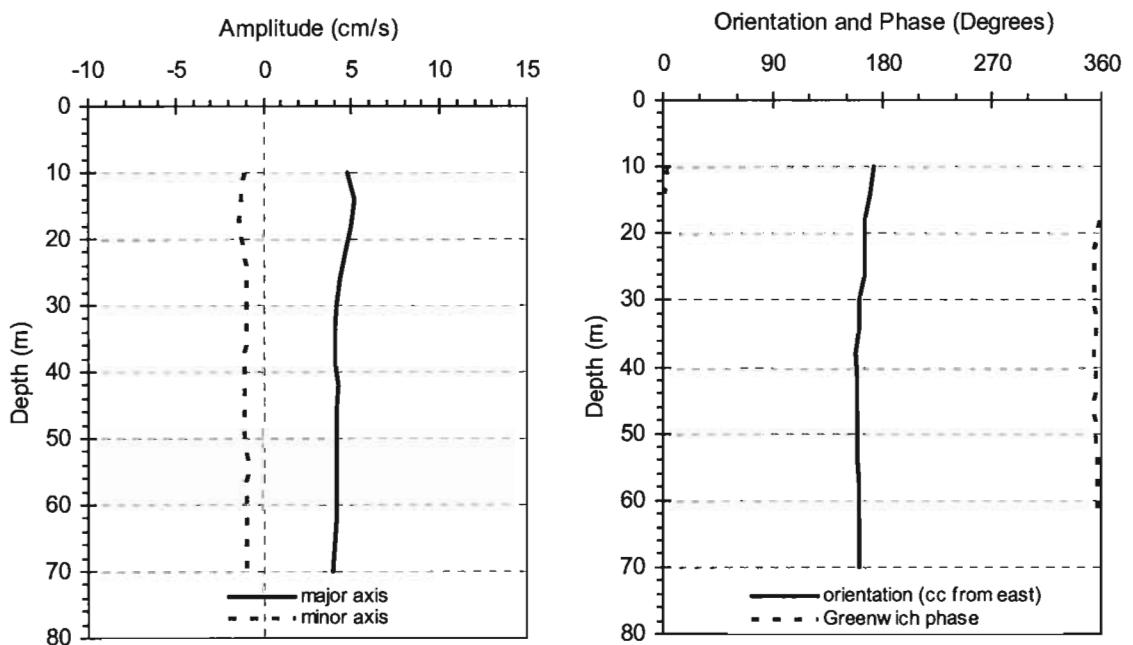


**Figure 53 – P1 Tidal Constituent, Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

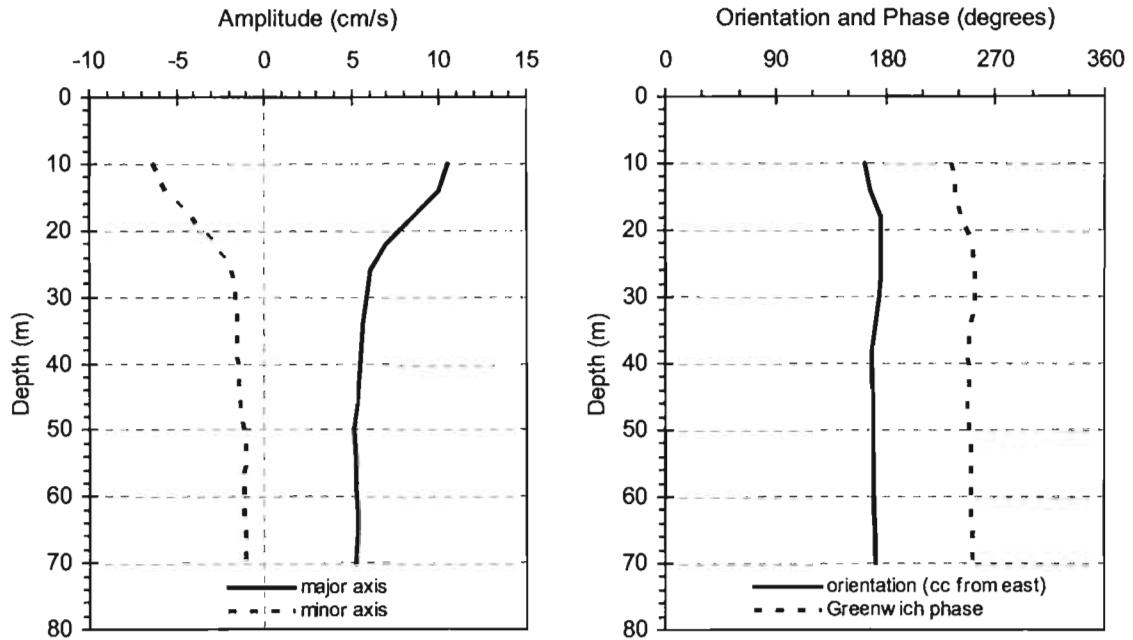


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

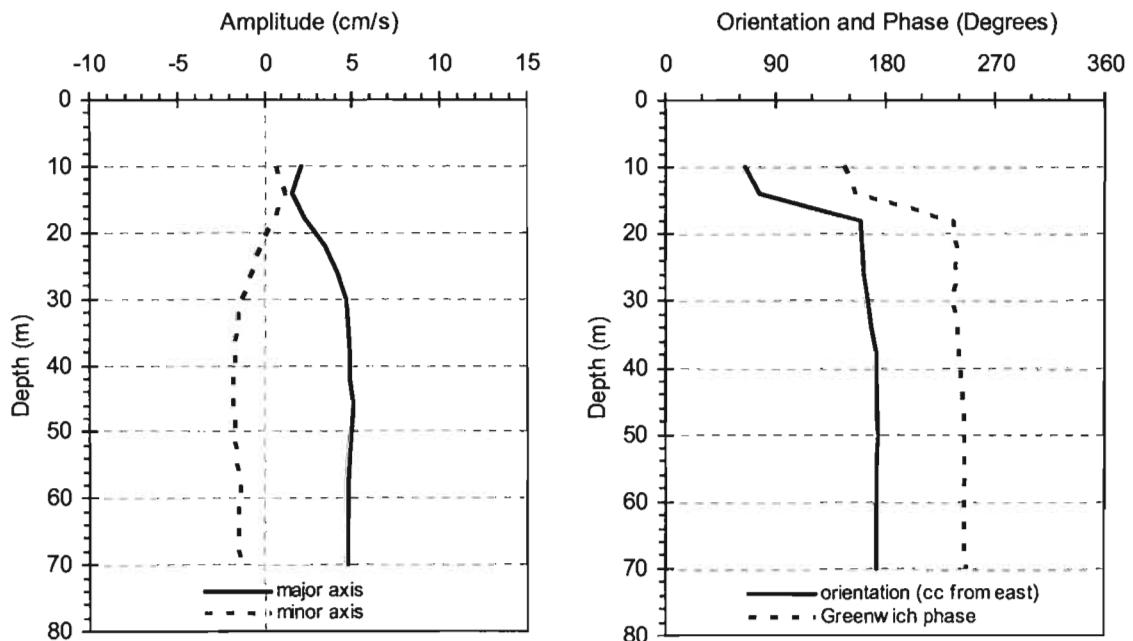


**Figure 54 – S2 Tidal Constituent, Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

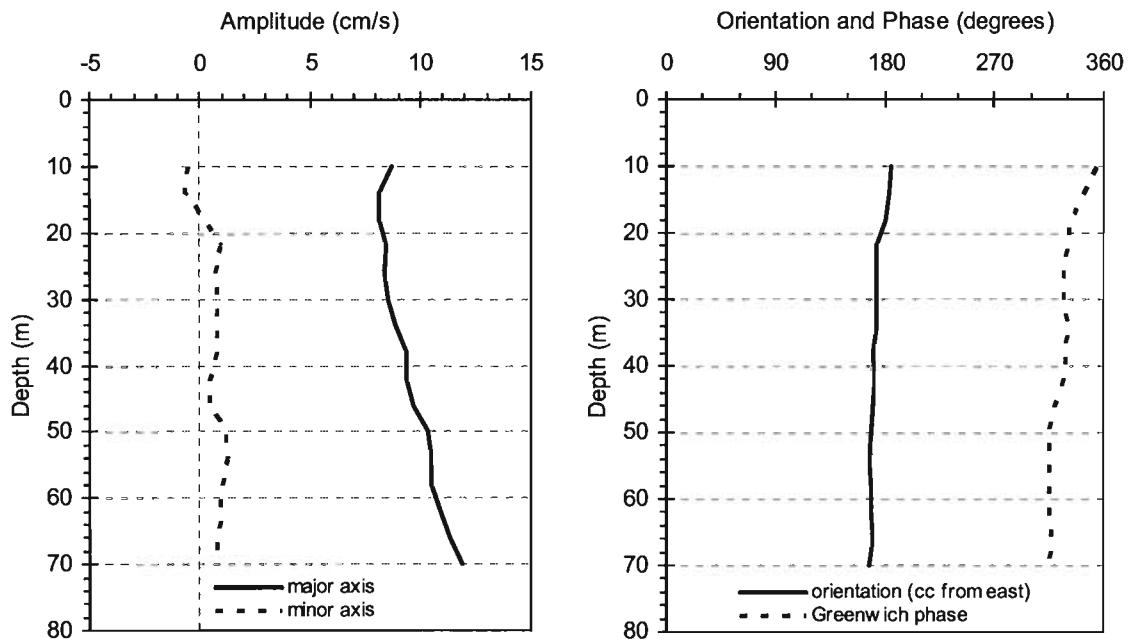


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

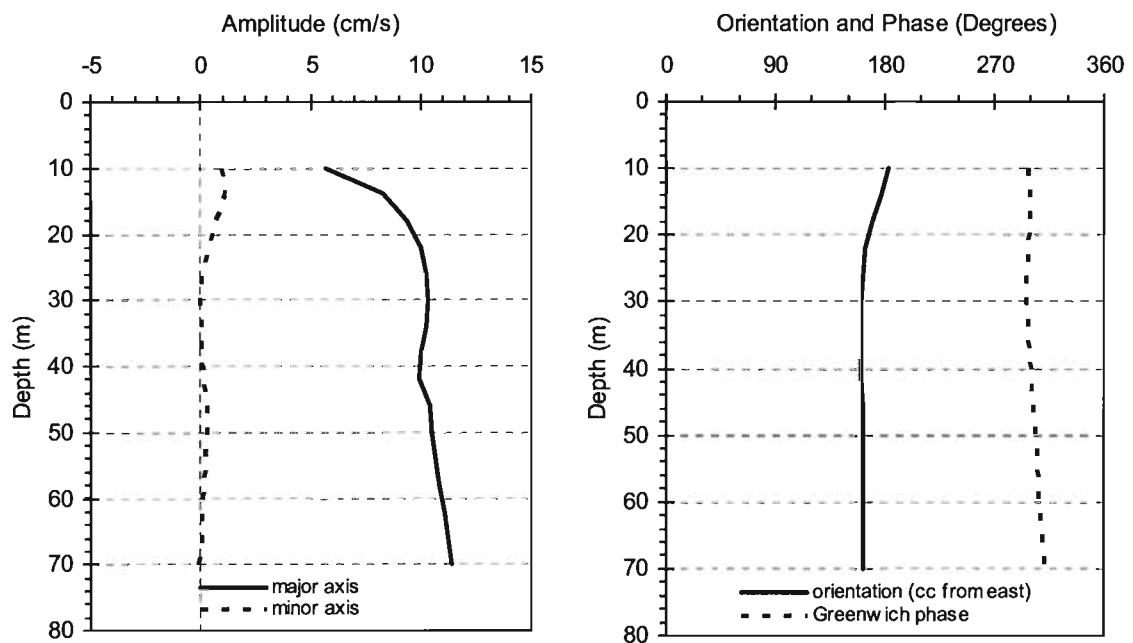


**Figure 55 – K1 Tidal Constituent, North Side of Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

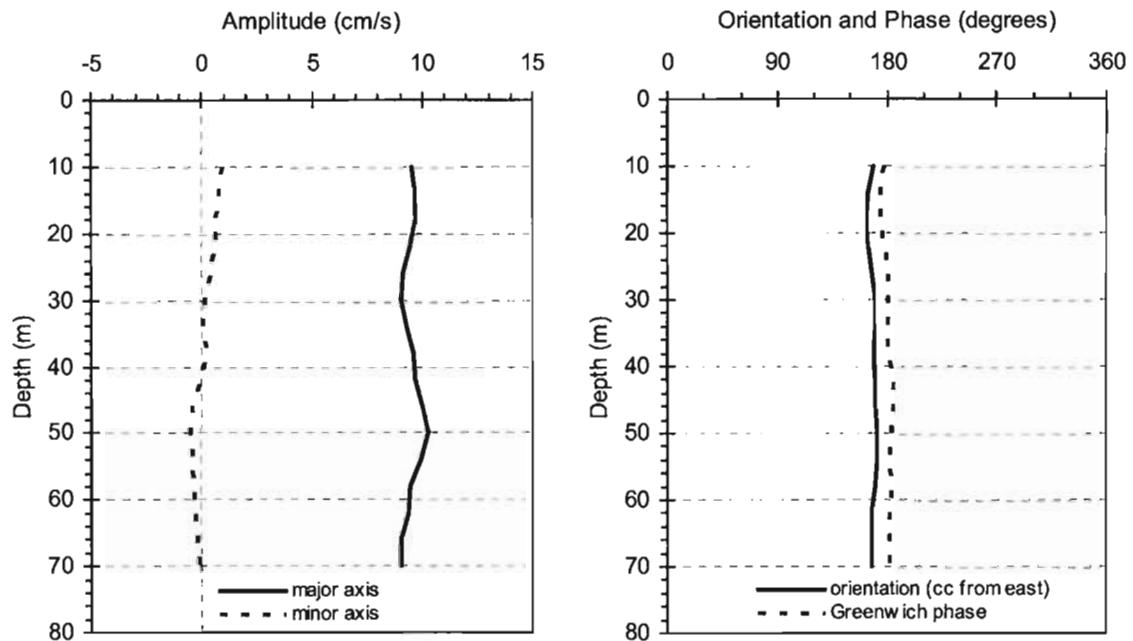


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

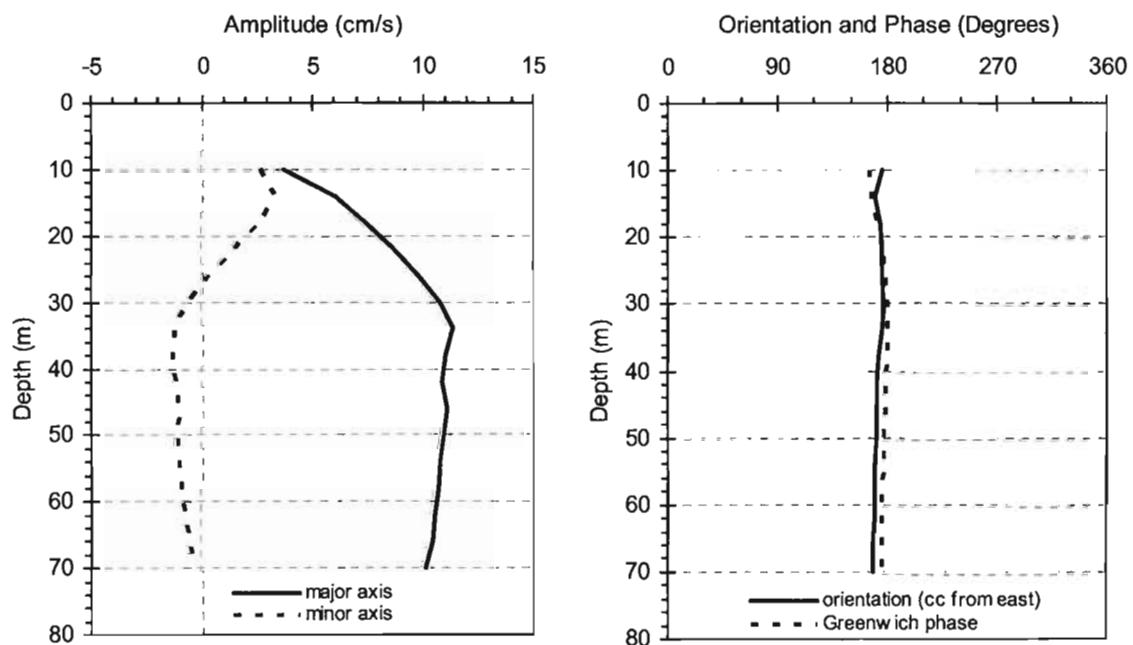


**Figure 56– M2 Tidal Constituent, North Side of Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 6, 2005):**

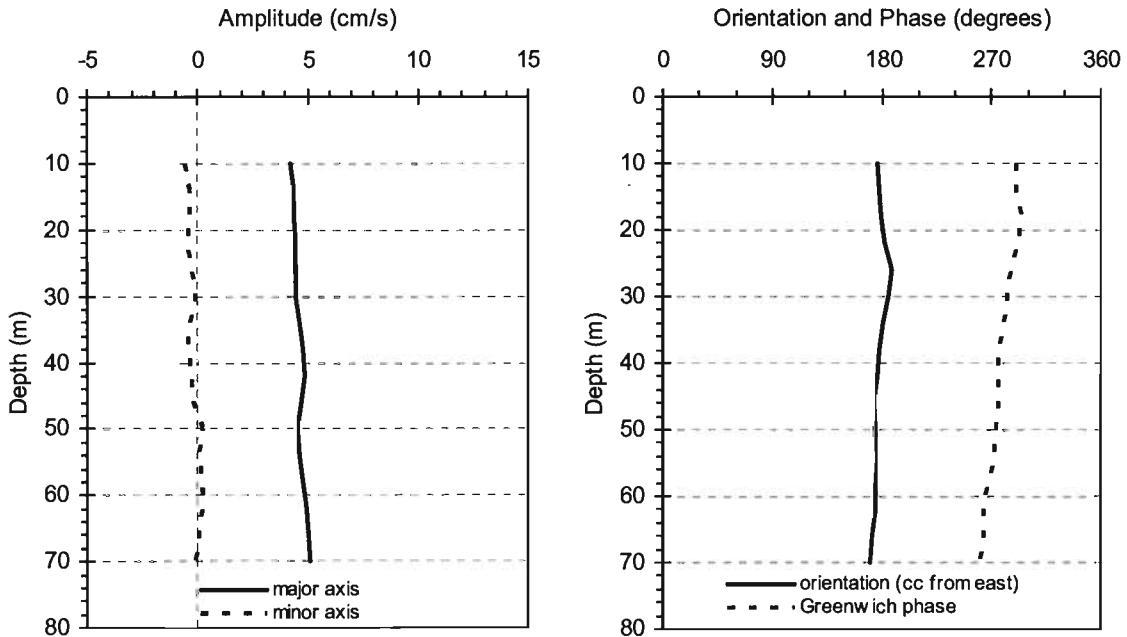


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

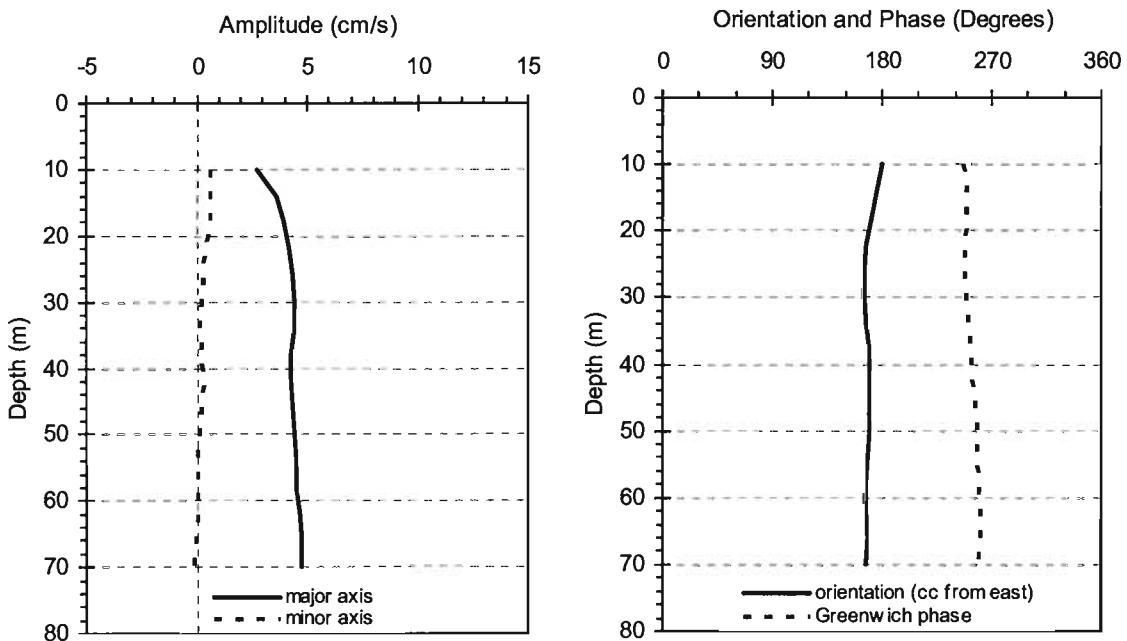


**Figure 57 – O1 Tidal Constituent, North Side of Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**

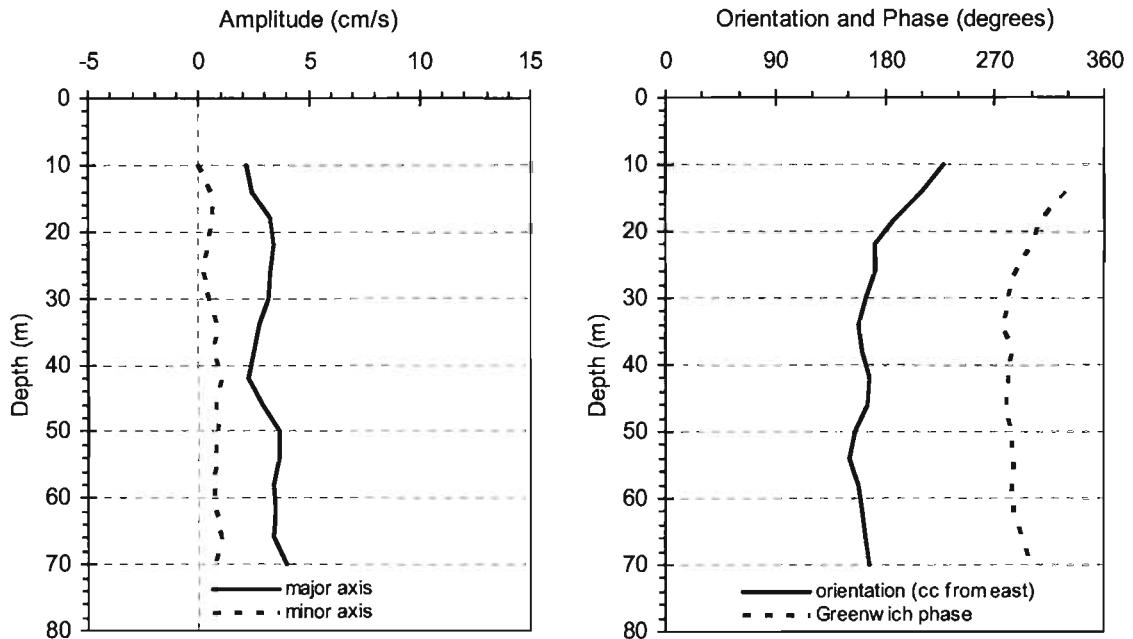


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

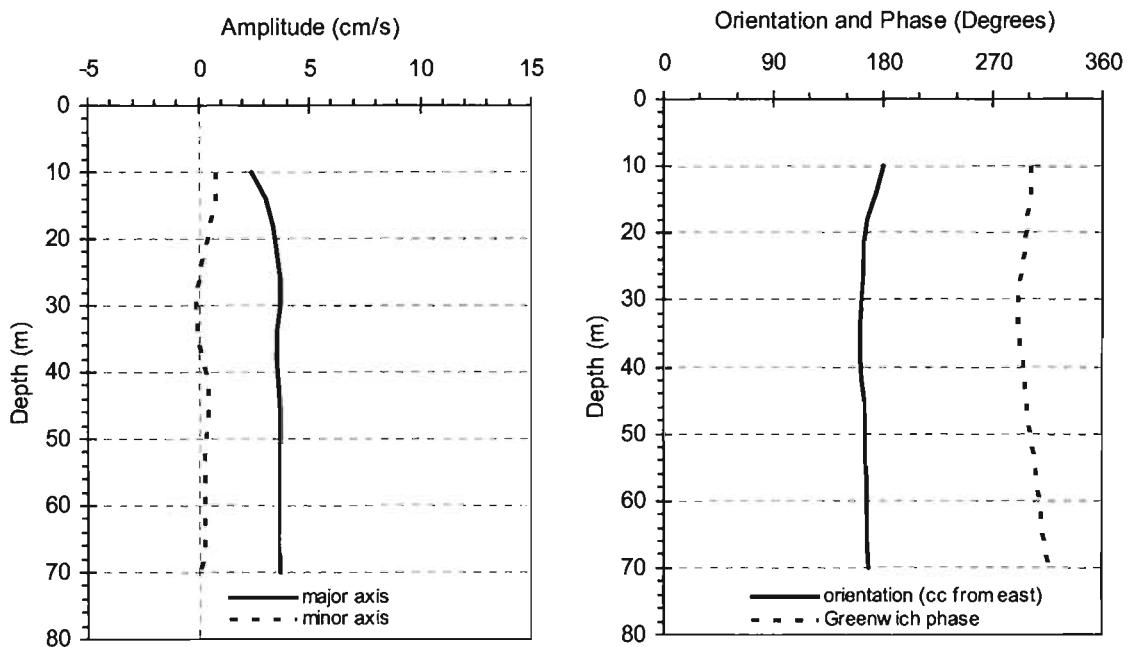


**Figure 58 – P1 Tidal Constituent, North Side of Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 to Oct. 6, 2005):**

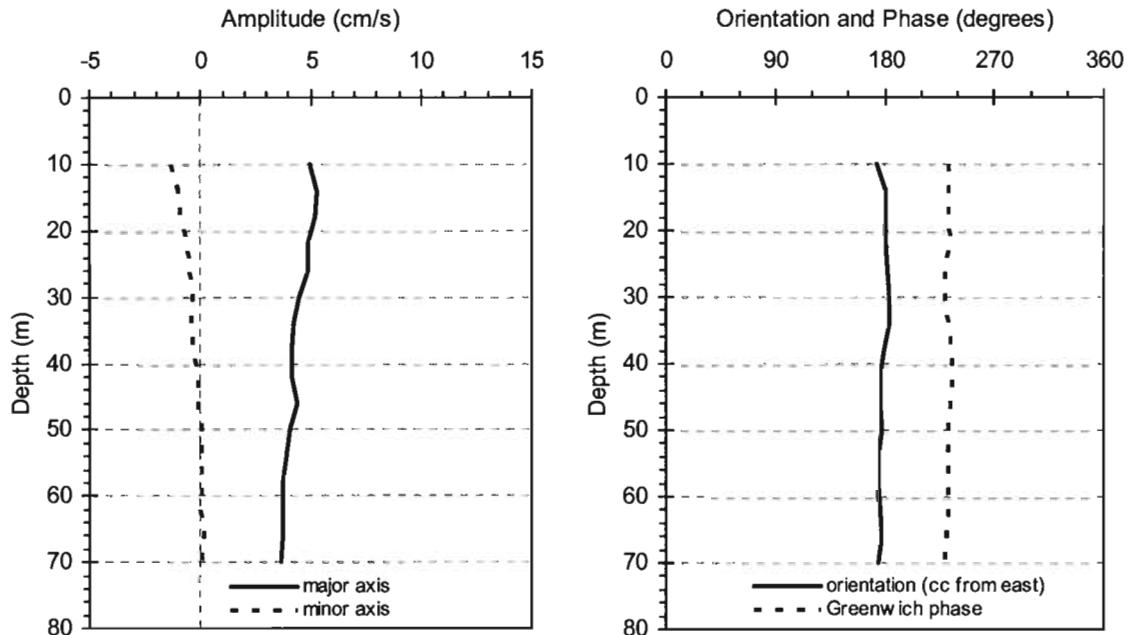


**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

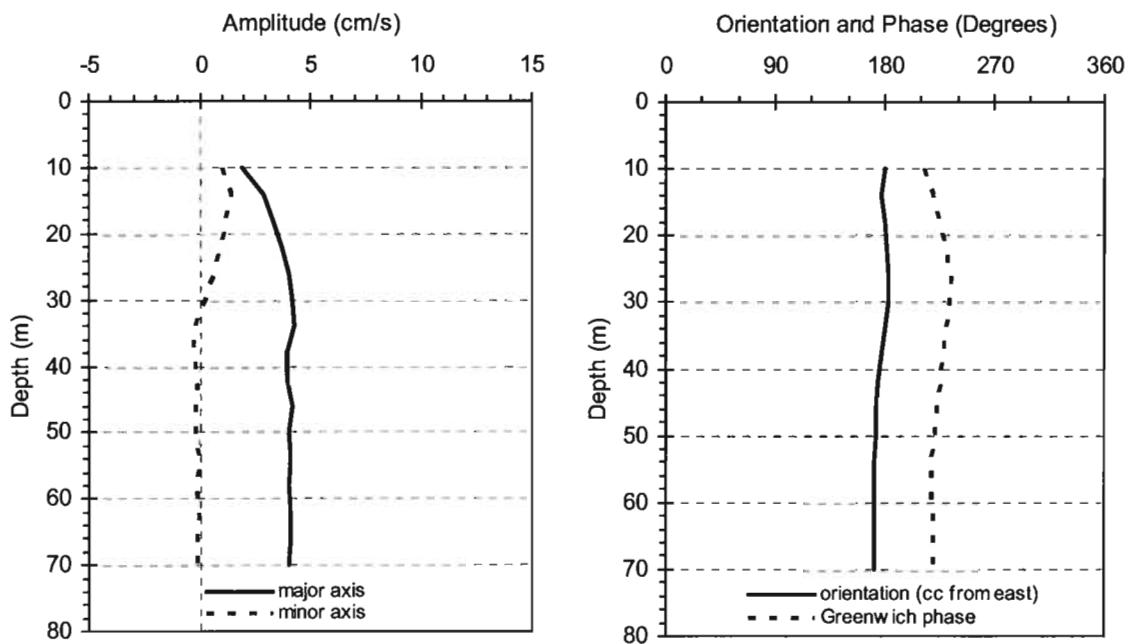


**Figure 59 – S2 Tidal Constituent, North Side of Barrow Strait**

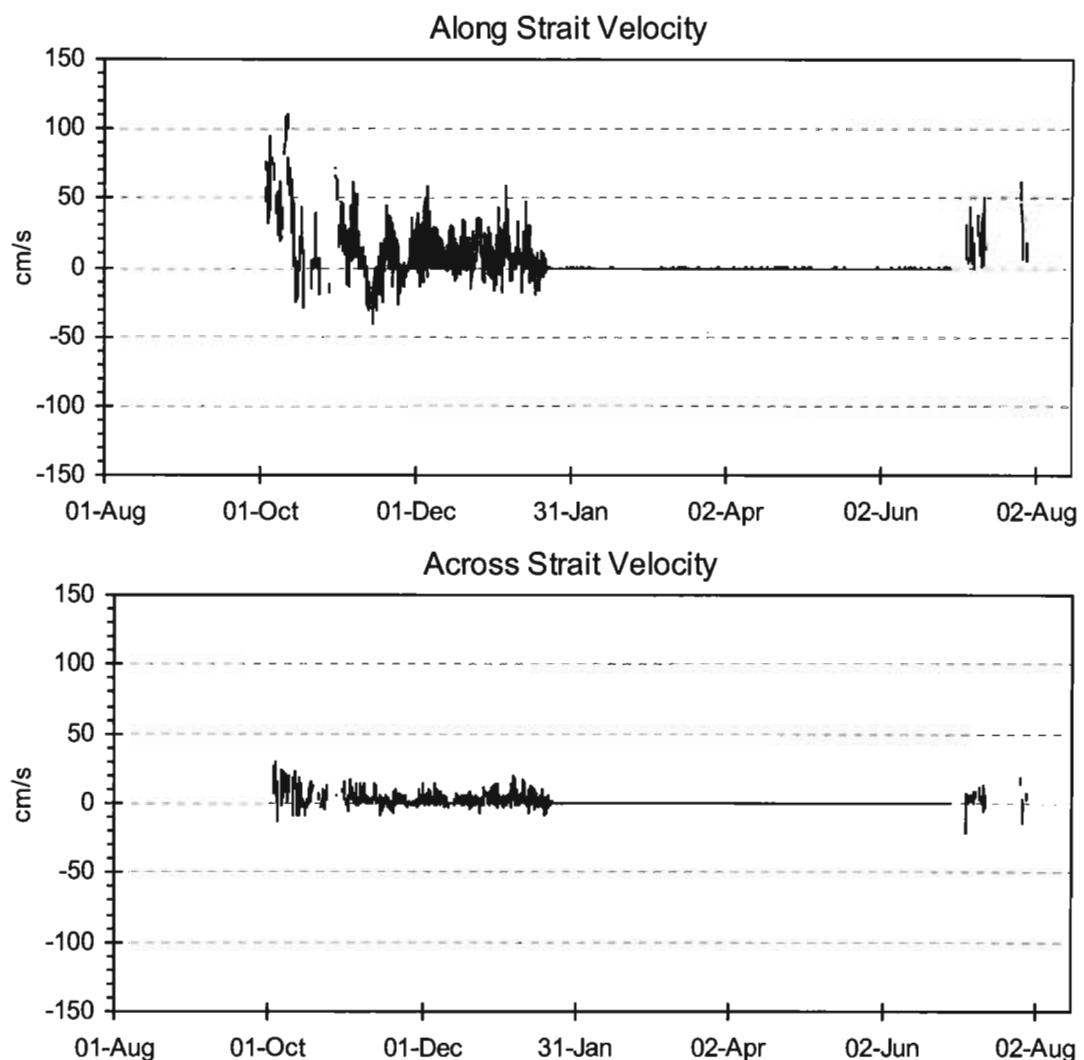
**For Ice Free Period (Aug. 10, 2005 to Oct. 06, 2005):**



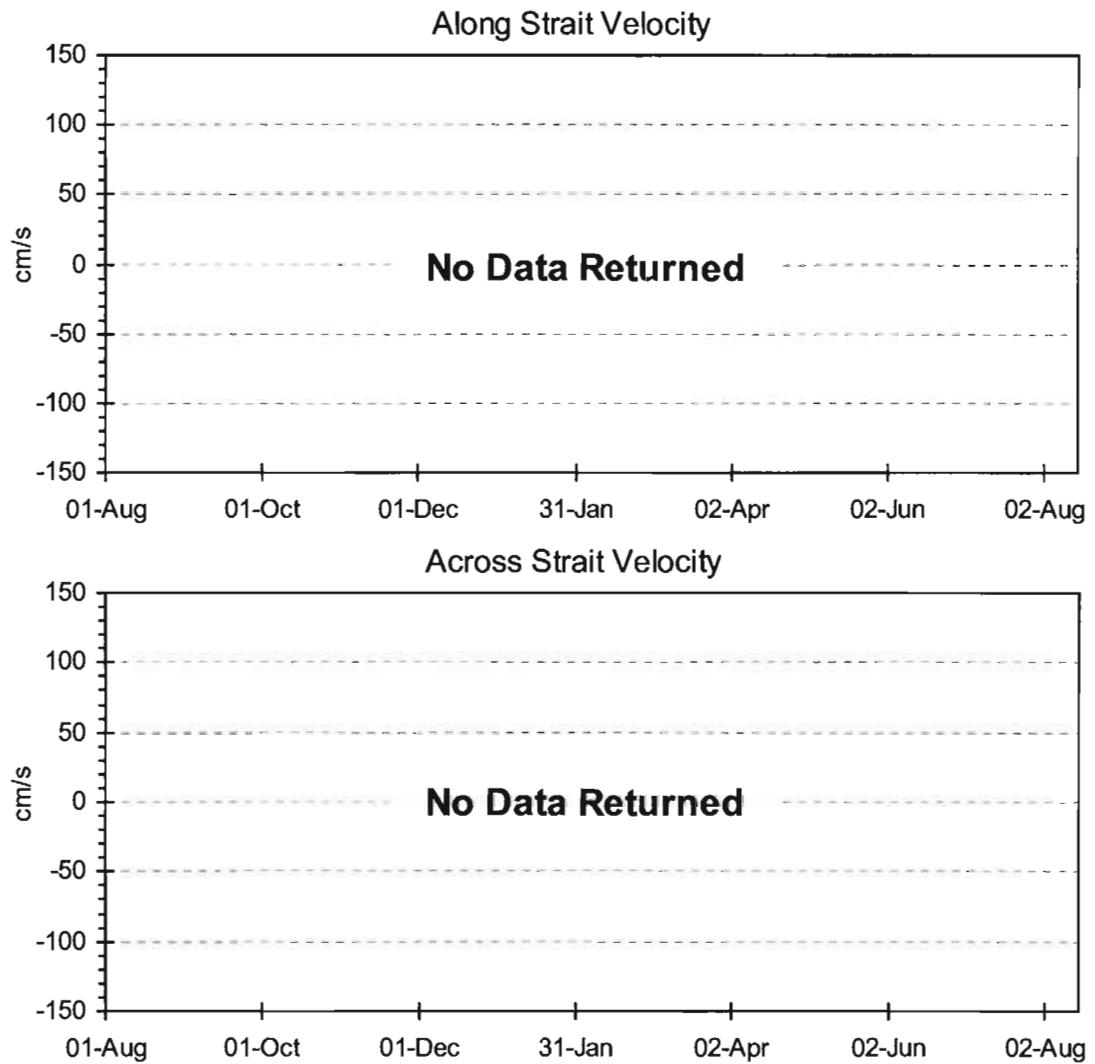
**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**



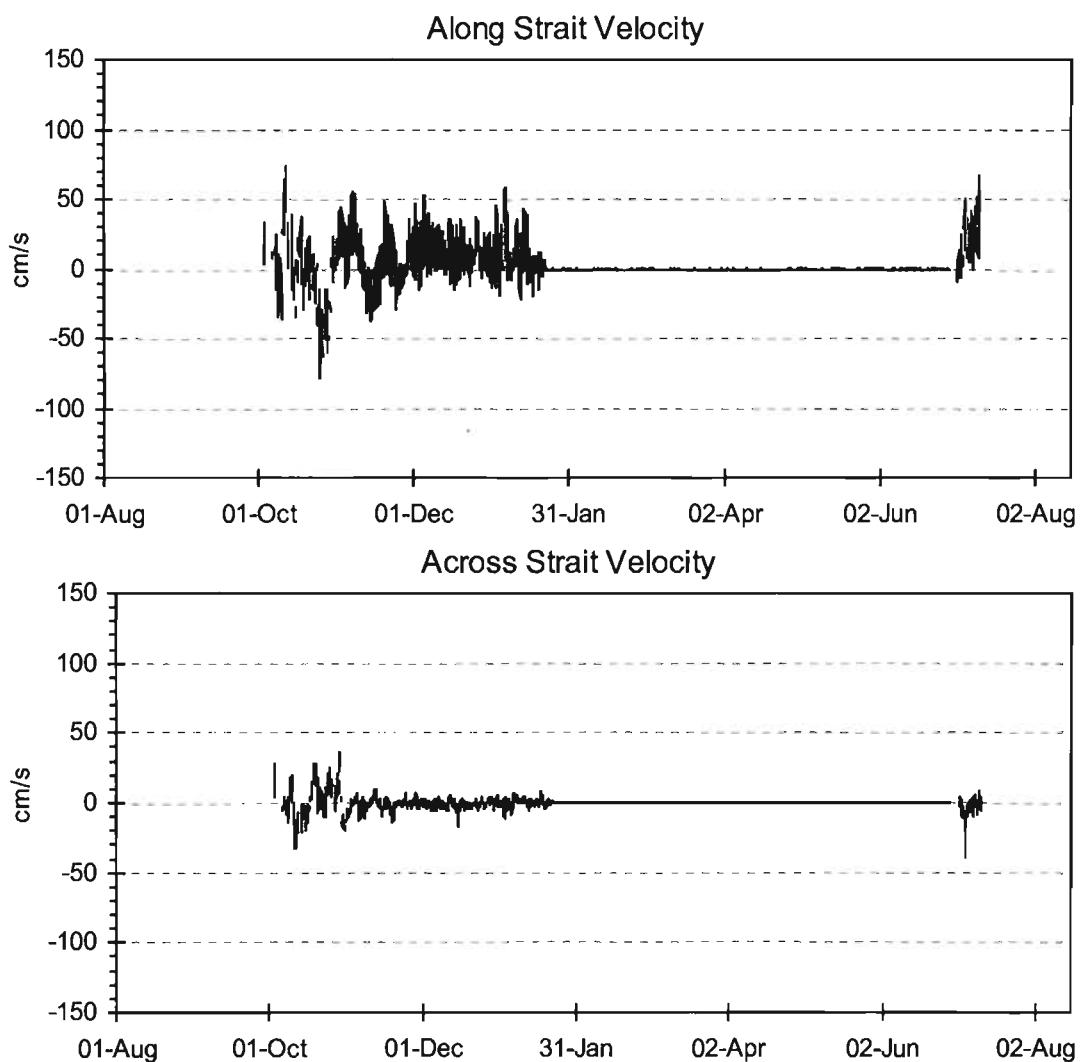
**Figure 60 - Ice velocity data, South side of Barrow Strait  
August 2005 – July 2006**



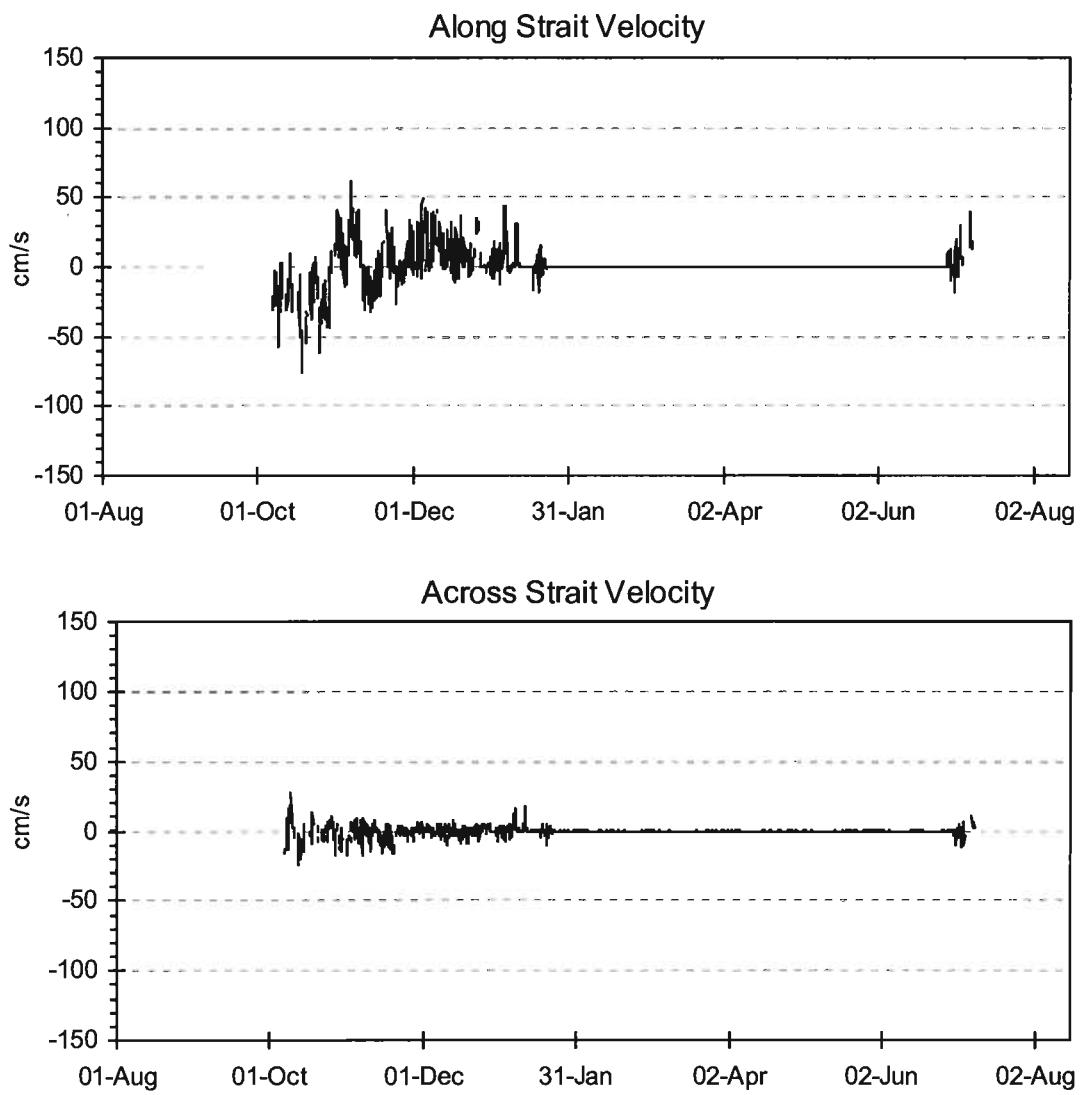
**Figure 61 - Ice velocity data, South Central Barrow Strait  
August 2005 – July 2006**



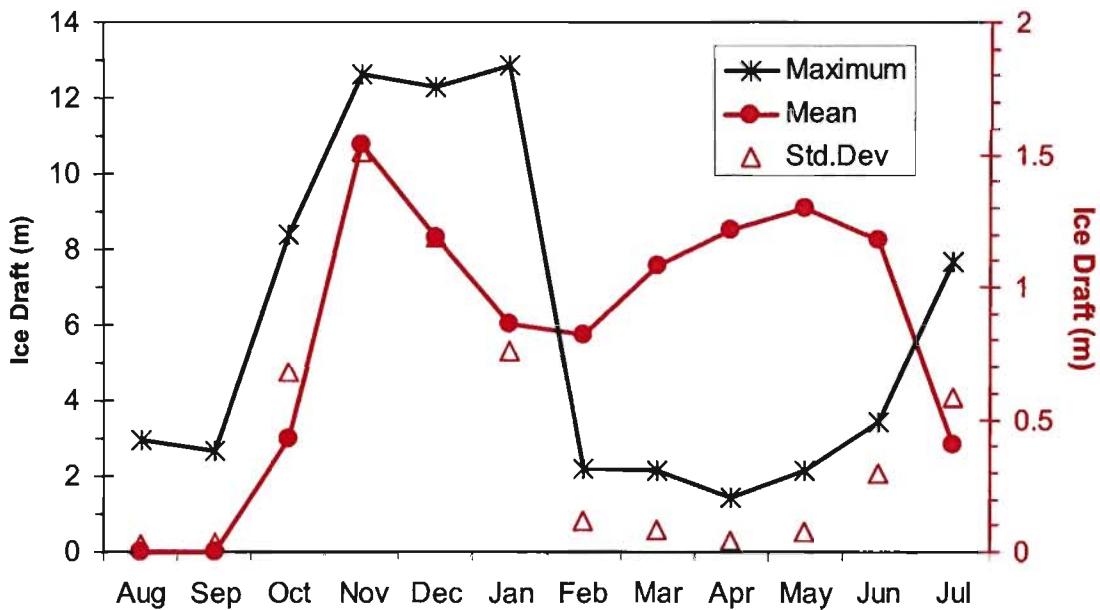
**Figure 62 - Ice velocity data, Central Barrow Strait  
August 2005 – July 2006**



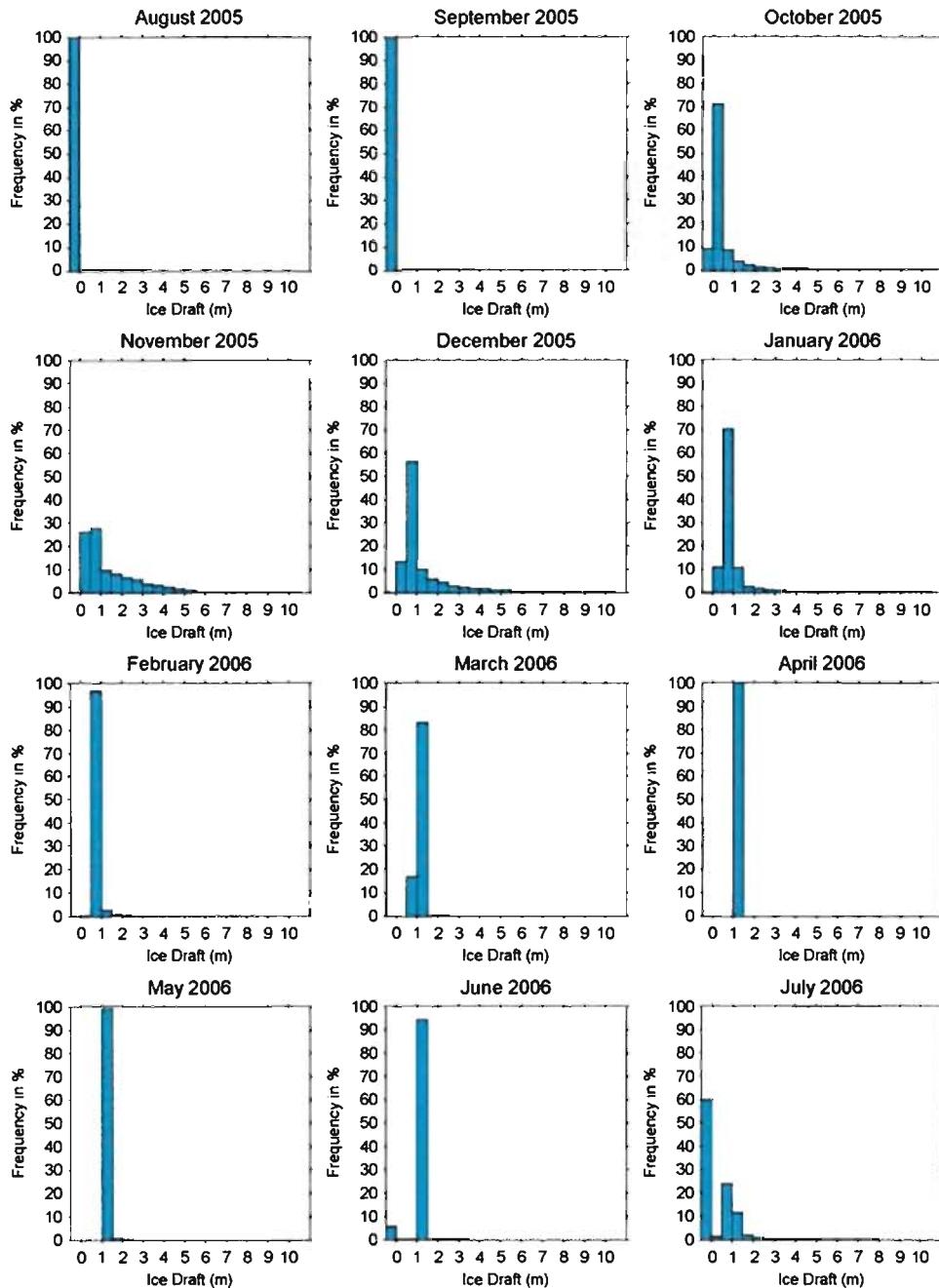
**Figure 63 - Ice velocity data, North side of Barrow Strait  
August 2005 – July 2006**



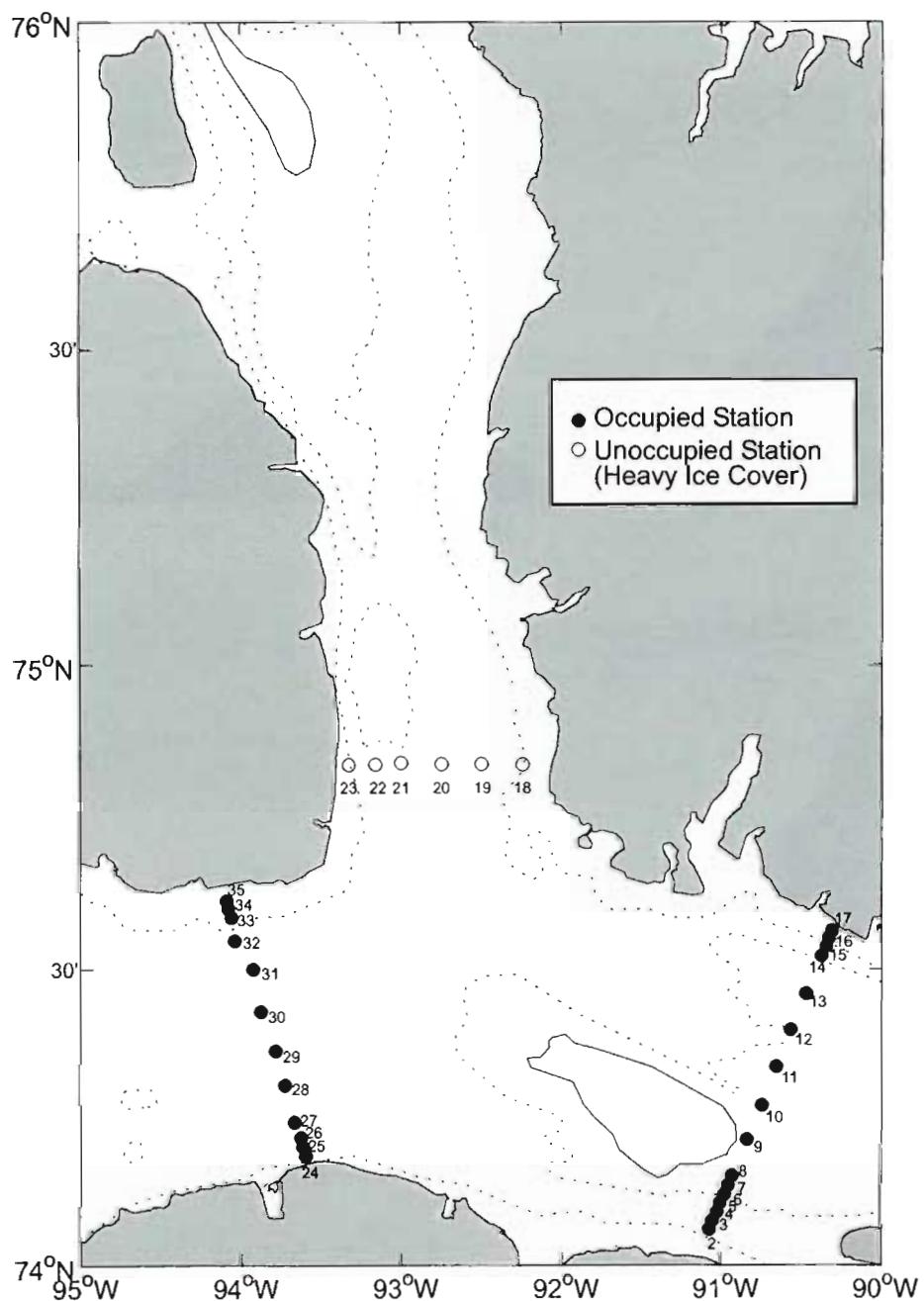
**Figure 64: Ice Draft Statistics from Ice Profiling Sonar  
South-Central Barrow Strait, August 2005 – July 2006**



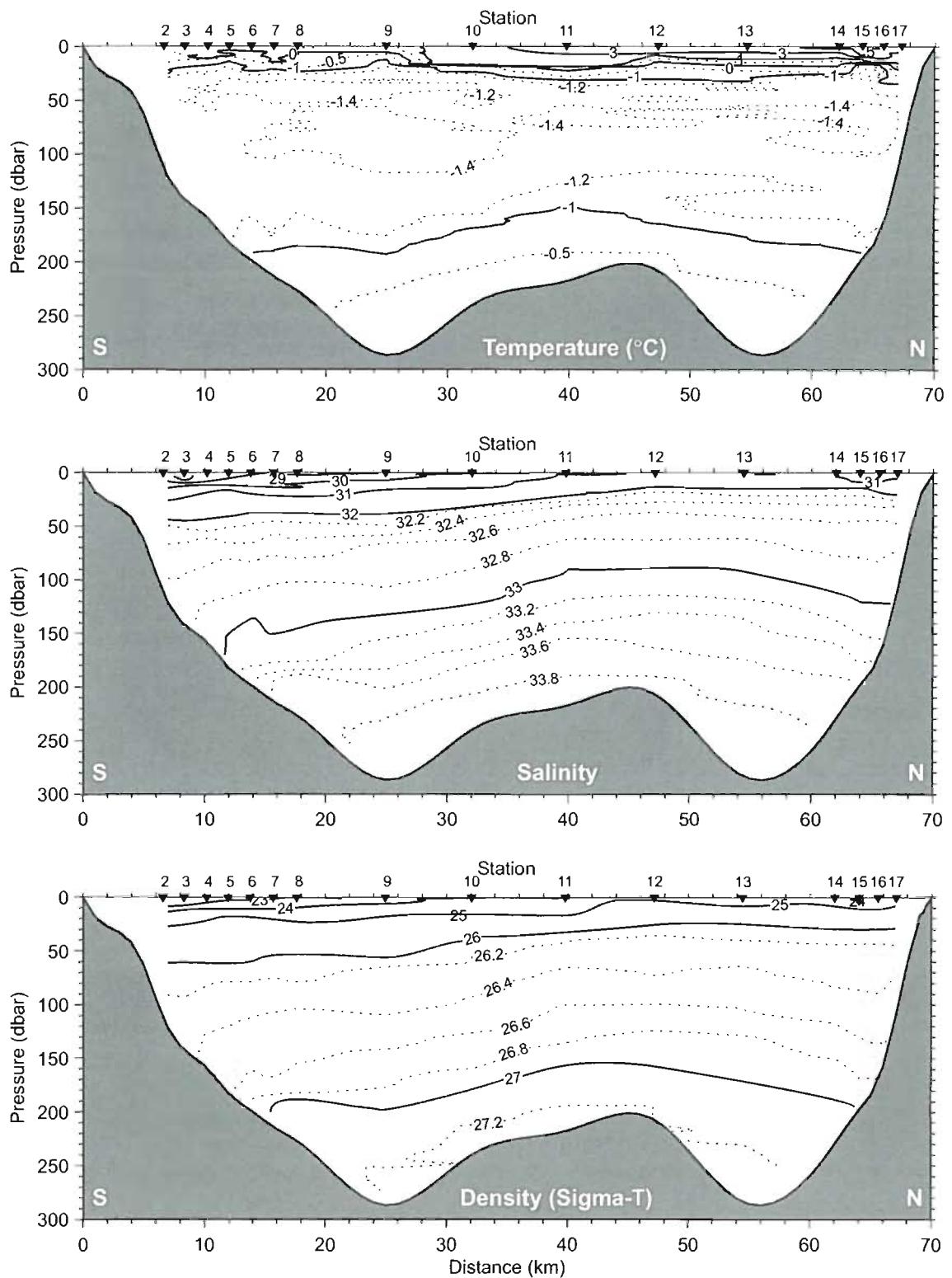
**Figure 65: Frequency of Occurrence vs. Ice Draft in meters**  
**South-Central Barrow Strait, August 2005 – July 2006**



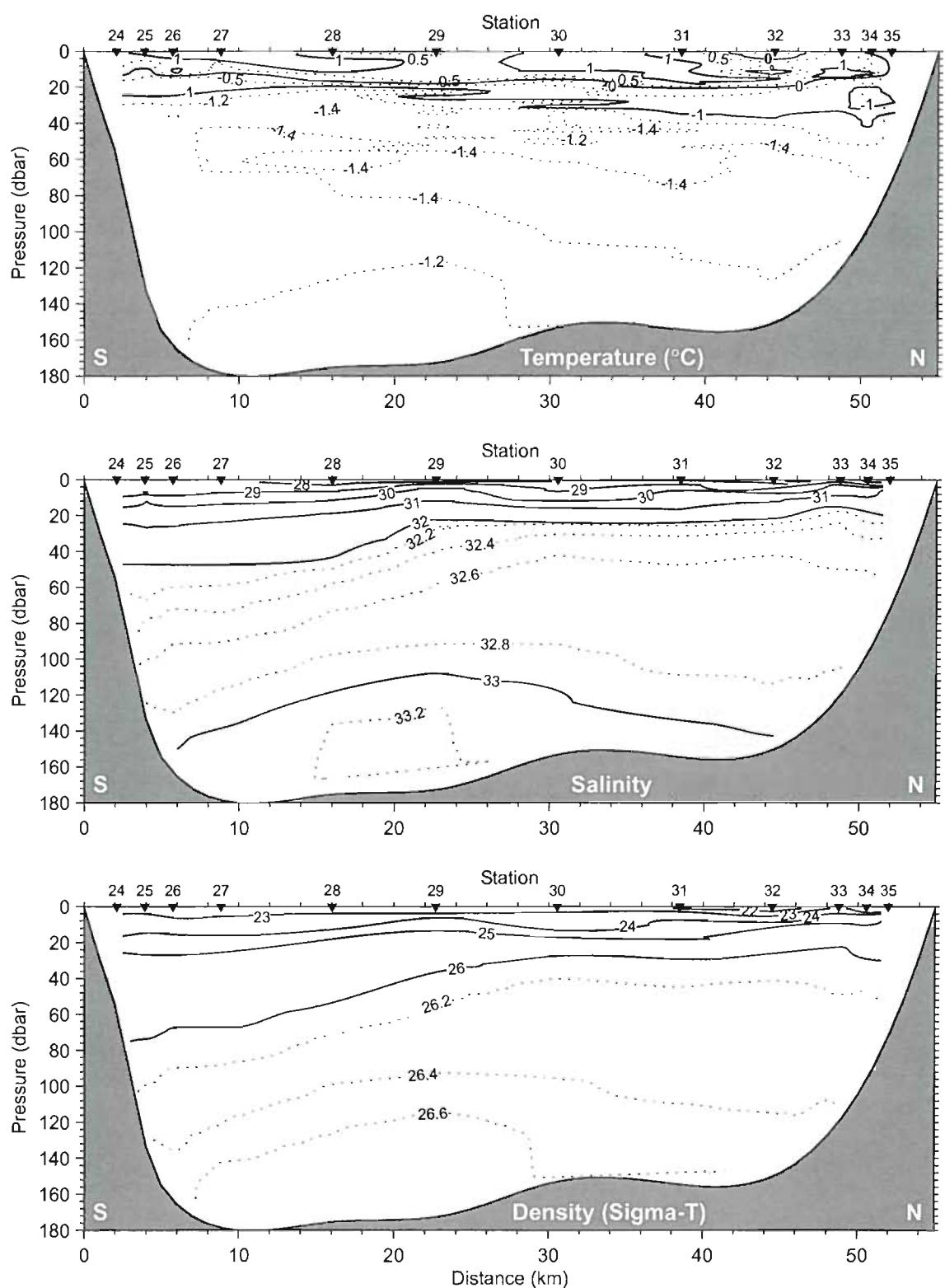
**Figure 66 - CTD Station Positions, August 2006**



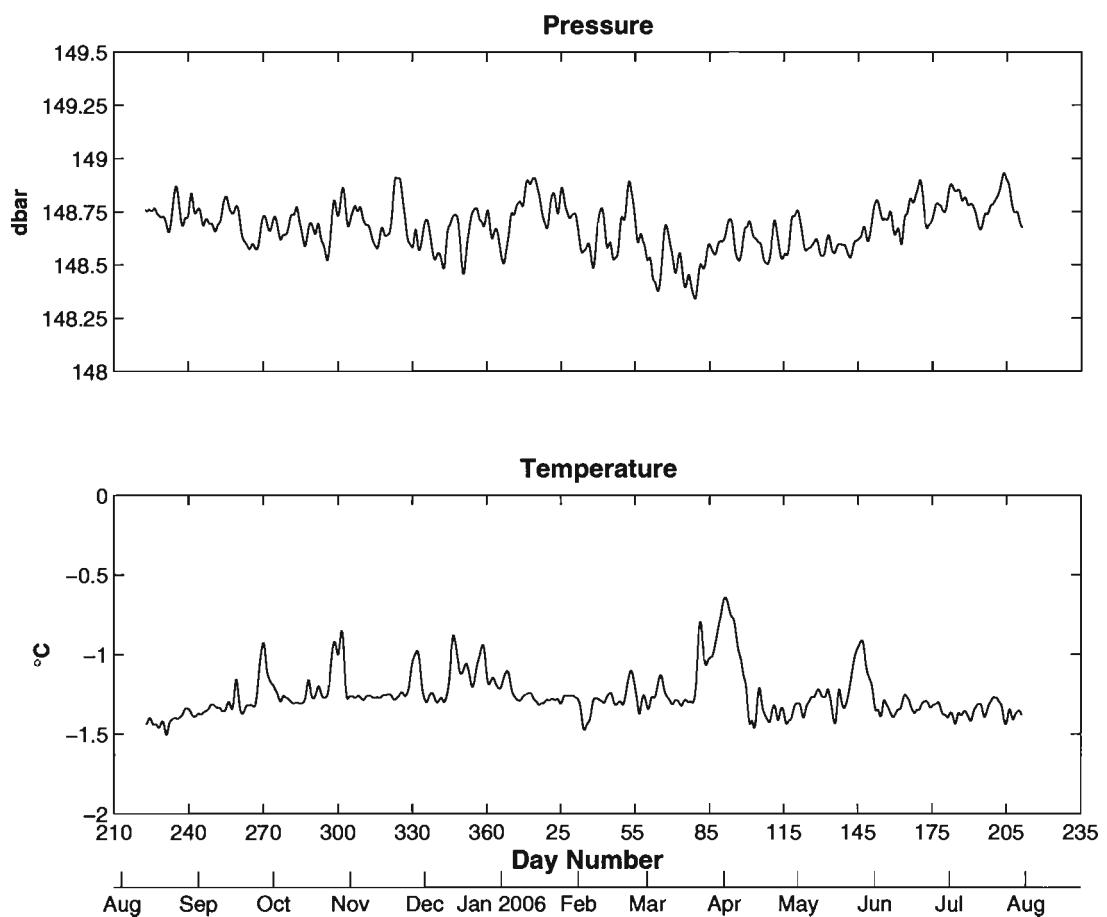
**Figure 67 – Eastern Barrow Strait CTD Line, Aug. 5-6, 2006.**



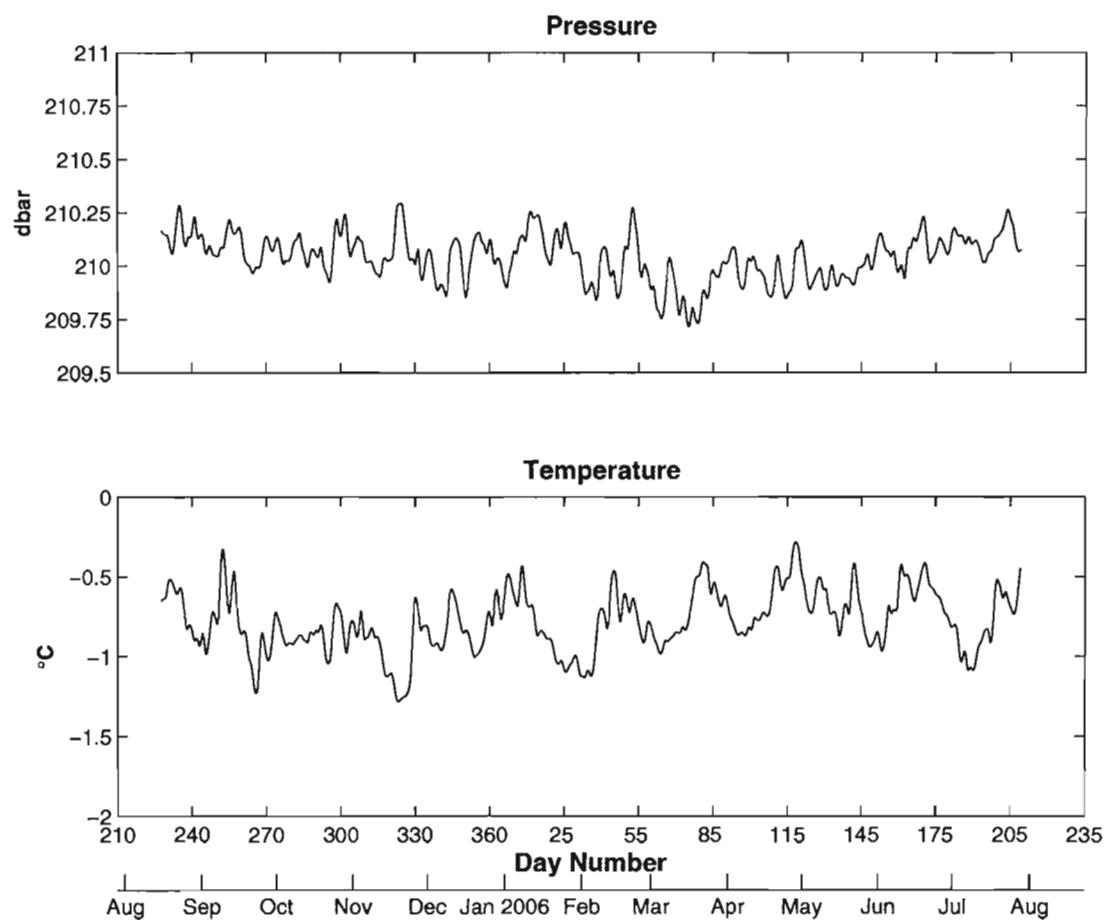
**Figure 68 – Western Barrow Strait CTD Line, Aug. 7-9, 2006.**



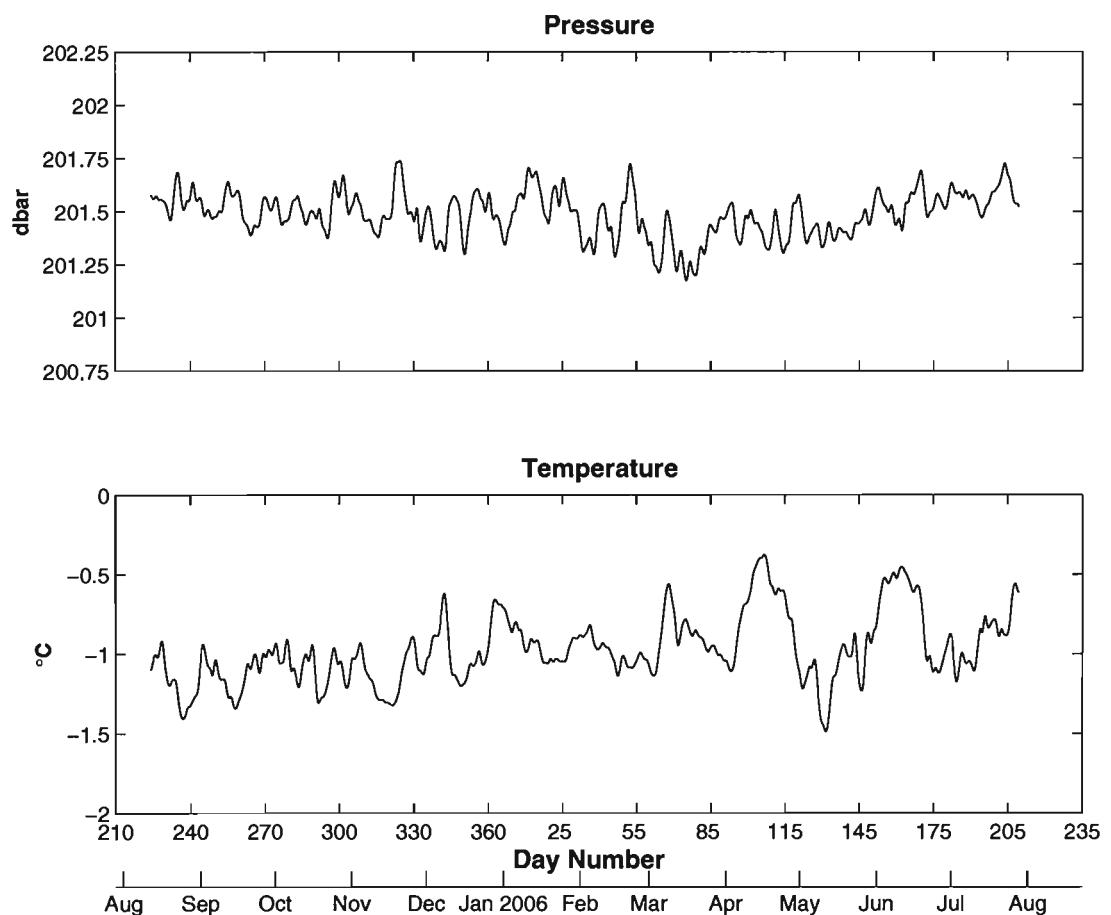
**Figure 69: Low-pass filtered Pressure and Temperature.  
South Side of Barrow Strait, August 2005 – July 2006**



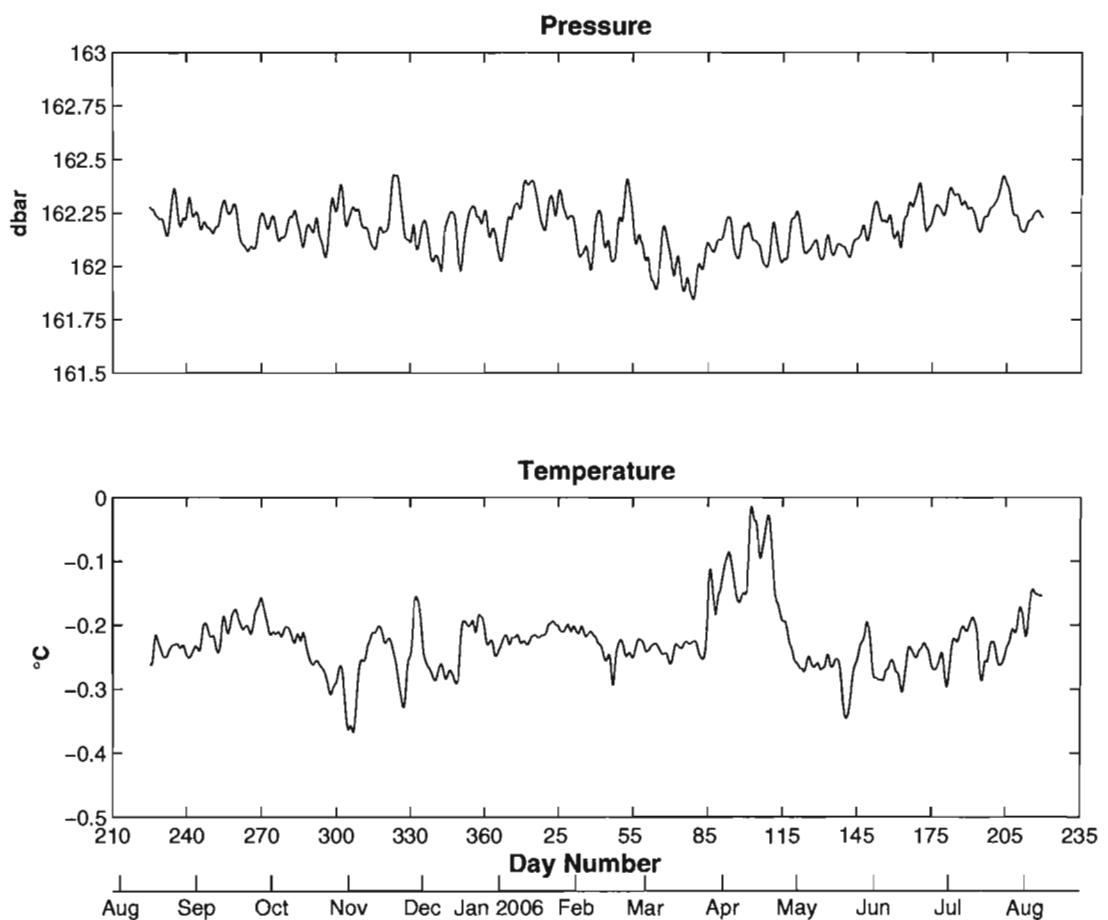
**Figure 70: Low-pass filtered Pressure and Temperature.  
Central Barrow Strait, August 2005 – July 2006**



**Figure 71: Low-pass filtered Pressure and Temperature.  
North Side of Barrow Strait, August 2005 – July 2006**



**Figure 72: Low-pass filtered Pressure and Temperature.  
Western Barrow Strait, August 2005 – July 2006**



**Table 1: Mooring Summary, Barrow Strait 2005-06**

**South Barrow Strait**

BIO Consecutive Mooring Number	Instrument Type <sup>†</sup>	Moored Depth (m)	Bottom Depth (m)	Latitude (°N)	Longitude (°W)	Start Date-Time (GMT)	End Date-Time (GMT)	Sampling Interval (Seconds)
1569	ICYCLER	50	153	74.0840	-91.0126	10-Aug-2005 16:00	19-Aug-2005 16:00	86400
1570	ADCP	76	147	74.0833	-91.0471	09-Aug-2005 14:00	31-Jul-2006 14:00	7200
1570	MCTD	38	147	74.0833	-91.0471	09-Aug-2005 14:00	31-Jul-2006 15:00	1800
1570	MCTD	78	147	74.0833	-91.0471	09-Aug-2005 14:00	31-Jul-2006 15:00	1800
1570	WLR	147	147	74.0833	-91.0471	09-Aug-2005 14:00	31-Jul-2006 15:00	3600
1571	ADCP	144	148	74.0818	-91.0330	09-Aug-2005 16:00	31-Jul-2006 14:00	7200
1571	MCTD	146	148	74.0818	-91.0330	09-Aug-2005 15:00	31-Jul-2006 14:30	1800

**South-Central Barrow Strait**

BIO Consecutive Mooring Number	Instrument Type <sup>†</sup>	Moored Depth (m)	Bottom Depth (m)	Latitude (°N)	Longitude (°W)	Start Date-Time (GMT)	End Date-Time (GMT)	Sampling Interval (Seconds)
1572	LRADCP	250	264	74.1959	-90.8486	10-Aug-2005 14:00	31-Jul-2006 12:00	7200
1573	MCTD	39	269	74.1991	-90.8461	10-Aug-2005 13:30	30-Jul-2006 13:30	1800
1573	MCTD	160	269	74.1991	-90.8461	10-Aug-2005 13:30	30-Jul-2006 13:30	1800
1573	MCTD	264	269	74.1991	-90.8461	10-Aug-2005 13:30	30-Jul-2006 13:30	1800
1574	IPS	56	271	74.1943	-90.8663	10-Aug-2005 12:43	30-Jul-2006 14:30	2
1574	MCTD	81	271	74.1943	-90.8663	10-Aug-2005 13:00	30-Jul-2006 14:30	1800

<sup>†</sup>ADCP: RDI Workhorse ADCP, LRADCP: Long Range ADCP, MCTD: Moored CTD, WLR: Water Level Recorder, IPS: Ice Profiling Sonar

**Table 1: Mooring Summary, Barrow Strait 2005-06 (continued)**

**Central Barrow Strait**

BIO Consecutive Mooring Number	Instrument Type <sup>†</sup>	Moored Depth (m)	Bottom Depth (m)	Latitude (°N)	Longitude (°W)	Start Date-Time (GMT)	End Date-Time (GMT)	Sampling Interval (Seconds)
1575	ADCP	76	208	74.3198	-90.7541	10-Aug-2005 16:00	29-Jul-2006 12:00	7200
1575	MCTD	38	208	74.3198	-90.7541	10-Aug-2005 15:30	29-Jul-2006 13:00	1800
1575	MCTD	78	208	74.3198	-90.7541	10-Aug-2005 15:30	29-Jul-2006 13:00	1800
1575	MCTD	157	208	74.3198	-90.7541	10-Aug-2005 15:30	29-Jul-2006 13:00	1800
1575	WLR	208	208	74.3198	-90.7541	10-Aug-2005 16:00	29-Jul-2006 13:00	3600

**North Barrow Strait**

BIO Consecutive Mooring Number	Instrument Type <sup>†</sup>	Moored Depth (m)	Bottom Depth (m)	Latitude (°N)	Longitude (°W)	Start Date-Time (GMT)	End Date-Time (GMT)	Sampling Interval (Seconds)
1576	ADCP	76	199	74.5359	-90.4262	10-Aug-2005 18:00	29-Jul-2006 18:00	7200
1576	MCTD	39	199	74.5359	-90.4262	10-Aug-2005 17:30	29-Jul-2006 19:00	1800
1576	MCTD	78	199	74.5359	-90.4262	10-Aug-2005 17:30	29-Jul-2006 19:00	1800
1576	MCTD	158	199	74.5359	-90.4262	10-Aug-2005 17:30	29-Jul-2006 19:00	1800
1576	WLR	199	199	74.5359	-90.4262	10-Aug-2005 17:00	29-Jul-2006 19:00	3600

**West Barrow Strait**

BIO Consecutive Mooring Number	Instrument Type <sup>†</sup>	Moored Depth (m)	Bottom Depth (m)	Latitude (°N)	Longitude (°W)	Start Date-Time (GMT)	End Date-Time (GMT)	Sampling Interval (Seconds)
1577	WLR	160	160	74.4024	-93.8267	11-Aug-2005 20:00	09-Aug-2006 01:00	3600

<sup>†</sup>ADCP: RDI Workhorse ADCP, LRADCP: Long Range ADCP, MCTD: Moored CTD, WLR: Water Level Recorder, IPS: Ice Profiling Sonar

**Table 2: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Late summer: August 9, 2005 - September 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.28	0.33	-1.58	1.42	31.70	0.30	30.64	32.34	25.49	0.25	24.62	26.01	29.86	17.03	-34.89	70.56	10.94	7.19	-9.18	29.76
78	78	-1.39	0.11	-1.58	-0.67	32.48	0.10	32.08	32.76	26.12	0.08	25.80	26.35	23.03	14.78	-25.81	54.37	-1.76	6.76	-24.74	15.41
146	138	-1.36	0.07	-1.59	-1.01	32.81	0.13	32.58	33.52	26.39	0.11	26.21	26.96	8.26	12.51	-31.11	35.52	-1.25	5.84	-17.89	16.28

**Table 3: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Late summer: August 10, 2005 - September 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.24	0.29	-1.57	0.30	32.32	0.18	31.42	32.71	25.98	0.15	25.21	26.30	14.40	15.08	-26.08	57.95	9.11	10.66	-30.42	37.38
81	81	-1.41	0.10	-1.63	-0.98	32.77	0.08	32.53	33.02	26.36	0.06	26.17	26.56	11.83	14.20	-20.97	55.19	7.76	9.22	-29.12	31.02
160	161	-1.26	0.08	-1.56	-0.89	33.20	0.15	32.92	33.64	26.70	0.12	26.49	27.05	7.55	14.72	-30.49	47.08	5.08	8.69	-23.26	26.04
264	233	-0.65	0.10	-1.05	-0.43	33.74	0.05	33.41	33.84	27.12	0.04	26.86	27.19	-1.70	19.36	-54.77	39.63	5.06	9.18	-19.72	36.67

**Table 4: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Late summer: August 10, 2005 - September 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.28	0.14	-1.53	-0.29	32.56	0.12	32.16	32.78	26.19	0.10	25.83	26.36	-2.86	15.92	-44.80	36.66	1.65	6.70	-17.84	27.01
78	70	-1.48	0.07	-1.64	-1.24	32.87	0.04	32.68	32.98	26.44	0.03	26.29	26.53	-4.19	15.66	-44.40	43.32	1.25	6.15	-18.76	18.05
157		-1.18	0.11	-1.43	-0.84	33.42	0.07	33.17	33.73	26.88	0.06	26.67	27.12								

**Table 5: North Side Barrow Strait, Microcat/ADCP statistical summary**  
**Late summer: August 10, 2005 - September 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-0.79	0.83	-1.55	2.38	32.27	0.41	30.65	32.81	25.93	0.37	24.46	26.38	-2.59	18.50	-59.00	40.50	-0.83	6.04	-25.24	21.59
78	70	-1.46	0.08	-1.65	-0.99	32.84	0.11	32.10	33.03	26.41	0.09	25.80	26.57	1.69	17.16	-58.21	40.01	-1.05	4.37	-21.91	10.34
158		-1.35	0.04	-1.43	-1.16	33.36	0.12	32.98	33.62	26.84	0.10	26.53	27.04								

**Table 6: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Fall: September 21, 2005 - December 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Straight Velocity (cm/s)				Cross-Straight Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.42	0.20	-1.73	-0.91	31.71	0.31	30.89	32.47	25.50	0.25	24.83	26.11	10.85	18.01	-54.27	70.68	4.28	6.24	-21.87	26.75
78	78	-1.25	0.08	-1.54	-0.66	32.50	0.14	31.93	32.90	26.14	0.11	25.68	26.46	7.16	18.48	-48.50	68.09	-1.31	5.78	-22.78	18.31
146	138	-1.19	0.13	-1.37	-0.70	33.12	0.26	32.61	33.71	26.64	0.21	26.22	27.09	2.02	16.30	-44.60	40.83	-3.06	5.61	-22.97	13.22

**Table 7: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Fall: September 21, 2005 - December 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Straight Velocity (cm/s)				Cross-Straight Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.43	0.31	-1.74	-0.40	31.84	0.45	31.04	32.67	25.60	0.36	24.96	26.26	4.68	15.02	-42.37	49.17	2.45	7.67	-27.20	29.41
81	81	-1.27	0.09	-1.69	-0.95	32.62	0.17	31.91	32.94	26.23	0.14	25.66	26.50	4.78	15.74	-43.84	54.72	2.80	7.93	-21.50	32.43
160	161	-1.24	0.05	-1.47	-1.04	33.26	0.13	32.90	33.55	26.75	0.10	26.46	26.98	2.75	15.82	-33.14	46.76	1.94	8.14	-22.72	30.61
264	233	-0.60	0.14	-1.18	0.08	33.76	0.07	33.32	34.06	27.13	0.05	26.79	27.35	-1.68	17.47	-53.04	48.20	4.11	7.44	-27.39	32.64

**Table 8: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Fall: September 21, 2005 - December 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.43	0.28	-1.74	-0.15	31.96	0.48	30.97	32.71	25.70	0.39	24.90	26.31	1.83	15.87	-48.78	58.09	-0.72	6.31	-25.28	17.80
78	70	-1.31	0.09	-1.72	-1.03	32.66	0.17	32.03	33.00	26.27	0.14	25.76	26.55	-0.35	16.18	-41.08	55.05	-0.13	5.81	-24.27	21.58
157		-1.24	0.03	-1.35	-1.07	33.29	0.11	33.04	33.62	26.78	0.09	26.57	27.04								

**Table 9: North Side Barrow Strait, Microcat/ADCP statistical summary**  
**Fall: September 21, 2005 - December 20, 2005**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-1.29	0.67	-1.76	1.30	31.86	0.46	30.69	32.58	25.61	0.38	24.68	26.20	-6.00	17.12	-76.31	36.00	-2.12	5.29	-25.39	15.61
78	70	-1.29	0.11	-1.75	-0.22	32.58	0.22	31.49	33.00	26.20	0.18	25.31	26.54	-4.09	15.93	-57.48	34.97	-1.57	5.08	-20.31	15.15
158		-1.26	0.06	-1.48	-0.73	33.24	0.19	32.62	33.75	26.74	0.15	26.23	27.13								

**Table 10: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Winter: December 21, 2005 - March 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.60	0.10	-1.76	-1.29	32.10	0.26	31.14	32.48	25.82	0.21	25.04	26.13	12.44	12.90	-23.94	45.10	3.26	5.30	-15.16	24.59
78	78	-1.49	0.16	-1.77	-1.25	32.55	0.07	32.14	32.76	26.19	0.06	25.84	26.35	11.02	15.93	-31.49	53.43	-2.12	5.99	-19.62	16.51
146	138	-1.24	0.10	-1.54	-0.86	32.93	0.23	32.57	33.62	26.48	0.19	26.20	27.03	4.22	14.54	-44.19	38.94	-2.24	5.28	-18.90	15.86

**Table 11: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Winter: December 21, 2005 - March 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.64	0.11	-1.77	-1.32	32.19	0.21	31.49	32.59	25.89	0.17	25.32	26.22	5.93	15.07	-39.97	58.80	3.75	8.14	-22.42	31.31
81	81	-1.58	0.18	-1.77	-1.24	32.59	0.06	32.32	32.86	26.22	0.05	26.00	26.44	5.40	15.50	-41.65	52.66	3.11	8.28	-27.45	30.70
160	161	-1.23	0.06	-1.52	-0.93	33.08	0.15	32.77	33.61	26.61	0.12	26.36	27.03	4.34	16.41	-37.23	49.28	3.10	8.29	-17.20	31.91
264	233	-0.62	0.13	-1.08	-0.29	33.73	0.08	33.28	33.89	27.11	0.06	26.76	27.23	-0.87	17.69	-48.60	41.95	5.02	7.91	-23.12	34.14

**Table 12: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Winter: December 21, 2005 - March 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.68	0.09	-1.78	-1.29	32.34	0.16	31.76	32.63	26.01	0.13	25.54	26.25	5.84	15.18	-32.80	48.90	0.96	6.32	-19.15	23.68
78	70	-1.59	0.17	-1.77	-1.24	32.63	0.07	32.27	32.85	26.25	0.05	25.96	26.43	4.52	15.66	-39.10	52.82	0.56	6.28	-20.49	27.78
157		-1.19	0.05	-1.42	-0.79	33.19	0.13	32.90	33.64	26.69	0.10	26.46	27.04								

**Table 13: North Side Barrow Strait, Microcat/ADCP statistical summary**  
**Winter: December 21, 2005 - March 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-1.66	0.15	-1.79	-1.25	32.54	0.10	32.19	32.85	26.18	0.08	25.88	26.43	1.51	13.16	-40.57	33.46	-1.19	3.96	-34.89	18.43
78	70	-1.54	0.17	-1.78	-1.24	32.78	0.08	32.61	33.13	26.37	0.06	26.24	26.65	1.32	14.60	-42.73	33.30	-1.48	3.91	-13.52	13.63
158		-1.19	0.08	-1.44	-0.81	33.29	0.14	32.95	33.66	26.77	0.11	26.51	27.07								

**Table 14: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Spring: March 21, 2006 - June 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.61	0.09	-1.76	-1.38	32.21	0.12	31.86	32.53	25.90	0.10	25.62	26.17	14.25	14.90	-33.30	51.70	2.99	5.78	-19.82	22.48
78	78	-1.55	0.12	-1.77	-1.29	32.59	0.09	32.22	32.82	26.21	0.07	25.92	26.41	8.95	16.87	-45.20	54.59	-2.37	5.82	-20.84	15.99
146	138	-1.20	0.22	-1.66	-0.58	33.03	0.30	32.60	33.73	26.56	0.24	26.22	27.11	3.80	14.15	-39.98	33.93	-2.22	5.53	-20.06	14.51

**Table 15: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Spring: March 21, 2006 - June 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.64	0.07	-1.77	-1.37	32.37	0.15	31.72	32.70	26.04	0.12	25.51	26.31	7.55	14.19	-33.12	60.19	3.09	7.61	-29.31	33.15
81	81	-1.66	0.10	-1.77	-1.25	32.69	0.05	32.28	32.88	26.30	0.04	25.97	26.45	5.90	13.40	-33.50	50.14	2.21	7.30	-23.18	27.94
160	161	-1.17	0.11	-1.51	-0.78	33.25	0.17	32.79	33.67	26.74	0.14	26.38	27.07	3.06	15.05	-38.87	42.90	1.18	7.14	-26.07	28.34
264	233	-0.41	0.10	-0.91	-0.10	33.82	0.05	33.48	33.95	27.17	0.04	26.92	27.27	-2.15	14.78	-51.00	39.75	2.98	6.55	-22.60	32.59

**Table 16: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Spring: March 21, 2006 - June 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.68	0.06	-1.78	-1.36	32.49	0.13	31.80	32.75	26.13	0.11	25.58	26.35	3.84	15.24	-32.07	51.40	0.81	6.06	-22.21	21.05
78	70	-1.64	0.09	-1.77	-1.33	32.73	0.04	32.48	32.92	26.33	0.03	26.12	26.48	2.76	15.32	-32.95	50.90	0.61	5.80	-20.38	23.50
157		-1.09	0.12	-1.50	-0.69	33.42	0.07	33.16	33.70	26.87	0.06	26.66	27.10								

**Table 17: North Side Barrow Strait, Microcat/ADCP statistical summary**  
**Spring: March 21, 2006 - June 20, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-1.69	0.06	-1.78	-1.40	32.48	0.13	32.12	32.92	26.13	0.10	25.84	26.48	2.26	14.04	-36.39	40.58	-1.47	4.63	-19.63	12.22
78	70	-1.42	0.11	-1.74	-1.20	32.96	0.15	32.66	33.36	26.51	0.12	26.27	26.83	1.86	15.45	-38.67	45.13	-1.71	3.65	-15.60	9.82
158		-1.14	0.21	-1.59	-0.56	33.47	0.13	33.11	33.81	26.92	0.10	26.63	27.18								

**Table 18: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Early Summer: June 21, 2006 – July 31, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.47	0.08	-1.64	-1.19	31.94	0.21	31.36	32.38	25.68	0.17	25.22	26.05	27.48	16.08	-13.49	71.33	6.82	6.75	-10.26	30.95
78	78	-1.43	0.08	-1.64	-1.18	32.49	0.11	32.01	32.74	26.13	0.09	25.74	26.33	23.31	15.26	-24.58	58.43	-2.85	6.83	-25.30	17.46
146	138	-1.34	0.06	-1.54	-1.22	32.75	0.09	32.50	33.03	26.34	0.08	26.14	26.56	10.75	13.23	-26.54	42.42	-1.86	5.28	-16.57	13.44

**Table 19: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Early Summer: June 21, 2006 – July 30, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.52	0.15	-1.71	-0.20	32.21	0.28	31.23	32.78	25.90	0.23	25.11	26.37	14.37	16.21	-26.44	59.31	7.27	9.45	-27.35	31.48
81	81	-1.54	0.10	-1.76	-1.29	32.68	0.07	32.46	33.02	26.29	0.06	26.10	26.56	11.45	16.45	-24.21	51.63	5.58	8.90	-34.32	31.74
160	161	-1.25	0.09	-1.57	-0.85	33.08	0.15	32.75	33.63	26.60	0.12	26.34	27.04	8.01	15.18	-31.36	46.61	4.39	7.81	-20.09	27.08
264	233	-0.52	0.12	-1.00	-0.27	33.76	0.07	33.44	33.88	27.13	0.05	26.88	27.22	-2.25	20.08	-51.65	39.97	6.13	9.01	-19.68	37.10

**Table 20: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Early Summer: June 21, 2006 – July 29, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.58	0.10	-1.73	-1.06	32.50	0.17	31.71	32.75	26.15	0.14	25.50	26.35	9.15	17.32	-29.27	61.82	-1.37	6.82	-24.72	15.96
78	70	-1.55	0.07	-1.72	-1.32	32.79	0.04	32.64	32.98	26.38	0.04	26.26	26.53	8.54	17.52	-34.53	65.17	-1.36	7.04	-20.16	18.30
157		-1.16	0.11	-1.34	-0.79	33.41	0.09	33.14	33.67	26.87	0.07	26.65	27.07								

**Table 21: North Side Barrow Strait, Microcat/ADCP statistical summary**  
**Early Summer: June 21, 2006 – July 29, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-1.31	0.41	-1.69	0.59	32.55	0.19	31.49	32.88	26.17	0.17	25.25	26.45	-3.02	13.88	-36.33	27.08	-1.59	5.70	-15.54	19.06
78	70	-1.38	0.05	-1.61	-1.25	32.99	0.10	32.73	33.24	26.53	0.08	26.33	26.73	-2.49	15.88	-38.83	36.43	-2.26	4.43	-18.30	9.18
158		-1.24	0.08	-1.37	-0.71	33.42	0.09	33.18	33.76	26.88	0.07	26.69	27.14								

**Table 22: South Side Barrow Strait, Microcat/ADCP statistical summary**  
**Complete Record: August 9, 2005 – July 31, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.50	0.20	-1.76	1.42	31.96	0.32	30.64	32.53	25.70	0.27	24.62	26.17	16.29	17.17	-54.27	71.33	4.77	6.60	-21.87	30.95
78	78	-1.43	0.16	-1.77	-0.66	32.53	0.11	31.93	32.90	26.17	0.09	25.68	26.46	12.33	17.75	-48.50	68.09	-2.02	6.11	-25.30	18.31
146	138	-1.24	0.15	-1.66	-0.58	32.97	0.27	32.50	33.73	26.52	0.22	26.14	27.11	4.78	14.81	-44.60	42.42	-2.28	5.52	-22.97	16.28

**Table 23: South-Central Barrow Strait, Microcat/ADCP statistical summary**  
**Complete Record: August 10, 2005 – July 30, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	41	-1.52	0.24	-1.77	0.30	32.16	0.35	31.04	32.78	25.87	0.28	24.96	26.37	7.98	15.40	-42.37	60.19	4.27	8.68	-30.42	37.38
81	81	-1.50	0.19	-1.77	-0.95	32.65	0.12	31.91	33.02	26.27	0.10	25.66	26.56	6.81	15.24	-43.84	55.19	3.62	8.33	-34.32	32.43
160	161	-1.22	0.08	-1.57	-0.78	33.18	0.17	32.75	33.67	26.69	0.14	26.34	27.07	4.40	15.69	-38.87	49.28	2.68	8.07	-26.07	31.91
264	233	-0.55	0.15	-1.18	0.08	33.76	0.07	33.28	34.06	27.13	0.05	26.76	27.35	-1.66	17.43	-54.77	48.20	4.39	7.83	-27.39	37.10

**Table 24: Central Barrow Strait, Microcat/ADCP statistical summary**  
**Complete Record: August 10, 2005 – July 29, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
38	38	-1.56	0.22	-1.78	-0.15	32.32	0.36	30.97	32.78	26.00	0.29	24.90	26.36	3.63	16.03	-48.78	61.82	0.31	6.43	-25.28	27.01
78	70	-1.51	0.17	-1.77	-1.03	32.71	0.13	32.03	33.00	26.31	0.10	25.76	26.55	2.22	16.30	-44.40	65.17	0.27	6.15	-24.27	27.78
157		-1.17	0.10	-1.50	-0.69	33.33	0.14	32.90	33.73	26.80	0.11	26.46	27.12								

**Table 25: North Barrow Strait, Microcat/ADCP statistical summary**  
**Complete Record: August 10, 2005 – July 29, 2006**

Depth (m)		Temperature (°C)				Salinity (ppt)				Density (Sigma-T)				Along-Strait Velocity (cm/s)				Cross-Strait Velocity (cm/s)			
Micro Cat	ADCP	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max	Avg	SD	Min	Max
39	38	-1.43	0.55	-1.79	2.38	32.32	0.41	30.65	32.92	25.99	0.34	24.46	26.48	-1.21	15.60	-76.31	40.58	-1.51	4.98	-34.89	21.59
78	70	-1.42	0.15	-1.78	-0.22	32.81	0.21	31.49	33.36	26.39	0.17	25.31	26.83	-0.31	15.83	-58.21	45.13	-1.60	4.30	-21.91	15.15
158		-1.22	0.14	-1.59	-0.56	33.35	0.17	32.62	33.81	26.82	0.14	26.23	27.18								

**Table 26 - Tidal Constants for K1 Constituent**

**South Side Barrow Strait**

**For Ice Free Period (Aug. 9, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	8.36	-0.62	170	2
14	8.01	-0.67	174	2
18	8.24	-0.54	175	1
22	7.91	-0.72	173	355
26	7.70	-0.97	167	352
30	7.60	-1.18	165	347
34	7.30	-1.03	168	346
38	6.68	-0.99	172	353
42	6.94	-0.83	176	358
46	7.33	-0.70	180	357
50	7.23	-0.55	179	356
54	6.97	-0.02	176	352
58	6.78	-0.43	170	347
62	6.78	-0.63	168	347
66	7.11	-0.46	168	346
70	7.76	-0.18	164	344
74	9.50	0.67	144	340
78	9.85	0.79	146	340
82	9.67	0.88	147	338
86	9.35	1.13	149	337
90	9.49	1.50	152	337
94	9.23	1.97	154	337
98	8.97	2.59	157	337
102	8.91	2.93	158	337
106	8.76	3.05	158	337
110	8.42	3.20	157	336
114	8.48	3.30	159	337
118	8.40	3.22	159	336
122	8.91	3.00	157	333
126	9.61	2.70	154	331
130	10.00	2.52	154	331
134	10.31	2.51	156	333
138	10.52	2.78	159	333

**Table 26 - Tidal Constants for K1 Constituent (continued)**

**South Side Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.28	1.91	201	6
14	6.07	2.21	190	357
18	6.29	2.23	182	351
22	6.59	2.22	175	346
26	7.04	2.12	170	341
30	7.34	2.11	167	337
34	7.54	1.96	166	335
38	7.55	1.94	165	334
42	7.30	2.05	164	332
46	7.84	2.33	163	332
50	7.86	2.47	163	332
54	7.97	2.48	164	330
58	7.99	2.36	164	330
62	8.03	2.29	163	329
66	8.01	2.28	163	328
70	8.08	2.37	162	327
74	8.84	1.88	146	326
78	8.89	1.91	146	326
82	8.95	1.98	146	325
86	8.93	2.11	147	324
90	9.06	2.15	147	323
94	9.03	2.22	147	323
98	9.12	2.32	148	323
102	9.27	2.52	148	323
106	9.27	2.66	149	322
110	9.29	2.86	149	322
114	9.39	2.97	149	322
118	9.47	3.00	150	321
122	9.54	2.99	150	320
126	9.64	3.06	150	319
130	9.84	3.09	150	318
134	9.95	3.13	152	317
138	9.93	3.00	154	314

**Table 26 - Tidal Constants for K1 Constituent (continued)**

**South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	8.65	-1.31	160	358
33	9.52	-0.52	157	352
41	10.29	-0.44	154	356
49	11.16	-1.10	158	356
57	12.01	-1.02	154	358
65	11.93	-0.95	152	356
73	12.11	-0.58	151	357
81	12.03	-0.15	153	0
89	11.76	-0.22	154	0
97	11.90	-0.25	152	0
105	12.06	-0.03	152	1
113	12.13	-0.13	153	1
121	11.81	0.04	154	359
129	11.72	0.15	156	0
137	11.98	0.20	157	1
145	12.46	-0.43	158	4
153	12.56	0.03	159	3
161	12.82	0.07	161	1
169	12.83	-0.45	159	0
177	13.59	-0.77	159	0
185	14.22	-1.05	164	358
193	14.31	-0.96	165	356
201	14.93	-1.62	164	355
209	16.03	-1.83	162	356
217	17.12	-1.58	162	355
225	16.89	-1.79	160	356
233	17.62	-2.14	161	359

**Table 26 - Tidal Constants for K1 Constituent (continued)**

**South Central Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	11.46	-1.04	170	359
33	11.46	-1.21	167	359
41	11.46	-1.33	167	358
49	11.46	-1.55	166	358
57	11.46	-1.47	165	359
65	11.61	-1.35	165	359
73	11.72	-1.39	165	0
81	11.75	-1.44	165	0
89	11.88	-1.45	165	0
97	11.95	-1.57	165	0
105	12.12	-1.47	164	0
113	12.25	-1.47	164	0
121	12.69	-1.61	164	1
129	13.12	-1.72	164	0
137	13.51	-1.81	164	1
145	13.96	-1.99	165	1
153	14.22	-2.12	165	1
161	14.53	-2.04	164	2
169	15.12	-2.00	164	2
177	15.50	-2.06	165	2
185	15.85	-2.07	165	3
193	16.27	-2.30	166	3
201	16.70	-2.44	165	2
209	17.38	-2.69	165	2
217	17.68	-2.72	164	4
225	16.92	-2.66	163	5
233	16.55	-2.60	163	7

**Table 26 - Tidal Constants for K1 Constituent (continued)**

**Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	11.45	-1.46	162	356
14	12.01	-1.82	165	351
18	12.71	-2.15	166	352
22	12.56	-2.17	166	353
26	12.90	-1.52	165	358
30	12.81	-1.39	165	1
34	12.75	-1.77	164	2
38	12.89	-2.03	163	2
42	13.31	-2.08	164	4
46	13.62	-1.70	164	4
50	13.31	-1.52	164	4
54	13.17	-1.63	163	4
58	13.40	-1.53	164	4
62	13.28	-1.69	164	6
66	13.40	-1.79	163	7
70	13.40	-1.83	163	7

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	10.72	-1.30	178	4
14	11.49	-1.68	173	1
18	11.66	-1.75	168	358
22	11.62	-1.95	166	356
26	11.66	-2.13	165	356
30	12.02	-2.27	164	357
34	12.14	-2.39	163	358
38	12.07	-2.43	163	358
42	12.18	-2.41	163	358
46	12.47	-2.52	163	358
50	12.44	-2.45	163	359
54	12.44	-2.38	163	359
58	12.46	-2.44	163	359
62	12.48	-2.39	163	359
66	12.42	-2.42	163	359
70	12.36	-2.39	163	360

**Table 26 - Tidal Constants for K1 Constituent (continued)**

**North Side Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	8.69	-0.54	185	354
14	8.16	-0.67	184	343
18	8.12	0.21	181	334
22	8.45	0.99	174	331
26	8.35	0.68	173	327
30	8.54	0.78	174	328
34	8.91	0.81	173	331
38	9.34	0.83	170	329
42	9.35	0.48	172	327
46	9.70	0.51	170	321
50	10.32	1.18	168	316
54	10.55	1.29	168	316
58	10.48	1.01	168	316
62	10.93	0.94	169	316
66	11.36	0.85	170	317
70	11.87	0.60	168	316

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.72	0.95	183	298
14	8.34	1.12	177	300
18	9.35	0.74	170	299
22	10.01	0.36	165	298
26	10.29	0.09	162	297
30	10.34	-0.02	161	297
34	10.27	0.05	160	298
38	9.99	0.08	161	300
42	9.91	0.16	161	301
46	10.42	0.27	162	302
50	10.55	0.33	162	304
54	10.70	0.21	162	305
58	10.84	0.14	163	307
62	11.10	0.08	163	308
66	11.28	0.03	163	310
70	11.39	-0.09	163	311

**Table 27 - Tidal Constants for M2 Constituent**

**South Side Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	7.69	-1.57	177	212
14	7.34	-1.16	171	210
18	7.52	-0.80	169	207
22	7.81	-0.67	168	204
26	7.96	-0.34	167	203
30	8.16	-0.20	166	203
34	8.33	-0.28	165	201
38	8.58	-0.19	165	199
42	8.50	-0.14	164	197
46	8.41	-0.18	164	198
50	8.76	-0.46	166	199
54	9.09	-0.86	168	200
58	9.14	-1.27	169	201
62	9.05	-1.52	169	202
66	9.04	-1.67	169	203
70	9.29	-1.80	169	205
74	9.74	-1.68	146	206
78	10.06	-1.87	146	207
82	10.29	-2.12	146	209
86	10.47	-2.14	146	210
90	10.57	-2.08	146	210
94	10.67	-2.12	147	210
98	10.75	-2.01	148	210
102	10.69	-1.67	148	211
106	10.42	-1.31	149	211
110	10.22	-1.03	150	211
114	10.08	-0.81	151	211
118	9.86	-0.79	152	212
122	9.68	-0.93	155	213
126	9.72	-0.94	160	214
130	9.77	-0.64	165	215
134	9.80	-0.32	169	217
138	9.60	0.03	174	219

**Table 27 - Tidal Constants for M2 Constituent (continued)**

**South Side Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.51	2.05	188	224
14	5.11	2.01	182	213
18	5.71	1.37	179	211
22	6.85	0.33	179	210
26	8.14	-0.81	179	209
30	9.23	-1.61	175	207
34	9.84	-2.19	173	205
38	9.94	-2.44	171	203
42	9.63	-2.46	170	201
46	10.14	-2.39	168	199
50	10.09	-2.17	166	198
54	10.11	-2.15	165	197
58	10.21	-2.22	164	196
62	10.29	-2.35	163	195
66	10.29	-2.43	162	194
70	10.13	-2.46	161	194
74	10.53	-2.68	150	196
78	10.42	-2.74	150	196
82	10.37	-2.64	151	197
86	10.20	-2.64	151	197
90	10.09	-2.45	152	197
94	9.97	-2.29	152	198
98	9.87	-2.17	153	199
102	9.66	-1.98	154	199
106	9.52	-1.83	155	200
110	9.42	-1.74	156	201
114	9.25	-1.66	158	201
118	9.17	-1.49	160	202
122	8.95	-1.38	163	204
126	8.86	-1.17	166	207
130	8.96	-1.07	171	210
134	8.94	-0.86	176	214
138	8.89	-0.40	182	218

**Table 27 - Tidal Constants for M2 Constituent (continued)**

**South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	10.24	1.31	174	189
33	10.68	0.92	173	189
41	10.50	1.15	175	191
49	10.25	1.46	177	194
57	10.01	1.19	181	200
65	9.84	1.54	183	204
73	9.15	1.82	185	203
81	9.00	1.79	186	205
89	8.87	1.77	184	205
97	8.44	1.72	184	205
105	8.36	2.09	181	201
113	7.66	2.47	181	199
121	7.07	2.86	180	198
129	7.09	2.83	181	201
137	6.96	2.79	183	205
145	7.25	2.26	185	207
153	7.37	2.17	188	208
161	7.76	1.88	193	210
169	8.15	1.55	195	214
177	8.24	1.76	197	216
185	8.29	1.47	198	216
193	8.40	1.12	199	217
201	8.27	0.62	200	219
209	8.19	0.51	201	223
217	8.04	0.74	205	226
225	7.13	0.76	209	230
233	6.35	1.36	220	236

**Table 27 - Tidal Constants for M2 Constituent (continued)**

**South Central Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	7.07	1.43	197	209
33	8.95	0.09	191	204
41	9.65	-0.62	188	202
49	9.78	-0.71	186	201
57	9.71	-0.73	185	200
65	9.58	-0.63	184	200
73	9.38	-0.59	184	200
81	9.19	-0.49	184	200
89	9.18	-0.40	185	200
97	9.07	-0.44	185	200
105	8.97	-0.33	186	201
113	8.71	-0.24	186	202
121	8.64	-0.09	186	204
129	8.30	0.21	185	204
137	7.93	0.49	186	204
145	7.70	0.88	186	205
153	7.25	1.22	186	203
161	7.16	1.43	184	201
169	7.18	1.66	183	198
177	7.30	1.69	184	200
185	7.45	1.61	186	200
193	7.51	1.47	188	202
201	7.32	1.27	191	205
209	7.23	1.04	195	208
217	7.21	0.86	197	211
225	6.46	0.93	199	215
233	5.66	1.41	205	219

**Table 27 - Tidal Constants for M2 Constituent (continued)**

**Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	8.91	-0.40	163	195
14	9.47	-1.22	160	187
18	10.35	-1.78	157	186
22	10.61	-2.15	158	189
26	10.38	-2.42	160	194
30	10.16	-2.26	163	198
34	10.03	-1.89	162	196
38	10.01	-1.98	161	194
42	10.37	-2.17	160	195
46	10.62	-2.15	161	196
50	10.67	-1.85	162	197
54	10.34	-1.98	163	197
58	10.23	-2.01	163	198
62	10.06	-1.97	164	199
66	10.09	-1.93	164	199
70	10.31	-1.90	165	200

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.26	3.05	249	271
14	4.13	3.53	230	252
18	4.86	2.83	179	204
22	6.70	1.28	171	198
26	8.26	-0.37	169	196
30	9.80	-1.66	166	194
34	10.83	-2.69	165	193
38	11.26	-3.23	165	192
42	11.39	-3.47	164	192
46	11.71	-3.60	164	192
50	11.71	-3.60	164	192
54	11.69	-3.58	164	192
58	11.60	-3.51	165	192
62	11.55	-3.46	165	192
66	11.42	-3.40	164	193
70	11.22	-3.36	165	193

**Table 27 - Tidal Constants for M2 Constituent (continued)**

**North Side Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	9.50	0.96	168	177
14	9.72	0.83	164	175
18	9.73	0.63	162	174
22	9.45	0.63	164	177
26	9.10	0.41	168	181
30	9.05	0.13	170	181
34	9.30	0.07	170	180
38	9.60	0.24	169	181
42	9.66	-0.06	170	185
46	10.03	-0.45	171	185
50	10.26	-0.51	172	184
54	9.90	-0.46	172	183
58	9.44	-0.36	170	183
62	9.33	-0.25	168	182
66	9.07	-0.18	167	182
70	9.04	-0.10	167	182

**For Solid Ice period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.69	2.62	176	165
14	6.08	3.27	170	167
18	7.32	2.60	174	173
22	8.62	1.44	175	177
26	9.80	0.24	176	179
30	10.74	-0.69	176	180
34	11.34	-1.27	175	180
38	11.04	-1.35	173	180
42	10.88	-1.18	172	179
46	11.08	-1.06	171	178
50	10.92	-1.06	171	177
54	10.79	-1.02	170	176
58	10.68	-0.94	170	176
62	10.53	-0.75	169	176
66	10.43	-0.57	168	175
70	10.15	-0.37	168	175

**Table 28 - Tidal Constants for O1 Constituent**

**South Side Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.71	0.53	180	324
14	3.99	0.06	180	316
18	3.78	0.35	178	311
22	3.38	0.70	180	314
26	3.52	0.49	174	310
30	3.48	0.33	167	307
34	3.47	0.48	164	305
38	3.60	0.81	164	306
42	3.72	0.89	164	305
46	3.74	0.94	166	304
50	3.50	0.95	164	301
54	3.30	0.73	160	295
58	3.24	0.61	163	289
62	3.37	0.62	167	285
66	3.32	0.53	169	286
70	3.28	0.41	171	284
74	3.64	-0.11	151	280
78	3.59	-0.15	150	278
82	3.49	-0.20	149	277
86	3.51	0.01	152	279
90	3.29	0.21	151	280
94	3.24	0.34	150	281
98	3.16	0.46	151	280
102	3.12	0.63	153	282
106	3.16	0.88	152	278
110	3.16	0.98	153	275
114	3.04	1.17	153	275
118	2.90	1.45	157	276
122	2.88	1.56	158	277
126	2.96	1.77	159	278
130	3.16	1.87	157	273
134	3.35	1.93	158	271
138	3.47	2.04	158	267

**Table 28 - Tidal Constants for O1 Constituent (continued)**

**South Side Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.58	0.92	183	296
14	2.81	1.03	181	291
18	2.87	0.92	174	290
22	2.90	0.95	168	285
26	2.94	0.93	164	283
30	3.05	0.84	164	283
34	3.20	0.84	164	280
38	3.00	0.84	162	278
42	2.91	0.75	163	278
46	3.08	0.68	162	278
50	3.12	0.61	161	278
54	3.22	0.56	161	277
58	3.19	0.60	161	276
62	3.14	0.76	160	275
66	3.21	0.79	158	272
70	3.31	0.75	155	270
74	3.86	0.27	144	271
78	3.95	0.39	144	270
82	3.99	0.46	145	270
86	4.03	0.53	146	269
90	4.05	0.57	146	270
94	4.08	0.65	148	271
98	4.17	0.67	150	273
102	4.20	0.74	151	273
106	4.23	0.84	152	273
110	4.26	0.92	154	274
114	4.27	0.94	156	274
118	4.30	0.92	157	275
122	4.36	1.02	158	275
126	4.41	1.11	158	276
130	4.43	1.17	158	275
134	4.46	1.05	158	273
138	4.40	0.86	161	270

**Table 28 - Tidal Constants for O1 Constituent (continued)**

**South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	5.90	0.51	156	299
33	6.43	0.57	158	301
41	6.51	0.55	157	300
49	6.87	0.31	159	300
57	7.10	0.38	156	301
65	7.32	0.31	158	303
73	7.47	0.53	161	303
81	7.39	0.53	163	303
89	7.44	0.85	164	303
97	7.29	1.02	164	303
105	7.54	1.23	164	304
113	7.55	1.11	163	303
121	7.62	0.86	163	304
129	7.61	0.85	163	304
137	7.74	0.99	163	303
145	7.81	0.86	162	303
153	7.97	0.85	164	305
161	8.11	0.72	165	305
169	8.50	0.56	165	304
177	8.94	0.50	165	304
185	9.02	0.24	166	302
193	9.44	0.11	166	302
201	9.88	-0.02	165	302
209	10.38	-0.19	164	302
217	10.77	-0.24	163	303
225	10.60	-0.38	161	305
233	10.85	-0.23	162	308

**Table 28 - Tidal Constants for O1 Constituent (continued)**

**South Central Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	5.51	0.01	168	302
33	5.64	-0.09	165	300
41	5.69	-0.25	163	300
49	5.55	-0.18	162	299
57	5.47	-0.18	162	300
65	5.54	-0.25	162	300
73	5.53	-0.26	163	300
81	5.53	-0.29	162	301
89	5.60	-0.22	163	301
97	5.65	-0.28	163	301
105	5.63	-0.23	163	301
113	5.78	-0.27	163	302
121	5.94	-0.27	162	301
129	6.08	-0.24	162	301
137	6.09	-0.22	161	303
145	6.00	-0.04	162	304
153	6.12	-0.16	162	304
161	6.32	-0.33	161	305
169	6.38	0.04	163	307
177	6.52	0.28	165	307
185	6.49	0.39	164	306
193	6.73	0.31	163	303
201	7.20	0.18	162	303
209	7.58	-0.11	161	301
217	7.88	-0.13	162	302
225	7.49	-0.17	161	301
233	7.47	-0.32	162	303

**Table 28 - Tidal Constants for O1 Constituent (continued)**

**Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.82	-0.30	163	303
14	5.76	-0.36	162	301
18	5.72	-0.72	160	301
22	5.79	-0.92	160	302
26	5.66	-0.62	161	303
30	5.57	-0.47	163	304
34	5.68	-0.53	163	305
38	5.71	-0.54	162	308
42	5.90	-0.58	162	310
46	6.05	-0.64	163	310
50	6.03	-0.62	161	311
54	5.97	-0.59	161	309
58	5.99	-0.64	162	310
62	6.06	-0.51	161	311
66	5.99	-0.47	162	312
70	5.93	-0.57	160	313

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.63	-0.07	169	312
14	5.13	-0.46	166	311
18	5.30	-0.65	164	309
22	5.30	-0.86	161	306
26	5.22	-0.88	160	304
30	5.33	-0.82	159	304
34	5.45	-0.90	157	305
38	5.31	-0.90	157	306
42	5.23	-0.85	158	305
46	5.46	-1.03	157	306
50	5.62	-1.07	158	306
54	5.57	-1.06	158	306
58	5.56	-1.10	158	306
62	5.57	-1.12	159	306
66	5.61	-1.16	158	307
70	5.57	-1.10	158	308

**Table 28 - Tidal Constants for O1 Constituent (continued)**

**North Side Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.21	-0.62	177	291
14	4.39	-0.34	177	291
18	4.43	-0.32	179	295
22	4.43	-0.51	183	291
26	4.44	-0.25	187	286
30	4.46	-0.13	186	283
34	4.62	-0.36	180	280
38	4.76	-0.42	178	275
42	4.87	-0.26	176	275
46	4.71	-0.15	173	276
50	4.56	0.19	175	275
54	4.64	0.08	176	272
58	4.79	0.23	175	267
62	4.96	0.19	174	264
66	5.03	0.07	171	263
70	5.12	-0.09	170	260

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.74	0.60	180	247
14	3.60	0.65	176	249
18	3.96	0.61	171	250
22	4.18	0.38	167	248
26	4.39	0.25	165	248
30	4.39	0.17	165	249
34	4.42	0.14	167	251
38	4.30	0.20	169	254
42	4.26	0.25	170	254
46	4.35	0.24	170	256
50	4.44	0.10	169	258
54	4.50	0.06	169	258
58	4.54	0.01	167	259
62	4.64	0.01	167	261
66	4.74	0.00	167	261
70	4.72	-0.08	167	260

**Table 29 - Tidal Constants for P1 Constituent**

**South Side Barrow Strait**

**For Ice Free Period (Aug. 09, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.69	-1.64	151	2
14	2.85	-1.60	164	351
18	2.41	-1.01	167	355
22	2.79	-1.36	166	341
26	3.00	-1.89	174	325
30	3.76	-1.89	179	318
34	3.58	-1.29	187	315
38	2.09	-0.80	208	300
42	1.37	-0.22	244	301
46	1.69	-0.28	256	329
50	1.88	-0.14	246	334
54	1.82	-0.19	219	327
58	2.22	-0.90	224	303
62	2.44	-1.09	239	291
66	2.06	-1.49	230	300
70	2.35	-1.83	154	6
74	3.28	-0.88	144	358
78	3.56	-0.79	148	1
82	3.25	-0.81	153	356
86	2.97	-0.30	163	354
90	3.00	-0.07	170	1
94	2.79	0.19	179	11
98	2.93	0.77	191	17
102	3.13	0.87	192	20
106	3.15	1.02	195	23
110	2.90	0.92	196	27
114	3.17	0.81	197	31
118	3.20	0.77	197	29
122	3.45	0.61	195	18
126	3.88	0.36	175	10
130	4.28	0.03	172	14
134	4.77	-0.21	174	22
138	5.30	-0.05	179	26

**Table 29 - Tidal Constants for P1 Constituent (continued)**

**South Side Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	3.17	0.43	196	15
14	2.94	0.19	194	7
18	2.91	0.07	193	356
22	2.90	0.14	194	356
26	2.55	0.48	190	352
30	2.42	0.72	183	346
34	2.30	0.74	176	340
38	2.15	0.81	170	334
42	2.24	0.85	170	333
46	2.22	0.95	170	329
50	2.28	0.93	167	327
54	2.39	0.89	169	326
58	2.37	0.77	168	326
62	2.38	0.83	167	327
66	2.32	0.91	167	328
70	2.11	1.00	170	329
74	2.73	0.84	135	320
78	2.86	0.90	135	320
82	2.93	0.99	136	320
86	2.94	1.14	136	319
90	2.83	1.18	137	317
94	2.80	1.27	138	317
98	2.78	1.32	139	318
102	2.74	1.23	141	319
106	2.65	1.20	140	316
110	2.61	1.23	140	316
114	2.50	1.28	140	316
118	2.50	1.34	142	317
122	2.51	1.33	140	315
126	2.43	1.39	140	314
130	2.26	1.26	145	317
134	2.30	1.10	148	317
138	2.27	0.98	149	315

**Table 29 - Tidal Constants for P1 Constituent (continued)**

**South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	3.90	-0.92	137	291
33	5.29	-1.09	135	298
41	4.69	-0.92	128	312
49	4.64	-0.13	142	320
57	4.81	-0.69	141	328
65	5.18	-1.39	139	322
73	5.48	-1.24	136	322
81	4.97	-0.73	131	324
89	4.65	-0.46	132	318
97	4.83	-0.79	130	320
105	4.32	-0.27	128	318
113	4.35	-0.02	132	321
121	4.84	-0.12	133	316
129	4.82	-0.09	130	312
137	4.62	0.16	129	311
145	3.99	0.46	133	317
153	4.27	0.42	126	314
161	4.76	0.61	131	309
169	5.16	-0.15	138	308
177	5.46	-0.41	142	312
185	5.78	0.32	148	309
193	6.36	0.25	147	305
201	6.31	-0.17	151	303
209	6.94	-0.31	148	306
217	7.84	-0.06	146	309
225	8.09	-0.31	146	315
233	8.21	-0.15	152	319

**Table 29 - Tidal Constants for P1 Constituent (continued)**

**South Central Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 to Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	4.53	-0.96	172	351
33	4.58	-1.05	167	349
41	4.57	-0.96	164	349
49	4.50	-1.05	161	349
57	4.38	-1.13	160	349
65	4.50	-1.03	162	348
73	4.44	-1.06	160	348
81	4.67	-1.03	161	346
89	4.57	-1.06	163	345
97	4.56	-1.02	162	345
105	4.63	-1.09	162	346
113	4.61	-1.08	161	347
121	4.71	-1.17	161	347
129	4.89	-1.19	162	350
137	4.90	-1.01	161	351
145	4.74	-0.87	162	350
153	4.78	-0.98	161	349
161	4.86	-1.09	158	350
169	4.83	-1.25	158	348
177	4.97	-1.31	157	347
185	5.15	-1.33	156	346
193	5.14	-1.26	157	344
201	5.26	-1.39	156	343
209	5.54	-1.54	157	342
217	5.76	-1.67	155	346
225	5.33	-1.76	157	344
233	5.49	-1.69	157	344

**Table 29 - Tidal Constants for P1 Constituent (continued)**

**Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.18	-0.45	155	340
14	5.07	-0.68	162	335
18	5.97	-1.05	165	337
22	5.81	-0.87	165	338
26	5.27	-0.37	158	346
30	4.91	-0.02	158	351
34	4.53	-0.52	156	353
38	4.60	-0.91	154	354
42	4.74	-0.88	154	0
46	4.77	-0.46	154	3
50	4.77	-0.36	154	0
54	4.70	-0.63	153	1
58	4.67	-0.39	155	4
62	4.53	-0.45	154	5
66	4.63	-0.65	153	9
70	4.42	-0.67	152	11

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	4.79	-1.09	173	3
14	5.21	-1.28	170	1
18	4.99	-1.37	165	358
22	4.62	-1.10	165	355
26	4.30	-0.95	165	354
30	4.13	-0.98	162	355
34	4.02	-1.01	160	355
38	4.05	-1.12	158	355
42	4.20	-1.08	159	356
46	4.14	-1.12	160	355
50	4.12	-1.04	160	356
54	4.15	-0.93	160	358
58	4.12	-0.95	161	358
62	4.12	-0.97	161	357
66	4.09	-0.96	161	357
70	3.96	-0.94	160	357

**Table 29 - Tidal Constants for P1 Constituent (continued)**

**North Side Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.16	0.00	228	11
14	2.41	0.52	210	328
18	3.28	0.62	188	307
22	3.38	0.38	171	300
26	3.28	0.25	172	287
30	3.18	0.44	165	281
34	2.74	0.81	158	277
38	2.47	0.70	161	284
42	2.25	1.03	167	282
46	2.93	0.81	166	280
50	3.62	0.89	155	283
54	3.66	0.77	152	286
58	3.41	0.75	159	285
62	3.46	0.81	162	287
66	3.44	1.03	164	293
70	3.95	0.72	167	299

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.38	0.75	180	300
14	3.02	0.77	175	300
18	3.37	0.52	166	297
22	3.57	0.25	163	297
26	3.71	0.06	163	294
30	3.71	-0.08	162	291
34	3.57	-0.01	161	291
38	3.53	0.22	161	294
42	3.60	0.43	162	296
46	3.67	0.41	165	298
50	3.67	0.39	166	302
54	3.65	0.32	165	303
58	3.59	0.26	167	307
62	3.59	0.28	167	310
66	3.61	0.26	167	312
70	3.70	0.15	167	315

**Table 30 - Tidal Constants for S2 Constituent**

**South Side Barrow Strait**

**For Ice Free Period (Aug. 9, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.08	-2.28	183	245
14	4.85	-1.67	183	247
18	4.73	-1.05	173	247
22	4.85	-0.82	168	245
26	4.68	-0.64	162	244
30	4.62	-0.84	158	244
34	4.69	-0.68	158	239
38	4.56	-0.18	159	242
42	4.27	-0.05	160	245
46	3.84	0.09	164	248
50	3.71	0.53	167	247
54	3.75	0.76	168	245
58	4.14	0.94	170	249
62	4.34	0.93	167	249
66	4.69	0.95	167	250
70	4.57	0.83	168	253
74	4.75	-0.04	148	259
78	4.86	-0.15	150	262
82	4.62	-0.35	152	265
86	4.66	-0.41	155	268
90	4.83	-0.44	158	267
94	4.83	-0.58	158	266
98	4.98	-0.59	156	266
102	5.07	-0.64	154	266
106	5.06	-0.74	152	265
110	5.06	-0.55	150	265
114	4.99	-0.41	150	264
118	4.98	-0.31	152	264
122	4.87	-0.27	153	263
126	4.73	-0.15	155	264
130	4.75	-0.20	156	266
134	4.81	-0.35	159	267
138	4.68	-0.54	165	268

**Table 30 - Tidal Constants for S2 Constituent (continued)**

**South Side Barrow Strait**

**For Solid ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	1.63	0.82	225	133
14	1.42	1.04	157	233
18	1.77	0.79	164	241
22	2.37	0.29	167	244
26	3.12	-0.17	174	248
30	3.59	-0.53	178	253
34	3.86	-0.67	179	252
38	3.87	-0.90	179	251
42	3.87	-1.13	180	251
46	4.21	-1.19	177	249
50	4.05	-1.04	173	249
54	3.98	-0.94	172	247
58	3.99	-0.84	171	246
62	3.91	-0.76	171	244
66	3.91	-0.87	170	244
70	3.87	-0.85	169	244
74	3.99	-0.98	154	242
78	4.05	-1.01	155	242
82	4.17	-1.03	154	243
86	4.18	-1.16	153	243
90	4.19	-1.15	154	243
94	4.10	-1.11	153	243
98	4.04	-1.13	153	244
102	4.00	-1.06	153	245
106	3.88	-1.05	154	246
110	3.77	-1.00	155	246
114	3.71	-0.81	157	243
118	3.57	-0.69	159	243
122	3.42	-0.56	160	244
126	3.36	-0.42	163	246
130	3.32	-0.29	167	249
134	3.22	-0.13	172	251
138	3.13	0.12	180	256

**Table 30 - Tidal Constants for S2 Constituent (continued)**

**South Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 02, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	6.74	-1.72	205	242
33	6.43	-1.40	212	247
41	5.93	-0.91	213	256
49	5.60	-0.65	217	257
57	5.40	-0.81	220	261
65	5.40	-0.80	222	265
73	5.34	-0.76	226	262
81	5.25	-0.67	224	263
89	5.17	-0.61	225	261
97	5.08	-0.71	224	260
105	5.05	-0.88	223	260
113	5.22	-0.92	223	259
121	5.02	-0.65	220	259
129	4.75	-0.73	226	262
137	4.51	-0.56	226	263
145	4.46	-0.64	226	266
153	4.55	-0.51	229	268
161	4.29	-0.23	233	266
169	3.90	-0.16	236	263
177	3.59	0.08	237	264
185	3.12	0.21	237	266
193	2.85	0.35	232	265
201	2.64	0.03	221	255
209	2.89	-0.17	217	251
217	3.60	-0.78	217	245
225	3.72	-1.30	221	247
233	3.51	-1.99	225	249

**Table 30 - Tidal Constants for S2 Constituent (continued)**

**South Central Barrow Strait**

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
25	2.46	0.94	196	261
33	2.97	0.41	190	258
41	3.29	-0.02	190	260
49	3.34	0.00	190	258
57	3.42	0.06	188	258
65	3.33	0.14	187	256
73	3.34	0.01	187	255
81	3.32	0.10	187	254
89	3.39	0.14	184	254
97	3.55	0.12	186	254
105	3.53	-0.04	186	255
113	3.58	0.05	185	255
121	3.64	-0.03	183	253
129	3.72	-0.02	181	252
137	3.74	0.00	181	249
145	3.73	-0.02	180	247
153	3.63	0.04	181	246
161	3.46	0.24	182	248
169	3.15	0.35	184	251
177	2.94	0.78	184	248
185	2.84	0.71	182	245
193	2.69	0.53	181	245
201	2.58	0.74	183	247
209	2.43	0.77	187	246
217	2.35	1.17	186	250
225	1.93	1.23	190	253
233	1.61	1.32	193	253

**Table 30 - Tidal Constants for S2 Constituent (continued)**

**Central Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	10.52	-6.38	162	233
14	9.92	-5.72	168	237
18	8.47	-4.23	176	243
22	6.95	-2.93	176	250
26	6.06	-1.88	176	253
30	5.87	-1.70	174	253
34	5.66	-1.57	172	250
38	5.48	-1.56	169	248
42	5.44	-1.45	169	248
46	5.30	-1.35	170	248
50	5.14	-1.16	170	249
54	5.21	-1.07	170	250
58	5.26	-1.13	170	250
62	5.34	-1.19	171	251
66	5.33	-1.10	171	252
70	5.26	-1.07	172	252

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	2.10	0.61	65	146
14	1.63	1.19	77	155
18	2.32	0.53	160	237
22	3.40	-0.30	161	239
26	4.11	-0.79	162	238
30	4.64	-1.29	165	235
34	4.79	-1.59	169	239
38	4.83	-1.68	172	241
42	4.82	-1.79	172	243
46	5.02	-1.83	173	245
50	4.91	-1.72	174	245
54	4.86	-1.55	173	245
58	4.75	-1.44	173	244
62	4.75	-1.48	173	245
66	4.78	-1.48	173	245
70	4.75	-1.41	173	246

**Table 30 - Tidal Constants for S2 Constituent (continued)**

**North Side Barrow Strait**

**For Ice Free Period (Aug. 10, 2005 – Oct. 06, 2005):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	5.00	-1.32	173	232
14	5.31	-0.98	180	232
18	5.23	-0.89	180	233
22	4.91	-0.57	181	233
26	4.89	-0.53	182	230
30	4.47	-0.35	183	230
34	4.22	-0.45	184	232
38	4.14	-0.32	180	235
42	4.18	-0.13	177	236
46	4.35	-0.10	177	235
50	4.06	0.06	178	233
54	3.86	0.09	175	233
58	3.77	0.04	176	232
62	3.76	-0.05	177	233
66	3.74	0.12	177	232
70	3.62	0.09	175	230

**For Solid Ice Period (Jan. 21, 2006 – Jun. 28, 2006):**

Depth (m)	Major Amplitude (cm/s)	Minor Amplitude (cm/s)	Orientation (degrees cc from East)	Greenwich Phase (degrees)
10	1.89	1.03	179	212
14	2.85	1.44	177	220
18	3.33	1.20	181	225
22	3.67	0.90	181	230
26	3.99	0.58	182	234
30	4.16	0.19	182	232
34	4.25	-0.19	180	230
38	3.97	-0.25	177	228
42	3.92	-0.16	174	226
46	4.16	-0.17	172	222
50	4.06	-0.19	172	221
54	4.09	-0.07	171	219
58	4.05	-0.12	171	218
62	4.08	-0.05	171	220
66	4.12	-0.12	171	219
70	4.05	-0.16	171	220

**Table 31: Ice Profiling Sonar, Ice Draft Monthly Statistics  
South-Central Barrow Strait, August 2005 – July 2006**

Year	Month	Ice Draft (m)		
		Mean	Maximum	Std.Dev
2005	August	0.00	2.93	0.03
	September	0.00	2.68	0.04
	October	0.43	8.38	0.68
	November	1.54	12.63	1.51
	December	1.19	12.31	1.19
2006	January	0.86	12.85	0.76
	February	0.83	2.18	0.12
	March	1.08	2.15	0.08
	April	1.22	1.41	0.04
	May	1.30	2.15	0.07
	June	1.18	3.42	0.30
	July	0.41	7.67	0.58

**Table 32: Ice Profiling Sonar, Ice Draft Percent Frequency by Month**  
**South-Central Barrow Strait, August 2005 – July 2006**

Ice Draft (m)	2005					2006						
	August	September	October	November	December	January	February	March	April	May	June	July
Open Water	99.95	99.94	9.35	0.01	0.02	0.00	0.00	0.00	0.00	0.00	5.73	59.86
0.0-0.5	0.01	0.01	71.13	26.22	12.91	10.94	0.00	0.00	0.00	0.00	0.04	1.23
0.5-1.0	0.01	0.01	8.81	27.94	56.53	70.06	96.96	16.72	0.00	0.00	0.03	23.88
1.0-1.5	0.01	0.01	3.84	10.02	9.82	10.72	2.48	82.98	100.00	98.99	94.06	11.54
1.5-2.0	0.01	0.02	2.43	8.18	5.53	2.58	0.44	0.19	0.00	0.65	0.12	1.98
2.0-2.5	0.00	0.01	1.57	6.53	4.03	1.75	0.12	0.11	0.00	0.37	0.02	0.75
2.5-3.0	0.00	0.00	1.11	5.74	2.82	1.09	0.00	0.00	0.00	0.00	0.00	0.33
3.0-3.5	0.00	0.00	0.75	3.94	2.09	0.86	0.00	0.00	0.00	0.00	0.00	0.20
3.5-4.0	0.00	0.00	0.45	3.28	1.64	0.59	0.00	0.00	0.00	0.00	0.00	0.10
4.0-4.5	0.00	0.00	0.28	2.46	1.43	0.42	0.00	0.00	0.00	0.00	0.00	0.04
4.5-5.0	0.00	0.00	0.15	1.84	0.95	0.29	0.00	0.00	0.00	0.00	0.00	0.02
5.0-5.5	0.00	0.00	0.08	1.24	0.84	0.20	0.00	0.00	0.00	0.00	0.00	0.01
5.5-6.0	0.00	0.00	0.04	0.79	0.44	0.15	0.00	0.00	0.00	0.00	0.00	0.01
6.0-6.5	0.00	0.00	0.01	0.63	0.30	0.09	0.00	0.00	0.00	0.00	0.00	0.01
6.5-7.0	0.00	0.00	0.01	0.38	0.22	0.07	0.00	0.00	0.00	0.00	0.00	0.01
7.0-7.5	0.00	0.00	0.00	0.25	0.13	0.07	0.00	0.00	0.00	0.00	0.00	0.00
7.5-8.0	0.00	0.00	0.00	0.17	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00
8.0-8.5	0.00	0.00	0.00	0.11	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00
8.5-9.0	0.00	0.00	0.00	0.11	0.07	0.02	0.00	0.00	0.00	0.00	0.00	0.00
9.0-9.5	0.00	0.00	0.00	0.05	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00
9.5-10.0	0.00	0.00	0.00	0.04	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00
>=10.0	0.00	0.00	0.00	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00

**Table 33: South Side Barrow Strait, Water Level Recorder Statistical Summary**

Season	Temperature (°C)				Depth (m)			
	Avg	SD	Min	Max	Avg	SD	Min	Max
Late Summer	-1.37	0.07	-1.63	-1.01	147.14	0.52	145.92	148.46
Fall	-1.20	0.13	-1.39	-0.74	147.08	0.50	145.96	148.41
Winter	-1.25	0.10	-1.56	-0.88	147.06	0.50	145.78	148.39
Spring	-1.21	0.22	-1.67	-0.57	147.04	0.49	145.96	148.31
Early Summer	-1.35	0.06	-1.53	-1.25	147.19	0.50	146.12	148.29
Year	-1.25	0.15	-1.67	-0.57	147.09	0.50	145.78	148.46

**Table 34: Central Barrow Strait, Water Level Recorder Statistical Summary**

Season	Temperature (°C)				Depth (m)			
	Avg	SD	Min	Max	Avg	SD	Min	Max
Late Summer	-0.72	0.19	-1.11	-0.26	207.85	0.56	206.62	209.24
Fall	-0.91	0.17	-1.35	-0.53	207.77	0.53	206.58	209.13
Winter	-0.81	0.19	-1.21	-0.32	207.73	0.53	206.42	209.13
Spring	-0.65	0.17	-1.07	-0.26	207.71	0.52	206.59	209.00
Early Summer	-0.76	0.20	-1.18	-0.26	207.83	0.52	206.68	209.01
Year	-0.78	0.20	-1.35	-0.26	207.76	0.53	206.42	209.24

**Table 35: North Side Barrow Strait, Water Level Recorder Statistical Summary**

Season	Temperature (°C)				Depth (m)			
	Avg	SD	Min	Max	Avg	SD	Min	Max
Late Summer	-1.17	0.14	-1.43	-0.74	199.36	0.58	198.06	200.84
Fall	-1.08	0.15	-1.36	-0.43	199.31	0.56	197.99	200.76
Winter	-0.93	0.17	-1.29	-0.33	199.27	0.56	197.90	200.75
Spring	-0.85	0.29	-1.53	-0.22	199.26	0.55	198.07	200.64
Early Summer	-0.92	0.19	-1.32	-0.43	199.38	0.56	198.11	200.63
Year	-0.97	0.23	-1.53	-0.22	199.30	0.56	197.90	200.84

**Table 36: West Barrow Strait, Water Level Recorder Statistical Summary**

<b>Season</b>	<b>Temperature (°C)</b>				<b>Depth (m)</b>			
	<b>Avg</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>	<b>Avg</b>	<b>SD</b>	<b>Min</b>	<b>Max</b>
Late Summer	-0.22	0.03	-0.29	-0.15	160.49	0.41	159.51	161.55
Fall	-0.24	0.05	-0.39	-0.12	160.44	0.40	159.47	161.51
Winter	-0.23	0.03	-0.36	-0.15	160.41	0.42	159.38	161.51
Spring	-0.21	0.08	-0.36	0.02	160.39	0.40	159.54	161.40
Early Summer	-0.23	0.04	-0.39	-0.15	160.53	0.40	159.58	161.38
Year	-0.23	0.05	-0.39	0.02	160.44	0.41	159.38	161.55