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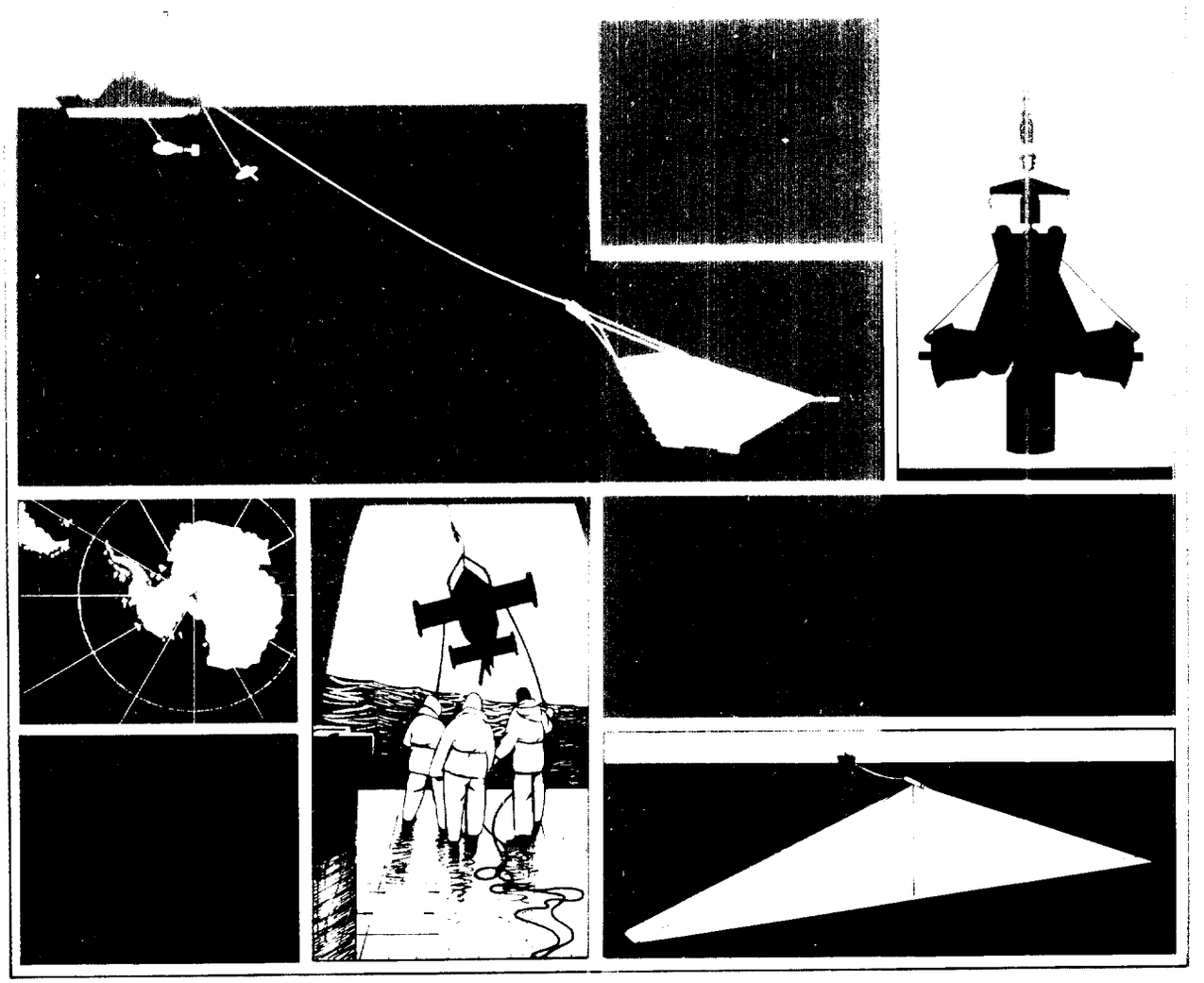
Shipboard ADCP observations during RRS *Charles Darwin* Cruise 51

G Griffiths, M C Hartman & S Alderson

Report No 293 1992



Natural Environment Research Council

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ABSTRACT

This report presents data collected from a survey of the Iceland-Faeroes region made by the *RRS Charles Darwin* on Cruise 51 during July and August 1990. It also includes a summary of ADCP installations and use by IOSDL on NERC research vessels prior to this cruise.

The data were gathered via an RDI 150 kHz ADCP that was vessel mounted in a 'top hat' arrangement. Currents are displayed in the form of horizontal maps of the survey as well as in 12 hr sections to a depth of 350 m. Relative echo amplitude, data quality and horizontal current velocity are shown and discussion of installation through to methods of data presentation are included.

Within the data set are many examples of currents at eddies and fronts. Some show substantial shear with depth and others have a near uniform current profile. The echo amplitude data clearly show diurnal migration of zooplankton. There is also evidence for increased backscatter near fronts

KEYWORDS

ACOUSTIC DOPPLER CURRENT PROFILER(ADCP)
"CHARLES DARWIN"/RRS - cruise(1990)(51)
CURRENT VELOCITY
ICELAND-FAEROES WATERS
RELATIVE ECHO AMPLITUDE
VESSEL MOUNTED ADCP

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CONTENTS

1. INTRODUCTION

Data reports on current meter records, CTDs and SeaSoar are a standard product following Marine Physics cruises at IOSDL. However, although Acoustic Doppler Current Profilers (ADCPs) have been used here for several years, a data report covering the entirety of a cruise dataset has not been produced. The reasons are many and varied, several of the main reasons are discussed below. With the commencement of the Vivaldi (UK WOCE 1988) upper ocean survey cruises, it is now timely to produce an ADCP data report to complement the SeaSoar and CTD data reports that will be produced*.

Scientists at IOSDL have been involved with vessel mounted ADCPs since 1979, when an experimental system, designed at IOSDL, was installed on *RRS Discovery*, (Crocker 1983). Although the unit showed promise, it's use did not become routine, mainly due to the problems of obtaining absolute currents especially when the ship was underway. In July 1986 an RD Instruments shipboard ADCP operating at 150 KHz was fitted onto *RRS Discovery*. The transducer unit was placed in the ASDIC pod, a specially designed housing for sonar transducers that could be lowered some 2 metres below the ships hull to avoid signal loss due to bubble entrapment along the ship's bottom. Purely from a sonar operation viewpoint, this arrangement worked well, but in practice there were several problems: the number of junction boxes required for the 41 way cable meant that the system could not be tested until the pod was in place. Although the pod could either be servo controlled to maintain a fixed heading, or disconnected from the servo and mechanically fixed, the pod did tend to wander by ±2°. Furthermore, its heading could not be guaranteed to be repeatable when raised and lowered. This became a particularly important problem as we attempted to calibrate the instrument. The complexity of the pod electro-hydraulics also required an experienced engineer to be available for each cruise.

Another major problem on RRS Discovery was that of obtaining an accurate and stable input for the ship's heading. The stepper gyro outputs normally available on the vessel proved difficult for the RDI gyro interface to handle. Improvements were made by the company, but the possibility of synchronisation loss was always present. This problem was finally overcome in March 1989 by contracting Sperry to provide a synchro output from the master gyrocompass. This method worked well during the following cruises. Problems with the ASDIC pod leaking, and the difficulty of maintaining long term seals on the junction box led to the ADCP transducer unit being fitted directly to the ship's hull in June 1990.

Table 1 shows a list of MPD cruises that used the ADCP installation on RRS Discovery, with a brief note on data quality and the scientific progress with the dataset. Meanwhile, in October 1986,

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* Since the work on this report started there have been a reappraisal of the role, and effort put into, data reports. This report documents our present practice with ADCP data, and hence is valuable. However, we are not planning to cover in this much detail the Vivaldi (UK WOCE 1988) dataset. Recording the calibration, performance and processing is important and will continue, but summary data only, such as horizontal maps, will be included.

a similar RDI installation was fitted to the *RRS Charles Darwin*. This installation differed from that on *RRS Discovery* in that the transducer unit was fitted in a 'top hat' arrangement, such that the transducer faces were within the line of the ship's hull. A similar installation was fitted to the *RRS Challenger* in September. Tables 2 and 3 list the MPD cruises that have used these installations.

A major problem with obtaining absolute current vectors using ADCPs has been that of obtaining the ship velocity over the ground. Away from the continuous coverage areas of Decca and Loran, until recently, the only viable system was Transit satellite navigation. Crocker, (1983) among others, examined the errors induced by uncertain ship velocities. With the advent of near continuous coverage by the Global Positioning System (GPS) satellites, the task of obtaining absolute velocities has become easier. However, the initial positional accuracy promised by GPS using the commercial code, 5 m rms, was deliberately downgraded to about 50 m rms in early 1990. At a typical survey speed of 8 kts (4 ms^{-1}) this position uncertainty requires velocity averaging over 15 minutes to reduce the rms velocity error to less than 5 cms^{-1}.

The availability of GPS has increased from 8 hrs a day when Pollard and Read (1990) calibrated the ADCP on *RRS Charles Darwin* in March 1988 to virtually 24 hours a day during August 1990. The availability of good ship velocity data has therefore been one major factor in our ability to gather high quality absolute currents and hence to produce this data report.

Another major factor was the development of the shipboard data processing path for ADCP data. The details are given in section 3; to summarise, the experience gained over several cruises was combined on Cruise 51 with an unified method of merging the data with navigation, checking and editing the data, and producing vector plots of current profiles. There are further refinements planned, but the basic shipboard processing now allows the dataset to be presented in a uniform format in a data report without an inordinate amount of effort required back at the laboratory.

We recognise that there may be alternative, and perhaps more appropriate, methods of presenting the ADCP data. The authors would be pleased to received feedback from readers of this report as to methods of showing the data. Our aim has been to show the velocity data in vector form, the data quality in the form of contoured sections of % good and relative scattering amplitude. The latter plot also serves as an indicator of scattering from zooplankton. As the cruise track, Figure 5-9, was in the form of a regular survey of the Iceland-Faeroes-Shetland region, we have been able to extract data at particular depth levels and present as horizontal maps. This method will not be applicable to all cruises.

2. ADCP INSTALLATION - CRUISE 51

The RDI shipboard ADCP (RDI 1990) is a complex instrument system comprising a hull mounted transducer unit, a signal processing unit and a data acquisition system (DAS) based on an

IBM PC-AT. Both the processing unit and the DAS are programmable by the user. Virtually all the functions of the ADCP can be accessed, though the manufacturer cautions the novice user not to alter the low level commands that affect the fundamental operation of the instrument.

As the user can alter the behaviour of the instrument, this data report includes a detailed configuration, Table 4, obtained from the RDI configuration file. We consider this an essential part of the documentation. This lists the type of each variable, its value and a brief description in menu order for the program, the two character codes are as in the ADCP manual, (RDI, 1990). Note that the only direct command (DC) used was FH00001, which turns on the bottom track mode, with one bottom ping per profile ping. Thus, all the low level options available through the direct command menu were set to their default values. This configuration was used throughout the cruise, except when in water shallower than 200 m from leaving port at Aberdeen to the end of the calibration exercise off the Shetlands. In shallow water, the only alteration was to select 4 m bin length and pulse length and 50 depth cells.

We also consider it important to give the versions of both firmware (signal processing unit software in EPROM memory), and software (DAS) that were used during a cruise. RDI make frequent upgrades and some of their firmware upgrades alter important functions such as bin to bin tracking or the bottom track algorithm. On this cruise, the DAS software was version 2.48 and the firmware was version 17.03. Whereas the DAS software has been stable since 1989, the firmware was a beta test version of RDI's improved bottom track algorithm. The performance of this algorithm is discussed in section 5.

The DAS on board *RRS Charles Darwin* is located in the plot, aft of the wheelhouse, and is an area that suffers severe motion in bad weather. There is a facility for mounting a video camera to monitor the ADCP display and relay it to the main laboratory, but unfortunately there was no camera available on this cruise. Checks on the display were made each watch (4 hours) and datafiles from the hard disk were dumped to floppy disk daily. It is unwise to regard the hard disk as a safe data storage medium. A note of the PC clock error (a drift of approximately 1 second per hour) was also made daily, the time was not reset but the clock was corrected for drift later .

Serial data from the DAS were routed via port 2 on the PC at 9600 baud directly to the shipboard computer system, level C, via a (printer) buffer. This arrangement worked very well, with no loss of data. Heading checks using the synchro gyro were made, the 'static' offset was noted.

3. DATA PROCESSING

3.1 Shipboard processing

Processing shipboard ADCP data has evolved over the last three years such that by the end of Cruise 51 many of the plots for this report could have been prepared at sea. The data processing was done entirely on the Sun 3/60 based level C using the Pstar programme library, Pollard et al, (1987). Many programmes specifically written to handle ADCP data have been added to the library. The bulk of the processing was carried out using 'execs' (Unix scripts), these are command files that run a sequence of Pstar programmes, with some parameters automatically supplied and others requested from the user. These execs, inherited from RRS *Discovery* Cruise 189, were significantly enhanced during Cruise 51, adpexec0 through 3 were modified and adpexec 4 and 5 were added. The following sections describe the processing done by each exec.

3.1.1 Adpexec0

This exec , listing 1, reads ADCP data from an RVS format file and writes to a Pstar output file. The data, selected on time, are split into two files (and two datanames), one corresponding to non-gridded data (e.g. heading) and the other to gridded data (e.g. velocity). This exec assumes the following variables in the RVS file: bindepth, heading, velocity port/starboard*, velocity east/west, velocity fore/aft*, velocity north/south, vertical velocity, error velocity, amplitude, percent good, bottom velocity east/west, bottom velocity north/south, depth and spectral width*. (Time is always held.) Those marked with a '*' are not used by the exec and soon dropped.

Data route:

datapup	copy from RVS file to temporary Pstar file
pcypya	copy out non-gridded information from temporary file
pheadr	set up dataname, instrument, etc.
pcopyg	remove extra rows of repeated information
pcalib	change velocity units to cm/s, bottom velocity
pcopya	copy out gridded information from temporary file
pheadr	set up dataname, instrument, etc. and variable names and units
pcalib	change velocity to cm/s, water velocity, agc units to dB using a nominal calibration

3.1.2 Adpexec1

This exec, listing 2, corrects the time in the adcp data files by adding the difference between the ADCP clock time (recorded from the PC display) and the ship's computer time. It expects a series of ADCP times in the format jday, hhmmss, dtime where jday is the day, of year, hhmmss is the time of day and dtime is the time difference in seconds (these should be separated by spaces). A time correction twice per day is adequate since the exec interpolates between entries to achieve a continuous timebase correction. The first and last times must however span the range of times in the ADCP file or the exec will fail.

Data route:

ypstar	creates a pstar file with the three time variables jday, time of day and dtime
pcalib	convert all time to seconds
parith	create one time variable in seconds
pmerge	merge clock correction file with ADCP files
parith	correct timebase by adding dtime

The last two are run twice, once for the gridded file and once for the non-gridded file.

3.1.3 Adpexec2

This exec, listing 3, averages and then adds a pointing angle and amplitude correction to the ADCP data. The user is asked for the start and stop times of the averaging in days, e.g. if a 12 hour file is input then the start and stop times may be ddd.0 and ddd.5, where ddd is the julian day involved.

Data route:

pedita	reset ADCP missing data values (1999) to pstar values (-999) in non-gridded file
pcopya	make additional variables in bottom track work file
pheadr	give new names to calibrated variables
adpcal	calibrate the bottom track velocity
papend	append the present non-gridded file to a master file for the cruise, if it exists
pheadr	enter header information of the master file, if it did not already exist
pedita	reset ADCP missing data values (1999) to pstar values (-999) in gridded file
padpav	average gridded file to less columns
adpcal	apply pointing angle and amplitude corrections

pheadr	rename corrected velocities
adedit	set velocities to missing data where percent good is less than 25%

3.1.4 Adpexec3

This exec, listing 4, calculates the velocity in each cell relative to a reference layer specified by the user. The data are then plotted on the drum plotter, or optionally on the flatbed. The data can be plotted as vectors or profiles, and the absolute currents can also be plotted on the same scale as the ships velocity obtained from the navigation. This latter plot is useful in identifying poor ADCP profiles and poor ship's velocity obtained from navigation.

Data route:

adprel	calculate the velocities relative to a reference layer	
then optionally:	plotgr	plot profiles
	parrog	plot vectors
	overxy	plot ADCP and ship velocity

The relevant plot description files are needed for the three plotting programmes (adpe.pdf, adpn.pdf, RELarrog.pdf, OVER.pdf).

3.1.5 Adpexec4

This exec, listing 5, merges the filtered ADCP data with a smoothed navigation file as created by navexec0 and 1. Absolute velocities are then calculated for each depth cell.

Data route:

pmerge	merge with smoothed navigation
parith	generate absolute velocities

3.1.6. Adpexec5

This exec, listing 6, plots absolute current vectors and or the contoured relative amplitude. It requires two plot description files, ABSarrog.pdf and AMPL.cdf.

Data route:

optionally:	(plist)	get min and max distance run
	parrog	plot absolute current vectors
optionally:	adprl 2	calculate relative amplitudes
	(plist)	get min and max distance run

pcontr plot relative amplitude contours

3.2 Laboratory processing

Several graphical representations of the data have been used in this report in an attempt to convey as much information as possible on the currents and scattering. To provide the large scale background to the data set, maps of the current at four depth levels are shown. These comprise vector plots of horizontal currents obtained using data which has had the M2 tidal component removed using the pstar program demod, this program fits a sinusoid with a specific period, in this case the M2 tidal component of period 12.42 hours, to the data. The sinusoid is fitted to the data using the least squares method, this is then subtracted from the data. The M2 component was chosen since it is the largest tidal component in the area and was therefore the most effective way of removing tidal energy, Figure 1 & 2. At these levels, contour maps of the relative scattering amplitude are also shown, Figure 3 & 4.

* [Four example section plots of relative amplitude, horizontal current velocity and data quality are shown, segmented into twelve hour periods from midday to midnight to midday. These were obtained using raw data, no tidal removal was performed, Figures 4-7.] The horizontal current velocities are represented by vectors at 15 minute intervals. North being represented by a vector at twelve o'clock, East by one at three o'clock, etc. The following steps were taken in producing the final graphical output that is provided in this report.

A. Vector plots at specific depths

pcopyg	for 20, 108, 204 and 308 db over wide area survey
papend	for all files at each depth over wide area survey
peditb	for editing errors
vecplo	for producing 'raw' current data vector plot
demod	for estimating, then removing the M2 tidal component
vecplo	for producing vector plot

B. Relative amplitude contour maps at specific depths

The first three steps of A are repeated.

adprl 2	for producing relative scattering amplitude compared with the mean amplitude for each depth level
ucontr	for producing the contour plot

* *Should read:*

"All the section plots of relative amplitude, horizontal current velocity and data quality are shown, segmented into twelve hour periods from midday to midnight to midday. These were obtained using raw data, no tidal removal was performed, from Figure 5 onwards."

C. Section Plots

1. Relative amplitude:

adprl 2 for producing relative scattering amplitude

ucontr

2. Current vectors:

parrog for 'raw' current vector plots

3. Data quality:

ucontr for contour maps of percent good at 25, 50 and 75%

4. CALIBRATION

The practice at IOSDL is to calibrate shipboard ADCPs for scaling factor (A) and pointing angle (ϕ) errors at least once per cruise. Pollard and Read (1990) set out the procedure; essentially it comprises a zig-zag course pattern, where the currents before and after a 90° turn are assumed constant. This procedure can be used both in deep water and in shallow water, where the bottom track velocity can also be calibrated. Previous practice had been to alter course every 20 minutes, allowing 5 minutes to become steady on course leaving 15 minutes of usable data per leg. However, the degradation of GPS position accuracy earlier in 1990 led us to increase the time between course alterations to 30 minutes, with a corresponding increase to 25 minutes for the usable data.

On Cruise 51 the calibration was done on passage to the first station when the ship was to the east of the Shetlands on 25 July. Nine zig-zags were made in all, between 1000 and 1430 hrs while steaming at 8 knots. The GPS coverage was continuous during the calibration period. Over the seven acceptable course alterations, the mean scaling factor over the depth range 6-78 m was 1.00258 with a standard deviation of .00506, and the mean pointing angle error was -0.36°, with a standard deviation of 0.157°. These values were then used throughout the cruise. Pollard and Read (1990) drew attention to the errors and drift of the ships gyrocompass as being an important source of error in ADCP velocity observations. Routinely, the ships navigating officers take star sights to check on gyrocompass errors, however, due to cloud cover, there were few sights during the cruise. The error band for such observations, $\pm^1/_2$°, make them of limited value in correcting the compass but for completeness they are listed in Table 5.

The following special Pstar programs are used in the calibration procedure together with programs for editing and copying the data.

posspd	-	calculate ship velocity over the ground from GPS lat. and lon.
fdiff	-	calculate velocity differences before and after turns
paphi 2	-	solve for misalignment angle and scaling factor
adpzcl	-	calculate mean and standard deviation of A and ϕ

5. DISCUSSION

Processing ADCP data has been simplified following the use of the execs documented in this report. Careful inspection of the data as it is gathered is still necessary to ensure high quality. Expecially in depths of less than 500 metres, the bottom reflection can cause significant errors that are not trapped by the present program. In rough weather the performance of an ADCP can deteriorate rapidly. With firmware versions prior to 17.03, this deterioration has taken the form of an apparent near-surface shear. Following changes by RDI, this problem seems to have been reduced, and there was no real evidence for such behaviour on this cruise*

The improvements by RDI in the bottom tracking algorithm were welcome. We tested their upgrade on this cruise and a short report was submitted to them. Bottom tracking is now fully automatic to some 750 metres, a 50% improvement over the previous range. However, problems were found in very shallow waters of less than 30 metres due to the very short length of the adaptive bottom track pulse. This problem was soon corrected by RDI after our report.

Processing and displaying ADCP data still need improvement. Data quality will benefit from using more stringent screening algorithms. The need to be able to apply re-calibration should be tackled. There is much interest in bio-acoustics and in using the ADCP to estimate zooplankton abundance. Programs will be needed to calibrate the backscatter data.

This data set is rich in portraying small scale eddies and current jets at fronts. A full discussion is beyond the scope of this report, but an example of a frontal crossing occurs on Day 219 near 4700 km distance run. An example of crossing an eddy can be seen on Day 226 near 7050 km distance run. Interpreting the current data, however, is greatly assisted by a map of the hydrography. The large tidal currents in this area, and their rapid spatial changes of amplitude and phase, complicate the interpretation.

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* On Cruise 58, April 1991, we noted that in severe weather the entire profile data was lost. This is preferable to gathering data of poor quality.

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TABLE 1

IOSDL Cruises on *RRS Discovery* using the ADCP

Cruise	PSO	Comment
162	Saunders	Initial Trials - no ships heading
164	Pollard	Sections partially processed, heading poor
165	Luyten	Agulhas sections worked up by University Hawaii
174	Saunders	
181	Pollard	Variable quality data, showing spurious shears. Pod retracted.
189	King	Transducer leaked and failed early in cruise, no usable data.
193	Pingree	Pod deployed, electronics reconfigured to remove most junction boxes. Good data. No damage to system when deployed even at 11.5 knots.

TABLE 2

IOSDL Cruises on *RRS Charles Darwin* using the ADCP

Cruise	PSO	Comment
32	Pollard	ADCP calibration procedures established, Pollard and Read (1989)
34A	Webb/King	Data report to be produced
42	Saunders	
43	Taylor	
50	Gould	
51	Griffiths	This data set

TABLE 3

IOSDL Cruises on *RRS Challenger* using the ADCP

Cruise	PSO	Comment
15/87	Gould	Section data used for transport estimates in Faeroe Bank Channel
18/87	Pingree	Internal waves in Bay of Biscay. No poor quality data noted.
31/88	Pingree	

TABLE 4

AD,SI,HUNDREDTHS	120.00	Sampling interval
AD,NB,WHOLE	64	Number of Depth Bins
AD,BL,WHOLE	3	Bin Length
AD,PL,WHOLE	8	Pulse Length
AD,BK,TENTHS	3.0	Blank Beyond Transmit
AD,PE,WHOLE	1	Pings Per Ensemble
AD,PC,HUNDREDTHS	1.00	Pulse Cycle Time
AD,PG,WHOLE	25	Percent Pings Good Threshold
XX,OD2,WHOLE	5	[SYSTEM DEFAULT, OD2]
XX,TE,HUNDREDTHS	0.00	[SYSTEM DEFAULT, TE]
AD,US,BOOLE	YES	Use Direct Commands on StartUp
DP,TR,BOOLE	NO	Toggle roll compensation
DP,TP,BOOLE	NO	Toggle Pitch compensation
DP,TH,BOOLE	YES	Toggle Heading compensation
DP,VS,BOOLE	NO	Calculate Sound Velocity from TEMP/Salinity
DP,UR,BOOLE	YES	Use Reference Layer
DP,FR,WHOLE	6	First Bin for reference Layer
DP,LR,WHOLE	15	Last Bin for reference Layer
DP,BT,BOOLE	YES	Use Bottom Track
DP,B3,BOOLE	NO	Use 3 Beam Solutions
DP,EV,BOOLE	YES	Use Error Velocity as Percent Good Criterion
DP,ME,TENTHS	100.0	Max. Error Velocity for Valid Data (cm/sec)
DR,RD,BOOLE	YES	Recording on disk
DR,RX,BOOLE	YES	Record N/S (FORE/AFT) Vel.
DR,RY,BOOLE	YES	Record E/W (FORT/STBD) Vel.
DR,RZ,BOOLE	YES	Record vertical vel.
DR,RE,BOOLE	YES	Record error Good
DR,RB,BOOLE	NO	Bytes of user prog. buffer
DR,RP,BOOLE	YES	Record Percent good
DR,RA,BOOLE	YES	Record average AGC/Bin
DR,RN,BOOLE	YES	Record Ancillary data
DR,AP,BOOLE	NO	Auto-ping on start-up
XX,LDR,TRI	3	[SYSTEM DEFAULT, LDR]
XX,RB2,WHOLE	0	[SYSTEM DEFAULT, RB2]
DR,RC,BOOLE	NO	Record CTD data
XX,FB,WHOLE	1	[SYSTEM DEFAULT, FB]
XX,PU,BOOLE	NO	[SYSTEM DEFAULT, PU]
GC,TG,TRI	1	DISPLAY (NO/GRAPH/TAB)
GC,ZV,WHOLE	1	ZERO VELOCITY REFERENCE (S/B/M/L)
GC,VL,WHOLE	-100	LOWEST VELOCITY ON GRAPH
CG,VH,WHOLE	100	HIGHEST VELOCITY ON GRAPH
GC,DL,WHOLE	0	LOWEST DEPTHS ON GRAPH
GC,DH,WHOLE	500	HIGHEST DEPTHS ON GRAPH
GC,SW,BOOLE	NO	SET DEPTHS WINDOW TO INCLUDE ALL BINS
GC,MP,WHOLE	25	MINIMUM PERCENT GOOD TO PLOT
SG,PNS,BOOLE	YES	PLOT NORTH/SOUTH VEL.
SG,PEW,BOOLE	YES	PLOT EAST/WEST VEL.
SG,PVT,BOOLE	NO	PLOT VERTICAL VEL.
SG,PEV,BOOLE	YES	PLOT ERROR VEL.
SG,PPE,BOOLE	NO	PLOT PERCENT ERROR
SG,PMD,BOOLE	NO	PLOT MAG AND DIR
SG,PSW,BOOLE	NO	PLOT AVERAGE SP. W.
SG,PAV,BOOLE	YES	PLOT AVERAGE AGC.
SG,PPG,BOOLE	YES	PLOT PERCENT GOOD
SG,PD1,BOOLE	NO	PLOT DOPPLER 1

SG,PD2,BOOLE	NO	PLOT DOPPLER 2
SG,PD3,BOOLE	NO	PLOT DOPPLER 3
SG,PD4,BOOLE	NO	PLOT DOPPLER 4
SG,PW1,BOOLE	NO	PLOT SP. W. 1
SG,PW2,BOOLE	NO	PLOT SP. W. 2
SG,PW3,BOOLE	NO	PLOT SP. W. 3
SG,PW4,BOOLE	NO	PLOT SP. W. 4
SG,PA1,BOOLE	NO	PLOT AGC 1
SG,PA2,BOOLE	NO	PLOT AGC 2
SG,PA3,BOOLE	NO	PLOT AGC 3
SG,PA4,BOOLE	NO	PLOT AGC 4
SG,PP3,BOOLE	NO	PLOT 3-BEAM SOLUTION
SS,OD,WHOLE	5	OffSet for Depth
SS,OH,TENTHS	0.0	OffSet for Heading
SS,OP,TENTHS	0.0	OffSet for Pitch
SS,ZR,TENTHS	0.0	OffSet for Roll
SS,OT,HUNDREDTHS	45.00	OffSet FOR temp
SS,ST,HUNDREDTHS	50.00	Scale for Temp
SS,SL,HUNDREDTHS	35.00	Salinity (PPT)
SS,UD,BOOLE	YES	Toggle UP/DOWN
SS,CV,BOOLE	NO	Toggle concave/Convex transducerhead
SS,MA,TENTHS	30.0	Mounting angle for transducers.
SS,SS,HUNDREDTHS	1500.00	Speed of Sound (m/sec)
XX,GP,BOOLE	YES	[SYSTEM DEFAULT, GP]
XX,DD,TENTHS	1.0	[SYSTEM DEFAULT, DD]
XX,PT,BOOLE	NO	[SYSTEM DEFAULT, PT]
XX,TU,TRI	2	[SYSTEM DEFAULT, TU]
TB,FP,WHOLE	1	FIRST BINS TO PRINT
TB,LP,WHOLE	64	LAST BIN TO PRINT
TB,SK,WHOLE	6	SKIP INTERVAL BETWEEN BINS
TB,DT,BOOLE	YES	DIAGNOSTIC TAB MODE
DU,TD,BOOLE	NO	TOGGLE USE OF DUMMY DATA
XX,PN,WHOLE	0	[SYSTEM DEFAULT, PN]
DR,SD,WHOLE	3	Second recording drive
DR,PD,WHOLE	3	First recording drive (1=A:,2=B: ...)
DP,PX,BOOLE	NO	Profiler does XYZE transform
SS,LC,TENTHS	5.0	Limit of Knots change
SS,NW,TENTHS	0.5	Weight of new knots of value
GC,GM,TRI	2	GRAPHICS CONTROL 0=LO RES, 1=HI RES, 2=ENHANCED
AD,PS,BOOLE	NO	YES=SERIAL/NO=PARALLEL Profiler Link
XX,LNN,BOOLE	YES	[SYSTEM DEFAULT, LNN]
XX,BM,BOOLE	YES	[SYSTEM DEFAULT, BM]
XX,RSD,BOOLE	NO	RECORD STANDARD DEVIATION OF VELOCITIES PER BIN
XX,DRV,WHOLE	0	[SYSTEM DEFAULT, DRV]
XX,PBD,WHOLE	3	[SYSTEM DEFAULT, PBD]
TB,RS,BOOLE	NO	SHOW RHPT STATISTIC
UX,EE,BOOLE	YES	ENABLE EXIT TO EXTERNAL PROGRAM
SS,VSC,TRI	0	Velocity scale adjustment
AD,DM,BOOLE	YES	USE DMA
TB,SC,BOOLE	NO	SHOW CTD DATA
AD,CW,BOOLE	NO	Collect spectral width
DR,RW,BOOLE	NO	Record average SP.W./Bin
DR,RRD,BOOLE	NO	Record last raw dopplers
DR,RRA,BOOLE	NO	Record last raw AGC
DR,RRW,BOOLE	NO	Record last SP.W.
DR,R3,BOOLE	NO	Record average 3-Beam solutions
DR,RBS,BOOLE	YES	Record beam statistic

```
XX,STD,BOOLE                NO    [SYSTEM DEFAULT, STD]
LR,HB,HUNDREDTHS          0.00    Heading Bias
SL,1,ARRAY5                 0     1     8     NONE     9600    PROFILER
SL,2,ARRAY5                 0     1     8     NONE     1200    LORAN RECEIVER
SL,3,ARRAY5                 0     1     8     NONE     1200    REMOTE DISPLAY
SL,4,ARRAY5                 2     1     8     NONE     9600    ENSEMBLE OUTPUT
SL,5,ARRAY5                 0     1     8     NONE     1200    AUX 1
SL,6,ARRAY5                 0     1     8     NONE     1200    AUX 2
DU,1,ARRAY6            100.00   100.00   60.00    0.00    0.00    YES D1
DU,2,ARRAY6           -100.00  -100.00   60.00    0.00    0.00    YES D2
DU,3,ARRAY6            200.00   200.00   60.00    0.00    0.00    YES D3
DU,4,ARRAY6           -200.00  -200.00   60.00    0.00    0.00    YES D4
DU,5,ARRAY6            200.00    19.00   60.00    0.00    0.00    YES AGC
DU,6,ARRAY6              0.00     0.00   60.00    0.00    0.00    NO  SP. W.
DU,7,ARRAY6              0.00     0.00   60.00    0.00    0.00    NO  ROLL
DU,8,ARRAY6              0.00     0.00   60.00    0.00    0.00    NO  PITCH
DU,9,ARRAY6              0.00     0.00   60.00    0.00    0.00    NO  HEADING
DU,10,ARRAY6             0.00     0.00   60.00    0.00    0.00    NO  TEMPERATURE
DC,1,SPECIAL    "FH00001" MACRO 1
CI,1,SPECIAL    "cd 51" CRUISE ID GOES HERE
LR,1,SPECIAL    "" LORAN FILE NAME GOES HERE
```

TABLE 5

Star sight: gyro compass differences

Date	Time	Difference	
28.7.90		+1°	(+ = gyro reads clockwise of true)
29.7.90		+2°	
2.8.90	0600	$+1^{1}/_{2}°$	
2.8.90	2030	+2°	
6.8.90	0130	+3°	
6.8.90	0430	$+2^{1}/_{2}°$	
7.8.90	evening	$+2^{1}/_{4}°$	
16.8.90		+2°	
17.8.90		+2°	
18.8.90		$+1^{1}/_{2}°$	

Adpexec 0

```
#
#exec to read in and perform preliminary processing on adcp data
#the data is split into two files: depth dependent and independent
#it assumes the RVS input file has 14 variables:
# bindepth, heading, velps*, velew, velfa*, velns,velvert,velerr,
# ampl, good, bottomew, bottomns, depth, specwid*
#or equivalent
#the exec does not use those marked with a '*'
#if these are changed then the variable numbers used in pstar progs in
#this and the following execs may need to be changed.
#
#the adpexec series need the following environment vars set outside"
#setenv CRUISE '189'
#setenv SHIPNAME 'Discovery'
#setenv YEAR '900101'  # ie start of year in format yymmdd

echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   RVS datafile name"
echo ">   start and end time of data"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

echo -n ">enter adcp file number: "
set num = $<

/bin/rm -f adptmp
/bin/rm -f adtmpbot
/bin/rm -f adtmpgrid
/bin/rm -f adbottmp
/bin/rm -f bot$CRUISE$num
/bin/rm -f adp$CRUISE$num

if ( -e "adp"$num ) then
   echo ">The file adp$CRUISE$num already exists.  If you mean"
   echo ">to overwrite it, you must remove it first."
   exit
endif

echo -n "enter RVS datafile name to read from (default=adcp) "
set rvs_fil = $<
if ( $rvs_fil == "" ) set rvs_fil = "adcp"

#ask user for start and stop times
echo -n ">enter start time in format yydddhhmm(ss) (0=start of file): "
set start = $<
echo -n ">enter stop  time in format yydddhhmm(ss) (0=end   of file): "
set stop  = $<
if ($stop  < $start) then
  echo ">start > stop"
  exit
endif

#create start and stop flags for datapup and then execute
if ($start != 0) then
  set start = "-s"$start
else
  set start = ''
endif
if ($stop  != 0) then
  set stop  = '-e'$stop
else
  set stop  = ''
endif

#read in from rvs format file - all vars
echo ">running datapup"
```

Adpexec 0 Continued


```
datapup $start $stop $rvs_fil ./adptmp  bindepth heading temp velew velns velvert
velerr ampl good bottomew bottomns depth
if ($status != 0) then
  echo ">*** problem running datapup  ***"
  exit
endif

#copy out bottom info
echo ">running pcopya"
pcopya > /dev/null << !
adptmp
n
adtmpbot
1,3,11,12,13,4/
/
/
!
if ($status != 0) then
  echo ">*** problem running pcopya ***"
  exit
endif

echo ">running pheadr"
pheadr > /dev/null << !
adtmpbot
y
1
bot$CRUISE$num
2
rdi adcp
ship
$SHIPNAME
cr$CRUISE
8       m
8
64/
/
/
/
!
if ($status != 0) then
  echo ">*** problem running pheadr ***"
  exit
endif
print_datnam adtmpbot new

echo ">running pcopyg"
print_datnam adtmpbot old
pcopyg > /dev/null << !
adtmpbot
adbottmp
/
1,1
!
if ($status != 0) then
  echo ">*** problem running pcopyg ***"
  exit
endif
print_datnam adbottmp new

echo ">running pcalib"
print_datnam adbottmp old
pcalib > /dev/null << !
adbottmp
y
1,-60,1/
3,0,0.1/
4,0,0.1/
/
```

Adpexec 0 Continued

```
!
if ($status != 0) then
  echo ">*** problem running pcalib ***"
  exit
endif

mv adbottmp bot$CRUISE${num}
print_datnam bot$CRUISE$num new
cp bot$CRUISE${num} bot$CRUISE${num}.arch

#copy out gridded info
echo ">running pcopya"
pcopya > /dev/null << !
adptmp
n
adtmpgrid
1,2,5,6,7,8,9,10/
/
/
!
if ($status != 0) then
  echo ">*** problem running pcopya ***"
  exit
endif

echo ">running pheadr"
print_datnam adtmpgrid old
pheadr > /dev/null << !
adtmpgrid
y
1
adp$CRUISE$num
2
rdi adcp
ship
$SHIPNAME
cr$CRUISE
8       m
8
64/
/
3
/
cm/s
4
/
cm/s
5
/
cm/s
6
/
cm/s
7
/
db
2
/
m
/
y
!
if ($status != 0) then
  echo ">*** problem running pheadr ***"
  exit
endif
print_datnam adtmpgrid new

#convert vels to cm/s and agc to db
```

Adpexec 0 Continued

```
echo ">running pcalib"
print_datnam adtmpgrid old
pcalib > /dev/null << !
adtmpgrid
y
3,0,.1/
4,0,.1/
5,0,.1/
6,0,.1/
7,0,0.42/
1,-60,1/
/
!
if ($status != 0) then
  echo ">*** problem running pcalib ***"
  exit
endif

mv adtmpgrid adp$CRUISE$num
print_datnam adp$CRUISE$num new
cp adp$CRUISE$num adp$CRUISE$num.arch

echo ">files created:   bot$CRUISE$num bot$CRUISE$num.arch"
echo ">                 adp$CRUISE$num adp$CRUISE$num.arch"
echo
echo ">end of adpexec0"
```

Adpexec 1

```
#exec to create a time correction file
#it assumes the user has kept track of the drift in time of the
#adcp pc clock with respect to the RVS clock used in logging
navigation
#
echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   adcp clock time and (gmt - adcp) time difference"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

echo -n ">enter adcp file number: "
set num = $<
/bin/rm -f clocktmp
/bin/rm -f adptmp
/bin/rm -f bottmp
/bin/rm -f bot$CRUISE$num.corr
/bin/rm -f adp$CRUISE$num.corr

set ans = "c"
if (-e "clock"$num) then
echo -n ">file clock$num already exists, continue (y/n)? "
set ans = $<
if ($ans != "y") exit
endif

if($ans == "c") then
#ask user for times
/bin/rm -f .list
echo "clocktmp"      > .list
echo "1"            >> .list
echo "clock"$num    >> .list
echo "2"            >> .list
echo "adcpclock"    >> .list
echo "ship"         >> .list
echo $SHIPNAME      >> .list
echo cr$CRUISE      >> .list
echo "/"            >> .list
echo "3"            >> .list
echo "19" $YEAR "0" >> .list
echo "8"            >> .list
echo "3 86400/"     >> .list
echo "0/"            >> .list
echo "-1"           >> .list
echo "1"            >> .list
echo "jday"         >> .list
echo "of year"      >> .list
echo "2"            >> .list
echo "secs"         >> .list
echo "secs"         >> .list
echo "3"            >> .list
echo "dtime"        >> .list
echo "secs"         >> .list
echo "-1"           >> .list
echo "/"            >> .list
set n = 0
set jday = 99999
while ($jday > 0)
echo -n ">enter jday hhmmss dtime (space separated, -ve jday to end):
"
set lin1 = $<
set jday = `echo $lin1 | awk '{print $1}'`
```

```
if ($jday < 0) break
set h    = `echo $lin1 | awk '{print substr($2,1,2)}'`
set m    = `echo $lin1 | awk '{print substr($2,3,2)}'`
set s    = `echo $lin1 | awk '{print substr($2,5,2)}'`
set dt   = `echo $lin1 | awk '{print $3}'`
@ sec = ($h * 3600) + ($m * 60) + $s
@ n = $n + 1
echo $jday $sec $dt >> .list
end
echo "-9999/" >> .list

echo ">running ypstar"
ypstar < .list > /dev/null
if ($status != 0) then
  echo ">*** Problem running ypstar ***"
  exit
endif
print_datnam clocktmp new

echo ">running pcalib"
print_datnam clocktmp old
pcalib > /dev/null << !
clocktmp
/
1,-86400,86400,0/
/
!
if ($status != 0) then
  echo ">*** Problem running pcalib ***"
  exit
endif
print_datnam clocktmp new

echo ">running parith"
print_datnam clocktmp old
parith > /dev/null << !
clocktmp
clock$num
3/
1,1,2/
0/
time
secs
!
if ($status != 0) then
  echo ">*** Problem running parith ***"
  exit
endif
endif
print_datnam clock$num new

echo ">running pmerge"
print_datnam bot$CRUISE$num old
pmerge > /dev/null << !
bot$CRUISE$num
bottmp
/
clock$num
2,1/
!
if ($status != 0) then
  echo ">*** Problem running pmerge ***"
  exit
```

Adpexec 1 Continued

```
endif
print_datnam bottmp new

echo ">running parith"
print_datnam bottmp old
parith > /dev/null << !
bottmp
bot$CRUISE$num.corr
2,3,4,5,6/
1,1,7/
0/
time
secs
!
if ($status != 0) then
  echo ">*** Problem running parith ***"
  exit
endif
print_datnam bot$CRUISE$num.corr new

echo ">running pmerge"
print_datnam adp$CRUISE$num old
pmerge > /dev/null << !
adp$CRUISE$num
adptmp
/
clock$num
2,1/
!
if ($status != 0) then
  echo ">*** Problem running pmerge ***"
  exit
endif
print_datnam adptmp new

echo ">running parith"
print_datnam adptmp old
parith > /dev/null << !
adptmp
adp$CRUISE$num.corr
2,3,4,5,6,7,8/
1,1,9/
0/
time
secs
!
if ($status != 0) then
  echo ">*** Problem running parith ***"
  exit
endif
print_datnam adp$CRUISE$num.corr new

cp clock$num clock$num.arch
cp bot$CRUISE$num.corr bot$CRUISE$num.corr.arch
cp adp$CRUISE$num.corr adp$CRUISE$num.corr.arch

echo ">files created:  clock$num clock$num.arch"
echo ">                bot$CRUISE$num.corr  bot$CRUISE$num.corr.arch"
echo ">                adp$CRUISE$num.corr  adp$CRUISE$num.corr.arch"
echo
echo ">End of adpexec1"
```

```
#exec to perform editing on adcp datafiles
#
echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   start and stop day in file (eg 204.5)"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

#calibration constants for adcp A and phi
set calA = 1.0026
set calp = -0.36

echo -n ">enter adcp file number: "
set num = $<

/bin/rm -f adp$CRUISE$num.av

#ask user for start and stop times
echo -n ">enter start day (real number): "
set start = $<
echo -n ">enter stop  day (real number): "
set stop  = $<

set start =  `echo "($start-1)*86400" | bc`
set stop  =  `echo "($stop -1)*86400" | bc`
echo $start $stop

echo ">running pedita"
print_datnam bot$CRUISE$num.corr old
pedita > /dev/null << !
bot$CRUISE$num.corr
y
2,-1000,1000
3,-1000,1000
/
!
if ($status != 0) then
  echo ">*** problem running pedita ***"
  exit
endif
print_datnam bot$CRUISE$num.corr new

echo ">running pcopya"
print_datnam bot$CRUISE$num.corr old
pcopya > /dev/null << !
bot$CRUISE$num.corr
n
bot$CRUISE$num.work
1,2,3,2,3,4,5,6/
/
/
!
if ($status != 0) then
  echo ">*** problem running pcopya ***"
  exit
endif
print_datnam bot$CRUISE$num.work new

echo ">running pheadr"
print_datnam bot$CRUISE$num.work old
pheadr > /dev/null << !
bot$CRUISE$num.work
```

Adpexec 2 Continued

```
y
/
2
ebotcal
/
3
nbotcal
/
/
y
!
if ($status != 0) then
  echo ">*** problem running pheadr ***"
  exit
endif
print_datnam bot$CRUISE$num.work new

echo ">running adpcal"
print_datnam bot$CRUISE$num.work old
adpcal > /dev/null << !
bot$CRUISE$num.work
y
y
2,3,$calA,$calp/
!
if ($status != 0) then
  echo ">*** problem running adpcal ***"
  exit
endif
print_datnam bot$CRUISE$num.work new

if(-e bot$CRUISE) then
echo ">running papend"
print_datnam bot$CRUISE old
papend > /dev/null << !
bot$CRUISE
y
bot$CRUISE$num.work
none
!
if ($status != 0) then
  echo ">*** problem running papend ***"
  exit
endif
else
echo ">copying bot$CRUISE$num"
cp bot$CRUISE$num.work bot$CRUISE
echo ">running pheadr"
pheadr > /dev/null << !
bot$CRUISE
/
1
bot$CRUISE
-1/
-1/
/
!
if ($status != 0) then
  echo ">*** problem running pheadr ***"
  exit
endif
endif
print_datnam bot$CRUISE new
```

Adpexec 2 Continued

```
#now take a backup copy of the master bottom file
set bot = `date | awk '{print $4}'`
cp bot$CRUISE bot${CRUISE}t$bot

echo ">running pedita"
print_datnam adp$CRUISE$num.corr old
pedita > /dev/null << !
adp$CRUISE$num.corr
y
2,,1000
3,,1000
4,,1000
5,,1000
6,,1000
/
!
if ($status != 0) then
  echo ">*** problem running pedita ***"
  exit
endif
print_datnam adp$CRUISE$num.corr new

echo ">running padpav"
print_datnam adp$CRUISE$num.corr old
padpav > /dev/null << !
adp$CRUISE$num.corr
adp$CRUISE$num.av
8,1,2,3,2,3,4,5,6,7/
$start,$stop,900,450
!
if ($status != 0) then
  echo ">*** problem running padpav ***"
  exit
endif
print_datnam adp$CRUISE$num.av new

echo ">running adpcal"
print_datnam adp$CRUISE$num.av old
adpcal > /dev/null << !
adp$CRUISE$num.av
y
y
3,4,$calA,$calp/
!
if ($status != 0) then
  echo ">*** problem running adpcal ***"
  exit
endif
print_datnam adp$CRUISE$num.av new

echo ">running pheadr"
print_datnam adp$CRUISE$num.av old
pheadr > /dev/null << !
adp$CRUISE$num.av
y
/
3
evelcal
/
4
nvelcal
/
```

Adpexec 2 Continued

```
/
y
!
if ($status != 0) then
  echo ">*** problem running pheadr ***"
  exit
endif
print_datnam adp$CRUISE$num.av new

echo ">running adedit"
print_datnam adp$CRUISE$num.av old
adedit > /dev/null << !
adp$CRUISE$num.av
y
/
!
if ($status != 0) then
  echo ">*** problem running adedit ***"
  exit
endif
print_datnam adp$CRUISE$num.av new

cp adp$CRUISE$num.av adp$CRUISE$num.av.arch

echo " "
echo ">files produced: adp$CRUISE$num.av adp$CRUISE$num.av.arch"
echo " "
echo ">End of adpexec2"
```

Adpexec 3

```
#exec to plot velocity relative to a reference layer
#plots are sent to the nicolet (nic), the flatbed can be used by
#substituting adv.

echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   levels to average over in adprel"
echo ">   plot type (plus other info)"
echo ">   device name"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

/bin/rm -f adreltmp

echo -n ">enter adcp file number: "
set num = $<
if (! -e "adp$CRUISE$num.av") then
  echo "file adp$CRUISE$num.av not found"
  exit
endif

echo -n ">enter start of averaging interval (def=30): "
set nstart = $<
if ($nstart == "") set nstart = 30
echo -n ">enter end   of averaging interval (def=40): "
set nend   = $<
if ($nend   == "") set nend   = 40
if ($nstart > $nend) then
  echo "start > end"
  exit
endif

set n = 0
set plot
echo ">Enter 'n'=no plot or 'y'=plot "
echo ">for each of the following plots"
foreach i (">profiles:" ">vectors:" ">adcp vs nav:")
  @ n = $n + 1
  echo -n $i
  set plot = ( $plot $< )
end

echo ">enter name of plotting device (default=php7550b): "
set devnam = $<
if ($devnam == "") set devnam = "php7550b"
echo "pzeta8 php7550b hpostp hpost" | grep -s $devnam
if ($status != 0) then
  echo ">device not known"
  exit
endif

if ($plot[1] == "y" || $plot[2] == "y") then
echo ">running adprel"
print_datnam adp$CRUISE$num.av old
adprel > /dev/null << !
adp$CRUISE$num.av
adreltmp
$nstart,$nend/
/
!
if ($status != 0) then
  echo ">*** problem running adprel ***"
```

```
  exit
endif
print_datnam adreltmp new
endif

if ($plot[1] == "y") then
echo ">running plotgr"
plotgr > /dev/null << !
adpe.pdf
3
adreltmp
s $devnam;e


!
if ($status != 0) then
  echo ">*** problem running plotgr ***"
  exit
endif
send_plot $devnam 2

echo ">running plotgr"
plotgr > /dev/null << !
adpn.pdf
3
adreltmp
s $devnam;e


!
if ($status != 0) then
  echo ">*** problem running plotgr ***"
  exit
endif
send_plot $devnam 2
endif

if ($plot[2] == "y") then
echo "running parrog"
echo ">enter start time in format JDAY HR MIN SEC"
set start = $<
echo ">enter stop  time in format JDAY HR MIN SEC"
set stop = $<
parrog > /dev/null << !
RELarrog.pdf
7
${start}/
8
${stop}/
3
adreltmp
s $devnam;e


!
if ($status != 0) then
  echo "*** problem running parrog ***"
  exit
endif
send_plot $devnam 2
endif

if ($plot[3] == "y") then
```

Adpexec 3 Continued

```
echo -n ">enter smoothed navigation file number (eg 1 gives
abnav511.av):"
set nav = $<
set navfil = `find $HOME -name "abnav$CRUISE$nav.av" -print`
if ($navfil == "") then
  echo "file not found"
  exit
endif
echo "running overxy"
echo ">enter start time in format JDAY HR MIN SEC"
set start = $<
echo ">enter stop  time in format JDAY HR MIN SEC"
set stop = $<
overxy > /dev/null << !
s $devnam;e
OVER.pdf
4
adp$CRUISE$num.av
/
6
1
evelcal
700,-700/
/
/
6
2
nvelcal
700,-700/
/
/
7
${start}/
8
${stop}/
3
adp$CRUISE$num.av

y
OVER.pdf
6
1
ve
-700,700/
/
/
6
2
vn
-700,700/
/
/
3
$navfil
n

!
if ($status != 0) then
  echo "*** problem running overxy ***"
  exit
endif
send_plot $devnam 2
endif
```

Adpexec 3 Continued

```
echo ">end of adpexec3"
```

```
#exec to merge adp data with smoothed navigation as created by
#navexec0 and 1
echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   smoothed navigation file number (eg 1)"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

/bin/rm -f adptmp

echo -n ">enter adp file number "
set num = $<

echo -n ">enter smoothed navigation file number (eg 1 gives
abnav${CRUISE}1.av): "
set nav = $<
set navfil = `find $HOME -name "abnav$CRUISE$nav.av" -print`
if ($navfil == "") then
  echo "file abnav$CRUISE$nav.av not found"
  exit
endif

#add in distrun, lat and long
echo "running pmerge"
print_datnam adp$CRUISE$num.av old
pmerge > /dev/null << !
adp$CRUISE$num.av
adptmp
/
$navfil
1,2,3,4,5,8,9/
!
if ($status != 0) then
  echo ">*** problem running pmerge ***"
  exit
endif
print_datnam adptmp new

#calculate abs velocity
echo "running parith"
print_datnam adptmp old
parith > /dev/null << !
adptmp
adp$CRUISE$num.abs
/
1,3,14/
1,4,13/
0/
absve
cm/s
absvn
cm/s
!
if ($status != 0) then
  echo ">*** problem running parith ***"
  exit
endif
print_datnam adp$CRUISE$num.abs new
/bin/cp adp$CRUISE$num.abs adp$CRUISE$num.abs.arch
echo " "
echo ">files created:  adp$CRUISE$num.abs   adp$CRUISE$num.abs.arch"
echo " "
```

Adpexec 4 Continued


```
endif

echo " "
echo ">End of adpexec4"
exit
```

Adpexec 5

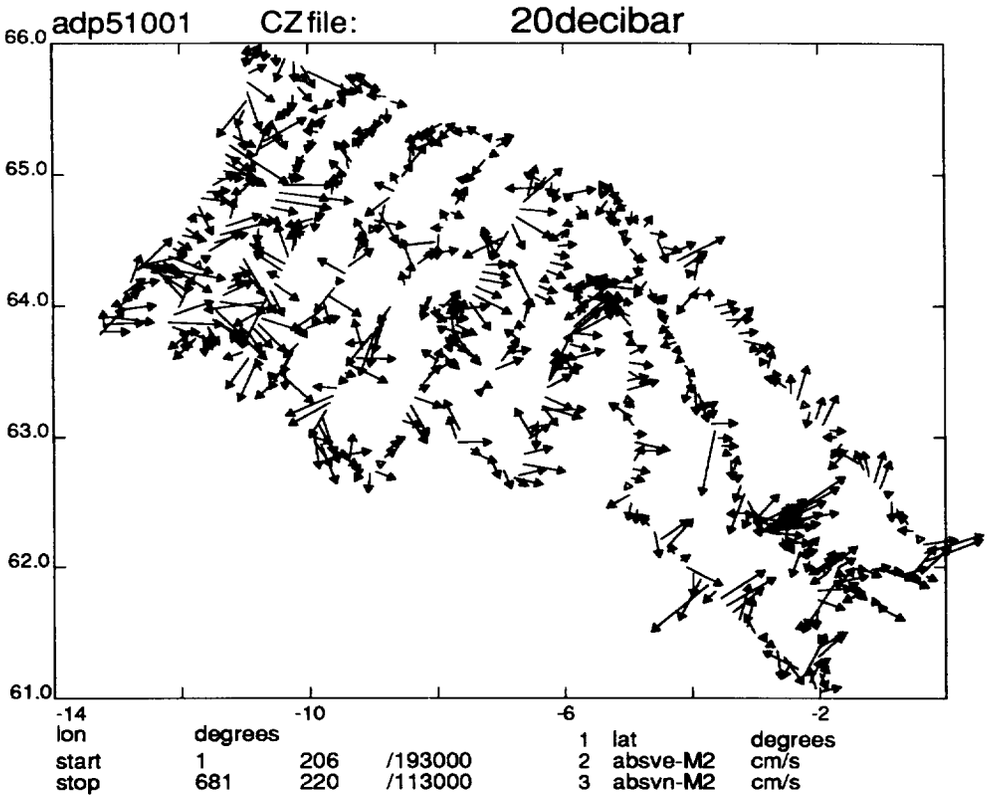
```
#
echo ">This exec will require the following information:"
echo ">   adcp file number"
echo ">   smoothed navigation file number (eg 1)"
echo ">   device name"
echo -n ">Continue (y/n)? "
set ans = $<
if ($ans != "y") exit

/bin/rm -f adptmp

echo -n ">enter adp file number "
set num = $<

if (! -e adp$CRUISE$num.abs) then
  echo "file adp$CRUISE$num.abs not found"
  exit
endif

echo -n ">enter smoothed navigation file number (eg 1 gives
abnav${CRUISE}1.av): "
set nav = $<
set navfil = `find $HOME -name "abnav$CRUISE$nav.av" -print`
if ($navfil == "") then
  echo "file not found"
  exit
endif

echo ">enter name of plotting device (default=php7550b): "
set devnam = $<
if ($devnam == "") set devnam = "php7550b"
echo "pzeta8 php7550b hpostp hpost" | grep -s $devnam
if ($status != 0) then
  echo ">device not known"
  exit
endif

set min = ""
set max = ""

echo -n "do you want to plot absolute current vectors (y/n)? "
set ans = $<
if ($ans == "y") then
/bin/rm -f .glist
plist > .glist << !
adp$CRUISE$num.abs
1/
1,1,1/
/
!
if ($status != 0) then
  echo ">*** problem running plist ***"
  exit
endif
set min = `grep distrun .glist | awk '{print $(NF-5)}'`
set max = `grep distrun .glist | awk '{print $(NF-3)}'`
echo ">minimum distrun is "$min
echo ">maximum distrun is "$max
echo ">require min and max for plotting "
echo ">enter min"
set min = $<
echo ">enter max"
set max = $<
```

Adpexec 5 Continued

```
if ($min > $max) then
  echo " min > max!"
  exit
endif
set scale
set tick
@ scale = $max - $min
@ tick  = $scale / 50
set scale = `echo $tick | awk '{print $1*49.5}'`
echo ">running parrog"
parrog > /dev/null << !
ABSarrog.pdf
5
1
/
$min,$max
10
$scale,,$tick/
3
adp$CRUISE$num.abs
s $devnam;e


!
if ($status != 0) then
  echo "*** problem running parrog ***"
  exit
endif
send_plot $devnam 3
endif

echo -n "do you want to plot contoured relative ampl (y/n)? "
set ans = $<
if ($ans == "y") then

/bin/rm -f adrelamp

echo ">running adprl2"
adprl2 > /dev/null << !
adp$CRUISE$num.abs
adrelamp
1/
/
1,2,9,15/
9/
3/
!
if ($status != 0) then
  echo "*** problem running adprl2 ***"
  exit
endif
if ($min == "") then
/bin/rm -f .glist
plist > .glist << !
adp$CRUISE$num.abs
1/
1,1,1/
/
!
if ($status != 0) then
  echo ">*** problem running plist ***"
  exit
endif
```

Adpexec 5 Continued

```
set min = `grep distrun .glist | awk '{print $(NF-5)}'`
set max = `grep distrun .glist | awk '{print $(NF-3)}'`
echo ">minimum distrun is "$min
echo ">maximum distrun is "$max
echo ">require min and max for plotting "
echo ">enter min"
set min = $<
echo ">enter max"
set max = $<
if ($min > $max) then
  echo " min > max!"
  exit
endif
set scale
set tick
@ scale = $max - $min
@ tick  = $scale / 50
set scale = `echo $tick | awk '{print $1*49.5}'`
endif
echo ">running pcontr"
pcontr > /dev/null << !
AMPL.cdf
5
1
/
$min,$max
10
$scale,,$tick/
3
adrelamp
s $devnam;e


!
if ($status != 0) then
  echo "*** problem running pcontr ***"
  exit
endif
send_plot $devnam 3
endif

echo " "
echo ">End of adpexec5"
exit
```



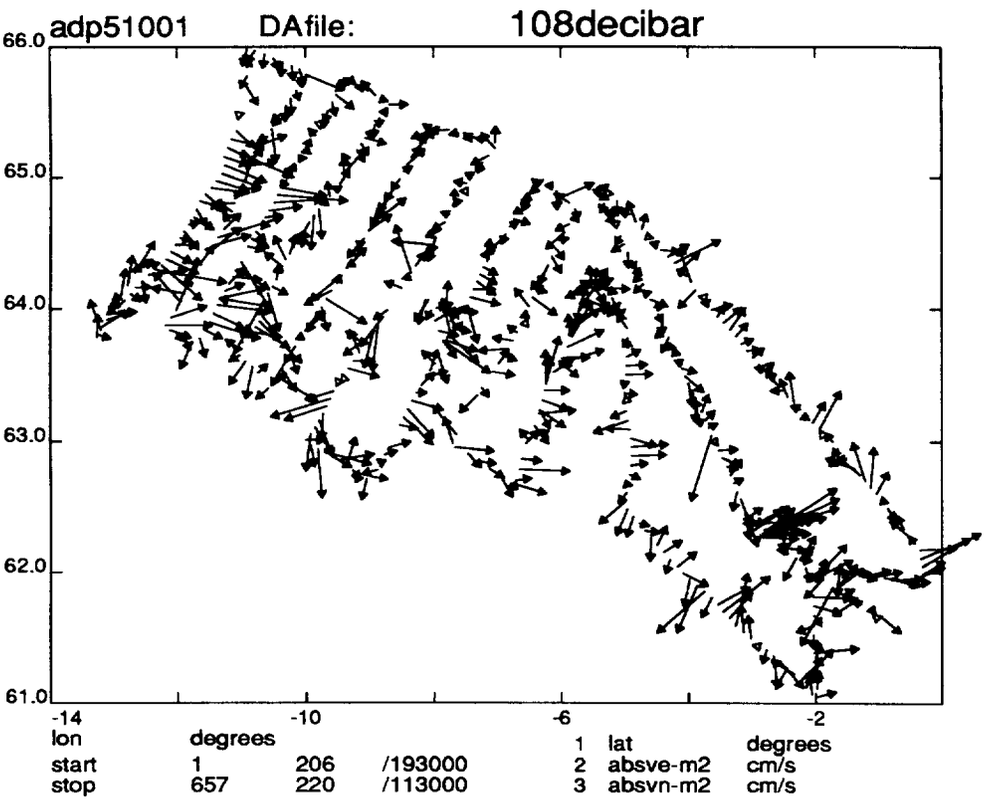
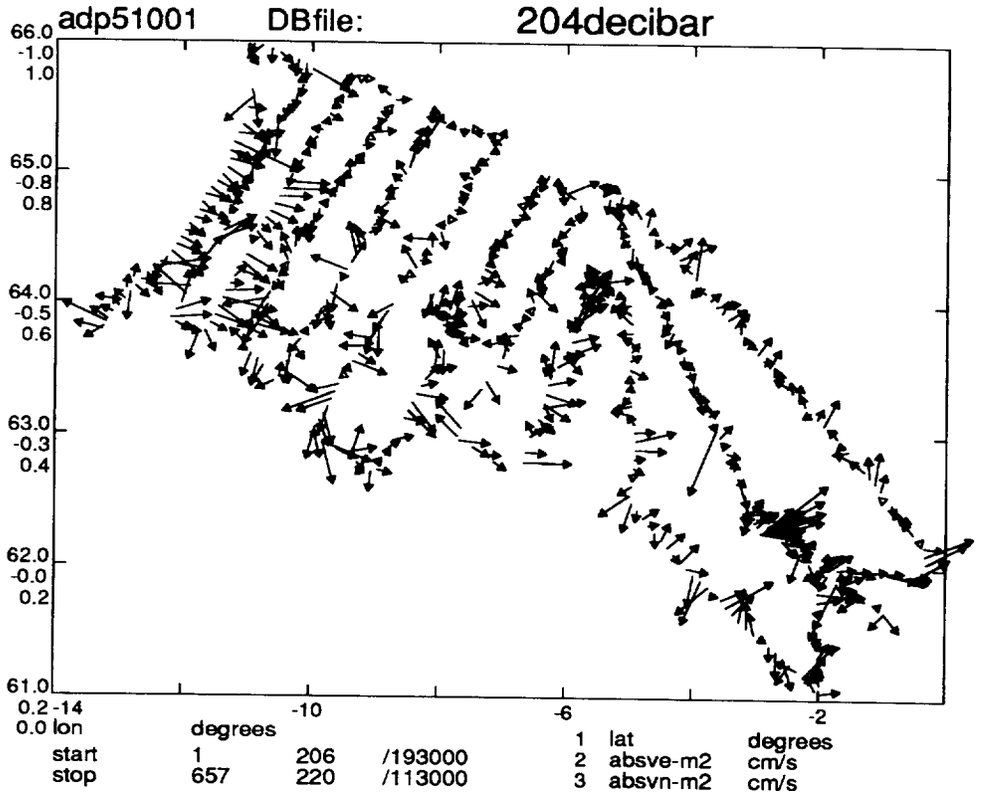


Figure 1. M2 Tidally corrected current vectors at 20 and 108 decibar levels for the large scale survey.



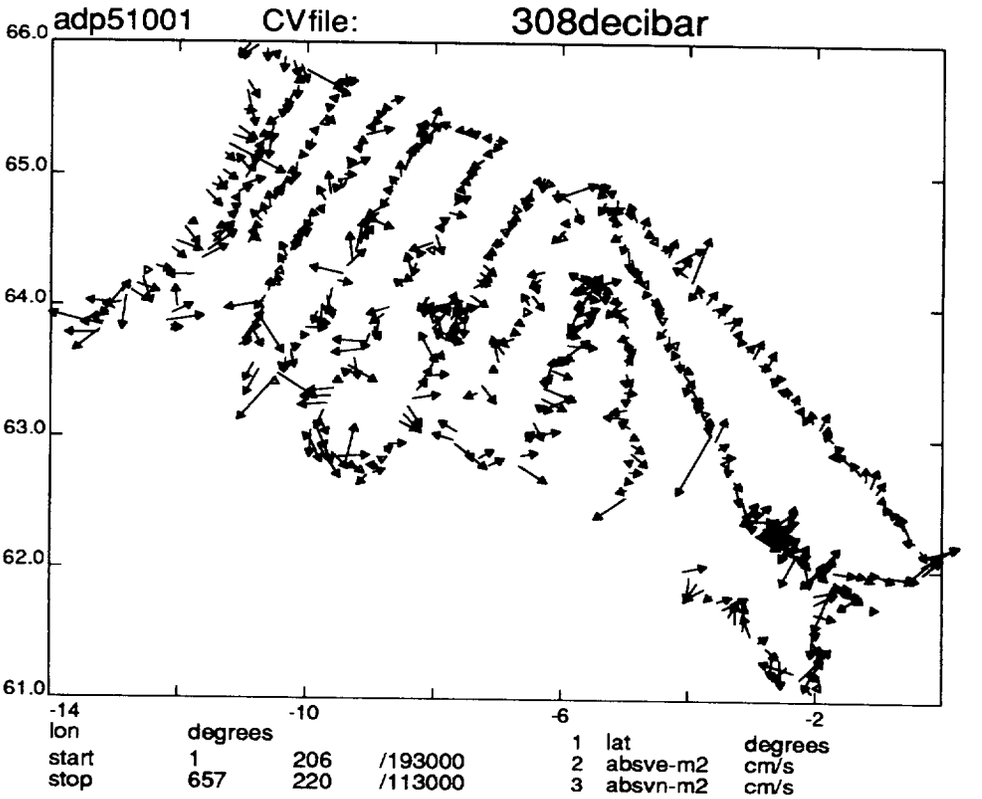


Figure 2. M2 Tidally corrected current vectors at 204 and 308 decibar levels for the large scale survey.

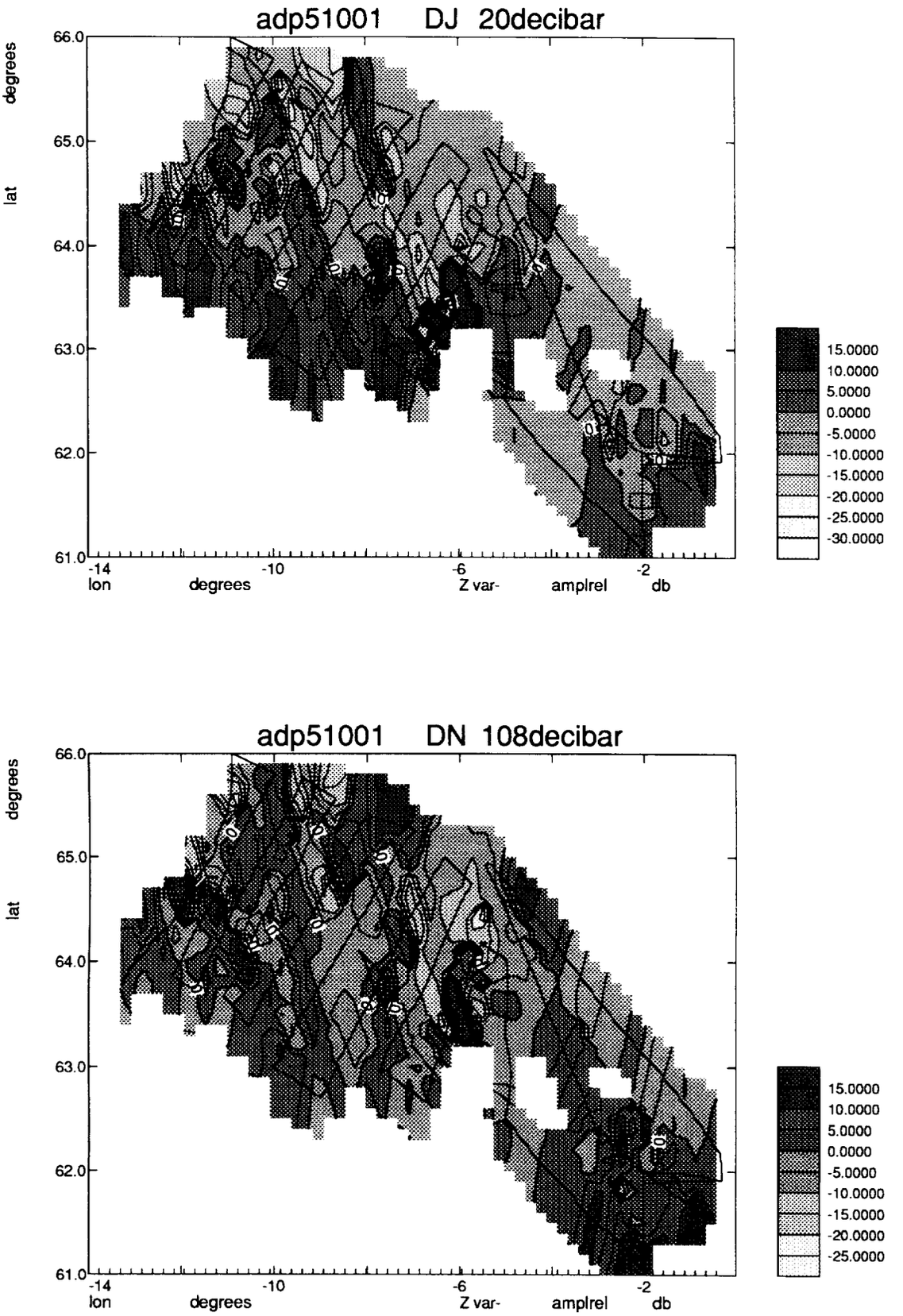


Figure 3. Relative amplitude of backscattered sound from 20 and 108 decibar levels, overlaid with ships track.

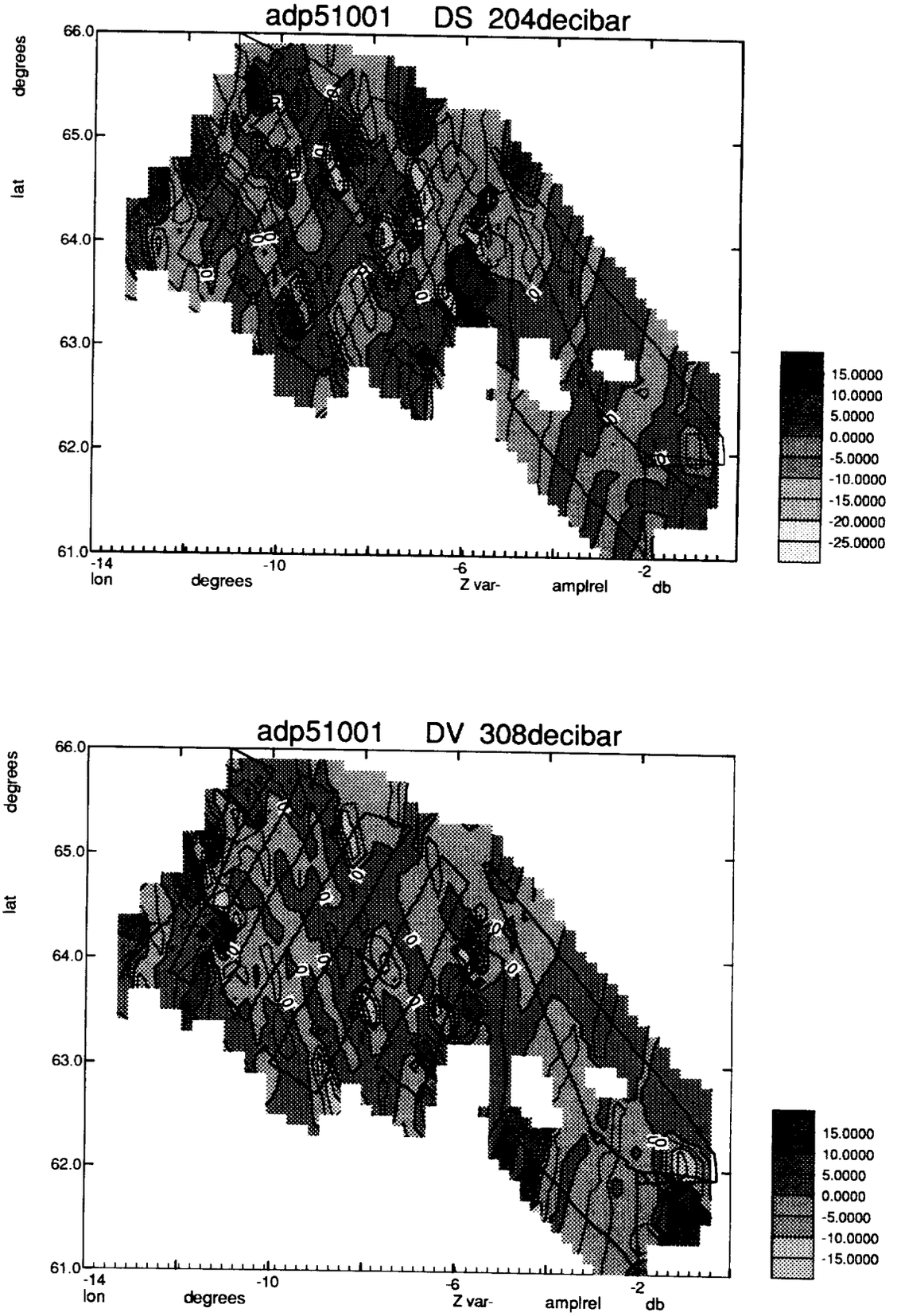


Figure 4. Relative amplitude of backscattered sound from 204 and 308 decibar levels, overlaid with ships track.

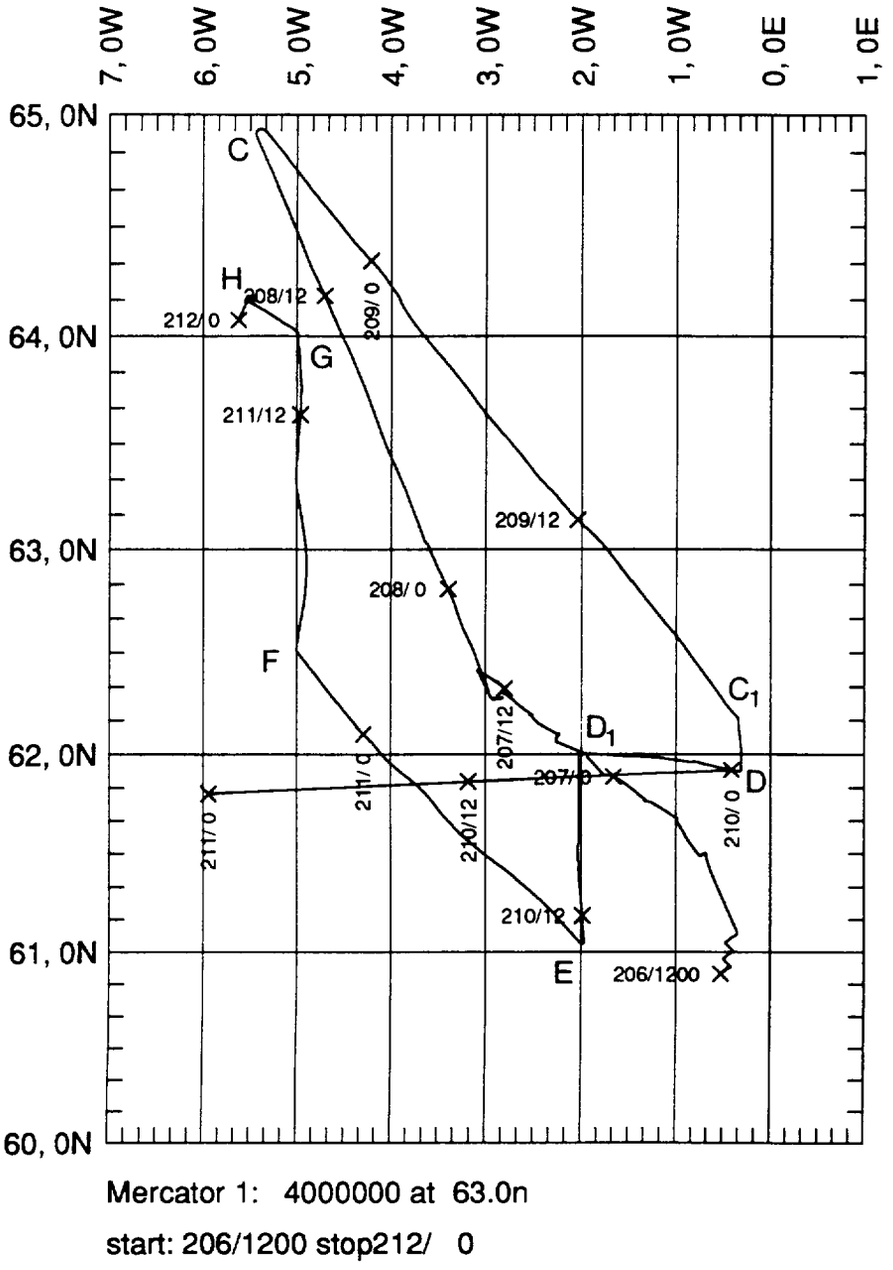
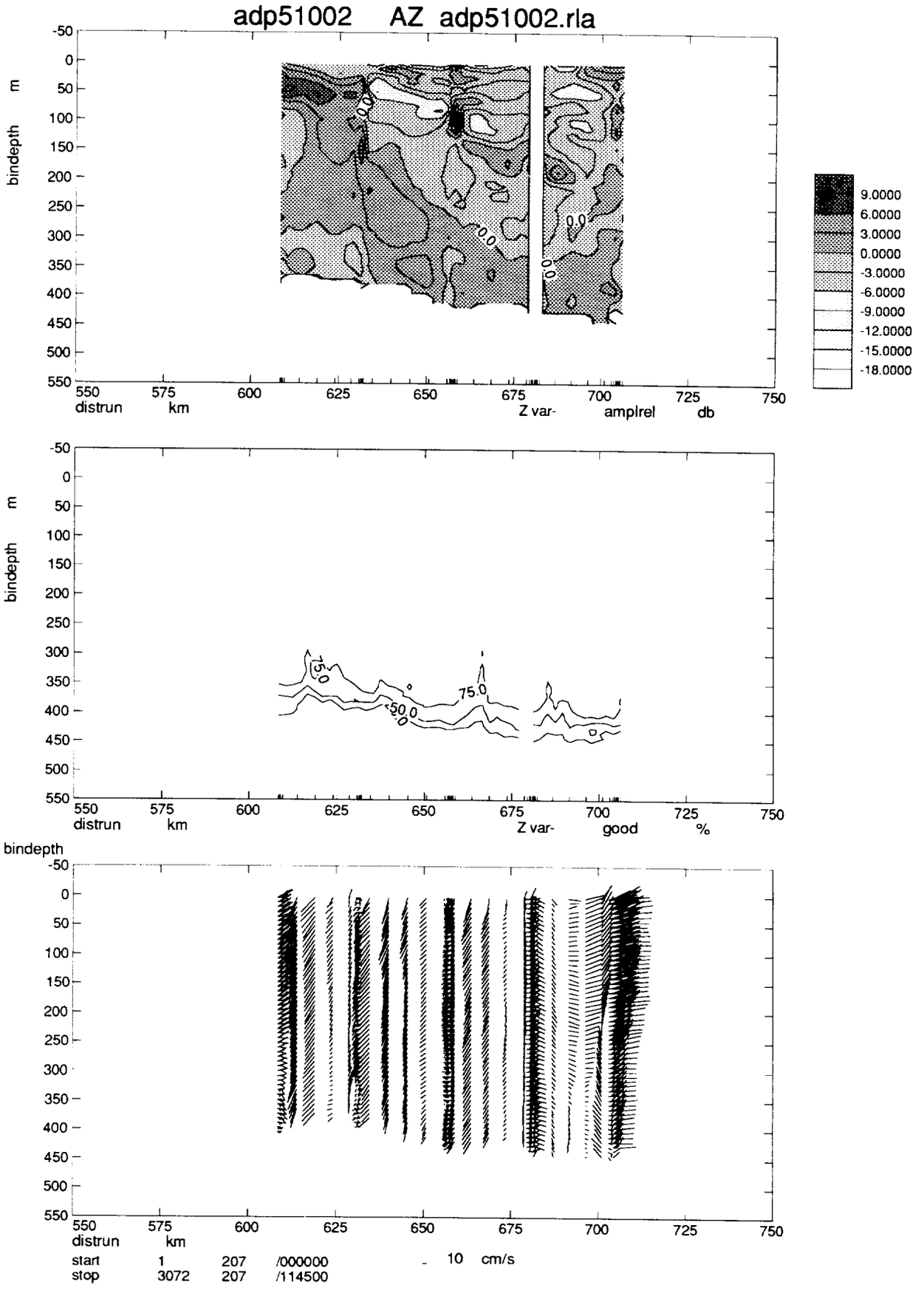
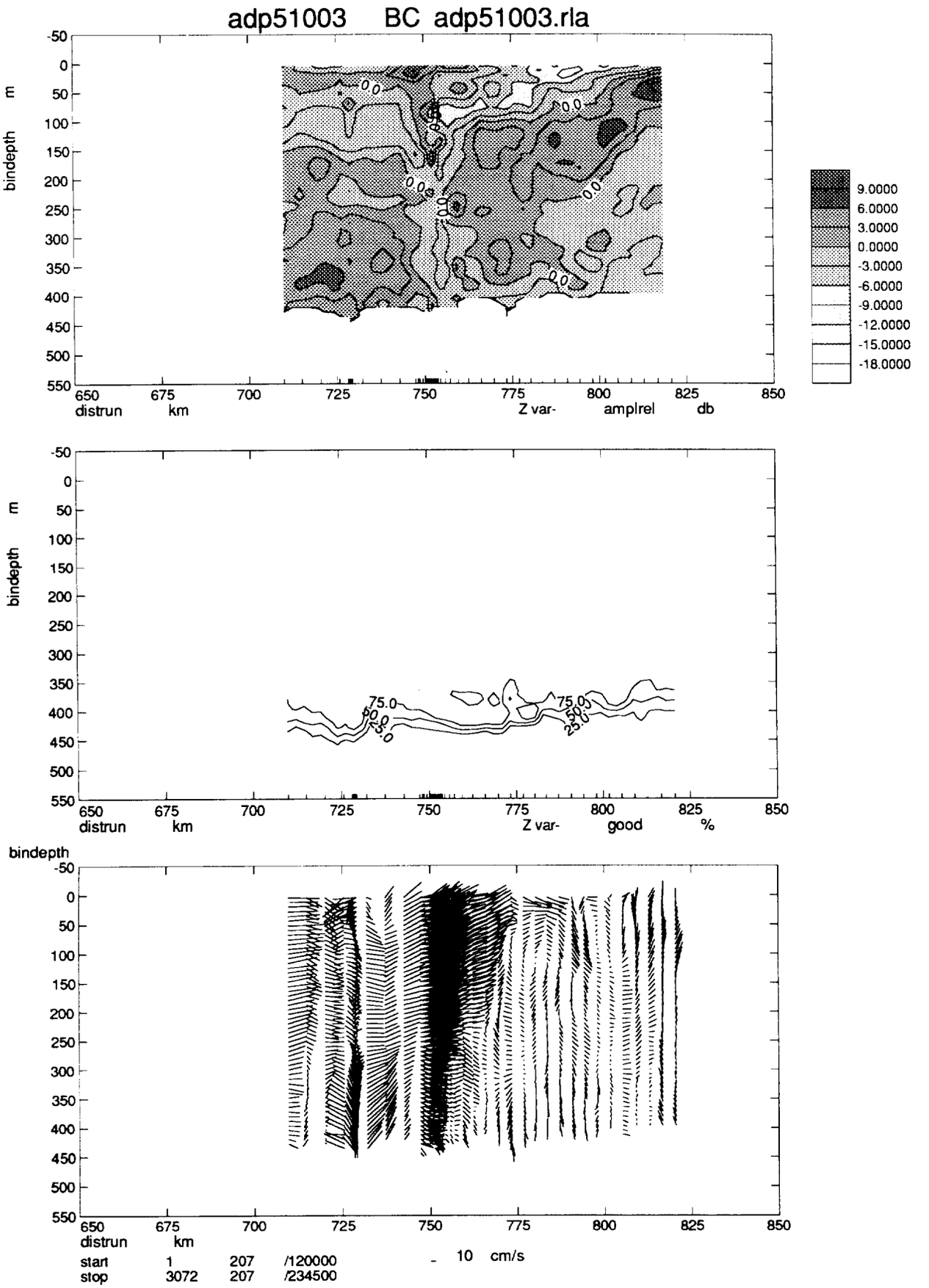
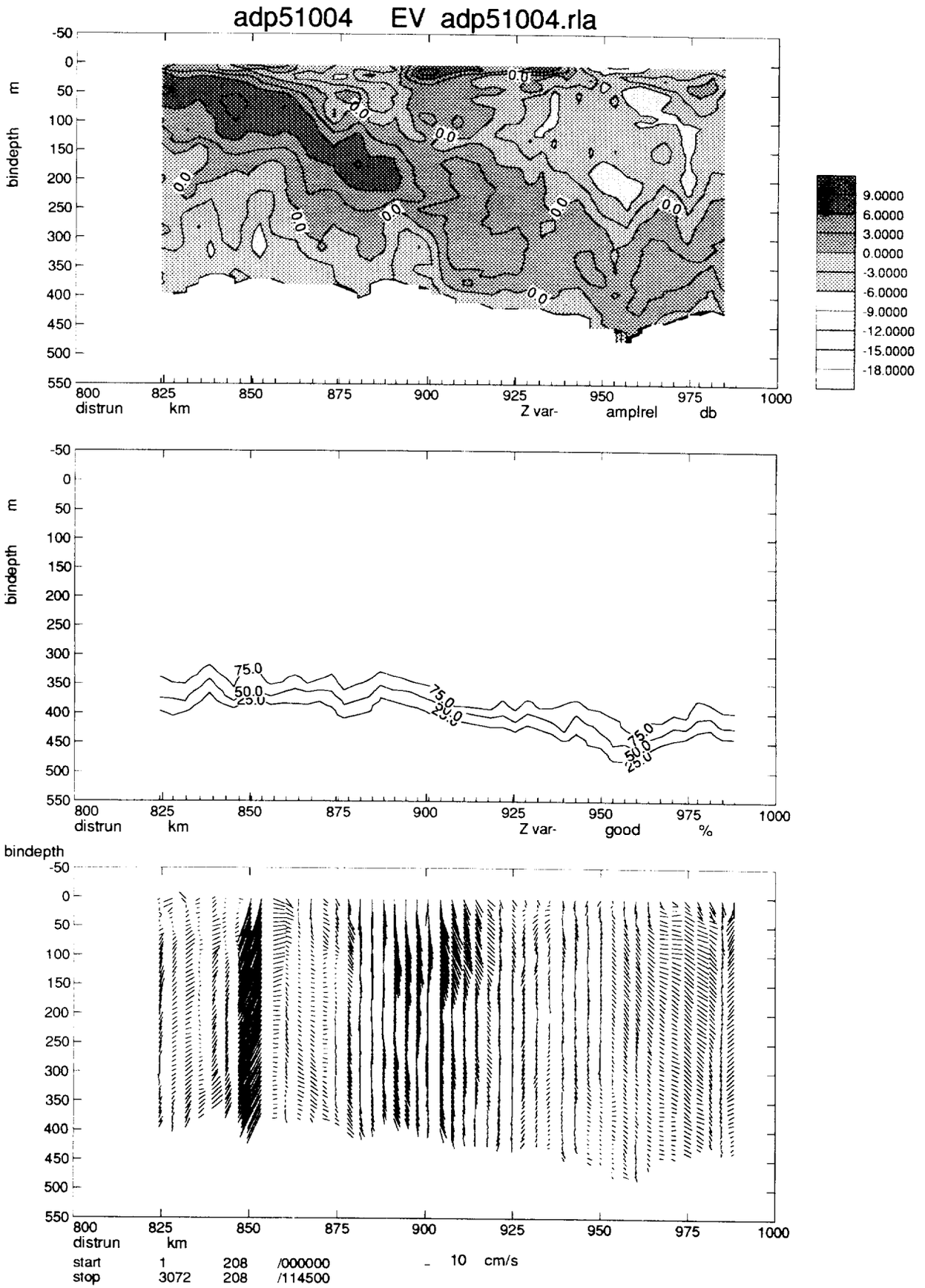
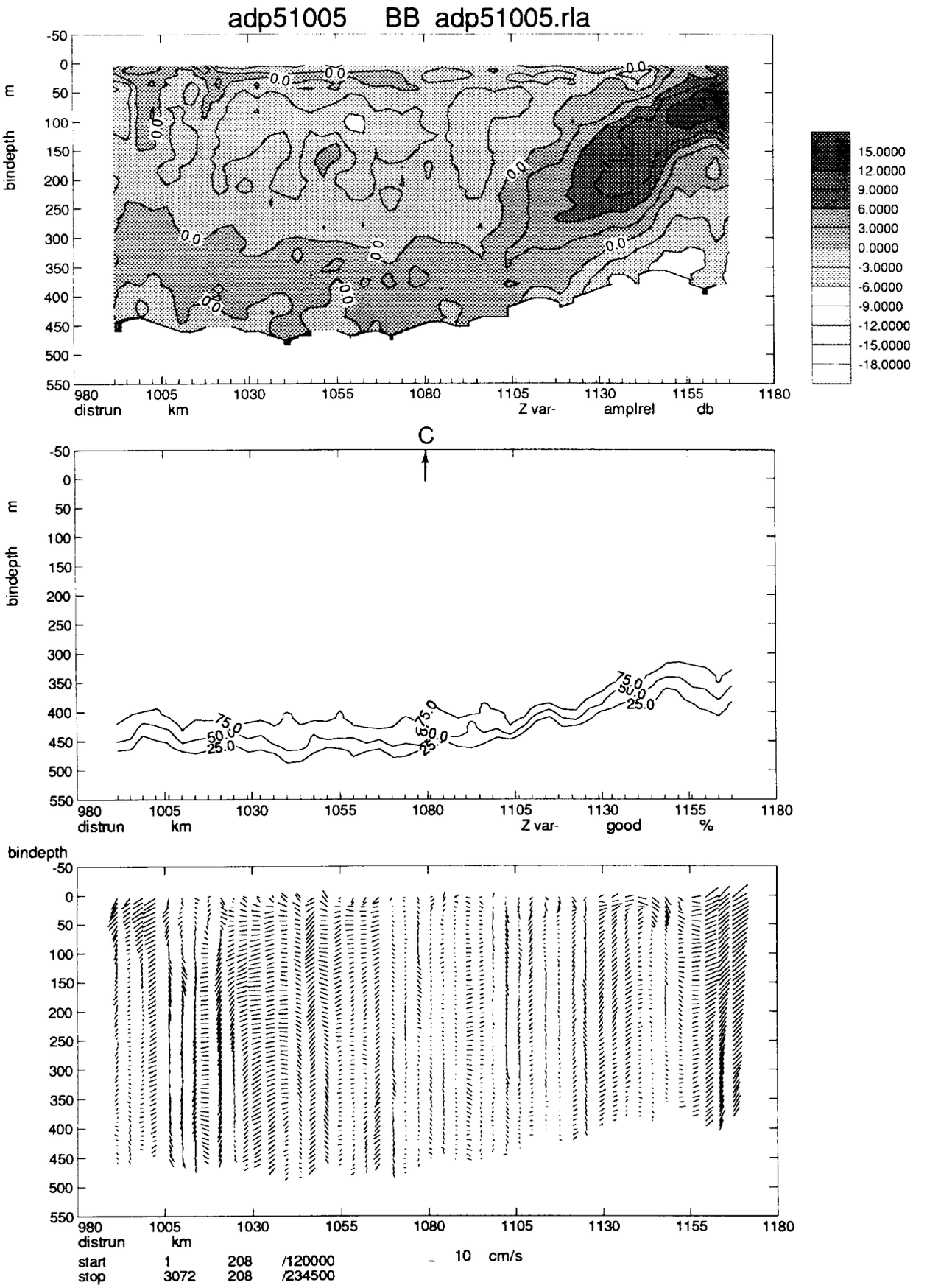


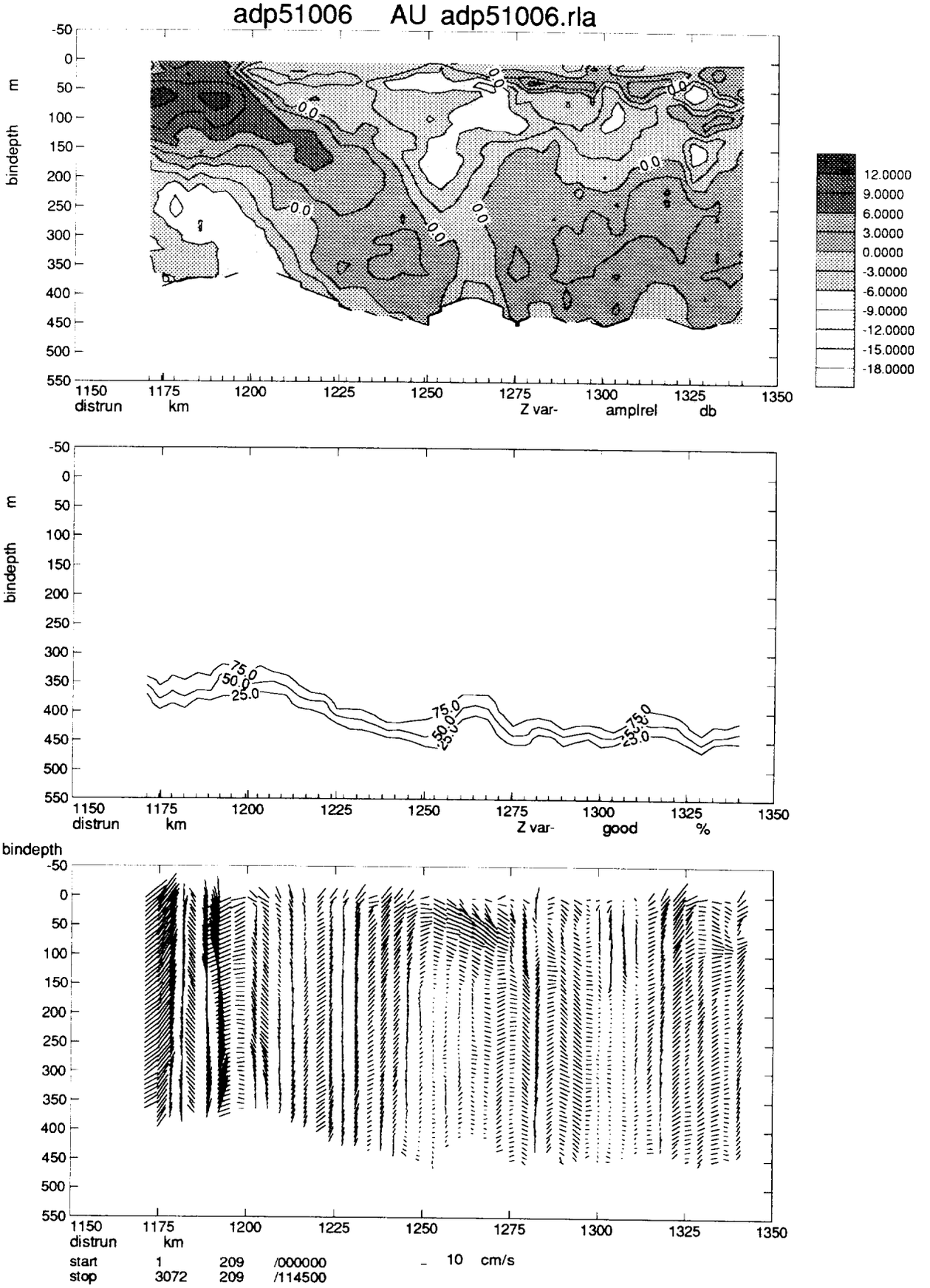
Figure 5. Track plot of the section of the large scale survey to the East of the Faeroes. Annotated times indicate start and stop times for the plots in the following section.

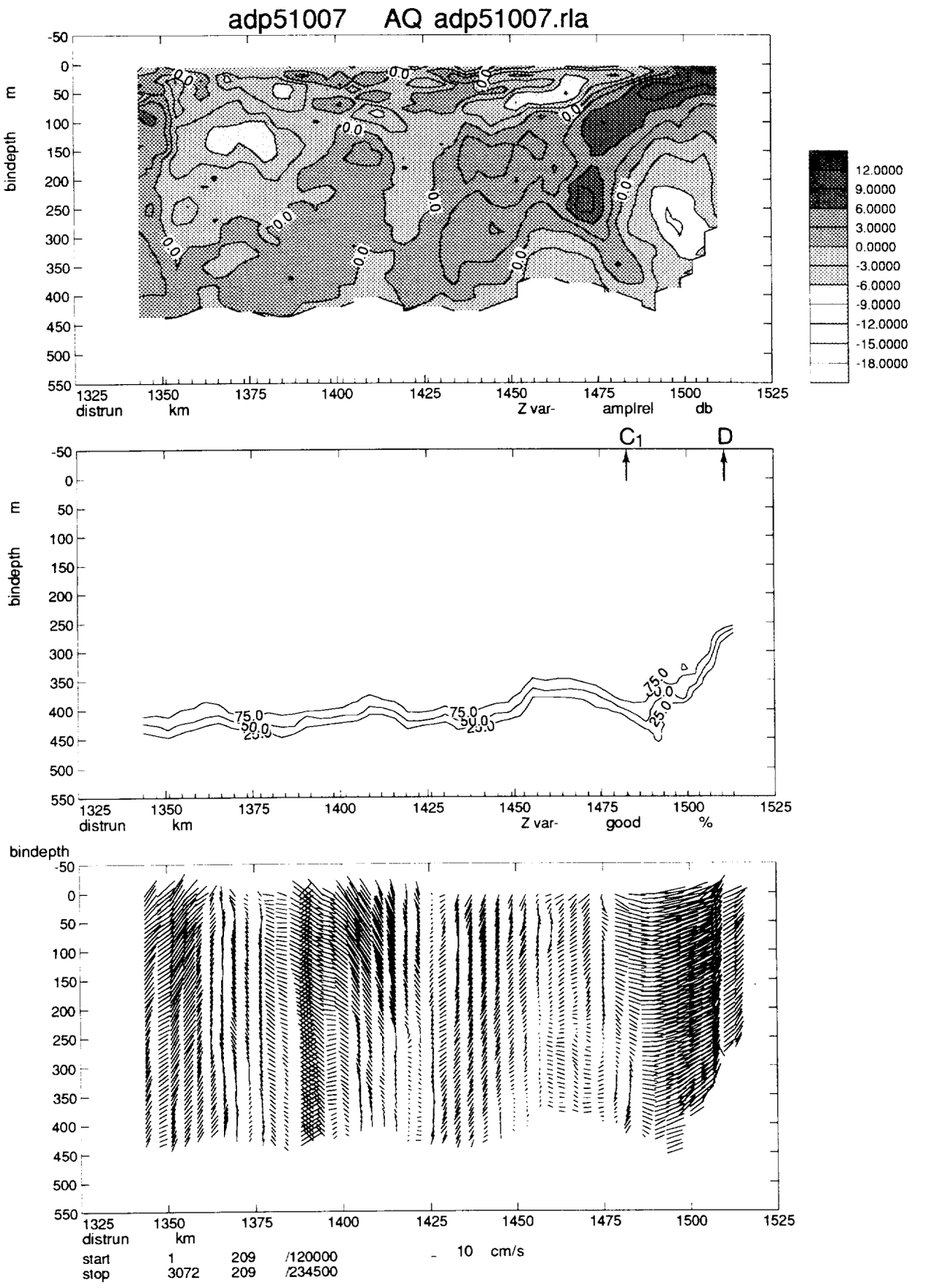

adp51002 AZ adp51002.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
550 575 600 625 650 675 700 725 750
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
bindepth m
75.0
50.0
distrun km
Z var- good %
bindepth
distrun km
start 1 207 /000000
stop 3072 207 /114500
10 cm/s

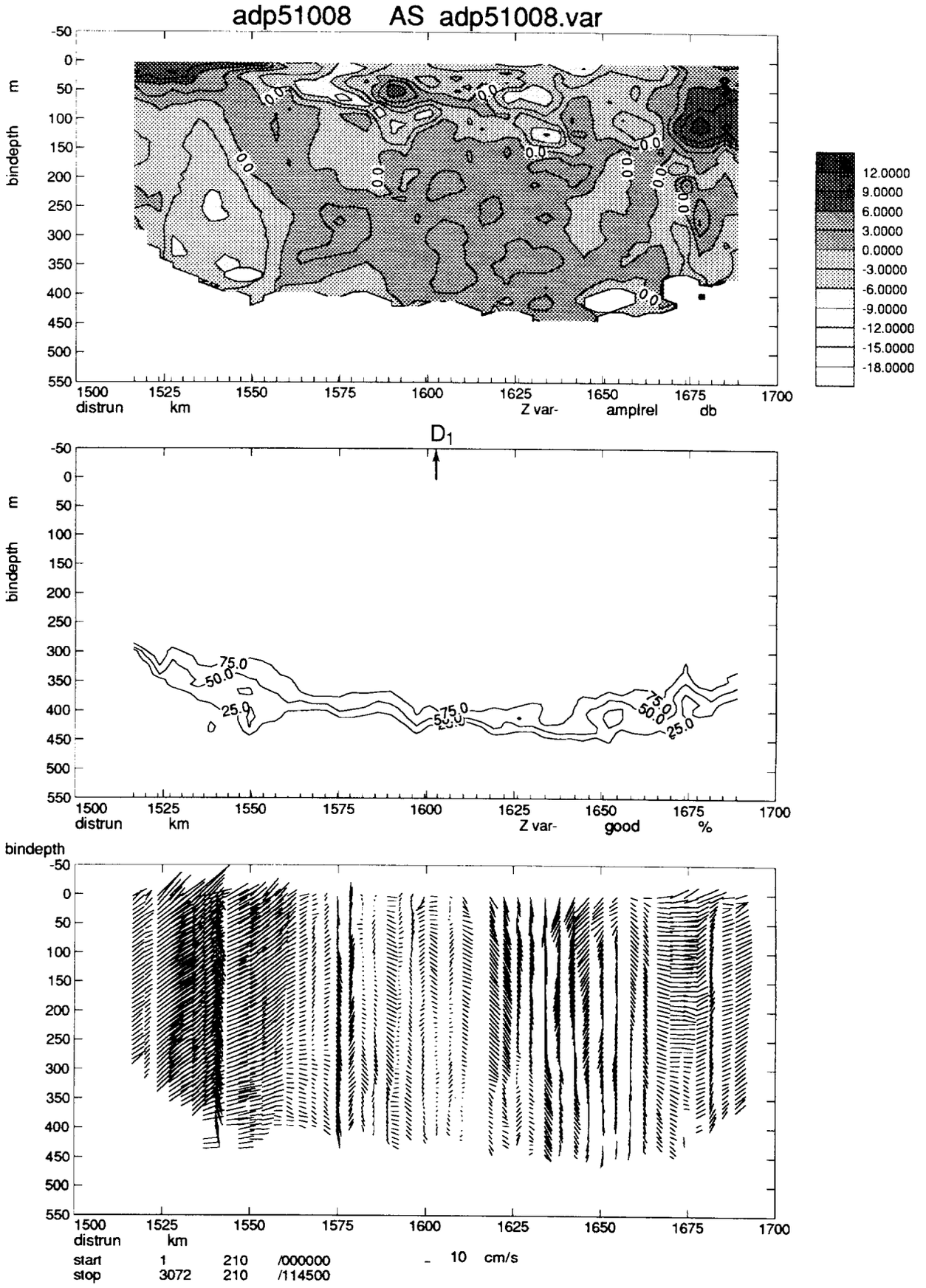

adp51003 BC adp51003.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
650 675 700 725 750 775 800 825 850
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
distrun km
start 1 207 /120000
stop 3072 207 /234500
10 cm/s

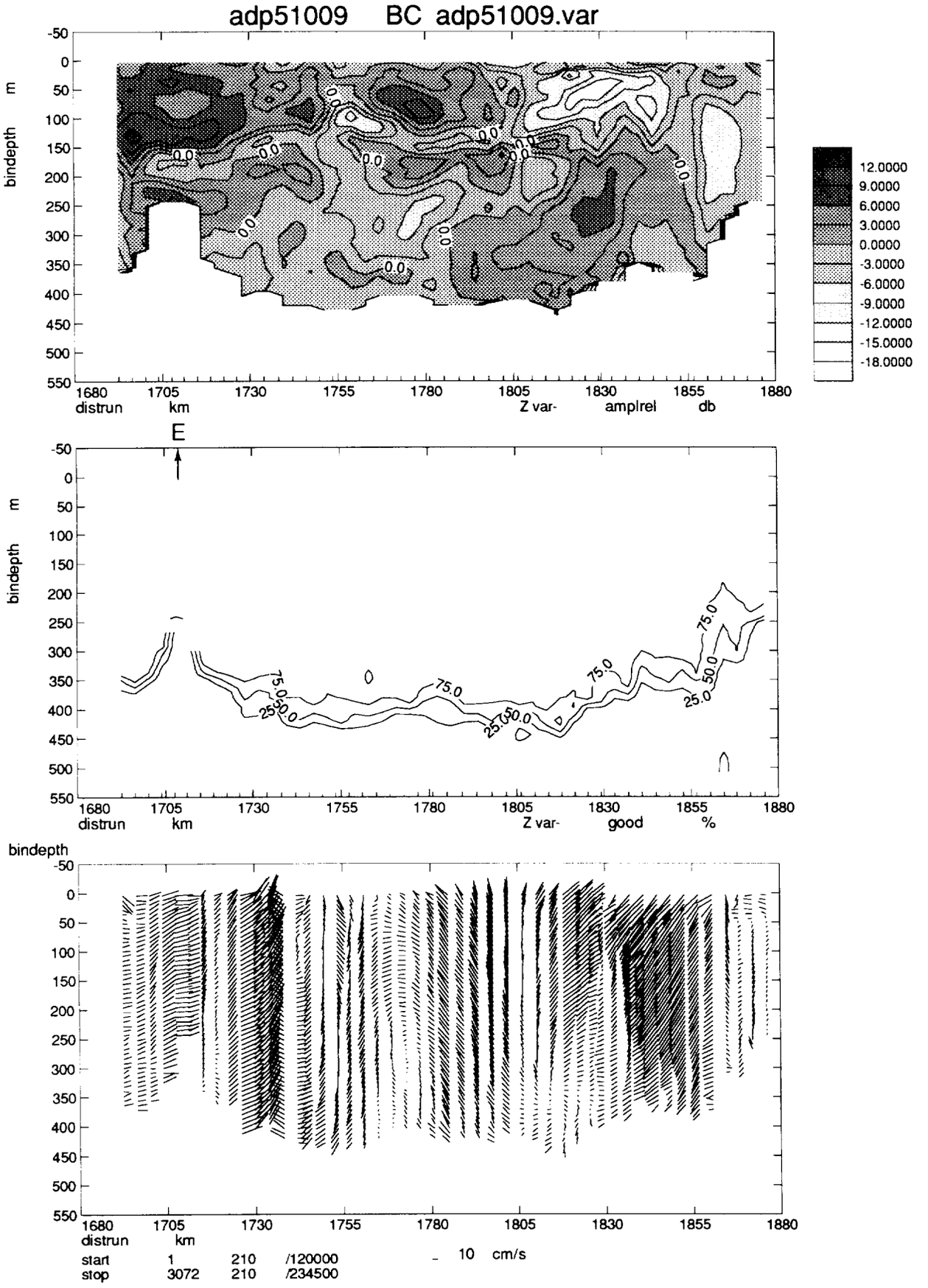

adp51004 EV adp51004.rla
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
800
825
850
875
900
925
950
975
1000
distrun
km
Z var-
amplrel
db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
0.0
bindepth
m
75.0
50.0
25.0
Z var-
good
%
bindepth
distrun
km
start 1 208 /000000
stop 3072 208 /114500
10 cm/s

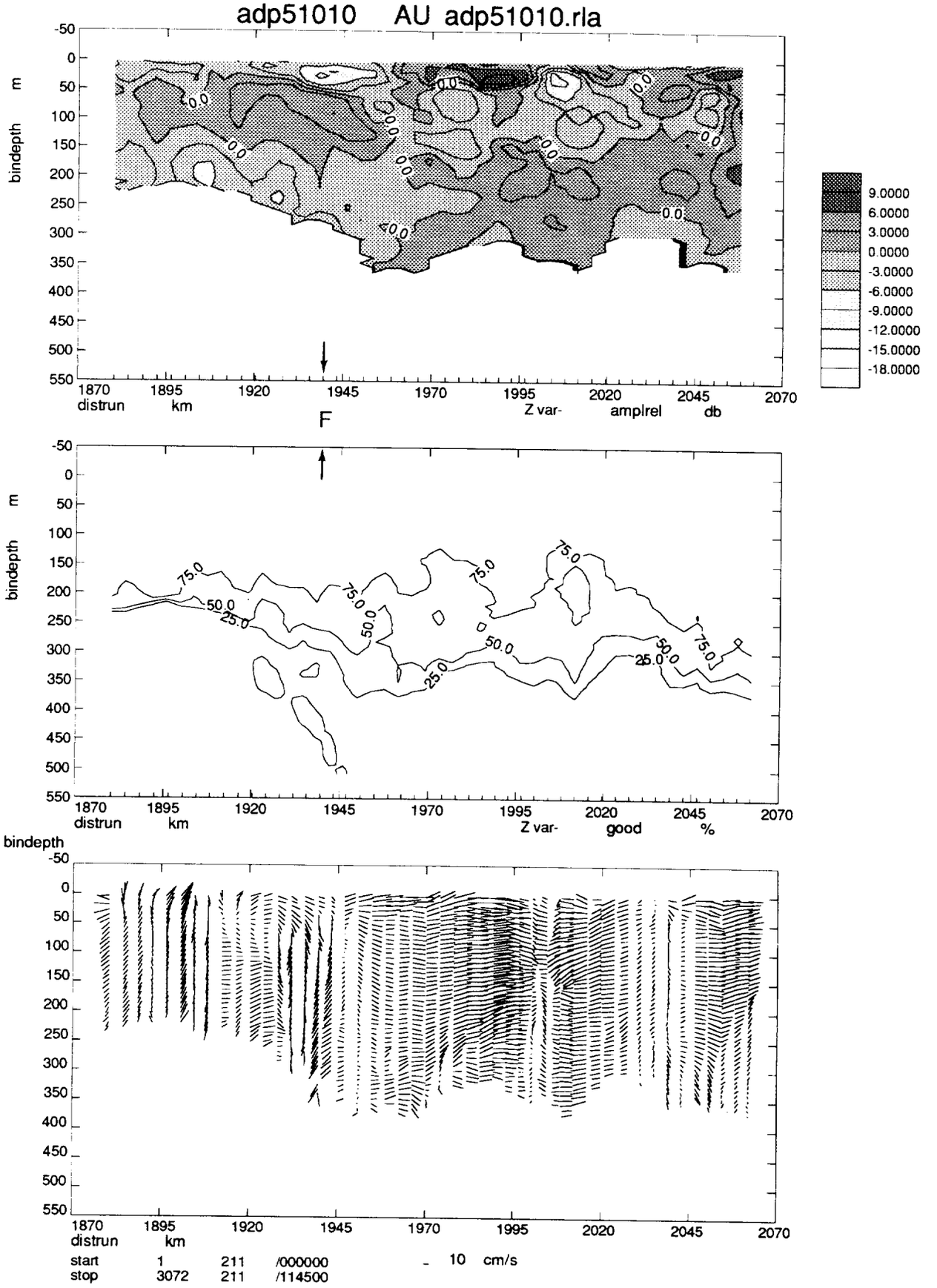

adp51005 BB adp51005.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
980 1005 1030 1055 1080 1105 1130 1155 1180
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
C
bindepth m
Z var- good %
75.0
50.0
25.0
bindepth
distrun km
start 1 208 /120000
stop 3072 208 /234500
10 cm/s

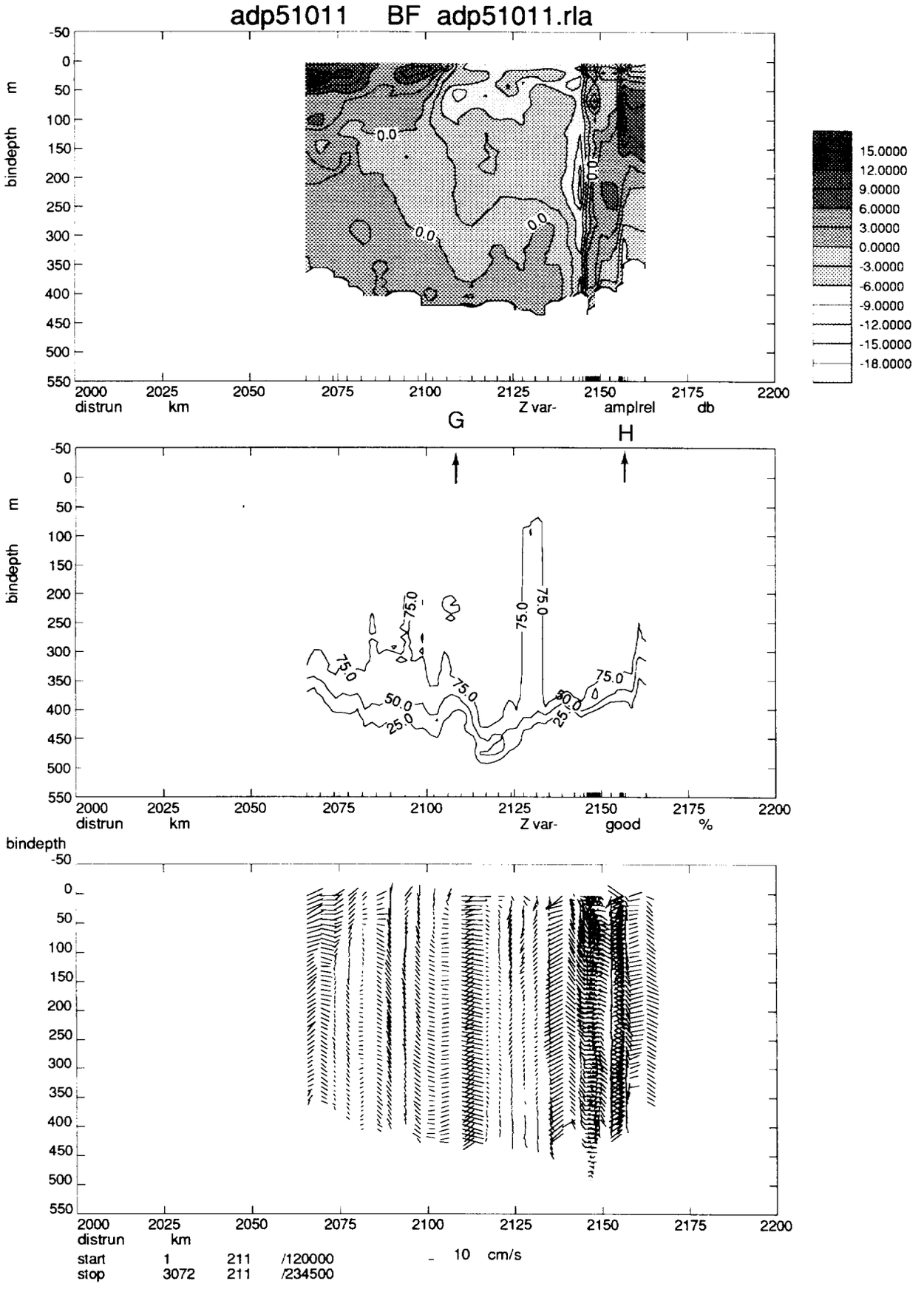

adp51006 AU adp51006.rla
bindepth
m
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
good
%
start 1 209 /000000
stop 3072 209 /114500
10 cm/s


adp51007 AQ adp51007.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
1325 1350 1375 1400 1425 1450 1475 1500 1525
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
C1
D
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
distrun km
start 1 209 /120000
stop 3072 209 /234500
10 cm/s


adp51008 AS adp51008.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
1500 1525 1550 1575 1600 1625 1650 1675 1700
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
D1
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
start 1 210 /000000
stop 3072 210 /114500
10 cm/s


adp51009 BC adp51009.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
1680 1705 1730 1755 1780 1805 1830 1855 1880
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
E
bindepth m
Z var- good %
75.0
50.0
25.0
bindepth
distrun km
start 1 210 /120000
stop 3072 210 /234500
10 cm/s


adp51010 AU adp51010.rla
bindepth m
-50 0 50 100 150 200 250 300 350 400 450 500 550
0.0
1870 1895 1920 1945 1970 1995 2020 2045 2070
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
F
bindepth m
75.0 50.0 25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 211 /000000
stop 3072 211 /114500
10 cm/s


adp51011 BF adp51011.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
0.0
0.0
0.0
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2000 2025 2050 2075 2100 2125 2150 2175 2200
distrun km
Z var- amplrel db
G
H
75.0
50.0
25.0
Z var- good %
bindepth
start 1 211 /120000
stop 3072 211 /234500
10 cm/s

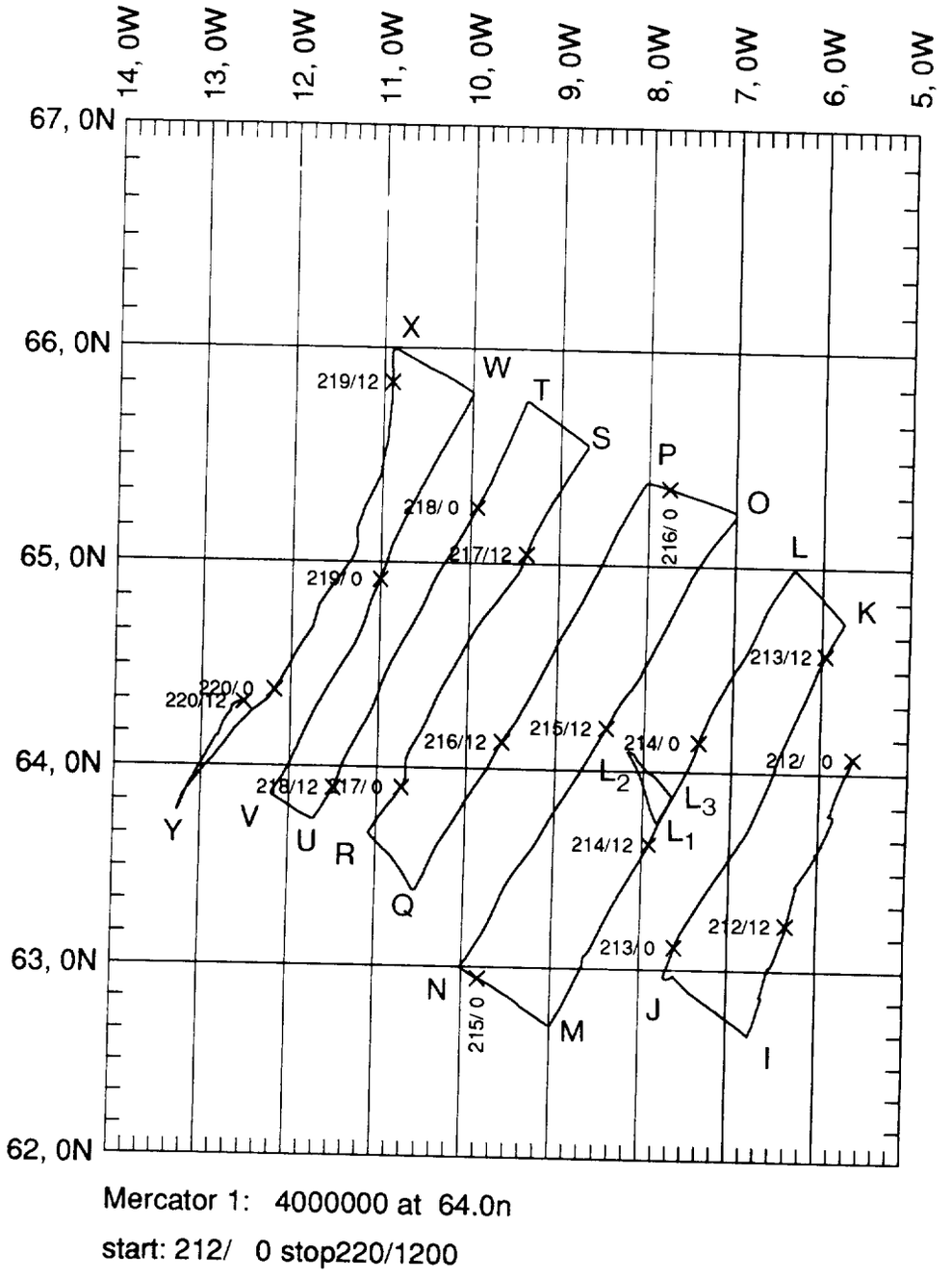
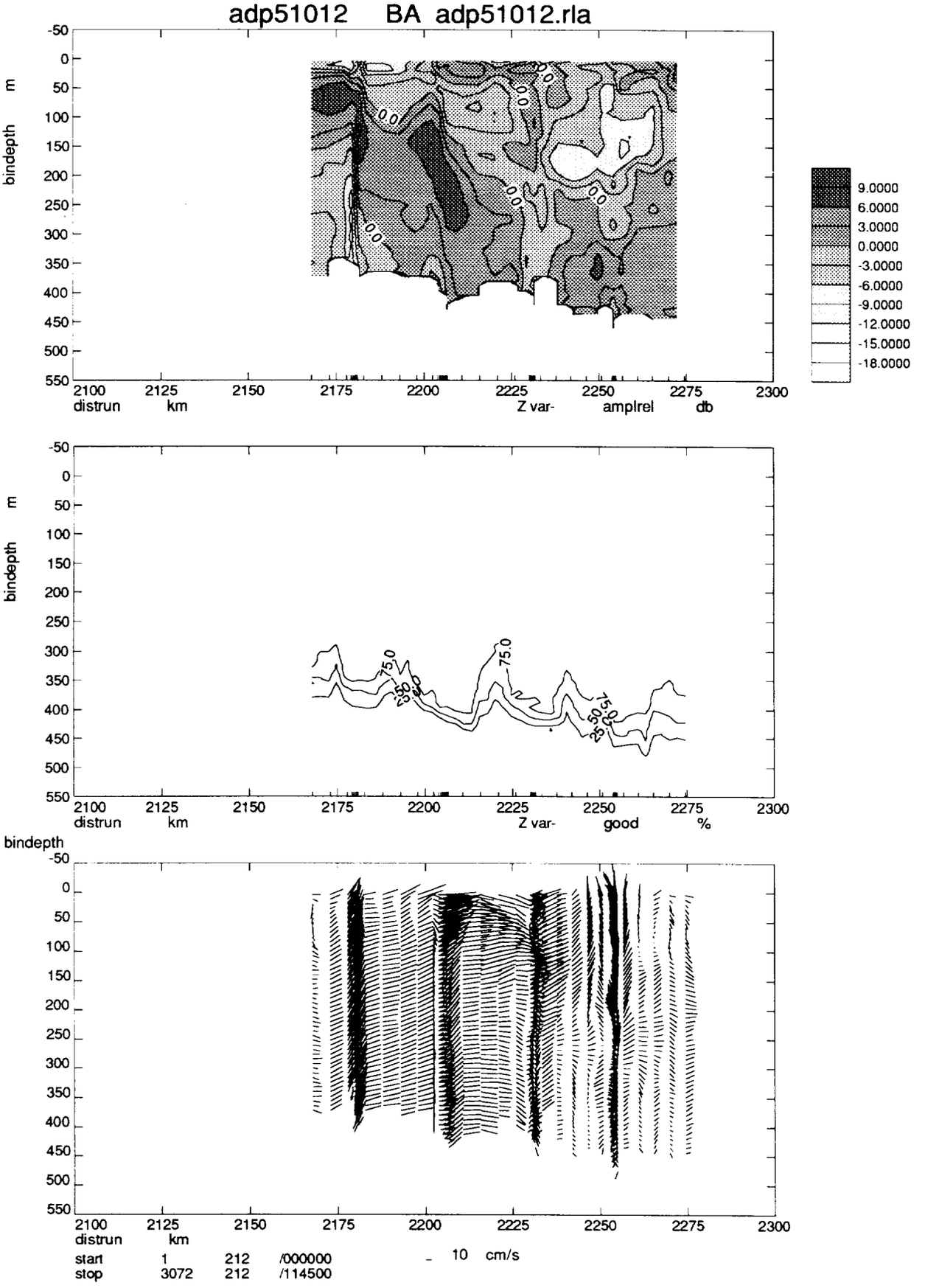
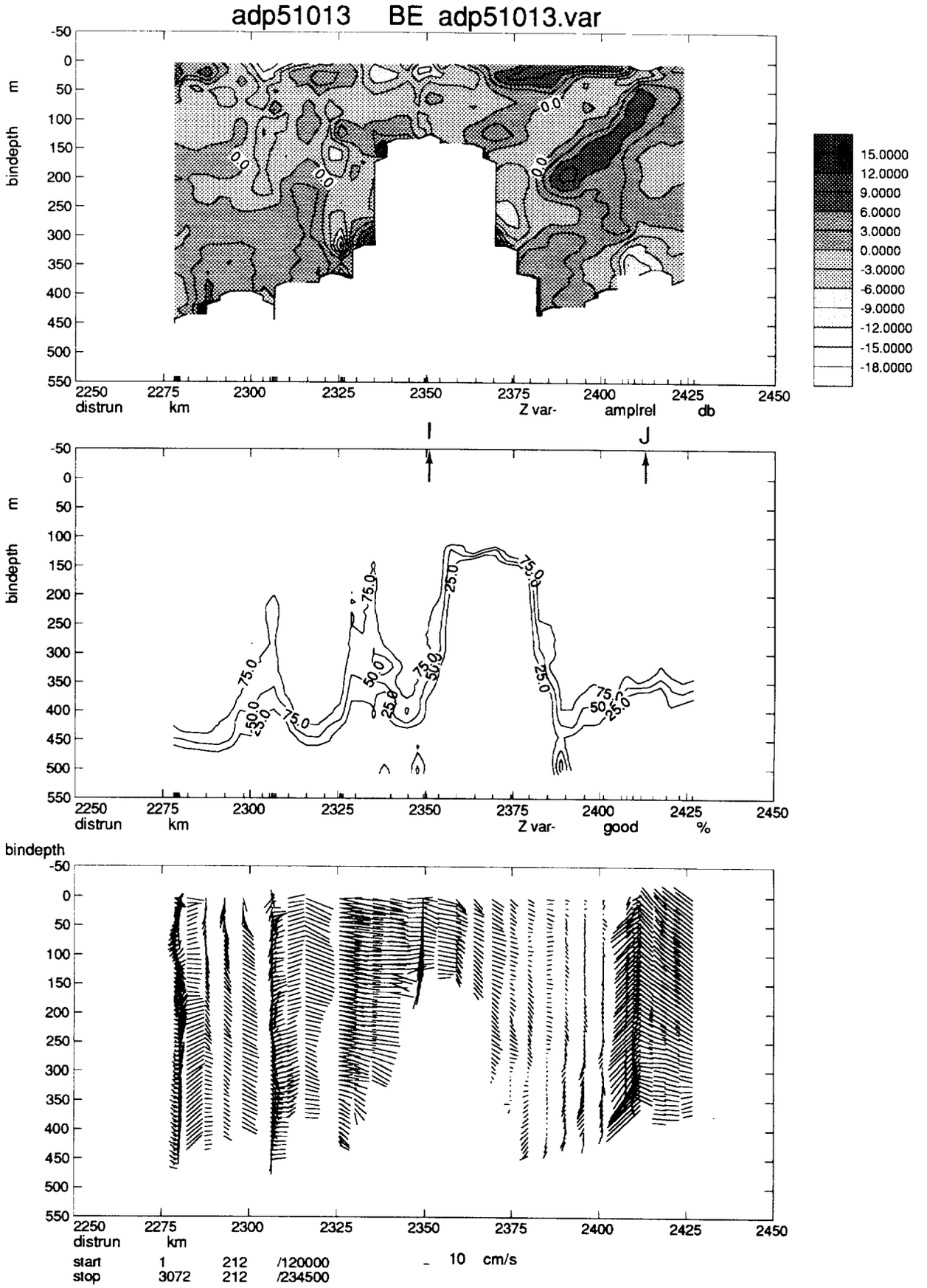
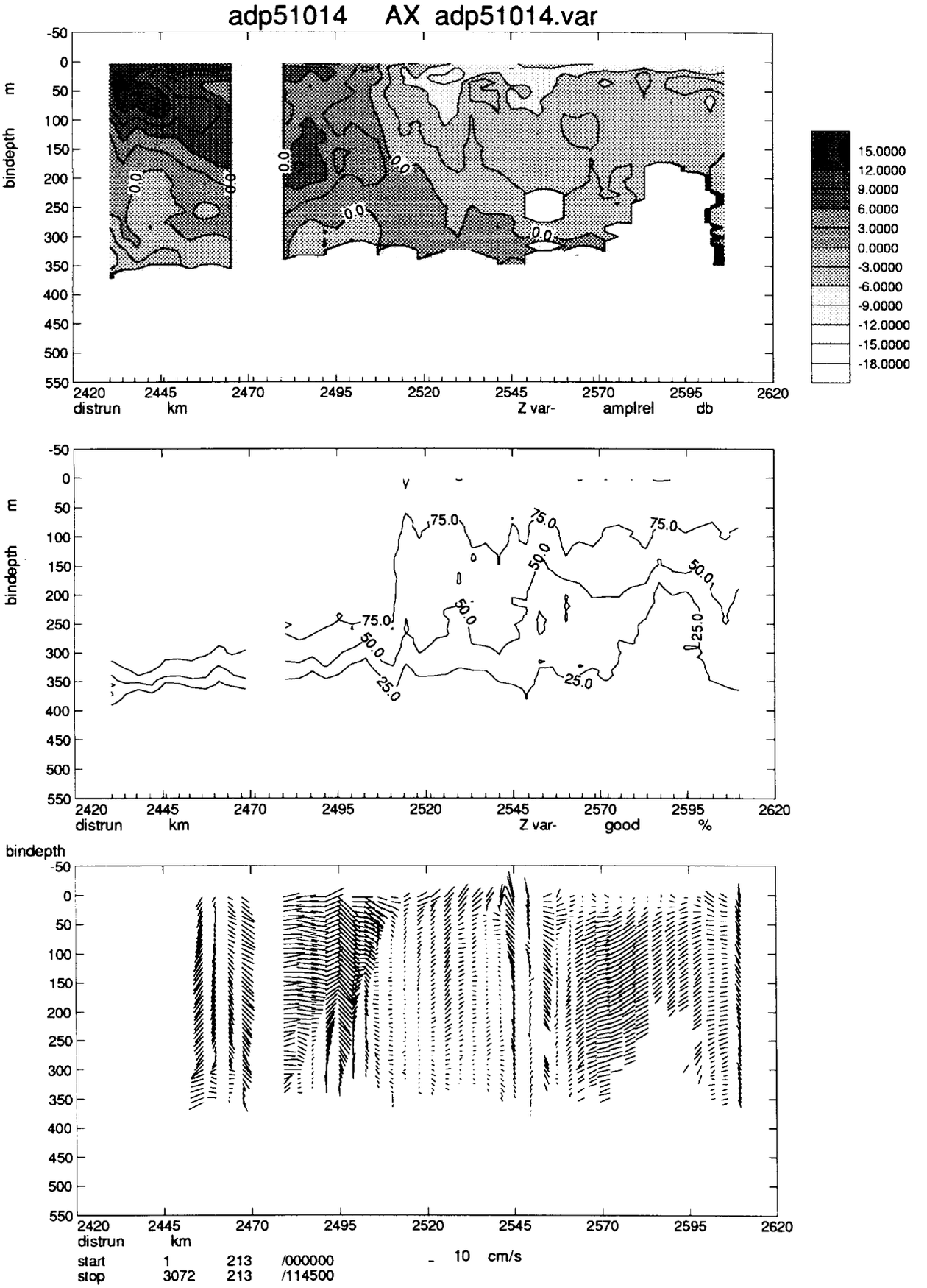
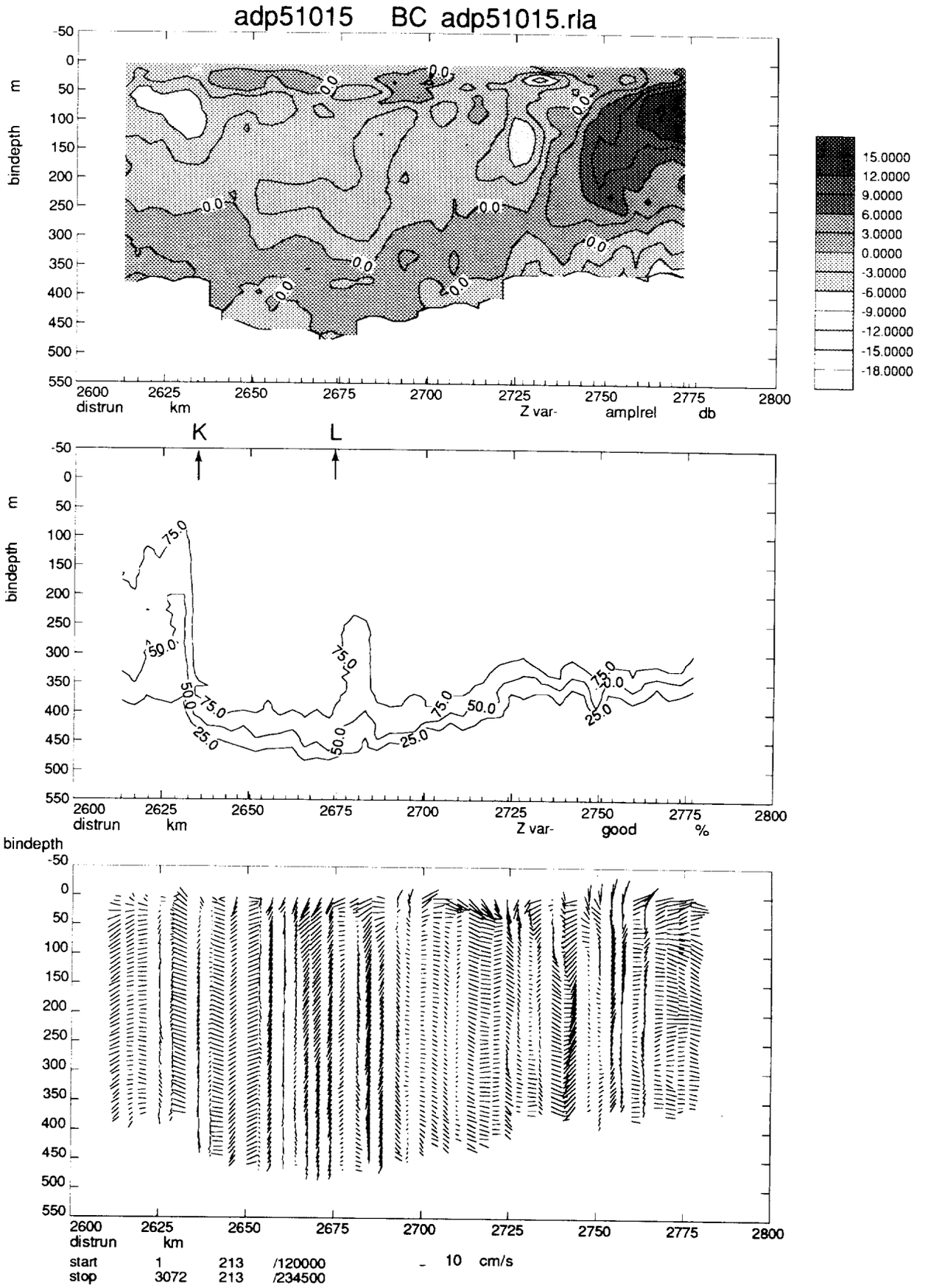


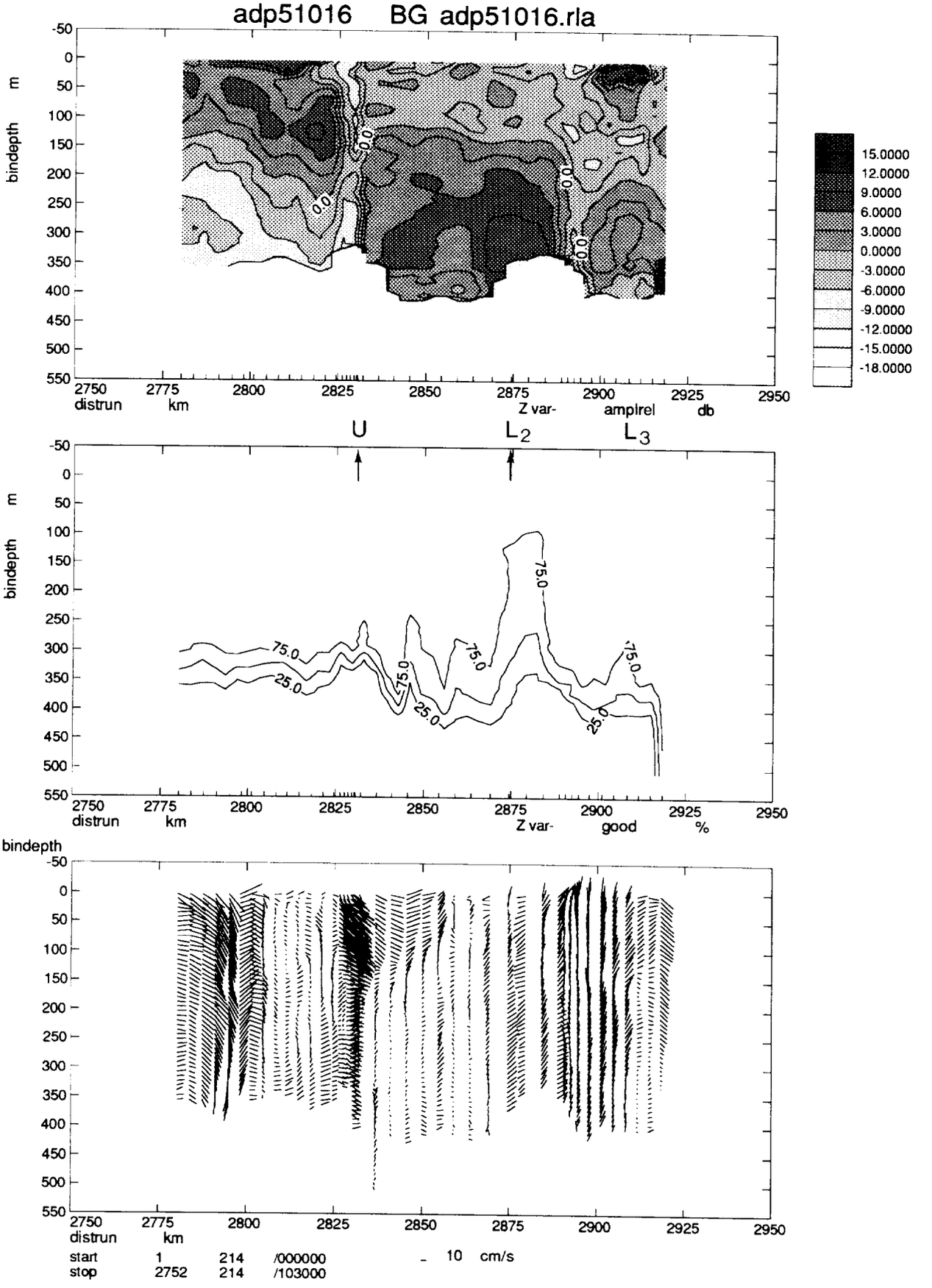
Figure 6. Track plot of the section of the large scale survey between the Faeroes and Iceland. Annotated times indicate start and stop times for the plots in the following section.

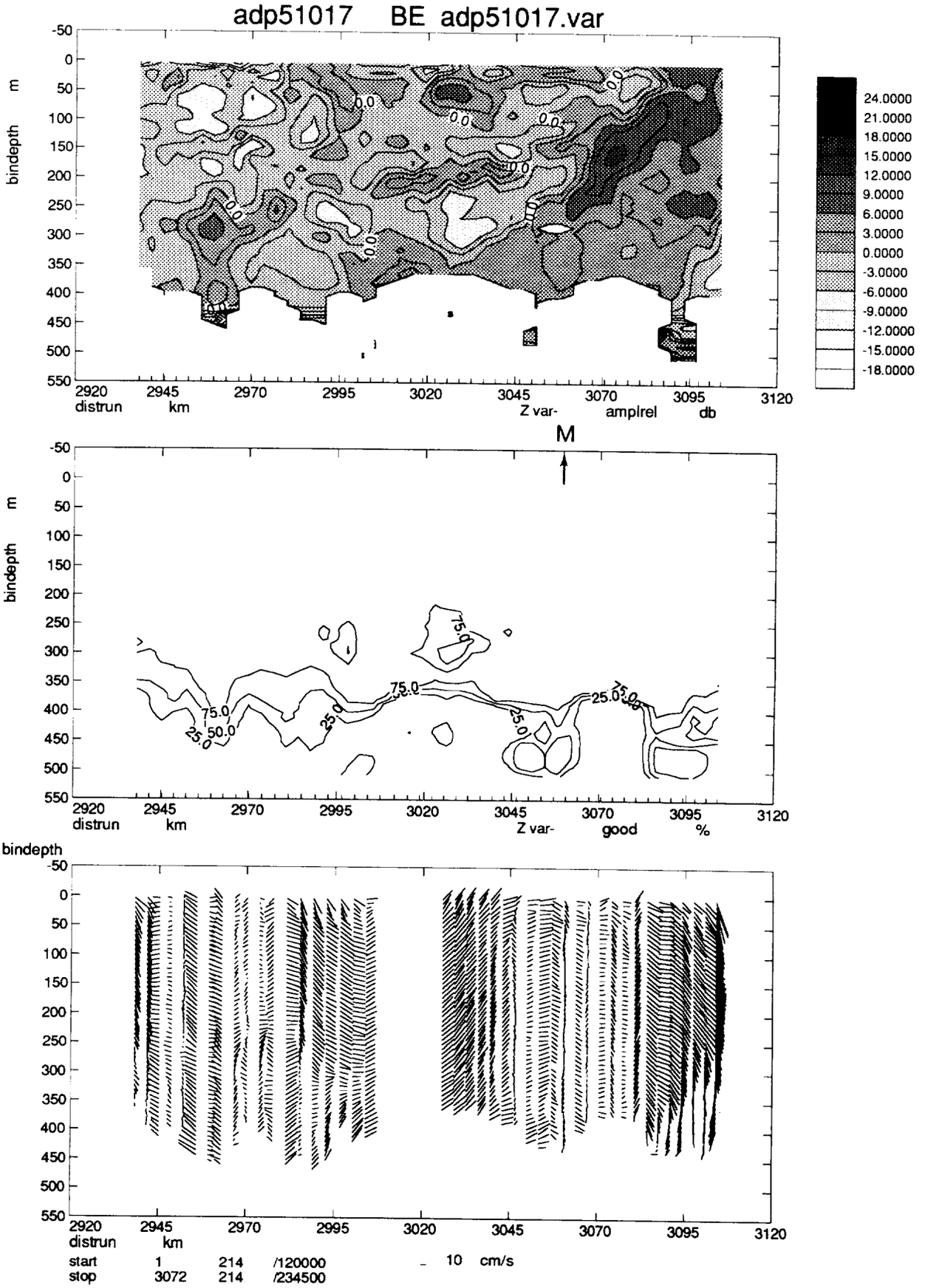

adp51012 BA adp51012.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
2100 2125 2150 2175 2200 2225 2250 2275 2300
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
bindepth m
Z var- good %
bindepth
start 1 212 /000000
stop 3072 212 /114500
10 cm/s

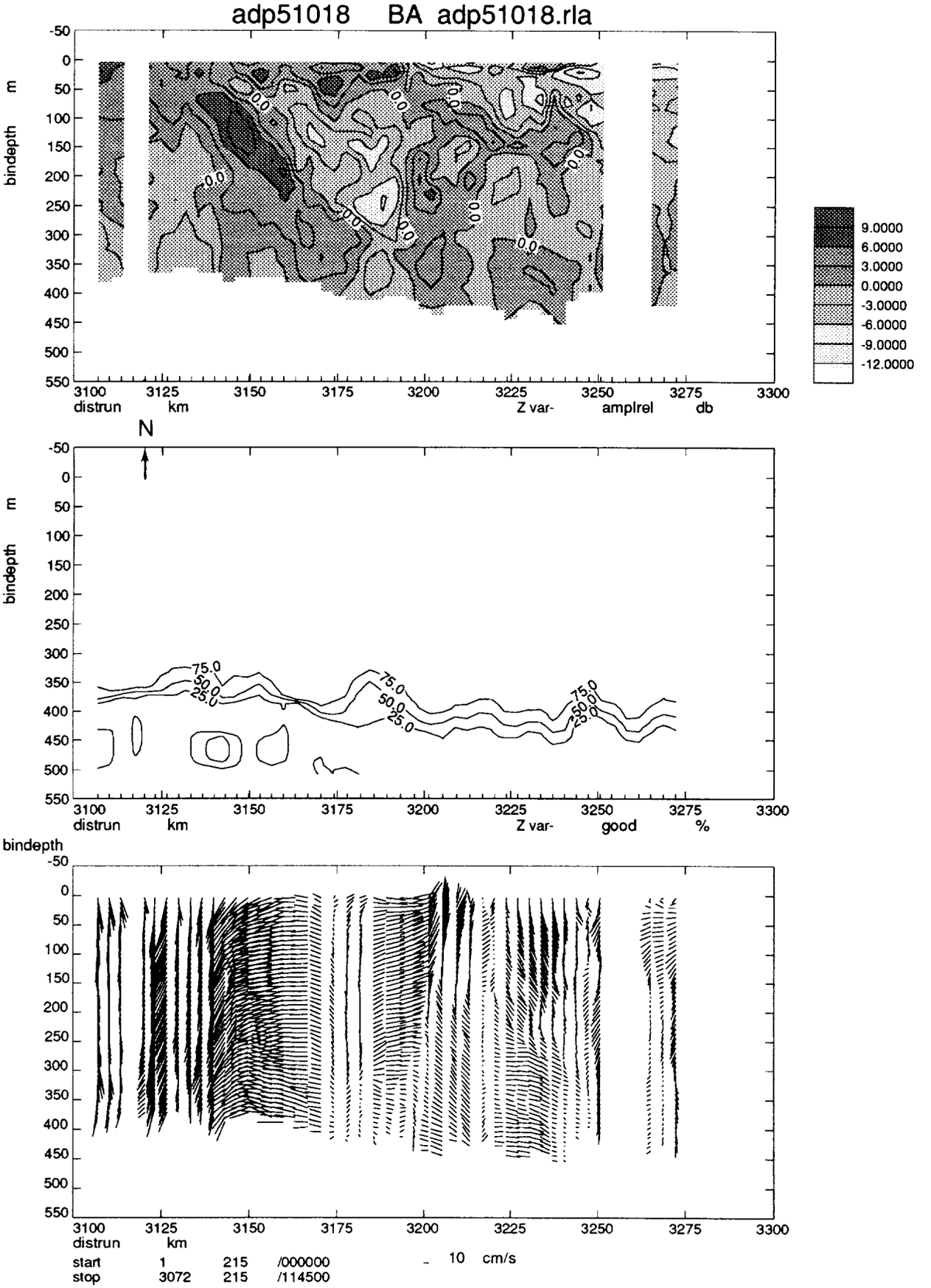

adp51013 BE adp51013.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
2250 2275 2300 2325 2350 2375 2400 2425 2450
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
I
J
bindepth m
Z var- good %
bindepth
distrun km
start 1 212 /120000
stop 3072 212 /234500
10 cm/s

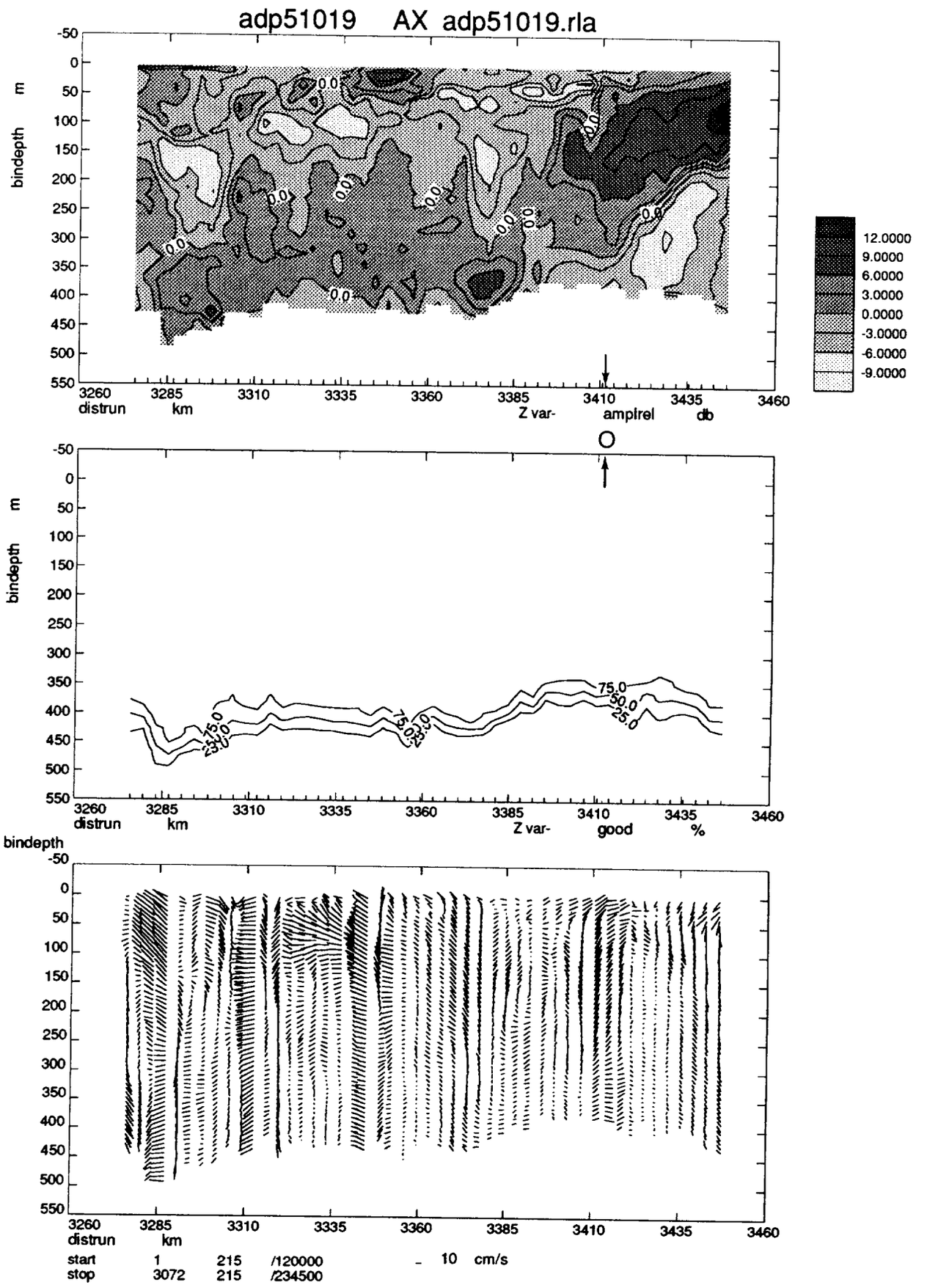

adp51014 AX adp51014.var
bindepth m
-50 0 50 100 150 200 250 300 350 400 450 500 550
0.0
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2420 2445 2470 2495 2520 2545 2570 2595 2620
distrun km
Z var- amplrel db
75.0
50.0
25.0
Z var- good %
bindepth
start 1 213 /000000
stop 3072 213 /114500
10 cm/s

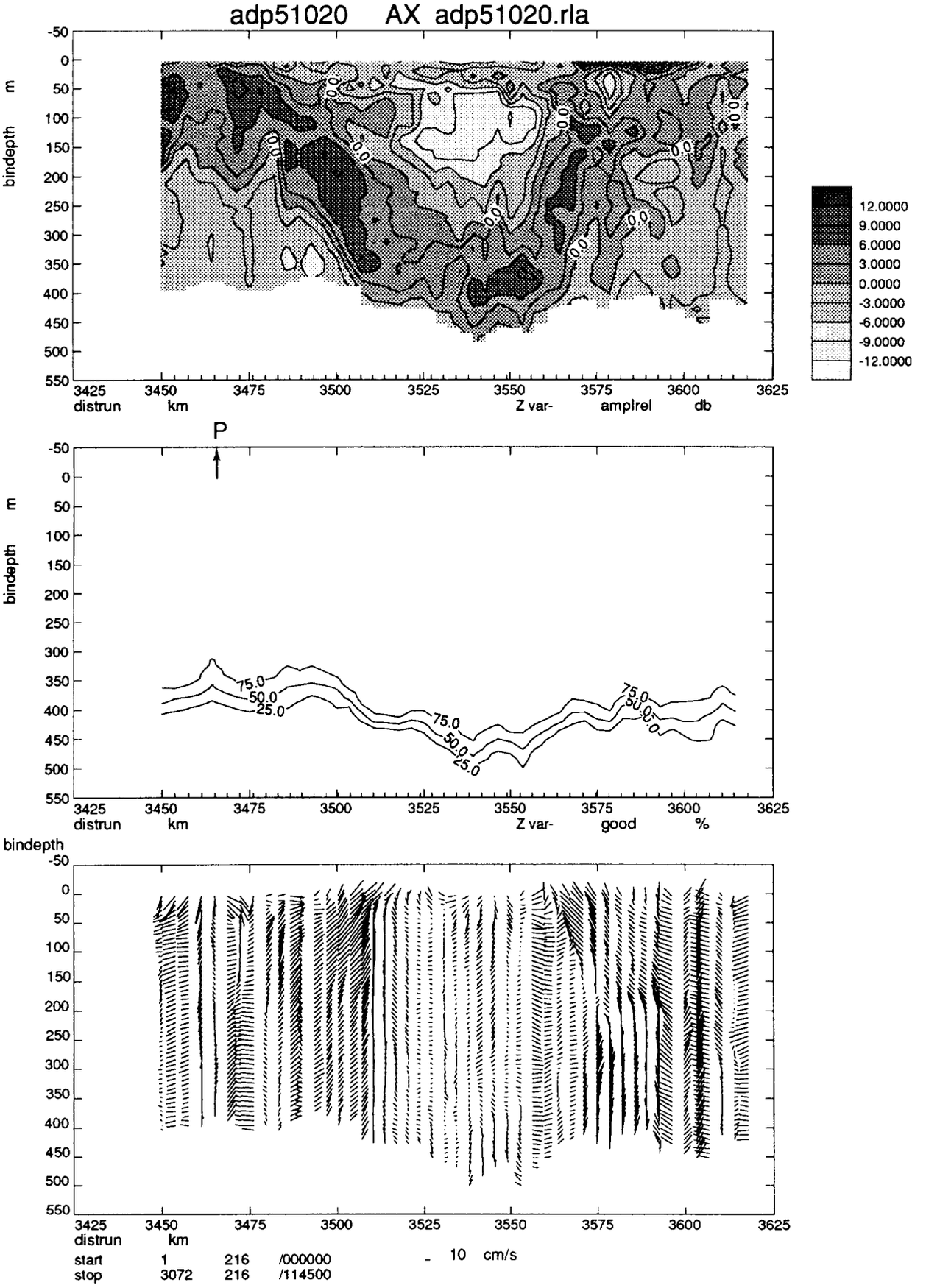

adp51015 BC adp51015.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
2600 2625 2650 2675 2700 2725 2750 2775 2800
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
K
L
bindepth m
Z var- good %
bindepth
distrun km
start 1 213 /120000
stop 3072 213 /234500
10 cm/s

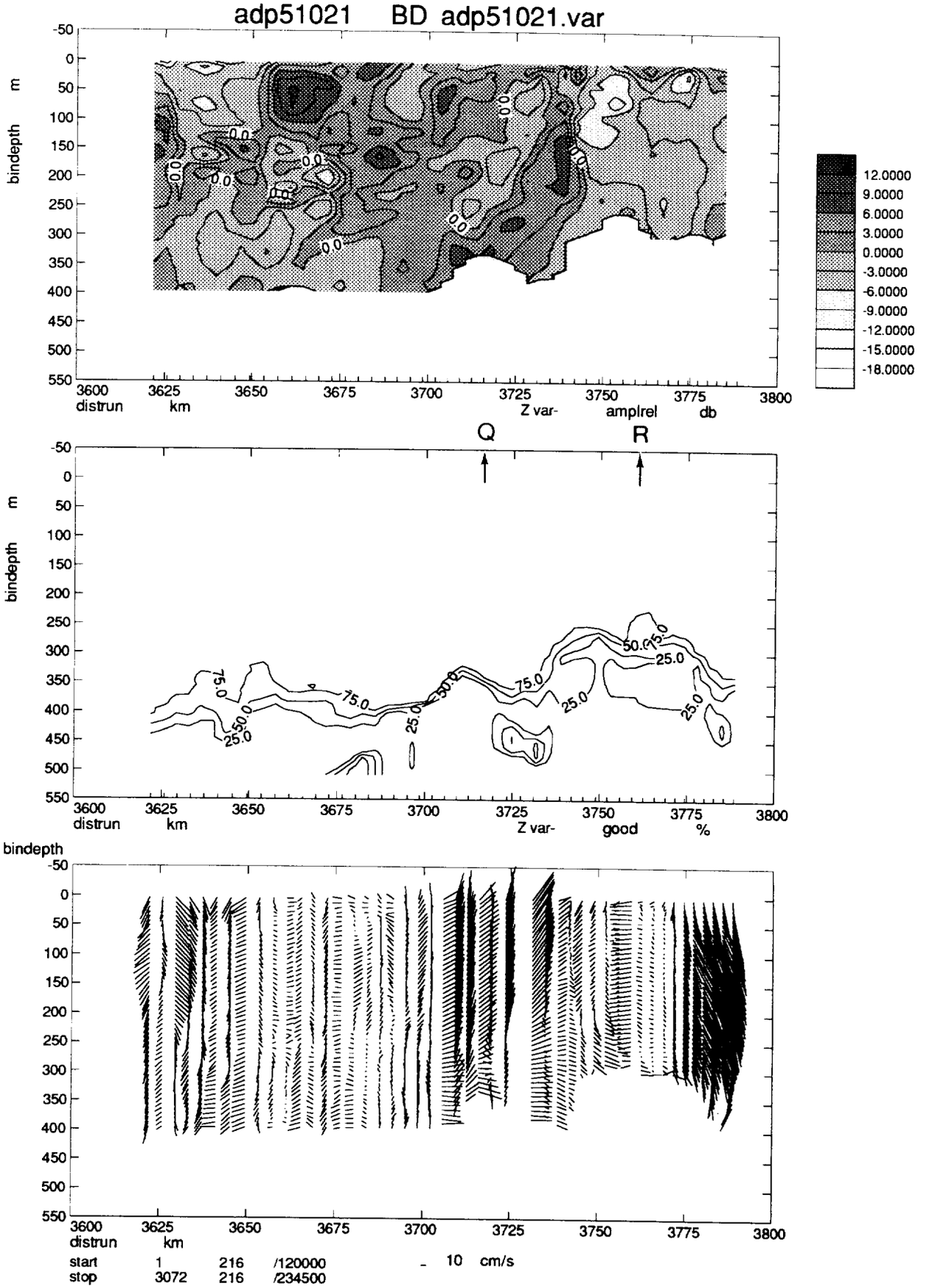

adp51016 BG adp51016.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2750 2775 2800 2825 2850 2875 2900 2925 2950
distrun km
Z var- amplrel db
U
L2
L3
75.0
25.0
Z var- good %
bindepth
start 1 214 /000000
stop 2752 214 /103000
10 cm/s

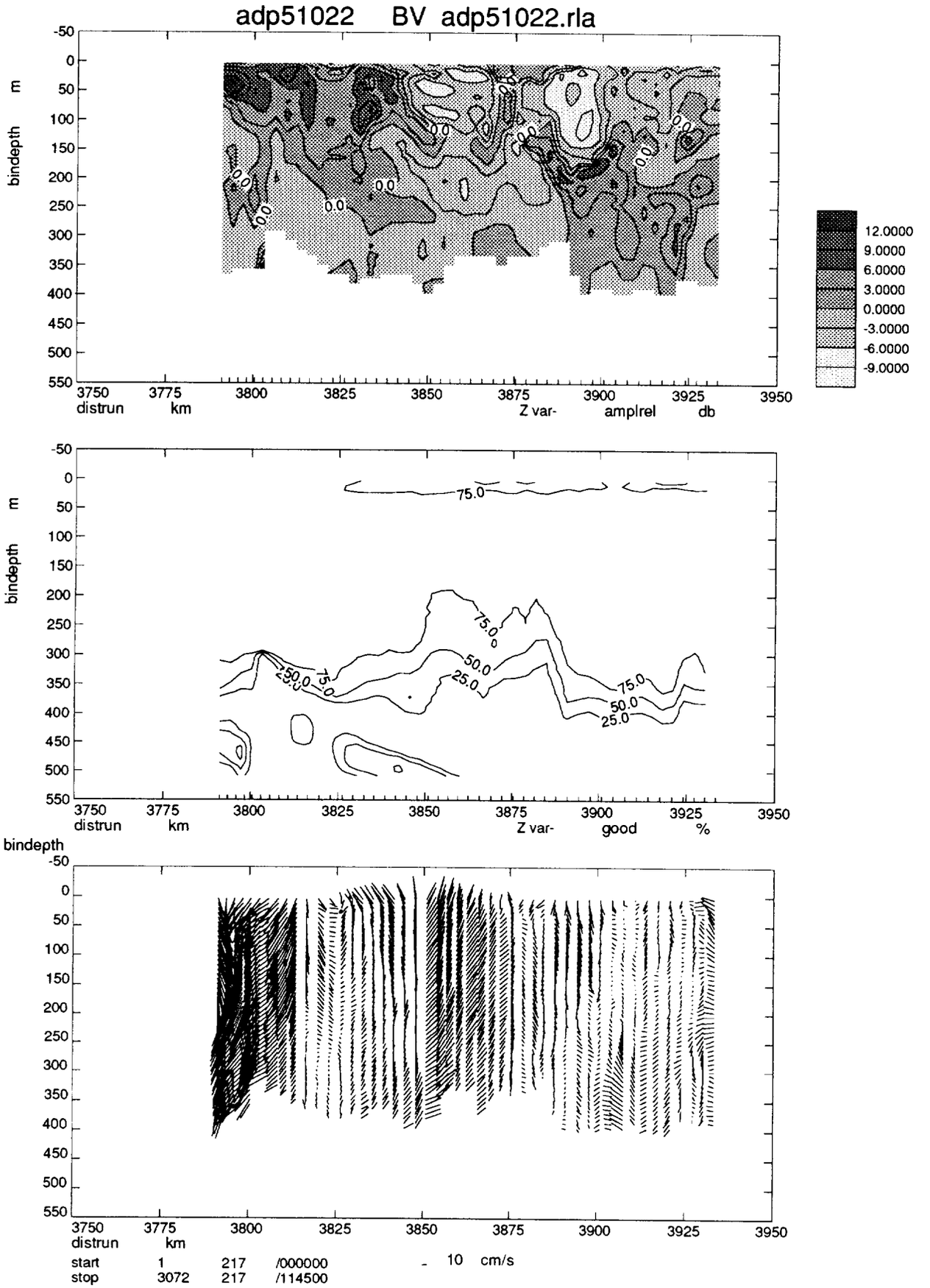

adp51017 BE adp51017.var
bindepth m
-50 0 50 100 150 200 250 300 350 400 450 500 550
2920 2945 2970 2995 3020 3045 3070 3095 3120
distrun km
Z var- amplrel db
24.0000
21.0000
18.0000
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
M
bindepth m
distrun km
Z var- good %
75.0
50.0
25.0
bindepth
distrun km
start 1 214 /120000
stop 3072 214 /234500
10 cm/s

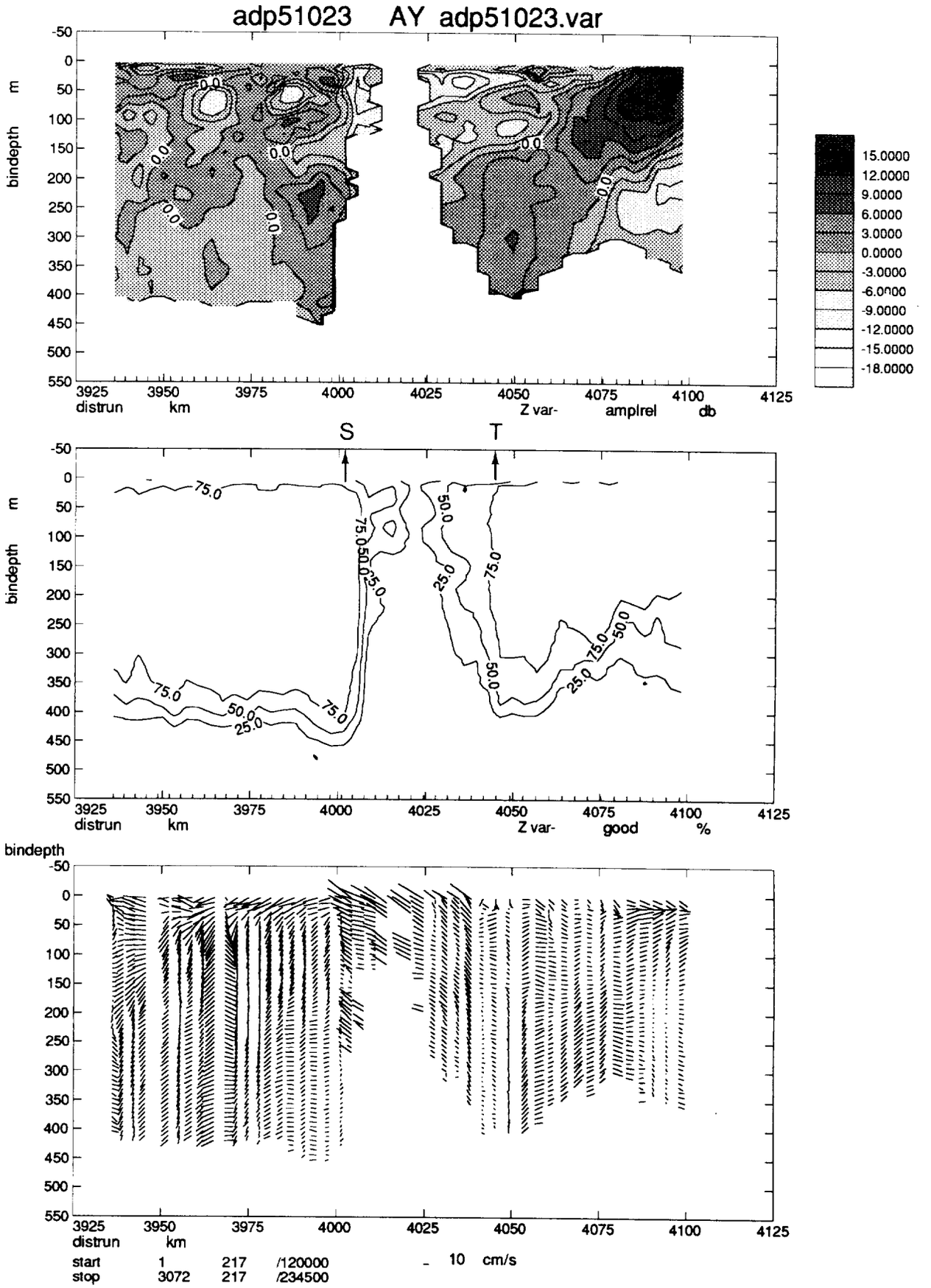

adp51018 BA adp51018.rla
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
3100
3125
3150
3175
3200
3225
3250
3275
3300
distrun
km
Z var-
amplrel
db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
N
75.0
50.0
25.0
Z var-
good
%
start 1 215 /000000
stop 3072 215 /114500
10 cm/s

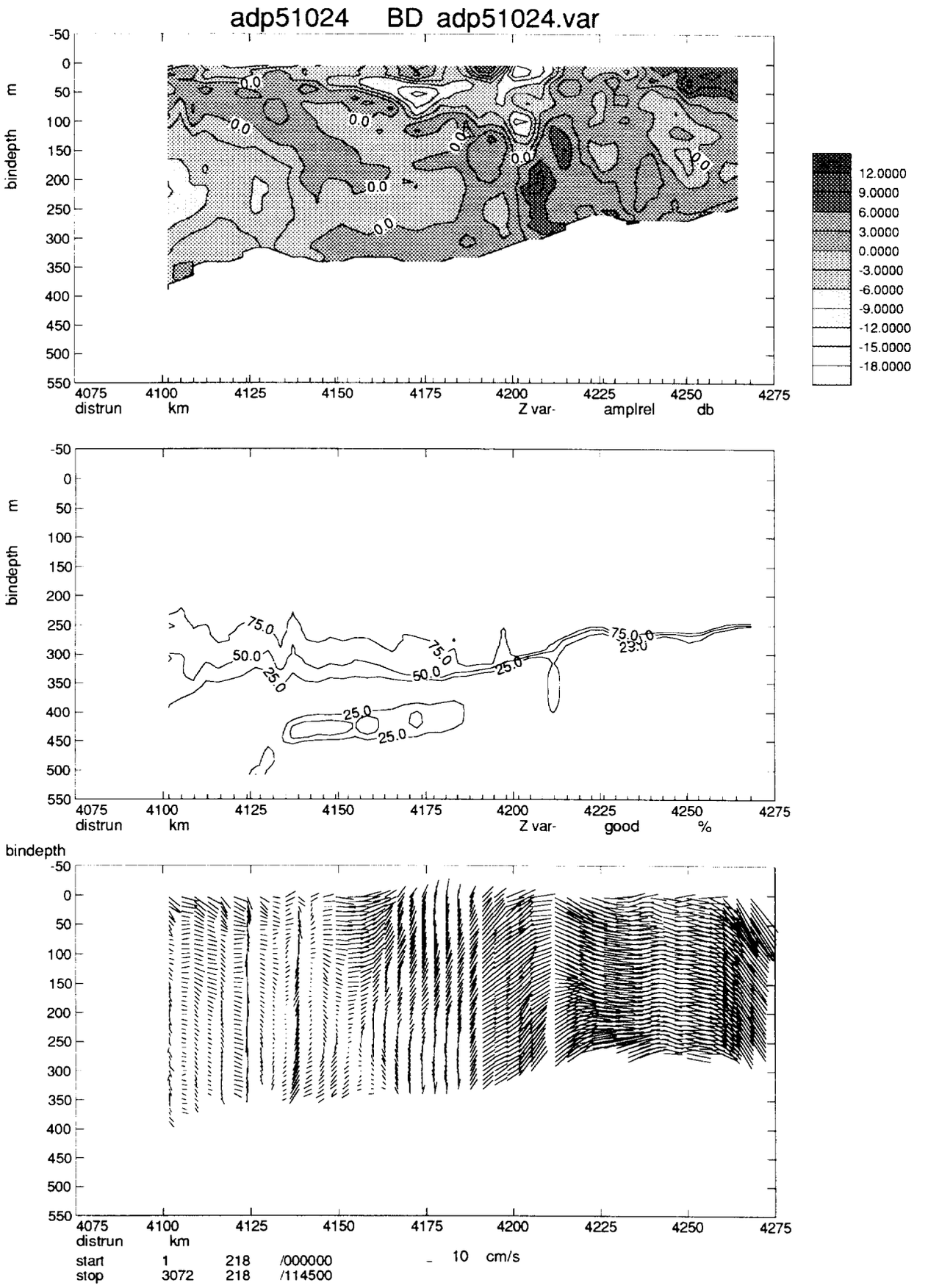

adp51019 AX adp51019.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
3260
3285
3310
3335
3360
3385
3410
3435
3460
distrun
km
Z var-
ampirel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
bindepth m
75.0
50.0
25.0
Z var-
good
%
bindepth
distrun
km
start 1 215 /120000
stop 3072 215 /234500
10 cm/s

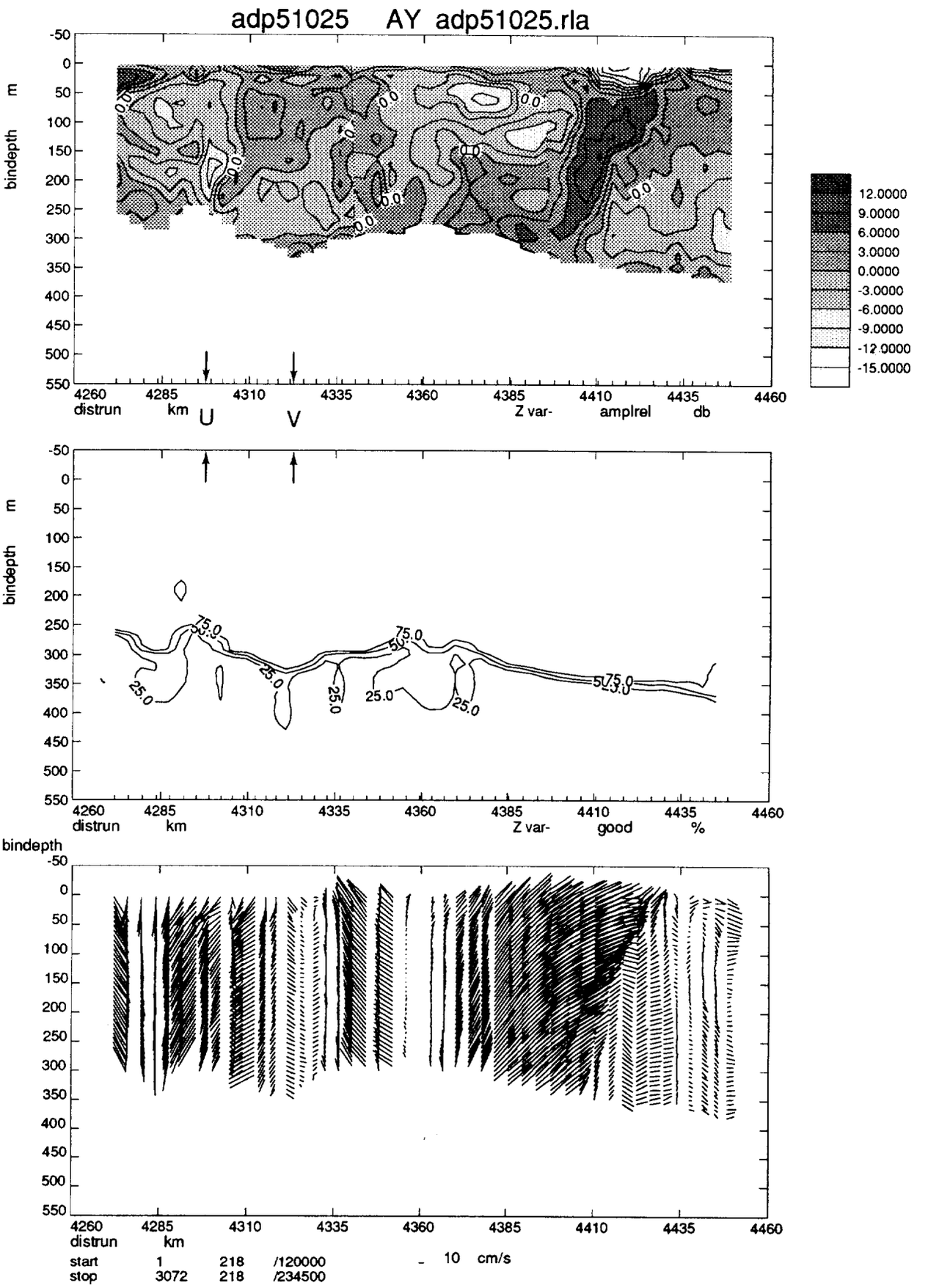

adp51020 AX adp51020.rla
bindepth m
-50 0 50 100 150 200 250 300 350 400 450 500 550
3425 3450 3475 3500 3525 3550 3575 3600 3625
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
P
bindepth m
75.0
50.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 216 /000000
stop 3072 216 /114500
10 cm/s

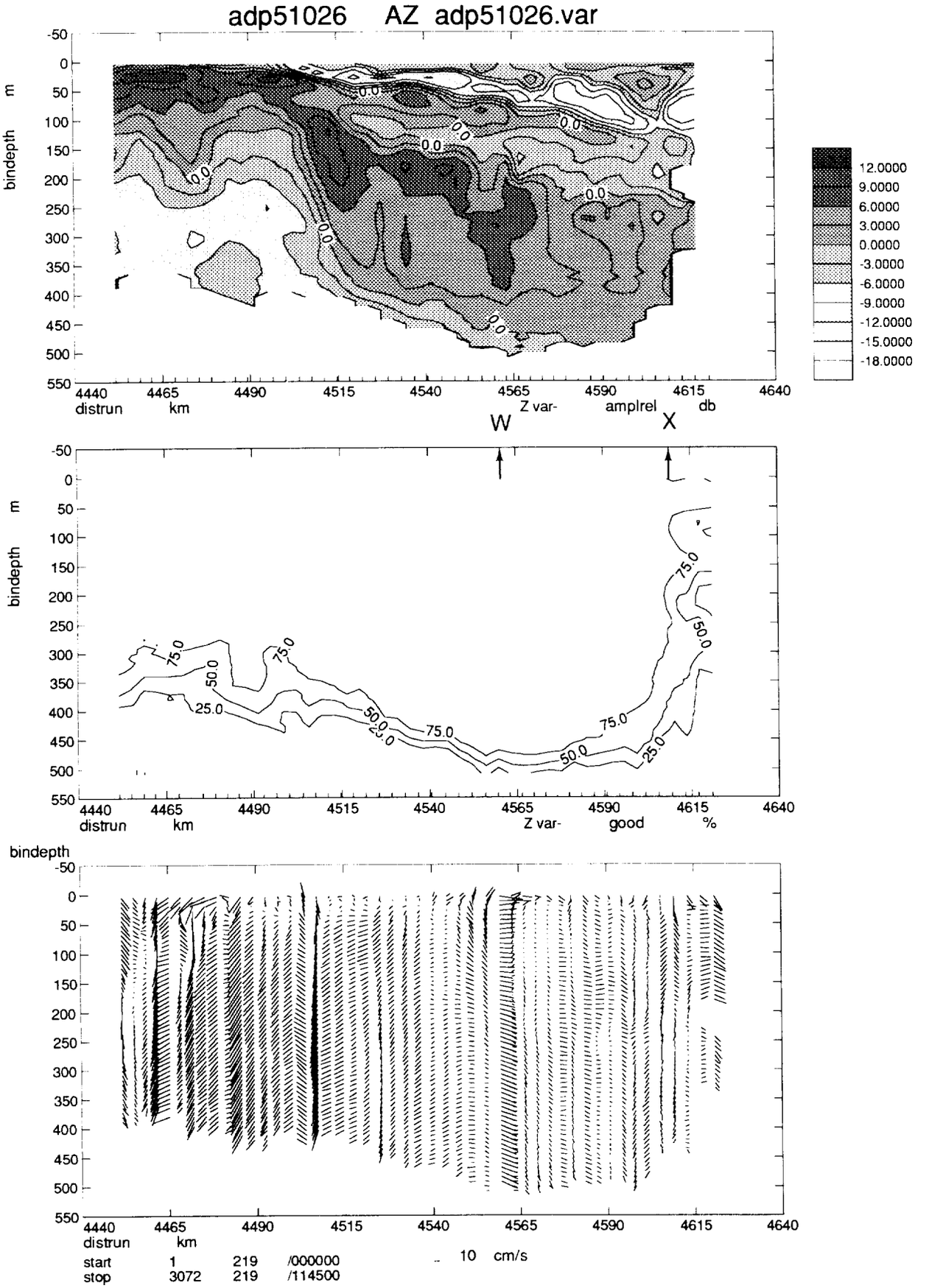

adp51021 BD adp51021.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
3600 3625 3650 3675 3700 3725 3750 3775 3800
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
Q
R
bindepth m
Z var- good %
bindepth
distrun km
start 1 216 /120000
stop 3072 216 /234500
10 cm/s

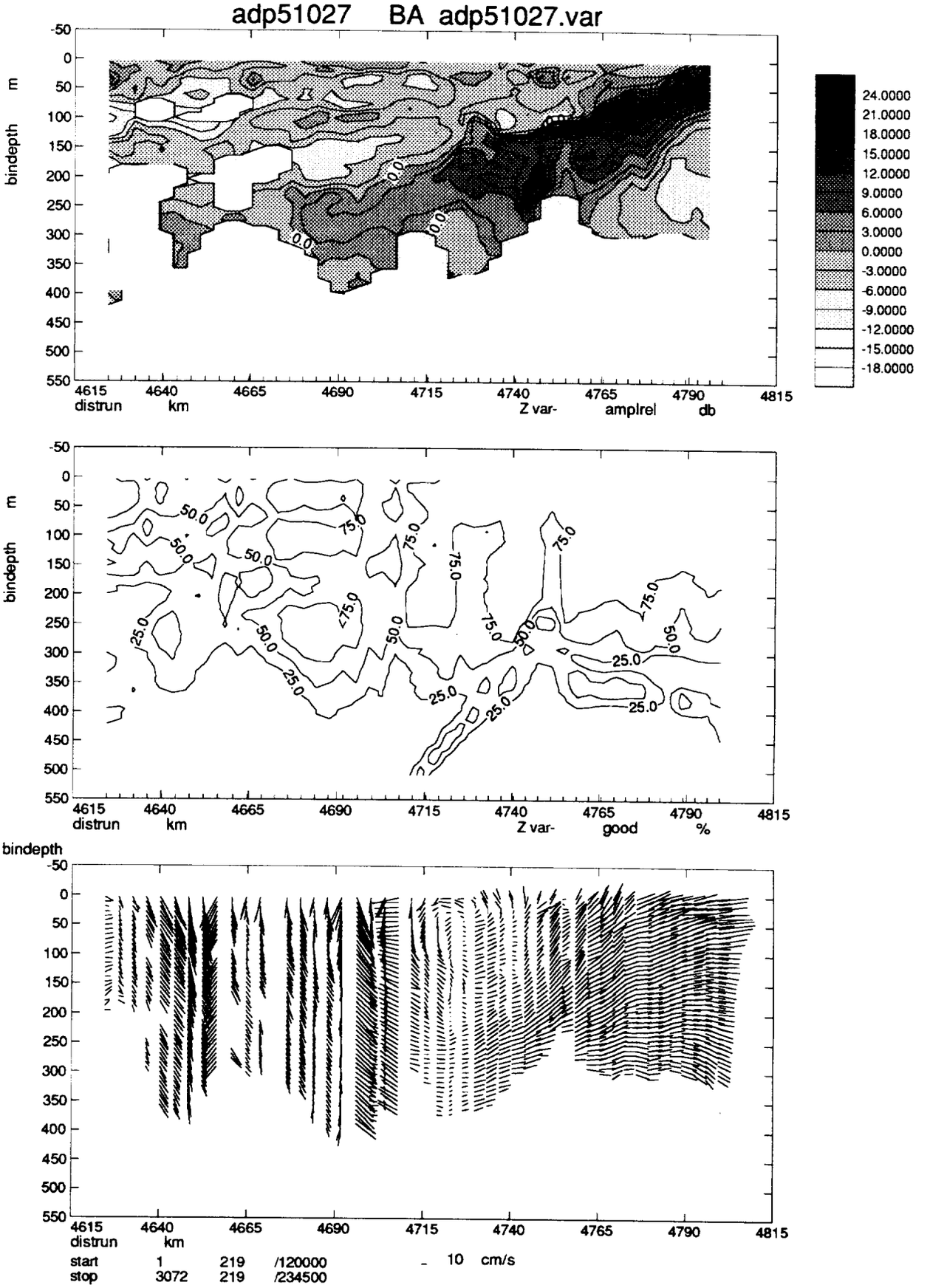

adp51022 BV adp51022.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
3750 3775 3800 3825 3850 3875 3900 3925 3950
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
0.0
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
start 1 217 /000000
stop 3072 217 /114500
10 cm/s

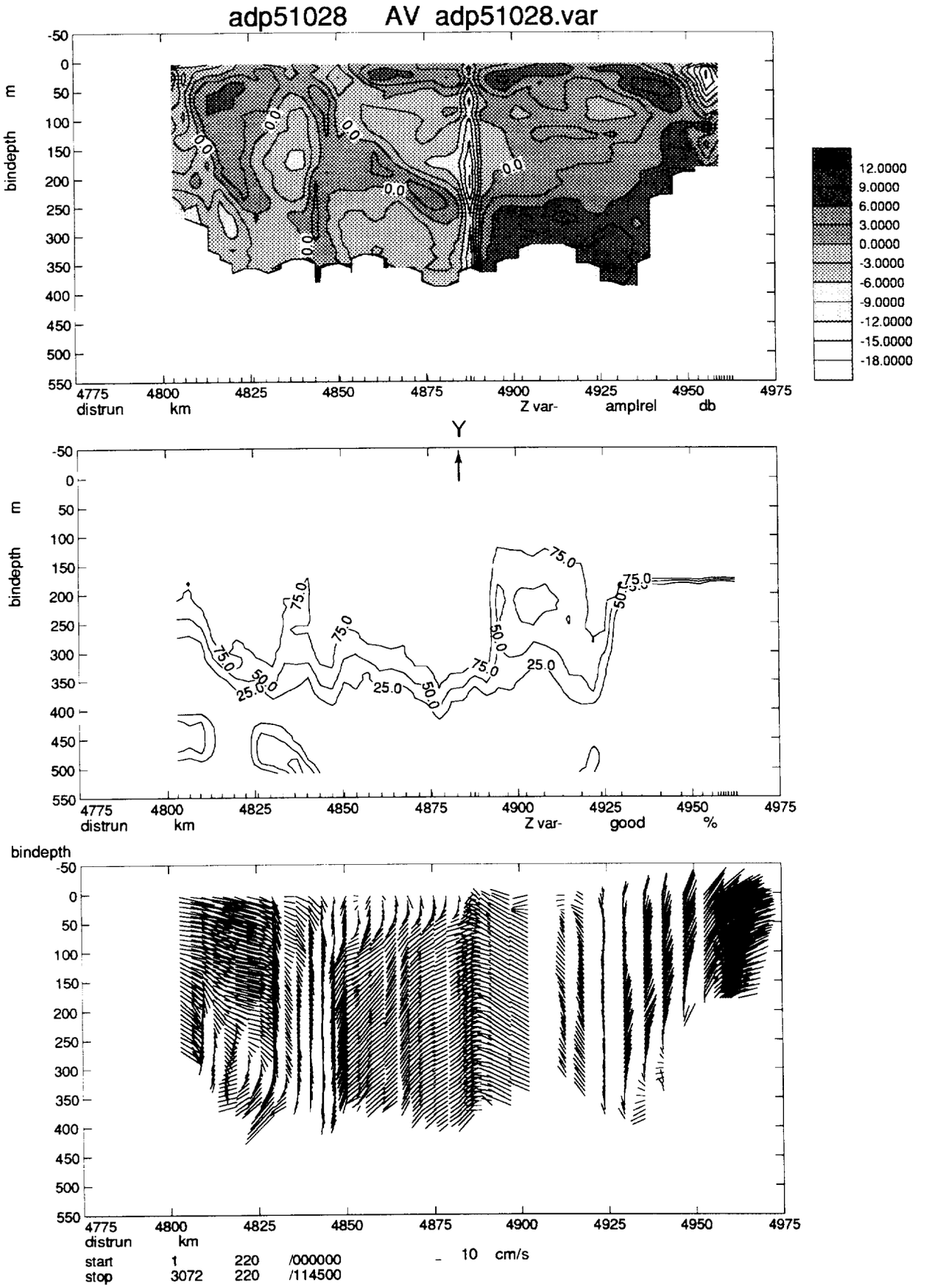

adp51023 AY adp51023.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
3925 3950 3975 4000 4025 4050 4075 4100 4125
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
S
T
Z var- good %
bindepth
start 1 217 /120000
stop 3072 217 /234500
10 cm/s


adp51024 BD adp51024.var
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4075
4100
4125
4150
4175
4200
4225
4250
4275
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
0.0
75.0
50.0
25.0
Z var-
good
%
start 1 218 /000000
stop 3072 218 /114500
10 cm/s


adp51025 AY adp51025.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4260 4285 4310 4335 4360 4385 4410 4435 4460
distrun km
U
V
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
bindepth m
25.0
50.0
75.0
Z var- good %
bindepth
distrun km
start 1 218 /120000
stop 3072 218 /234500
10 cm/s


adp51026 AZ adp51026.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4440 4465 4490 4515 4540 4565 4590 4615 4640
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
W
X
bindepth m
Z var- good %
75.0
50.0
25.0
bindepth
distrun km
start 1 219 /000000
stop 3072 219 /114500
10 cm/s


adp51027 BA adp51027.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4615 4640 4665 4690 4715 4740 4765 4790 4815
distrun km
Z var- amplrel db
24.0000
21.0000
18.0000
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
bindepth m
Z var- good %
bindepth
start 1 219 /120000
stop 3072 219 /234500
10 cm/s


adp51028 AV adp51028.var
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4775
4800
4825
4850
4875
4900
4925
4950
4975
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
Y
Z var-
good
%
bindepth
distrun
km
start 1 220 /000000
stop 3072 220 /114500
10 cm/s

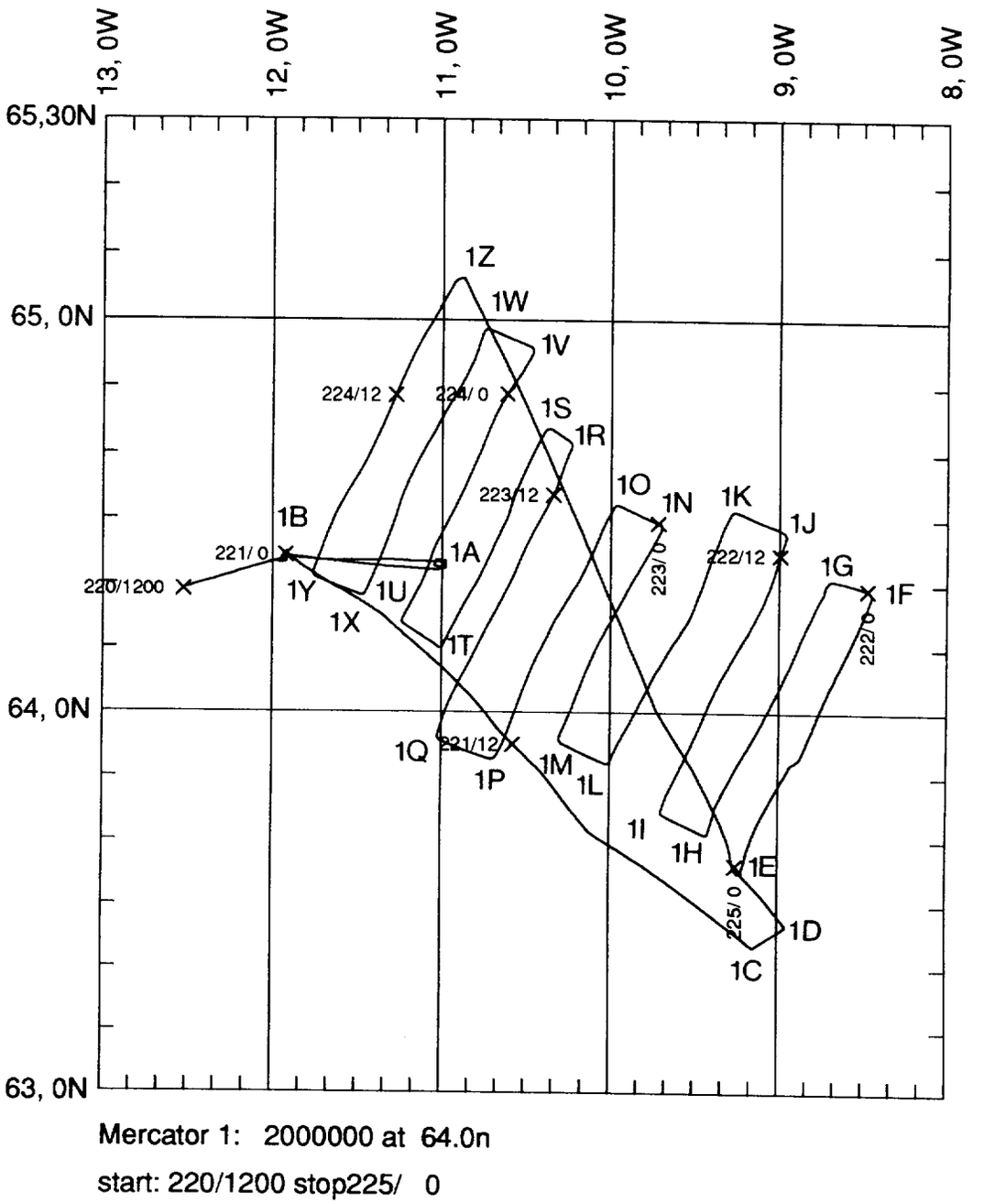
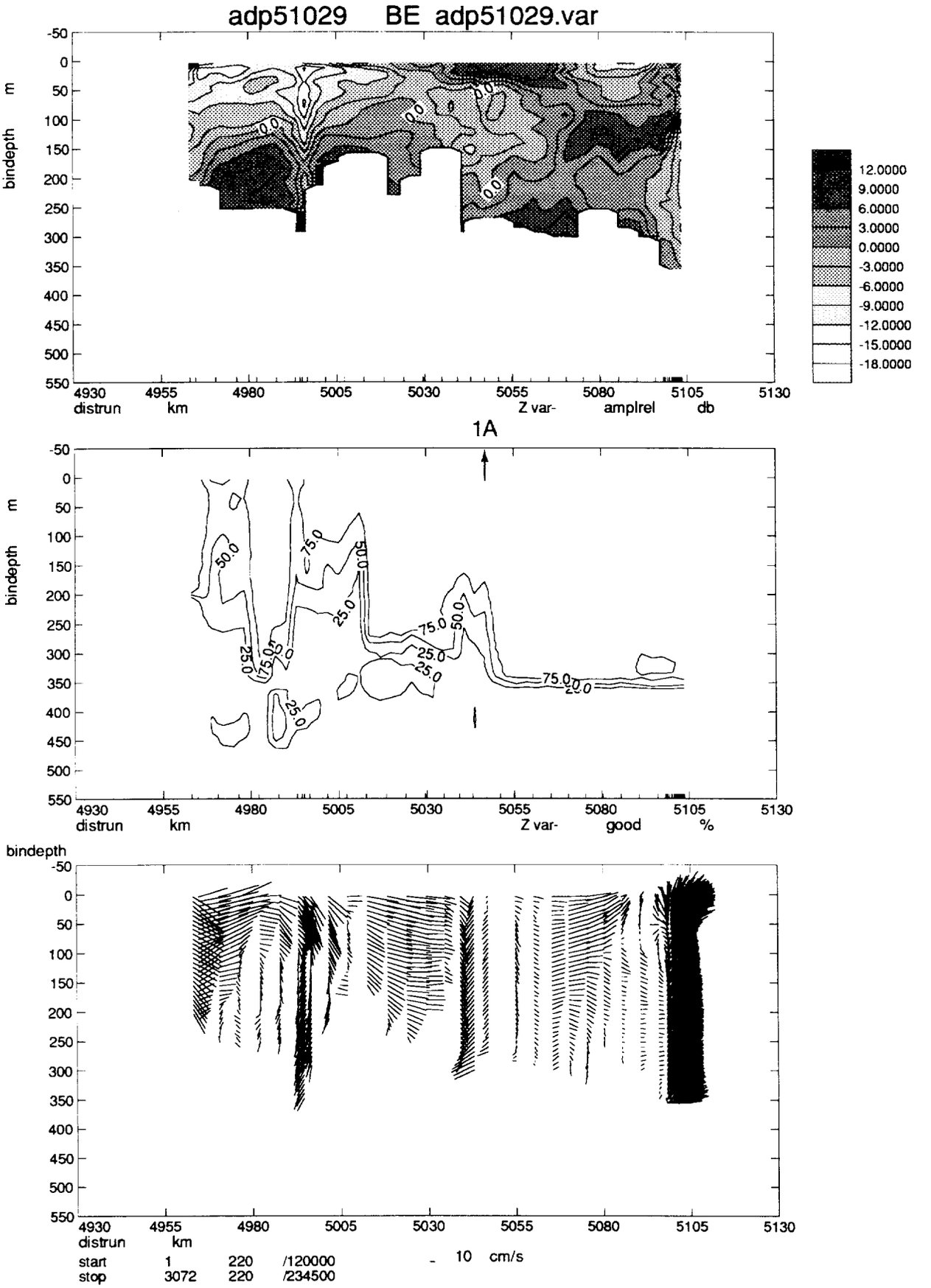
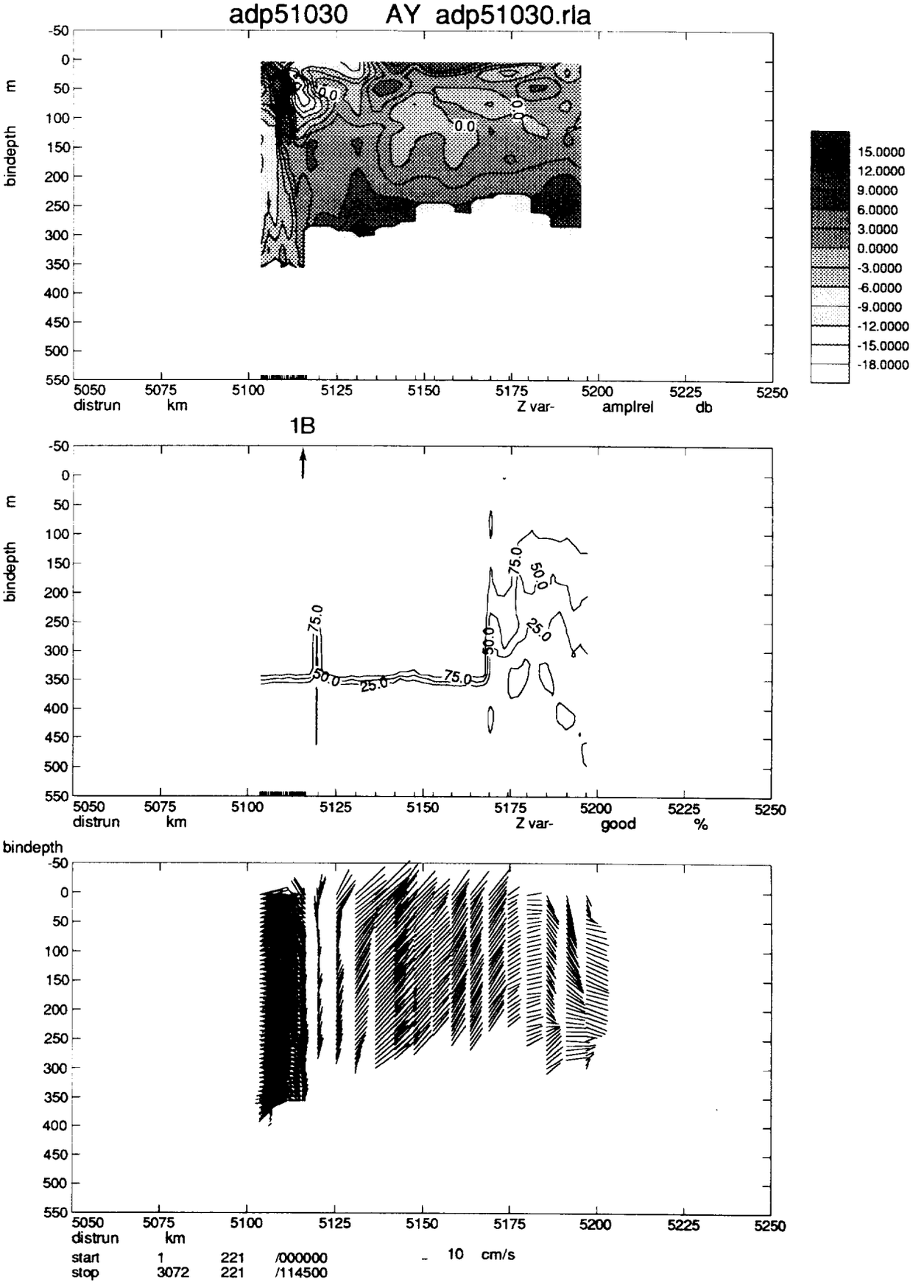
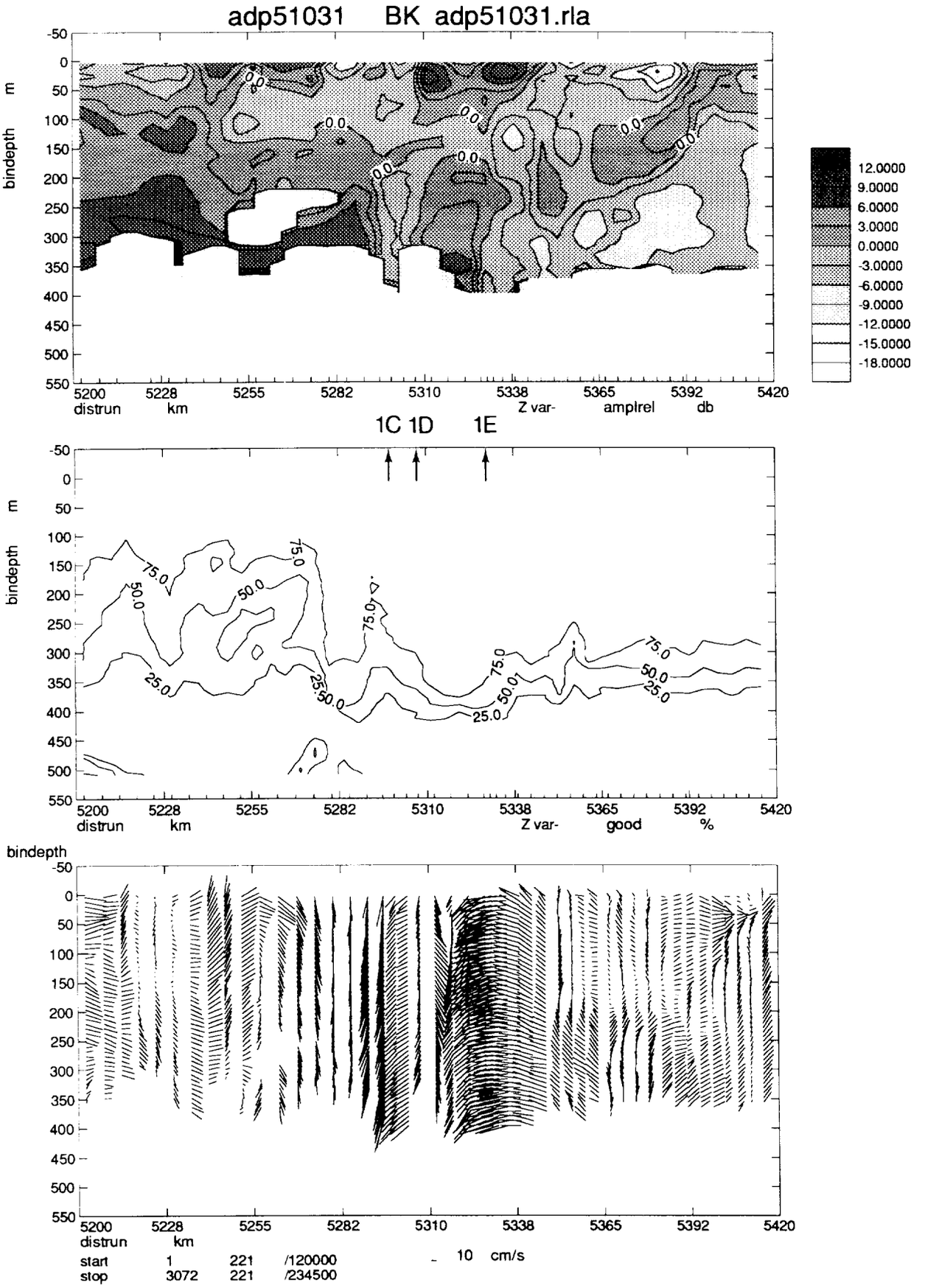
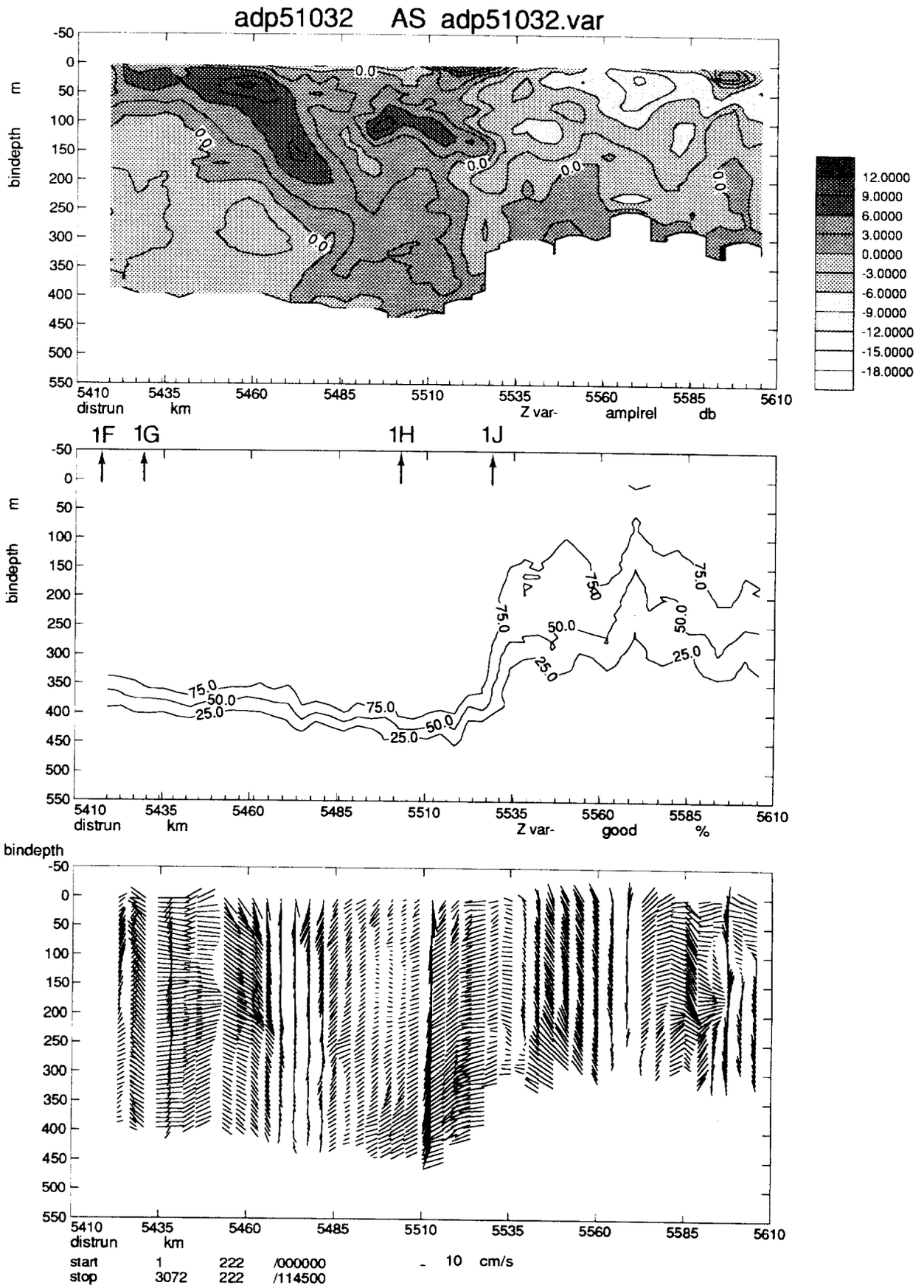


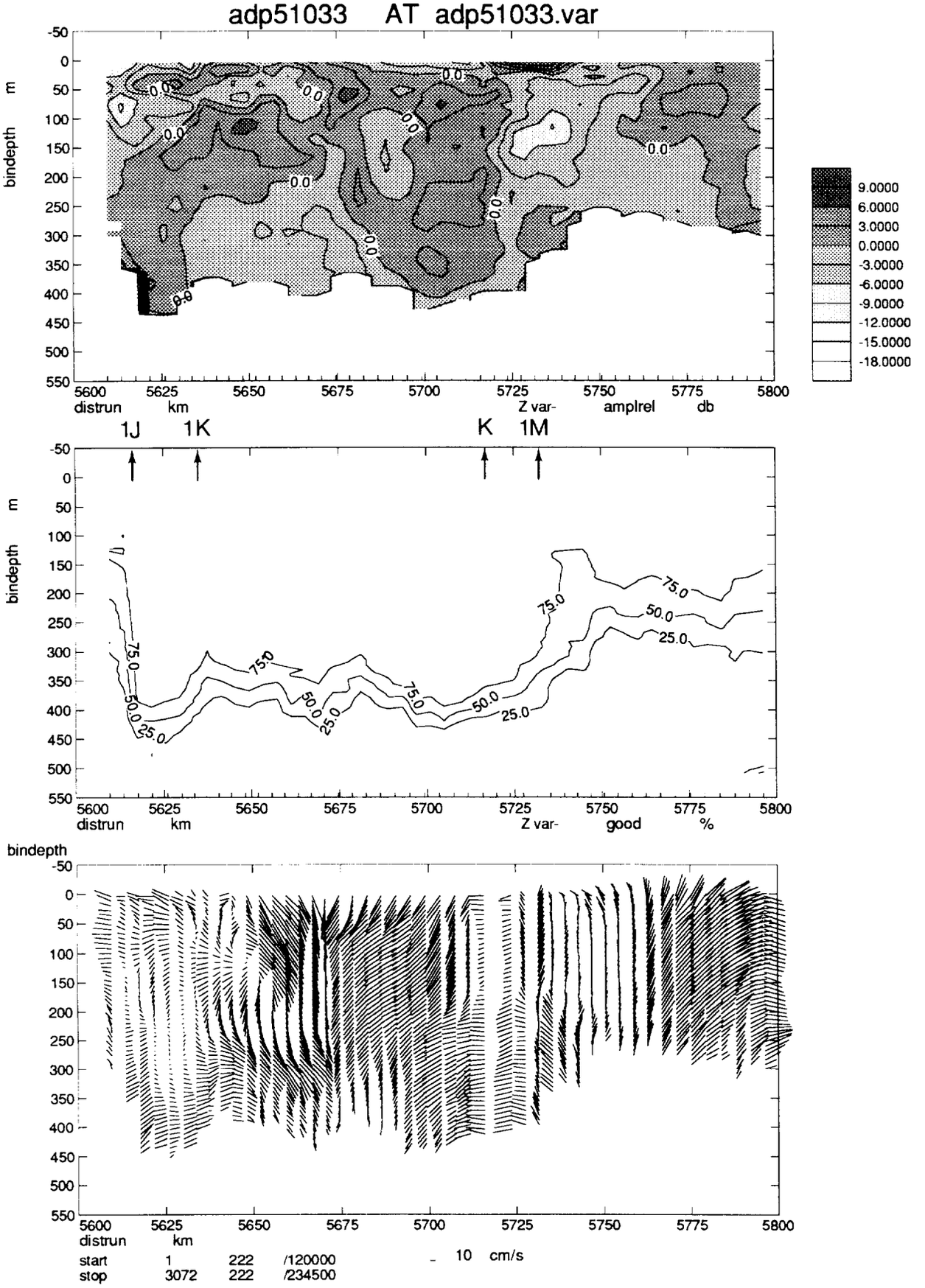
Figure 7. Track plot of the first small scale survey between the Faeroes and Iceland. Annotated times indicate start and stop times for the plots in the following section.

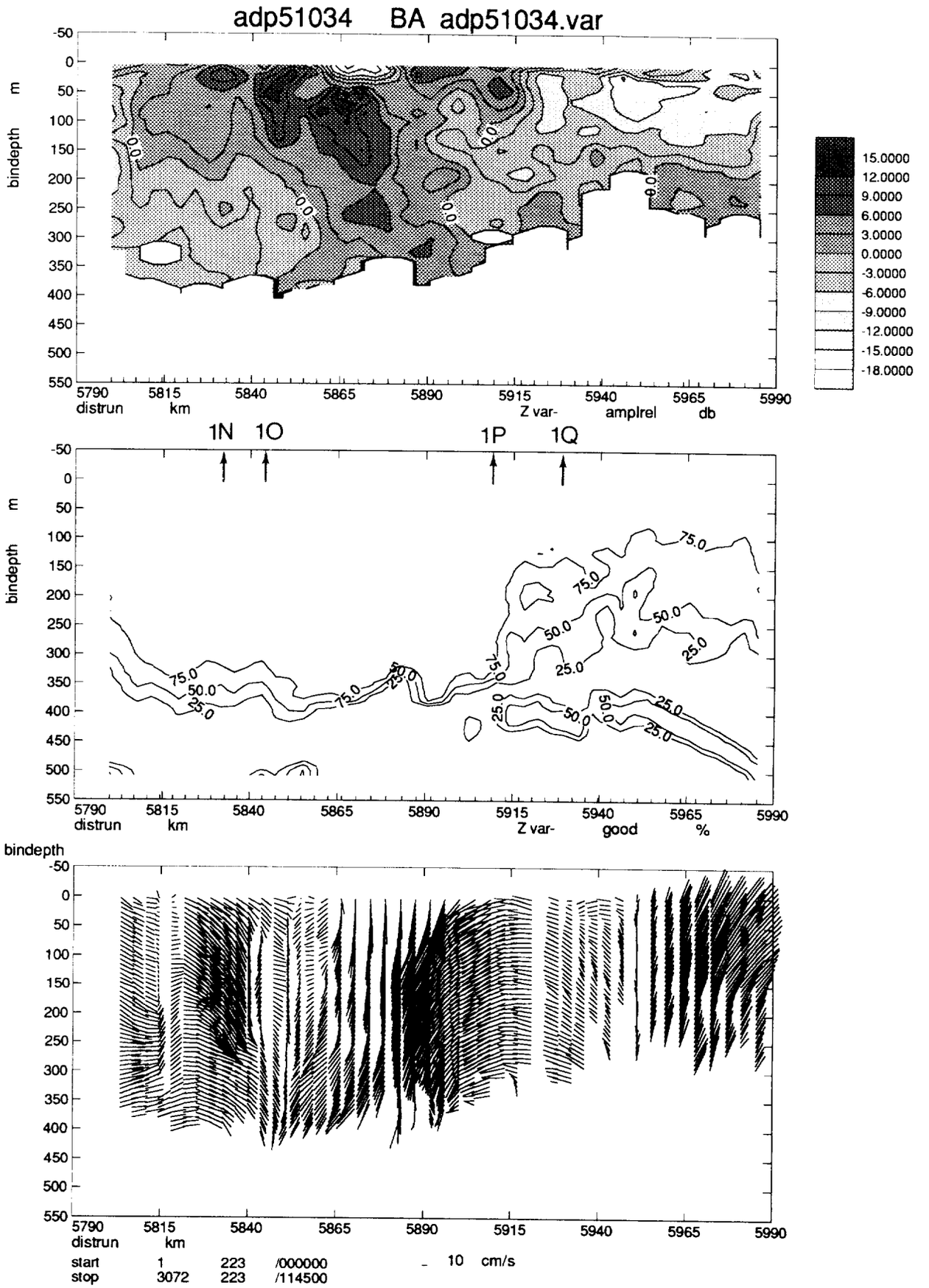

adp51029 BE adp51029.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
4930 4955 4980 5005 5030 5055 5080 5105 5130
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1A
bindepth m
distrun km
Z var- good %
bindepth
distrun km
start 1 220 /120000
stop 3072 220 /234500
10 cm/s

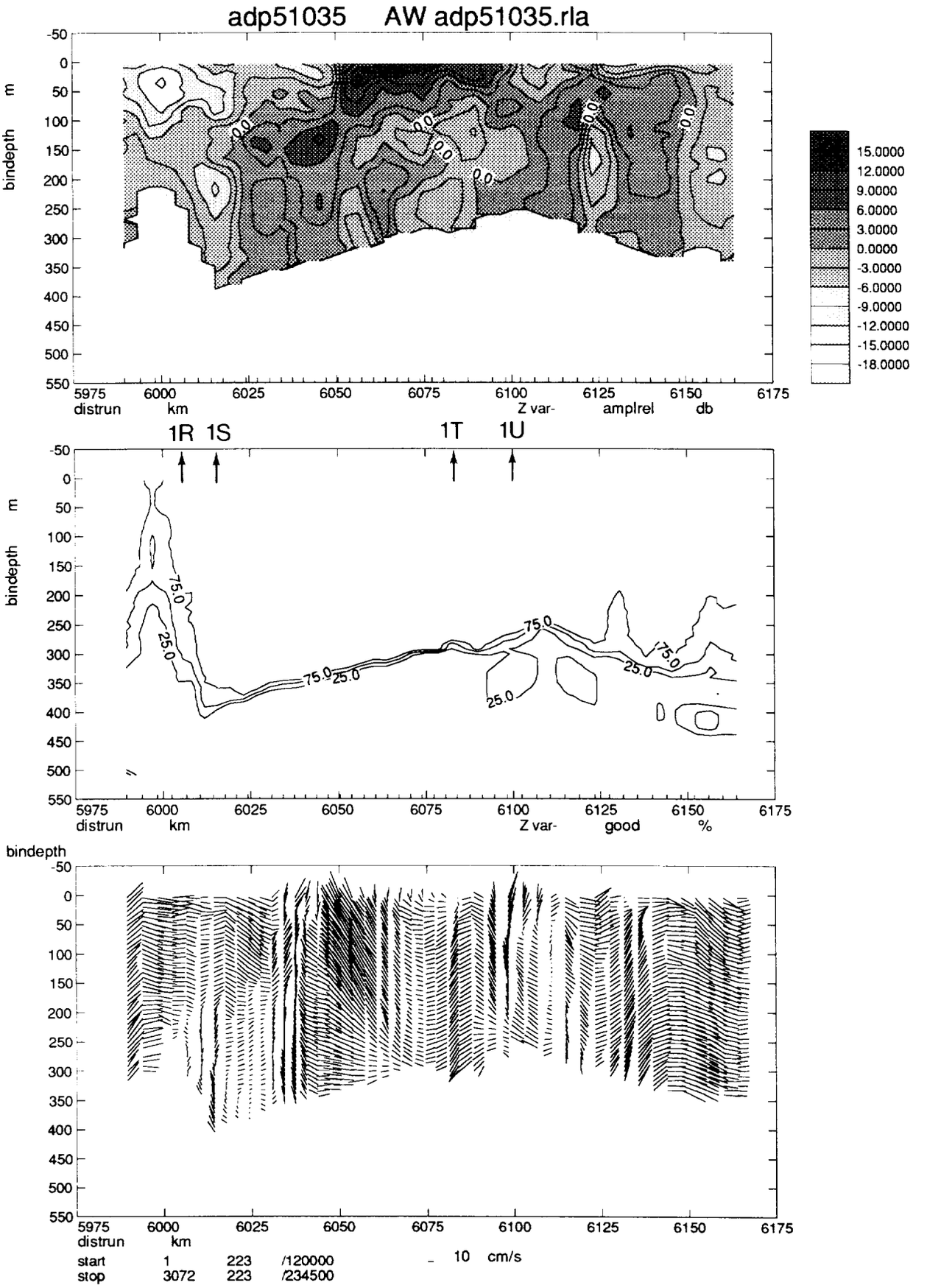

adp51030 AY adp51030.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
5050 5075 5100 5125 5150 5175 5200 5225 5250
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1B
bindepth m
75.0
50.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 221 /000000
stop 3072 221 /114500
10 cm/s

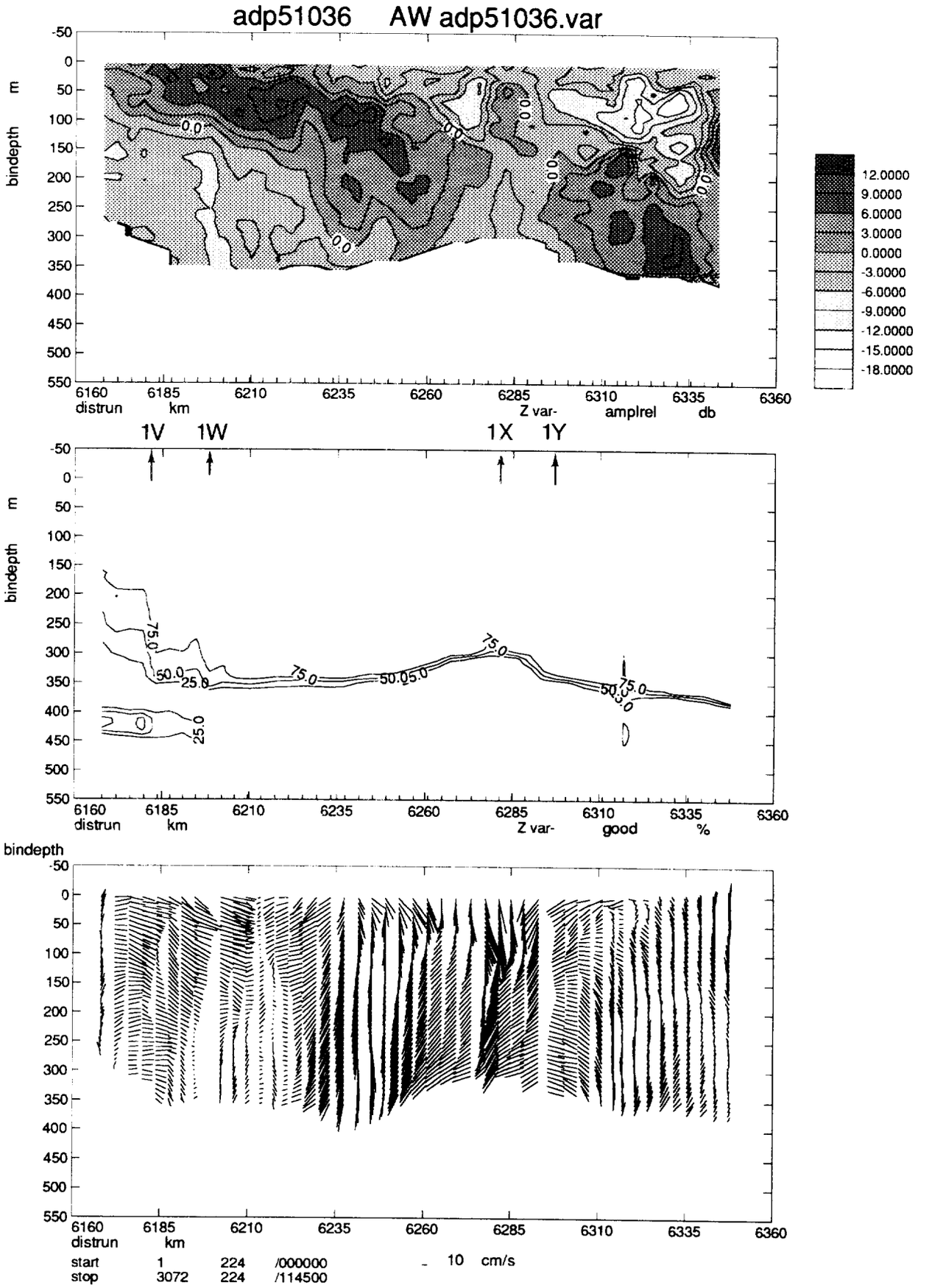

adp51031 BK adp51031.rla
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
5200 5228 5255 5282 5310 5338 5365 5392 5420
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1C 1D 1E
75.0
50.0
25.0
Z var- good %
bindepth
start 1 221 /120000
stop 3072 221 /234500
10 cm/s

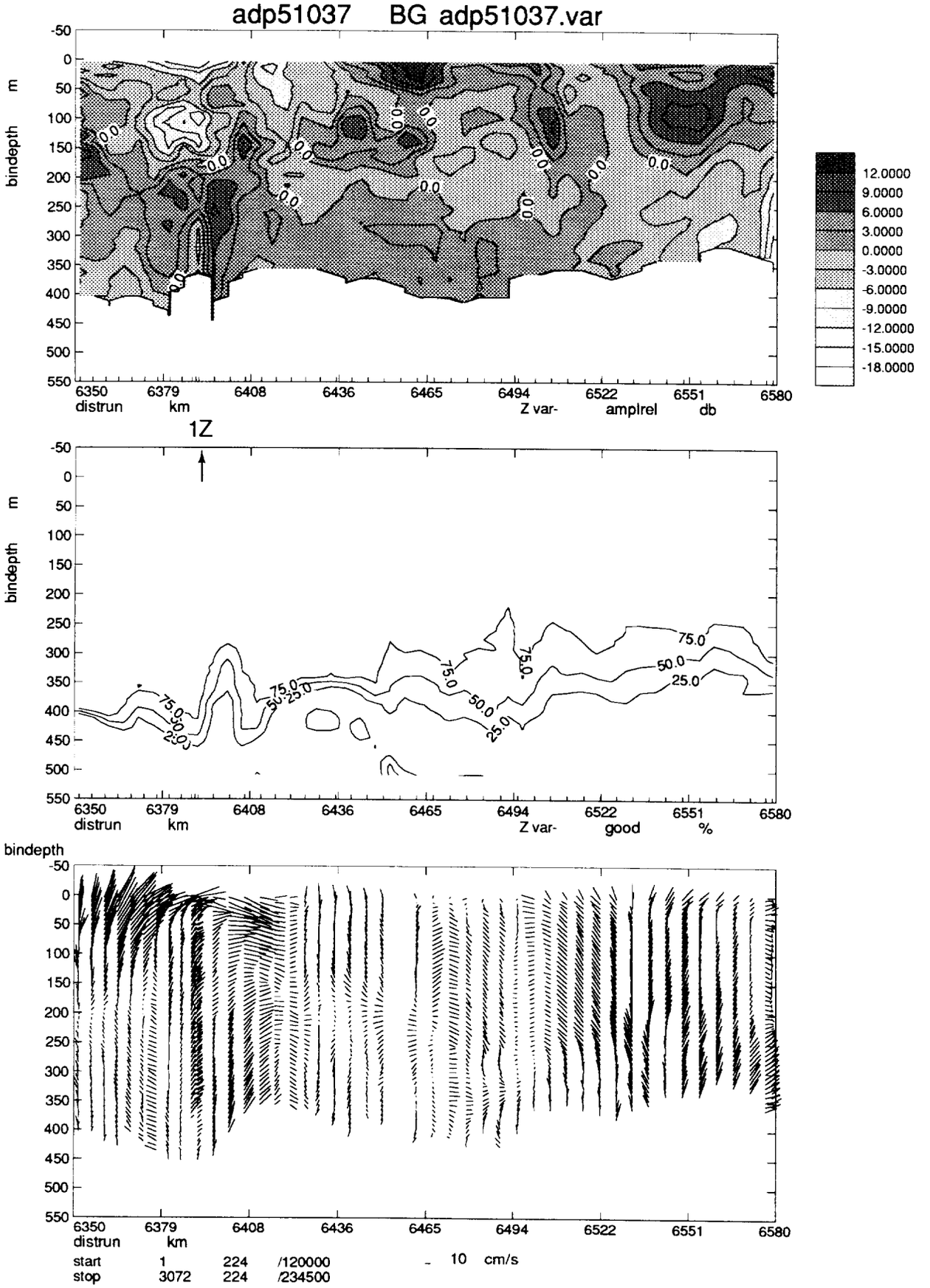

adp51032 AS adp51032.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
5410 5435 5460 5485 5510 5535 5560 5585 5610
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1F 1G 1H 1J
bindepth m
75.0
50.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 222 /000000
stop 3072 222 /114500
10 cm/s


adp51033 AT adp51033.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
5600 5625 5650 5675 5700 5725 5750 5775 5800
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1J 1K K 1M
bindepth m
Z var- good %
bindepth
distrun km
start 1 222 /120000
stop 3072 222 /234500
10 cm/s


adp51034 BA adp51034.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
5790 5815 5840 5865 5890 5915 5940 5965 5990
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1N 1O 1P 1Q
bindepth m
75.0
50.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 223 /000000
stop 3072 223 /114500
10 cm/s


adp51035 AW adp51035.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
5975 6000 6025 6050 6075 6100 6125 6150 6175
distrun km
Z var- amplrel db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1R 1S 1T 1U
bindepth m
75.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 223 /120000
stop 3072 223 /234500
10 cm/s


adp51036 AW adp51036.var
bindepth
m
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1V
1W
1X
1Y
good
%
start 1 224 /000000
stop 3072 224 /114500
10 cm/s


adp51037 BG adp51037.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
6350 6379 6408 6436 6465 6494 6522 6551 6580
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
1Z
bindepth m
Z var- good %
75.0
50.0
25.0
bindepth
start 1 224 /120000
stop 3072 224 /234500
10 cm/s

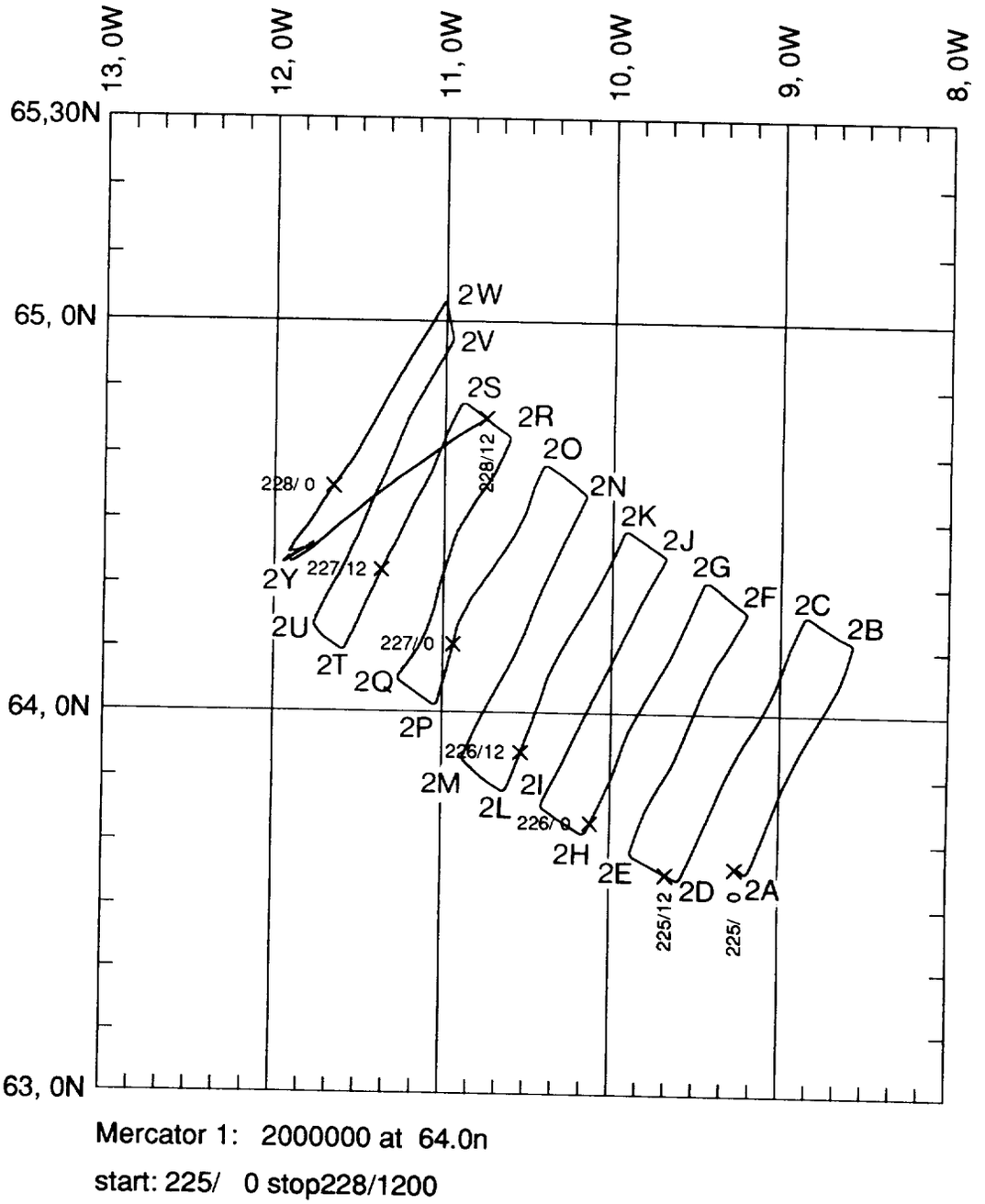
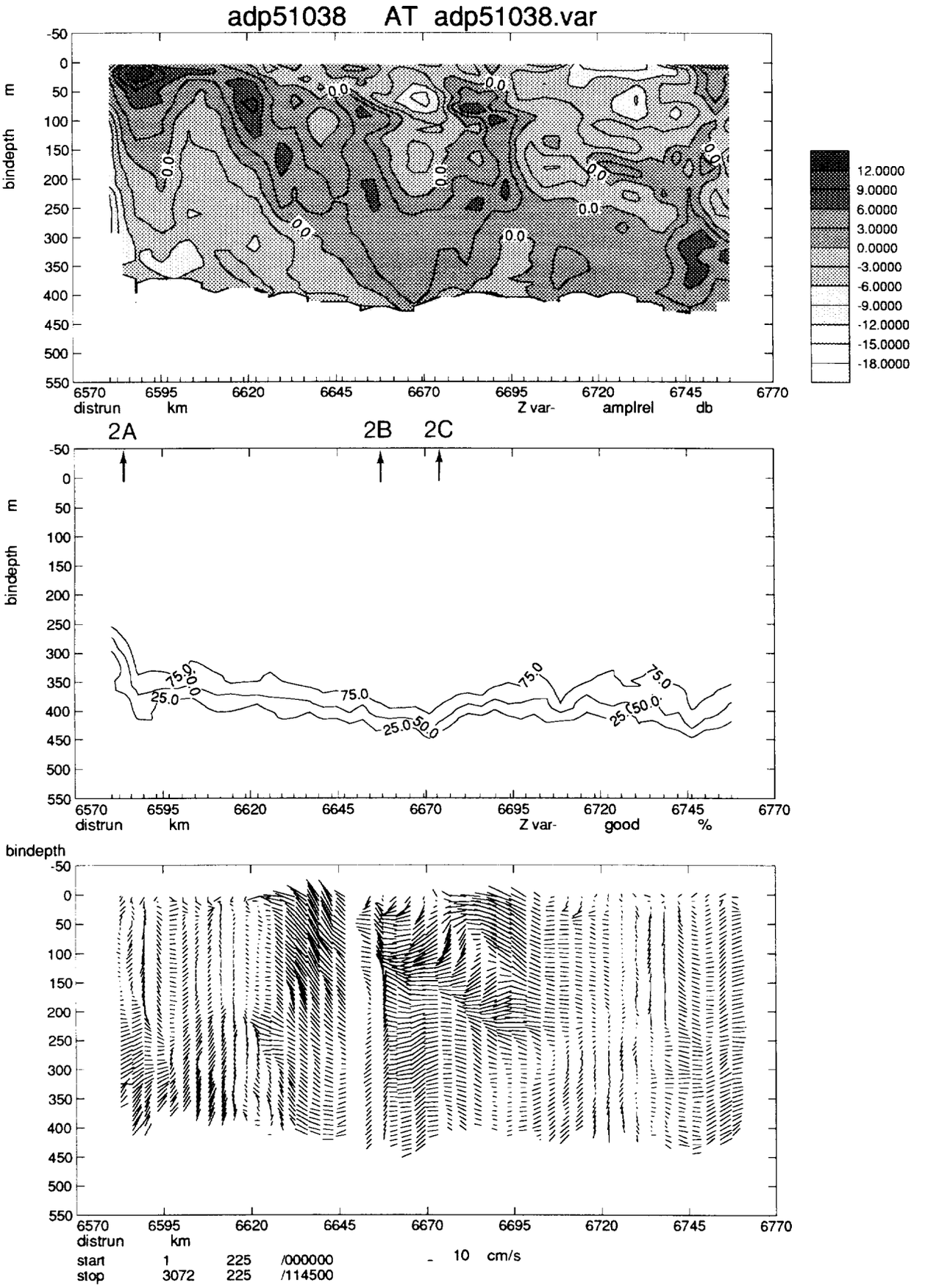
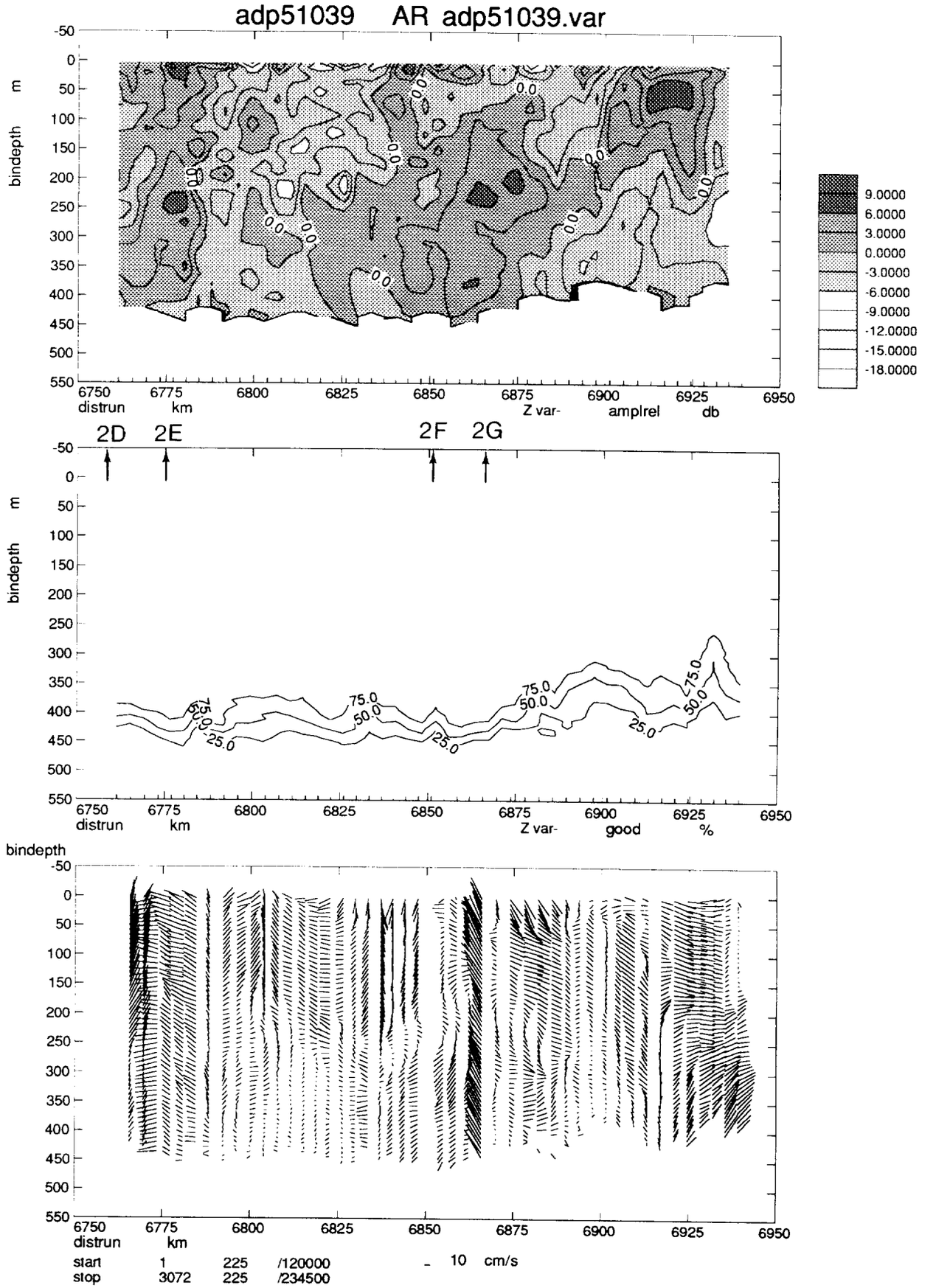
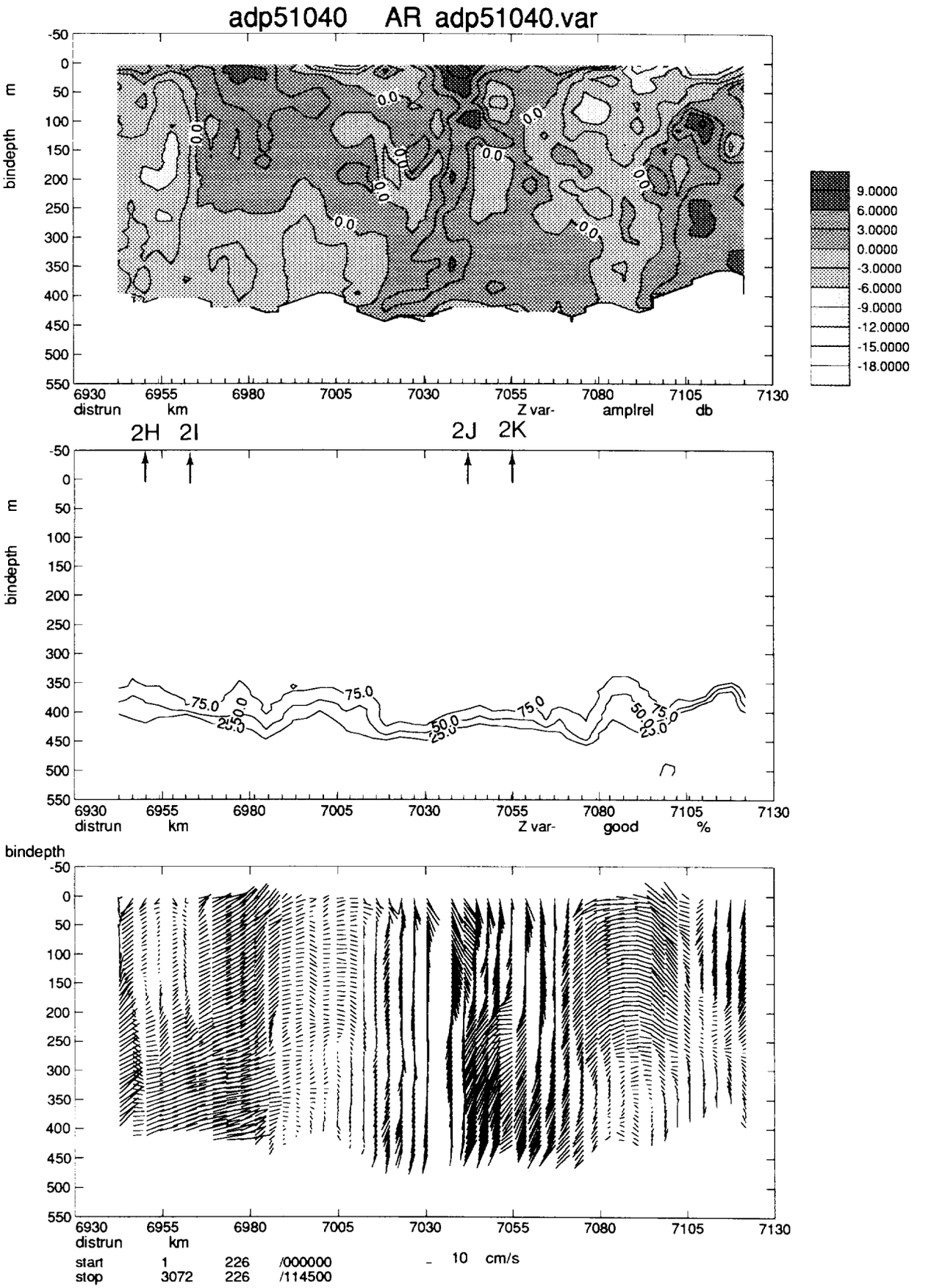
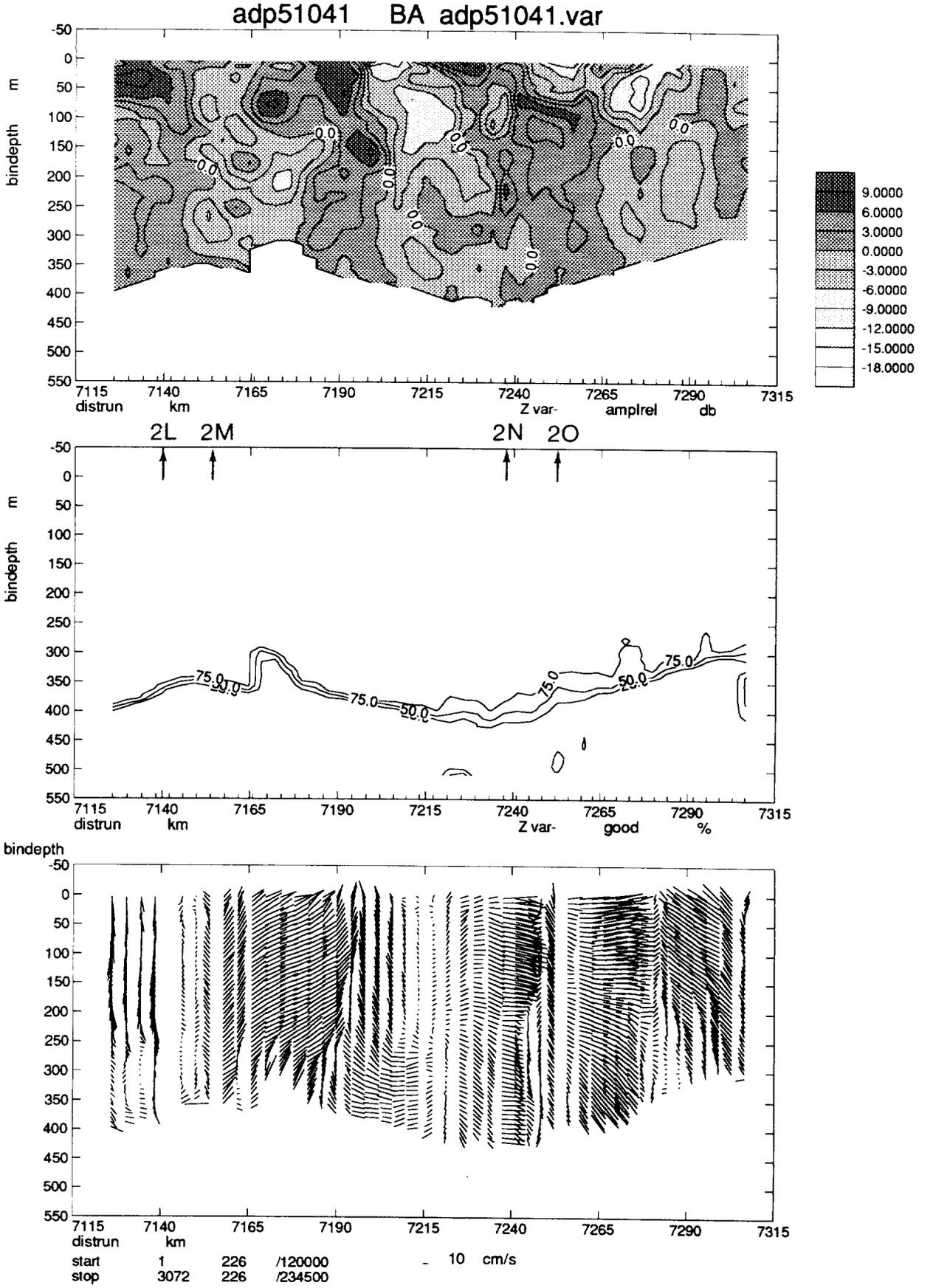


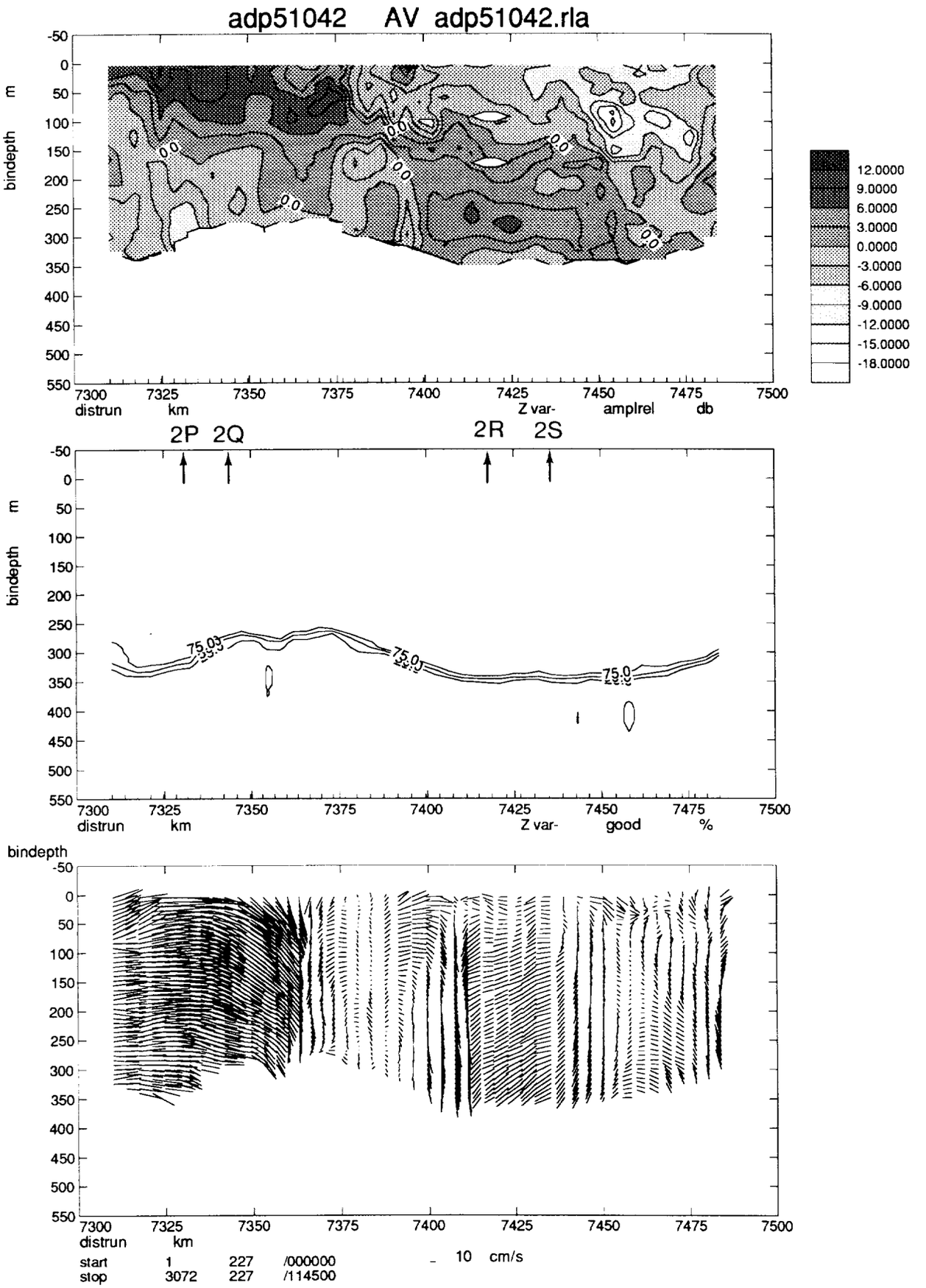
Figure 8. Track plot of the second small scale survey between the Faeroes and Iceland. Annotated times indicate start and stop times for the plots in the following section.

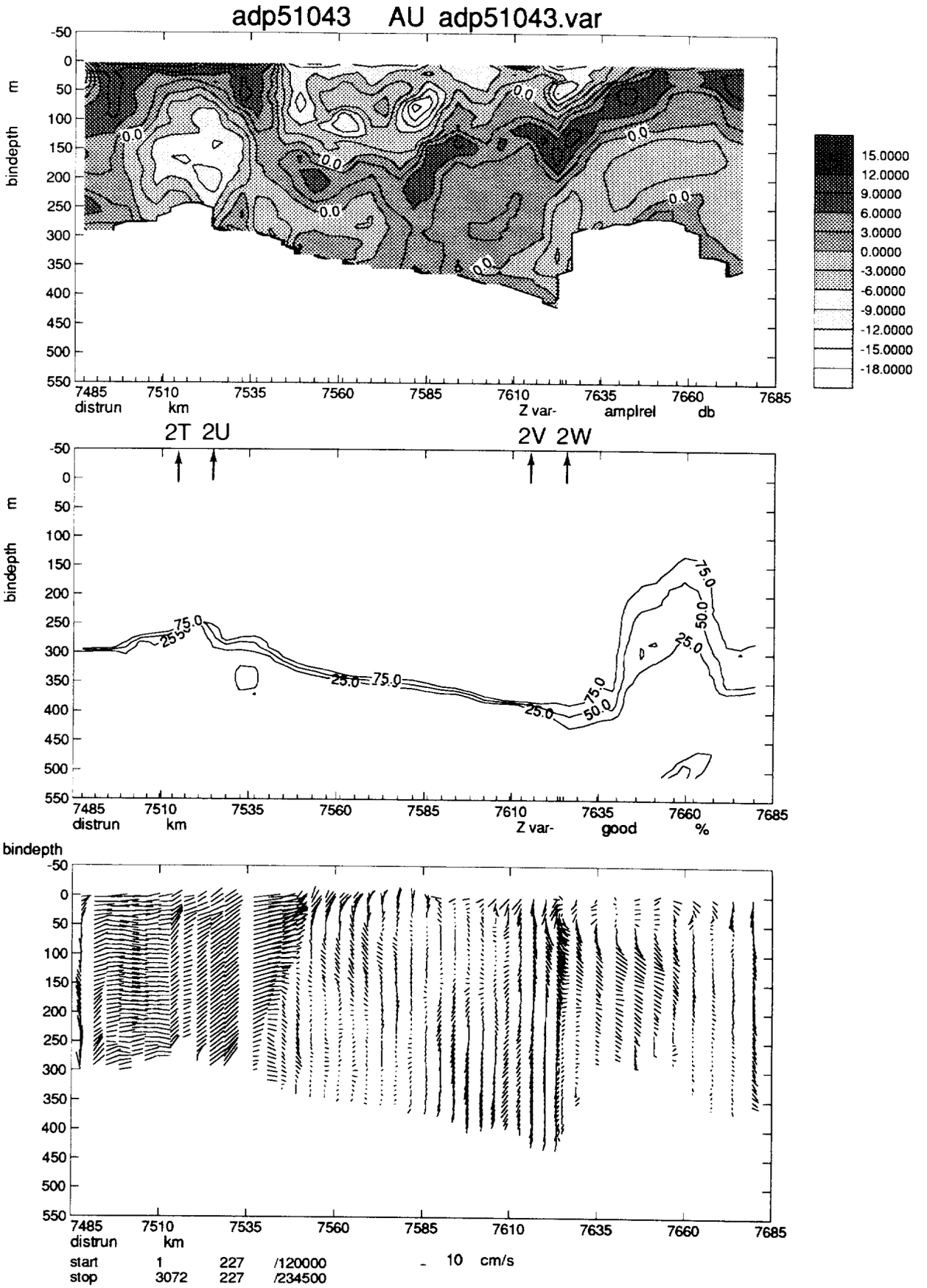

adp51038 AT adp51038.var
bindepth
m
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2A
2B
2C
good
%
start 1 225 /000000
stop 3072 225 /114500
10 cm/s

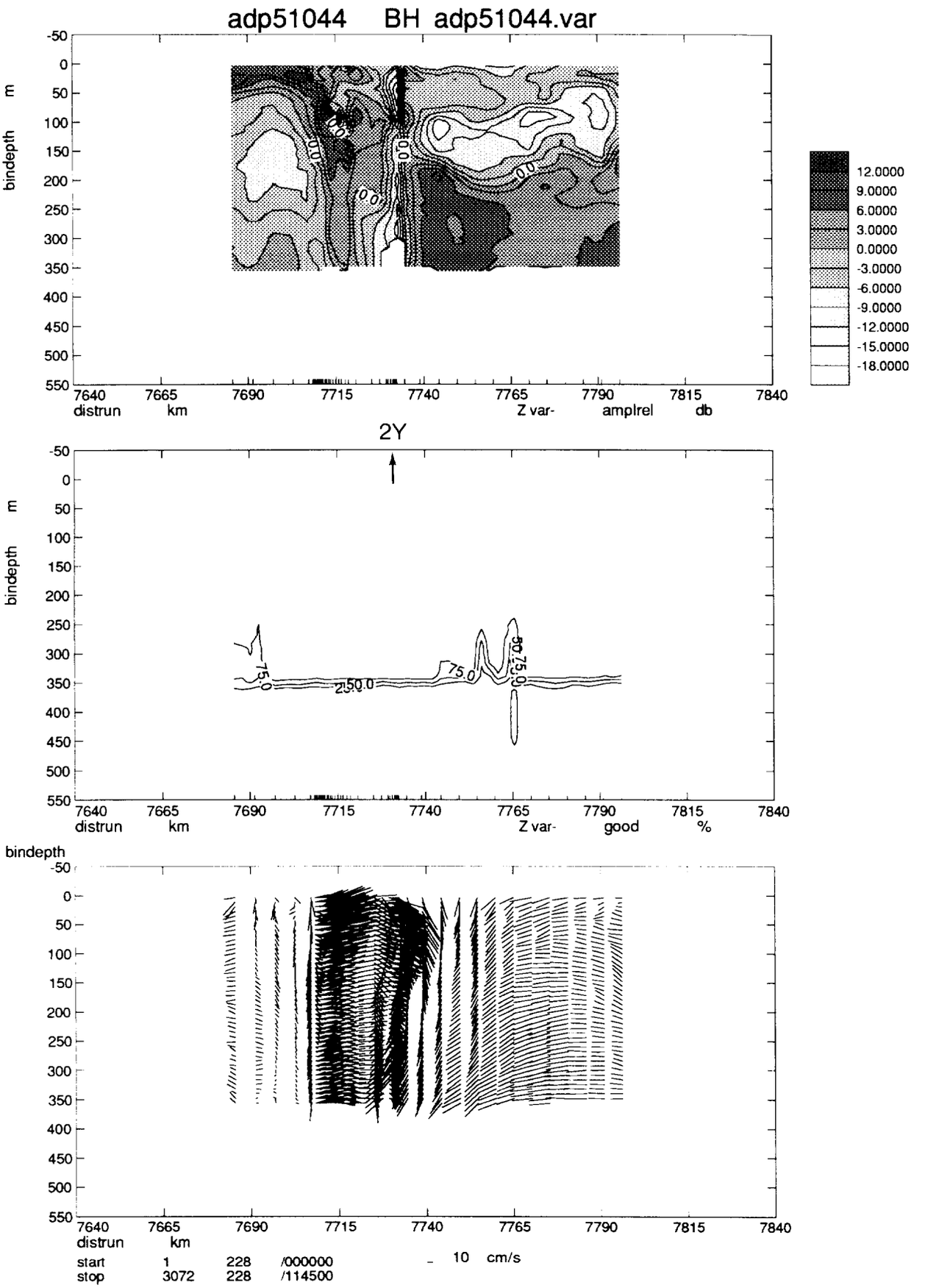

adp51039 AR adp51039.var
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
6750
6775
6800
6825
6850
6875
6900
6925
6950
distrun
km
Z var-
amplrel
db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2D
2E
2F
2G
75.0
50.0
25.0
Z var-
good
%
bindepth
start 1 225 /120000
stop 3072 225 /234500
10 cm/s


adp51040 AR adp51040.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
6930 6955 6980 7005 7030 7055 7080 7105 7130
distrun km
Z var- amplrel db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2H 2I 2J 2K
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
distrun km
start 1 226 /000000
stop 3072 226 /114500
10 cm/s


adp51041 BA adp51041.var
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
7115
7140
7165
7190
7215
7240
7265
7290
7315
distrun
km
Z var-
amplrel
db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2L
2M
2N
2O
75.0
50.0
good
%
bindepth
start 1 226 /120000
stop 3072 226 /234500
10 cm/s


adp51042 AV adp51042.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
7300 7325 7350 7375 7400 7425 7450 7475 7500
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2P 2Q
2R 2S
bindepth m
75.0
distrun km
Z var- good %
bindepth
distrun km
start 1 227 /000000
stop 3072 227 /114500
10 cm/s


adp51043 AU adp51043.var
bindepth
m
distrun
km
Z var-
amplrel
db
15.0000
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2T 2U
2V 2W
good
%
start 1 227 /120000
stop 3072 227 /234500
10 cm/s


adp51044 BH adp51044.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
7640 7665 7690 7715 7740 7765 7790 7815 7840
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
2Y
bindepth m
Z var- good %
bindepth
distrun km
start 1 228 /000000
stop 3072 228 /114500
10 cm/s

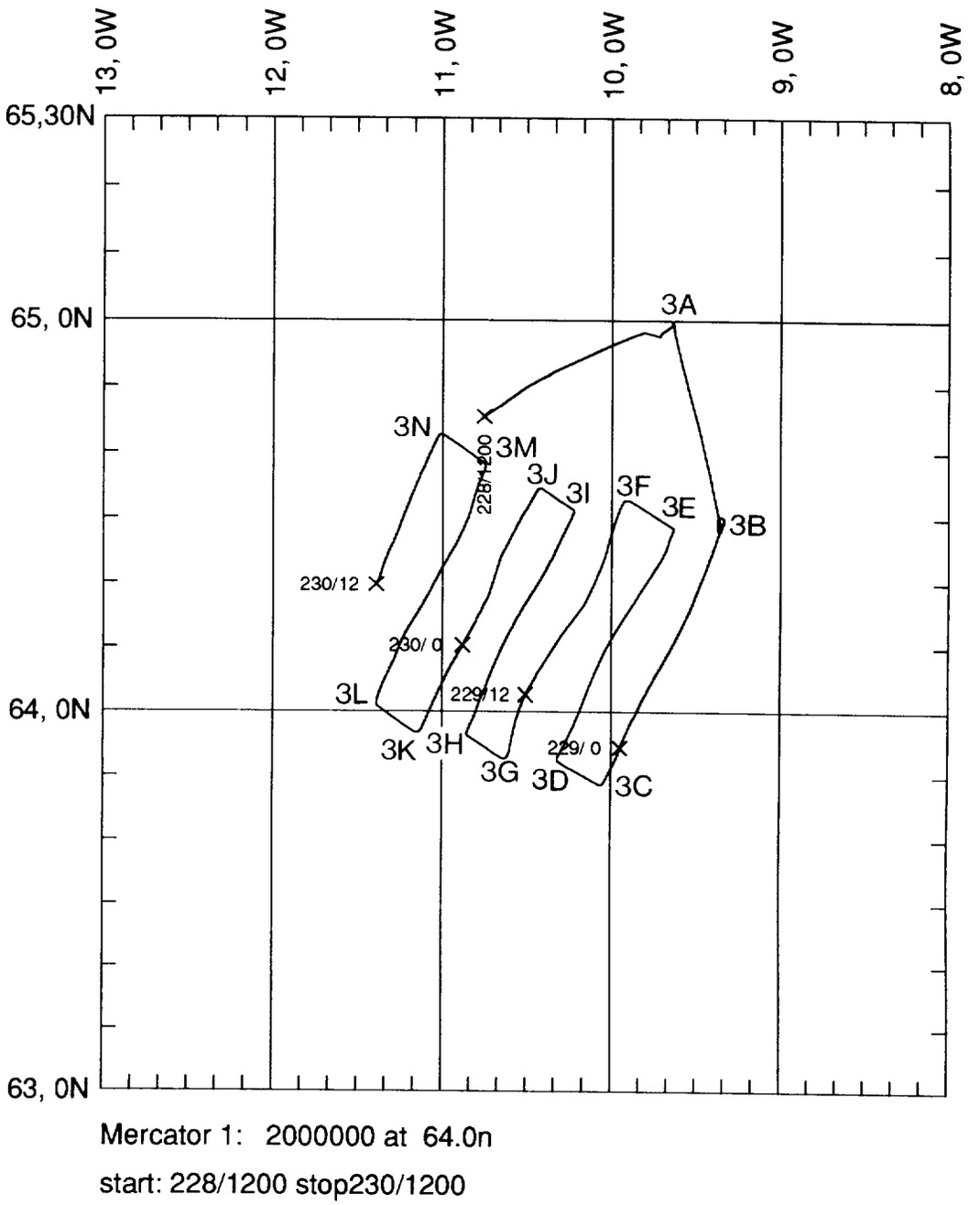
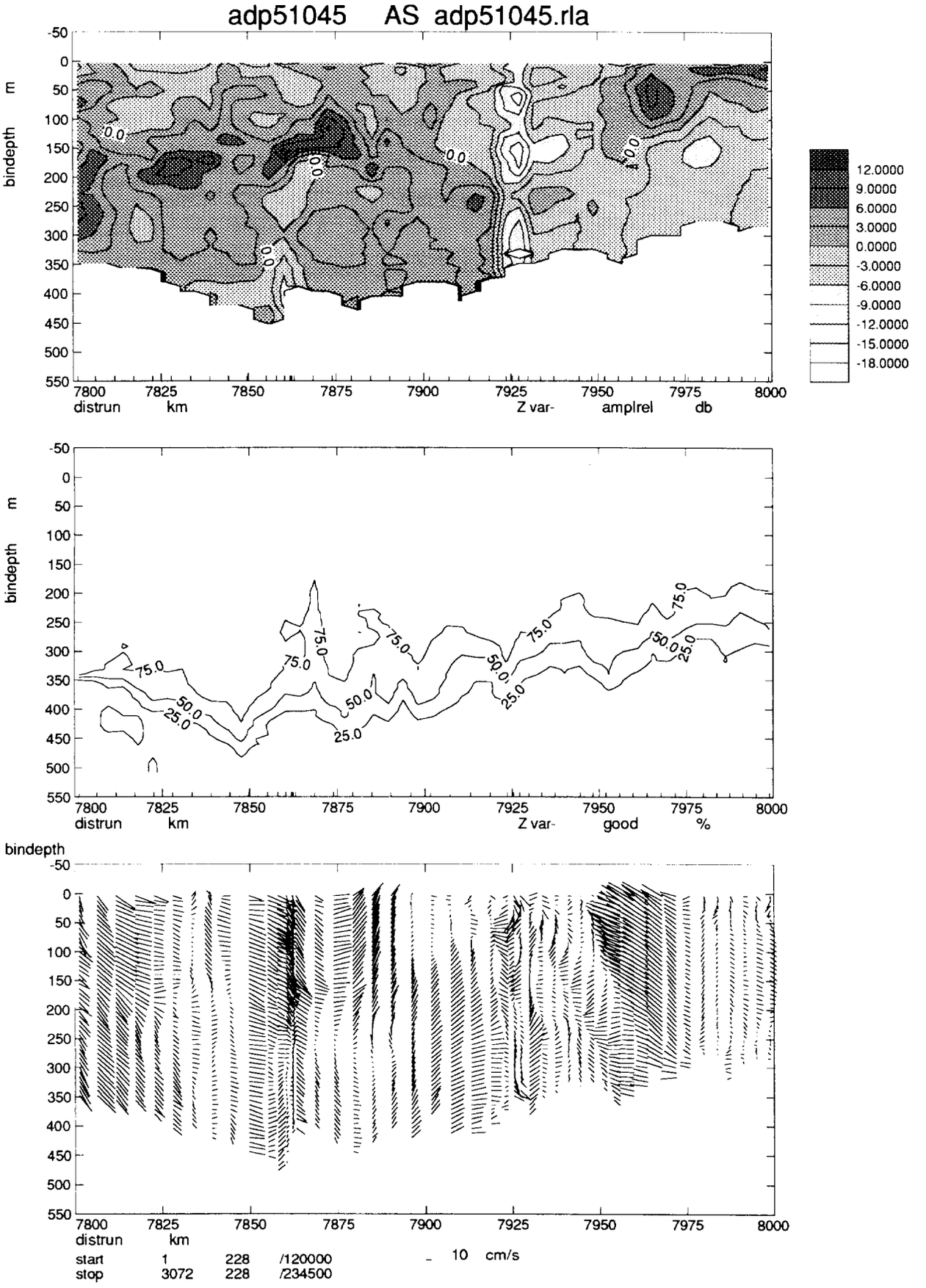
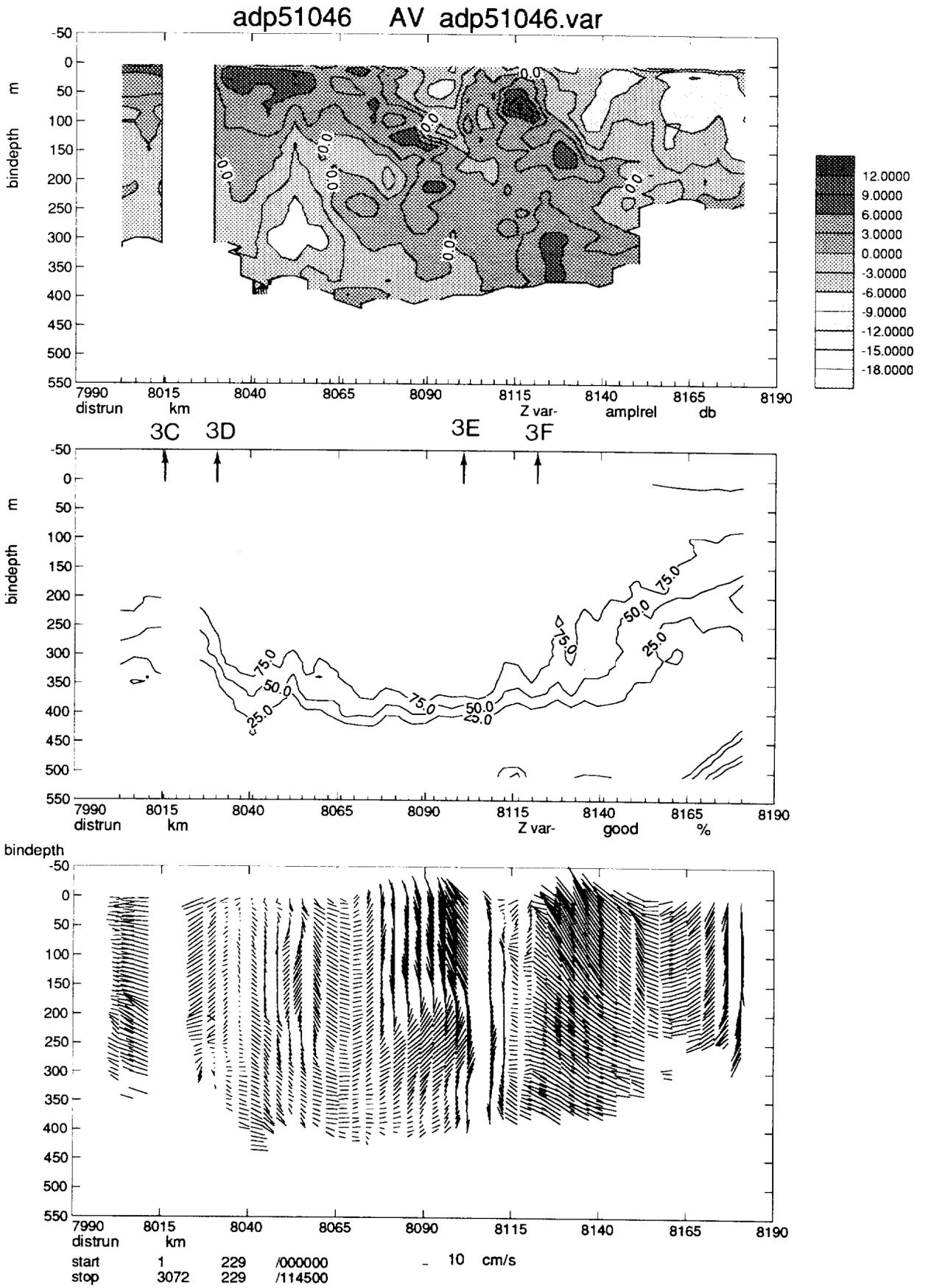
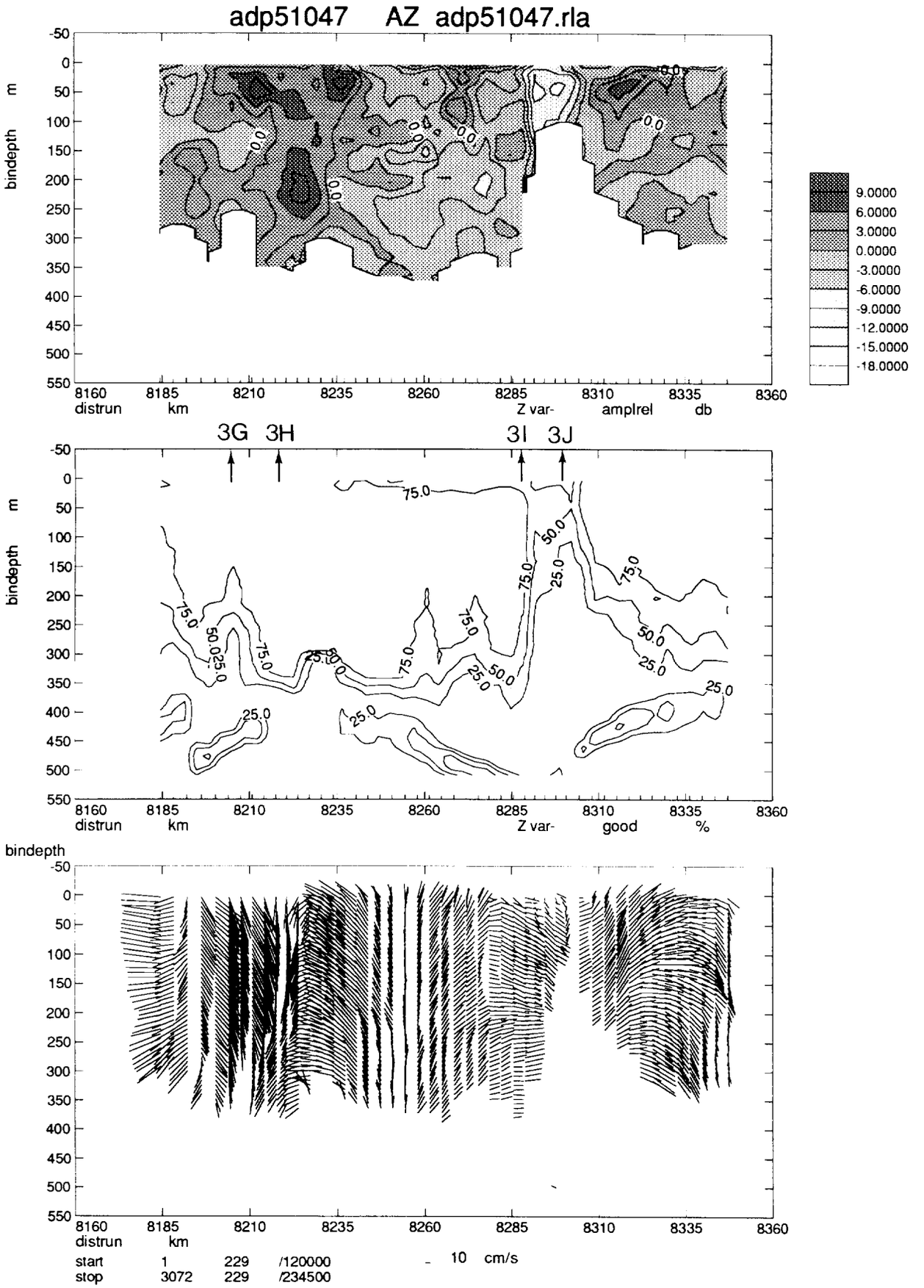
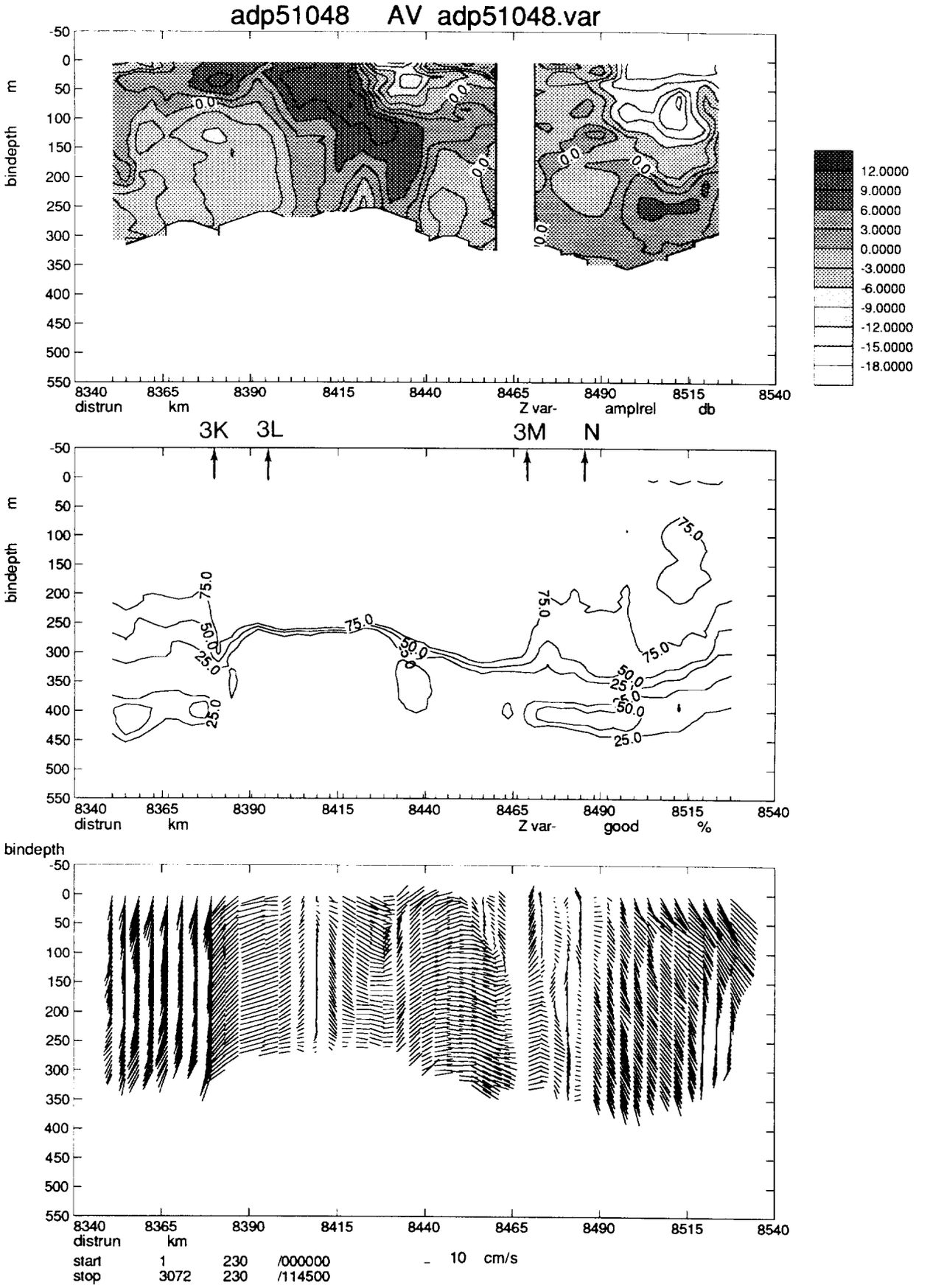


Figure 9. Track plot of the third small scale survey between the Faeroes and Iceland. Annotated times indicate start and stop times for the plots in the following section.


adp51045 AS adp51045.rla
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
0.0
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
7800 7825 7850 7875 7900 7925 7950 7975 8000
distrun km
Z var- amplrel db
bindepth m
75.0
50.0
25.0
distrun km
Z var- good %
bindepth
distrun km
start 1 228 /120000
stop 3072 228 /234500
10 cm/s


adp51046 AV adp51046.var
bindepth m
-50
0
50
100
150
200
250
300
350
400
450
500
550
7990 8015 8040 8065 8090 8115 8140 8165 8190
distrun km
Z var- amplrel db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
3C 3D 3E 3F
bindepth m
75.0
50.0
25.0
Z var- good %
bindepth
start 1 229 /000000
stop 3072 229 /114500
10 cm/s


adp51047 AZ adp51047.rla
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
8160
8185
8210
8235
8260
8285
8310
8335
8360
distrun
km
Z var-
amplrel
db
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
3G
3H
3I
3J
75.0
50.0
25.0
Z var-
good
%
bindepth
distrun
km
start 1 229 /120000
stop 3072 229 /234500
10 cm/s


adp51048 AV adp51048.var
bindepth
m
-50
0
50
100
150
200
250
300
350
400
450
500
550
8340
8365
8390
8415
8440
8465
8490
8515
8540
distrun
km
Z var-
amplrel
db
12.0000
9.0000
6.0000
3.0000
0.0000
-3.0000
-6.0000
-9.0000
-12.0000
-15.0000
-18.0000
3K
3L
3M
N
good
%
start 1 230 /000000
stop 3072 230 /114500
10 cm/s