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Great Bay Estuarine Field Program
1975 Data Report

Part 1: Currents and Sea Levels

UNH Sea Grant
Technical Report UNH-SG-157

GREAT BAY ESTUARINE FIELD PROGRAM

1975 Data Report

Part 1: Currents and Sea Levels

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Report No.: UNH-SG-157

This publication is a result of research sponsored, in part, by NOAA Office of Sea Grant, Department of Commerce, under Grant No. 04-5-158-50. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon. The National Ocean Survey also cooperated in this research.

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September, 1977

Published by the University of New Hampshire Marine Advisory Program, a part of the UNH/U-Maine Cooperative University Institutional Sea Grant Program. Available at no charge from UNH Marine Advisory Program, Kingsbury Hall, Durham, N.H. 03824, 603-862-1889.

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Abstract

This report contains data summaries from a cooperative program between Sea Grant at the University of New Hampshire and the National Ocean Survey (NOS) to measure currents and sea level in the Great Bay Estuarine System, New Hampshire. Part A contains a description and summary of the University of New Hampshire program. Its goal was to describe the lateral variability of the currents at several locations in the estuary. Part B contains the results from the NOS program of moored current meters and fixed tide gauges.

SECTION A: UNH CURRENTS

I. Introduction

During the summer of 1975 a comprehensive field program, designed to measure the tidal elevations and currents within the Great Bay Estuarine System, was performed by the University of New Hampshire in cooperation with the National Ocean Survey (NOS). The NOS program consisted of a number of moored current meters and sea level measurement stations. The details of this program appear in the second section of this report.

In the first section we describe the results obtained from the UNH part of the field program which investigated the vertical and horizontal variability of estuarine currents. To this end, a series of 13-hour transects were occupied at each of the locations shown in Figure 1. Each transect consisted of three stations spaced across the main channel. The details of each of the transects are shown in Figures 2 through 7. Superposed on these bathymetric maps are the station locations, current ellipses and the longitudinal and transverse directions used in the subsequent data analysis. The current "ellipses" were formed by using the vector averaged mean profile data from each station. The heads of these averaged vectors from each station were connected to give the observed current "ellipse".

In Tables I and II, the times of each station are indicated for each transect.

Table I

Cruise Summary Data

July 8, 1975 Adams Point		July 22, 1975 Fox Point		August 5, 1975 Newington	
STATION	TIME (EDT)	STATION	TIME (EDT)	STATION	TIME (EDT)
2	0930				
3	0958	2	0937	1	0927
1	1016	3	0955	2	0954
2	1033	4	1018	3	1034
3	1092	3	1039	2	1057
2	1108	2	1059	1	1122
1	1129	3	1122	2	1140
2	1146	4	1141	3	1157
3	1205	3	1207	2	1213
2	1221	2	1229	1	1236
1	1240	4	1357	2	1250
2	1305	3	1425	3	1311
3	1330	2	1454	2	1337
2	1357	3	1516	1	1408
1	1423	4	1546	2	1421
2	1448	3	1609	3	1444
3	1508	2	1639	2	1503
2	1526	1	1718	1	1526
1	1559	2	1734	2	1543
2	1621	3	1753	3	1606
3	1651	1	1936	2	1621
2	1711	2	1951	1	1646
1	1734	3	2012	2	1659
2	1751	3	2113	3	1717
3	1812	2	2138	2	1731
2	1827	1	2201	1	1746
1	1849			2	1802
2	1905			3	1817
3	1930			2	1835
2	1956			1	1902
1	2015			2	1915
2	2030			3	1935
3	2045			2	1950
2	2059			1	2007
1	2117			2	2027
2	2138			3	2047
3	2201			2	2106
				1	2129
				2	2145

Table II

Cruise Summary Data

August 19, 1975
Dover Point

STATION	TIME (EDT)
3	0955
2	1015
1	1037
2	1100
3	1120
2	1140
1	1200
2	1228
3	1250
2	1310
1	1342
2	1405
3	1430
1	1510
2	1540
3	1600
2	1616
1	1636
2	1654
3	1712
2	1729
1	1749
2	1808
3	1827
2	1843
1	1903
2	1915
3	1932
2	1947
1	2005
2	2022
3	2044
2	2100

September 10, 1975
Great Bay

STATION	TIME (EDT)
1	0840
2	0857
3	0916
2	0934
1	0955
2	1005
3	1020
2	1032
1	1046
2	1103
3	1125
2	1140
1	1155
2	1207
3	1225
2	1236
1	1256
2	1310
3	1329
2	1346
1	1403
2	1425
3	1440
2	1454
1	1509
2	1522
3	1543
2	1558
1	1618
2	1627
3	1644
2	1652
1	1710
2	1730
3	1755
2	1812
1	1833
2	1845
3	1856
2	1914
1	1929
2	1945
3	2004
2	2026
1	2045
2	2100

September 24, 1975
Portsmouth

STATION	TIME (EDT)
1	0755
2	0822
3	0858
2	0915
1	0938
2	0950
3	1011
2	1030
1	1047
2	1111
3	1132
2	1146
1	1225
2	1242
3	1308
2	1350
1	1430
2	1450
3	1519
2	1535
1	1603
2	1615
3	1645
2	1700
1	1729
2	1747
3	1826
2	1841
1	1908
2	1922
3	2000
2	2015

II. Measurement Methods

The sampling procedure was to crisscross the channel, sampling the stations in the following order: 1, 2, 3, 2, 1, 2, 3, and so on. Thus, the center station was sampled more frequently than the side stations. Station locations were determined by using compass bearings taken on known landmarks. The precision with which we could locate ourselves by this method was ± 50 meters. The ship was anchored at each station while measurements were made. It took approximately 15-20 minutes to take measurements at each station, so an entire transect took approximately on hour.

A profile was done at each station, which involved taking a one-minute analog record of each parameter at two-meter intervals from the surface to the bottom of the water column.

The instrument array used to make the current profiles is shown in Figure 8. It consisted on a Marsh-McBirney Model 711 Electromagnetic water current meter and a Martek TDC metering system. The sensors from the Martek (pressure, temperature and conductivity) were attached to the top of the current meter as shown in Figure 8. The output of the instrument consisted of 6-analog signals: 1) N-S water current component, 2) E-W water current component, 3) current direction, 4) pressure, 5) temperature and 6) conductivity. This output was monitored by strip chart recorders.

The Marsh-McBirney Model 711 electromagnetic water current meter is a general purpose instrument consisting of a transducer probe and a signal processor mounted in a case. The transducer is connected to the signal processor via a detachable electrical cable. The instrument is based upon Faraday's principle of electromagnetic induction. A magnetic field is produced within the transducer so as to be parallel to the long axis of the instrument. Electrodes placed in the sensor detect water flow in a plane perpendicular to the instrument. Two pairsof electrodes are used so the flow can be resolved into X and Y components instantaneously. The voltages induced across the electrodes are proportional to the flow velocity. These signals are output as analog voltages which give the components of flow in the plane perpendicular to the instrument. A compass housed on the top of the instrument supplies an analog voltage which is proportional to the heading of the instrument with respect to magnetic north. A detachable vane keeps the instrument aligned with the "mean" current.

Since we did not have the facilities to calibrate the speed, we used the manufacturer's specified sensitivity of $\pm$ 1 volt equals $\pm$ 304.8 cm/sec. We have also used the manufacturer's specifications with regard to the instrument's precision:

Long term zero drift	< 2.14 cm/sec
linearity	$\pm$ 2% of reading
electronic noise	$.91/\sqrt{T}$ rms cm/sec where T=time constant of meter
absolute calibration	$\pm$ 2%

We were able to calibrate the compass calibration by comparison to a "Brunton" compass. We found the precision in direction to be $\pm 8^{\circ}$.

The Martek Model TDC metering system is a compact battery-operated instrument for making in-situ measurements of conductivity, temperature and depth. The output is available as an analog voltage for strip chart recording and as a meter reading. Salinity can be determined as a function of conductivity and temperature using conversion graphs supplied with the instrument.

The instrument consists of an underwater transducer made up of three modular sensors for temperature, pressure and conductivity. The transducer is connected to a readout module by a detachable cable. The pressure sensor is a standard Bourdon tube potentiometric transducer. The sensor's linearity is ± .5% and has a repeatability of ± .1% - the overall accuracy is ± 2% of full scale. We checked the depth (pressure) calibration by measuring the amount of cable out (in meters) and monitored the pressure transducer output (in voltage). This was done at slack tide when there was no angle to the hydro-wire. This yielded a regression equation which was used for calculating depths from the measured voltages. We found our depth precision to be ± 25 cm with this method. However, there was considerable nonlinearity in the upper half meter where the pressure was almost zero. Because of this, surface depth readings had an uncertainty of approximately 50 cm.

The conductivity sensor is a flow-through electrode-type cell with a pair of gold plated, platinum black coated nickel electrodes set at a known distance from each other in a PVC housing. The manufacturer specifications give a precision of ± 2 μMhos/cm.

The temperature sensor consists of a glass bead thermistor enclosed by a stainless steel tube which is housed in a PVC jacket. The manufacturer quotes a precision of ± .5°C.

The bathymetry shown in Figures 2 through 7 were constructed from data which was collected as part of the field program. The depth data was obtained during a series of traverses across each of the study areas. Hand bearing compasses were used to keep track of the ship's position at the beginning of the traverse, the end of the traverse and at one-minute intervals during the traverse. The depth data collected from each traverse was first referenced to mean low water (using tidal tables) and plotted on a chart. It was then hand contoured at two-meter intervals. In areas where no data were obtained, we used the USCGS charts to extend our bathymetric charts.

The bathymetry based upon USCGS data have dashed contours in contrast to the solid contours used with our own data. Owing to the precision of the ship's fathometer and our navigation precision (± 50 meters), we estimate the precision of the bathymetric charts to be approximately ± .5 meters. These charts were used to construct the bathymetric profiles used for the contour plots.

The current data collected is presented here as (1) a time series of profiles made at each station, which show the variability of the vertical current structure at one location and (2) cross-channel transects spaced approximately one hour apart showing the details of both the horizontal and vertical current structure. An outline of the data reduction process is shown in Figure 9.

Plots of speed, direction, longitude and transverse velocity profiles for each cruise are shown in Figures 10 through 35.* The vertical axis represents the depth below the water surface (in meters). A horizontal scale for each parameter appears to the right of the title on each plot. The station number for the speed and direction profiles appears above the tic mark which corresponds to 100 cm/sec and 180° respectively. For longitudinal and transverse velocity profiles the station number appears above the origin. The time of each profile is indicated below, along with a dashed line showing the approximate depth of the bottom.

The contour plots of current speed, longitudinal component and transverse component (Figures 36 to 77) summarize the profile data. Each plot is made from three stations which comprise one cross-channel transect. The

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*Since writing this report, we have discovered that there was equipment malfunction during the ebb tide portion of the Portsmouth cruise (9/24/75); therefore, the confidence in the current meter data collected during this time is low.

dots indicate the depths at which the measurements were made. The solid horizontal line indicates the water surface and the dashed horizontal line indicates the approximate position of mean low water. The values are hand contoured at 20 cm/sec intervals with intermediate values, i.e., 10, 30 cm/sec, dashed in to clarify the picture when necessary. The time of the section, which is the time of the center station, is indicated in the lower left corner of each plot along with a title. The times of the two side stations are within one-half hour on either side of this time. The orientation of the contour plots is such that the view represented is downstream. With regards to convention, positive longitudinal flow corresponds to flow out of the estuary and positive transverse flow corresponds to flow to the right of the downstream direction.

SECTION B: NOS CURRENTS AND SEA LEVELS

I. Introduction

In this section, the estuarine sea levels and currents measured principally by NOS are described. The purposes of the NOS survey were to update tidal elevation and current prediction data, to redefine and update tidal datum planes for land movement and shoreline determination, and to acquire water circulation data to be used for future ecological studies of the area. The last NOS goal served as a basis for the joint UNH/NOS field program during the summers of 1975 and 1976. The 1975 results are reported herein.

II. Currents

Currents presented in this report were measured at the locations indicated in Figure 1. A typical mooring consisted of a surface flotation unit, from which were suspended a string of savonius rotor current meters, at depths* of 4.57, 9.15, 15.25 meters, and a heavy weight, chosen to minimize the tilt of the array. Current speed and direction were burst sampled every 12 minutes and recorded on magnetic tape aboard the flotation unit. For monitoring purposes, the current values were radioed to the NOAA ship FERREL, where the data were reduced to engineering units, stored on magnetic tape aboard the ship, and hand plotted. (In addition to the processed data described here we also have copies of the unedited hand plots.) The details of the processed currents are summarized in Table III, and the presentation shown in Figure 79 demonstrates how the current records at different locations were related during the field program.

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* For shallower water depths, less than three current meters were used.

Table III

Summary of Current Meter Data*

CURRENTS

STATION NUMBER	CURRENT METER I.D.	STATION LATITUDE (NORTH)	LOCATION LONGITUDE (WEST)	START DATE	START TIME (GMT)	END DATE	END TIME (GMT)	NUMBER OF DAYS
C 104	A, B	43°04'35"	70°43'01"	7-9-75	19:49	11-2-75	18:13	115
C 124	A	43°07'00"	70°49'44"	7-9-75	23:36	9-26-75	15:12	79
C 119	A, B	43°05'27"	70°45'38"	7-10-75	19:27	9-26-75	19:15	78
C 111	A, B, C	43°04'30"	70°43'39.6"	7-14-75	19:24	7-23-75	20:00	9
C 130	A, B	43°06'59"	70°51'39"	7-24-75	14:24	8-3-75	14:36	10
	A, B			8-3-75	14:48	8-14-75	14:48	11
	A, B			8-14-75	15:48	8-20-75	02:00	6
	A, B			8-20-75	02:12	8-25-75	13:12	5
C 135	A (3.04)	43°07'29"	70°49'41"	7-24-75	19:42	8-4-75	19:42	11
	A (3.04)			8-3-75	21:54	8-9-75	20:54	6
C 125	A, B	43°07'09"	70°50'14"	9-13-75	24:12	9-21-75	18:00	8
	A, B			9-21-75	20:00	9-27-75	19:12	6
C 133	A, B	43°04'55"	70°52'06"	8-11-75	16:00	8-23-75	16:00	12
	A, B			8-23-75	16:24	8-25-75	22:00	2
C 138	A (3.04)	43°04'17"	70°52'06"	8-21-75	19:42	8-30-75	13:30	9
C 134	A (3.04)	43°04'22"	70°52'24"	8-20-75	20:06	8-30-75	13:42	10
C 131	A, B	43°06'00"	70°51'40"	8-28-75	16:00	9-5-75	16:00	8
	A, B			9-5-75	16:12	9-13-75	16:12	8
C 121	A	43°06'01"	70°47'06"	9-9-75	21:52	9-27-75	13:04	18
C 128	A, B	43°07'21.7"	70°50'25"	9-2-75	20:06	9-11-75	15:06	9
C 127	A	43°07'37"	70°51'22"	9-3-75	14:30	9-11-75	16:18	8
C 137	A (3.04)	43°10'7.5"	70°49'44"	9-12-75	16:07	9-20-75	17:31	8
C 126	A (3.04)	43°07'47"	70°50'59"	9-13-75	18:00	9-22-75	14:12	9
C 122	A	43°06'39"	70°48'07"	9-19-75	21:18	9-24-75	21:30	5
	A			9-24-75	22:00	9-28-75	18:36	4
C 136	A (3.04)	43°08'56"	70°50'03"	9-29-75	22:36	10-9-75	13:24	10
C 106	A, B	43°04'42"	70°43'17"	9-29-75	15:00	10-15-75	17:36	16
C 115	A, B	43°04'33"	70°44'29"	9-30-75	14:36	10-8-75	14:36	8
C 120	A	43°05'41"	70°46'06"	10-25-75	14:00	11-2-75	14:12	8
C 107	A	43°04'58"	70°43'10"	10-1-75	21:30	10-10-75	13:54	9
C 108	A (3.04)	43°05'32"	70°43'07"	10-1-75	18:53	10-14-75	15:05	13
C 118	A	43°04'47"	70°45'19"	10-9-75	14:04	10-13-75	03:40	4
C 114	A	43°04'16"	70°44'20"	10-10-75	14:42	10-20-75	14:54	10
C 113	A, B, C	43°04'21"	70°44'16"	10-14-75	18:02	10-24-75	22:02	10
	A, B, C			10-24-75	22:20	10-31-75	15:08	7

*Except where indicated ( ), current meters A, B, and C were moored at depths of 4.57, 9.15 and 15.25 meters below the surface at MLW respectively. The start and end times refer to the available 12 minute values of current speed and direction for each current meter.

Every 12 minutes, five current speeds and five current directions were sampled in rapid succession (1 second intervals) and stored. Any data pair whose direction falls outside ± 15° of the mean direction were discarded. The remaining speeds and directions are averaged separately, to form the vector assigned to that particular 12 minute sample.

The estimated precision of the current speed and direction are ±2.6 cm/sec and ±2.5 degrees respectively for zero tilt and speeds less than 52 cm/sec (1 kt). The precision of speeds greater than 52 cm/sec is about ± 5 cm/sec.

In general the ebb and flood currents are aligned with the general bathymetric features and, therefore, we chose to present current speed and direction separately. In Figure 80 we show representative samples of currents and sea level from a number of locations in the estuary. The particular current direction, current speed, and sea level records were chosen to coincide with the UNH profiling cruises described in section A of this data report. Twenty-four hours of data are shown starting at 0400 EDT (0800 GMT) for each cruise day. Current speed values of 524.2752 cm/sec (9.99 kts.) have been used to designate missing data in the original records. Those values have been replaced by 0.0 cm/sec for presentation purposes here. One should be suspicious of corresponding direction values which appear to have a similar spikiness.

III. Sea Level

With the exception of the UNH resistance tide gauge located at Adams Point, all sea level measurements were made by NOS with the standard NOS automatic digital recording (ADR) tide gauges. The location of the stations is indicated in Figure 81. Table IV summarizes the details of the available data series, which are composed of one hour samples,* while figure

* The UNH Adams Point series is one-half hour samples.

Table IV

Sea Level Data Summary*

TIDE STATIONS

STATION IDENTIFICATION	TIDE GAUGE TYPE	STATION LOCATION LATITUDE (NORTH)	STATION LOCATION LONGITUDE (WEST)	START DATE	START TIME (GMT)	END DATE	END TIME (GMT)	NUMBER OF DAYS
T-5	ADR	43°04'25"	70°43'07"	6-24-75	00:00	9-29-75	23:00	97
				10-6-75	00:00	10-20-75	23:00	14
				10-25-75	00:00	12-2-75	23:00	38
T-13	ADR	43°06'10"	70°47'40"	9-1-75	00:00	9-30-75	23:00	29
T-16A	ADR	43°07'45"	70°50'50"	7-1-75	00:00	7-10-75	23:00	9
				7-21-75	00:00	8-11-75	23:00	21
				8-16-75	00:00	8-18-75	23:00	2
				8-20-75	00:00	8-31-75	23:00	11
T-16B				9-1-75	00:00	9-19-75	23:00	18
				9-21-75	00:00	9-26-75	23:00	5
				9-29-75	00:00	9-30-75	23:00	1
T-15	ADR	43°11'28"	70°49'28"	9-9-75	00:00	9-30-75	23:00	21
T-14	ADR	43°07'00"	70°48'45"	7-1-75	00:00	9-27-75	23:00	88
T-14A	ADR	43°07'00"	70°48'45"	9-3-75	00:00	11-13-75	23:00	71
				11-17-75	00:00	12-31-75	23:00	44
T-12	ADR	43°05'49"	70°47'00"	9-5-75	00:00	9-30-75	23:00	25
T-11	ADR	43°05'25"	70°45'50"	7-1-75	00:00	9-30-75	23:00	91
T-19	ADR	43°03'08"	70°54'40"	7-1-75	00:00	7-31-75	23:00	30
SEAVEY	ADR	43°04'45"	70°44'30"	2-1-75	00:00	12-31-75	23:00	333
UNH	RESISTANCE	43°05'25"	70°51'55"	7-7-75	23:47	9-7-75	07:47	62
				9-10-75	10:47	9-25-75	05:17	15

* With the exception of the UNH (one-half hour) samples, the series is composed of one hour samples, with the indicated start and end times.

82 shows relation of the various measurements during the field program.

The ADR tide gauges record six-minute values of the sea level as measured by a float in the standard NOS tidal well. These measurements were obtained in accordance with procedures specified in NOS Special Publication 30-1, "Manual of Tide Observations." The precision of these measurements is better than the 3 cm resolution of the ADR. The data presented here are one hour subsamples of the "adjusted" data record obtained by the ADR. The data are adjusted to a calculated reference level of mean low water (MLW). The 2 σ standard deviation accuracy of MLW relative to a 19-year mean value for a one month tide series is $\pm$ 7.6 cm.

The Adams Point sea level was measured continuously by a Metritape Inc. Level Sensor. This device is a precision-wound resistance helix having 1.5 contacts per cm along its 2.89 meter length. The jacket envelope consists of multiple layers of selected material to protect the electrical system and act as a pressure receiving diaphragm. Pressure of the fluid causes progressive contact of the extended resistence element against a conducting strip. The resistence remains unshorted above the fluid level. The tape was inserted in a tidal well to damp high frequency sea level fluctuations. The output voltage was recorded on a chart recorder and sampled every half hour by hand. The calculated precision (rms non-linearity) is $\pm$ .5 cm while the long period uncertainty is $\pm$ 2 cm and related to fluctuation of the electronic reference.

In Figure 83 representative examples of the sea level records are plotted for the duration of the summer 1975 program. A summary of the tidal ranges, a function of position in the estuary, is shown in Figure 84. In this presentation mean sea level (MSL) is assumed to be level, which is not strictly true, because of the river flow, but is acceptable within the precision of the measurements. The distribution of July mean high water (MHW) and mean low water (MLW) for the estuary is plotted. Because of the phase lag in high and low tide, the instantaneous sea level differs from the mean tidal range picture. For comparison, the instantaneous sea level distribution at slack high water (SHW) and slack low water (SLW) at Dover Point for 15 July 1975 is plotted. The phase distribution of July, 1975, MHW relative to Dover Point is plotted above in Figure 84.

IV. Acknowledgments

This work was made possible with the generous support of a number of groups. Without the cooperation of the National Ocean Survey and the crew of the NOAA Ship FERREL, this project would never have occurred. We thank Capt. Ned McIntosh and the crew of the UNH R/V Jere A. Chase for their assistance, cooperation and moral support. Our appreciation goes out to Dr. Arthur Mathieson for providing the support and facilities of the Jackson Estuarine Laboratory and the Public Service Company of New Hampshire for kindly providing the Metr i tape tide gauge which was installed at the Jackson Laboratory. The actual data sampling was done with cooperation and assistance of the chemical oceanographic group directed by Dr. Theodore C. Loder III. The assistance of a number of students including Ronnal Reichard, Steven Szydlik, and Ken Dallas is greatfully acknowledged. Technical assistance was provided by Mr. Lee Amoroso. Drs. Robinson Swift and Barbaros Celikkol also provided valuable guidance and assistance in the field and the laboratory. The UNH work described herein was supported under Sea Grant 04-5-158-50 and with funds from the Leslie Hubbard Fund.

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Figure 36 ADAMS POINT CONTOUR PLOT showing speed (cm/sec) from 1033 (EDT) to 1526 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 37 ADAMS POINT CONTOUR PLOT showing speed (cm/sec) from 1621 (EDT) to 2030 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 38 ADAMS POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1033 (EDT) to 1526 (EDT).Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 39 ADAMS POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1621 (EDT) to 2030 (EDT).Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 40 ADAMS POINT CONTOUR PLOT showing transverse component (cm/sec) from 1033 (EDT) to 1526 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 41 ADAMS POINT CONTOUR PLOT showing transverse component (cm/sec) from 1621 (EDT) to 2030 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 42 FOX POINT CONTOUR PLOT showing speed (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 43 FOX POINT CONTOUR PLOT showing speed (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 44 FOX POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 45 FOX POINT CONTOUR PLOT showing longitudinal component (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 46 FOX POINT CONTOUR PLOT showing transverse component (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 47 FOX POINT CONTOUR PLOT showing transverse component (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 48 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 49 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 50 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 51 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 52 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 53 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 54 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 55 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 56 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 57 DOVER POINT CONTOUR PLOT showing speed (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 58 DOVER POINT CONTOUR PLOT showing speed (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 59 DOVER POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 60 DOVER POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 61 DOVER POINT CONTOUR PLOT showing transverse component (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 62 DOVER POINT CONTOUR PLOT showing transverse component (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 63 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 64 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 65 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 66 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 67 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 68 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 69 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 70 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 71 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 72 PORTSMOUTH CONTOUR PLOT showing speed (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 73 PORTSMOUTH CONTOUR PLOT showing speed (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream.

Figure 74 PORTSMOUTH CONTOUR PLOT showing longitudinal component (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 75 PORTSMOUTH CONTOUR PLOT showing longitudinal component (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow out of Estuary.

Figure 76 PORTSMOUTH CONTOUR PLOT showing transverse component (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 77 PORTSMOUTH CONTOUR PLOT showing transverse component (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is looking downstream. Positive flow corresponds to flow to the right of the downstream direction.

Figure 78 Location map for NOS current meter moorings (●) during the 1975 summer field program.

Figure 79 A summary of the deployment periods of the NOS current meters.

Figure 80 Representative examples of current direction, D, current speed, S, and sea level, SL, for six locations in the estuary. Each 24 hour data set starting at 0400 EDT (0800 GMT) was chosen to coincide with the date of a UNH profiling cruise. The most appropriate current and sea level record for each particular UNH cruise is shown. For 8 July 1975 only the UNH sea level is shown. The following indicates the date, current meter identification, and tide gauge identification for the other data shown;

22 July 1975	C124	T-16,
5 August 1975	C135	T-14,
19 August 1975	C124	T-14,
10 September 1975	C131	UNH, and
24 September 1975	C119	T-11.

Missing current speeds have been assigned a zero value; the observed inverted spikes in the 19 August and 24 September data coincident currents direction values appear to be spurious.

Figure 81 Location chart of the NOS/UNH sea level monitoring program. Each division of the estuarine length scale corresponds to .5 km.

Figure 82 Sea level data acquisition summary. With the exception of the Adams Point series, all were obtained from NOS ADR (see text) tide gauges.

Figure 83 Examples of sea level from the Portsmouth Yacht Club, Hilton Park, and Adams Point locations within the Great Bay Estuary.

Figure 84 Summary of tidal elevation distribution within the Great Bay Estuarine System. The distributions of 7-day mean high and low water (MHW, MLW) relative to a horizontal surface are shown below. These are compared with instantaneous sea level distributions shown for slack high and low water (SHW, SLW) and mid ebb and flood at Dover Point for 15 July 1975. Above the phase distribution of high water relative to Dover Point is shown.

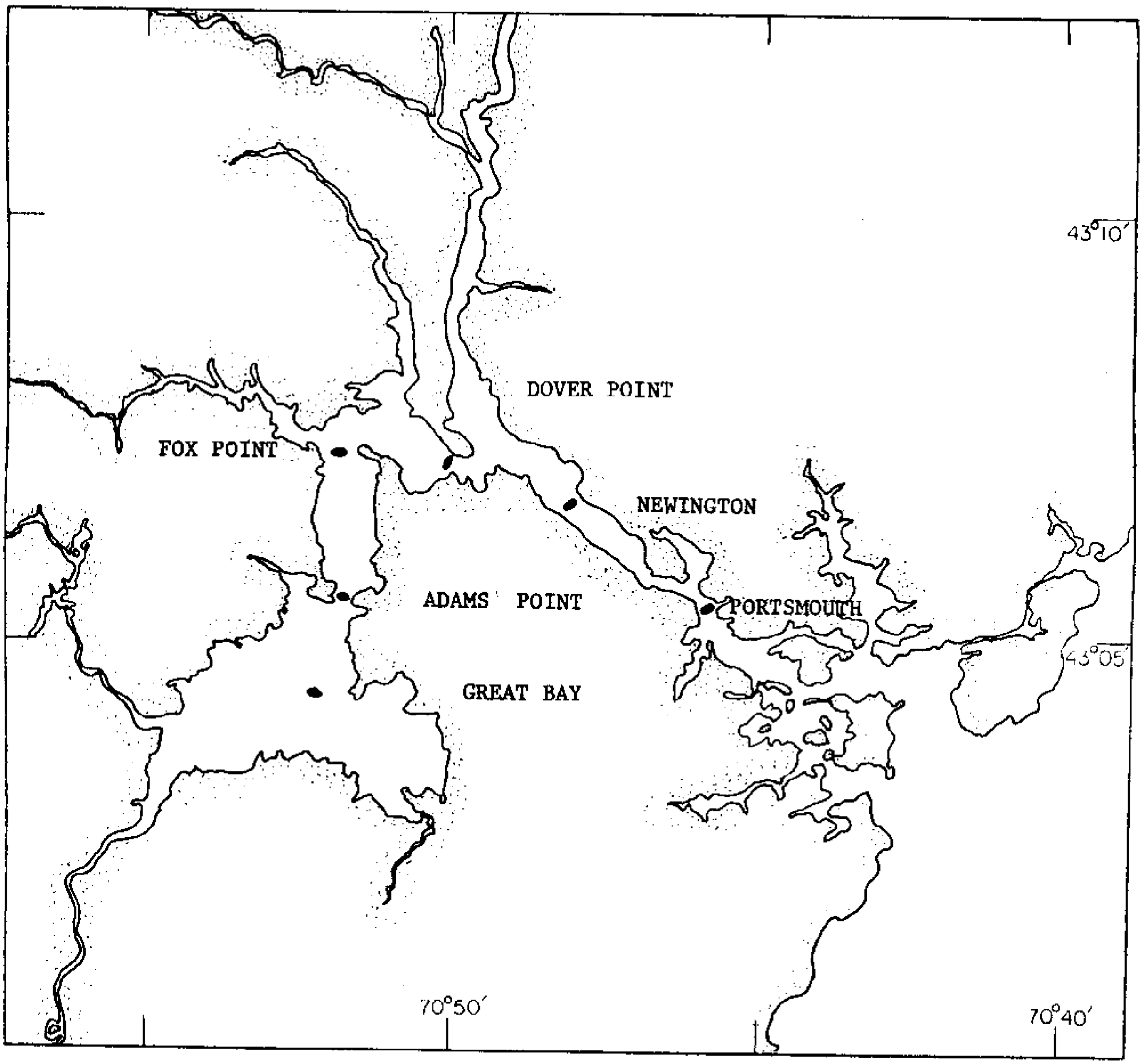

Figure 1 Sample locations for summer 1975 experiment, 13-hour UNH transect indicated by (●).

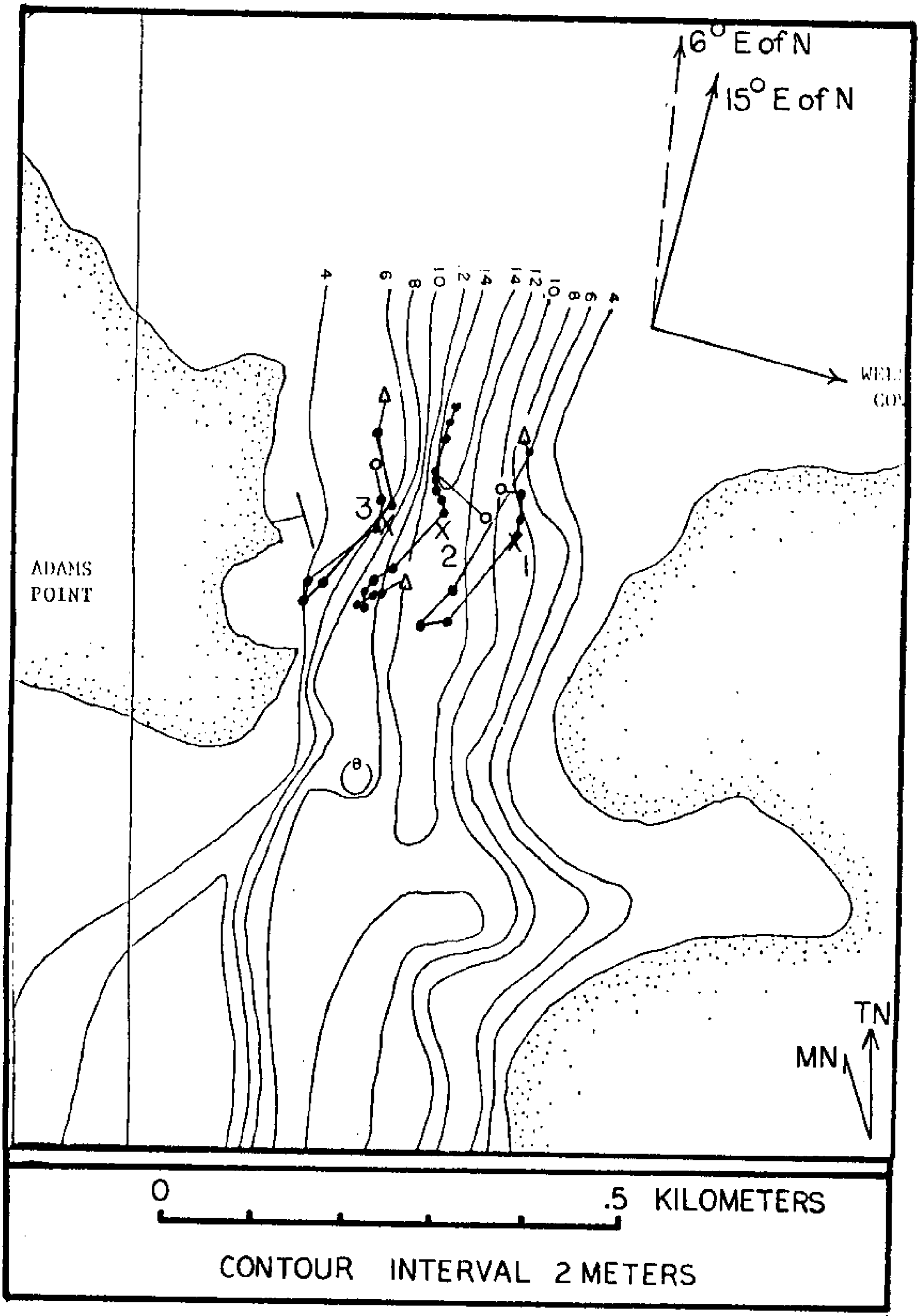

Figure 2 STATION LOCATIONS FOR ADAM'S POINT CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table I).

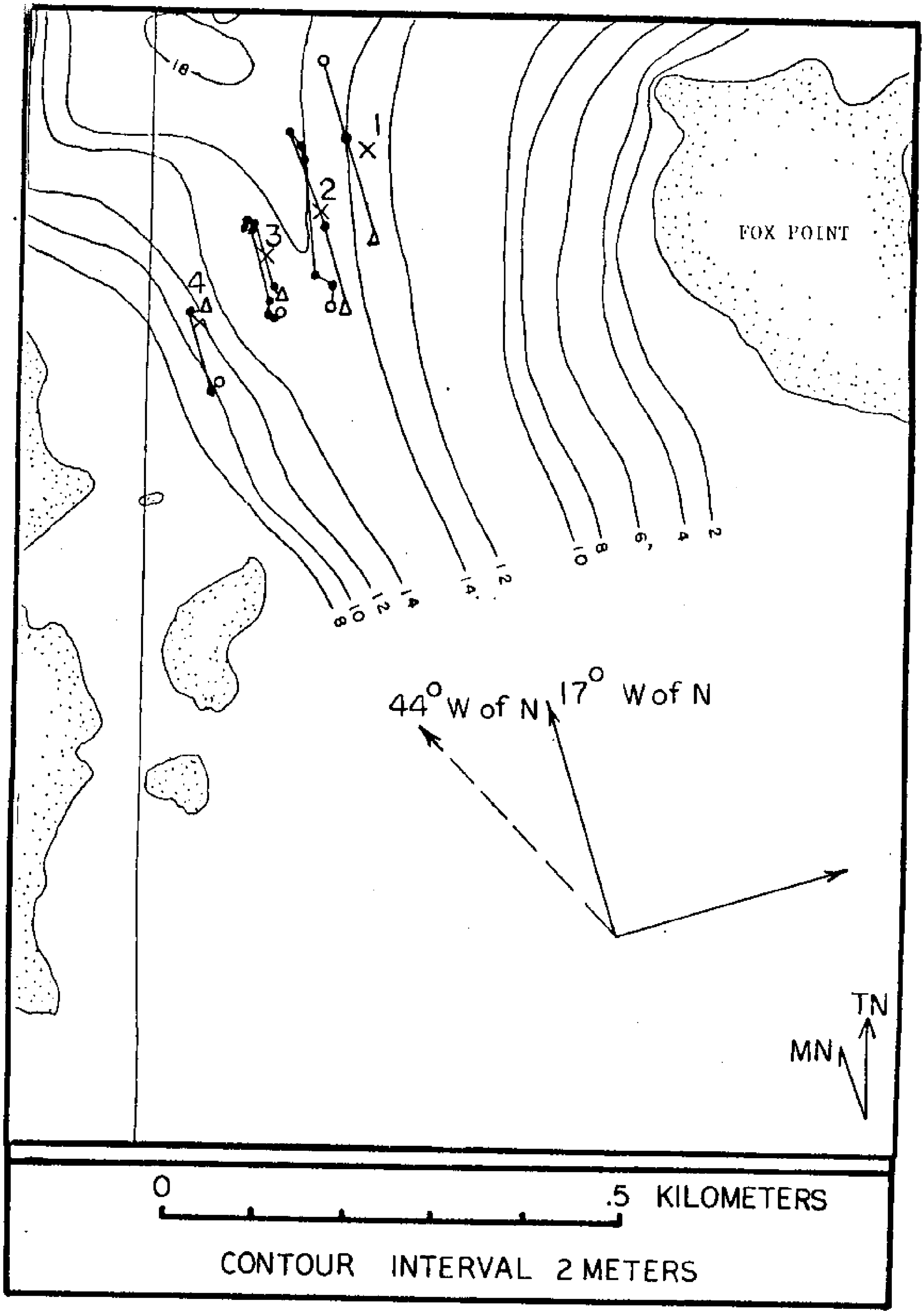

Figure 3 STATION LOCATIONS FOR FOX POINT CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table I).

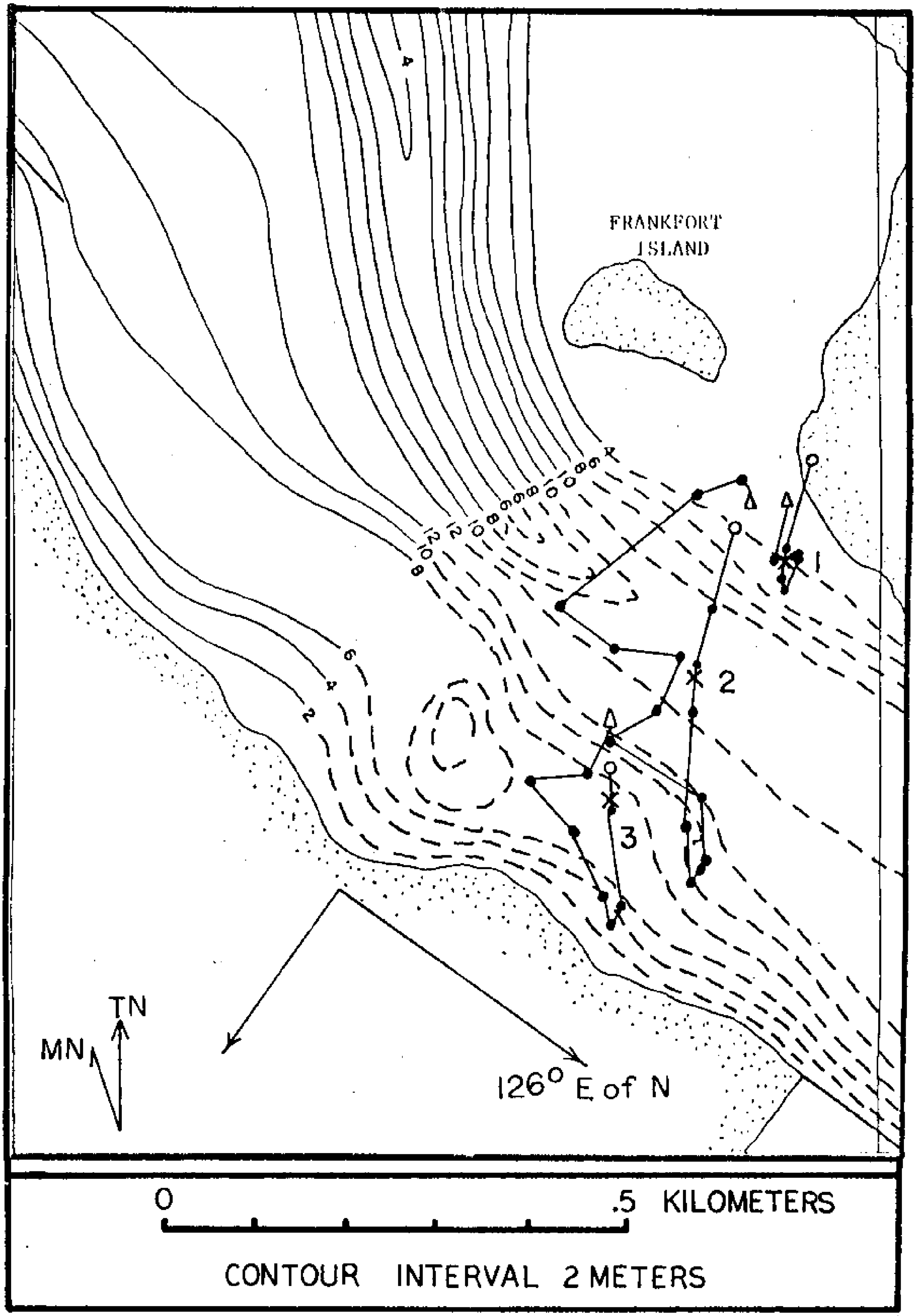

Figure 4 STATION LOCATIONS FOR NEWINGTON CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table I).

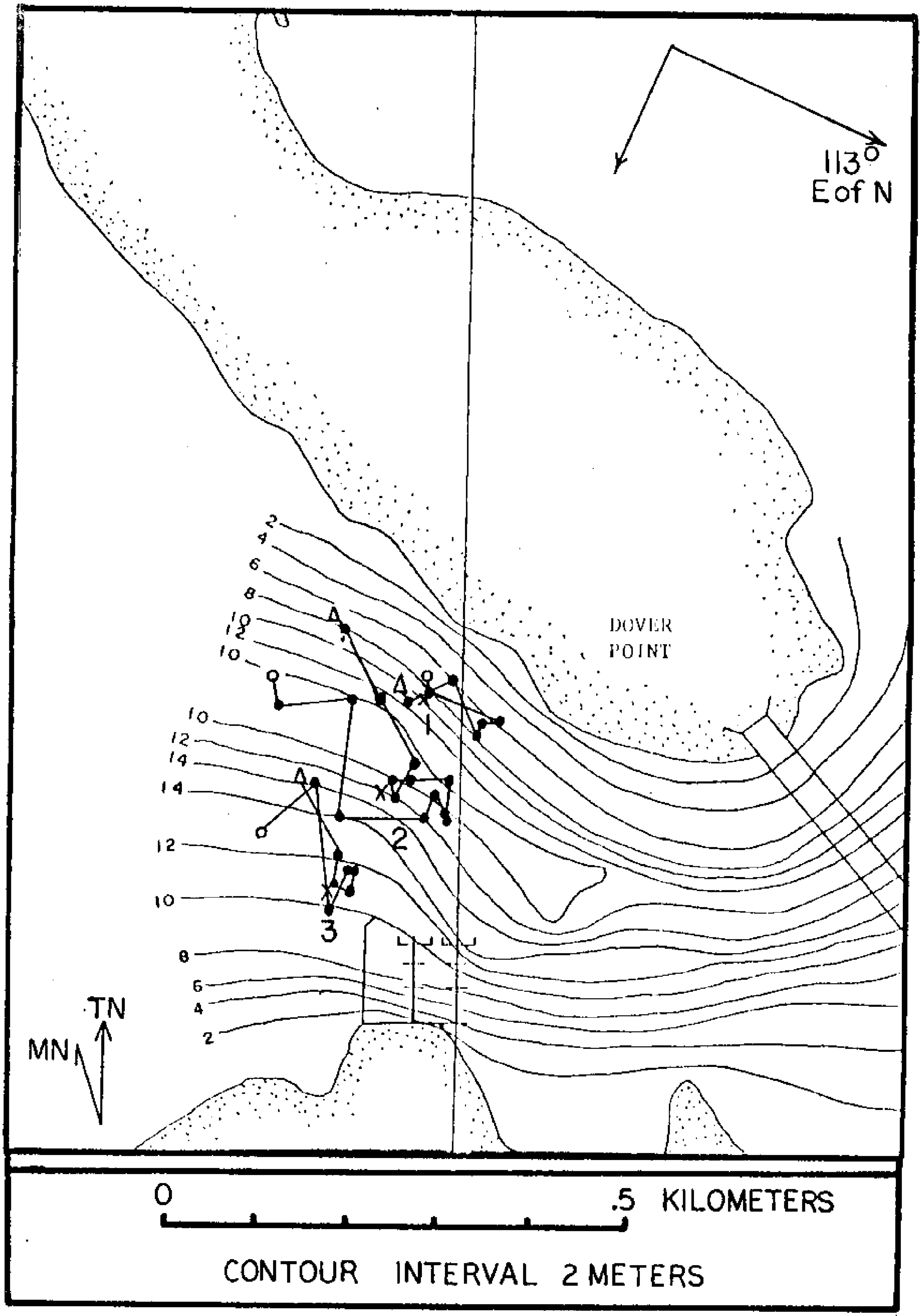

Figure 5 STATION LOCATIONS FOR DOVER POINT CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table II).

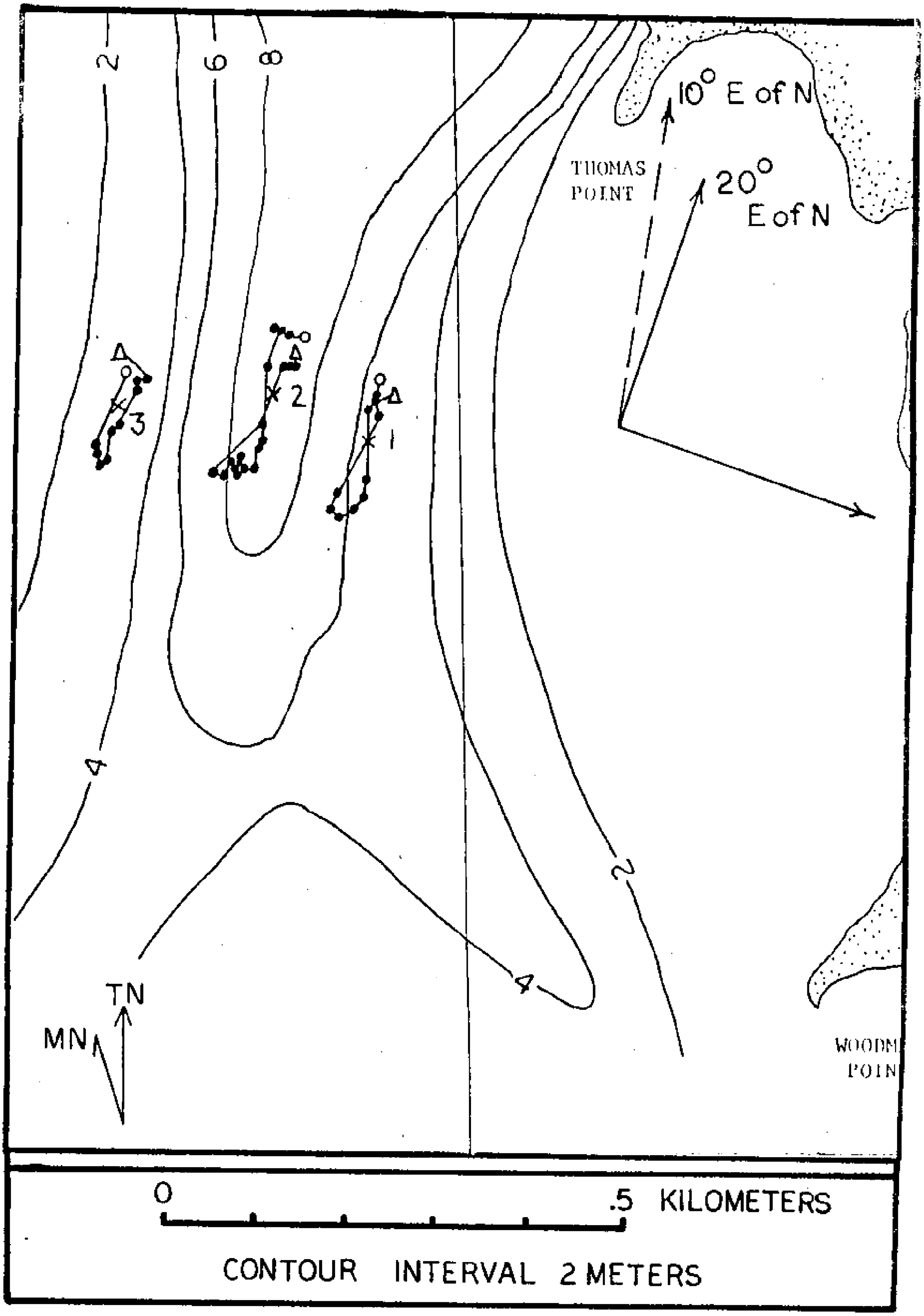

Figure 6 STATION LOCATIONS FOR GREAT BAY CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table II).

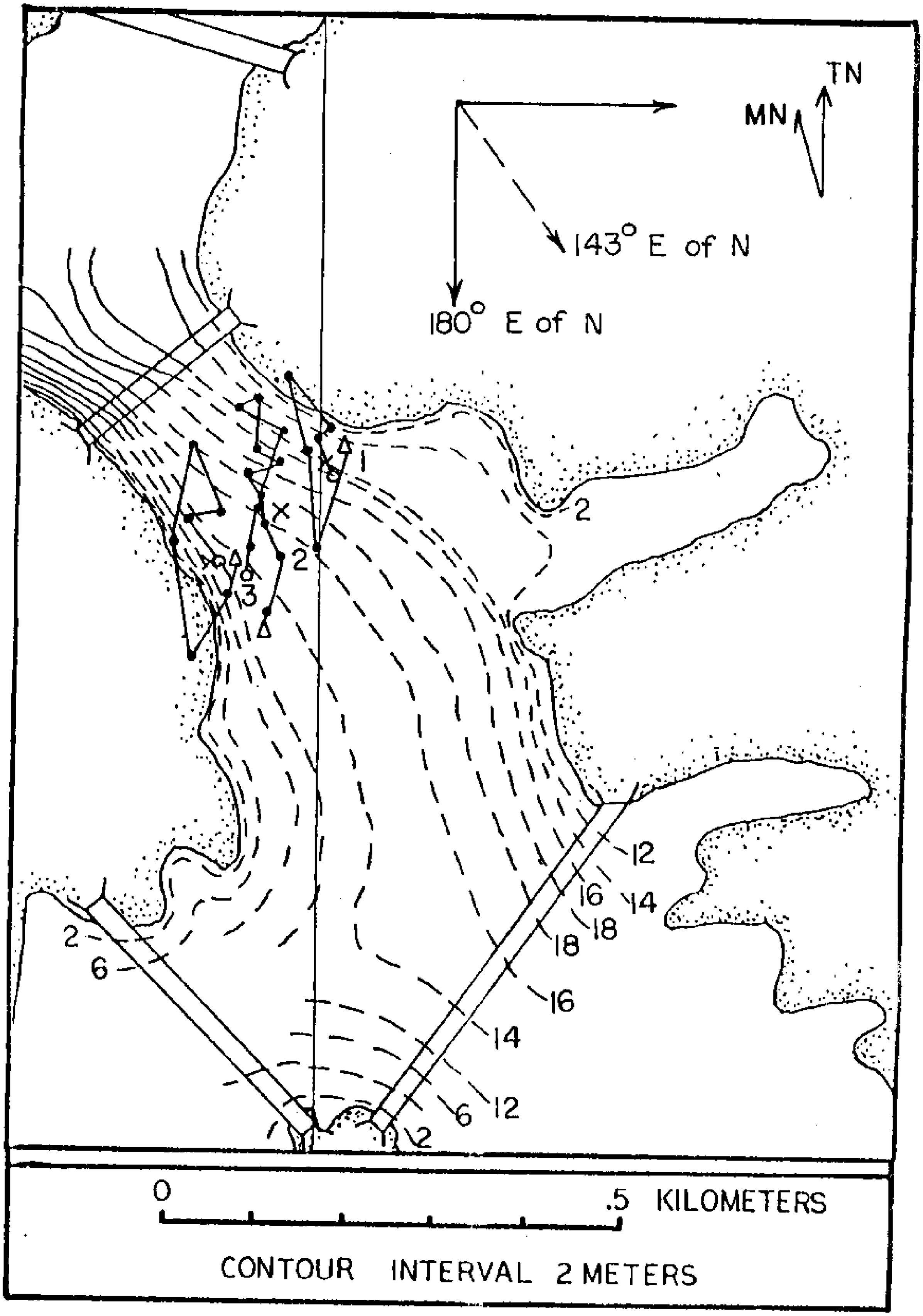

Figure 7 STATION LOCATIONS FOR PORTSMOUTH CRUISE. Longitudinal-transverse axis is shown as solid line; normal to the transect is shown as dashed line. Open circles indicate first sample, triangles indicate last sample for each station (see Table II).

Figure 8 PHOTOGRAPH OF INSTRUMENT ARRAY

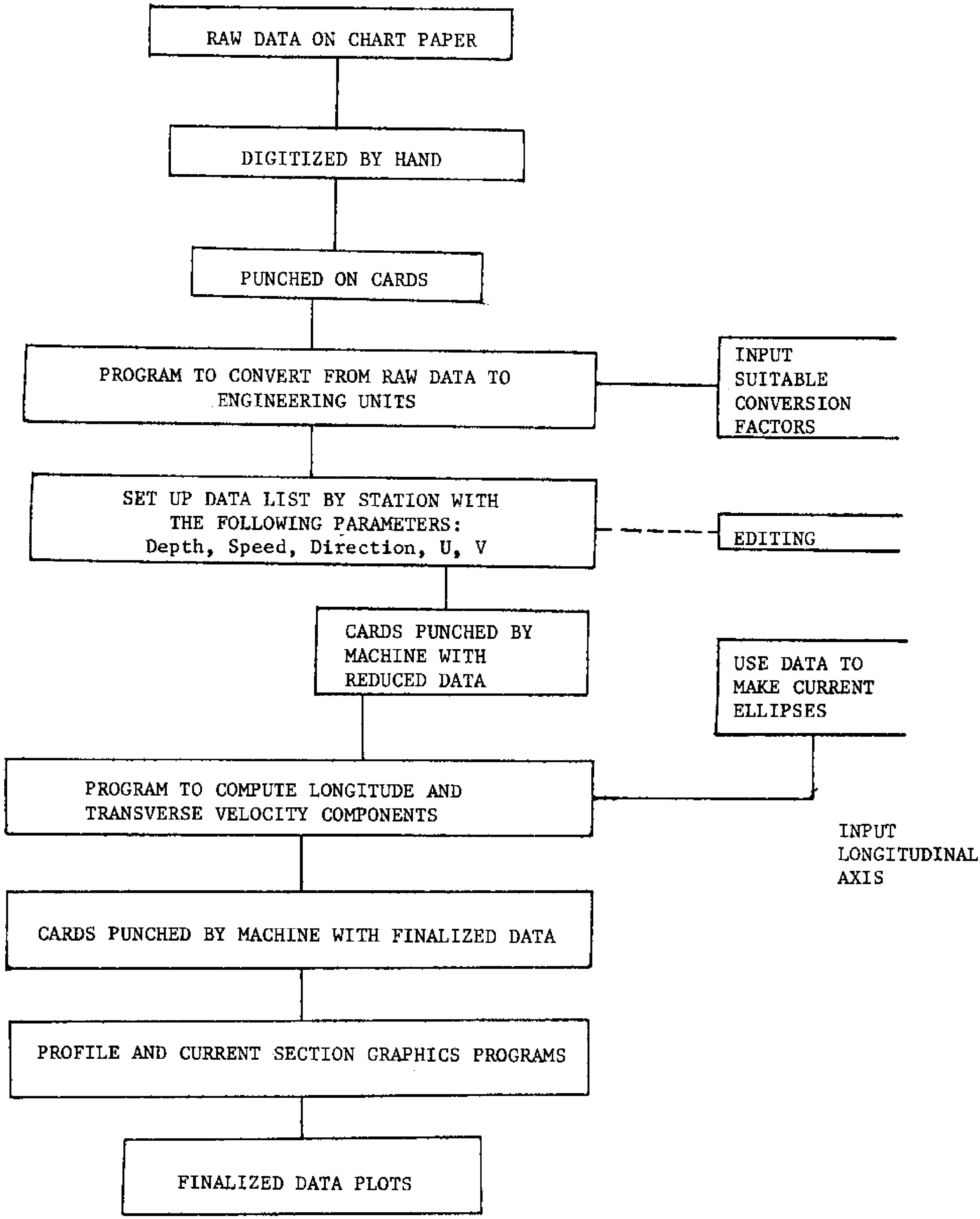

Figure 9 Block diagram of the steps used in data processing

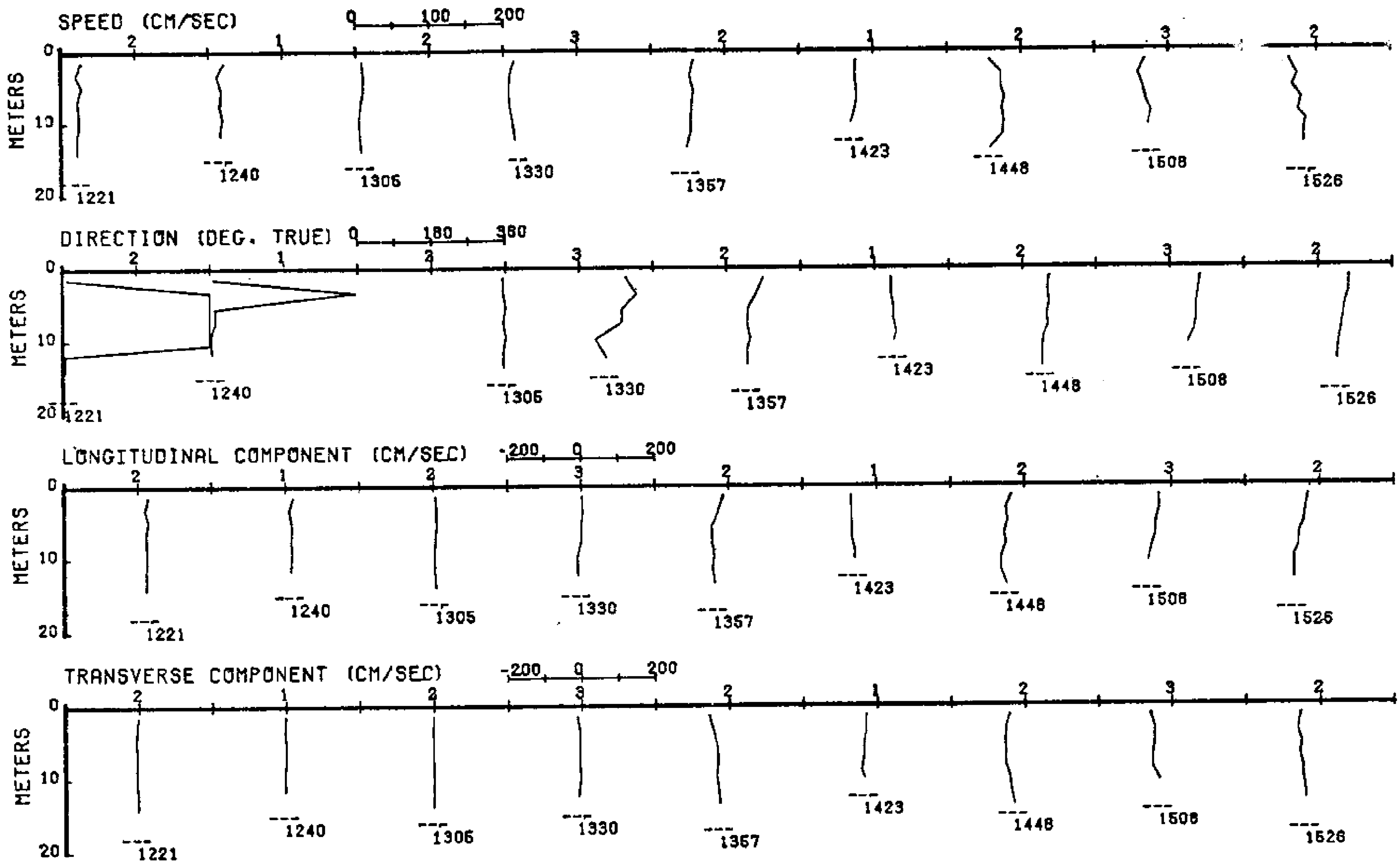

Figure 11 ADAM'S POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1221 (EDT) to 1526 (EDT).

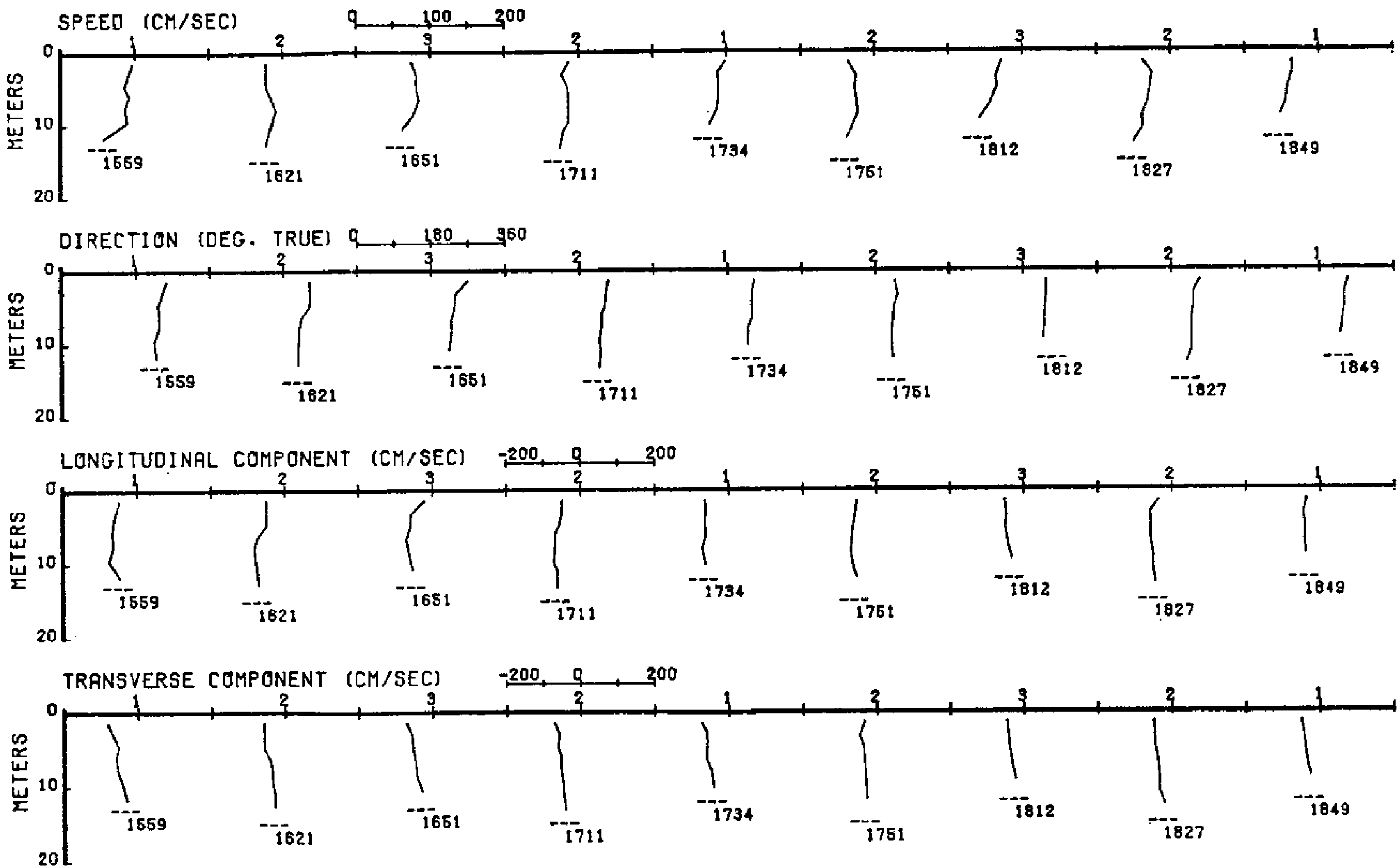

Figure 12 ADAM S POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1559 (EDT) to 1849 (EDT).

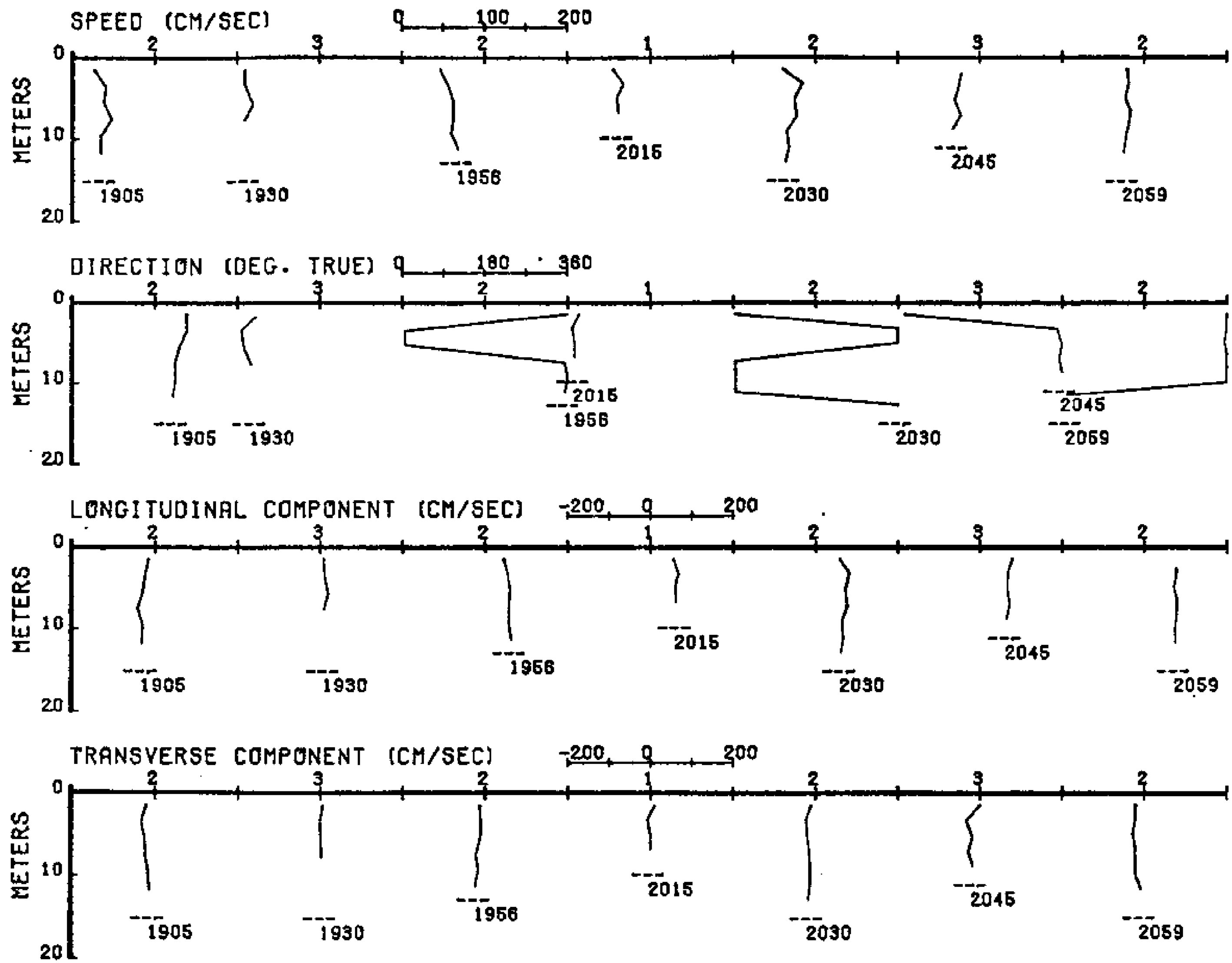

Figure 13 ADAMS: POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1905 (EDT) to 2059 (EDT).

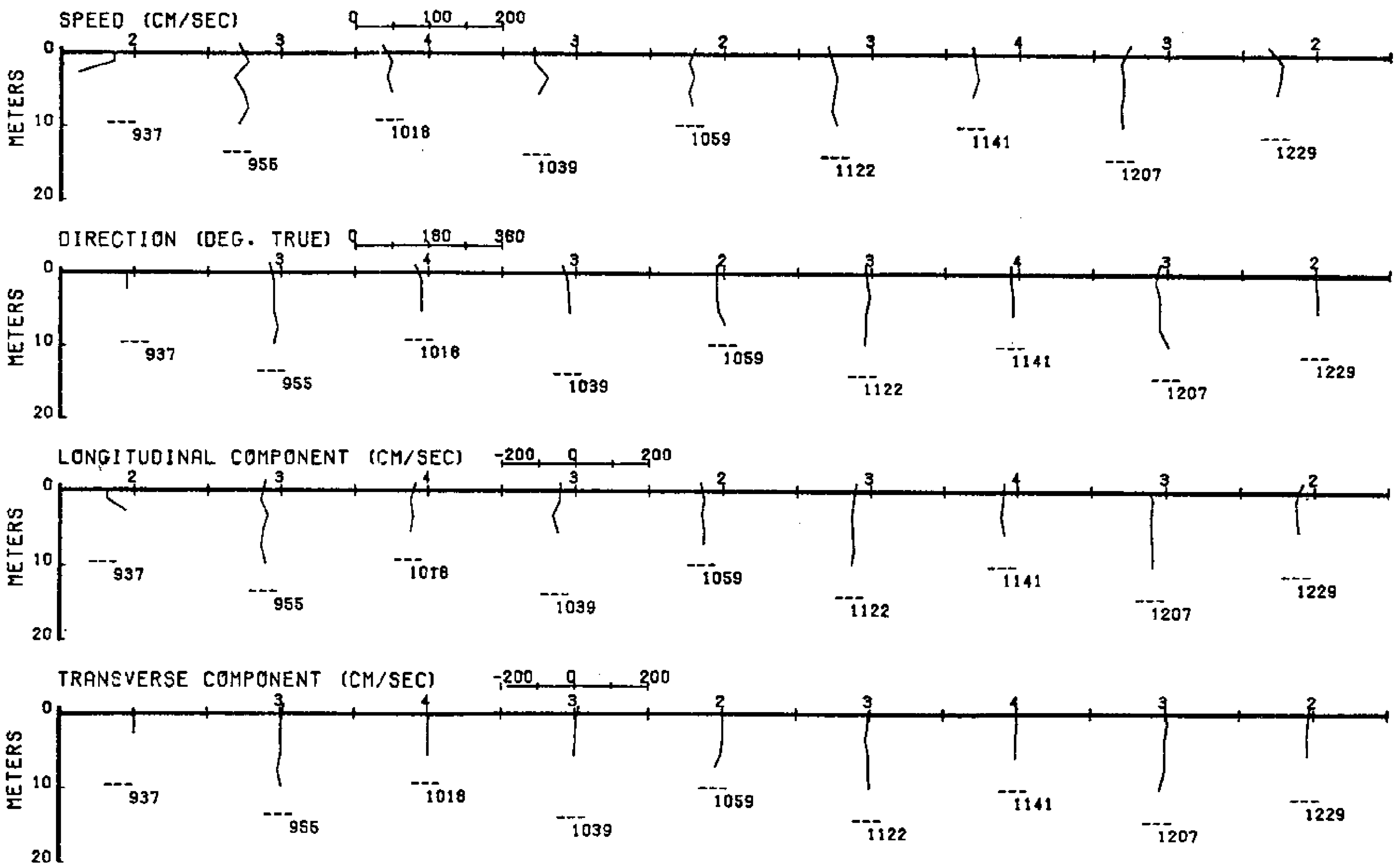

Figure 14 FOX POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 0937 (EDT) to 1229 (EDT).

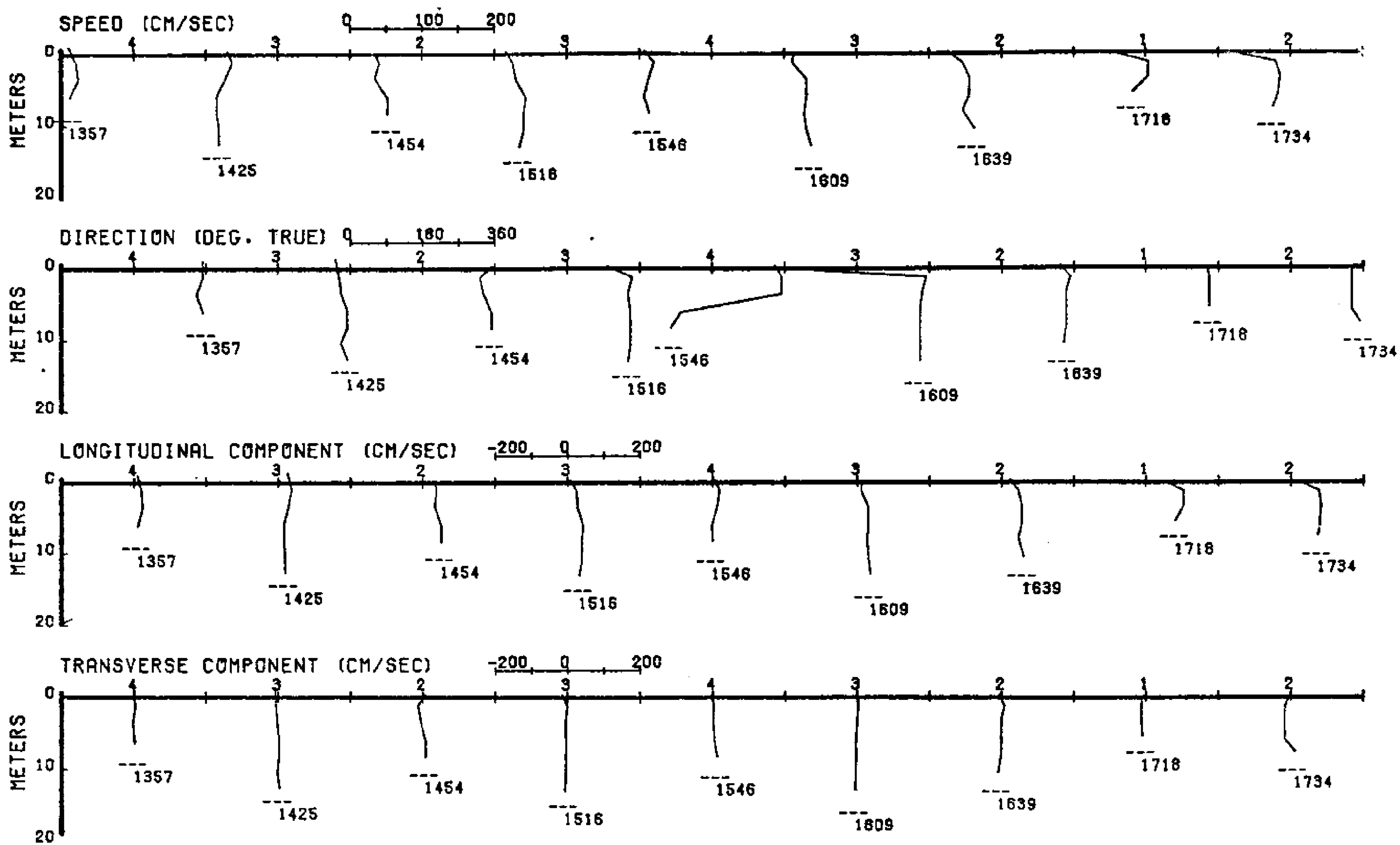

Figure 15 FOX POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1357 (EDT) to 1734 (EDT).

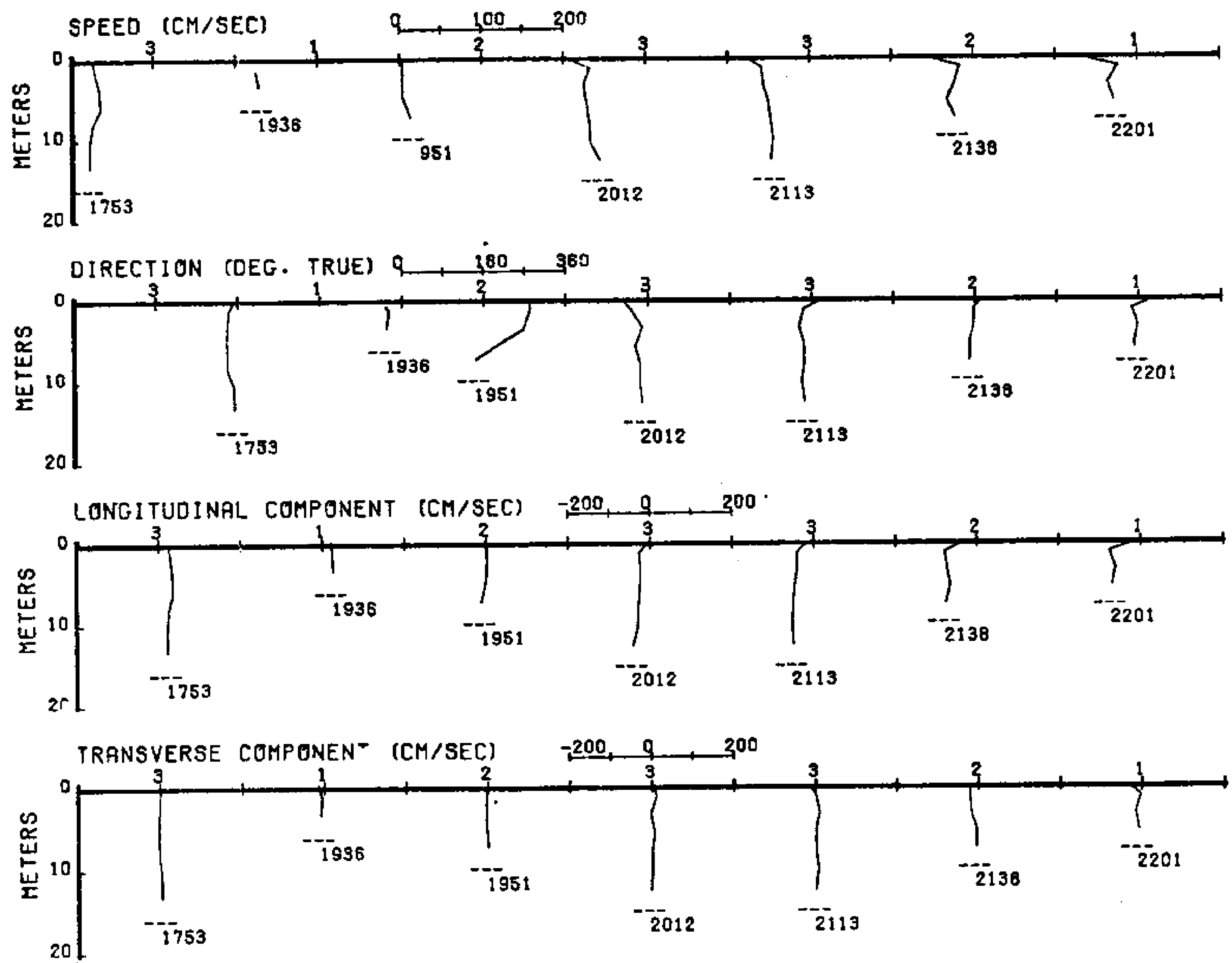

Figure 16 FOX POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1753 (EDT) to 2201 (EDT).

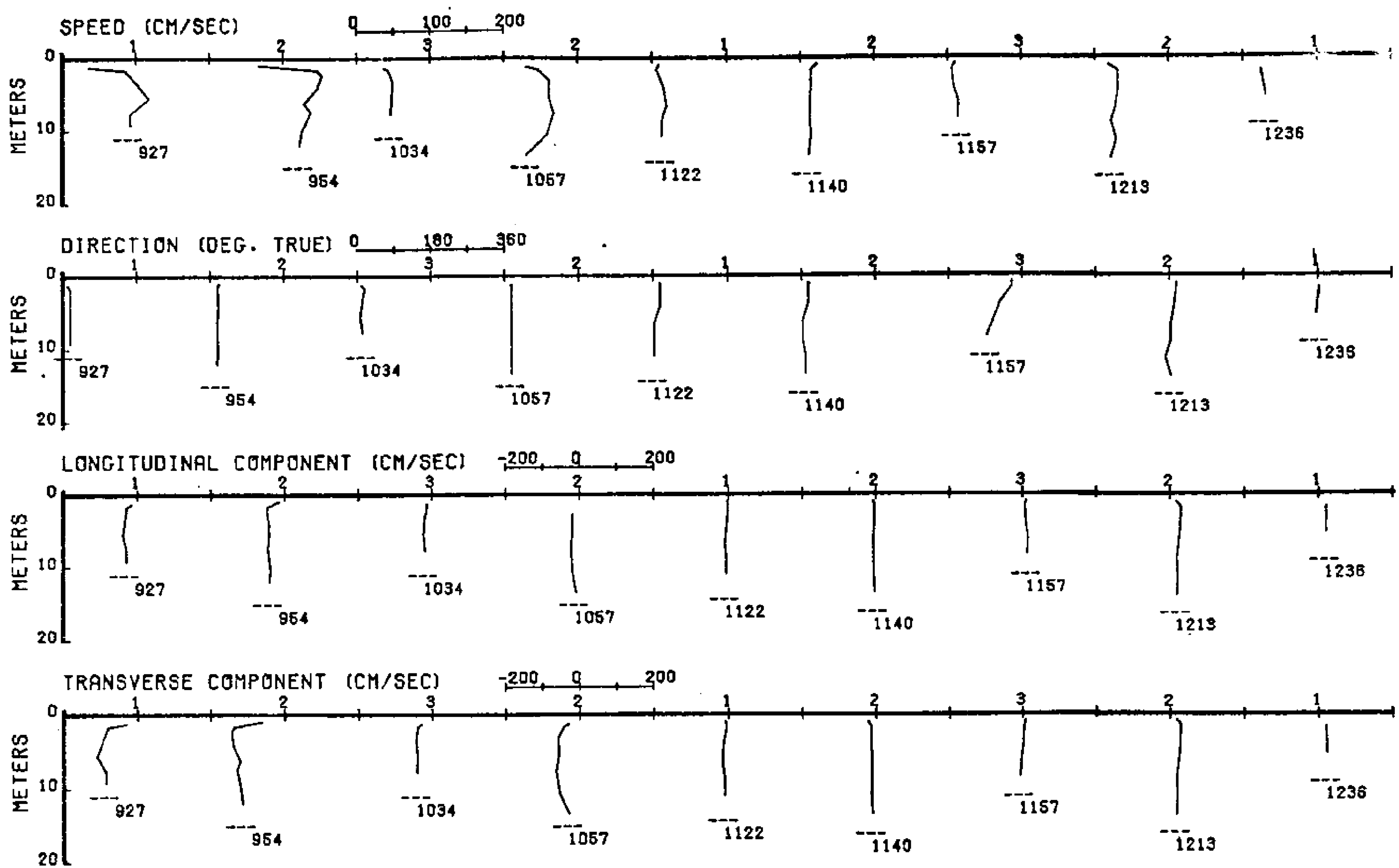

Figure 17 NEWINGTON PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 0927 (EDT) to 1236 (EDT).

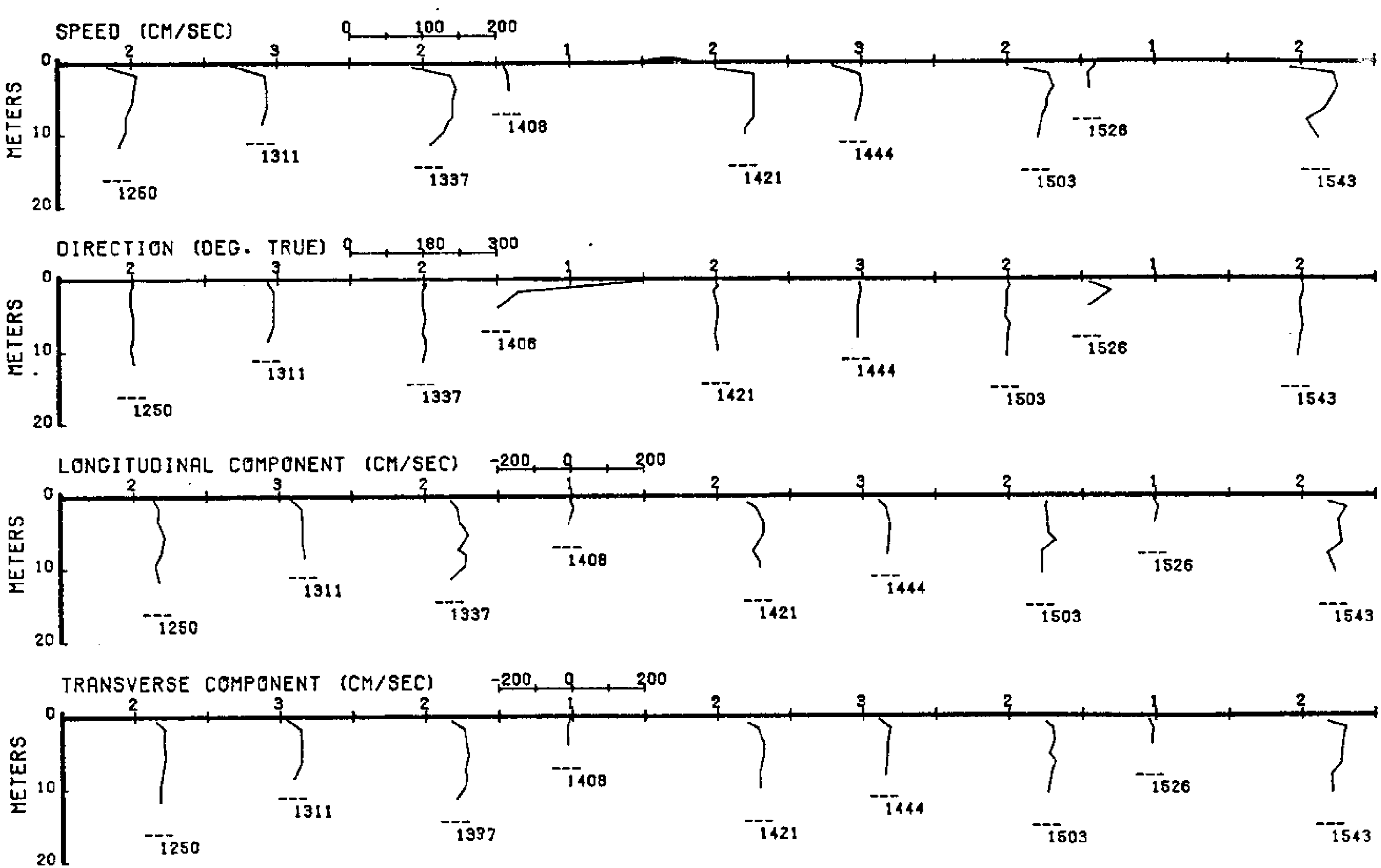

Figure 18 NEWINGTON PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1250 (EDT) to 1543 (EDT).

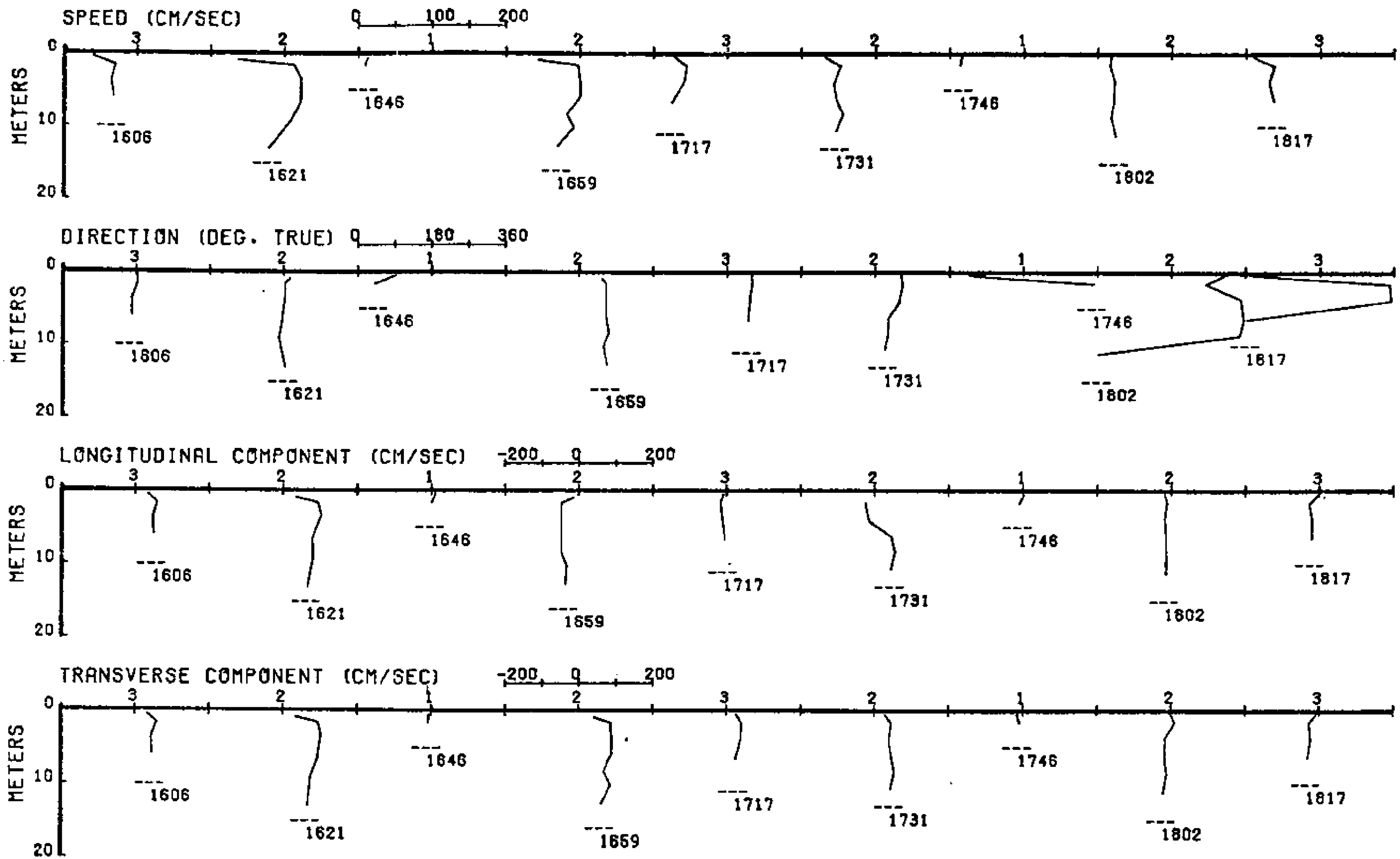

Figure 19 NEWINGTON PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1606 (EDT) to 1817 (EDT).

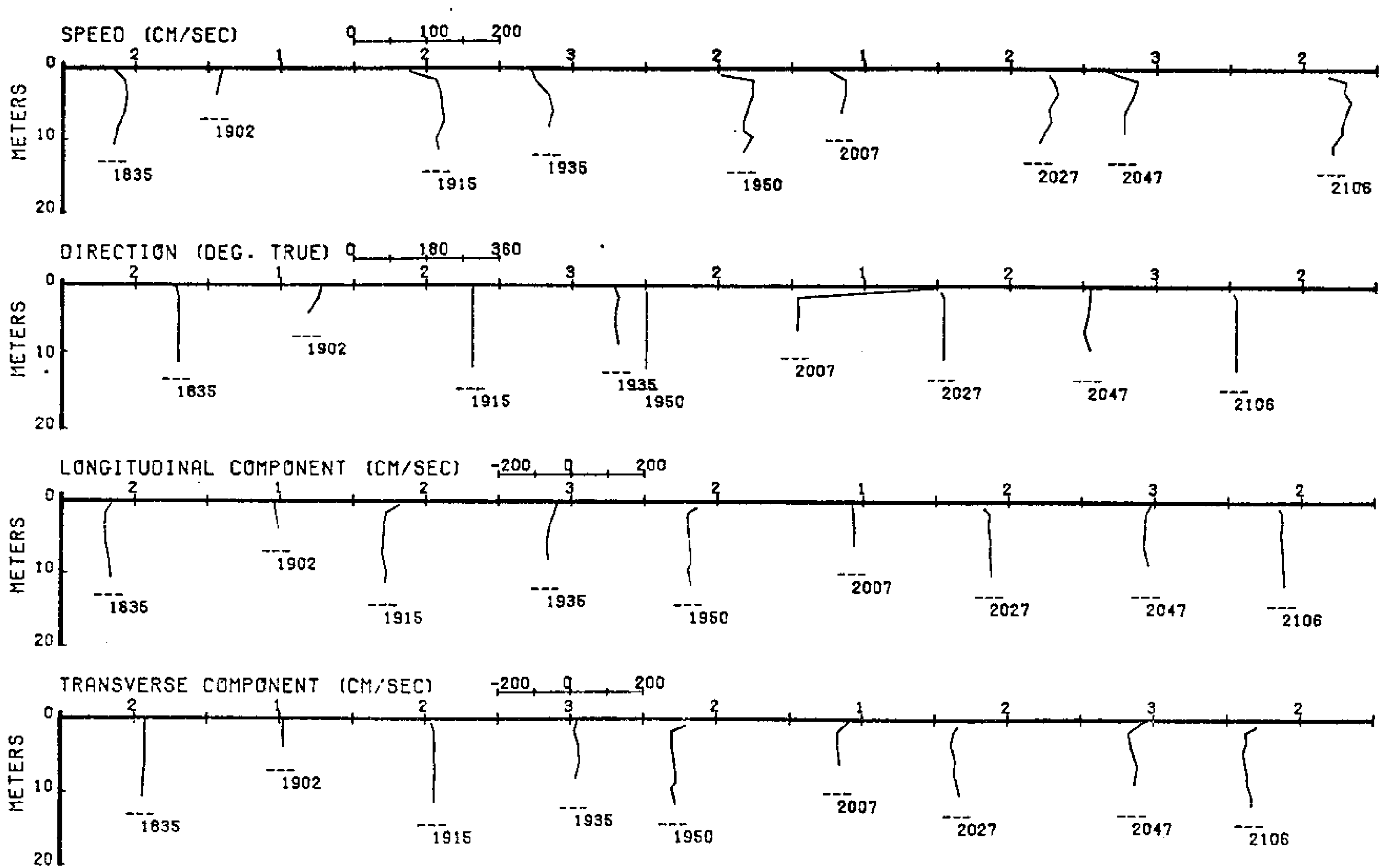

Figure 20 NEWINGTON PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1836 (EDT) to 2106 (EDT).

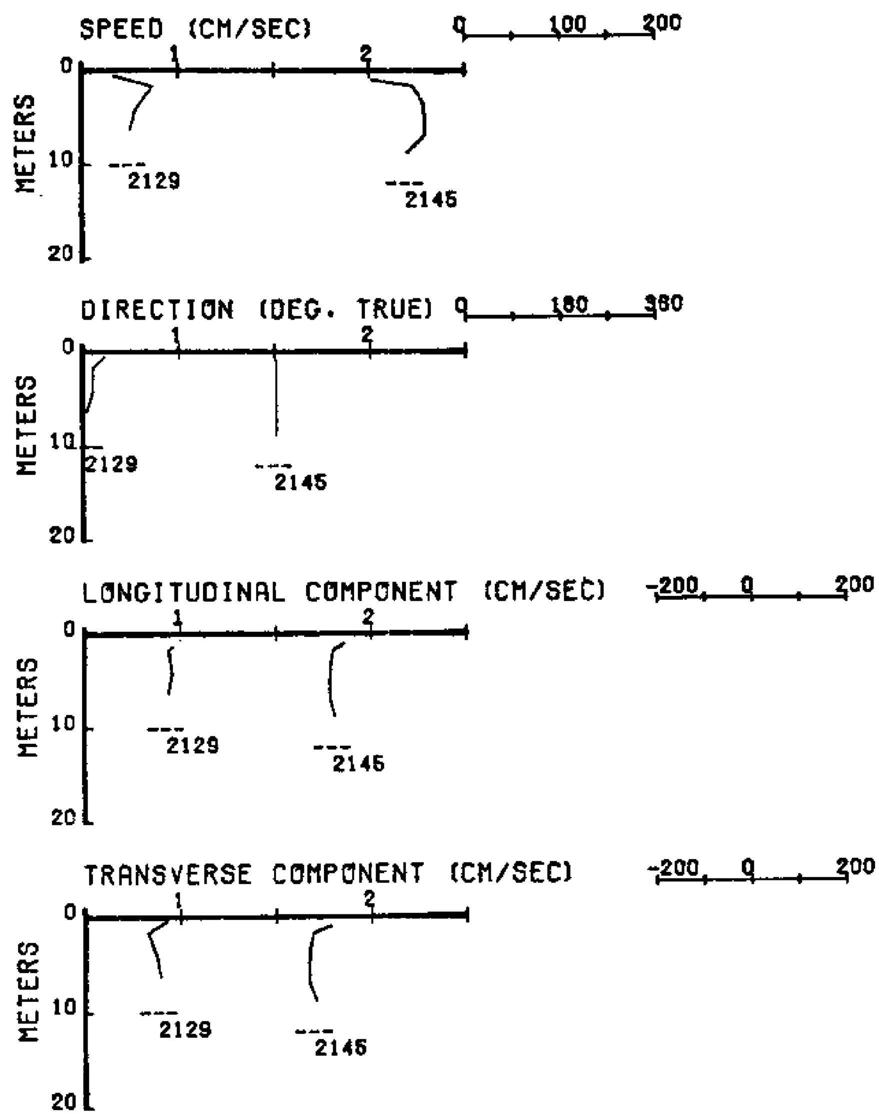

Figure 21 NEWINGTON PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 2129 (EDT) to 2145 (EDT).

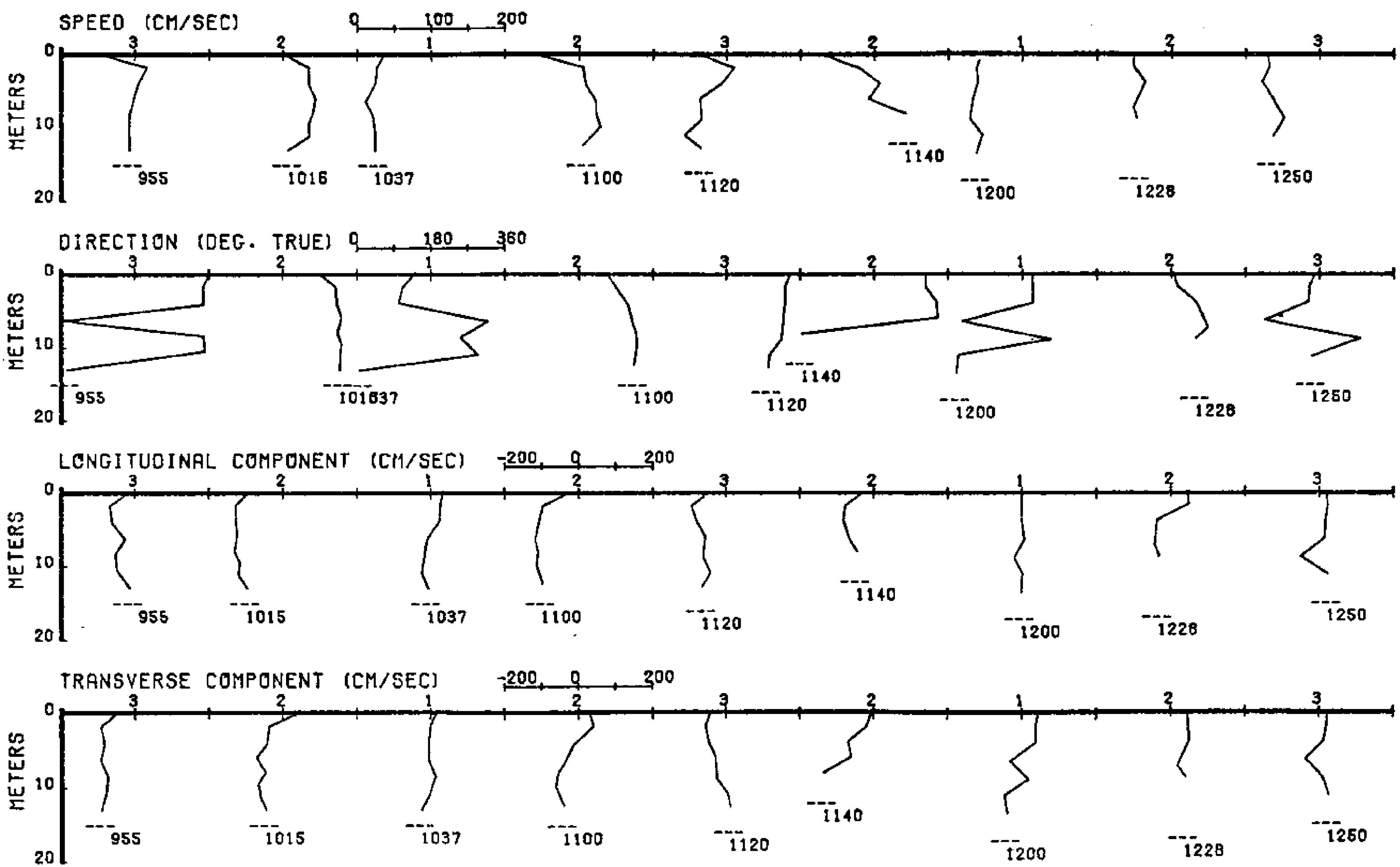

Figure 22 DOVER POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 0955 (EDT) to 1250 (EDT).

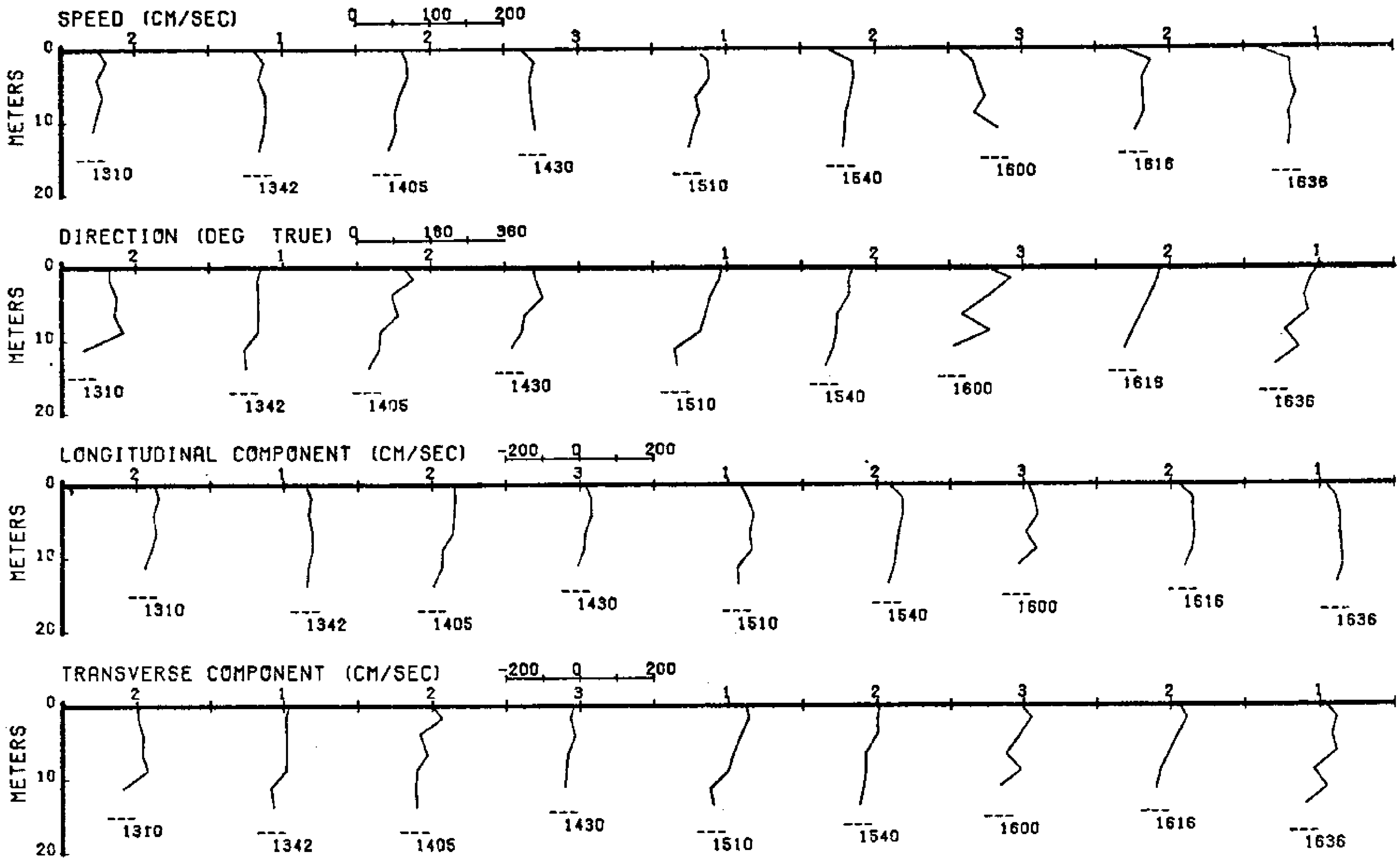

Figure 23 DOVER POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1310 (EDT) to 1636 (EDT).

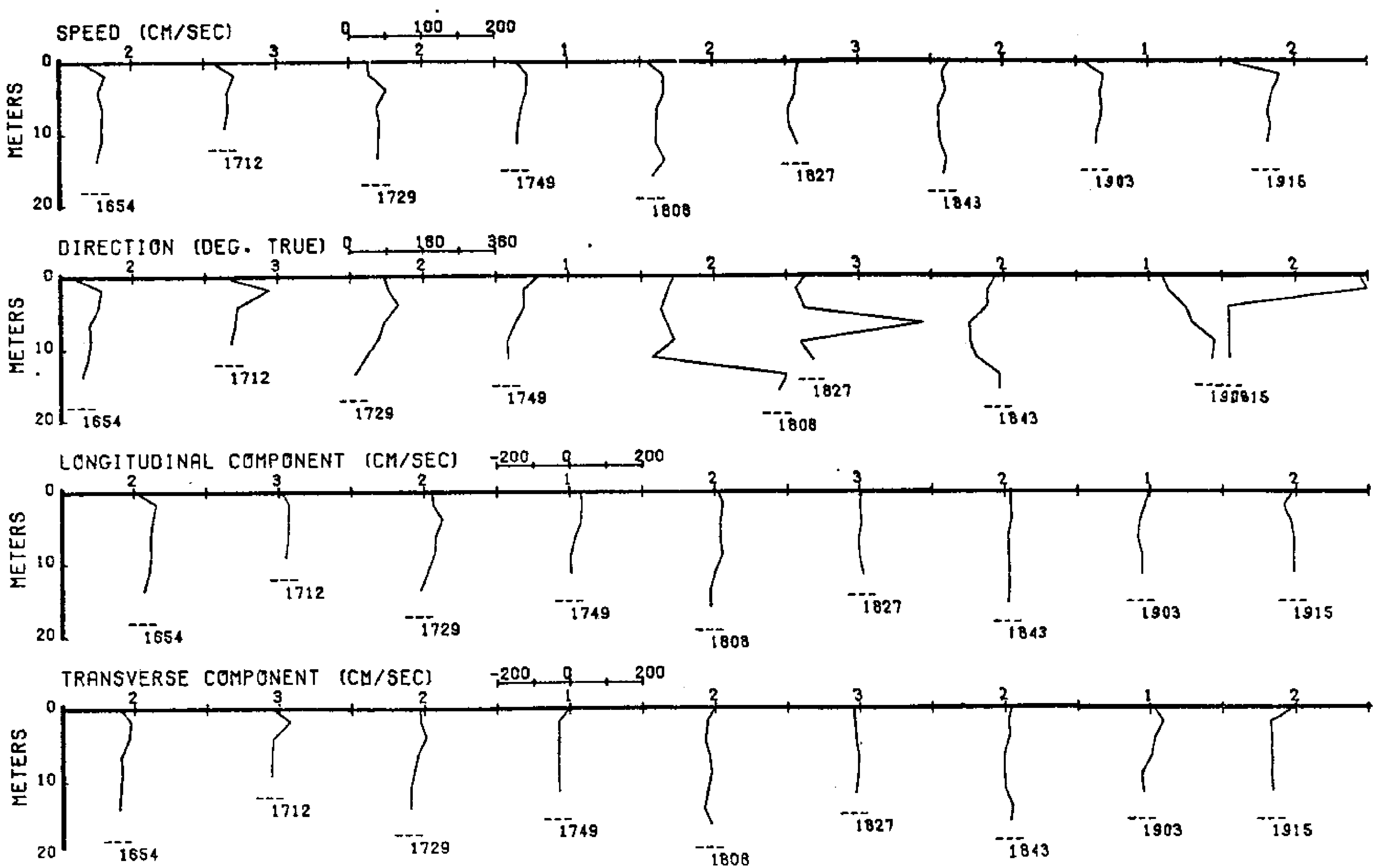

Figure 24 DOVER POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1654 (EDT) to 1915 (EDT).

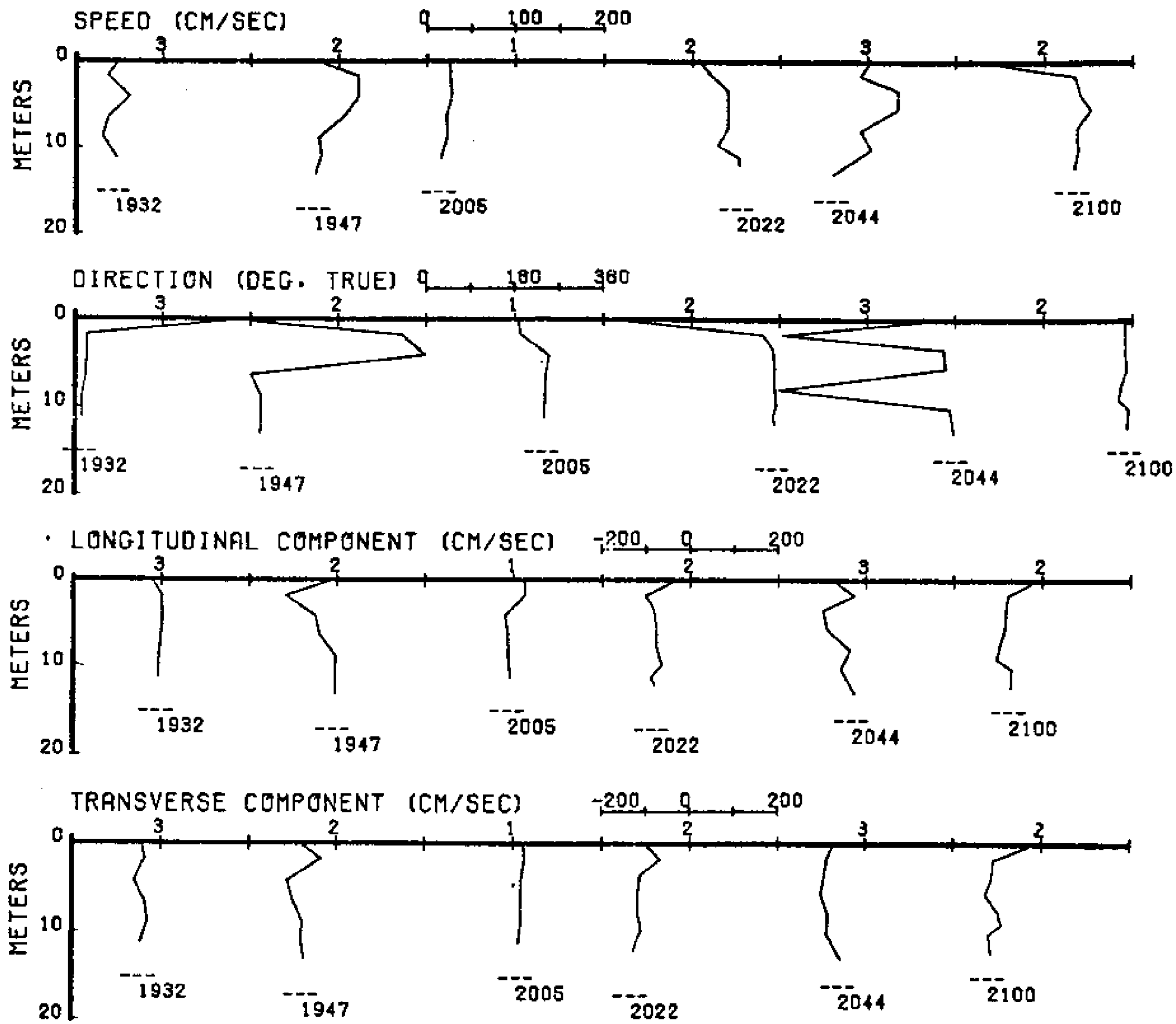

Figure 25 DOVER POINT PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1932 (EDT) to 2100 (EDT).

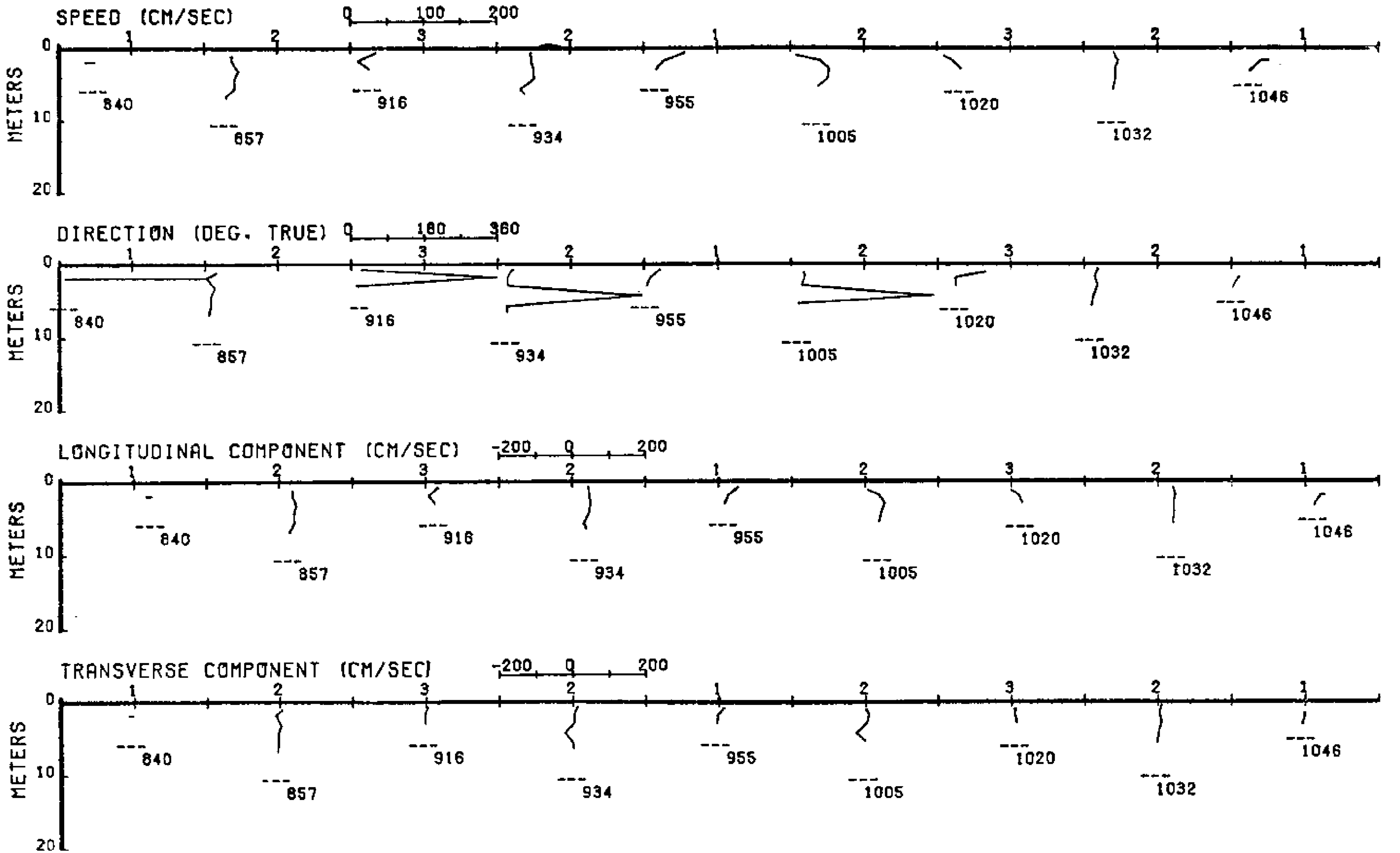

Figure 26 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 0840 (EDT) to 1046 (EDT).

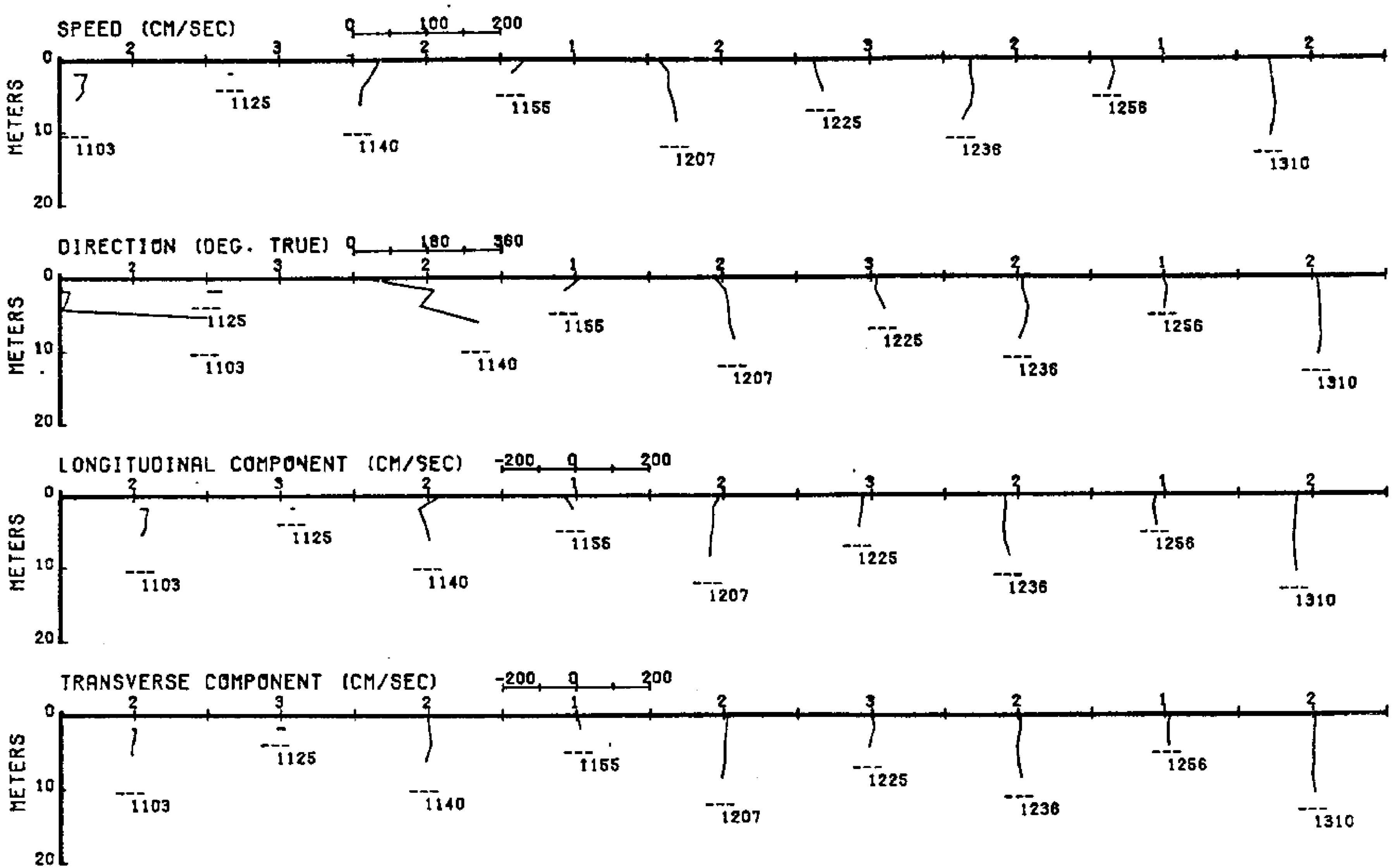

Figure 27 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1103 (EDT) to 1310 (EDT).

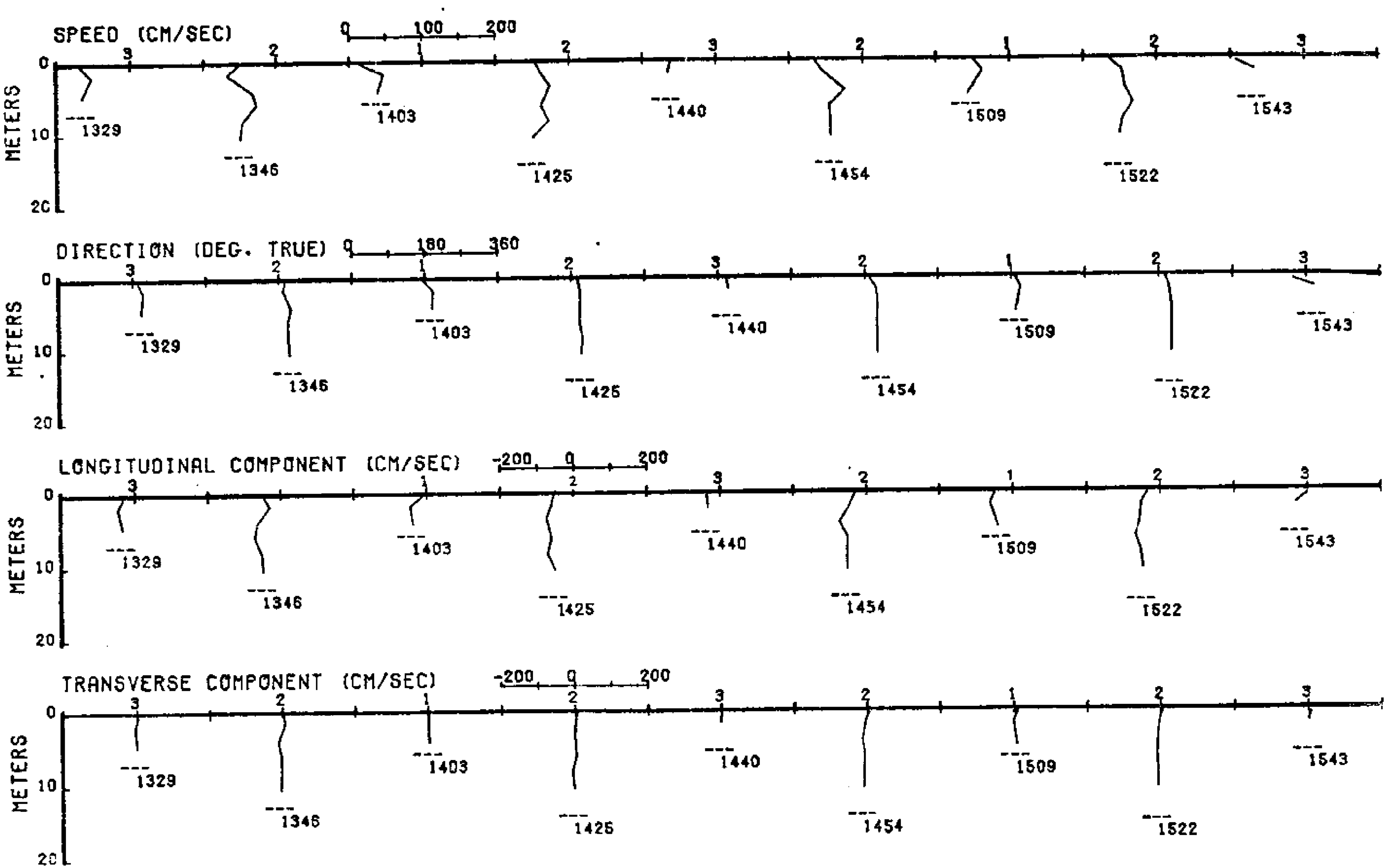

Figure 28 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1329 (EDT) to 1543 (EDT).

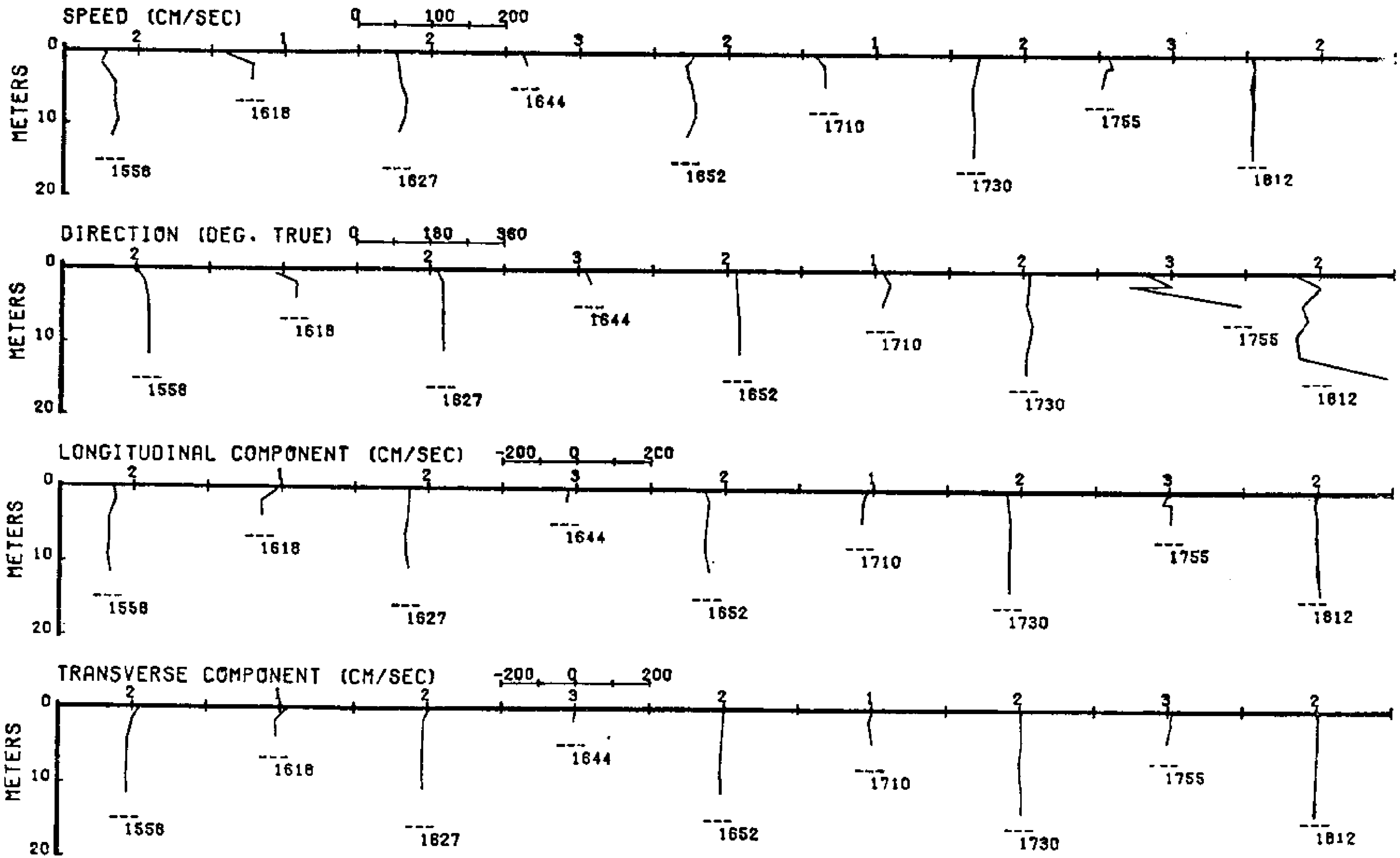

Figure 29 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1558 (EDT) to 1812 (EDT).

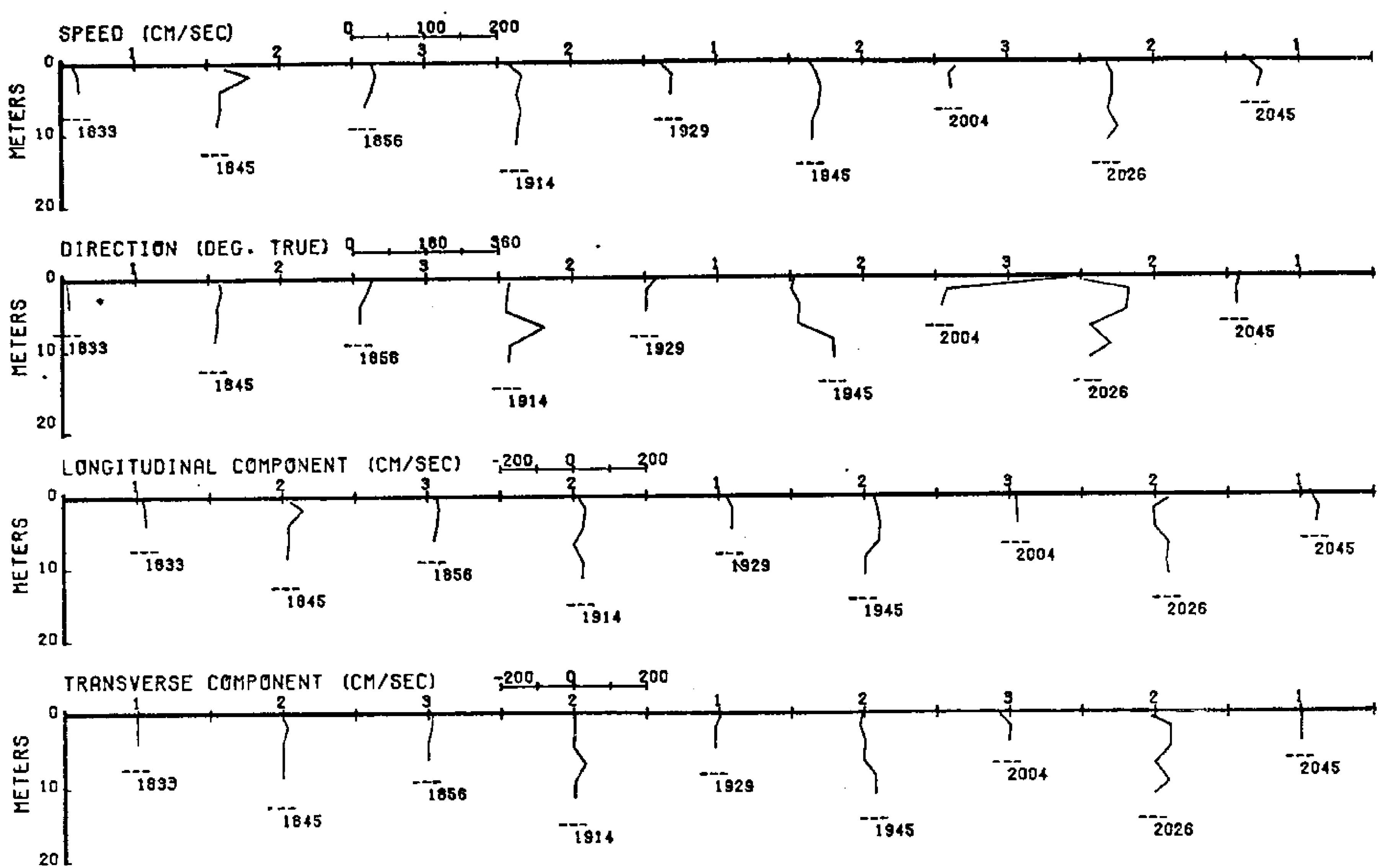

Figure 30 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1833 (EDT) to 2045 (EDT).

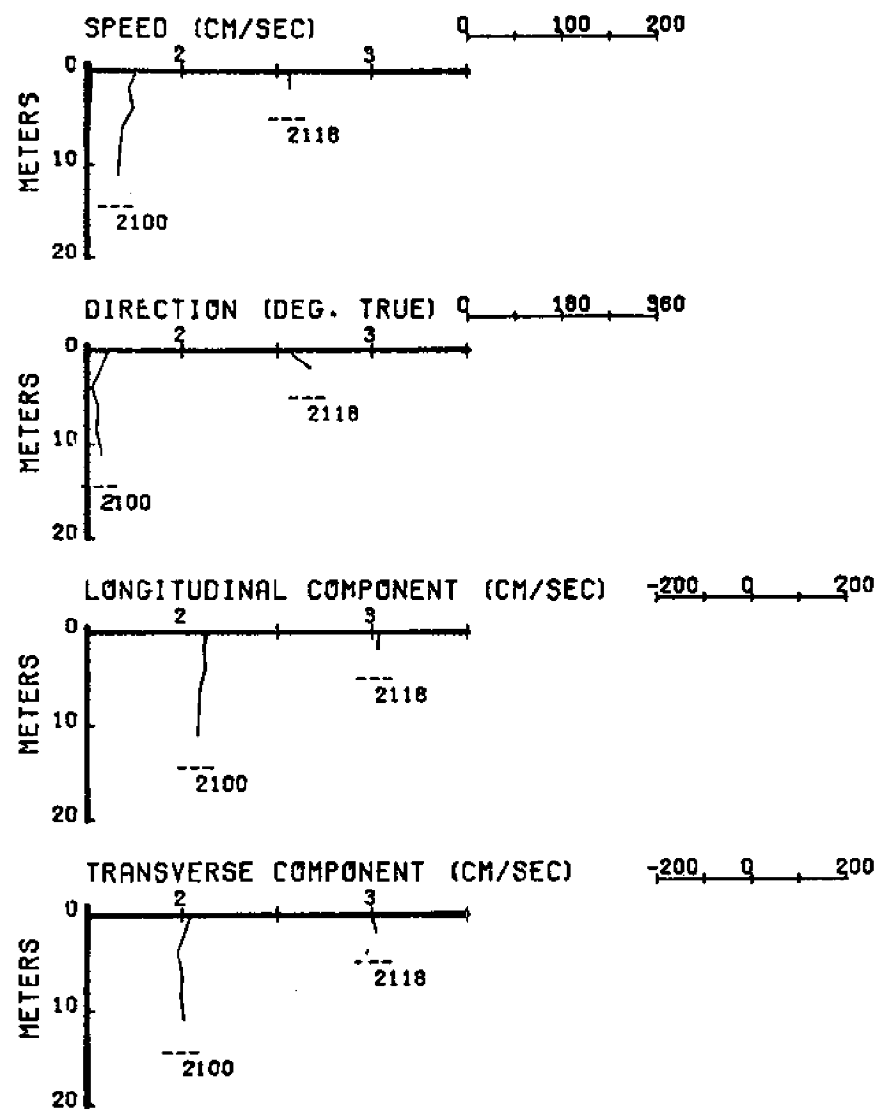

Figure 31 GREAT BAY PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 2100 (EDT) to 2118 (EDT).

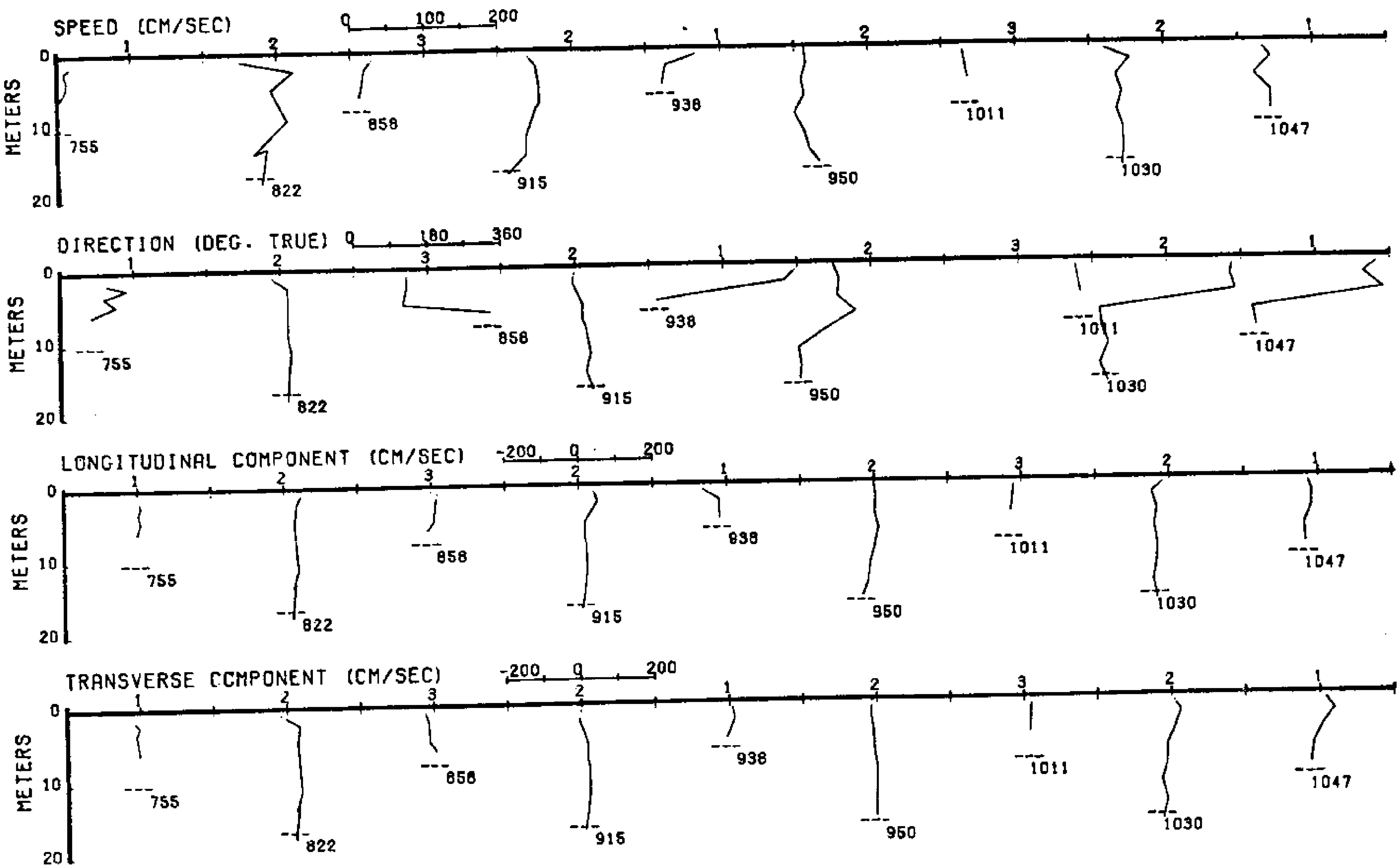

Figure 32 PORTSMOUTH PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 0755 (EDT) to 1047 (EDT).

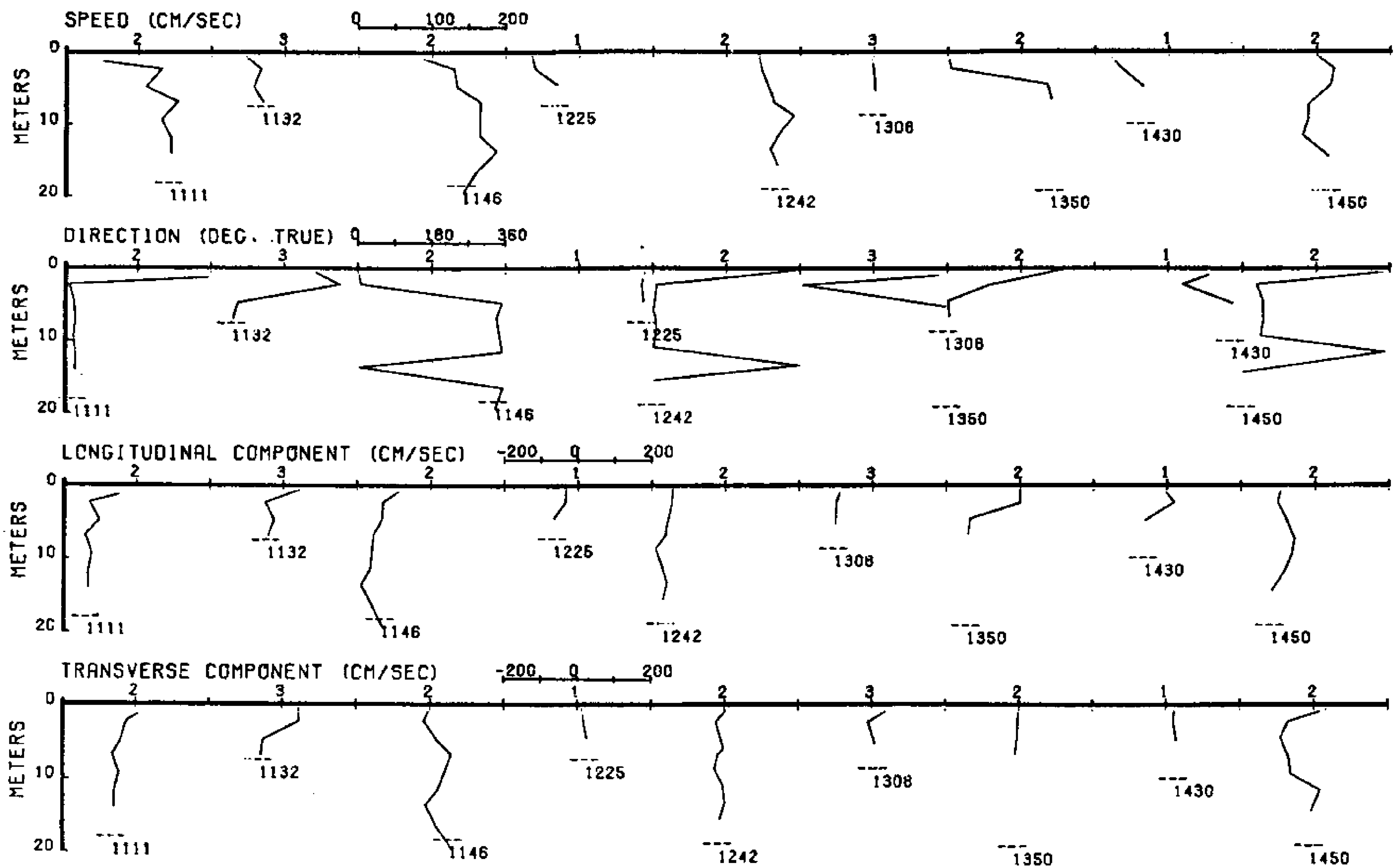

Figure 33 PORTSMOUTH PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1111 (EDT) to 1450 (EDT).

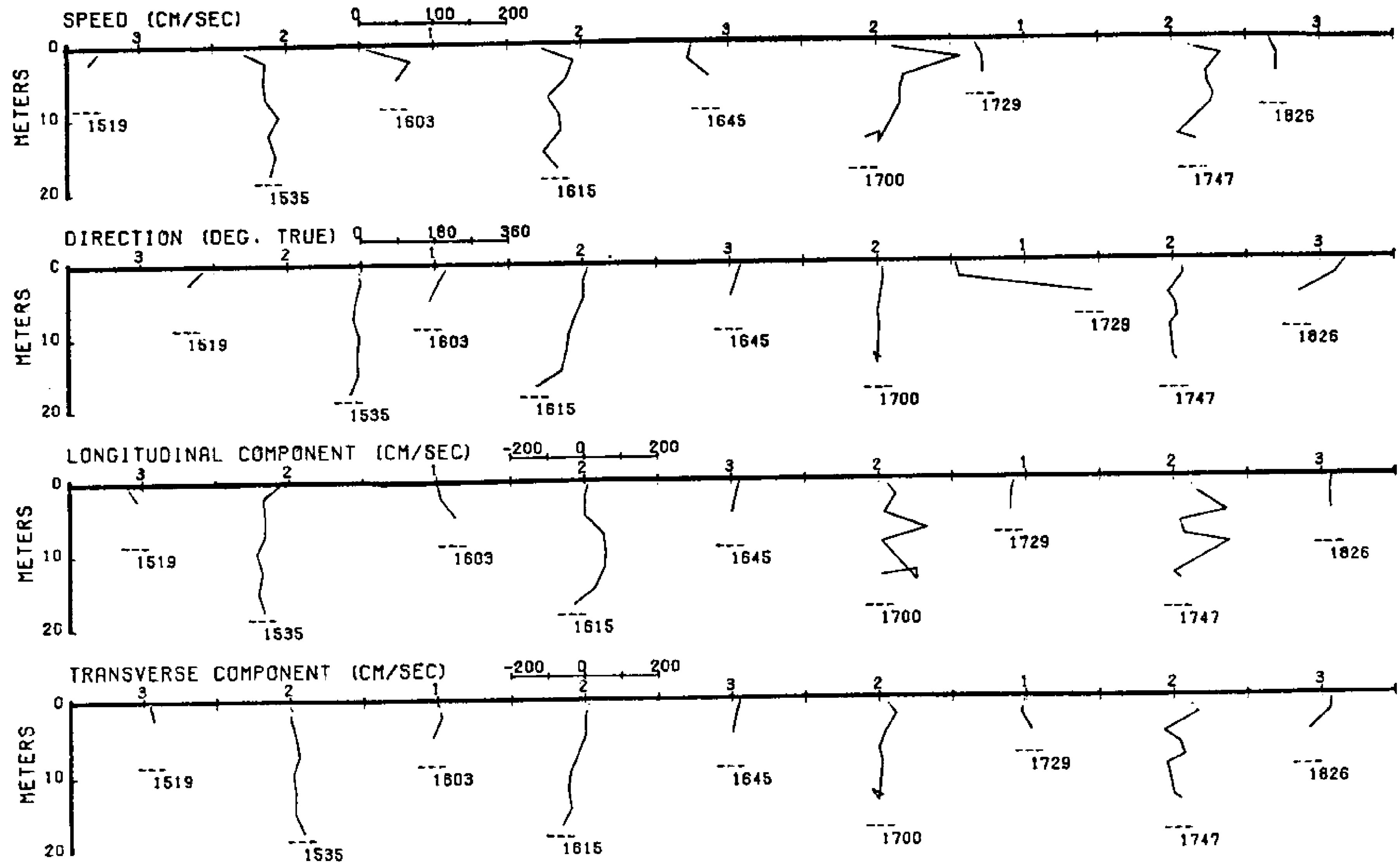

Figure 34 PORTSMOUTH PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1519 (EDT) to 1820 (EDT).

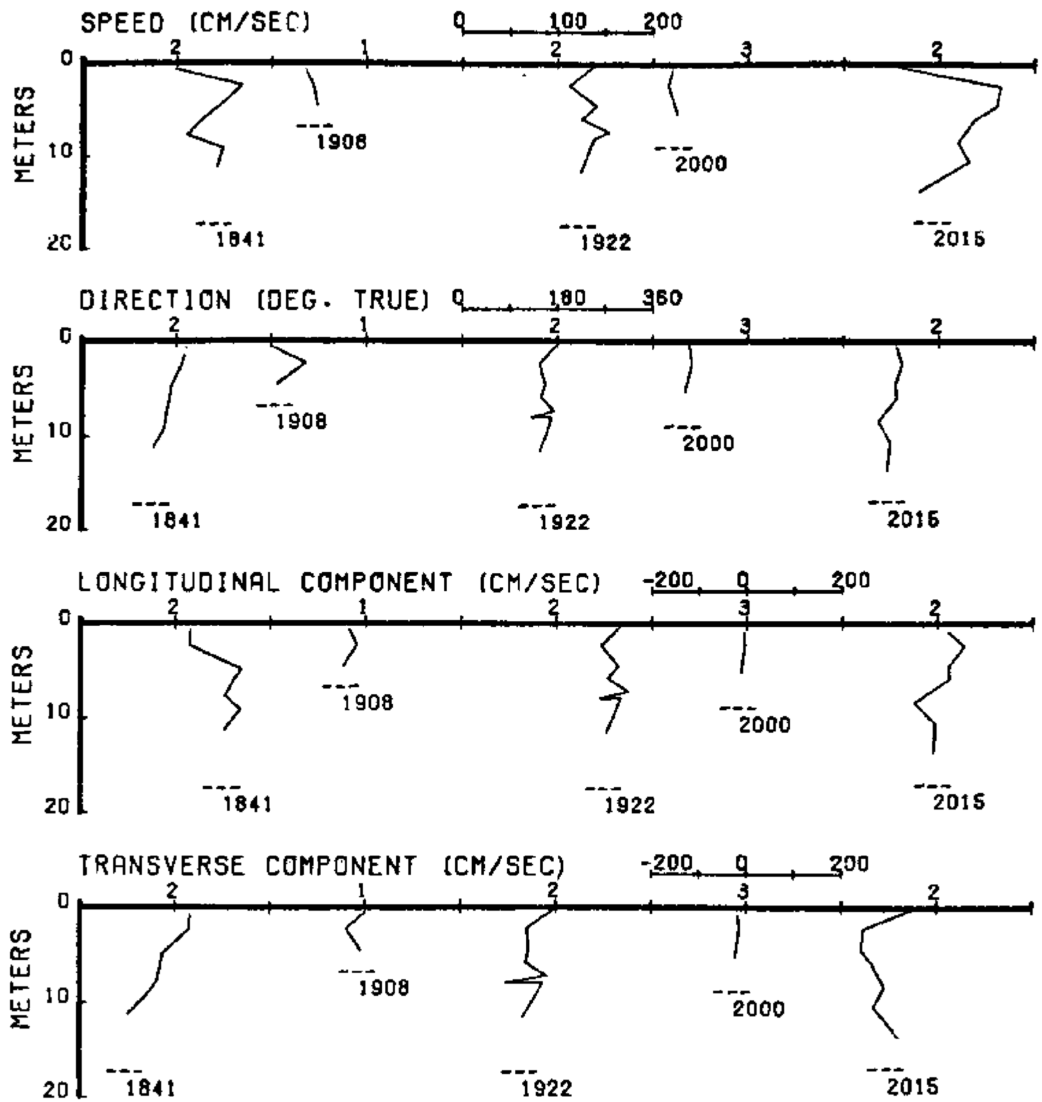

Figure 35 PORTSMOUTH PROFILE DATA showing speed (cm/sec), direction, longitude and transverse velocity components (cm/sec) from 1841 (EDT) to 2015 (EDT).

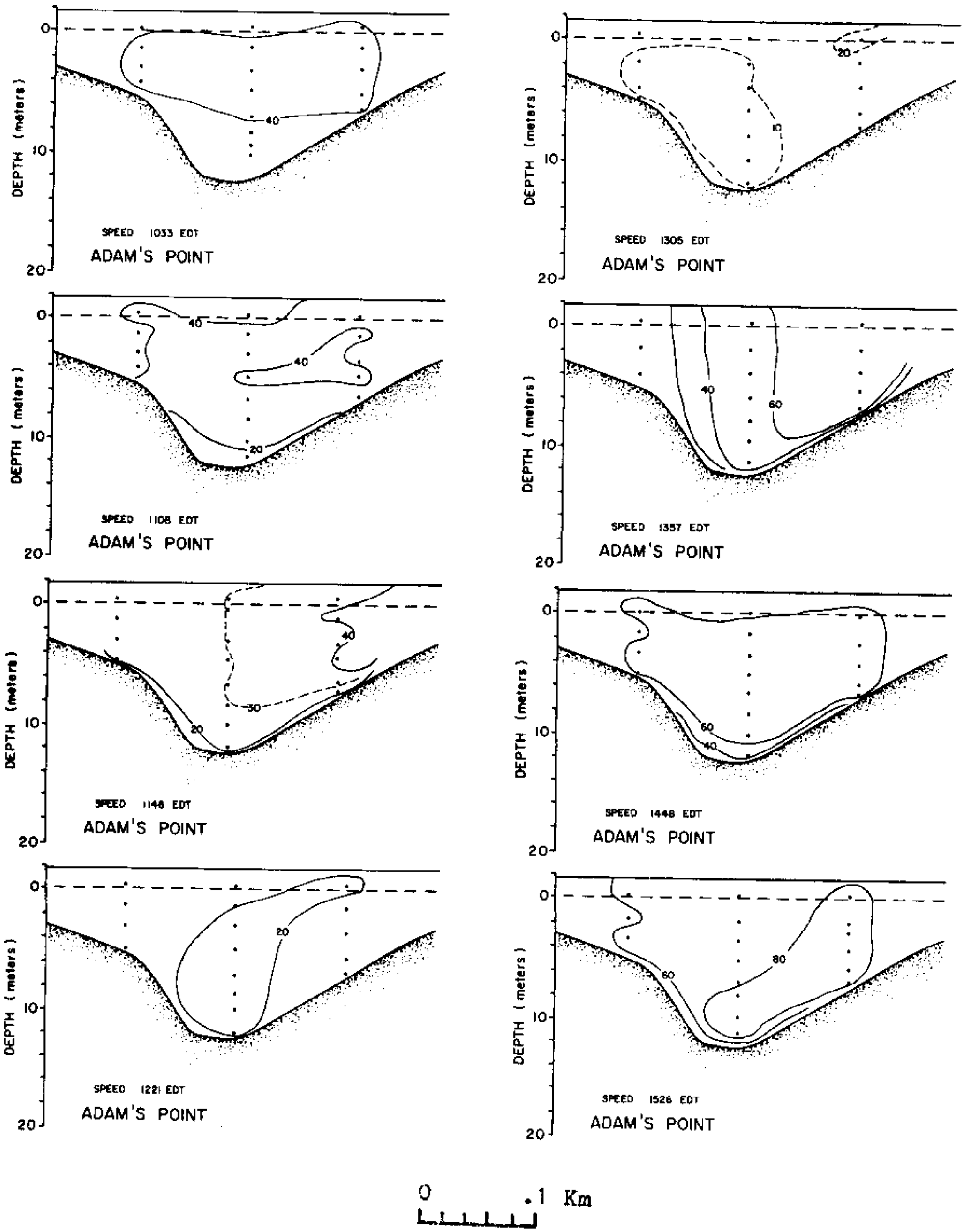

Figure 36 ADAMS POINT CONTOUR PLOT showing speed (cm/sec) from 1033 (EDT) to 1526 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

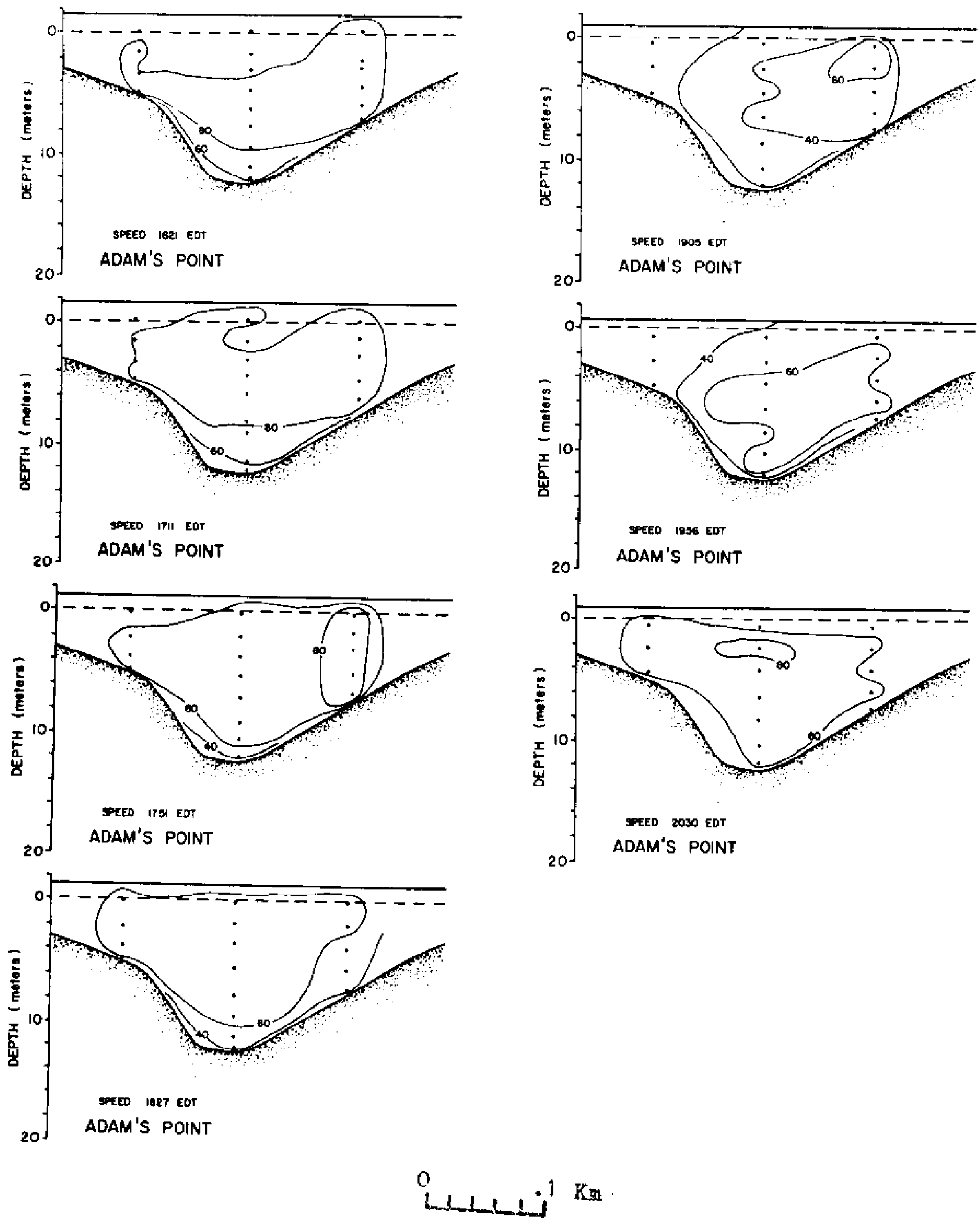

Figure 37 ADAMS POINT CONTOUR PLOT showing speed (cm/sec) from 1621 (EDT) to 2030 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

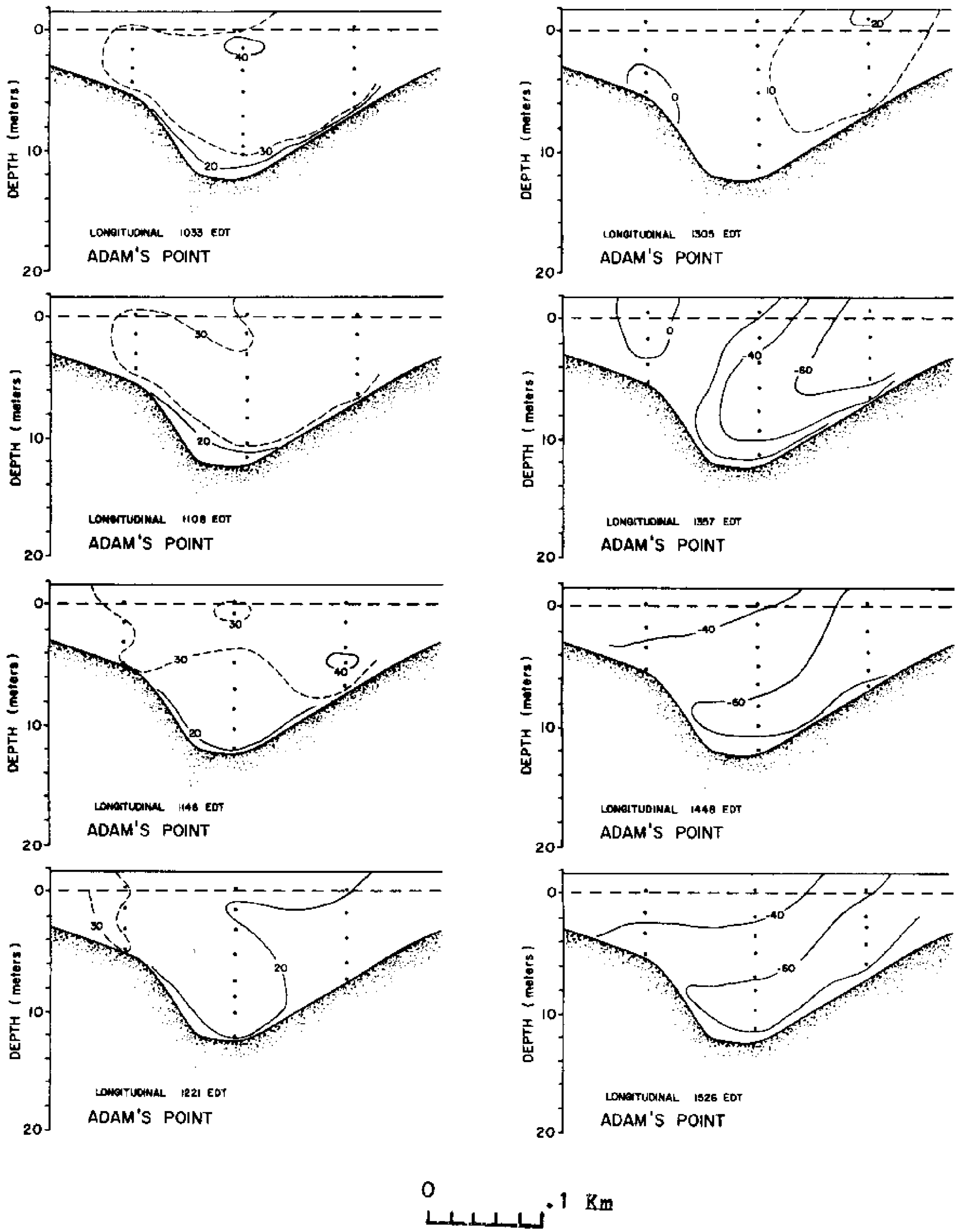

Figure 38 ADAMS POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1033 (EDT) to 1526 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

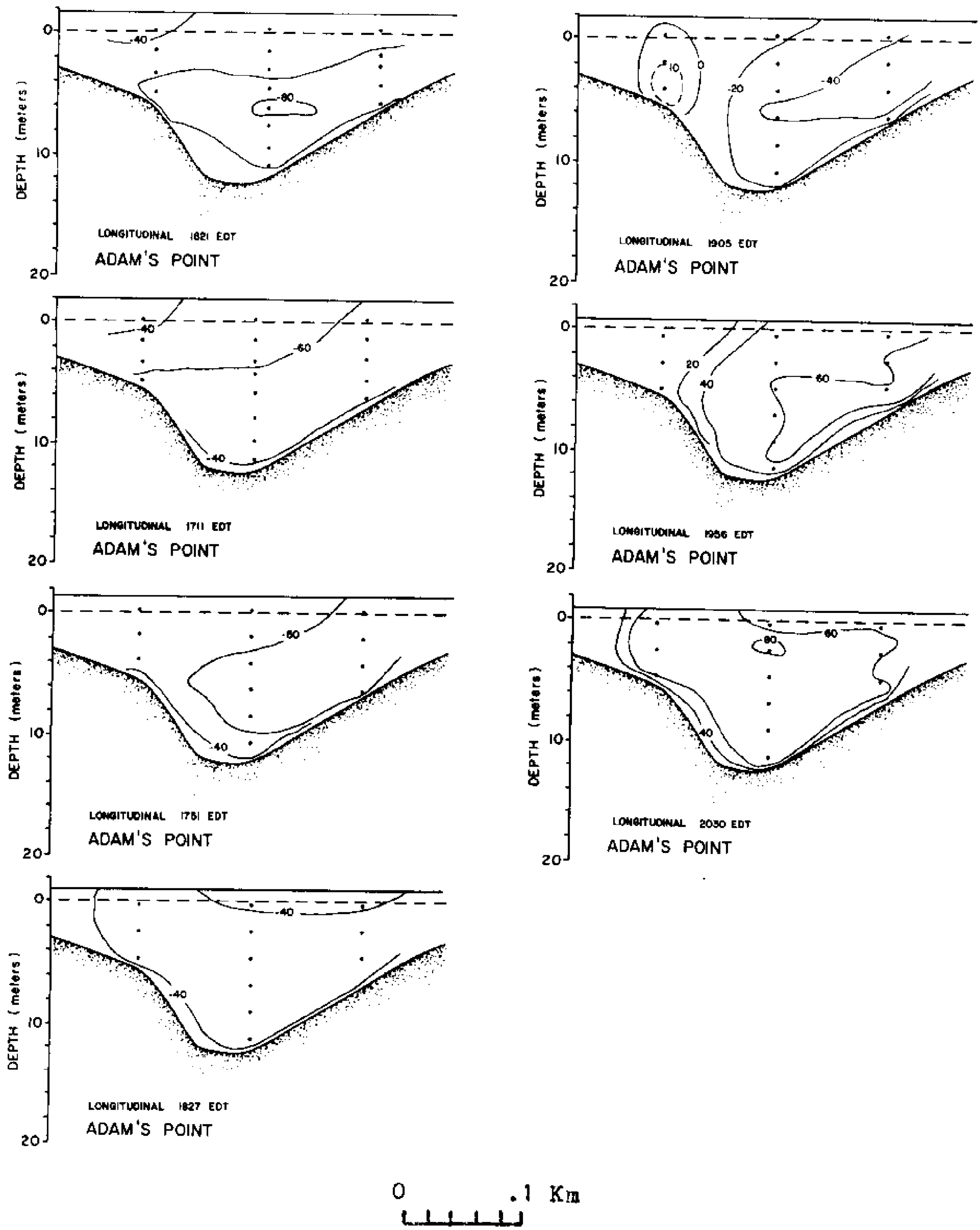

Figure 39 ADAMS POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1621 (EDT) to 2030 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

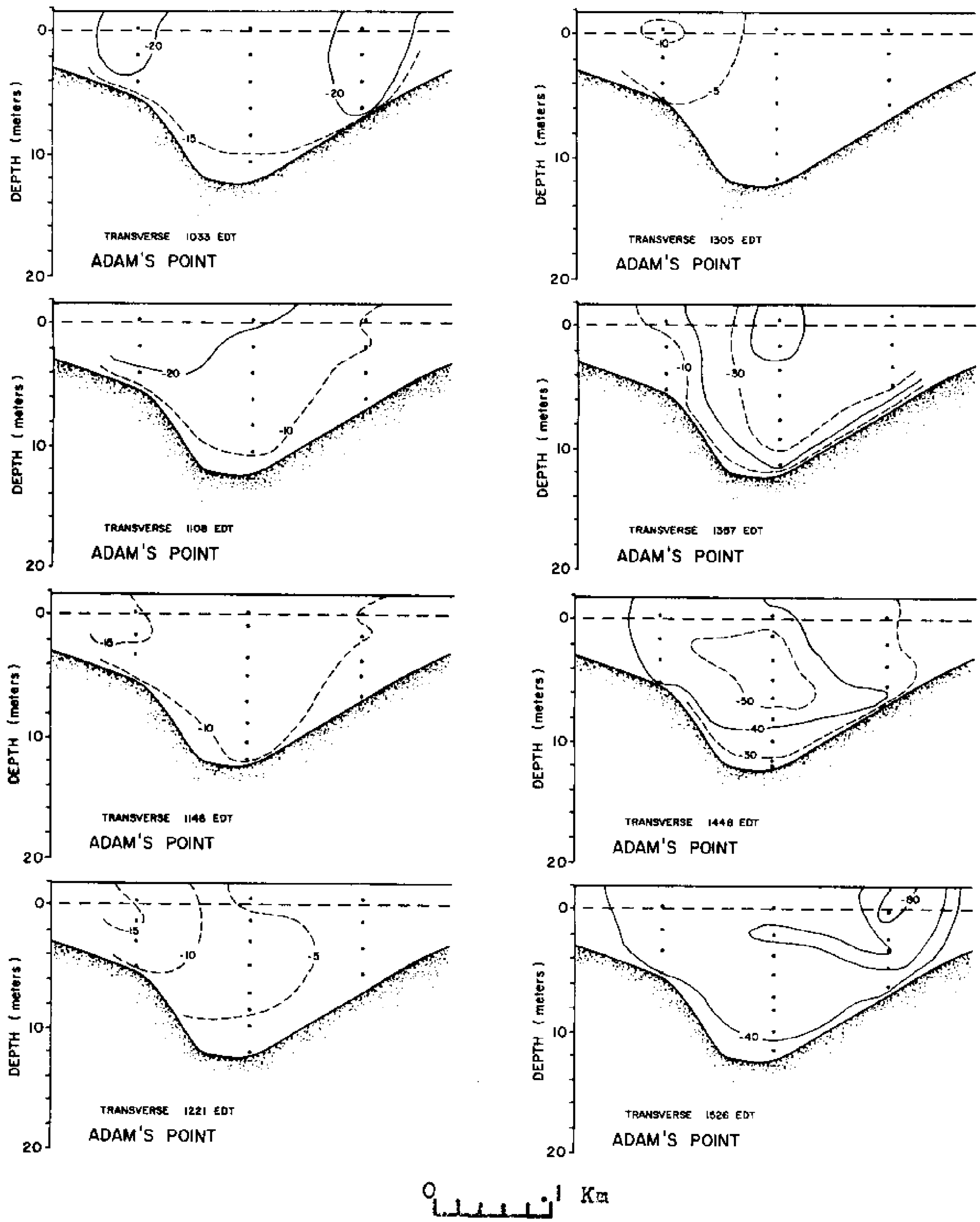

Figure 40 ADAMS POINT CONTOUR PLOT showing transverse component (cm/sec) from 1033 (EDT) to 1526 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

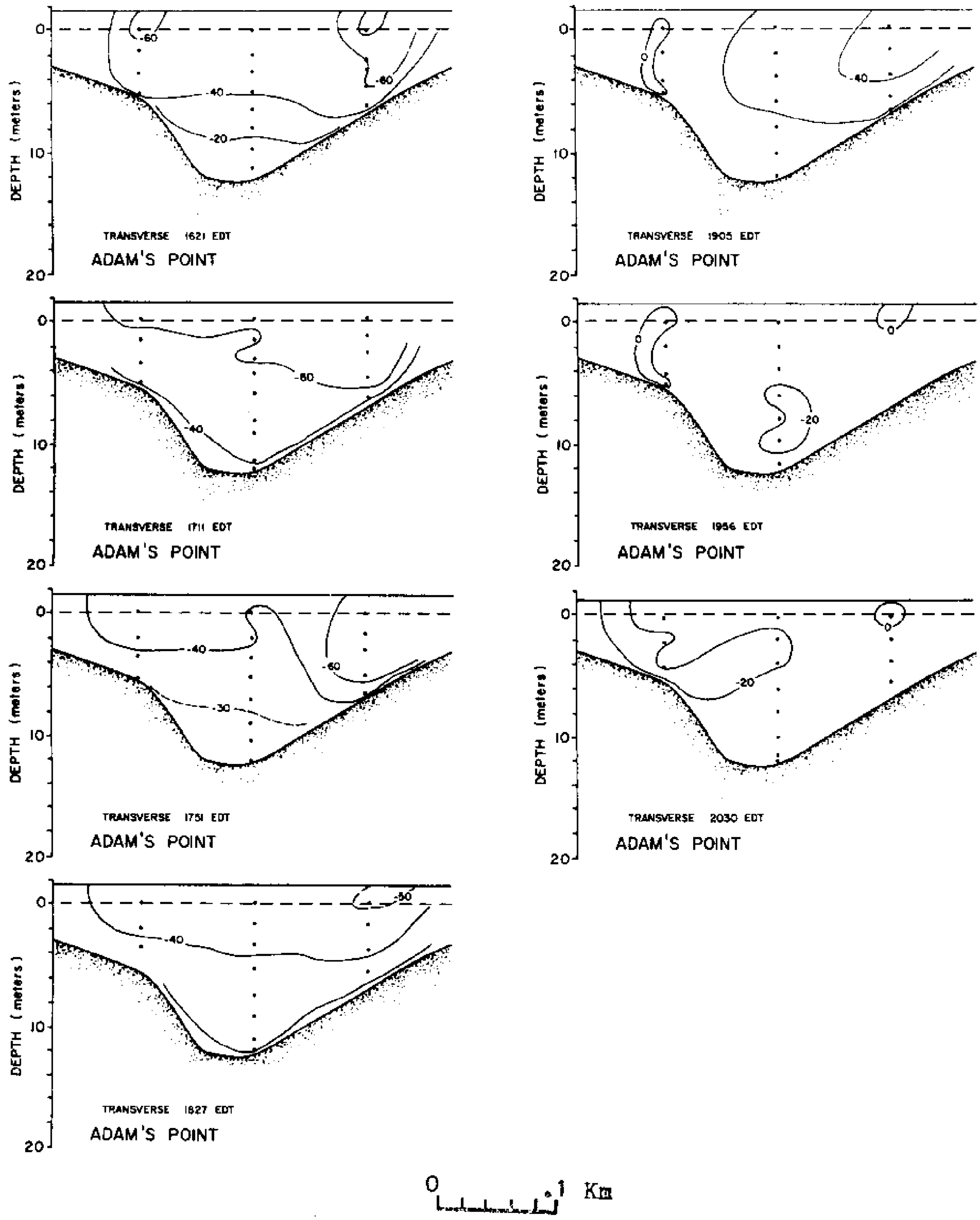

Figure 41 ADAMS POINT CONTOUR PLOT showing transverse component (cm/sec) from 1621 (EDT) to 2030 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

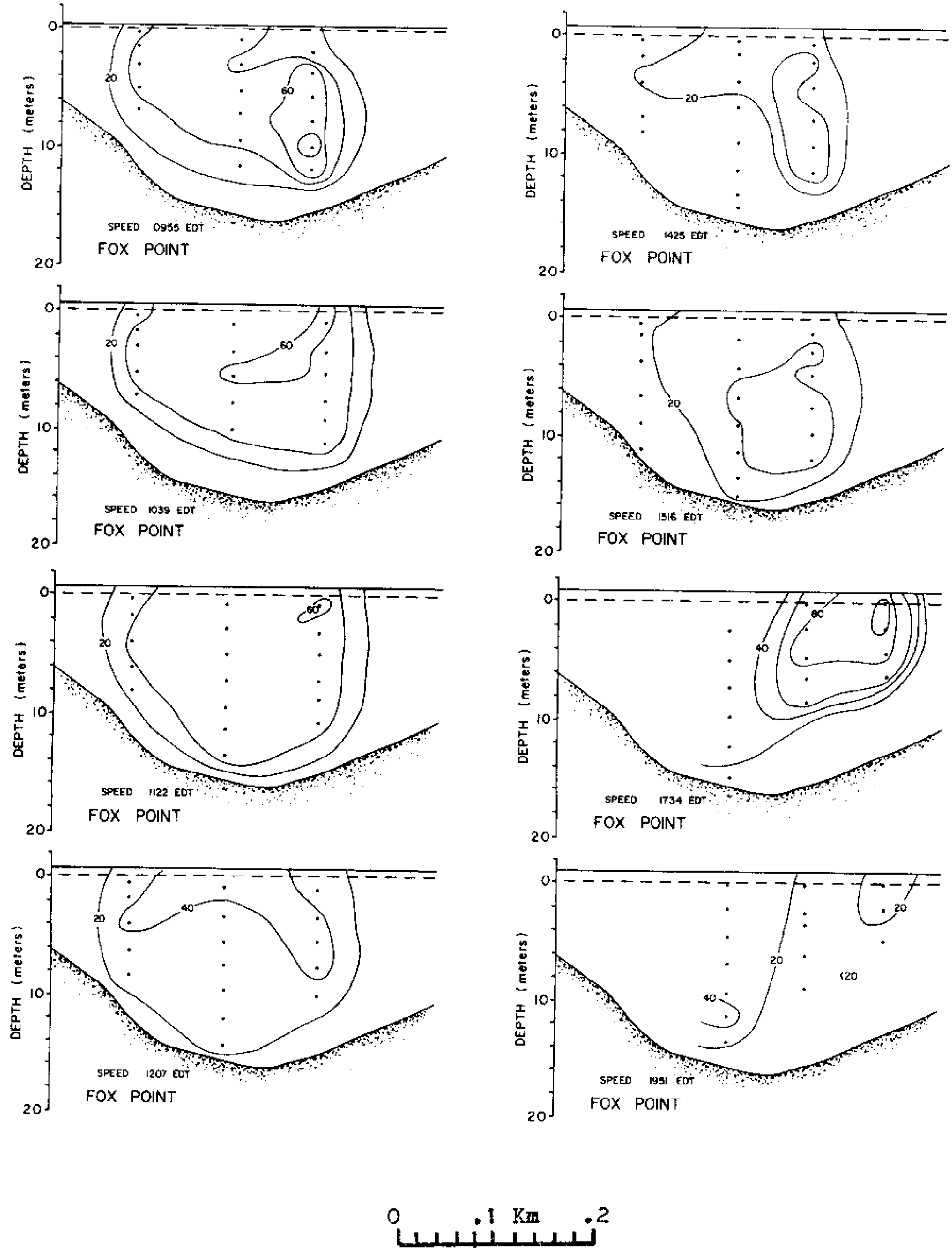

Figure 42 FOX POINT CONTOUR PLOT showing speed (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

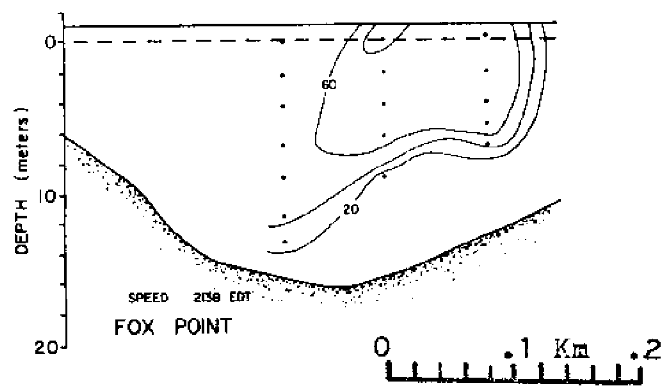

Figure 43 FOX POINT CONTOUR PLOT showing speed (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

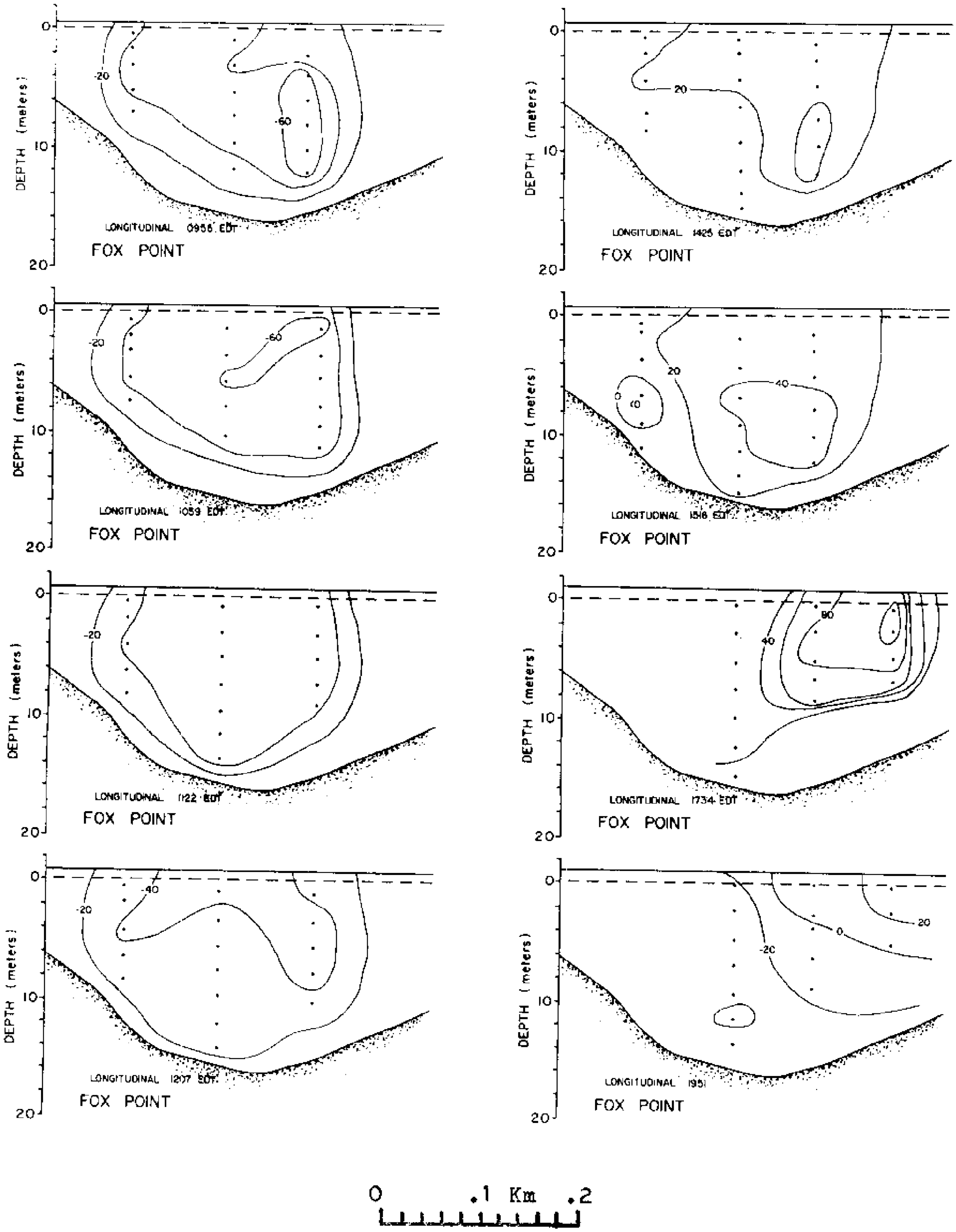

Figure 44 FOX POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

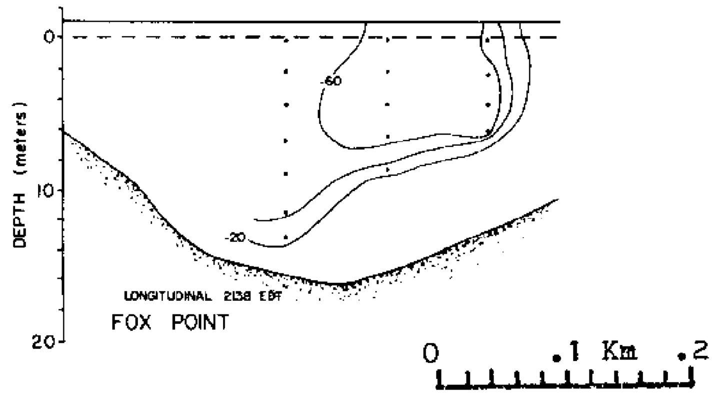

Figure 45 FOX POINT CONTOUR PLOT showing longitudinal component (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

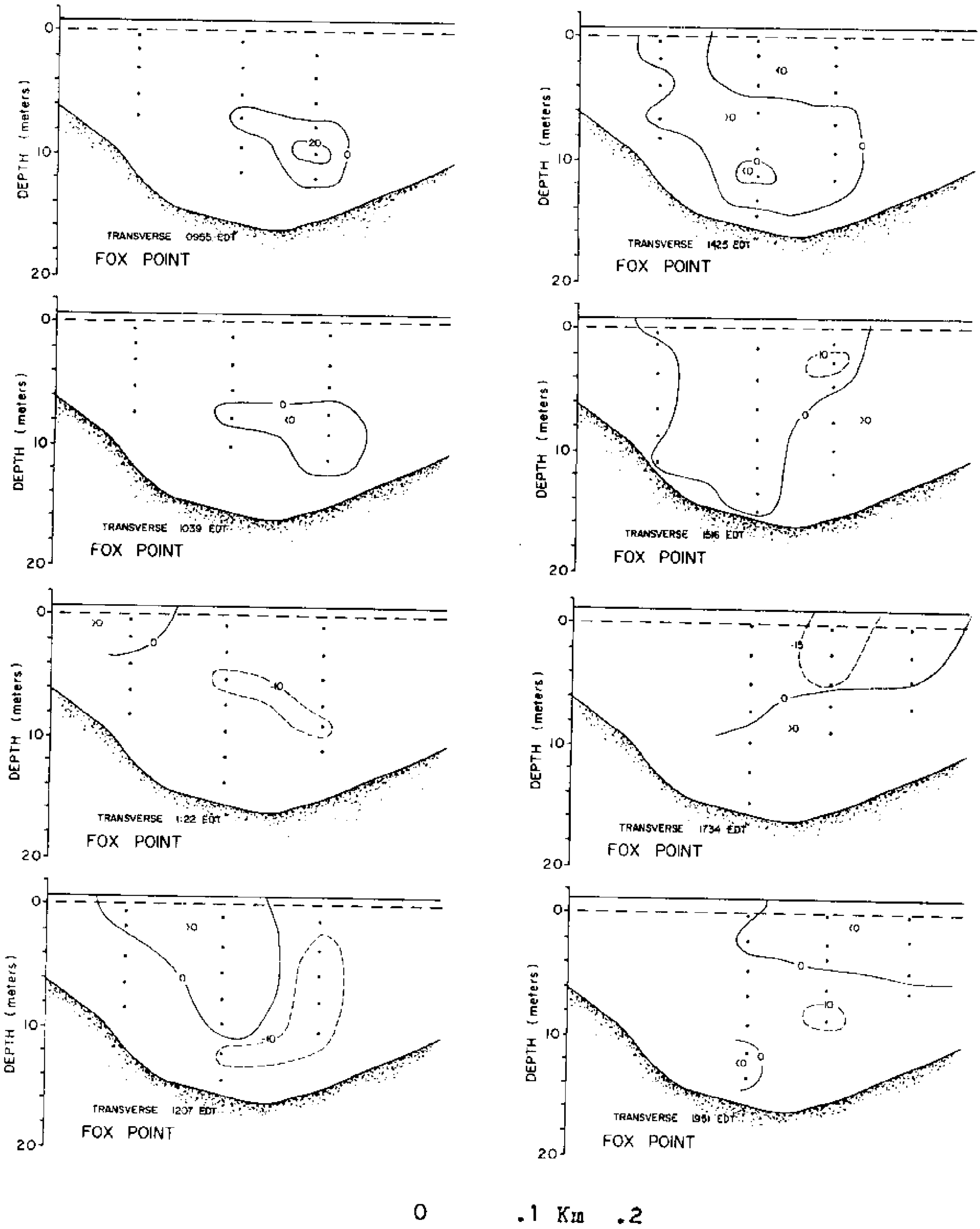

Figure 46 FOX POINT CONTOUR PLOT showing transverse component (cm/sec) from 0955 (EDT) to 1951 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

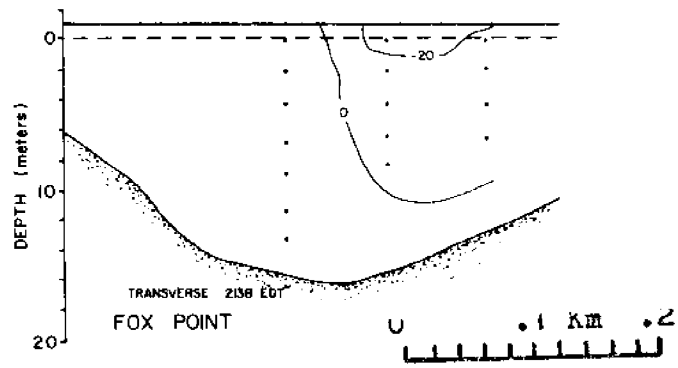

Figure 47 FOX POINT CONTOUR PLOT showing transverse component (cm/sec) at 2138 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

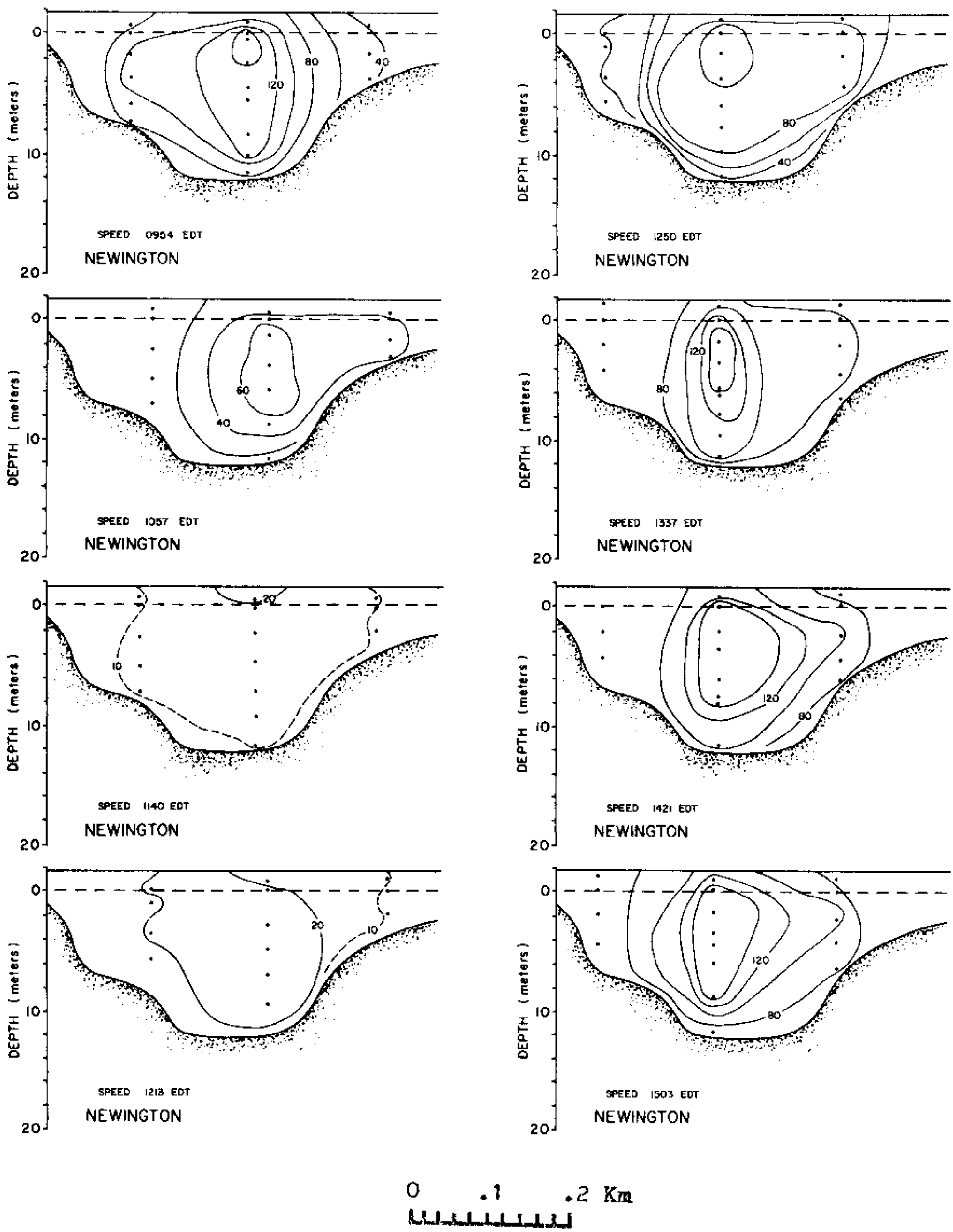

Figure 48 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

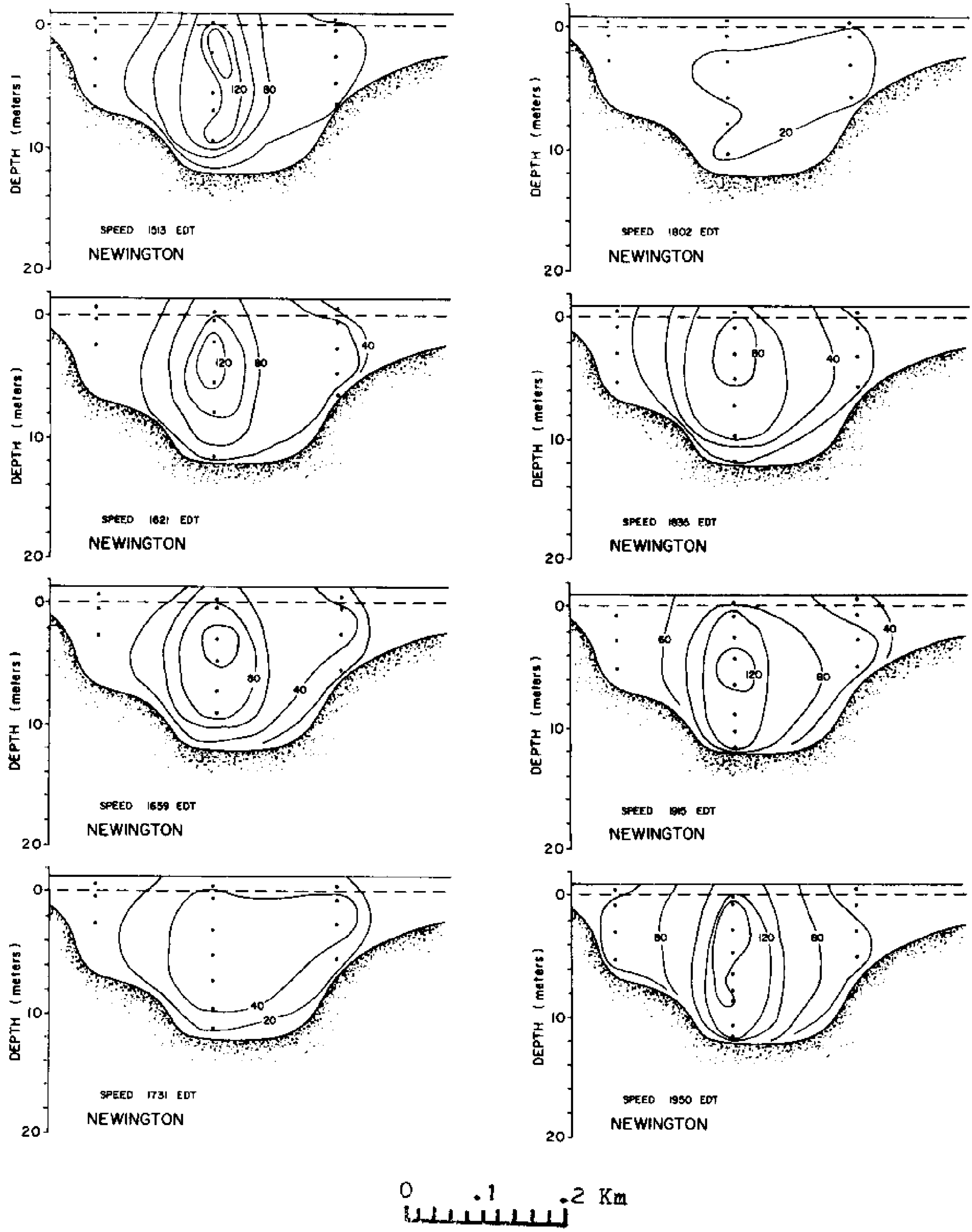

Figure 49 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

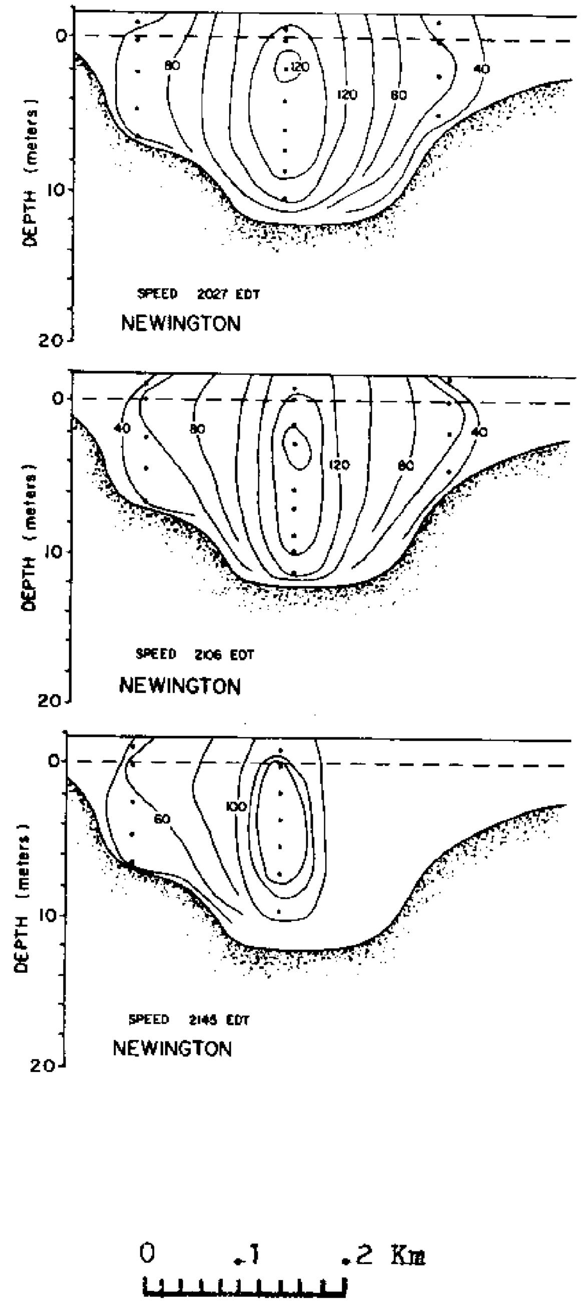

Figure 50 NEWINGTON CONTOUR PLOT showing speed (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

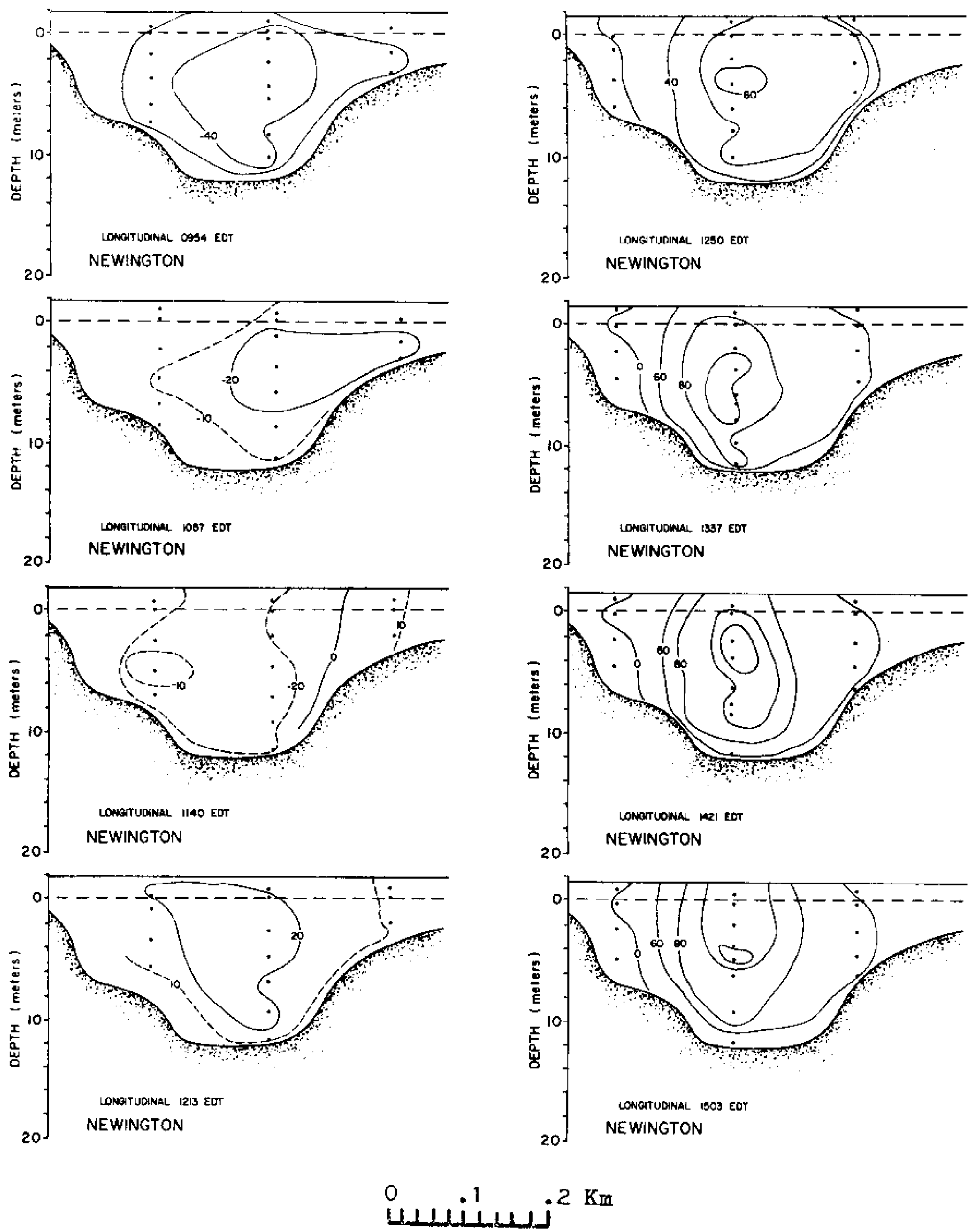

Figure 51 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

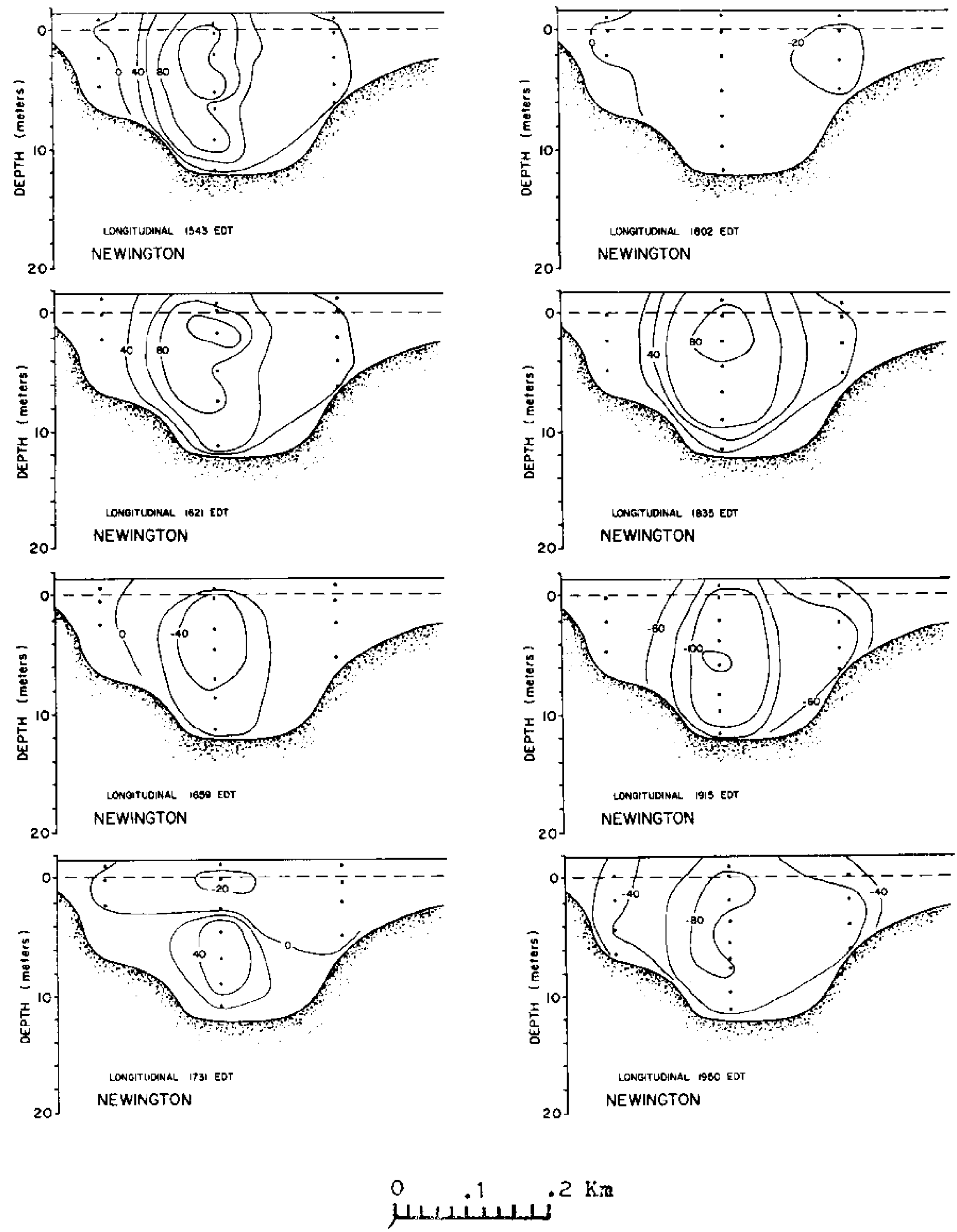

Figure 52 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

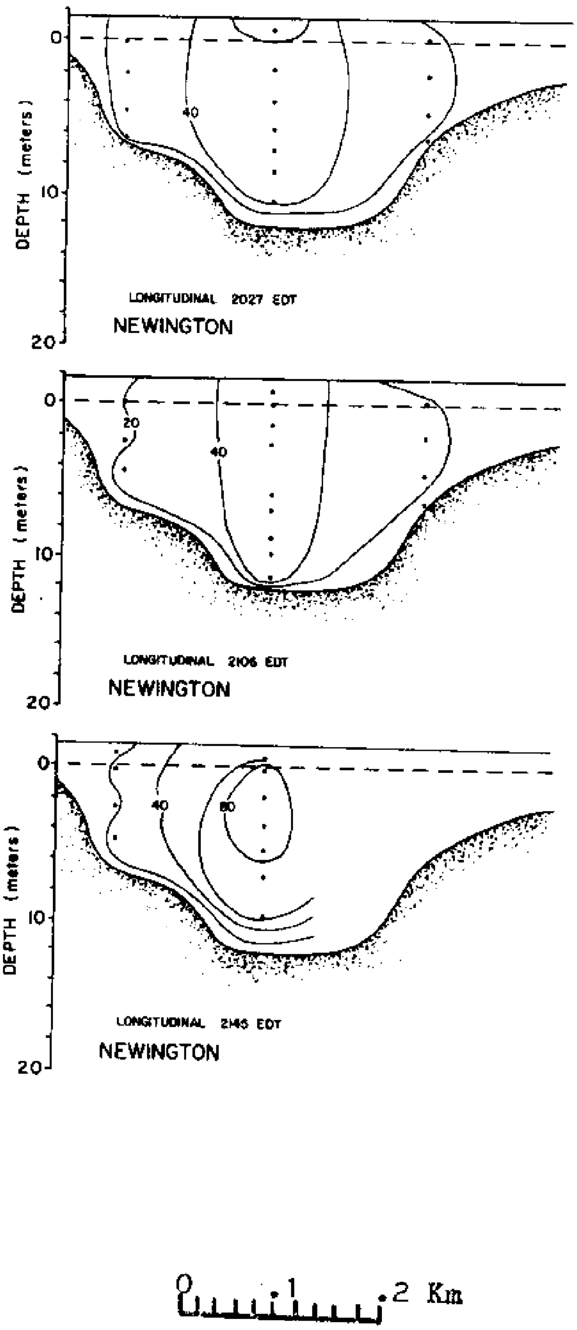

Figure 53 NEWINGTON CONTOUR PLOT showing longitudinal component (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

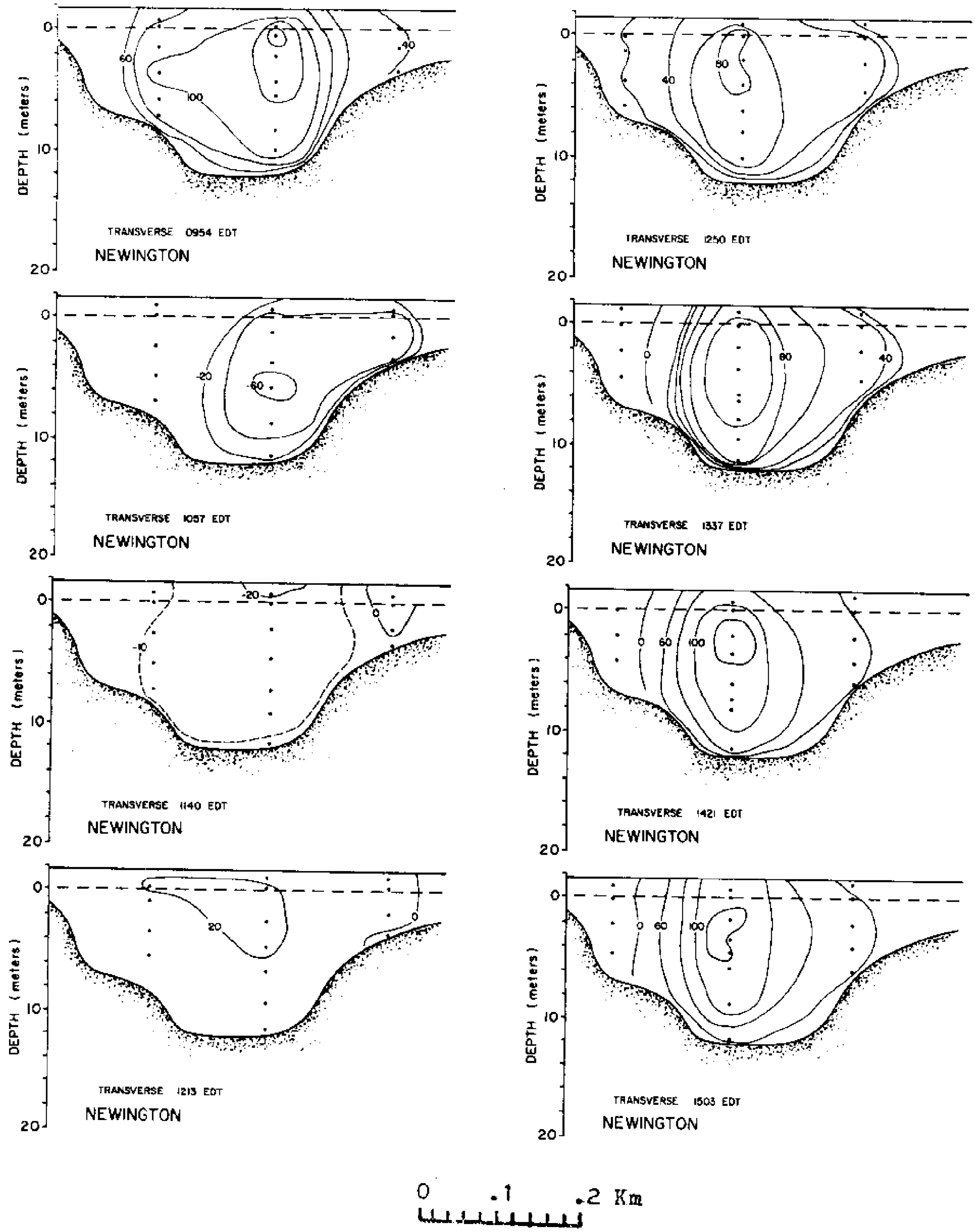

Figure 54 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 0954 (EDT) to 1503 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

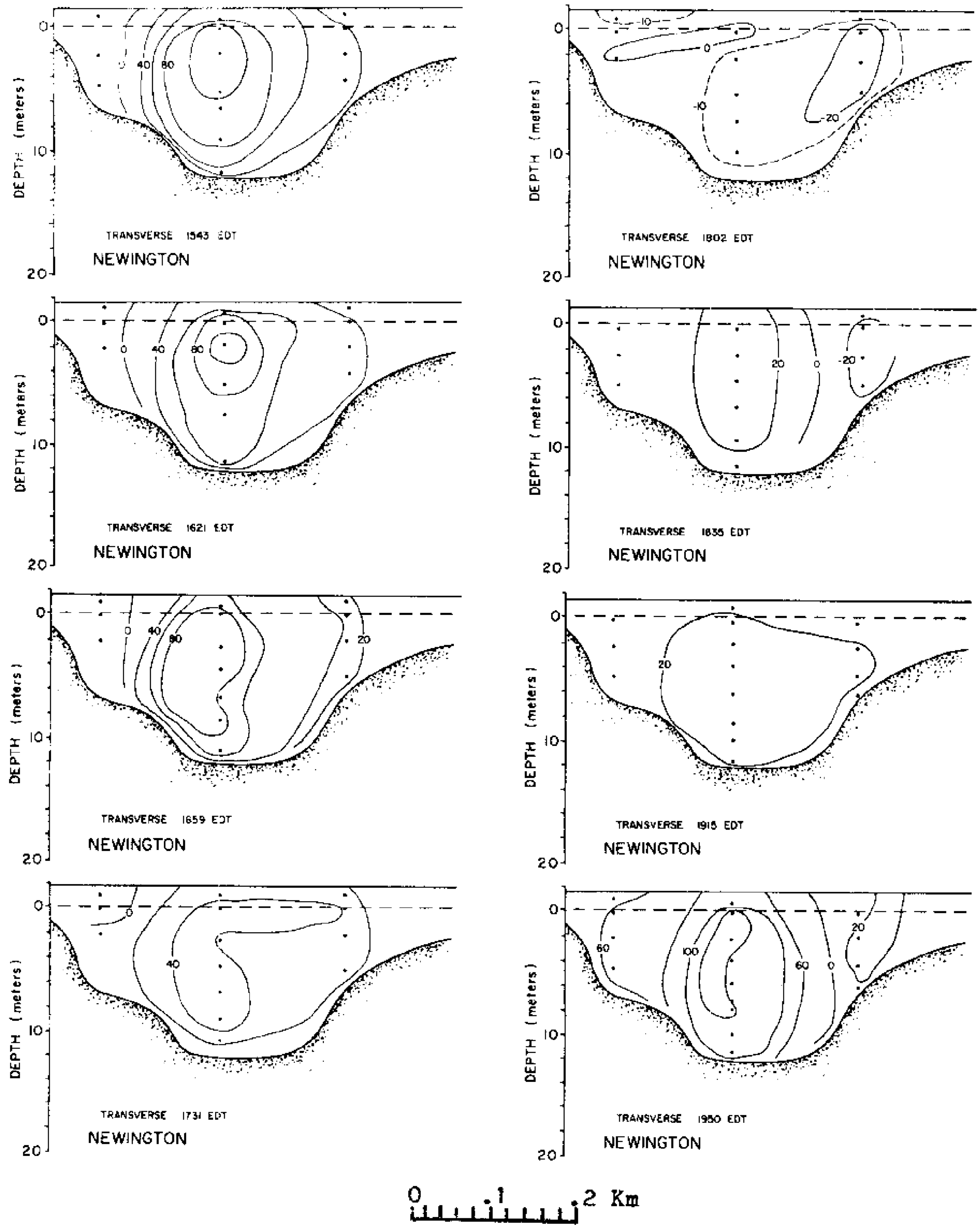

Figure 55 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 1513 (EDT) to 1950 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

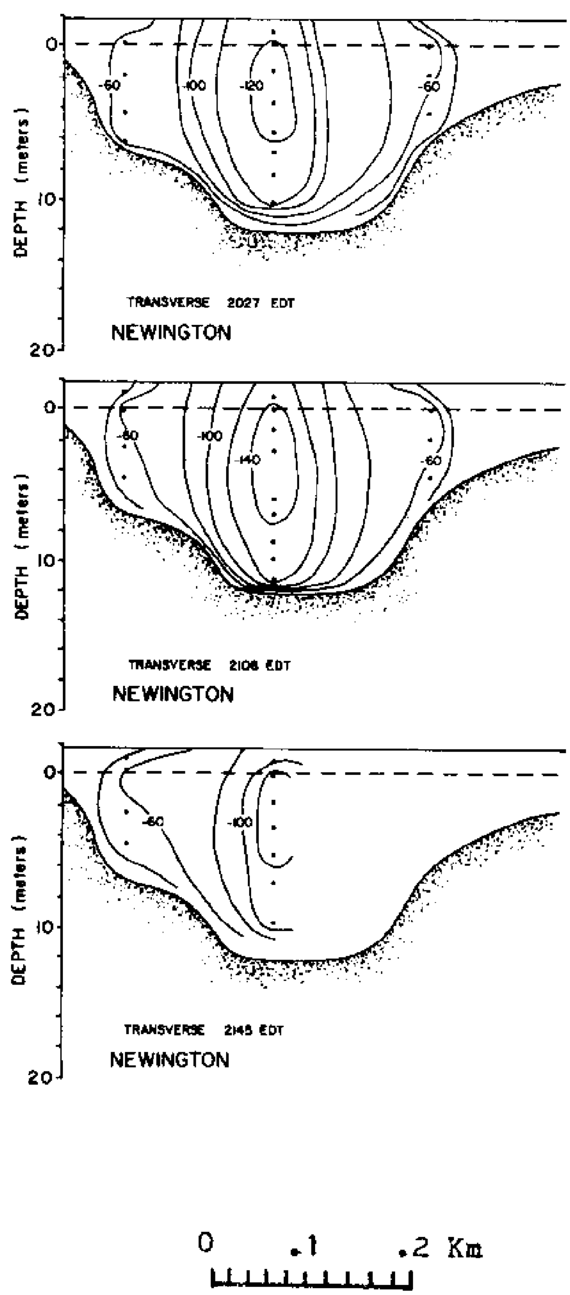

Figure 56 NEWINGTON CONTOUR PLOT showing transverse component (cm/sec) from 2027 (EDT) to 2145 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

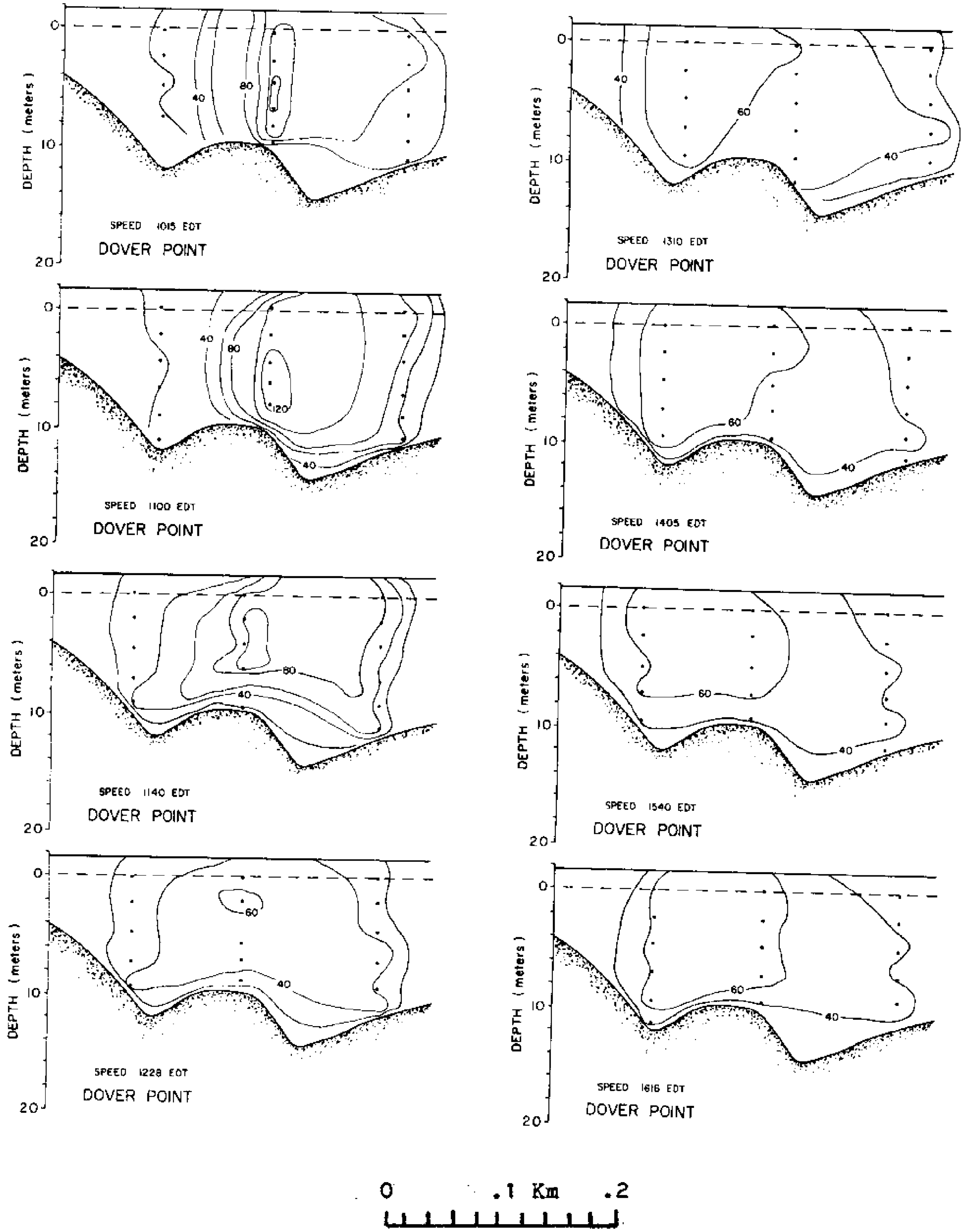

Figure 57 DOVER POINT CONTOUR PLOT showing speed (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

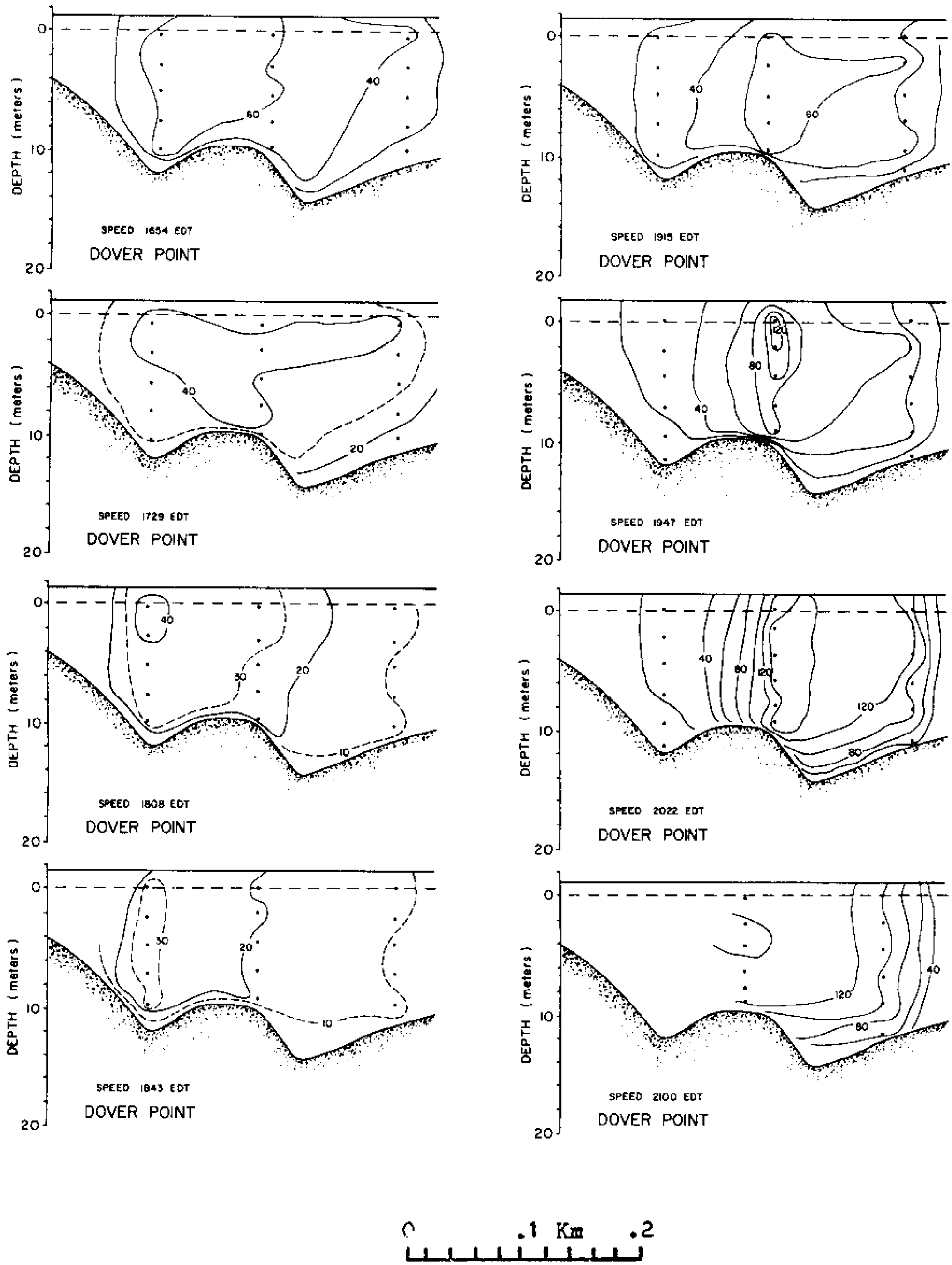

Figure 58 DOVER POINT CONTOUR PLOT showing speed (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

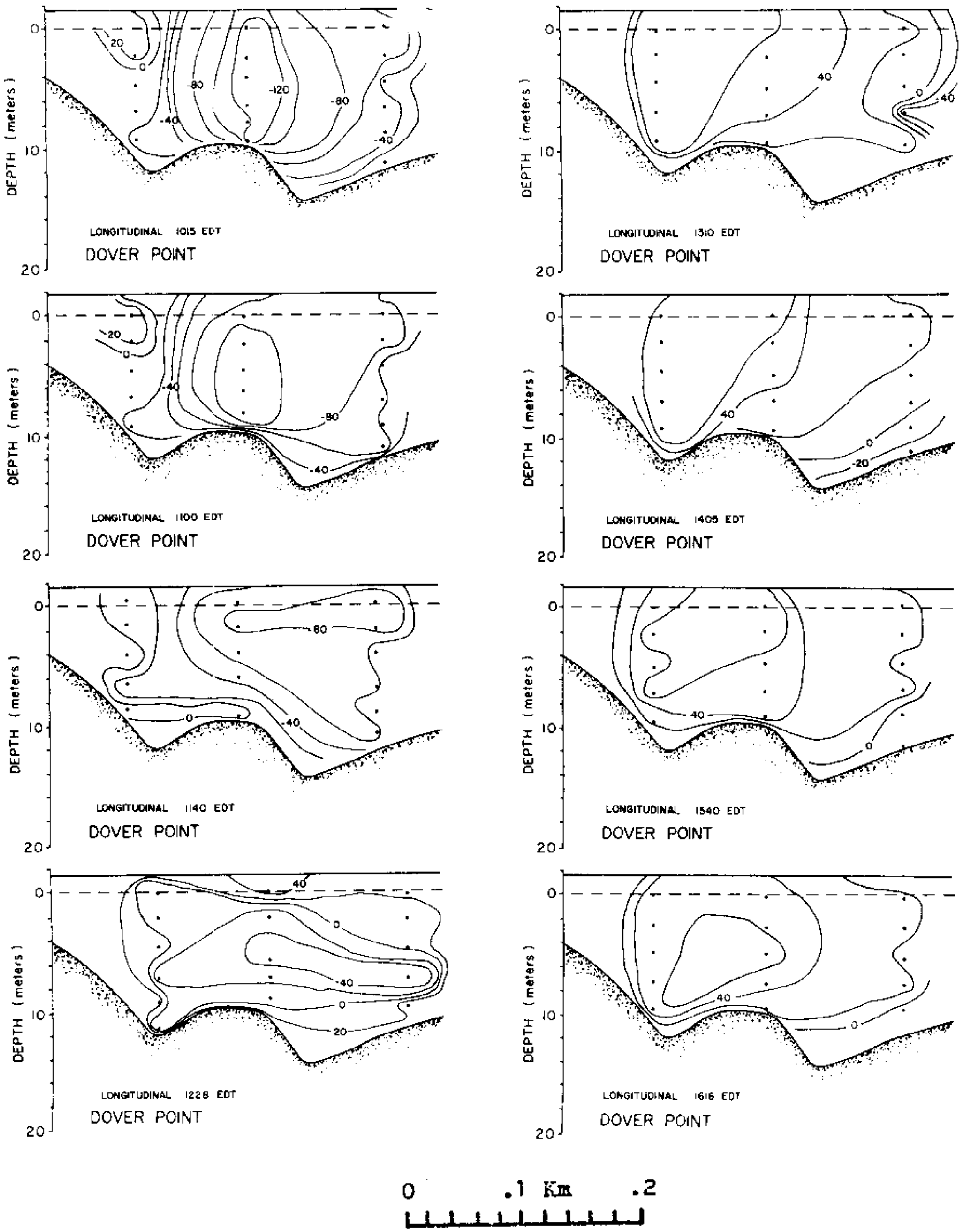

Figure 59 DOVER POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

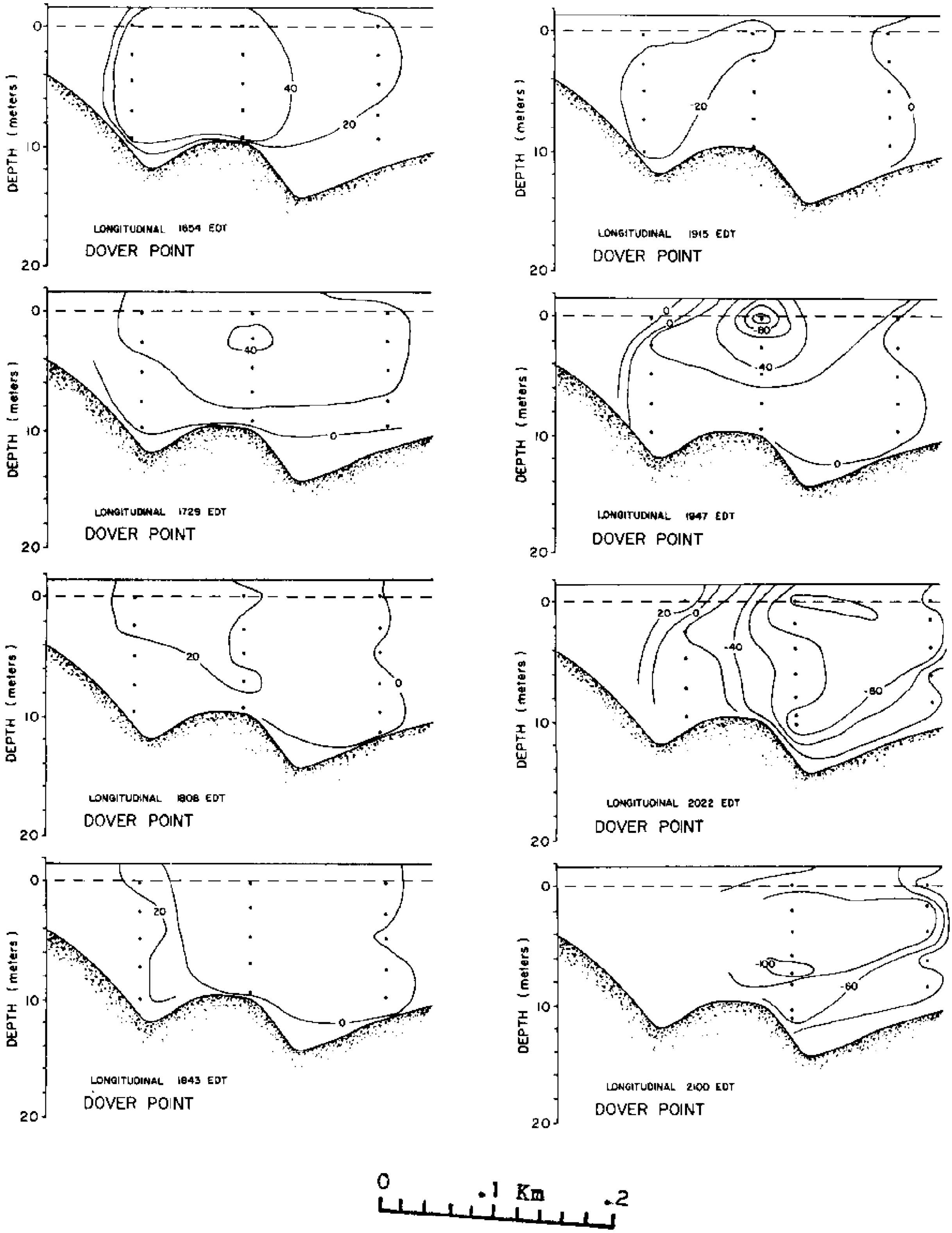

Figure 60 DOVER POINT CONTOUR PLOT showing longitudinal component (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

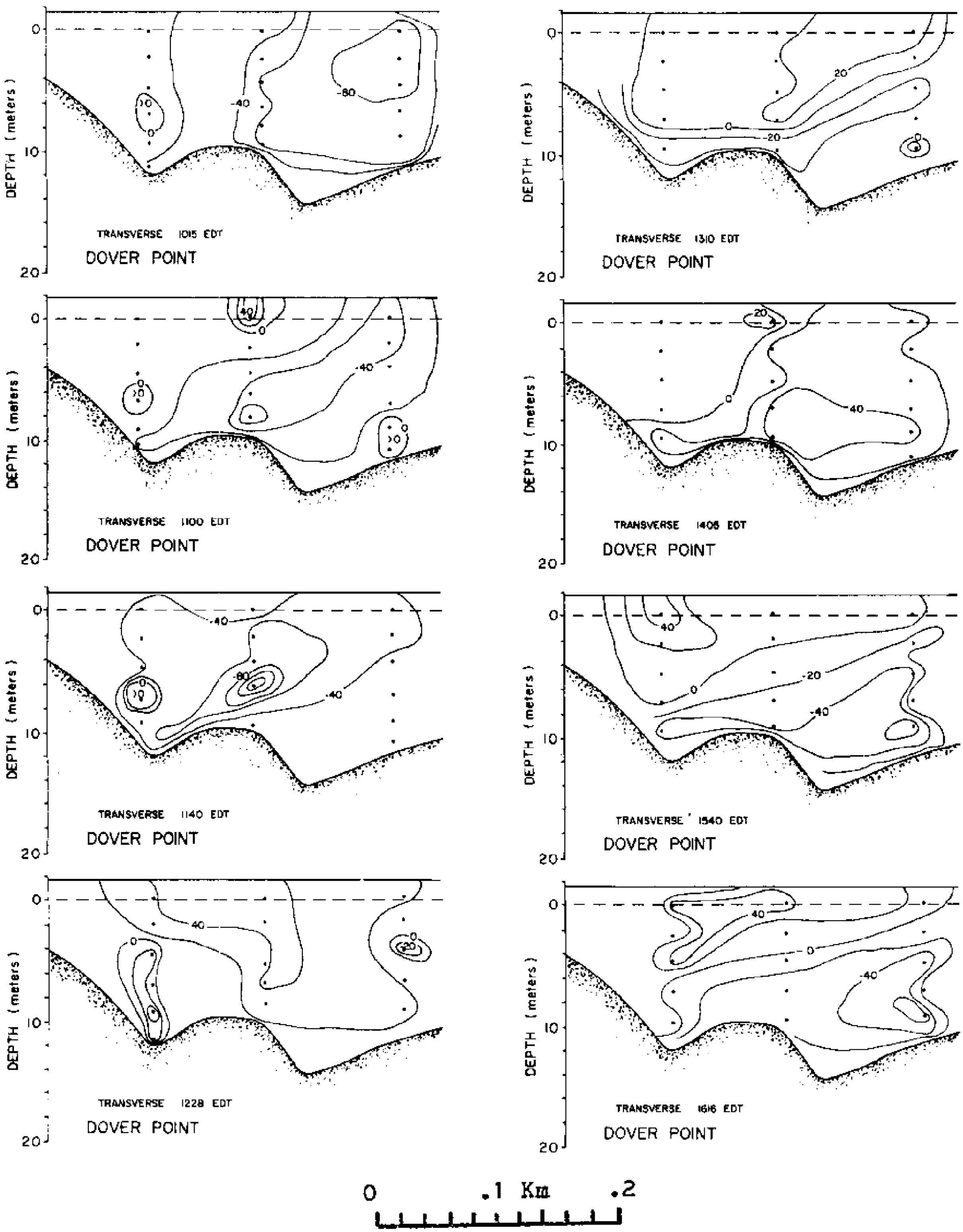

Figure 61 DOVER POINT CONTOUR PLOT showing transverse component (cm/sec) from 1015 (EDT) to 1616 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

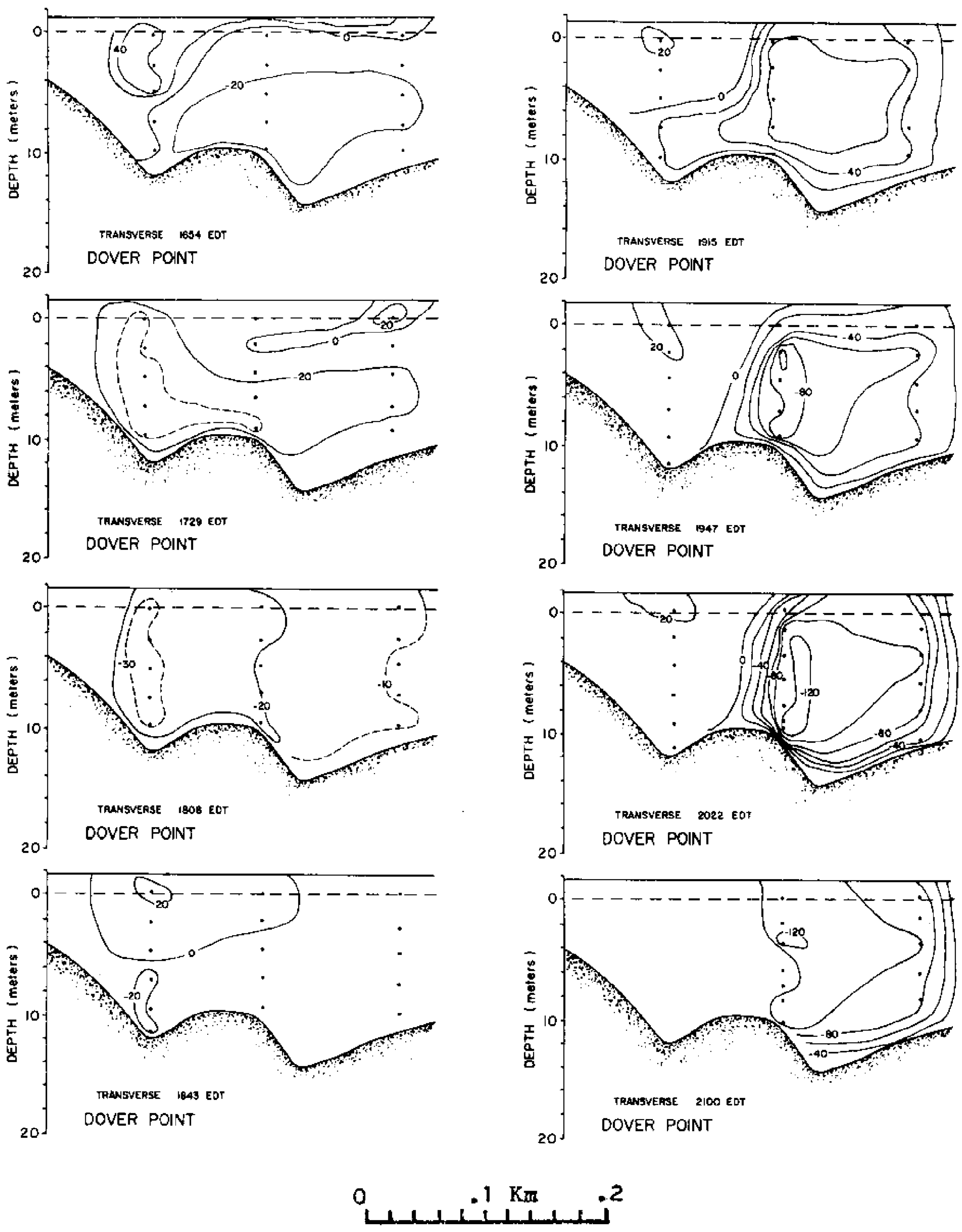

Figure 62 DOVER POINT CONTOUR PLOT showing transverse component (cm/sec) from 1654 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

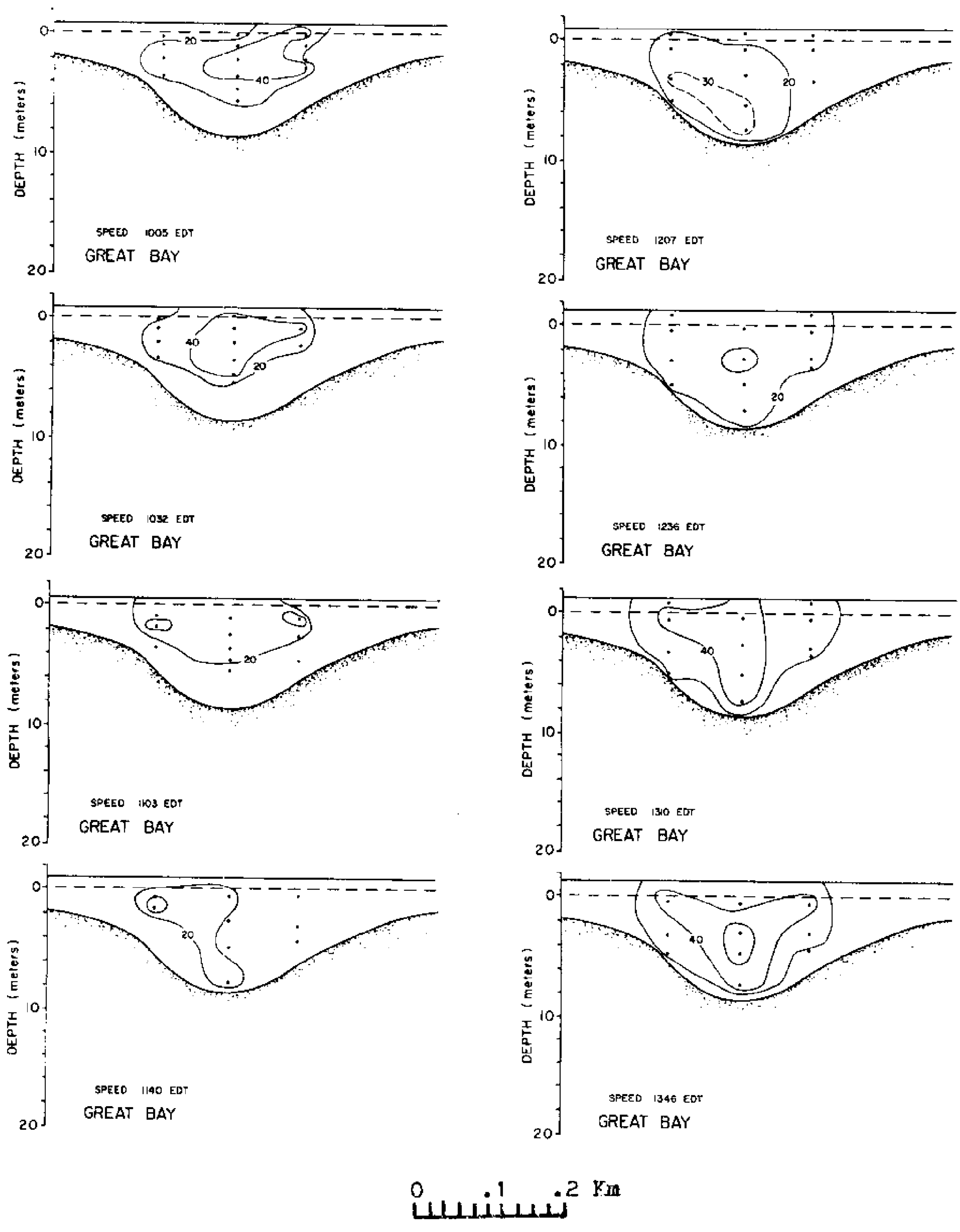

Figure 63 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

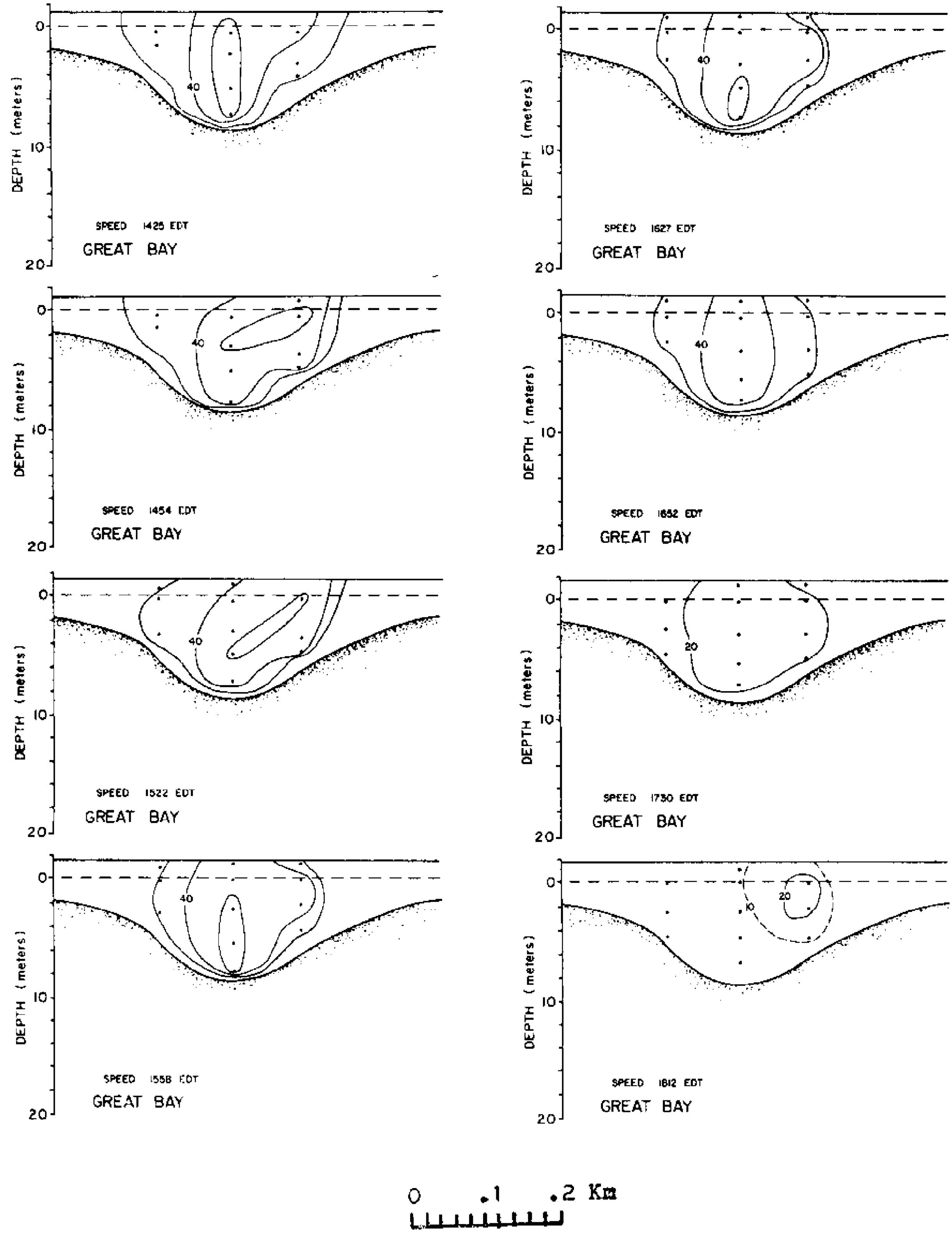

Figure 64 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

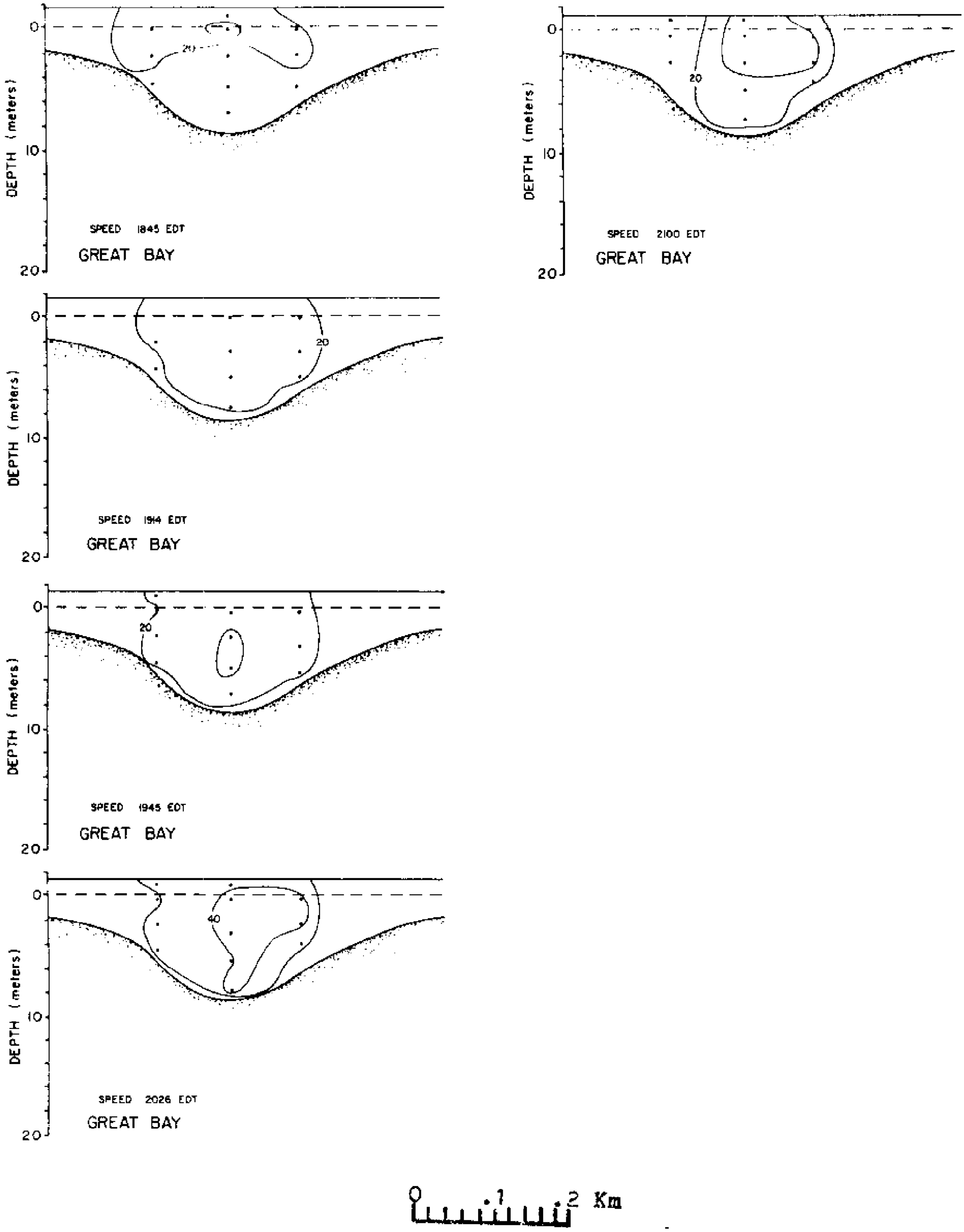

Figure 65 GREAT BAY CONTOUR PLOT showing speed (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

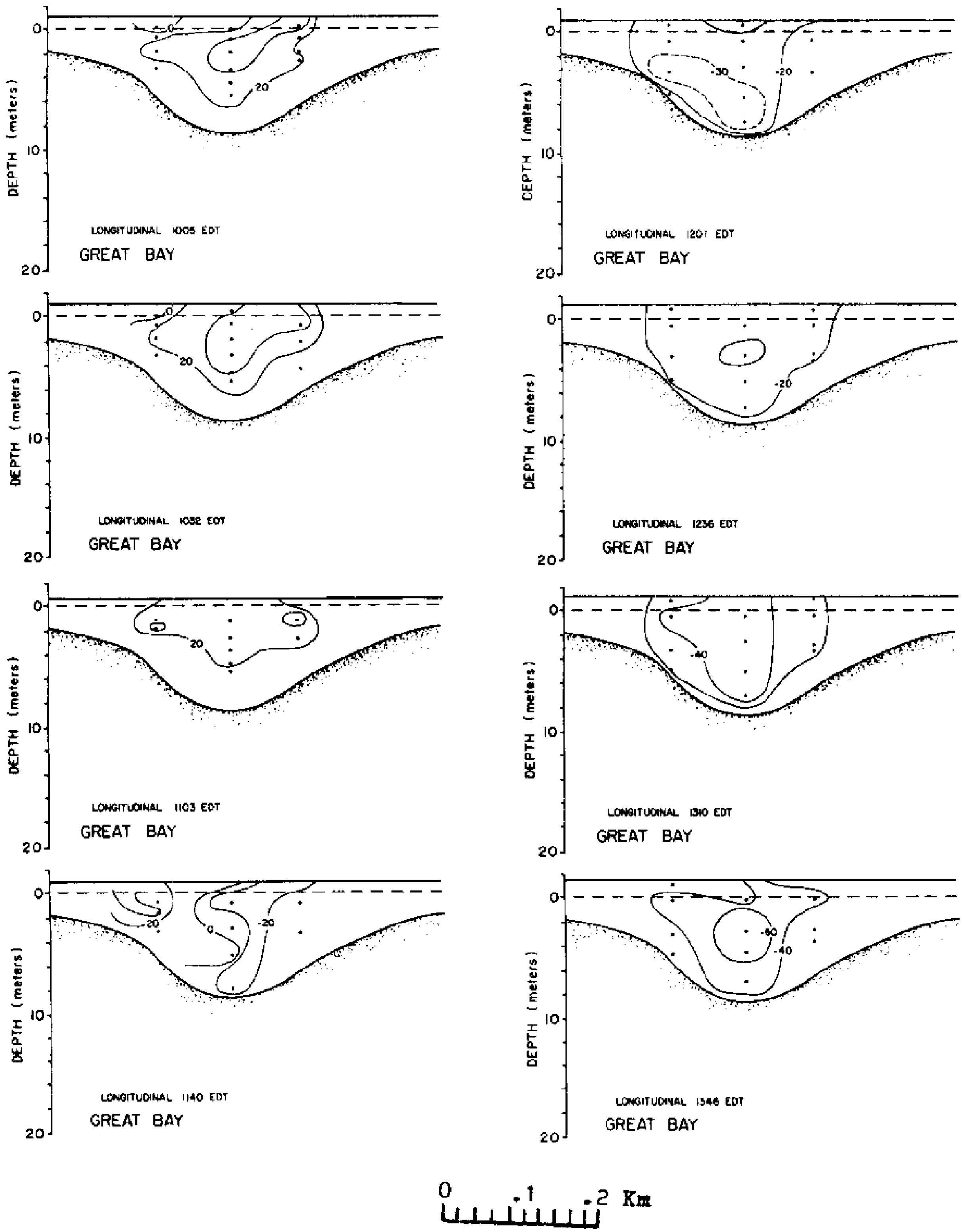

Figure 66 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

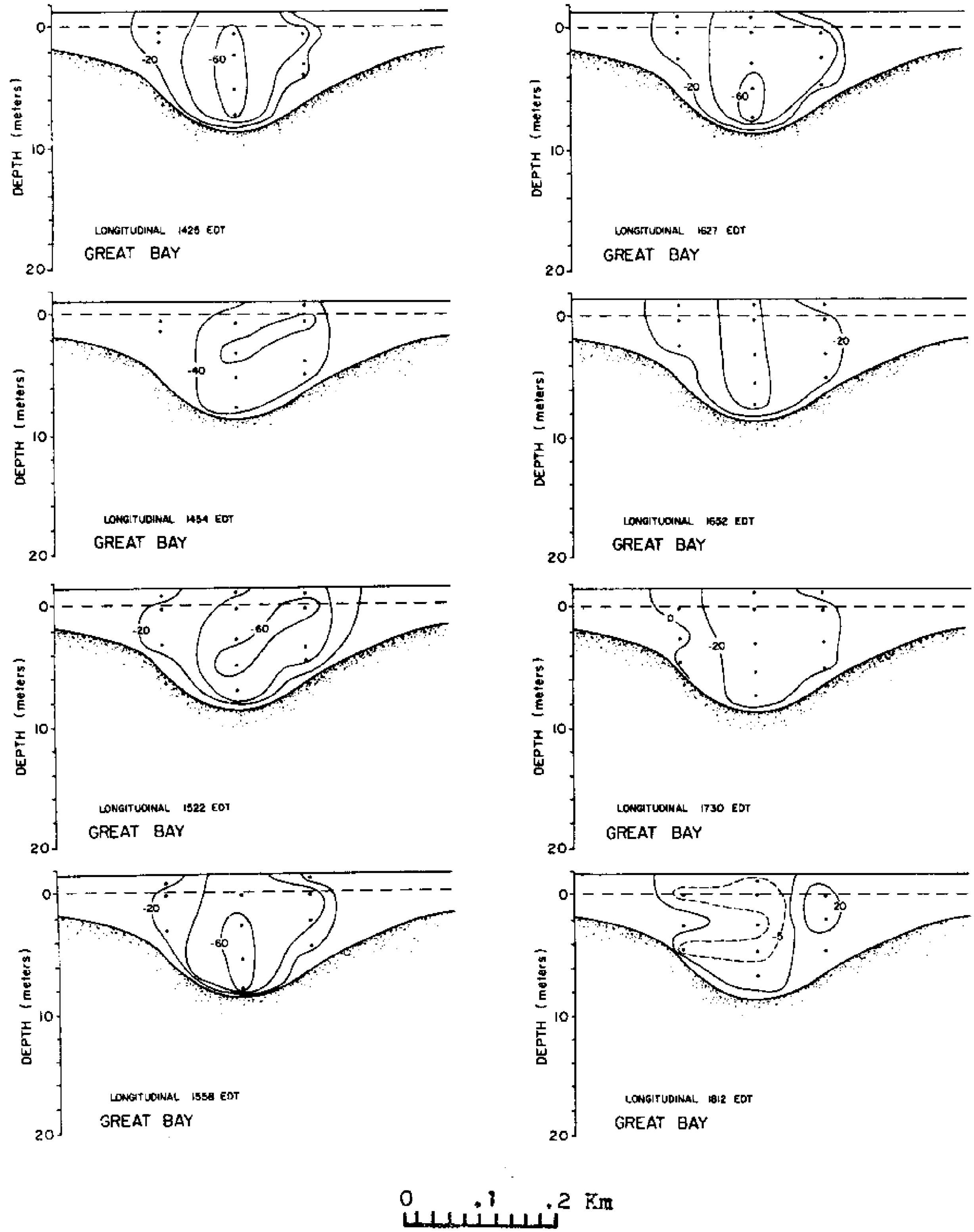

Figure 67 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

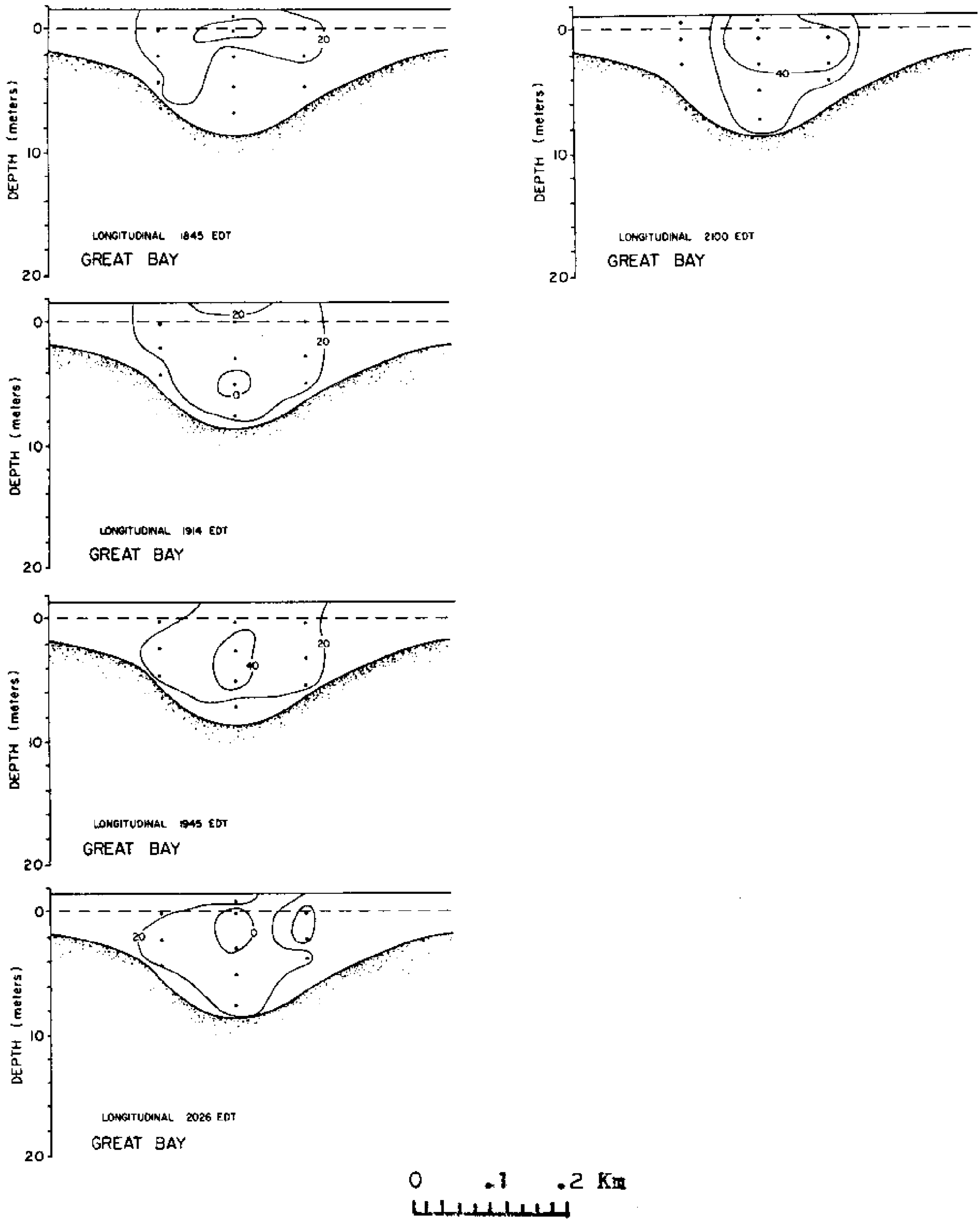

Figure 68 GREAT BAY CONTOUR PLOT showing longitudinal component (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

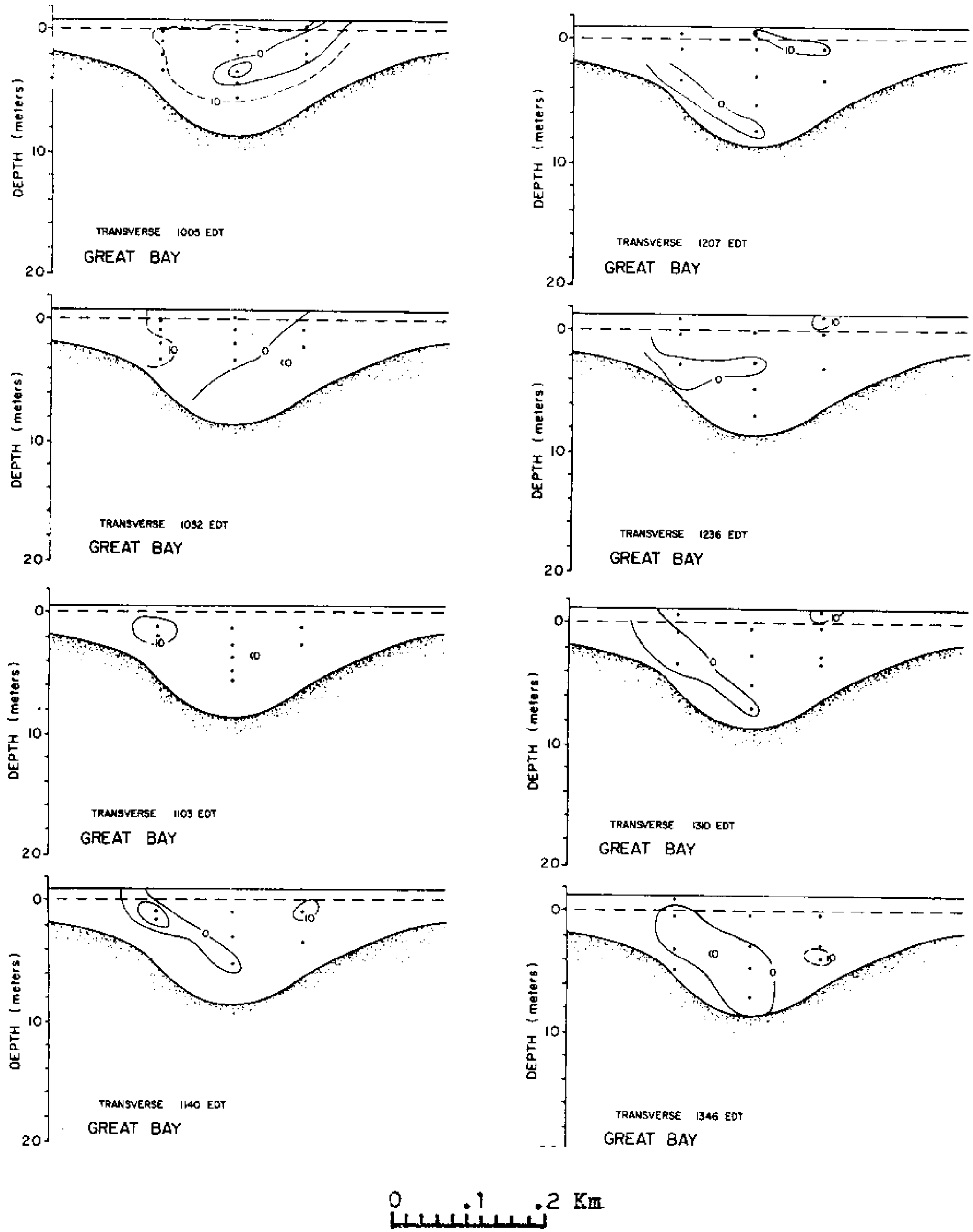

Figure 69 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1005 (EDT) to 1346 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

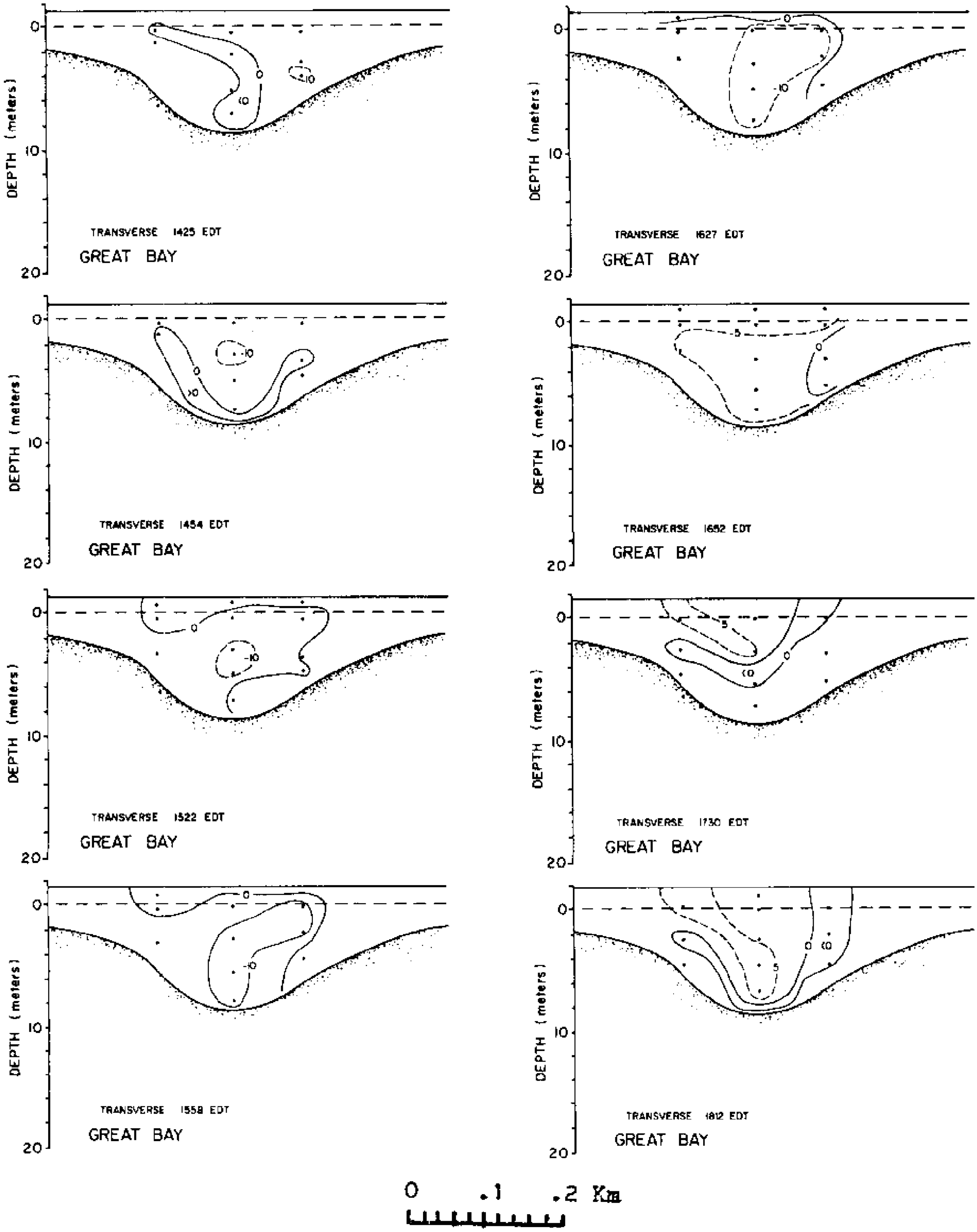

Figure 70 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1425 (EDT) to 1812 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

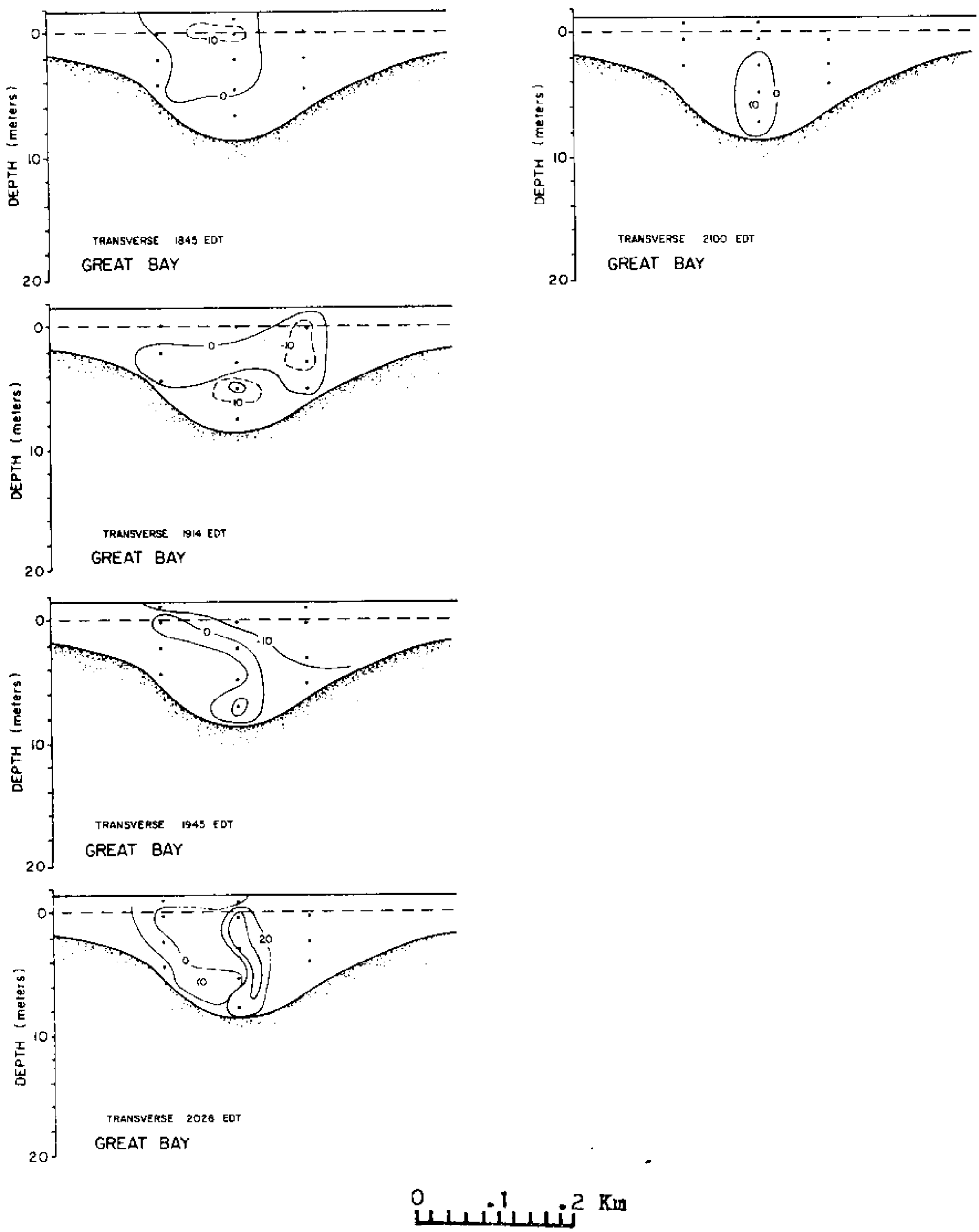

Figure 71 GREAT BAY CONTOUR PLOT showing transverse component (cm/sec) from 1845 (EDT) to 2100 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

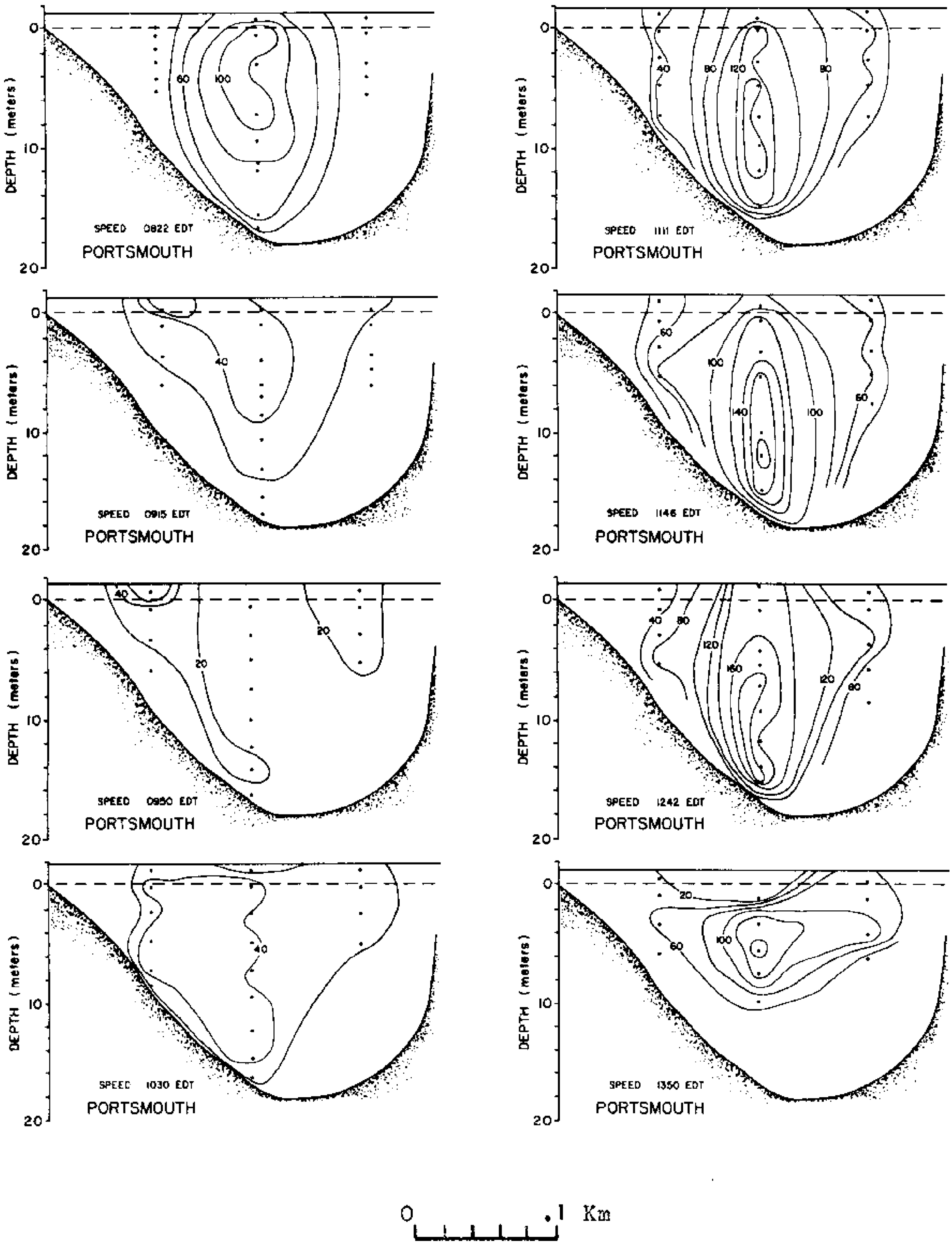

Figure 72 PORTSMOUTH CONTOUR PLOT showing speed (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

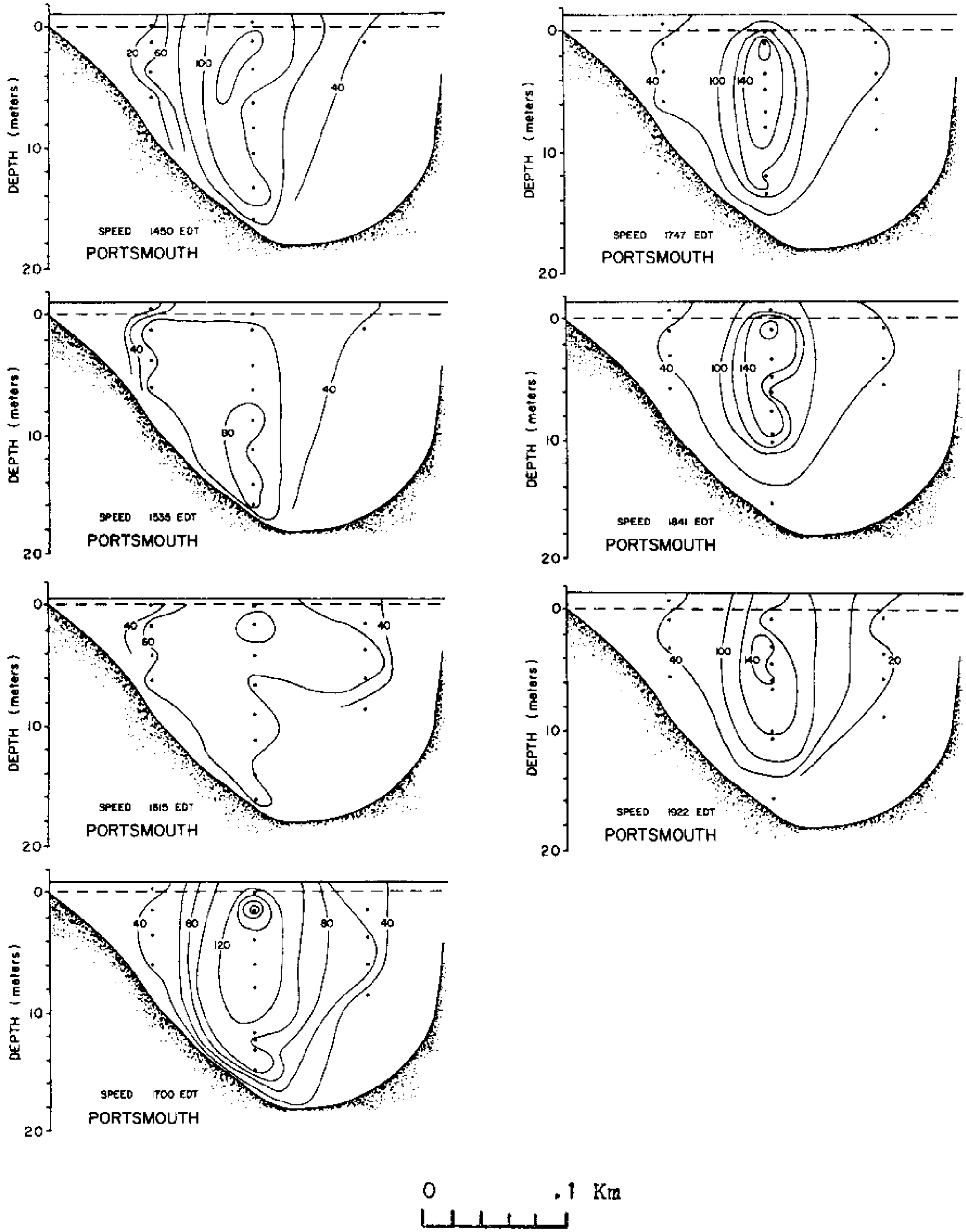

Figure 73 PORTSMOUTH CONTOUR PLOT showing speed (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream.

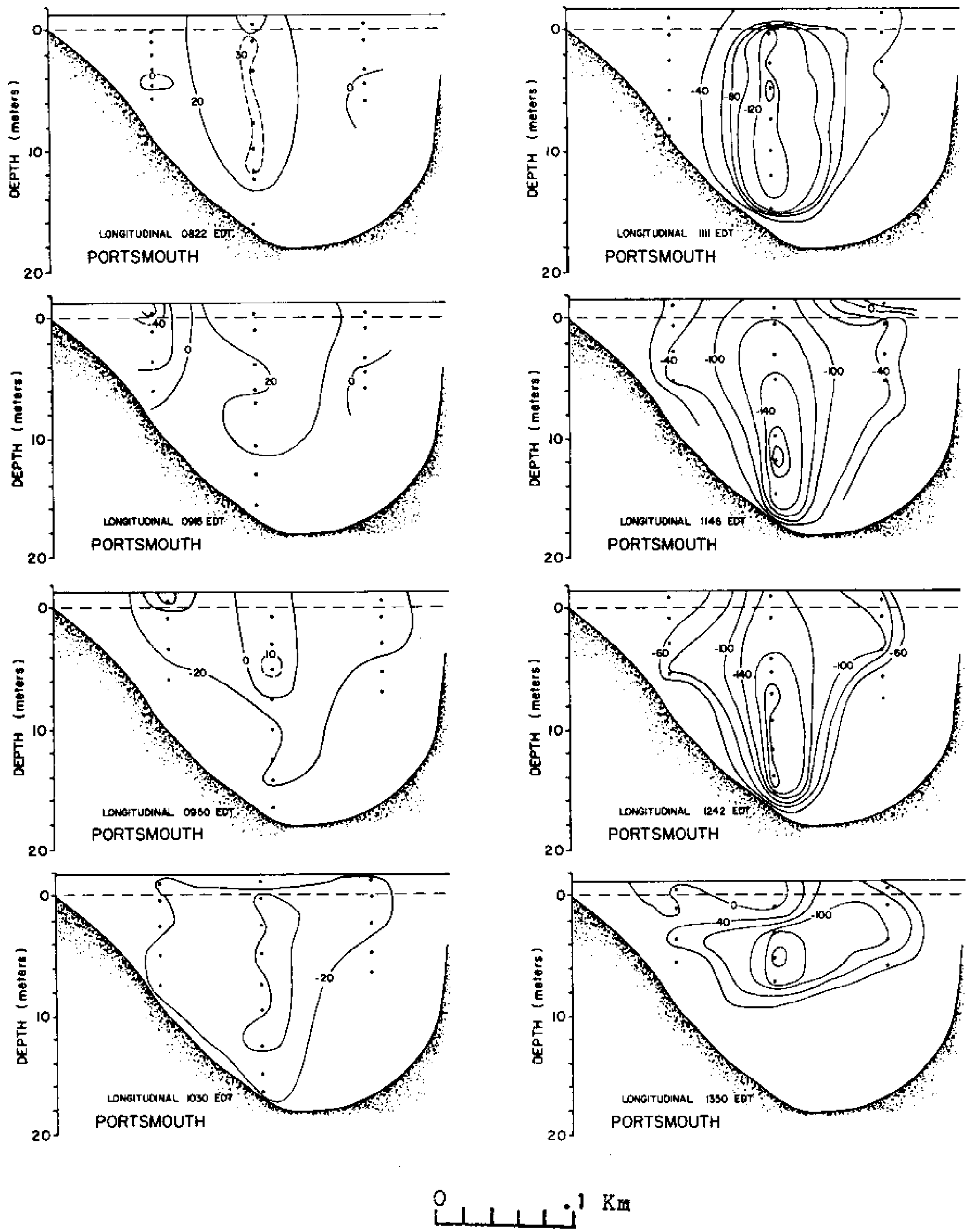

Figure 74 PORTSMOUTH CONTOUR PLOT showing longitudinal component (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

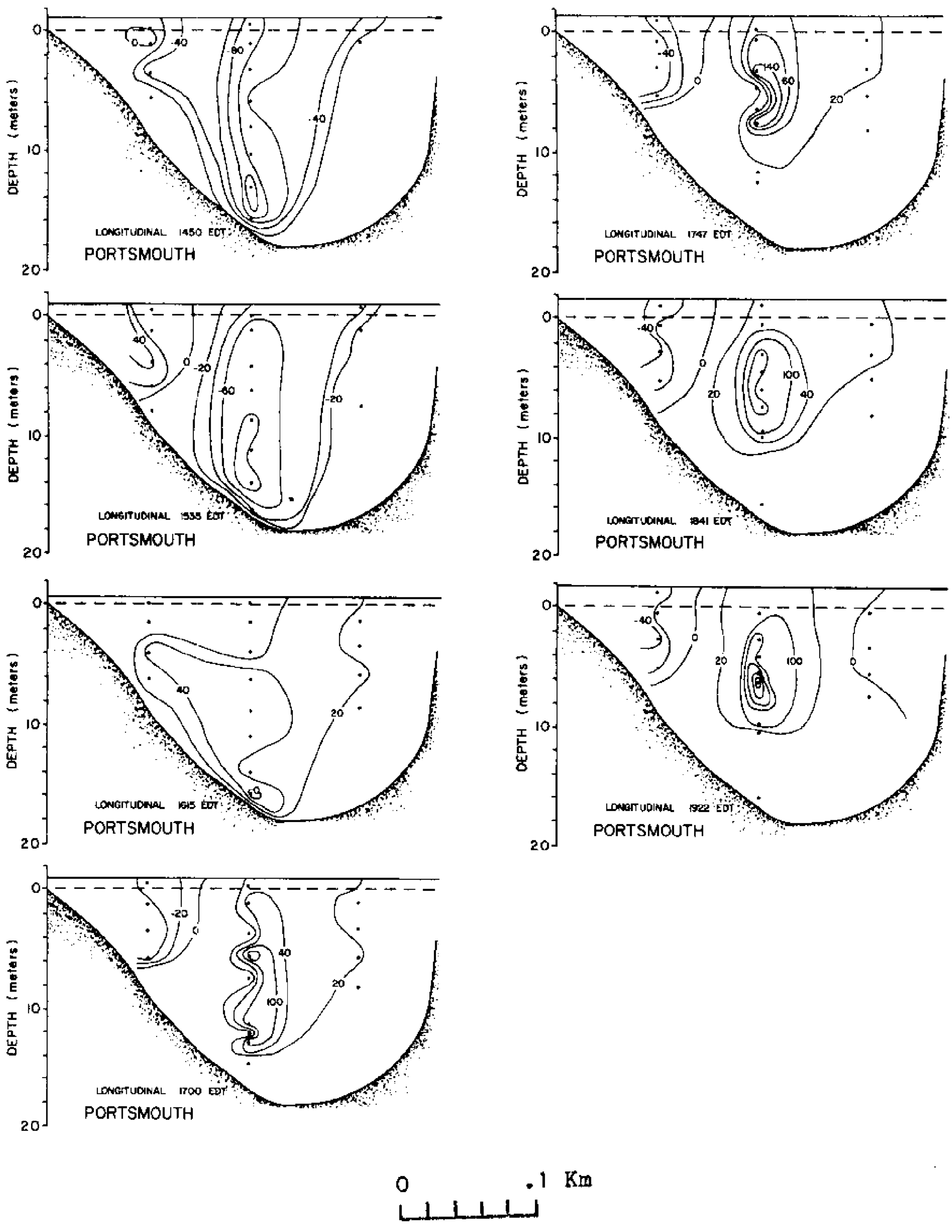

Figure 75 PORTSMOUTH CONTOUR PLOT showing longitudinal component (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow out of Estuary.

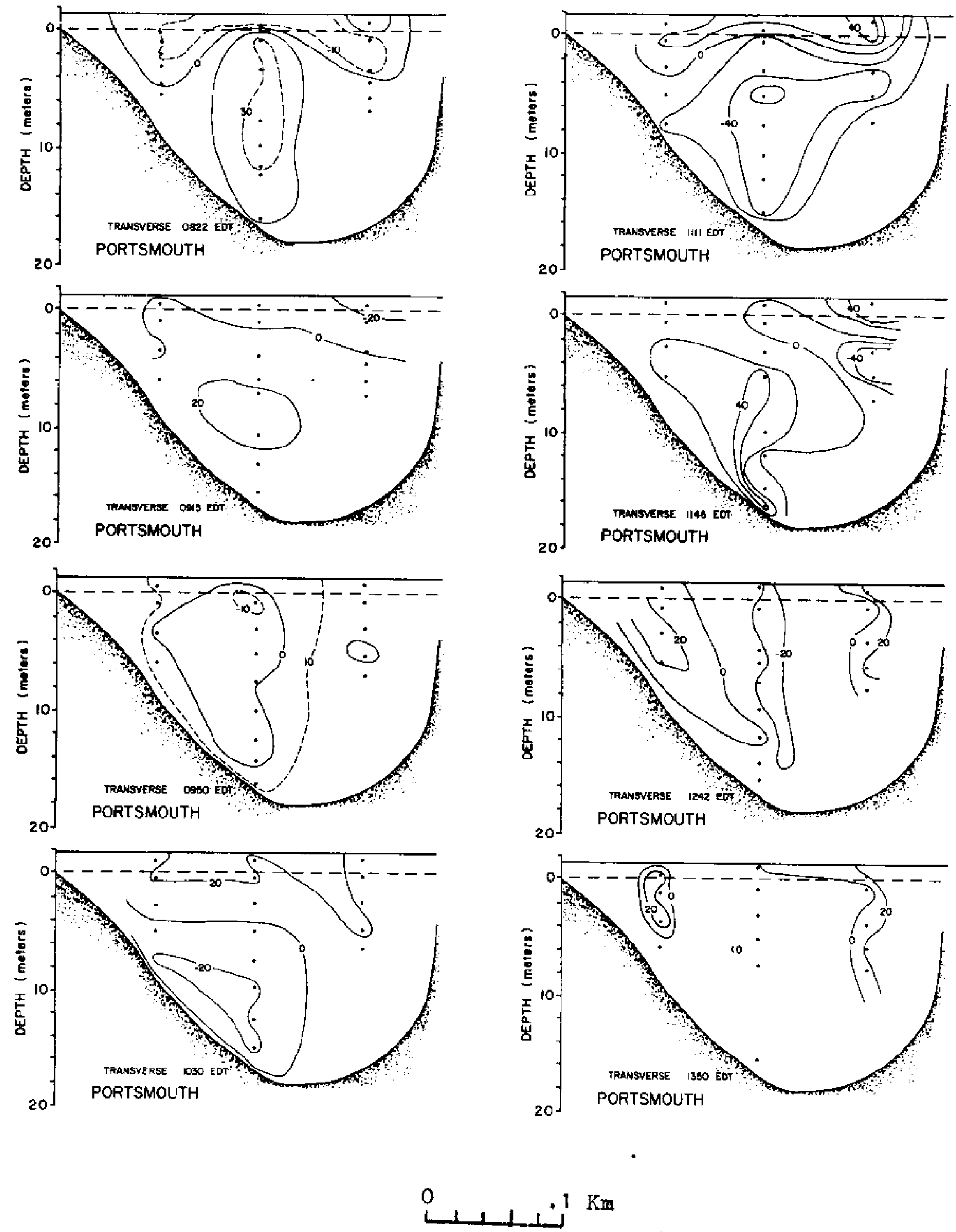

Figure 76 PORTSMOUTH CONTOUR PLOT showing transverse component (cm/sec) from 0822 (EDT) to 1350 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

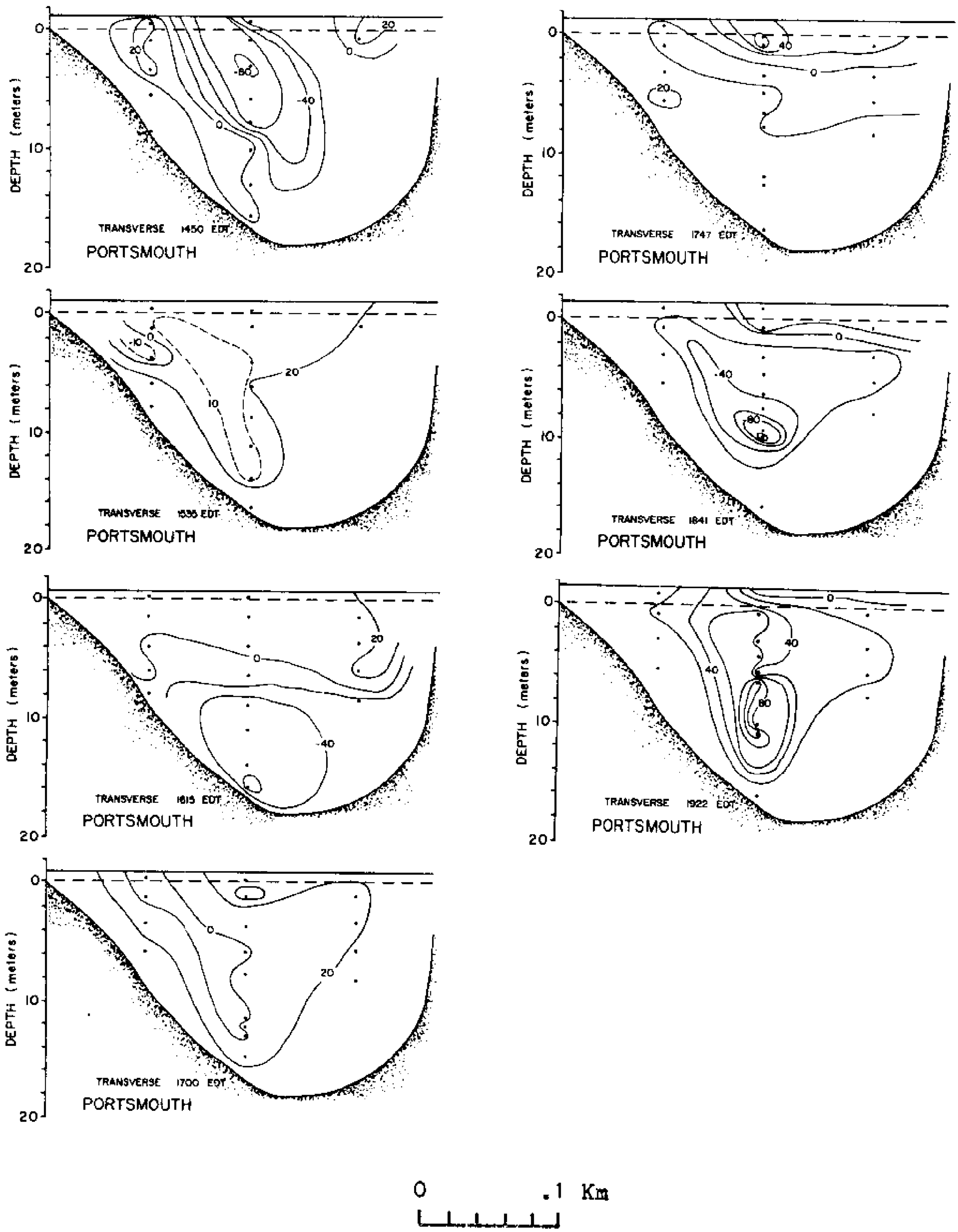

Figure 77 PORTSMOUTH CONTOUR PLOT showing transverse component (cm/sec) from 1450 (EDT) to 1922 (EDT). Contour interval is 20 cm/sec, dashed horizontal line indicates MLW, solid line indicates water surface. View is downstream. Positive flow corresponds to flow to the right of the downstream direction.

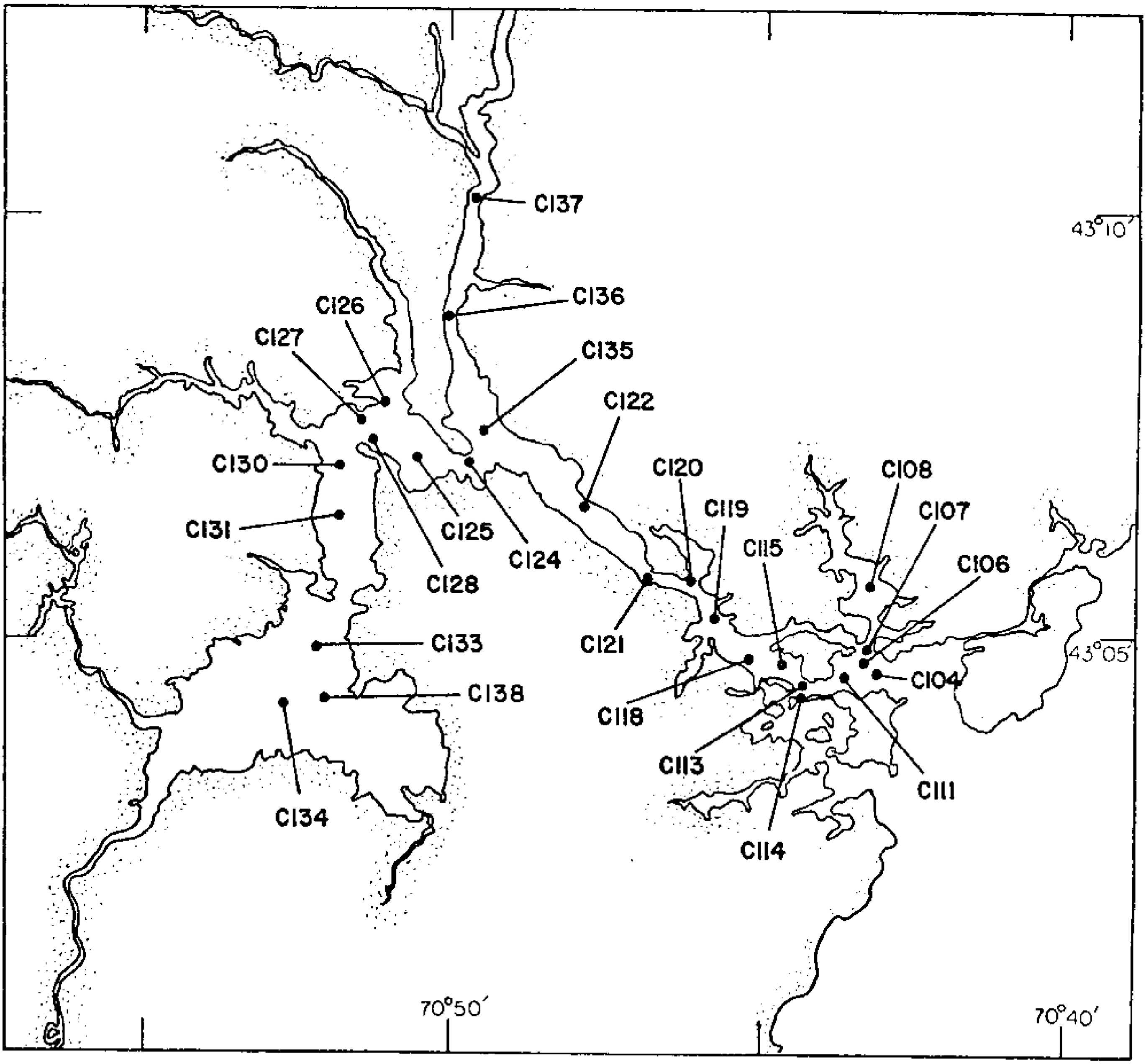

Figure 78 Location map for NOS current meter moorings (●) during the 1975 summer field program.

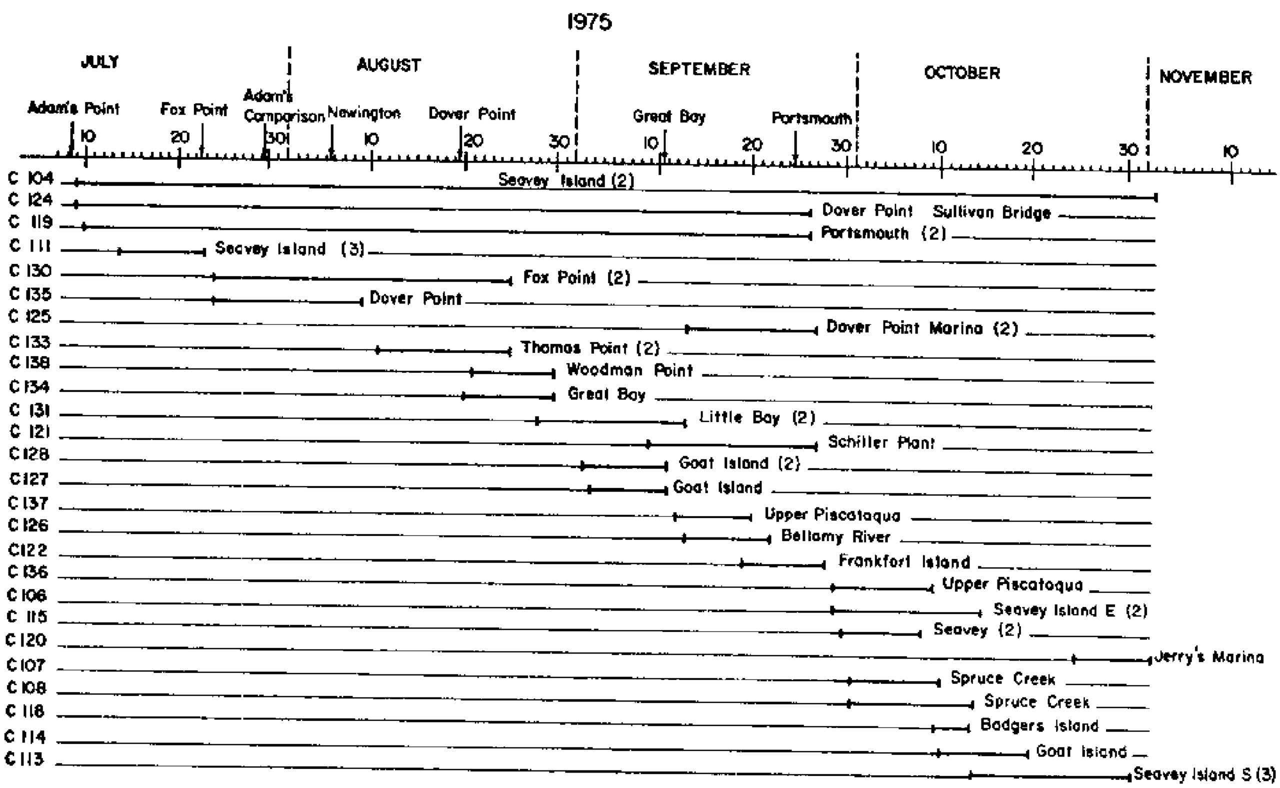

Figure 79 A summary of the deployment periods of the NOS current meters.

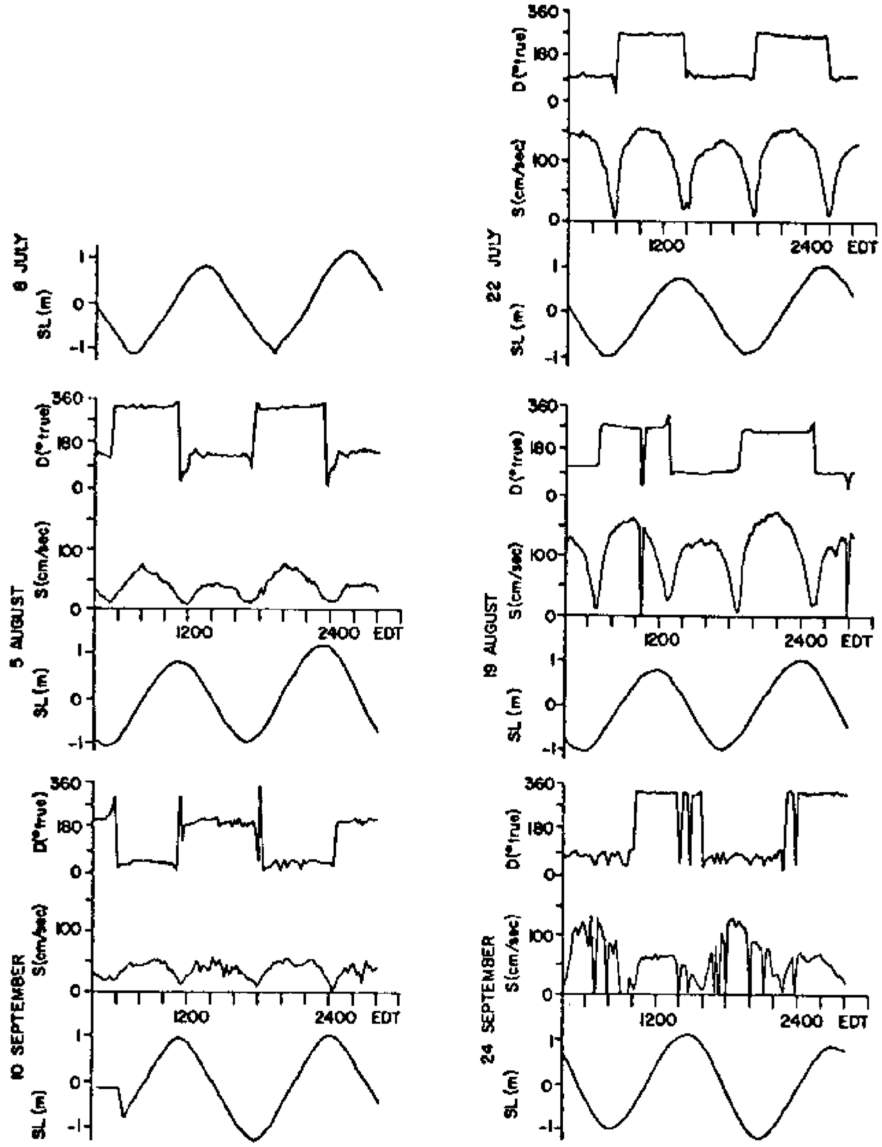

Figure 80 Representative examples of current direction, D, current speed, S, and sea level, SL, for six locations in the estuary. Each 24 hour data set starting at 0400 EDT (0800 GMT) was chosen to coincide with the date of a UNH profiling cruise. The most appropriate current and sea level record for each particular UNH cruise is shown. For 8 July 1975 only the UNH sea level is shown. The following indicates the date, current meter identification, and tide gauge identification for the other data shown:

22 July 1975	C124	T-16,
5 August 1975	C135	T-14,
19 August 1975	C124	T-14,
10 September 1975	C131	UNH, and
24 September 1975	C119	T-11.

Missing current speeds have been assigned a zero value; the observed inverted spikes in the 19 August and 24 September data coincident currents direction values appear to be spurious.

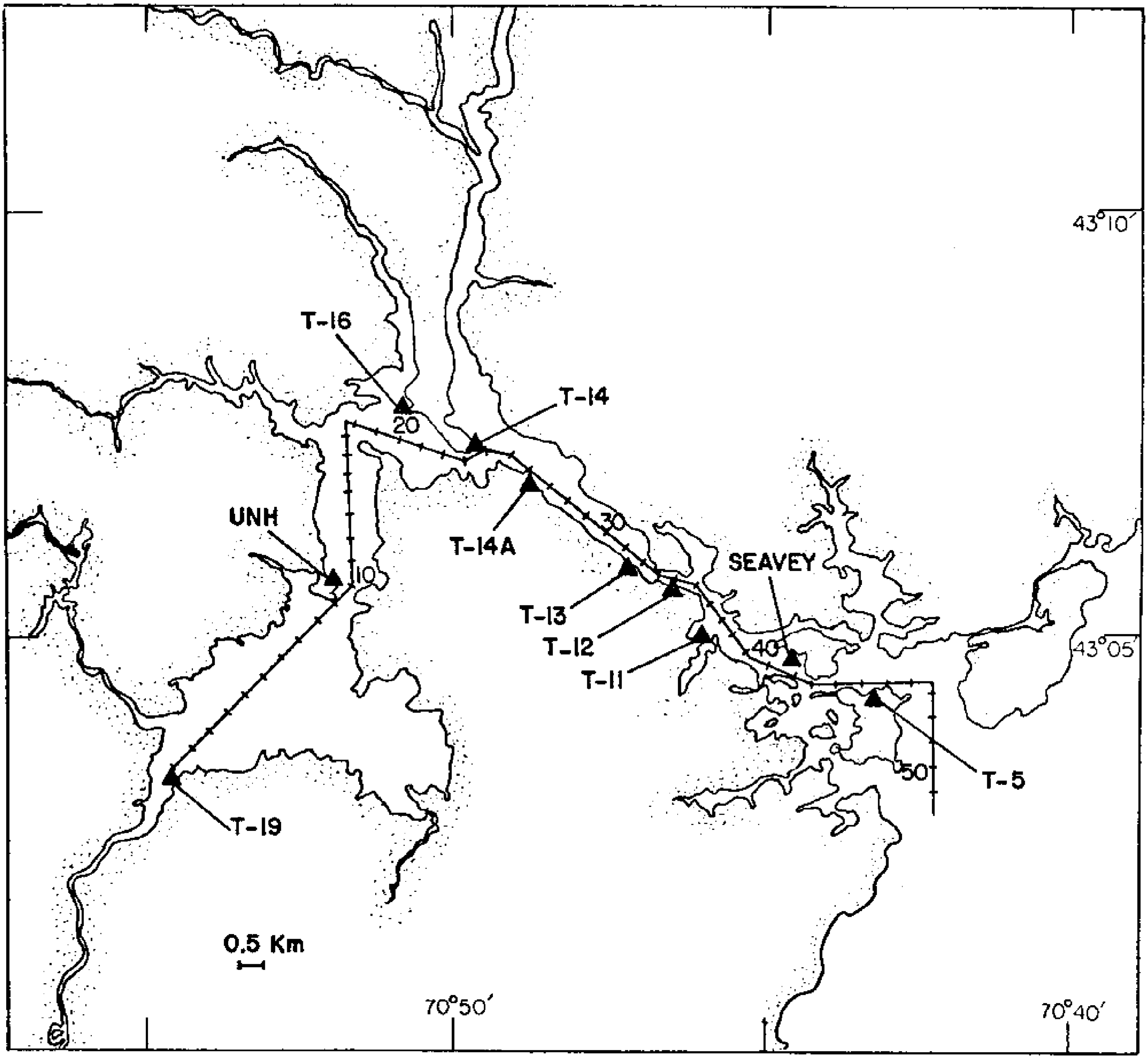

Figure 81 Location chart of the NOS/UNH sea level monitoring program. Each division of the estuarine length scale corresponds to .5 km.

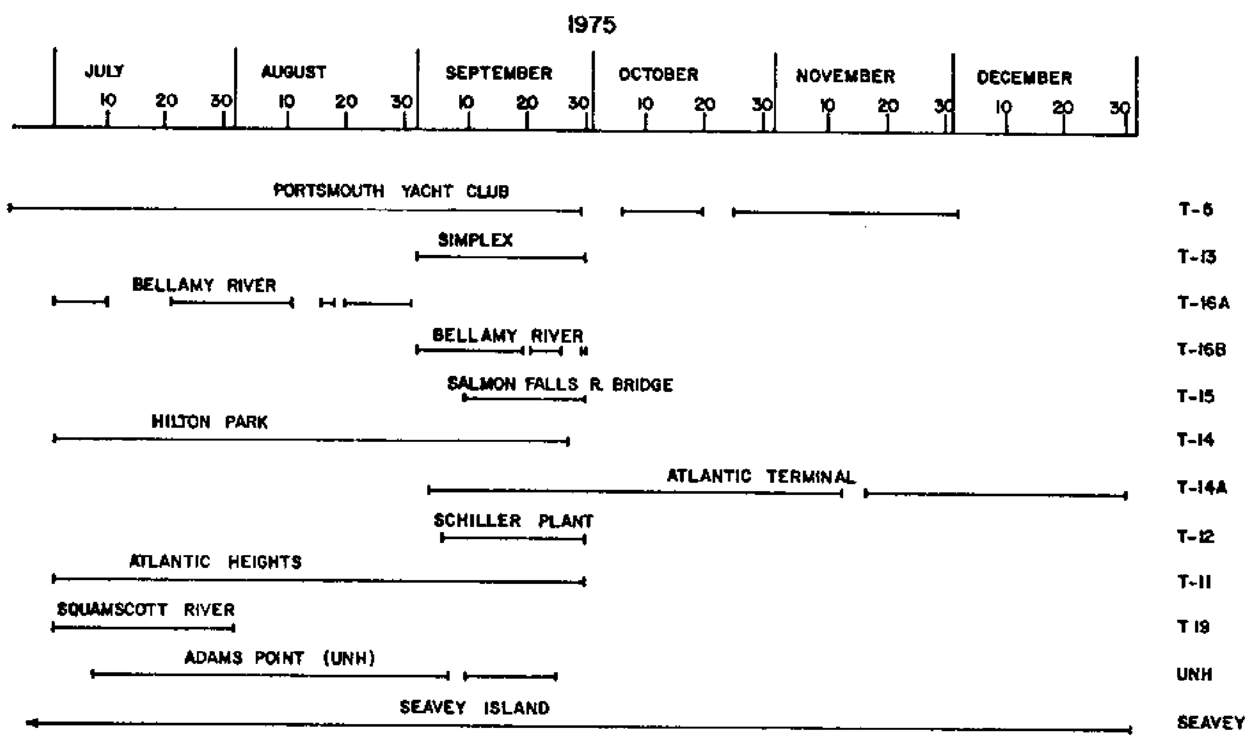

Figure 82 Sea level data acquisition summary. With the exception of the Adams Point series, all were obtained from NOS ADR (see text) tide gauges.

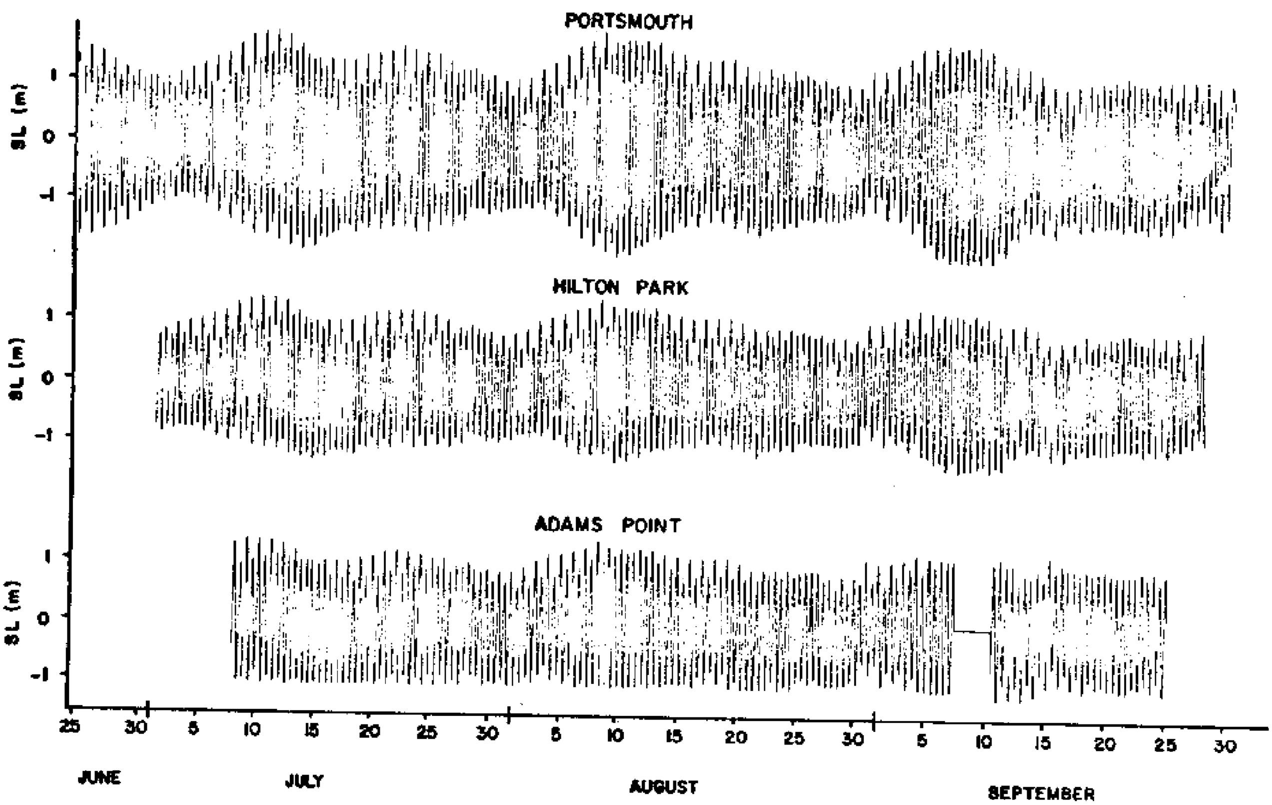

Figure 83 Examples of sea level from the Portsmouth Yacht Club, Hilton Park, and Adams Point locations within the Great Bay Estuary.

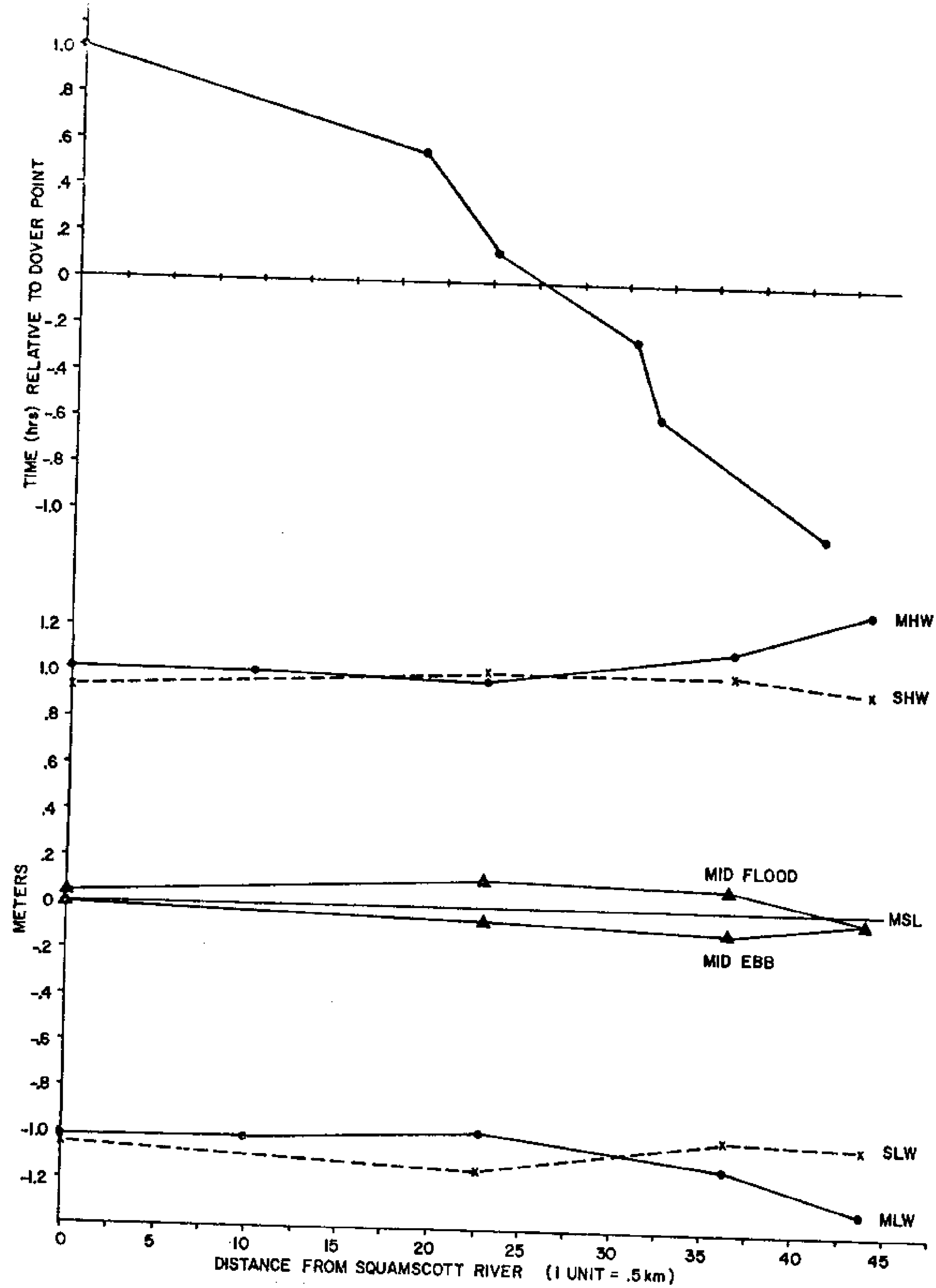

Figure 84 Summary of tidal elevation distribution within the Great Bay Estuarine System. The distributions of 7-day mean high and low water (MHW, MLW) relative to a horizontal surface are shown below. These are compared with instantaneous sea level distributions shown for slack high and low water (SHW, SLW) and mid ebb and flood at Dover Point for 15 July 1975. Above, the phase distribution of high water relative to Dover Point is shown.