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# DIAGNOSTIC MODELLING OF CONTINENTAL SHELF CIRCULATION IN THE NEW YORK BIGHT

Kevin E. Kohler

Gregory C. Han

Atlantic Oceanographic and Meteorological Laboratories
National Oceanic and Atmospheric Administration
4301 Rickenbacker Causeway
Miami, Florida 33149

Rockville, Maryland
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UNITED STATES
DEPARTMENT OF COMMERCE
Malcolm Baldrige, Secretary

National Oceanic and
Atmospheric Administration
Anthony J. Calio,
Deputy Administrator

National Ocean Service
Paul M. Wolff,
Assistant Administrator

Atlantic Office, Stony Brook, New York

Coastal and Estuarine Assessment Branch
Ocean Assessments Division
Office of Oceanography and Marine Assessment
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## CONTENTS


Figures iv

ABSTRACT 1

1. INTRODUCTION 1

2. DESCRIPTION OF ANALYSIS 2

2.1 Model Description 2
2.2 Input Parameter Calculations 3
2.3 Strong-form Boundary Condition Calculation 7

3. MODEL APPLICATION 9

4. MODEL ACCURACY AND STATISTICS 14

5. CONCLUSIONS 19

6. ACKNOWLEDGEMENTS 20

7. REFERENCES 21

List of Tables 22

Appendices

Appendix A: Triangular element grid, depth, pycnocline depth, alpha fields.
Appendix B: Sea surface elevation, bottom velocity, surface and bottom transport.
Appendix C: Actual and relative errors vs. absolute time difference.
Appendix D: Cumulative probability density functions.
Appendix E: Linear regressions of modelled vs. observed velocity components.

List of Figures


| | | Page |
|---|---|---|
| Figure 1. | Schematic perimeter of model grid with annotated boundaries and boundary points: (a) 1975-1976 application; (b) 1978 application..... | 4 |
| Figure 2. | Schematic boundary elevation calculation..... | 8 |
| Figure 3a. | Current mooring location for 1975..... | 10 |
| Figure 3b. | Current mooring location for 1976..... | 11 |
| Figure 3c. | Current mooring location for 1978..... | 12 |
| Figure 3d. | Current mooring location for 1979..... | 13 |
| Figure 4. | Schematic boundary velocity interpolation..... | 15 |

# Diagnostic Modelling of Continental Shelf Circulation in the New York Bight

Kevin E. Kohler and Gregory C. Han

ABSTRACT. This report summarizes the application at AOML of a steady-state diagnostic model to the New York Bight region using STD and wind stress data collected during 1975-1979. The techniques used in this application, e.g., boundary condition specification, STD data conversion, are described in detail. Also a complete presentation of modelled transport, bottom velocity, and sea surface elevation fields for the bight region for specific day intervals spanning 1975-1979 is shown.

The accuracy of the model in calculating current velocities in the bight region was evaluated. The model statistics computed are actual and relative errors, mean and standard deviation of actual and relative errors, cumulative probability density functions for actual and relative errors, direction errors, and total speed errors, linear regression of modelled vs. observed velocities, and mean vertical shear errors. It was found that the greatest accuracy was achieved when a "weak" form boundary condition, which results in a smooth flow exiting the boundary, was specified along the southernmost boundary. The model was also found to be sensitive to the specification of the bottom friction coefficient. A large value for bottom friction produced a solution that dissipated rapidly a short distance into the modelled region, while too small a value produced unrealistic circulation gyres.

## 1. INTRODUCTION

This report summarizes the results of the application of a steady-state diagnostic model formulated by Galt (1980) (hereafter referred to as the Galt model or Galt) at AOML to the New York Bight region using STD and wind stress data collected during 1975-1979. The complete description of the model derivation and detailed description of the operation of the model are contained in various manuscripts (Galt (1975), Watabayashi (unpublished manuscript)). This report describes only the techniques that were used at AOML in applying the model to the New York Bight. Han et al. (1980) present some preliminary model results using STD and wind data collected during May-June 1976. Han and Kohler (1982) describe the model response to various forcings and range of parameters. Along with a complete presentation of model results for 1975-1979, the present report also presents an evaluation of the model's accuracy in calculating velocities in the bight region.

The interrelationship of the physical, biological, and chemical systems in the New York Bight area has been the subject of a continuing investigation of the National Oceanic and Atmospheric Administration/Marine Ecosystems Analysis Program (NOAA/MESA). A series of expanded water column

characterization (XWCC) cruises, conducted during 1975-1979, serves as the data collection source for these model applications. Using STD data, wind stress, bottom topography, and boundary velocity values for various day intervals, the Galt model yields surface elevations, barotropic (bottom) velocities, and transport values within the bight region which can then be used to calculate the divergence of concentration flux of various biological and chemical constituents.

There are three basic aims of this report. The first is to describe the specific techniques used in the application of the Galt model to the New York Bight region. Examples of these include the conversion of STD data into model station data, the calculation of model boundary conditions, and the calculation of current velocities and transport fields. A second aim is to produce a complete presentation of modelled transport and sea surface elevation fields for the bight region for specific day intervals spanning 1975-1979. These transport fields can be used in the determination of nutrient and pollutant fluxes in the region. The third aim of this report is to determine the accuracy of the Galt model in calculating current velocities in the bight region. Various statistical quantities are computed to provide a quantitative evaluation of the model's accuracy by comparing modelled velocities with independent velocity measurements in the region interior.

## 2. DESCRIPTION OF ANALYSIS

### 2.1 Model Description

A brief description of the Galt model is given here for completeness. Detailed presentations can be found in Galt (1975) and Galt (1980).

The Galt model is a steady-state formulation of the linearized equations of motion in the form of conservation of vorticity. The model equation to be solved is

$$\rho_0 g\, J(\xi,H) + gJ(\alpha,H) + \hat{k} \cdot (\nabla \times \underline{\tau_w}) - \rho_0 g\gamma \cos\theta\left(\frac{\nabla^2\alpha}{\rho_0} + \nabla^2\xi\right) = 0 \qquad (1)$$

where $\xi$ is the sea surface elevation, H the bottom depth, $\tau_w$ the surface wind stress, $\rho_0$ a reference density, g the gravitational constant, $\alpha = \int_{-H}^{0} \rho\, dz$, where z is the vertical coordinate zero at the surface and positive upward, $J(a,b) = \left(\frac{\partial a}{\partial x}\right)\left(\frac{\partial b}{\partial y}\right) - \left(\frac{\partial a}{\partial y}\right)\left(\frac{\partial b}{\partial x}\right)$ the Jacobian operator, $\theta$ the veering angle between the barotropic velocity and the bottom stress, and $\gamma$ the bottom friction parameter.

Equation (1) is solved for the surface elevation $\xi$, subject to boundary conditions discussed in Section 2.2, using a finite element technique. The input variables required by the model are depth, vertically averaged density ($\alpha$), and wind stress at each of the triangular element vertices (discussed in Section 2.2).

The most useful outputs from the model are transports per unit width and the top and bottom geostrophic velocities for each triangular element. Transports are calculated by summing the contribution from the top and bottom Ekman layers and the geostrophic interior and is given by the equation

$$\underline{T} = \hat{k} \times \frac{1}{f} \underline{\tau}_W + \hat{k} \times \frac{gH}{f} \left[\nabla\xi + \frac{\nabla\alpha}{2\rho_0}\right] + \underline{T}_B, \tag{2}$$

where $\underline{T}_B$ is the bottom Ekman transport given by

$$\underline{T}_B = -\gamma g f^{-1} \Big\{ [(\xi_x \cos\theta - \xi_y \sin\theta) + \rho_0^{-1}(\alpha_x \cos\theta - \alpha_y \sin\theta)]\, \hat{i}$$

$$+ [(\xi_x \sin\theta + \xi_y \cos\theta) + \rho_0^{-1}(\alpha_x \sin\theta + \alpha_y \cos\theta)]\, \hat{j} \Big\}, \tag{3}$$

where ^ denotes a unit vector.

The top geostrophic velocities can be computed from the gradients of $\xi$. The bottom geostrophic velocities can be calculated by subtracting the vertical shear in the velocity profile due to density ($\alpha$), yielding

$$\underline{U}_B = \hat{k} \times \frac{g}{f} \left[\nabla\xi + \frac{\nabla\alpha}{\rho_0}\right] \tag{4}$$

## 2.2 Input Parameter Calculations

This section will describe the calculation of the input variables required by the diagnostic model, specifically finite elements, vertically averaged density, wind stress, and boundary conditions.

### 2.2.1 Finite elements

An essential step in modelling a particular region is to define the geometry and bathymetry of the region. For each of 53 day intervals, the New York Bight region is outlined by a string of points along the coastlines of Long Island and New Jersey and by transects of STD stations of a concurrent XWCC cruise along the open southern, outer, and northern boundaries of the cruise track. The region perimeter is shown schematically in Figure 1. With these lines defining the modelled region perimeter, the area is subdivided into triangular elements which are used as a grid for the solution of the model equations. The vertices for these triangles are the STD cast locations from the XWCC cruise encompassing the particular day interval. Each station is assigned a depth value taken from the NOS bathymetric charts. In localities where better resolution of the bottom topography is needed, such as in the Hudson Shelf Valley, additional stations are inserted and incorporated into the model grid. The triangles are formed by the model to be as equilateral as possible. However, in some cases, this selection would produce significant errors in specifying the bottom topography, such as in the Shelf Valley. In these instances, the vertices of such triangles are manually changed to obtain a better approximation to the local bathymetry.

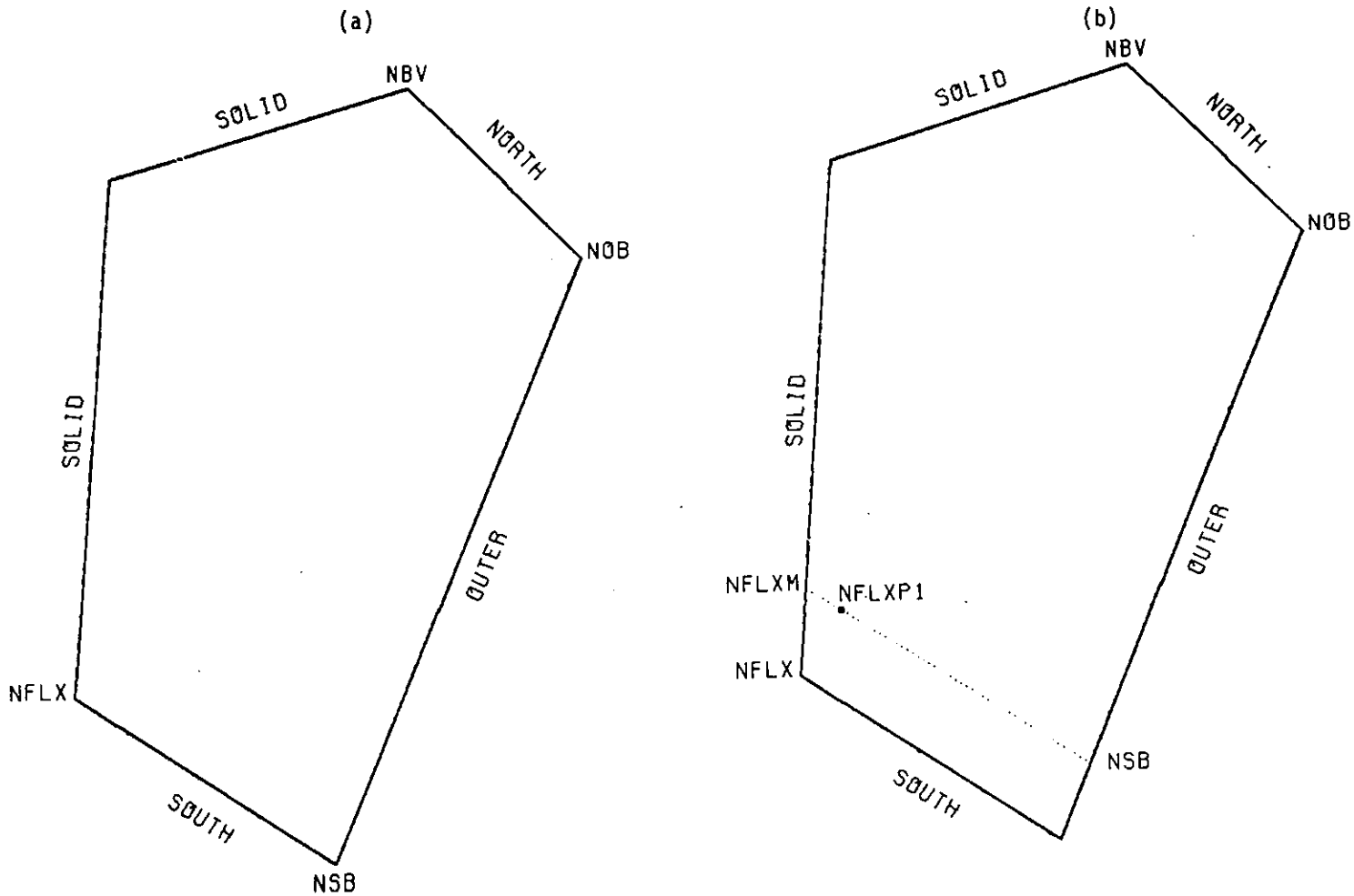


Figure 1. Schematic perimeter of model grid with annotated boundaries and boundary points: (a) 1975-1976 application; (b) 1978 application.

### 2.2.2 Vertically averaged density

A basic data input needed by the diagnostic model to calculate the baroclinic contribution to the model solution is the specification of the vertically averaged density ($\alpha$) at each of the vertices of the triangular finite elements. The density data used as input for the diagnostic model are obtained from STD casts from MESA XWCC cruises. The casts were taken to within approximately 5 meters of the bottom and yield sigma-t values which were resampled at one-meter intervals. A vertically averaged density value was when calculated for each of the XWCC STD stations.

Since no data exist for the artificially created shoreline and Shelf Valley stations, $\alpha$ values for these stations must be interpolated. Alpha values have both a bottom depth and horizontal dependence, making interpolation between stations difficult since the stations are at different depths. The depth dependence of $\alpha$ is eliminated in the interpolation by separating $\alpha$ into two components, one having vertical dependence only, the other having only horizontal dependence, i.e.,

$$\alpha(x,y,H) = \alpha_o(H) + \alpha_d(x,y)$$

where $H = H(x,y)$ is the bottom depth.

To obtain $\alpha_o$, a least-squares fit is done of all the density data from actual cruise stations to a third-order polynomial versus depth, i.e.,

$$\alpha_o(H) = AH^3 + BH^2 + CH + D.$$

After obtaining $\alpha_o$, $\alpha_d$ is computed by subtracting $\alpha_o$ from $\alpha$. Since $\alpha_d$ is independent of depth, it can be interpolated to yield values of $\alpha$ for the artificially created stations.

The procedure for interpolating $\alpha_d$ values for noncruise stations depends upon the type of station. For the solid boundary (shoreline) stations, offshore values are extrapolated shoreward, preferably along a cruise transect. For Shelf Valley stations, $\alpha_d$ values are interpolated along the Shelf Valley. In cases where stations were added to provide better depth resolution of a given area, the $\alpha_d$ values for these stations were found by interpolating between surrounding stations.

After the estimate of an $\alpha_d$ value has been made, it is converted back to $\alpha$ using the original coefficients for $\alpha_o(H)$. Both the $\alpha$ and $\alpha_d$ values are plotted, contoured, and checked for smoothness. If the $\alpha_d$ field is still inadequate, i.e., if unrealistically large horizontal density gradients still exist, the $\alpha_d$ values for the created stations are re-estimated until a smooth field is obtained. When a satisfactory $\alpha_d$ field has been obtained, $\alpha$ values are computed for the created stations.

The final set of $\alpha$ values for all grid points is used as input for the Galt model. The model uses a third-order least-squares fit of the $\alpha$ values

vs. depth (H) to calculate the vertical variation in $\alpha$ needed by the model to approximate the horizontal gradients in $\alpha$ over a sloping bottom.

### 2.2.3 Wind stress

The wind data used by the model were collected either at JFK Airport on the Long Island coast or at EB-34, a meteorological buoy located at mid-shelf, north of the Shelf Valley. The velocity measurements were made every three hours, converted to north and east wind stress components, and then averaged over the day intervals selected for the boundary conditions. The wind stress is specified at each triangle vertex and is taken to be uniform over the modelled region. The wind stress curl is neglected since it is normally much less than vortex-stretching terms.

### 2.2.4 Boundary conditions

From Section 2.1, the mathematical formulation of the Galt model leads to the solution of a weakly elliptical equation (1) with sea surface elevation as the dependent variable. The set of boundary conditions used in this solution is of the Dirichlet type, i.e., the specification of sea surface elevation around the perimeter of the model domain (Figure 1). Since sea surface elevation cannot be measured directly with sufficient accuracy, near-bottom current measurements are used to determine elevation gradients from the equation

$$\underline{u}(z) = \hat{k} \times \frac{g}{f}\left[\nabla\xi - \frac{z}{H}\frac{\nabla\alpha}{\rho_0}\right], \tag{5}$$

where $\alpha = \alpha(x,y,H)$

for $0 > z > -H$. The values of $\xi$ along the perimeter are then calculated from $\nabla\xi$ after fixing $\xi$ to an arbitrary constant at a single boundary point. Thus, the problem of specifying sea surface elevations around the perimeter of the grid area reduces to specifying the component of velocity normal to the boundaries, thereby determining the barotropic transport into or out of the northern and southern cross-shelf boundaries and the open-ocean outer boundary.

The boundary velocities are used by the model to calculate the sea surface elevations of the cross-shelf boundary points. When a specification of the outer boundary elevation is made, the Dirichlet conditions on the model are complete. Galt (1980) shows that these boundary conditions can be in either the <u>strong</u> or the <u>weak</u> form. The strong form requires the specification of actual boundary values, as is usually done on the northern, southern, or outer boundaries, or the specification of solution for the boundary values subject to a no-flux condition, as is done on the solid boundary. The weak form minimizes $\partial^2\xi/\partial n^2$, where n is the direction perpendicular to the boundary.

The form of the boundary conditions used in the model applications was changed for different data sets. For the 1975, 1976, and 1978 data, the strong-form boundary condition was used on the northern and southern boundaries, whenever current meter data were available. For the 1979 data,

current meter data were available only for the northern boundary, thus only the northern boundary was specified in the strong form, while the weak form was used on the southern boundary. The specification of sea surface elevation on both the northern, southern, and outer boundaries overdetermines the solution in the sense that it completely specifies the barotropic flux out of the model. Consequently any imbalance in the net flux is compensated by the formation of strong flow in the bottom Ekman layer, which produces unrealistic flow patterns along the southern boundary. The details of the calculation of the strong-form boundary conditions are discussed in the next section.

## 2.3 Strong-Form Boundary Condition Calculation

### 2.3.1 Boundary elevation correction

As stated above, the strong form of boundary condition requires the specification of actual boundary values along the region perimeter. From equation (5), the normal component of the barotropic velocity between two boundary points gives the sea surface elevation gradient between them. The elevation of each boundary point can thus be determined once the elevation at one point has been specified. There were two procedures followed in the model application, one for 1975-1976 data, and one for 1978 data. The latter application, using the notation of Figure 1b, is shown schematically in Figure 2. In order to calculate elevation values, the elevation at NFLXM is first set arbitrarily to 10 cm (Figure 2a). The elevations along the southern boundary are then calculated from points NFLXM to NSB from observed current meter data. Since the outer-boundary elevation gradient is not known, the elevation at point NOB is set to 0 cm and the elevations along the northern boundary from NOB to NBV are calculated (Figure 2b), again using current meter data. These are then adjusted such that the elevation at NBV is 10 cm, yielding a new elevation at NOB (Figure 2c). The elevation at point NSB is set equal to that at NOB and the remaining southern boundary point elevations are recalculated (Figure 2d).

The final $\xi$ field is determined by repeatedly solving Equation (1) with varying boundary slopes to satisfy a smoothness criterion for flow through the southern boundary. The sea surface elevations are calculated for each of the triangle vertices for each day interval. Since the solid boundary point elevations are calculated by imposing the condition of no transport through the solid boundary, a discontinuity sometimes exists between the elevations at NFLXM and the adjacent point along the southern boundary. To minimize this, a correction is applied by raising or lowering the elevation at point NSB and recalculating the elevations along the outer and southern boundaries as described above. This is done until a reasonable sea surface elevation gradient exists between the two troublesome points and the calculated near-bottom velocities in that region are in close agreement with observed values. Physically, this is equivalent to specifying the sea surface slope along the outer boundary and hence the barotropic transport through that boundary. This raising or lowering of the point NSB is designated in the model as an ITC correction.

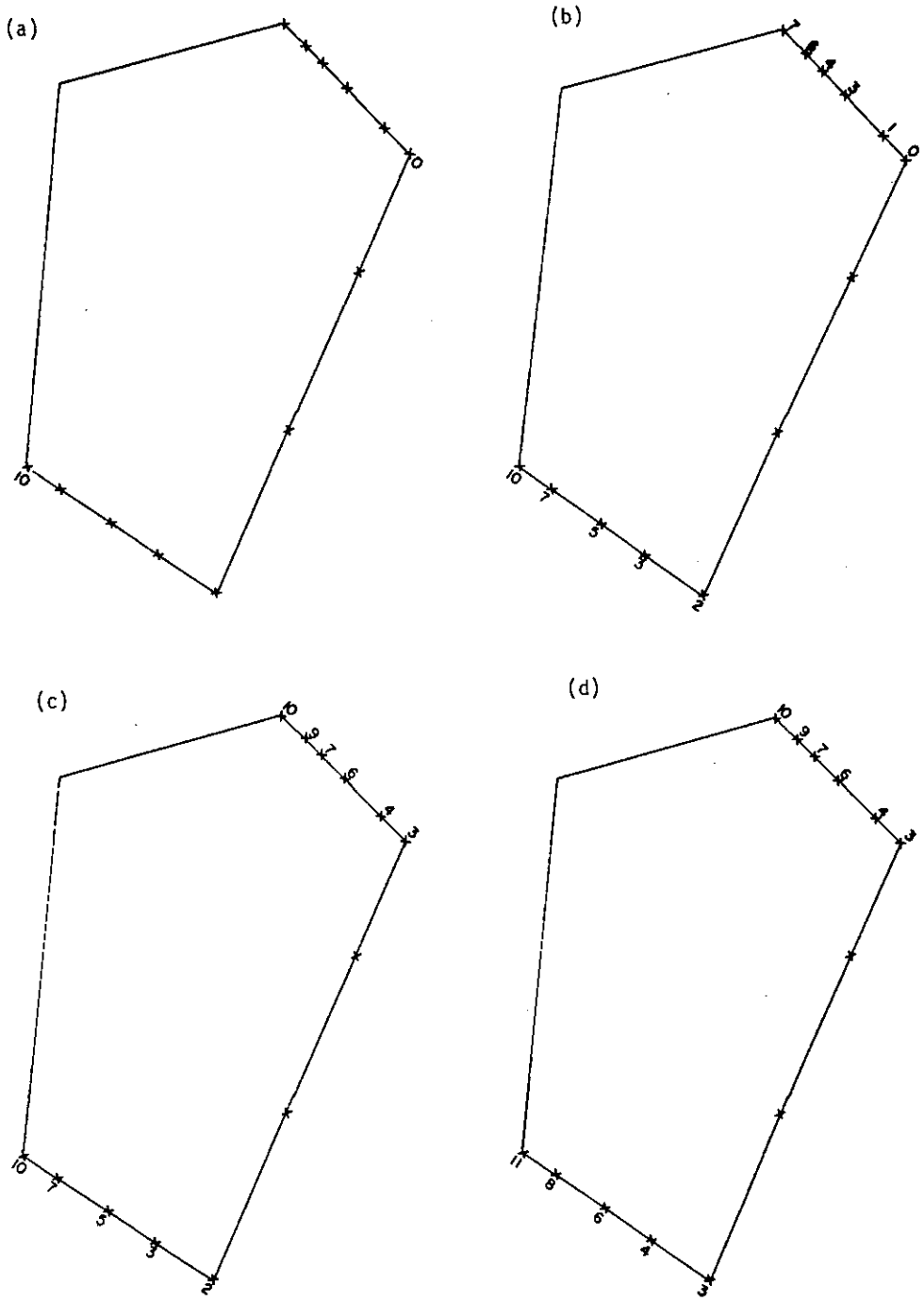


Figure 2. Schematic boundary elevation calculation.

### 2.3.2 Boundary slope correction

The procedure followed for the 1975 and 1976 data is the same as described above except that the elevation at NSB is not set equal to that at NOB (Figure 1a). Instead, the ITC correction is applied at NSB until a reasonable elevation gradient is attained between NFLX and the adjacent southern boundary point. A slope correction, ITSL, is then applied to the southern boundary to further minimize the discontinuity in elevation between these two points. This slope correction was later determined to be too artificial in that it altered the southern boundary transport and was not particularly more realistic in defining the southern boundary conditions. Consequently, no ITSL corrections were applied to the model formulations for the 1978 data. The values of ITC and ITSL for each of the model cases are given in Table 1.

## 3. MODEL APPLICATION

The Galt model is applied to a region of the continental shelf off the Long Island and New Jersey coasts, approximately 100 km offshore and 200-250 km wide. The model is applied for 53 day intervals, from 5 to 30 days in length, using STD stations from the XWCC cruise occurring nearest in time to form the vertices of the triangular finite elements. As previously stated, the depths of each of the vertices were obtained from NOS bathymetric charts. The density data were obtained from 16 XWCC cruises (2, 4, 5, 6, 7, 8, 9, 10, 17, 18, 19, 20, 21, 22, 23, and 24). The dates of these cruises are given in Table 2. Pycnocline depths, defined as the depth of maximum sigma-t gradient, were calculated for each triangle vertex. The model grids, depth (H) distribution, vertically averaged density ($\alpha$) distribution, and pycnocline depth distribution for each of the XWCC cruises are shown in Appendix A. The north and east components of wind stress for each of the day intervals is given in Table 3.

The current meter data used for the boundary condition calculations are 40-hour, low-passed records obtained from NOAA/MESA current meter arrays as described in Han (1982). The locations of the current moorings are shown in Figures 3a-3d. The surface measurements (3-meter depth) were made with a tethered spar buoy system which minimizes the surface wave contamination of the data. The boundary velocities are determined by dividing the entire record from a near-bottom current meter into day intervals approximately four to twenty days in length. These day intervals are selected by examining progressive vector diagrams of current meters located near the model grid boundary and determining time segments during which the current direction was approximately constant. The final decision of the time record subdivision was made by considering resulting time intervals from each of the meters. Consequently, each XWCC cruise has several day intervals or "cases" of different velocity averages associated with it. The cases are identified by the XWCC cruise number and the day interval number, e.g., 2-1, 2-3, 17-4, etc. The density ($\alpha$) field remains constant for each case with the same cruise number (4-1, 4-2, etc.), while the boundary velocity and wind stress values vary with each case. The cruise cases and their corresponding day intervals are given in Table 4.

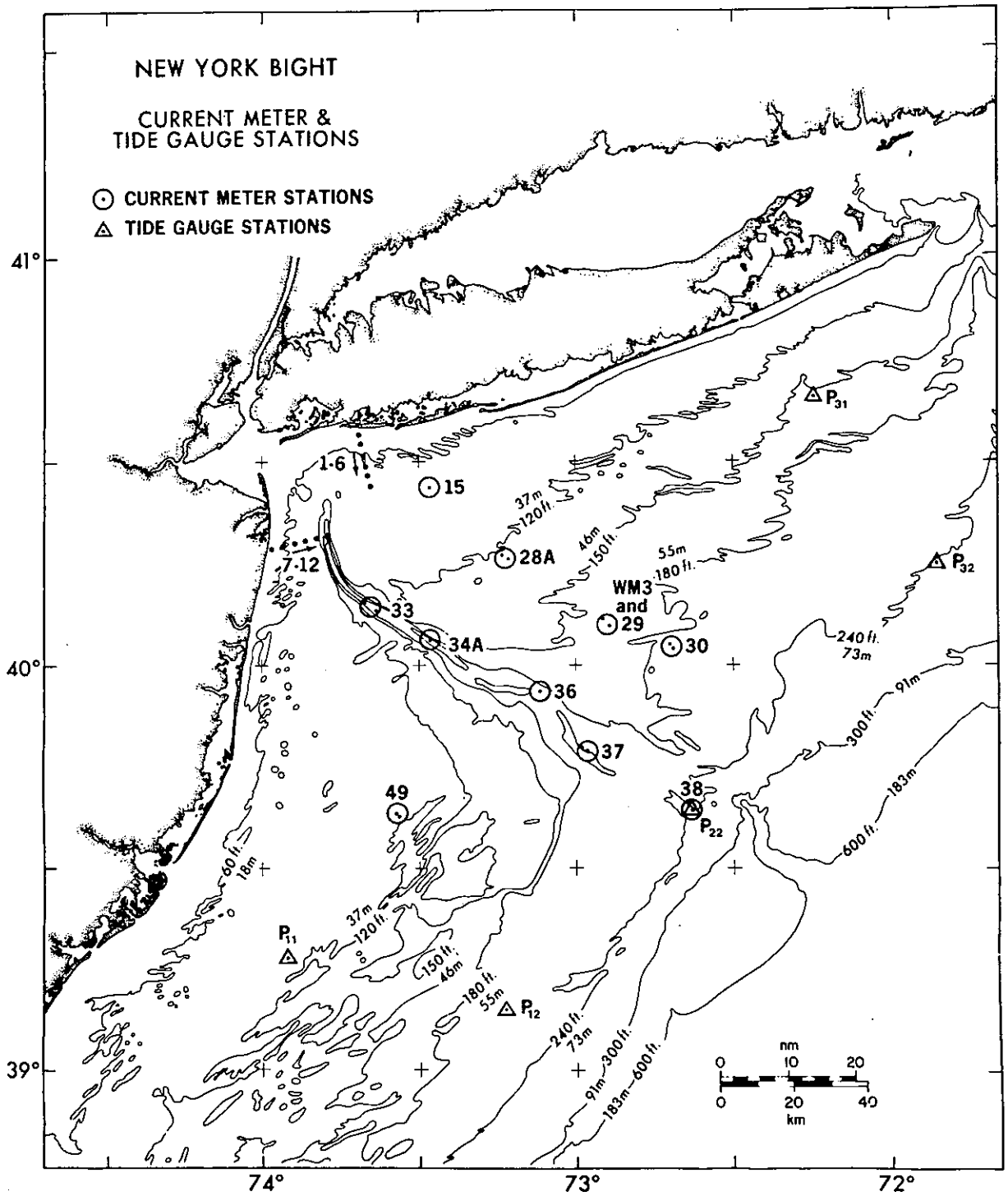


Figure 3a. Current mooring locations for 1975.

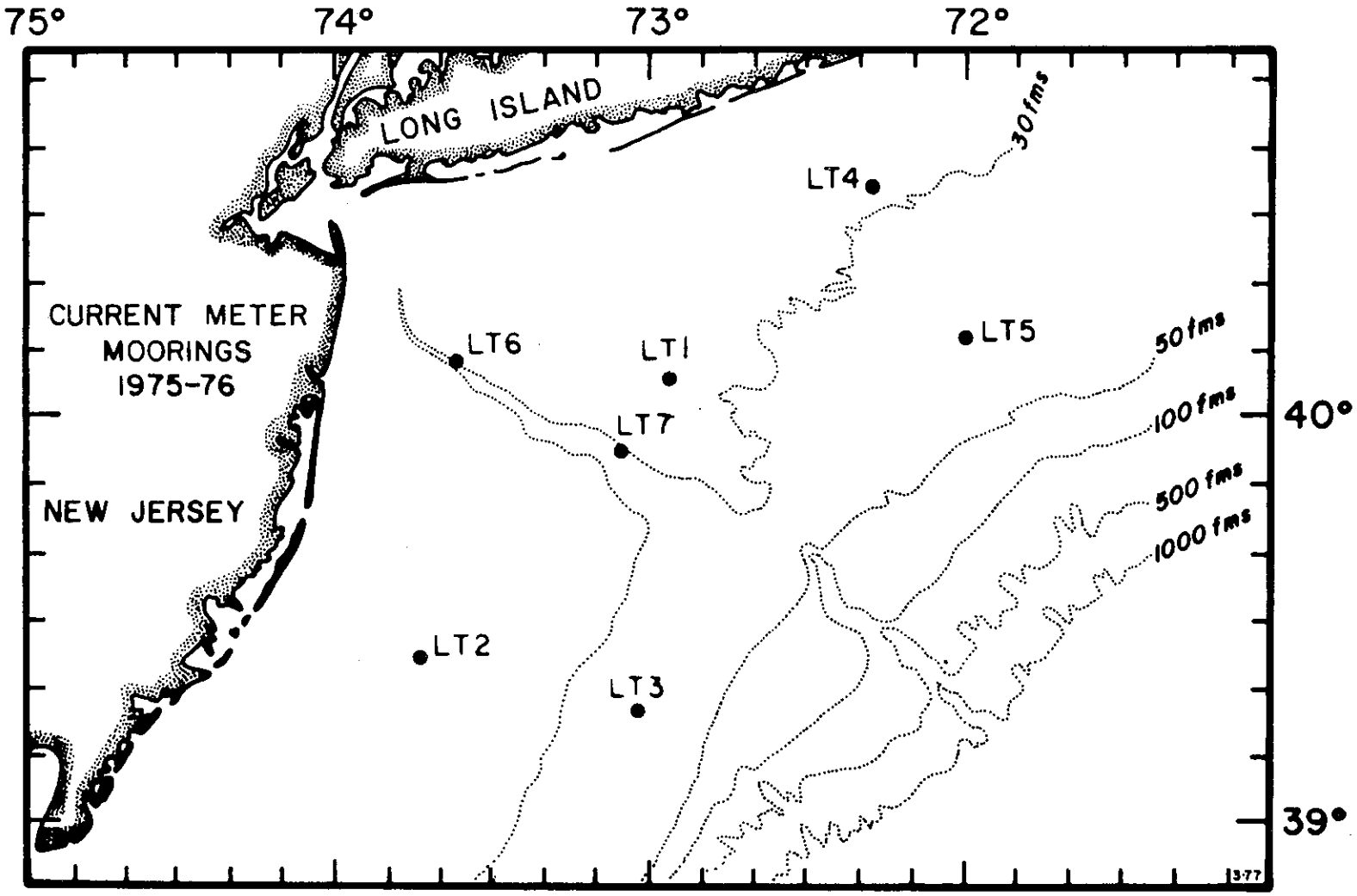


Figure 3b. Current mooring locations for 1976.

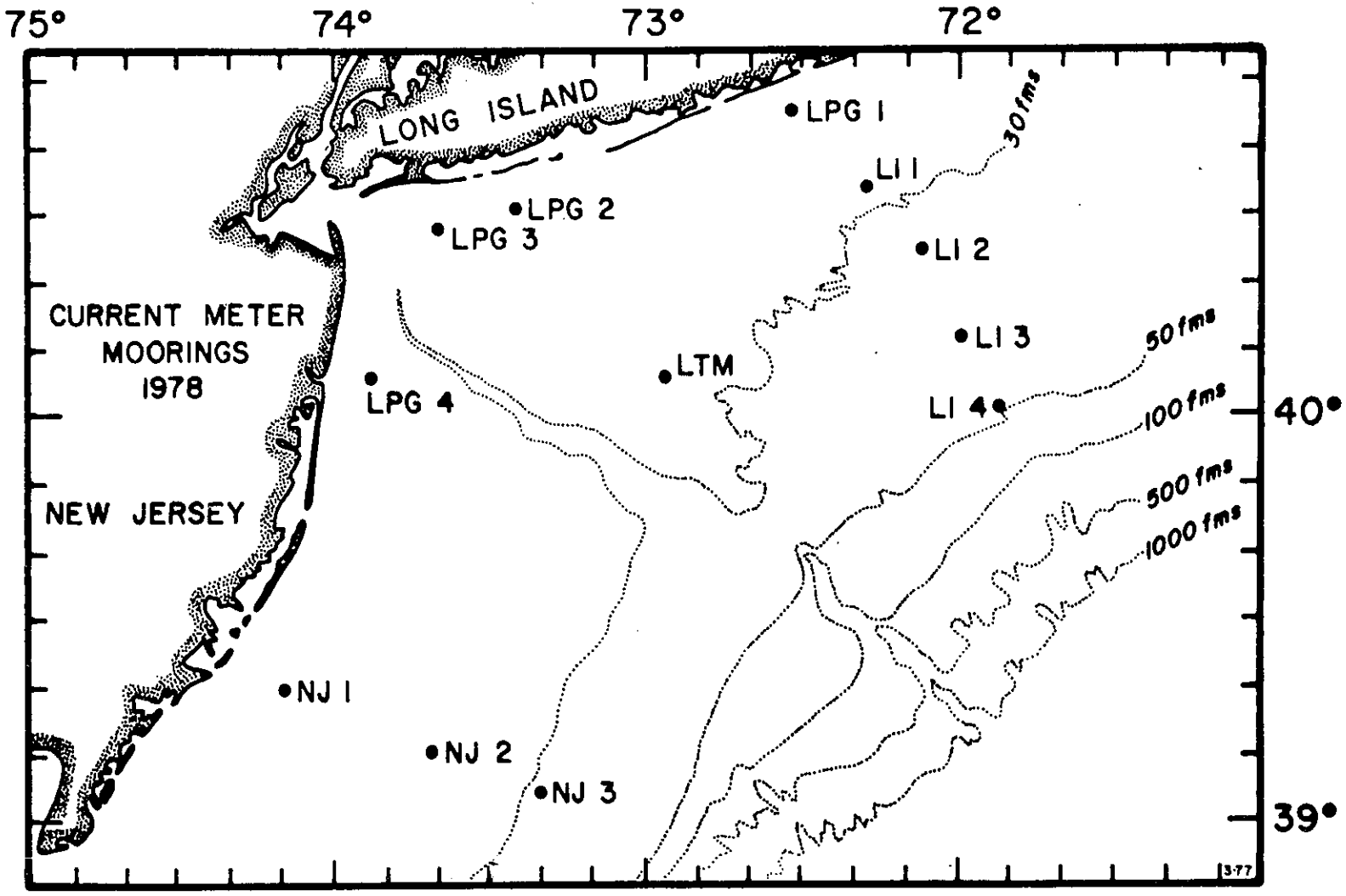


Figure 3c. Current mooring locations for 1978.

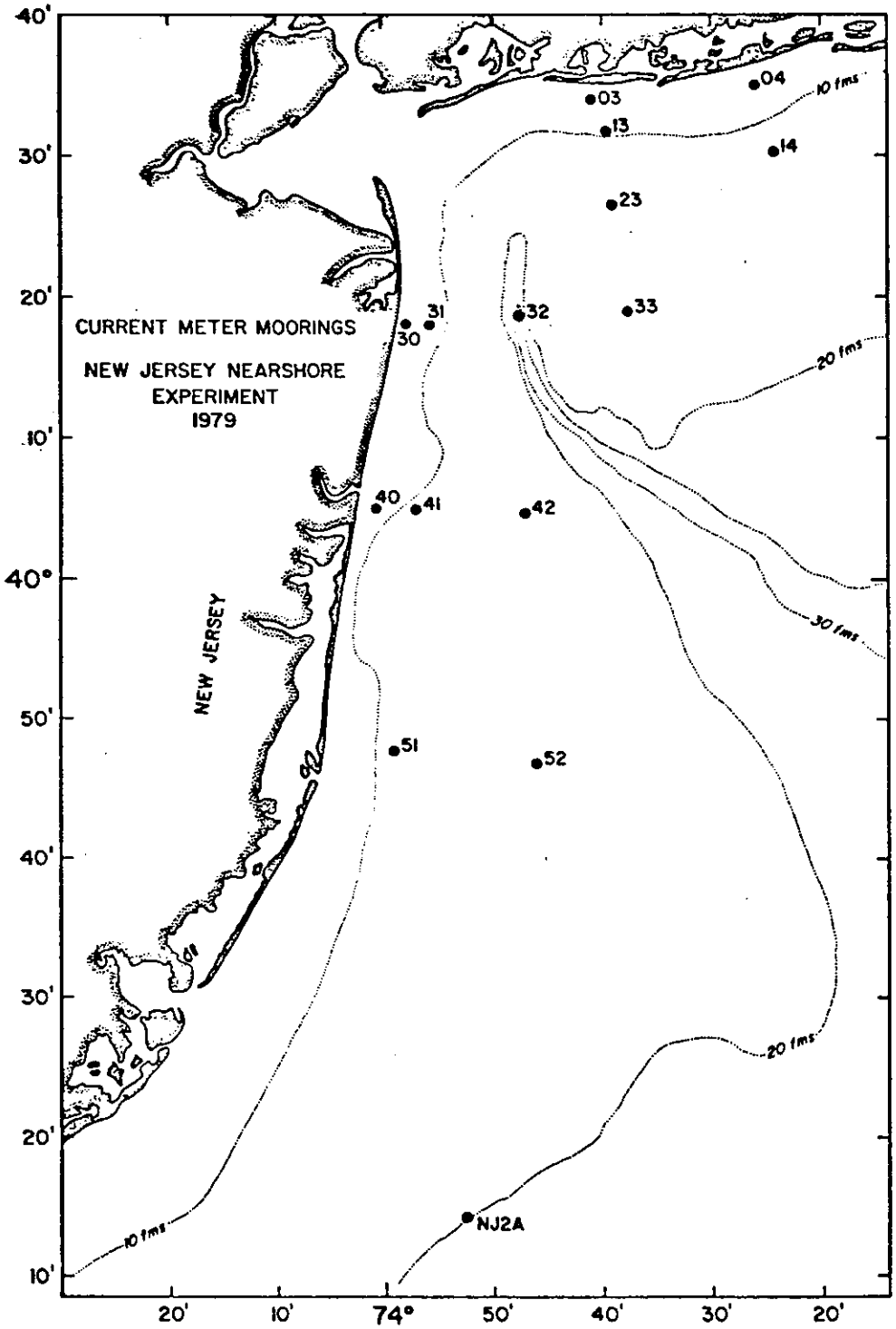


Figure 3d. Current mooring locations for 1979.

The north and east velocity components are averaged for each current meter over each of the day intervals. The components are then rotated to give the alongshelf and cross-shelf components. The rotation angles for each of the current moorings are given in Table 5. The velocities required are those near the bottom (3-15 m) but not in the bottom Ekman layer, the optimum height above bottom being approximately 8 m. The boundary velocities required by the model are specified at the centroids of the boundary triangles. To determine these velocity values, the velocity component perpendicular to the model boundary as measured by a near-bottom current meter is plotted on a graph with velocity as the ordinate and the string of boundary station locations as the abscissa, as shown in Figure 4. The longshore components are plotted at the projection of current mooring locations on the boundary, and the velocity values are interpolated to the projected centroid locations. These values are used as the boundary velocities for the model input. The height of the centroid velocities above the bottom is also required and is similarly obtained by plotting the height off the bottom of each of the current meters and interpolating for the values at the projected centroid locations.

The primary model output is the surface elevation field, which also portrays the streamlines of the near-surface geostrophic velocities. Bottom (barotropic) velocities are calculated from equation (4) using the approximation for the density gradient over a sloping bottom. Surface and bottom transports, defined by the pycnocline depth of each triangular element, are calculated by integrating equation (5). The model solution plots of sea surface elevation, bottom (barotropic) velocity, surface and bottom transports for each of the XWCC cruise cases are shown in Appendix B.

## 4. MODEL ACCURACY AND STATISTICS

The calculation of the velocity profile over the entire water column for comparison to observed values requires a separate model for the vertical velocity structure in the top and bottom Ekman layers. Constant eddy viscosity solutions produce velocity profiles that are unrealistically smooth and that penetrate too deeply for strongly stratified finite depth situations. To calculate the velocity profile over the entire depth, the one-dimensional model of Mellor and Durbin (1975) is applied to the geostrophic velocities derived from the Galt model solutions. The model is a turbulence closure scheme for parameterizing the Reynolds stresses based upon Richardson number dependent stability functions. It is time dependent and uses inputs of wind stress, geostrophic velocity profiles, and observed vertical density profiles of a nearby station. The bottom frictional layer is imposed by fitting to a logarithmic velocity profile. The Ekman layers are spun up over three inertial periods from the initial geostrophic profiles with linear shear. The profiles are time averaged over two and three inertial periods which removes inertial oscillations to give a steady profile. The wind stress is kept constant and the observed density profile is modified by vertical mixing in the model for the first 0.4 inertial period which eliminates instabilities due to small-scale perturbations in the density profiles (Han et al., 1980).

The Mellor model was applied to the Galt model solution, i.e., to the linear geostrophic velocity shear calculated (Eqn. 5) for each triangular element of the model grid for each day interval. The current mooring

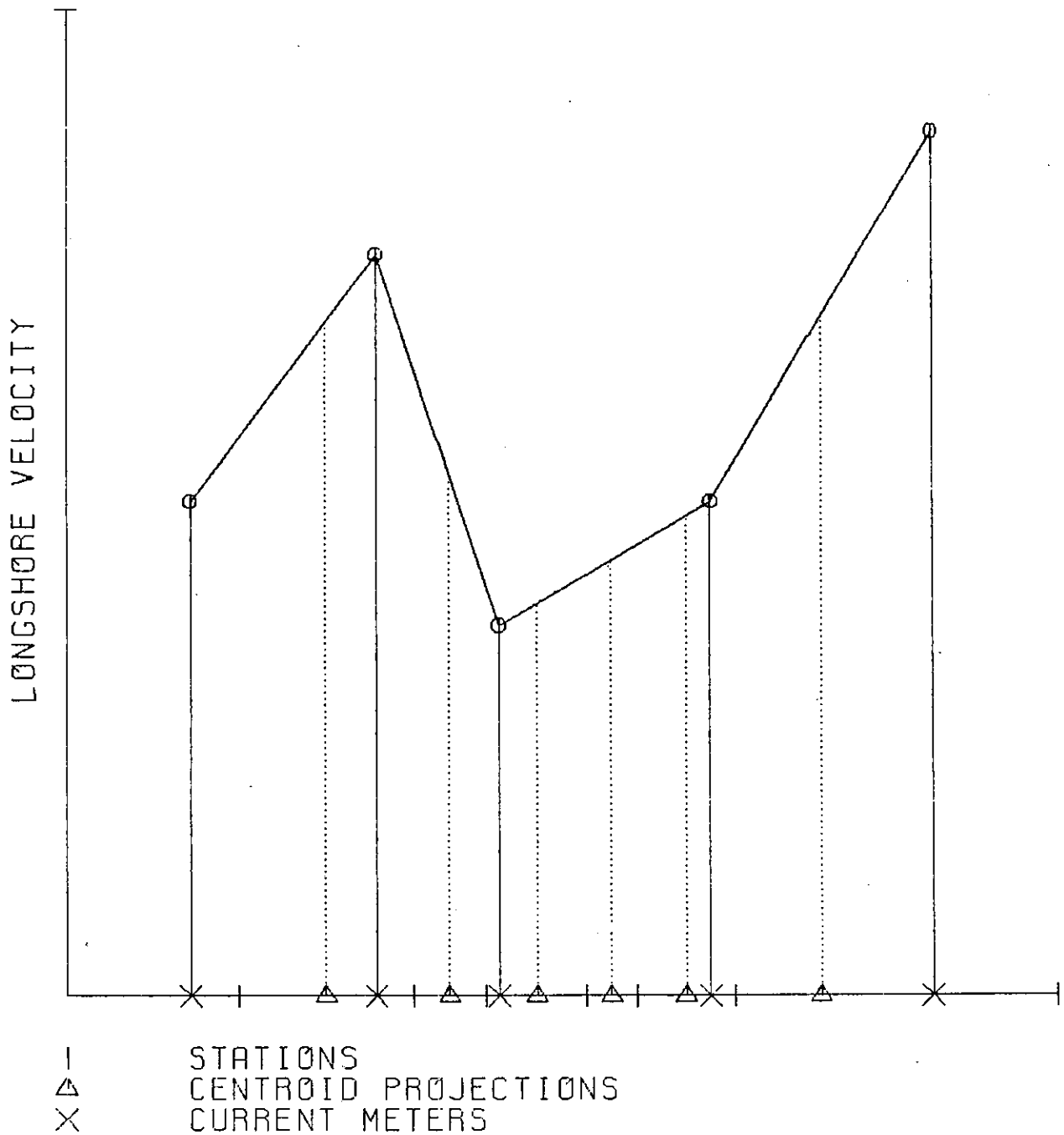


Figure 4. Schematic boundary velocity interpolation.

positions were superimposed on the model grid and the triangles closest to the mooring position were selected for comparison. The Galt model solutions of sea surface elevations were used to calculate the top and bottom geostrophic velocities at each of the triangle centroids. The vertices of each triangle were examined to determine the STD station having a profile depth nearest the current mooring depth. The density profile of this station, the top and bottom velocities computed for the selected triangle, and the wind stress for each dav interval were read into the Mellor model, which then calculated the vertical profile over the entire water depth for each triangle-station pair.

The calculated velocity profiles for each triangle-station pair were compared to the corresponding observed velocity values at the depth of each current meter. The relative error for each velocity component, given by (observed velocity minus modelled velocity)/observed velocity, was calculated for each current meter of the mooring. The absolute values of these errors were summed and the triangle-station pair having the smallest total relative error was selected as having the best representative modelled velocity for the given mooring and was used in the calculation of various statistics to evaluate the accuracy of the model.

A variety of statistics were used to evaluate the accuracy of the Galt model solutions. The modelled and observed velocity values for each day interval and current meter are shown in Table 6. The longshore (L) and cross-shore (C) components, positive upshelf and offshelf, are calculated by rotating the observed north and east velocities clockwise from north by an angle $\theta$. The rotation angles for each current mooring are given in Table 5.

Observed velocities are designated as (L, C) with the corresponding modelled velocities designated as (L', C'). The computed statistics are:

(1) Actual errors (AE) for each current meter for each day interval: EU = C-C'; EV = L-L'.

(2) Relative errors (RE) for each current meter for each day interval: REU = (C-C')/C; REV = (L-L')/L.

(3) Mean and standard deviations of actual and relative errors for each mooring for all day intervals in a given year.

(4) Cumulative probability density functions (CDF) for the absolute value of relative errors, actual errors, direction errors, and total speed errors for all moorings in a given year.

(5) Linear regression of modelled vs. observed velocities for each mooring for all day intervals in a given year: C' = A + (B)C; L' = A + (B)L.

(6) Mean-square vertical shear error

$$r_s^2 = \frac{\Sigma\,[(u_1 - u_2) - (u_1' - u_2')]^2}{\Sigma\,(u_1 - u_2)^2}$$

where $u_1$, $u_2$, and $u_1'$, $u_2'$ are observed and modelled velocities, respectively, at preselected depth layers.

The actual and relative errors for each current meter and day interval are shown in Table 7. Asterisks indicate a 0 cm/s observed velocity for which the relative errors are undefined. The actual errors have units of cm/s, while the relative errors are nondimensional. Most of the actual errors of the mid- and deep-water current meters are less than 3 cm/s. Typically, the largest actual errors for any mooring are found in the uppermost current meter. This is probably due to any rotor pumping that might have occurred due to wave action. The fact that the largest actual errors are positive, i.e., the observed velocity was greater than the modelled velocity, confirms this. Conversely, the largest relative errors are usually found in the bottommost current meter, due to the fact that the current velocities are smallest near the bottom and consequently a modest actual error is divided by the small observed velocity to yield a large relative error.

The means and standard deviations of the actual and relative errors for each mooring are shown in Tables 8a-d. These are calculated for all current meters at the mooring. These quantities show that, in general, the shelf velocities are modelled better than those in the Shelf Valley, and that for both the Shelf Valley and shelf moorings, the longshore component of velocity is better modelled than the cross-shore component in terms of relative error. In most cases, the standard deviations of the errors are significantly larger than their respective means, indicating that there is considerable scatter of data about the mean errors. In this respect, the mean errors should not be viewed as firmly fixed values, but rather as general indicators of the model's accuracy.

The actual and relative errors were plotted against the absolute value of the time difference between the time of data collection and the time of the current measurements. These graphs are shown in Appendix C. The data are from all moorings and meters for the set of cases for each XWCC cruise, with the dark solid line indicating the linear least-squares fit of the data. The graphs show that there is no trend of over- or underestimation of current velocities with the variation of the time difference interval; however, the errors are usually smallest at the time of the density observations. This is in agreement with the results of Han et al. (1980).

Cumulative probability density functions (CDF) were computed for absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors. They show the distribution of the number of comparisons with values for each of these quantities greater than a certain value. The graphs of the CDF's are shown in Appendix D. The values of the median errors for each of these quantities are given in Table 9.

In every case, the median RE for the longshore component shelf moorings was substantially less than that for the cross-shore component for the same moorings. For the Shelf Valley moorings, in 1975 the median RE for the two components was comparable. In 1976, median RE for the longshore component was slightly less than that for the cross-shore component. There were no Shelf Valley moorings in 1978. For 1979, the moorings were separated into nearshore and mid-shelf categories, with N13, N14, N31, N41, and N51 being the nearshore moorings. The CDF plot for 1979 shows a 50.3% median RE for

the L component, the lowest of all years. The average median relative error for all years was 55.5% for shelf L component, 87.8% for Shelf Valley L component, 107.9% for shelf C component, and 103.9% for Shelf Valley C component.

The CDF's for absolute actual error show that for approximately 70% of the calculations, the median actual error was less than 3.0 cm/s. The average median actual errors for all years was 1.9 cm/s for Shelf L components, 2.7 cm/s for Shelf Valley L component, 1.3 cm/s for Shelf C component, and 4.1 cm/s for Shelf Valley C component.

The absolute direction errors were obtained by computing the absolute value of the difference between the direction of the modelled and observed velocities, yielding values between 0 and 180°. The median actual errors ranged from 22° for 1975 nonshelf moorings to 61° for 1979 nearshore moorings. The average median direction error for all years was 25.5° for shelf and 46.4° for Shelf Valley moorings.

The absolute total speed error was obtained by computing the total speed for the modelled and observed velocity components and taking the absolute value of the difference. The median errors ranged from 1.2 cm/s for 1978 non-Shelf Valley moorings to 4.8 cm/s for 1975 shelf moorings. The average median total speed error for all years was 1.7 cm/s for shelf moorings and 4.0 cm/s for Shelf Valley moorings.

Linear regressions were computed of modelled vs. observed velocity components for each current mooring. The listings of moorings, y-intercepts, slopes, and correlation coefficients for the component linear regressions are found in Tables 10a-d. Also listed is whether the best-fit line for each mooring is significantly different from 1.0, using a two-sided t-test at the 95% confidence level. Hereafter, a best-fit regression line having a slope computed to be not significantly different from 1.0 will be referred to as a significant regression.

Of the 43 regression comparisons made for each velocity component, 14% of the longshore component comparisons yielded significant regressions, while 35% of the cross-shore component regressions were significant. Only a single mooring (NJ2) had a significant longshore component regression prior to 1979; however, in 1979, 36% of the moorings had significant longshore regressions and 43% of the moorings had significant cross-shore regressions. Hence, it appears that the velocity components at the current moorings were most accurately predicted by the model in 1979. One explanation may be the use of a different value for the bottom friction coefficient in the model formulation for the years 1978 and 1979 which yields a more realistic flow, particularly in the Shelf Valley region, or possibly the application of combined strong/weak form of the boundary conditions (see Section 2.2.4).

The graphs of the velocity component linear regressions are shown in Appendix E. The day intervals over which the data were compared is given on each plot. The dark solid line is the linear least-squares fit of the data, while the two dotted lines represent the 95% confidence band for the slope of the regression line. The regression plots reveal that there are situations where although the slope of the regression line is computed as being significantly different from 1.0, there is good visual correlation between modelled and observed velocity components. In most cases, the regression

line slope was less than 1.0, indicating that the model consistently underestimated the magnitude of both observed velocity components.

The mean vertical shear error for each velocity component was computed for all moorings for each XWCC cruise. The water column at each mooring was divided into five groups (water depth = DMO):

(1) 0 to 3 meters

(2) 3 to (DMO/2)-3) meters

(3) ((DMO/2)-3) to (DMO-9) meters

(4) (DMO-9) to (DMO-3) meters

(5) (DMO-3) to DMO meters

Modelled and observed velocity components in the same depth group were separately averaged and the shear errors were computed between depth groups 1 and 2 (upper layer) and between 2 and 4 (lower layer) for cases for all moorings where the appropriate velocity components were available.

The small number of data points for several of the cruises gives the shear error computation dubious value. The lower layer vertical shear errors are smaller than those for the upper layer for both velocity components. In general, the upper-layer alongshore component shear errors are the largest. There was no observable trend of vertical shear error variation away from the time of data collection, although the errors were generally smallest nearer this time.

## 5. CONCLUSIONS

In summary, the velocity field in the bight region was most accurately modelled using data from 1979, cruises XWCC 21-XWCC 24. The most significant changes made to the model application for this data set were the use of a smaller bottom friction coefficient ( $\gamma$= 500 cm) and the specification of the weak-form boundary condition on the southern boundary. The revised bottom friction coefficient yields the most realistic flow pattern with strong veering in the Shelf Valley and a smooth flow in the inner bight (Han and Kohler, 1982). The strong-form boundary condition specification on the southern boundary, as discussed in Section 2.2.4, overdetermines the model solution, requiring an unrealistically strong bottom Ekman flow to compensate for any imbalance in the net transport flux. It also presents other computational problems in the solution. Han and Kohler (1982) show that the southern boundary condition specification affects the model solution in a relatively small area northward of the boundary, even for extreme boundary velocities. Thus it appears that the weak form specification on the southern boundary yields the most satisfactory results.

Generally, the longshore velocity component was modelled more accurately than the cross-shore component, as revealed by the relative and actual errors. The longshore velocities are usually much larger than the cross-shore velocities, thereby having a smaller relative error for the same actual error. Han and Kohler (1982) show that the velocity and transport

fields in the bight are largely barotropic and that the use of STD data to obtain the baroclinic contribution often leads to unrealistic fine structure in these fields. This could be another source of velocity errors.

The mean actual error for all years and moorings on the shelf was less than 2.0 cm/s for both velocity components. This accuracy is sufficient for transport and nutrient flux calculations. It must be considered that this accuracy is achieved by a model which requires very little data input and which runs very quickly (approximately 3 minutes on a UNIVAC 1108 for a typical model grid), making the model a very useful and efficient tool in studying the general circulation in the bight.

## 6. ACKNOWLEDGEMENTS

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List of Tables


| | | Page |
|---|---|---|
| Table 1. | ITC and ITSL corrections | 23 |
| Table 2. | Dates of XWCC cruises | 24 |
| Table 3. | Wind stress components | 25 |
| Table 4. | XWCC cruise cases and corresponding day intervals | 26 |
| Table 5. | Rotation angles of current moorings | 27 |
| Table 6. | Modelled and observed velocity components for each current mooring and day interval | 28 |
| Table 7. | Actual and relative errors for each current mooring and day interval | 42 |
| Table 8a-8d. | Mean and standard deviation of actual and relative errors | 56 |
| Table 9. | Median errors for absolute relative errors, actual errors, direction errors, and total speed errors | 60 |
| Table 10a-10d. | Linear regression of modelled vs. observed velocity component parameters | 61 |

Table 1. ITC and ITSL Corrections in (cm) (see pages 12-13)

| Cruise | Model Case | ITC | ITSL | Cruise | Case | ITC | ITSL |
|---|---|---|---|---|---|---|---|
| XWCC 2 | 1 | 6 | 2 | XWCC 17 | 1 | N/A | ** |
| | 2 | -5 | 3 | | 2 | N/A | ** |
| | 3 | -2 | 3 | | 3 | N/A | ** |
| | 4 | 5 | 1 | | 4 | -3 | ** |
| | 5 | -5 | 3 | | 5 | 0 | ** |
| XWCC 4 | 1 | 7 | 2 | XWCC 18 | 1 | 1 | ** |
| | 2 | -4 | 3 | | 2 | 4 | ** |
| | 3 | 5 | 2 | | 3 | 3 | ** |
| | 4 | -3 | 4 | | 4 | 3 | ** |
| | 5 | 1 | 4 | | | | |
| XWCC 5 | 1 | -2 | 4 | XWCC 19 | 1 | -2 | ** |
| | 2 | -3 | 4 | | 2 | -2 | ** |
| | | | | | 3 | -2 | ** |
| XWCC 6 | 1 | -4 | 3 | XWCC 20 | 1 | -2 | ** |
| | 2 | 5 | 2 | | 2 | -3 | ** |
| | | | | | 3 | -1 | ** |
| | | | | | 4 | N/A | ** |
| XWCC 7 | 1 | 8 | 2 | XWCC 21 | 1 | N/A | ** |
| | 2 | 1 | 1 | | 2 | N/A | ** |
| | 3 | 4 | 1 | | 3 | N/A | ** |
| | 4 | -2 | 4 | | | | |
| | 5 | 0 | 2 | | | | |
| XWCC 8 | 1 | 2 | 3 | XWCC 22 | 1 | N/A | ** |
| | 2 | 4 | 1 | | 2 | N/A | ** |
| | 3 | -2 | 2 | | 3 | N/A | ** |
| | 4 | 2 | 1 | | | | |
| | 5 | 3 | 2 | | | | |
| | 6 | 1 | 3 | | | | |
| XWCC 9 | 1 | 1 | 3 | XWCC 23 | 1 | N/A | ** |
| | 2 | 5 | 3 | | 2 | N/A | ** |
| | 3 | N/A | ** | | | | |
| | 4 | N/A | ** | | | | |
| | 5 | N/A | ** | | | | |
| | 6 | N/A | ** | | | | |
| XWCC 10 | 1 | 4 | 1 | XWCC 24 | 1 | N/A | ** |
| | 2 | 5 | 1 | | 2 | N/A | ** |
| | 3 | 4 | 2 | | | | |
| | 4 | 3 | 2 | | | | |
| | 5 | 1 | 3 | | | | |

N/A = Not applicable to cases where only northern boundary input velocities exist.

** = ITSL correction not used in this case.

Table 2. XWCC Cruise Dates

| Cruise | Date |
|---|---|
| XWCC 2 | 27 February - 4 March 1975 |
| XWCC 4 | 2 May - 10 May 1975 |
| XWCC 5 | 8 June - 15 June 1975 |
| XWCC 6 | 30 September - 4 October 1975 |
| XWCC 7 | 3 December - 8 December 1975 |
| XWCC 8 | 12 April - 16 April 1976 |
| XWCC 9 | 17 May - 24 May 1976 |
| XWCC 10 | 28 June - 1 July 1976 |
| XWCC 17 | 10 April - 17 April 1978 |
| XWCC 18 | 31 May - 8 June 1978 |
| XWCC 19 | 5 July - 15 July 1978 |
| XWCC 20 | 31 July - 9 August 1978 |
| XWCC 21 | 9 April - 16 April 1979 |
| XWCC 22 | 29 May - 7 June 1979 |
| XWCC 23 | 16 July - 27 July 1979 |
| XWCC 24 | 13 August - 23 August 1979 |

Table 3. Wind Stress (dynes/cm$^2$)

| Cruise | Case | East | North |
|---|---|---|---|
| XWCC 2 | 1 | .69 | -.35 |
| | 2 | .06 | -.31 |
| | 3 | .52 | -.56 |
| | 4 | 2.07 | -.52 |
| | 5 | .60 | -.67 |
| XWCC 4 | 1 | 2.07 | -.52 |
| | 2 | .60 | -.67 |
| | 3 | .76 | .01 |
| | 4 | -.01 | -.20 |
| | 5 | -.02 | .19 |
| XWCC 5 | 1 | -.02 | .19 |
| | 2 | .16 | .03 |
| XWCC 6 | 1 | .06 | -.14 |
| | 2 | .52 | .03 |
| XWCC 7 | 1 | .52 | .03 |
| | 2 | .14 | -.39 |
| | 3 | .20 | -.79 |
| | 4 | .97 | -.60 |
| | 5 | .53 | .04 |
| XWCC 8 | 1 | .32 | .12 |
| | 2 | .42 | .26 |
| | 3 | .61 | -.65 |
| | 4 | .34 | .07 |
| | 5 | .02 | .18 |
| | 6 | .65 | -.13 |
| XWCC 9 | 1 | .65 | -.13 |
| | 2 | .36 | .42 |
| | 3 | 1.22 | -.03 |
| | 4 | -.22 | -.10 |
| | 5 | .08 | .10 |
| | 6 | .27 | .48 |
| XWCC 10 | 1 | .00 | .47 |
| | 2 | .21 | .46 |
| | 3 | .49 | .22 |
| | 4 | .06 | .12 |
| | 5 | -.01 | .29 |
| XWCC 17 | 1 | .04 | -.04 |
| | 2 | .08 | -.02 |
| | 3 | .24 | -.19 |
| | 4 | .08 | -.13 |
| | 5 | -.27 | .02 |
| XWCC 18 | 1 | -.27 | .02 |
| | 2 | -.01 | -.03 |
| | 3 | .23 | .04 |
| | 4 | .06 | .20 |
| XWCC 19 | 1 | .06 | .20 |
| | 2 | .09 | -.05 |
| | 3 | .10 | .19 |
| XWCC 20 | 1 | .10 | .19 |
| | 2 | .06 | .10 |
| | 3 | .01 | .04 |
| | 4 | .03 | -.01 |
| XWCC 21 | 1 | .39 | -.17 |
| | 2 | .01 | -.03 |
| | 3 | .10 | .14 |
| XWCC 22 | 1 | -.15 | -.08 |
| | 2 | -.02 | .25 |
| | 3 | .08 | .00 |
| XWCC 23 | 1 | .11 | .04 |
| | 2 | .03 | .18 |
| XWCC 24 | 1 | .19 | -.20 |
| | 2 | -.02 | .19 |

Table 4. XWCC Cruise Cases and Day Intervals

| Cruise | Case | Day Interval | Cruise | Case | Day Interval |
|---|---|---|---|---|---|
| XWCC 2 | 1 | 060-066 1975 | XWCC 17 | 1 | 067-078 1978 |
| | 2 | 066-080 1975 | | 2 | 078-095 1978 |
| | 3 | 080-090 1975 | | 3 | 095-105 1978 |
| | 4 | 090-095 1975 | | 4 | 105-124 1978 |
| | 5 | 095-109 1975 | | 5 | 124-139 1978 |
| XWCC 4 | 1 | 090-095 1975 | XWCC 18 | 1 | 124-139 1978 |
| | 2 | 095-109 1975 | | 2 | 139-158 1978 |
| | 3 | 109-115 1975 | | 3 | 158-169 1978 |
| | 4 | 115-127 1975 | | 4 | 169-179 1978 |
| | 5 | 127-150 1975 | | | |
| XWCC 5 | 1 | 127-150 1975 | XWCC 19 | 1 | 169-179 1978 |
| | 2 | 150-168 1975 | | 2 | 179-196 1978 |
| | | | | 3 | 196-211 1978 |
| XWCC 6 | 1 | 280-305 1975 | XWCC 20 | 1 | 196-211 1978 |
| | 2 | 305-328 1975 | | 2 | 211-224 1978 |
| | | | | 3 | 224-241 1978 |
| | | | | 4 | 241-266 1978 |
| XWCC 7 | 1 | 305-328 1975 | XWCC 21 | 1 | 087-098 1979 |
| | 2 | 328-354 1975 | | 2 | 098-122 1979 |
| | 3 | 354-002 1975 | | 3 | 122-129 1979 |
| | 4 | 002-023 1976 | | | |
| | 5 | 023-052 1976 | | | |
| XWCC 8 | 1 | 052-076 1976 | XWCC 22 | 1 | 129-140 1979 |
| | 2 | 076-094 1976 | | 2 | 140-163 1979 |
| | 3 | 094-104 1976 | | 3 | 163-182 1979 |
| | 4 | 104-110 1976 | | | |
| | 5 | 110-117 1976 | | | |
| | 6 | 117-125 1976 | | | |
| XWCC 9 | 1 | 117-125 1976 | XWCC 23 | 1 | 182-198 1979 |
| | 2 | 125-139 1976 | | 2 | 198-216 1979 |
| | 3 | 139-144 1976 | | | |
| | 4 | 144-155 1976 | | | |
| | 5 | 155-165 1976 | | | |
| | 6 | 165-181 1976 | | | |
| XWCC 10 | 1 | 165-181 1976 | XWCC 24 | 1 | 216-228 1979 |
| | 2 | 181-189 1976 | | 2 | 228-249 1979 |
| | 3 | 189-204 1976 | | | |
| | 4 | 204-222 1976 | | | |
| | 5 | 222-226 1976 | | | |

Table 5. Current Meter Rotation Angles (measured clockwise from north).

| Year | Meter | Angle |
|---|---|---|
| 1975 | CM15 | 70 |
| | CM28 | 60 |
| | CM29 | 45 |
| | CM30 | 45 |
| | CM33 | 30 |
| | CM34 | 40 |
| | CM36 | 50 |
| | CM37 | 50 |
| | CM38 | 45 |
| | CM49 | 30 |
| 1976 | LT1 | 45 |
| | LT2 | 30 |
| | LT3 | 30 |
| | LT4 | 60 |
| | LT5 | 55 |
| | LT6 | 30 |
| | LT7 | 50 |
| 1978 | LI1 | 60 |
| | LI2 | 60 |
| | LI3 | 55 |
| | LI4 | 55 |
| | LPG1 | 70 |
| | LPG2 | 75 |
| | LPG3 | 80 |
| | LPG4 | 00 |
| | LTM | 45 |
| | NJ1 | 30 |
| | NJ2 | 30 |
| | NJ3 | 30 |
| 1979 | LTM | 45 |
| | LI1 | 60 |
| | LI3 | 55 |
| | NJ2A | 30 |
| | N13 | 80 |
| | N14 | 75 |
| | N23 | 80 |
| | N31 | -10 |
| | N32 | -10 |
| | N33 | -10 |
| | N41 | 00 |
| | N42 | 00 |
| | N51 | 05 |
| | N52 | 05 |

Table 6. Observed and Modeled Velocities 1975.

| CRUISE | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 60- 66 | | | | 66- 80 | | | | 80- 90 | | | | 90- 95 | | | | 95-109 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | -3.1 | .4 | -7.2 | .2 | 11.0 | 9.9 | -1.7 | 21.7 | -7.8 | 4.6 | -10.4 | 3.2 |
| 20.0 | | | | | | | | | -1.9 | -.4 | 1.6 | -.2 | 5.0 | 1.8 | 5.3 | -4.7 | -2.2 | -1.3 | .8 | -.8 |
| CM28 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -5.8 | 7.6 | -4.6 | 5.0 | -10.1 | -.4 | -8.6 | .3 | -8.1 | 2.7 | -7.1 | 3.8 | 7.3 | 5.0 | -3.5 | 13.7 | -8.2 | -.2 | -9.6 | 3.9 |
| 24.0 | 2.2 | -3.7 | 1.0 | -.1 | -9.4 | -.1 | -3.1 | -.1 | -7.1 | 1.2 | -.2 | .3 | | | | | | | | |
| 37.0 | .9 | -1.5 | 1.5 | -.5 | -2.9 | -.9 | -1.4 | -.2 | -1.8 | -.9 | .7 | -.2 | 2.2 | -.7 | 3.3 | -2.0 | -3.5 | -.6 | -.5 | -.5 |
| CM29 | | | | | | | | | | | | | | | | | | | | |
| 10.0 | -.9 | 3.5 | -2.9 | -.0 | -11.2 | -3.5 | -5.6 | -3.1 | -2.3 | .6 | -4.5 | -1.3 | 14.3 | 4.7 | -4.6 | 3.6 | -12.6 | -3.1 | -7.5 | -2.5 |
| 25.0 | 1.4 | 1.4 | 1.6 | -1.4 | -10.9 | -3.0 | -3.7 | -1.7 | -1.8 | -.6 | .5 | -1.0 | 10.5 | 2.0 | 5.5 | -2.8 | -10.4 | -3.9 | -2.2 | -2.4 |
| 40.0 | 2.2 | 1.1 | 2.3 | -.5 | -7.2 | -1.4 | -2.9 | -1.2 | -.7 | -.1 | .8 | -.3 | 5.1 | 1.1 | 5.2 | -2.2 | -5.3 | -1.5 | -1.7 | -1.3 |
| CM30 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 4.2 | 1.9 | -1.9 | 6.4 | -10.2 | -.9 | -6.5 | -3.3 | -.9 | -1.0 | -5.0 | 3.5 | 15.8 | 4.9 | -3.3 | 16.9 | -14.6 | -1.8 | -11.4 | 1.9 |
| 27.0 | 2.1 | 3.3 | 5.1 | -.3 | -7.6 | -2.5 | -2.8 | -1.8 | -1.3 | -.3 | 3.4 | -.1 | 11.7 | 5.9 | 9.8 | -.5 | -11.9 | -2.3 | -1.6 | -1.7 |
| 42.0 | 3.8 | .7 | 4.4 | -.1 | -8.9 | -1.3 | -3.8 | -1.6 | .6 | -1.9 | 2.6 | .1 | 10.4 | 4.7 | 7.6 | .4 | -9.8 | -1.7 | -2.5 | -1.6 |
| CM33 | | | | | | | | | | | | | | | | | | | | |
| 8.0 | -10.5 | -11.2 | 3.0 | -7.1 | -6.5 | 7.7 | -1.5 | 2.0 | 5.0 | 13.9 | 1.6 | -4.6 | | | | | | | | |
| 39.0 | 5.4 | -11.5 | 1.3 | -3.9 | -3.7 | -5.2 | -.8 | 2.1 | .3 | -5.0 | .4 | -1.7 | 2.4 | -27.4 | 4.2 | -7.0 | 4.7 | -1.0 | -.4 | -.4 |
| 58.0 | .2 | -5.0 | 1.3 | -3.1 | -.0 | -.9 | -.6 | 1.6 | .0 | -3.6 | .5 | -1.2 | | | | | | | | |
| CM34 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | |
| CM36 | | | | | | | | | | | | | | | | | | | | |
| 27.0 | -2.7 | -9.8 | .7 | -1.2 | -11.7 | 1.0 | -1.0 | 2.0 | -4.9 | -4.6 | -.1 | .4 | -.3 | -21.8 | -.9 | -4.0 | -11.3 | .1 | -1.5 | -.5 |
| 41.0 | -1.7 | -9.8 | 2.2 | -1.2 | -7.4 | -1.1 | -1.8 | 1.8 | -.5 | -5.5 | .9 | .7 | .9 | -20.4 | 4.5 | -5.3 | -7.6 | -.6 | -1.0 | 1.0 |
| 55.0 | -2.0 | -8.8 | 2.1 | -2.1 | -2.9 | -.1 | -2.0 | 1.7 | .6 | -3.9 | .9 | -.1 | -2.0 | -18.3 | 4.2 | -4.8 | -3.9 | .3 | -1.2 | .9 |
| CM37 | | | | | | | | | | | | | | | | | | | | |
| 7.0 | -.1 | -7.2 | .0 | -.2 | -7.3 | 10.4 | -7.7 | -.9 | -8.5 | -2.9 | -1.9 | -1.4 | 13.8 | -11.1 | 4.9 | 1.5 | -15.0 | 4.8 | -5.0 | 3.3 |
| 38.0 | -1.7 | -12.5 | 5.1 | -2.1 | -10.7 | 11.1 | -5.4 | .4 | -5.7 | -7.5 | 2.0 | -1.8 | 8.1 | -16.0 | 10.7 | -6.4 | -13.8 | 3.1 | -2.4 | .9 |
| 62.0 | -3.1 | -10.0 | 3.9 | -2.2 | -5.6 | 9.0 | -5.1 | .9 | -2.5 | -4.5 | 1.7 | -1.1 | 4.0 | -13.2 | 8.9 | -4.9 | -6.9 | 2.9 | -2.2 | .9 |
| CM38 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 6.6 | -1.2 | -8.5 | 4.3 | -12.6 | -.4 | -14.9 | -2.5 | 2.3 | -.7 | -11.2 | 1.2 | 14.5 | -1.9 | -2.7 | 13.1 | -16.0 | -.3 | -18.5 | 3.3 |
| 26.0 | 8.8 | -4.4 | 1.7 | -3.6 | -16.9 | -1.8 | -8.2 | -.6 | 4.3 | -4.0 | .0 | -2.4 | 17.0 | -3.8 | 7.2 | -4.9 | -17.7 | -4.1 | -6.4 | -1.0 |
| 41.0 | 9.6 | -4.2 | 2.0 | -3.4 | -15.5 | -.8 | -8.0 | -.6 | 3.6 | -3.8 | .4 | -2.1 | 16.0 | -5.0 | 7.4 | -4.2 | -13.8 | -.8 | -5.9 | -.5 |
| 75.0 | 3.4 | -4.7 | 2.1 | -1.5 | -5.2 | .5 | -5.2 | .5 | .4 | -3.6 | 1.2 | -.8 | 3.2 | -10.9 | 5.7 | -3.4 | -3.5 | .6 | -3.4 | .9 |
| CM49 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | -18.6 | -1.5 | -12.9 | .7 |
| 11.0 | -4.7 | 3.6 | -1.8 | -1.3 | | | | | | | | | | | | | -13.9 | -1.5 | -10.7 | -1.7 |
| 27.0 | -2.3 | -.4 | 2.4 | .3 | -8.8 | .4 | -4.1 | -.9 | -2.7 | -1.0 | -.1 | -.4 | 5.2 | 2.3 | 6.6 | -1.7 | -7.1 | .3 | -2.9 | -.2 |
| 34.0 | -.0 | -.4 | 1.6 | .1 | -4.7 | -4.1 | -3.1 | -.3 | -.6 | -2.7 | -.1 | -.2 | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975.

| CRUISE | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 90- 95 | | | | 95-109 | | | | 109-115 | | | | 115-127 | | | | 127-150 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 11.0 | 9.9 | -3.9 | 17.3 | -7.8 | 4.6 | -6.5 | -4.7 | 9.1 | 10.4 | -2.8 | -.5 | -7.7 | -.2 | 1.5 | -3.8 | .6 | .0 | .6 | -1.9 |
| 20.0 | 5.0 | 1.8 | 1.9 | -5.4 | -2.2 | -1.3 | .3 | -.7 | 4.6 | -2.5 | 2.2 | -1.7 | -4.2 | 2.6 | -1.2 | -.3 | -1.5 | 1.6 | -.8 | -.7 |
| CM28 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 7.3 | 5.0 | 1.6 | 14.0 | -8.2 | -.2 | -8.8 | .4 | 2.1 | 8.0 | 2.6 | 6.0 | -8.5 | -2.6 | .2 | -4.7 | -4.3 | -1.4 | 1.8 | -2.0 |
| 24.0 | | | | | | | | | | | | | | | | | | | | |
| 37.0 | 2.2 | -.7 | 4.0 | -1.9 | -3.5 | -.6 | -.4 | -.2 | 2.0 | -1.9 | 1.9 | -.9 | -3.4 | 1.0 | -1.2 | .2 | -1.0 | -.0 | -.6 | -.2 |
| CM29 | | | | | | | | | | | | | | | | | | | | |
| 10.0 | 14.3 | 4.7 | 4.6 | .4 | -12.6 | -3.1 | -4.7 | -.3 | 8.5 | 5.4 | 1.2 | .3 | -6.7 | -2.8 | -4.9 | .0 | -6.6 | .9 | -3.1 | .2 |
| 25.0 | 10.5 | 2.0 | 5.2 | .2 | -10.4 | -3.9 | -3.9 | -.5 | | | | | | | | | | | | |
| 40.0 | 5.1 | 1.1 | 6.0 | .0 | -5.3 | -1.5 | -3.1 | -.7 | 5.4 | -1.3 | 2.6 | -.1 | -5.2 | .9 | -3.2 | -.3 | -2.1 | .4 | -1.5 | -.2 |
| CM30 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 15.8 | 4.9 | -7.9 | 18.2 | -14.6 | -1.8 | -16.7 | -.4 | 6.2 | -.1 | -4.8 | 7.7 | | | | | | | | |
| 27.0 | 11.7 | 5.9 | 3.5 | -6.1 | -11.9 | -2.3 | -4.0 | -2.4 | 1.3 | 2.9 | 1.6 | -1.6 | | | | | | | | |
| 42.0 | 10.4 | 4.7 | 5.7 | -.2 | -9.8 | -1.7 | -3.7 | -1.9 | 6.4 | 1.1 | 2.2 | -.9 | -8.1 | .3 | -3.6 | -1.4 | -2.3 | -1.2 | -1.8 | -1.1 |
| CM33 | | | | | | | | | | | | | | | | | | | | |
| 8.0 | | | | | | | | | | | | | | | | | | | | |
| 39.0 | 2.4 | -27.4 | 5.4 | -11.2 | 4.7 | -1.0 | -.4 | -2.2 | 1.5 | -17.5 | 2.3 | -7.4 | -5.0 | 3.8 | -1.3 | 6.9 | | | | |
| 58.0 | | | | | | | | | | | | | | | | | | | | |
| CM34 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | |
| CM36 | | | | | | | | | | | | | | | | | | | | |
| 27.0 | -.3 | -21.8 | 1.8 | -1.8 | -11.3 | .1 | -5.3 | 3.9 | -1.9 | -14.5 | -.3 | .6 | -5.3 | 1.5 | -5.9 | 4.3 | -5.9 | .2 | -4.5 | 3.1 |
| 41.0 | .9 | -20.4 | 2.6 | -2.8 | -7.6 | -.6 | -4.0 | 2.9 | 1.0 | -14.7 | .5 | -.4 | -4.0 | 2.9 | -4.6 | 3.2 | -3.5 | -.0 | -3.2 | 2.1 |
| 55.0 | -2.0 | -18.3 | 3.4 | -3.8 | -3.9 | .3 | -2.9 | 2.0 | -.8 | -11.9 | 1.3 | -1.4 | -2.3 | 4.2 | -3.4 | 2.3 | -2.1 | -.2 | -2.2 | 1.2 |
| CM37 | | | | | | | | | | | | | | | | | | | | |
| 7.0 | 13.8 | -11.1 | -3.0 | -2.2 | -15.0 | 4.8 | -7.6 | 3.7 | 5.7 | -10.2 | -1.4 | -8.0 | -7.7 | 7.9 | -4.3 | 6.2 | -5.1 | 5.0 | -2.0 | 4.4 |
| 38.0 | 8.1 | -16.0 | 9.4 | -8.6 | -13.8 | 3.1 | -2.4 | 4.0 | 4.7 | -11.6 | 4.4 | -6.1 | -7.1 | 13.5 | -4.3 | 4.7 | -3.1 | 6.2 | -2.1 | 2.9 |
| 62.0 | 4.0 | -13.2 | 7.2 | -7.7 | -6.9 | 2.9 | -2.1 | 2.3 | 1.5 | -10.1 | 3.2 | -4.5 | -3.3 | 12.1 | -3.4 | 2.9 | -.7 | 4.9 | -1.3 | 1.3 |
| CM38 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 14.5 | -1.9 | 2.6 | 22.3 | -16.0 | -.3 | -19.4 | 4.8 | 6.5 | -.7 | -3.1 | 12.0 | | | | | | | | |
| 26.0 | 17.0 | -3.8 | 6.5 | -5.1 | -17.7 | -4.1 | -.5 | -.4 | 7.4 | -3.6 | 5.5 | -2.9 | | | | | | | | |
| 41.0 | 16.0 | -5.0 | 11.5 | -4.5 | -13.8 | -.8 | -.8 | .3 | 4.1 | -5.2 | 5.7 | -2.3 | | | | | | | | |
| 75.0 | 3.2 | -10.9 | 7.6 | -3.8 | -3.5 | .6 | -.4 | .6 | 1.1 | -4.0 | 4.1 | -2.0 | | | | | | | | |
| CM49 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | -10.6 | -1.5 | -12.7 | .2 | 2.1 | 3.6 | .1 | 5.1 | | | | | | | | |
| 11.0 | | | | | -13.9 | -1.5 | -6.5 | -3.4 | 3.2 | 3.4 | -.0 | 4.8 | -9.1 | -2.4 | -2.7 | .0 | -2.7 | .2 | -1.3 | -.4 |
| 27.0 | 5.2 | 2.3 | 5.8 | 2.1 | -7.1 | .3 | -2.1 | .9 | 5.1 | -.9 | 1.7 | -.6 | -6.3 | 2.6 | -3.1 | .7 | -2.5 | 1.0 | -1.2 | -.3 |
| 34.0 | | | | | | | | | | | | | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975.

| CRUISE | XWCC- 5 | | | | XWCC- 5 | | | |
|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 127-150 | | | | 150-168 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | |
| 3.0 | .6 | .0 | -1.0 | .7 | | | | |
| 20.0 | -1.5 | 1.6 | .1 | .0 | .7 | -.4 | .5 | -.1 |
| CM28 | | | | | | | | |
| 3.0 | -4.3 | -1.4 | -6.3 | 3.3 | -11.5 | 5.9 | -9.8 | 4.7 |
| 24.0 | | | | | | | | |
| 37.0 | -1.0 | -.0 | -.4 | -.1 | | | | |
| CM29 | | | | | | | | |
| 10.0 | -6.6 | .9 | -1.6 | -.1 | | | | |
| 25.0 | | | | | | | | |
| 40.0 | -2.1 | .4 | -1.3 | -.2 | -2.2 | -.2 | -1.4 | -.3 |
| CM30 | | | | | | | | |
| 3.0 | | | | | | | | |
| 27.0 | | | | | | | | |
| 42.0 | -2.3 | -1.2 | -2.4 | -1.0 | -4.5 | -.9 | -2.6 | -1.1 |
| CM33 | | | | | | | | |
| 8.0 | | | | | | | | |
| 39.0 | | | | | | | | |
| 58.0 | | | | | | | | |
| CM34 | | | | | | | | |
| 30.0 | | | | | -7.5 | 1.6 | -3.9 | -7.4 |
| CM36 | | | | | | | | |
| 27.0 | -5.9 | .2 | .1 | 6.9 | -1.0 | -4.3 | .1 | 7.0 |
| 41.0 | -3.5 | -.0 | .5 | 3.0 | -1.4 | -1.9 | .6 | 3.0 |
| 55.0 | -2.1 | -.2 | .2 | 2.7 | -.9 | -.9 | .2 | 2.7 |
| CM37 | | | | | | | | |
| 7.0 | -5.1 | 5.0 | .2 | 12.3 | -1.8 | 5.6 | .4 | 12.5 |
| 38.0 | -3.1 | 6.2 | .2 | 7.1 | -2.9 | 4.6 | .1 | 7.1 |
| 62.0 | -.7 | 4.9 | .1 | 2.9 | -1.2 | 4.7 | .0 | 2.9 |
| CM38 | | | | | | | | |
| 3.0 | | | | | | | | |
| 26.0 | | | | | | | | |
| 41.0 | | | | | | | | |
| 75.0 | | | | | | | | |
| CM49 | | | | | | | | |
| 3.0 | | | | | -3.3 | 3.3 | -2.1 | 4.0 |
| 11.0 | -2.7 | .2 | -1.0 | 1.2 | -2.0 | 3.0 | -.6 | 1.5 |
| 27.0 | -2.5 | 1.0 | -.9 | -.2 | -2.3 | .5 | -.9 | .1 |
| 34.0 | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975-1976.

| CRUISE | XWCC- 6 | | | | XWCC- 6 | | | | XWCC- 7 | | | | XWCC- 7 | | | | XWCC- 7 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 280-305 | | | | 305-328 | | | | 305-328 | | | | 328-354 | | | | 354- 2 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -12.8 | -2.8 | -21.0 | -1.7 | -4.9 | 4.2 | -1.9 | .1 | -4.9 | 4.2 | -1.1 | 6.4 | -7.2 | 1.3 | -9.7 | 1.4 | -8.6 | .7 | -14.8 | .3 |
| 9.0 | -16.5 | -3.3 | -19.3 | -3.8 | -7.3 | 3.2 | -4.3 | 2.5 | -7.3 | 3.2 | -3.3 | .6 | -10.4 | 2.9 | -4.9 | -2.1 | -12.1 | 2.2 | -8.2 | -4.2 |
| 19.0 | -14.4 | -2.9 | -10.5 | .6 | -4.3 | .4 | .0 | -.2 | -4.3 | .4 | -1.5 | -1.8 | | | | | | | | |
| 39.0 | -5.6 | 1.8 | -8.5 | -.6 | .2 | -.8 | .0 | -.2 | .2 | -.8 | .1 | -1.0 | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | .3 | 3.2 | .6 | 8.4 | .3 | 3.2 | 2.3 | 5.7 | -5.8 | 1.7 | -12.1 | -1.5 | -12.1 | .0 | -19.8 | -5.2 |
| 13.0 | -16.1 | -3.2 | -6.0 | -2.9 | .4 | 1.1 | -.2 | 3.4 | .4 | 1.1 | 1.9 | 4.7 | -9.1 | 1.7 | -4.1 | -.1 | -14.8 | -.9 | -7.1 | -5.1 |
| 23.0 | -10.2 | -1.3 | -5.1 | -2.0 | 5.7 | 1.5 | 4.1 | 2.1 | 5.7 | 1.5 | 3.8 | .1 | -2.9 | -2.0 | -3.1 | -.1 | -5.3 | -5.2 | -5.9 | -3.6 |
| 31.0 | -4.9 | -.6 | -2.9 | -1.2 | 2.1 | .8 | 2.9 | 1.1 | 2.1 | .8 | 2.7 | .2 | -3.9 | -1.2 | -1.5 | .3 | -5.0 | -2.7 | -4.5 | -1.7 |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | -16.5 | -1.7 | -7.6 | -2.6 | -13.1 | -2.3 | -25.5 | -10.6 |
| 9.0 | -17.5 | -2.6 | -3.3 | -2.2 | -9.5 | 1.5 | -1.9 | 13.8 | -9.5 | 1.5 | -7.9 | 16.2 | -18.6 | -1.4 | -11.2 | -.3 | -16.8 | -3.6 | -13.8 | -9.0 |
| 19.0 | | | | | -7.4 | .7 | -.7 | 3.3 | -7.4 | .7 | -5.2 | .3 | -17.7 | -2.3 | -1.6 | -1.3 | -16.5 | -4.4 | -9.9 | -5.0 |
| 39.0 | -13.6 | -2.7 | -1.3 | -4.4 | -5.4 | -.8 | -3.8 | 1.8 | -5.4 | -.8 | -6.9 | .6 | -9.8 | -1.4 | -3.4 | -.7 | -14.4 | -2.3 | -11.0 | -4.1 |
| 59.0 | -10.1 | -.1 | -5.2 | -3.8 | -1.7 | -.2 | -5.5 | 2.5 | -1.7 | -.2 | -8.9 | .5 | -4.6 | 1.1 | -5.1 | -.9 | -10.1 | 1.2 | -10.9 | -4.0 |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | -18.2 | .7 | -9.1 | -1.5 | -3.9 | 5.5 | 2.7 | -2.0 | -3.9 | 5.5 | 5.0 | -1.8 | -10.7 | 7.2 | .0 | -1.1 | -18.3 | 5.3 | -3.7 | -1.2 |
| 39.0 | -8.0 | .0 | -8.4 | -.8 | 2.9 | -.2 | 2.9 | -1.2 | 2.9 | -.2 | 3.2 | -1.6 | -1.7 | -1.3 | -1.6 | -1.0 | -5.3 | -2.2 | -5.2 | -1.3 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | -17.3 | -.3 | -7.1 | -.6 | -2.9 | 1.5 | -1.7 | -2.2 | -2.9 | 1.5 | -2.0 | 1.0 | -14.6 | -.9 | -4.2 | 2.2 | -23.3 | .7 | -7.4 | 2.1 |
| 40.0 | -11.8 | -.4 | -7.1 | -.5 | -2.6 | -.8 | -1.7 | -2.1 | -2.6 | -.8 | -1.7 | -.9 | -8.4 | -1.1 | -3.9 | .4 | -18.2 | -.2 | -7.1 | .2 |
| 60.0 | -7.1 | 1.4 | -7.4 | .5 | -2.3 | 1.0 | -1.6 | -2.0 | -2.3 | 1.0 | -1.6 | -2.6 | -4.2 | 1.8 | -3.7 | -1.4 | -7.4 | 2.4 | -7.0 | -1.6 |
| 65.0 | -4.6 | .2 | -5.1 | .9 | -1.4 | .4 | -1.4 | -1.3 | -1.4 | .4 | -1.8 | -1.6 | -3.0 | .7 | -2.8 | -.2 | -5.0 | 1.0 | -4.6 | .6 |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | -5.7 | -8.1 | -7.9 | -.8 | -6.6 | -8.8 | -13.8 | .1 |
| 21.0 | | | | | | | | | | | | | -6.2 | -8.8 | -1.0 | 1.7 | -6.0 | -9.4 | -2.6 | 3.8 |
| 42.0 | -4.1 | -.4 | -2.1 | 1.6 | | | | | | | | | -2.4 | -7.2 | -.9 | 1.6 | -1.5 | -5.4 | -2.6 | 3.5 |
| 52.0 | -2.5 | .7 | -2.0 | 1.5 | -.7 | -7.9 | 1.7 | -1.9 | -.7 | -7.9 | 1.2 | -1.6 | -.6 | -2.4 | -.9 | 1.6 | .7 | -3.8 | -2.5 | 3.4 |
| 62.0 | -2.5 | 2.3 | -2.0 | 1.5 | -.7 | -5.4 | 1.6 | -1.9 | -.7 | -5.4 | 1.1 | -1.5 | -.7 | -1.3 | -.9 | 1.5 | .5 | -3.3 | -2.5 | 3.3 |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | -8.9 | -2.8 | -14.7 | 3.1 | -10.7 | -.3 | -26.8 | 4.8 |
| 17.0 | | | | | | | | | | | | | | | | | | | | |
| 38.0 | | | | | | | | | | | | | -4.3 | -4.5 | -3.9 | 3.3 | -13.6 | -3.5 | -8.4 | 3.8 |
| 48.0 | | | | | | | | | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | -1.3 | -2.2 | -2.6 | 1.9 | -6.0 | -2.7 | -5.3 | 3.2 |

Table 6 (cont.). Observed and Modeled Velocities 1975-1976.

| CRUISE | XWCC- 7 | | | | XWCC- 7 | | | | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 2- 23 | | | | 23- 52 | | | | 52- 76 | | | | 76- 94 | | | | 94-104 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | | | | | -3.6 | 2.8 | -.9 | -1.4 | -11.7 | 1.1 | -4.5 | .6 | -3.2 | .0 | -2.5 | -.2 | -3.2 | -3.3 | -3.7 | -2.3 |
| 39.0 | | | | | 1.1 | -.6 | .6 | -.5 | -3.3 | .2 | -4.7 | -.3 | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -3.7 | .3 | -10.4 | 5.4 | -3.2 | 1.4 | -1.2 | 4.0 | -6.7 | 2.2 | -2.6 | 3.5 | 2.3 | 4.1 | -1.0 | 4.6 | -8.2 | -.4 | -13.5 | -.7 |
| 13.0 | -5.7 | .2 | -9.0 | 1.8 | | | | | | | | | .8 | 3.1 | .1 | -1.3 | -12.1 | .8 | -3.0 | -.8 |
| 23.0 | -3.1 | -.8 | -2.5 | -2.7 | -.3 | -.9 | -.5 | -1.2 | | | | | .7 | .6 | -.2 | -1.0 | -4.3 | -.5 | -3.3 | -.5 |
| 31.0 | -1.5 | -.5 | -.8 | .1 | -.1 | -1.3 | -.2 | -.4 | | | | | | | | | | | | |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -13.5 | 1.7 | -20.0 | 5.0 | -5.4 | .1 | -3.3 | 7.3 | -9.6 | 1.0 | -14.4 | 10.0 | | | | | | | | |
| 9.0 | -17.6 | 1.4 | -6.4 | -4.6 | -6.5 | 1.2 | -.2 | -.5 | -13.4 | 2.0 | -13.7 | .7 | -6.5 | 1.3 | -13.2 | 3.0 | -11.7 | -2.0 | -19.6 | -7.0 |
| 19.0 | -17.0 | -1.0 | .1 | -5.0 | -5.3 | -4.2 | 3.6 | -1.8 | -13.3 | -2.0 | -8.9 | 1.2 | -5.8 | -1.0 | -7.0 | -.3 | -9.0 | -5.2 | -7.8 | -2.3 |
| 39.0 | -10.9 | -4.7 | .9 | -2.5 | .9 | -3.9 | 3.5 | -1.1 | -7.6 | -2.4 | -6.8 | 1.2 | -3.1 | -1.2 | -4.9 | -.3 | -4.6 | -4.1 | -5.7 | -2.3 |
| 59.0 | -1.0 | -2.4 | .6 | -2.6 | 2.4 | -2.4 | 3.4 | -1.1 | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | -6.1 | -.5 | 5.0 | -1.7 | -4.3 | -2.8 | 4.3 | -1.3 | -12.0 | -2.2 | -6.0 | .2 | -6.1 | .3 | -2.8 | 1.6 | -3.2 | -7.2 | -6.3 | -.8 |
| 39.0 | 1.8 | -4.5 | 2.4 | -1.4 | 2.0 | -2.3 | 2.5 | -1.2 | -5.5 | 1.1 | -5.4 | -1.3 | -1.8 | -.8 | -1.8 | -1.2 | .5 | -.2 | .3 | -.8 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| 40.0 | -1.2 | -.4 | -.9 | -.1 | -1.1 | -2.0 | -.9 | .1 | -6.7 | -3.6 | -6.3 | -2.6 | -4.0 | .9 | -3.3 | -3.1 | -2.1 | -.7 | -1.3 | -3.0 |
| 60.0 | | | | | | | | | | | | | | | | | | | | |
| 65.0 | | | | | | | | | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 21.0 | | | | | | | | | | | | | -3.6 | -4.6 | -.6 | 12.4 | -2.4 | -5.1 | -1.2 | 14.7 |
| 42.0 | -.4 | -15.0 | 1.4 | -1.0 | -2.1 | -10.5 | 1.5 | -1.9 | -4.3 | -8.8 | -1.5 | 7.6 | -1.9 | -7.8 | -.2 | 6.5 | -2.2 | -3.4 | -.8 | 8.7 |
| 52.0 | -.6 | -13.3 | 1.4 | -.9 | -.8 | -6.7 | 1.5 | -1.9 | -1.0 | -2.5 | -1.3 | 5.0 | -3.0 | -5.4 | -.1 | 4.0 | -2.7 | -3.5 | -.7 | 6.3 |
| 62.0 | -.9 | -12.3 | 1.3 | -.9 | | | | | | | | | -2.9 | -4.0 | .1 | .5 | -2.1 | -1.9 | -.2 | 2.8 |
| 69.0 | | | | | -.6 | -6.1 | .7 | -1.5 | -.8 | -.6 | -1.0 | .9 | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -6.1 | -4.5 | -16.4 | 10.8 | | | | | | | | | | | | | | | | |
| 17.0 | | | | | -7.0 | -10.3 | -6.1 | -1.6 | -6.1 | .1 | -5.7 | 1.8 | -3.9 | -3.6 | -2.8 | 1.0 | -6.1 | -4.6 | -1.9 | 1.6 |
| 38.0 | -7.9 | -11.1 | -3.4 | -.7 | -3.7 | -13.2 | -3.2 | -1.0 | -5.1 | -4.5 | -5.3 | .9 | | | | | | | | |
| 48.0 | | | | | -2.4 | -12.7 | -1.7 | -1.1 | -4.1 | -8.2 | -5.1 | .5 | | | | | | | | |
| 58.0 | -1.3 | -7.3 | -.7 | -1.0 | -2.6 | -9.6 | -.4 | -1.3 | -2.7 | -3.8 | -4.9 | .1 | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975-1976.

| CRUISE | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 9 | | | | XWCC- 9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 104-110 | | | | 110-117 | | | | 117-125 | | | | 117-125 | | | | 125-139 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | 1.1 | -.7 | .5 | -.6 | -6.4 | -1.1 | -6.0 | -1.0 | -9.8 | .3 | 1.3 | .2 | -9.8 | .3 | -.5 | .4 | 2.3 | 4.2 | 2.5 | -.2 |
| 39.0 | | | | | | | | | | | | | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -2.0 | 2.6 | -.6 | 1.6 | -4.4 | 5.3 | .5 | 1.0 | -6.4 | 2.5 | -8.1 | 3.2 | -6.4 | 2.5 | -9.8 | 6.7 | | | | |
| 13.0 | -1.5 | .3 | 2.1 | -1.8 | -8.0 | -.9 | -1.9 | -.7 | -8.6 | -1.7 | -1.4 | -1.3 | -8.6 | -1.7 | -.4 | -2.3 | 8.0 | 3.1 | 4.8 | -1.2 |
| 23.0 | 1.7 | .9 | 1.8 | -1.4 | -1.6 | -1.6 | -2.1 | -.3 | -3.5 | -2.7 | -1.7 | -1.0 | -3.5 | -2.7 | -2.1 | -.5 | 4.9 | -2.3 | 4.7 | .7 |
| 31.0 | | | | | | | | | | | | | | | | | | | | |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | -12.3 | 2.5 | -14.5 | 3.9 | -12.3 | 2.5 | -11.8 | 2.3 | 1.5 | 4.9 | 3.3 | 8.4 |
| 9.0 | 2.4 | .6 | -3.0 | 1.5 | | | | | | | | | | | | | | | | |
| 19.0 | 3.3 | -.7 | 1.4 | 2.2 | -7.5 | .0 | -6.7 | -.1 | -10.3 | -3.0 | -1.0 | -.7 | -10.3 | -3.0 | -3.5 | -4.2 | 3.5 | -1.9 | .8 | -.4 |
| 39.0 | 5.6 | -.8 | 3.4 | 2.2 | | | | | | | | | | | | | | | | |
| 59.0 | | | | | | | | | -4.4 | -.4 | -2.3 | -.8 | -4.4 | -.4 | -4.8 | -2.8 | .4 | -.0 | -2.3 | 1.5 |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | .4 | 3.8 | 1.0 | 1.0 | -4.6 | -3.3 | -3.6 | -.5 | -8.6 | 5.7 | -5.7 | 6.1 | -8.6 | 5.7 | .5 | 9.5 | 5.9 | 4.7 | 16.4 | 5.4 |
| 19.0 | -3.8 | 2.9 | -1.1 | -.5 | -8.2 | -1.4 | -4.5 | .3 | -3.9 | -1.6 | -8.2 | 2.0 | -3.9 | -1.6 | .6 | -1.3 | 1.6 | .1 | 5.8 | -1.5 |
| 39.0 | .9 | -3.2 | .4 | -1.9 | -6.2 | 1.5 | -5.6 | .2 | -5.3 | -.9 | -4.6 | -.3 | -5.3 | -.9 | -4.9 | -.7 | .0 | -1.5 | .4 | -1.1 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| 40.0 | | | | | | | | | | | | | | | | | | | | |
| 60.0 | | | | | | | | | | | | | | | | | | | | |
| 65.0 | | | | | | | | | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 21.0 | .8 | -5.0 | -.8 | 13.1 | 2.1 | -1.4 | -1.2 | 15.0 | 6.6 | 2.0 | -.8 | 13.0 | 6.6 | 2.0 | .9 | -2.6 | | | | |
| 42.0 | -.6 | -8.6 | -.4 | 7.2 | .5 | 3.2 | -.9 | 8.6 | -.9 | -.1 | -.4 | 7.1 | -.9 | -.1 | .8 | -2.2 | -.5 | -13.2 | 1.4 | -5.9 |
| 52.0 | | | | | | | | | | | | | | | | | | | | |
| 62.0 | | | | | | | | | | | | | | | | | | | | |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | -5.3 | 1.5 | -11.7 | 12.4 | -5.3 | 1.5 | -3.6 | 5.6 | | | | |
| 17.0 | .0 | -9.5 | -1.4 | 2.1 | -3.2 | -.6 | -4.6 | 2.1 | -6.2 | .5 | -2.7 | 1.4 | -6.2 | .5 | 1.6 | -1.8 | 4.0 | 2.3 | 4.8 | -2.0 |
| 38.0 | | | | | | | | | -2.4 | -3.1 | -2.4 | .6 | -2.4 | -3.1 | .3 | -1.4 | | | | |
| 48.0 | | | | | | | | | -3.0 | -3.3 | -2.3 | .2 | -3.0 | -3.3 | -.3 | -1.2 | -1.6 | -8.4 | 2.6 | -1.3 |
| 58.0 | | | | | | | | | | | | | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975-1976.

| CRUISE | XWCC- 9 | | | | XWCC- 9 | | | | XWCC- 9 | | | | XWCC- 9 | | | | XWCC-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 139-144 | | | | 144-155 | | | | 155-165 | | | | 165-181 | | | | 165-181 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -3.7 | 3.0 | -2.2 | 10.8 | 2.3 | -1.3 | .4 | -3.9 | 3.1 | -.3 | .6 | 1.0 | 1.9 | 1.6 | 5.0 | 4.0 | | | | |
| 9.0 | -3.3 | 2.4 | -5.0 | 3.6 | 1.4 | -1.9 | -3.6 | -.8 | 4.0 | -.6 | .2 | -1.3 | -.8 | .5 | -1.7 | .8 | | | | |
| 19.0 | 1.0 | -4.3 | 2.0 | -1.2 | -.3 | .5 | -1.7 | .1 | 3.5 | -.9 | -.1 | -1.1 | -3.5 | -4.8 | 6.1 | -1.5 | -2.9 | -5.2 | 2.3 | -2.6 |
| 39.0 | 2.1 | -1.8 | 1.8 | -1.0 | -3.2 | 1.8 | -2.9 | -.2 | .0 | .4 | -.5 | -.6 | -1.8 | .1 | -.6 | -1.1 | -1.8 | -.2 | .0 | -.3 |
| 46.0 | .7 | .1 | .9 | -.5 | -2.5 | 2.5 | -2.2 | .5 | .3 | .4 | -.6 | -.2 | -1.1 | .4 | -.7 | -.5 | -1.1 | .3 | -.0 | .3 |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | 8.4 | 7.0 | 8.6 | .9 |
| 13.0 | 3.1 | 1.4 | 3.3 | -4.5 | -5.5 | 2.0 | -4.3 | -.3 | 2.6 | 1.6 | -1.2 | -1.3 | 6.8 | 1.3 | 2.8 | -2.5 | 6.4 | 2.5 | 3.3 | -2.8 |
| 23.0 | 2.9 | -3.3 | 2.3 | -3.3 | -5.3 | 1.1 | -4.2 | .4 | -1.2 | -.7 | -1.1 | -.6 | 3.1 | -1.5 | 2.9 | -1.6 | 3.3 | -.9 | 3.3 | -1.8 |
| 31.0 | | | | | | | | | | | | | .8 | -1.7 | 1.7 | -1.0 | 1.1 | -1.5 | 2.1 | -1.5 |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 2.2 | 5.4 | -.4 | 9.9 | -5.8 | -.6 | -7.5 | -5.4 | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | 7.8 | -1.6 | 7.8 | -3.1 | -11.4 | 5.8 | -10.7 | -3.2 | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | | | | | | | | |
| 59.0 | 4.6 | -2.7 | 6.4 | -.6 | -7.2 | 2.7 | -12.4 | -1.3 | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 6.9 | 5.9 | 4.6 | 13.2 | .9 | -5.5 | 11.1 | -2.3 | 2.1 | .5 | 10.9 | 2.4 | 7.0 | 6.8 | 14.6 | 6.5 | 7.9 | 5.8 | 4.3 | -1.6 |
| 19.0 | 5.3 | -4.2 | 4.9 | -1.5 | 2.0 | -.2 | 1.9 | -.8 | 2.8 | -.8 | 5.7 | -.4 | 1.1 | 1.0 | 4.7 | -.9 | 1.3 | .8 | -2.6 | -1.0 |
| 39.0 | -1.3 | -3.3 | -1.8 | -2.2 | -6.6 | 3.0 | -4.9 | -1.3 | -1.2 | .1 | -.8 | -1.0 | -2.5 | .2 | -1.4 | -2.2 | -2.5 | .5 | -2.4 | -.6 |
| 46.0 | .1 | -1.6 | -2.4 | -.6 | -1.6 | .1 | -3.9 | .6 | .1 | .3 | -1.7 | -.1 | -.9 | -.2 | -2.4 | -.1 | -.9 | -.0 | -2.4 | -.4 |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | -3.3 | 4.9 | .3 | .9 | -10.7 | 1.7 | -4.1 | .5 | -7.0 | 2.6 | -.7 | .5 | -4.4 | 1.5 | -1.1 | .6 | -4.3 | 1.8 | -2.0 | .4 |
| 40.0 | -.7 | .3 | .0 | .5 | -9.2 | -.4 | -4.4 | .1 | -2.8 | .8 | -1.0 | .1 | -3.7 | .9 | -1.4 | .2 | -3.7 | 1.1 | -2.0 | .4 |
| 60.0 | -.1 | -.6 | -.3 | .2 | -4.8 | .6 | -4.7 | -.3 | -1.5 | 1.3 | -1.3 | -.3 | -1.8 | .9 | -1.7 | -.2 | -1.8 | 1.0 | -1.9 | .4 |
| 65.0 | .1 | -.7 | -.3 | .1 | -3.6 | .5 | -3.5 | .6 | -1.0 | .9 | -1.0 | -.2 | -1.3 | .2 | -1.3 | -.1 | -1.3 | .3 | -1.3 | .5 |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -1.7 | -7.1 | -11.9 | -9.0 | .3 | -3.8 | 4.9 | -5.7 | -3.6 | 8.6 | 2.1 | -5.0 | 7.1 | -1.5 | 4.8 | -.8 | 7.2 | -1.2 | 7.2 | 4.4 |
| 21.0 | -.5 | -18.4 | 6.1 | -18.1 | -1.4 | -.3 | .1 | -2.7 | -7.3 | 7.3 | 2.0 | -5.1 | .6 | -5.5 | 3.0 | -7.1 | .9 | -5.5 | .3 | -1.2 |
| 42.0 | -1.6 | -10.7 | 4.7 | -10.5 | -2.1 | 13.7 | -.6 | -.3 | -5.8 | -3.0 | 1.2 | -2.6 | -1.8 | -.8 | 2.2 | -4.7 | -1.8 | -.9 | .3 | -1.2 |
| 52.0 | .6 | -9.2 | 3.2 | -7.0 | -.9 | 13.3 | -1.1 | 1.0 | -1.6 | -5.8 | .8 | -1.4 | -1.0 | 2.1 | 1.7 | -3.6 | -1.1 | 2.0 | .3 | -1.1 |
| 62.0 | | | | | | | | | | | | | | | | | -.4 | 1.4 | .3 | -1.1 |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -6.9 | -1.3 | -11.0 | .2 | -1.0 | -.4 | -4.4 | 5.2 | 2.3 | -2.2 | -3.0 | -5.3 | 4.7 | 10.2 | -1.8 | 10.9 | 7.5 | 8.4 | .7 | 6.3 |
| 17.0 | -3.3 | -9.5 | 1.1 | -7.9 | .3 | 5.4 | -6.6 | 4.3 | 7.4 | -5.1 | -2.1 | -5.6 | 3.5 | 6.7 | -1.9 | 2.3 | 5.3 | 5.4 | -4.8 | 2.8 |
| 38.0 | 3.6 | -12.2 | 2.0 | -5.7 | -5.1 | 2.0 | -5.0 | 2.3 | 3.0 | -8.1 | -1.2 | -3.4 | 1.7 | .0 | -.3 | .3 | 1.6 | -.5 | -2.9 | 1.6 |
| 48.0 | .8 | -10.0 | 2.4 | -4.6 | -4.1 | 2.1 | -4.3 | 1.4 | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1975-1976.

| CRUISE | XWCC-10 | | | | XWCC-10 | | | | XWCC-10 | | | | XWCC-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 181-189 | | | | 189-204 | | | | 204-222 | | | | 222-226 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | |
| 19.0 | -3.5 | -3.2 | -3.7 | 1.2 | -1.7 | .0 | -1.0 | 2.2 | -2.8 | -.9 | -5.2 | 1.3 | 10.4 | -3.8 | 2.6 | -3.0 |
| 39.0 | -2.6 | .8 | -1.8 | .2 | -1.6 | .6 | -.3 | .4 | -2.6 | .3 | -2.7 | .3 | 1.8 | -2.4 | .2 | -1.1 |
| 46.0 | -1.6 | 1.0 | -1.2 | -.0 | -1.0 | .7 | -.2 | -.1 | -1.6 | .8 | -1.8 | -.0 | -.4 | -.8 | .0 | -.3 |
| LT2 | | | | | | | | | | | | | | | | |
| 2.0 | 5.3 | 7.7 | 5.4 | 3.9 | | | | | | | | | | | | |
| 13.0 | 7.7 | -1.5 | 2.5 | -2.2 | 6.4 | -.8 | 1.9 | -2.6 | 1.8 | -3.6 | -1.0 | -1.7 | 8.5 | -2.0 | .7 | -1.8 |
| 23.0 | 2.7 | .1 | 2.6 | -1.2 | 1.7 | -1.9 | 1.9 | -1.6 | -1.8 | -.7 | -1.0 | -.7 | .9 | 1.9 | .8 | -.8 |
| 31.0 | .3 | -1.2 | 1.7 | -.9 | .9 | -1.3 | 1.2 | -1.0 | -1.2 | -.5 | -.7 | .0 | | | | |
| LT3 | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | 10.6 | -1.0 | -2.0 | -.9 |
| 19.0 | | | | | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | -.8 | -4.2 | -.4 | -.3 |
| 59.0 | | | | | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | |
| 2.0 | 6.1 | 8.2 | .1 | 1.6 | 4.3 | 3.8 | -.1 | 5.6 | .5 | 2.1 | -3.6 | -.1 | 5.9 | -4.0 | 6.0 | -2.3 |
| 19.0 | -3.4 | 2.3 | -6.2 | -.9 | -4.2 | -3.9 | -3.1 | -.9 | -8.0 | .5 | -5.2 | -1.4 | 9.7 | -4.1 | 1.0 | -1.7 |
| 39.0 | -6.1 | .1 | -5.8 | -.4 | -3.3 | -.7 | -2.9 | -.5 | -4.8 | .7 | -4.9 | -.9 | 1.2 | -.0 | 1.0 | -1.1 |
| 46.0 | -1.9 | .1 | -5.7 | -.3 | -1.5 | -.4 | -2.8 | -.3 | -4.6 | 2.7 | -4.8 | -.8 | -.9 | -.3 | 1.0 | -1.0 |
| LT5 | | | | | | | | | | | | | | | | |
| 20.0 | -7.2 | 2.3 | -2.6 | 1.4 | -.8 | 1.5 | -.2 | .9 | -7.9 | -.6 | -4.9 | .0 | 2.2 | 4.0 | -2.4 | -1.3 |
| 40.0 | -5.2 | .9 | -2.5 | 1.3 | -1.1 | .9 | -.2 | .9 | -6.2 | -.1 | -4.8 | .0 | -3.0 | .2 | -2.3 | -1.2 |
| 60.0 | -1.8 | .3 | -2.4 | 1.3 | .2 | .4 | -.2 | .9 | -4.3 | 1.1 | -4.6 | .0 | -2.2 | 1.5 | -2.2 | -1.2 |
| 65.0 | -1.1 | .1 | -1.5 | 1.3 | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | |
| 2.0 | .0 | -6.4 | .3 | -15.5 | 1.0 | 4.4 | .0 | 10.5 | -3.8 | 3.6 | -.4 | 3.2 | | | | |
| 21.0 | -1.2 | -5.8 | -2.6 | -17.5 | -2.0 | -2.7 | 1.4 | -1.9 | -3.4 | 1.1 | -1.0 | .5 | | | | |
| 42.0 | .0 | 4.2 | -1.3 | -10.6 | -1.7 | -3.7 | 1.3 | -1.9 | -2.6 | 2.4 | -.9 | .5 | | | | |
| 52.0 | 2.6 | 7.7 | -1.6 | -6.9 | | | | | | | | | | | | |
| 62.0 | .4 | 3.7 | .1 | -3.8 | | | | | | | | | | | | |
| 69.0 | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | |
| 2.0 | 3.2 | 7.2 | 5.7 | 14.1 | 3.6 | 4.9 | 1.7 | 15.5 | 1.2 | -.6 | -7.3 | 6.4 | | | | |
| 17.0 | 1.2 | 5.7 | .2 | 7.0 | 5.3 | -1.4 | 1.1 | 5.9 | -2.2 | .8 | -8.1 | 3.1 | | | | |
| 38.0 | .0 | 2.1 | .0 | 4.3 | .9 | -2.8 | .9 | 3.3 | -3.4 | -1.3 | -6.0 | 1.8 | | | | |
| 48.0 | | | | | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1978.

| CRUISE | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 67- 78 | | | | 78- 95 | | | | 95-105 | | | | 105-124 | | | | 124-139 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -2.2 | 1.8 | -5.5 | .1 | -2.9 | -1.7 | -1.4 | .2 | -4.9 | 4.5 | -1.8 | 2.3 | -5.0 | 1.9 | -2.7 | -1.3 | -4.3 | -8.1 | -4.6 | -1.2 |
| 33.0 | -5.9 | 6.0 | -5.4 | .5 | -.4 | .5 | -1.0 | .6 | 2.0 | .8 | 2.1 | .0 | -2.7 | 1.5 | -2.2 | -.2 | -9.3 | 2.9 | -7.2 | -.2 |
| 47.0 | -2.5 | .9 | -3.9 | .7 | 2.7 | -2.8 | -.6 | .4 | | | | | | | | | | | | |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -11.9 | -1.8 | -8.1 | 1.8 | -1.0 | -.2 | 3.9 | -.7 | -6.4 | .1 | -4.6 | 2.1 | -4.7 | .0 | -7.6 | 1.3 | -12.3 | -1.5 | -8.7 | -1.5 |
| 44.0 | -4.7 | .9 | -4.5 | .9 | 8.1 | -2.5 | 7.7 | -2.3 | | | | | -3.4 | 1.5 | -3.2 | .0 | -6.7 | 1.3 | -6.5 | 1.1 |
| 58.0 | -2.4 | 1.4 | -2.5 | .7 | -.2 | -1.0 | 6.0 | -2.8 | .8 | .0 | 1.0 | -.6 | -1.2 | .1 | -1.4 | -.0 | -2.5 | 1.1 | -4.1 | 1.2 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -8.0 | .8 | -6.5 | .6 | -6.0 | -1.2 | -6.0 | -.6 |
| 52.0 | | | | | -6.5 | -.9 | -2.6 | -3.2 | -2.2 | -.0 | -1.4 | -1.0 | -6.1 | 1.0 | -4.9 | -.5 | -6.7 | .8 | -6.7 | .6 |
| 66.0 | -5.6 | 2.7 | -3.0 | .9 | 2.5 | .6 | -2.4 | -2.1 | | | | | -3.3 | 2.2 | -3.7 | .3 | -3.4 | .8 | -4.6 | 1.5 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -17.5 | -3.2 | -6.8 | -.1 | -8.3 | -1.3 | -3.3 | -2.9 |
| 76.0 | | | | | | | | | | | | | | | | | | | | |
| 90.0 | | | | | | | | | | | | | -6.4 | .1 | -5.1 | .9 | -1.6 | .1 | -4.6 | 1.2 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -8.5 | .8 | 1.3 | -1.4 | 1.6 | 3.0 | 5.9 | -.8 | 4.6 | 2.4 | 5.8 | 1.4 | -.2 | 1.9 | 5.3 | -1.5 | -7.5 | -.3 | 6.6 | -7.1 |
| 27.0 | | | | | -1.6 | -1.3 | -.8 | .2 | .7 | -.5 | .7 | -.1 | -.5 | -.4 | -.2 | -.1 | -2.0 | .3 | -1.2 | -.1 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.3 | 3.5 | 5.7 | -.7 | 6.2 | 4.4 | 7.0 | .4 | 10.1 | 4.1 | 3.5 | 2.5 | 1.1 | 1.4 | 5.0 | -1.1 | -2.3 | 1.3 | 6.8 | -4.7 |
| 20.0 | -.6 | -1.0 | -.4 | -.5 | -2.2 | -1.4 | .6 | -.2 | -.3 | -.6 | 1.3 | -.3 | 2.6 | -1.8 | .3 | -.3 | | | | |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 1.0 | -.7 | 3.3 | -2.7 | 13.9 | 8.8 | 4.9 | -3.0 | | | | | 7.8 | 10.0 | -1.5 | -2.2 | -7.1 | -.1 | 1.5 | -2.7 |
| 22.0 | .6 | -.3 | -.1 | -1.0 | 6.1 | -1.6 | 1.1 | -1.3 | | | | | 2.0 | -.5 | -.2 | -.5 | -.6 | .5 | -3.1 | -.2 |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 22.0 | | | | | | | | | | | | | | | | | | | | |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.5 | -1.2 | -8.9 | -.5 | -2.8 | 1.6 | -5.5 | .4 | -4.7 | .9 | -7.9 | .4 | -4.1 | .3 | -9.3 | -.3 | -5.5 | -2.4 | -4.9 | -4.4 |
| 20.0 | -7.4 | -1.6 | -6.2 | .1 | .0 | .9 | -2.0 | -.3 | -1.6 | -2.6 | -.7 | -1.5 | -1.4 | 1.3 | -4.1 | .2 | -11.3 | -.4 | -7.5 | .7 |
| 40.0 | -4.4 | .4 | -4.8 | .1 | 7.7 | 1.9 | -.4 | -.3 | | | | | .6 | 2.3 | -2.6 | .2 | -5.1 | 2.1 | -6.2 | .8 |
| 47.0 | -2.4 | .4 | -3.2 | .5 | 2.7 | .0 | .0 | -.2 | | | | | | | | | | | | |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 23.0 | | | | | | | | | | | | | 1.8 | 2.1 | 1.7 | -.5 | 1.9 | .5 | .8 | -.3 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -7.2 | -1.0 | -4.8 | -1.0 | -4.7 | .4 | -3.6 | -4.8 |
| 23.0 | | | | | | | | | | | | | | | | | | | | |
| 37.0 | | | | | | | | | | | | | -4.4 | .7 | -1.7 | -.5 | -3.0 | 1.3 | -4.4 | -.0 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 47.0 | | | | | | | | | | | | | -7.4 | 1.2 | -4.8 | -.8 | -8.5 | .0 | -9.2 | -1.1 |
| 61.0 | | | | | | | | | | | | | -2.6 | -1.1 | -3.3 | -.3 | -3.3 | .2 | -7.0 | .9 |

Table 6 (cont.). Observed and Modeled Velocities 1978.

| CRUISE | XWCC-18 | | | | XWCC-18 | | | | XWCC-18 | | | | XWCC-18 | | | | XWCC-19 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 124-139 | | | | 139-158 | | | | 158-169 | | | | 169-179 | | | | 169-179 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.3 | -8.1 | -5.1 | -5.7 | -4.9 | .7 | -4.3 | -.0 | 3.2 | 6.5 | -3.0 | 7.3 | 1.6 | 8.0 | 1.5 | 5.5 | 1.6 | 8.0 | -8.1 | .1 |
| 33.0 | -9.3 | 2.9 | -7.4 | -.2 | -2.7 | -.7 | -2.6 | .2 | 1.5 | -.6 | .9 | .2 | -1.7 | 3.0 | -1.0 | .2 | -1.7 | 3.0 | -1.6 | -.3 |
| 47.0 | | | | | -1.8 | 1.0 | -1.4 | .2 | .8 | .4 | 1.1 | -.3 | -1.7 | .6 | -.3 | -.1 | -1.7 | .6 | .8 | -.3 |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -12.3 | -1.5 | -2.9 | -6.0 | -3.6 | 1.0 | -1.7 | -1.0 | -1.7 | 5.8 | -2.5 | 4.8 | 3.0 | 5.2 | 2.7 | 4.0 | 3.0 | 5.2 | -4.6 | 5.3 |
| 44.0 | -6.7 | 1.3 | -6.7 | .3 | -1.5 | .4 | -1.4 | .0 | -.5 | -1.3 | -.6 | -.8 | -1.5 | .3 | -1.5 | -.4 | -1.5 | .3 | -1.6 | .1 |
| 58.0 | -2.5 | 1.1 | -4.6 | 1.2 | -.2 | -.0 | -.9 | .1 | .3 | -.2 | -.4 | -.5 | -.0 | -.6 | -.9 | -.2 | -.0 | -.6 | -.3 | -.2 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.0 | -1.2 | -5.0 | -7.4 | -5.4 | .1 | -4.4 | -3.0 | -1.7 | 3.9 | -3.4 | 3.4 | -2.5 | 4.5 | .8 | 1.6 | -2.5 | 4.5 | 1.0 | 5.6 |
| 52.0 | -6.7 | .8 | -6.4 | -.3 | -3.2 | -.1 | -2.7 | -.8 | .3 | 1.0 | .2 | -.4 | -1.5 | 1.1 | -1.2 | -.4 | -1.5 | 1.1 | -1.0 | .2 |
| 66.0 | -3.4 | .8 | -4.3 | .7 | -2.0 | .6 | -1.7 | .0 | .1 | .7 | .5 | -.0 | -.1 | -.1 | -.5 | .1 | -.1 | -.1 | -1.3 | -.2 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -8.3 | -1.3 | 2.5 | -4.3 | -7.2 | -1.0 | 2.9 | -.7 | -2.1 | 3.5 | 7.7 | 3.8 | -6.4 | 2.6 | 7.8 | 1.3 | -6.4 | 2.6 | -3.9 | 5.5 |
| 76.0 | | | | | | | | | | | | | -3.0 | -.5 | -2.6 | -.3 | -3.0 | -.5 | -3.2 | 1.4 |
| 90.0 | -1.6 | .1 | -4.9 | 2.0 | -1.7 | .4 | -4.1 | 1.5 | 3.0 | 1.0 | -.3 | .1 | -.3 | -.4 | -2.9 | .8 | -.3 | -.4 | -1.7 | 1.0 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.5 | -.3 | 6.7 | -9.1 | -6.8 | -.0 | 3.5 | -2.0 | 6.6 | 4.2 | 2.2 | 4.2 | -6.5 | -.3 | 8.2 | 2.8 | -6.5 | -.3 | 8.9 | 4.2 |
| 27.0 | -2.0 | .3 | -1.2 | .0 | -1.2 | .2 | -.6 | .2 | -.0 | -.9 | .1 | .1 | -.3 | 1.1 | -.1 | .0 | -.3 | 1.1 | -.1 | .1 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -2.3 | 1.3 | 4.4 | -10.9 | -5.9 | .8 | 2.7 | -4.6 | 9.6 | 2.7 | 2.4 | 1.2 | 6.6 | 5.2 | 7.7 | -.2 | 6.6 | 5.2 | 1.2 | 2.7 |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.1 | -.1 | 7.7 | 4.5 | -3.1 | -.3 | .5 | .7 | 10.5 | 4.3 | .7 | 7.1 | 3.7 | -4.3 | 6.0 | 5.4 | 3.7 | -4.3 | -5.2 | .7 |
| 22.0 | -.6 | .5 | -2.3 | 1.6 | .4 | -1.0 | -.9 | -.4 | | | | | | | | | | | | |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 22.0 | | | | | | | | | | | | | | | | | | | | |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -5.5 | -2.4 | 2.7 | -8.9 | -10.9 | 1.0 | -.5 | -4.7 | -6.1 | 9.5 | -3.4 | 1.9 | -6.4 | 8.5 | 2.9 | 2.7 | -6.4 | 8.5 | -.4 | 4.5 |
| 20.0 | -11.3 | -.4 | -4.1 | -2.0 | -11.3 | .0 | -.9 | -2.6 | -3.8 | 2.8 | 1.0 | -2.6 | -5.9 | 2.3 | -.1 | -2.3 | -5.9 | 2.3 | -.1 | -.5 |
| 40.0 | -5.1 | 2.1 | -4.6 | -.7 | -2.5 | 1.8 | -1.3 | -1.3 | | | | | | | | | | | | |
| 47.0 | | | | | -.2 | -.9 | -1.2 | -.6 | .9 | -1.1 | .3 | -.8 | 1.2 | -1.3 | -.6 | -.4 | 1.2 | -1.3 | -.1 | -.4 |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | 14.5 | 7.2 | -2.3 | -.9 | 14.5 | 7.2 | 11.6 | 2.9 |
| 23.0 | 1.9 | .5 | .6 | -.9 | -1.8 | 1.4 | -1.4 | -.8 | -3.6 | 3.2 | -2.2 | -.6 | .7 | .3 | .3 | -.6 | .7 | .3 | 1.0 | -.3 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.7 | .4 | .6 | -4.6 | -4.6 | -1.2 | -4.3 | -2.7 | -5.8 | 2.6 | -5.6 | -.0 | 1.1 | -.6 | 4.0 | 2.6 | 1.1 | -.6 | -2.2 | 1.5 |
| 23.0 | | | | | | | | | | | | | .2 | 2.7 | .8 | -1.1 | .2 | 2.7 | .1 | -1.1 |
| 37.0 | -3.0 | 1.3 | -4.4 | -.3 | -1.1 | .5 | -3.0 | .0 | .7 | .6 | .4 | .4 | 2.1 | -1.7 | -1.3 | -.3 | 2.1 | -1.7 | .8 | -.4 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -9.0 | 2.9 | -7.2 | 6.2 | -9.0 | 2.9 | 2.9 | 3.3 |
| 47.0 | -8.5 | .4 | -9.2 | -.4 | -5.2 | .2 | -5.3 | -.2 | 1.7 | .1 | 1.8 | .5 | -2.4 | .3 | -2.4 | -.1 | -2.4 | .3 | -2.0 | -1.4 |
| 61.0 | -3.3 | .2 | -5.6 | 1.0 | -2.4 | -.2 | -3.1 | .6 | 1.9 | -1.5 | 2.0 | -.3 | -1.5 | -.4 | -1.1 | -.1 | -1.5 | -.4 | -1.7 | -.0 |

Table 6 (cont.). Observed and Modeled Velocities 1978.

| CRUISE | XWCC-19 | | | | XWCC-19 | | | | XWCC-20 | | | | XWCC-20 | | | | XWCC-20 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 179-196 | | | | 196-211 | | | | 196-211 | | | | 211-224 | | | | 224-241 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.4 | .1 | -8.3 | -1.0 | -1.2 | 3.1 | -9.5 | -.0 | | | | | -8.7 | 8.5 | -4.6 | 2.6 | -2.1 | -1.1 | -5.8 | 1.8 |
| 33.0 | -1.1 | -.5 | -2.4 | -.5 | -1.7 | -.1 | -2.5 | -.4 | -1.7 | -.1 | -1.8 | .2 | -3.8 | .8 | -3.3 | .4 | -5.3 | .6 | -4.9 | .2 |
| 47.0 | -1.6 | .9 | .2 | -.3 | -.3 | 1.1 | .1 | -.2 | -.3 | 1.1 | -1.3 | -.2 | | | | | | | | |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -8.6 | -.3 | -8.5 | 1.1 | -10.5 | 7.1 | -7.2 | 4.9 | -10.5 | 7.1 | -3.2 | 4.9 | 2.3 | 1.1 | .1 | 3.0 | -5.3 | -.9 | -3.0 | 3.2 |
| 44.0 | -4.7 | .9 | -4.4 | .2 | -2.7 | .1 | -2.7 | -.3 | -2.7 | .1 | -2.8 | .8 | -.9 | -.5 | -1.0 | .8 | -4.4 | -1.2 | -4.6 | 1.2 |
| 58.0 | | | | | -.4 | .1 | -1.3 | -.3 | -.4 | .1 | -2.3 | .7 | -.7 | .0 | -1.0 | .4 | -1.0 | .3 | -3.5 | 1.4 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -9.1 | .6 | -3.1 | .8 | -10.0 | 2.2 | -3.7 | 4.6 | -10.0 | 2.2 | -5.7 | 7.4 | -8.2 | 2.4 | -6.4 | 5.1 | -8.7 | -.7 | -9.9 | 2.1 |
| 52.0 | -6.3 | 1.6 | -5.0 | -.2 | -6.4 | .8 | -4.9 | -.7 | -6.4 | .8 | -5.4 | .1 | -5.6 | -.5 | -4.1 | .2 | -8.1 | -1.4 | -7.7 | .2 |
| 66.0 | -2.2 | .8 | -4.3 | -.0 | -1.7 | -.1 | -4.2 | -.4 | -1.7 | -.1 | -3.6 | .3 | -1.8 | -.3 | -2.7 | .2 | -4.2 | .8 | -5.3 | .8 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -14.7 | 2.2 | -8.1 | .6 | -11.7 | 5.2 | -7.5 | 5.3 | -11.7 | 5.2 | -3.1 | 6.2 | -11.0 | 4.0 | -5.3 | 3.6 | -11.3 | 1.8 | -7.5 | 1.8 |
| 76.0 | -5.9 | -.3 | -6.2 | 1.7 | -5.1 | .1 | -1.6 | -.4 | -5.1 | .1 | -5.4 | 1.6 | -6.5 | -1.0 | -5.6 | 1.2 | -7.4 | -1.8 | -8.2 | 1.9 |
| 90.0 | -1.7 | .2 | -3.9 | 2.0 | -2.4 | -.1 | -2.1 | 1.1 | -2.4 | -.1 | -3.2 | 2.3 | -3.5 | -.4 | -3.4 | 2.1 | -4.3 | -1.0 | -4.8 | 3.2 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 4.2 | 1.5 | 2.3 | 1.9 | -.5 | .5 | 7.4 | 4.9 | -.5 | .5 | 7.8 | 4.1 | 2.0 | 1.5 | 4.2 | 3.4 | -16.8 | .7 | 4.1 | 1.0 |
| 27.0 | | | | | -.9 | -1.1 | -.5 | .1 | -.9 | -1.1 | -.4 | .2 | -1.9 | .4 | -1.2 | .3 | -2.5 | 1.1 | -.4 | -.1 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | 13.5 | 5.7 | .4 | 2.6 | 13.5 | 5.7 | 4.1 | .0 | 2.8 | .3 | 2.1 | -.8 | -1.2 | .3 | .2 | -2.2 |
| 20.0 | | | | | 1.2 | -1.7 | -.0 | -.4 | 1.2 | -1.7 | .2 | -.5 | -.6 | .0 | -.2 | -.4 | -1.2 | -1.7 | -.8 | -.4 |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -5.9 | -.9 | -12.3 | -.4 | | | | | | | | | | | | | | | | |
| 22.0 | | | | | .9 | -.6 | 1.1 | -1.4 | .9 | -.6 | 1.0 | -.6 | 1.0 | .6 | .6 | -.3 | -1.9 | -.1 | -1.3 | -.2 |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | 10.0 | -1.0 | -12.2 | 4.9 | 10.0 | -1.0 | 1.5 | 1.3 | 7.5 | 1.9 | -1.6 | 1.4 | -1.2 | .8 | -.0 | -.6 |
| 22.0 | | | | | -2.2 | -.2 | -.0 | -.7 | -2.2 | -.2 | .4 | -.4 | -.3 | .2 | -.2 | -.3 | -.2 | .8 | -.8 | -.3 |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.6 | -.8 | -2.5 | -2.0 | -5.2 | -.2 | -2.8 | 3.8 | -5.2 | -.2 | 5.8 | -.3 | | | | | | | | |
| 20.0 | -7.1 | -1.5 | -2.0 | -.9 | -3.4 | -2.4 | -1.5 | -.9 | -3.4 | -2.4 | 2.2 | -3.4 | -1.9 | -4.6 | 2.2 | -3.3 | -1.3 | -1.4 | .5 | -4.0 |
| 40.0 | | | | | -1.6 | 2.9 | -1.5 | -.9 | -1.6 | 2.9 | -.4 | -1.2 | -1.7 | -.3 | -.4 | -1.1 | -3.2 | .0 | -2.2 | -1.8 |
| 47.0 | -1.3 | .0 | -1.7 | -.4 | -.8 | -.2 | -1.3 | -.5 | -.8 | -.2 | -.9 | -.3 | -1.4 | -.4 | -.0 | -.2 | -2.5 | -.4 | -2.2 | -.3 |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 2.6 | 1.3 | 7.8 | -1.6 | 10.9 | .4 | 11.5 | 2.9 | 10.9 | .4 | 6.3 | .3 | 6.3 | 4.2 | 6.6 | .1 | -1.2 | 3.8 | 4.5 | -1.5 |
| 23.0 | -10.3 | -1.2 | 1.3 | -.6 | 2.7 | -1.2 | 1.6 | -.6 | 2.7 | -1.2 | 1.6 | -1.0 | 1.3 | -1.3 | 1.0 | -.6 | -.5 | -.6 | -1.1 | -1.6 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -10.3 | -1.2 | -14.8 | -2.9 | -9.1 | .3 | -6.2 | .0 | -9.1 | .3 | -11.8 | -2.5 | -7.4 | 3.0 | -10.4 | -2.3 | -13.6 | -.8 | -16.9 | -2.0 |
| 23.0 | -7.3 | 2.4 | -6.8 | -.9 | -4.2 | .5 | -3.2 | -1.5 | -4.2 | .5 | -4.2 | -1.3 | -2.6 | .0 | -2.5 | -.9 | -12.0 | 1.0 | -10.5 | -.9 |
| 37.0 | -2.0 | 1.8 | -2.9 | .2 | .2 | .5 | -1.8 | -.4 | .2 | .5 | -.8 | -.6 | .4 | .6 | .6 | -.4 | -2.2 | 1.3 | -5.3 | .8 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -12.9 | -.3 | -2.7 | -4.3 | -9.1 | .2 | -.9 | 3.3 | -9.1 | .2 | -6.1 | .1 | -8.9 | 3.3 | -3.0 | .2 | | | | |
| 47.0 | -6.9 | .1 | -4.4 | -1.3 | -4.6 | .8 | -4.4 | -1.3 | -4.6 | .8 | -4.9 | -.5 | -2.2 | .0 | -2.4 | -.2 | -7.6 | -.2 | -7.4 | -.2 |
| 61.0 | -4.1 | .5 | -3.5 | .2 | -3.1 | .4 | -3.5 | .2 | -3.1 | .4 | -3.7 | .3 | -2.0 | .4 | -1.8 | .0 | -5.7 | .7 | -5.4 | 1.1 |

Table 6 (cont.). Observed and Modeled Velocities 1978.

CRUISE XWCC-20
DAY INTERVAL 241-266

| MOORING | DEPTH | OBSERVED L | OBSERVED C | MODELED L | MODELED C |
|---|---|---|---|---|---|
| LI1 | | | | | |
| | 3.0 | -4.0 | .3 | -2.9 | 1.9 |
| | 33.0 | -3.0 | .0 | -2.4 | .2 |
| | 47.0 | | | | |
| LI2 | | | | | |
| | 3.0 | -1.3 | -.4 | 1.1 | 3.1 |
| | 44.0 | -.6 | .5 | -.6 | 1.0 |
| | 58.0 | -.3 | .2 | -.8 | .4 |
| LI3 | | | | | |
| | 3.0 | -5.8 | -1.0 | -4.4 | 2.3 |
| | 52.0 | -3.1 | .3 | -2.2 | .7 |
| | 66.0 | -2.0 | .7 | -1.3 | .3 |
| LI4 | | | | | |
| | 3.0 | | | | |
| | 76.0 | | | | |
| | 90.0 | | | | |
| LPG1 | | | | | |
| | 3.0 | | | | |
| | 27.0 | -1.0 | -.1 | -.3 | .3 |
| LPG2 | | | | | |
| | 3.0 | -2.0 | 3.2 | -.5 | -2.4 |
| | 20.0 | .6 | -.7 | -.3 | -.3 |
| LPG3 | | | | | |
| | 3.0 | | | | |
| | 22.0 | 1.3 | .4 | .6 | -.1 |
| LPG4 | | | | | |
| | 3.0 | -7.3 | .0 | .4 | -.2 |
| | 22.0 | -.9 | -.7 | -.7 | -.1 |
| LTM | | | | | |
| | 3.0 | | | | |
| | 20.0 | -1.5 | -.8 | 2.3 | -3.5 |
| | 40.0 | -1.4 | .1 | -.3 | -1.3 |
| | 47.0 | -.6 | -.1 | -.8 | -.4 |
| NJ1 | | | | | |
| | 3.0 | -4.2 | 1.5 | 5.0 | .3 |
| | 23.0 | | | | |
| NJ2 | | | | | |
| | 3.0 | -5.0 | 6.4 | 1.3 | -4.4 |
| | 23.0 | -6.6 | 2.9 | -.3 | -2.0 |
| | 37.0 | -.3 | 2.0 | -.9 | -.2 |
| NJ3 | | | | | |
| | 3.0 | | | | |
| | 47.0 | | | | |
| | 61.0 | | | | |

Table 6 (cont.). Observed and Modeled Velocities 1979.

| CRUISE | XWCC-21 | | | | XWCC-21 | | | | XWCC-21 | | | | XWCC-22 | | | | XWCC-22 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 87- 98 | | | | 98-122 | | | | 122-129 | | | | 129-140 | | | | 140-163 | | | |
| | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 10.2 | 4.6 | 6.8 | 3.6 | -4.2 | -1.4 | -1.5 | -2.0 | -4.2 | 1.9 | -4.5 | 1.8 | -9.8 | -5.4 | 1.3 | -2.2 | .6 | 1.8 | 2.1 | 3.4 |
| 41.0 | 6.4 | -2.3 | 12.5 | -2.0 | -2.9 | -.2 | -1.7 | -.9 | -2.2 | -2.2 | -1.0 | -.0 | -4.0 | .0 | -2.2 | -.4 | -4.2 | -.9 | -2.2 | -.7 |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 42.0 | 7.3 | -7.4 | 7.4 | 1.1 | -2.1 | .3 | -2.1 | -.3 | -.1 | -.5 | -.1 | -.0 | -2.4 | -.1 | -2.6 | .6 | -3.2 | 1.9 | -3.5 | .7 |
| 46.0 | 8.1 | -4.6 | 6.9 | 1.3 | -2.0 | -.2 | -2.1 | -.2 | -.3 | -1.5 | -.1 | -.0 | -3.7 | -.5 | -2.5 | .1 | -2.6 | 1.5 | -3.4 | .1 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 58.0 | | | | | -4.8 | .6 | -4.6 | -.8 | -1.0 | .6 | -.9 | -.4 | -5.7 | 1.0 | -4.8 | 3.9 | -5.2 | -.1 | -4.1 | 3.9 |
| 61.0 | 9.4 | -1.2 | 15.9 | 1.9 | -5.2 | 1.3 | -4.6 | -.7 | -.2 | .7 | -.9 | -.4 | -5.6 | 1.0 | -4.6 | 3.8 | -3.7 | .9 | -3.9 | 3.7 |
| NJ2A | | | | | | | | | | | | | | | | | | | | |
| 29.0 | | | | | -2.3 | 3.2 | -1.9 | -.1 | 2.0 | 2.6 | -.2 | -.6 | -7.6 | 2.8 | -3.6 | -.3 | -6.1 | .5 | -2.6 | -.1 |
| 32.0 | -1.6 | -1.5 | 2.3 | -.0 | -2.2 | -.8 | -1.7 | -.1 | 3.9 | .1 | -.2 | -.5 | -5.4 | 2.2 | -3.4 | .2 | -2.5 | .9 | -2.3 | -.1 |
| N13 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 34.5 | 19.9 | 2.6 | 4.0 | -1.2 | 1.1 | -5.1 | 2.1 | 16.7 | 7.0 | -3.5 | -3.9 | -6.8 | -3.0 | -1.5 | -3.3 | 3.5 | 1.8 | 6.3 | 2.2 |
| 12.0 | 32.1 | 2.7 | 5.9 | 1.1 | -1.0 | -.7 | -3.4 | -2.2 | 2.3 | .7 | -.8 | -1.3 | -12.6 | 2.6 | -5.0 | -.8 | 12.5 | -4.7 | -2.9 | -.9 |
| N14 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 18.0 | | | | | | | | | | | | | | | | | -.7 | 2.1 | -.8 | -.3 |
| N23 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 17.4 | 13.9 | 4.5 | 4.5 | -6.5 | -.0 | -.6 | -6.1 | 14.6 | 4.9 | -1.3 | -3.7 | -10.5 | -3.7 | -.7 | -2.9 | 2.6 | 2.7 | 3.5 | 4.4 |
| 19.0 | 9.4 | -2.0 | 6.1 | 1.2 | -2.4 | .4 | -2.2 | -1.9 | 2.7 | -.1 | -.0 | -1.2 | -6.1 | 2.7 | -5.1 | -.8 | 1.7 | -1.6 | -2.7 | -.9 |
| N31 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.5 | -3.5 | 2.9 | 4.9 | -9.3 | -7.8 | 2.1 | -18.6 | 10.0 | 3.9 | 3.6 | 10.5 | -16.0 | -12.2 | 13.4 | -4.8 | -2.7 | -2.2 | 11.1 | -3.7 |
| 19.0 | -4.7 | -2.5 | 6.6 | 5.5 | -4.5 | -1.3 | .9 | -4.1 | .1 | -4.4 | 3.7 | 2.6 | -12.4 | -5.8 | -4.1 | -1.4 | -4.3 | -3.6 | .5 | -1.2 |
| N32 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | .6 | -2.0 | 5.4 | -1.5 | -4.1 | -3.2 | -1.1 | -1.7 | 5.6 | 2.4 | 5.2 | -2.2 | -2.2 | -7.8 | -18.5 | .5 | 5.0 | -.0 | 29.1 | 2.0 |
| 32.0 | 9.5 | -3.5 | 10.9 | 1.0 | -1.0 | -1.5 | -1.0 | -.8 | 5.2 | -.7 | 3.1 | .2 | -5.8 | -3.8 | -8.8 | -.1 | 3.8 | -.0 | 12.8 | -.6 |
| 52.0 | 5.0 | .1 | 10.6 | .8 | -1.5 | .4 | -.9 | -.7 | 2.3 | .6 | 2.7 | .1 | -4.8 | .3 | -2.8 | -.1 | 2.1 | .5 | .9 | -.5 |
| N33 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 6.1 | 5.9 | 5.2 | 5.4 | -5.6 | 2.6 | 3.2 | 4.1 | -1.6 | 4.3 | 2.2 | 4.2 | -8.3 | -1.5 | 1.5 | -12.3 | .5 | .8 | 3.8 | -8.0 |
| 18.0 | | | | | | | | | | | | | | | | | 1.0 | .2 | -2.1 | -4.1 |
| N41 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.1 | -1.1 | -23.7 | -.9 | -9.7 | -3.1 | -16.5 | .1 | 6.9 | 8.1 | -15.9 | 3.8 | -20.0 | -6.6 | 1.9 | -.1 | 2.7 | -.1 | -.2 | 2.4 |
| 18.0 | -4.9 | -1.9 | -1.4 | 1.1 | -.9 | -.1 | -4.4 | -.0 | 3.1 | -4.2 | -1.8 | 1.5 | -10.6 | -1.5 | -3.3 | -.5 | -1.4 | -5.6 | .1 | -1.0 |
| N42 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.6 | -.5 | -6.0 | -2.2 | -9.4 | -3.0 | -3.9 | -1.5 | -8.9 | .3 | -4.3 | -4.1 | -4.3 | -5.6 | -2.3 | -9.5 | -6.5 | 3.6 | -6.8 | -5.4 |
| 26.0 | | | | | | | | | | | | | | | | | -.8 | 6.1 | -2.2 | -.9 |
| N51 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -9.4 | -.7 | -1.8 | -.0 | | | | | | | | | | | | | | | | |
| 16.0 | -6.0 | .4 | 1.4 | 1.6 | -3.4 | -.1 | -.4 | .6 | | | | | | | | | | | | |
| N52 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.1 | 1.6 | -13.4 | 1.9 | -10.1 | -.9 | -11.4 | -.0 | | | | | | | | | -13.6 | -6.0 | -5.6 | 4.8 |
| 20.0 | -3.9 | 2.9 | -1.5 | 1.2 | -4.8 | 2.1 | -3.9 | .0 | | | | | | | | | -1.4 | 11.4 | -2.2 | -.3 |

Table 6 (cont.). Observed and Modeled Velocities 1979.

| CRUISE | | XWCC-22 | | | | XWCC-23 | | | | XWCC-23 | | | | XWCC-24 | | | | XWCC-24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | | 163-182 | | | | 182-198 | | | | 198-216 | | | | 216-228 | | | | 228-248 | | | |
| | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | | OBSERVED | | MODELED | |
| MOORING | DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LTM | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | -4.1 | 4.7 | -3.1 | -2.9 | -7.7 | 4.9 | -1.4 | 5.2 | -3.2 | 8.1 | -5.5 | 6.6 | -7.4 | -1.8 | -11.0 | -.1 | | | | |
| | 41.0 | -5.7 | 1.2 | -3.2 | -.6 | -3.0 | .7 | -2.5 | .7 | -2.8 | 1.6 | -2.2 | .4 | -3.3 | 2.5 | -2.9 | -.4 | | | | |
| LI1 | | | | | | | | | | | | | | | | | | | | | |
| | 42.0 | -2.0 | 1.5 | -2.2 | .3 | -3.7 | .2 | -3.9 | .2 | -2.4 | .2 | -2.4 | -.2 | -3.9 | 1.7 | -4.3 | .3 | | | | |
| | 46.0 | -2.6 | 1.7 | -2.0 | -.3 | -3.1 | 1.1 | -3.8 | .3 | -2.2 | 1.2 | -2.4 | -.0 | -4.6 | 1.7 | -3.0 | .5 | | | | |
| LI3 | | | | | | | | | | | | | | | | | | | | | |
| | 58.0 | -5.2 | .1 | -18.7 | 1.6 | -2.5 | .9 | -2.8 | .6 | -2.5 | .7 | -2.6 | .3 | -1.8 | .9 | -1.7 | .4 | -3.5 | .7 | -3.2 | 1.4 |
| | 61.0 | -3.7 | .8 | -18.1 | 1.6 | -1.9 | .8 | -2.7 | .4 | -1.5 | .4 | -2.6 | .1 | -1.5 | .3 | -1.5 | .4 | -4.9 | 1.4 | -2.9 | 1.3 |
| NJ2A | | | | | | | | | | | | | | | | | | | | | |
| | 29.0 | -3.0 | .7 | -4.0 | -.5 | -2.5 | .1 | -3.5 | -.1 | -2.4 | .0 | -2.8 | -.1 | -5.4 | 2.1 | -7.3 | 1.4 | -3.1 | .6 | -2.7 | -.1 |
| | 32.0 | -1.7 | .4 | -3.8 | .1 | -1.7 | .1 | -2.6 | -.0 | -1.7 | .5 | -2.0 | -.1 | -3.7 | 1.1 | -5.9 | .3 | -2.3 | .2 | -2.8 | -.2 |
| N13 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 5.9 | 2.6 | -.5 | 1.5 | 6.8 | 4.4 | -1.2 | 3.5 | | | | | | | | | | | | |
| | 12.0 | | | | | | | | | | | | | | | | | | | | |
| N14 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 6.7 | 3.5 | 2.5 | -2.0 | -2.1 | 4.6 | -1.9 | 1.4 | -4.5 | 4.1 | 1.3 | 1.5 | -1.4 | 4.8 | -.6 | -2.6 | -5.2 | 1.9 | 8.7 | -7.3 |
| | 18.0 | -3.5 | 4.0 | -.6 | -.4 | -4.1 | 3.2 | -.5 | -.6 | -4.4 | 2.0 | -.2 | -.4 | -1.2 | 1.0 | .2 | -1.9 | 2.2 | -.4 | -.8 | -2.0 |
| N23 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | | | | | 2.4 | -2.1 | 2.5 | 6.0 | 1.7 | -.6 | .8 | 3.9 | -1.3 | 3.0 | 1.4 | 6.1 | 6.7 | 17.7 | 3.9 | 13.6 |
| | 19.0 | -2.0 | -.3 | -2.7 | -1.0 | 1.2 | -1.4 | 2.2 | -1.1 | | | | | | | | | | | | |
| N31 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | | | | | | | | | | | | | | | | | 5.5 | 4.6 | 6.1 | -2.7 |
| | 19.0 | -5.1 | -3.7 | -.9 | -.9 | -.4 | -.2 | -1.3 | 2.1 | -16.4 | -12.4 | -1.3 | -1.7 | -2.0 | -.7 | -.6 | -1.7 | -3.1 | -2.8 | .4 | -2.5 |
| N32 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 1.7 | 4.7 | 31.9 | -.9 | -1.4 | 5.8 | 19.0 | 3.6 | -1.3 | -3.0 | 19.4 | -.4 | -2.3 | -5.0 | 14.6 | -6.9 | 6.3 | 8.4 | 16.3 | 3.1 |
| | 32.0 | | | | | | | | | -2.9 | -1.2 | 10.6 | -.3 | 6.8 | -.4 | 7.5 | -1.1 | .5 | .1 | 4.6 | -1.9 |
| | 52.0 | .1 | .2 | .4 | -.6 | .5 | .4 | 3.3 | 1.0 | .5 | -.1 | 4.1 | .4 | | | | | | | | |
| N33 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 4.7 | 5.3 | 2.5 | -7.2 | -4.9 | 8.5 | -1.1 | -4.4 | -.8 | 3.1 | 3.3 | -2.9 | -8.5 | 2.2 | .3 | 11.9 | 3.9 | 1.4 | 3.3 | 9.8 |
| | 18.0 | -.0 | 2.4 | -.0 | -4.5 | 1.6 | 2.2 | -.7 | -2.9 | | | | | | | | | | | | |
| N41 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 3.6 | 6.4 | 1.0 | .8 | 4.3 | 5.2 | 7.0 | 3.5 | 1.7 | -.9 | 4.9 | 2.2 | -4.6 | .5 | -17.9 | -8.7 | 5.9 | 4.2 | -12.1 | -3.0 |
| | 18.0 | -4.5 | -4.8 | -1.7 | .2 | -4.1 | -1.3 | 2.7 | .4 | -6.7 | -6.3 | 3.5 | .0 | -3.1 | -3.7 | -3.4 | -1.9 | 1.3 | -3.8 | -2.0 | -2.9 |
| N42 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 3.7 | 3.4 | 12.2 | 1.1 | -6.8 | 1.0 | 5.3 | 6.1 | -7.3 | 3.4 | 5.4 | 5.7 | | | | | | | | |
| | 26.0 | -1.4 | .2 | .7 | .6 | -1.0 | .4 | .5 | 1.0 | -3.4 | .1 | 1.1 | .7 | | | | | | | | |
| N51 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | 4.0 | 1.9 | 4.0 | -.7 | 3.4 | -1.3 | 4.3 | -1.1 | 5.0 | 3.4 | 2.7 | 1.9 | -5.9 | -.6 | -16.5 | -6.8 | 7.9 | 4.1 | .7 | 2.3 |
| | 16.0 | -.6 | .3 | .3 | -.3 | -6.2 | .1 | .8 | .2 | -8.2 | -.1 | 1.6 | -.1 | -8.2 | -.1 | -4.0 | -.9 | 4.1 | -.4 | .4 | .0 |
| N52 | | | | | | | | | | | | | | | | | | | | | |
| | 3.0 | .7 | 8.2 | 4.8 | -.2 | -4.2 | 1.3 | 1.1 | -3.2 | -9.2 | -1.6 | -7.9 | -4.0 | | | | | | | | |
| | 20.0 | -.9 | 7.8 | .3 | .1 | -3.7 | 2.0 | .5 | -.9 | -4.1 | 1.1 | -1.1 | -1.5 | -8.7 | 3.6 | -3.7 | -.7 | -2.7 | .4 | -2.6 | -1.5 |

Table 7. Actual and Relative Errors 1975.

| CRUISE | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | | XWCC- 2 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 60- 66 | | | | 66- 80 | | | | 80- 90 | | | | 90- 95 | | | | 95-100 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | 4.1 | .3 | -1.3 | .6 | 12.7 | -11.8 | 1.2 | -1.2 | 2.6 | 1.3 | -.3 | .3 |
| 20.0 | | | | | | | | | -3.5 | -.2 | 1.8 | .5 | -.3 | 6.5 | -.1 | 3.6 | -3.0 | -.5 | 1.4 | .4 |
| CM28 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.2 | 2.6 | .2 | .3 | -1.5 | -.7 | .1 | 1.8 | -1.0 | -1.1 | .1 | -.4 | 10.8 | -8.7 | 1.5 | -1.7 | 1.4 | -4.1 | -.2 | 18.0 |
| 24.0 | 1.2 | -3.6 | .5 | 1.0 | -6.3 | -.0 | .7 | .1 | -6.8 | 1.0 | 1.0 | .8 | | | | | | | | |
| 37.0 | -.7 | -.9 | -.8 | .6 | -1.5 | -.7 | .5 | .8 | -2.5 | -.8 | 1.4 | .8 | -1.1 | 1.3 | -.5 | -1.8 | -3.0 | -.1 | .9 | .2 |
| CM29 | | | | | | | | | | | | | | | | | | | | |
| 10.0 | 1.9 | 3.5 | -2.1 | 1.0 | -5.6 | -.4 | .5 | .1 | 2.2 | 1.9 | -.9 | 3.0 | 18.8 | 1.1 | 1.3 | .2 | -5.1 | -.6 | .4 | .2 |
| 25.0 | -.2 | 2.8 | -.2 | 2.0 | -7.2 | -1.3 | .7 | .4 | -2.3 | .3 | 1.3 | -.5 | 5.0 | 4.8 | .5 | 2.4 | -8.2 | -1.5 | .8 | .4 |
| 40.0 | -.1 | 1.6 | -.0 | 1.5 | -4.3 | -.3 | .6 | .2 | -1.5 | .2 | 2.1 | -1.2 | -.1 | 3.4 | -.0 | 3.0 | -3.6 | -.1 | .7 | .1 |
| CM30 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 6.0 | -4.5 | 1.4 | -2.3 | -3.8 | 2.4 | .4 | -2.6 | 4.2 | -4.5 | -4.9 | 4.5 | 19.1 | -11.9 | 1.2 | -2.4 | -3.2 | -3.7 | .2 | 2.1 |
| 27.0 | -3.1 | 3.6 | -1.5 | 1.1 | -4.8 | -.7 | .6 | .3 | -4.6 | -.2 | 3.6 | .6 | 1.9 | 6.4 | .2 | 1.1 | -10.3 | -.5 | .9 | .2 |
| 42.0 | -.6 | .9 | -.1 | 1.2 | -5.2 | .4 | .6 | -.3 | -1.9 | -2.0 | -3.0 | 1.0 | 2.8 | 4.3 | .3 | .9 | -7.2 | -.1 | .7 | .0 |
| CM33 | | | | | | | | | | | | | | | | | | | | |
| 8.0 | -13.5 | -4.2 | 1.3 | .4 | -5.1 | 5.7 | .8 | .7 | 3.4 | 18.5 | .7 | 1.3 | | | | | | | | |
| 39.0 | 4.0 | -7.6 | .7 | .7 | -2.9 | -7.2 | .8 | 1.4 | -.0 | -3.4 | -.1 | .7 | -1.8 | -19.5 | -.7 | .7 | 5.1 | -.6 | 1.1 | .6 |
| 58.0 | -1.0 | -1.9 | -4.3 | .4 | .6 | -2.5 | -11.0 | 2.8 | -.5 | -2.3 | -49.0 | .7 | | | | | | | | |
| CM34 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | |
| CM36 | | | | | | | | | | | | | | | | | | | | |
| 27.0 | -3.4 | -8.7 | 1.2 | .9 | -10.6 | -1.0 | .9 | -.9 | -4.7 | -5.0 | 1.0 | 1.1 | .6 | -17.8 | -2.2 | .8 | -9.8 | .7 | .9 | 4.7 |
| 41.0 | -3.9 | -8.6 | 2.3 | .9 | -5.6 | -3.0 | .8 | 2.6 | -1.4 | -6.2 | 2.9 | 1.1 | -3.6 | -15.1 | -4.0 | .7 | -6.6 | -1.6 | .9 | 2.7 |
| 55.0 | -4.1 | -6.6 | 2.0 | .8 | -1.0 | -1.8 | .3 | 17.6 | -.3 | -3.8 | -.5 | 1.0 | -6.2 | -13.6 | 3.1 | .7 | -2.7 | -.6 | .7 | -2.2 |
| CM37 | | | | | | | | | | | | | | | | | | | | |
| 7.0 | -.2 | -6.9 | 1.4 | 1.0 | .4 | 11.2 | -.1 | 1.1 | -6.6 | -1.5 | .8 | .5 | 8.9 | -12.7 | .6 | 1.1 | -10.0 | 1.5 | .7 | .3 |
| 38.0 | -6.8 | -10.4 | 3.9 | .8 | -5.3 | 10.7 | .5 | 1.0 | -7.7 | -5.8 | 1.3 | .8 | -2.6 | -9.7 | -.3 | .6 | -11.3 | 2.1 | .8 | .7 |
| 62.0 | -7.0 | -7.8 | 2.3 | .8 | -.5 | 8.1 | .1 | .9 | -4.1 | -3.5 | 1.7 | .8 | -4.9 | -8.3 | -1.2 | .6 | -4.6 | 2.0 | .7 | .7 |
| CM38 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 15.0 | -5.5 | 2.3 | 4.6 | 2.3 | 2.1 | -.2 | -4.9 | 13.5 | -1.9 | 6.0 | 2.6 | 17.2 | -15.0 | 1.2 | 7.9 | 2.5 | -3.6 | -.2 | 12.9 |
| 26.0 | 7.2 | -.8 | .8 | .2 | -8.7 | -1.2 | .5 | .7 | 4.3 | -1.6 | 1.0 | .4 | 9.8 | 1.1 | .6 | -.3 | -11.3 | -3.1 | .6 | .8 |
| 41.0 | 7.6 | -.9 | .8 | .2 | -7.5 | -.1 | .5 | .2 | 3.2 | -1.6 | .9 | .4 | 8.7 | -.8 | .5 | .2 | -7.9 | -.3 | .6 | .4 |
| 75.0 | 1.3 | -3.1 | .4 | .7 | .1 | .0 | -.0 | .0 | -.9 | -2.8 | -2.5 | .8 | -2.5 | -7.5 | -.8 | .7 | -.2 | -.4 | .0 | -.6 |
| CM49 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | 3.3 | -2.2 | -.2 | 1.5 |
| 11.0 | -2.9 | 5.0 | .6 | 1.4 | | | | | | | | | | | | | -3.2 | .2 | .2 | -.2 |
| 27.0 | -4.8 | -.7 | 2.1 | 1.8 | -4.7 | 1.3 | .5 | 3.0 | -2.6 | -.6 | 1.0 | .6 | -1.4 | 4.0 | -.3 | 1.7 | -4.2 | .5 | .6 | 1.8 |
| 34.0 | -1.7 | -.5 | 55.7 | 1.2 | -1.6 | -3.8 | .3 | .9 | -.5 | -2.4 | .8 | .9 | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975.

| CRUISE | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | | XWCC- 4 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 90- 95 | | | | 95-109 | | | | 109-115 | | | | 115-127 | | | | 127-150 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 14.9 | -7.5 | 1.4 | -.8 | -1.3 | 9.3 | .2 | 2.0 | 11.8 | 11.0 | 1.3 | 1.1 | -9.1 | 3.6 | 1.2 | -15.0 | .1 | 1.9 | .1 | 94.5 |
| 20.0 | 3.1 | 7.2 | .6 | 4.0 | -2.4 | -.6 | 1.1 | .5 | 2.4 | -.8 | .5 | .3 | -3.0 | 2.9 | .7 | 1.1 | -.8 | 2.3 | .5 | 1.5 |
| CM28 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 5.7 | -9.0 | .8 | -1.8 | .6 | -.6 | -.1 | 2.9 | -.5 | 2.0 | -.2 | .2 | -8.6 | 2.2 | 1.0 | -.8 | -6.0 | .5 | 1.4 | -.4 |
| 24.0 | | | | | | | | | | | | | | | | | | | | |
| 37.0 | -1.8 | 1.2 | -.9 | -1.6 | -3.1 | -.4 | .9 | .7 | .1 | -1.1 | .0 | .6 | -2.2 | .9 | .6 | .9 | -.4 | .1 | .4 | -6.5 |
| CM29 | | | | | | | | | | | | | | | | | | | | |
| 10.0 | 9.7 | 4.2 | .7 | .9 | -7.9 | -2.8 | .6 | .8 | 7.3 | 5.1 | .9 | .9 | -1.9 | -2.8 | .3 | 1.0 | -3.6 | .7 | .5 | .8 |
| 25.0 | 5.3 | 1.8 | .5 | .9 | -6.5 | -3.4 | .6 | .9 | | | | | | | | | | | | |
| 40.0 | -.9 | 1.1 | -.2 | 1.0 | -2.2 | -.8 | .4 | .5 | 2.8 | -1.2 | .5 | .9 | -1.9 | 1.3 | .4 | 1.4 | -.6 | .5 | .3 | 1.6 |
| CM30 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 23.8 | -13.3 | 1.5 | -2.7 | 2.0 | -1.3 | -.1 | .8 | 11.0 | -7.8 | 1.8 | 55.8 | | | | | | | | |
| 27.0 | 8.2 | 12.0 | .7 | 2.0 | -7.9 | .2 | .7 | -.1 | -.3 | 4.5 | -.2 | 1.5 | | | | | | | | |
| 42.0 | 4.7 | 4.9 | .5 | 1.0 | -6.0 | .2 | .6 | -.1 | 4.2 | 2.1 | .7 | 1.8 | -4.5 | 1.7 | .6 | 6.1 | -.6 | -.1 | .2 | .1 |
| CM33 | | | | | | | | | | | | | | | | | | | | |
| 8.0 | | | | | | | | | | | | | | | | | | | | |
| 39.0 | -2.9 | -16.2 | -1.2 | .6 | 5.2 | 1.2 | 1.1 | -1.2 | -.8 | -10.1 | -.5 | .6 | -3.7 | -3.1 | .7 | -.8 | | | | |
| 58.0 | | | | | | | | | | | | | | | | | | | | |
| CM34 | | | | | | | | | | | | | | | | | | | | |
| 30.0 | | | | | | | | | | | | | | | | | | | | |
| CM36 | | | | | | | | | | | | | | | | | | | | |
| 27.0 | -2.1 | -19.9 | 7.9 | .9 | -6.1 | -3.8 | .5 | -27.0 | -1.7 | -15.1 | .9 | 1.0 | .6 | -2.8 | -.1 | -1.8 | -1.4 | -2.9 | .2 | -18.2 |
| 41.0 | -1.7 | -17.5 | -1.9 | .9 | -3.6 | -3.5 | .5 | 5.7 | .4 | -14.3 | .4 | 1.0 | .6 | -.3 | -.2 | -.1 | -.2 | -2.1 | .1 | 82.2 |
| 55.0 | -5.4 | -14.5 | 2.7 | .8 | -1.0 | -1.7 | .3 | -6.4 | -2.1 | -10.4 | 2.8 | .9 | 1.1 | 1.9 | -.5 | .4 | .1 | -1.3 | -.0 | 7.8 |
| CM37 | | | | | | | | | | | | | | | | | | | | |
| 7.0 | 16.8 | -9.0 | 1.2 | .8 | -7.4 | 1.1 | .5 | .2 | 7.1 | -2.2 | 1.2 | .2 | -3.4 | 1.7 | .4 | .2 | -3.1 | .6 | .6 | .1 |
| 38.0 | -1.3 | -7.4 | -.2 | .5 | -11.4 | -.9 | .8 | -.3 | .3 | -5.6 | .1 | .5 | -2.7 | 8.9 | .4 | .7 | -1.0 | 3.2 | .3 | .5 |
| 62.0 | -3.2 | -5.5 | -.8 | .4 | -4.7 | .6 | .7 | .2 | -1.7 | -5.6 | -1.1 | .6 | .1 | 9.2 | -.0 | .8 | .6 | 3.6 | -.8 | .7 |
| CM38 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 11.9 | -24.2 | .8 | 12.7 | 3.4 | -5.1 | -.2 | 18.2 | 9.6 | -12.7 | 1.5 | 17.9 | | | | | | | | |
| 26.0 | 10.5 | 1.3 | .6 | -.3 | -17.2 | -3.7 | 1.0 | .9 | 1.9 | -.7 | .3 | .2 | | | | | | | | |
| 41.0 | 4.6 | -.6 | .3 | .1 | -13.0 | -1.1 | .9 | 1.4 | -1.6 | -3.0 | -.4 | .6 | | | | | | | | |
| 75.0 | -4.4 | -7.1 | -1.3 | .7 | -3.2 | -.0 | .9 | -.1 | -3.1 | -2.0 | -2.9 | .5 | | | | | | | | |
| CM49 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | 2.1 | -1.7 | -.2 | 1.1 | 2.0 | -1.5 | 1.0 | -.4 | | | | | | | | |
| 11.0 | | | | | -7.4 | 2.0 | .5 | -1.4 | 3.3 | -1.4 | 1.0 | -.4 | -6.5 | -3.2 | .7 | 1.3 | -1.4 | .5 | .5 | 3.2 |
| 27.0 | -.7 | .2 | -.1 | .1 | -5.0 | -.6 | .7 | -2.1 | 3.4 | -.3 | .7 | .3 | -3.2 | 1.8 | .5 | .7 | -1.4 | 1.3 | .5 | 1.3 |
| 34.0 | | | | | | | | | | | | | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975.

| CRUISE | XWCC- 5 | | | | XWCC- 5 | | | |
|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 127-150 | | | | 150-168 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C |
| CM15 | | | | | | | | |
| 3.0 | 1.6 | -.7 | 2.6 | -33.5 | | | | |
| 20.0 | -1.7 | 1.5 | 1.1 | 1.0 | .2 | -.3 | .3 | .7 |
| CM28 | | | | | | | | |
| 3.0 | 2.0 | -4.7 | -.5 | 3.3 | -1.6 | 1.2 | .1 | .2 |
| 24.0 | | | | | | | | |
| 37.0 | -.7 | .0 | .6 | -2.0 | | | | |
| CM29 | | | | | | | | |
| 10.0 | -5.1 | 1.0 | .8 | 1.1 | | | | |
| 25.0 | | | | | | | | |
| 40.0 | -.7 | .5 | .4 | 1.5 | -.8 | .1 | .4 | -.2 |
| CM30 | | | | | | | | |
| 3.0 | | | | | | | | |
| 27.0 | | | | | | | | |
| 42.0 | .1 | -.2 | -.0 | .1 | -1.9 | .3 | .4 | -.3 |
| CM33 | | | | | | | | |
| 8.0 | | | | | | | | |
| 39.0 | | | | | | | | |
| 58.0 | | | | | | | | |
| CM34 | | | | | | | | |
| 30.0 | | | | | -3.6 | 9.0 | .5 | 5.6 |
| CM36 | | | | | | | | |
| 27.0 | -6.0 | -6.8 | 1.0 | -42.2 | -1.0 | -11.3 | 1.1 | 2.6 |
| 41.0 | -4.0 | -3.0 | 1.2 | 60.4 | -2.0 | -4.8 | 1.4 | 2.6 |
| 55.0 | -2.2 | -2.9 | 1.1 | 17.0 | -1.1 | -3.7 | 1.2 | 4.0 |
| CM37 | | | | | | | | |
| 7.0 | -5.3 | -7.3 | 1.0 | -1.5 | -2.2 | -6.9 | 1.2 | -1.2 |
| 38.0 | -3.3 | -.9 | 1.1 | -.1 | -3.1 | -2.6 | 1.0 | -.6 |
| 62.0 | -.8 | 2.0 | 1.1 | .4 | -1.3 | 1.8 | 1.0 | .4 |
| CM38 | | | | | | | | |
| 3.0 | | | | | | | | |
| 26.0 | | | | | | | | |
| 41.0 | | | | | | | | |
| 75.0 | | | | | | | | |
| CM49 | | | | | | | | |
| 3.0 | | | | | -1.2 | -.7 | .4 | -.2 |
| 11.0 | -1.7 | -1.1 | .6 | -6.7 | -1.4 | 1.4 | .7 | .5 |
| 27.0 | -1.6 | 1.2 | .6 | 1.2 | -1.4 | .4 | .6 | .8 |
| 34.0 | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975-1976.

| CRUISE | XWCC- 6 | | | | XWCC- 6 | | | | XWCC- 7 | | | | XWCC- 7 | | | | XWCC- 7 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 280-305 | | | | 305-328 | | | | 305-328 | | | | 328-354 | | | | 354- 2 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 8.2 | -1.1 | -.6 | .4 | -3.0 | 4.2 | .6 | 1.0 | -3.9 | -2.2 | .8 | -.5 | 2.5 | -.1 | -.4 | -.1 | 6.2 | .4 | -.7 | .6 |
| 9.0 | 2.8 | .5 | -.2 | -.2 | -3.0 | .7 | .4 | .2 | -4.0 | 2.5 | .6 | .8 | -5.5 | 5.0 | .5 | 1.7 | -2.9 | 6.4 | .2 | 2.9 |
| 19.0 | -3.8 | -3.5 | .3 | 1.2 | -4.3 | .5 | 1.0 | 1.5 | -2.9 | 2.2 | .7 | 6.4 | | | | | | | | |
| 39.0 | 2.9 | 2.4 | -.5 | 1.3 | .2 | -.6 | 1.0 | .8 | .1 | .2 | .3 | -.2 | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | -.2 | -5.2 | -.8 | -1.7 | -2.0 | -2.6 | -6.2 | -.8 | 6.3 | 3.2 | -1.1 | 1.8 | 7.7 | 5.2 | -.6 | 104.8 |
| 13.0 | -10.1 | -.3 | .6 | .1 | .6 | -2.3 | 1.5 | -2.0 | -1.4 | -3.5 | -3.3 | -3.1 | -5.0 | 1.8 | .6 | 1.1 | -7.7 | 4.2 | .5 | -4.7 |
| 23.0 | -5.1 | .7 | .5 | -.6 | 1.5 | -.7 | .3 | -.5 | 1.9 | 1.4 | .3 | .9 | .2 | -1.9 | -.1 | .9 | .6 | -1.7 | -.1 | .3 |
| 31.0 | -2.0 | .6 | .4 | -.9 | -.9 | -.4 | -.4 | -.5 | -.6 | .5 | -.3 | .7 | -2.4 | -1.5 | .6 | 1.3 | -.5 | -1.0 | .1 | .4 |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | -8.9 | .9 | .5 | -.6 | 12.3 | 8.2 | -.9 | -3.5 |
| 9.0 | -14.1 | -.4 | .8 | .2 | -7.7 | -12.3 | .8 | -8.4 | -1.7 | -14.8 | .2 | -10.1 | -7.4 | -1.1 | .4 | .8 | -3.0 | 5.4 | .2 | -1.5 |
| 19.0 | | | | | -6.7 | -2.6 | .9 | -3.9 | -2.2 | .4 | .3 | .6 | -16.2 | -1.0 | .9 | .4 | -6.6 | .6 | .4 | -.1 |
| 39.0 | -12.2 | 1.7 | .9 | -.6 | -1.6 | -2.6 | .3 | 3.3 | 1.5 | -1.4 | -.3 | 1.8 | -6.4 | -.7 | .7 | .5 | -3.4 | 1.7 | .2 | -.7 |
| 59.0 | -4.9 | 3.8 | .5 | -53.7 | 3.8 | -2.7 | -2.2 | 15.9 | 7.2 | -.7 | -4.2 | 4.1 | .6 | 2.0 | -.1 | 1.8 | .8 | 5.3 | -.1 | 4.3 |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | -9.1 | 2.2 | .5 | 3.2 | -6.6 | 7.4 | 1.7 | 1.4 | -8.9 | 7.3 | 2.3 | 1.3 | -10.8 | 8.3 | 1.0 | 1.2 | -14.6 | 6.5 | .8 | 1.2 |
| 39.0 | .4 | .8 | -.0 | 83.0 | -.1 | 1.0 | -.0 | -5.5 | -.3 | 1.5 | -.1 | -7.6 | -.1 | -.3 | .1 | .2 | -.1 | -.9 | .0 | .4 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | -10.1 | .4 | .6 | -1.4 | -1.1 | 3.7 | .4 | 2.5 | -.9 | .5 | .3 | .4 | -10.4 | -3.2 | .7 | 3.4 | -16.0 | -1.4 | .7 | -1.9 |
| 40.0 | -4.7 | .1 | .4 | -.2 | -.9 | 1.3 | .4 | -1.5 | -.8 | .0 | .3 | -.0 | -4.5 | -1.5 | .5 | 1.4 | -11.1 | -.4 | .6 | 2.4 |
| 60.0 | .3 | .9 | -.0 | .6 | -.7 | 3.0 | .3 | 3.1 | -.7 | 3.6 | .3 | 3.7 | -.5 | 3.2 | .1 | 1.8 | -.4 | 4.0 | .1 | 1.7 |
| 65.0 | .4 | -.7 | -.1 | -4.1 | .0 | 1.7 | -.0 | 4.4 | .4 | 1.9 | -.3 | 5.1 | -.3 | .9 | .1 | 1.3 | -.4 | .4 | .1 | .4 |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | 2.2 | -7.3 | -.4 | .9 | 7.2 | -8.9 | -1.1 | 1.0 |
| 21.0 | | | | | | | | | | | | | -5.3 | -10.4 | .8 | 1.2 | -3.4 | -13.1 | .6 | 1.4 |
| 42.0 | -2.0 | -2.0 | .5 | 4.6 | | | | | | | | | -1.5 | -8.8 | .6 | 1.2 | 1.1 | -8.9 | -.7 | 1.6 |
| 52.0 | -.4 | -.8 | .2 | -1.1 | -2.4 | -6.0 | 3.2 | .8 | -1.9 | -6.3 | 2.6 | .9 | .3 | -4.0 | -.5 | 1.6 | 3.2 | -7.2 | 4.5 | 1.9 |
| 62.0 | -.5 | .9 | .2 | .4 | -2.3 | -3.5 | 3.4 | .7 | -1.8 | -3.8 | 2.7 | .7 | .2 | -2.9 | -.3 | 2.1 | 3.0 | -6.6 | 5.7 | 2.0 |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | 5.8 | -5.9 | -.7 | 2.1 | 16.1 | -5.1 | -1.5 | 15.1 |
| 17.0 | | | | | | | | | | | | | | | | | | | | |
| 38.0 | | | | | | | | | | | | | -.4 | -7.9 | .1 | 1.7 | -5.3 | -7.3 | .4 | 2.1 |
| 48.0 | | | | | | | | | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | 1.4 | -4.1 | -1.1 | 1.9 | -.7 | -5.8 | .1 | 2.2 |

Table 7 (cont.). Actual and Relative Errors 1975-1976.

| CRUISE | XWCC- 7 | | | | XWCC- 7 | | | | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 8 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 2- 23 | | | | 23- 52 | | | | 52- 76 | | | | 76- 94 | | | | 94-104 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | | | | | -2.7 | 4.1 | .7 | 1.5 | -7.2 | .5 | .6 | .4 | -.8 | .2 | .2 | ***** | .5 | -1.0 | -.2 | .3 |
| 39.0 | | | | | .4 | -.2 | .4 | .3 | 1.3 | .5 | -.4 | 2.4 | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 6.6 | -5.1 | -1.8 | -16.3 | -2.1 | -2.6 | .6 | -1.8 | -4.1 | -1.2 | .6 | -.5 | 3.3 | -.5 | 1.4 | -.1 | 5.4 | .3 | -.7 | -.8 |
| 13.0 | 3.4 | -1.7 | -.6 | -10.4 | | | | | | | | | .7 | 4.5 | .9 | 1.4 | -9.2 | 1.6 | .8 | 2.1 |
| 23.0 | -.6 | 1.9 | .2 | -2.5 | .2 | .3 | -.7 | -.4 | | | | | .9 | 1.6 | 1.2 | 2.5 | -1.1 | .0 | .2 | -.1 |
| 31.0 | -.8 | -.6 | .5 | 1.2 | .2 | -.9 | -2.0 | .7 | | | | | | | | | | | | |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 6.5 | -3.3 | -.5 | -2.0 | -2.1 | -7.2 | .4 | -72.0 | 4.8 | -8.9 | -.5 | -8.8 | | | | | | | | |
| 9.0 | -11.2 | 6.0 | .6 | 4.4 | -6.2 | 1.7 | 1.0 | 1.4 | .3 | 1.3 | -.0 | .6 | 6.7 | -1.6 | -1.0 | -1.2 | 7.9 | 5.0 | -.7 | -2.5 |
| 19.0 | -17.1 | 4.0 | 1.0 | -3.8 | -9.0 | -2.4 | 1.7 | .6 | -4.4 | -3.2 | .3 | 1.6 | 1.2 | -.7 | -.2 | .7 | -1.2 | -2.9 | .1 | .6 |
| 39.0 | -11.7 | -2.2 | 1.1 | .5 | -2.6 | -2.7 | -2.9 | .7 | -.9 | -3.6 | .1 | 1.5 | 1.8 | -.9 | -.6 | .7 | 1.1 | -1.8 | -.3 | .4 |
| 59.0 | -1.6 | .2 | 1.6 | -.1 | -1.0 | -1.3 | -.4 | .5 | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | -11.1 | 1.2 | 1.8 | -2.3 | -8.5 | -1.5 | 2.0 | .5 | -6.1 | -2.4 | .5 | 1.1 | -3.3 | -1.3 | .5 | -4.2 | 3.0 | -6.4 | -.9 | .9 |
| 39.0 | -.6 | -3.1 | -.4 | .7 | -.4 | -1.1 | -.2 | .5 | -.1 | 2.3 | .0 | 2.1 | -.0 | .3 | .0 | -.4 | .2 | .6 | .4 | -3.1 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| 40.0 | -.2 | -.4 | .2 | .8 | -.2 | -2.1 | .2 | 1.1 | -.4 | -1.0 | .1 | .3 | -.7 | 3.9 | .2 | 4.6 | -.7 | 2.3 | .4 | -3.2 |
| 60.0 | | | | | | | | | | | | | | | | | | | | |
| 65.0 | | | | | | | | | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | -3.0 | -17.0 | .9 | 3.7 | -1.3 | -19.8 | .5 | 3.9 |
| 21.0 | | | | | | | | | | | | | -1.7 | -14.3 | .9 | 1.8 | -1.4 | -12.1 | .6 | 3.6 |
| 42.0 | -1.9 | -14.0 | 4.2 | .9 | -3.6 | -8.5 | 1.7 | .8 | -2.8 | -16.5 | .7 | 1.0 | -2.9 | -9.4 | 1.0 | 1.7 | -2.1 | -9.8 | .8 | 2.8 |
| 52.0 | -2.0 | -12.4 | 3.2 | .9 | -2.2 | -4.9 | 2.9 | .7 | .3 | -7.6 | -.3 | 3.0 | -3.0 | -4.4 | 1.0 | 1.1 | -1.9 | -4.7 | .9 | 2.5 |
| 62.0 | -2.2 | -11.4 | 2.6 | .9 | | | | | | | | | | | | | | | | |
| 69.0 | | | | | -1.4 | -4.6 | 2.2 | .7 | .2 | -1.5 | -.3 | 2.5 | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 10.2 | -15.3 | -1.7 | 3.4 | | | | | | | | | | | | | | | | |
| 17.0 | | | | | -.9 | -8.8 | .1 | .8 | -.4 | -1.7 | .1 | -15.0 | -1.2 | -4.6 | .3 | 1.3 | -4.2 | -6.1 | .7 | 1.3 |
| 38.0 | -4.5 | -10.4 | .6 | .9 | -.5 | -12.2 | .1 | .9 | .2 | -5.4 | -.0 | 1.2 | | | | | | | | |
| 48.0 | | | | | -.7 | -11.6 | .3 | .9 | 1.0 | -8.7 | -.3 | 1.1 | | | | | | | | |
| 58.0 | -.7 | -6.2 | .5 | .9 | -2.2 | -8.4 | .8 | .9 | 2.2 | -3.9 | -.8 | 1.0 | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975-1976.

| CRUISE | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 8 | | | | XWCC- 9 | | | | XWCC- 9 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 104-110 | | | | 110-117 | | | | 117-125 | | | | 117-125 | | | | 125-139 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | .6 | -.1 | .5 | .2 | -.4 | -.1 | .1 | .1 | -11.0 | .1 | 1.1 | .4 | -9.2 | -.1 | .9 | -.4 | -.1 | 4.4 | -.1 | 1.1 |
| 39.0 | | | | | | | | | | | | | | | | | | | | |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -1.3 | 1.1 | .7 | .4 | -5.0 | 4.4 | 1.1 | .8 | 1.7 | -.7 | -.3 | -.3 | 3.4 | -4.1 | -.5 | -1.6 | | | | |
| 13.0 | -3.6 | 2.1 | 2.3 | 6.5 | -6.2 | -.3 | .8 | .3 | -7.2 | -.4 | .8 | .2 | -8.2 | .6 | 1.0 | -.3 | 3.2 | 4.3 | .4 | 1.4 |
| 23.0 | -.2 | 2.3 | -.1 | 2.6 | .5 | -1.3 | -.3 | .8 | -1.8 | -1.7 | .5 | .6 | -1.4 | -2.2 | .4 | .8 | .3 | -3.0 | .1 | 1.3 |
| 31.0 | | | | | | | | | | | | | | | | | | | | |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | 2.2 | -1.4 | -.2 | -.6 | -.5 | .2 | .0 | .1 | -1.9 | -3.5 | -1.3 | -.7 |
| 9.0 | 5.4 | -1.0 | 2.3 | -1.7 | | | | | | | | | | | | | | | | |
| 19.0 | 1.9 | -3.0 | .6 | 4.1 | -.7 | .2 | .1 | 3.2 | -9.3 | -2.3 | .9 | .8 | -6.8 | 1.2 | .7 | -.4 | 2.8 | -1.5 | .8 | .8 |
| 39.0 | 2.2 | -3.0 | .4 | 3.7 | | | | | | | | | | | | | | | | |
| 59.0 | | | | | | | | | -2.1 | .3 | .5 | -.7 | .3 | 2.3 | -.1 | -5.1 | 2.7 | -1.6 | 6.1 | 52.0 |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -.7 | 2.8 | -1.9 | .7 | -1.0 | -2.8 | .2 | .8 | -3.0 | -.4 | .3 | -.1 | -9.1 | -3.7 | 1.1 | -.6 | -10.4 | -.8 | -1.8 | -.2 |
| 19.0 | -2.7 | 3.4 | .7 | 1.2 | -3.7 | -1.6 | .5 | 1.2 | 4.2 | -3.6 | -1.1 | 2.3 | -4.6 | -.3 | 1.2 | .2 | -4.2 | 1.6 | -2.7 | 18.2 |
| 39.0 | .5 | -1.3 | .6 | .4 | -.6 | 1.3 | .1 | .9 | -.7 | -.6 | .1 | .7 | -.4 | -.2 | .1 | .2 | -.4 | -.3 | -8.8 | .2 |
| 46.0 | | | | | | | | | | | | | | | | | | | | |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| 40.0 | | | | | | | | | | | | | | | | | | | | |
| 60.0 | | | | | | | | | | | | | | | | | | | | |
| 65.0 | | | | | | | | | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | | | | |
| 21.0 | 1.6 | -18.1 | 2.0 | 3.6 | 3.3 | -16.4 | 1.6 | 11.6 | 7.4 | -11.1 | 1.1 | -5.6 | 5.6 | 4.5 | .9 | 2.3 | | | | |
| 42.0 | -.2 | -15.8 | .4 | 1.8 | 1.4 | -5.5 | 2.6 | -1.7 | -.5 | -7.2 | .6 | 90.4 | -1.6 | 2.1 | 1.9 | -26.5 | -1.9 | -7.3 | 3.9 | .6 |
| 52.0 | | | | | | | | | | | | | | | | | | | | |
| 62.0 | | | | | | | | | | | | | | | | | | | | |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | 6.3 | -10.9 | -1.2 | -7.1 | -1.8 | -4.1 | .3 | -2.7 | | | | |
| 17.0 | 1.4 | -11.6 | 70.0 | 1.2 | 1.5 | -2.7 | -.5 | 4.6 | -3.5 | -.9 | .6 | -1.7 | -7.8 | 2.4 | 1.3 | 4.4 | -.8 | 4.3 | -.2 | 1.9 |
| 38.0 | | | | | | | | | .0 | -3.6 | -.0 | 1.2 | -2.7 | -1.7 | 1.1 | .5 | | | | |
| 48.0 | | | | | | | | | -.6 | -3.5 | .2 | 1.1 | -2.7 | -2.1 | .9 | .7 | -4.2 | -7.1 | 2.6 | .8 |
| 58.0 | | | | | | | | | | | | | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975-1976.

| CRUISE | XWCC- 9 | | | | XWCC- 9 | | | | XWCC- 9 | | | | XWCC- 9 | | | | XWCC-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 139-144 | | | | 144-155 | | | | 155-165 | | | | 165-181 | | | | 165-181 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | -1.5 | -7.8 | .4 | -2.6 | 1.9 | 2.6 | .8 | -2.0 | 2.5 | -1.3 | .8 | 4.3 | -3.1 | -2.4 | -1.6 | -1.5 | | | | |
| 9.0 | 1.7 | -1.2 | -.5 | -.5 | 5.0 | -1.1 | 3.6 | .6 | 3.8 | .7 | 1.0 | -1.2 | .9 | -.3 | -1.1 | -.6 | | | | |
| 19.0 | -1.0 | -3.1 | -1.0 | .7 | 1.4 | .4 | -4.7 | .8 | 3.6 | .2 | 1.0 | -.2 | -9.6 | -3.3 | 2.7 | .7 | -5.2 | -2.6 | 1.8 | .5 |
| 39.0 | .3 | -.8 | .1 | .4 | -.3 | 2.0 | .1 | 1.1 | .5 | 1.0 | ***** | 2.5 | -1.2 | 1.2 | .7 | 12.0 | -1.8 | .1 | 1.0 | -.6 |
| 46.0 | -.2 | .6 | -.3 | 6.0 | -.3 | 2.0 | .1 | .8 | .9 | .6 | 3.0 | 1.5 | -.4 | .9 | .4 | 2.2 | -1.1 | .0 | 1.0 | .0 |
| LT2 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | | -.1 | 6.1 | -.0 | .9 |
| 13.0 | -.2 | 5.9 | -.1 | 4.2 | -1.2 | 2.3 | .2 | 1.1 | 3.8 | 2.9 | 1.5 | 1.8 | 4.0 | 3.8 | .6 | 2.9 | 3.1 | 5.3 | .5 | 2.1 |
| 23.0 | .6 | .0 | .2 | .0 | -1.1 | .7 | .2 | .6 | -.1 | -.1 | .1 | .1 | .2 | .1 | .1 | -.1 | -.0 | 1.0 | -.0 | -1.1 |
| 31.0 | | | | | | | | | | | | | -.9 | -.7 | -1.1 | .4 | -1.1 | -.0 | -1.0 | .0 |
| LT3 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 2.6 | -4.5 | 1.2 | -.8 | 1.7 | 4.8 | -.3 | -8.0 | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | | | | | |
| 19.0 | .0 | 1.5 | .0 | -.9 | -.7 | 9.0 | .1 | 1.6 | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | | | | | | | | |
| 59.0 | -1.8 | -2.1 | -.4 | .8 | 5.2 | 4.0 | -.7 | 1.5 | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 2.3 | -7.3 | .3 | -1.2 | -10.2 | -3.2 | -11.3 | .6 | -8.8 | -1.9 | -4.2 | -3.8 | -7.6 | .3 | -1.1 | .0 | 3.6 | 7.4 | .5 | 1.3 |
| 19.0 | .4 | -2.7 | .1 | .6 | .1 | .6 | .0 | -3.0 | -2.9 | -.4 | -1.0 | .5 | -3.6 | 1.9 | -3.3 | 1.9 | 3.9 | 1.9 | 3.1 | 2.2 |
| 39.0 | .5 | -1.1 | -.4 | .3 | -1.7 | 4.3 | .3 | 1.4 | -.4 | 1.1 | .3 | 11.0 | -1.1 | 2.4 | .4 | 12.0 | -.1 | 1.1 | .0 | 2.1 |
| 46.0 | 2.5 | -1.0 | 25.0 | .6 | 2.3 | -.5 | -1.4 | -5.0 | 1.8 | .4 | 18.0 | 1.3 | 1.5 | -.1 | -1.7 | .5 | 1.5 | .3 | -1.7 | -6.2 |
| LT5 | | | | | | | | | | | | | | | | | | | | |
| 20.0 | -3.6 | 4.0 | 1.1 | .8 | -6.6 | 1.2 | .6 | .7 | -6.3 | 2.1 | .9 | .8 | -3.3 | .9 | .8 | .6 | -2.2 | 1.4 | .5 | .8 |
| 40.0 | -.7 | -.2 | 1.0 | -.7 | -4.8 | -.5 | .5 | 1.2 | -1.8 | .7 | .6 | .9 | -2.3 | .7 | .6 | .8 | -1.7 | .7 | .5 | .7 |
| 60.0 | .2 | -.8 | -2.0 | 1.3 | -.1 | .9 | .0 | 1.5 | -.2 | 1.6 | .1 | 1.2 | -.1 | 1.1 | .1 | 1.2 | .1 | .6 | -.1 | .6 |
| 65.0 | .4 | -.8 | 4.0 | 1.1 | -.1 | -.1 | .0 | -.2 | .0 | 1.1 | .0 | 1.2 | .0 | .3 | .0 | 1.5 | .0 | -.2 | -.0 | -.8 |
| LT6 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 10.2 | 1.9 | -6.0 | -.3 | -4.6 | 1.9 | -15.3 | -.5 | -5.7 | 13.6 | 1.6 | 1.6 | 2.3 | -.7 | .3 | .5 | .0 | -5.6 | .0 | 4.9 |
| 21.0 | -6.6 | -.3 | 13.2 | .0 | -1.5 | 2.4 | 1.1 | -8.0 | -9.3 | 12.4 | 1.3 | 1.7 | -2.4 | 1.6 | -4.0 | -.3 | .6 | -4.2 | .6 | .8 |
| 42.0 | -6.3 | -.2 | 3.9 | .0 | -1.5 | 14.0 | .7 | 1.0 | -7.0 | -.4 | 1.2 | .1 | -4.0 | 3.9 | 2.2 | -4.9 | -2.1 | .3 | 1.2 | -.3 |
| 52.0 | -2.6 | -2.2 | -4.3 | .2 | .2 | 12.3 | -.2 | .9 | -2.4 | -4.4 | 1.5 | .8 | -2.7 | 5.7 | 2.7 | 2.7 | -1.4 | 3.2 | 1.2 | 1.6 |
| 62.0 | | | | | | | | | | | | | | | | | -.7 | 2.5 | 1.8 | 1.8 |
| 69.0 | | | | | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | | | | | |
| 2.0 | 4.1 | -1.5 | -.6 | 1.2 | 3.4 | -5.6 | -3.4 | 14.0 | 5.3 | 3.1 | 2.3 | -1.4 | 6.5 | -.7 | 1.4 | -.1 | 6.8 | 2.1 | .9 | .2 |
| 17.0 | -4.4 | -1.6 | 1.3 | .2 | 6.9 | 1.1 | 23.0 | .2 | 9.5 | .5 | 1.3 | -.1 | 5.4 | 4.4 | 1.5 | .7 | 10.1 | 2.6 | 1.9 | .5 |
| 38.0 | 1.6 | -6.5 | .4 | .5 | -.1 | -.3 | .0 | -.2 | 4.2 | -4.7 | 1.4 | .6 | 2.0 | -.3 | 1.2 | ***** | 4.4 | -2.1 | 2.8 | 4.3 |
| 48.0 | -1.6 | -5.4 | -2.0 | .5 | .2 | .7 | -.0 | .3 | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1975-1976.

| CRUISE | XWCC-10 | | | | XWCC-10 | | | | XWCC-10 | | | | XWCC-10 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 181-189 | | | | 189-204 | | | | 204-222 | | | | 222-226 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LT1 | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | | | | |
| 19.0 | .2 | -4.4 | -.1 | 1.4 | -.7 | -2.2 | .4 | ***** | 2.5 | -2.2 | -.9 | 2.4 | 7.8 | -.7 | .8 | .2 |
| 39.0 | -.8 | .6 | .3 | .7 | -1.2 | .2 | .8 | .3 | .2 | .0 | -.1 | .0 | 1.6 | -1.3 | .9 | .5 |
| 46.0 | -.4 | 1.0 | .3 | 1.0 | -.8 | .8 | .8 | 1.1 | .1 | .8 | -.1 | 1.1 | -.4 | -.5 | 1.1 | .6 |
| LT2 | | | | | | | | | | | | | | | | |
| 2.0 | -.1 | 3.8 | -.0 | .5 | | | | | | | | | | | | |
| 13.0 | 5.1 | .7 | .7 | -.5 | 4.5 | 1.8 | .7 | -2.3 | 2.8 | -1.9 | 1.5 | .5 | 7.8 | -.3 | .9 | .1 |
| 23.0 | .1 | 1.3 | .0 | 21.3 | -.3 | -.3 | -.1 | .2 | -.8 | .0 | .5 | -.0 | .1 | 2.7 | .1 | 1.4 |
| 31.0 | -1.4 | -.3 | -4.2 | .3 | -.3 | -.3 | -.4 | .2 | -.6 | -.6 | .5 | 1.1 | | | | |
| LT3 | | | | | | | | | | | | | | | | |
| 2.0 | | | | | | | | | | | | | | | | |
| 9.0 | | | | | | | | | | | | | 12.6 | -.1 | 1.2 | .1 |
| 19.0 | | | | | | | | | | | | | | | | |
| 39.0 | | | | | | | | | | | | | -.4 | -3.9 | .6 | .9 |
| 59.0 | | | | | | | | | | | | | | | | |
| LT4 | | | | | | | | | | | | | | | | |
| 2.0 | 6.1 | 6.6 | 1.0 | .8 | 4.4 | -1.8 | 1.0 | -.5 | 4.2 | 2.2 | 7.6 | 1.1 | -.1 | -1.7 | -.0 | .4 |
| 19.0 | 2.8 | 3.2 | -.8 | 1.4 | -1.1 | -3.0 | .3 | .8 | -2.8 | 2.0 | .3 | 3.6 | 8.7 | -2.4 | .9 | .6 |
| 39.0 | -.3 | .5 | .0 | 6.1 | -.4 | -.3 | .1 | .4 | .1 | 1.6 | -.0 | 2.3 | .2 | 1.1 | .2 | -55.5 |
| 46.0 | 3.8 | .4 | -2.0 | 5.9 | 1.3 | -.1 | -.9 | .1 | .2 | 3.5 | -.0 | 1.3 | -1.8 | .7 | 2.1 | -2.4 |
| LT5 | | | | | | | | | | | | | | | | |
| 20.0 | -4.7 | .9 | .6 | .4 | -.7 | .6 | .8 | .4 | -2.9 | -.7 | .4 | 1.1 | 4.6 | 5.3 | 2.1 | 1.3 |
| 40.0 | -2.8 | -.5 | .5 | -.6 | -1.0 | .0 | .9 | .0 | -1.4 | -.1 | .2 | 1.7 | -.7 | 1.5 | .2 | 6.1 |
| 60.0 | .6 | -1.0 | -.3 | -3.0 | .4 | -.5 | 1.7 | -1.2 | .3 | 1.1 | -.1 | 1.0 | .0 | 2.7 | -.0 | 1.8 |
| 65.0 | .4 | -1.2 | -.3 | -20.7 | | | | | | | | | | | | |
| LT6 | | | | | | | | | | | | | | | | |
| 2.0 | -.2 | 9.2 | -11.5 | -1.4 | 1.0 | -6.1 | 1.0 | -1.4 | -3.5 | .4 | .9 | .1 | | | | |
| 21.0 | 1.4 | 11.7 | -1.2 | -2.0 | -3.4 | -.7 | 1.7 | .3 | -2.5 | .6 | .7 | .5 | | | | |
| 42.0 | 1.4 | 14.9 | 45.3 | 3.5 | -2.9 | -1.8 | 1.8 | .5 | -1.7 | 2.0 | .7 | .8 | | | | |
| 52.0 | 4.2 | 14.7 | 1.6 | 1.9 | | | | | | | | | | | | |
| 62.0 | .3 | 7.4 | .8 | 2.0 | | | | | | | | | | | | |
| 69.0 | | | | | | | | | | | | | | | | |
| LT7 | | | | | | | | | | | | | | | | |
| 2.0 | -2.4 | -6.9 | -.8 | -1.0 | 1.9 | -10.5 | .5 | -2.1 | 8.4 | -7.0 | 7.3 | 11.6 | | | | |
| 17.0 | 1.0 | -1.3 | .8 | -.2 | 4.2 | -7.3 | .8 | 5.3 | 5.9 | -2.3 | -2.7 | -3.0 | | | | |
| 38.0 | .0 | -2.2 | .0 | -1.0 | -.0 | -6.0 | -.0 | 2.2 | 2.6 | -3.1 | -.8 | 2.5 | | | | |
| 48.0 | | | | | | | | | | | | | | | | |
| 58.0 | | | | | | | | | | | | | | | | |

Table 7 (cont.). Actual and Relative Errors 1978

| CRUISE | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | | XWCC-17 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 67- 78 | | | | 78- 95 | | | | 95-105 | | | | 105-124 | | | | 124-139 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 3.3 | 1.8 | -1.5 | 1.0 | -1.4 | -1.9 | .5 | 1.1 | -3.1 | 2.2 | .6 | .5 | -2.3 | 3.2 | .5 | 1.7 | .3 | -7.0 | -.1 | .9 |
| 33.0 | -.5 | 5.4 | .1 | .9 | .6 | -.1 | -1.5 | -.2 | -.1 | .8 | -.0 | 1.0 | -.5 | 1.6 | .2 | 1.1 | -2.1 | 3.2 | .2 | 1.1 |
| 47.0 | 1.4 | .2 | -.6 | .2 | 3.3 | -3.2 | 1.2 | 1.1 | | | | | | | | | | | | |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -3.8 | -3.6 | .3 | 2.0 | -5.0 | .5 | 4.9 | -2.0 | -1.9 | -2.0 | .3 | -18.1 | 2.9 | -1.2 | -.6 | -41.3 | -3.6 | -.1 | .3 | .0 |
| 44.0 | -.2 | .0 | .0 | .0 | .4 | -.1 | .1 | .1 | | | | | -.2 | 1.5 | .1 | 1.0 | -.3 | .2 | .0 | .1 |
| 58.0 | .1 | .7 | -.0 | .5 | -6.2 | 1.8 | 29.6 | -1.7 | -.1 | .6 | -.2 | ***** | .2 | .1 | -.1 | 1.3 | 1.7 | -.1 | -.7 | -.1 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -1.4 | .1 | .2 | .2 | -.0 | -.6 | .0 | .5 |
| 52.0 | | | | | -3.9 | 2.4 | .6 | -2.7 | -.8 | 1.0 | .4 | -19.6 | -1.1 | 1.5 | .2 | 1.5 | .1 | .3 | -.0 | .3 |
| 66.0 | -2.5 | 1.8 | .5 | .7 | 4.9 | 2.7 | 2.0 | 4.3 | | | | | .5 | 1.9 | -.1 | .9 | 1.3 | -.7 | -.4 | -.0 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -10.7 | -3.1 | .6 | 1.0 | -5.0 | 1.7 | .6 | -1.3 |
| 76.0 | | | | | | | | | | | | | | | | | | | | |
| 90.0 | | | | | | | | | | | | | -1.3 | -.7 | .2 | -5.6 | 3.1 | -1.1 | -2.0 | -8.1 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -9.7 | 2.2 | 1.1 | 2.9 | -4.3 | 3.8 | -2.7 | 1.3 | -1.3 | 1.0 | -.3 | .4 | -5.5 | 3.4 | 36.5 | 1.8 | -14.1 | 6.8 | 1.9 | -25.2 |
| 27.0 | | | | | -.8 | -1.5 | .5 | 1.1 | .1 | -.4 | .1 | .8 | -.3 | -.3 | .6 | .7 | -.8 | .4 | .4 | 1.4 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.0 | 4.1 | 5.2 | 1.2 | -.8 | 4.1 | -.1 | .9 | 6.6 | 1.7 | .7 | .4 | -3.9 | 2.5 | -3.7 | 1.8 | -9.1 | 5.9 | 3.9 | 4.7 |
| 20.0 | -.2 | -.4 | .3 | .5 | -2.8 | -1.3 | 1.3 | .9 | -1.6 | -.3 | 6.1 | .5 | 2.3 | -1.5 | .9 | .8 | | | | |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -2.2 | 2.0 | -2.1 | -2.7 | 9.0 | 11.8 | .6 | 1.3 | | | | | 9.3 | 12.2 | 1.2 | 1.2 | -8.6 | 2.5 | 1.2 | -19.5 |
| 22.0 | .7 | .7 | 1.2 | -2.2 | 5.0 | -.3 | .8 | .2 | | | | | 2.2 | .0 | 1.1 | -.1 | 2.5 | .7 | -4.2 | 1.4 |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 22.0 | | | | | | | | | | | | | | | | | | | | |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 7.4 | -.7 | -5.0 | .5 | 2.8 | 1.2 | -1.0 | .7 | 3.2 | .4 | -.7 | .5 | 5.2 | .6 | -1.3 | 2.2 | -.6 | 2.0 | .1 | -.8 |
| 20.0 | -1.2 | -1.6 | .2 | 1.0 | 2.0 | 1.1 | ***** | 1.3 | -.9 | -1.0 | .6 | .4 | 2.7 | 1.1 | -1.9 | .0 | -3.8 | -1.1 | .3 | 2.6 |
| 40.0 | .5 | .3 | -.1 | .8 | 8.1 | 2.2 | 1.1 | 1.2 | | | | | 3.3 | 2.2 | 5.1 | .0 | 1.1 | 1.4 | -.2 | .6 |
| 47.0 | .8 | -.1 | -.3 | -.1 | 2.6 | .2 | 1.0 | ***** | | | | | | | | | | | | |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 23.0 | | | | | | | | | | | | | .1 | 2.6 | .1 | 1.2 | 1.1 | .8 | .6 | 1.6 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -2.4 | -.0 | .3 | .0 | -1.1 | 5.2 | .2 | 12.3 |
| 23.0 | | | | | | | | | | | | | | | | | | | | |
| 37.0 | | | | | | | | | | | | | -2.6 | 1.1 | .6 | 1.7 | 1.5 | 1.3 | -.5 | 1.0 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 47.0 | | | | | | | | | | | | | -2.6 | 2.0 | .4 | 1.7 | .7 | 1.4 | -.1 | 3.0 |
| 61.0 | | | | | | | | | | | | | .7 | -.8 | -.3 | .7 | 3.7 | -.7 | -1.1 | -3.6 |

Table 7 (cont.). Actual and Relative Errors 1978.

| CRUISE | XWCC-18 | | | | XWCC-18 | | | | XWCC-18 | | | | XWCC-18 | | | | XWCC-19 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 124-139 | | | | 139-158 | | | | 158-169 | | | | 169-179 | | | | 169-179 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | .8 | -2.4 | -.2 | .3 | -.7 | .7 | .1 | 1.0 | 6.2 | -.9 | 1.9 | -.1 | .1 | 2.5 | .1 | .3 | 9.7 | 7.9 | 6.0 | 1.0 |
| 33.0 | -1.9 | 3.1 | .2 | 1.1 | -.1 | -.9 | .0 | 1.3 | .6 | -.8 | .4 | 1.3 | -.7 | 2.9 | .4 | 1.0 | -.1 | 3.3 | .1 | 1.1 |
| 47.0 | | | | | -.4 | .8 | .2 | .8 | -.3 | .6 | -.4 | 1.7 | -1.5 | .7 | .9 | 1.1 | -2.5 | .9 | 1.5 | 1.4 |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -9.3 | 4.4 | .8 | -2.9 | -1.9 | 2.0 | .5 | 2.1 | .8 | 1.0 | -.4 | .2 | .3 | 1.2 | .1 | .2 | 7.6 | -.1 | 2.5 | -.0 |
| 44.0 | -.1 | 1.0 | .0 | .7 | -.1 | .4 | .1 | 1.0 | .1 | -.5 | -.2 | .4 | -.1 | .7 | .1 | 2.6 | .1 | .2 | -.0 | .6 |
| 58.0 | 2.1 | -.0 | -.9 | -.0 | .7 | -.1 | -3.1 | 9.0 | .7 | .3 | 2.2 | -1.9 | .9 | -.4 | -92.0 | .7 | .3 | -.4 | -28.0 | .6 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.0 | 6.3 | .2 | -5.4 | -1.1 | 3.1 | .2 | 31.2 | 1.7 | .5 | -.9 | .1 | -3.3 | 2.9 | 1.3 | .6 | -3.5 | -1.2 | 1.4 | -.3 |
| 52.0 | -.3 | 1.1 | .0 | 1.4 | -.5 | .7 | .2 | -10.3 | .1 | 1.4 | .4 | 1.4 | -.4 | 1.5 | .2 | 1.4 | -.6 | .9 | .4 | .8 |
| 66.0 | 1.0 | .1 | -.3 | .1 | -.3 | .6 | .1 | 1.0 | -.4 | .7 | -3.2 | 1.0 | .4 | -.2 | -5.1 | 2.8 | 1.2 | .1 | -15.2 | -2.2 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -10.8 | 3.1 | 1.3 | -2.4 | -10.1 | -.3 | 1.4 | .3 | -9.9 | -.2 | 4.7 | -.1 | -14.2 | 1.4 | 2.2 | .5 | -2.5 | -2.8 | .4 | -1.1 |
| 76.0 | | | | | | | | | | | | | -.4 | -.3 | .1 | .5 | .1 | -1.9 | -.0 | 3.5 |
| 90.0 | 3.3 | -1.8 | -2.1 | -14.2 | 2.4 | -1.1 | -1.4 | -2.9 | 3.3 | .9 | 1.1 | .9 | 2.7 | -1.2 | -9.2 | 2.7 | 1.4 | -1.5 | -4.8 | 3.3 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -14.1 | 8.9 | 1.9 | -32.8 | -10.3 | 2.0 | 1.5 | -67.0 | 4.4 | .0 | .7 | .0 | -14.7 | -3.2 | 2.3 | 9.3 | -15.3 | -4.5 | 2.4 | 13.3 |
| 27.0 | -.8 | .3 | .4 | 1.0 | -.6 | .0 | .5 | .1 | -.1 | -.9 | 14.0 | 1.1 | -.2 | 1.0 | .7 | 1.0 | -.2 | 1.0 | .7 | .9 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.7 | 12.1 | 2.9 | 9.7 | -8.6 | 5.4 | 1.5 | 6.8 | 7.2 | 1.5 | .7 | .6 | -1.1 | 5.4 | -.2 | 1.0 | 5.4 | 2.5 | .8 | .5 |
| 20.0 | | | | | | | | | | | | | | | | | | | | |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -14.8 | -4.6 | 2.1 | 35.8 | -3.6 | -1.0 | 1.2 | 3.0 | 9.9 | -2.8 | .9 | -.7 | -2.3 | -9.8 | -.6 | 2.3 | 9.0 | -5.1 | 2.4 | 1.2 |
| 22.0 | 1.7 | -1.1 | -2.8 | -2.2 | 1.2 | -.6 | 3.3 | .6 | | | | | | | | | | | | |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 22.0 | | | | | | | | | | | | | | | | | | | | |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -8.2 | 6.5 | 1.5 | -2.7 | -10.4 | 5.7 | 1.0 | 5.7 | -2.7 | 7.6 | .4 | .8 | -9.3 | 5.7 | 1.5 | .7 | -6.0 | 4.0 | .9 | .5 |
| 20.0 | -7.2 | 1.6 | .6 | -3.8 | -10.4 | 2.6 | .9 | ***** | -4.8 | 5.4 | 1.3 | 1.9 | -5.8 | 4.6 | 1.0 | 2.0 | -5.7 | 2.8 | 1.0 | 1.2 |
| 40.0 | -.5 | 2.8 | .1 | 1.3 | -1.2 | 3.1 | .5 | 1.8 | | | | | | | | | | | | |
| 47.0 | | | | | 1.0 | -.4 | -4.7 | .4 | .6 | -.3 | .7 | .3 | 1.8 | -.9 | 1.5 | .7 | 1.3 | -1.0 | 1.1 | .7 |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | 16.8 | 8.1 | 1.2 | 1.1 | 2.9 | 4.3 | .2 | .6 |
| 23.0 | 1.3 | 1.4 | .7 | 2.7 | -.5 | 2.2 | .3 | 1.5 | -1.4 | 3.8 | .4 | 1.2 | .4 | .8 | .6 | 3.1 | -.3 | .5 | -.4 | 2.0 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -5.3 | 5.1 | 1.1 | 12.1 | -.3 | 1.5 | .1 | -1.3 | -.1 | 2.7 | .0 | 1.0 | -2.8 | -3.3 | -2.5 | 5.0 | 3.4 | -2.2 | 3.0 | 3.4 |
| 23.0 | | | | | | | | | | | | | -.7 | 3.8 | -4.2 | 1.4 | .1 | 3.8 | .3 | 1.4 |
| 37.0 | 1.5 | 1.5 | -.5 | 1.2 | 1.9 | .5 | -1.7 | 1.0 | .4 | .3 | .5 | .4 | 3.4 | -1.4 | 1.6 | .8 | 1.4 | -1.3 | .6 | .8 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | -1.0 | -3.3 | .2 | -1.2 | -11.9 | -.4 | 1.3 | -.1 |
| 47.0 | .7 | .7 | -.1 | 2.0 | .1 | .4 | -.0 | 1.7 | -.1 | -.5 | -.1 | -5.7 | .1 | .4 | -.0 | 1.3 | -.4 | 1.7 | .2 | 5.3 |
| 61.0 | 2.3 | -.8 | -.7 | -4.1 | .7 | -.8 | -.3 | 3.8 | -.2 | -1.3 | -.1 | .8 | -.4 | -.3 | .2 | .8 | .2 | -.4 | -.1 | .9 |

Table 7 (cont.). Actual and Relative Errors 1978.

| CRUISE | XWCC-19 | | | | XWCC-19 | | | | XWCC-20 | | | | XWCC-20 | | | | XWCC-20 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 179-196 | | | | 196-211 | | | | 196-211 | | | | 211-224 | | | | 224-241 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 1.0 | 1.1 | -.1 | 8.1 | 8.2 | 3.1 | -6.8 | 1.0 | | | | | -4.1 | 5.9 | .5 | .7 | 3.6 | -2.9 | -1.7 | 2.6 |
| 33.0 | 1.3 | -.0 | -1.2 | .1 | .8 | .3 | -.5 | -1.9 | .2 | -.3 | -.1 | 2.4 | -.5 | .4 | .1 | .4 | -.4 | .5 | .1 | .7 |
| 47.0 | -1.8 | 1.2 | 1.1 | 1.3 | -.4 | 1.3 | 1.4 | 1.2 | 1.0 | 1.3 | -3.3 | 1.2 | | | | | | | | |
| LI2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -.1 | -1.4 | .0 | 4.3 | -3.3 | 2.2 | .3 | .3 | -7.2 | 2.2 | .7 | .3 | 2.2 | -1.8 | .9 | -1.6 | -2.3 | -4.0 | .4 | 4.8 |
| 44.0 | -.2 | .7 | .0 | .8 | .0 | .4 | -.0 | 6.2 | .1 | -.7 | -.0 | -12.0 | .1 | -1.3 | -.1 | 2.7 | .2 | -2.3 | -.0 | 2.0 |
| 58.0 | | | | | .8 | .4 | -2.0 | 3.9 | 1.9 | -.6 | -4.7 | -5.3 | .3 | -.3 | -.5 | -6.2 | 2.5 | -1.1 | -2.5 | -3.1 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.0 | -.2 | .7 | -.3 | -6.3 | -2.5 | .6 | -1.1 | -4.2 | -5.2 | .4 | -2.4 | -1.7 | -2.6 | .2 | -1.1 | 1.2 | -2.8 | -.1 | 4.0 |
| 52.0 | -1.2 | 1.8 | .2 | 1.1 | -1.5 | 1.5 | .2 | 1.9 | -1.0 | .7 | .2 | .9 | -1.5 | -.7 | .3 | 1.4 | -.3 | -1.6 | .0 | 1.2 |
| 66.0 | 2.1 | .8 | -1.0 | 1.0 | 2.5 | .2 | -1.4 | -1.9 | 1.9 | -.4 | -1.1 | 3.7 | .9 | -.5 | -.5 | 1.9 | 1.0 | .0 | -.2 | .0 |
| LI4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -6.6 | 1.6 | .4 | .7 | -4.2 | -.1 | .4 | -.0 | -8.6 | -1.0 | .7 | -.2 | -5.7 | .4 | .5 | .1 | -3.8 | .1 | .3 | .0 |
| 76.0 | .2 | -2.0 | -.0 | 8.0 | -3.5 | .5 | .7 | 4.7 | .4 | -1.5 | -.1 | -13.5 | -.9 | -2.2 | .1 | 2.2 | .8 | -3.7 | -.1 | 2.1 |
| 90.0 | 2.2 | -1.9 | -1.3 | -11.7 | -.3 | -1.2 | .1 | 15.1 | .9 | -2.4 | -.4 | 29.9 | -.1 | -2.5 | .0 | 6.4 | .5 | -4.2 | -.1 | 4.3 |
| LPG1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 2.0 | -.3 | .5 | -.2 | -7.9 | -4.4 | 16.2 | -9.5 | -8.3 | -3.7 | 16.9 | -8.0 | -2.2 | -1.9 | -1.1 | -1.3 | -20.9 | -.3 | 1.2 | -.4 |
| 27.0 | | | | | -.4 | -1.1 | .5 | 1.1 | -.5 | -1.2 | .6 | 1.2 | -.7 | .1 | .4 | .1 | -2.1 | 1.2 | .8 | 1.1 |
| LPG2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | 13.1 | 3.1 | 1.0 | .5 | 9.4* | 5.7 | .7 | 1.0 | .7 | 1.2 | .2 | 3.5 | -1.4 | 2.5 | 1.1 | 8.6 |
| 20.0 | | | | | 1.2 | -1.3 | 1.0 | .8 | 1.0 | -1.1 | .8 | .7 | -.4 | .5 | .6 | 12.0 | -.4 | -1.3 | .3 | .7 |
| LPG3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 6.4 | -.5 | -1.1 | .6 | | | | | | | | | | | | | | | | |
| 22.0 | | | | | -.2 | .8 | -.2 | -1.2 | -.1 | -.1 | -.1 | .1 | .4 | .9 | .4 | 1.6 | -.6 | .1 | .3 | -.5 |
| LPG4 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | 22.2 | -5.9 | 2.2 | 5.9 | 8.5 | -2.3 | .8 | 2.3 | 9.1 | .5 | 1.2 | .2 | -1.2 | 1.4 | 1.0 | 1.7 |
| 22.0 | | | | | -2.2 | .5 | 1.0 | -2.5 | -2.6 | .2 | 1.2 | -1.2 | -.1 | .5 | .2 | 2.4 | .6 | 1.1 | -3.2 | 1.4 |
| LTN | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.1 | 1.2 | .6 | -1.6 | -2.4 | -4.0 | .5 | 19.2 | -11.0 | .1 | 2.1 | -.5 | | | | | | | | |
| 20.0 | -5.2 | -.6 | .7 | .4 | -1.9 | -1.5 | .6 | .6 | -5.6 | 1.0 | 1.7 | -.4 | -4.1 | -1.3 | 2.1 | .3 | -1.7 | 2.6 | 1.4 | -1.8 |
| 40.0 | | | | | -.1 | 3.8 | .1 | 1.3 | -1.3 | 4.1 | .8 | 1.4 | -1.3 | .9 | .8 | -3.1 | -1.1 | 1.9 | .3 | ***** |
| 47.0 | .4 | .4 | -.3 | ***** | .5 | .3 | -.6 | -1.6 | .1 | .1 | -.1 | -.4 | -.5 | -.2 | .4 | .5 | -.2 | -.1 | .1 | .3 |
| NJ1 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -5.2 | 2.9 | -2.0 | 2.3 | -.7 | -2.5 | -.1 | -5.9 | 4.6 | .2 | .4 | .4 | -.4 | 4.1 | -.1 | 1.0 | -5.7 | 5.3 | 4.9 | 1.4 |
| 23.0 | -11.6 | -.6 | 1.1 | .5 | 1.2 | -.7 | .4 | .5 | 1.2 | -.2 | .4 | .2 | .3 | -.8 | .2 | .6 | .6 | .9 | -1.2 | -1.5 |
| NJ2 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 4.5 | 1.7 | -.4 | -1.4 | -2.9 | -.7 | .3 | -2.4 | 2.7 | 2.8 | -.3 | 9.0 | 3.0 | 5.3 | -.4 | 1.8 | 3.2 | 1.2 | -.2 | -1.4 |
| 23.0 | -.5 | 3.3 | .1 | 1.4 | -1.1 | 2.0 | .3 | 4.1 | -.0 | 1.8 | .0 | 3.7 | -.1 | 1.8 | .0 | 2.0 | -1.5 | 1.9 | .1 | 2.0 |
| 37.0 | .9 | 1.6 | -.5 | .9 | 1.9 | .9 | 12.1 | 1.9 | 1.0 | 1.1 | 6.1 | 2.2 | -.1 | 1.0 | -.3 | 1.7 | 3.2 | .4 | -1.5 | .3 |
| NJ3 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -10.1 | 4.0 | .8 | -13.3 | -8.3 | -3.1 | .9 | -16.3 | -3.1 | .0 | .3 | .3 | -5.9 | 3.1 | .7 | .9 | | | | |
| 47.0 | -2.4 | 1.3 | .4 | 22.3 | -.2 | 2.1 | .0 | 2.6 | .3 | 1.3 | -.1 | 1.6 | .2 | .2 | -.1 | ***** | -.2 | .0 | .0 | -.1 |
| 61.0 | -.6 | .3 | .2 | .7 | .4 | .2 | -.1 | .6 | .6 | .1 | -.2 | .7 | -.1 | .4 | .1 | 1.0 | -.4 | -.5 | .1 | -.7 |

Table 7 (cont.). Actual and Relative Errors 1978.

CRUISE XWCC-20
DAY INTERVAL 241-266

| MOORING | DEPTH | ACTUAL L | ACTUAL C | RELATIVE L | RELATIVE C |
|---|---|---|---|---|---|
| LI1 | | | | | |
| | 3.0 | -1.1 | -1.5 | .3 | -4.5 |
| | 33.0 | -.6 | -.2 | .2 | ***** |
| | 47.0 | | | | |
| LI2 | | | | | |
| | 3.0 | -2.3 | -3.4 | 1.8 | 8.8 |
| | 44.0 | .0 | -.5 | -.0 | -1.2 |
| | 58.0 | .5 | -.3 | -1.4 | -1.7 |
| LI3 | | | | | |
| | 3.0 | -1.4 | -3.3 | .2 | 3.4 |
| | 52.0 | -.9 | -.4 | .3 | -1.5 |
| | 66.0 | -.7 | .4 | .4 | .6 |
| LI4 | | | | | |
| | 3.0 | | | | |
| | 76.0 | | | | |
| | 90.0 | | | | |
| LPG1 | | | | | |
| | 3.0 | | | | |
| | 27.0 | -.7 | -.3 | .7 | 5.3 |
| LPG2 | | | | | |
| | 3.0 | -1.4 | 5.6 | .7 | 1.8 |
| | 20.0 | .9 | -.4 | 1.5 | .5 |
| LPG3 | | | | | |
| | 3.0 | | | | |
| | 22.0 | .7 | .5 | .5 | 1.3 |
| LPG4 | | | | | |
| | 3.0 | -7.6 | .2 | 1.0 | ***** |
| | 22.0 | -.2 | -.6 | .2 | .9 |
| LTM | | | | | |
| | 3.0 | | | | |
| | 20.0 | -3.8 | 2.7 | 2.6 | -3.5 |
| | 40.0 | -1.2 | 1.4 | .8 | 10.3 |
| | 47.0 | .3 | .2 | -.4 | -1.6 |
| NJ1 | | | | | |
| | 3.0 | -9.2 | 1.2 | 2.2 | .8 |
| | 23.0 | | | | |
| NJ2 | | | | | |
| | 3.0 | -6.3 | 10.7 | 1.3 | 1.7 |
| | 23.0 | -6.4 | 4.9 | 1.0 | 1.7 |
| | 37.0 | .6 | 2.2 | -1.8 | 1.1 |
| NJ3 | | | | | |
| | 3.0 | | | | |
| | 47.0 | | | | |
| | 61.0 | | | | |

Table 7 (cont.). Actual and Relative Errors 1979.

| CRUISE | XWCC-21 | | | | XWCC-21 | | | | XWCC-21 | | | | XWCC-22 | | | | XWCC-22 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 87- 98 | | | | 98-122 | | | | 122-129 | | | | 129-140 | | | | 140-163 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 3.4 | 1.0 | .3 | .2 | -2.7 | .6 | .6 | -.4 | .3 | .1 | -.1 | .0 | -11.1 | -3.3 | 1.1 | .6 | -1.5 | -1.5 | -2.6 | -.8 |
| 41.0 | -6.1 | -.4 | -.9 | .2 | -1.2 | .7 | .4 | -3.5 | -1.2 | -2.2 | .6 | 1.0 | -1.7 | .4 | .4 | ***** | -1.9 | -.2 | .5 | .2 |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 42.0 | -.1 | -8.5 | -.0 | 1.1 | .0 | .6 | .0 | 2.0 | .0 | -.5 | -.2 | 1.0 | .3 | -.7 | -.1 | 7.3 | .3 | 1.1 | -.1 | .6 |
| 46.0 | 1.2 | -5.9 | .1 | 1.3 | .1 | .0 | -.1 | -.1 | -.2 | -1.5 | .8 | 1.0 | -1.2 | -.6 | .3 | 1.2 | .8 | 1.4 | -.3 | .9 |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 58.0 | | | | | -.2 | 1.4 | .0 | 2.2 | -.1 | 1.0 | .1 | 1.7 | -.9 | -2.9 | .2 | -2.9 | -1.1 | -4.0 | .2 | 44.1 |
| 61.0 | -6.5 | -3.1 | -.7 | 2.7 | -.6 | 2.0 | .1 | 1.6 | .7 | 1.1 | -2.7 | 1.6 | -1.0 | -2.8 | .2 | -2.8 | .2 | -2.8 | -.1 | -3.0 |
| NJ2A | | | | | | | | | | | | | | | | | | | | |
| 29.0 | | | | | -.5 | 3.3 | .2 | 1.0 | 2.1 | 3.2 | 1.1 | 1.2 | -4.1 | 3.0 | .5 | 1.1 | -3.5 | .6 | .6 | 1.2 |
| 32.0 | -3.9 | -1.5 | 2.5 | 1.0 | -.5 | -.7 | .2 | .9 | 4.0 | .6 | 1.0 | 7.9 | -2.0 | 2.1 | .4 | .9 | -.2 | .9 | .1 | 1.1 |
| N13 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 31.9 | 15.9 | .9 | .8 | 3.9 | -1.0 | -3.2 | -.9 | 20.2 | 10.9 | 1.2 | 1.6 | -5.3 | .3 | .8 | -.1 | -2.7 | -.3 | -.8 | -.2 |
| 12.0 | 26.2 | 1.6 | .8 | .6 | 2.4 | 1.5 | -2.4 | -2.2 | 3.1 | 2.0 | 1.3 | 2.9 | -7.6 | 3.4 | .6 | 1.3 | 15.4 | -3.8 | 1.2 | .8 |
| N14 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | | | | |
| 18.0 | | | | | | | | | | | | | | | | | .1 | 2.3 | -.1 | 1.1 |
| N23 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 12.9 | 9.5 | .7 | .7 | -5.9 | 6.0 | .9 | ***** | 15.9 | 8.6 | 1.1 | 1.8 | -9.8 | -.8 | .9 | .2 | -.9 | -1.7 | -.3 | -.6 |
| 19.0 | 3.3 | -3.2 | .4 | 1.6 | -.2 | 2.2 | .1 | 5.8 | 2.7 | 1.1 | 1.0 | -7.9 | -1.0 | 3.5 | .2 | 1.3 | 4.4 | -.7 | 2.6 | .4 |
| N31 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -10.4 | -8.4 | 1.4 | 2.4 | -11.4 | 10.8 | 1.2 | -1.4 | 6.4 | -6.6 | .6 | -1.7 | -29.4 | -7.4 | 1.8 | .6 | -13.7 | 1.5 | 5.2 | -.7 |
| 19.0 | -11.4 | -8.0 | 2.4 | 3.3 | -5.4 | 2.8 | 1.2 | -2.1 | -3.6 | -7.1 | -51.1 | 1.6 | -8.3 | -4.4 | .7 | .8 | -4.9 | -2.4 | 1.1 | .7 |
| N32 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.8 | -.6 | -8.6 | .3 | -3.0 | -1.5 | .7 | .5 | .3 | 4.6 | .1 | 1.9 | 16.3 | -8.3 | -7.5 | 1.1 | -24.2 | -2.0 | -4.9 | 89.7 |
| 32.0 | -1.3 | -4.5 | -.1 | 1.3 | -.0 | -.7 | .0 | .5 | 2.1 | -.9 | .4 | 1.2 | 2.9 | -3.7 | -.5 | 1.0 | -9.0 | .6 | -2.4 | -11.6 |
| 52.0 | -5.6 | -.8 | -1.1 | -13.0 | -.6 | 1.1 | .4 | 3.0 | -.4 | .5 | -.2 | .8 | -2.0 | .4 | .4 | 1.5 | 1.1 | 1.0 | .6 | 2.1 |
| N33 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | .8 | .5 | .1 | .1 | -8.8 | -1.5 | 1.6 | -.6 | -3.8 | .1 | 2.4 | .0 | -9.8 | 10.8 | 1.2 | -7.4 | -3.3 | 8.8 | -7.0 | 11.2 |
| 18.0 | | | | | | | | | | | | | | | | | 3.0 | 4.3 | 3.1 | 25.4 |
| N41 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 19.6 | -.2 | -4.8 | .2 | 6.8 | -3.2 | -.7 | 1.0 | 22.8 | 4.3 | 3.3 | .5 | -21.9 | -6.5 | 1.1 | 1.0 | 2.9 | -2.5 | 1.1 | 24.7 |
| 18.0 | -3.5 | -3.0 | .7 | 1.6 | 3.5 | -.1 | -3.9 | .9 | 4.9 | -5.7 | 1.6 | 1.4 | -7.3 | -1.0 | .7 | .6 | -1.5 | -4.6 | 1.1 | .8 |
| N42 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.6 | 1.7 | .2 | -3.4 | -5.5 | -1.5 | .6 | .5 | -4.6 | 4.4 | .5 | 14.8 | -2.0 | 3.9 | .5 | -.7 | .3 | 9.0 | -.0 | 2.5 |
| 26.0 | | | | | | | | | | | | | | | | | 1.4 | 7.0 | -1.7 | 1.1 |
| N51 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -7.6 | -.6 | .8 | .9 | | | | | | | | | | | | | | | | |
| 16.0 | -7.4 | -1.2 | 1.2 | -2.9 | -3.0 | -.7 | .9 | 7.5 | | | | | | | | | | | | |
| N52 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 7.3 | -.3 | -1.2 | -.2 | 1.3 | -.9 | -.1 | 1.0 | | | | | | | | | -9.0 | -10.8 | .6 | 1.8 |
| 20.0 | -2.3 | 1.7 | .6 | .6 | -.9 | 2.1 | .2 | 1.0 | | | | | | | | | .8 | 11.7 | -.6 | 1.0 |

Table 7 (cont.). Actual and Relative Errors 1979.

| CRUISE | XWCC-22 | | | | XWCC-23 | | | | XWCC-23 | | | | XWCC-24 | | | | XWCC-24 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DAY INTERVAL | 163-182 | | | | 182-198 | | | | 198-216 | | | | 216-228 | | | | 228-248 | | | |
| | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | | ACTUAL | | RELATIVE | |
| MOORING DEPTH | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C | L | C |
| LTM | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -1.0 | 7.6 | .3 | 1.6 | -6.3 | -.3 | .8 | -.1 | 2.3 | 1.4 | -.7 | .2 | 3.7 | -1.7 | -.5 | .9 | | | | |
| 41.0 | -2.5 | 1.8 | .4 | 1.5 | -.5 | .1 | .2 | .1 | -.6 | 1.2 | .2 | .8 | -.4 | 2.8 | .1 | 1.1 | | | | |
| LI1 | | | | | | | | | | | | | | | | | | | | |
| 42.0 | .1 | 1.2 | -.1 | .8 | .2 | .0 | -.1 | .2 | .0 | .4 | -.0 | 2.0 | .4 | 1.4 | -.1 | .8 | | | | |
| 46.0 | -.6 | 2.0 | .2 | 1.2 | .8 | .8 | -.2 | .7 | .2 | 1.2 | -.1 | 1.0 | -1.6 | 1.2 | .3 | .7 | | | | |
| LI3 | | | | | | | | | | | | | | | | | | | | |
| 58.0 | 13.5 | -1.5 | -2.6 | -11.6 | .3 | .4 | -.1 | .4 | .1 | .4 | -.0 | .6 | -.2 | .5 | .1 | .5 | -.4 | -.7 | .1 | -1.0 |
| 61.0 | 14.4 | -.8 | -3.8 | -1.0 | .8 | .3 | -.5 | .4 | 1.1 | .3 | -.7 | .7 | .1 | -.1 | -.1 | -.3 | -2.0 | .1 | .4 | .1 |
| NJ2A | | | | | | | | | | | | | | | | | | | | |
| 29.0 | 1.1 | 1.2 | -.4 | 1.7 | 1.0 | .2 | -.4 | 3.0 | .4 | .2 | -.2 | 15.0 | 1.9 | .7 | -.4 | .3 | -.4 | .7 | .1 | 1.2 |
| 32.0 | 2.1 | .4 | -1.2 | .8 | 1.0 | .2 | -.6 | 1.1 | .3 | .6 | -.2 | 1.2 | 2.1 | .9 | -.6 | .8 | .5 | .4 | -.2 | 2.1 |
| N13 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 6.3 | 1.0 | 1.1 | .4 | 8.1 | .9 | 1.2 | .2 | | | | | | | | | | | | |
| 12.0 | | | | | | | | | | | | | | | | | | | | |
| N14 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 4.2 | 5.4 | .6 | 1.6 | -.2 | 3.2 | .1 | .7 | -5.8 | 2.6 | 1.3 | .6 | -.8 | 7.4 | .6 | 1.5 | -13.9 | 9.3 | 2.7 | 4.8 |
| 18.0 | -2.9 | 4.4 | .8 | 1.1 | -3.6 | 3.9 | .9 | 1.2 | -4.2 | 2.5 | .9 | 1.2 | -1.4 | 2.9 | 1.1 | 2.8 | 3.0 | 1.6 | 1.4 | -3.5 |
| N23 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | -.1 | -8.1 | -.0 | 3.8 | 1.0 | -4.5 | .6 | 7.4 | -2.8 | -3.1 | 2.1 | -1.0 | 2.9 | 4.1 | .4 | .2 |
| 19.0 | .7 | .8 | -.3 | -3.2 | -1.1 | -.3 | -.9 | .2 | | | | | | | | | | | | |
| N31 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | | | | | | | | | | | | | | | | | -.6 | 7.3 | -.1 | 1.6 |
| 19.0 | -4.2 | -2.8 | .8 | .8 | .9 | -2.3 | -2.4 | 13.4 | -15.0 | -10.8 | .9 | .9 | -1.4 | 1.0 | .7 | -1.6 | -3.4 | -.3 | 1.1 | .1 |
| N32 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -30.2 | 5.6 | -17.5 | 1.2 | -20.5 | 2.3 | 14.2 | .4 | -20.7 | -2.6 | 15.9 | .9 | -16.9 | 1.9 | 7.4 | -.4 | -10.0 | 5.3 | -1.6 | .6 |
| 32.0 | | | | | | | | | -13.5 | -1.0 | 4.6 | .8 | -.7 | .7 | -.1 | -1.6 | -4.1 | 2.0 | -8.3 | 22.1 |
| 52.0 | -.3 | .8 | -5.5 | 3.9 | -2.7 | -.6 | -5.0 | -1.4 | -3.6 | -.5 | -6.8 | 4.2 | | | | | | | | |
| N33 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 2.2 | 12.5 | .5 | 2.4 | -3.9 | 12.9 | .8 | 1.5 | -4.1 | 6.0 | 5.4 | 1.9 | -8.8 | -9.7 | 1.0 | -4.3 | .6 | -8.4 | .2 | -6.0 |
| 18.0 | .0 | 6.9 | -.5 | 2.9 | 2.3 | 5.1 | 1.4 | 2.3 | | | | | | | | | | | | |
| N41 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | 2.6 | 5.6 | .7 | .9 | -2.7 | 1.7 | -.6 | .3 | -3.2 | -3.1 | -1.9 | 3.4 | 13.3 | 9.2 | -2.9 | 18.5 | 18.0 | 7.2 | 3.1 | 1.7 |
| 18.0 | -2.8 | -5.0 | .6 | 1.0 | -6.8 | -1.6 | 1.7 | 1.3 | -10.2 | -6.3 | 1.5 | 1.0 | .3 | -1.8 | -.1 | .5 | 3.3 | -.9 | 2.5 | .2 |
| N42 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -8.5 | 2.3 | -2.3 | .7 | -12.1 | -5.1 | 1.8 | -5.1 | -12.7 | -2.3 | 1.7 | -.7 | | | | | | | | |
| 26.0 | -2.1 | -.4 | 1.5 | -1.9 | -1.5 | -.6 | 1.5 | -1.5 | -4.5 | -.6 | 1.3 | -6.4 | | | | | | | | |
| N51 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -.1 | 2.5 | -.0 | 1.4 | -.9 | -.2 | -.3 | .1 | 2.3 | 1.5 | .5 | .4 | 10.6 | 6.3 | -1.8 | -10.6 | 7.2 | 1.8 | .9 | .4 |
| 16.0 | -.9 | .5 | 1.5 | 2.0 | -7.0 | -.1 | 1.1 | -.5 | -9.9 | .1 | 1.2 | -.6 | -4.2 | .8 | .5 | -9.6 | 3.7 | -.4 | .9 | 1.0 |
| N52 | | | | | | | | | | | | | | | | | | | | |
| 3.0 | -4.1 | 8.3 | -5.7 | 1.0 | -5.3 | 4.5 | 1.3 | 3.6 | -1.3 | 2.4 | .1 | -1.5 | | | | | | | | |
| 20.0 | -1.2 | 7.7 | 1.3 | 1.0 | -4.3 | 3.0 | 1.1 | 1.5 | -3.0 | 2.6 | .7 | 2.4 | -5.0 | 4.3 | .6 | 1.2 | -.1 | 1.9 | .0 | 4.5 |

Table 8a. Mean and Standard Deviations of Actual and Relative Errors for Days 060 1975 to 168 1975.

| MOORING | | ACTUAL MEAN | ACTUAL ST. DEV. | ACTUAL N | RELATIVE MEAN | RELATIVE ST. DEV. | RELATIVE N |
|---|---|---|---|---|---|---|---|
| CM15 | | | | | | | |
| | L | 1.5 | 6.0 | 19 | .7 | .9 | 19 |
| | C | 1.3 | 5.3 | 19 | 3.2 | 23.7 | 19 |
| CM28 | | | | | | | |
| | L | -1.1 | 3.8 | 26 | .4 | .7 | 26 |
| | C | -.9 | 2.9 | 26 | .7 | 4.2 | 26 |
| CM29 | | | | | | | |
| | L | -.6 | 5.7 | 30 | .4 | .7 | 30 |
| | C | .7 | 2.1 | 30 | .9 | .9 | 30 |
| CM30 | | | | | | | |
| | L | .8 | 7.7 | 28 | .3 | 1.5 | 28 |
| | C | -.2 | 5.1 | 28 | 2.6 | 10.6 | 28 |
| CM33 | | | | | | | |
| | L | -.9 | 4.7 | 15 | -4.0 | 12.9 | 15 |
| | C | -3.6 | 8.8 | 15 | .6 | .9 | 15 |
| CM34 | | | | | | | |
| | L | -3.6 | .0 | 1 | .5 | .0 | 1 |
| | C | 9.0 | .0 | 1 | 5.6 | .0 | 1 |
| CM36 | | | | | | | |
| | L | -2.8 | 2.8 | 37 | .8 | 1.8 | 37 |
| | C | -6.3 | 5.9 | 37 | 2.3 | 15.7 | 37 |
| CM37 | | | | | | | |
| | L | -2.6 | 5.3 | 36 | .6 | .9 | 36 |
| | C | -1.4 | 6.3 | 36 | .4 | .6 | 36 |
| CM38 | | | | | | | |
| | L | 1.7 | 8.3 | 32 | .5 | 1.4 | 32 |
| | C | -3.3 | 5.3 | 32 | 2.5 | 5.4 | 32 |
| CM40 | | | | | | | |
| | L | -1.7 | 2.7 | 27 | 2.6 | 10.6 | 27 |
| | C | -.0 | 2.0 | 27 | .5 | 1.8 | 27 |

Table 8b. Mean and Standard Deviations of Actual and Relative Errors for Days 280 1975 to 226 1976.

| MOORING | | ACTUAL MEAN | ACTUAL ST. DEV. | ACTUAL N | RELATIVE MEAN | RELATIVE ST. DEV. | RELATIVE N |
|---|---|---|---|---|---|---|---|
| LT1 | | | | | | | |
| | L | -.6 | 3.6 | 62 | .4 | 1.1 | 61 |
| | C | .1 | 2.3 | 62 | 1.0 | 2.1 | 60 |
| LT2 | | | | | | | |
| | L | -.3 | 3.6 | 72 | .0 | 1.2 | 72 |
| | C | .4 | 2.4 | 72 | 1.7 | 12.9 | 72 |
| LT3 | | | | | | | |
| | L | -1.6 | 6.2 | 62 | .2 | 1.3 | 62 |
| | C | -.6 | 4.1 | 62 | -1.2 | 13.7 | 62 |
| LT4 | | | | | | | |
| | L | -1.5 | 4.5 | 71 | .4 | 4.3 | 71 |
| | C | .5 | 3.0 | 71 | 1.2 | 12.4 | 71 |
| LT5 | | | | | | | |
| | L | -1.8 | 3.4 | 58 | .4 | .7 | 58 |
| | C | .8 | 1.7 | 58 | .5 | 3.4 | 58 |
| LT6 | | | | | | | |
| | L | -1.0 | 3.2 | 75 | 1.4 | 6.1 | 75 |
| | C | -3.2 | 8.2 | 75 | 1.9 | 11.1 | 75 |
| LT7 | | | | | | | |
| | L | 1.5 | 4.5 | 57 | 2.0 | 9.8 | 57 |
| | C | -4.2 | 4.4 | 57 | 1.2 | 4.1 | 56 |

Table 8c. Mean and Standard Deviations of Actual and Relative Errors for Days 067 1978 to 266 1978.

| MOORING | | ACTUAL MEAN | ACTUAL ST. DEV. | ACTUAL N | RELATIVE MEAN | RELATIVE ST. DEV. | RELATIVE N |
|---|---|---|---|---|---|---|---|
| LI1 | | | | | | | |
| | L | .4 | 2.8 | 40 | .0 | 1.7 | 40 |
| | C | .9 | 2.6 | 40 | .9 | 1.6 | 39 |
| LI2 | | | | | | | |
| | L | -.5 | 2.8 | 46 | -2.0 | 14.9 | 46 |
| | C | -.1 | 1.5 | 46 | -.9 | 7.6 | 45 |
| LI3 | | | | | | | |
| | L | -.6 | 2.1 | 43 | -.4 | 2.6 | 43 |
| | C | .3 | 1.9 | 43 | .5 | 6.2 | 43 |
| LI4 | | | | | | | |
| | L | -2.5 | 4.9 | 31 | -.2 | 2.3 | 31 |
| | C | -.9 | 1.7 | 31 | .8 | 8.0 | 31 |
| LPG1 | | | | | | | |
| | L | -4.5 | 6.3 | 29 | 3.4 | 7.9 | 29 |
| | C | .3 | 2.9 | 29 | -3.4 | 15.0 | 29 |
| LPG2 | | | | | | | |
| | L | .1 | 5.4 | 24 | 1.2 | 1.9 | 24 |
| | C | 2.3 | 3.3 | 24 | 2.5 | 3.3 | 24 |
| LPG3 | | | | | | | |
| | L | 1.2 | 6.0 | 21 | .3 | 1.7 | 21 |
| | C | .3 | 4.8 | 21 | 1.0 | 9.2 | 21 |
| LPG4 | | | | | | | |
| | L | 2.7 | 8.5 | 10 | .6 | 1.4 | 10 |
| | C | -.4 | 2.2 | 10 | 1.3 | 2.4 | 9 |
| LTW | | | | | | | |
| | L | -1.5 | 4.2 | 52 | .4 | 1.5 | 51 |
| | C | 1.4 | 2.3 | 52 | .9 | 3.5 | 48 |
| NJ1 | | | | | | | |
| | L | -.2 | 5.6 | 20 | .5 | 1.3 | 20 |
| | C | 1.7 | 2.5 | 20 | .8 | 1.9 | 20 |
| NJ2 | | | | | | | |
| | L | .0 | 2.7 | 34 | .4 | 2.6 | 34 |
| | C | 1.8 | 2.6 | 34 | 2.2 | 3.3 | 34 |
| NJ3 | | | | | | | |
| | L | -1.3 | 3.5 | 30 | .1 | .4 | 30 |
| | C | .2 | 1.5 | 30 | .3 | 6.2 | 29 |

Table 8d. Mean and Standard Devistions of Actual and Relative Errors for Days 087 1979 to 248 1979.

| MOORING | | ACTUAL MEAN | ACTUAL ST. DEV. | ACTUAL N | RELATIVE MEAN | RELATIVE ST. DEV. | RELATIVE N |
|---|---|---|---|---|---|---|---|
| LTM | | | | | | | |
| | L | -1.6 | 3.5 | 18 | .1 | .8 | 18 |
| | C | .4 | 2.3 | 18 | .2 | 1.2 | 17 |
| LI1 | | | | | | | |
| | L | .0 | .7 | 18 | .0 | .3 | 18 |
| | C | -.4 | 2.7 | 18 | 1.3 | 1.6 | 18 |
| LI3 | | | | | | | |
| | L | 1.0 | 4.9 | 19 | -.5 | 1.2 | 19 |
| | C | -.6 | 1.7 | 19 | 1.8 | 10.7 | 19 |
| NJ2A | | | | | | | |
| | L | .1 | 2.2 | 19 | .1 | .8 | 19 |
| | C | .9 | 1.2 | 19 | 2.3 | 3.5 | 19 |
| N13 | | | | | | | |
| | L | 8.5 | 12.5 | 12 | .2 | 1.5 | 12 |
| | C | 2.7 | 5.4 | 12 | .4 | 1.3 | 12 |
| N14 | | | | | | | |
| | L | -2.3 | 4.9 | 11 | .9 | .7 | 11 |
| | C | 4.1 | 2.4 | 11 | 1.2 | 2.0 | 11 |
| N23 | | | | | | | |
| | L | 1.4 | 6.2 | 16 | .6 | .9 | 16 |
| | C | .8 | 4.7 | 16 | -11.9 | 50.5 | 16 |
| N31 | | | | | | | |
| | L | -7.2 | 8.2 | 16 | -2.2 | 13.1 | 16 |
| | C | -2.3 | 6.0 | 16 | 1.2 | 3.6 | 16 |
| N32 | | | | | | | |
| | L | -5.8 | 10.0 | 26 | -1.0 | 6.8 | 26 |
| | C | -.0 | 2.9 | 26 | 2.7 | 11.2 | 26 |
| N33 | | | | | | | |
| | L | -2.6 | 4.5 | 13 | .8 | 2.8 | 13 |
| | C | 3.7 | 7.3 | 13 | 2.3 | 8.3 | 13 |
| N41 | | | | | | | |
| | L | 1.9 | 10.7 | 20 | .2 | 2.2 | 20 |
| | C | -.9 | 4.5 | 20 | 3.1 | 6.4 | 20 |
| N42 | | | | | | | |
| | L | -4.5 | 4.6 | 12 | .5 | 1.3 | 12 |
| | C | 1.5 | 4.1 | 12 | .0 | 5.3 | 12 |
| N51 | | | | | | | |
| | L | -1.3 | 6.1 | 13 | .6 | .9 | 13 |
| | C | .8 | 2.0 | 13 | -.8 | 4.7 | 13 |
| N52 | | | | | | | |
| | L | -1.9 | 3.7 | 14 | -.1 | 1.8 | 14 |
| | C | 2.7 | 5.2 | 14 | 1.3 | 1.5 | 14 |

Table 9: Cumulative Probability Density Function Median Errors

| | Relative Errors | | Actual Errors | | Direction Errors | Total Speed Errors |
|---|---|---|---|---|---|---|
| | L | C | L | C | | |
| 1975 Shelf | 61.1% | 97.8% | 2.6 cm/s | 1.3 cm/s | 22.0° | 2.3 cm/s |
| 1975 Shelf Valley | 79.6% | 76.5% | 3.3 cm/s | 3.3 cm/s | 35.8° | 4.8 cm/s |
| 1976 Shelf | 52.0% | 99.0% | 1.7 cm/s | 1.3 cm/s | 25.5° | 1.6 cm/s |
| 1976 Shelf Valley | 96.0% | 131.3% | 2.2 cm/s | 5.1 cm/s | 57.0° | 3.1 cm/s |
| 1978 Shelf | 53.5% | 126.9% | 1.3 cm/s | 1.2 cm/s | 29.0° | 1.2 cm/s |
| 1979 Mid-shelf | 50.3% | 111.5% | 1.6 cm/s | 1.5 cm/s | 28.3° | 1.6 cm/s |
| 1979 Nearshore | 100.1% | 120.7% | 4.5 cm/s | 2.6 cm/s | 61.0° | 4.1 cm/s |
| Average All Years: | | | | | | |
| Shelf | 55.5% | 107.9% | 1.9 cm/s | 1.3 cm/s | 25.5° | 1.7 cm/s |
| Shelf Valley | 87.8% | 103.9% | 2.7 cm/s | 4.1 cm/s | 46.4° | 4.0 cm/s |

Table 10a

LINEAR REGRESSION MODELED VS. OBSERVED L COMPONENT (Y=A+BX) FOR DAYS 60 1975 TO 168 1975

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| CM15 | -1.1595 | .1822 | .2863 | 19 | 2.1100 | YES |
| CM28 | -.2098 | .5524 | .6827 | 26 | 2.0640 | YES |
| CM29 | -.4198 | .3488 | .7412 | 30 | 2.0480 | YES |
| CM30 | -1.2257 | .3445 | .5633 | 28 | 2.0560 | YES |
| CM33 | .9841 | .0811 | .1870 | 15 | 2.1600 | YES |
| CM34 | .0000 | .0000 | .0000 | 1 | 2.1600 | N.F.P. |
| CM36 | .8968 | .4305 | .5719 | 37 | 2.0000 | YES |
| CM37 | 1.0745 | .4246 | .6685 | 36 | 2.0000 | YES |
| CM38 | -1.5399 | .4588 | .6963 | 32 | 2.0420 | YES |
| CM49 | .7627 | .7336 | .8575 | 27 | 2.0600 | YES |

LINEAR REGRESSION MODELED VS. OBSERVED C COMPONENT (Y=A+BX) FOR DAYS 60 1975 TO 168 1975

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| CM15 | -1.6916 | 1.1563 | .6545 | 19 | 2.1100 | NO |
| CM28 | .8742 | 1.0470 | .7406 | 26 | 2.0640 | NO |
| CM29 | -.6620 | .2686 | .5403 | 30 | 2.0480 | YES |
| CM30 | .4594 | .6776 | .3535 | 28 | 2.0560 | NO |
| CM33 | -.7639 | .2895 | .7111 | 15 | 2.1600 | YES |
| CM34 | .0000 | .0000 | .0000 | 1 | 2.1600 | N.F.P. |
| CM36 | 2.3860 | .2864 | .7930 | 37 | 2.0000 | YES |
| CM37 | 1.0386 | .4168 | .7466 | 36 | 2.0000 | YES |
| CM38 | 2.8678 | .8508 | .4098 | 32 | 2.0420 | NO |
| CM49 | .2361 | .4556 | .5070 | 27 | 2.0600 | YES |

Table 10b

LINEAR REGRESSION MODELED VS. OBSERVED L COMPONENT (Y=A+BX) FOR DAYS 280 1975 TO 226 1976

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LT1 | -.2531 | .7219 | .7235 | 62 | 2.0000 | YES |
| LT2 | -.2246 | .6517 | .7620 | 72 | 2.0000 | YES |
| LT3 | -1.5733 | .5416 | .5804 | 62 | 2.0000 | YES |
| LT4 | .6877 | .6014 | .6295 | 71 | 2.0000 | YES |
| LT5 | -1.1484 | .3460 | .7746 | 58 | 2.0000 | YES |
| LT6 | .3616 | .4355 | .3901 | 75 | 2.0000 | YES |
| LT7 | -2.0956 | .6932 | .5885 | 57 | 2.0000 | YES |

LINEAR REGRESSION MODELED VS. OBSERVED C COMPONENT (Y=A+BX) FOR DAYS 280 1975 TO 226 1976

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LT1 | -.0804 | .4857 | .4703 | 62 | 2.0000 | YES |
| LT2 | -.3193 | .5832 | .5184 | 72 | 2.0000 | YES |
| LT3 | .6466 | 1.0131 | .5089 | 62 | 2.0000 | NO |
| LT4 | -.2292 | .4235 | .5019 | 71 | 2.0000 | YES |
| LT5 | -.2207 | .1240 | .1336 | 58 | 2.0000 | YES |
| LT6 | .5608 | .1564 | .1431 | 75 | 2.0000 | YES |
| LT7 | 3.2041 | .5394 | .6381 | 57 | 2.0000 | YES |

Table 10c

LINEAR REGRESSION MODELED VS. OBSERVED L COMPONENT (Y=A+BX) FOR DAYS 67 1978 TO 266 1978

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LI1 | -1.5501 | .5290 | .5696 | 40 | 2.0000 | YES |
| LI2 | -.6032 | .6176 | .7580 | 46 | 2.0000 | YES |
| LI3 | -1.2190 | .5637 | .7187 | 43 | 2.0000 | YES |
| LI4 | -1.4965 | .2963 | .3452 | 31 | 2.0450 | YES |
| LPG1 | 2.2310 | -.1601 | -.2179 | 29 | 2.0520 | YES |
| LPG2 | 1.9976 | .0949 | .1864 | 24 | 2.0740 | YES |
| LPG3 | -.1093 | .1583 | .2024 | 21 | 2.0930 | YES |
| LPG4 | -.8863 | -.3414 | -.5057 | 10 | 2.3060 | YES |
| LTM | -1.2041 | .1778 | .2122 | 52 | 2.0000 | YES |
| NJ1 | 2.0061 | .3143 | .4729 | 20 | 2.1010 | YES |
| NJ2 | -.2922 | .9228 | .8191 | 34 | 2.0000 | NO |
| NJ3 | -1.8308 | .3686 | .4379 | 30 | 2.0480 | YES |

LINEAR REGRESSION MODELED VS. OBSERVED C COMPONENT (Y=A+BX) FOR DAYS 67 1978 TO 266 1978

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LI1 | -.0930 | .3587 | .6463 | 40 | 2.0000 | YES |
| LI2 | .2705 | .7173 | .7328 | 46 | 2.0000 | YES |
| LI3 | -.3451 | 1.0198 | .5875 | 43 | 2.0000 | NO |
| LI4 | 1.0752 | .7376 | .6836 | 31 | 2.0450 | NO |
| LPG1 | -.0639 | .5796 | .2467 | 29 | 2.0520 | NO |
| LPG2 | -1.2954 | .2700 | .2527 | 24 | 2.0740 | YES |
| LPG3 | .2269 | -.1690 | -.2214 | 21 | 2.0930 | YES |
| LPG4 | .5405 | -.5748 | -.3037 | 10 | 2.3060 | YES |
| LTM | -1.0958 | .4319 | .5428 | 52 | 2.0000 | YES |
| NJ1 | -.4804 | .1377 | .2898 | 20 | 2.1010 | YES |
| NJ2 | -.7940 | -.2272 | -.2280 | 34 | 2.0000 | YES |
| NJ3 | -.1722 | .8491 | .5012 | 30 | 2.0480 | NO |

Table 10d

LINEAR REGRESSION MODELED VS. OBSERVED L COMPONENT (Y=A+BX) FOR DAYS 87 1979 TO 248 1979

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LTM | .9459 | .7654 | .7346 | 18 | 2.1200 | NO |
| LI1 | -.1330 | .9343 | .9826 | 18 | 2.1200 | NO |
| LI3 | .4790 | 1.5318 | .7551 | 19 | 2.1100 | NO |
| NJ2A | -1.4666 | .4652 | .5834 | 19 | 2.1100 | YES |
| N13 | -1.9477 | .1542 | .5758 | 12 | 2.2280 | YES |
| N14 | .4889 | -.1122 | -.1352 | 11 | 2.2620 | YES |
| N23 | .1376 | .2313 | .5583 | 16 | 2.1450 | YES |
| N31 | 2.8094 | .0274 | .0408 | 16 | 2.1450 | YES |
| N32 | 5.7008 | 1.1085 | .3981 | 26 | 2.0640 | NO |
| N33 | 1.7961 | .1538 | .3323 | 13 | 2.2010 | YES |
| N41 | -4.1732 | -.0063 | -.0048 | 20 | 2.1010 | YES |
| N42 | 3.5731 | .8020 | .5790 | 12 | 2.2280 | NO |
| N51 | .1844 | .3699 | .4201 | 13 | 2.2010 | YES |
| N52 | 1.0393 | .8421 | .6756 | 14 | 2.1790 | NO |

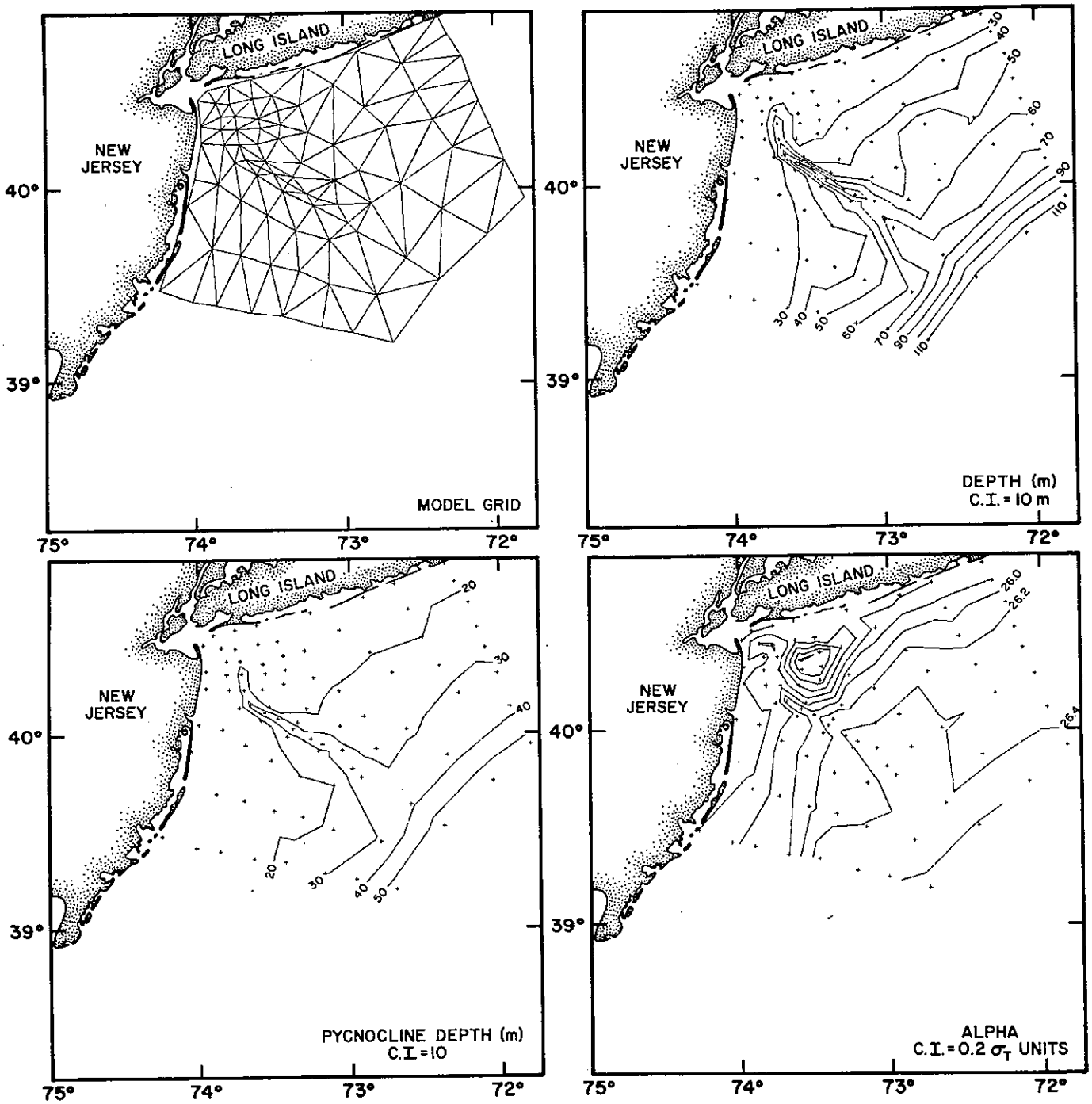
LINEAR REGRESSION MODELED VS. OBSERVED C COMPONENT (Y=A+BX) FOR DAYS 87 1979 TO 248 1979

| MOORING | A | B | R | PTS. | T | SIG. DIFF. |
|---|---|---|---|---|---|---|
| LTM | -.0297 | .5726 | .7053 | 18 | 2.1200 | YES |
| LI1 | .2389 | -.1073 | -.5586 | 18 | 2.1200 | YES |
| LI3 | 1.4238 | -.3433 | -.1206 | 19 | 2.1100 | NO |
| NJ2A | -.0963 | .0452 | .1352 | 19 | 2.1100 | YES |
| N13 | -.4311 | .2084 | .4963 | 12 | 2.2280 | YES |
| N14 | -2.8076 | .5305 | .3603 | 11 | 2.2620 | NO |
| N23 | .1664 | .5216 | .6259 | 16 | 2.1450 | YES |
| N31 | .8558 | .5723 | .4303 | 16 | 2.1450 | NO |
| N32 | -.2107 | .2689 | .4599 | 26 | 2.0640 | YES |
| N33 | -2.3027 | .5064 | .1828 | 13 | 2.2010 | NO |
| N41 | -.0106 | .1422 | .2189 | 20 | 2.1010 | YES |
| N42 | -1.2056 | .6401 | .4577 | 12 | 2.2280 | NO |
| N51 | -.6403 | .7288 | .5216 | 13 | 2.2010 | NO |
| N52 | -.1165 | -.0803 | -.1656 | 14 | 2.1790 | YES |

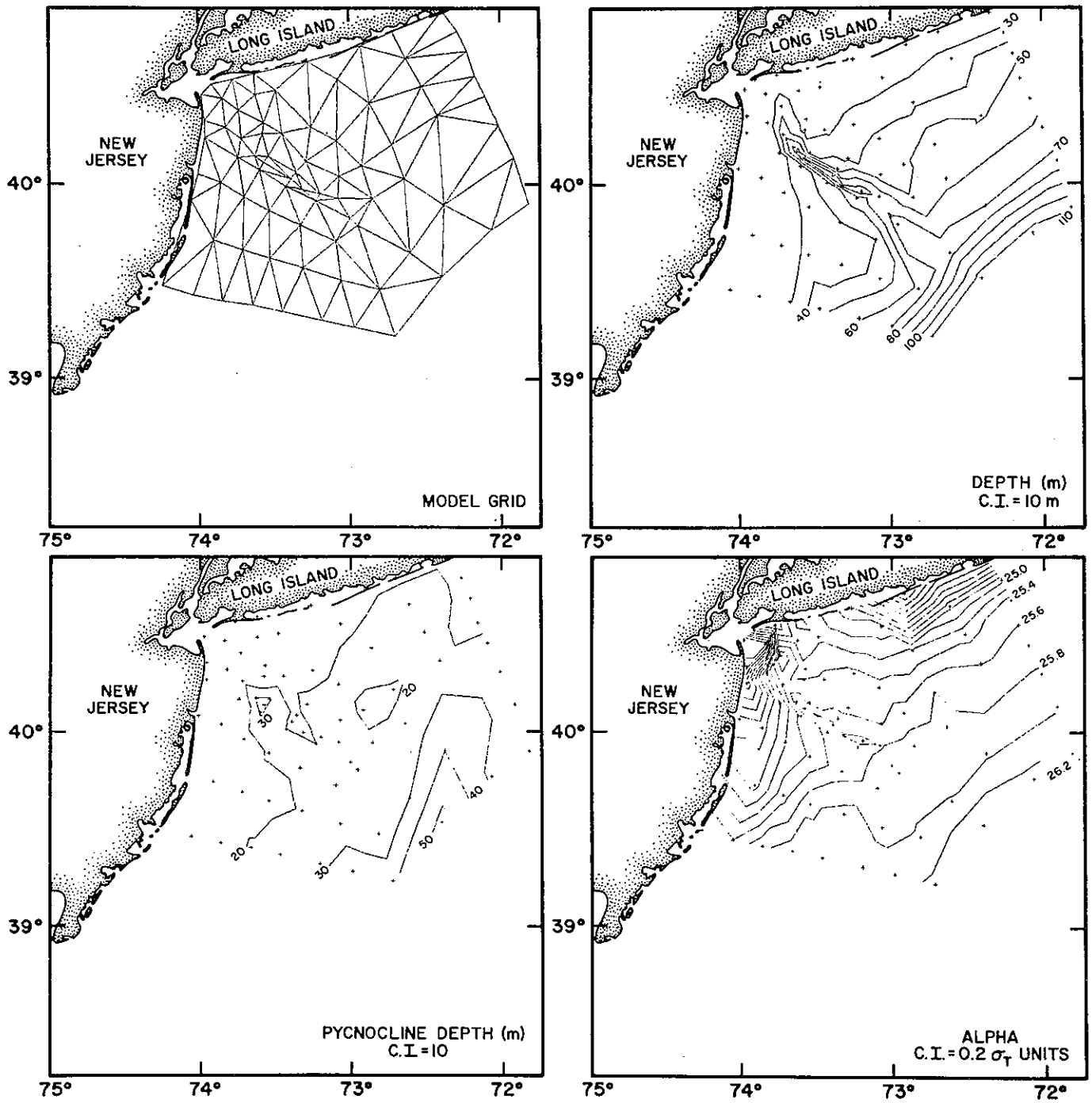
# APPENDIX A

Triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field diagrams for:

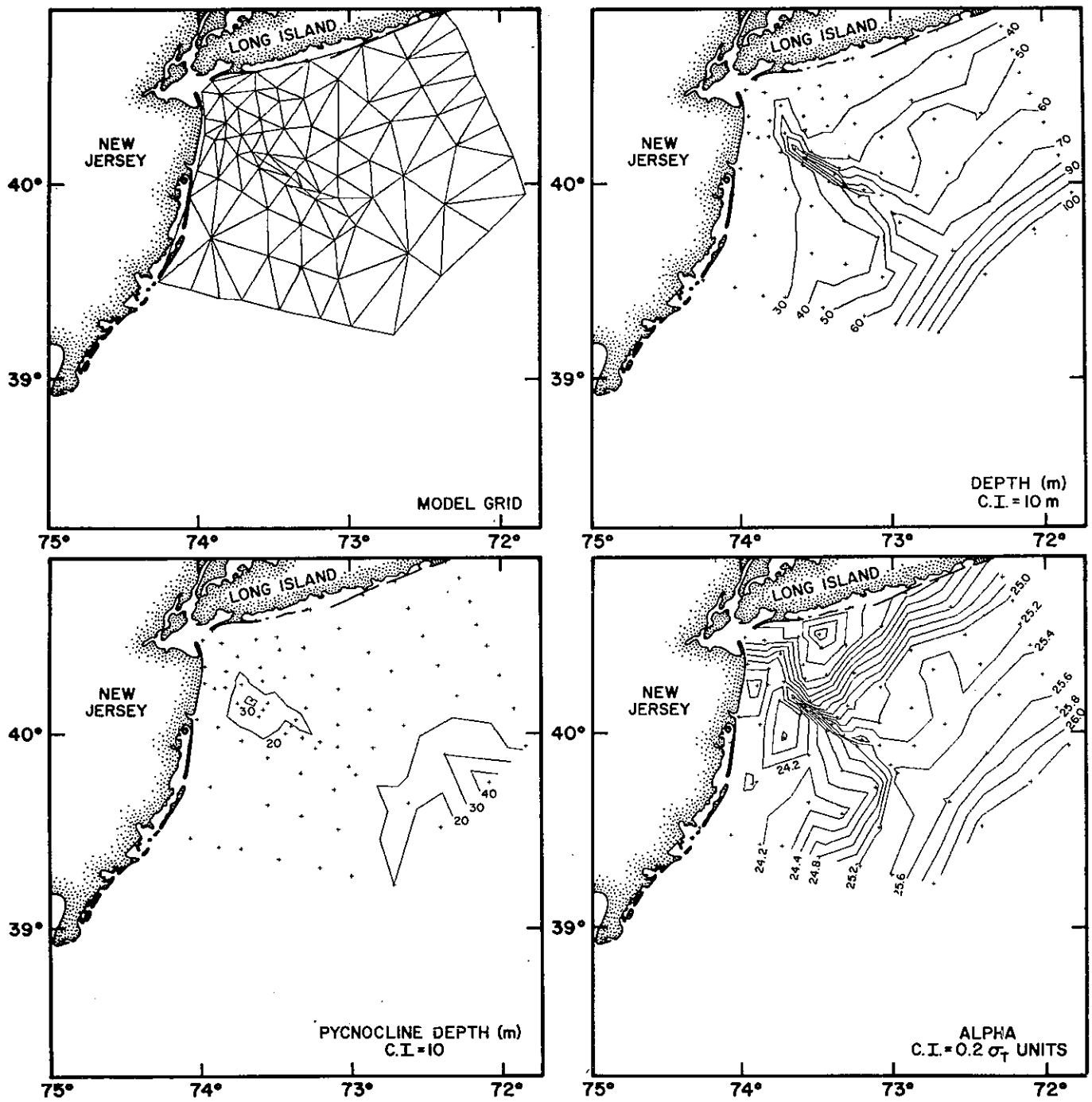

| Cruise | Date | Page |
|---|---|---|
| XWCC-2 | 27 Feb - 04 Mar 1975 | A-2 |
| XWCC-4 | 02 May - 10 May 1975 | A-3 |
| XWCC-5 | 08 Jun - 15 Jun 1975 | A-4 |
| XWCC-6 | 30 Sep - 04 Oct 1975 | A-5 |
| XWCC-7 | 03 Dec - 08 Dec 1975 | A-6 |
| XWCC-8 | 12 Apr - 16 Apr 1976 | A-7 |
| XWCC-9 | 17 May - 24 May 1976 | A-8 |
| XWCC-10 | 28 Jun - 01 Jul 1976 | A-9 |
| XWCC-17 | 10 Apr - 17 Apr 1978 | A-10 |
| XWCC-18 | 31 May - 08 Jun 1978 | A-11 |
| XWCC-19 | 05 Jul - 15 Jul 1978 | A-12 |
| XWCC-20 | 31 Jul - 09 Aug 1978 | A-13 |
| XWCC-21 | 09 Apr - 16 Apr 1979 | A-14 |
| XWCC-22 | 29 May - 07 Jun 1979 | A-15 |
| XWCC-23 | 16 Jul - 27 Jul 1979 | A-16 |
| XWCC-24 | 13 Aug - 23 Aug 1979 | A-17 |



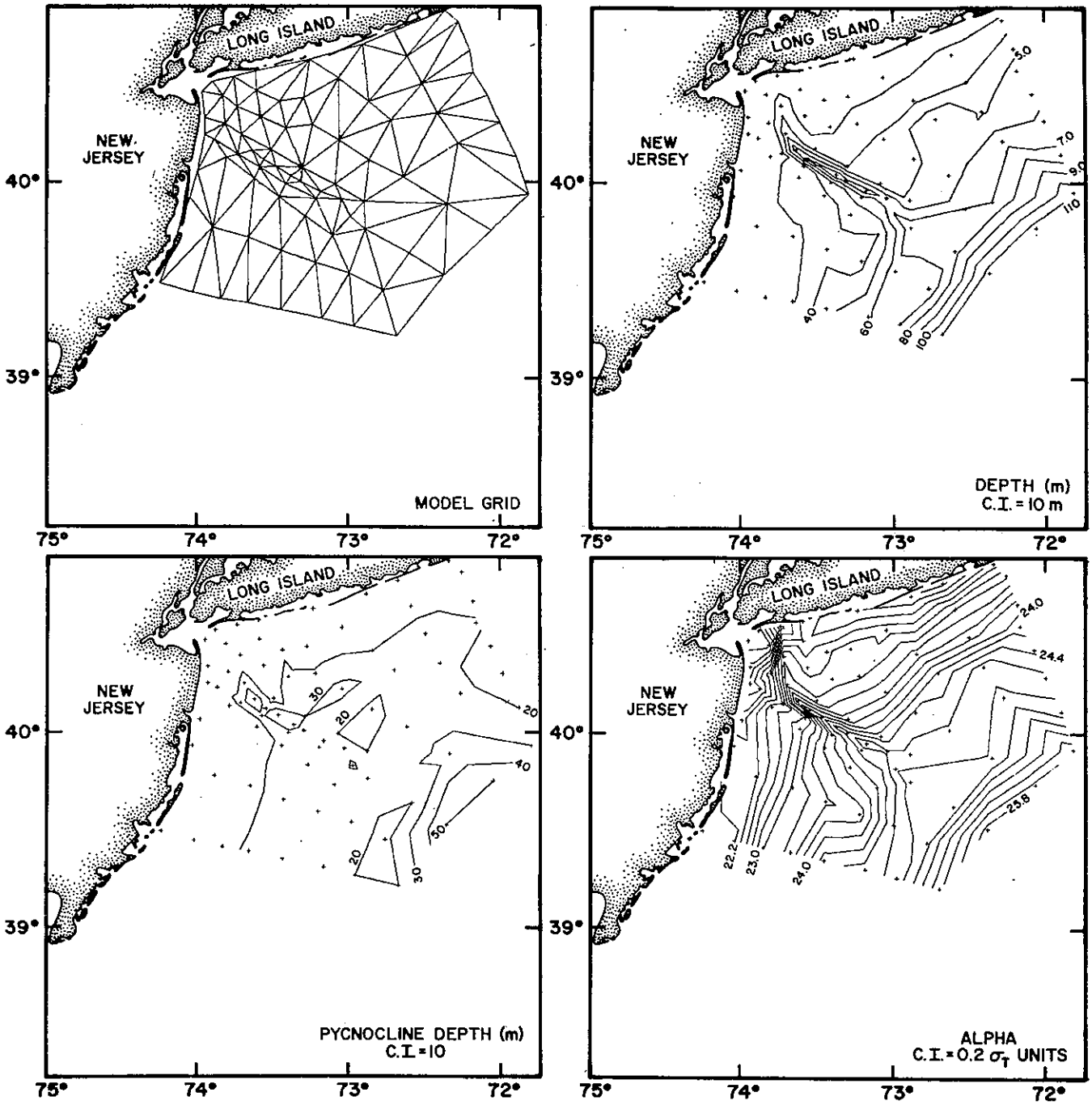

Cruise XWCC-2: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



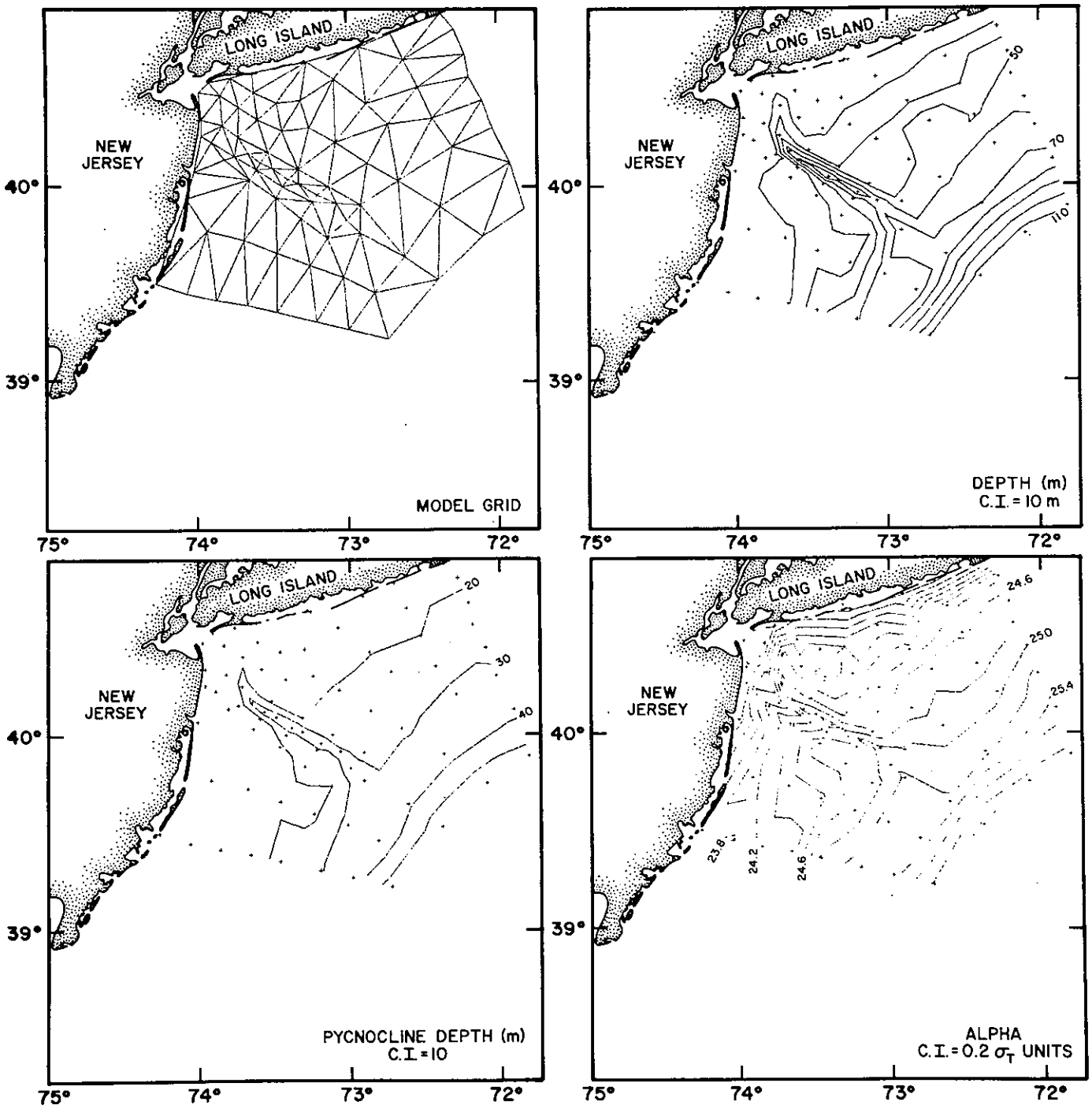

Cruise XWCC-4: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



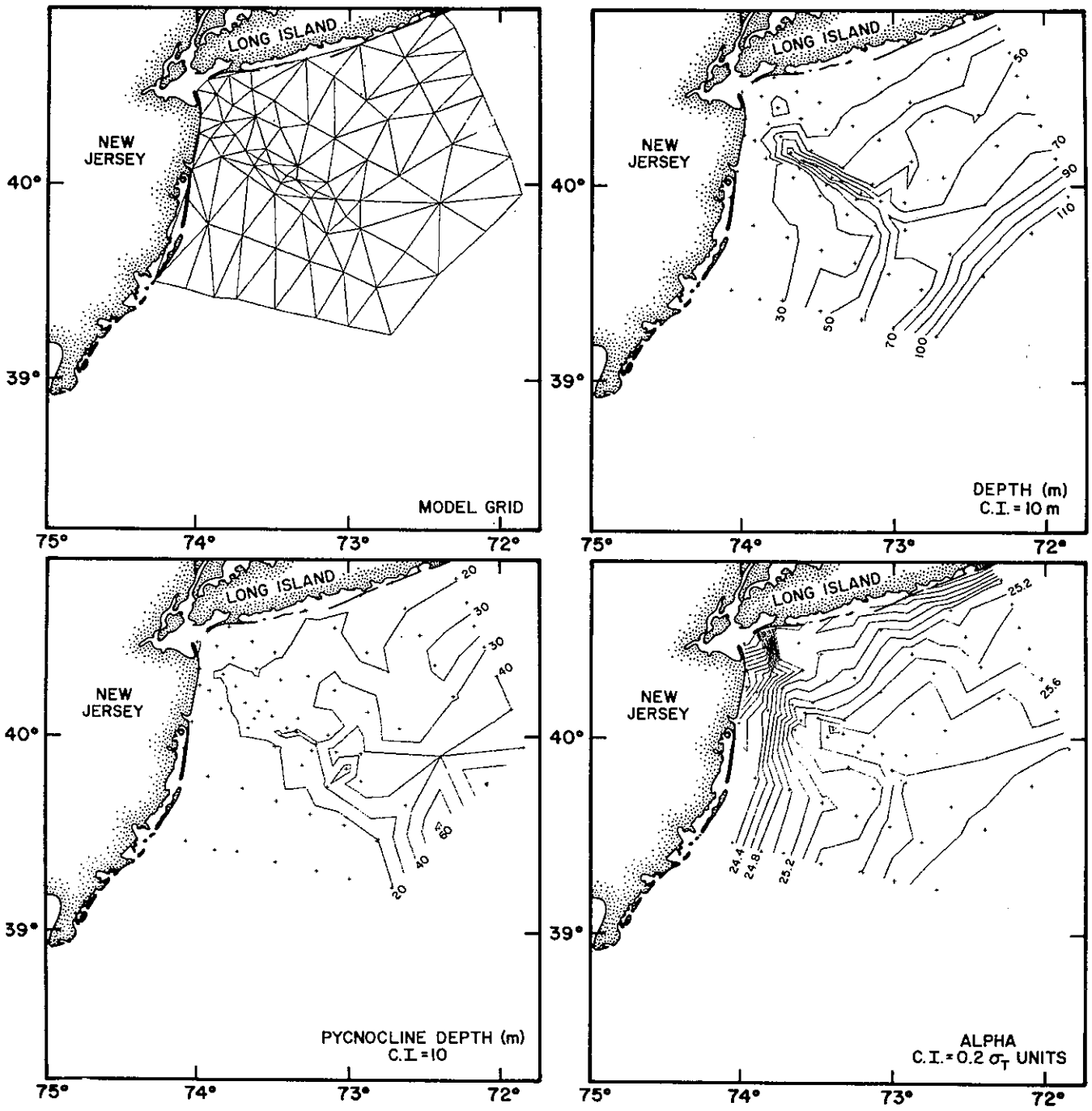

Cruise XWCC-5: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



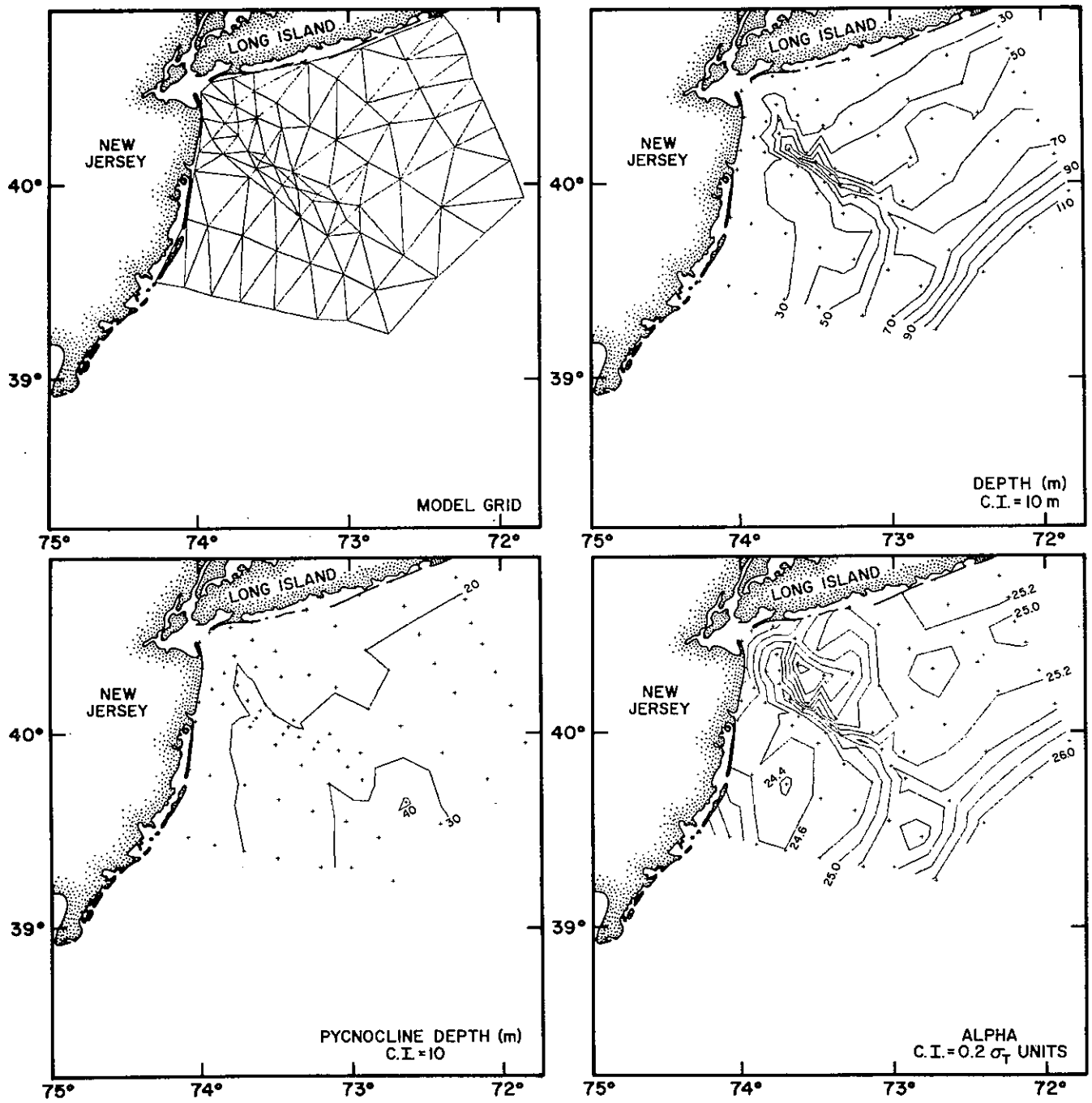

Cruise XWCC-6: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



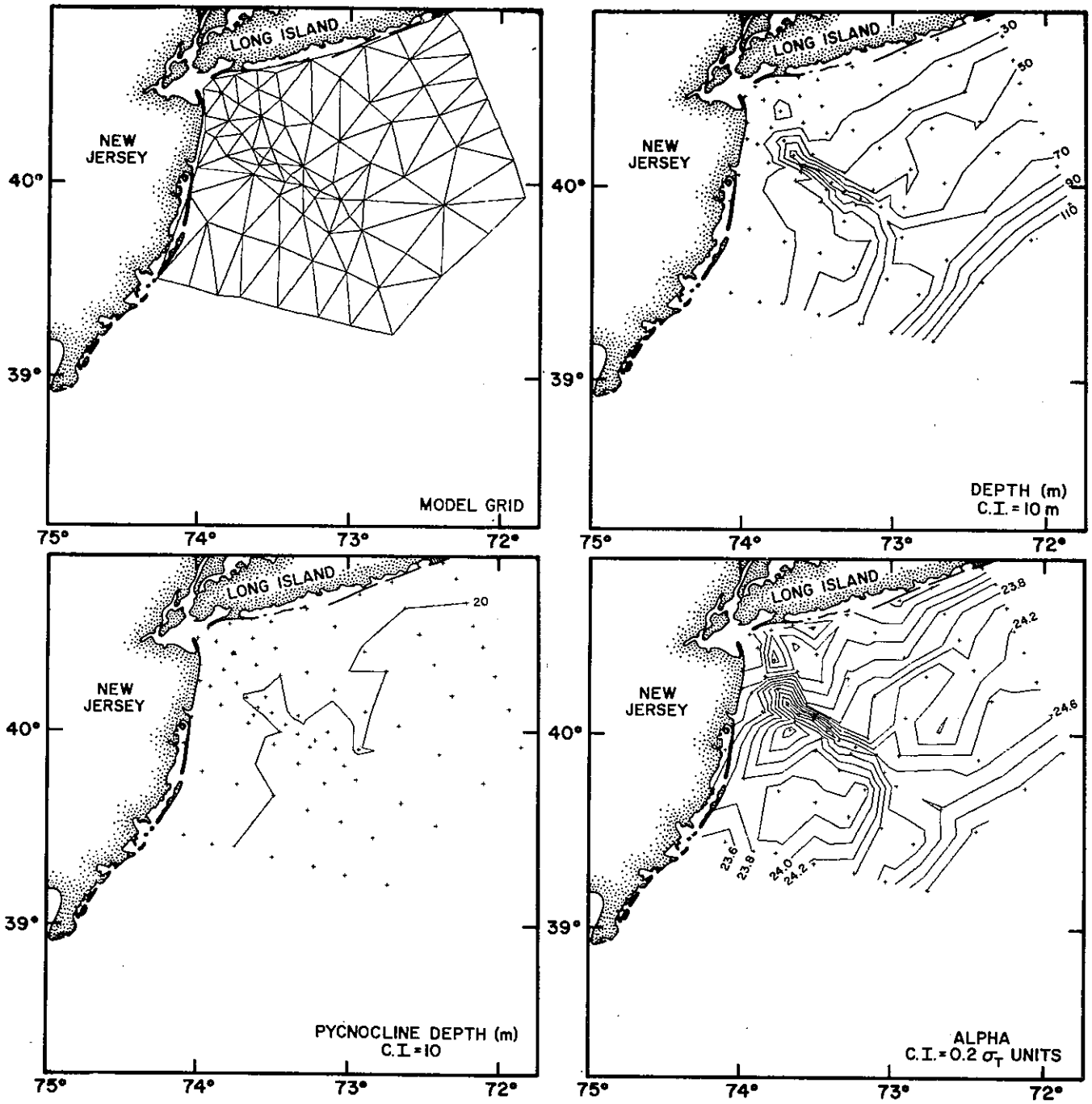

Cruise XWCC-7: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



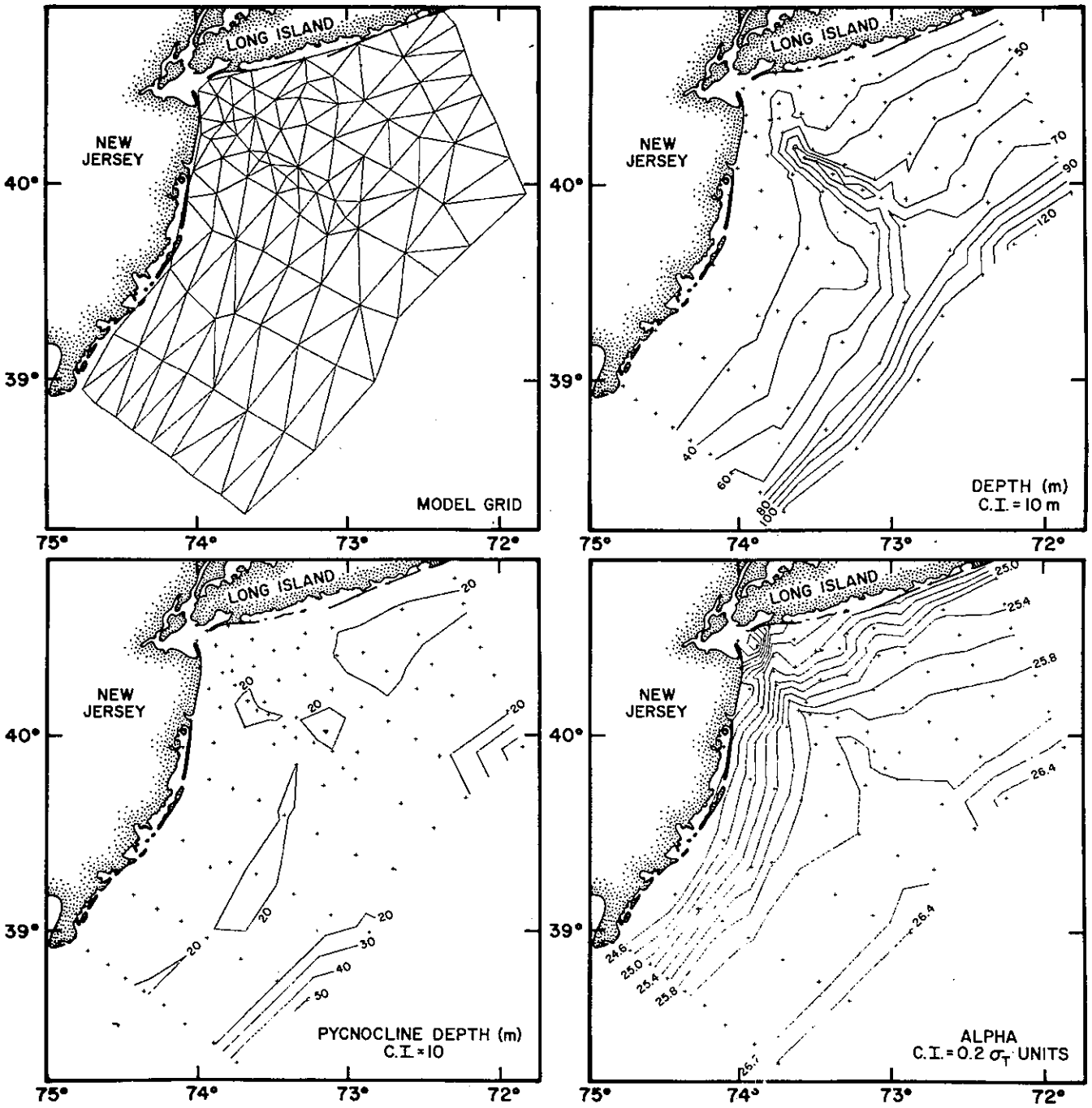

Cruise XWCC-8: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



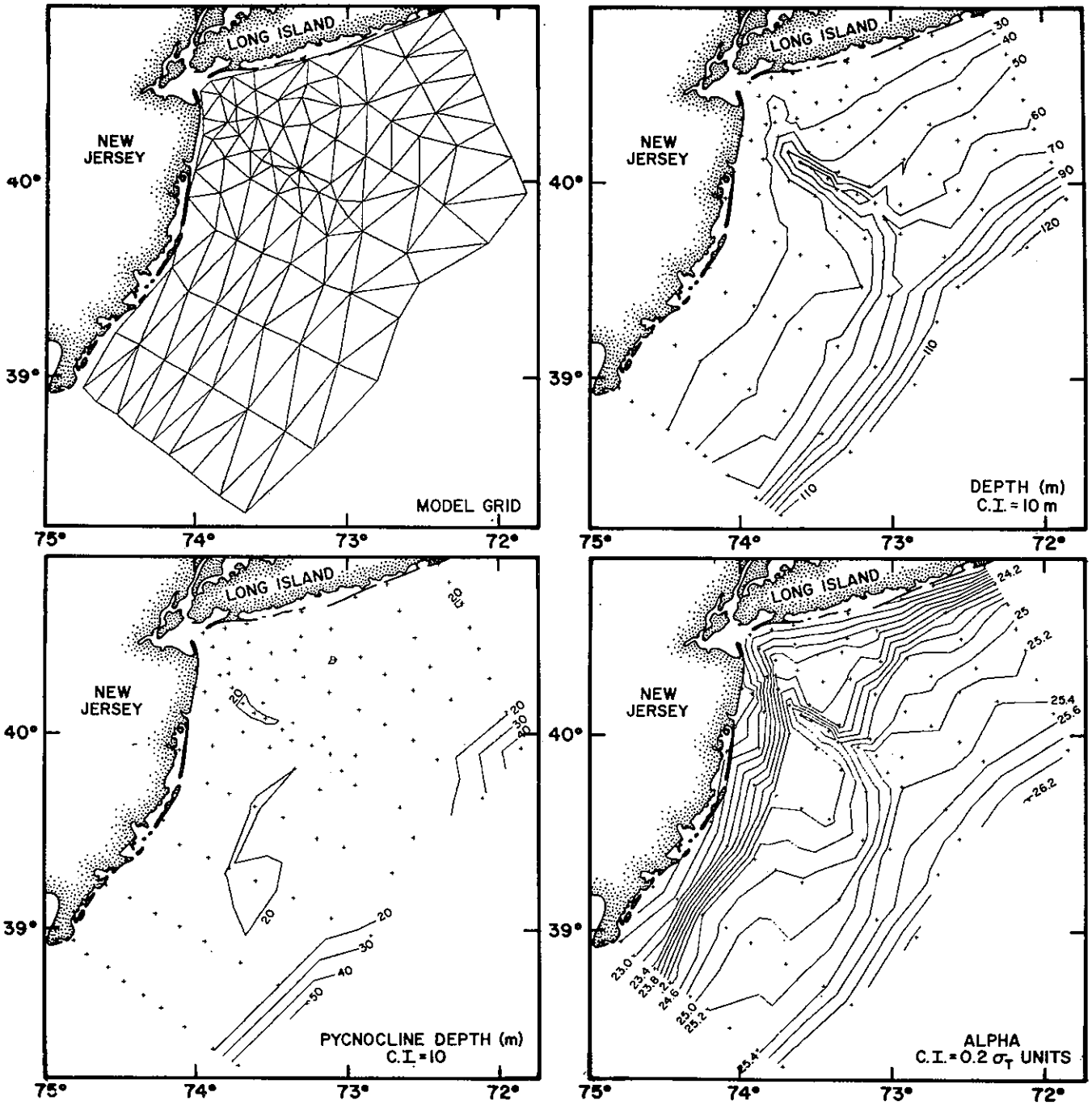

Cruise XWCC-9: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



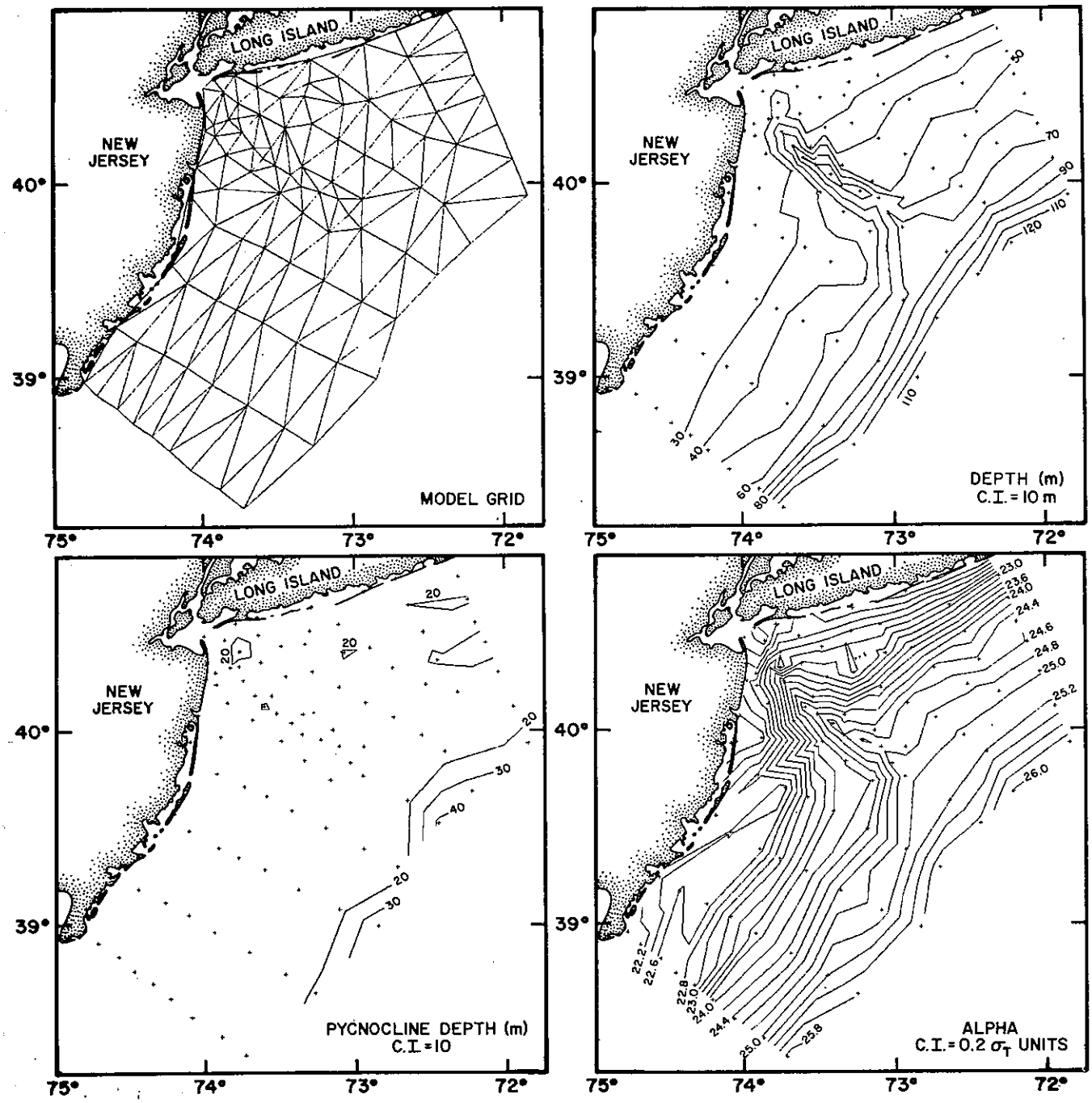

Cruise XWCC-10: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



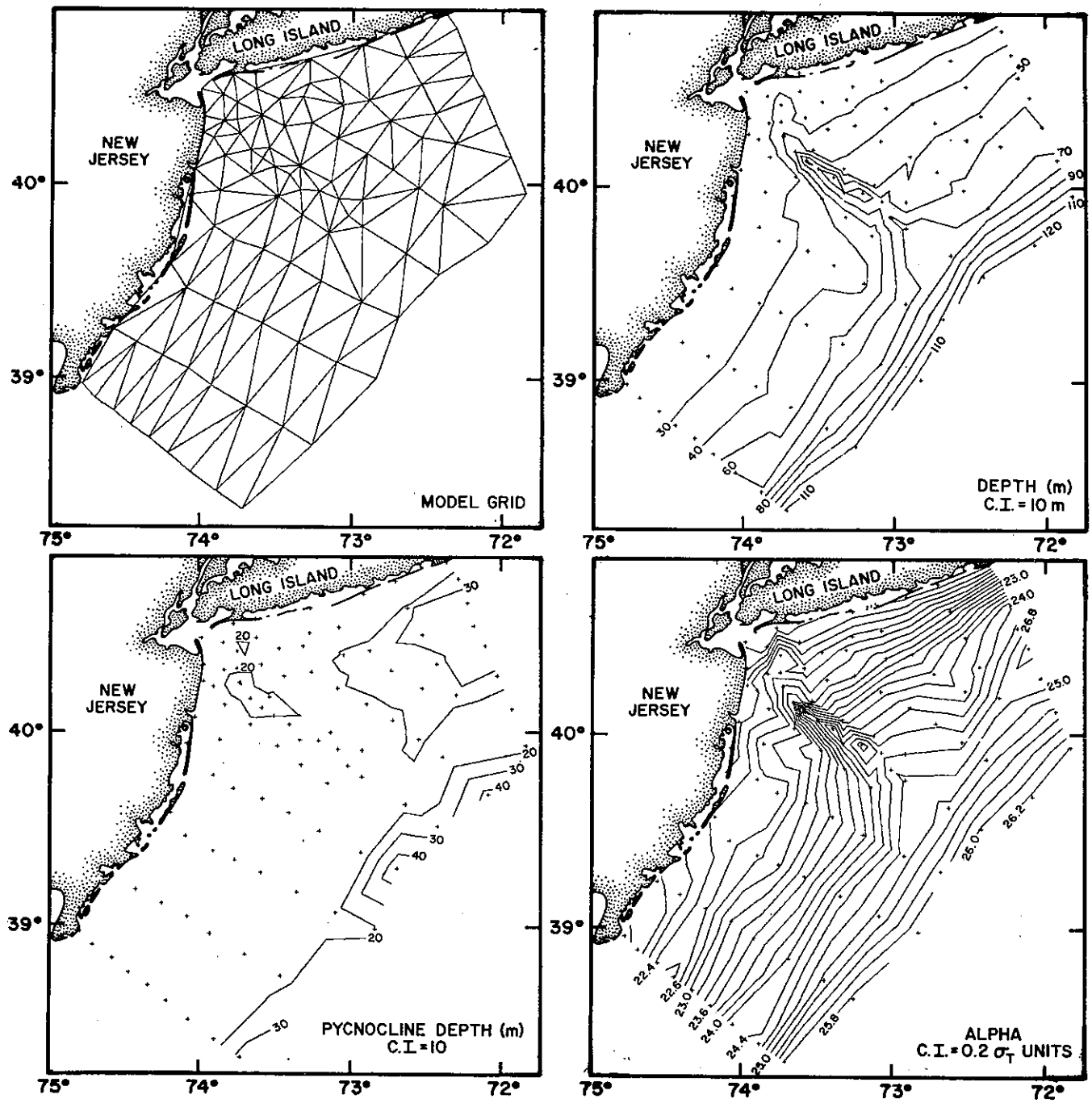

Cruise XWCC-17: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



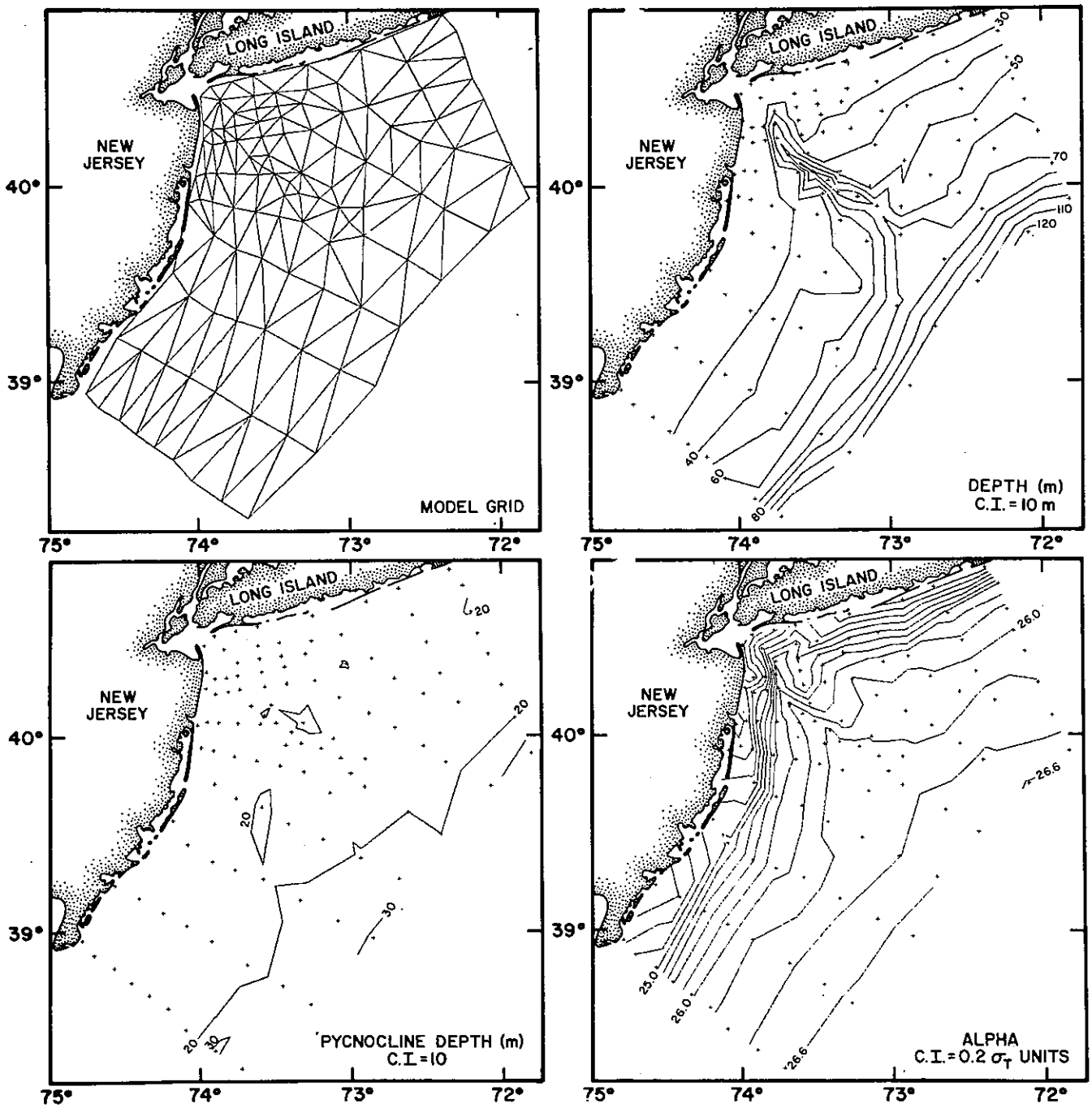

Cruise XWCC-18: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



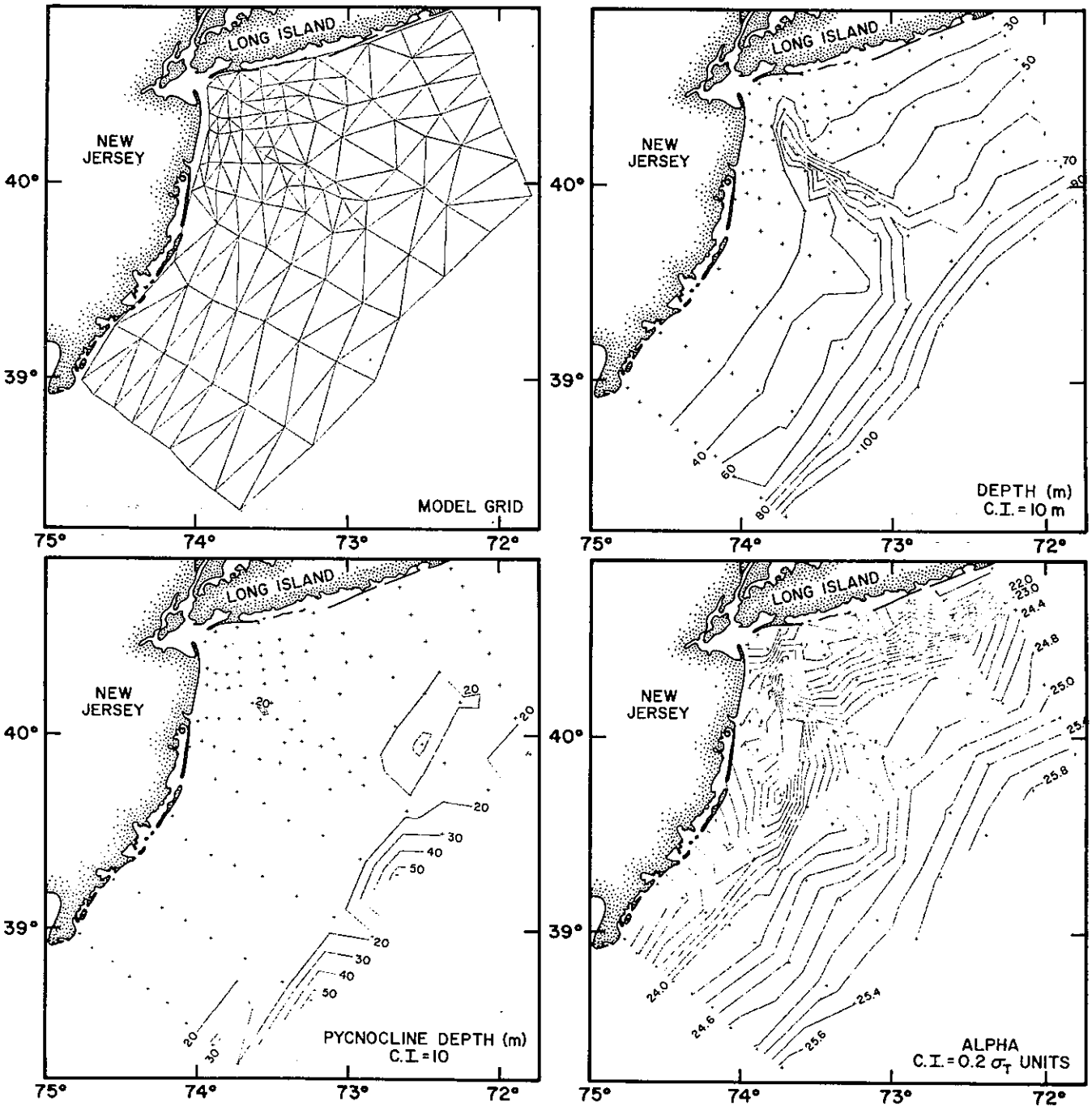

Cruise XWCC-19: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



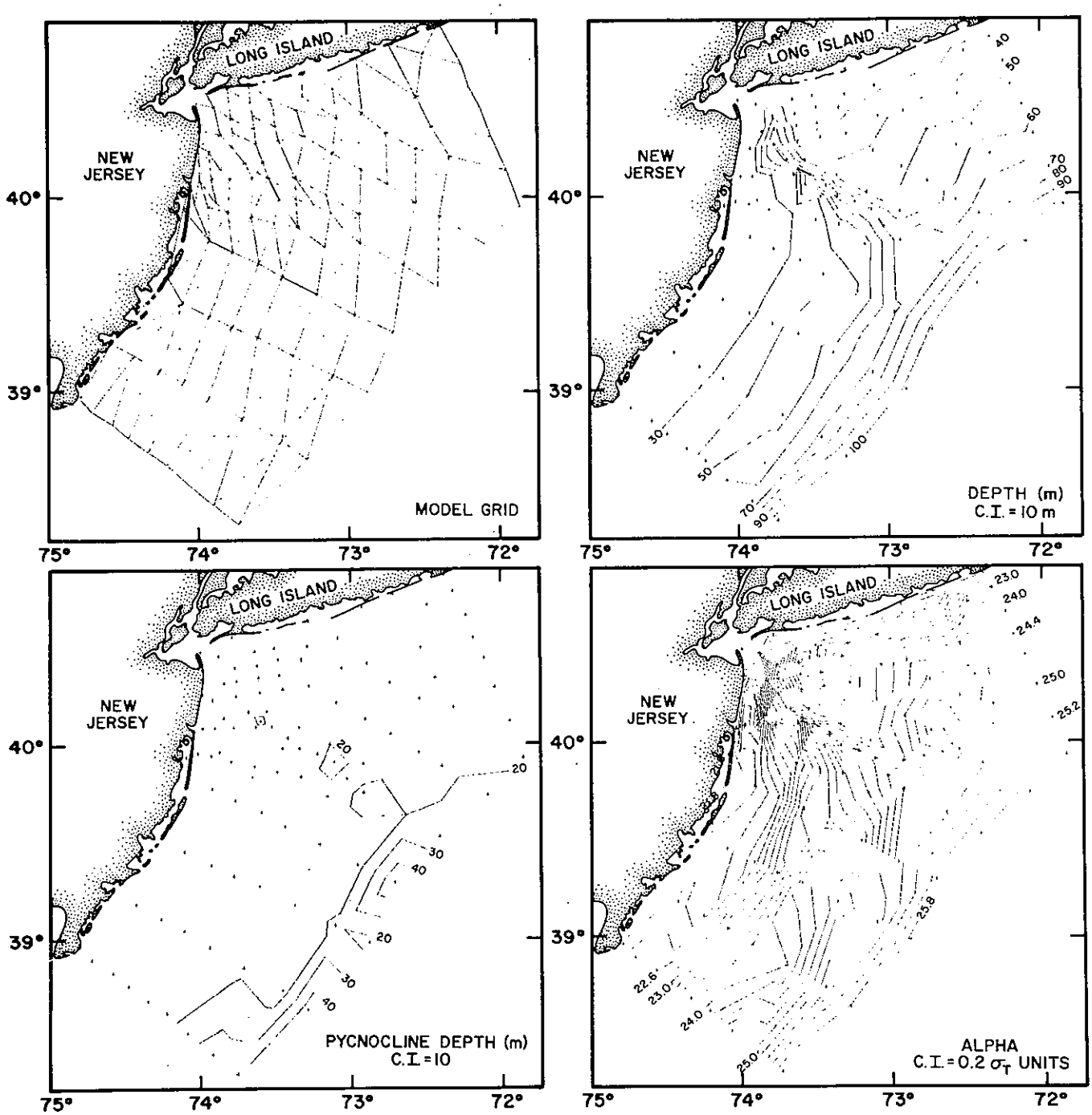

Cruise XWCC-20: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.



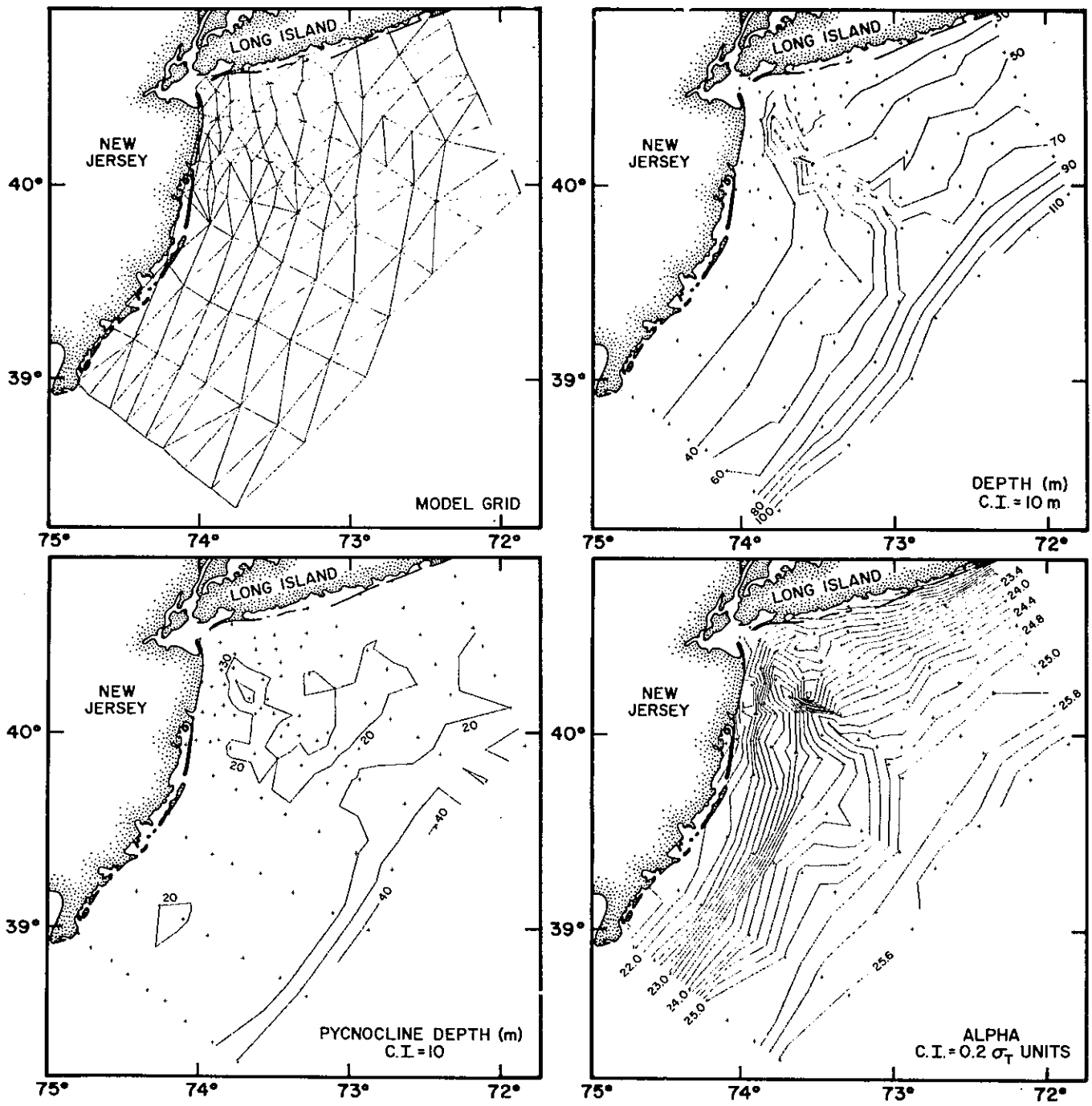

Cruise XWCC-21: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.




Cruise XWCC-22: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.




Cruise XWCC-23: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.

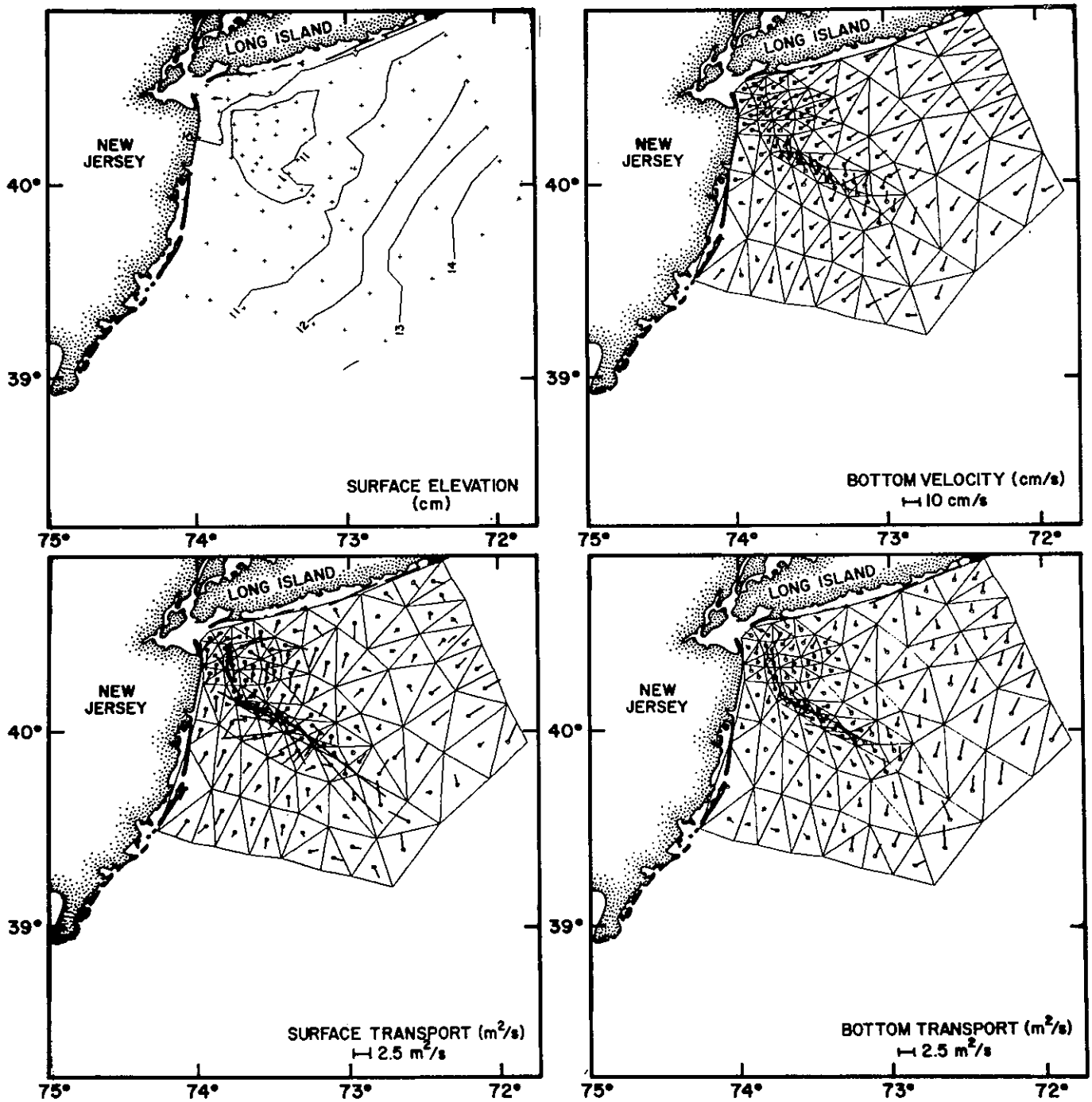



Cruise XWCC-24: Diagrams for triangular element grid, depth field, pycnocline depth field, and alpha (vertically averaged density) field.

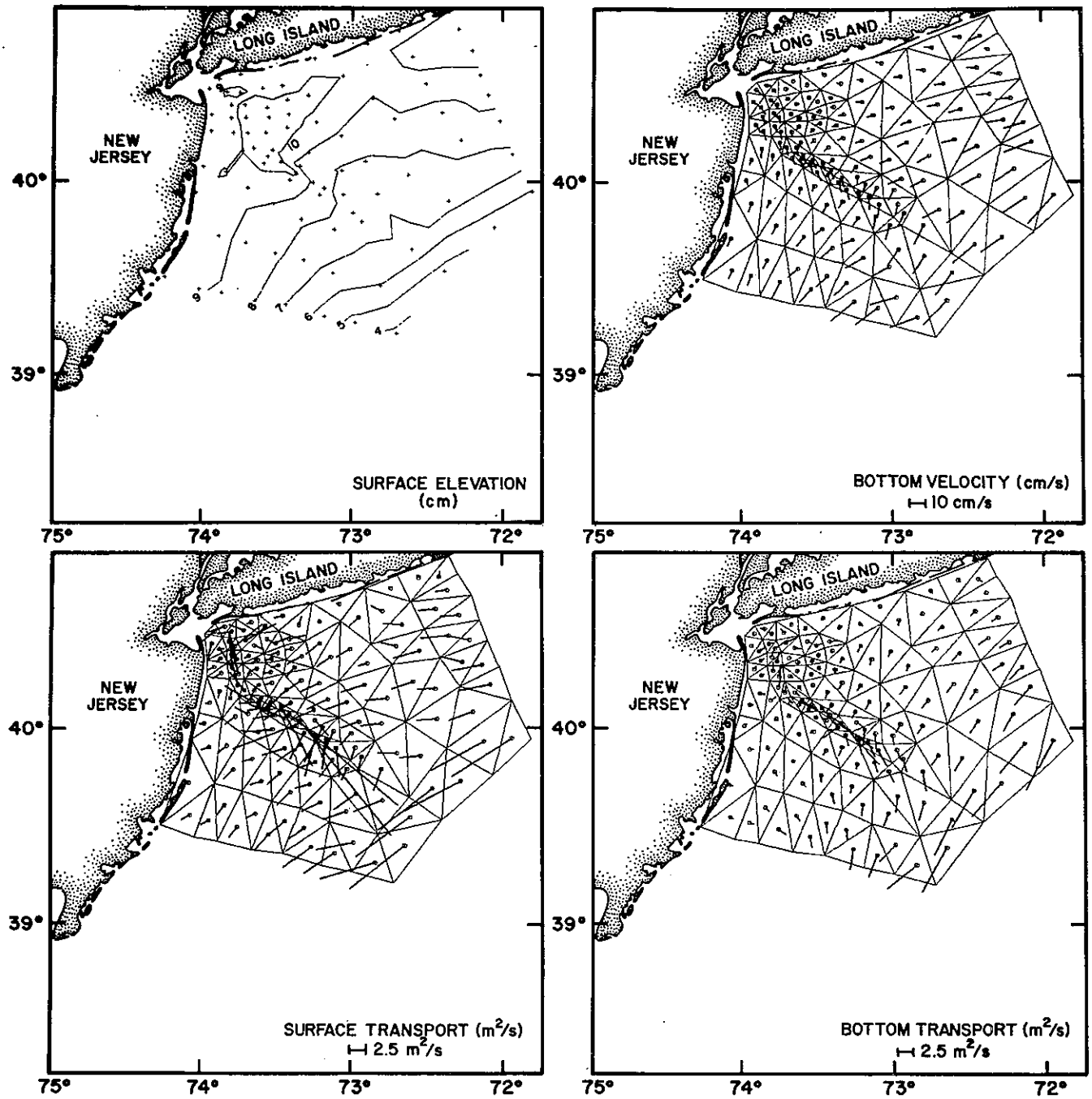
# APPENDIX B

Sea surface elevation, bottom (barotropic) velocity, surface transport, and bottom transport fields. One figure (case) for each cruise modeling time period.

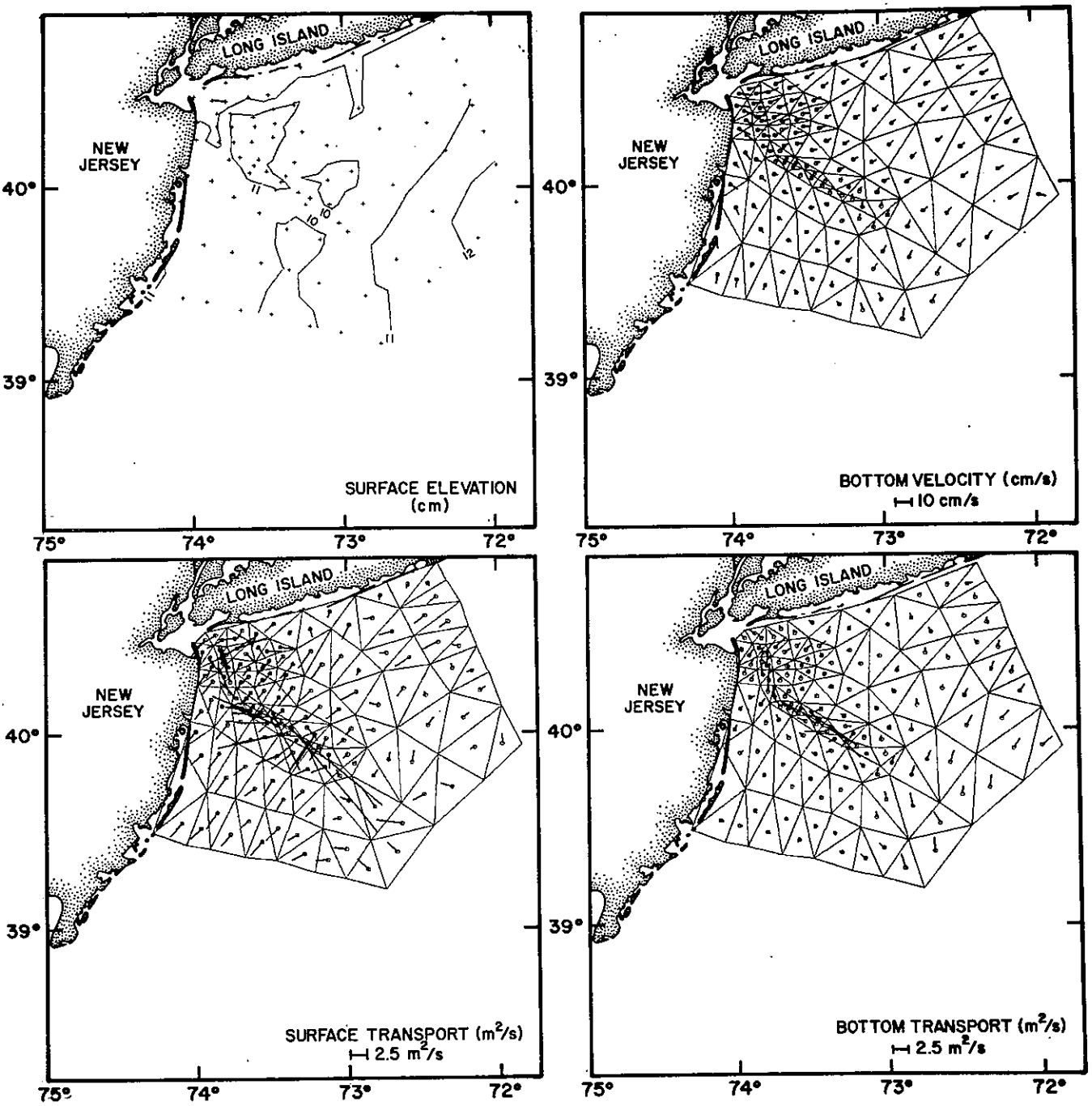

| | Julian Day interval | page |
|---|---|---|
| Cruise XWCC-2, Cases 1-5 | 060-109 1975 | B-2 to B-6 |
| Cruise XWCC-4, Cases 1-5 | 090-150 1975 | B-7 to B-11 |
| Cruise XWCC-5, Cases 1-2 | 127-168 1975 | B-12 to B-13 |
| Cruise XWCC-6, Cases 1-2 | 280-328 1975 | B-14 to B-15 |
| Cruise XWCC-7, Cases 1-5 | 305-052 1975-6 | B-16 to B-20 |
| Cruise XWCC-8, Cases 1-6 | 052-125 1976 | B-21 to B-26 |
| Cruise XWCC-9, Cases 1-6 | 117-181 1976 | B-27 to B-32 |
| Cruise XWCC-10, Cases 1-5 | 165-226 1976 | B-33 to B-37 |
| Cruise XWCC-17, Cases 1-5 | 067-139 1978 | B-38 to B-42 |
| Cruise XWCC-18, Cases 1-4 | 124-179 1978 | B-43 to B-46 |
| Cruise XWCC-19, Cases 1-3 | 169-211 1978 | B-47 to B-49 |
| Cruise XWCC-20, Cases 1-4 | 196-266 1978 | B-50 to B-53 |
| Cruise XWCC-21, Cases 1-3 | 087-129 1979 | B-54 to B-56 |
| Cruise XWCC-22, Cases 1-3 | 129-182 1979 | B-57 to B-59 |
| Cruise XWCC-23, Cases 1-2 | 182-216 1979 | B-60 to B-61 |
| Cruise XWCC-24, Cases 1-2 | 216-249 1979 | B-62 to B-63 |



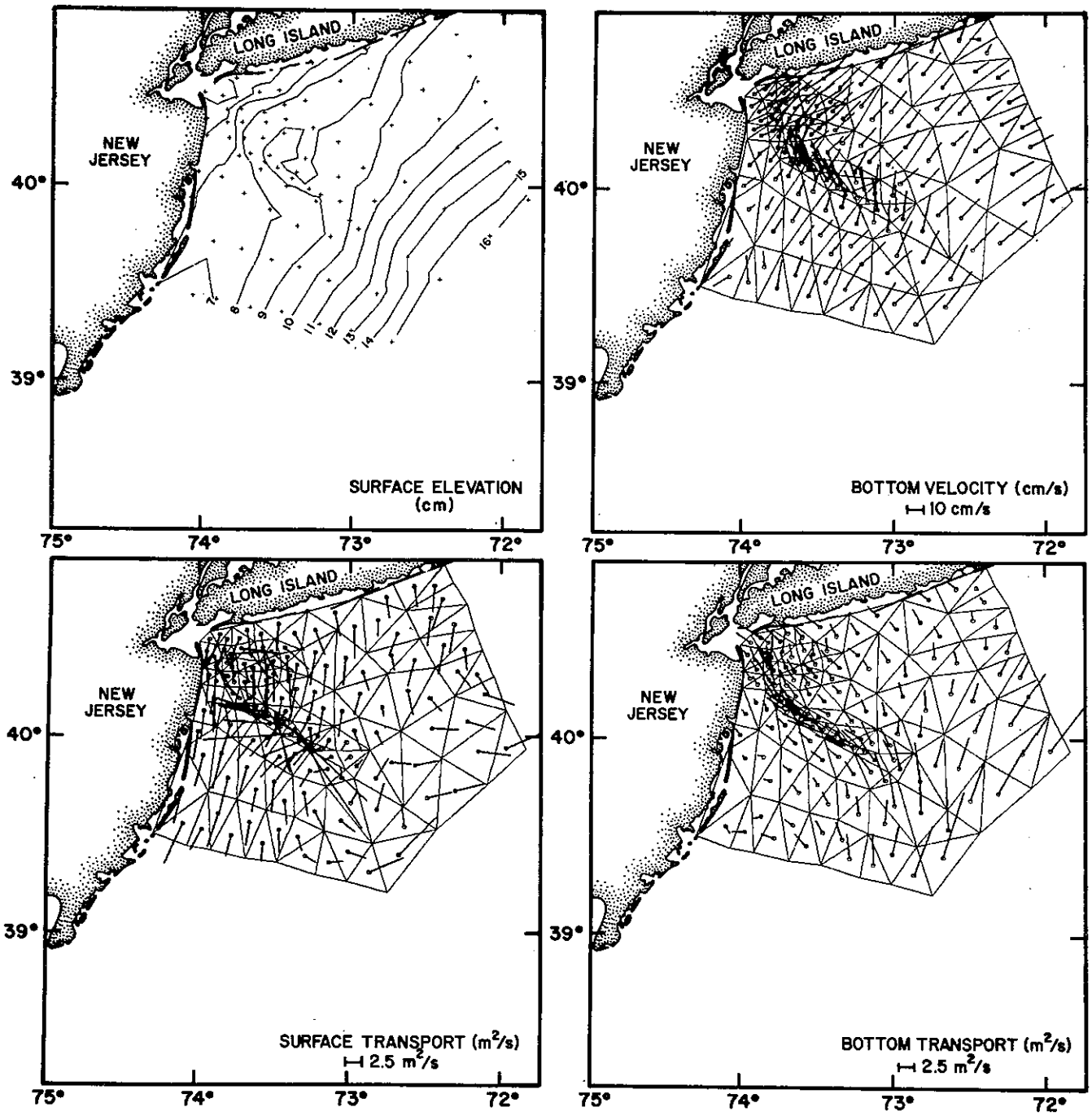

Cruise XWCC-2, modeling case 1 (Julian Day 060-066 1975).



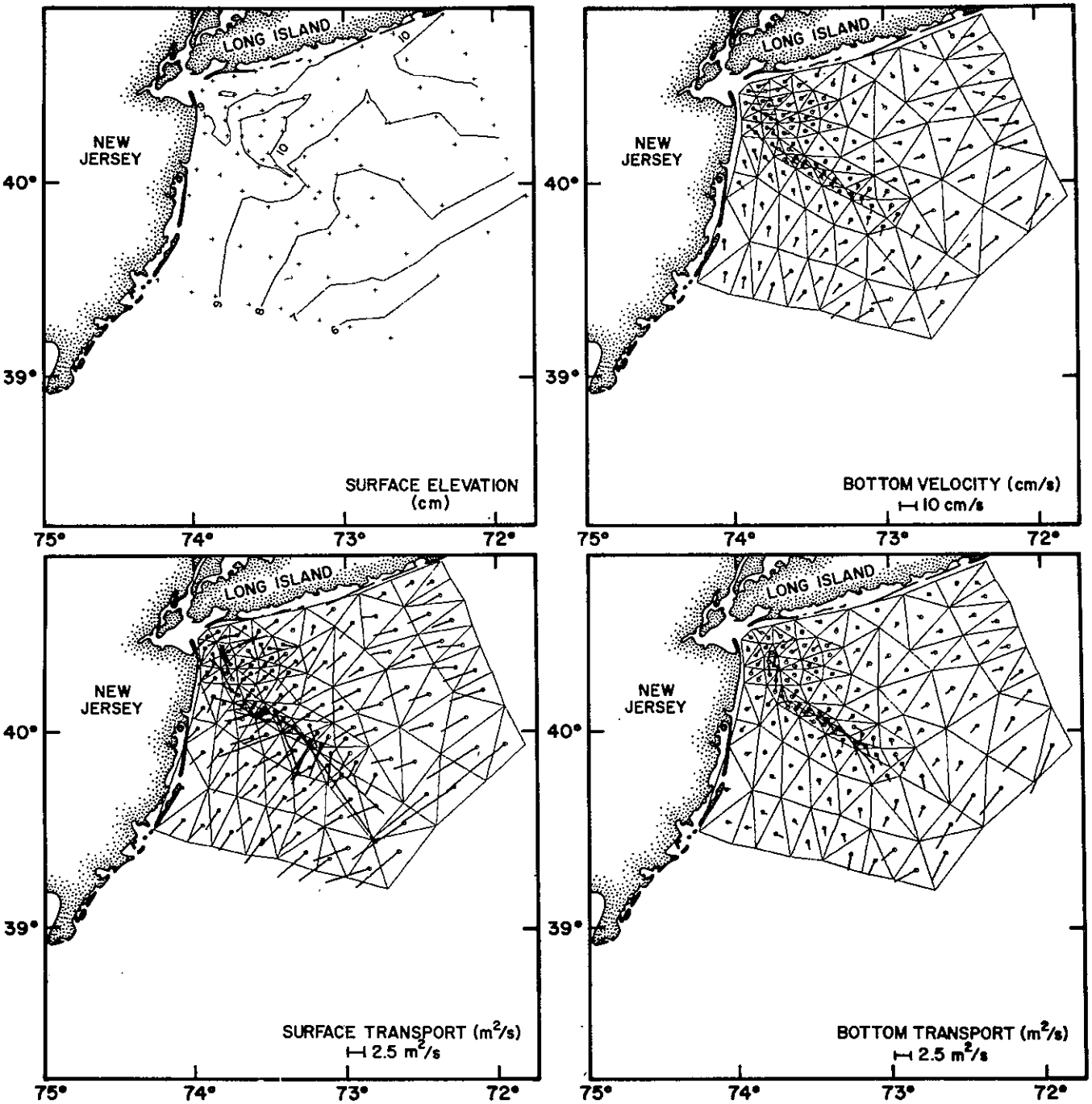

Cruise XWCC-2, modeling case 2 (Julian Day 066-080 1975).



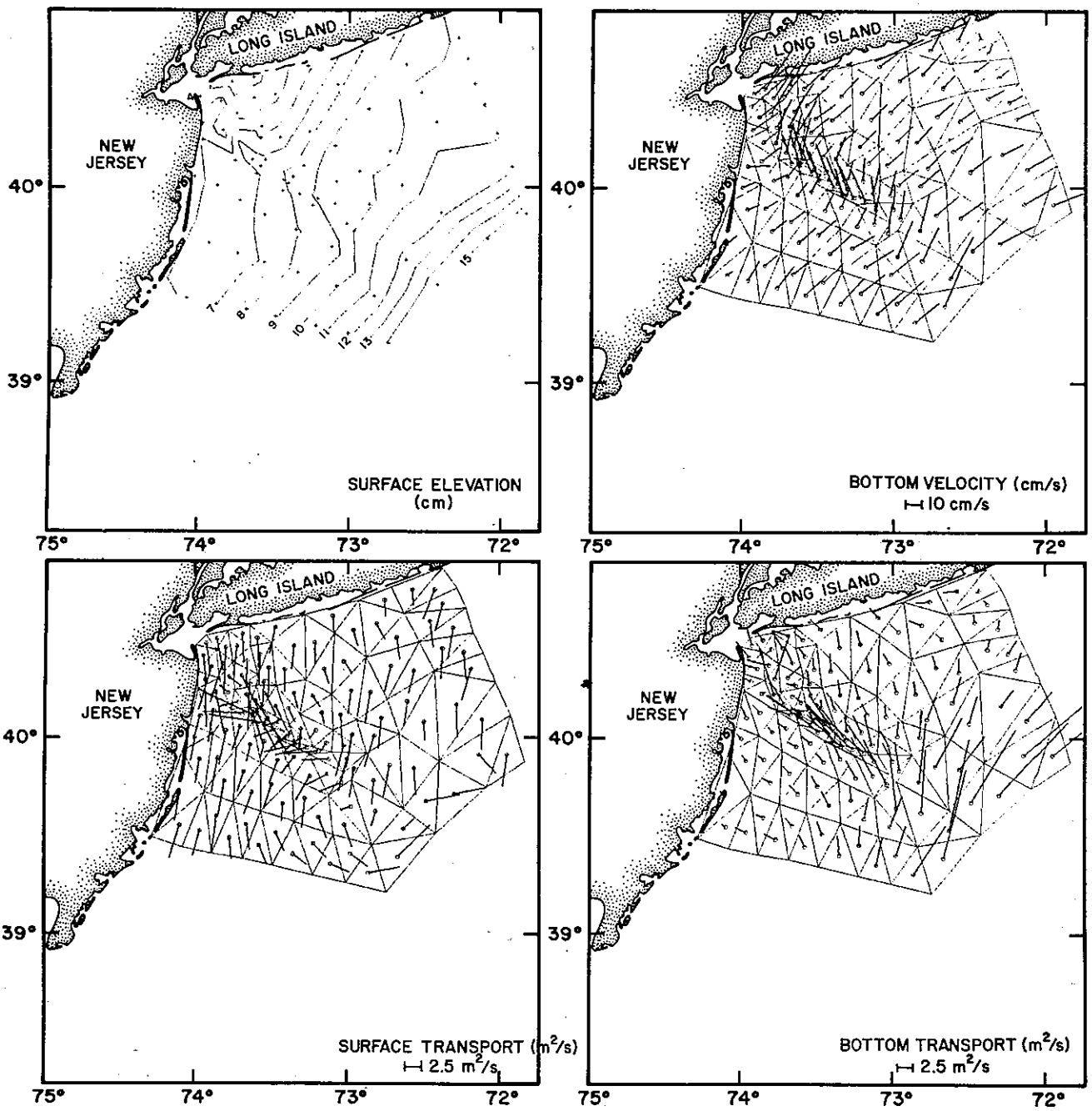

Cruise XWCC-2, modeling case 3 (Julian Day 080-090 1975).



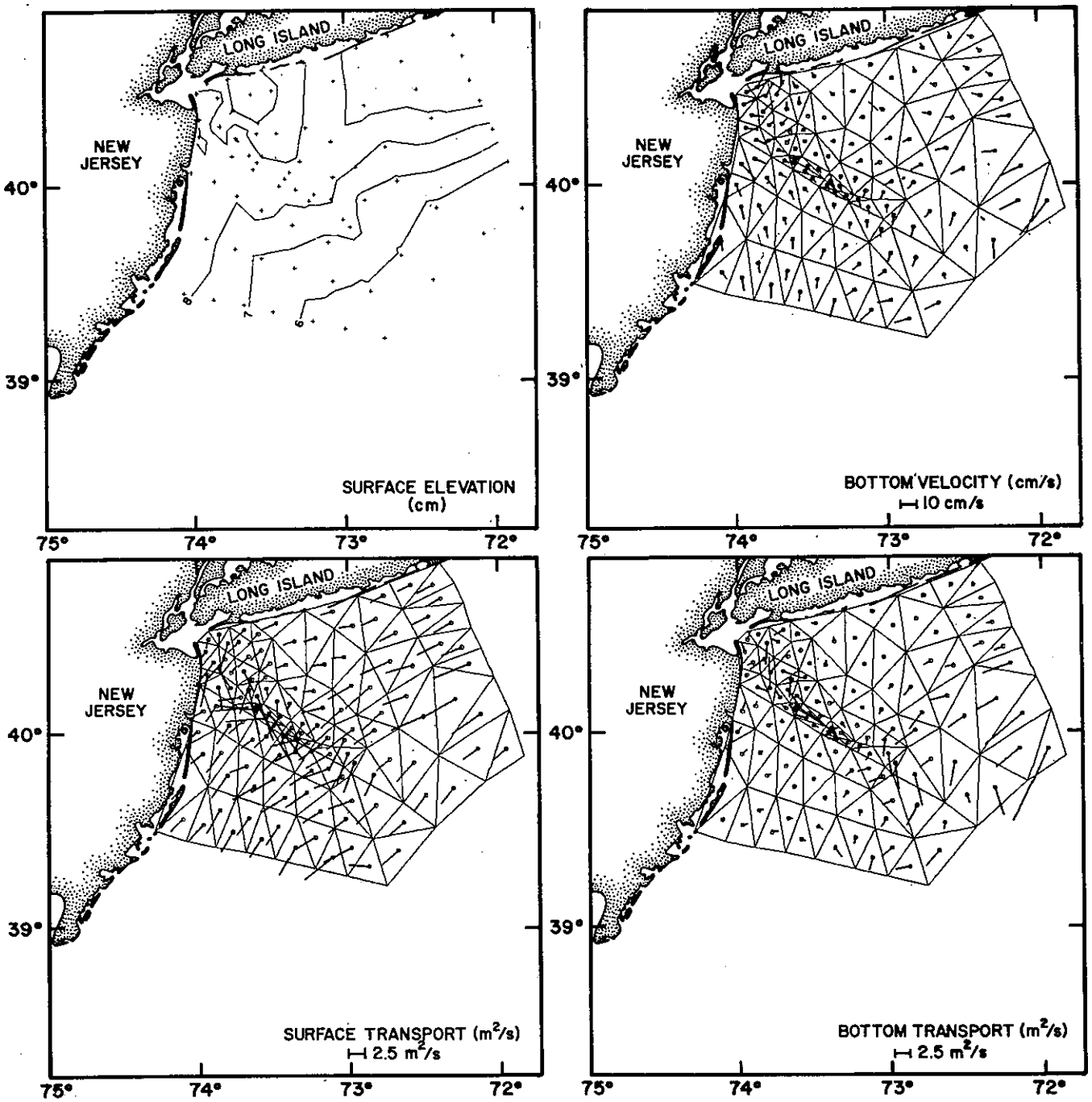

Cruise XWCC-2, modeling case 4 (Julian Day 090-095 1975).



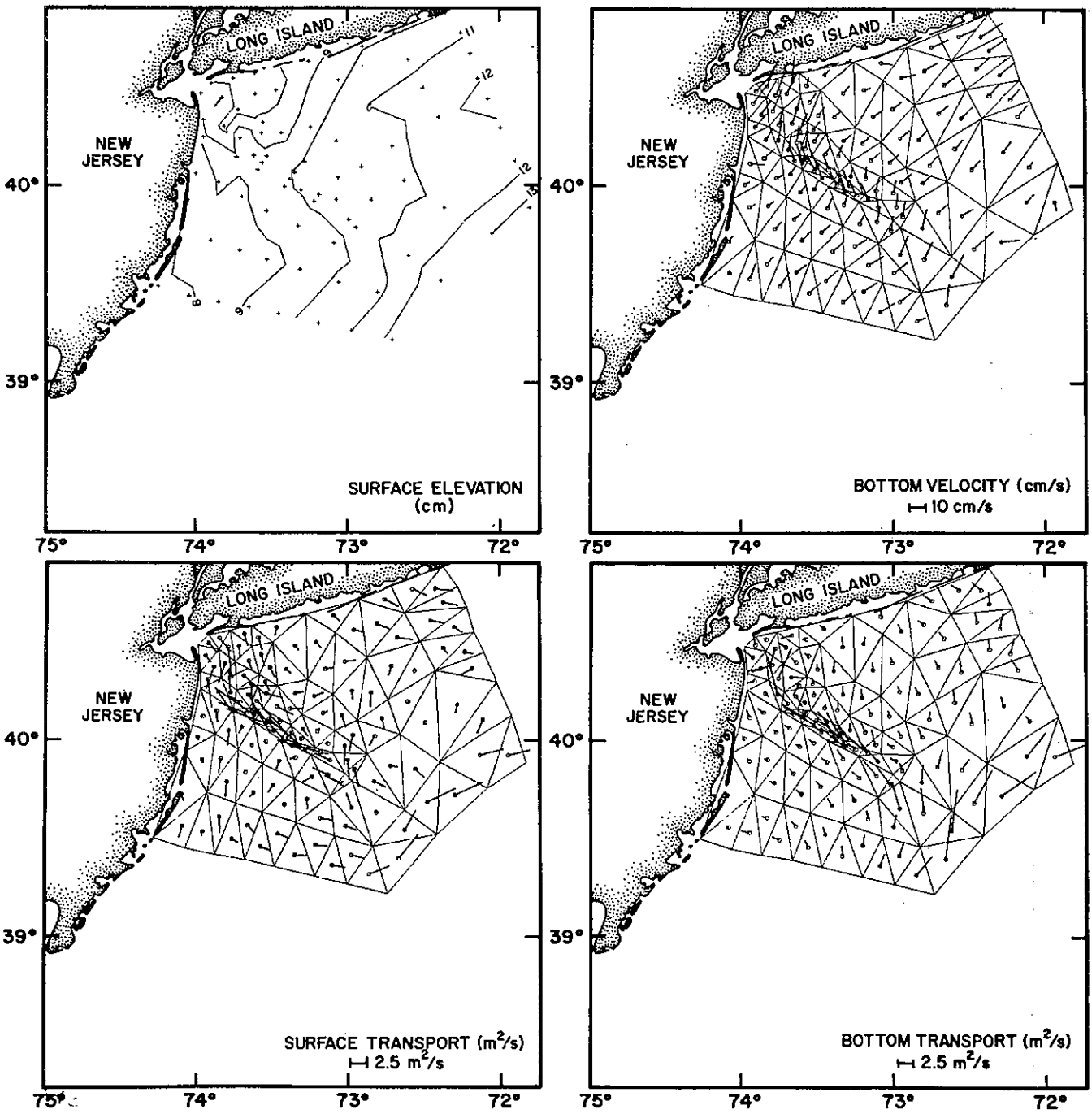

Cruise XWCC-2, modeling case 5 (Julian Day 095-109 1975).



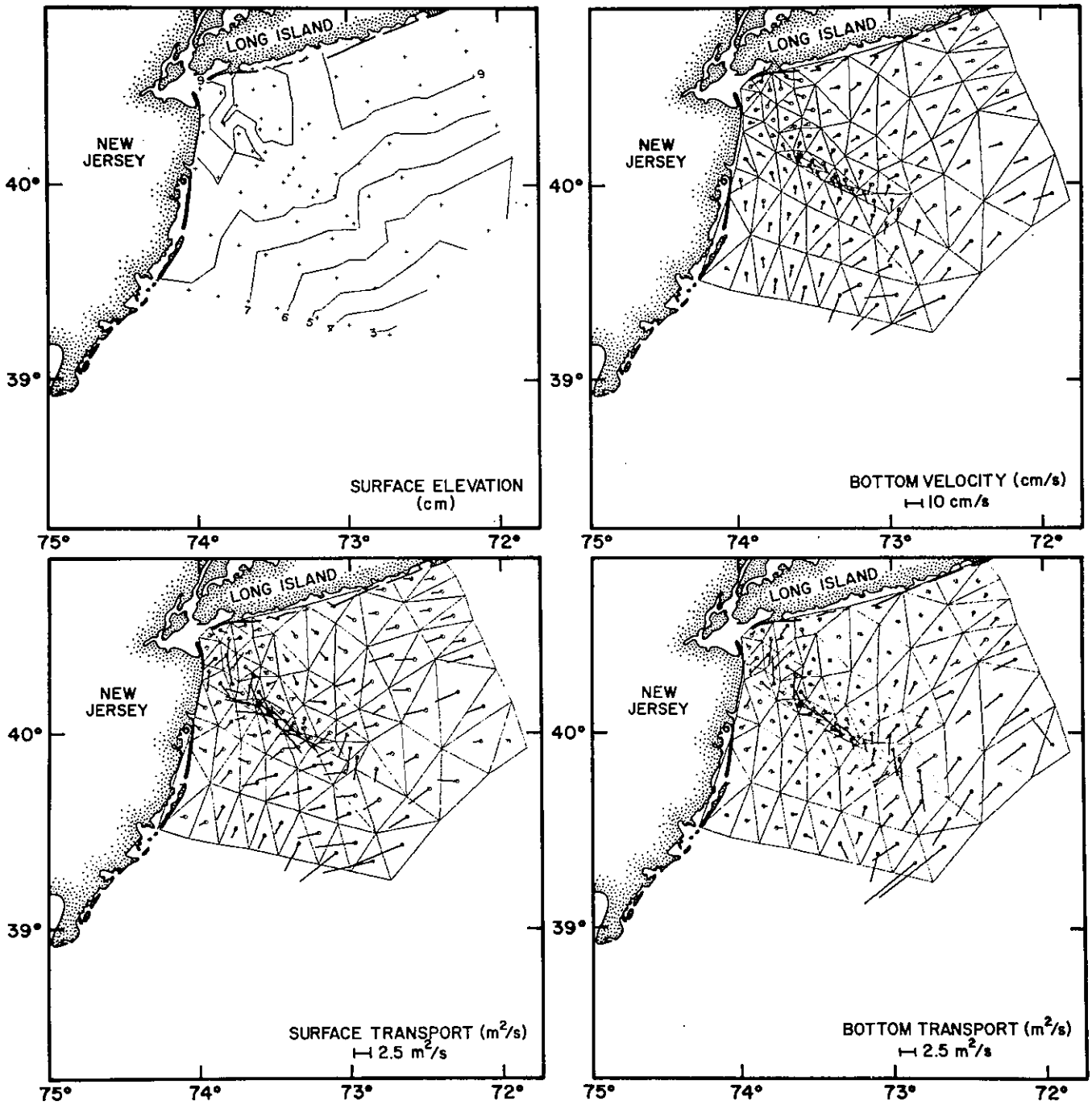

Cruise XWCC-4, modeling case 1 (Julian Day 090-095 1975).



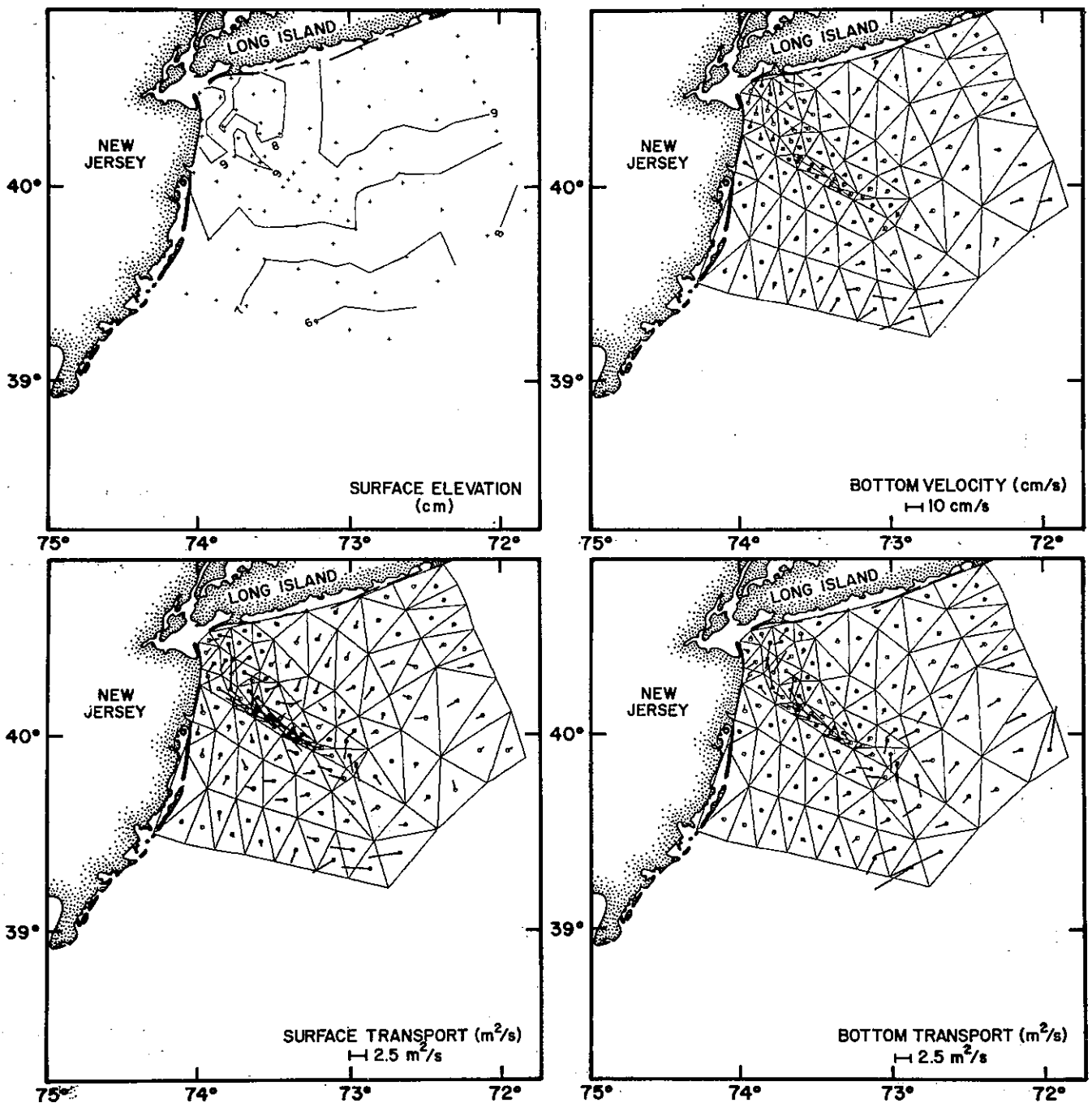

Cruise XWCC-4, modeling case 2 (Julian Day 095-109 1975).



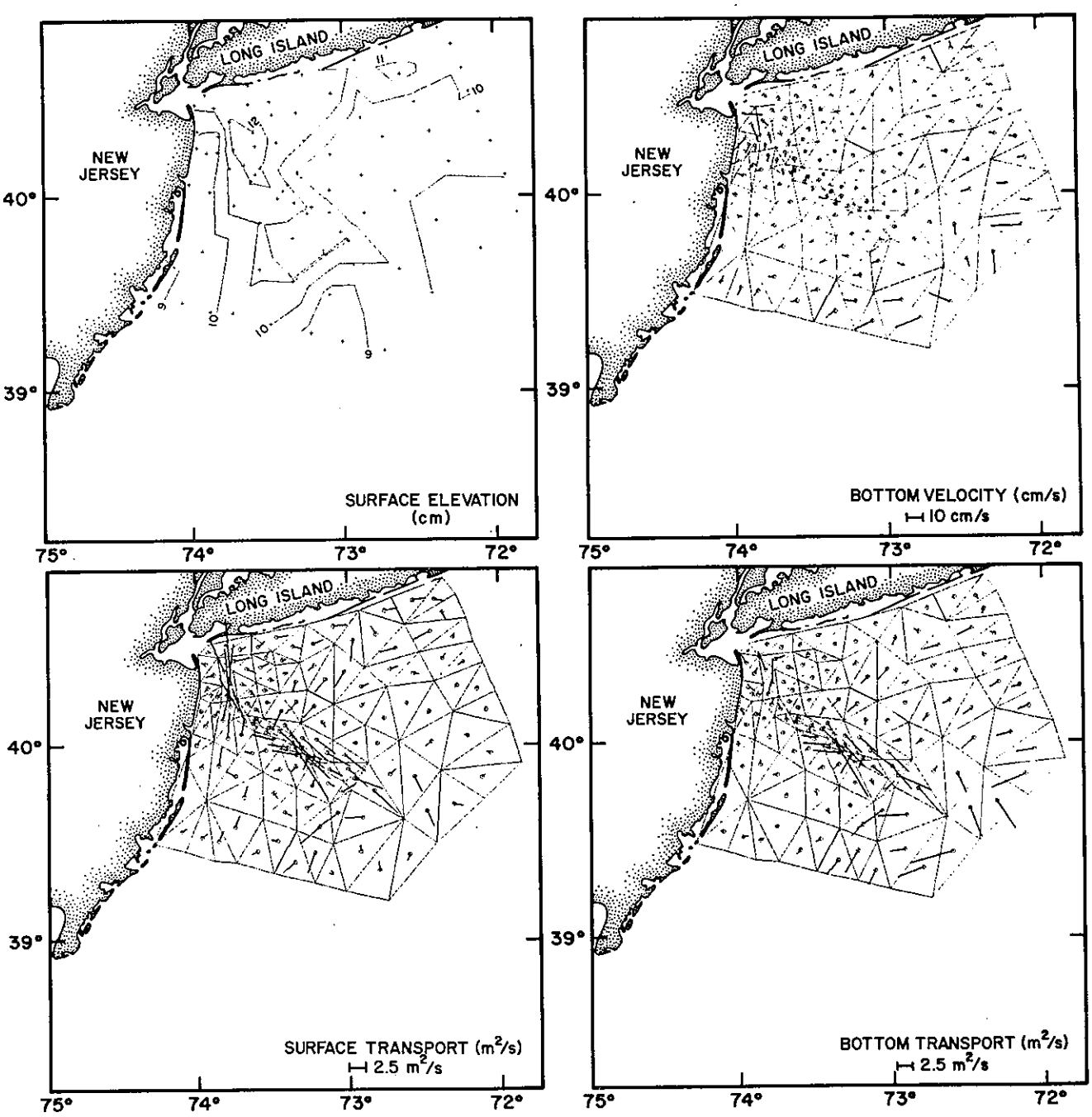

Cruise XWCC-4, modeling case 3 (Julian Day 109-115 1975).



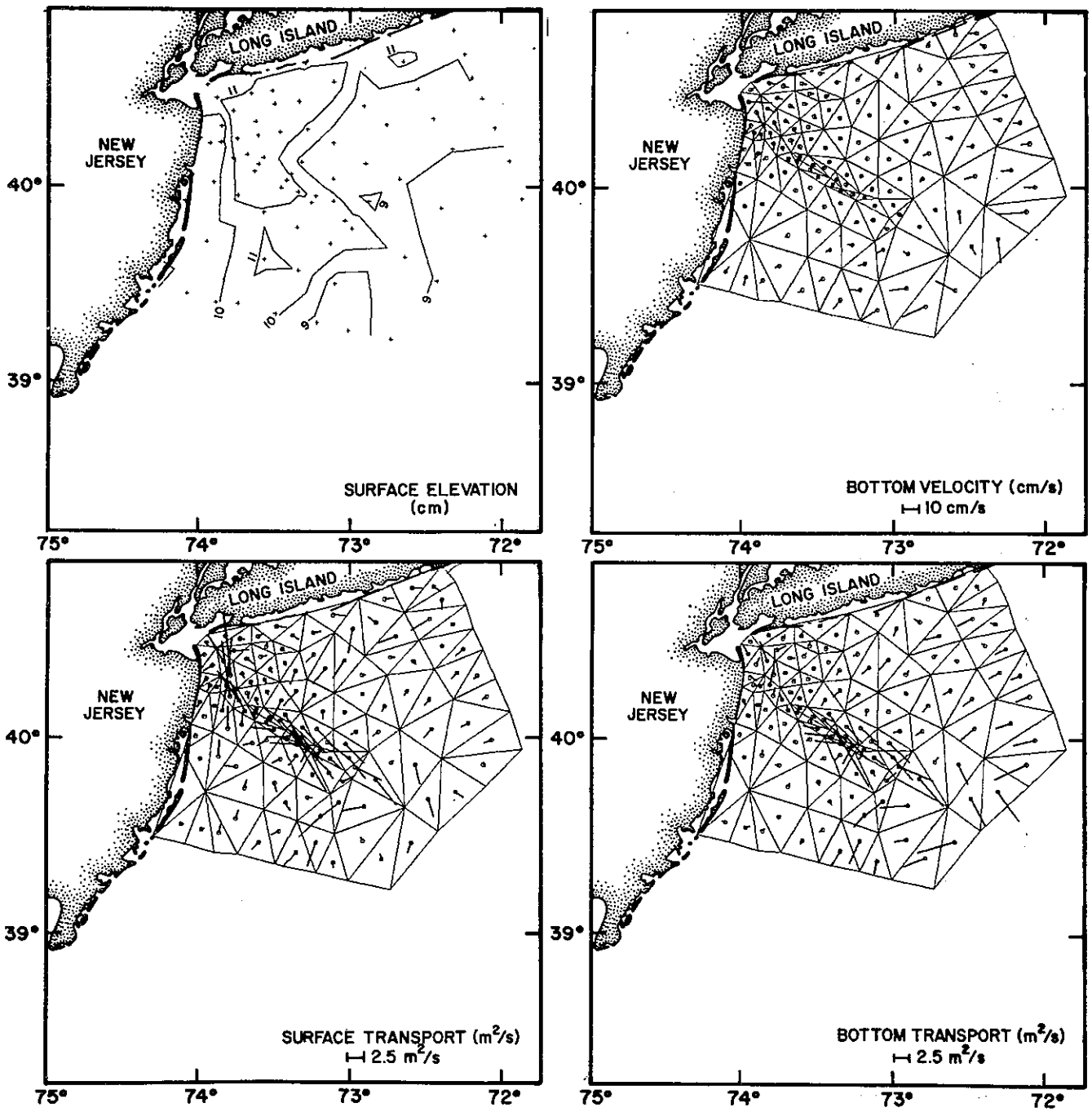

Cruise XWCC-4, modeling case 4 (Julian Day 115-127 1975).



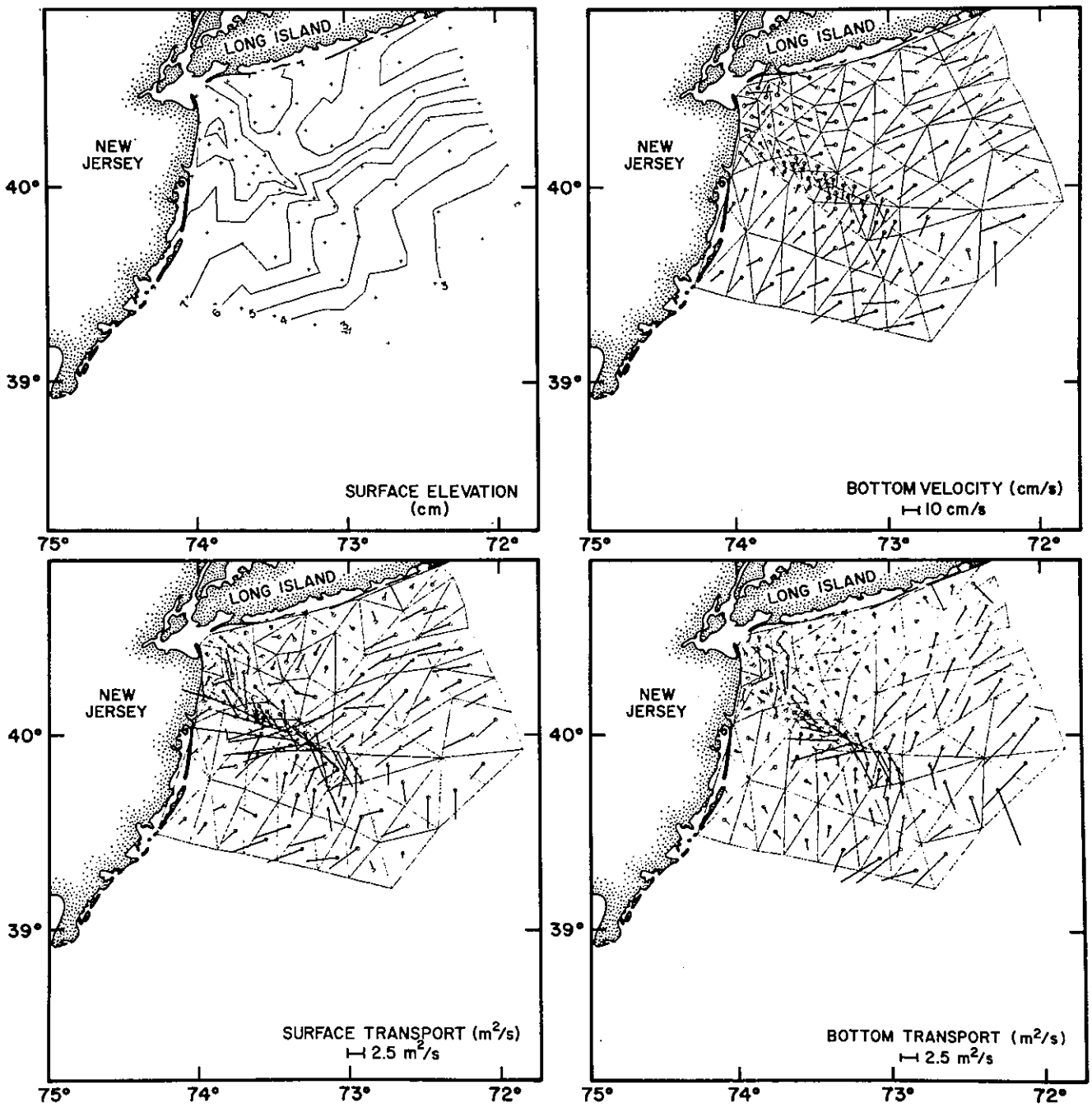

Cruise XWCC-4, modeling case 5 (Julian Day 127-150 1975).



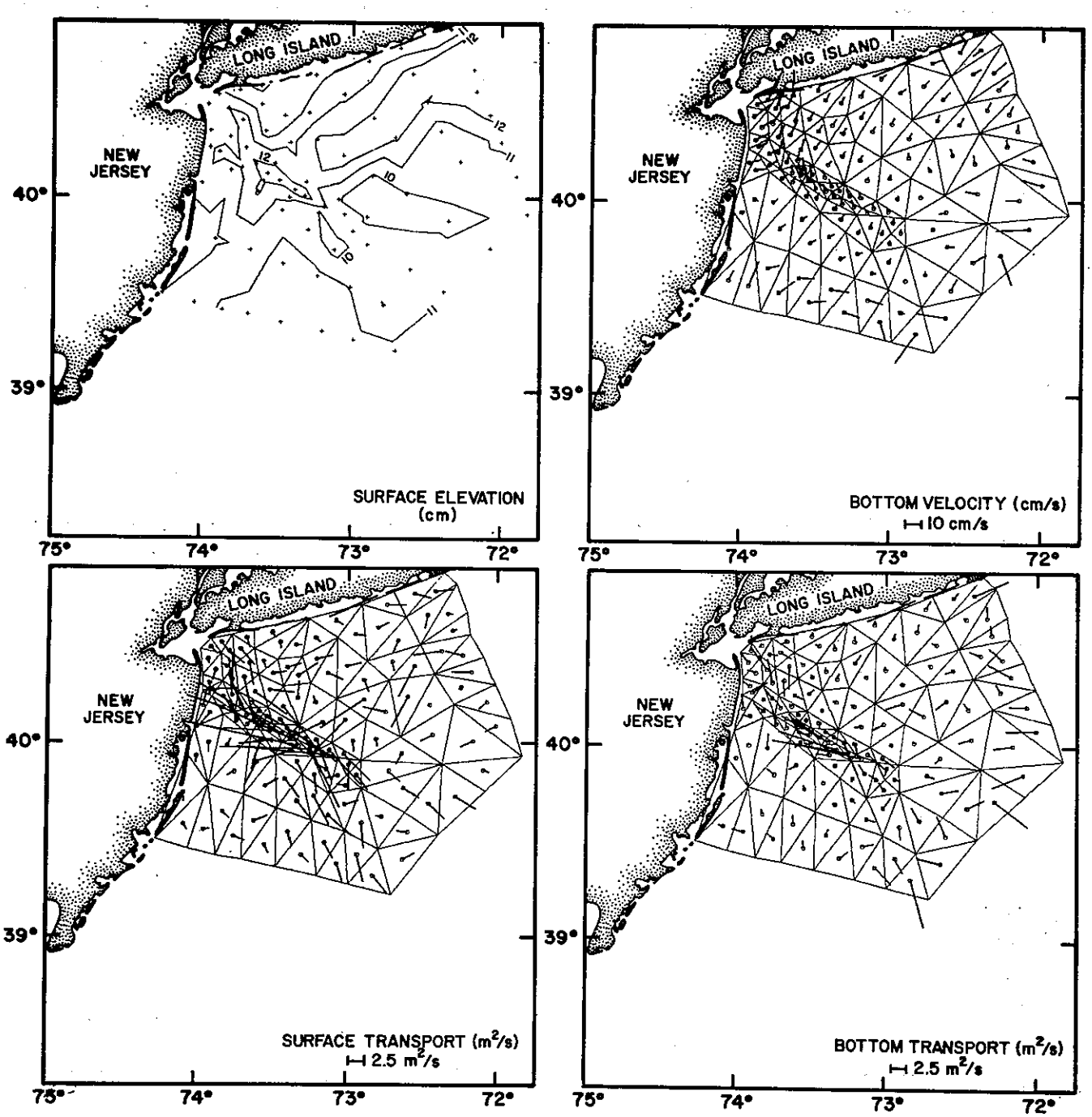

Cruise XWCC-5, modeling case 1 (Julian Day 127-150 1975).



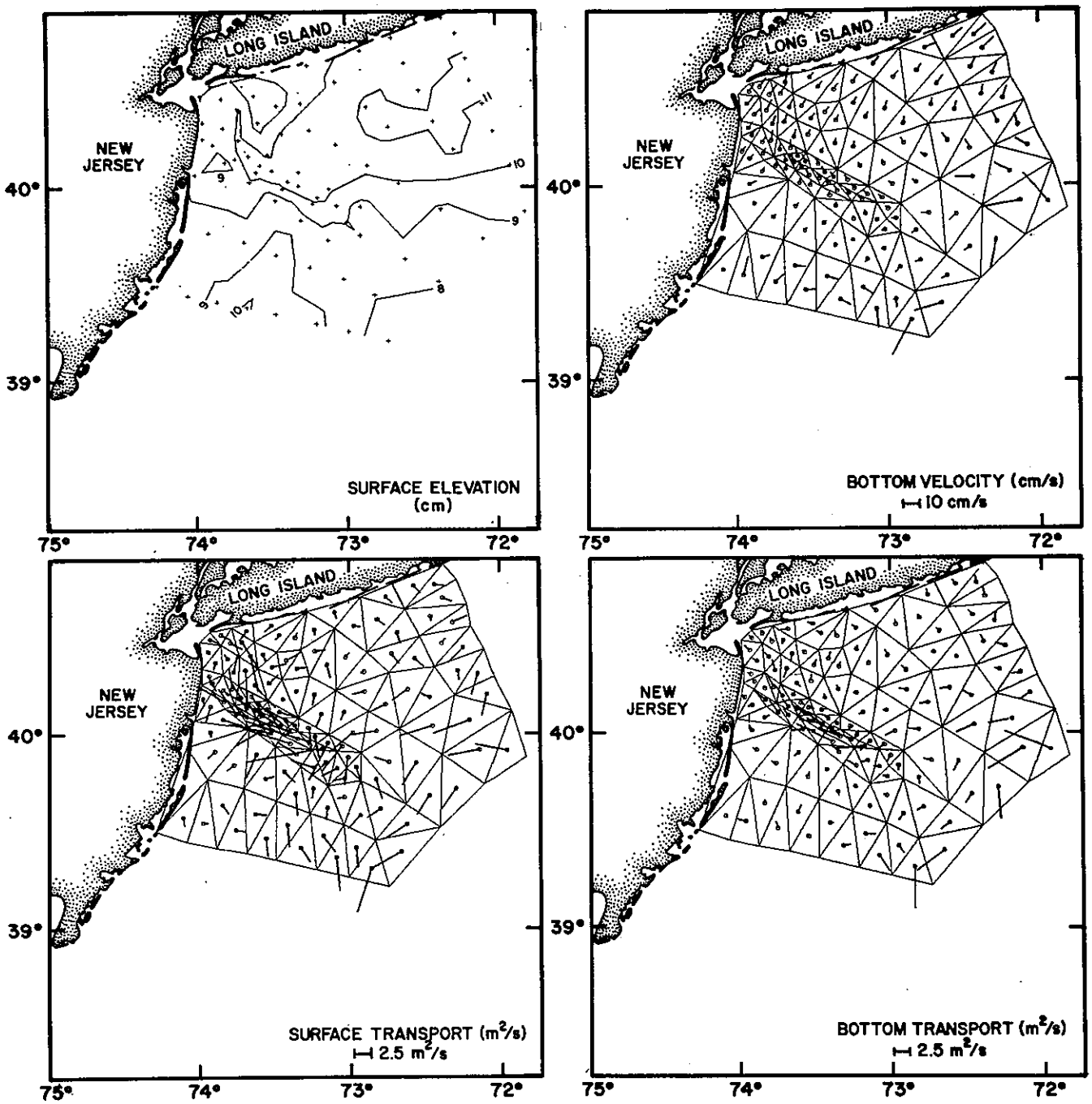

Cruise XWCC-5, modeling case 2 (Julian Day 150-168 1975).



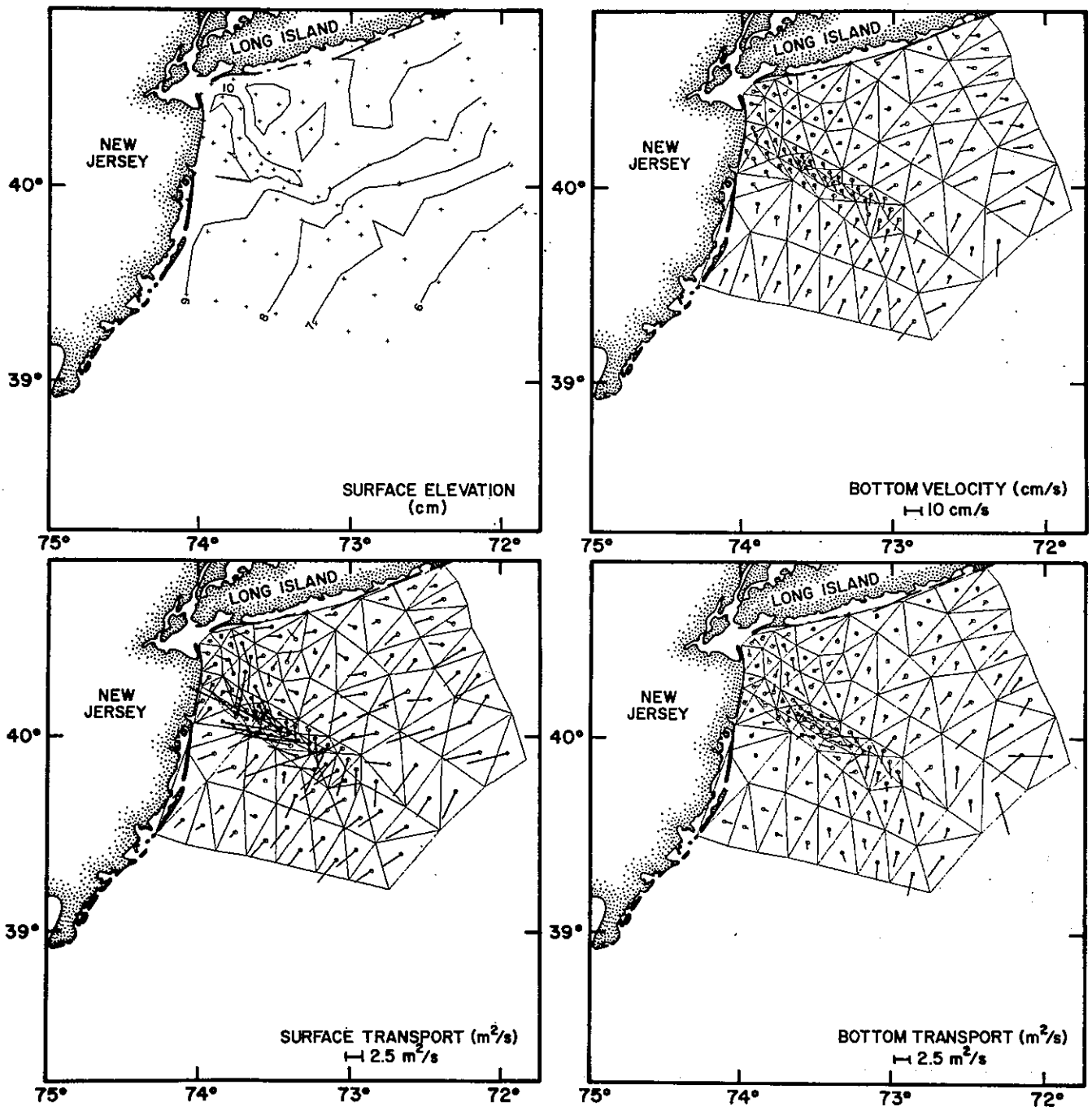

Cruise XWCC-6, modeling case 1 (Julian Day 280-305 1975).



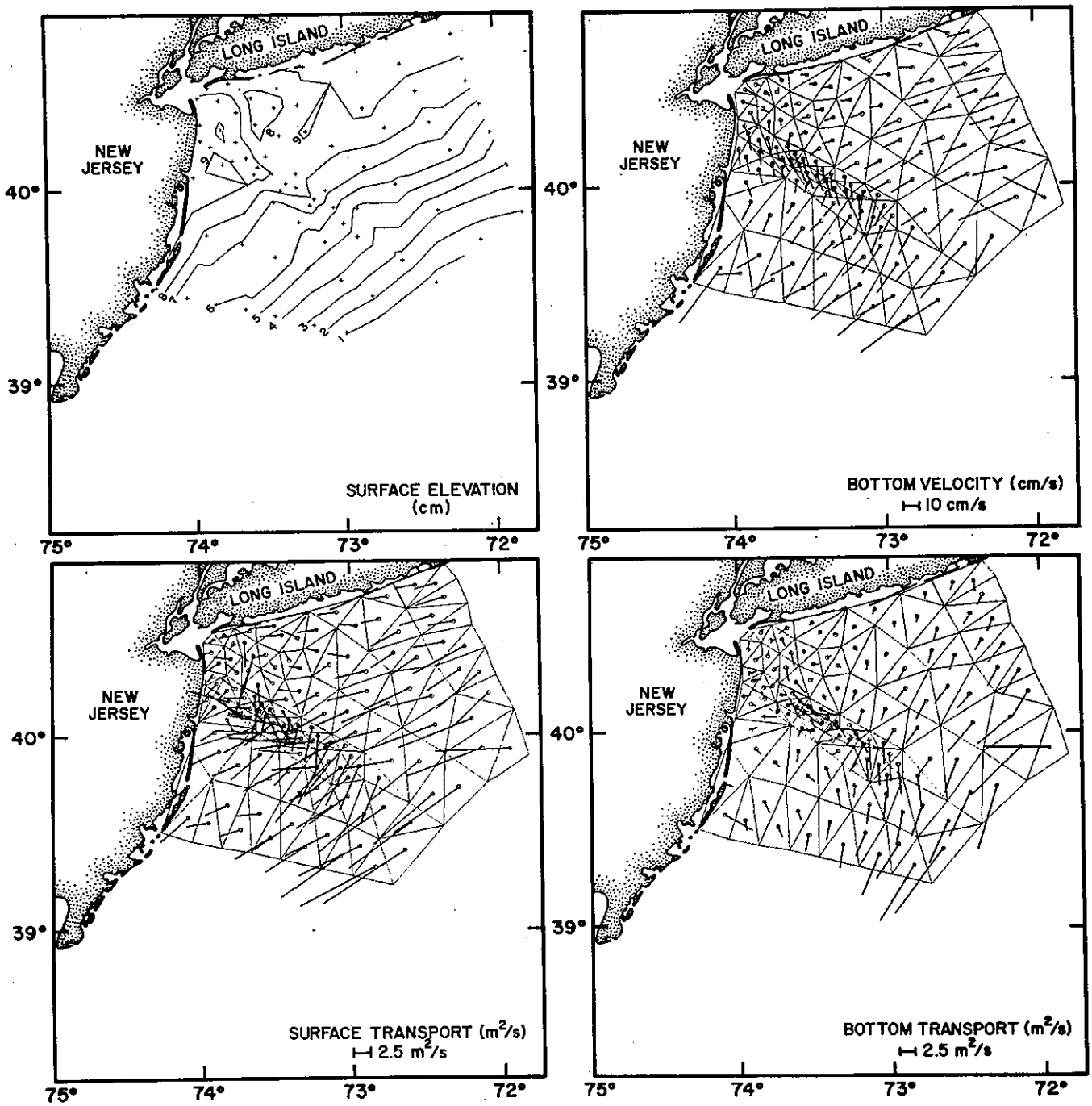

Cruise XWCC-6, modeling case 2 (Julian Day 305-328 1975).



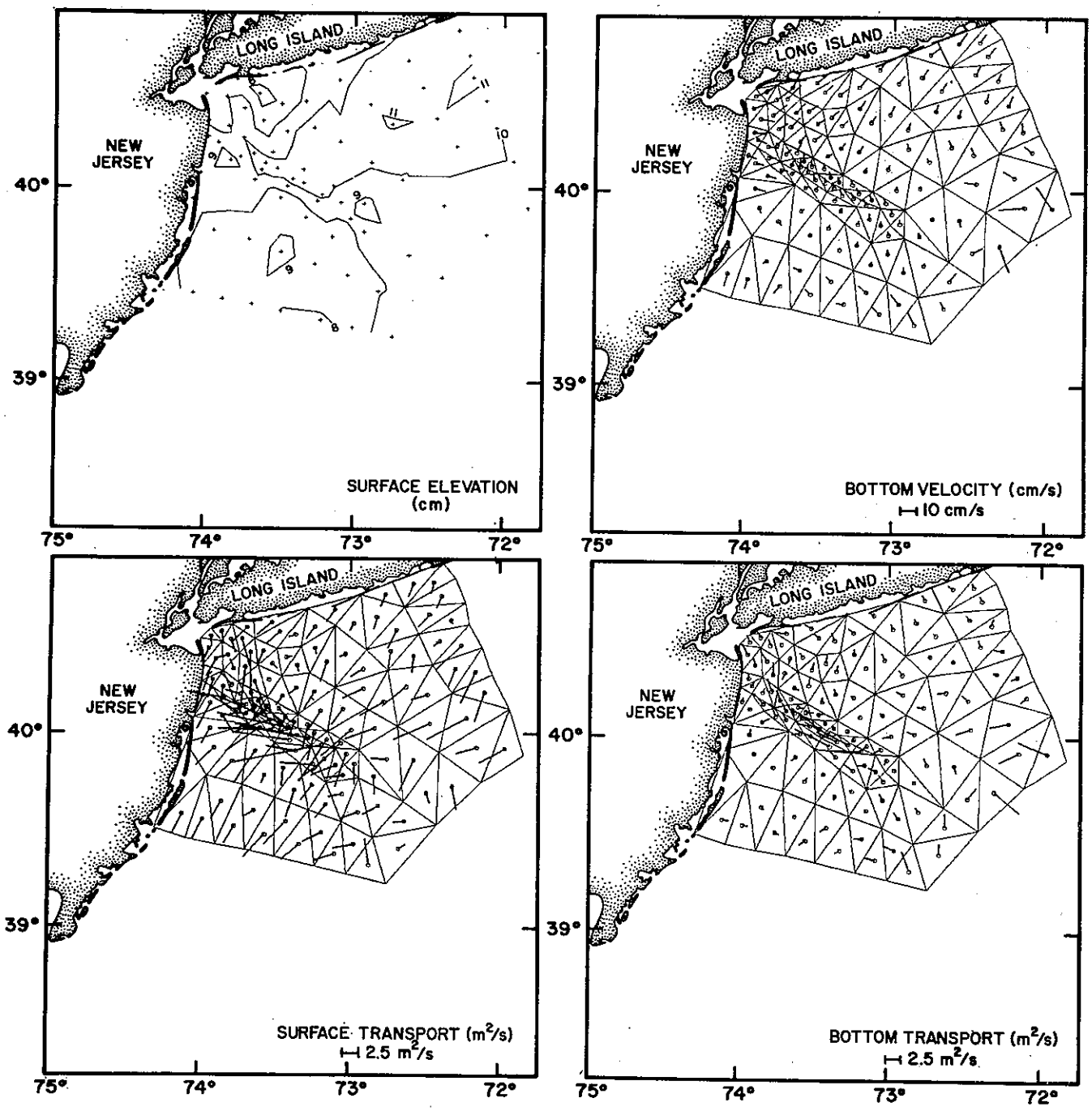

Cruise XWCC-7, modeling case 1 (Julian Day 305-328 1975).



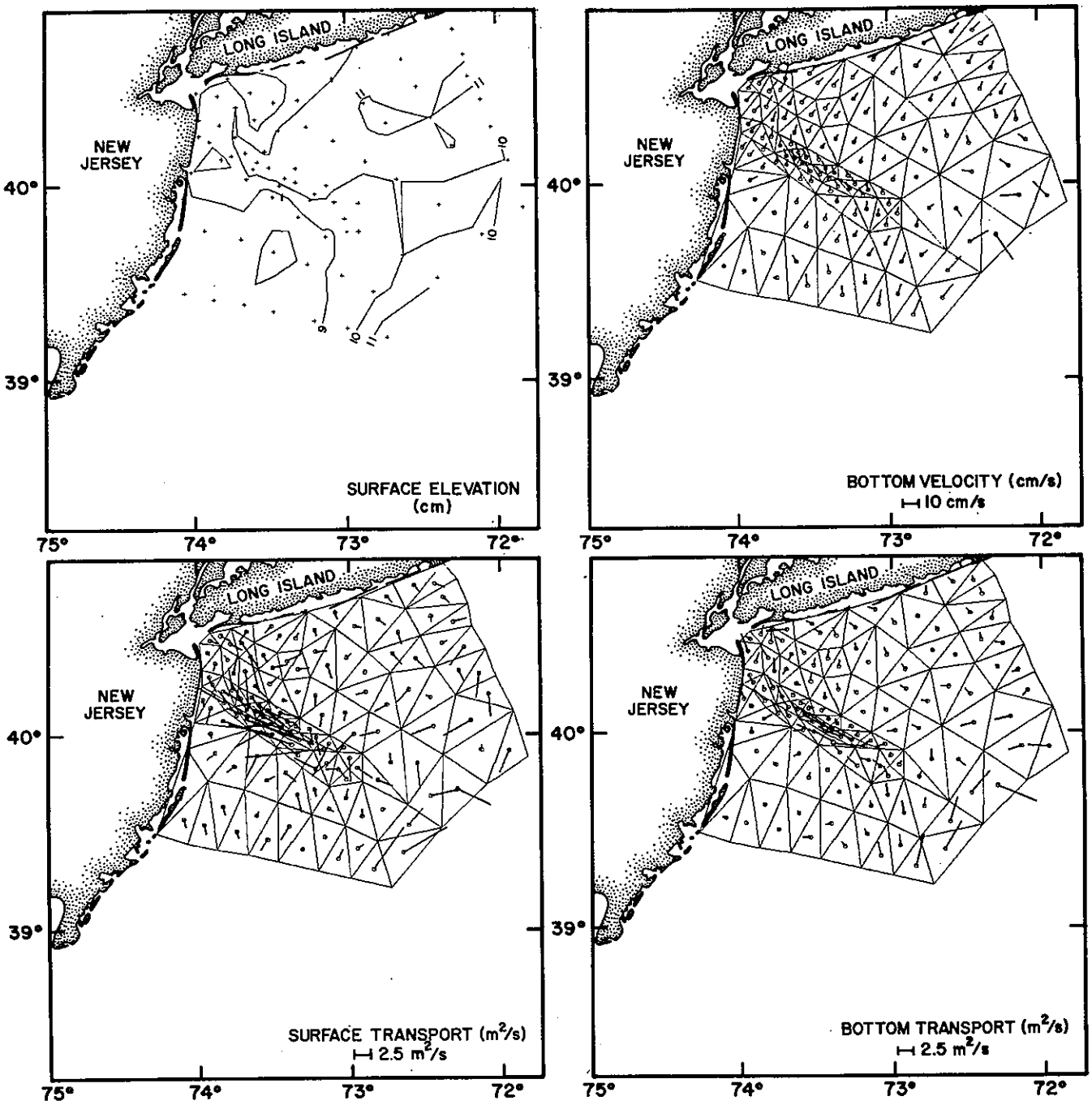

Cruise XWCC-7, modeling cruise 2 (Julian Day 328-354 1975).



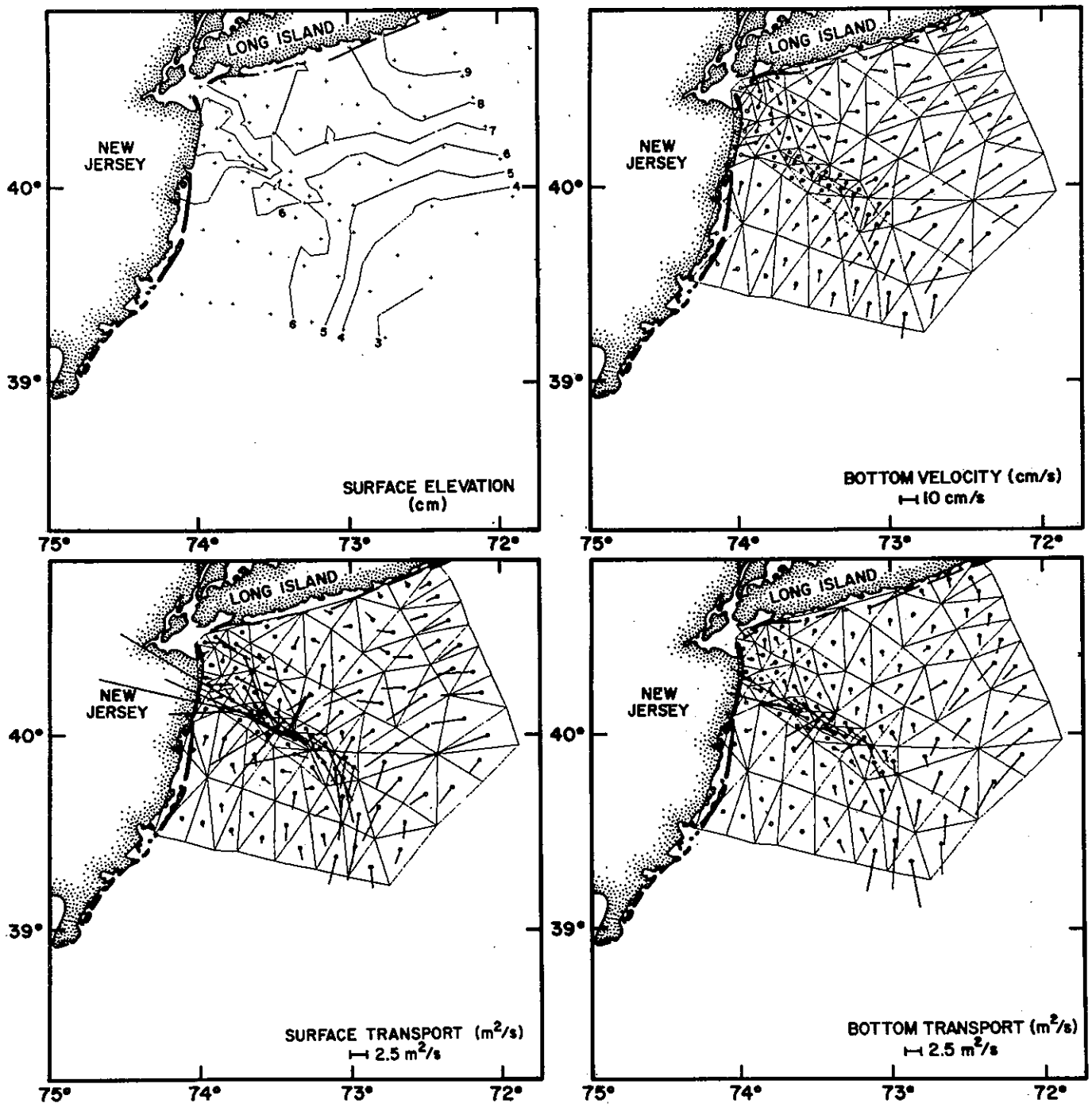

Cruise XWCC-7, modeling case 3 (Julian Day 354-002 1975-6).



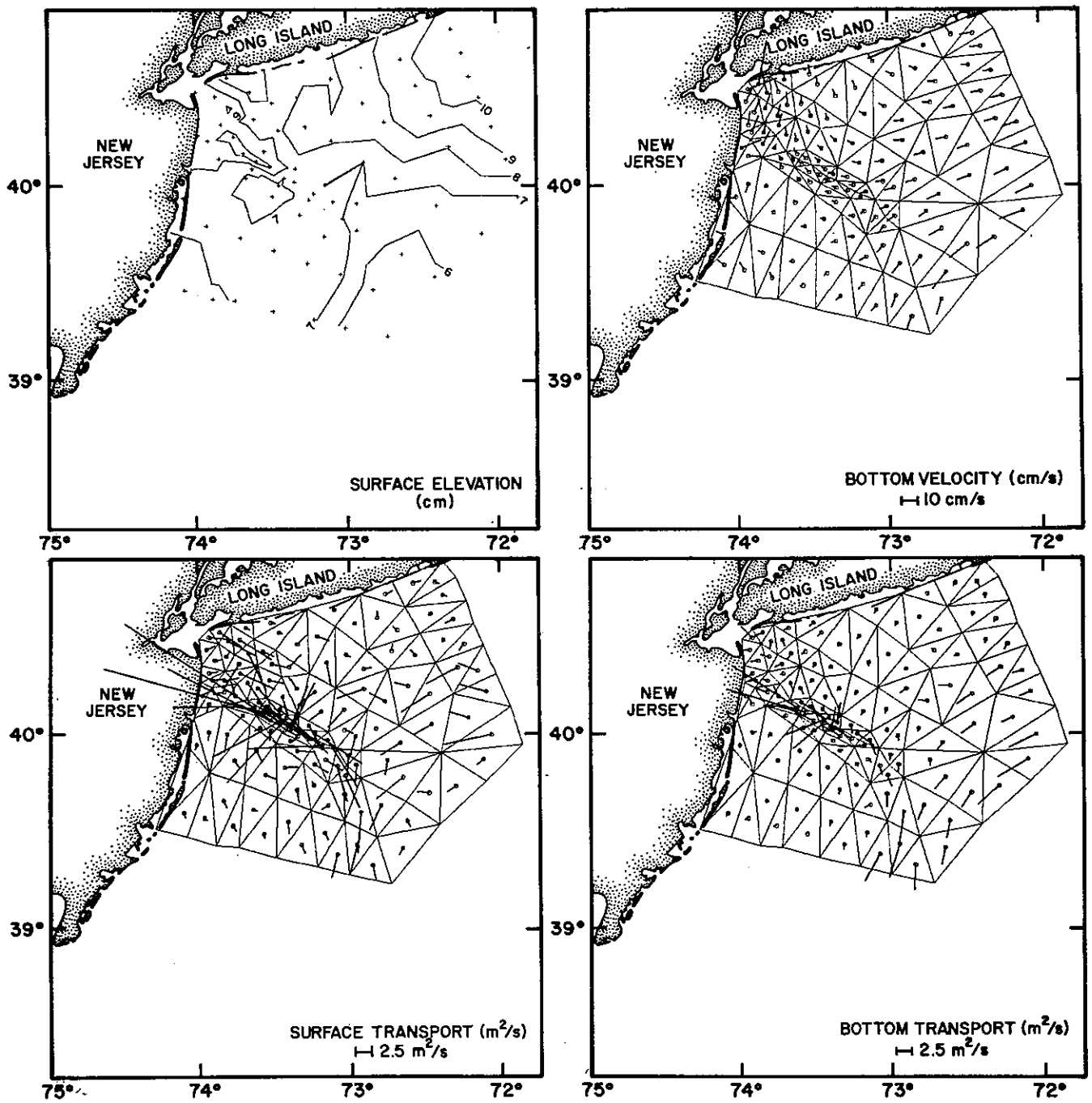

Cruise XWCC-7, modeling case 4 (Julian Day 002-023 1976).



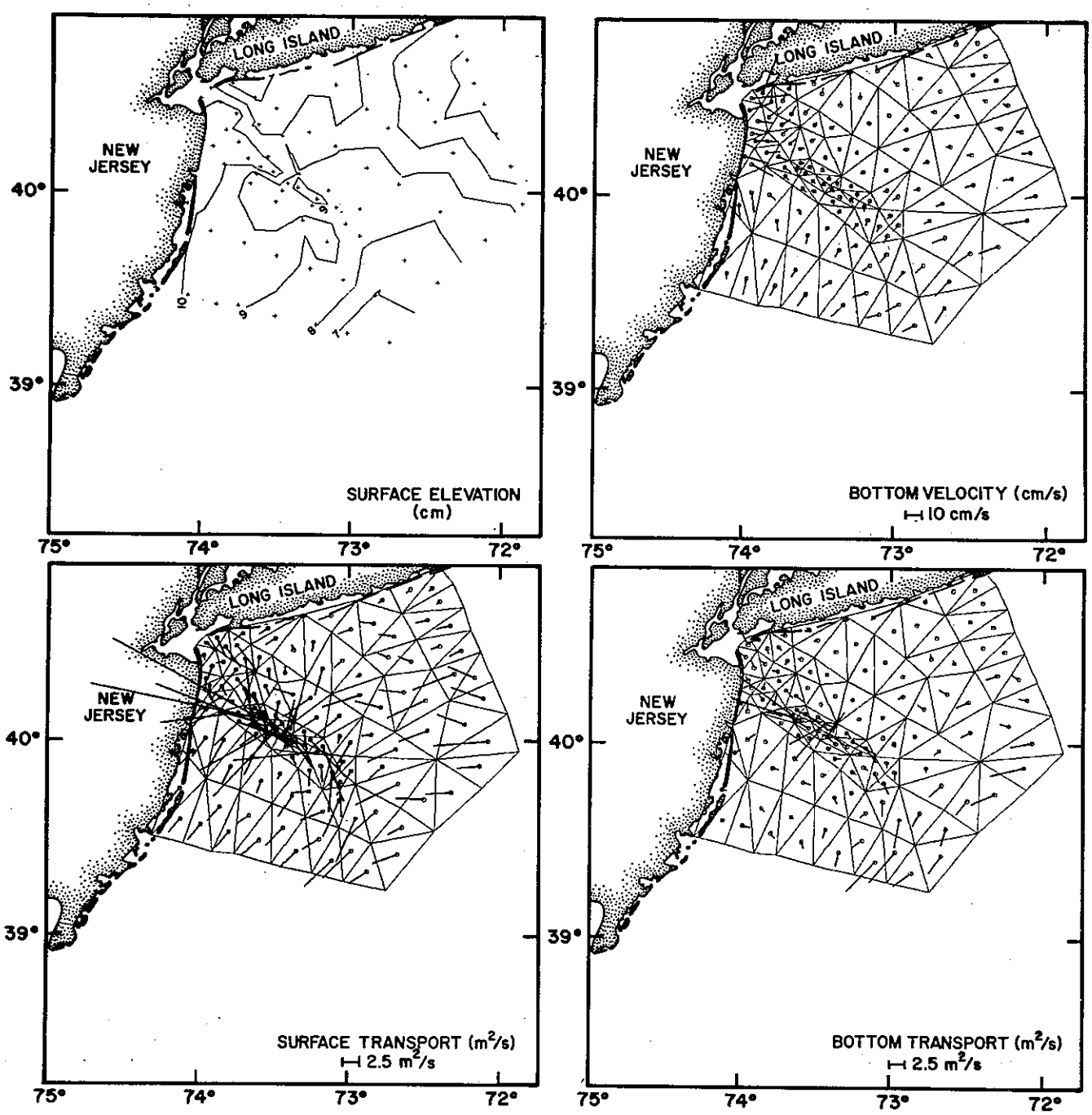

Cruise XWCC-7, modeling case 5 (Julian Day 023-052 1976).



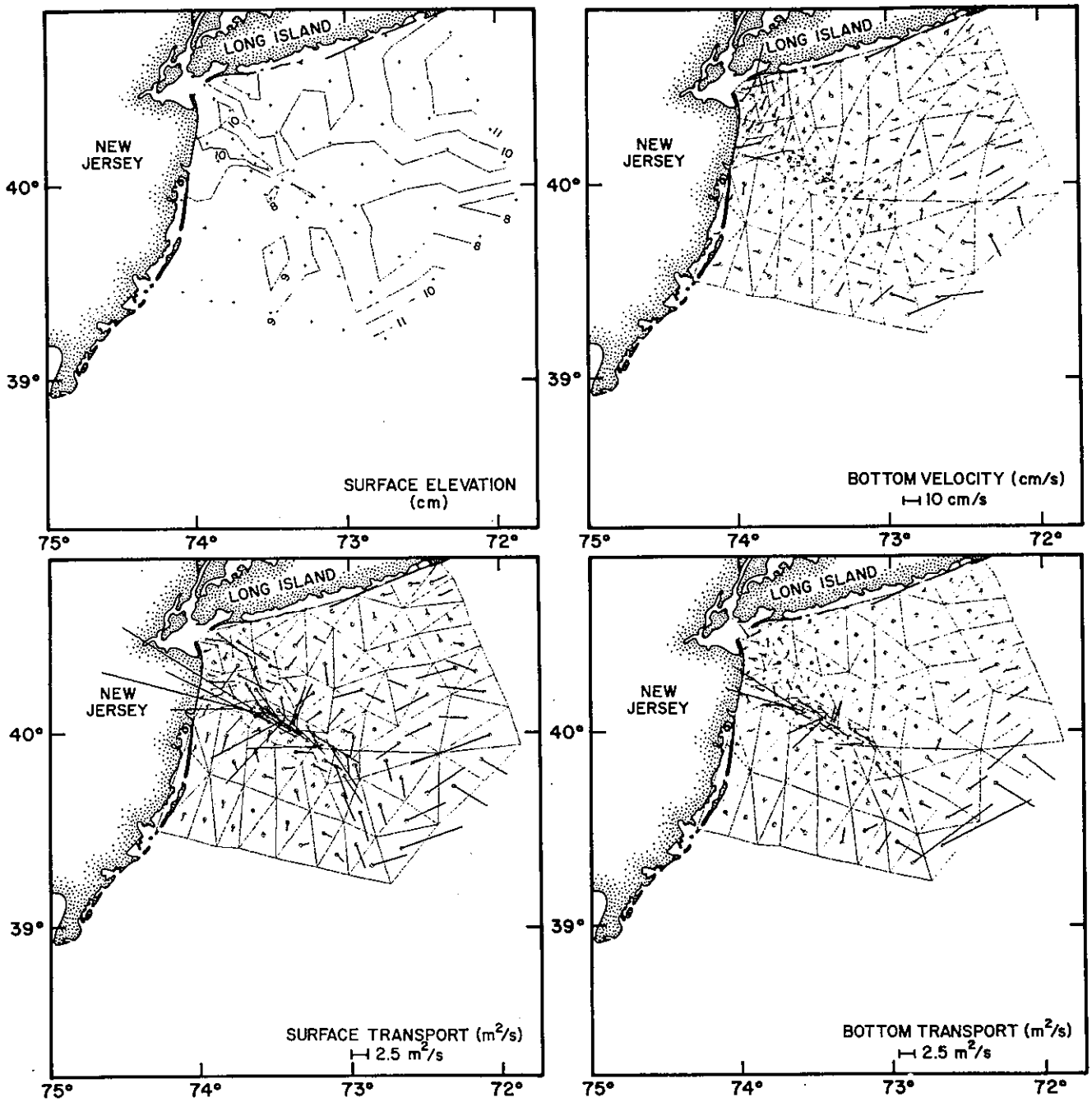

Cruise XWCC-8, modeling case 1 (Julian Day 052-076 1976).



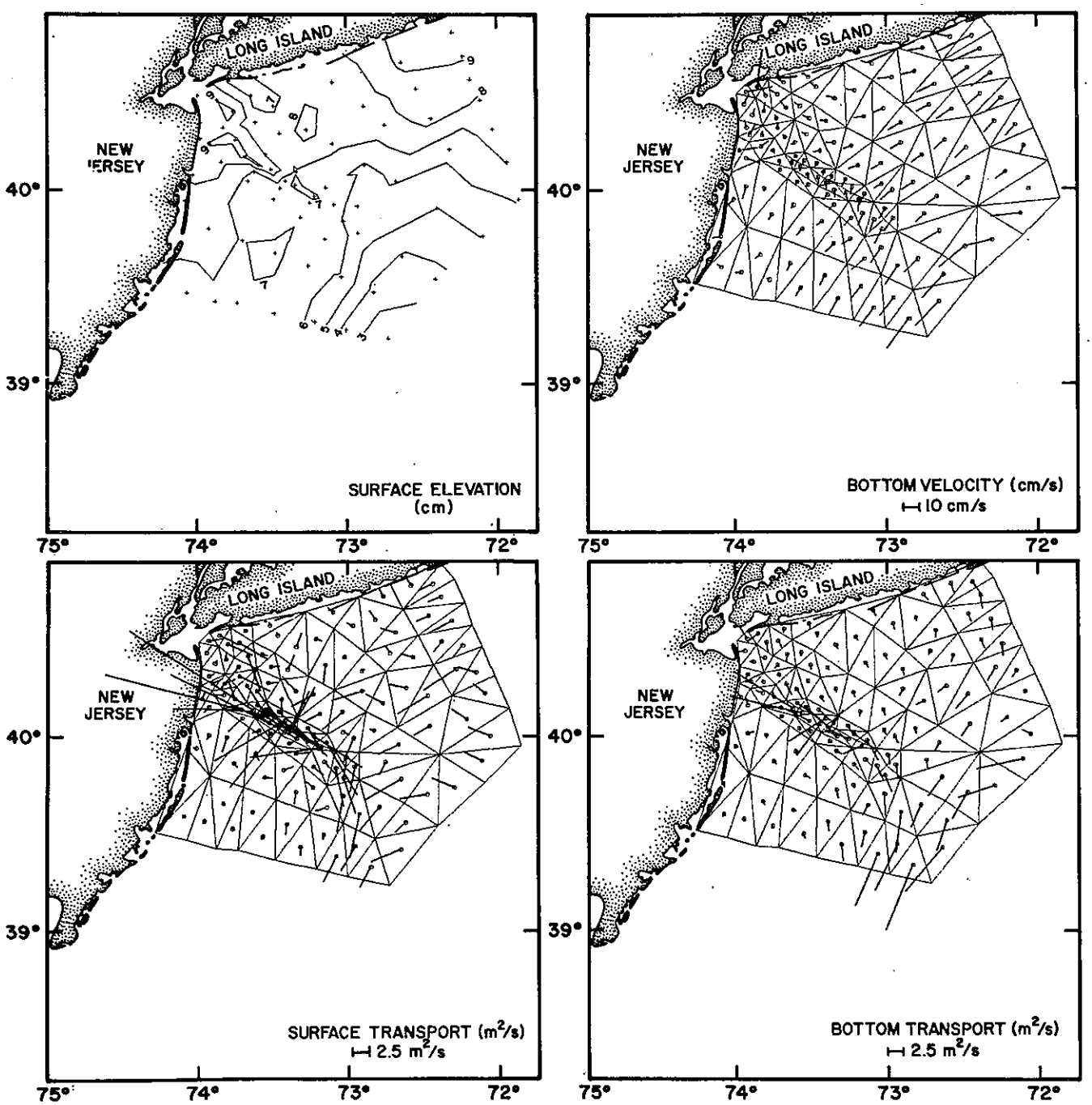

Cruise XWCC-8, modeling case 2 (Julian Day 076-094 1976).



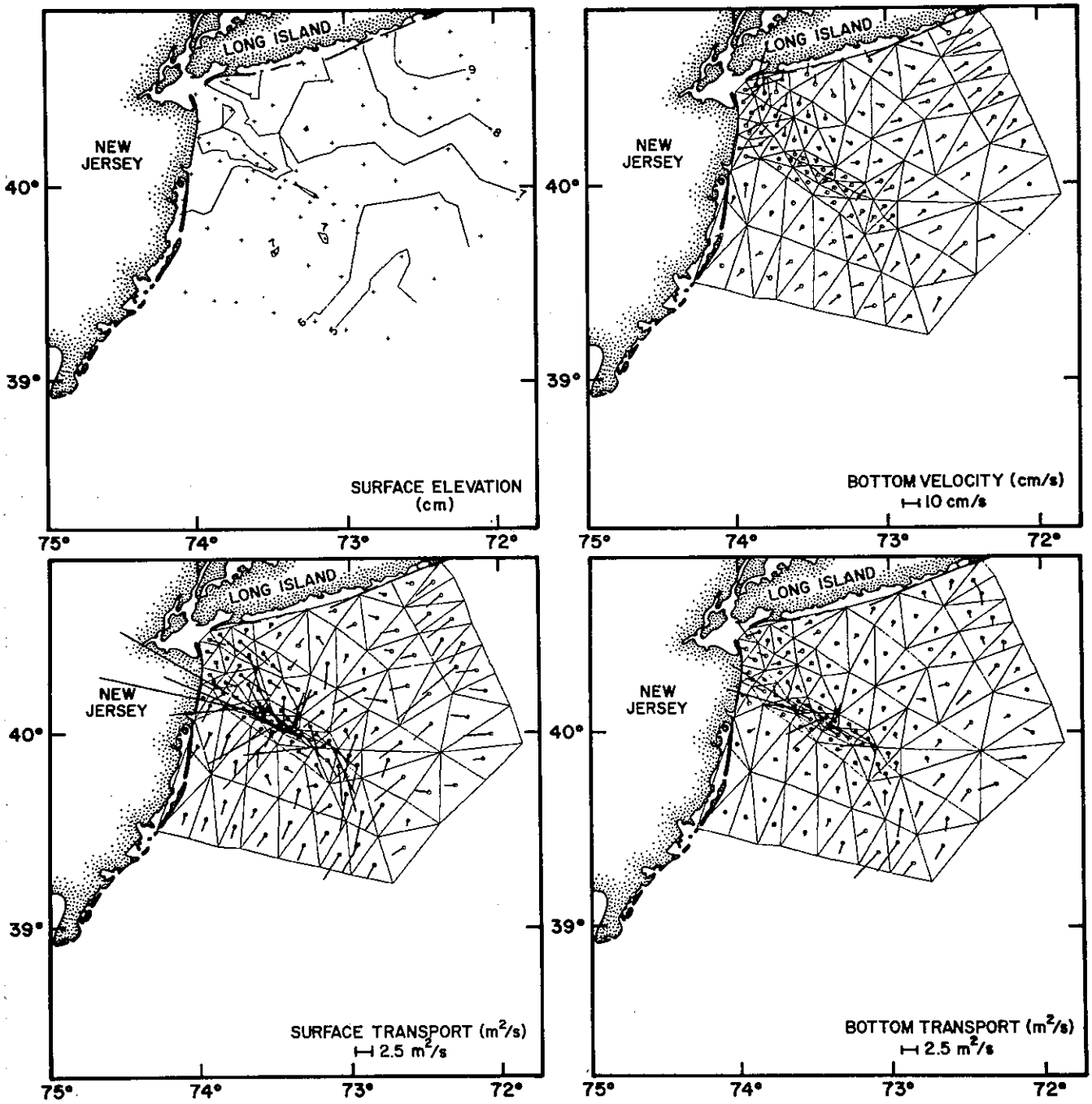

Cruise XWCC-8, modeling case 3 (Julian Day 094-104 1976).



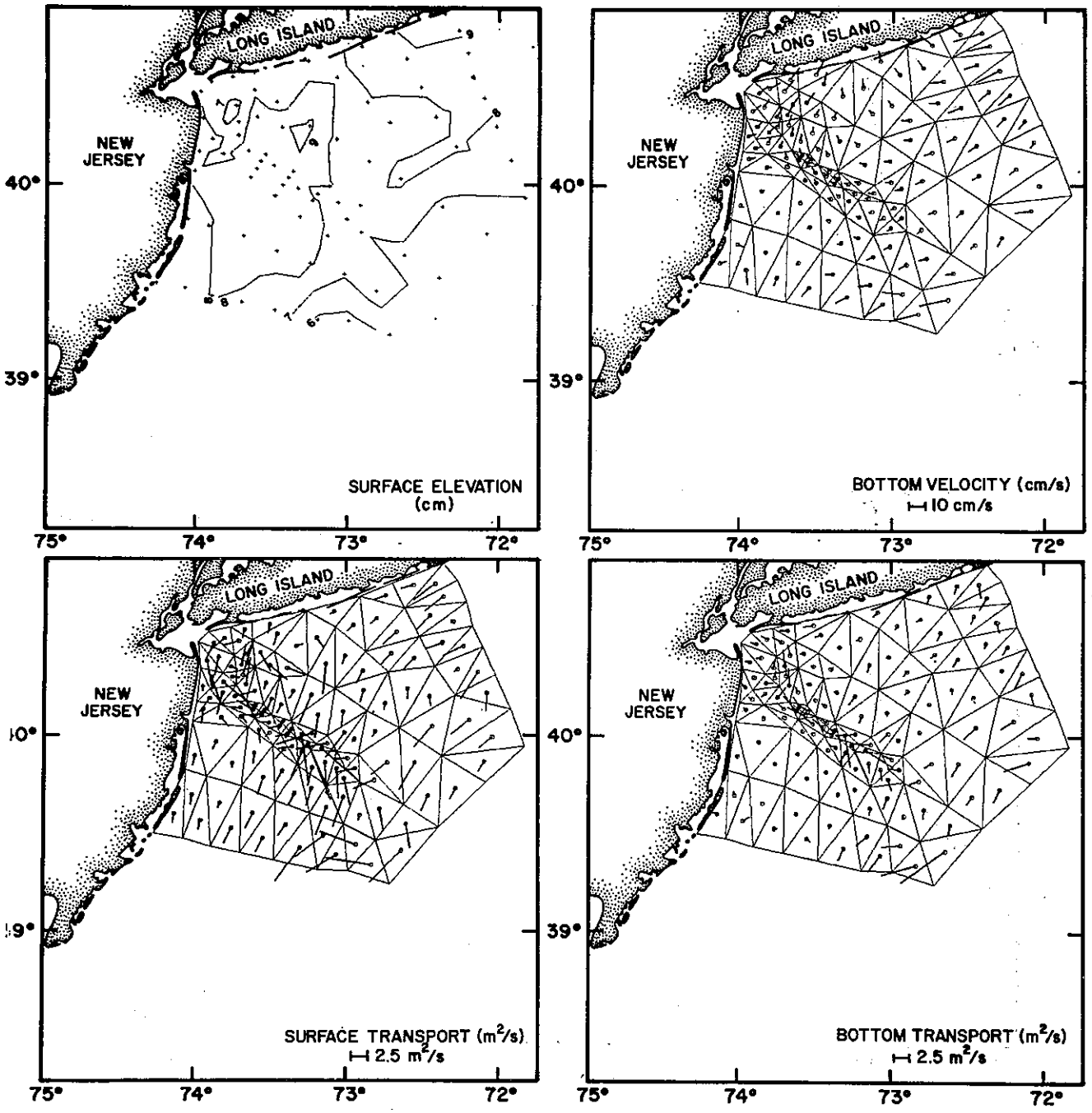

Cruise XWCC-8, modeling case 4 (Julian Day 104-110 1976).



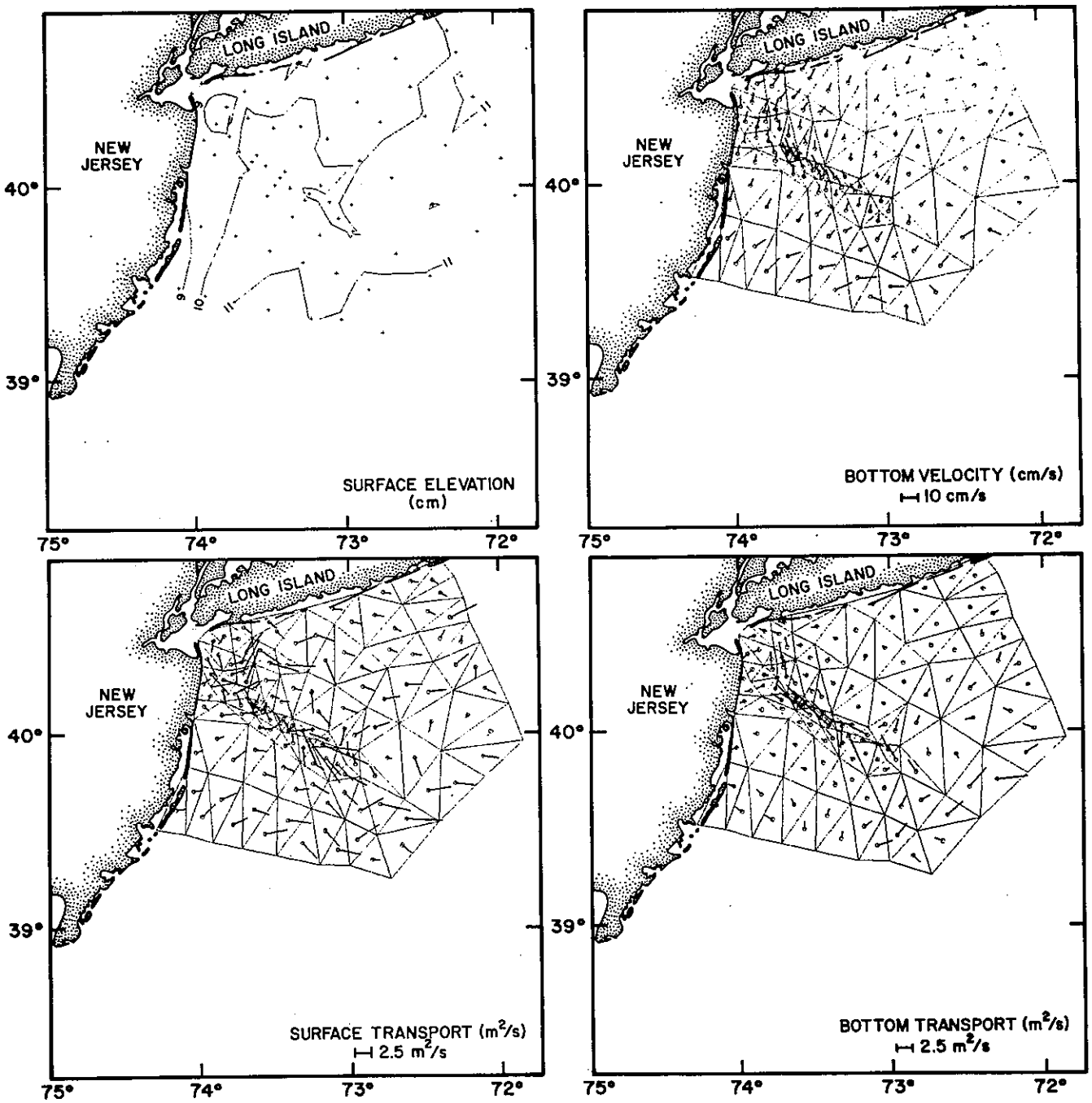

Cruise XWCC-8, modeling case 5 (Julian Day 110-117 1976).



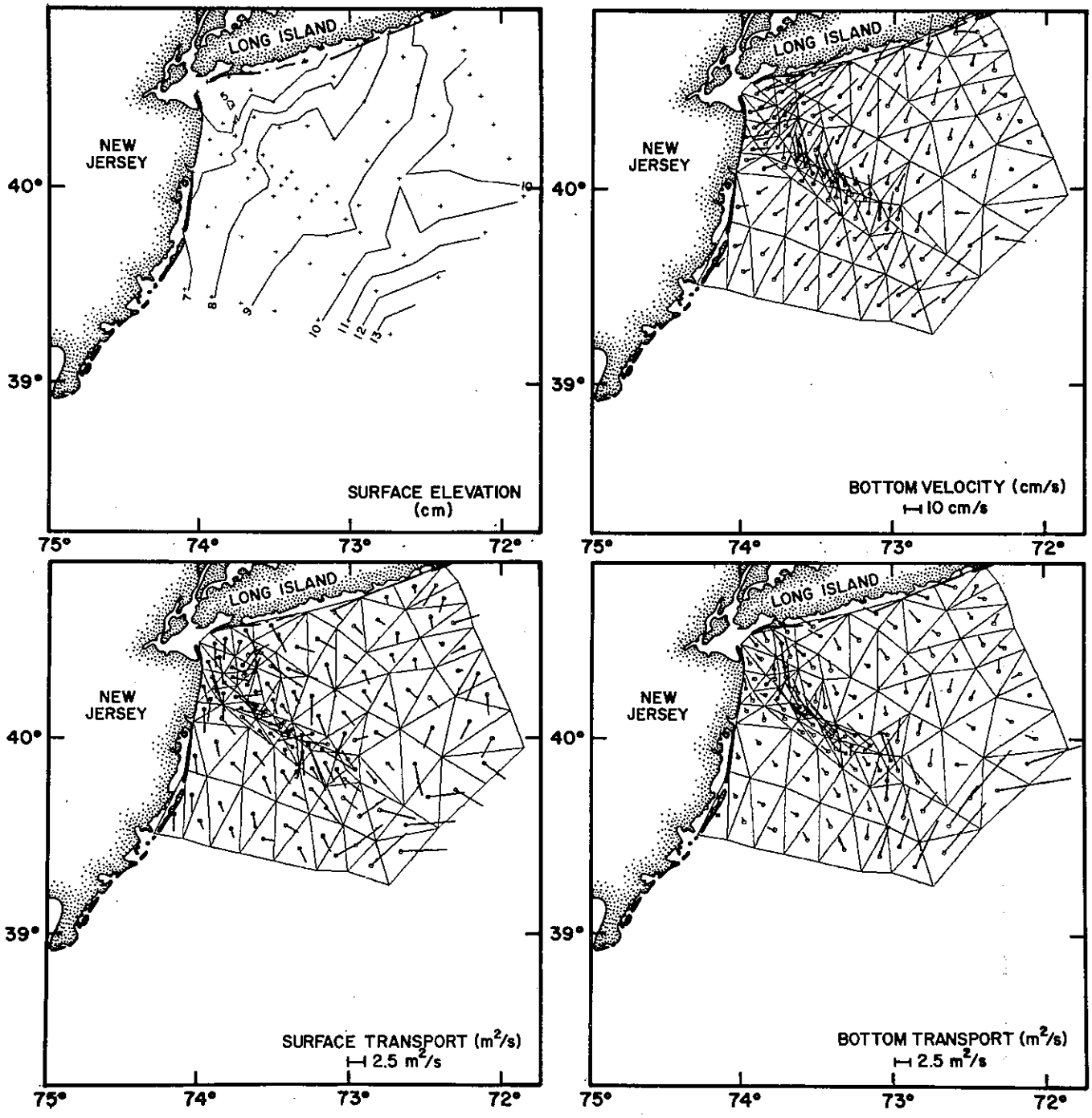

Cruise XWCC-8, modeling case 6 (Julian Day 117-125 1976).



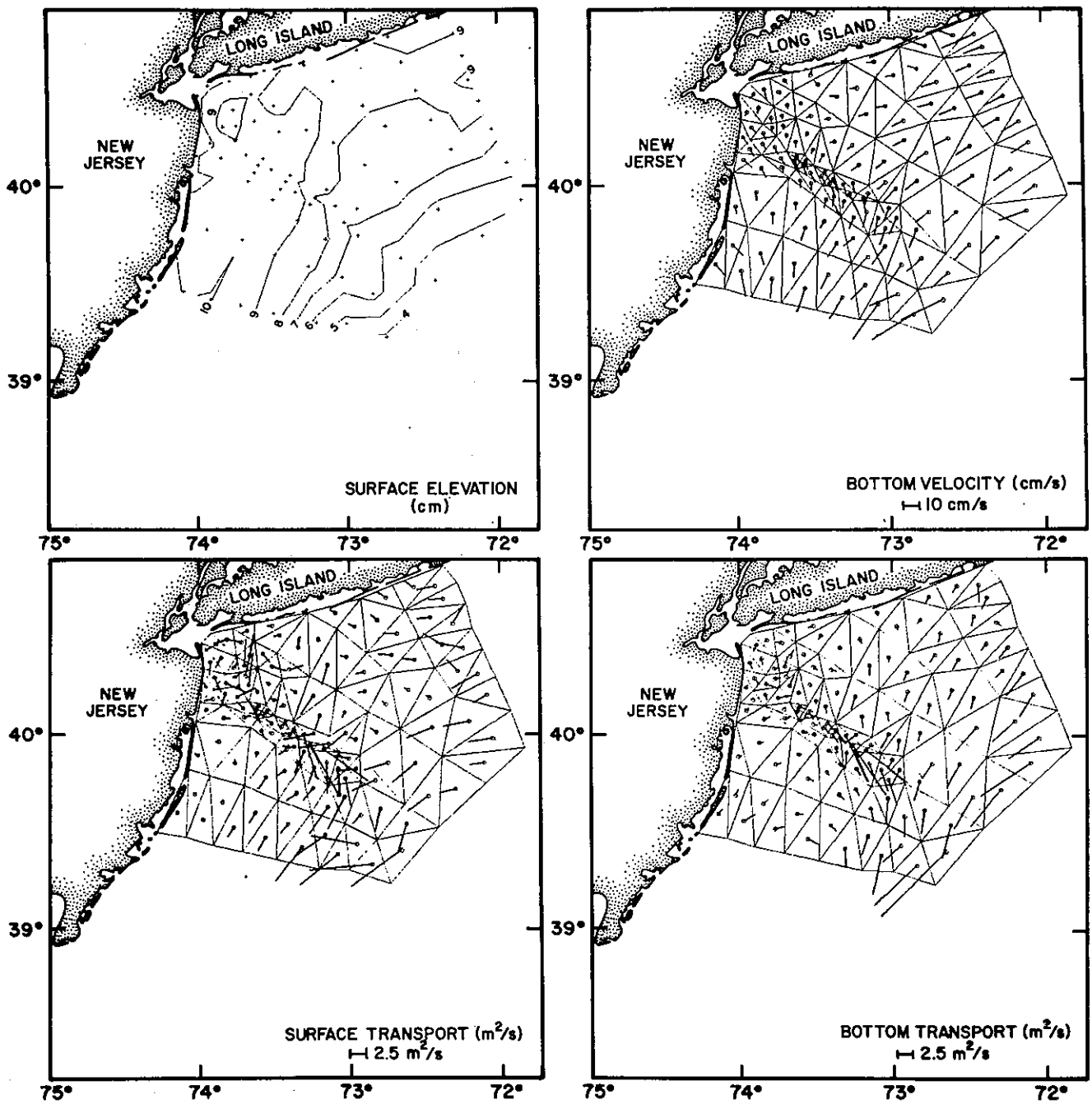

Cruise XWCC-9, modeling case 1 (Julian Day 117-125 1976).



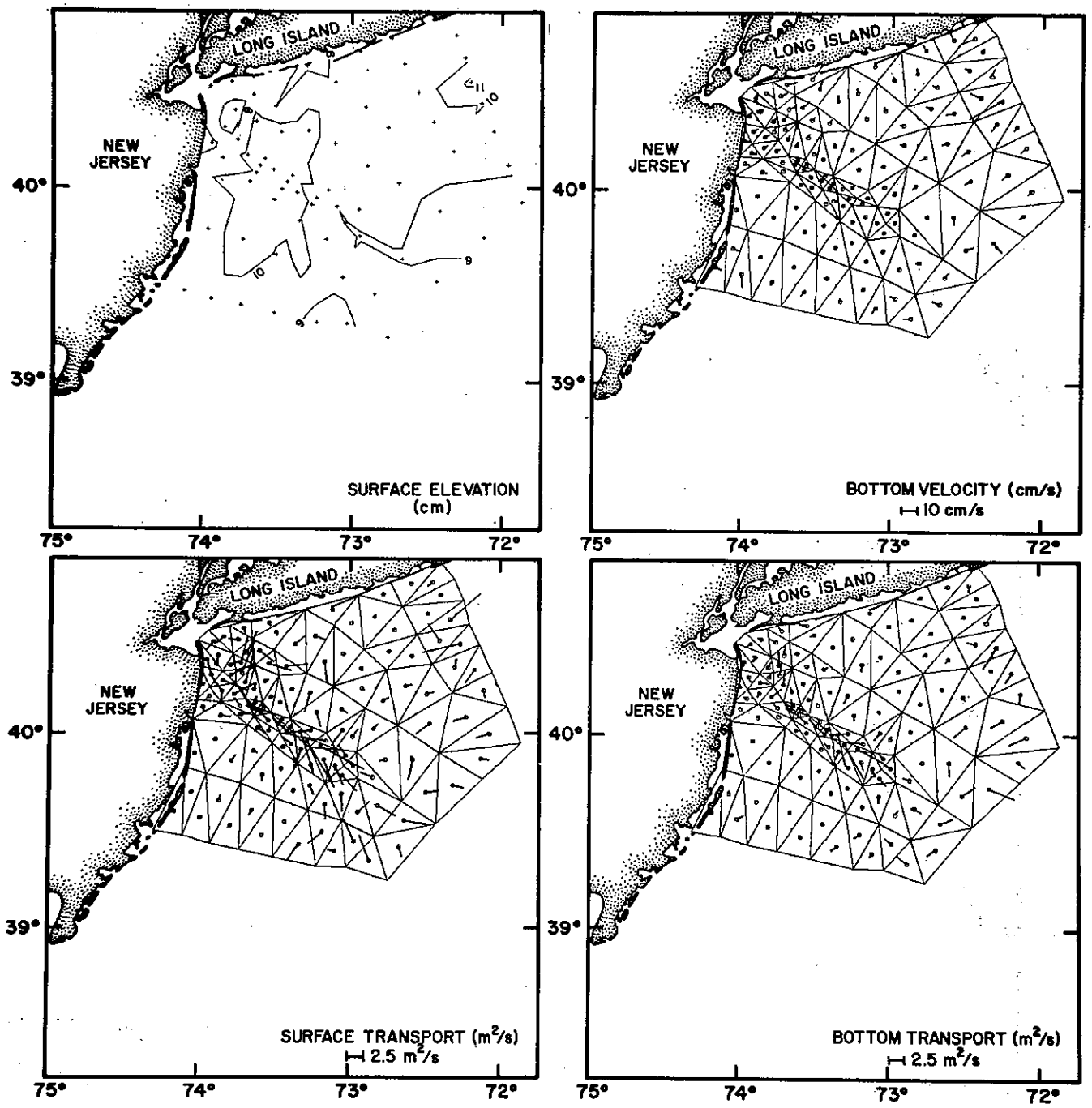

Cruise XWCC-9, modeling case 2 (Julian Day 125-139 1976).



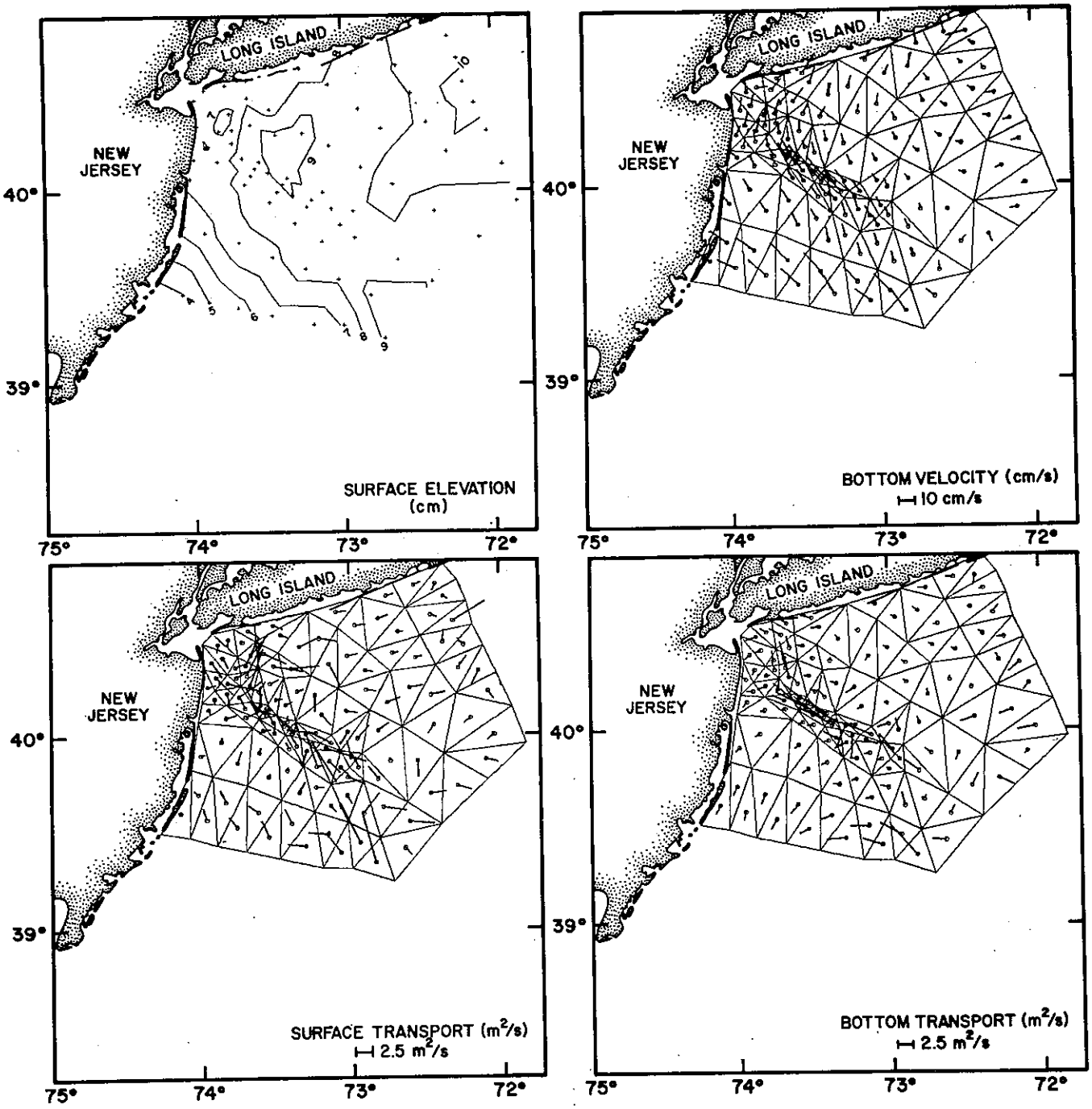

Cruise XWCC-9, modeling case 3 (Julian Day 139-144 1976).



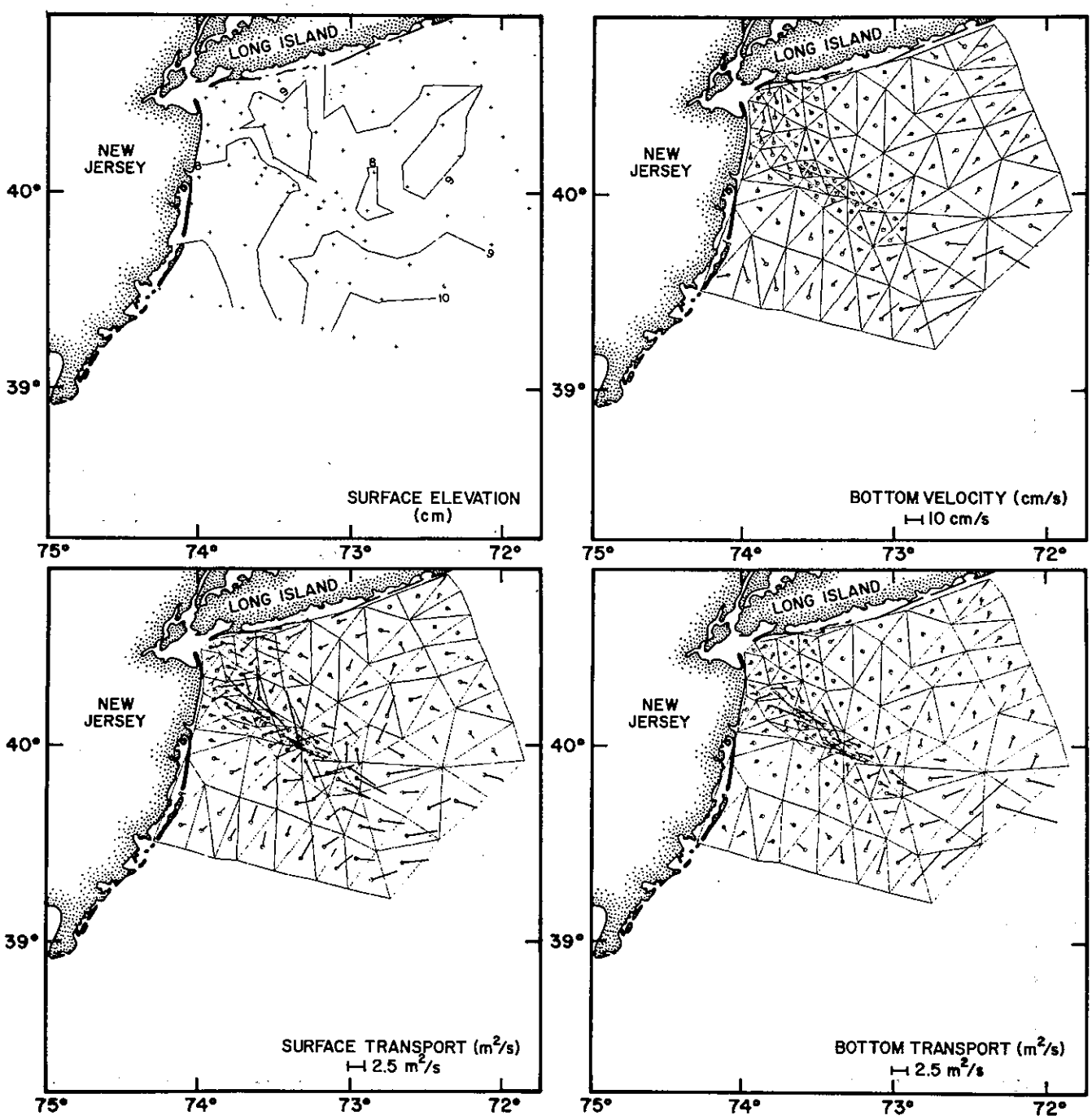

Cruise XWCC-9, modeling case 4 (Julian Day 144-155 1976).



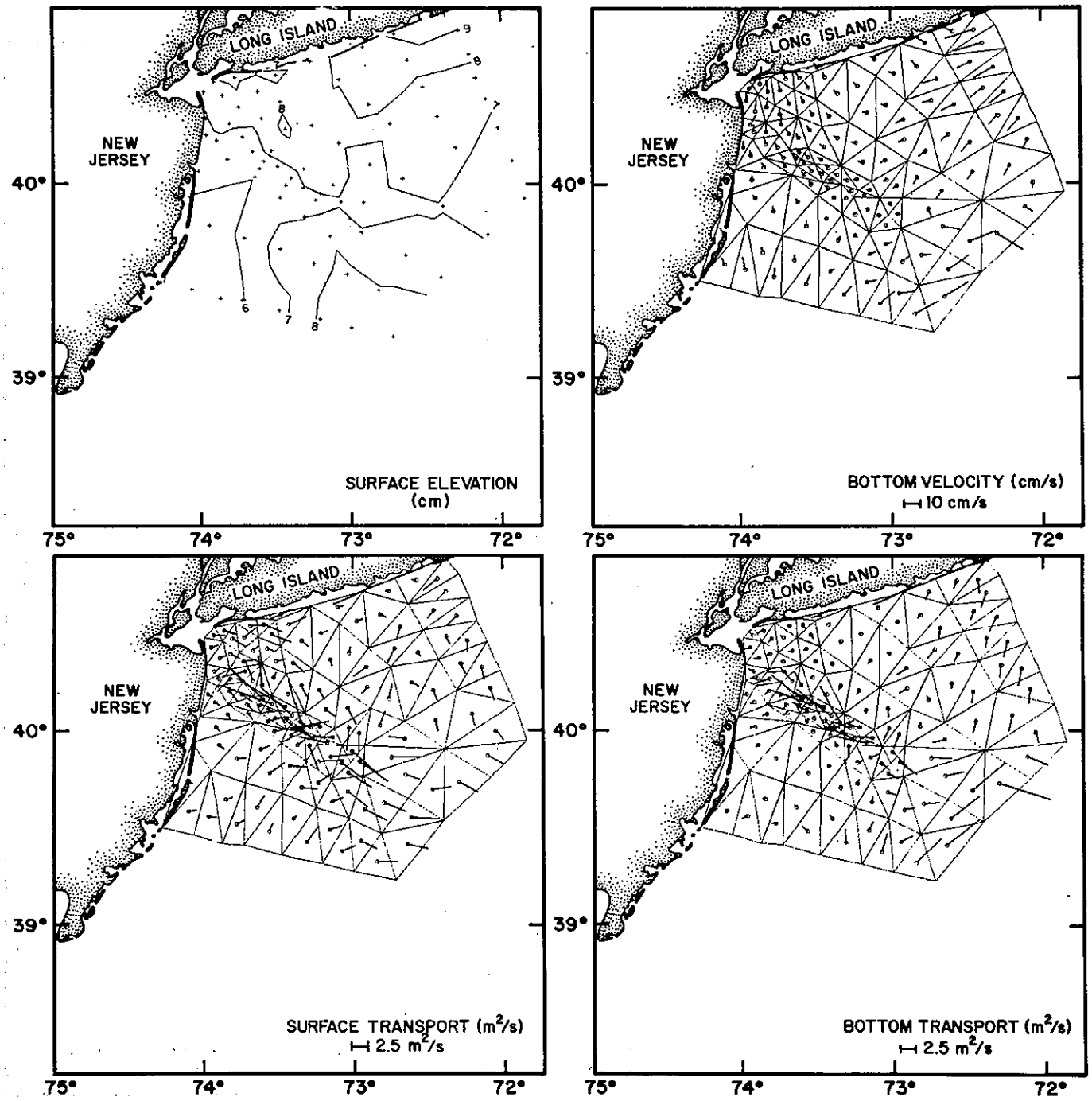

Cruise XWCC-9, modeling case 5 (Julian Day 155-165 1976).



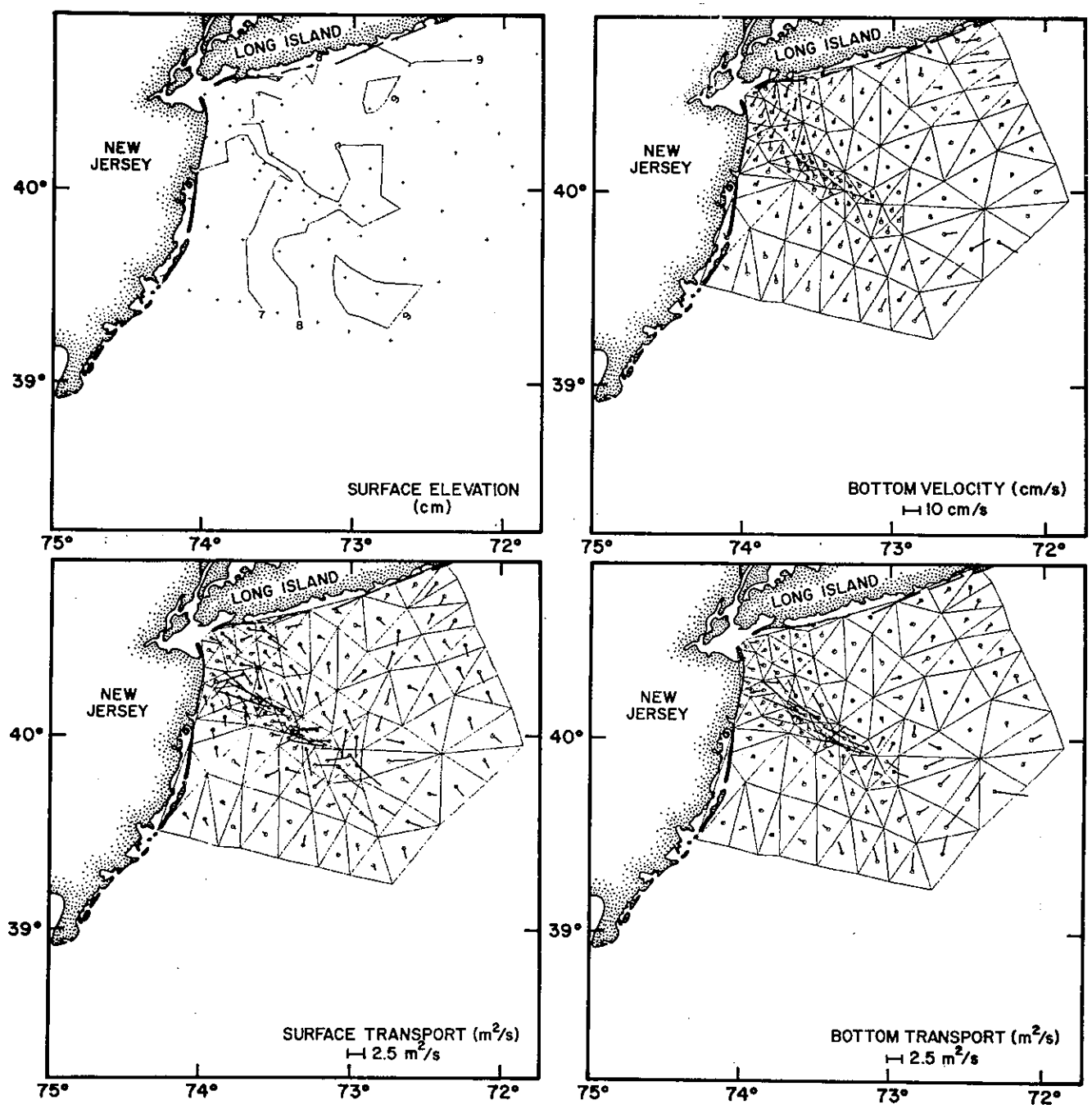

Cruise XWCC-9, modeling case 6 (Julian Day 165-181 1976).



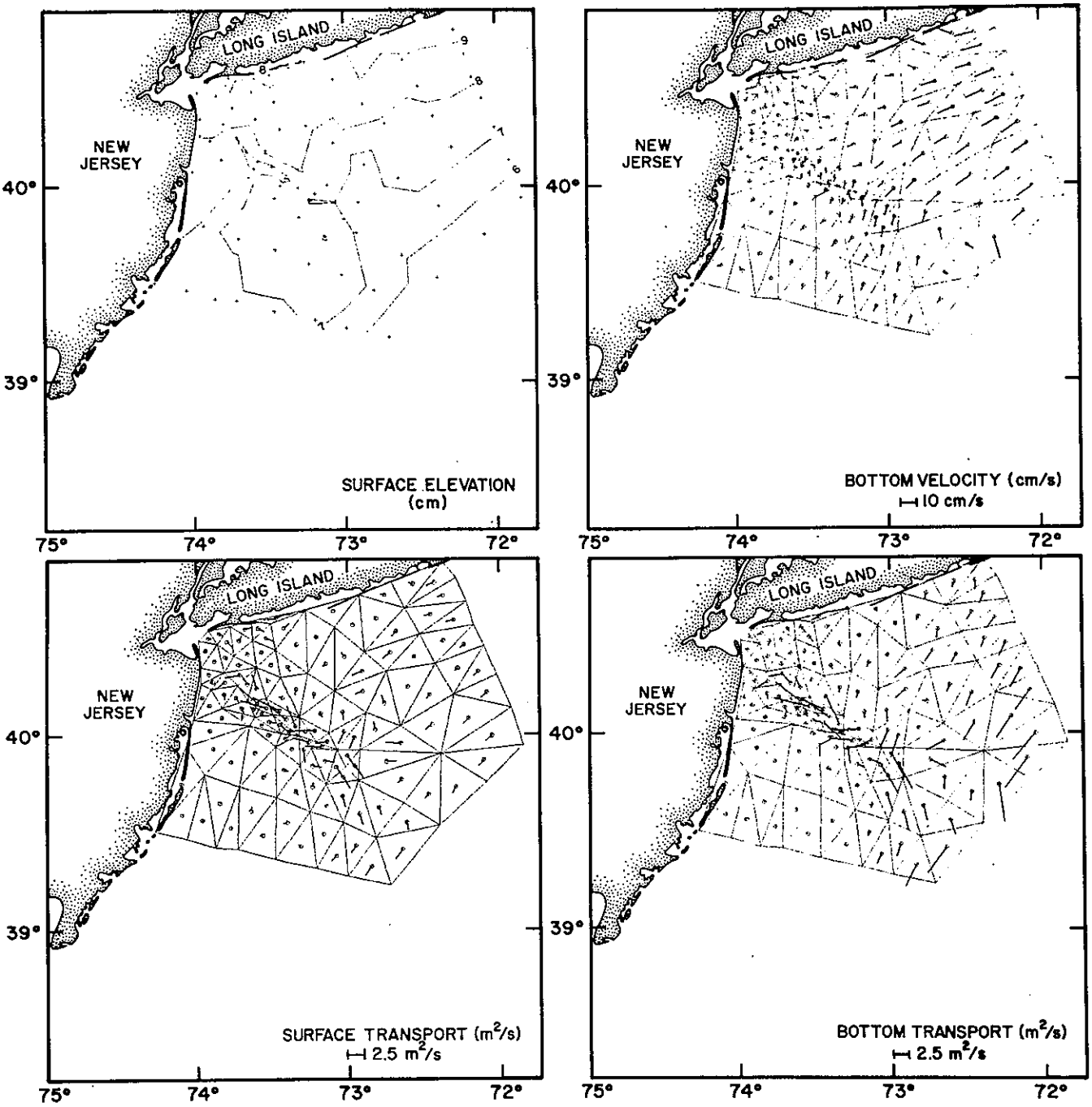

Cruise XWCC-10, modeling case 1 (Julian Day 165-181 1976).



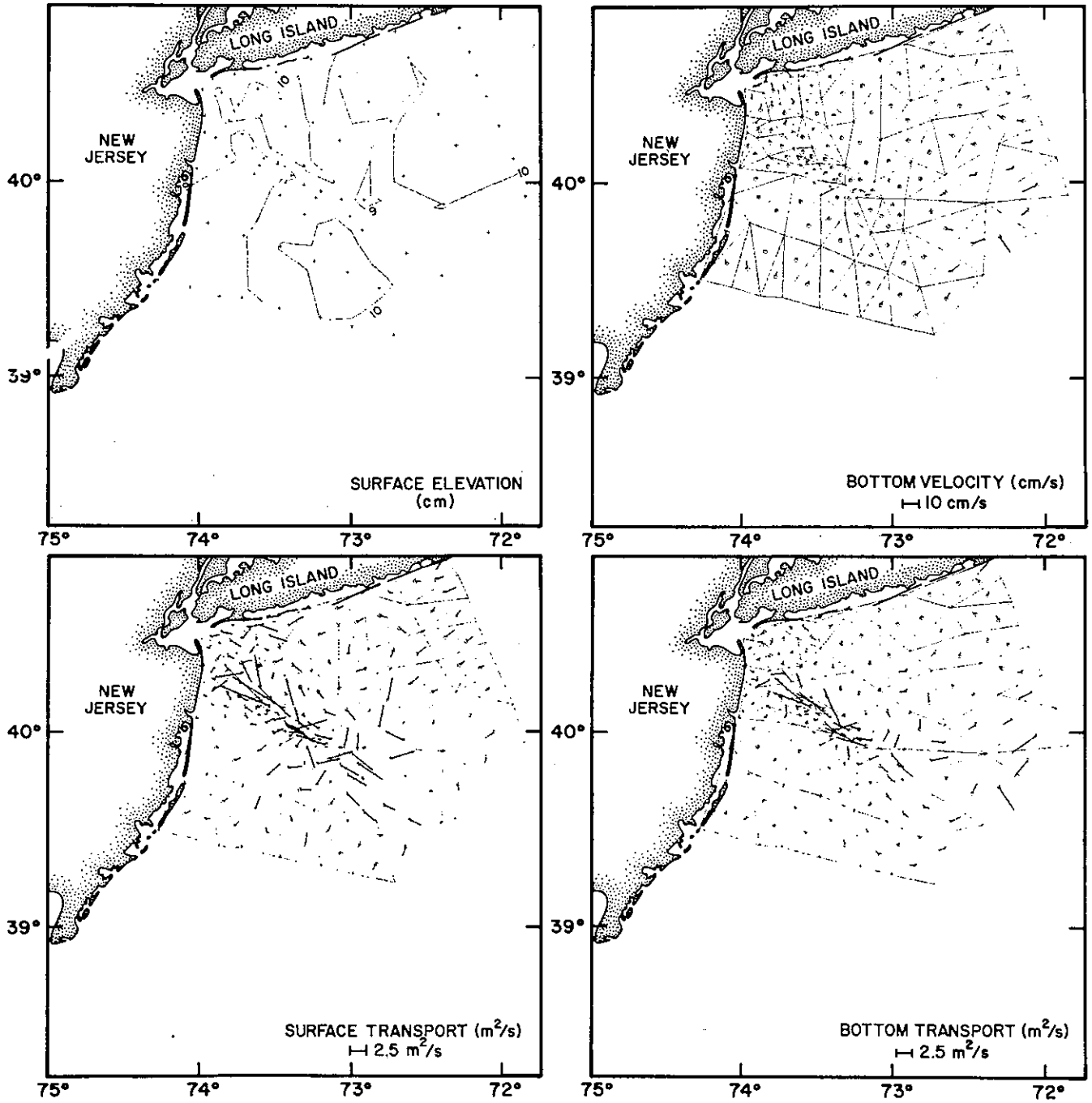

Cruise XWCC-10, modeling case 2 (Julian Day 181-189 1976).



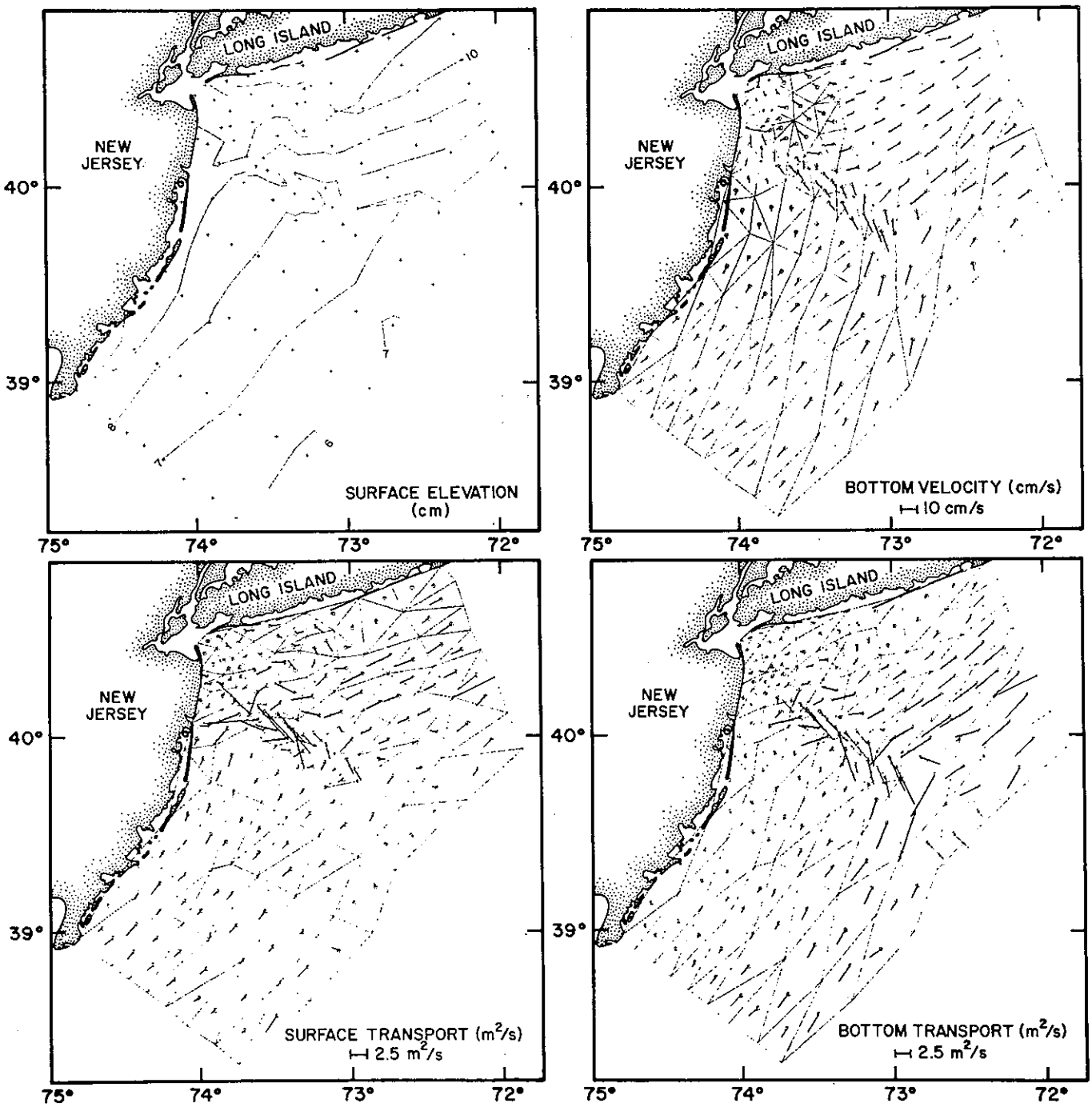

Cruise XWCC-10, modeling case 3 (Julian Day 189-204 1976).



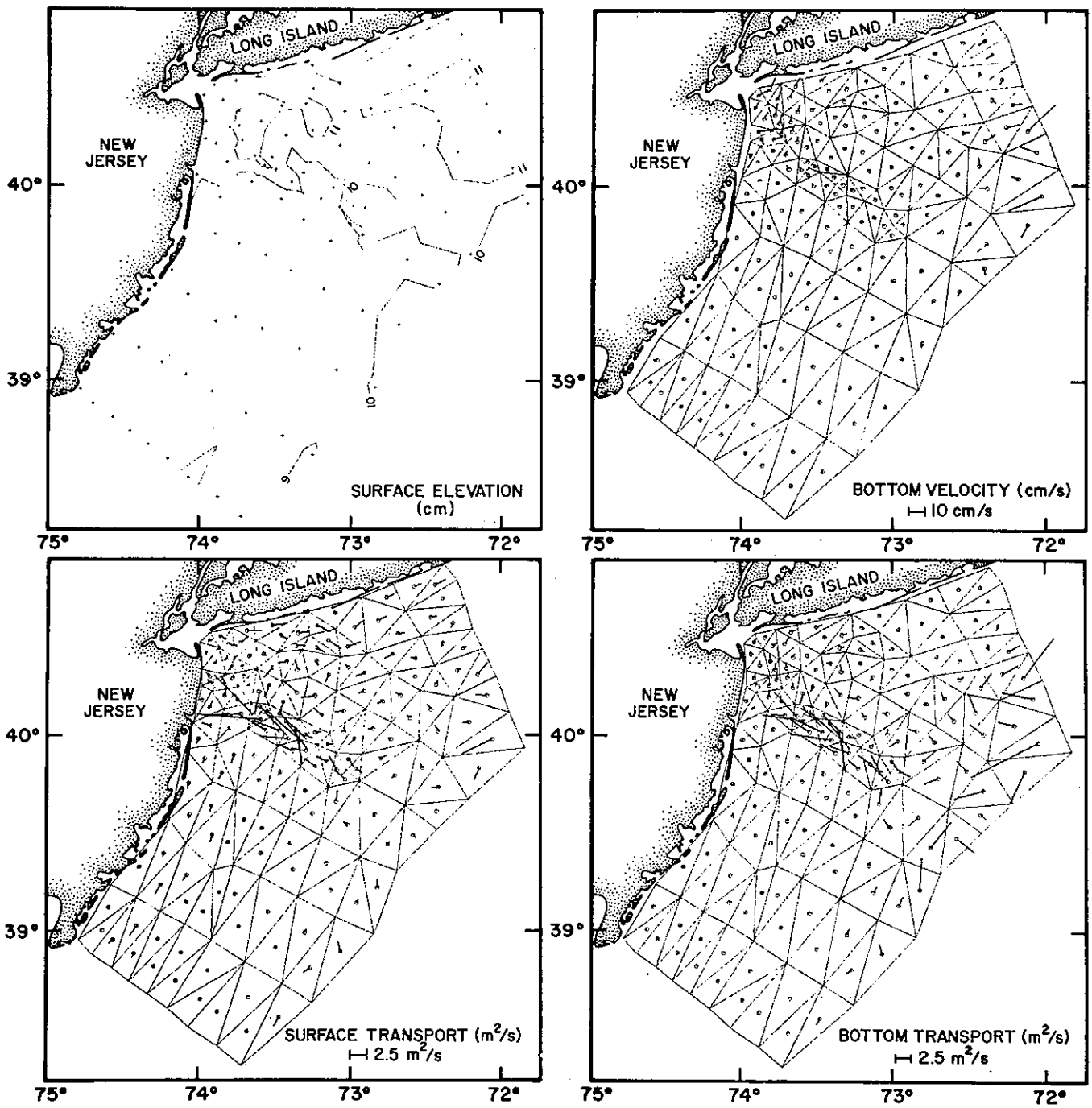

Cruise XWCC-10, modeling case 4 (Julian Day 204-222 1976).



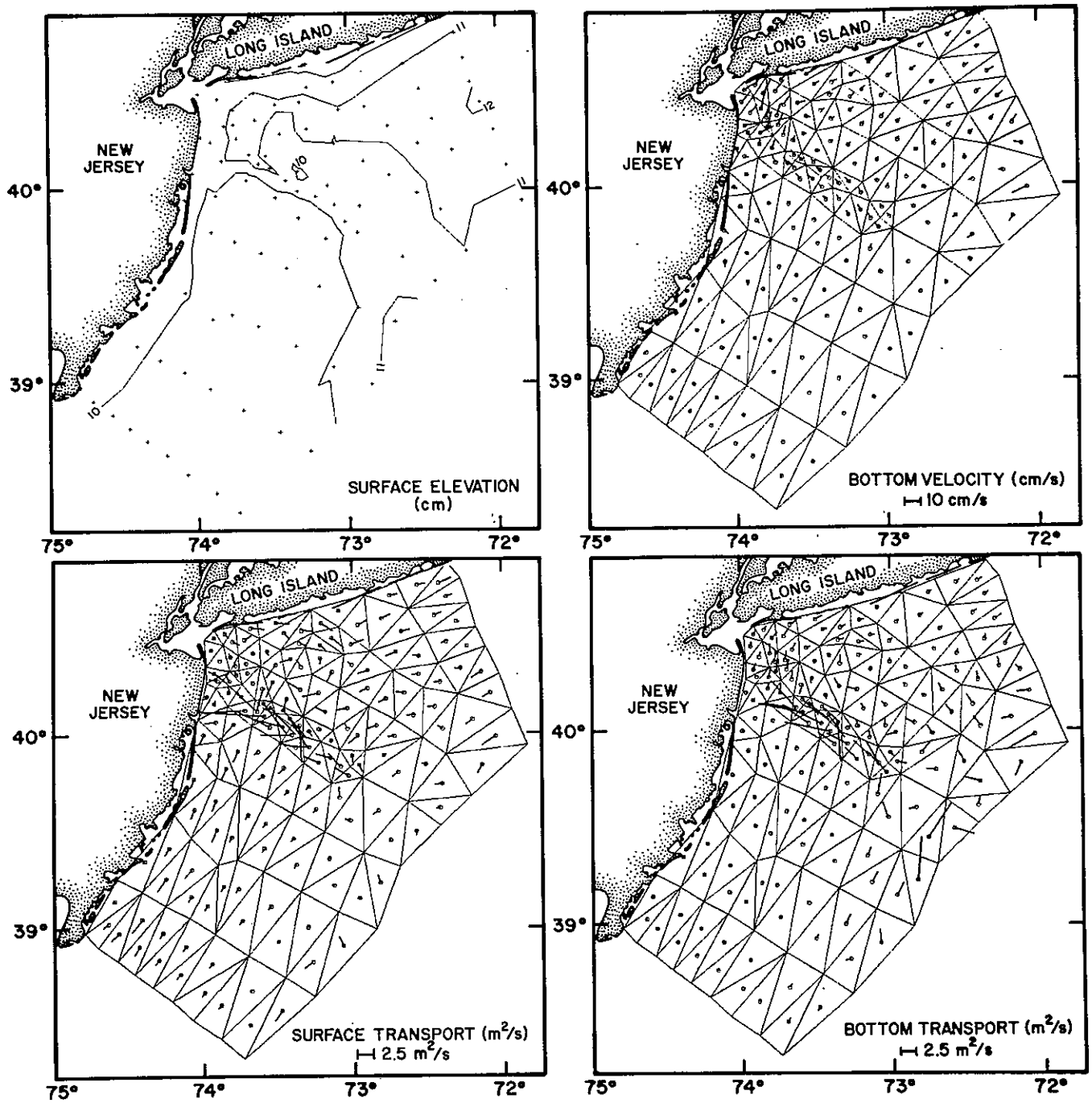

Cruise XWCC-10, modeling case 5 (Julian Day 222-226 1976).



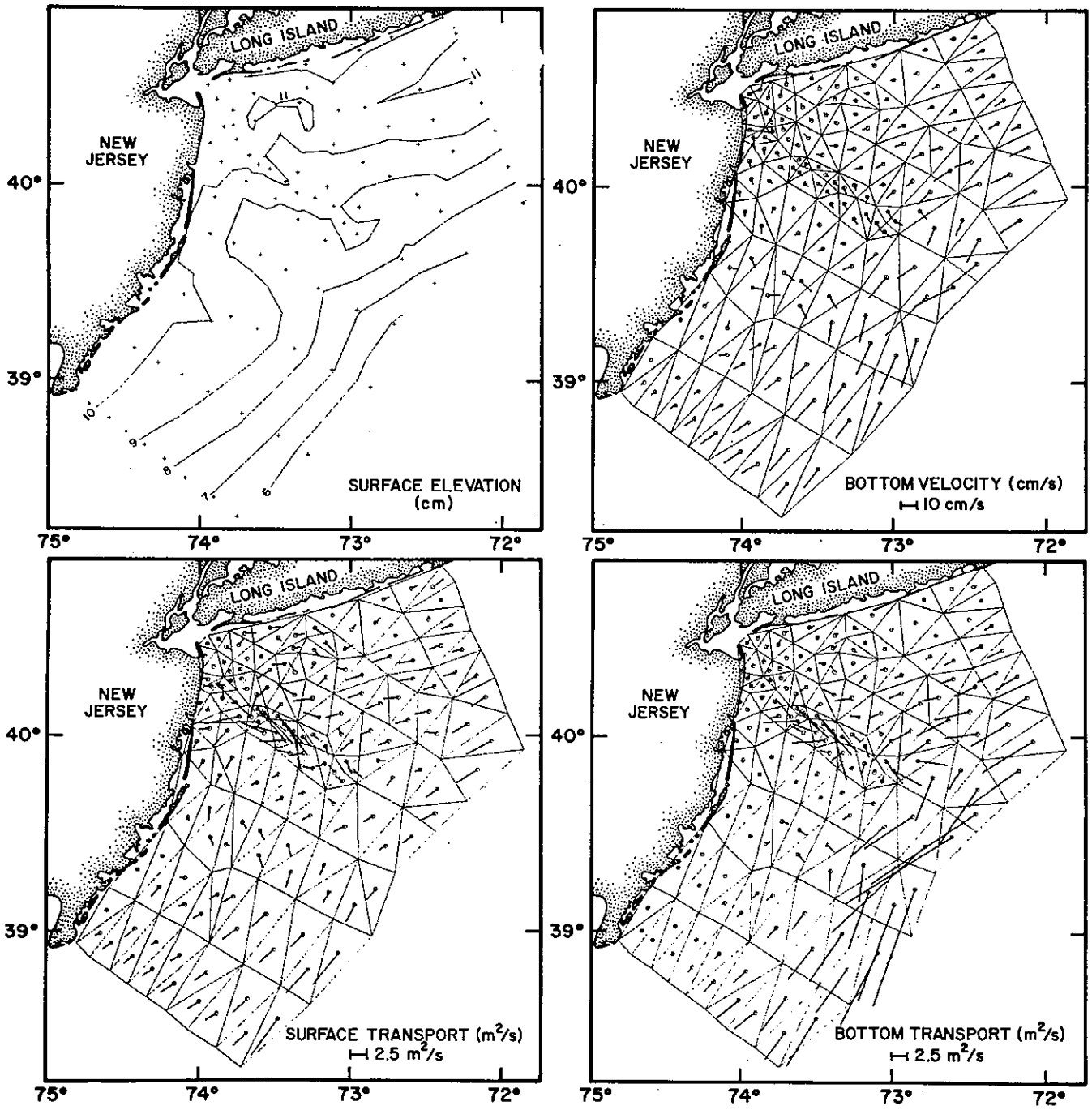

Cruise XWCC-17, modeling case 1 (Julian Day 067-078 1978).



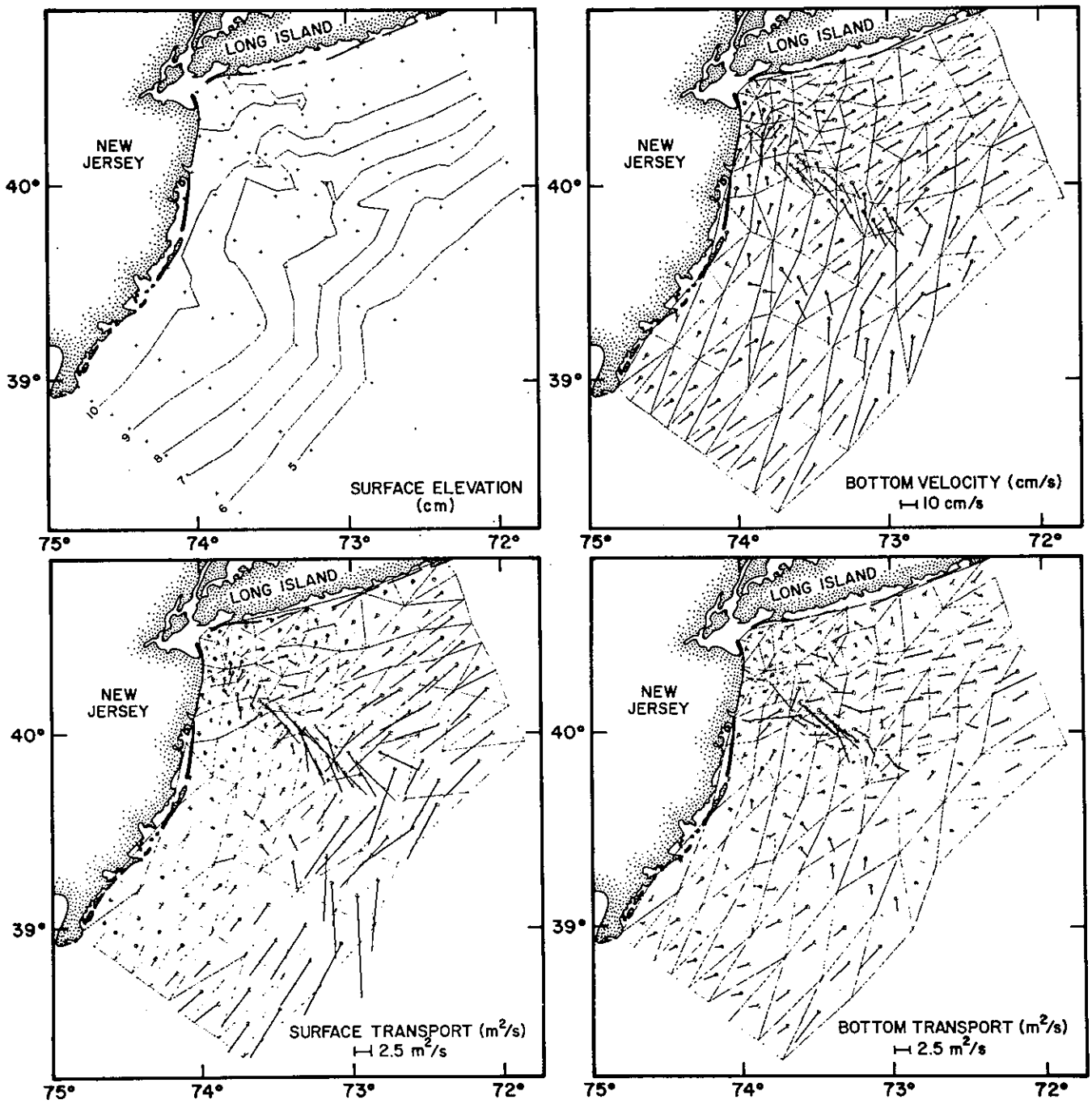

Cruise XWCC-17, modeling case 2 (Julian Day 078-095 1978).



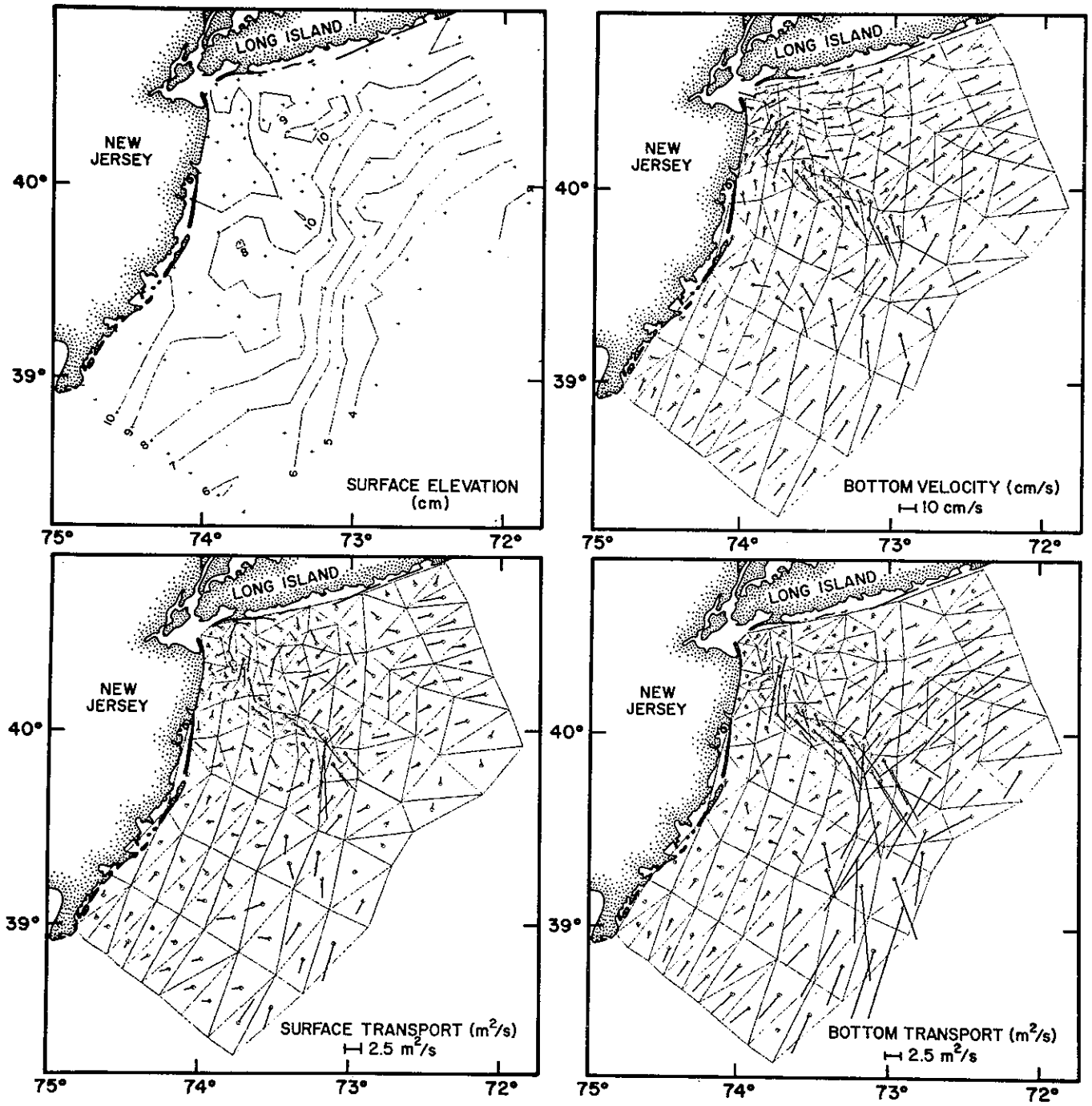

Cruise XWCC-17, modeling case 3 (Julian Day 095-105 1978).



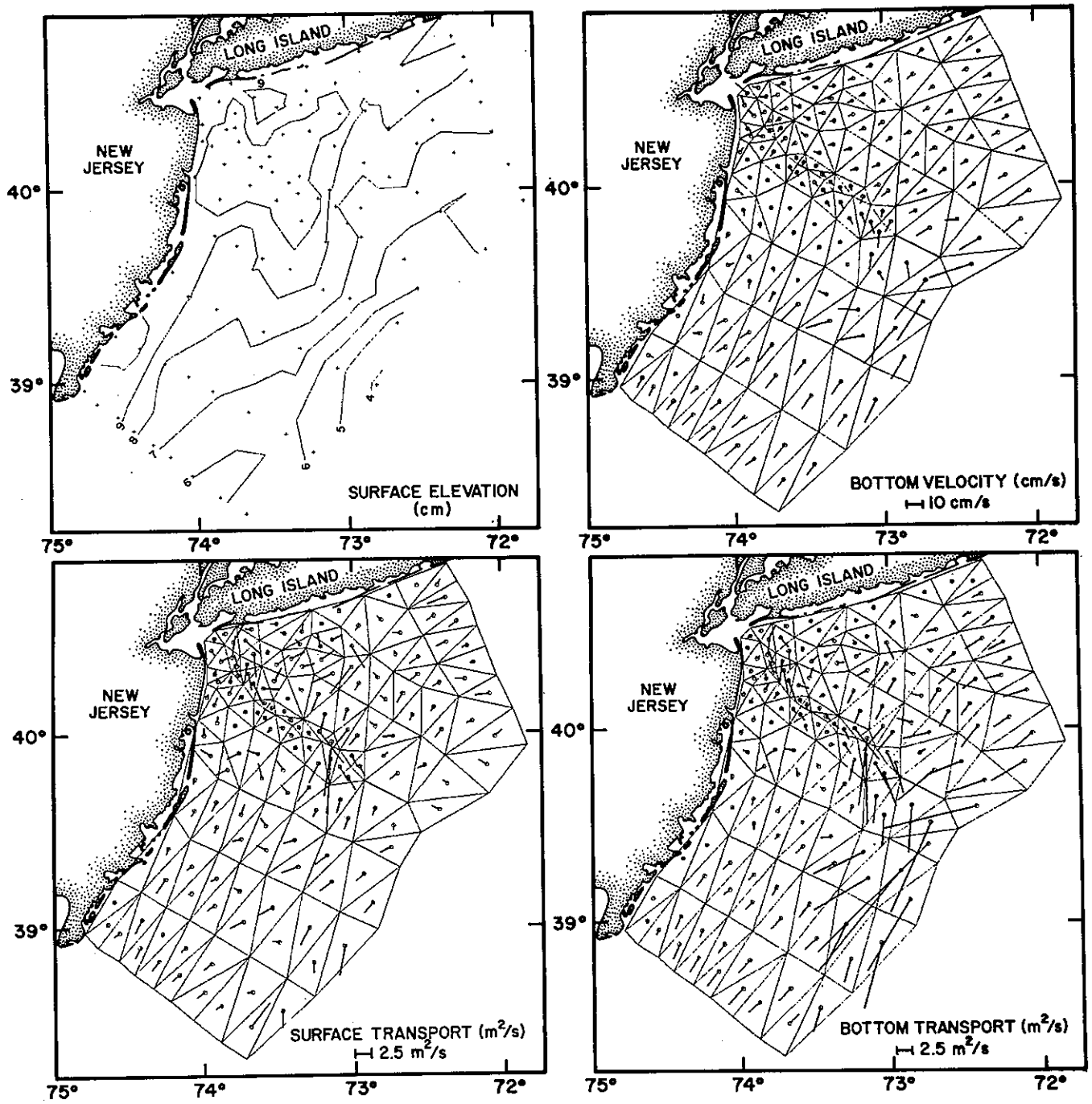

Cruise XWCC-17, modeling case 4 (Julian Day 105-124 1978).



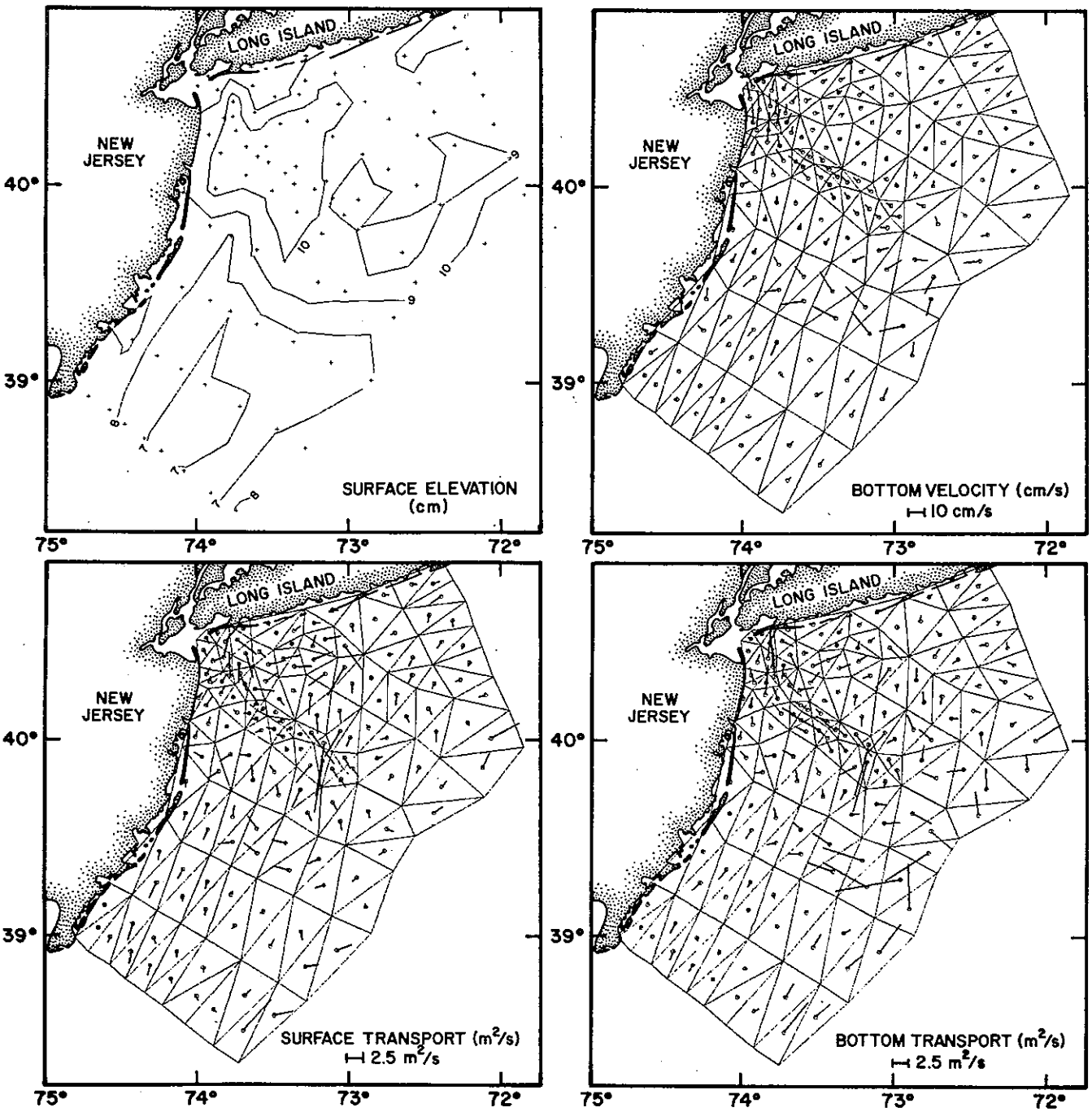

Cruise XWCC-17, modeling case 5 (Julian Day 124-139 1978).



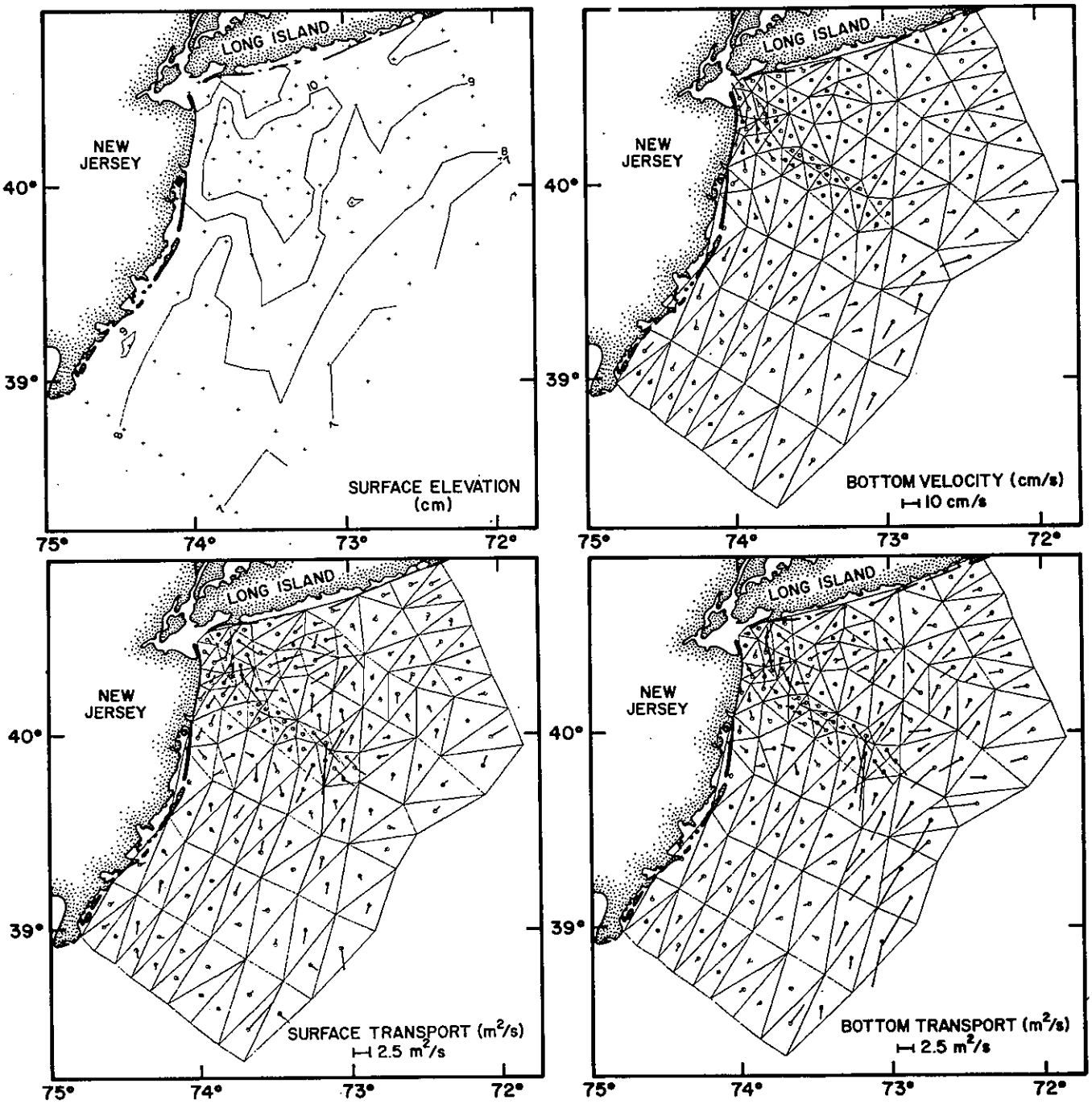

Cruise XWCC-18, modeling case 1 (Julian Day 124-139 1978).



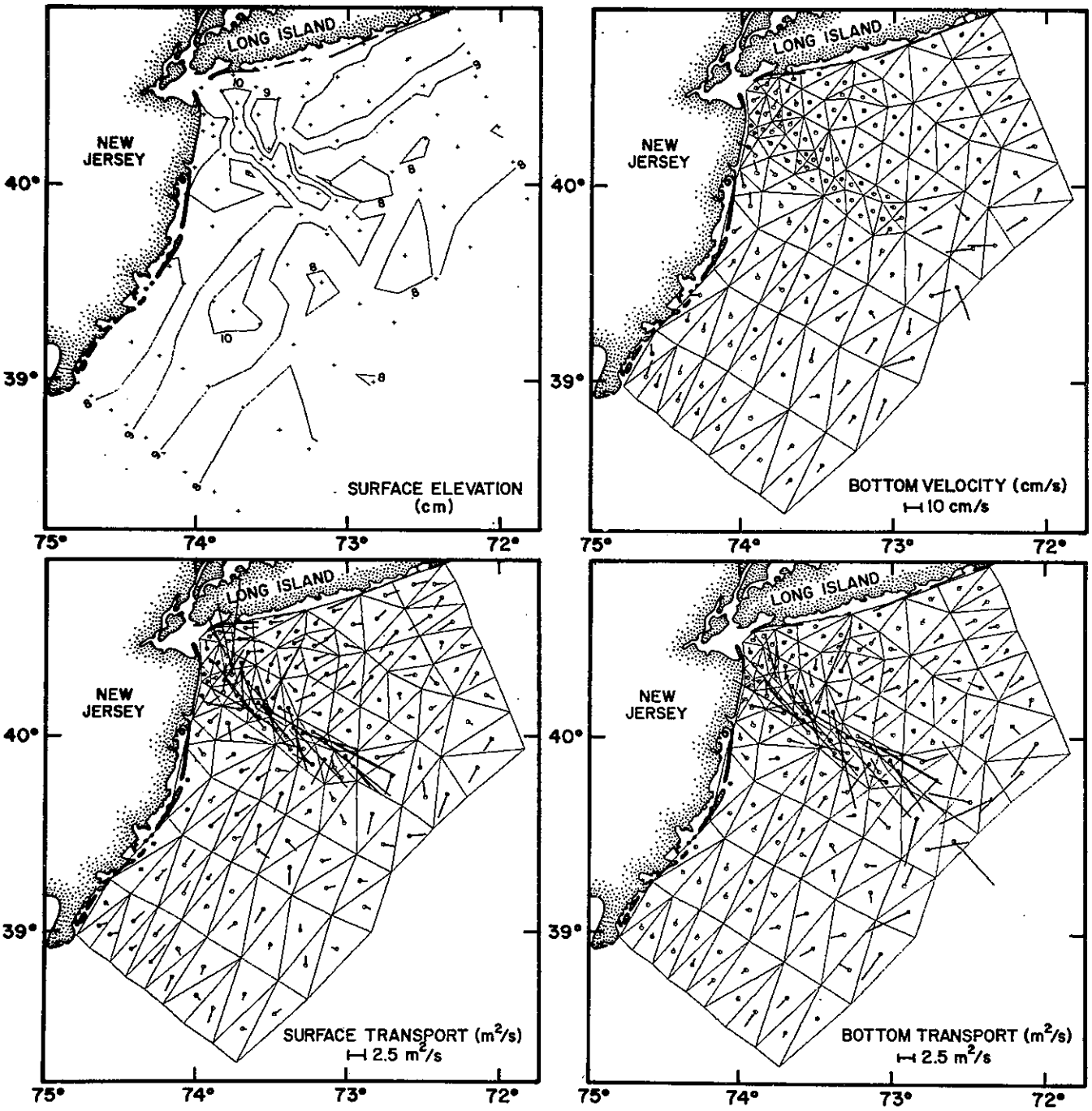

Cruise XWCC-18, modeling case 2 (Julian Day 139-158 1978).



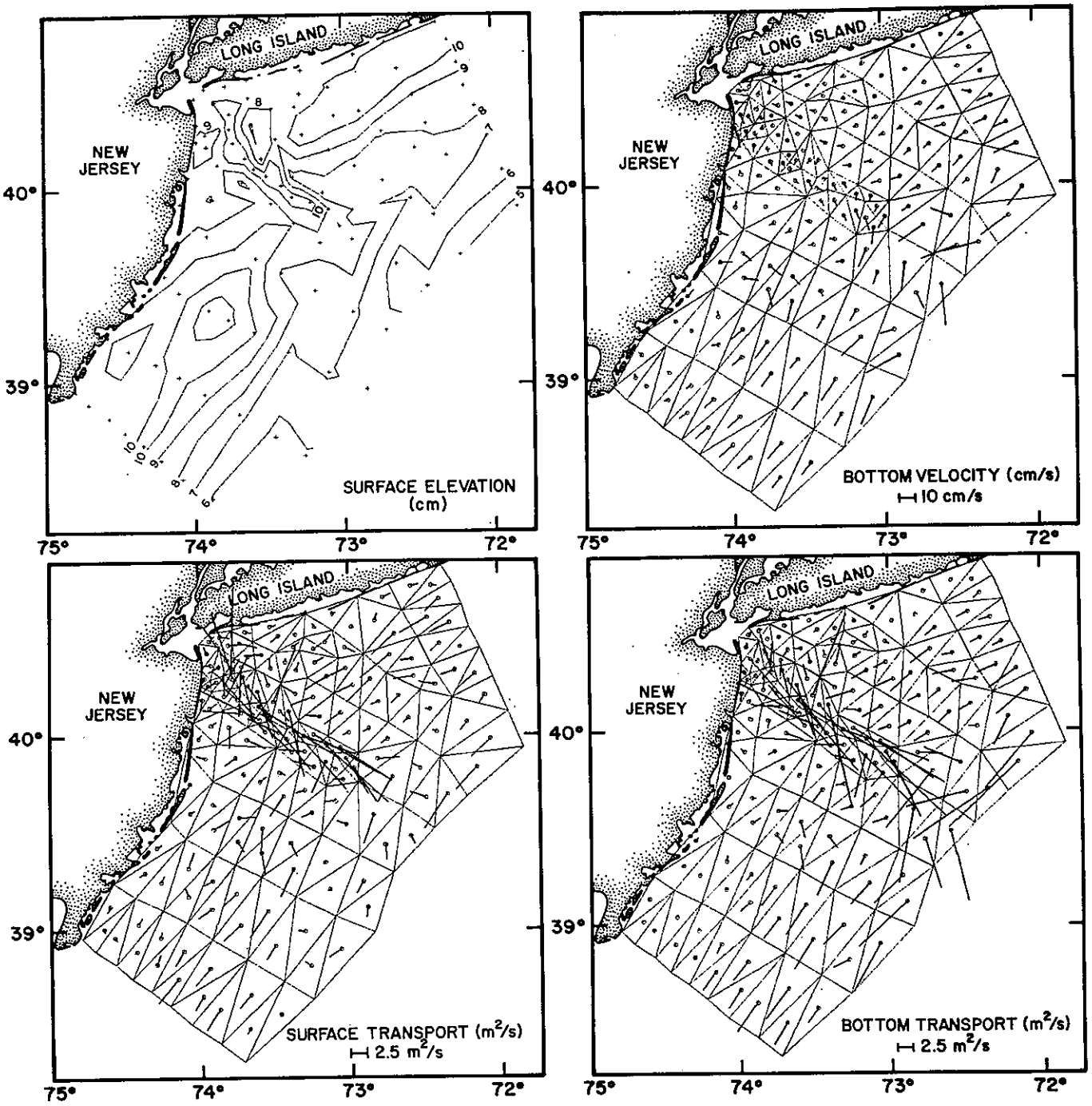

Cruise XWCC-18, modeling case 3 (Julian Day 158-169 1978).



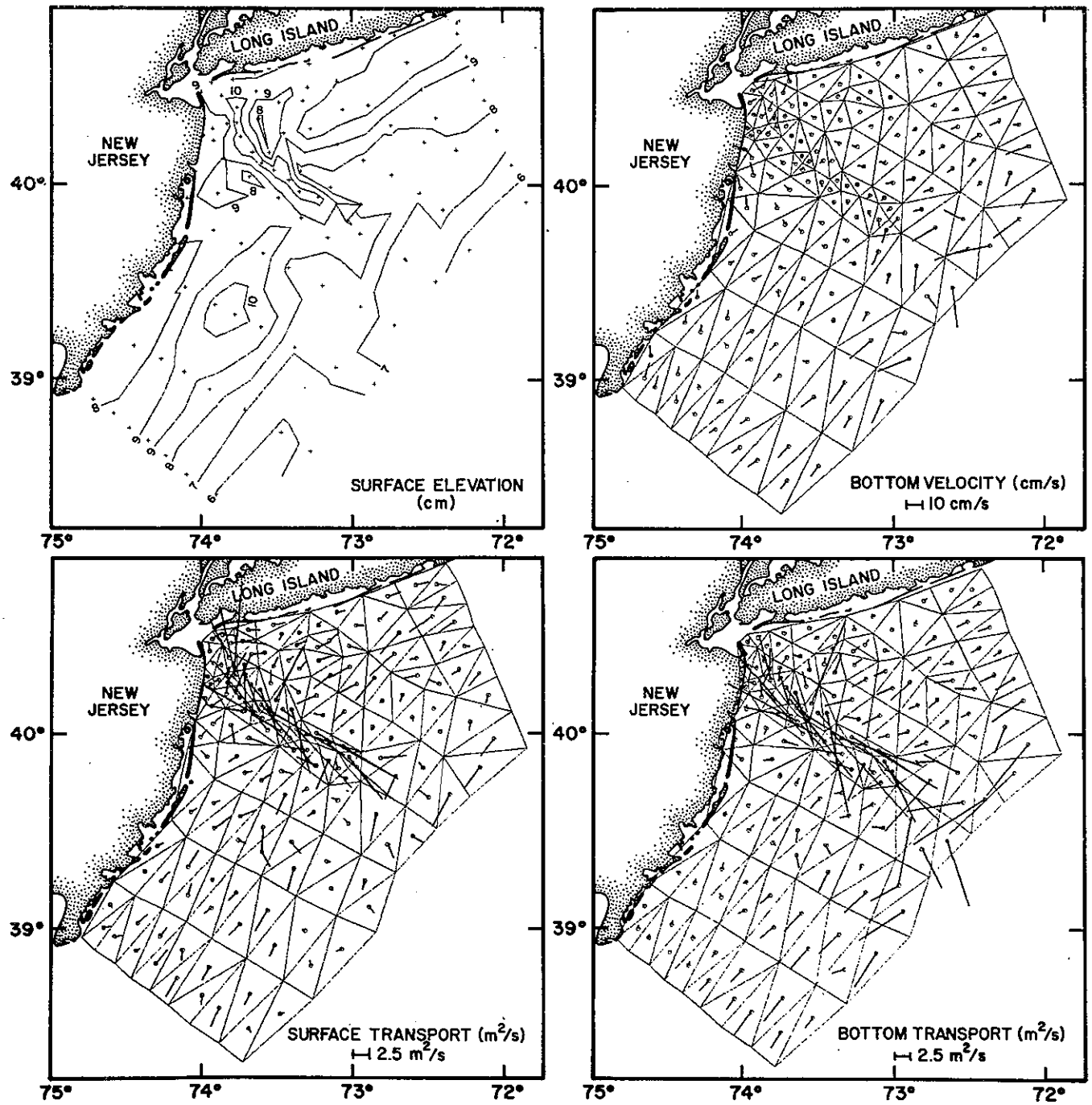

Cruise XWCC-18, modeling case 4 (Julian Day 169-179 1978).



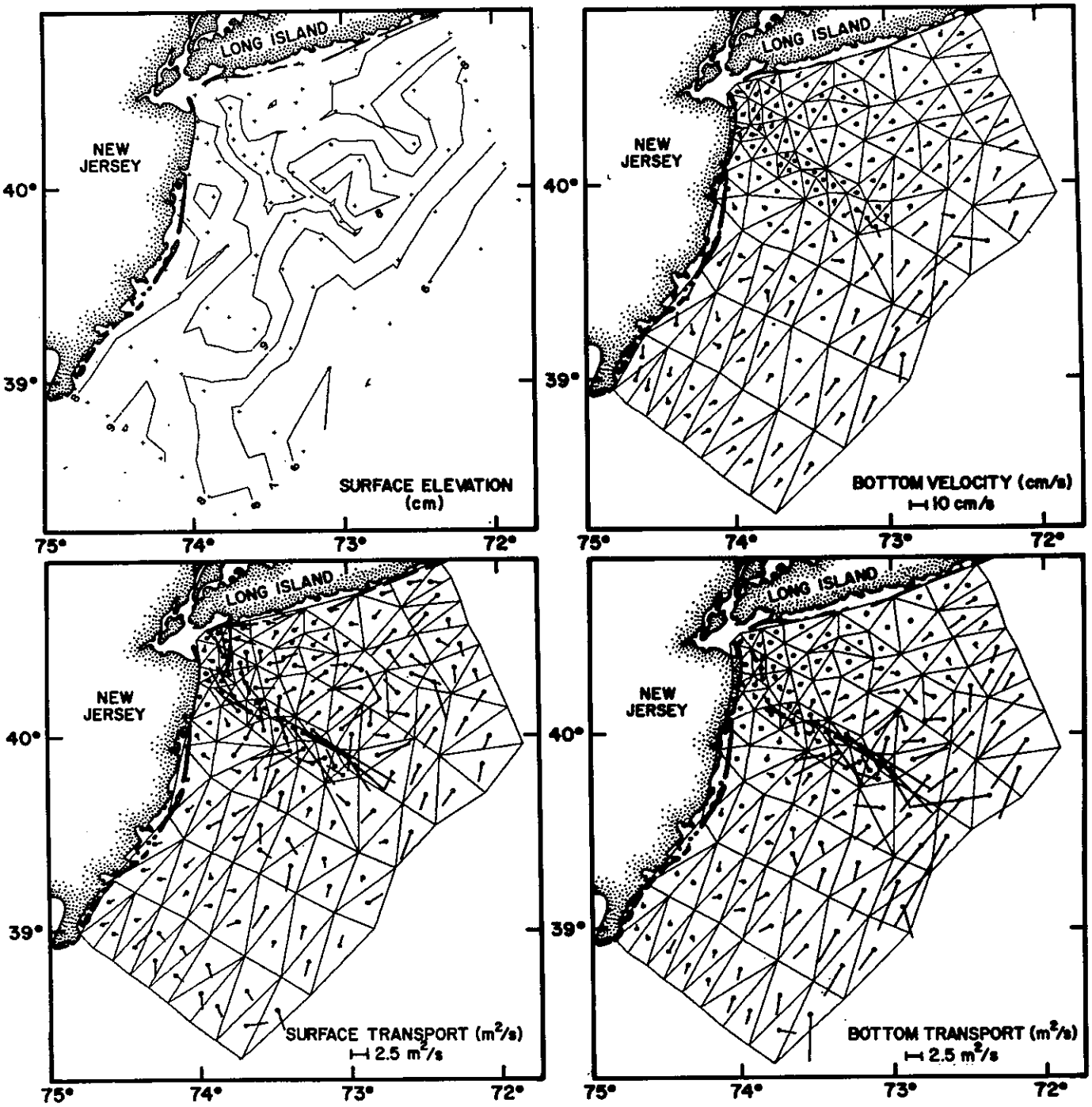

Cruise XWCC-19, modeling case 1 (Julian Day 169-179 1978).



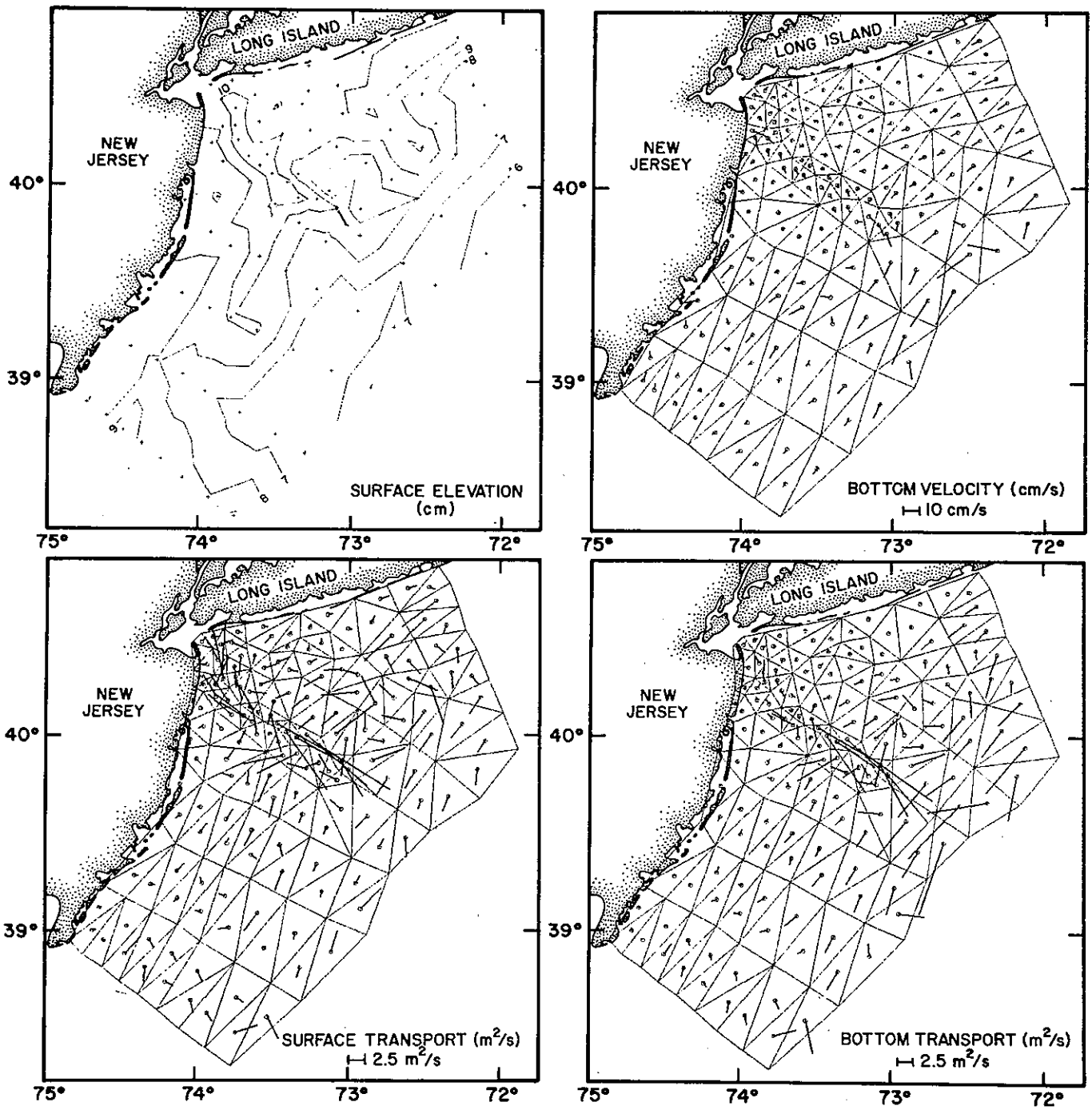

Cruise XWCC-19, modeling case 2 (Julian Day 179-196 1978).



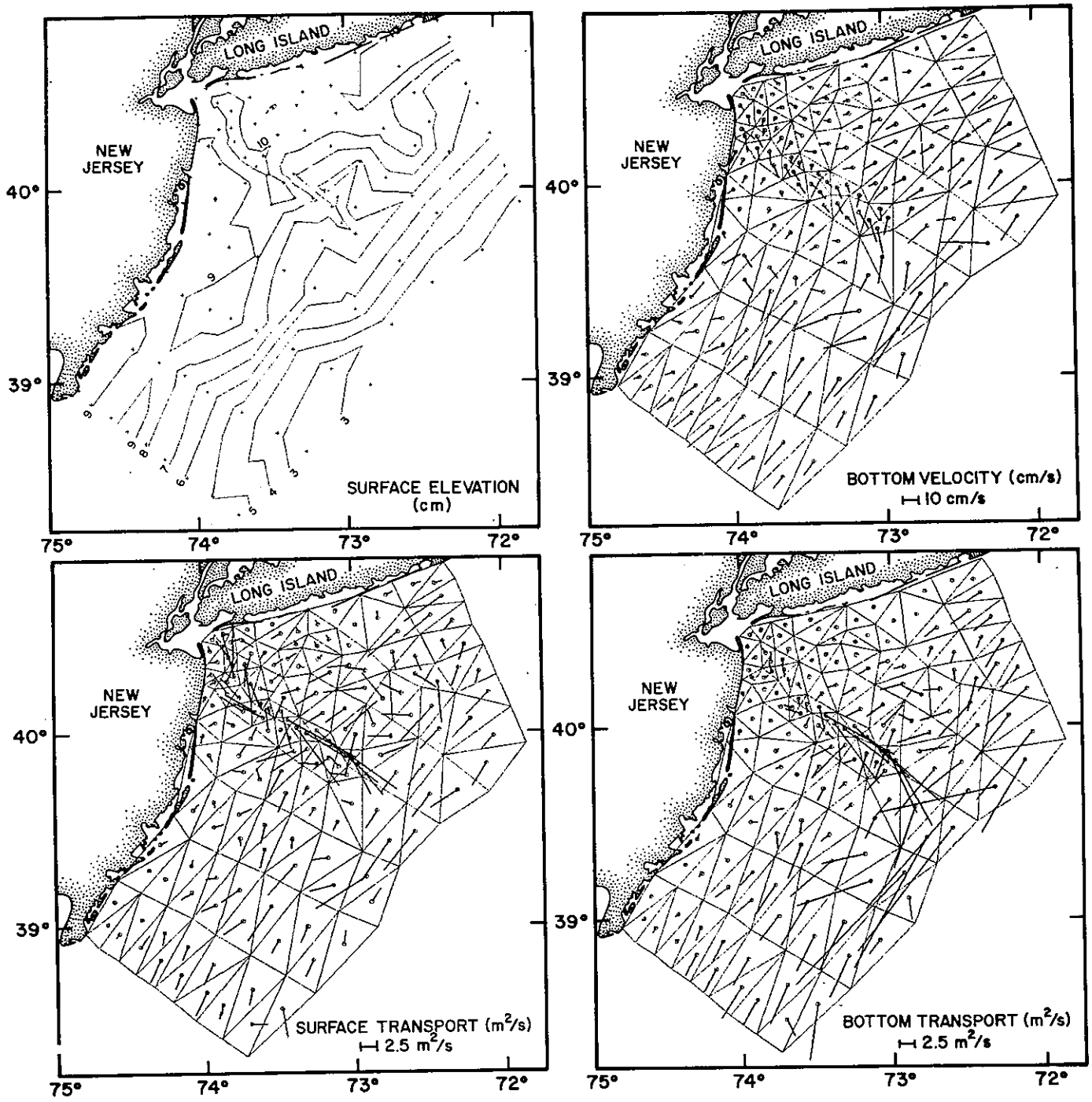

Cruise XWCC-19, modeling case 3 (Julian Day 196-211 1978).



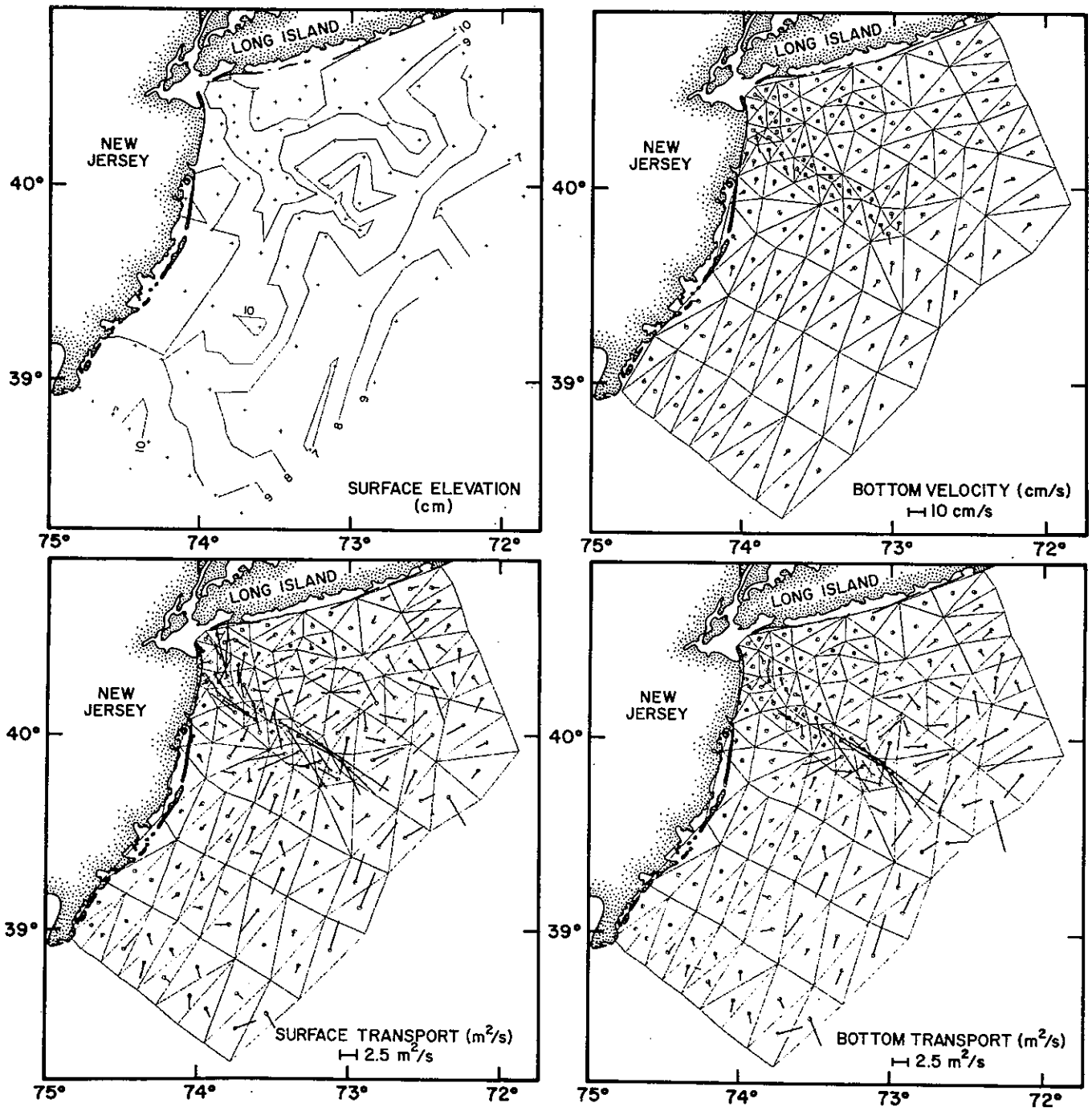

Cruise XWCC-20, modeling case 1 (Julian Day 196-211 1978).



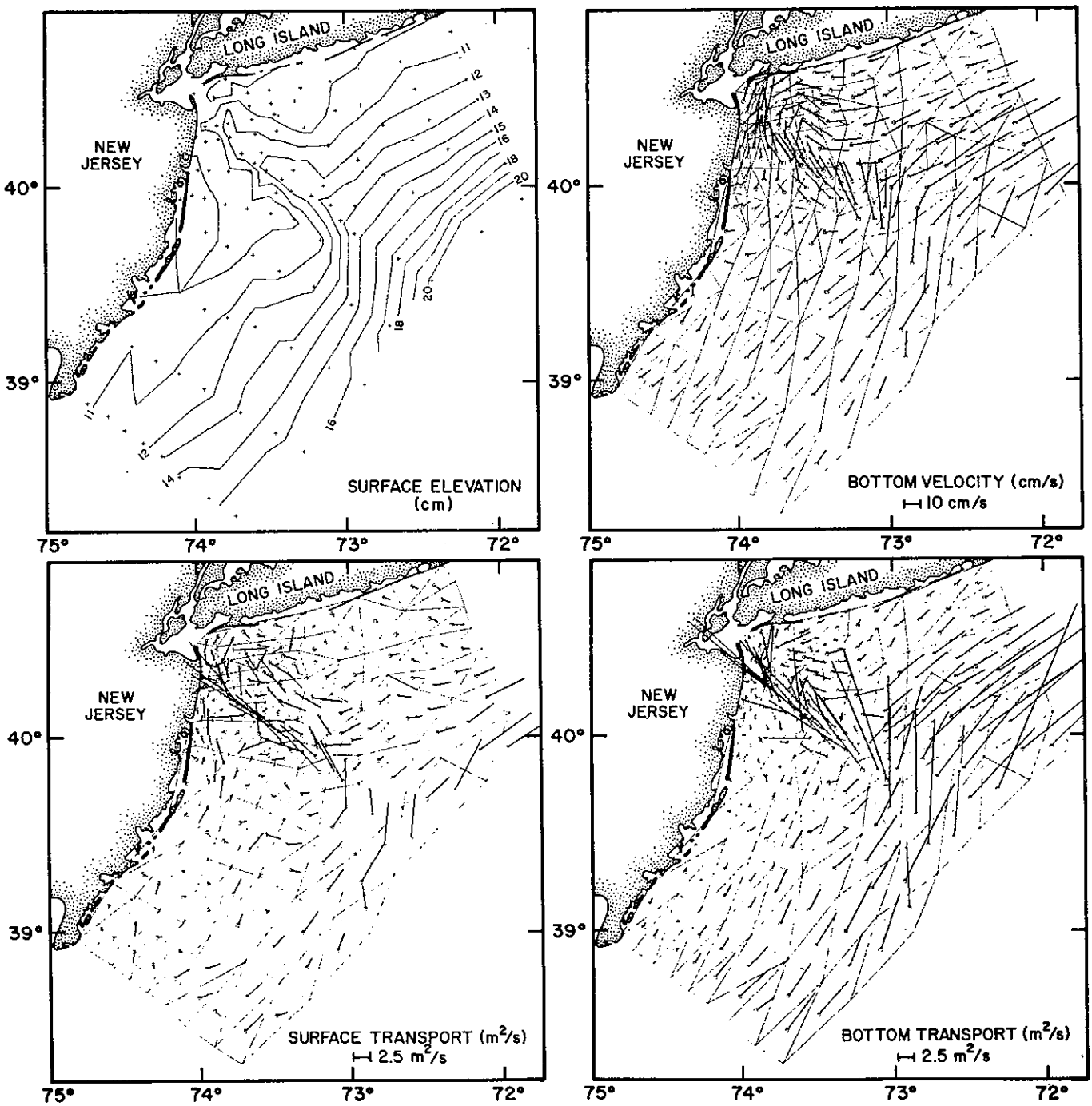

Cruise XWCC-20, modeling case 2 (Julian Day 211-224 1978).



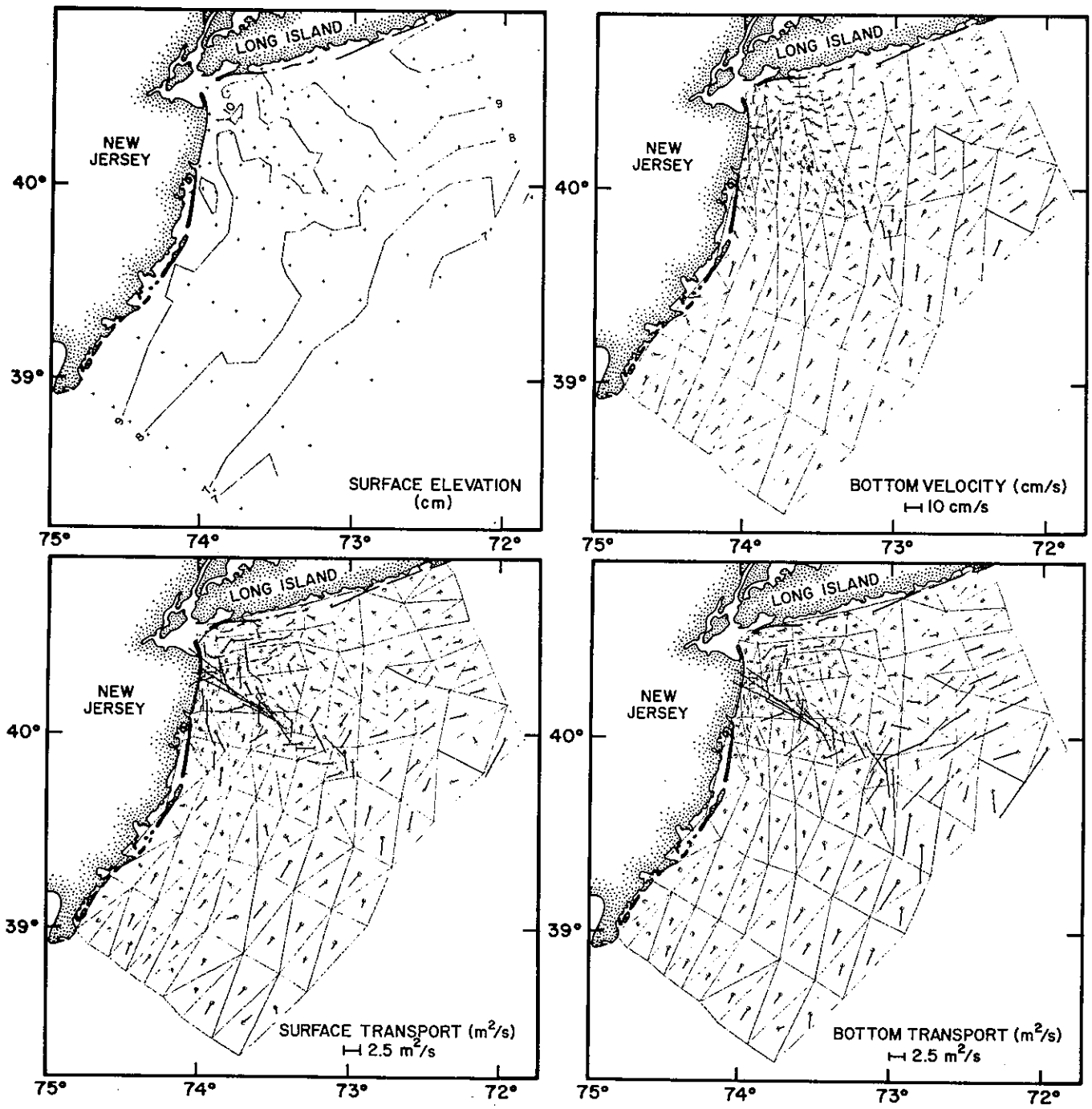

Cruise XWCC-20, modeling case 3 (Julian Day 224-241 1978).



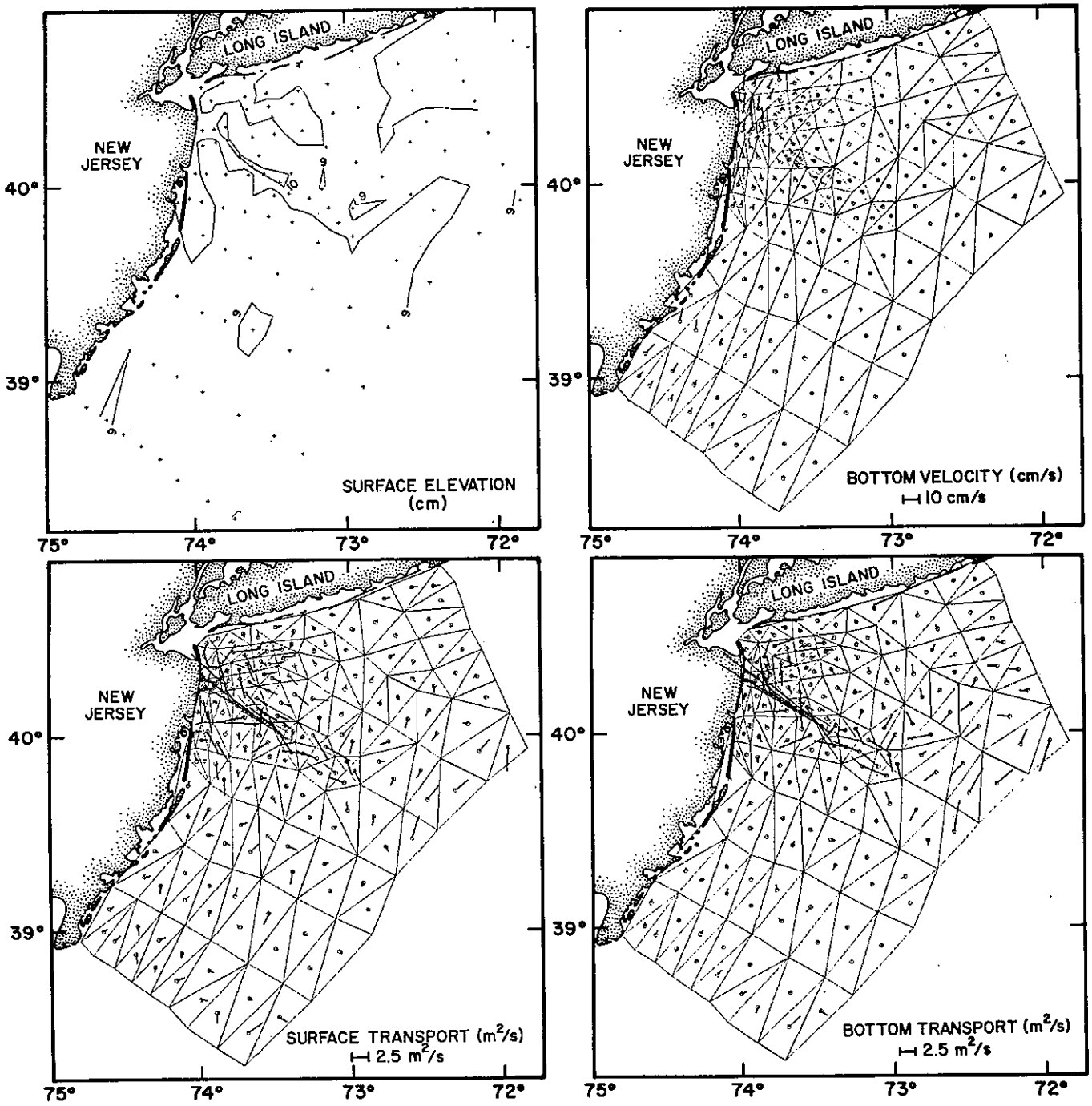

Cruise XWCC-20, modeling case 4 (Julian Day 241-266 1978).



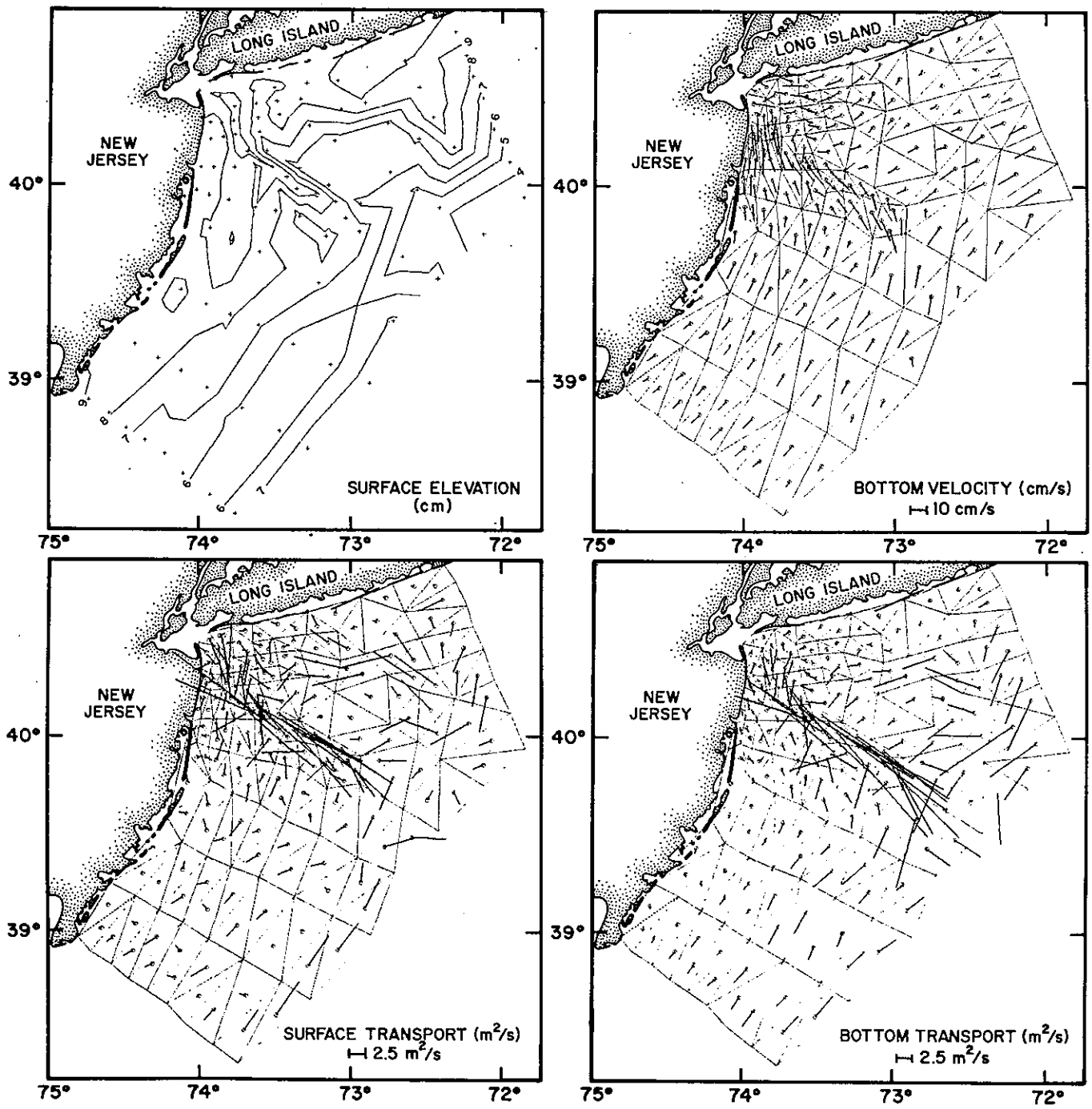

Cruise XWCC-21, modeling case 1 (Julian Day 087-098 1979).



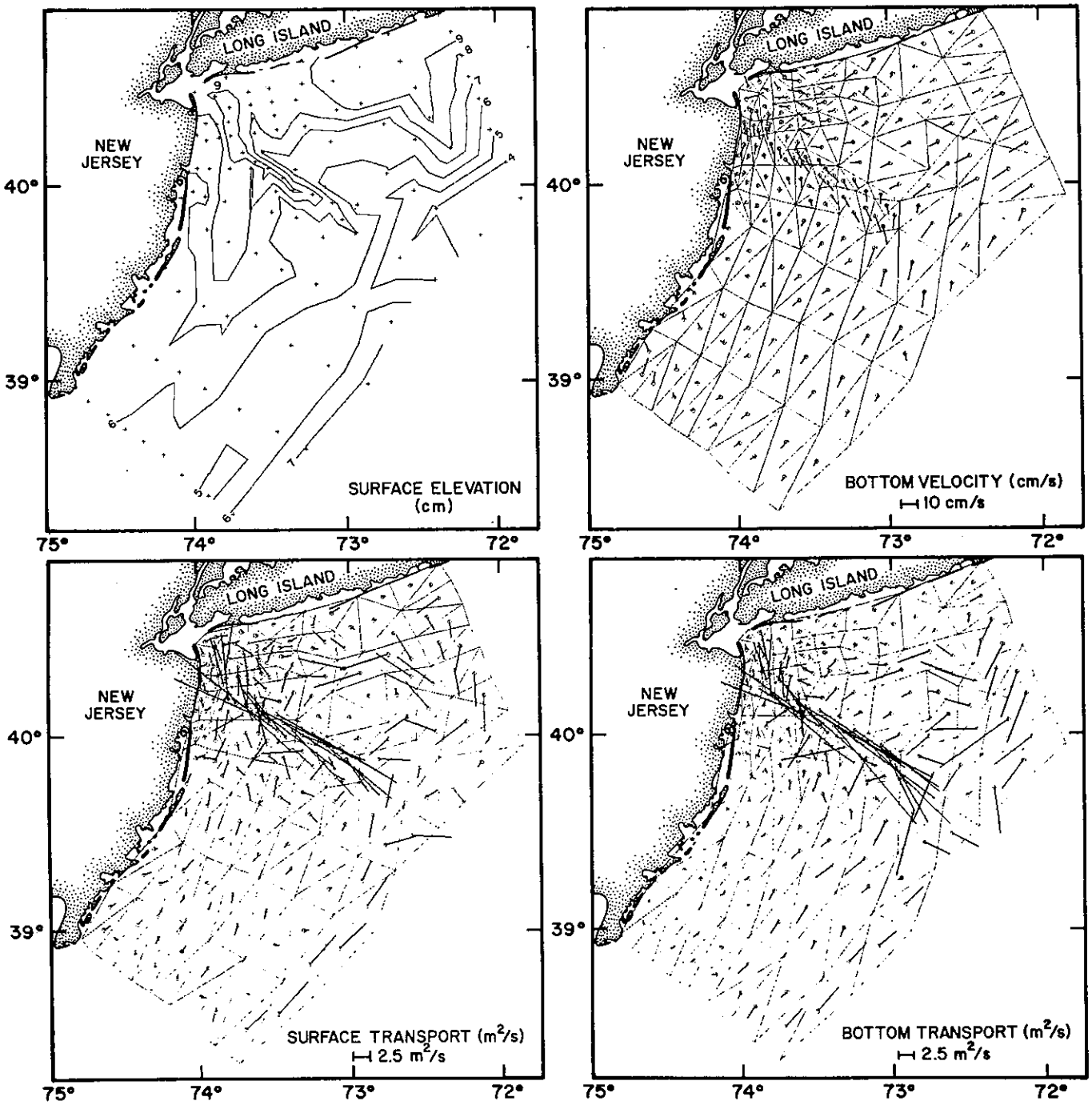

Cruise XWCC-21, modeling case 2 (Julian Day 098-122 1979).



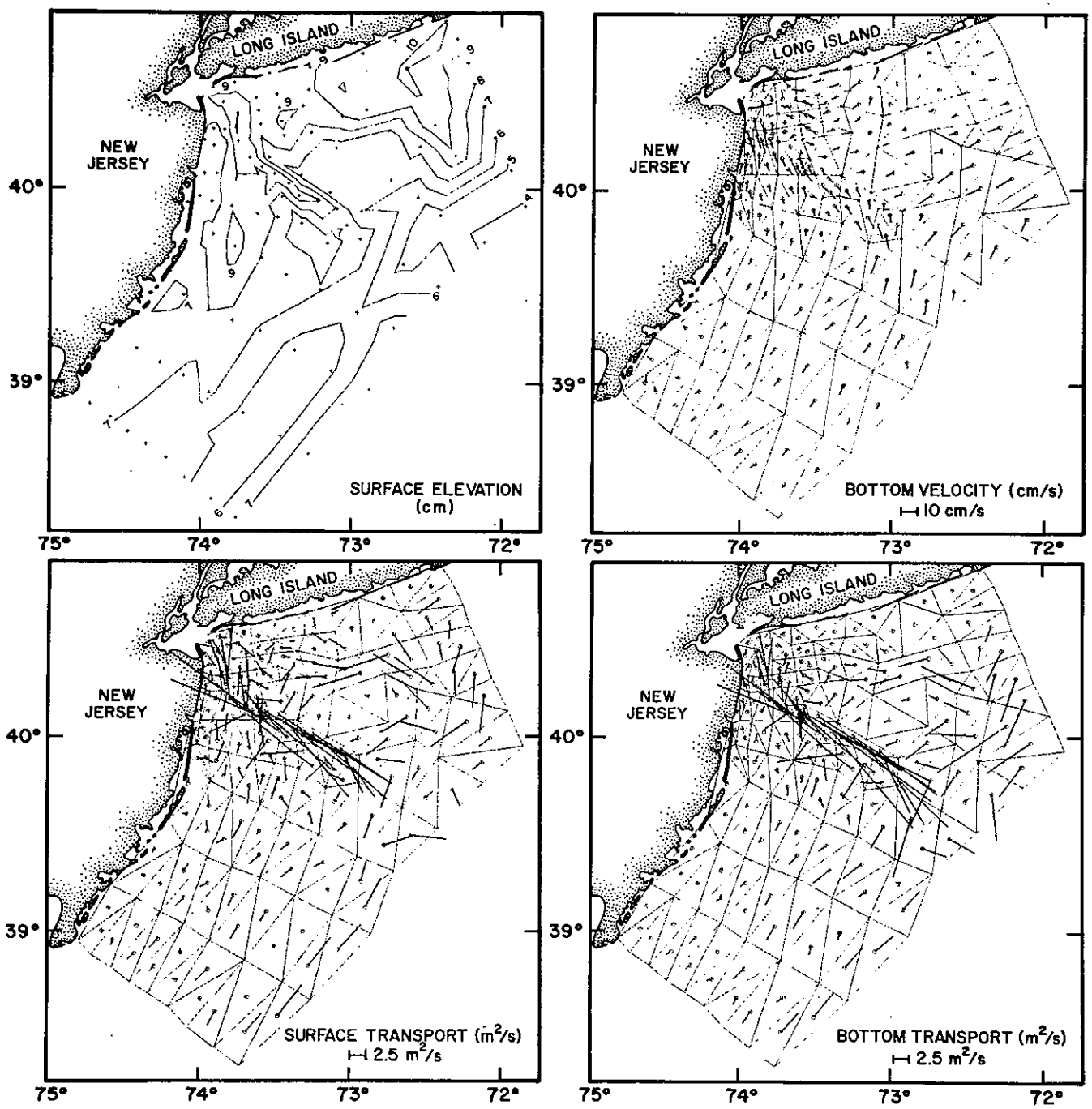

Cruise XWCC-21, modeling case 3 (Julian Day 122-129 1979).



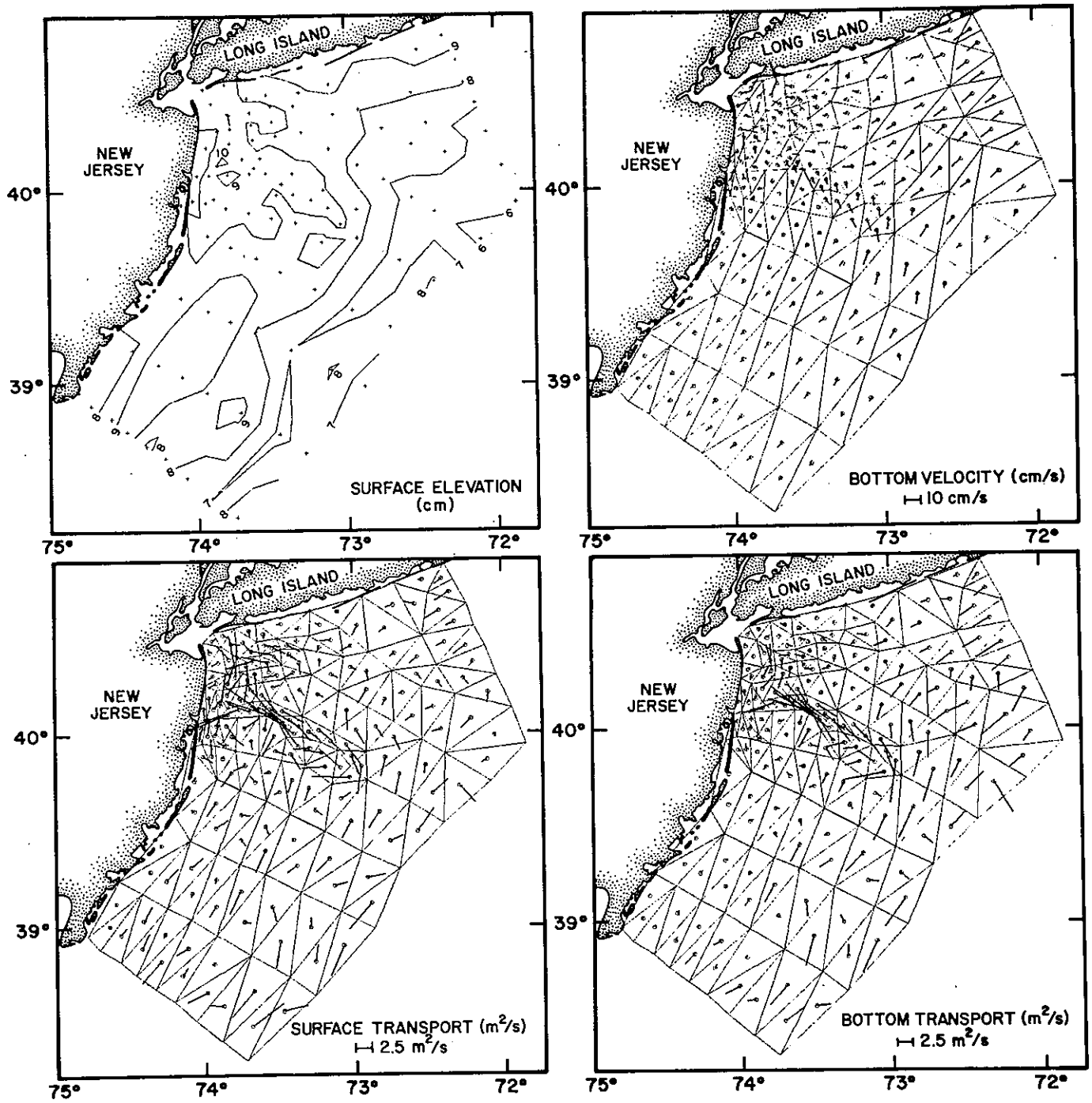

Cruise XWCC-22, modeling case 1 (Julian Day 129-140 1979).



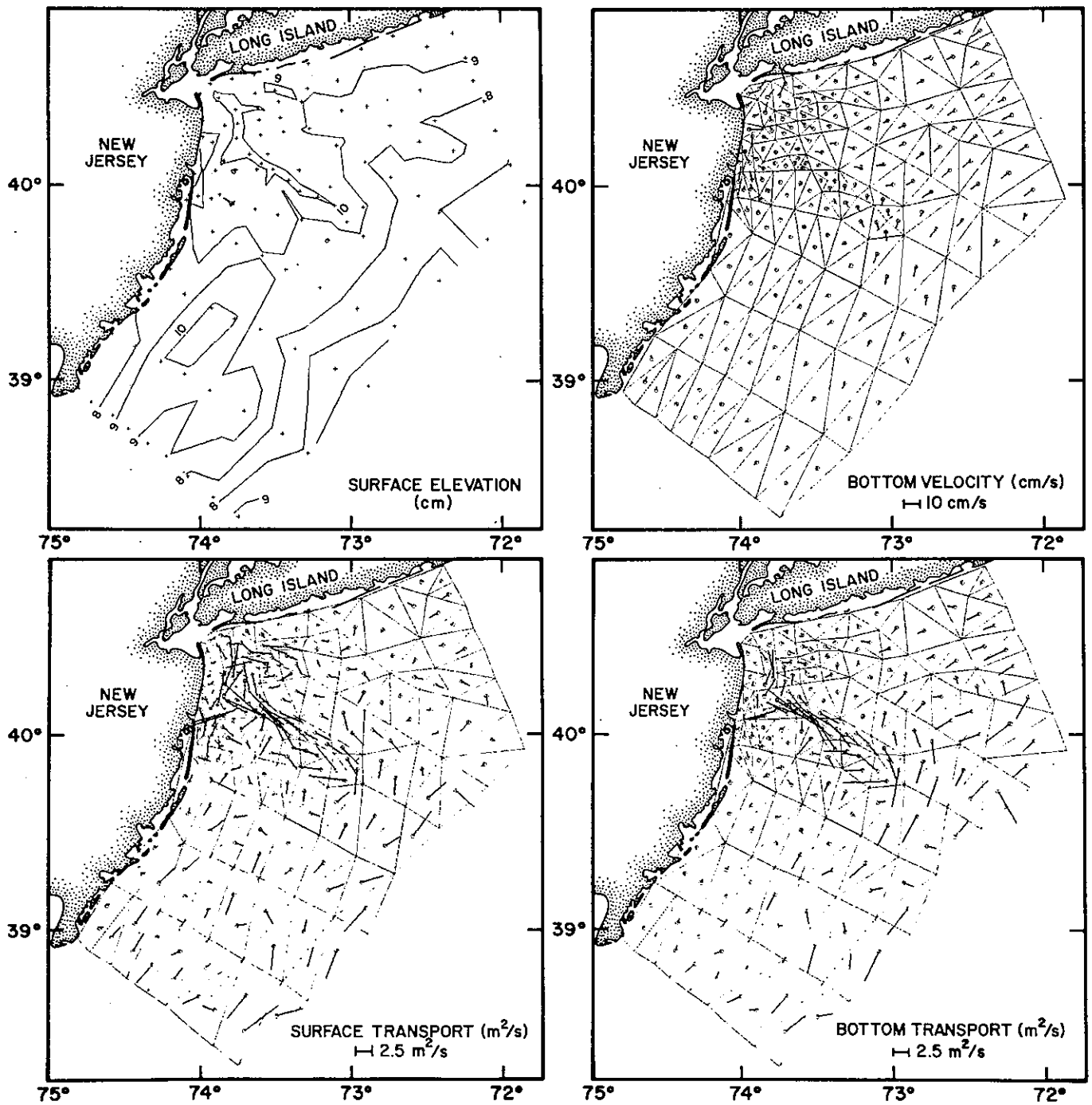

Cruise XWCC-22, modeling case 2 (Julian Day 140-163 1979).



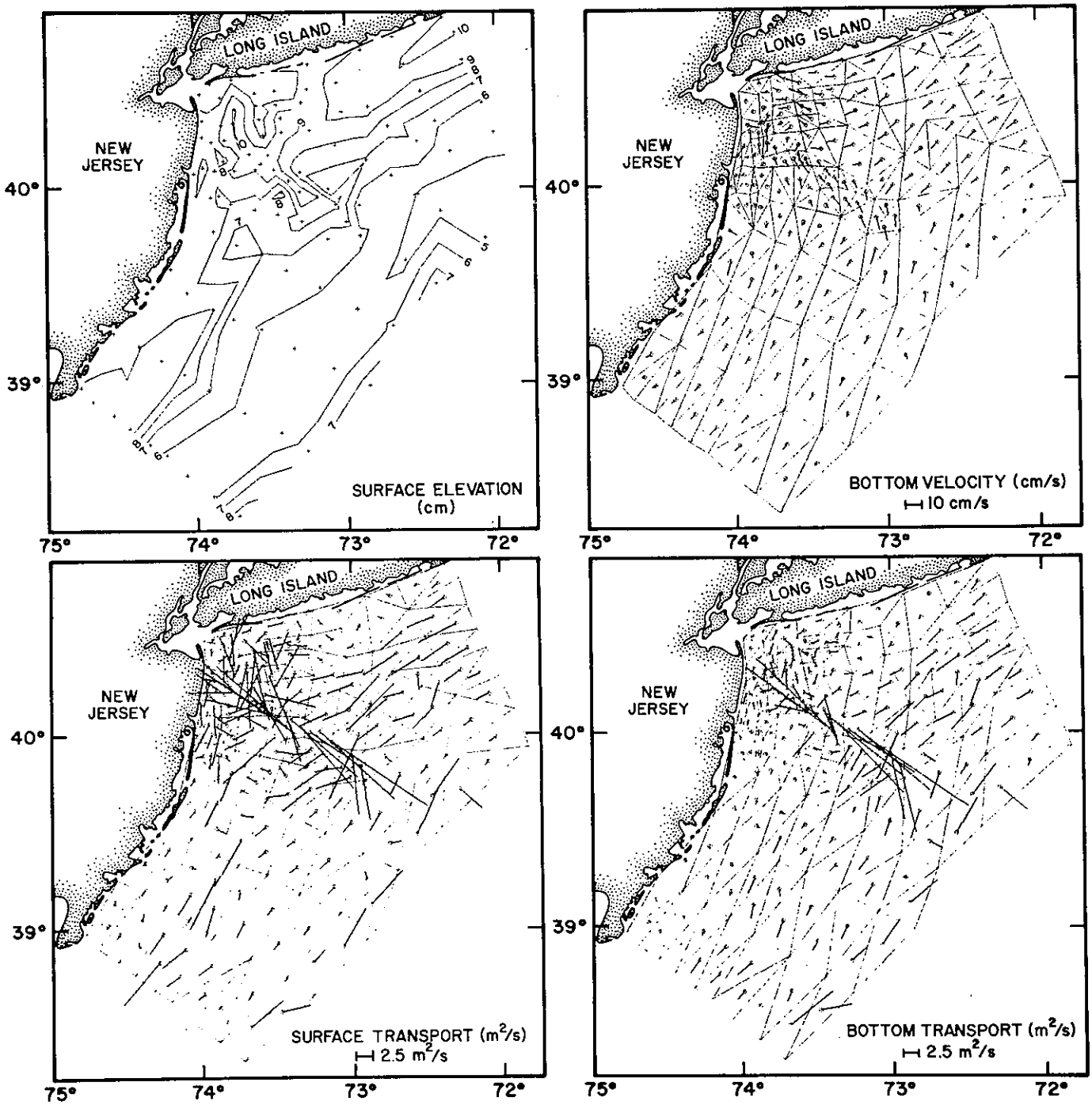

Cruise XWCC-22, modeling case 3 (Julian Day 163-182 1979).



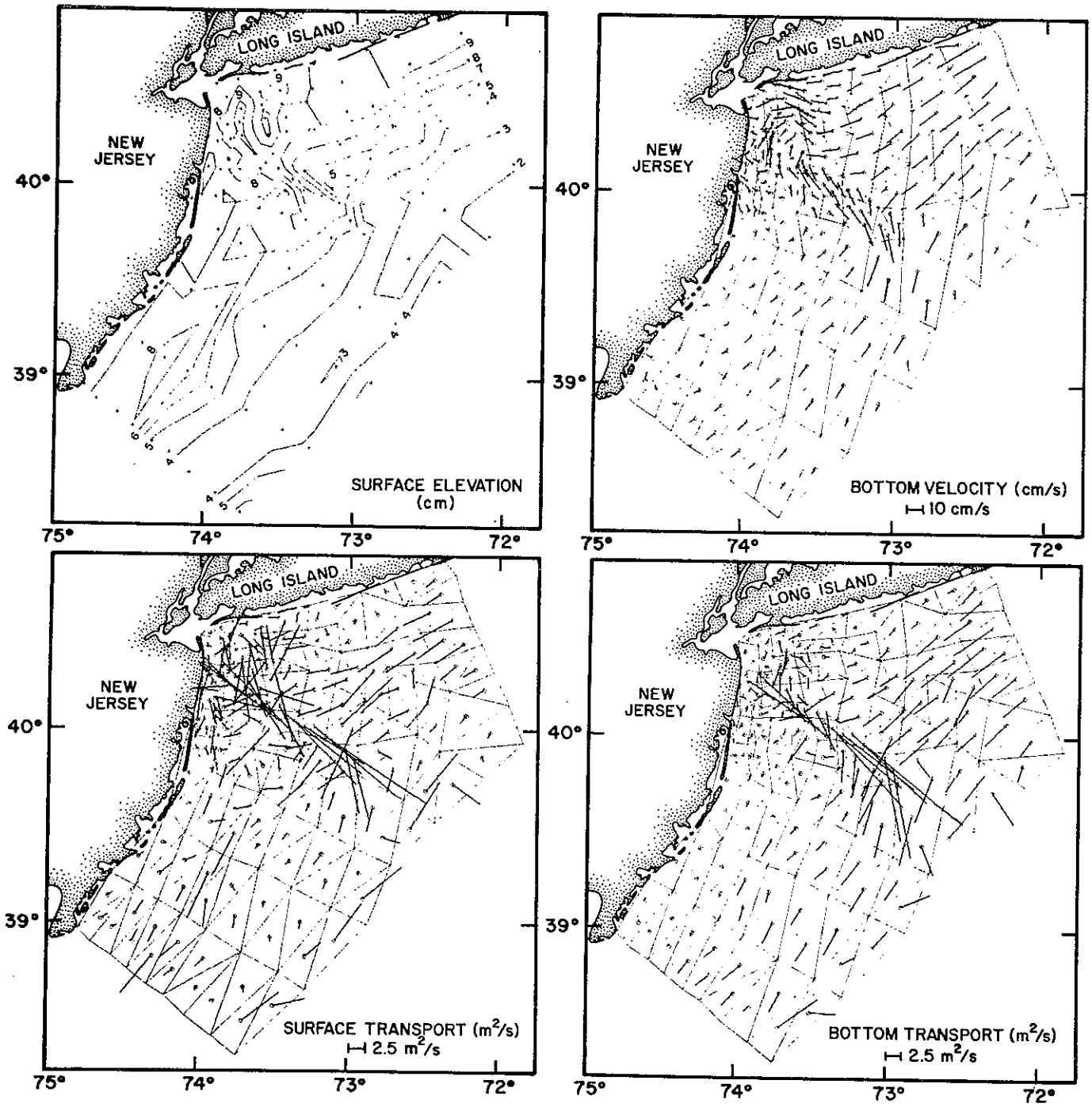

Cruise XWCC-23, modeling case 1 (Julian Day 182-198 1979).




Cruise XWCC-23, modeling case 2 (Julian Day 198-216 1979).




Cruise XWCC-24, modeling case 1 (Julian Day 216-228 1979).

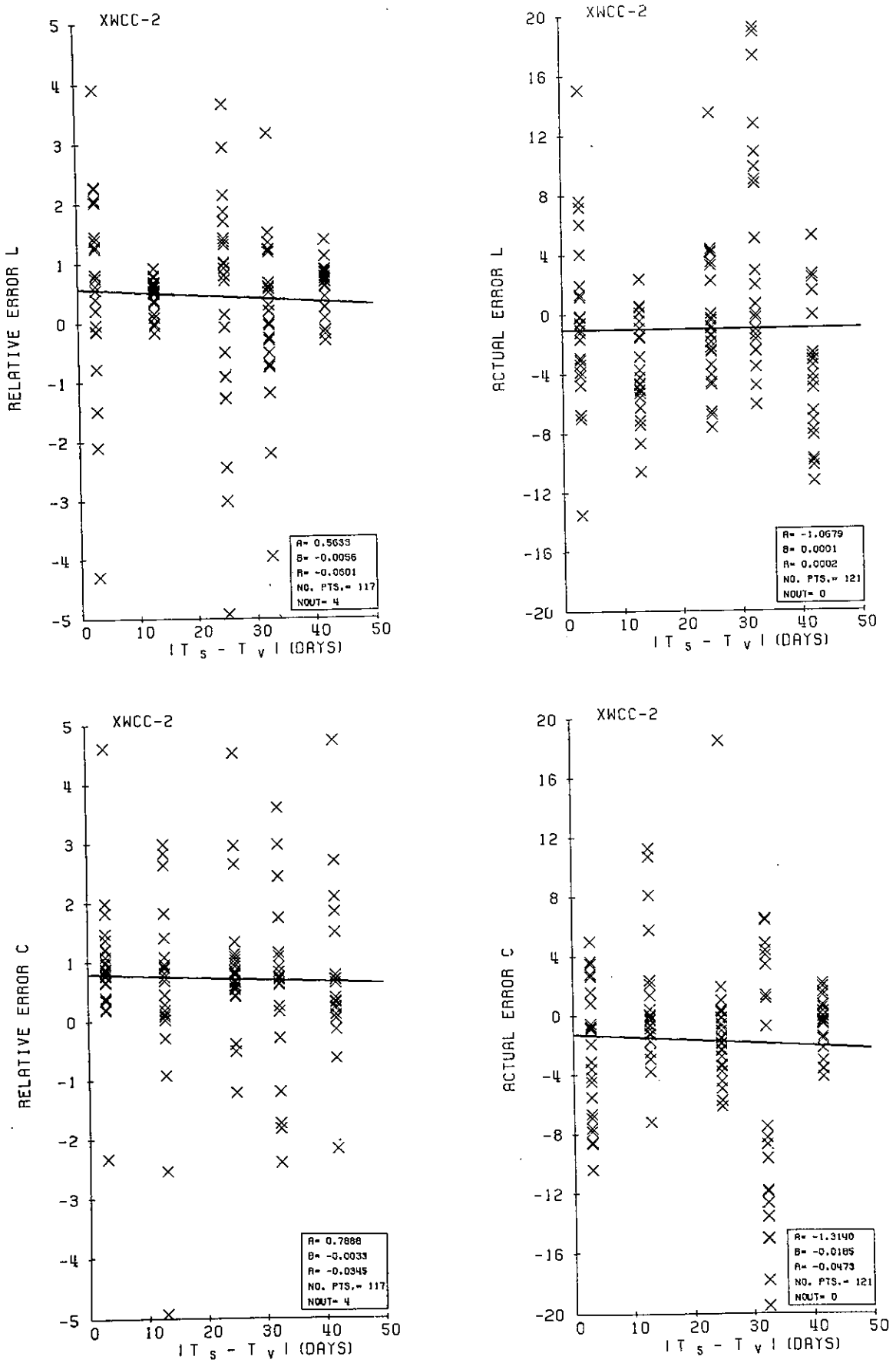



Cruise XWCC-24, modeling case 2 (Julian Day 228-249 1979).

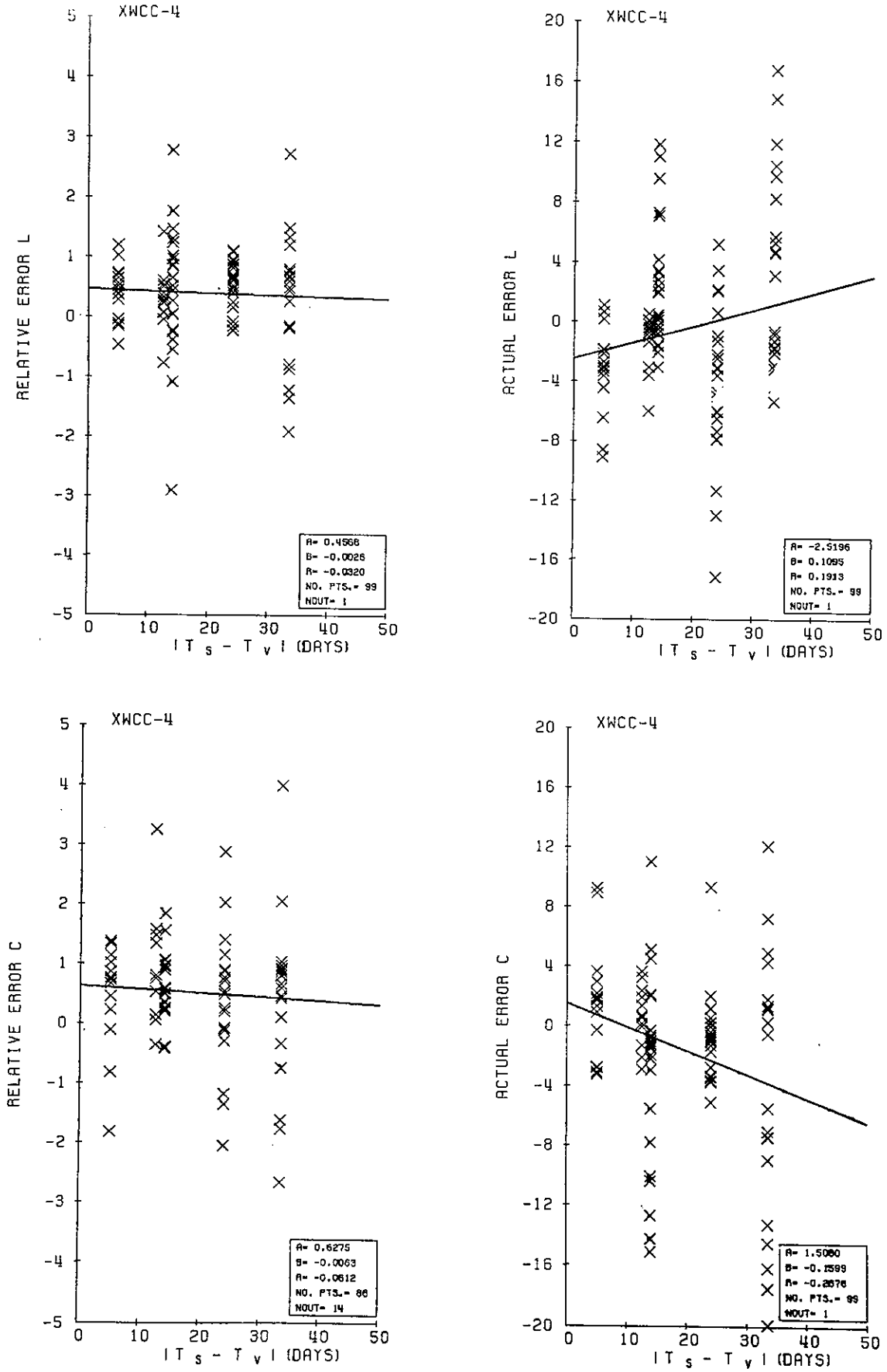
# APPENDIX C

Actual (cm/s) and relative (dimensionless) errors vs. absolute time difference between the time of data collection and the time of current measurement.

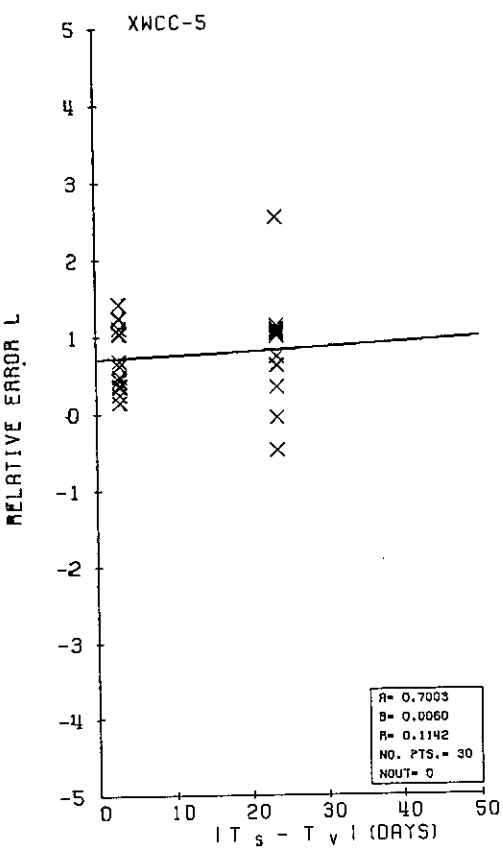

| | page |
|---|---|
| Cruise XWCC-2 | C-2 |
| Cruise XWCC-4 | C-3 |
| Cruise XWCC-5 | C-4 |
| Cruise XWCC-6 | C-5 |
| Cruise XWCC-7 | C-6 |
| Cruise XWCC-8 | C-7 |
| Cruise XWCC-9 | C-8 |
| Cruise XWCC-10 | C-9 |
| Cruise XWCC-17 | C-10 |
| Cruise XWCC-18 | C-11 |
| Cruise XWCC-19 | C-12 |
| Cruise XWCC-20 | C-13 |
| Cruise XWCC-21 | C-14 |
| Cruise XWCC-22 | C-15 |
| Cruise XWCC-23 | C-16 |
| Cruise XWCC-24 | C-17 |

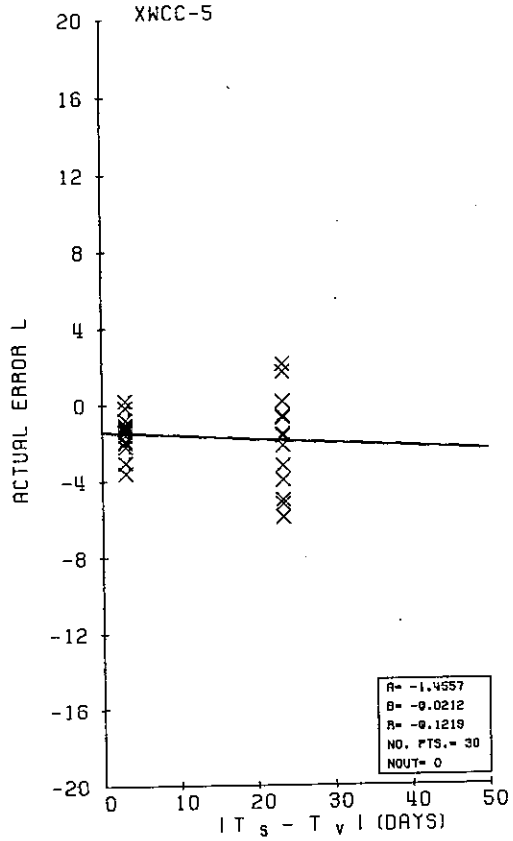


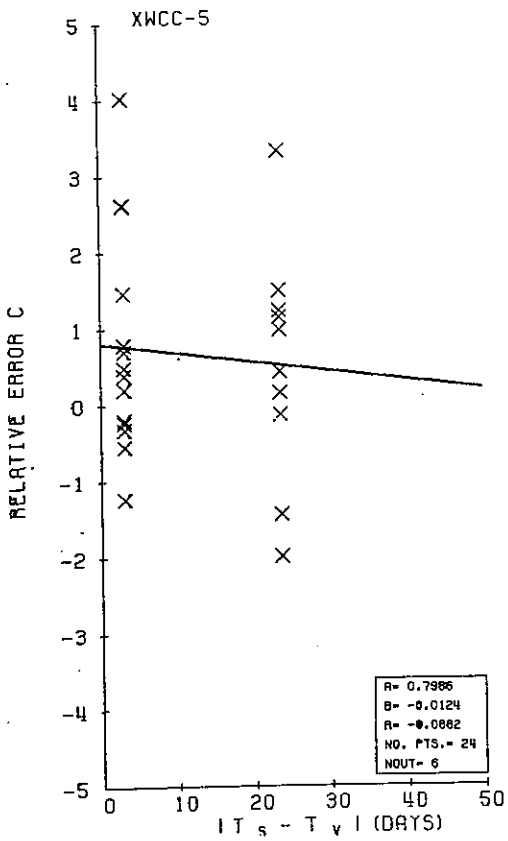

Cruise XWCC-2: Actual and relative errors vs. absolute time difference.

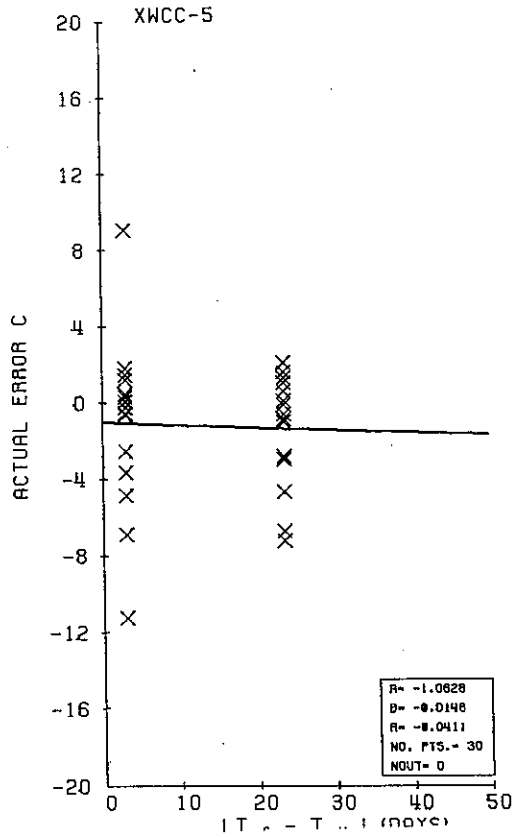



Cruise XWCC-4: Actual and relative errors vs. absolute time difference.

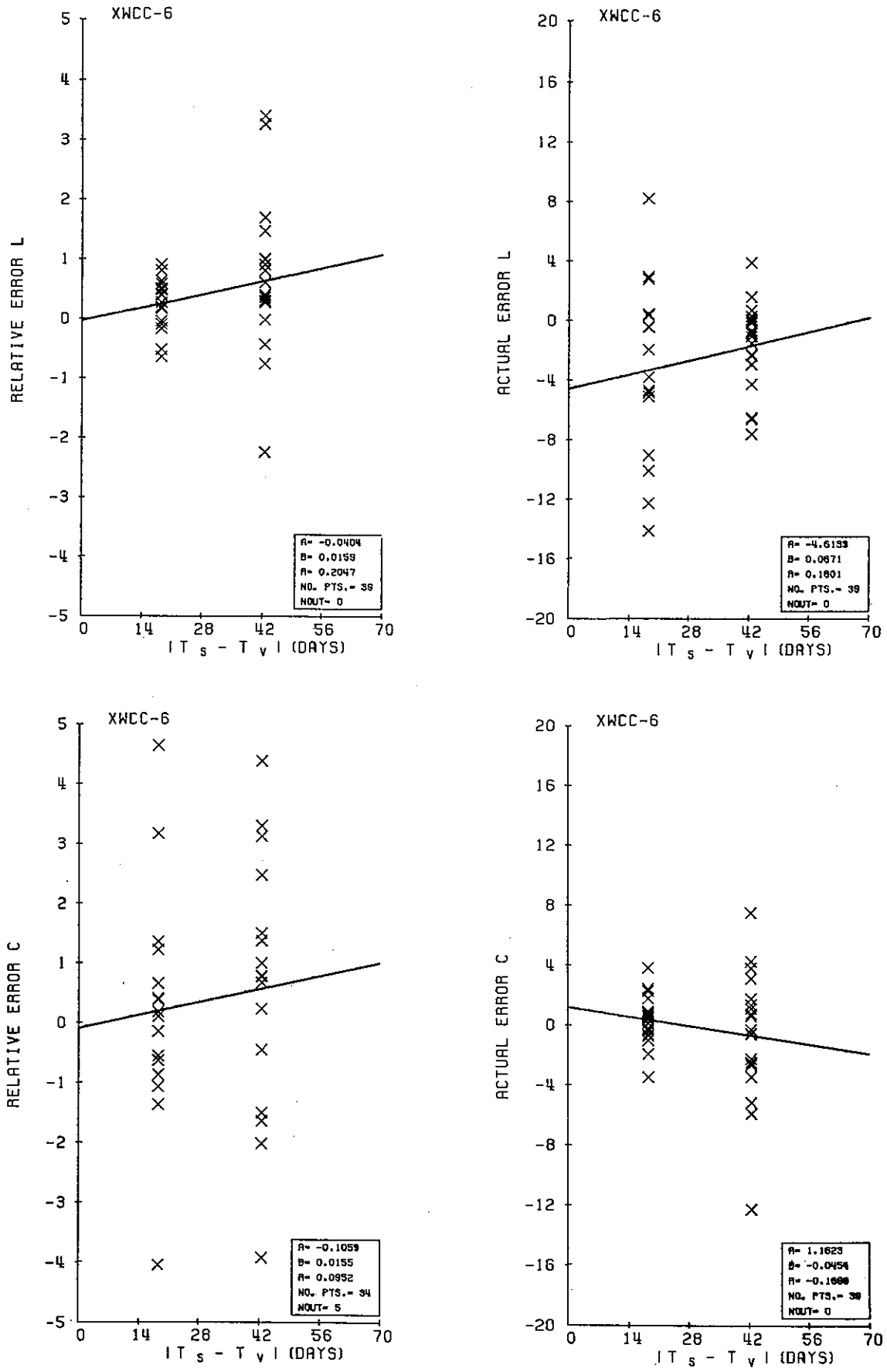


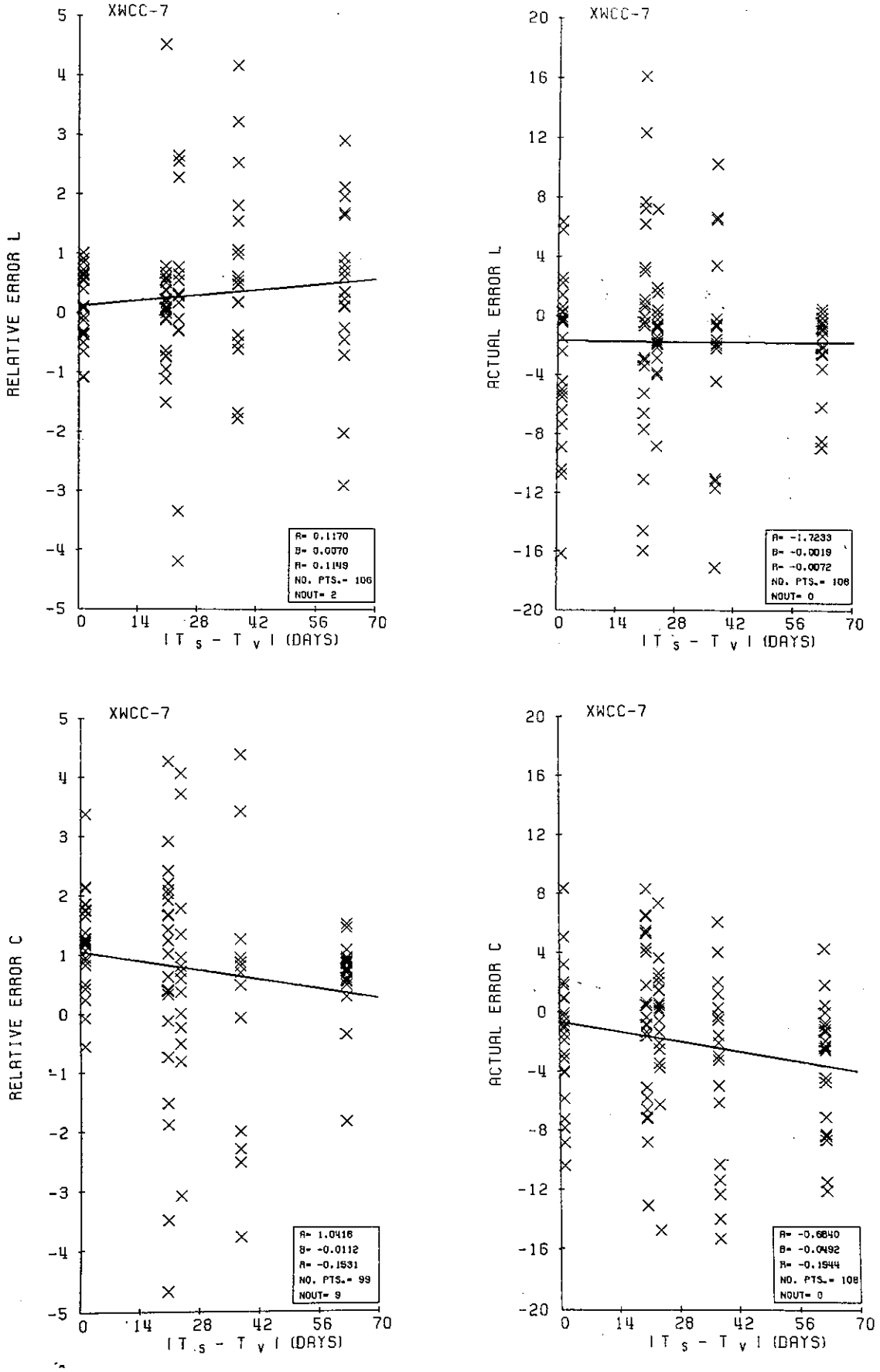



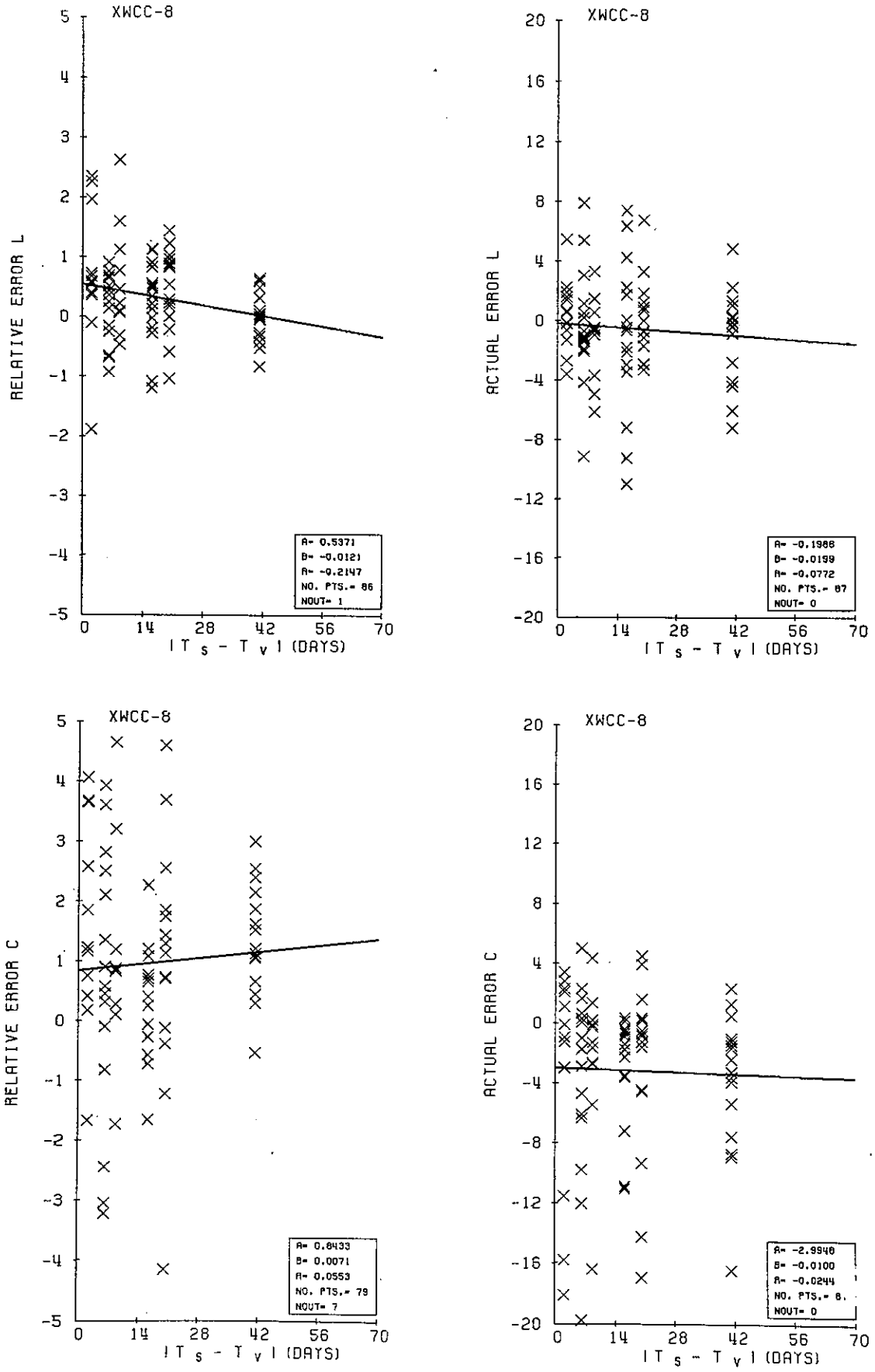

Cruise XWCC-5: Actual and relative errors vs. absolute time difference.



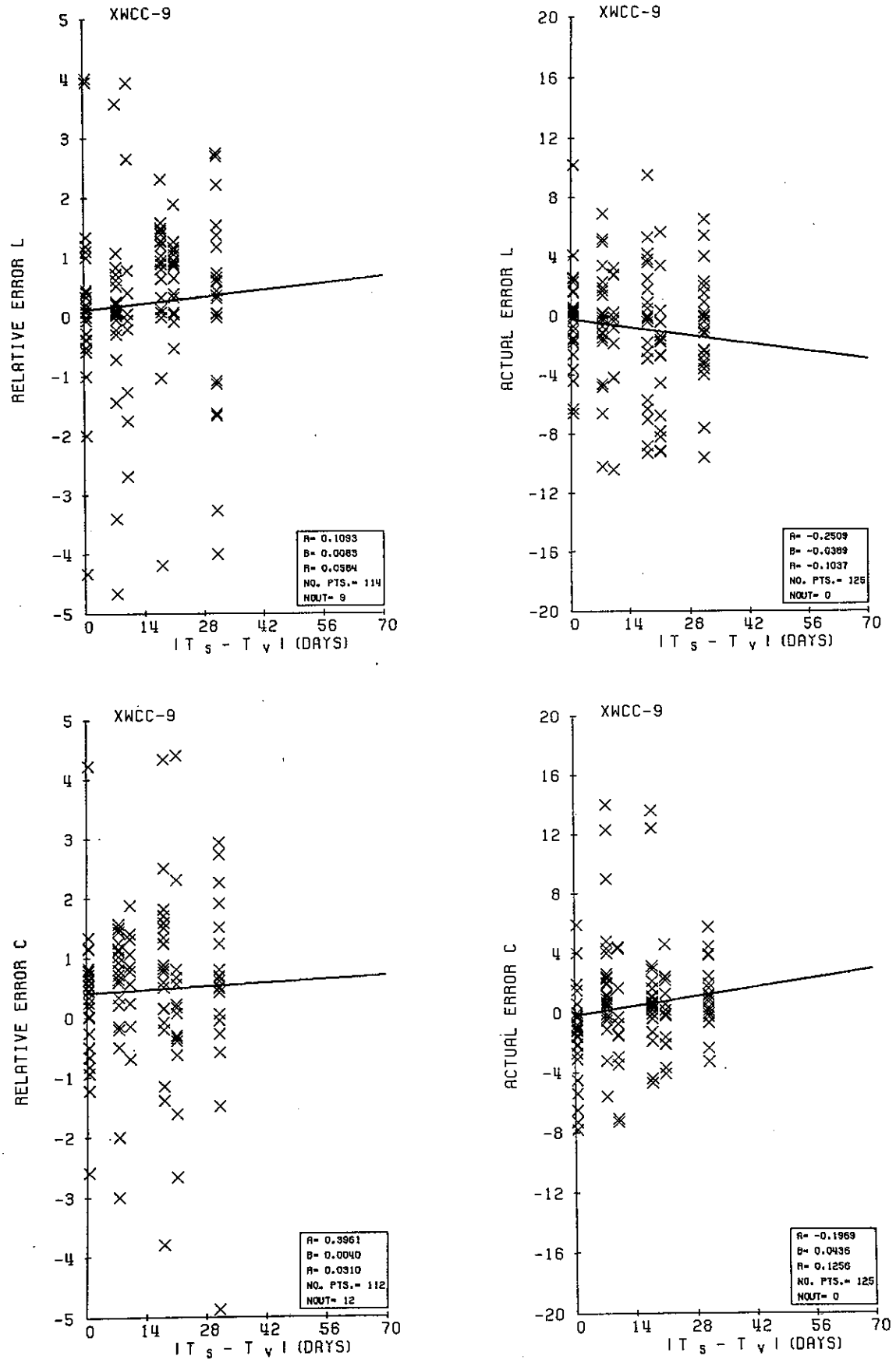

Cruise XWCC-6: Actual and relative errors vs. absolute time difference.



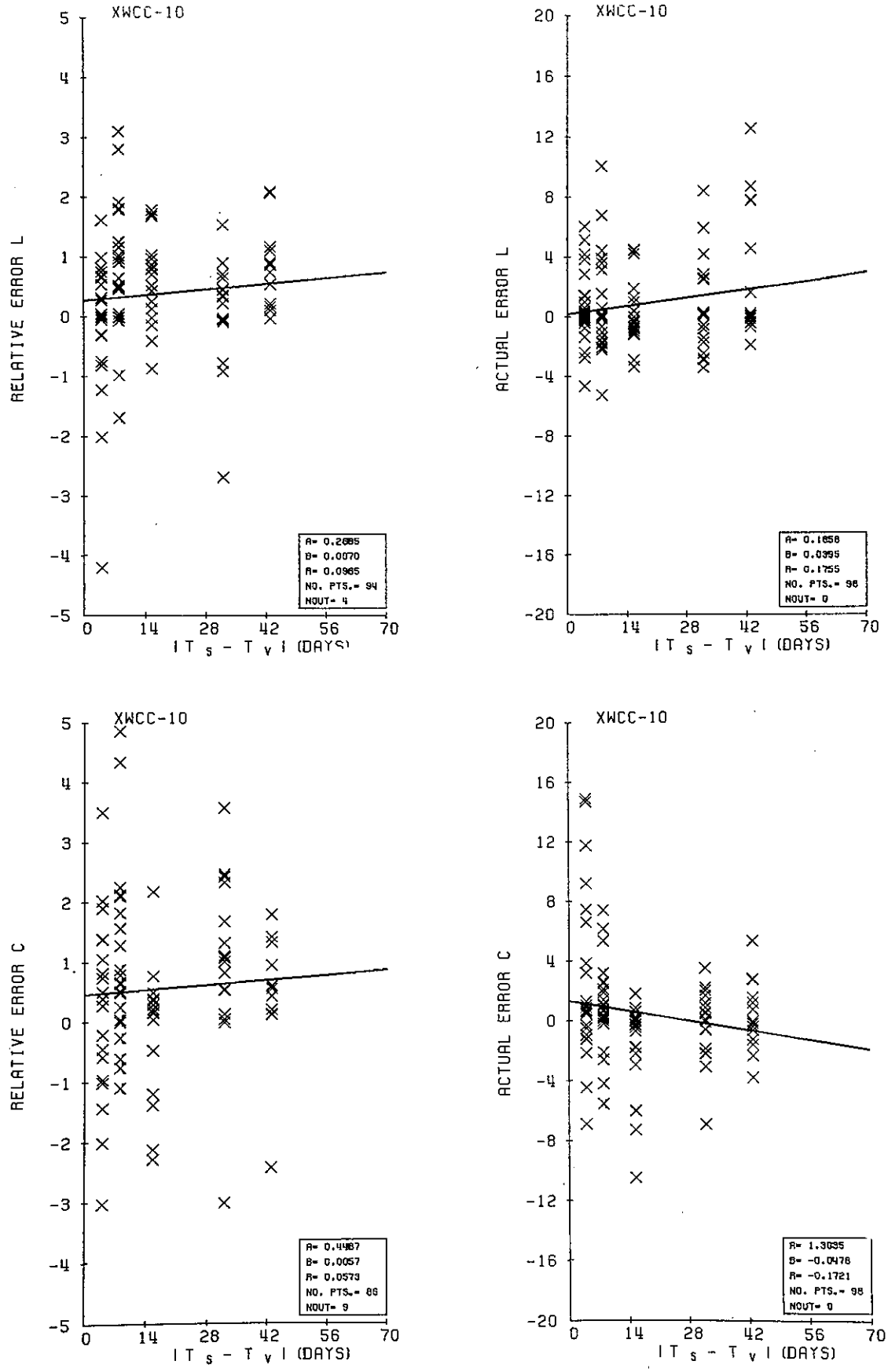

Cruise XWCC-7: Actual and relative errors vs. absolute time difference.



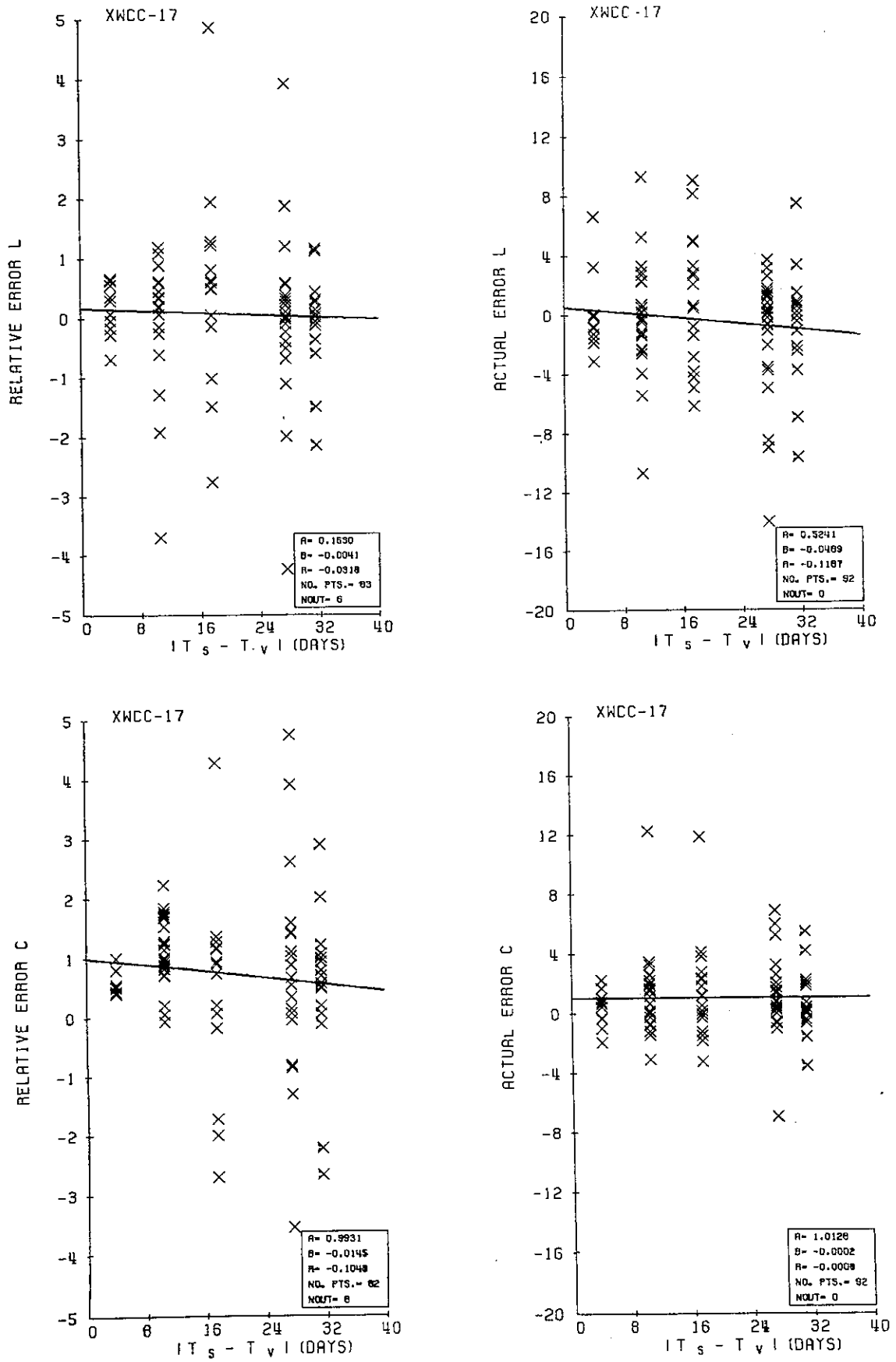

Cruise XWCC-8: Actual and relative errors vs. absolute time difference.



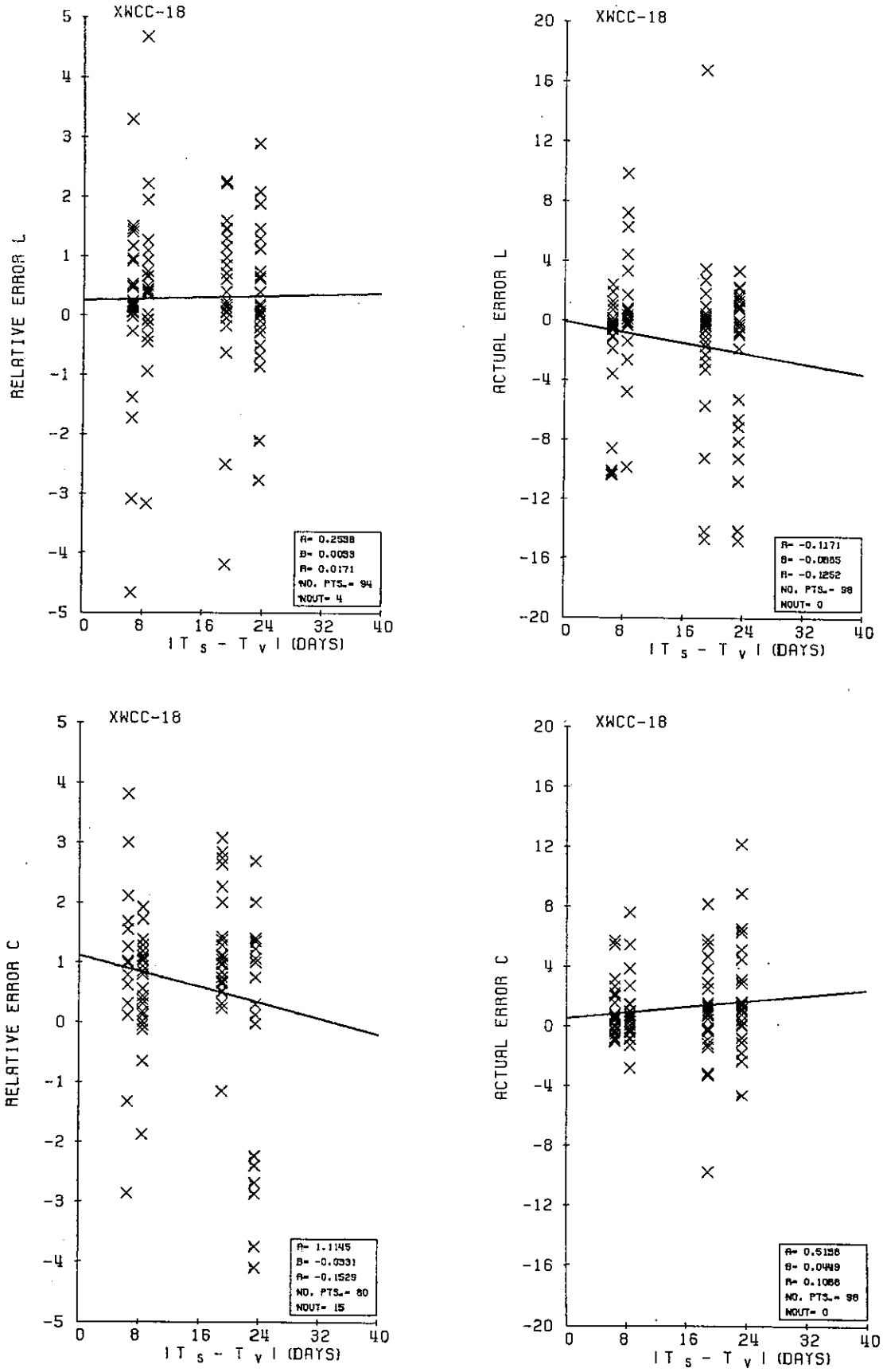

Cruise XWCC-9: Actual and relative errors vs. absolute time difference.



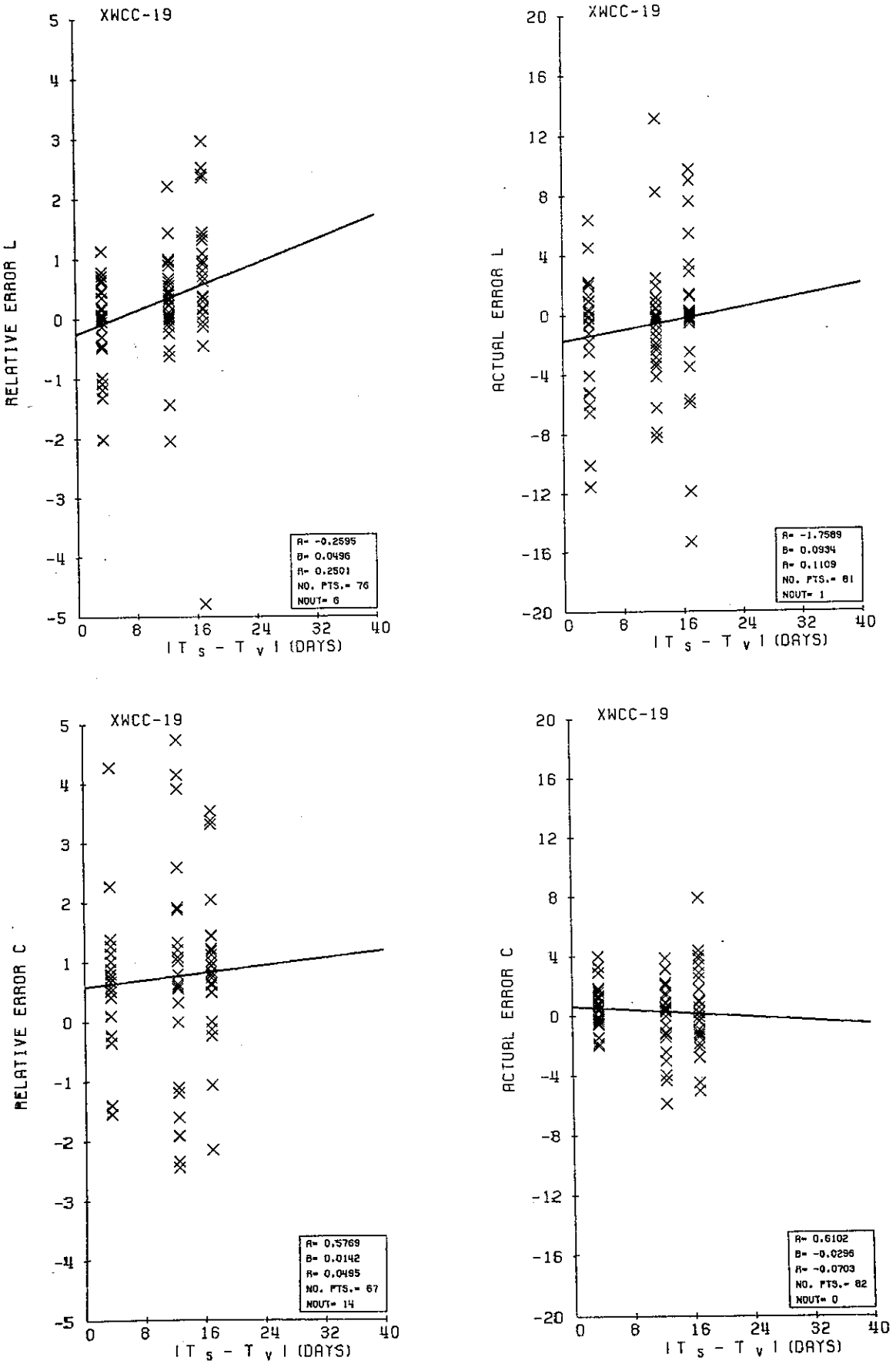

Cruise XWCC-10: Actual and relative errors vs. absolute time difference.



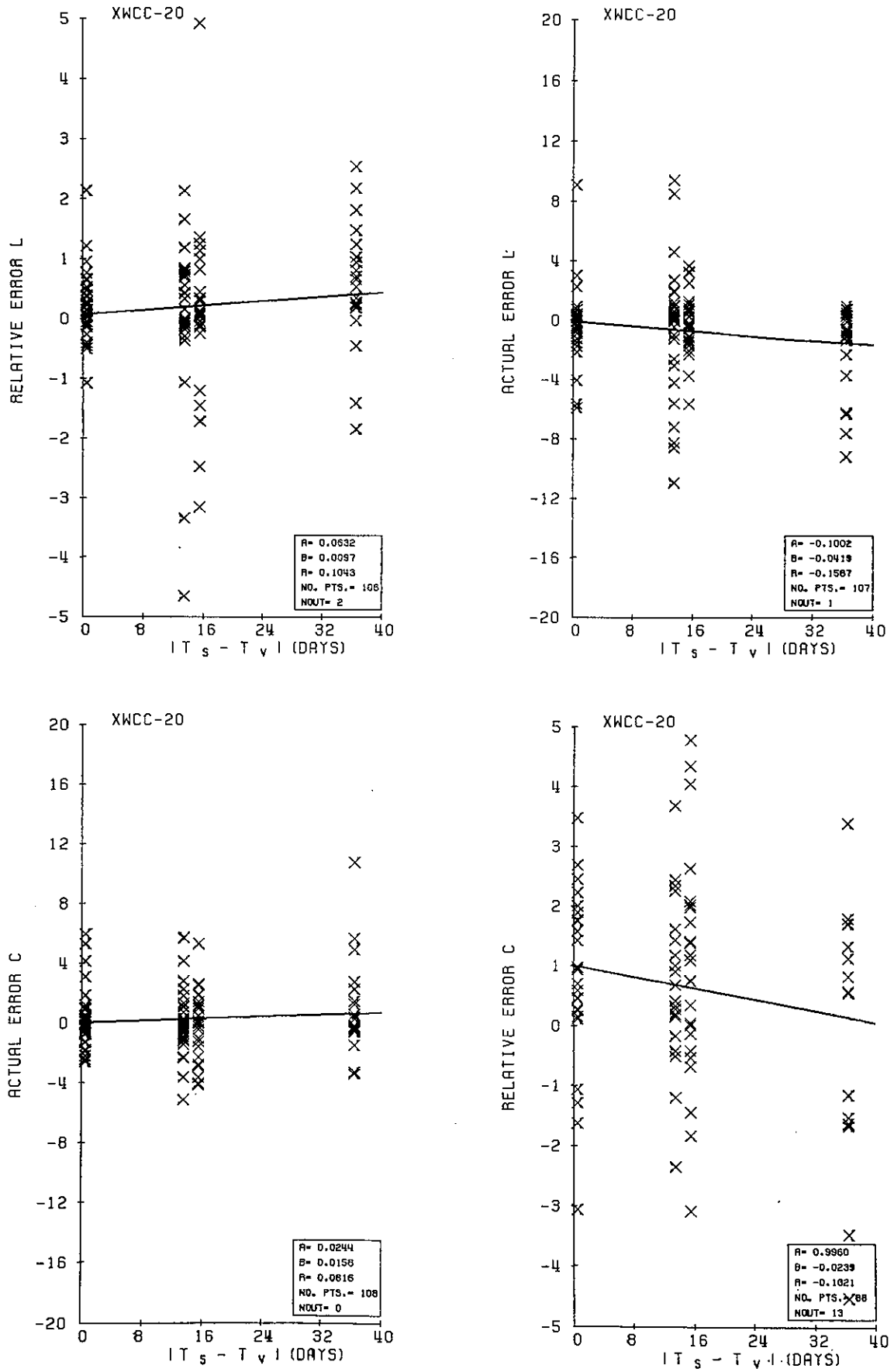

Cruise XWCC-17: Actual and relative errors vs. absolute time difference.



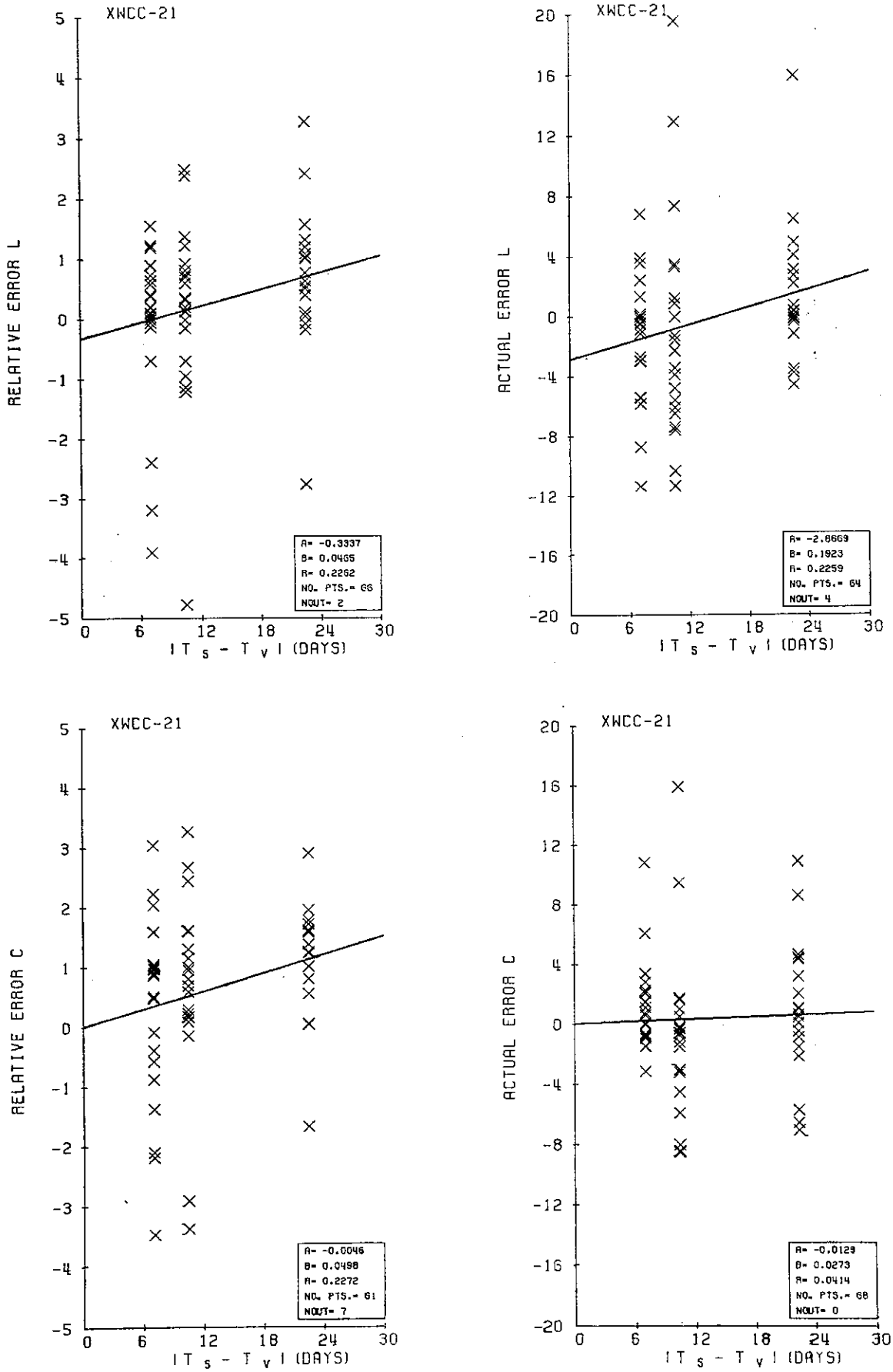

Cruise XWCC-18: Actual and relative errors vs. absolute time difference.



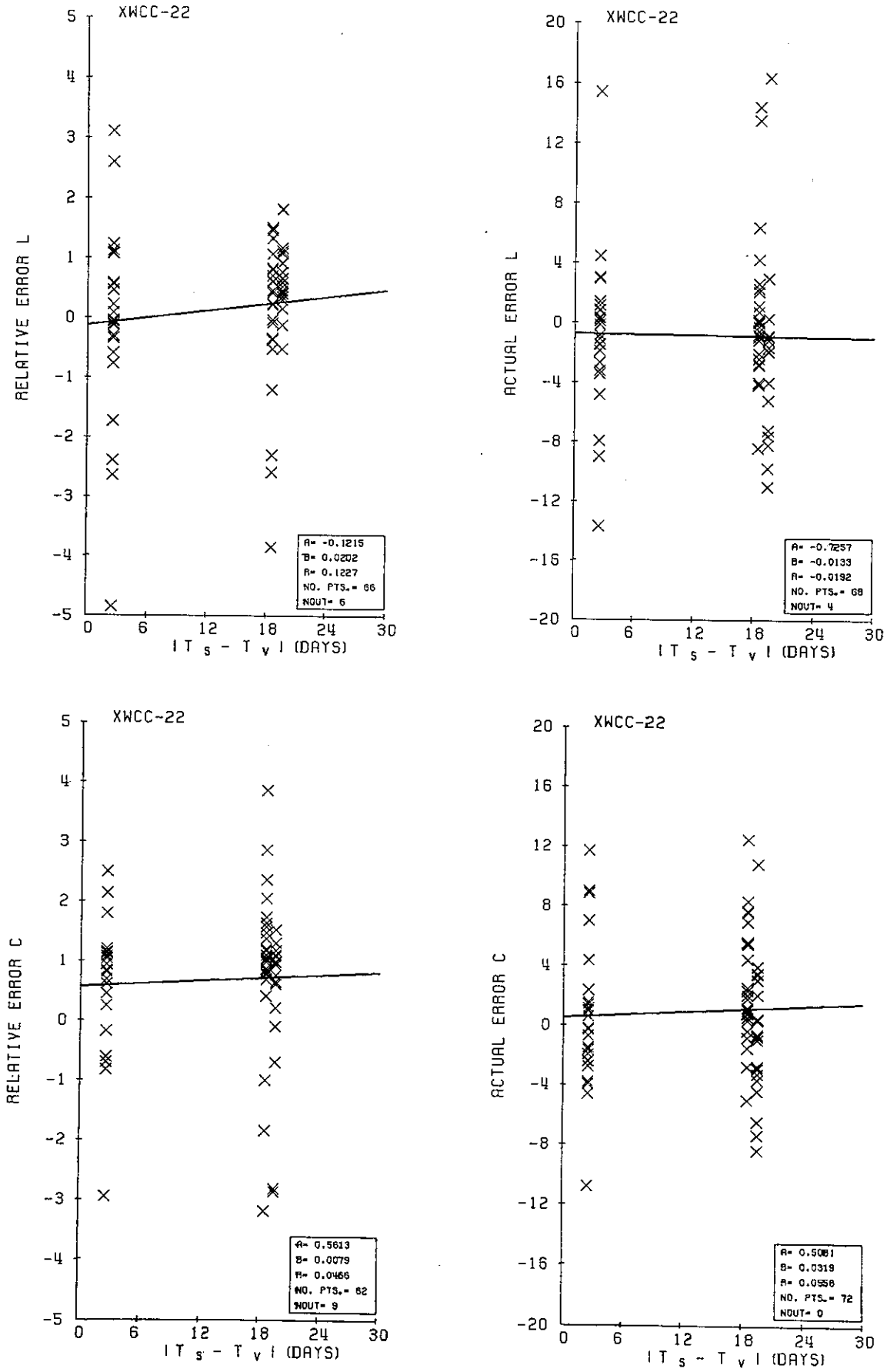

Cruise XWCC-19: Actual and relative errors vs. absolute time difference.



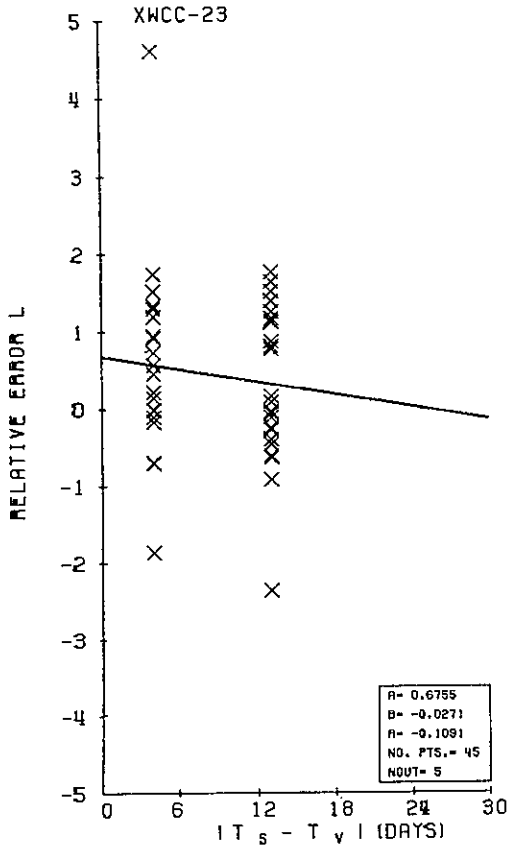

Cruise XWCC-20: Actual and relative errors vs. absolute time difference.

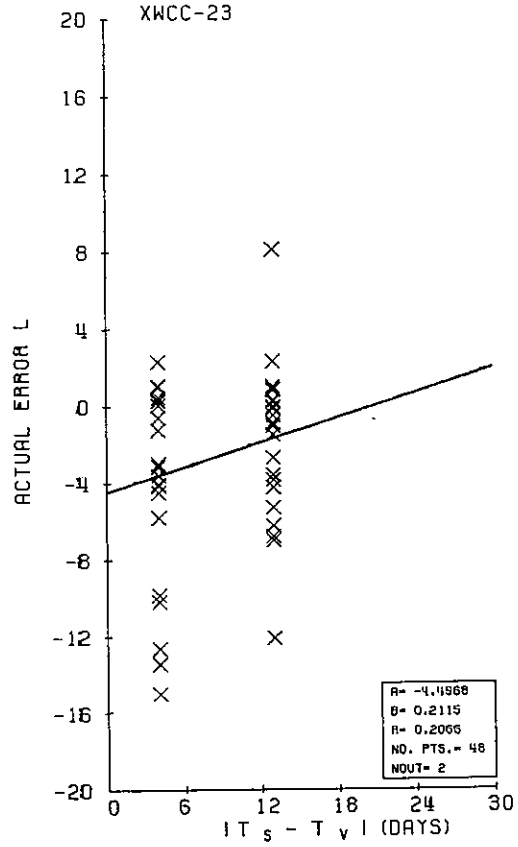


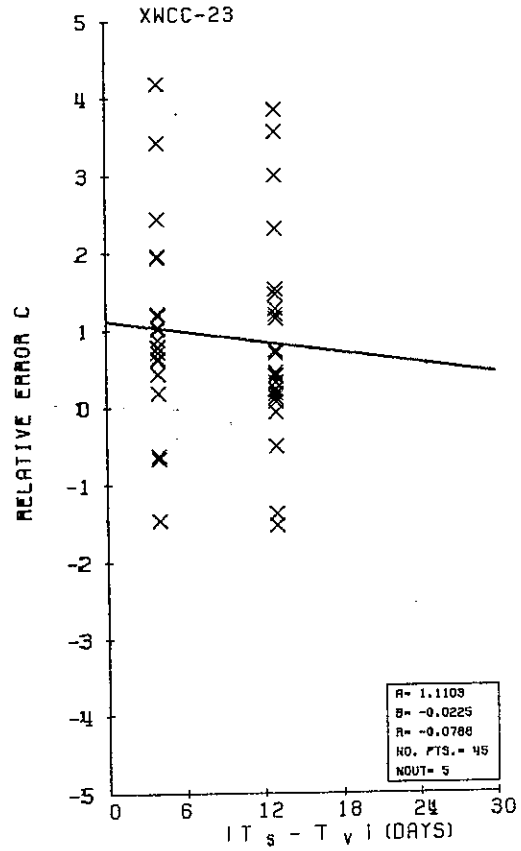

Cruise XWCC-21: Actual and relative errors vs. absolute time difference.

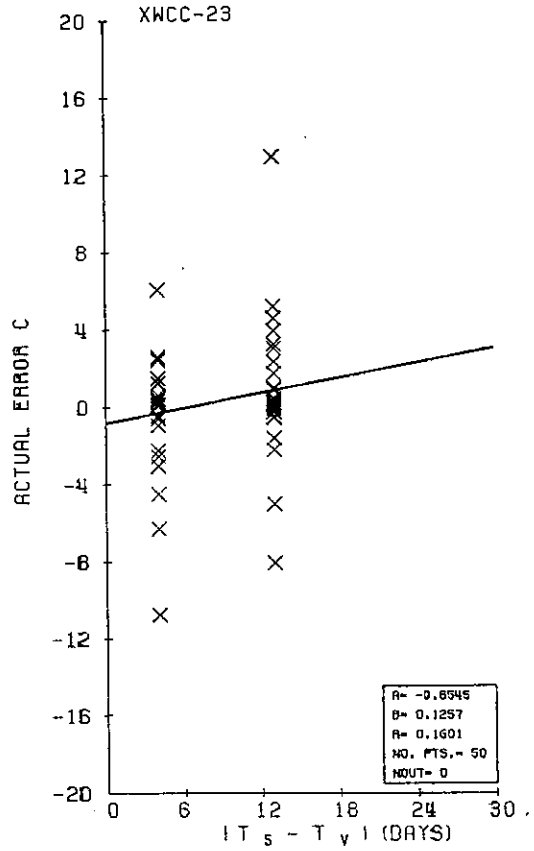



Cruise XWCC-22: Actual and relative errors vs. absolute time difference.

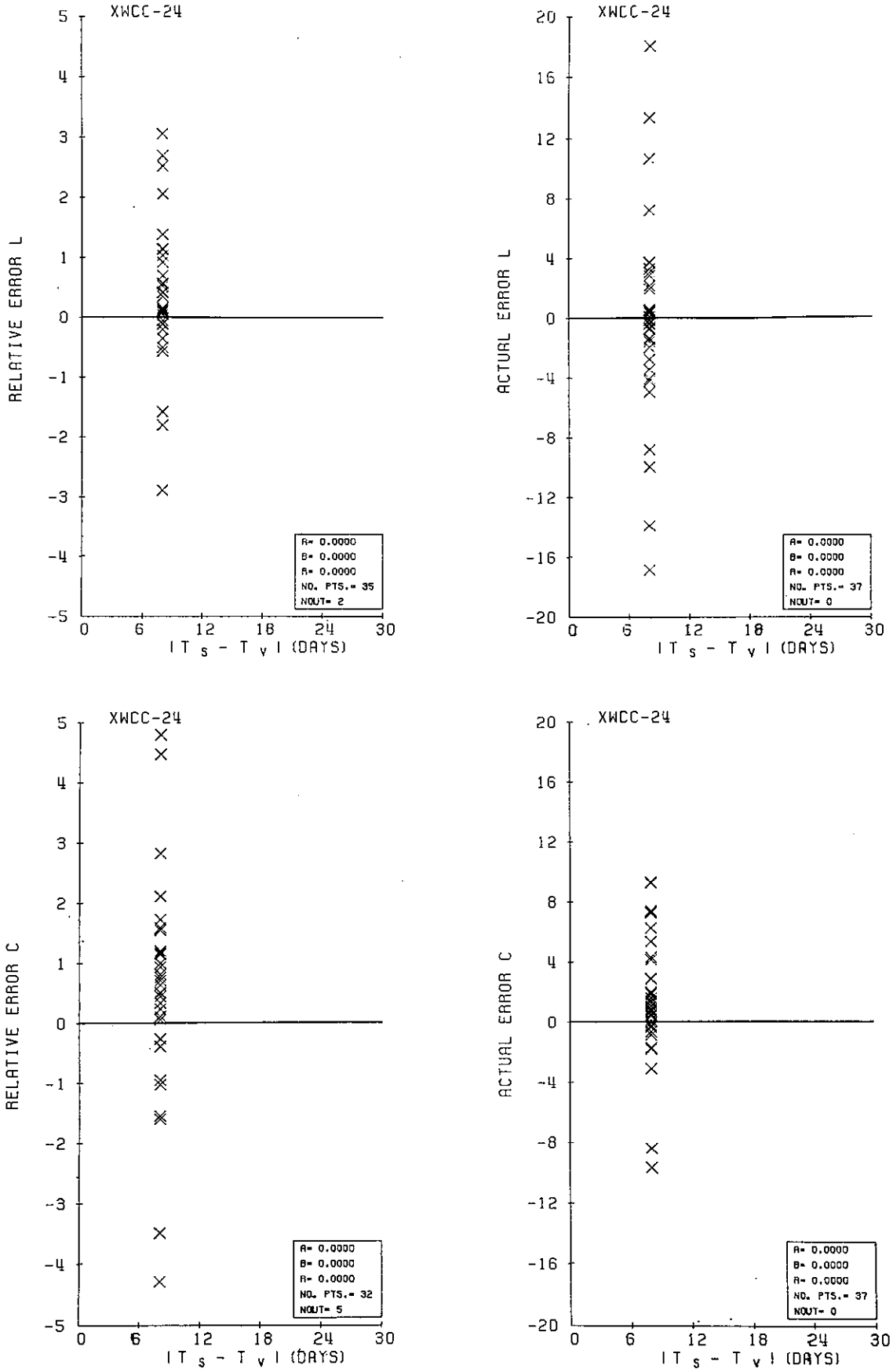



Cruise XWCC-23: Actual and relative errors vs. absolute time difference.



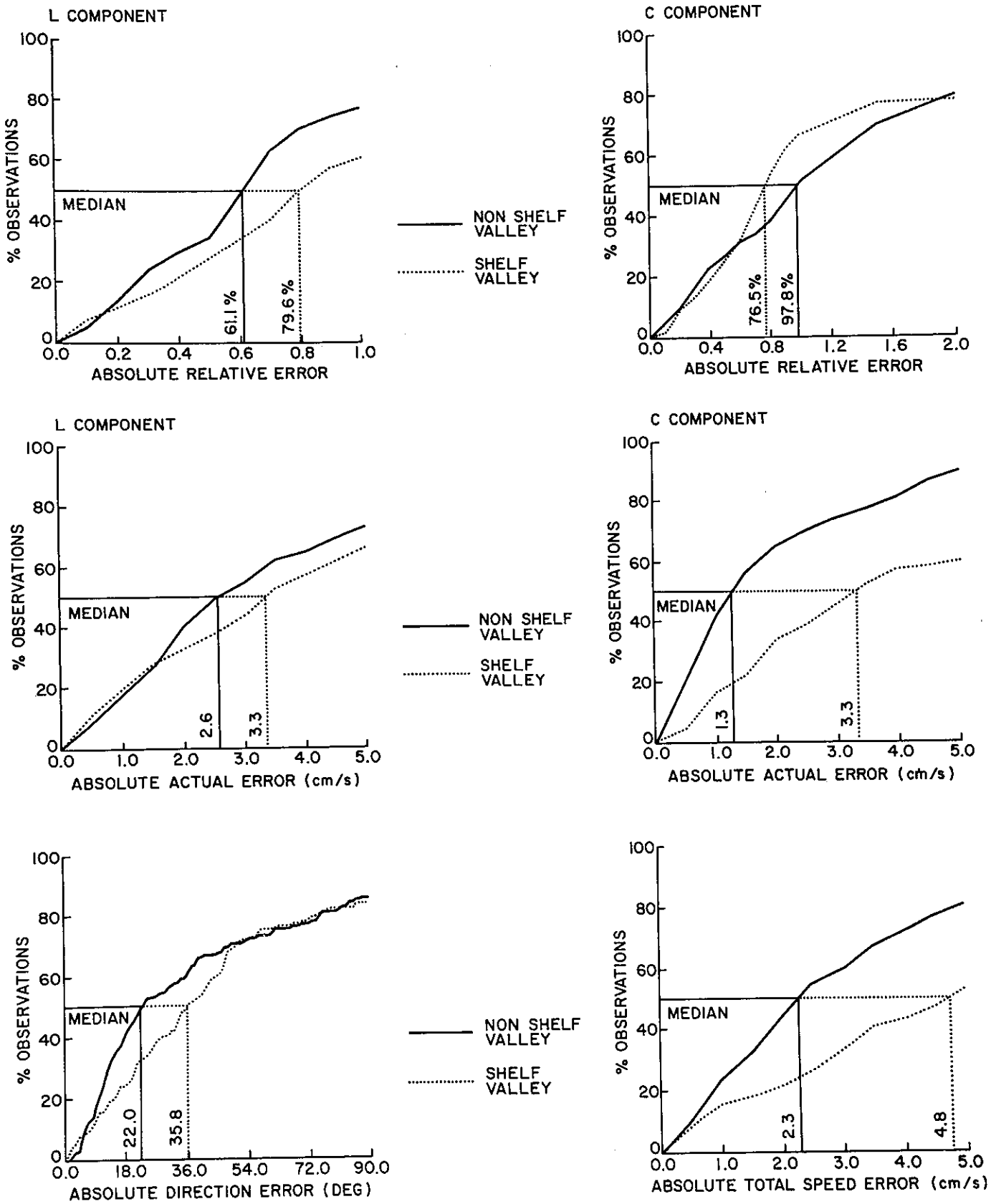

Cruise XWCC-24: Actual and relative errors vs. absolute time difference.

# APPENDIX D

Cumulative probability density functions (CDF) of absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors for:

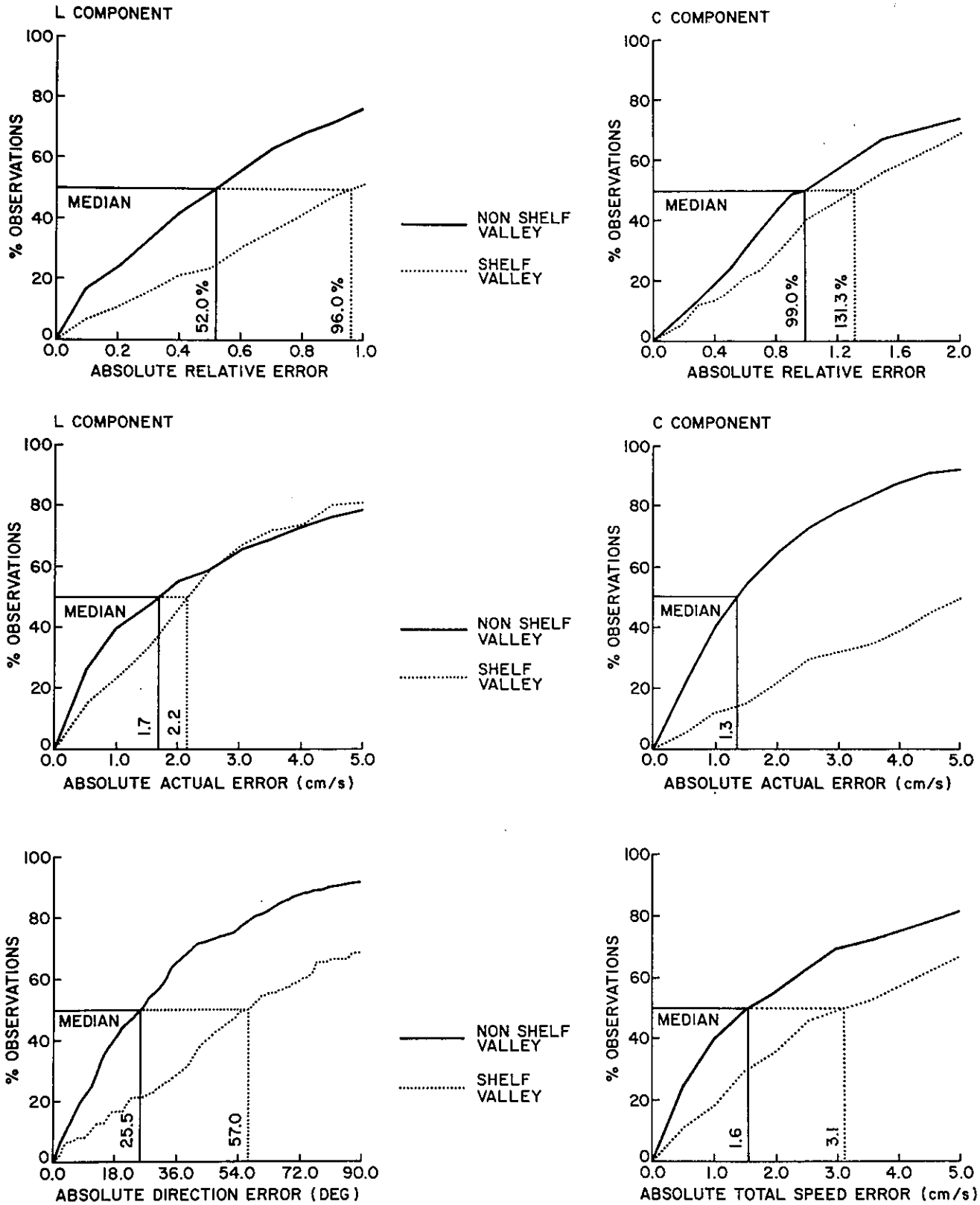

| year | page |
|---|---|
| 1975 | D-2 |
| 1976 | D-3 |
| 1978 | D-4 |
| 1979 | D-5 |

CUMULATIVE PROBABILITY DENSITY FUNCTIONS
1975



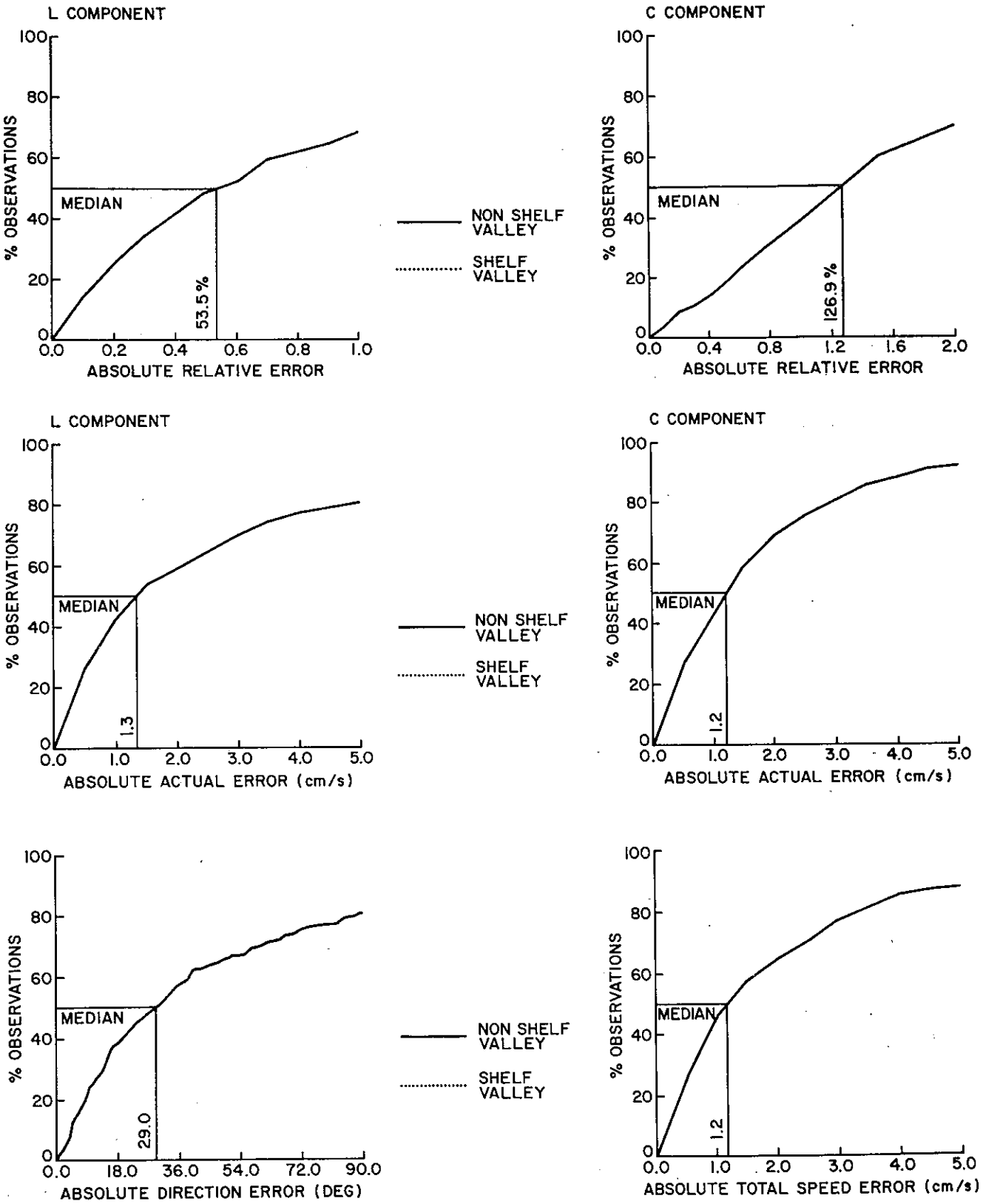

1975 cumulative probability density functions (CDF) of absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors.

CUMULATIVE PROBABILITY DENSITY FUNCTIONS
1976



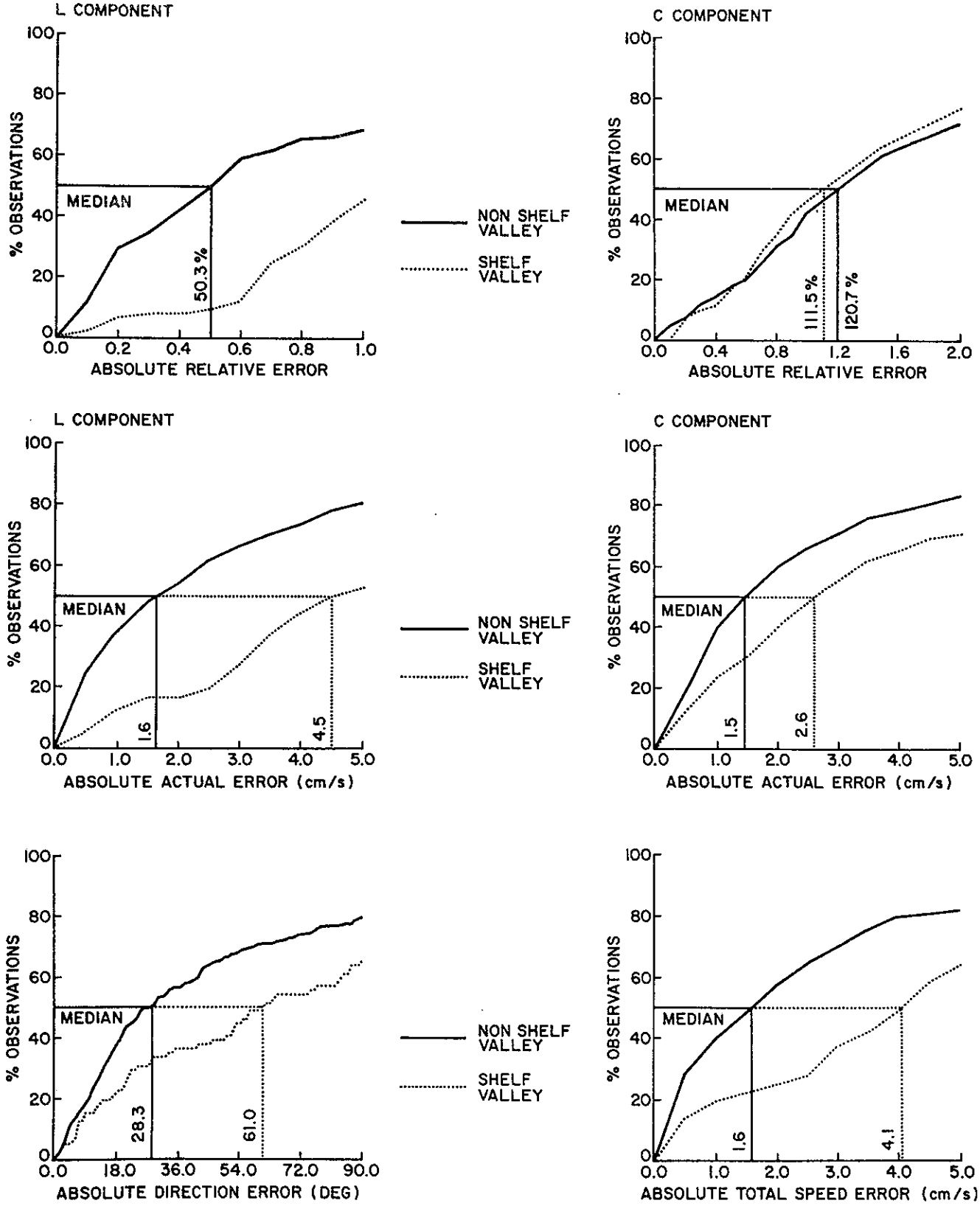

1976 cumulative probability density functions (CDF) of absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors.

## CUMULATIVE PROBABILITY DENSITY FUNCTIONS
## 1978




1978 cumulative probability density functions (CDF) of absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors.

CUMULATIVE PROBABILITY DENSITY FUNCTIONS
1979

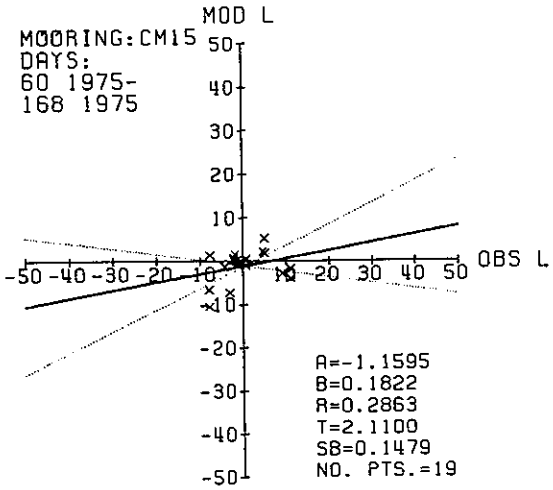



1979 cumulative probability density functions (CDF) of absolute relative errors, absolute actual errors, absolute direction errors, and absolute total speed errors.

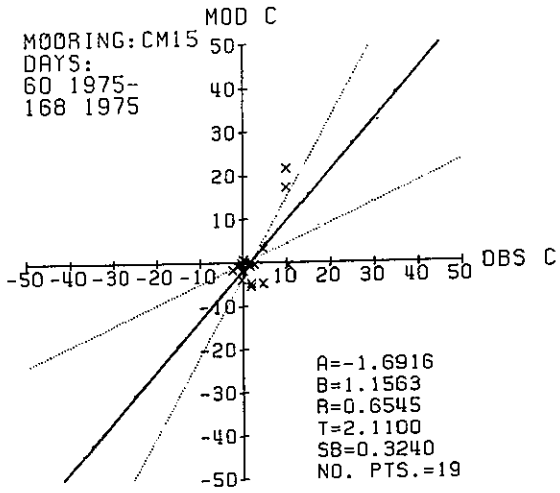
# APPENDIX E

Linear regression of modelled vs. observed velocity components.

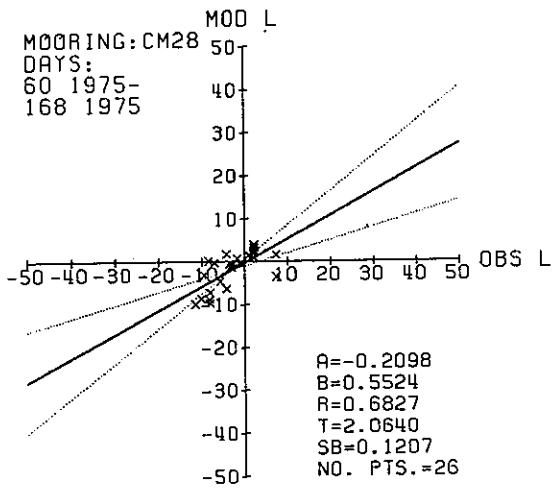

| | page |
|---|---|
| Moorings CM15, CM28, CM29 | E-2 |
| Moorings CM30, CM33, CM34 | E-3 |
| Moorings CM36, CM37, CM38 | E-4 |
| Moorings CM49, LT1, LT2 | E-5 |
| Moorings LT3, LT4, LT5 | E-6 |
| Moorings LT6, LT7, LI1 | E-7 |
| Moorings LI2, LI3, LI4 | E-8 |
| Moorings LPG1, LPG2, LPG3 | E-9 |
| Moorings LPG4, LTM, NJ1 | E-10 |
| Moorings NJ2, NJ3, LTM | E-11 |
| Moorings LI1, LI3, NJ2A | E-12 |
| Moorings N13, N14, N23 | E-13 |
| Moorings N31, N32, N33 | E-14 |
| Moorings N41, N42, N51 | E-15 |
| Mooring N52 | E-16 |



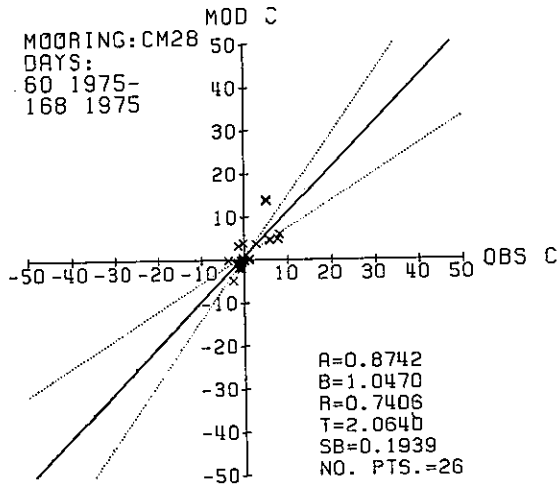

SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%



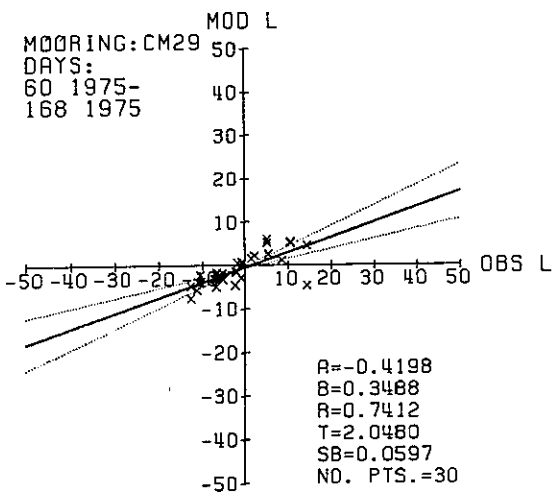

SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%



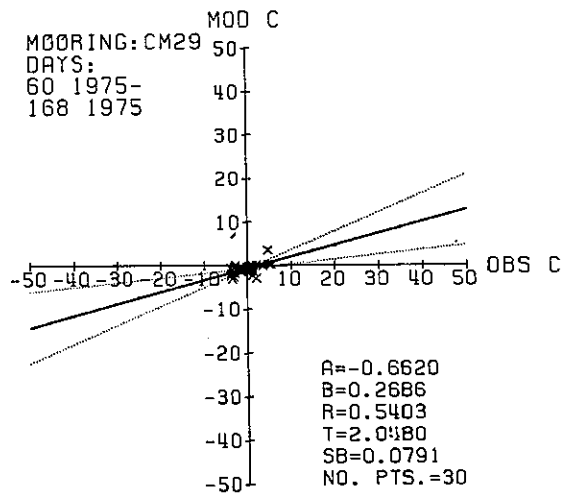

SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%




SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

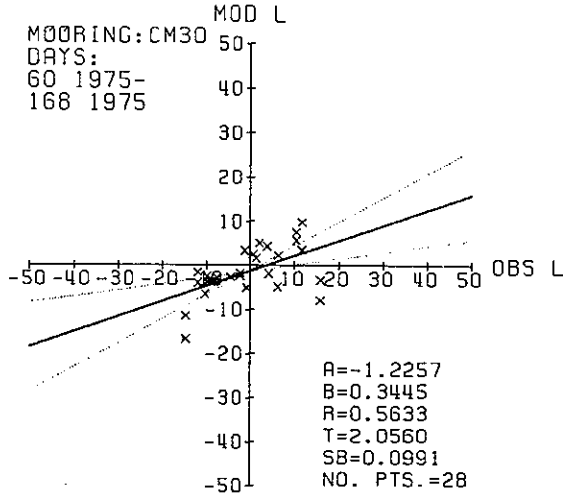



SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL . 95%

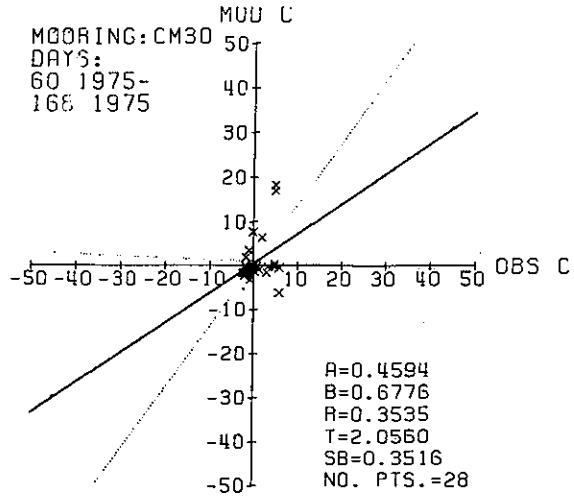



SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

Moorings CM15, CM28, CM29: Linear regression of modelled vs. observed velocity components.




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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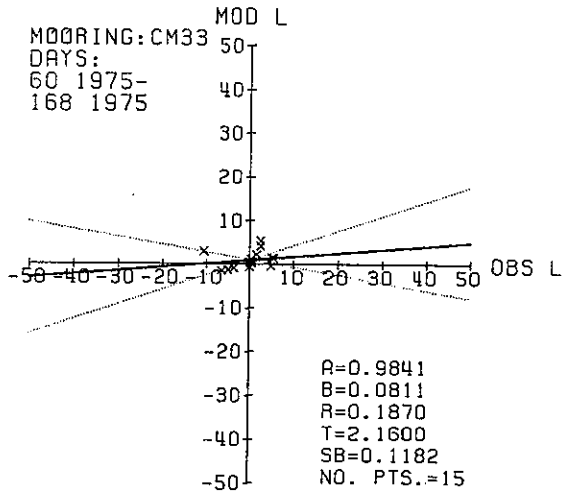
CONFIDENCE LEVEL : 95%

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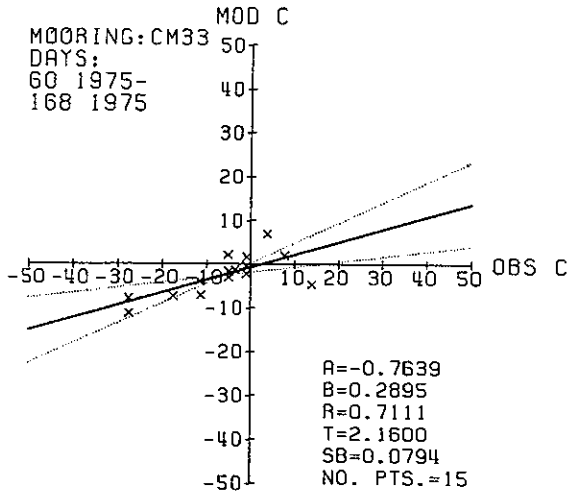


SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
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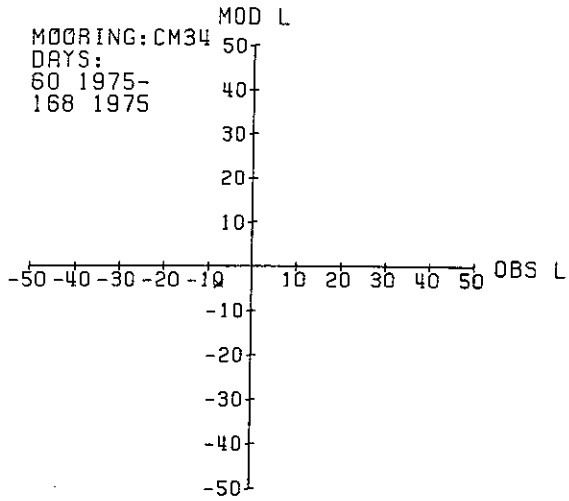
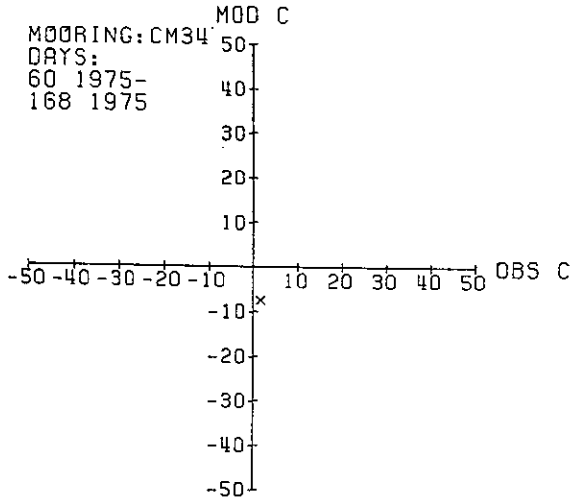
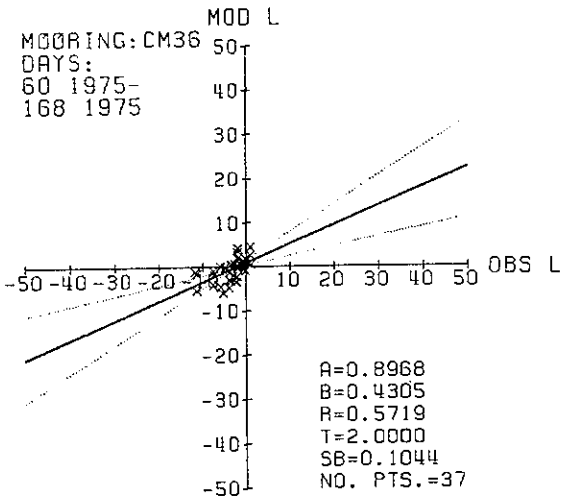



NOT ENOUGH POINTS FOR SLOPE CONFIDENCE LIMIT EVALUATION

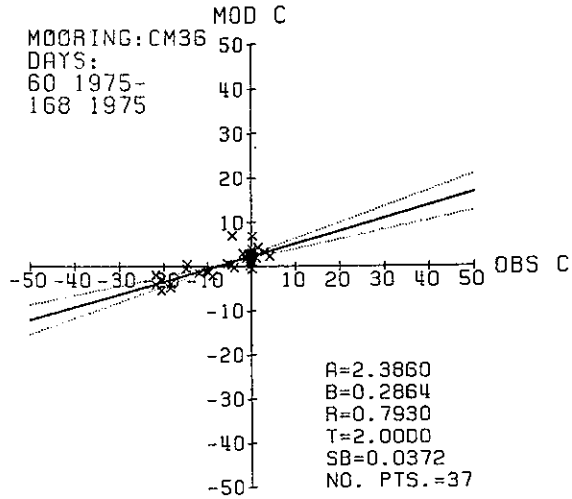



NOT ENOUGH POINTS FOR SLOPE CONFIDENCE LIMIT EVALUATION

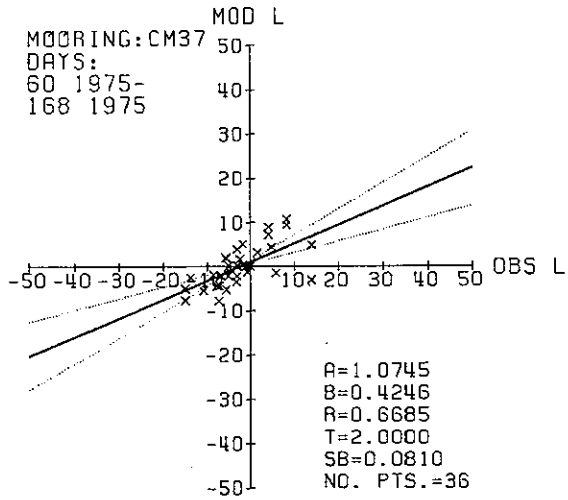
Moorings CM30, CM33, CM34: Linear regression of modelled vs. observed velocity components.




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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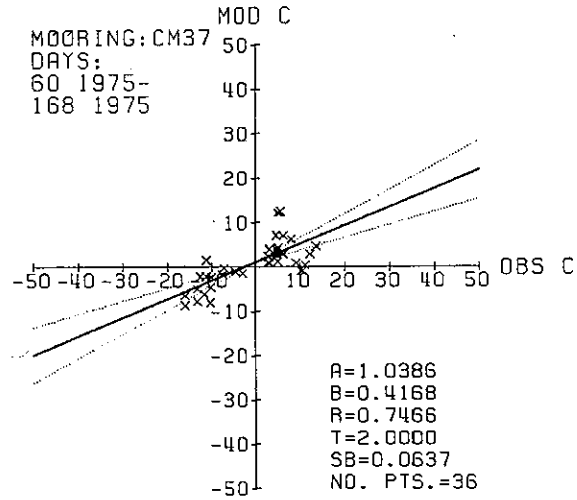


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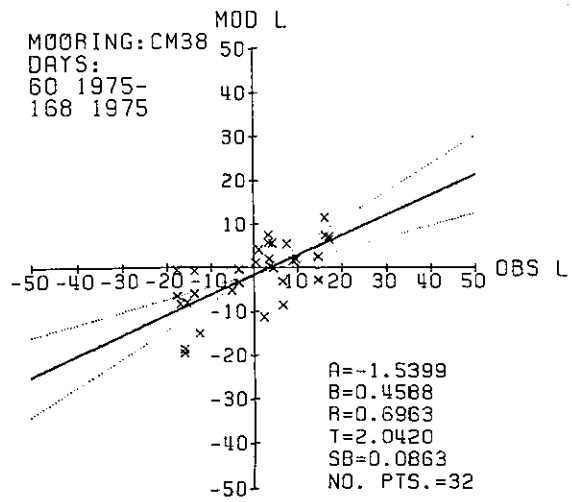


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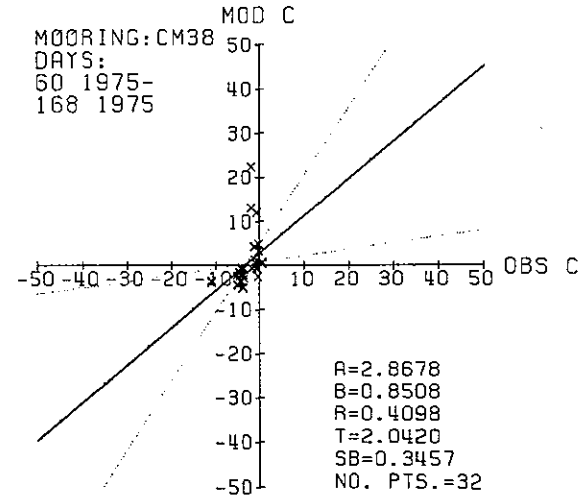
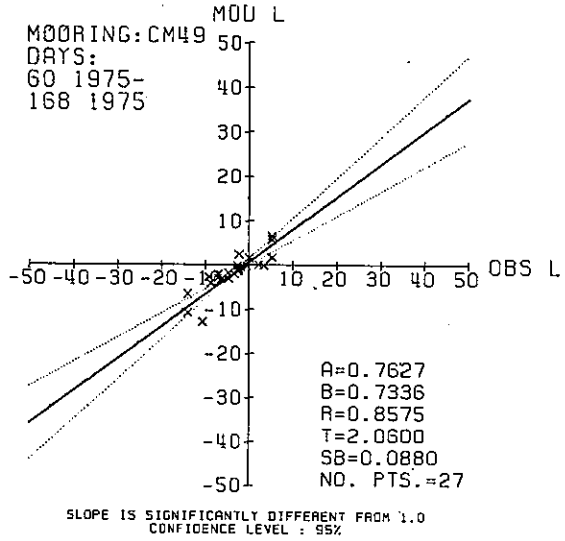
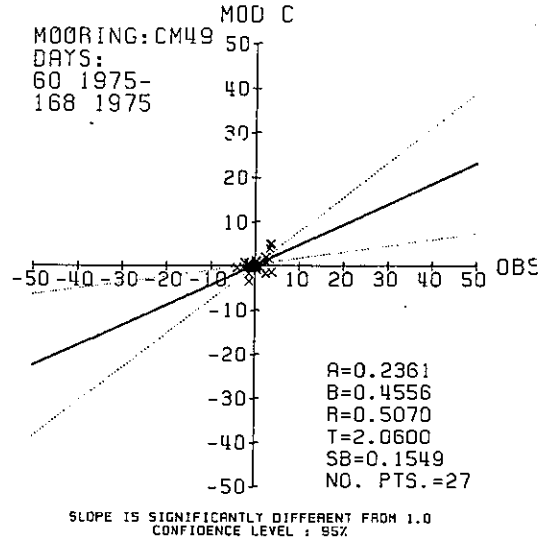
CONFIDENCE LEVEL : 95%

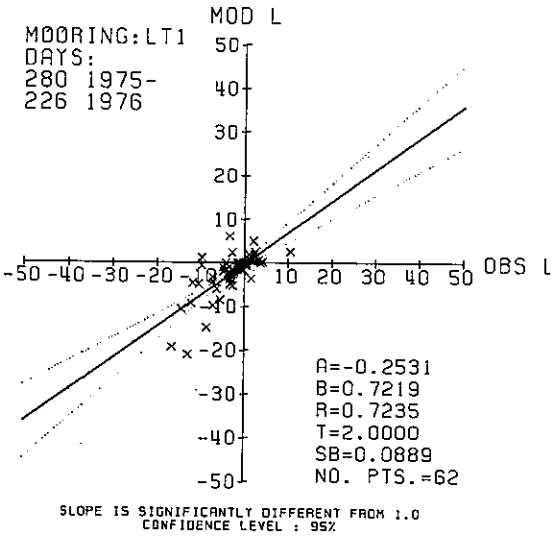


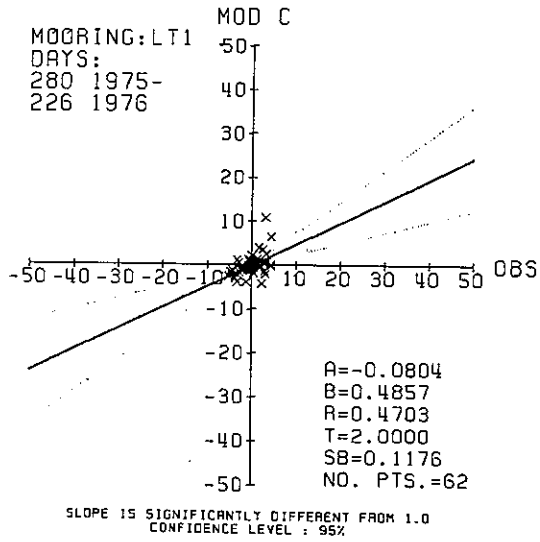

SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

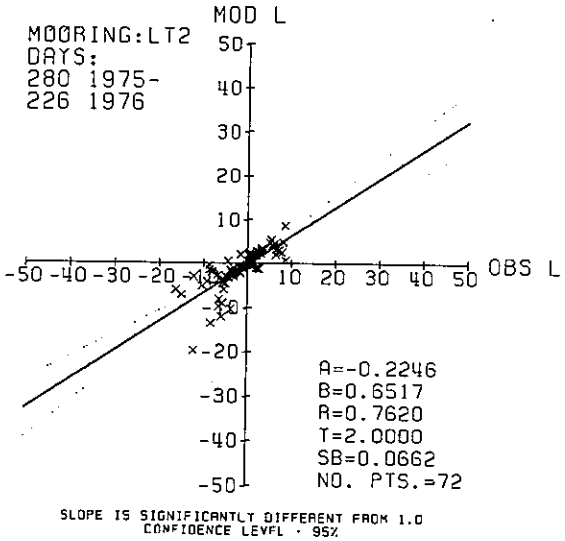
Moorings CM36, CM37, CM38: Linear regression of modelled vs. observed velocity components.

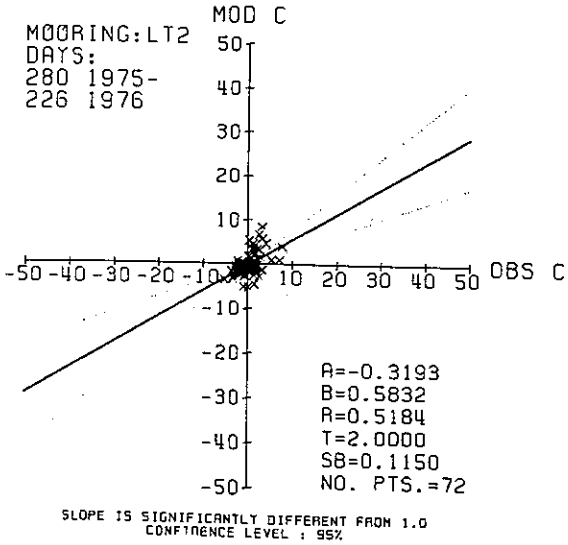


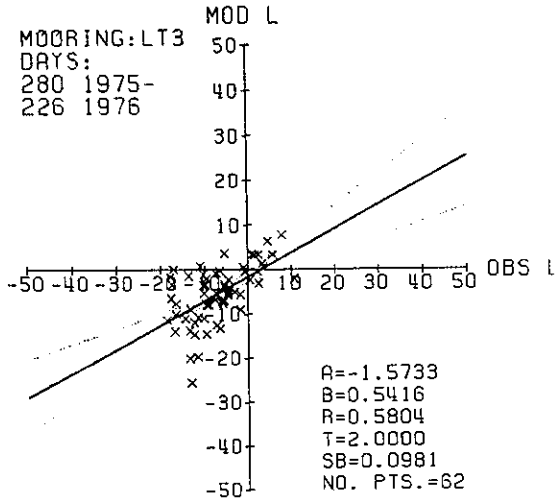



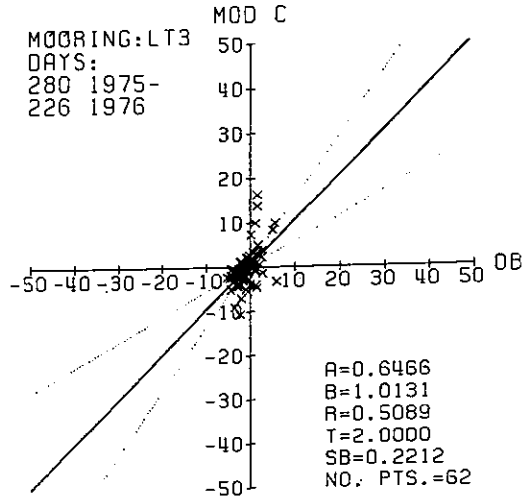




Moorings CM49, LT1, LT2: Linear regression of modelled vs. observed velocity components.




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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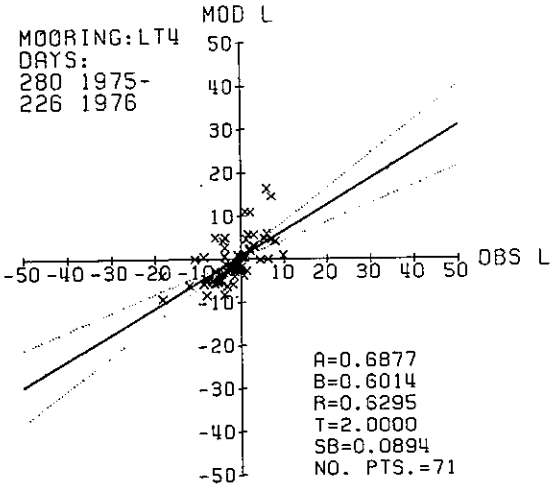


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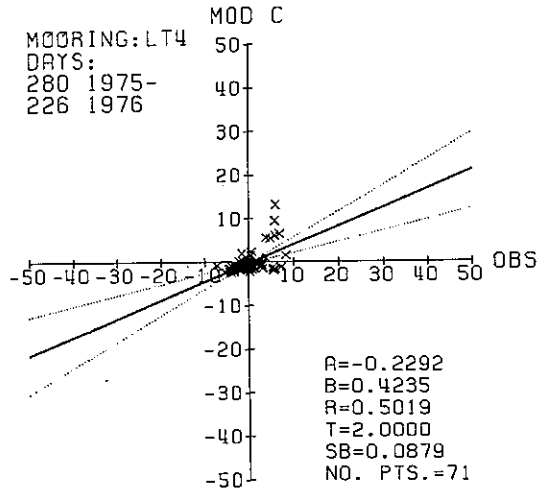


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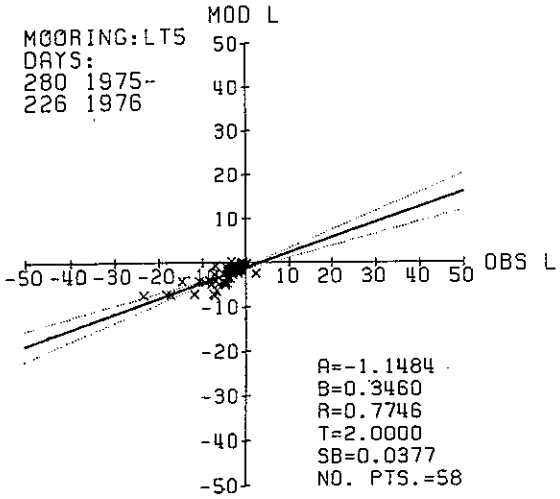


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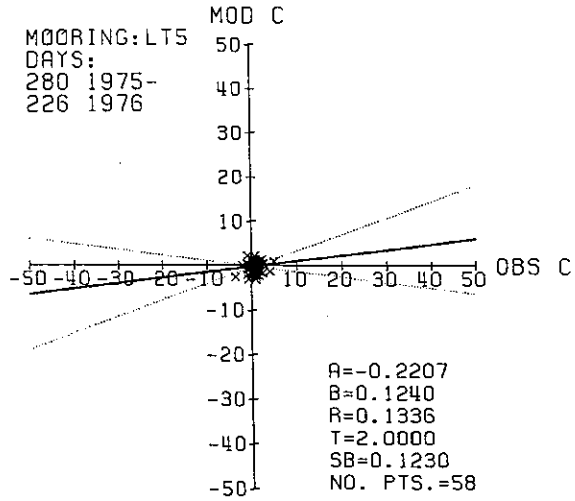


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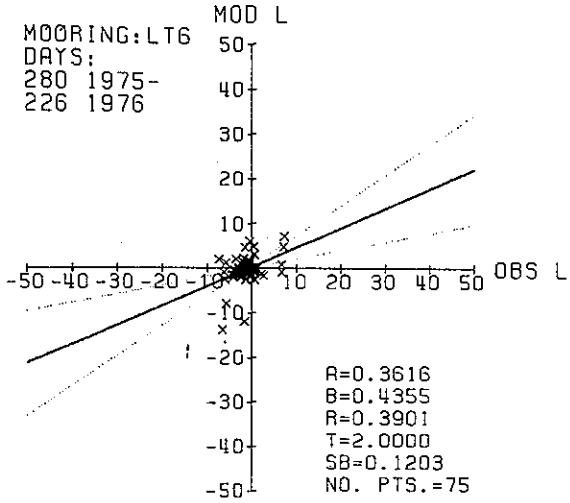
Moorings LT3, LT4, LT5: Linear regression of modelled vs. observed velocity components.

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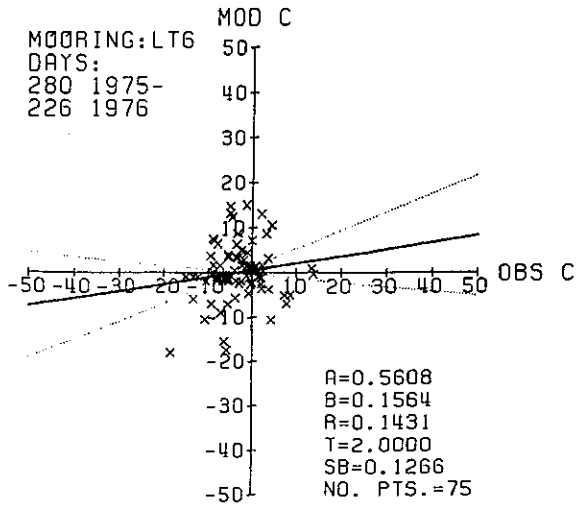


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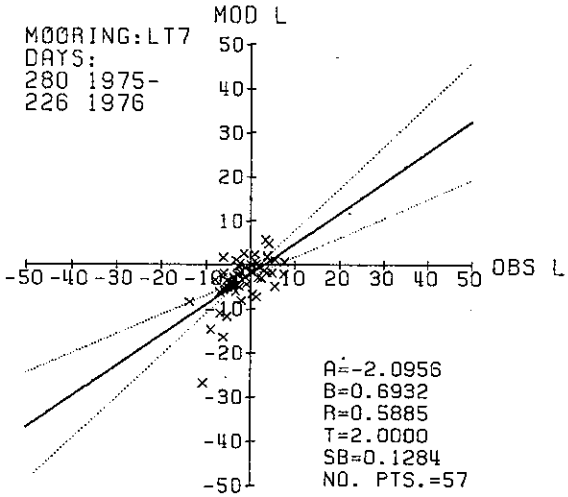


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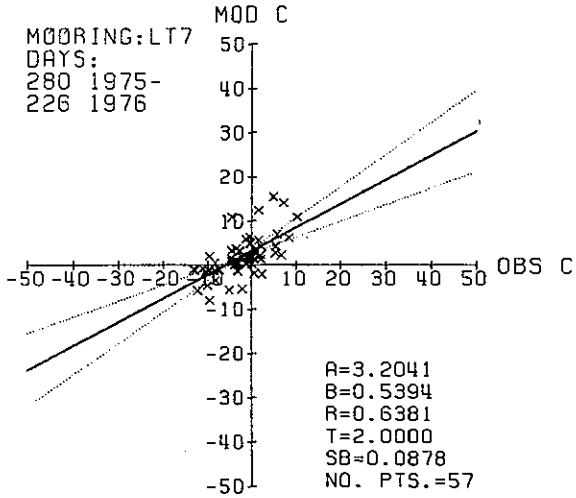


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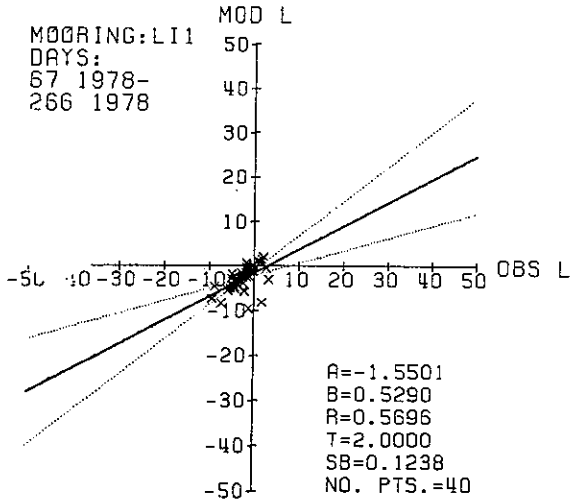


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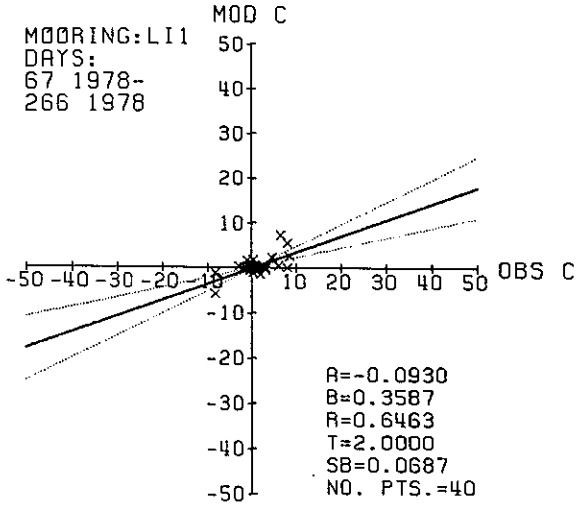


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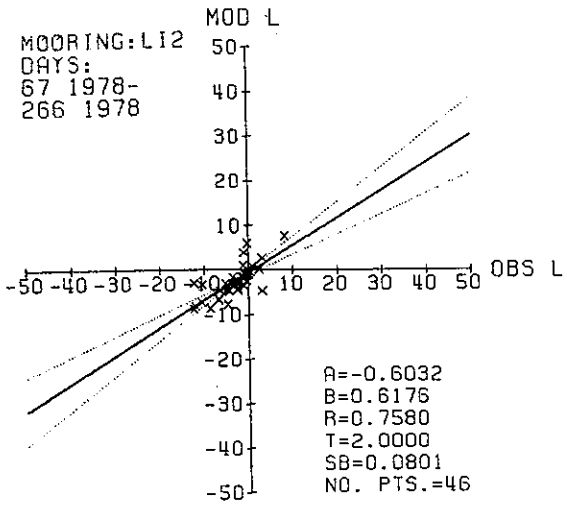
CONFIDENCE LEVEL : 95%

Moorings LT6, LT7, LI1: Linear regression of modelled vs. observed velocity components.

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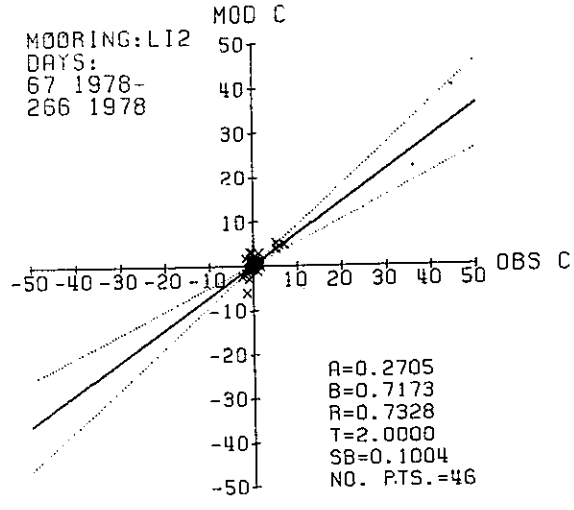


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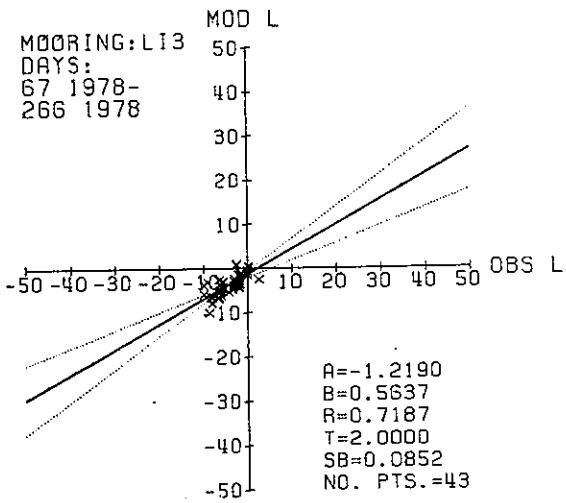


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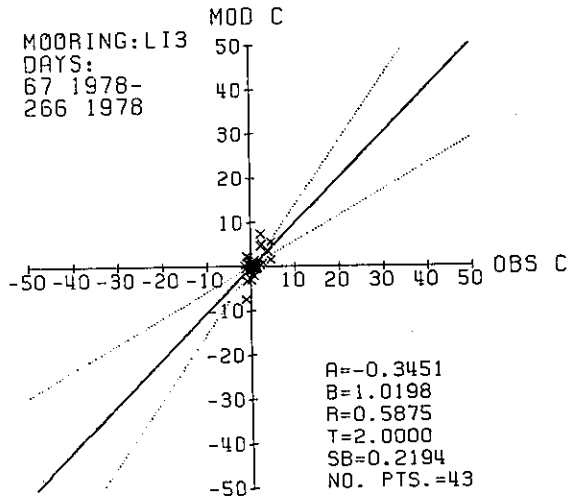


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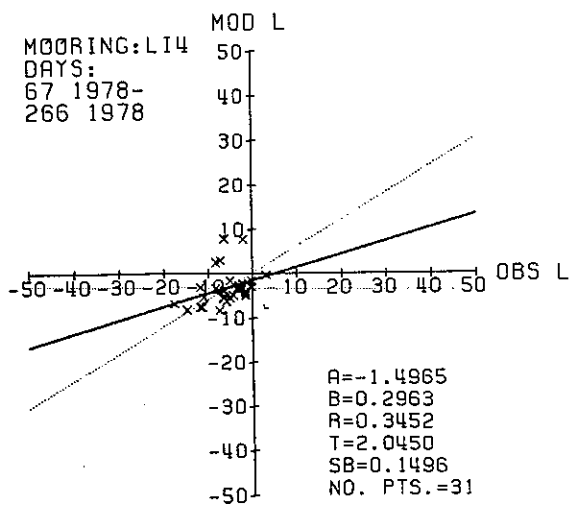


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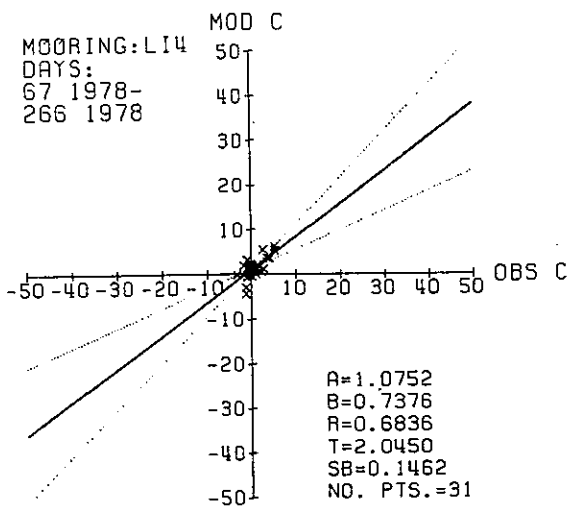
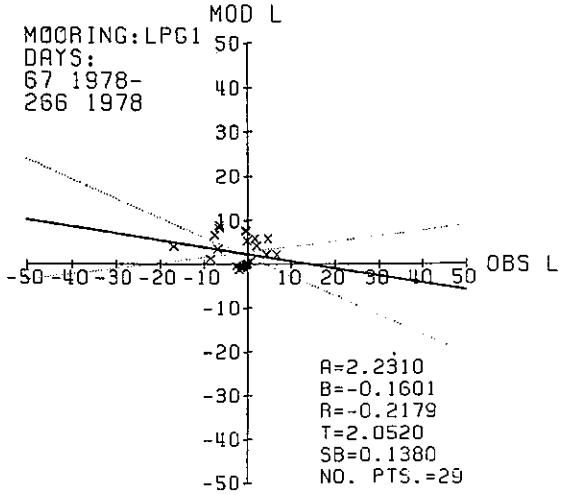



SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

Moorings LI2, LI3, LI4: Linear regression of modelled vs. observed velocity components.




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
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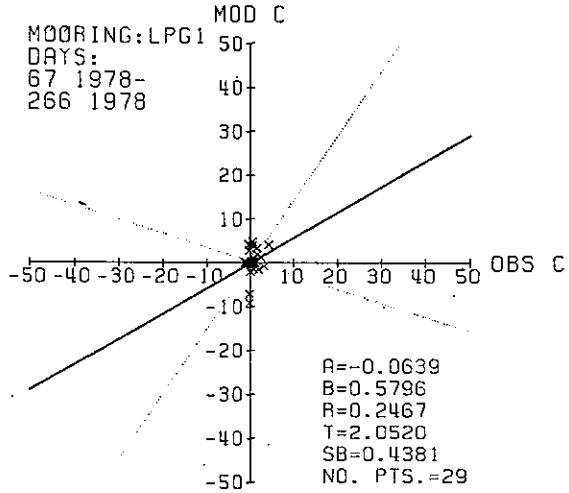
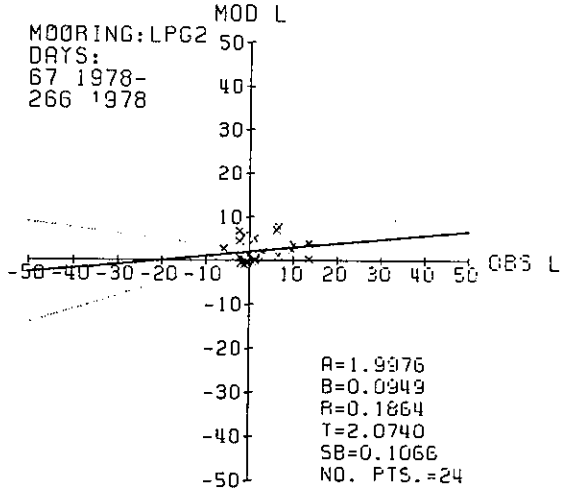



SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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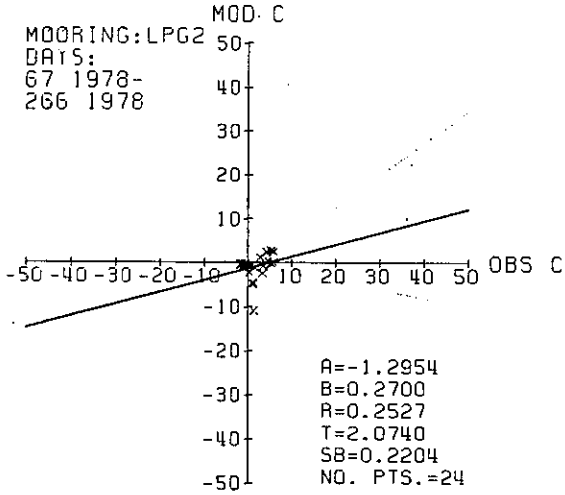


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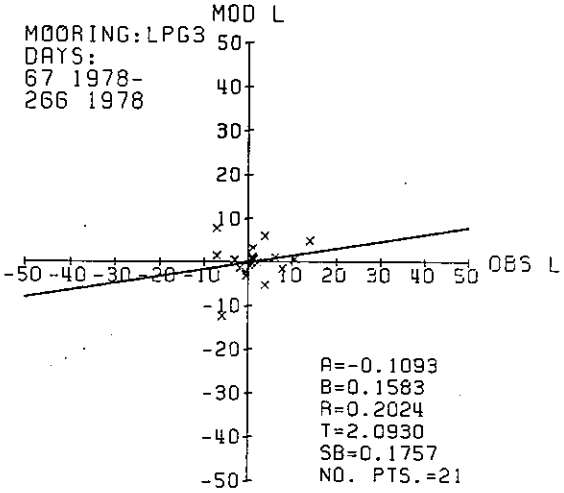
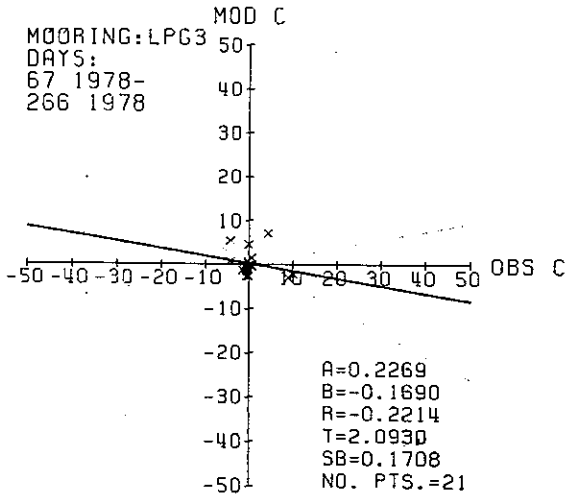
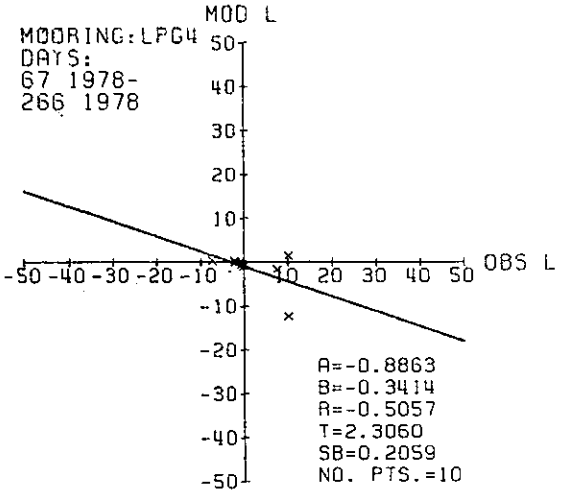



SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

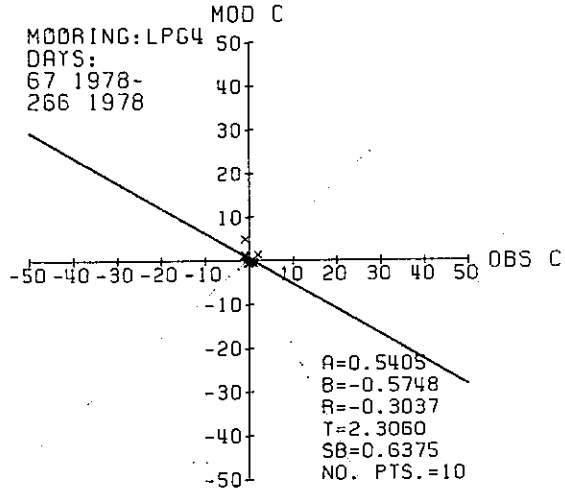



SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

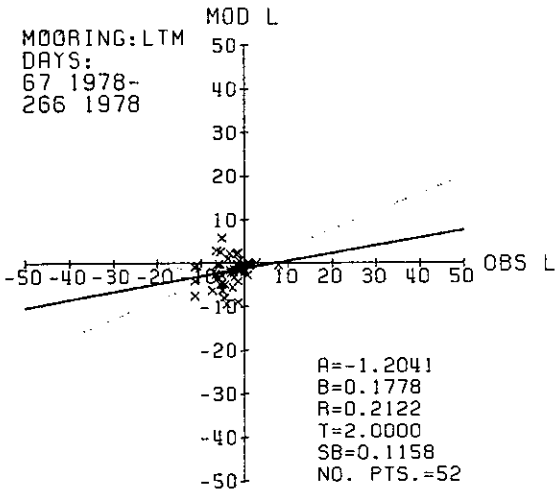
Moorings LPG1, LPG2, LPG3: Linear regression of modelled vs. observed velocity components.




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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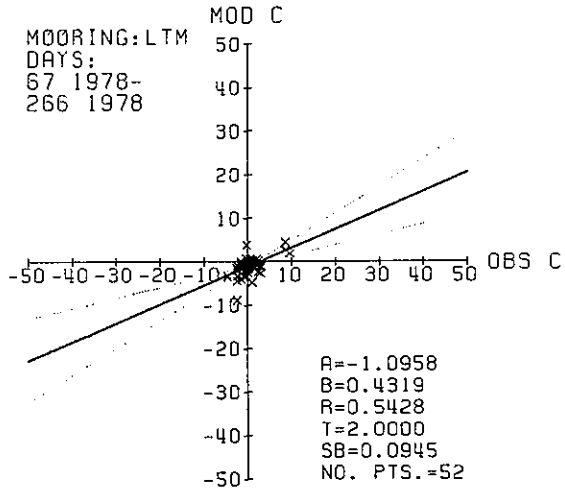
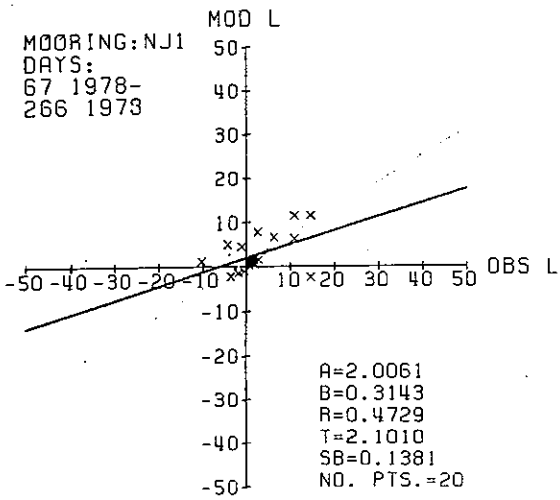
CONFIDENCE LEVEL : 95%




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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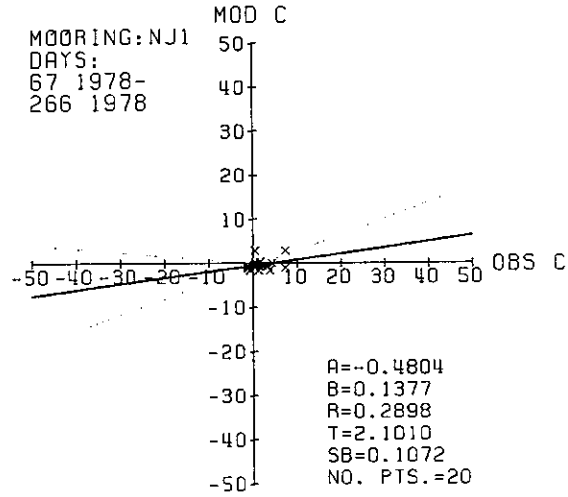
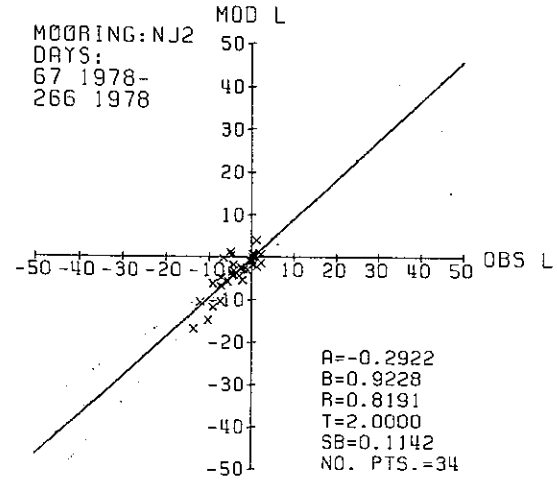
CONFIDENCE LEVEL : 95%

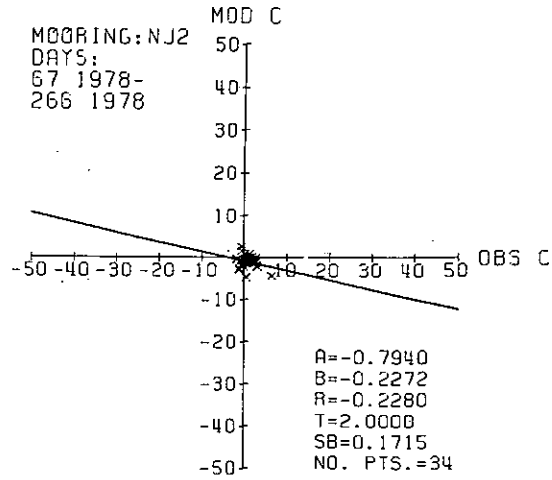



SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

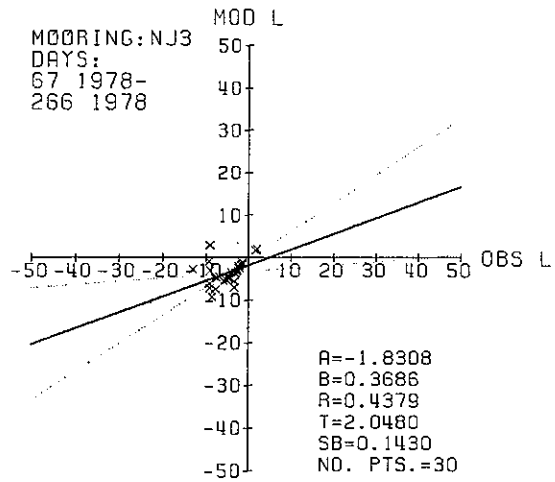
Moorings LPG4, LTM, NJ1: Linear regression of modelled vs. observed velocity components.




SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%




SLOPE IS SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

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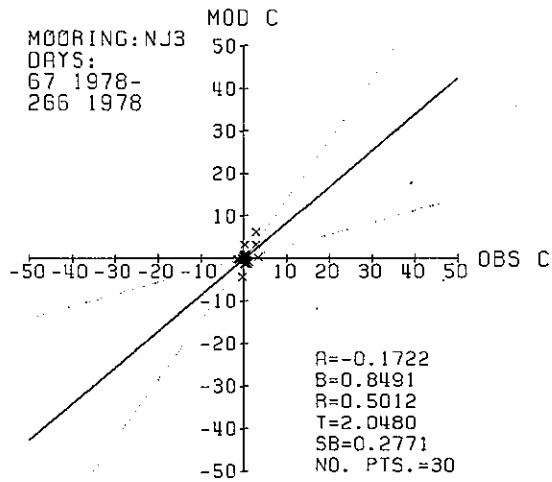


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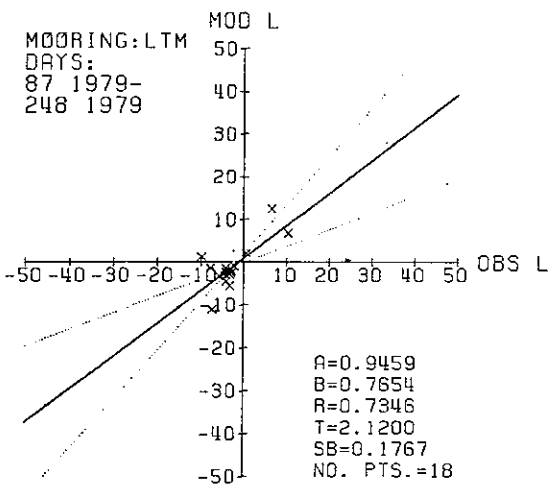


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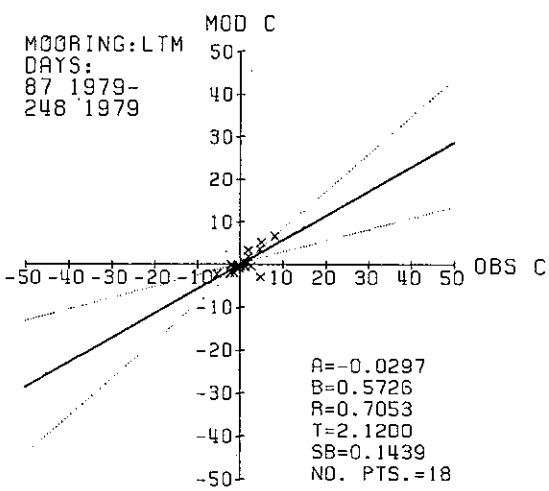


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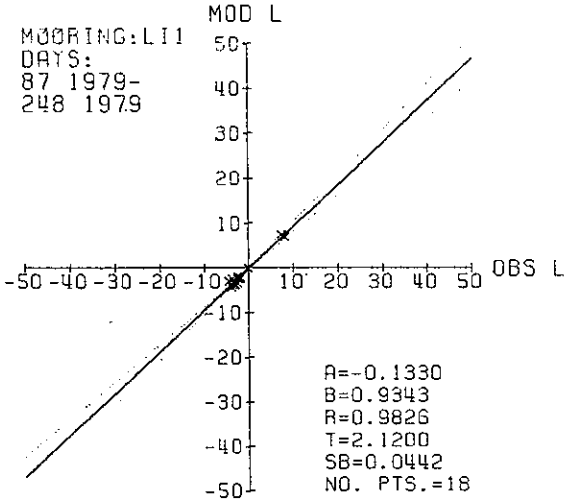
Moorings NJ2, NJ3, LTM: Linear regression of modelled vs. observed velocity components.

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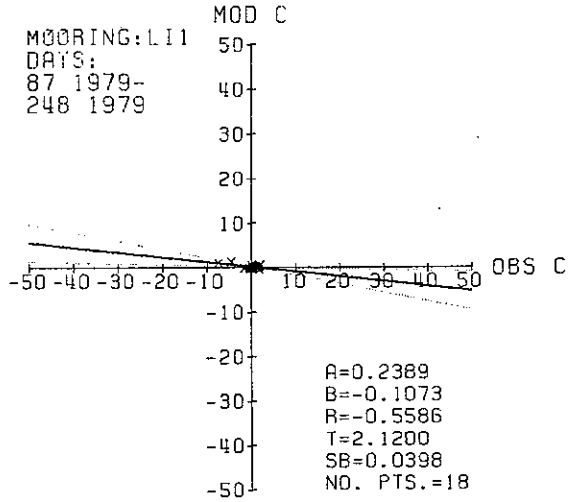


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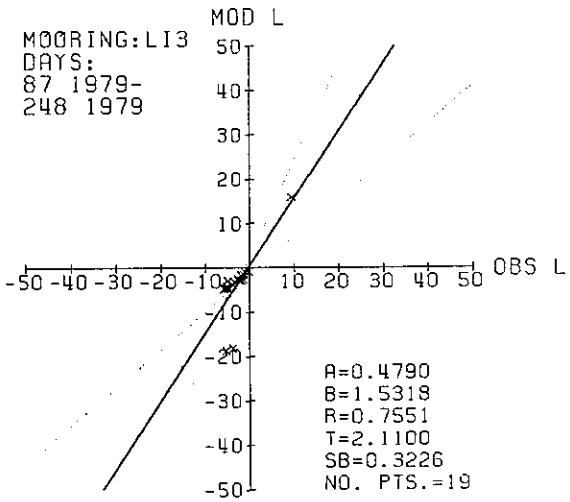


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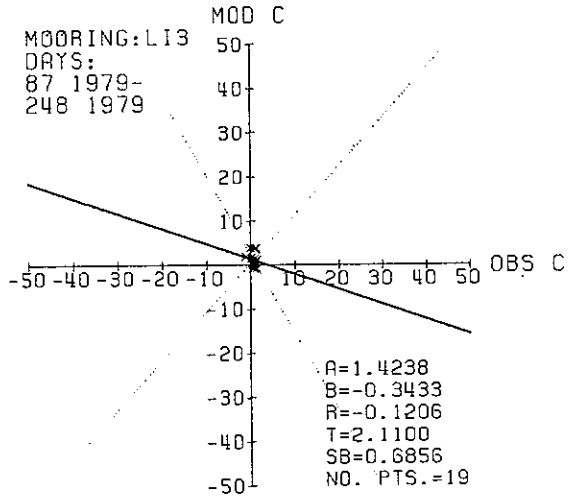


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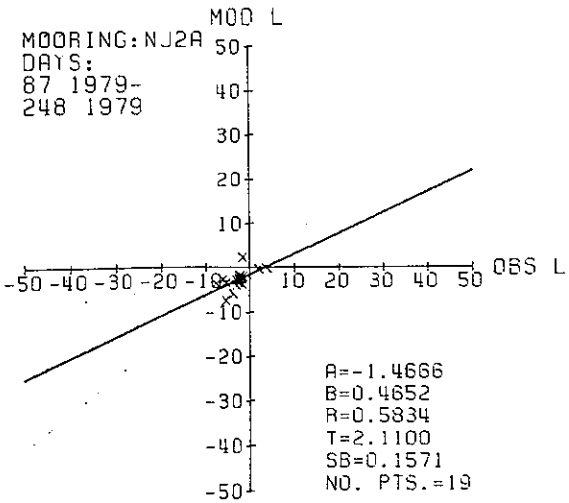


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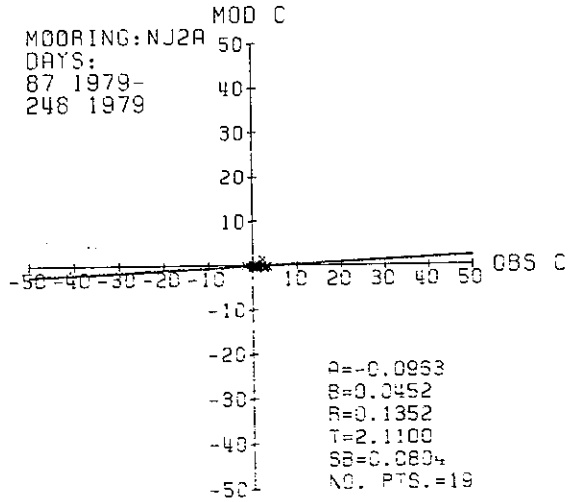


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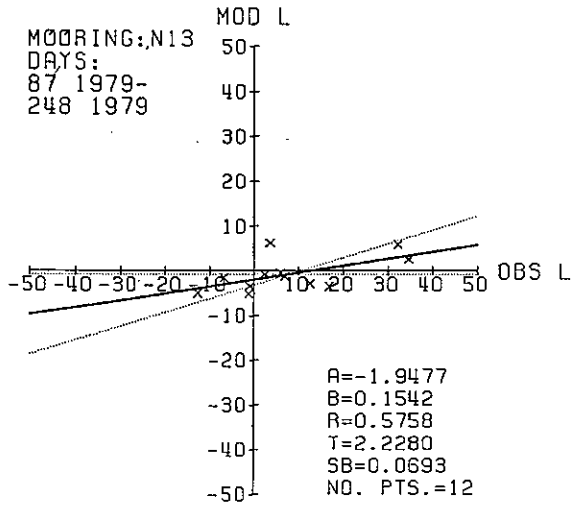
Moorings LI1, LI3, NJ2A: Linear regression of modelled vs. observed velocity components.

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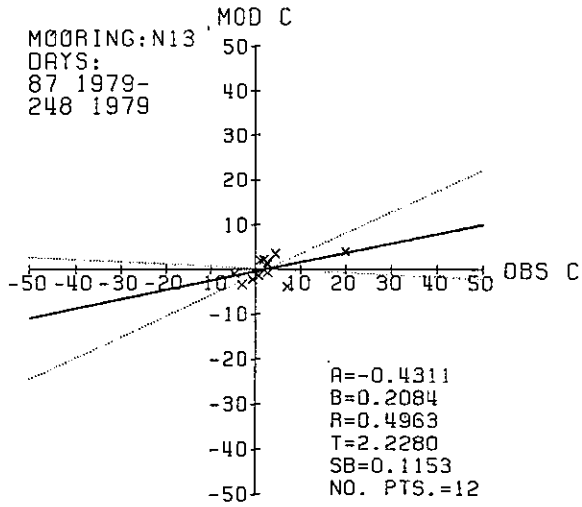


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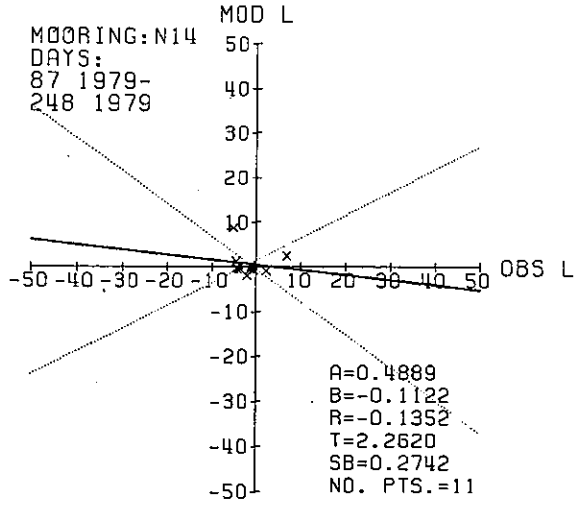


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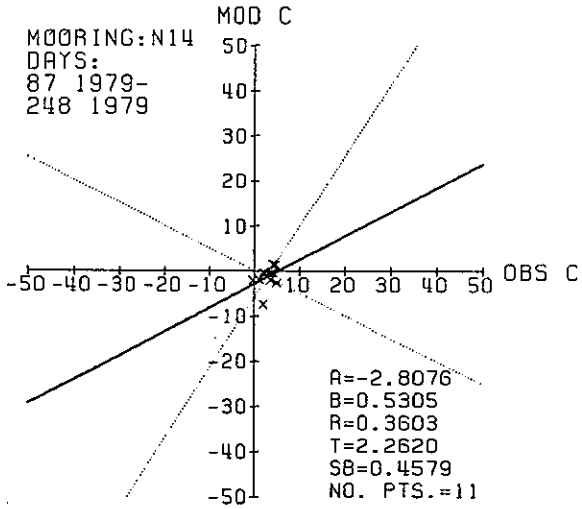


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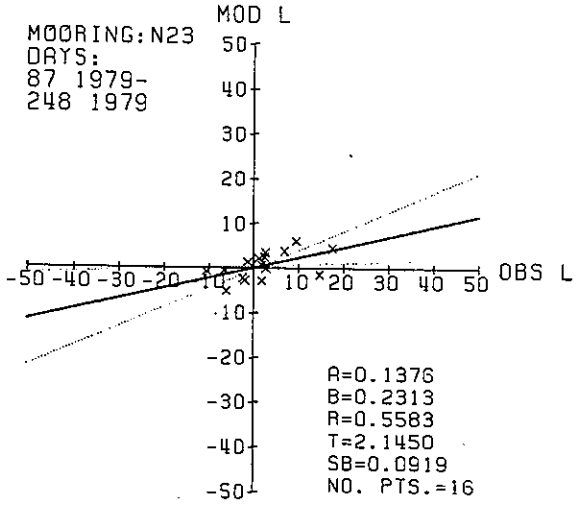


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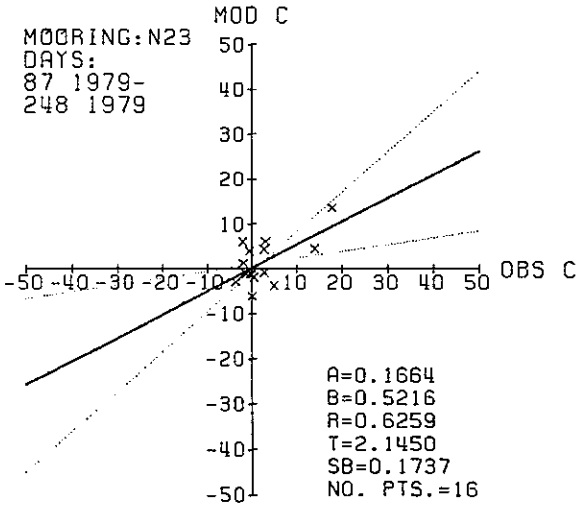


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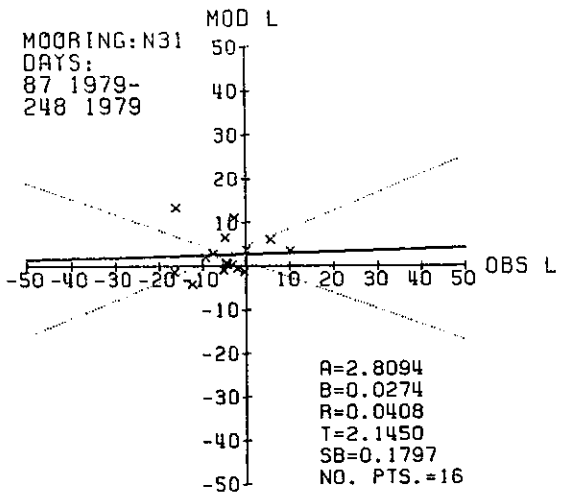
CONFIDENCE LEVEL : 95%

Moorings N13, N14, N23: Linear regression of modelled vs. observed velocity components.

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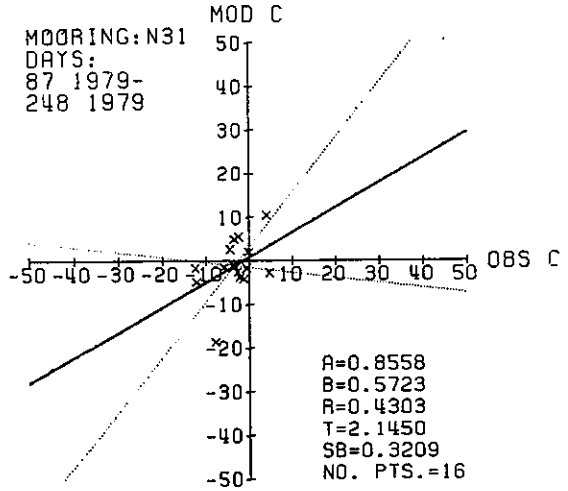


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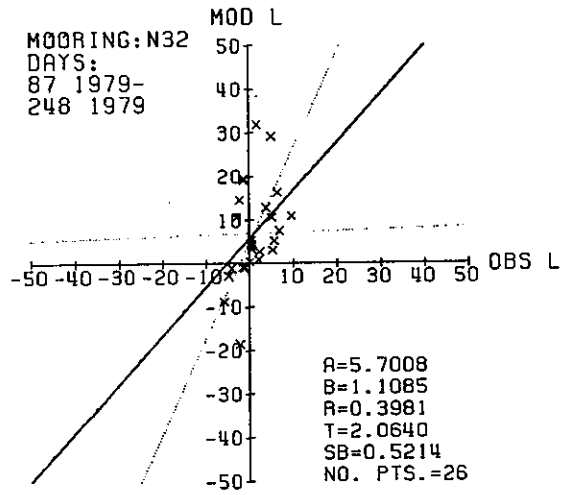


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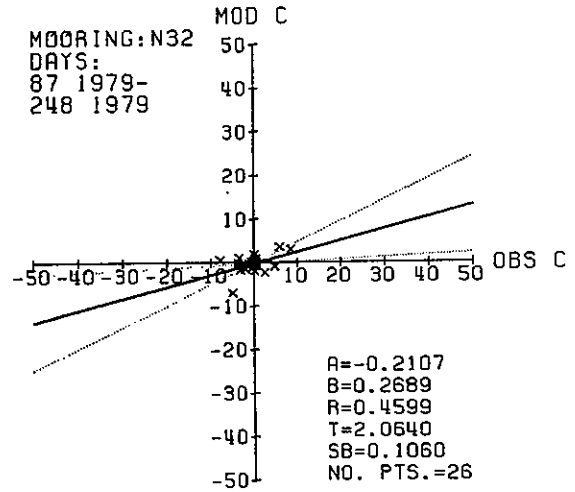


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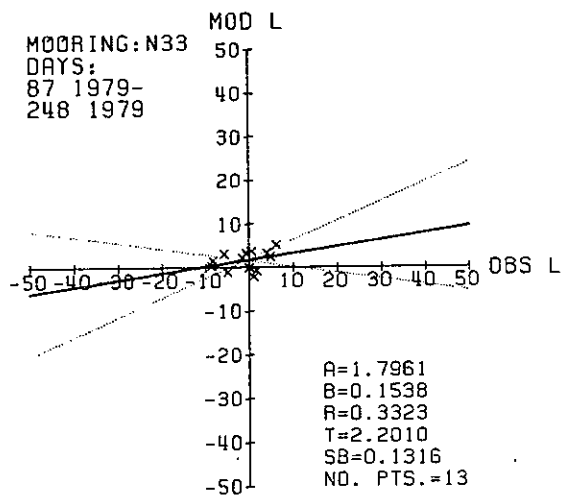


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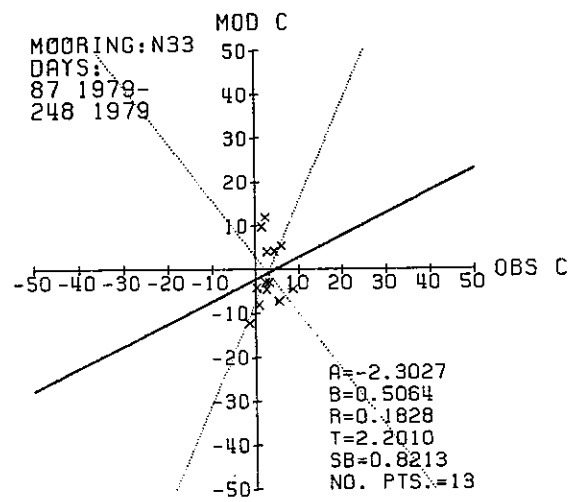
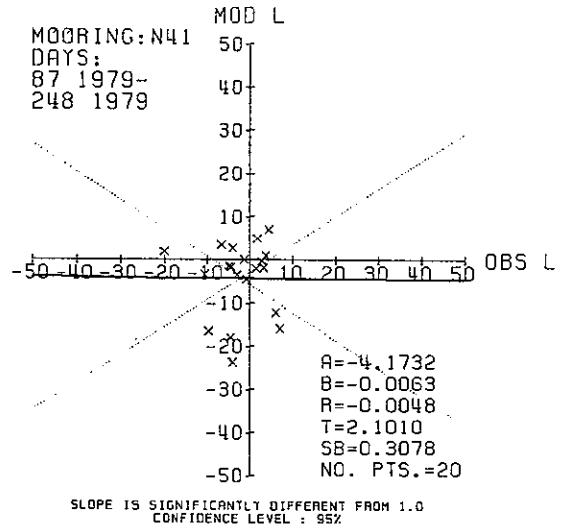
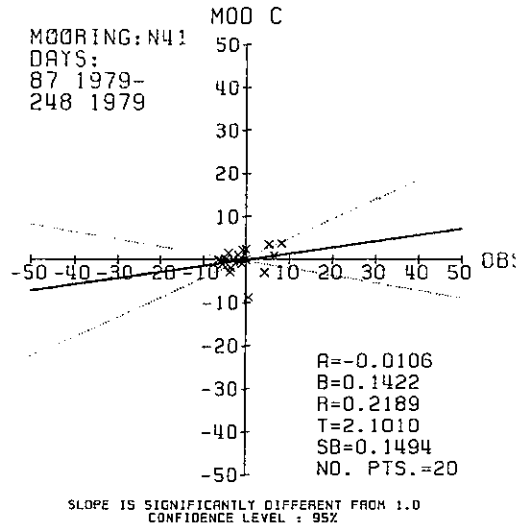
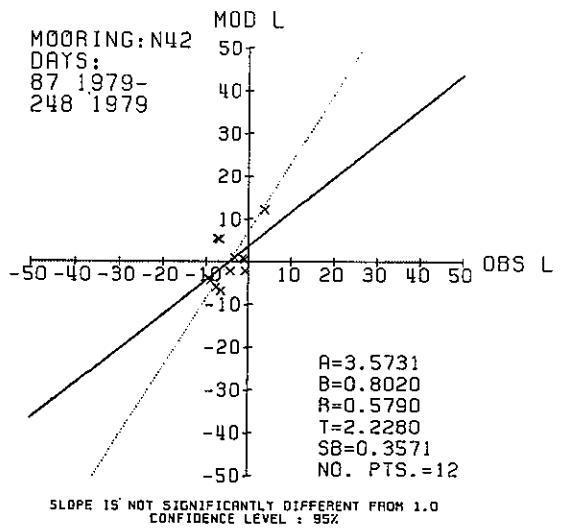


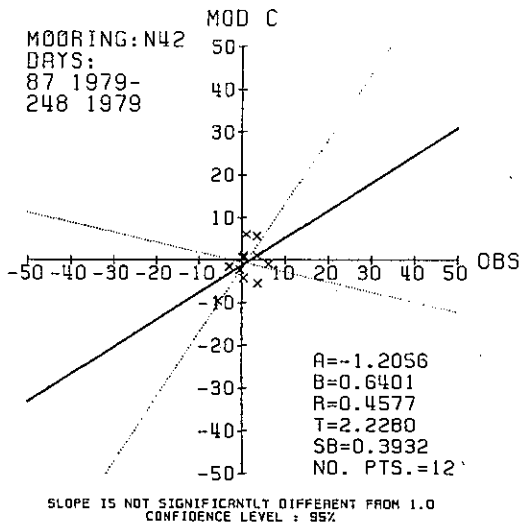

SLOPE IS NOT SIGNIFICANTLY DIFFERENT FROM 1.0
CONFIDENCE LEVEL : 95%

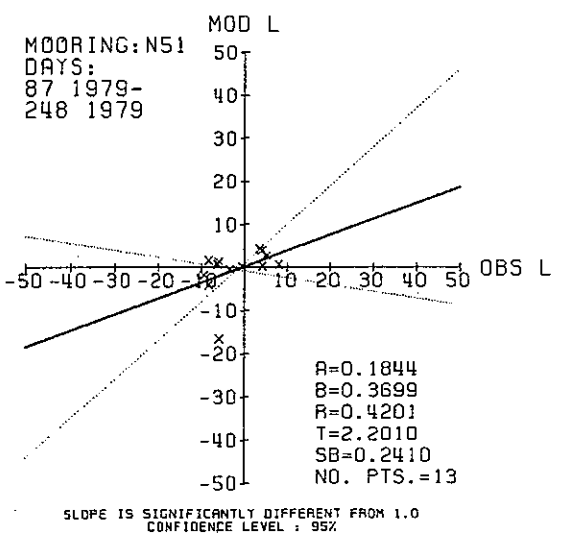
Moorings N31, N32, N33: Linear regression of modelled vs. observed velocity components.

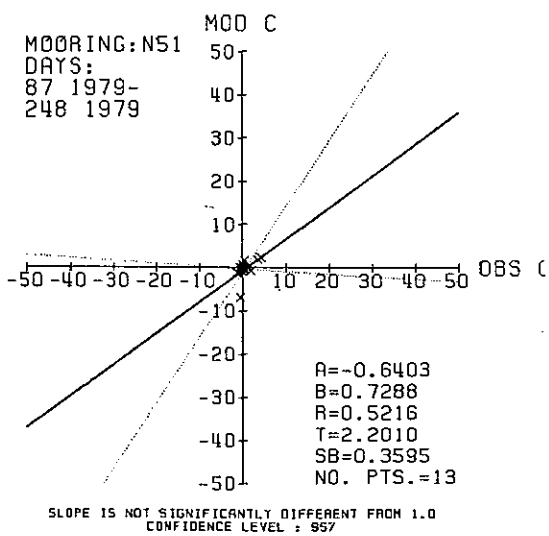


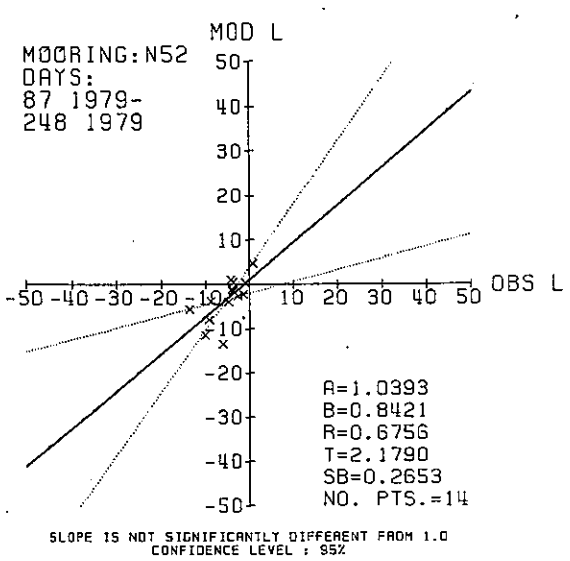



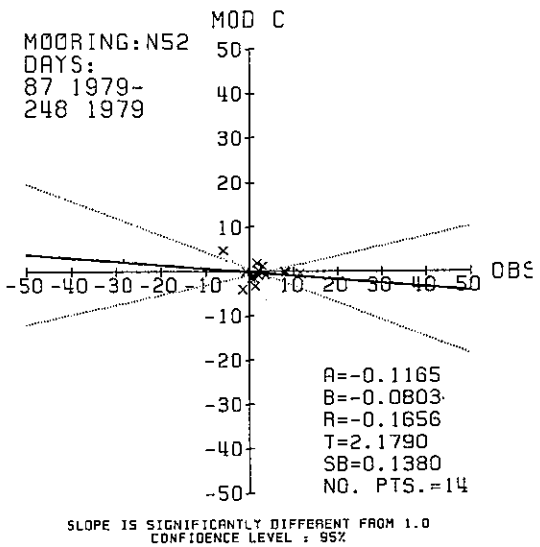




Moorings N41, N42, N51: Linear regression of modelled vs. observed velocity components.




Mooring N52: Linear regression of modelled vs. observed velocity components.