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Technical Report No. 287

**An Investigation of Mean Temperature
Structure and Internal Waves in Puget Sound
Central Basin**

by

Floyd T. Lovorn

Office of Naval Research
Contract Number N00014-67-A-0103-0014

Reference M73-49
July 1973

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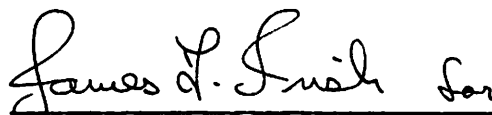
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AN INVESTIGATION OF MEAN TEMPERATURE STRUCTURE
AND INTERNAL WAVES IN PUGET SOUND CENTRAL BASIN

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MAURICE RATTRAY, JR.
PRINCIPAL INVESTIGATOR AND CHAIRMAN

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ABSTRACT

A description is given of the experiment and the temperature and pressure time-series. Three separate temperature phases are identified—each lasting about 11 days. The last phase is believed to be a lens of warm water intruding from the north. Originating, perhaps, in Possession Sound. An attempt is made to estimate the contribution of mooring motion to the temperature signal. The first temperature phase is investigated for the possible presence of internal waves.

INTRODUCTION

During the winter of 1972 the University of Washington Oceanography Department and Pacific Oceanographic Laboratories (POL) conducted a joint engineering evaluation of two thermistor arrays used by the Internal Waves Project. The primary purpose of the evaluation was to test each array as an unattended system under field conditions. However, the data that the test provided could be used to investigate tides, temperature and salinity structure of the Puget Sound central basin. The data could also augment the observations of current and water properties made by POL during Feb. 1972. This report is intended to provide a summary and analysis of the test and data.

DESCRIPTION OF THE EXPERIMENT

Two subsurface thermistor arrays were deployed in the central basin of Puget Sound in Feb. 1972. The north array (array 4) was deployed midway between West Point and Pt. Jefferson in 201 m of water on 17 Feb. The south array (array 3) was deployed on 22 Feb. midway between Pt. Williams and Blake Island in 205 m of water. The arrays were deployed from the UW ship *Onax* by streaming them out on the surface and dropping the anchor (railroad wheels). The position of the arrays were determined by sextant sightings on charted objects. No hydrographic casts were made at the time of deployment. However, the data of array 4 overlaps 10 days and array 3 overlaps 7 days with POL's hydrographic and current observations. Both arrays were retrieved by acoustic release of the anchor on 23 Mar.

The test sites were selected based on a desire for data from Puget Sound central basin and on a historic data base obtained at or near these sites by UW on a tri-weekly interval during the previous 2 years (Lincoln and Collias, 1970).

The configuration of each array is given in Table 1. The thermistors used were the Wienbridge Oscillator type designed by the Applied Physics Laboratory. The salinity sensors were Plessy conductivity cells. The sampling interval was 2 min. Figure 1 shows a typical array configuration and Figure 2 the site location.

DATA TAPE

Data for each sample point (T,C,P) are recorded on tape as the least significant part (l.s.p.) of the cycle count of the high frequency clock ($f_c = 1.47456 \times 10^6$ Hz) during the gate-open time corresponding to 446 pulses of the sensor ($t = 446/f_s$). For example, a typical f_s is 8000 Hz.

TABLE 1. Array location, deployment time, and configuration.

	North Array Data Module #4	South Array Data Module #3
Latitude	47° 42.47'	47° 32.07'
Longitude	122° 26.12'	122° 25.60'
Depth	110 fms/201 m	112 fms/205 m
Start digital electronics*	47-Z2132	47-Z2138
Deploy array*	48-Z1957	53-Z1932
Sensor on tape channel** #1	P1 27 m	C1 180 m
Sensor on tape channel #2	T1 103 27 m	T1 112 35 m
Sensor on tape channel #3	T2 316 52 m	T2 301 60 m
Sensor on tape channel #4	T3 305 77 m	T3 317 85 m
Sensor on tape channel #5	T4 309 102 m	T4 303 110 m
Sensor on tape channel #6	T5 310 132 m	T5 315 140 m
Sensor on tape channel #7	T6 201 157 m	T6 306 155 m
Sensor on tape channel #8	T7 318 172 m	T7 307 165 m
Sensor on tape channel #9	T8 207 182 m	T8 313 170 m
Sensor on tape channel #10	P2 102 m	T9 311 175 m
Sensor on tape channel #11	C1 4183 172 m	T10 302 180 m

* All time information = Julian Day, Zulu Time.

**All sensor information = Type (T,P,C), Serial no. and estimated depth.

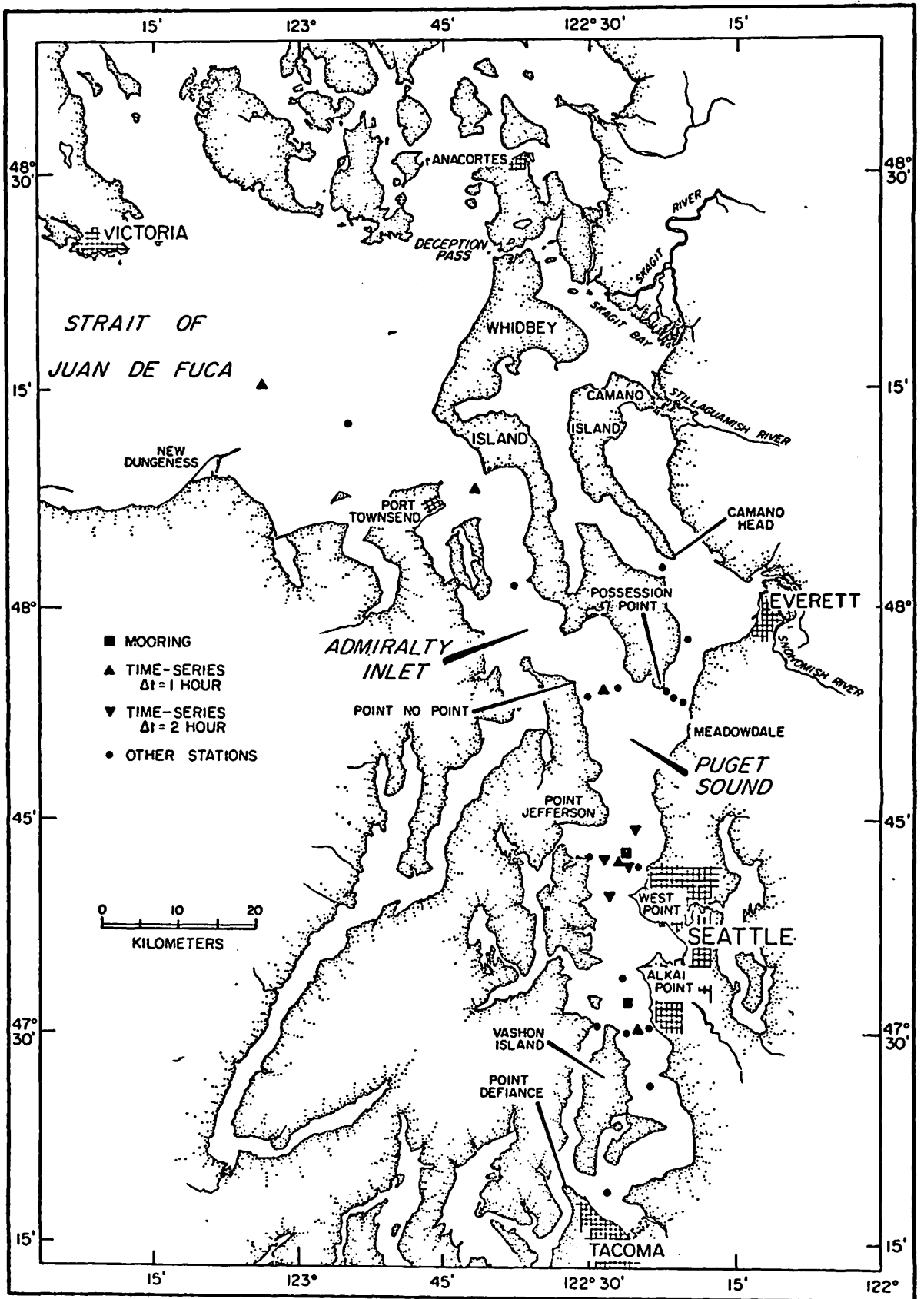


Figure 2. Locations of Moorings and Hydrographic stations

This corresponds to $446 \times f_c/f_s = 83600 = (82 \times 1024 + 656)$ cycle counts. It is the 656 which is recorded. If the l.s.p. is greater than $1024 = 2^{10}$, there is an "overflow" and the count begins again at zero. Thus, the data will be ambiguous unless overflows can be detected (Dworski, unpublished).

Two methods were used to detect overflows. First, a coarse resolution sample was taken every 40 min (every 20 samples). This was done by effectively decreasing the clock frequency by a factor of 16, ($f_c/16$). This sample recorded the temperature which the fine resolution samples should closely approximate. When the data were analyzed, the coarse sample value was replaced with the next fine resolution sample. The second method to detect overflows was a "logical" statement in the program used to process the data tape. If the difference in two succeeding l.s.p. was greater than 512 an overflow had occurred. This method sets an upper limit on the rate of change of the measured parameter.

In the example above, the actual number of overflows is 82. At some point in the data, we must know this number exactly. Let M = actual number of overflows, C = counts between 0 and 1023, C_0 = full count, then $C_0 = M \times 1024 + C$ and $446/f_s = C_0/f_c$. Thus $f_s = 446 \times f_c/C_0$. We know $T = T(f_s)$, $P = P(f_s)$ and $C = C(f_s)$ from calibration curves.

Linda Olund processed the raw data tapes. One hour of data was removed from the beginning of the tape in order to eliminate data taken during launch. Twenty-two anomalous values appeared randomly in the data taken at array 4. These were replaced with the value 5000 and appear as a sharp spike in all records from array 4. In analyzing the data, these values were replaced with the preceding value.

Least Count

The least count (l.c.) is a measure of the resolution of the system. ('System' is sensor plus digitizing electronics.) That is

$$\text{l.c.} = \frac{\Delta\theta}{\Delta C} = \frac{\Delta\theta}{\Delta f_s} \cdot \frac{\Delta f_s}{\Delta C} = \left[\frac{^\circ\text{C}}{\text{count}} \right].$$

From above

$$\frac{\Delta f_s}{\Delta C_0} = \frac{\Delta f_s}{\Delta C} = - \frac{446 \times f_c}{C_0^2} = - \frac{f_s^2}{446 \times f_c}.$$

$\Delta\theta/\Delta f_s$ for the thermistors can be calculated from the calibration curves

$$f_s = f_0 \exp \left[\frac{\alpha T}{(1 + T/\theta_0)^2} \right]$$

where α and θ_0 are calibration constants. Therefore,

$$\text{l.c.} = - \frac{(1 + T/\theta_0)^2}{f_s \alpha} \cdot \frac{f_s^2}{446 \times f_c} = - \frac{(1 + T/\theta_0)^2 \cdot f_s}{\alpha \cdot 446 \cdot f_c}$$

For the thermistors used on the two arrays

$$\text{l.c.} \approx 0.53 \times 10^{-3} \text{ } ^\circ\text{C/count.}$$

The calibration curves for the pressure sensors are

$$f_s^2 = \lambda^2 - \beta^2 \cdot P$$

and the l.c. at 27 m is

$$\text{l.c.} \approx 8 \text{ cm/count.}$$

TIME SERIES

The lunar day (l.d.) average temperature at each sensor is plotted in Figures 3 and 4. Tables I and II in the appendix give the values plotted and their variance. Figures 5 and 6 are plots of isotherms whose depths were calculated by linear interpolation using the l.d. averages and the estimated depths of the sensors.

Basically, three separate temperature structures can be distinguished in the time series. An initial period in which the temperature profile can be described as two layer with a maximum gradient in the thermocline of $-.0030^\circ\text{C/m}$ at array 4 and $-.0013^\circ\text{C/m}$ at array 3. Next, a period in which the entire water column is isothermal at approximately 6.75°C . Last, a period of warm water intrusion during which there are large horizontal and vertical gradients and a rapid increase in temperature at all sensors. Each period is of approximately equal duration, 11 days.

The isotherm plots show that the warm water intrusion has the appearance of a "lens". A particular isotherm in the lens slopes upward from north to south. For the 6.80°C isotherm, the "outer boundary" of the lens, this slope amounts to $35 \text{ m}/19 \text{ km} = 1.85 \text{ m/km} \approx 1^\circ$ slope. The warm water appears to strike both arrays simultaneously at their shallowest sensor and "propagate" down the array with about one days lag between sensors. This could be accounted for by the sloping boundary of a lens intercepting successively deeper sensors as the lens moves horizontally past the array.

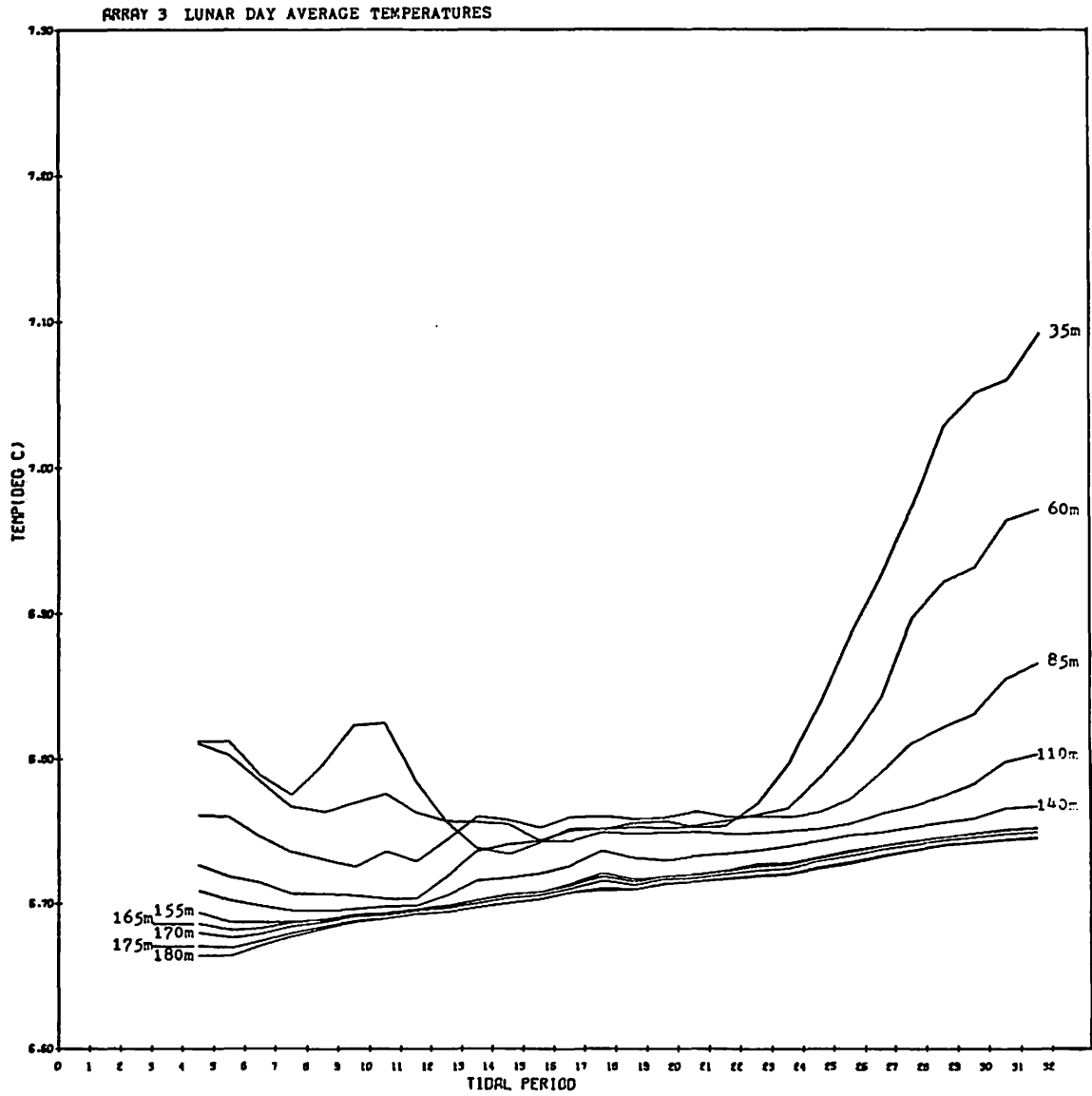


Figure 3.

ARRAY 4 LUNAR DAY AVERAGE TEMPERATURES

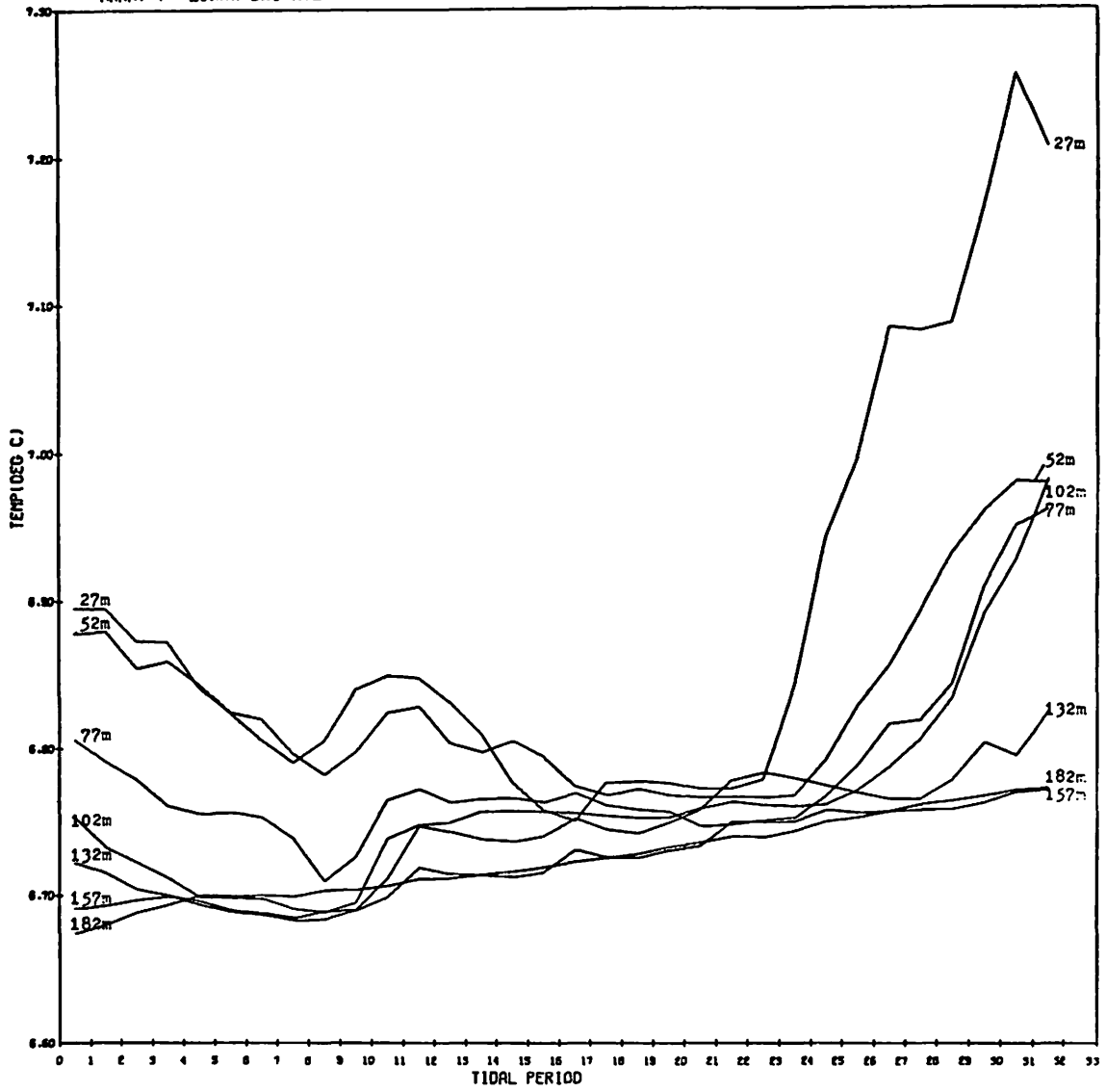


Figure 4.

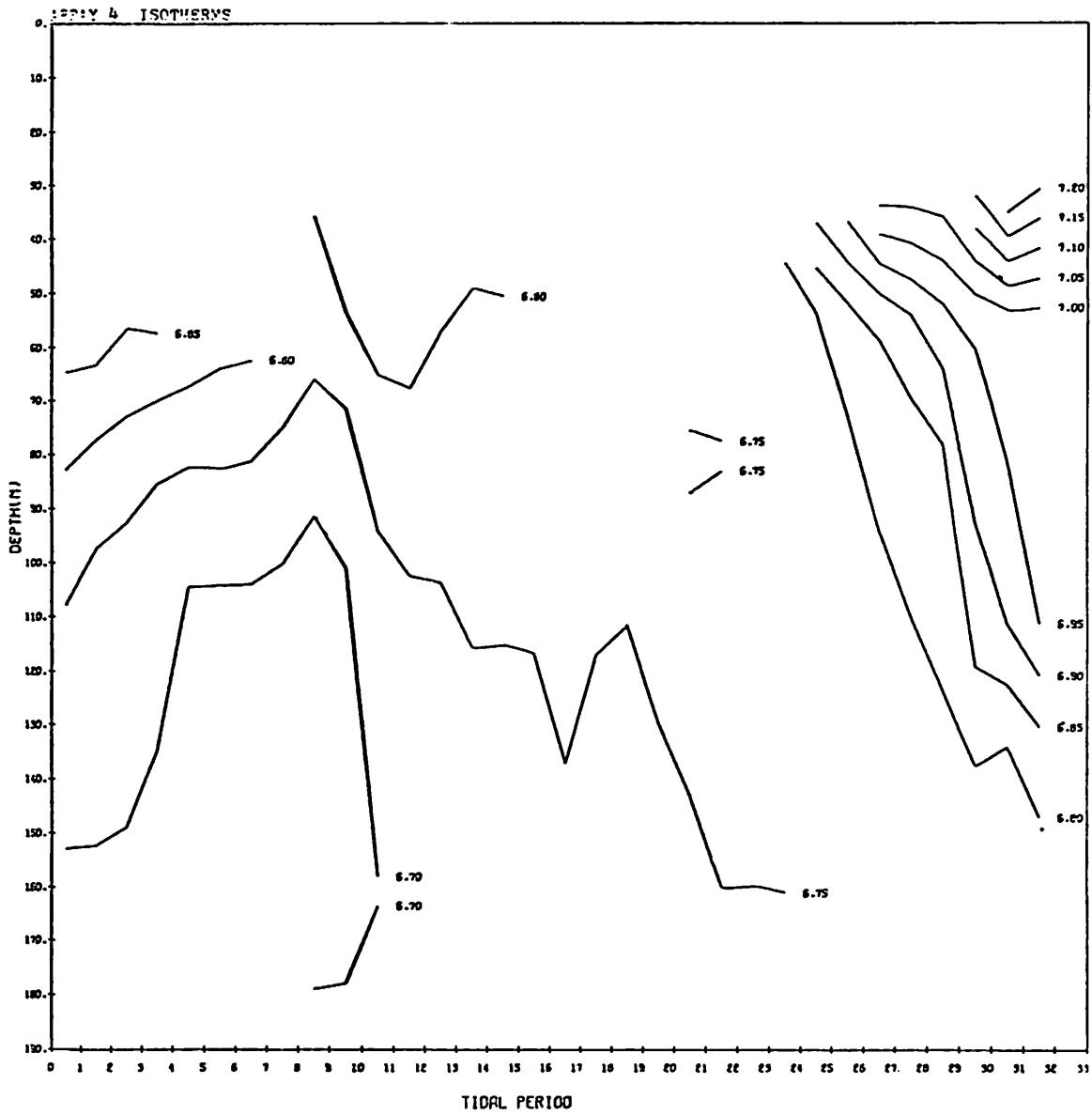


Figure 5.

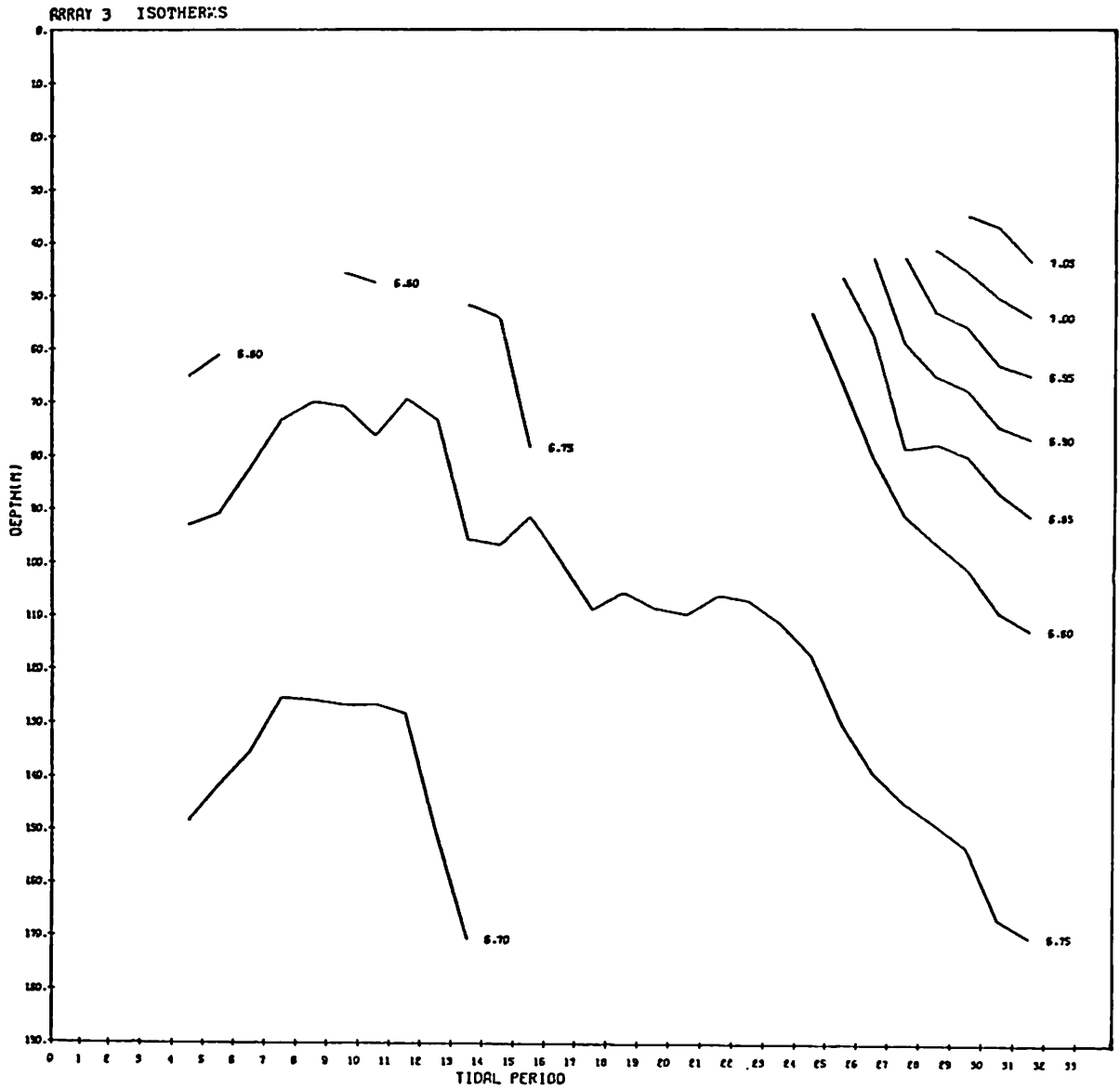


Figure 6.

Tables 2 and 3 give the average temperature and gradient at each sensor for each of the three temperature phases at array 4 but only the first phase at array 3. The gradients were calculated from the fit of a cubic spline to the data. Zero second derivatives were specified at the end points. The general tendency of the three phases is evident, especially in the temperature gradients. During phase three, the thermocline at array 4 has moved upward from 77 m to less than 52 m. There is also an increase in gradient at 132 m.

The plots of hourly temperature, Figures 7 and 8, show temperature fluctuations correlated with the tide. During the initial temperature phase, the sensors at 77 m and 102 m on array 4 and 35 m through 110 m on array 3, show warmest temperatures occur at low tide. However, at 110 m, array 3, these warm temperatures occur only on lower low tide. During the isothermal phase, the temperature fluctuations are not large enough on this scale to visually correlate with the tide. The warm water phase shows not only a warming trend at each sensor, but also large temperature fluctuations during each tide cycle. At array 4, the warmest temperatures occur at high tide at 77 m and below, and at low tide at 27 m. However, at 52 m warmest temperatures initially occur at high tide and then change to low tide after Julian Date (JD) 77. The temperature range from high to low tide has a maximum of $\approx 0.35^{\circ}\text{C}$ at 27 m. During the warm water phase, the temperature at all sensors on array 3 is warmest at low tide. However, at 35 m and 60 m there is often a sharp decrease of $\approx 0.08^{\circ}\text{C}$ right at low tide. This may be due either to the leading edge of the warm water lens passing the sensors as the lens is advected north between high and low tide or to cooler surface temperatures.

The tide record at 27 m is plotted in Figure 8. This record also includes the contribution from mooring motion, seiches and other barotropic pressure forces. Since the mooring motion is due to drag on the array, its contribution should appear proportional to a rectified horizontal velocity signal (i.e., au^2). Inspection of the tidal record reveals several "peaked" high tides—for example, JD59 - JD62. These peaks are also present but not as prominent at low tide. Irish has suggested that such peaks could occur if maximum tidal velocity occurred near high or low tide. In this case, the mooring would be at maximum displacement near high and low tide, making the tide look higher and lower than it really is.

An attempt was made to estimate the magnitude of mooring motion. Using a program developed by Irish, the surface tide was predicted based on harmonic constants derived from tide records taken in Elliot Bay, Puget Sound. No correction was made for the 6' difference in latitude and longitude between the tide station and array 4. The tidal constituents used are given in Table V in the appendix. The predicted surface tide was subtracted from the observed to obtain the residual. The variance of each is given in Table 4.

TABLE 2: Array 3, mean temperature and gradients for period JD54 - JD65.

	35m	60m	85m	110m	140m	155m	165m	170m	175m	180m
Ave Temp ($^{\circ}\text{C}$)	6.7780	6.7651	6.7354	6.7070	6.6933	6.6877	6.6828	6.6799	6.6768	6.6736
Variance(10^{-4})	11.6853	6.7402	8.1647	4.2314	1.1097	.8850	1.0334	1.1681	1.4337	1.9129
Stand. Dev.	.0342	.0260	.0286	.0206	.0105	.0094	.0102	.0108	.0120	.0138
Ave Grad ($^{\circ}\text{C}/\text{M}$)	-.0003	-.0009	-.0013	-.0008	-.0003	-.0004	-.0005	-.0006	-.0006	-.0006
Variance(10^{-6})	2.1316	1.1644	.5640	.4685	.1767	.1731	.1977	.3124	.4249	.4697
Stand. Dev.	.0015	.0011	.0008	.0007	.0004	.0004	.0004	.0006	.0007	.0007

TABLE 3: Array 4, mean temperature and gradients for temperature phases I, II, III.

	27m	52m	77m	102m	132m	157m	172m	182m	Temperature Phase
Ave Temp ($^{\circ}\text{C}$)	6.8385	6.8300	6.7542	6.7047	6.6897	6.6823	6.6817	6.6826	I (JD49 - JD60)
Variance(10^{-4})	16.2414	16.4302	17.1297	8.5355	2.6043	0.9673	1.2235	2.1588	
Stand. Dev.	0.0403	0.0405	0.0414	0.0292	.0161	0.0098	0.0111	0.0147	
Ave Grad ($^{\circ}\text{C}/\text{m}$)	0.0004	-0.0019	-0.0030	-0.0011	-0.0003	-0.0002	0.0001	0.0001	
Variance(10^{-6})	2.5532	1.1108	0.7211	0.9533	0.4731	0.3741	0.4549	0.5259	II (JD60 - JD71)
Stand. Dev.	0.0016	0.0011	0.0008	0.0010	0.0007	0.0006	0.0007	0.0007	
Ave Temp ($^{\circ}\text{C}$)	6.7839	6.7817	6.7532	6.7436	6.7327	6.7108	6.7089	6.7113	
Variance(10^{-4})	13.8055	6.6805	1.7692	2.0682	2.6208	1.9142	1.2376	0.9518	
Stand. Dev.	0.0372	0.0258	0.0133	0.0144	0.0162	0.0138	0.0111	0.0098	III (JD71 - JD83)
Ave Grad ($^{\circ}\text{C}/\text{m}$)	0.0002	-0.0007	-0.0009	-0.0001	-0.0008	-0.0005	0.0002	0.0003	
Variance(10^{-6})	2.4815	0.7306	0.6669	0.3306	0.2351	0.1541	0.1926	0.2623	
Stand. Dev.	0.0016	0.0009	0.0008	0.0006	0.0005	0.0004	0.0004	0.0005	
Ave Temp ($^{\circ}\text{C}$)	7.0102	6.8569	6.8193	6.8136	6.7744	6.7493	6.7465	6.7476	III (JD71 - JD83)
Variance(10^{-4})	304.4830	76.3005	63.2546	62.2775	8.1037	1.3965	1.5378	1.6349	
Stand. Dev.	0.1745	0.0874	0.0795	0.0789	0.0285	0.0118	0.0124	0.0128	
Ave Grad ($^{\circ}\text{C}/\text{m}$)	-0.0073	-0.0039	-0.0002	-0.0007	-0.0014	-0.0005	0.0000	0.0001	
Variance(10^{-6})	31.7313	5.9647	2.1386	2.5560	2.4785	0.5988	0.2324	0.3662	III (JD71 - JD83)
Stand. Dev.	0.0056	0.0024	0.0015	0.0016	0.0016	0.0008	0.0005	0.0006	

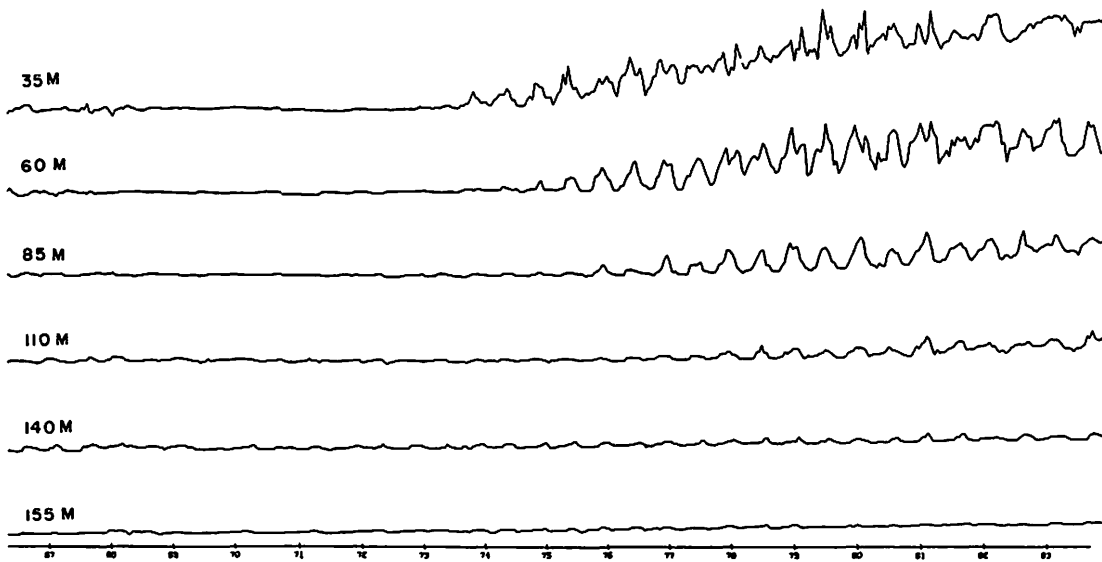
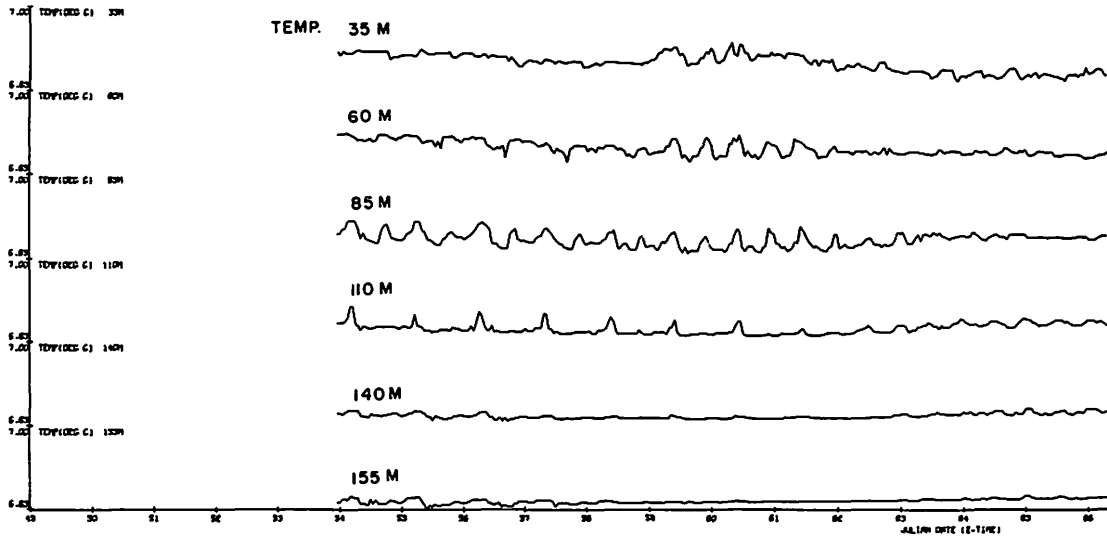


Figure 7.

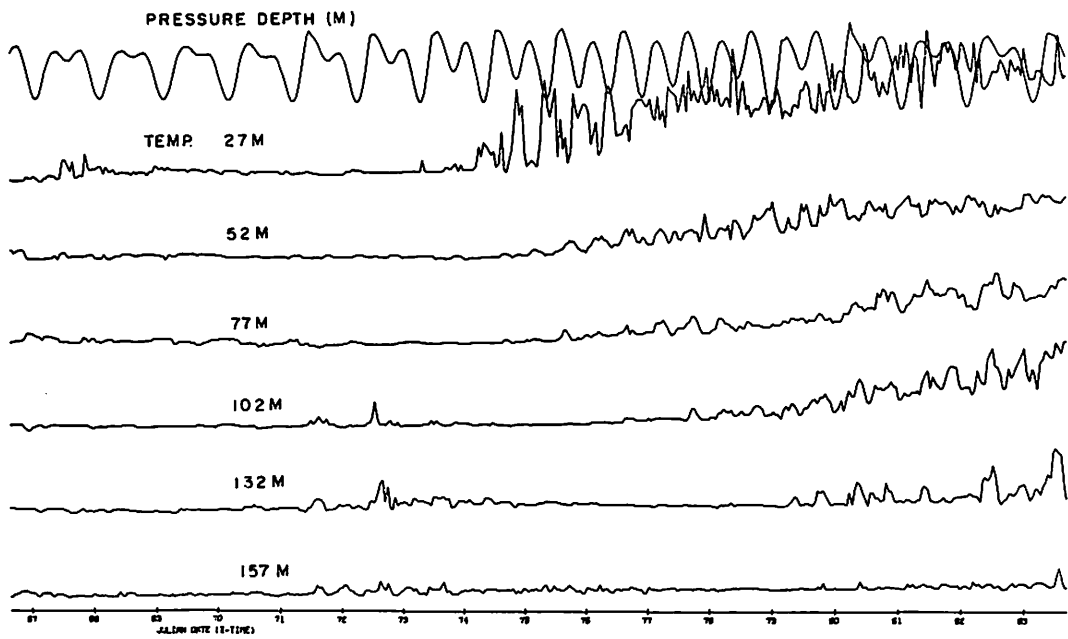
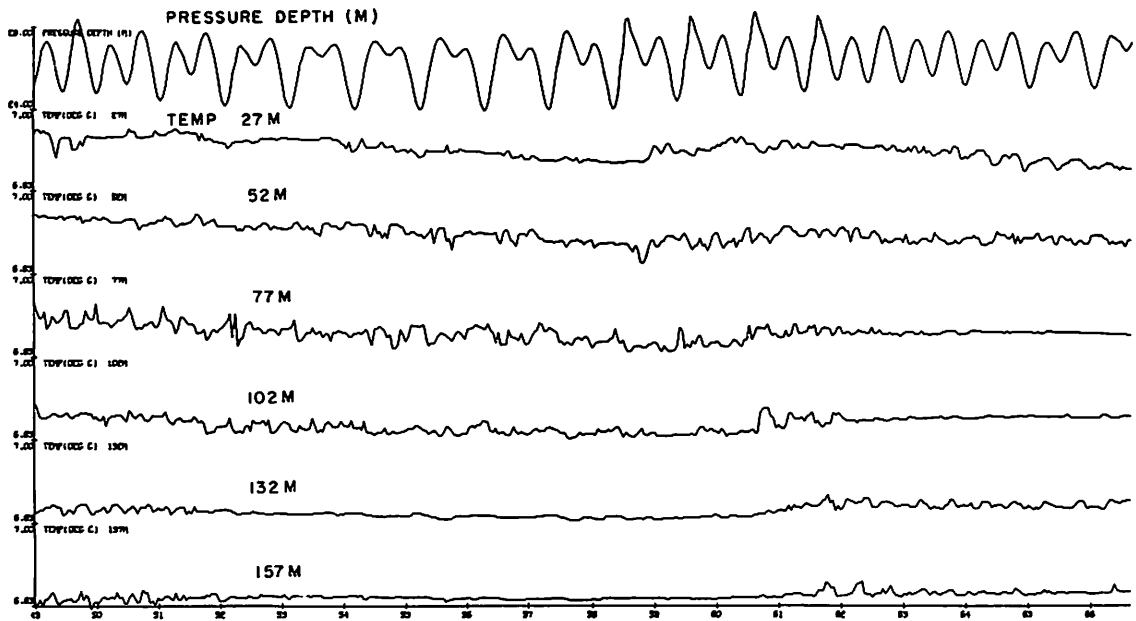


Figure 8

TABLE 4: Variance of the tide.

Recorded Variance	= 1.021940 m ²
Predicted Variance	= 0.9650736 m ²
Residual Variance	= 0.0568661 m ²

If the entire residual variance is attributed to mooring motion then the amplitude is small, ~24 cm. This is equivalent to a 3° displacement from the vertical. Inspection of the residual series, however, shows some displacements much larger than 24 cm, the largest being 1.3 m on JD61. This is equivalent to a 6° displacement. The predicted tidal amplitudes and phases are given in Table 5.

TABLE 5: Predicted tide.

Tidal Line	Amplitude (cm)	Initial Phase*
M_2	100.0 ± 9.8	169.9 ± 5°
S_2	24.9 ± 2.5	223.2 ± 5°
K_1	84.7 ± 12.5	92.7 ± 7°
O_1	48.6 ± 7.1	266.0 ± 7°

*Phase at beginning of record.

Reliable conductivity data was obtained only from the sensor on array 4. However, the thermistor at the same depth (172 m) malfunctioned after 18 days. The salinity at array 4 calculated from the conductivity at 172 m and the temperature at 182 m decreased steadily from 29.45‰ to 28.88‰ during the test period 17 Feb 1972 to 23 Mar 1972. This is consistent with the similar trend shown in the POL hydrographic data discussed below.

HYDROGRAPHIC SURVEY AND OTHER DATA

During 1972, POL commenced an experimental program to study the dynamics of the Puget Sound system. Cannon and Laird have provided an initial summary of the experiment, current measurements and STD observations made in Puget Sound in Feb 1972 (Cannon and Laird, 1972). Their sections of temperature, salinity, and density are reproduced in Figures 9 through 14. The vertical lines in the figures indicate locations occupied during the survey. Table 6 and Figure 15 summarize the results of their current measurements. The u axis is chosen along the direction of maximum variance with $+u$ northerly and $+v$ at 90° to the left.

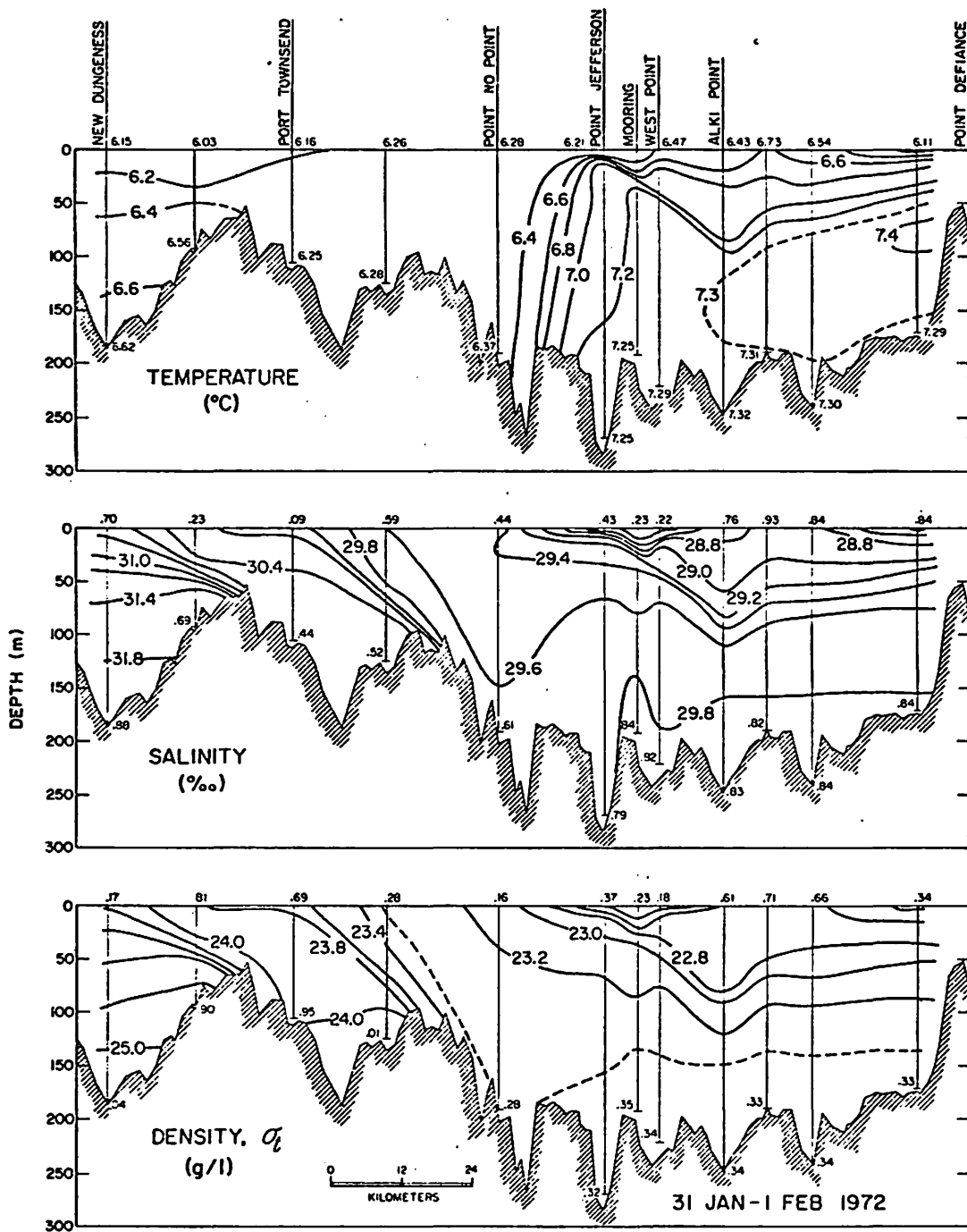


Figure 9. Physical properties (Cannon & Laird, 1972)

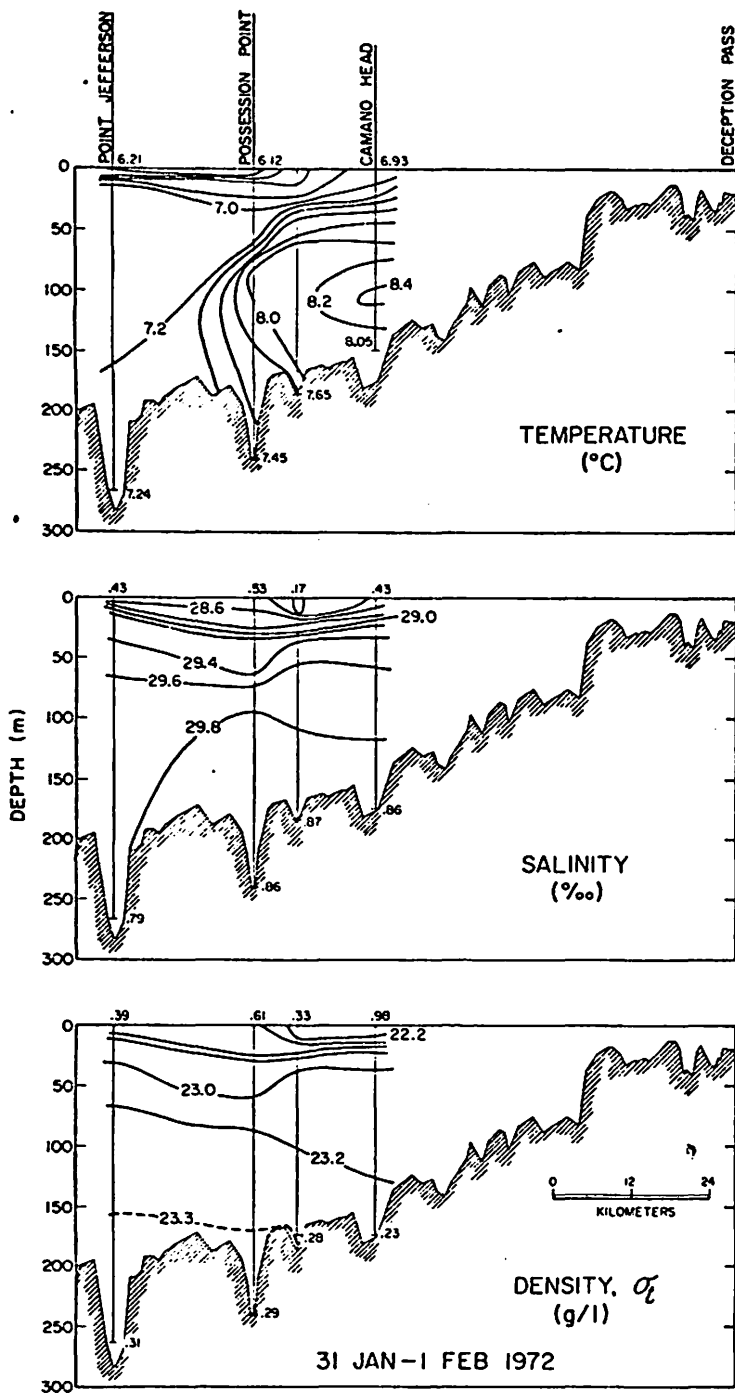


Figure 11. Physical properties (Cannon & Laird, 1972)

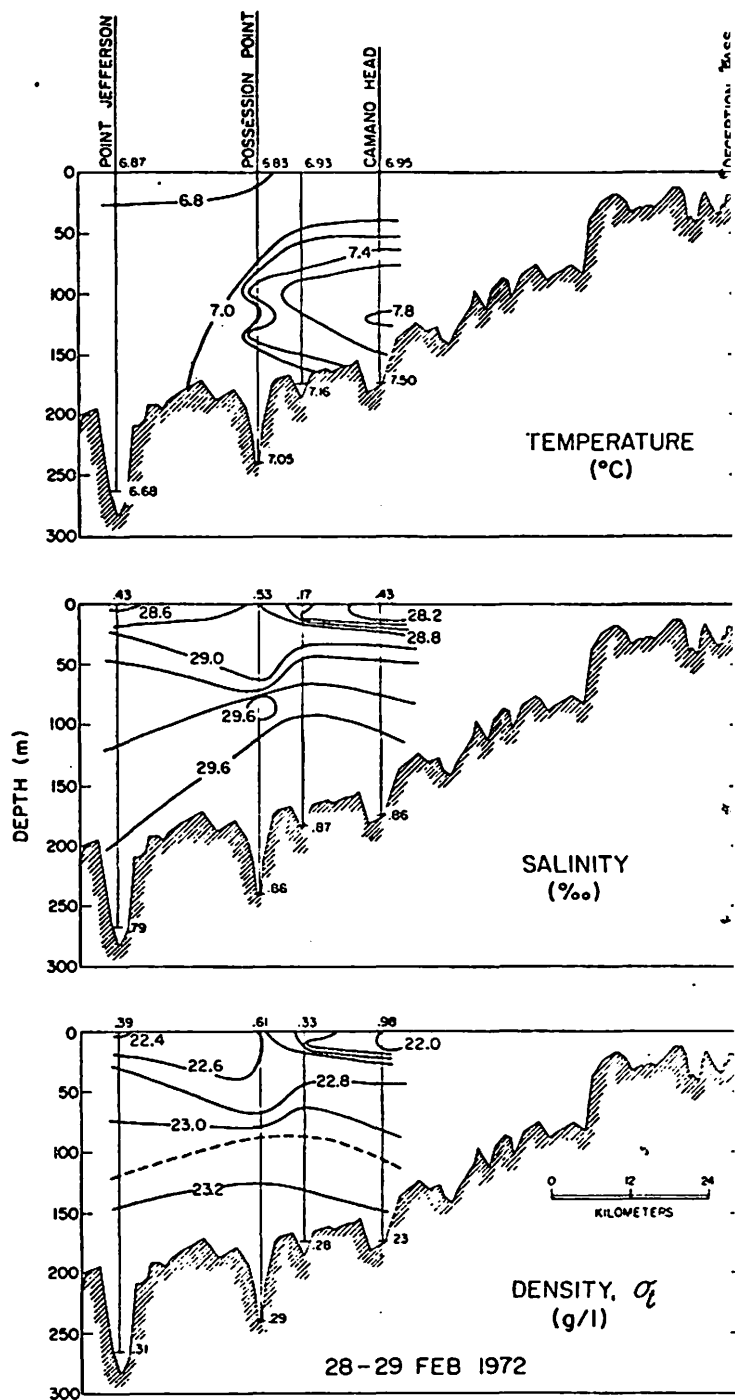


Figure 12. Physical properties (Cannon & Laird, 1972)

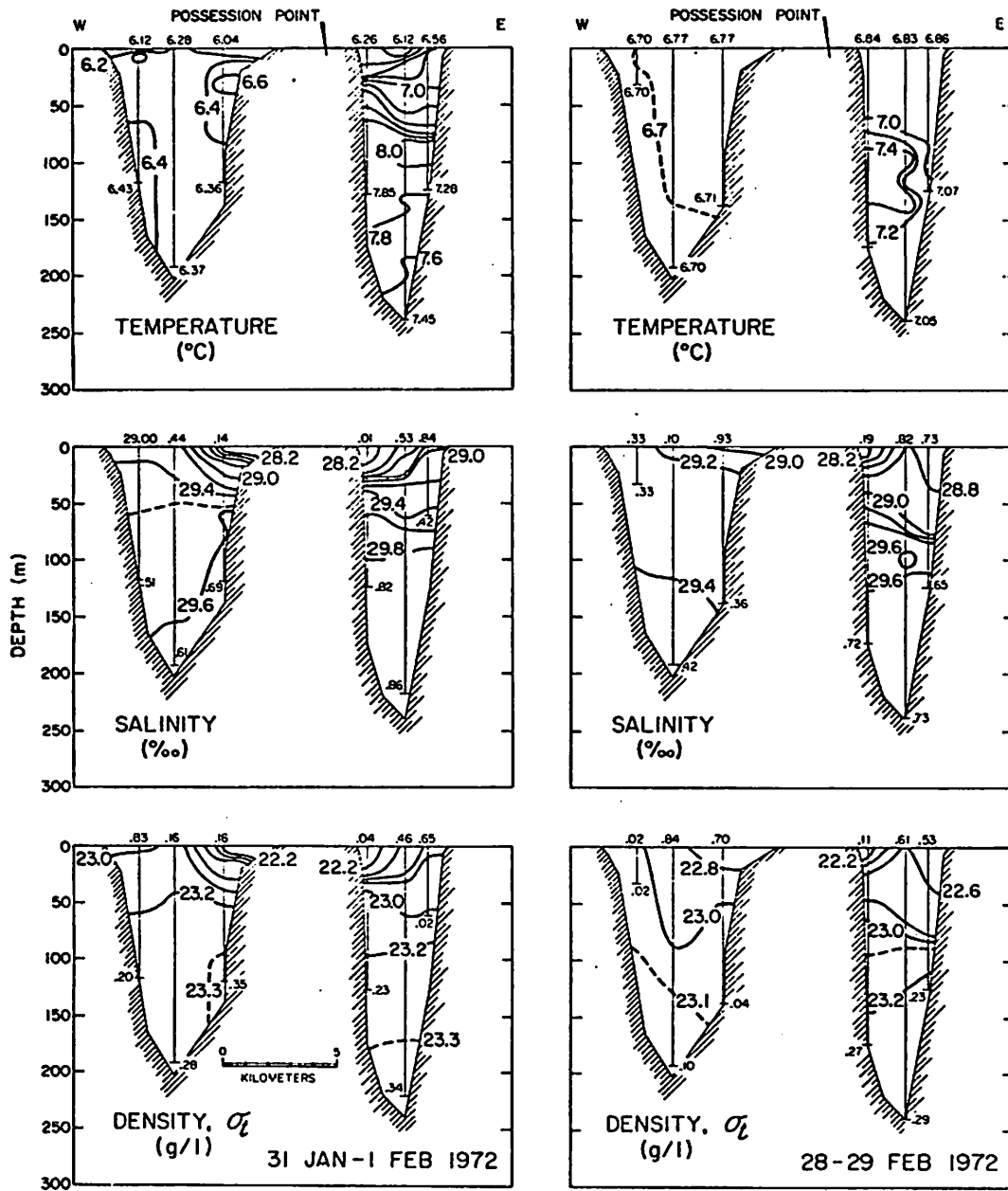


Figure 13. Physical properties (Cannon & Laird, 1972)

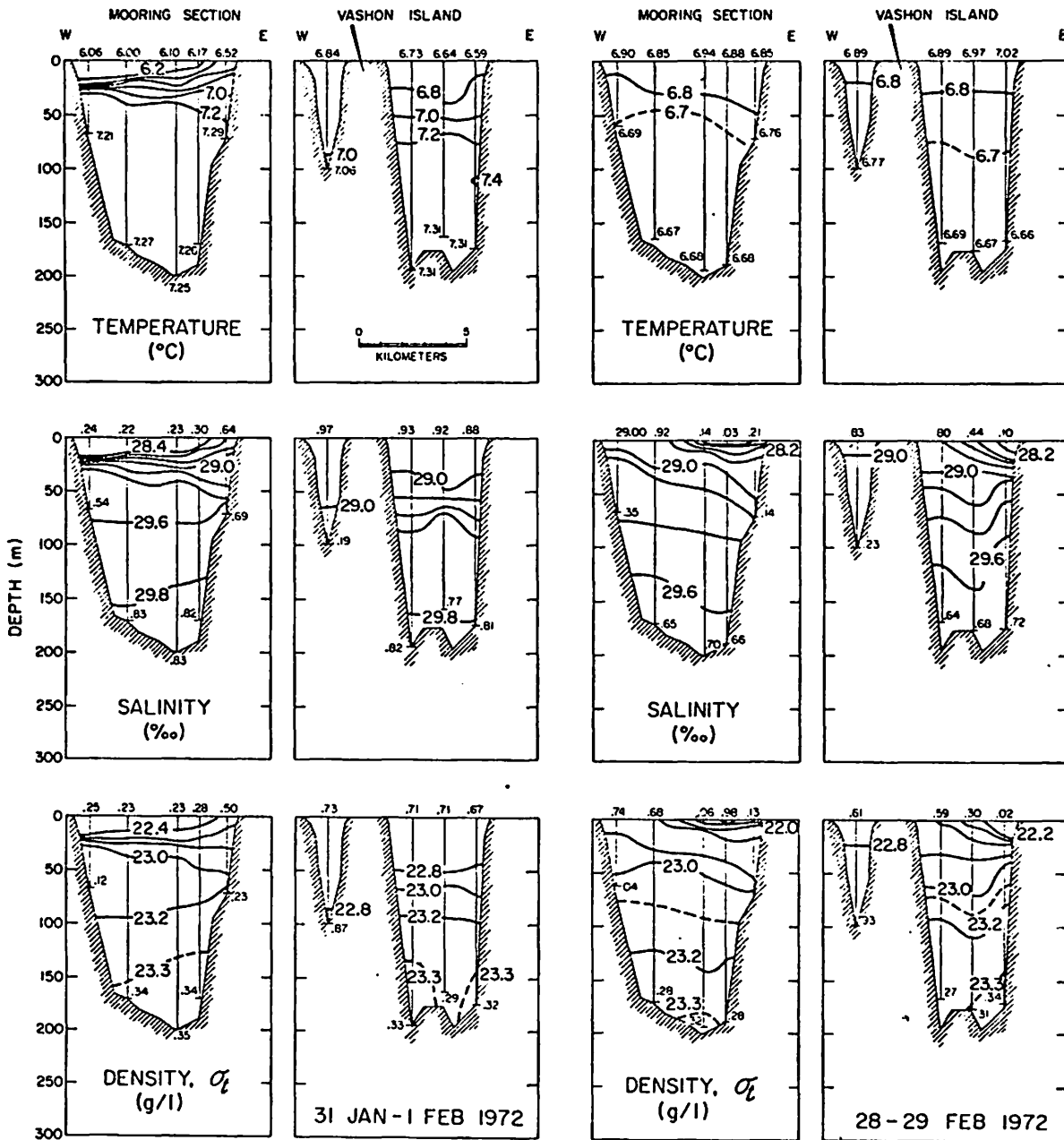


Figure 14. Physical properties (Cannon & Laird, 1972)

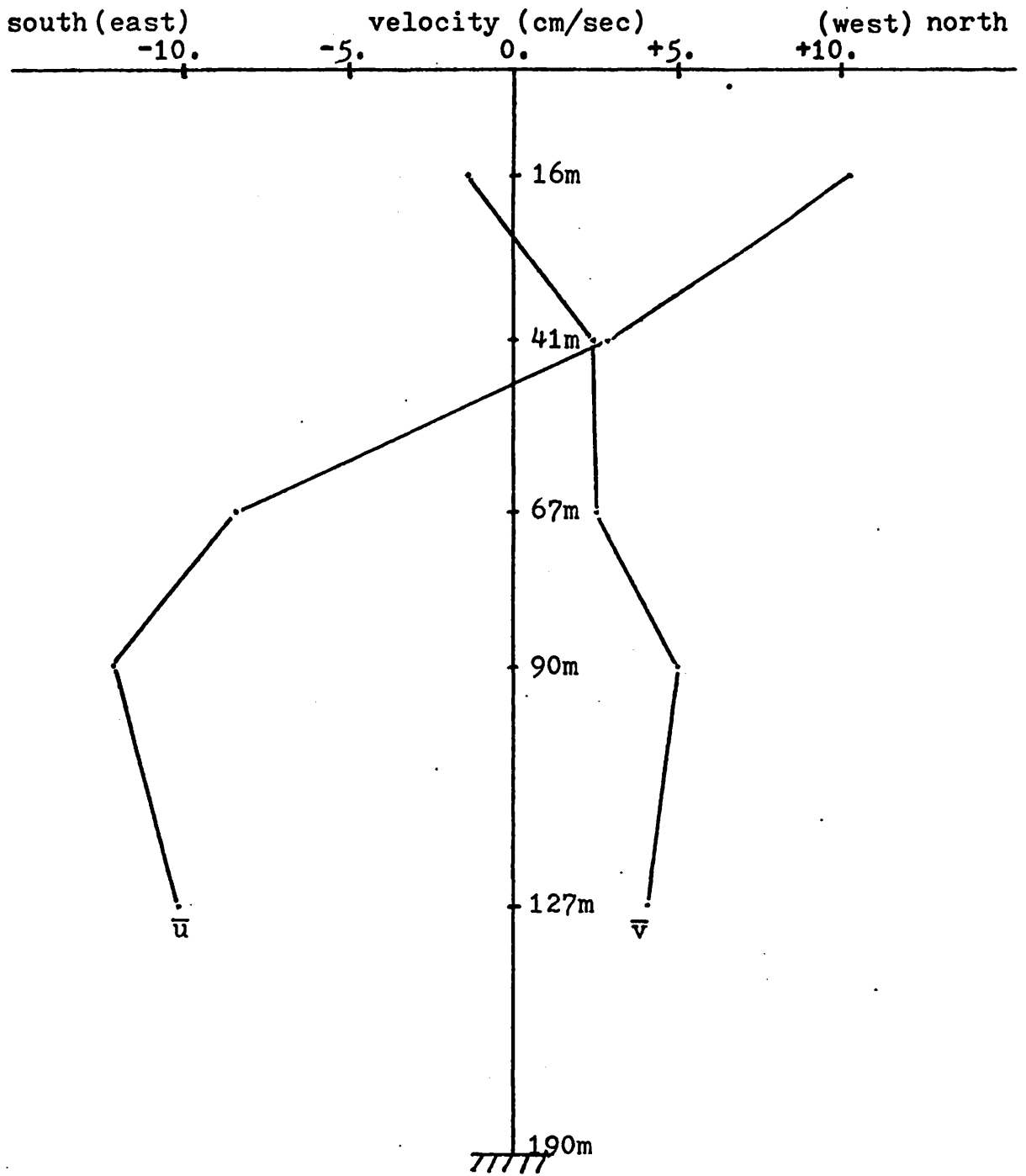


Figure 15. Mean velocity vs Depth

TABLE 6: Summary statistics of the current-meter records.

Depth (m)	Direction of $+u$ (°T)	\bar{u} (cm/s)	Variance (cm ² /s ²)	\bar{v} (cm/s)	Total Variance (cm ² /s ²)	Lunar Day (#)
16	24	10.1	194.	-1.3	222.	29.
41	31	2.9	530.	2.4	594.	26.
67	46	- 8.3	206.	2.5	238.	25.
90	42	-11.9	165.	4.9	201.	30.
127	48	- 9.9	236.	4.0	280.	21.

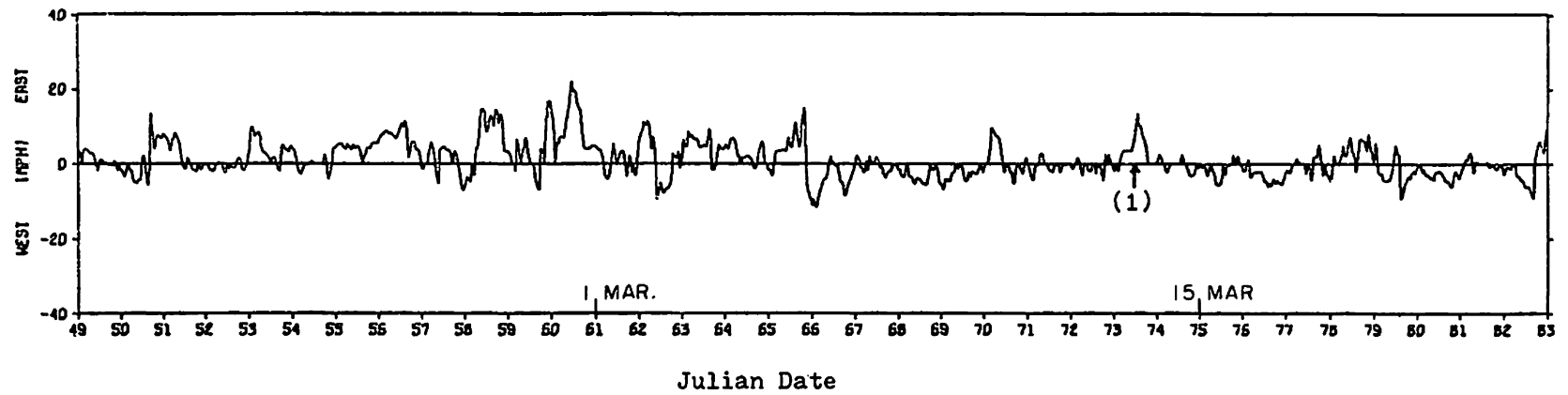
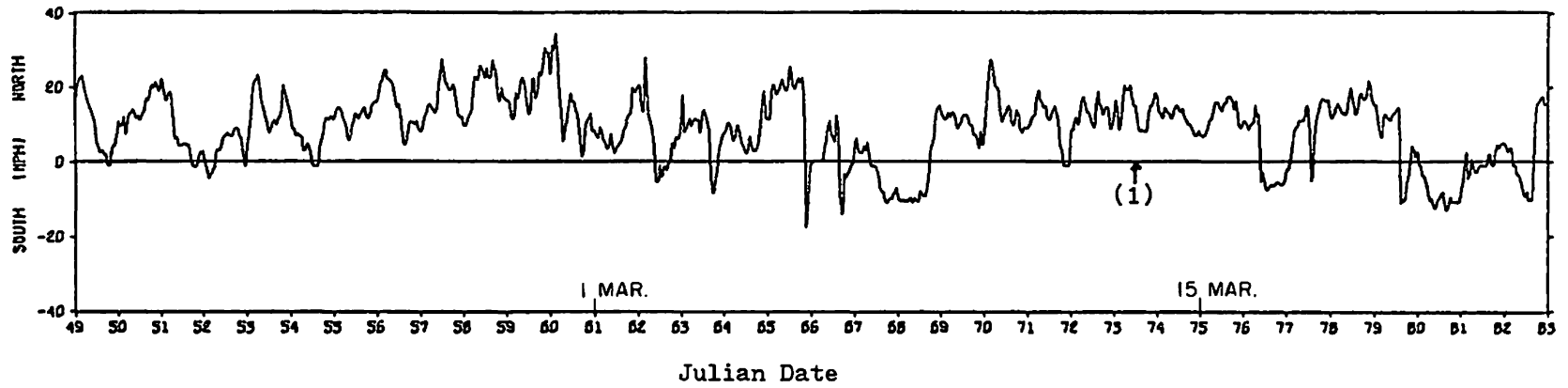
*Reproduced from Cannon and Laird, 1972. Start of records 31 Jan 1972.

The following is a summary of their principal observations:

- (1) A colder than usual winter for Puget Sound.
- (2) An intrusion of slightly fresher bottom water. (Figure 10)
- (3) Northerly mean flow above 50 m and southerly mean flow below. (Figure 15)
- (4) Kinetic energy maximum in the main pycnocline (\approx 41 m) concentrated chiefly in the lunar semi-diurnal u -component of velocity. (Table 6)
- (5) Relatively large temperature fluctuations near the beginning of the record which decay and are absent at the end of the record.

The decay of these temperature fluctuations into an isothermal phase is observed perhaps in the time-series from arrays 3 and 4.

Wind, air temperature, and runoff data from 1 Feb through 30 Mar 1972 are plotted in Figures 16, 17, and 18. Wind observations, recorded at West Point as part of a UW program, were obtained from Gene Collias. These observations were reduced from analog records by visually estimating hourly averages of speed and direction separately. The components are plotted (+) blowing north, (-) south, (+) east, and (-) west. The wind was generally blowing north and northeast for the entire period of recorded data. On JD 73, after almost three days of blowing north, there was a sharp change to blowing northeast with an easterly component of \approx 10 mph. This was also the first day of the warm water intrusion. The wind change lasted about one day.



(1) Warm water detected

Figure 16. Wind velocity and direction vs Julian Date

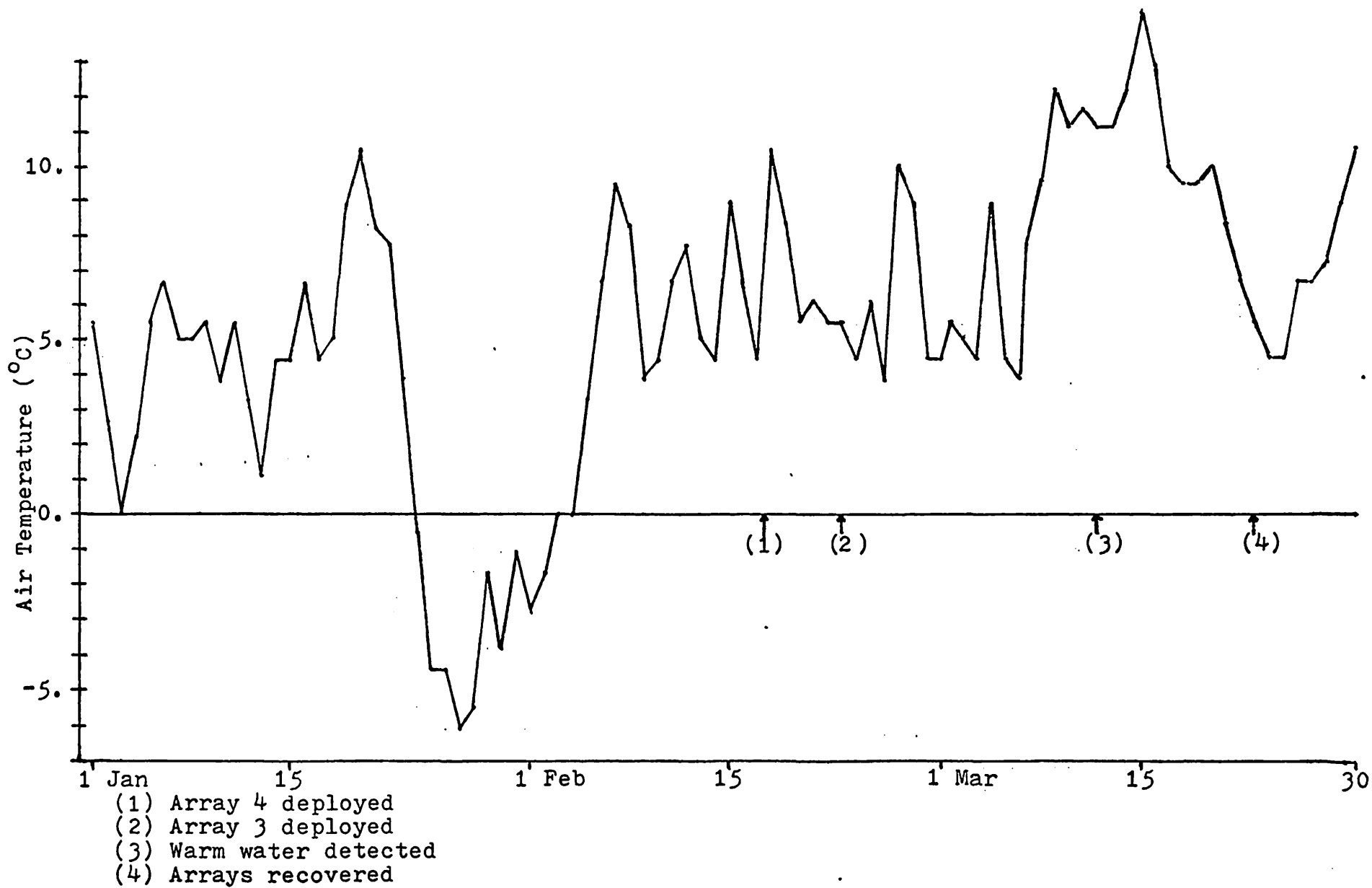


Figure 17.

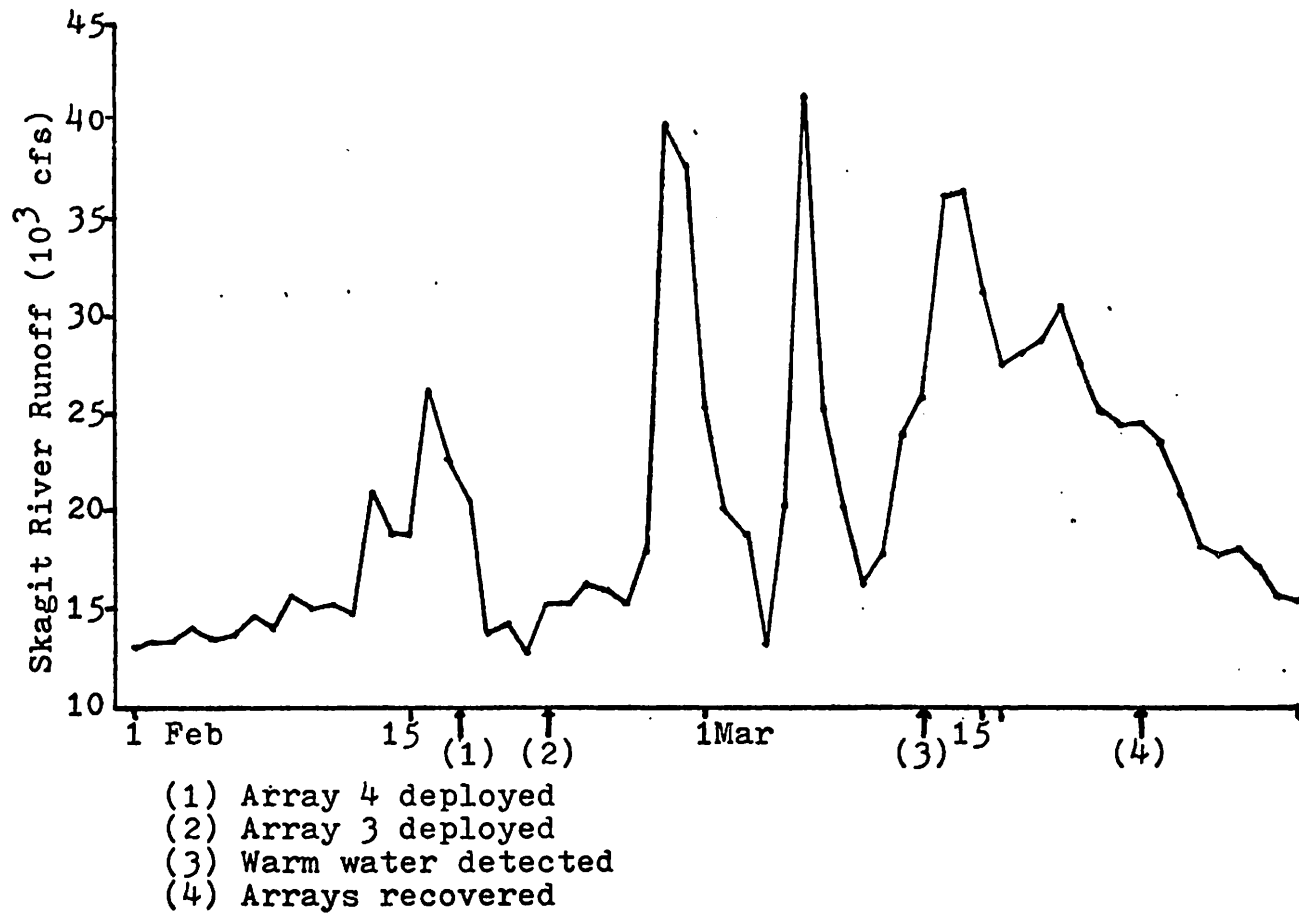


Figure 18.

Runoff data was obtained from the weekly runoff report of the U.S. Geological Survey. The daily averages for the Skagit River near Concrete, Washington are plotted in Figure 18. This data shows that runoff increases from 15000 cfs to 40000 cfs at 15 days and again at 7 days before the warm water intrusion occurs.

Air temperature data were obtained from the monthly NOAA report of local climatological data. The daily average air temperature is plotted in Figure 17. Four days before the warm water intrusion the air temperature increases by 8°C and remains high.

FOURIER REPRESENTATION

A fast Fourier transform algorithm (FFT), obtained from Cannon, was used to compute the Fourier coefficients of the pressure and temperature time-series. Record lengths of 34 days (25000 points at $\Delta t = 2$ min) were used for the pressure series and 11 days (8192 points at $\Delta t = 2$ min) were used for the temperature series. The lengths of records for the temperature series approximately cover each of the three temperature phases. The periodogram ordinates (amplitude²/2 vs frequency) are plotted in Figures 19 through 33.

Before analyzing the temperature periodogram, we must consider what type of motions could make a significant contribution to the temperature signal. The temperature measured at a fixed point (x,z) as a function of time, can be characterized by

$$\theta(x,z,t) = \theta_0(x - \eta(x,z,t), z - \xi(x,z,t)).$$

This can be written as

$$\begin{aligned} \theta(x,z,t) = & \theta_0(x,z) - \eta(x,z,t) \frac{\partial \theta_0}{\partial x}(x,z) \\ & - \xi(x,z,t) \frac{\partial \theta_0}{\partial z}(x,z) + \text{higher order terms.} \end{aligned}$$

Or, to first order

$$\theta(x,z,t) \approx \theta_0(x,z) - \eta \frac{\partial \theta_0}{\partial x} - \xi \frac{\partial \theta_0}{\partial z}$$

ARRAY 4 PRESSURE SENSOR 27 M

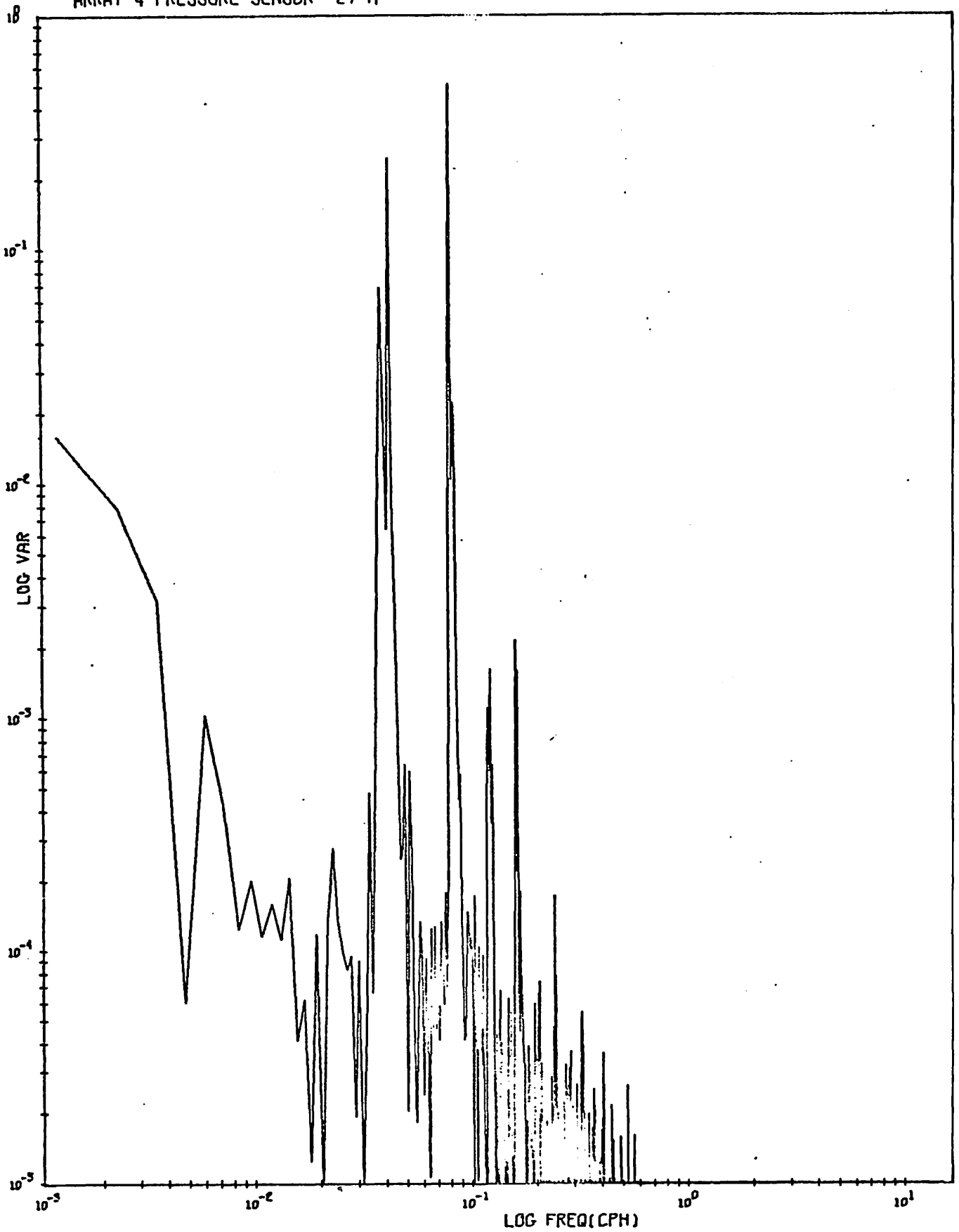


Figure 19. Tide spectrum

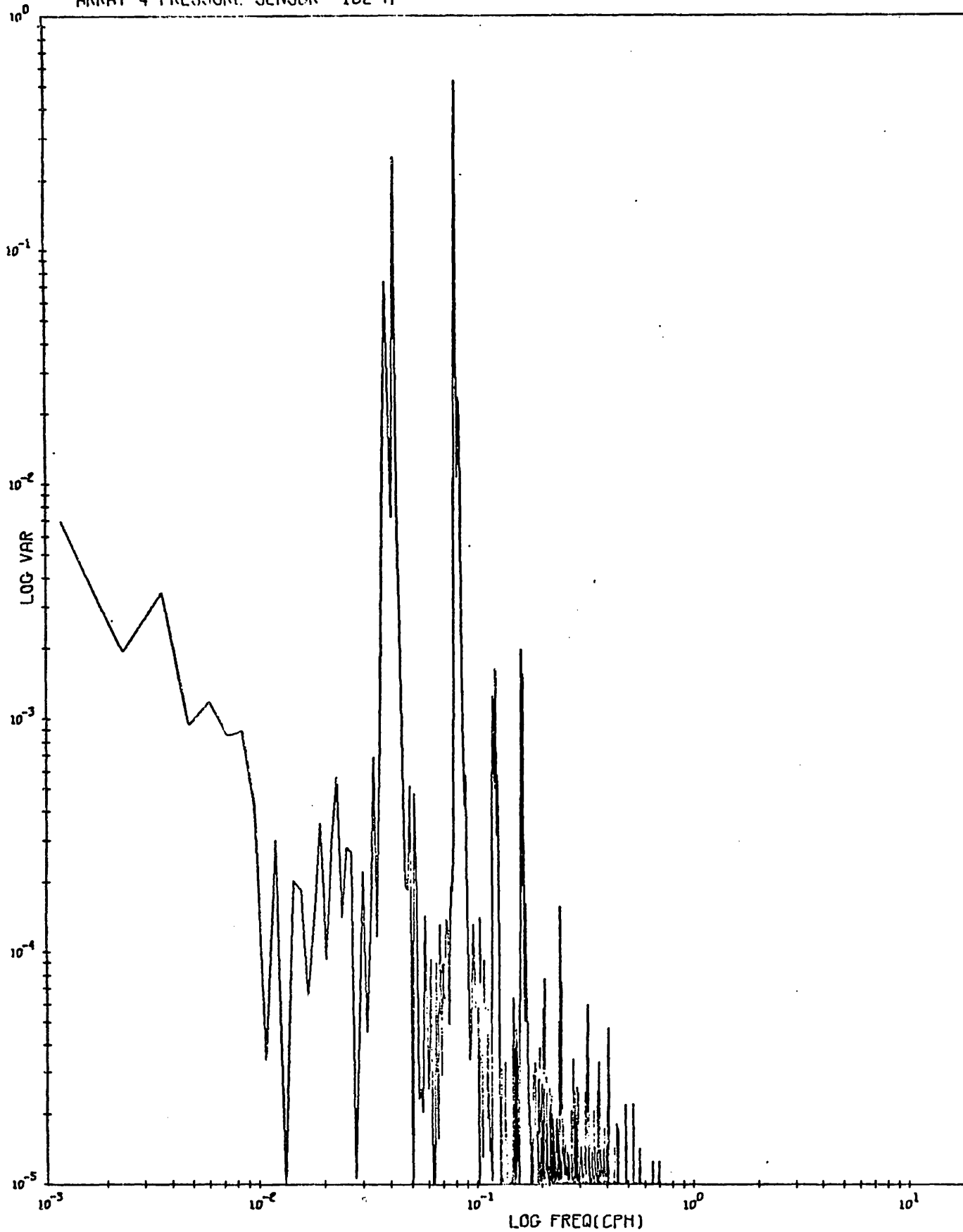


Figure 20. Tide spectrum

ARRAY 3 TEMPERATURE SPECTRUM 95 M

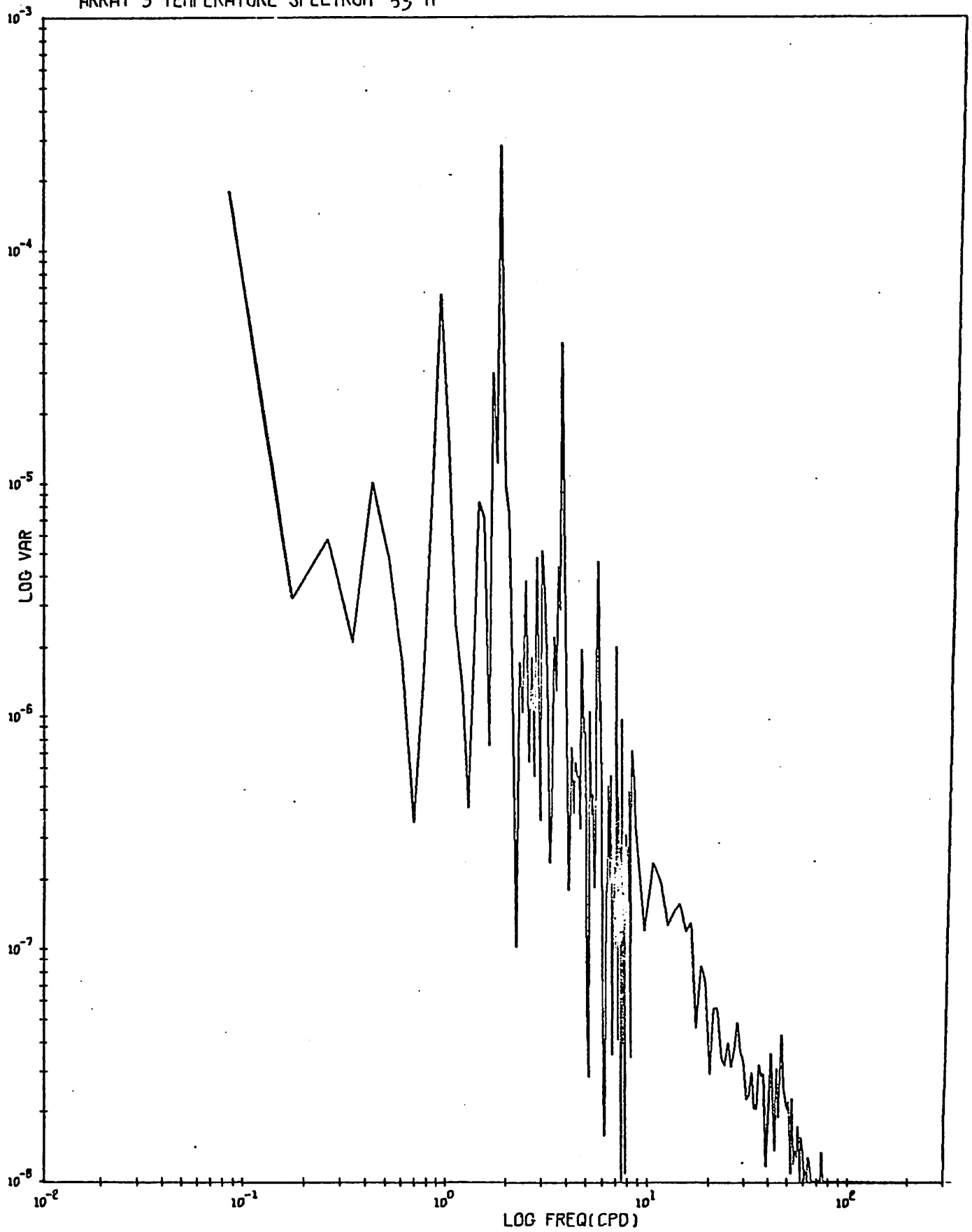


Figure 21.

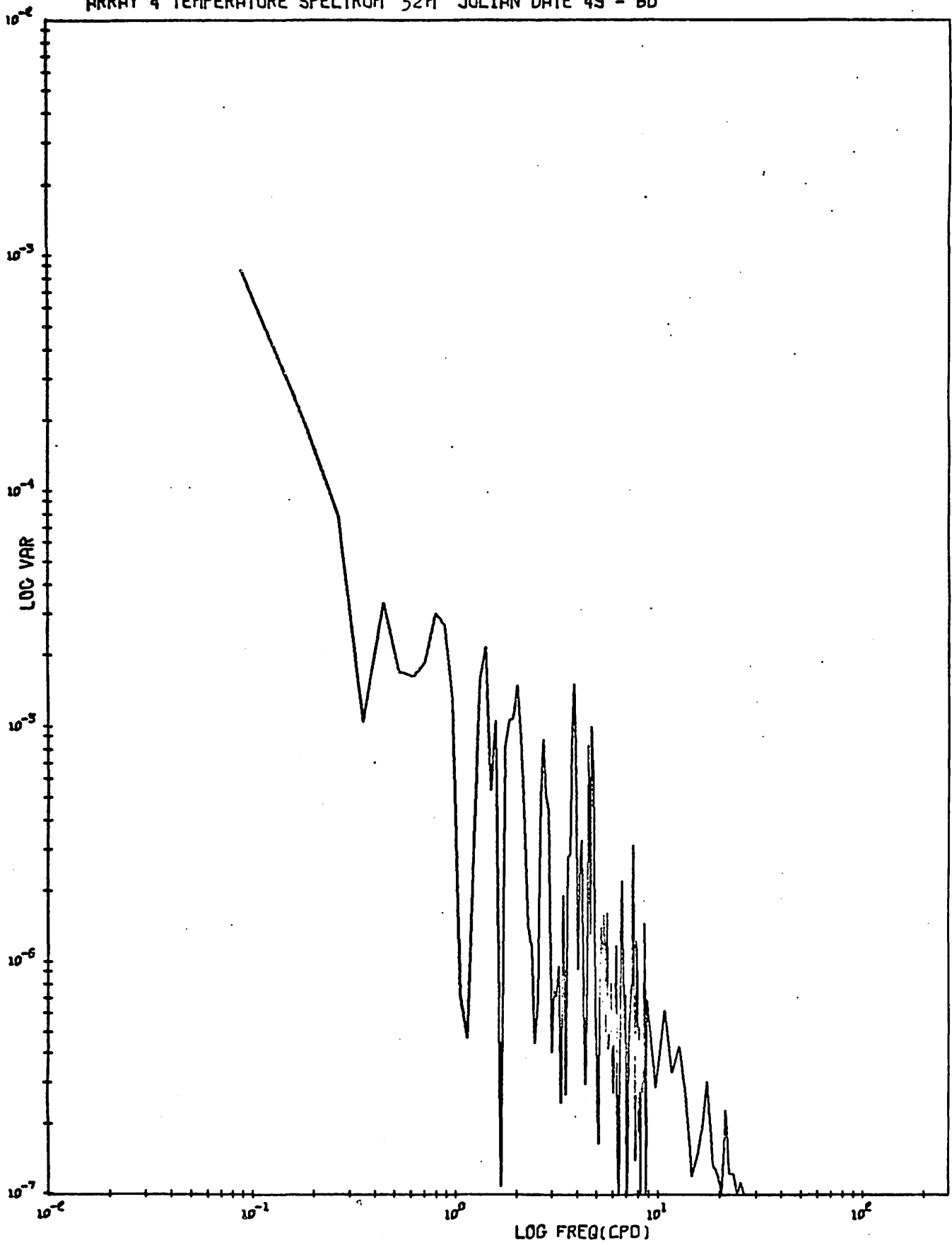


Figure 22.

ARRAY 4 TEMPERATURE SPECTRUM 52M JULIAN DATE 60 - 71

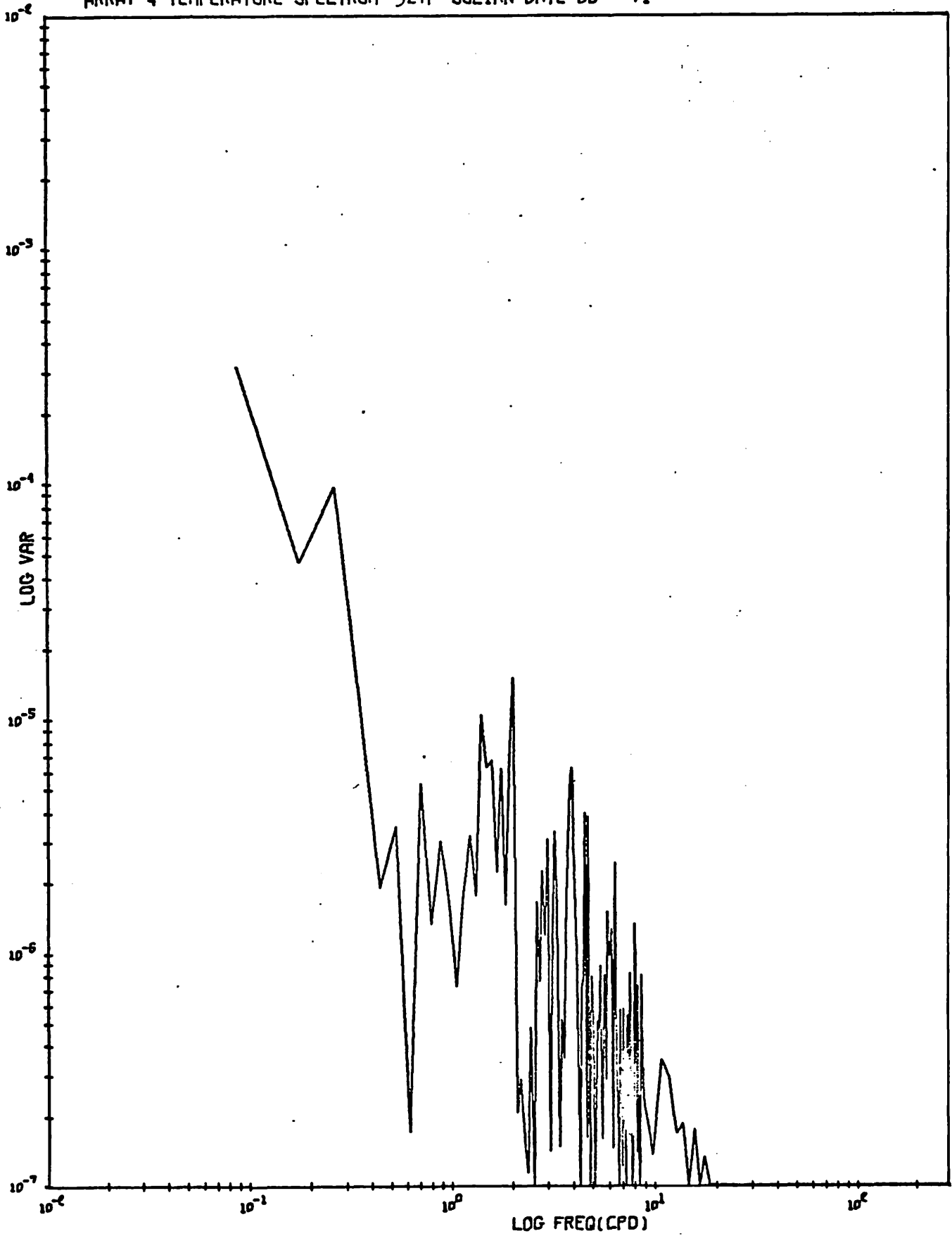


Figure 23.

ARRAY 4 TEMPERATURE SPECTRUM 52 M JULIAN DATE 71 - 89

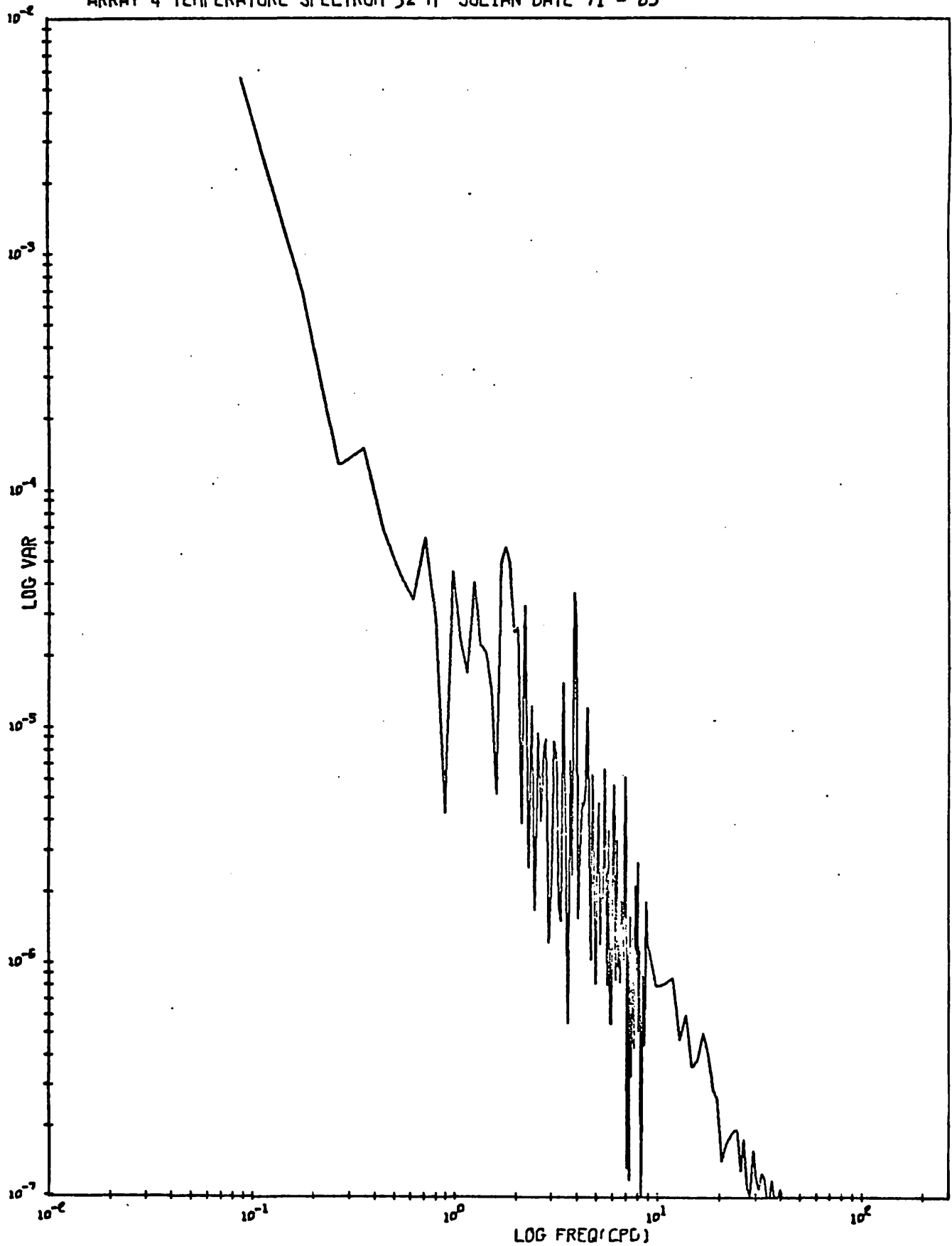


Figure 24.

ARRAY 4 TEMPERATURE SPECTRUM 77 M JULIAN DATE 49 - 60

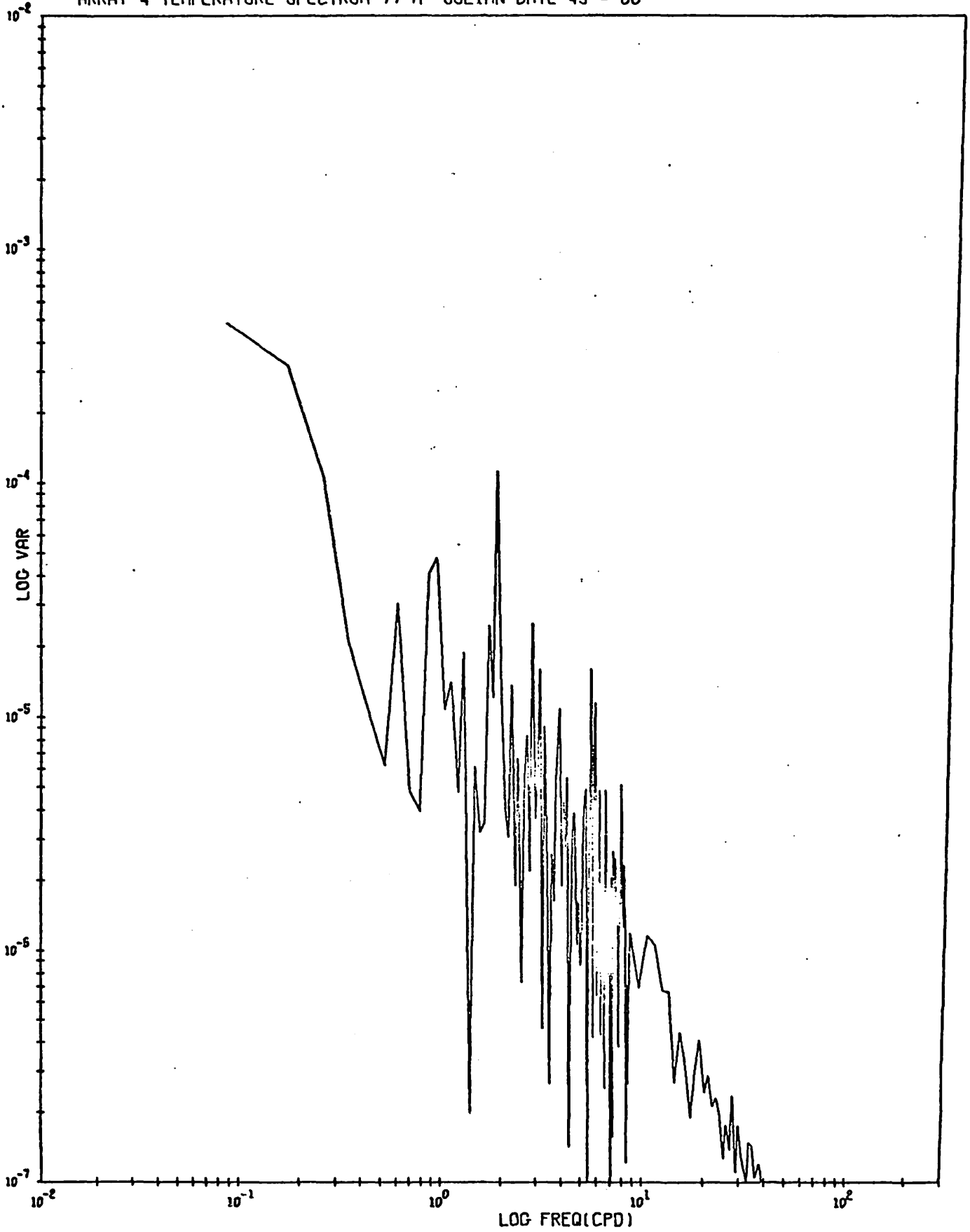


Figure 25.

ARRAY 4 TEMPERATURE SPECTRUM 77 M JULIAN DATE 60 - 71

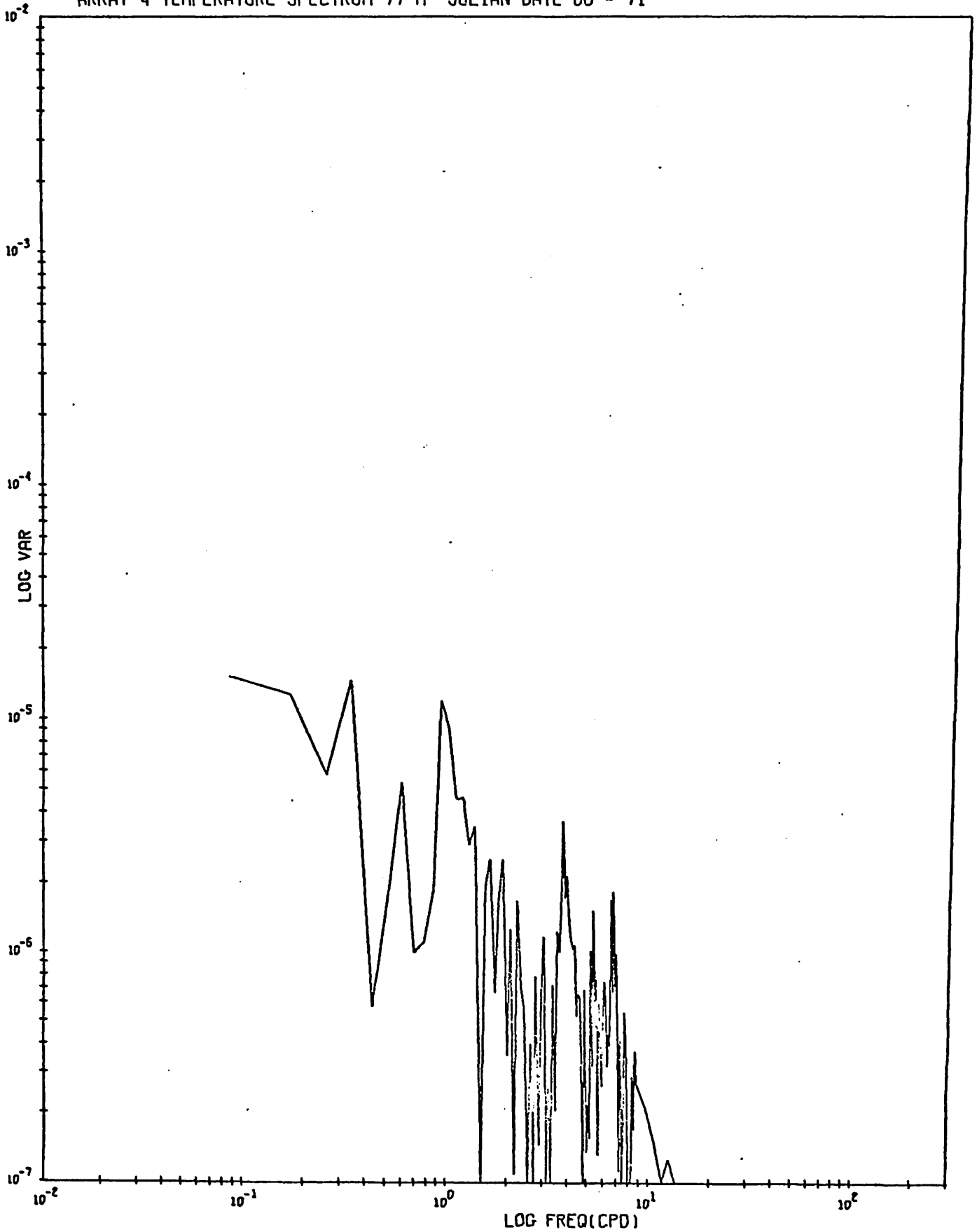


Figure 26.

ARRAY 4 TEMPERATURE SPECTRUM 77 M JULIAN DATE 71 - 83

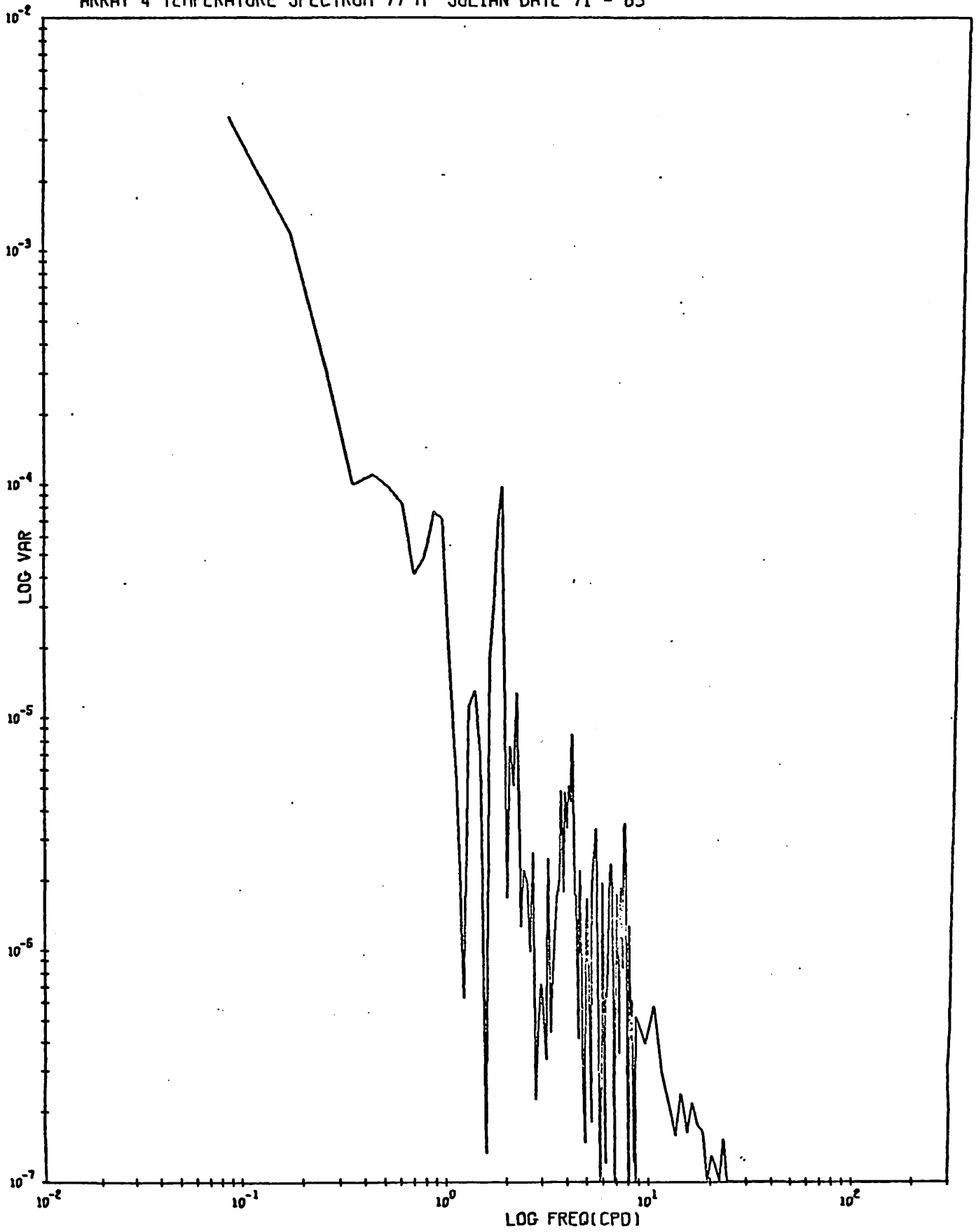


Figure 27.

ARRAY 4 TEMPERATURE SPECTRUM 102 M JULIAN DATE 49 - 60

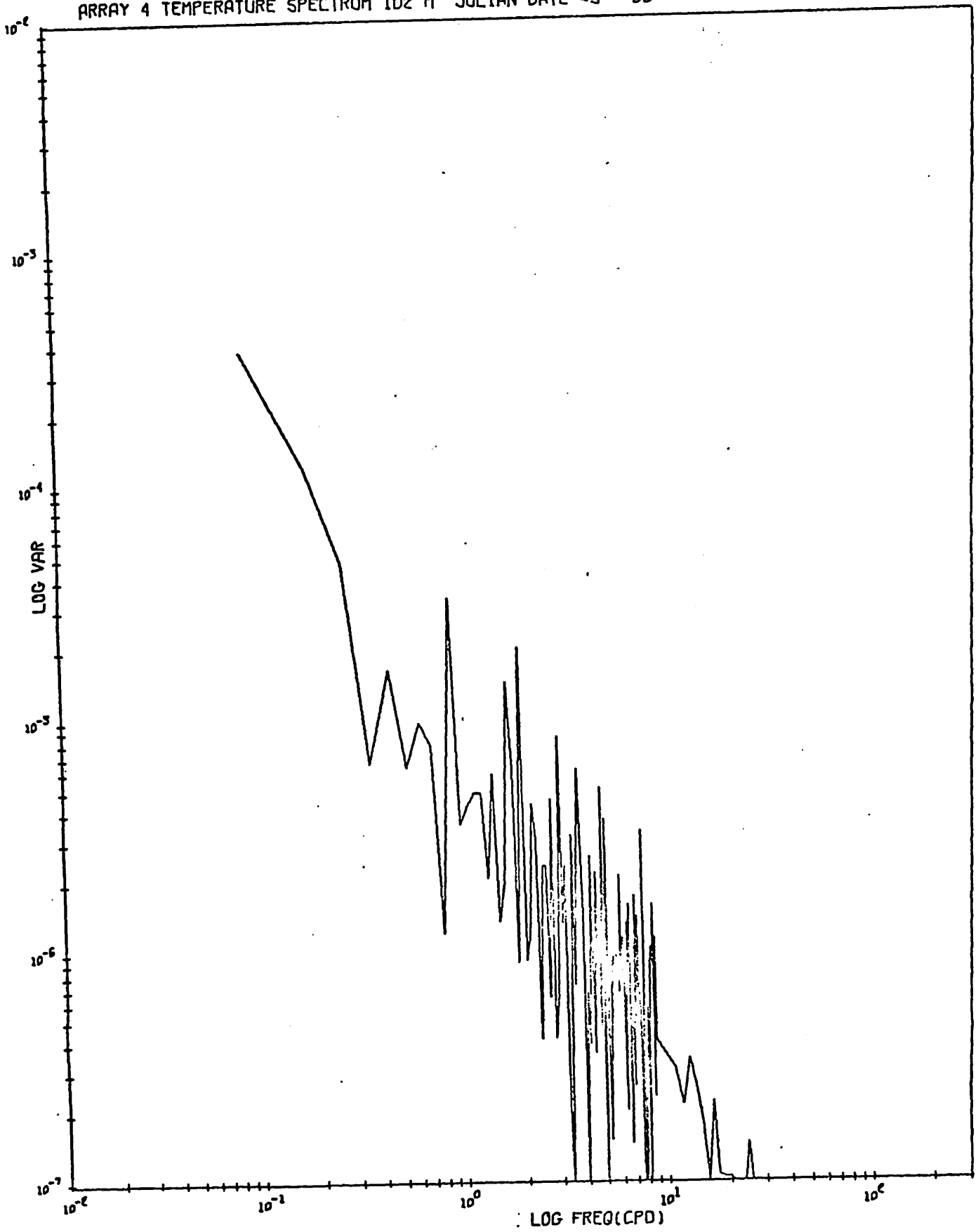


Figure 28.

ARRAY 4 TEMPERATURE SPECTRUM 102 M JULIAN DATE 60 - 71

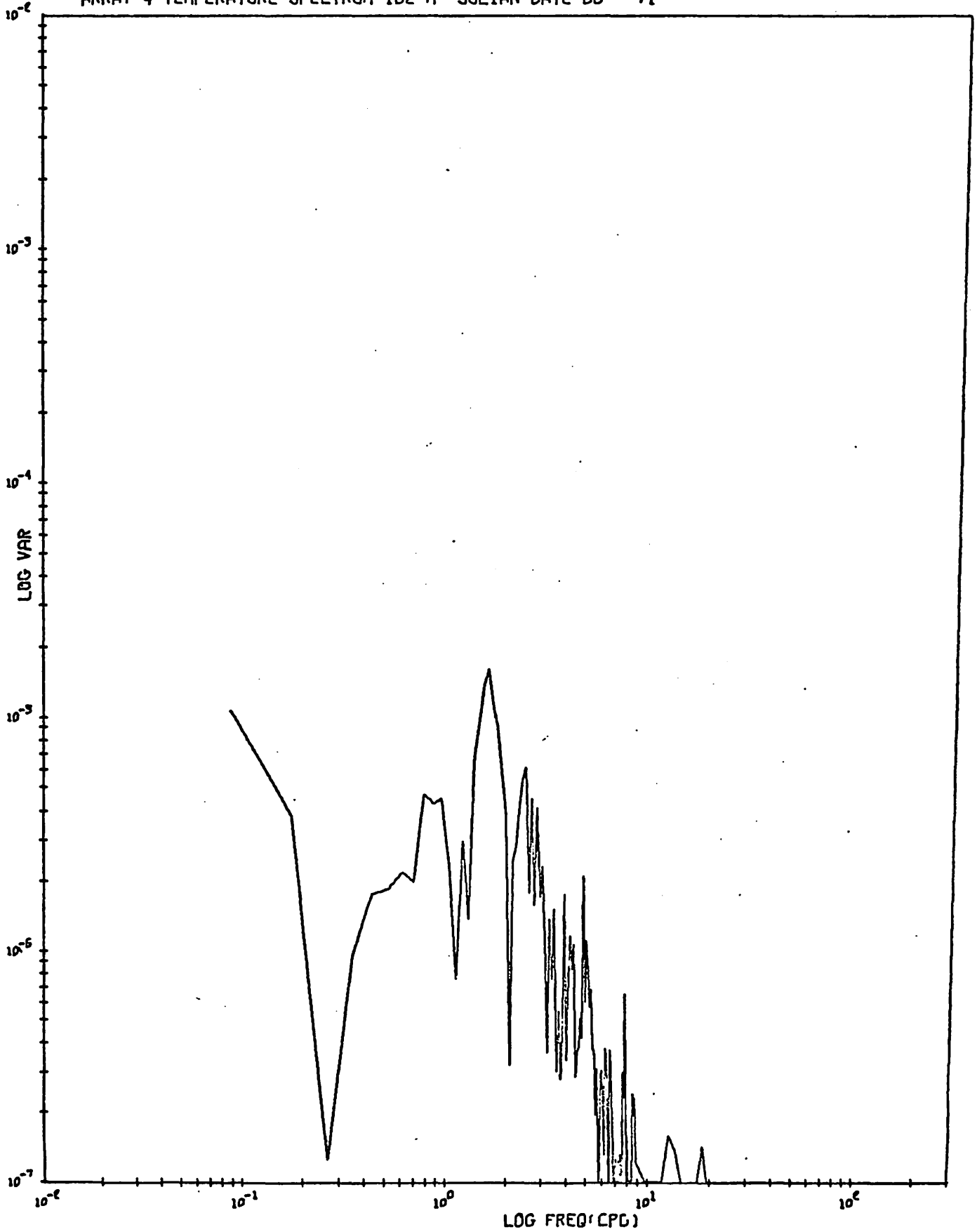


Figure 29.

ARRAY 4 TEMPERATURE SPECTRUM 102 M JULIAN DATE 71 - 89

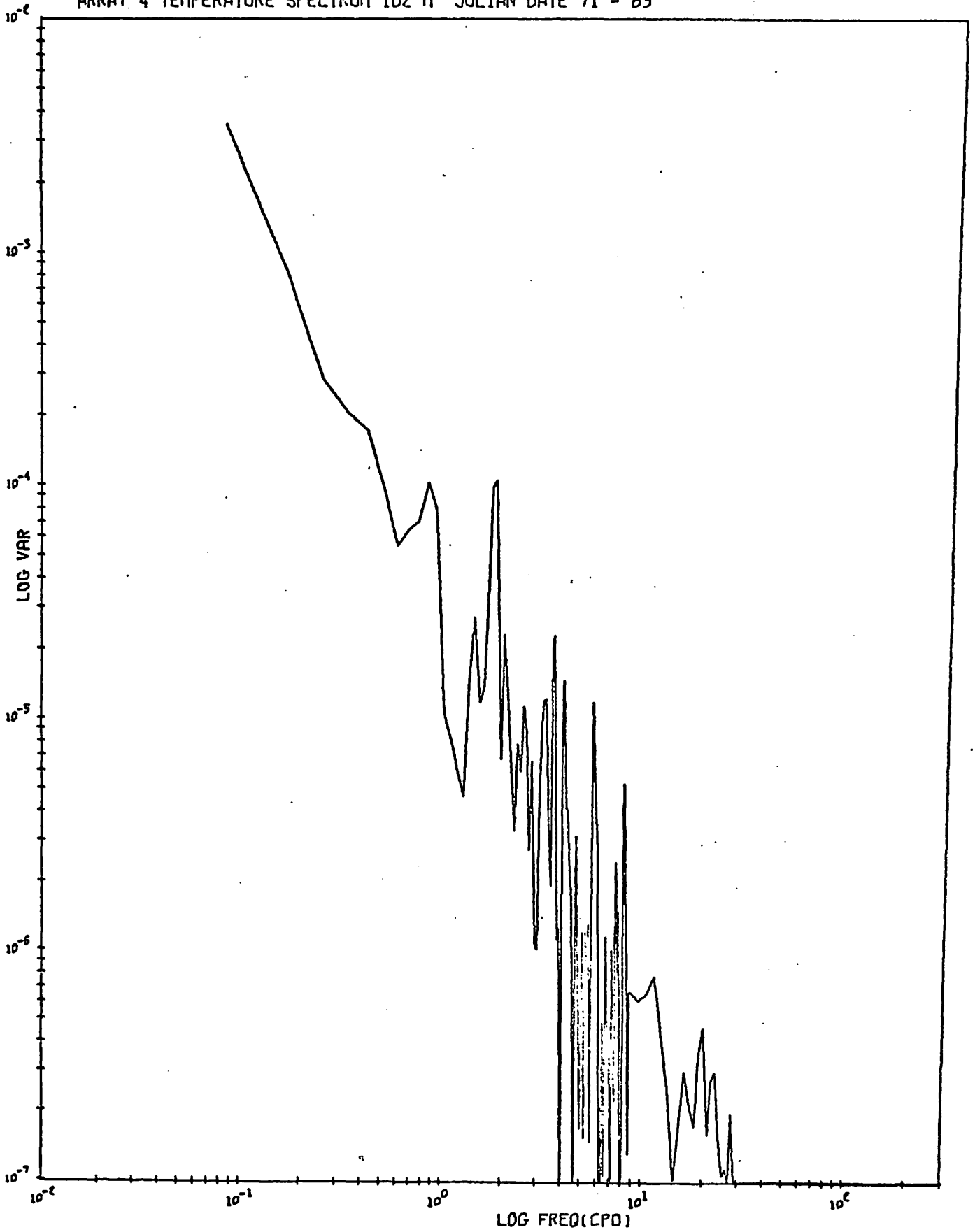


Figure 30.

ARRAY 4 TEMPERATURE SPECTRUM 132 M JULIAN DATE 49 - 60

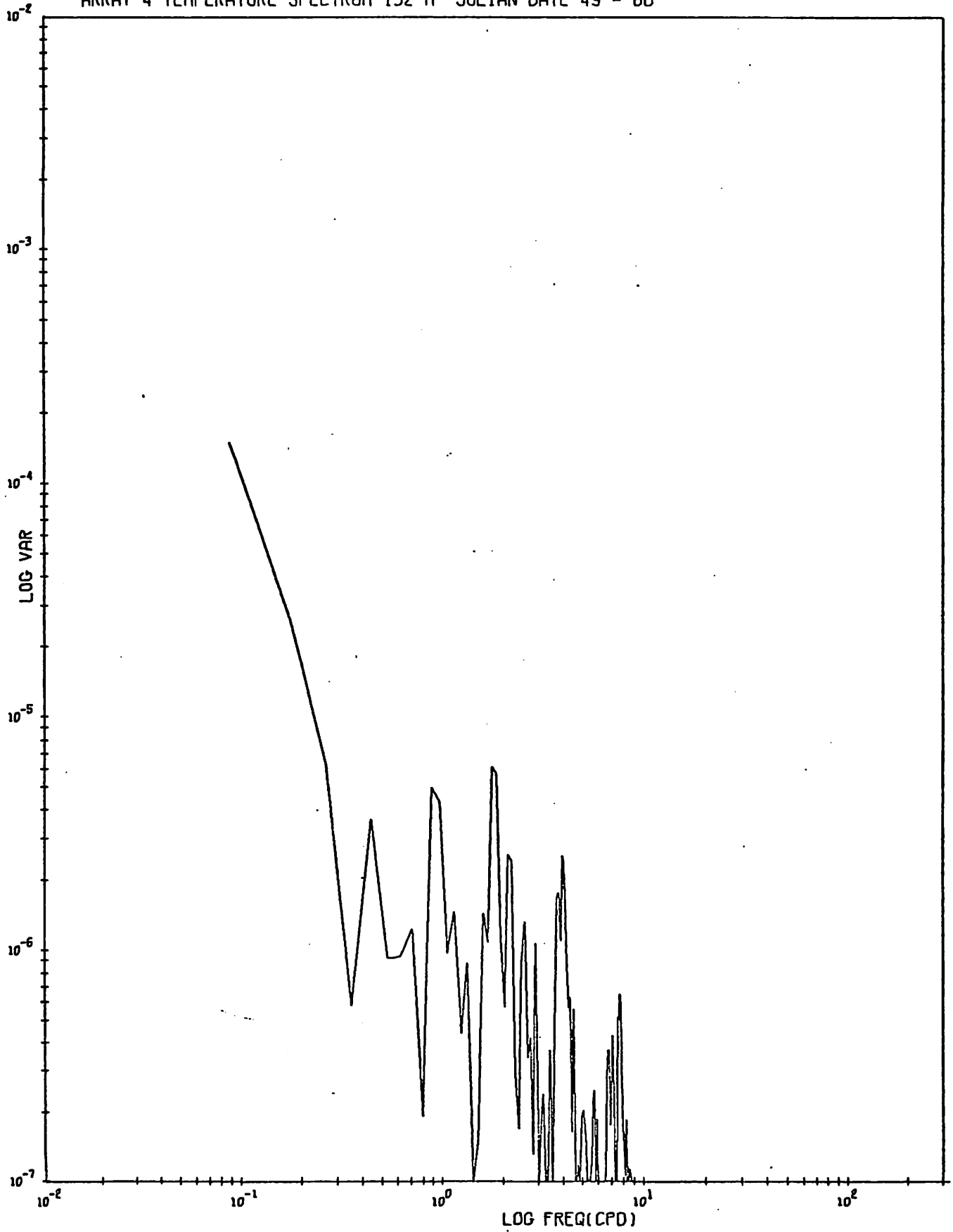


Figure 31.

ARRAY 4 TEMPERATURE SPECTRUM 132 M JULIAN DATE 60 - 71

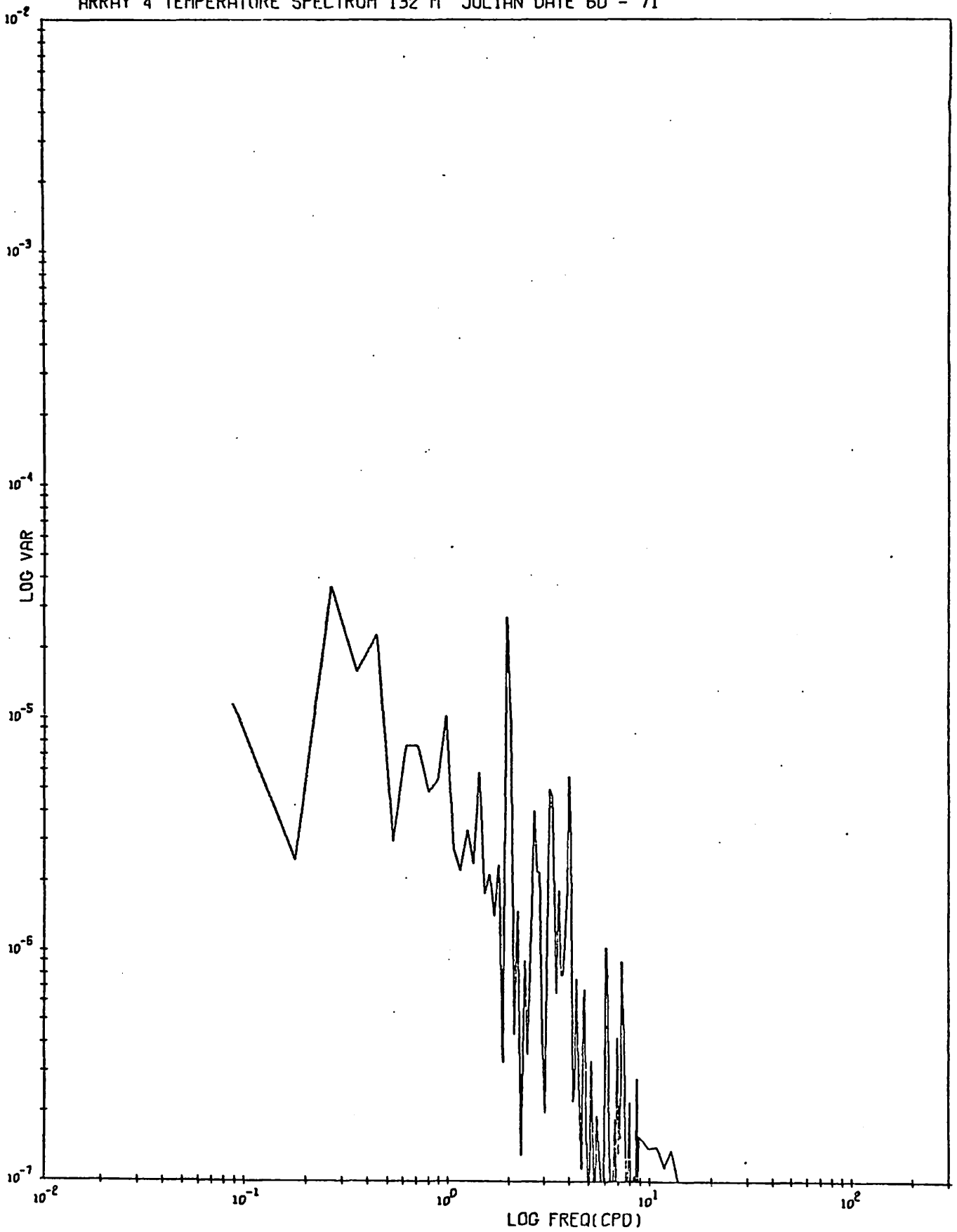


Figure 32.

ARRAY 4 TEMPERATURE SPECTRUM 132 M JULIAN DATE 71 - 83

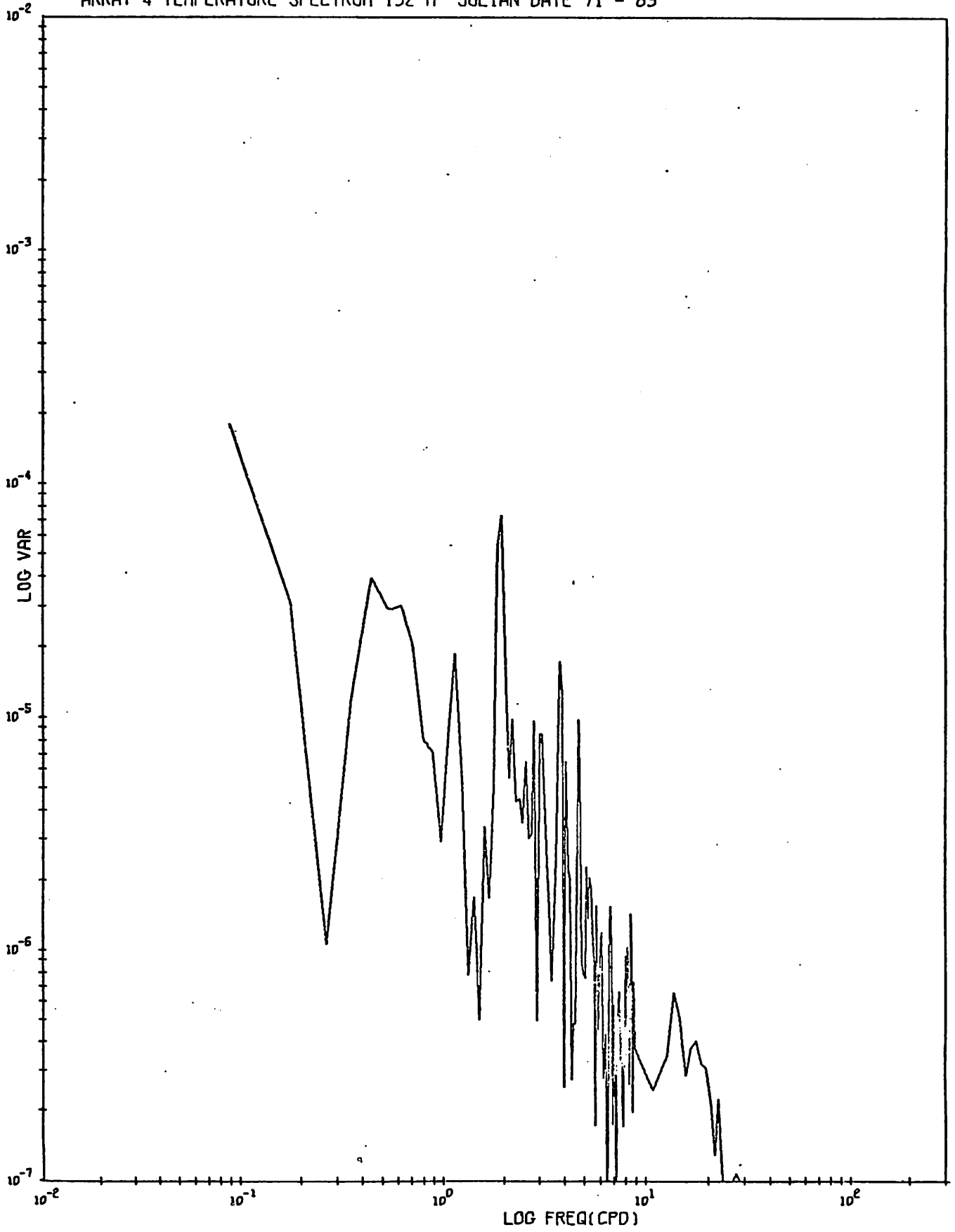


Figure 33.

where

$$\frac{1}{T} \int_{-T/2}^{T/2} \theta(x, z, t) dt \equiv \langle \theta(x, z, t) \rangle = \theta_0(x, z)$$

and variance = $\langle (\eta(\partial\theta_0/\partial x) + \xi(\partial\theta_0/\partial z))^2 \rangle$. The temperature gradient can be estimated from measurements as

$$\left\langle \frac{\partial \theta}{\partial x}(x, z, t) \right\rangle = \frac{\partial \theta_0}{\partial x}(x, z) \quad \text{and} \quad \left\langle \frac{\partial \theta}{\partial z}(x, z, t) \right\rangle = \frac{\partial \theta_0}{\partial z}(x, z).$$

The values for $\theta_0(x, z) = \text{Ave Temp } (^{\circ}\text{C})$, $\partial\theta_0/\partial z = \text{Ave Grad } (^{\circ}\text{C/m})$ and their variances are found in Tables 2 and 3. Estimates of the horizontal gradients $\partial\theta_0/\partial x$ are given in Table 7.

TABLE 7: Horizontal gradients

Depth (m)	Horizontal Gradient* ($^{\circ}\text{C/km}$)
35	-.0010
52	-.0011
60	-.0013
77	.0007
85	.0009
102	.0014
110	.0012

*(-) Temperature decreases from north to south.

The horizontal gradients are calculated for the first temperature phase only. They are calculated as the average temperature difference between arrays 3 and 4 during the last six lunar days of the first temperature phase. This is the only time that records from the two arrays overlap during phase one. (Data from Tables I and II in the appendix were used for the calculations.)

The horizontal gradients appear to be smallest in the thermocline. However, they are of order $10^{-3} \text{ }^\circ\text{C/km}$ at all depths. These are order of magnitude estimates at best since larger (or smaller) horizontal gradients could exist in the vicinity of each array. For example, a larger local gradient is seen in Figure 9 near the mooring between Point-No-Point and West Point. The horizontal gradient is $\approx 0.04 \text{ }^\circ\text{C/km}$ at 50 m.

There are at least three contributions to the vertical displacement ξ :

$$\xi = \left(1 - \frac{z}{d}\right) \xi_{BT} + \xi_m + \xi_{BC}$$

where ξ_{BT} = barotropic tide, ξ_m = mooring motion, and ξ_{BC} = baroclinic motion. The horizontal displacement η , will be

$$\eta = \int_0^t u \, dt.$$

Moreover, because ξ_m is due to drag on the mooring cable, we may expect $\xi_m \propto u^2$.

We can now write

$$\theta(x, z, t) = \theta_0(x, z) - \eta \frac{\partial \theta_0}{\partial x} - \left[\left(1 - \frac{z}{d}\right) \xi_{BT} + \xi_m + \xi_{BC} \right] \cdot \frac{\partial \theta_0}{\partial z}.$$

The vertical displacements are $\xi_{BT} = 1 \text{ m}$, $\xi_m = 0.25 \text{ m}$, and ξ_{BC} , as will be shown later, is $\approx 5 \text{ m}$ in the thermocline at array 4. The horizontal displacement η can be estimated as

$$\eta = \int_0^{T/2} u_0 \sin(2\pi ft) \, dt, \quad f = \frac{1}{12} \text{ hr.}$$

The maximum tidal velocity in the central basin is $\approx \frac{1}{2} \text{ knt}$. Thus $\eta \approx 4 \text{ km}$.

In later analysis, only those depths will be considered where the mean temperatures and gradients are larger than their standard deviation. Otherwise, the higher order terms cannot be neglected.

Tide Spectra

The tide periodograms for 27 m and 102 m are plotted in Figures 19 and 20 respectively. There is little difference between them. The depth of the lower pressure sensor was calculated from its position on the mooring

cable and is given as 102 m. However, data from the pressure sensor indicated the mean depth was 96 m. This difference has not been accounted for.

The tide record was of sufficient length to resolve the M_2 , S_2 , K_1 , and O_1 lines. Peaks also occur at $M_2 + O_1$, $M_2 + K_1$ and the harmonics $2M_2$ and $2S_2$. The amplitude of these tidal lines are given in Table 8. The noise level in the signal-to-noise ratio (S/N) was estimated by drawing a smooth line through the periodogram.

TABLE 8: Tidal amplitudes - observed and from tide tables.

Tidal Line	S/N (db)	Freq. Obs. (cph)	Amp. Obs. (cm)	Amp. Tide Table (cm)	Freq. Tide Table (cph)
M_2	35	.0804	101.3	106.41	.0805114
S_2	22	.0828	21.14	25.85	.0833333
K_1	32	.042	70.3	82.94	.04178
O_1	30	.0384	37.2	45.81	.03873
$M_2 + O_1$	11	.1188	4.72		
$M_2 + K_1$	12	.1224	5.69		
$\left(\frac{K_1 + O_1}{M_2 + S_2} \right)$			0.878	0.973	
Harmonics					
$2M_2$	15	.1608	6.59		
$2S_2$	14	.1644	5.65		

Temperature Spectra

The temperature spectra were calculated in three parts—one for each of the three temperature phases. Figures 21 through 33 are the periodograms. After the 100th harmonic, the variance in eleven bandwidths were averaged together and the value plotted at the central frequency. A spectrum was not

calculated for all records. Only those records which were near the thermocline and chiefly on array 4, since it had the pressure sensors, were analyzed in this manner. The Nyquist frequency is 15 cph = 360 cpd.

If the temperature at a sensor was determined solely by the vertical motion of the barotropic tide and the local temperature gradient, then the temperature spectrum would look like the tide spectrum (as long as the local gradient was linear and time independent). This is obviously not the case for this data.

In general, the spectra show peaks at diurnal, semidiurnal, 8 hr, 6 hr, and 4 hr periods. The peaks are not always at the same frequency for different time spans at the same depth nor for the same time span at different depths. However, the peaks are often found at nearby frequencies or split, with a peak on either side of a minimum at the previous frequency. This can be seen more clearly by inspecting Tables III and IV in the appendix where the variance and phase of the first 96 harmonics plotted in each periodogram are tabulated. The phases $\phi(f)$ have the range -180° to $+180^\circ$. ϕ less than zero "leads" ϕ greater than zero. A harmonic component is written as

$$A(f) \cdot \cos (2\pi ft - \phi(f))$$

where $A(f) = (\text{variance} \times 2)^{\frac{1}{2}}$.

Whereas the S/N for the diurnal and semidiurnal peaks in the tide is 22 db and 35 db respectively, the same peaks in the temperature spectra have less than a 12 db S/N . An exception is array 3 at 85 m (Figure 21) where the S/N for the semidiurnal is ≈ 20 db. The peak at 4 cpd in this spectrum is also stronger (12 db) than in other spectra (usually less than 6 db).

Generally, the variance at frequencies greater than 30 cpd is less than $10^{-7} \text{ }^\circ\text{C}^2$. At each depth, the temperature variance at low frequencies (less than 1 cpd) is a minimum during the second temperature phase (JD60 - JD71) and maximum during the third (JD71 - JD83).

When considering internal waves, vertical displacement at the semi-diurnal frequency is of particular interest. The temperature spectrum becomes a vertical displacement spectrum upon dividing by the vertical temperature gradient. In order to be exact, however, this method requires a constant temperature gradient. The gradients calculated from this data are obviously not constant. Nevertheless, approximate vertical displacements can be calculated at semi-diurnal frequency and the contribution from barotropic and baroclinic motion estimated. The results are given in Table 9.

TABLE 9: Semidiurnal vertical displacements

Depth (m)	Vertical Displacement (m)
Array 4	
52	2.3 ± 1.2
77	5.0 ± 1.3
102	5.8 ± 5.2
Array 3	
85	18 ± 11.

The vertical displacements were calculated only for the first temperature phase and near the thermocline. This restricts horizontal gradients to 10^{-3} °C/km and the mean vertical gradients are larger than their standard deviation (Table 3).

The contribution of the barotropic tide to the variance at the thermocline can be estimated by assuming that both the horizontal and vertical motions of the tide act to increase the temperature variance. Thus, at array 4 at 77 m

$$\xi \frac{\partial \theta}{\partial z} + \eta \frac{\partial \theta}{\partial x} = 1 \text{ m} \cdot (.003 \text{ °C/m}) + 4 \text{ km} \cdot (.001 \text{ °C/km}) = 0.007 \text{ °C}.$$

Let this be the "temperature" amplitude of the semidiurnal barotropic tide, then

$$\Delta \theta_{BT} = (.007 \text{ °C}) \cdot \sin(\omega_0 t); \quad \langle (\Delta \theta_{BT})^2 \rangle = \frac{(.007)^2}{2} = 2.4 \times 10^{-5} (\text{°C})^2$$

This is ≈20% of the temperature variance at 12.41 hr at 77 m. A similar calculation for array 3 at 85 m accounts for ≈5% of the variance.

These estimates assume zero correlation between barotropic and baroclinic motion. They will be low estimates in those cases where there is a positive correlation, i.e., $\langle \xi_{BT} \cdot \xi_{BC} \rangle$ and $\langle \xi_m \cdot \xi_{BC} \rangle > 0$; high in those cases where there is a negative correlation. They will also be high when $\langle \xi_{BT} \cdot \eta \rangle < 0$.

Results at array 3 and array 4 are not strictly comparable since the records used to calculate spectra at array 3 overlap only about six out of eleven days with the records used at array 4.

DISCUSSION

Warm Water Intrusion

A major intrusion of warm water occurred on 13 March 1972 (JD73). The event was recorded by both arrays on the lower low tide of that day. Isotherm plots indicate that it had the appearance of a lens and was moving from north to south. The depth of an isotherm increased from south to north. A small vertical slope of these isotherms at the south array changing to a steep vertical slope at the north array can account for the correlation of warm temperature with high tide at the north array and with low tide at the south array. Thus, at the north array the steep vertical slope of the isotherms would produce large horizontal gradients and the advection of water past the thermistor by the incoming tide would show an increase in temperature from the colder water outside the lens to the warmer water inside (vice versa for outgoing tide). However, at the south array, the shallow slope of the isotherms would make the vertical motion of the tide more important. The temperature at the thermistor would become colder as the tide rose and warmer as it fell. The temperature record at 52 m, array 4, would change phase if the sensor moved from a region of steep isotherms into a "core" region of shallow sloping isotherms as the lens is advected further south. The outer boundary of the "core" appears to be the 7°C isotherm (Figure 6).

Since there was no time series at Admiralty Inlet and no salinity measurements at the depth of the lens, the source of this warm water is not certain. However, there is evidence to indicate that it may have come from between Camano Head and Possession Point. The hydrographics show that in the period 1 Feb-29 Feb 1972, the only water north of the array warm enough to be the lens lay in Possession Sound (Figure 12). It is of sufficient horizontal (≥ 24 km) and vertical (≈ 150 m) extent to cover the dimensions of the lens. The density of this water on 28-29 Feb between the depths 50-100 m was $\sigma_t = 22.8$ to 23.0. If moved into the central basin, it would lie between the depths 30 to 60 m which is where the warm water "core" is observed.

How this water could be forced out of Possession Sound is not clear. However, wind and runoff data may provide some clue.

Two weeks and one week prior to first detecting the warm water intrusion, the Skagit River runoff peaked at 40×10^3 cfs (Figure 18). Also, for this two week period, the wind was blowing generally north with velocity 10-20 mph (Figure 16). An exception was 6-9 March when the wind is blowing south. Northward velocities of 20-25 mph occurred during the first peak runoff. If the increased outflow at the surface of Possession Sound were retarded by the winds then outflow could occur at depth, moving the warm water south. Alternatively, an internal seiche, perhaps initiated or aided by the sudden change in wind to blowing south could have moved the warm water south.

Internal Waves

The evidence for internal waves is by no means conclusive. They are inferred from the inability to account for all of the temperature variance at the semidiurnal frequency by barotropic motion only. Other evidence such as a maximum amplitude and maximum kinetic energy in or near the thermocline is also consistent with the existence of internal waves. However, this evidence has been evaluated at each array separately. Thus, it is not possible to distinguish between fluctuations due to internal waves and other less regular causes. A distinction can be made, however, by calculating the coherence between the temperature records at the two arrays and observing whether or not there exists a phase shift appropriate to the phase velocity of internal waves. An attempt was made in this direction by calculating the coherence between the 27 m sensor record at array 4 and the 35 m record at array 3. The coherence at 12.8 hr was above the 95% confidence level for a phase shift of 48° , north leading south. The wave length is thus ≈ 120 km. The hydrographic sections indicate that the Brunt-Väisälä frequency, N , is highly variable throughout the central basin. Nevertheless, between the two arrays, the mean N is ≈ 36 cy/hr at ≈ 40 m on 28-29 Feb. Using the relation for a free internal wave

$$k^2 = \frac{(\sigma^2 - f^2) \pi^2}{(N^2 - \sigma^2) H^2}$$

where k = wavenumber, j = mode number, f = inertial frequency, N = Brunt-Väisälä frequency, H = depth, and σ = frequency of interest, we get a mode one wavelength of ≈ 270 km. This result is encouraging but a more extensive analysis is needed.

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APPENDIX

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Lunar day

TABLE I: Summary of lunar day averages, Array 3.

Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	
35m			60m			85m			
6.6855	.000256	.016015	6.6790	.000275	.016583	6.6699	.000245	.015659	5
6.6813	.000232	.015219	6.6759	.000200	.014155	6.6688	.000169	.012988	6
6.6830	.000137	.011703	6.6790	.000125	.011192	6.6743	.000124	.011141	7
6.6872	.000123	.011094	6.6843	.000119	.010888	6.6798	.000117	.010834	8
6.6890	.000100	.009977	6.6871	.000101	.010064	6.6839	.000103	.010145	9
6.6925	.000095	.009766	6.6909	.000098	.009880	6.6880	.000099	.009935	10
6.6933	.000087	.009331	6.6923	.000087	.009334	6.6898	.000087	.009336	11
6.6963	.000088	.009377	6.6950	.000087	.009316	6.6927	.000086	.009268	12
6.6986	.000090	.009473	6.6969	.000090	.009467	6.6943	.000087	.009334	13
6.7024	.000092	.009600	6.7003	.000090	.009479	6.6975	.000086	.009299	14
6.7063	.000101	.010034	6.7038	.000094	.009720	6.7006	.000088	.009400	15
6.7077	.000089	.009458	6.7057	.000088	.009379	6.7029	.000086	.009260	16
6.7125	.000089	.009424	6.7104	.000087	.009302	6.7075	.000085	.009230	17
6.7188	.000095	.009757	6.7154	.000093	.009648	6.7105	.000088	.009395	18
6.7145	.000084	.009178	6.7124	.000081	.009005	6.7093	.000078	.008837	19
6.7186	.000088	.009365	6.7169	.000088	.009355	6.7139	.000085	.009195	20
6.7196	.000090	.009498	6.7177	.000088	.009371	6.7152	.000086	.009265	21
6.7224	.000090	.009468	6.7206	.000090	.009474	6.7173	.000087	.009343	22
6.7258	.000096	.009775	6.7228	.000094	.009708	6.7193	.000090	.009502	23
6.7269	.000104	.010192	6.7242	.000097	.009855	6.7208	.000090	.009482	24
6.7314	.000110	.010511	6.7294	.000106	.010313	6.7254	.000098	.009918	25
6.7357	.000108	.010398	6.7329	.000103	.010166	6.7286	.000097	.009841	26
6.7401	.000105	.010268	6.7374	.000101	.010059	6.7334	.000093	.009634	27
6.7432	.000100	.009988	6.7407	.000095	.009764	6.7373	.000091	.009548	28
6.7460	.000093	.009619	6.7440	.000089	.009460	6.7407	.000087	.009336	29
6.7479	.000096	.009793	6.7458	.000093	.009649	6.7423	.000090	.009463	30
6.7508	.000094	.009700	6.7483	.000092	.009592	6.7447	.000088	.009375	31
6.7523	.000094	.009671	6.7500	.000093	.009667	6.7462	.000087	.009330	32

52

TABLE I: (Continued)

	110m			140m			155m			
	6.8119	.000206	.014354	6.8100	.000213	.014582	6.7608	.001024	.032002	5
	6.8121	.000163	.012787	6.8018	.000274	.016548	6.7597	.000840	.028975	6
	6.7885	.000287	.016943	6.7842	.000376	.019398	6.7459	.001063	.032610	7
	6.7749	.000147	.012108	6.7665	.000308	.017554	6.7353	.000624	.024977	8
	6.7958	.000873	.029541	6.7631	.000348	.018657	6.7302	.000619	.024878	9
	6.8230	.000791	.028128	6.7698	.001157	.034021	6.7249	.000688	.026235	10
	6.8246	.000302	.017386	6.7760	.000908	.030128	6.7361	.001212	.034814	11
	6.7837	.000316	.017781	6.7625	.000308	.017564	6.7289	.000623	.024970	12
	6.7557	.000288	.016962	6.7565	.000138	.011751	6.7445	.000478	.021871	13
	6.7380	.000317	.017800	6.7558	.000148	.012154	6.7600	.000175	.013228	14
	6.7339	.000268	.016370	6.7548	.000186	.013636	6.7575	.000144	.012020	15
	6.7421	.000275	.016580	6.7437	.000161	.012695	6.7523	.000113	.010622	16
	6.7519	.000157	.012538	6.7507	.000122	.011038	6.7599	.000109	.010448	17
53	6.7512	.000185	.013598	6.7518	.000096	.009818	6.7605	.000102	.010120	18
	6.7559	.000085	.009236	6.7529	.000079	.008893	6.7582	.000086	.009260	19
	6.7570	.000089	.009416	6.7521	.000089	.009456	6.7597	.000090	.009511	20
	6.7527	.000096	.009799	6.7541	.000108	.010386	6.7638	.000094	.009706	21
	6.7541	.000087	.009320	6.7576	.000096	.009800	6.7597	.000106	.010308	22
	6.7689	.000310	.017596	6.7618	.000109	.010423	6.7602	.000109	.010454	23
	6.7962	.000874	.029562	6.7664	.000148	.012179	6.7598	.000107	.010357	24
	6.8366	.001551	.039383	6.7868	.000822	.028667	6.7633	.000170	.013053	25
	6.8850	.001682	.041010	6.8100	.001681	.040998	6.7722	.000424	.020589	26
	6.9273	.001220	.034932	6.8423	.002539	.050384	6.7907	.000995	.031548	27
	6.9741	.001461	.038219	6.8971	.002303	.047994	6.8107	.001770	.042070	28
	7.0281	.003434	.058603	6.9212	.003465	.058862	6.8213	.001838	.042875	29
	7.0508	.001620	.040255	6.9322	.003173	.056329	6.8307	.001580	.039746	30
	7.0594	.001450	.038082	6.9643	.002068	.045472	6.8546	.001258	.035473	31
	7.0920	.001610	.040127	6.9718	.002405	.049039	6.8661	.001060	.032565	32

TABLE I: (Continued)

165m			170m			175m			
6.7262	.000391	.019508	6.7082	.000169	.013017	6.6931	.000213	.014590	5
6.7178	.000354	.018818	6.7016	.000176	.013253	6.6864	.000235	.015345	6
6.7137	.000417	.020410	6.6975	.000154	.012404	6.6869	.000170	.013028	7
6.7059	.000430	.020732	6.6943	.000105	.010266	6.6876	.000114	.010694	8
6.7061	.000347	.018627	6.6945	.000100	.009990	6.6885	.000097	.009863	9
6.7045	.000269	.016411	6.6964	.000093	.009641	6.6914	.000092	.009599	10
6.7026	.000349	.018678	6.6978	.000099	.009943	6.6916	.000085	.009238	11
6.7027	.000169	.012984	6.6982	.000089	.009438	6.6949	.000088	.009373	12
6.7191	.000257	.016041	6.7057	.000108	.010381	6.6977	.000092	.009588	13
6.7365	.000242	.015541	6.7158	.000140	.011829	6.7022	.000097	.009835	14
6.7414	.000236	.015350	6.7180	.000184	.013555	6.7061	.000108	.010383	15
6.7433	.000144	.012009	6.7208	.000149	.012196	6.7076	.000095	.009763	16
6.7431	.000137	.011720	6.7261	.000141	.011889	6.7135	.000093	.009636	17
6.7494	.000133	.011515	6.7364	.000111	.010515	6.7206	.000098	.009902	18
6.7482	.000108	.010396	6.7314	.000122	.011030	6.7162	.000089	.009450	19
6.7494	.000103	.010131	6.7294	.000112	.010599	6.7186	.000094	.009719	20
6.7498	.000098	.009913	6.7328	.000112	.010579	6.7202	.000094	.009673	21
6.7481	.000107	.010353	6.7347	.000115	.010737	6.7230	.000092	.009613	22
6.7487	.000107	.010350	6.7369	.000117	.010825	6.7274	.000099	.009932	23
6.7504	.000098	.009916	6.7401	.000122	.011050	6.7281	.000109	.010443	24
6.7521	.000111	.010513	6.7435	.000125	.011175	6.7322	.000116	.010761	25
6.7554	.000149	.012192	6.7473	.000122	.011030	6.7368	.000111	.010534	26
6.7625	.000233	.015250	6.7496	.000130	.011421	6.7400	.000107	.010338	27
6.7674	.000368	.019189	6.7529	.000137	.011706	6.7435	.000102	.010091	28
6.7744	.000394	.019840	6.7560	.000154	.012393	6.7456	.000097	.009831	29
6.7831	.000458	.021408	6.7593	.000155	.012462	6.7487	.000097	.009834	30
6.7982	.000392	.019789	6.7662	.000174	.013186	6.7517	.000095	.009737	31
6.8032	.000348	.018646	6.7678	.000134	.011560	6.7529	.000093	.009669	32

TABLE I: (Continued)

180m			
6.6633	.000209	.014442	5
6.6635	.000156	.012497	6
6.6711	.000131	.011440	7
6.6774	.000130	.011391	8
6.6825	.000105	.010257	9
6.6871	.000099	.009959	10
6.6897	.000087	.009354	11
6.6928	.000086	.009271	12
6.6941	.000088	.009357	13
6.6972	.000087	.009306	14
6.7005	.000087	.009347	15
6.7028	.000085	.009219	16
6.7073	.000084	.009182	17
6.7094	.000087	.009316	18
6.7094	.000078	.008816	19
6.7134	.000082	.009072	20
6.7152	.000086	.009252	21
6.7169	.000087	.009301	22
6.7187	.000088	.009399	23
6.7201	.000087	.009316	24
6.7242	.000094	.009691	25
6.7274	.000092	.009575	26
6.7321	.000089	.009415	27
6.7364	.000090	.009461	28
6.7403	.000087	.009342	29
6.7419	.000087	.009349	30
6.7441	.000087	.009337	31
6.7453	.000084	.009179	32

TABLE II: Summary of lunar day averages, Array 4.

27m			52m			77m			Lunar day
Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	Ave. Temp. (°C)	Var-iance (°C ²)	Stand. Dev. (°C)	
6.8352	.000310	.017510	6.8778	.000347	.013637	6.8058	.000538	.023204	1
6.8947	.000469	.021647	6.8795	.000356	.013880	6.7903	.001035	.032167	2
6.8727	.000205	.014306	6.8545	.000184	.013575	6.7783	.000938	.030523	3
6.8721	.000402	.020055	6.8595	.000331	.013135	6.7504	.000445	.021055	4
6.8414	.000308	.017559	6.8434	.000503	.022434	6.7551	.001040	.032254	5
6.8241	.000168	.012955	6.8243	.000575	.023972	6.7561	.000883	.029717	6
6.8055	.000270	.015446	6.8193	.000509	.022566	6.7525	.001004	.031696	7
6.7901	.000159	.012597	6.7961	.000170	.013034	6.7383	.000605	.024525	8
6.8056	.000826	.023740	6.7816	.000944	.030721	6.7095	.000478	.021354	9
6.8403	.000454	.021310	6.7979	.000591	.024301	6.7262	.000661	.025705	10
6.8495	.000376	.013384	6.8246	.000529	.025077	6.7648	.000676	.025001	11
6.8477	.000147	.012134	6.8289	.000420	.020498	6.7723	.000345	.013582	12
6.8306	.000245	.015639	6.8030	.000324	.017996	6.7527	.000157	.012534	13
6.8096	.000556	.023573	6.7970	.000278	.015673	6.7654	.000123	.011093	14
6.7763	.000531	.025067	6.8051	.000305	.017457	6.7658	.000092	.009613	15
6.7576	.000277	.015652	6.7937	.000277	.015645	6.7628	.000089	.009424	16
6.7499	.000531	.023037	6.7735	.000340	.013445	6.7695	.000284	.015854	17
6.7763	.000481	.021929	6.7676	.000131	.011444	6.7605	.000130	.011389	18
6.7775	.000150	.012228	6.7724	.000110	.010482	6.7578	.000137	.011698	19
6.7762	.000159	.010452	6.7377	.000106	.010307	6.7565	.000160	.013416	20
6.7722	.000121	.011017	6.7664	.000101	.010056	6.7465	.000161	.012673	21
6.7724	.000122	.011052	6.7671	.000099	.009956	6.7482	.000120	.010955	22
6.7739	.000172	.013124	6.7661	.000110	.010475	6.7509	.000100	.009999	23
6.8434	.005864	.075573	6.7680	.000128	.011309	6.7528	.000111	.010528	24
6.9429	.015030	.122597	6.7920	.000405	.020133	6.7673	.000244	.015633	25
6.9934	.007071	.094087	6.8294	.000745	.027303	6.7883	.000225	.015010	26
7.0342	.005038	.071327	6.8561	.000647	.025427	6.8159	.000565	.023759	27
7.0824	.004421	.065493	6.8935	.001475	.033412	6.8197	.000312	.017566	28
7.0879	.002983	.054519	6.9320	.002031	.045055	6.8439	.000309	.017585	29
7.1670	.005999	.077451	6.9612	.000970	.031147	6.9094	.001659	.040729	30
7.2549	.005189	.072035	6.9506	.000819	.029621	6.9512	.001113	.033352	31
7.2061	.002380	.043789	6.9792	.000950	.030321	6.9624	.001875	.043304	32

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TABLE II: (Continued)

102m			132m			157m			
6.7327	.000227	.015073	6.7220	.000262	.015181	6.6909	.000374	.013335	1
6.7321	.000577	.024030	6.7147	.000159	.012596	6.6931	.000192	.013344	2
6.7215	.000547	.023386	6.7036	.000122	.011035	6.6970	.000110	.010451	3
6.7116	.000305	.017467	6.6999	.000098	.009922	6.6995	.000097	.009336	4
6.6986	.000272	.015492	6.6936	.000123	.011104	6.6959	.000097	.009833	5
6.6980	.000368	.019171	6.6884	.000133	.011517	6.6897	.000100	.010016	6
6.6976	.000334	.013280	6.6868	.000096	.009818	6.6878	.000089	.009457	7
6.6905	.000232	.015245	6.6828	.000137	.011721	6.6848	.000094	.009716	8
6.6885	.000199	.014100	6.6840	.000107	.010340	6.6895	.000091	.009522	9
6.6952	.000237	.015392	6.6904	.000116	.010782	6.6900	.000090	.009509	10
6.7387	.001337	.035533	6.7117	.000342	.013498	6.6989	.000141	.011887	11
6.7476	.000447	.021139	6.7467	.000358	.013913	6.7185	.000453	.021269	12
6.7493	.000119	.010916	6.7424	.000224	.014956	6.7140	.000237	.015395	13
6.7568	.000101	.010047	6.7377	.000228	.015111	6.7134	.000143	.011971	14
6.7571	.000095	.009813	6.7361	.000192	.013873	6.7123	.000125	.011160	15
6.7554	.000097	.009872	6.7399	.000252	.015866	6.7155	.000115	.010706	16
6.7553	.000145	.012057	6.7518	.000108	.010415	6.7304	.000172	.013127	17
6.7538	.000093	.009642	6.7442	.000107	.010330	6.7255	.000113	.010618	18
6.7523	.000080	.009970	6.7417	.000099	.009928	6.7253	.000092	.009582	19
6.7529	.000101	.010049	6.7494	.000126	.011212	6.7305	.000100	.009994	20
6.7590	.000220	.014335	6.7580	.000336	.015321	6.7334	.000242	.015533	21
6.7634	.000495	.022255	6.7780	.001606	.040075	6.7499	.000302	.017388	22
6.7610	.000154	.012416	6.7834	.000299	.017295	6.7494	.000302	.017372	23
6.7604	.000110	.010496	6.7793	.000188	.013727	6.7502	.000137	.011710	24
6.7615	.000097	.009825	6.7745	.000119	.010915	6.7578	.000205	.014323	25
6.7717	.000139	.011790	6.7694	.000095	.009772	6.7558	.000153	.012777	26
6.7872	.000299	.017294	6.7653	.000091	.009564	6.7571	.000116	.010754	27
6.8068	.000336	.013335	6.7657	.000094	.009578	6.7582	.000096	.009776	28
6.8344	.000848	.029120	6.7766	.000648	.025449	6.7565	.000105	.010234	29
6.8909	.001153	.033949	6.8042	.001081	.032873	6.7629	.000126	.011206	30
6.9273	.001841	.042912	6.7951	.000407	.020156	6.7705	.000130	.011389	31
6.9821	.003367	.059024	6.8253	.001814	.042590	6.7722	.000160	.012655	32

TABLE II: (Continued)

172m			182m			
5.5717	.000332	.013227	6.6740	.000227	.015077	1
6.6776	.000199	.014118	6.6801	.000131	.013452	2
6.6872	.000159	.012620	6.6884	.000203	.014241	3
6.6900	.000137	.011717	6.6939	.000134	.011553	4
6.6919	.000104	.010214	6.7000	.000107	.010338	5
6.6891	.000088	.009395	6.6994	.000093	.009637	6
6.6875	.000088	.009382	6.7000	.000089	.009414	7
6.6858	.000092	.009583	6.6993	.000087	.009310	8
6.6910	.000087	.009335	6.7035	.000068	.009361	9
6.6900	.000038	.009355	6.7041	.000087	.009345	10
6.6949	.000106	.010303	6.7068	.000089	.009431	11
6.7044	.000200	.014132	6.7113	.000122	.011061	12
6.7024	.000155	.012469	6.7117	.000111	.010533	13
6.7046	.000117	.010836	6.7140	.000096	.009796	14
5.7052	.000096	.009786	6.7163	.000090	.009489	15
6.7076	.000092	.009577	6.7189	.000086	.009365	16
			6.7227	.000092	.009603	17
			6.7252	.000090	.009471	18
			6.7281	.000076	.009375	19
			6.7328	.000086	.009286	20
			6.7359	.000126	.011234	21
			6.7400	.000142	.011935	22
			6.7394	.000110	.010464	23
			6.7437	.000116	.010751	24
			6.7501	.000134	.011574	25
			6.7531	.000114	.010695	26
			6.7572	.000104	.010175	27
			6.7620	.000091	.009538	28
			6.7645	.000091	.009536	29
			6.7679	.000090	.009490	30
			6.7718	.000095	.009723	31
			6.7734	.000091	.009553	32

Malfunction of sensor
after JD16.

TABLE III. ARRAY 3. 35m. SPECTRUM FOR TEMPERATURE PHASE I.

FREQUENCY (CPH)	PERIOD (HOUR)	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
3.66211F-03	2.73067F+02	2.55515E-04	147.60
7.32422F-03	1.76533F+02	5.76324E-04	73.09
1.09947F-02	9.10222F+01	1.69670E-05	142.48
1.46494F-02	6.82667F+01	1.55144E-05	69.39
1.87105F-02	5.46133E+01	1.74080E-05	85.04
2.19727F-02	4.55111F+01	4.43875E-06	33.40
2.56749F-02	3.90095F+01	3.44127E-05	101.24
2.92969E-02	3.41333E+01	2.54971E-06	106.07
3.29599E-02	3.03407F+01	1.47521E-05	73.21
3.66211F-02	2.73067F+01	5.94752E-06	171.74
4.02837F-02	2.48742F+01	2.80954E-05	93.15
4.39457F-02	2.27556F+01	7.04179E-06	-157.16
4.76074F-02	2.10051F+01	8.75488E-06	59.23
5.12695E-02	1.95048E+01	1.88698E-06	177.78
5.49316E-02	1.82044F+01	8.21991E-07	85.67
5.85939F-02	1.70567F+01	5.37234E-06	118.65
6.22552F-02	1.60627F+01	3.20299E-06	19.16
6.59180F-02	1.51704F+01	7.87902E-06	107.18
6.95801F-02	1.43719E+01	6.93713E-06	51.15
7.32422E-02	1.36533F+01	2.53920E-06	133.35
7.69044F-02	1.30032F+01	1.82443E-05	19.59
8.05664E-02	1.24121E+01	1.10955E-06	79.15
8.42285F-02	1.18725E+01	7.51276E-06	-20.63
8.78904E-02	1.13779F+01	1.97947E-05	-139.50
9.15527F-02	1.09227F+01	7.08539E-06	97.40
9.52149E-02	1.05026F+01	4.29118E-07	-112.90
9.88770F-02	1.01136E+01	1.84069E-06	94.56
1.02539F-01	9.75239E+00	9.75008E-07	-146.28
1.06201F-01	9.41609E+00	9.72024E-07	100.41
1.09863F-01	9.10222E+00	2.12341E-07	-32.99
1.13525E-01	8.80860E+00	2.60635E-06	-172.03
1.17188E-01	8.53333E+00	1.48082E-06	-96.14
1.20850F-01	8.27475E+00	1.85897E-06	97.90
1.24512F-01	8.03137E+00	7.11859E-06	69.37
1.28174E-01	7.80190E+00	3.10918E-06	102.65
1.31836F-01	7.58519E+00	9.32112E-07	65.64
1.35498F-01	7.38018E+00	1.20520E-06	133.86
1.39160F-01	7.18596F+00	1.72243E-06	93.51
1.42822F-01	7.00171E+00	1.10645E-07	65.23
1.46484E-01	6.82667E+00	4.78829E-07	50.25
1.50146F-01	6.66016E+00	4.69162E-07	-22.72
1.53809E-01	6.50159F+00	4.35338E-06	94.59
1.57471F-01	6.35039F+00	4.27660E-06	-29.82
1.61133E-01	6.20044F+00	4.03675E-07	40.74
1.64795E-01	6.06815E+00	6.72019E-07	.45
1.68457F-01	5.93623E+00	4.33557E-06	149.24
1.72119F-01	5.80997E+00	1.34889E-06	13.00
1.75781F-01	5.68889E+00	7.24232E-07	-153.95
1.79443F-01	5.57279E+00	1.47865E-06	84.56
1.83105F-01	5.46133E+00	1.70295E-07	-4.14
1.86767F-01	5.35425E+00	1.11356E-06	117.11
1.90429E-01	5.25128F+00	1.03674E-06	40.32
1.94092E-01	5.15220F+00	1.54637E-07	34.26
1.97754E-01	5.05679E+00	2.41693E-07	-160.53
2.01416E-01	4.96485E+00	1.87344E-06	-156.99
2.05078F-01	4.87619E+00	2.93509E-07	142.27
2.08740E-01	4.79044F+00	2.94124E-07	-55.32
2.12402F-01	4.70805E+00	1.73553E-07	138.61
2.16064F-01	4.62825F+00	8.18243E-07	73.15
2.19727F-01	4.55111F+00	2.25556E-07	70.71
2.23389E-01	4.47650E+00	7.36163E-07	54.06
2.27051F-01	4.40430E+00	3.72461E-07	-150.89
2.30713E-01	4.33439E+00	6.65250E-07	129.14
2.34375E-01	4.26667E+00	5.48930E-07	33.12
2.38037E-01	4.20103E+00	1.42634E-06	121.73
2.41699E-01	4.13737E+00	8.66546E-09	-97.62
2.45361E-01	4.07562E+00	5.96501E-07	26.18
2.49023E-01	4.01569E+00	7.25339E-07	-34.47
2.52684E-01	3.95749E+00	7.08949E-08	-35.84
2.56346E-01	3.90095E+00	1.71394E-08	130.97
2.60008E-01	3.84601E+00	1.06164E-07	-91.86
2.63670F-01	3.79259E+00	7.41092E-07	160.15
2.67332F-01	3.74064E+00	4.98392E-07	-5.27
2.70994E-01	3.69009F+00	3.97003E-07	91.66
2.74656E-01	3.64089F+00	1.40493E-06	-18.47
2.78318F-01	3.59299F+00	1.87106E-08	-37.81
2.81980F-01	3.54632E+00	1.57009E-06	10.20
2.85642E-01	3.50085E+00	4.54400E-07	-139.61
2.89304F-01	3.45654F+00	1.45597E-07	117.99
2.92966E-01	3.41333E+00	2.33330E-07	-138.52
2.96628F-01	3.37119F+00	2.36762E-07	-174.01
3.00290E-01	3.33008F+00	6.93415E-08	130.29
3.03952E-01	3.28996E+00	3.89097E-07	65.94
3.07614F-01	3.25079E+00	5.17801E-07	-52.14
3.11276F-01	3.21255F+00	2.71624E-07	-110.53
3.14938F-01	3.17519E+00	3.30077E-07	93.54
3.18600F-01	3.13870E+00	5.85167E-07	-48.15
3.22262F-01	3.10303F+00	1.14916E-06	137.71
3.25924F-01	3.06816E+00	1.48096E-07	97.16
3.29586F-01	3.03407E+00	5.83537E-07	92.46
3.33248F-01	3.00073F+00	1.77047E-07	6.73
3.36910F-01	2.96812E+00	7.48766E-08	-173.04
3.40572F-01	2.93620F+00	8.53291E-08	40.73
3.44234E-01	2.90496E+00	1.88456E-07	158.75
3.47896F-01	2.87439E+00	3.80256E-07	-166.11
3.51558F-01	2.84444F+00	5.12778E-07	109.17

TABLE III. ARRAY 3. 60m. SPECTRUM FOR TEMPERATURE PHASE I.

FREQUENCY (CPH)	PERIOD (HOUR)	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
3.66711E-03	2.73067E+02	1.41312E-04	60.66
7.32427E-03	1.36533E+02	1.41258E-04	81.54
1.09867E-02	9.10222E+01	6.29069E-06	96.30
1.46444E-02	6.82667E+01	8.49502E-06	94.50
1.83105E-02	5.46133E+01	1.15376E-05	84.20
2.19727E-02	4.45111E+01	2.16284E-06	73.09
2.56344E-02	3.90095E+01	4.59702E-06	110.41
2.92969E-02	3.41333E+01	3.54296E-06	69.90
3.29590E-02	3.03407E+01	2.86552E-06	131.06
3.66211E-02	2.73067E+01	7.71422E-06	-94.95
4.02837E-02	2.48242E+01	3.50512E-05	41.27
4.39457E-02	2.27556E+01	5.27599E-06	89.13
4.76074E-02	2.10051E+01	1.13228E-05	117.21
5.12695E-02	1.95049E+01	8.54808E-07	85.33
5.49314E-02	1.82044E+01	3.30142E-06	23.83
5.85934E-02	1.70667E+01	4.83964E-06	105.42
6.22559E-02	1.60627E+01	4.12195E-06	75.64
6.59180E-02	1.51704E+01	2.37356E-06	63.11
6.95801E-02	1.43719E+01	1.11696E-06	3.07
7.32427E-02	1.36533E+01	1.97421E-05	97.79
7.69047E-02	1.30032E+01	3.14959E-05	27.19
8.05664E-02	1.24121E+01	6.52951E-05	-176.89
8.42284E-02	1.18725E+01	3.78752E-05	16.72
8.78904E-02	1.13778E+01	1.90997E-05	-130.24
9.15527E-02	1.09227E+01	2.43778E-06	84.28
9.52144E-02	1.05026E+01	3.59539E-07	-166.80
9.88770E-02	1.01136E+01	9.37756E-07	80.52
1.02539E-01	9.75238E+00	1.04610E-06	-170.33
1.06201E-01	9.41609E+00	4.53554E-07	-1.18
1.09867E-01	9.10222E+00	5.12742E-07	97.52
1.13529E-01	8.80860E+00	2.30654E-06	78.90
1.17184E-01	8.53333E+00	1.01404E-06	6.31
1.20850E-01	8.27475E+00	2.63670E-06	105.54
1.24512E-01	8.03137E+00	1.23679E-07	34.74
1.28174E-01	7.80190E+00	1.93119E-06	-100.63
1.31836E-01	7.58519E+00	9.31364E-07	128.00
1.35498E-01	7.38018E+00	9.31130E-07	-30.58
1.39160E-01	7.18596E+00	1.21172E-07	-169.20
1.42822E-01	7.00171E+00	4.76918E-08	69.43
1.46484E-01	6.82667E+00	8.82355E-08	18.81
1.50146E-01	6.66016E+00	1.14996E-06	-139.71
1.53809E-01	6.50159E+00	3.13478E-07	-169.33
1.57471E-01	6.35039E+00	3.25929E-06	-100.55
1.61133E-01	6.20606E+00	1.39617E-06	53.19
1.64795E-01	6.06815E+00	1.78647E-06	159.74
1.68457E-01	5.93627E+00	3.82494E-06	88.26
1.72119E-01	5.80993E+00	1.74629E-06	-82.78
1.75781E-01	5.68889E+00	2.87323E-06	94.04
1.79443E-01	5.57279E+00	3.34682E-07	-124.07
1.83105E-01	5.46133E+00	9.10118E-08	57.28
1.86767E-01	5.35425E+00	2.68928E-07	27.81
1.90429E-01	5.25128E+00	2.71272E-07	136.09
1.94092E-01	5.15220E+00	5.25204E-07	98.60
1.97754E-01	5.05679E+00	1.54575E-06	51.17
2.01416E-01	4.96485E+00	5.17273E-07	154.50
2.05078E-01	4.87619E+00	7.33274E-08	-50.35
2.08740E-01	4.79064E+00	1.21370E-08	33.67
2.12402E-01	4.70805E+00	1.54614E-06	100.81
2.16064E-01	4.62825E+00	2.91863E-08	-93.50
2.19727E-01	4.55111E+00	1.67466E-07	62.98
2.23389E-01	4.47650E+00	2.96028E-07	39.50
2.27051E-01	4.40430E+00	6.08278E-07	-147.19
2.30713E-01	4.33439E+00	6.40511E-07	95.26
2.34375E-01	4.26667E+00	9.32523E-07	-37.00
2.38037E-01	4.20103E+00	5.72255E-07	141.23
2.41699E-01	4.13737E+00	3.67776E-07	71.29
2.45361E-01	4.07562E+00	1.33974E-06	102.63
2.49023E-01	4.01569E+00	5.93306E-07	-53.43
2.52685E-01	3.95749E+00	3.57525E-07	134.97
2.56347E-01	3.90095E+00	1.00481E-07	35.57
2.60010E-01	3.84601E+00	8.68004E-07	120.18
2.63672E-01	3.79259E+00	5.42637E-07	-7.45
2.67334E-01	3.74064E+00	5.30956E-07	107.94
2.70996E-01	3.69009E+00	9.97707E-08	143.23
2.74658E-01	3.64089E+00	2.74740E-07	-74.70
2.78320E-01	3.59298E+00	1.66622E-06	-144.57
2.81982E-01	3.54637E+00	1.22408E-06	-13.85
2.85644E-01	3.50085E+00	2.42155E-07	-166.28
2.89307E-01	3.45644E+00	1.23435E-06	105.75
2.92969E-01	3.41333E+00	2.60814E-07	-51.15
2.96631E-01	3.37119E+00	1.89554E-07	63.72
3.00293E-01	3.33008E+00	1.83915E-08	45.32
3.03955E-01	3.28996E+00	8.86361E-08	61.75
3.07617E-01	3.25079E+00	3.46767E-07	-28.49
3.11279E-01	3.21255E+00	4.97503E-07	65.75
3.14941E-01	3.17519E+00	4.42118E-09	-141.39
3.18604E-01	3.13870E+00	7.31845E-07	66.48
3.22266E-01	3.10307E+00	2.56560E-07	162.57
3.25928E-01	3.06814E+00	1.58928E-07	45.70
3.29590E-01	3.03407E+00	7.53863E-07	150.68
3.33252E-01	3.00073E+00	8.96478E-07	42.44
3.36914E-01	2.96812E+00	3.00140E-07	169.55
3.40576E-01	2.93620E+00	5.19031E-07	44.24
3.44238E-01	2.90494E+00	2.39638E-07	87.25
3.47900E-01	2.87439E+00	5.08662E-07	125.56
3.51562E-01	2.84444E+00	7.13520E-07	-105.42

TABLE III. ARRAY 3, 85m. SPECTRUM FOR TEMPERATURE PHASE 1.

FREQUENCY (CPH)	PERIOD (HOUR)	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
3.66211E-03	2.73057E+02	1.78949E-04	9.81
7.32422E-03	1.36513E+02	3.20498E-06	10.41
1.09443E-02	9.10222E+01	5.81767E-06	-114.91
1.46444E-02	6.82667E+01	2.09128E-06	176.87
1.83105E-02	5.46133E+01	1.01537E-05	49.71
2.19727E-02	4.55111E+01	4.74997E-06	-12.03
2.56344E-02	3.90095E+01	1.69781E-06	90.24
2.92969E-02	3.41333E+01	3.51062E-07	-62.18
3.29590E-02	3.03407E+01	1.61821E-06	-54.91
3.66211E-02	2.73057E+01	1.07330E-05	-11.77
4.02832E-02	2.48242E+01	6.49205E-05	57.58
4.39453E-02	2.27554E+01	1.62453E-05	150.12
4.76074E-02	2.10051E+01	2.51562E-06	156.72
5.12695E-02	1.95048E+01	1.33993E-06	116.78
5.49316E-02	1.82044E+01	4.07976E-07	56.89
5.85937E-02	1.70667E+01	1.80804E-06	79.99
6.22558E-02	1.60627E+01	8.37334E-06	99.21
6.59179E-02	1.51704E+01	7.05139E-06	82.80
6.95801E-02	1.43710E+01	7.45226E-07	30.08
7.32422E-02	1.36513E+01	2.99829E-05	95.04
7.69043E-02	1.30072E+01	1.21441E-05	72.97
8.05664E-02	1.24121E+01	2.81056E-04	-170.92
8.42285E-02	1.18725E+01	9.76393E-06	1.74
8.78906E-02	1.13778E+01	7.39609E-06	-72.14
9.15527E-02	1.09227E+01	1.25807E-06	-128.37
9.52148E-02	1.05026E+01	1.02948E-07	156.04
9.88769E-02	1.01136E+01	1.72887E-06	-75.45
1.02539E-01	9.75239E+00	1.03691E-06	31.04
1.06201E-01	9.41609E+00	3.84927E-06	-26.59
1.09863E-01	9.10222E+00	6.34501E-07	-144.05
1.13525E-01	8.80849E+00	1.82131E-06	-106.80
1.17187E-01	8.53333E+00	5.53382E-07	-41.70
1.20849E-01	8.27475E+00	4.85677E-06	152.49
1.24511E-01	8.03137E+00	3.60442E-07	-40.70
1.28173E-01	7.80190E+00	5.20150E-06	-124.09
1.31835E-01	7.58519E+00	3.38390E-06	-174.88
1.35497E-01	7.38018E+00	1.49993E-06	146.28
1.39159E-01	7.18596E+00	2.35841E-07	165.16
1.42821E-01	7.00171E+00	4.00923E-07	-23.82
1.46483E-01	6.82667E+00	2.20897E-06	-93.18
1.50145E-01	6.66016E+00	1.28999E-06	-38.60
1.53807E-01	6.50159E+00	4.42012E-06	-84.25
1.57469E-01	6.35039E+00	2.88662E-06	-144.32
1.61131E-01	6.20606E+00	4.02444E-05	4.42
1.64793E-01	6.06815E+00	7.87453E-04	-179.50
1.68455E-01	5.93623E+00	1.42856E-06	69.22
1.72117E-01	5.80993E+00	1.78441E-07	39.47
1.75779E-01	5.68899E+00	3.32097E-07	82.72
1.79441E-01	5.57279E+00	7.46754E-07	32.33
1.83103E-01	5.46133E+00	3.87750E-07	-162.16
1.86765E-01	5.35425E+00	6.43950E-07	-141.09
1.90427E-01	5.25129E+00	5.44447E-07	91.25
1.94089E-01	5.15220E+00	5.62330E-07	103.64
1.97751E-01	5.05679E+00	3.29245E-07	129.09
2.01413E-01	4.96485E+00	1.97690E-06	-130.41
2.05075E-01	4.87619E+00	8.44945E-07	8.38
2.08737E-01	4.79054E+00	8.66567E-07	139.63
2.12400E-01	4.70805E+00	5.77206E-08	-126.29
2.16062E-01	4.62825E+00	2.84917E-08	-132.86
2.19724E-01	4.55111E+00	1.05818E-06	18.61
2.23386E-01	4.47650E+00	3.81267E-07	5.11
2.27048E-01	4.40430E+00	4.67228E-07	178.10
2.30710E-01	4.33439E+00	1.84240E-07	93.11
2.34372E-01	4.26667E+00	2.86700E-07	68.15
2.38034E-01	4.20193E+00	1.68107E-06	31.15
2.41696E-01	4.13777E+00	4.64470E-06	-141.83
2.45358E-01	4.07542E+00	9.52996E-07	58.59
2.49020E-01	4.01569E+00	1.16873E-06	-74.29
2.52682E-01	3.95749E+00	9.98195E-08	-171.83
2.56344E-01	3.90095E+00	1.56248E-08	47.61
2.60006E-01	3.84601E+00	2.62915E-08	-3.88
2.63668E-01	3.79259E+00	1.74093E-07	-78.11
2.67330E-01	3.74064E+00	2.01060E-07	-99.82
2.70992E-01	3.69009E+00	5.11374E-07	71.93
2.74654E-01	3.64089E+00	1.95916E-07	10.59
2.78316E-01	3.59298E+00	5.65365E-07	117.89
2.81978E-01	3.54632E+00	3.56030E-08	-1.66
2.85640E-01	3.50085E+00	1.46747E-07	-126.59
2.89302E-01	3.45654E+00	2.30763E-07	-2.24
2.92964E-01	3.41333E+00	1.01686E-07	171.09
2.96626E-01	3.37119E+00	2.02485E-06	63.53
3.00288E-01	3.33008E+00	4.11802E-08	54.81
3.03950E-01	3.28996E+00	4.53959E-07	152.58
3.07612E-01	3.25079E+00	2.33671E-07	68.34
3.11274E-01	3.21255E+00	6.31868E-09	97.05
3.14936E-01	3.17519E+00	9.75781E-07	-144.78
3.18598E-01	3.13870E+00	3.97212E-08	-113.30
3.22260E-01	3.10303E+00	1.80203E-07	-52.99
3.25922E-01	3.06816E+00	1.08623E-08	120.42
3.29584E-01	3.03407E+00	3.18427E-07	152.11
3.33246E-01	3.00073E+00	2.89569E-07	-59.92
3.36908E-01	2.96812E+00	2.39241E-07	175.36
3.40570E-01	2.93620E+00	1.61053E-07	85.86
3.44232E-01	2.90496E+00	4.82144E-07	140.60
3.47894E-01	2.87439E+00	3.44073E-08	11.61
3.51556E-01	2.84446E+00	3.43094E-07	-125.00

TABLE IV. ARRAY 4, 27m. SPECTRUM FOR TEMPERATURE PHASE I.

FREQUENCY (CPH)	PERIOD (HOUR)	VARIANCE (°C ²)	PHASE
7.44211E-03	2.73047E+02	1.25421E-03	81.60
7.72422E-03	1.74533E+02	7.55319E-05	47.42
1.00047E-02	9.10222E+01	1.23054E-05	25.52
1.46494E-02	6.82667E+01	2.47614E-05	-111.18
1.83105E-02	5.46173E+01	2.23174E-05	-7.02
2.19727E-02	4.55111E+01	8.58309E-06	61.46
2.56348E-02	3.90095E+01	9.85040E-06	116.81
2.92969E-02	3.41737E+01	1.82072E-05	22.00
3.29590E-02	3.07607E+01	1.96062E-05	7.26
3.66211E-02	2.73477E+01	2.73494E-05	21.54
4.02832E-02	2.49247E+01	3.90603E-07	155.72
4.39453E-02	2.25017E+01	2.95172E-06	-5.00
4.76074E-02	2.00787E+01	3.03896E-07	-137.51
5.12695E-02	1.76557E+01	4.23349E-07	-10.56
5.49316E-02	1.52327E+01	6.40424E-06	112.26
5.85937E-02	1.28097E+01	2.11595E-06	92.94
6.22558E-02	1.03867E+01	5.11040E-06	75.47
6.59179E-02	8.96347E+00	7.29033E-07	169.51
6.95800E-02	7.53827E+00	3.51626E-07	-14.70
7.32421E-02	6.11307E+00	2.15744E-09	-41.08
7.69042E-02	4.68787E+00	5.77022E-06	-27.91
8.05663E-02	3.26267E+00	1.57917E-07	124.15
8.42284E-02	1.83747E+00	1.45724E-05	83.00
8.78905E-02	4.13777E+00	6.62894E-06	74.32
9.15526E-02	1.09227E+00	2.78795E-06	126.46
9.52147E-02	1.05024E+00	1.06245E-07	102.36
9.88768E-02	1.01176E+00	2.06630E-06	159.74
1.02498E-01	9.75237E+00	1.13171E-06	50.13
1.06219E-01	9.41409E+00	2.85554E-06	170.30
1.09940E-01	9.10222E+00	1.62327E-06	78.15
1.13661E-01	8.80860E+00	8.47284E-06	154.34
1.17382E-01	8.53737E+00	3.25082E-06	154.17
1.21103E-01	8.27475E+00	4.44419E-06	-151.35
1.24824E-01	8.03177E+00	1.80752E-06	-86.86
1.28545E-01	7.80199E+00	1.00741E-06	-119.96
1.32266E-01	7.58919E+00	2.85207E-07	-103.71
1.35987E-01	7.39919E+00	7.50481E-07	114.29
1.39708E-01	7.22694E+00	3.43781E-07	158.91
1.43429E-01	7.07171E+00	8.11344E-07	-11.54
1.47150E-01	6.92647E+00	2.22240E-07	-105.94
1.50871E-01	6.79124E+00	3.92889E-06	10.34
1.54592E-01	6.66601E+00	6.91789E-07	-55.48
1.58313E-01	6.55078E+00	1.15421E-06	-27.25
1.62034E-01	6.44555E+00	7.36707E-07	-99.98
1.65755E-01	6.35032E+00	5.72278E-07	38.04
1.69476E-01	6.26509E+00	8.51167E-07	144.94
1.73197E-01	6.18986E+00	3.88325E-06	146.25
1.76918E-01	6.12463E+00	7.80127E-07	109.87
1.80639E-01	6.06940E+00	1.11291E-06	41.73
1.84360E-01	6.02417E+00	7.15230E-07	83.52
1.88081E-01	5.98894E+00	2.56521E-07	63.81
1.91802E-01	5.96371E+00	6.08574E-07	44.28
1.95523E-01	5.94848E+00	2.27306E-07	-177.49
1.99244E-01	5.94325E+00	2.83784E-06	144.68
2.02965E-01	5.94802E+00	4.73501E-07	-158.54
2.06686E-01	5.96279E+00	4.95937E-07	119.91
2.10407E-01	5.97756E+00	8.58674E-07	160.88
2.14128E-01	5.99233E+00	2.03247E-07	67.45
2.17849E-01	6.00710E+00	1.17857E-06	41.24
2.21570E-01	6.02187E+00	6.05357E-07	161.29
2.25291E-01	6.03664E+00	1.73822E-08	116.06
2.29012E-01	6.05141E+00	1.49888E-06	-95.32
2.32733E-01	6.06618E+00	3.96929E-07	147.90
2.36454E-01	6.08095E+00	4.35739E-07	-170.37
2.40175E-01	6.09572E+00	9.80722E-07	89.69
2.43896E-01	6.11049E+00	9.35036E-07	-170.15
2.47617E-01	6.12526E+00	5.06254E-07	131.68
2.51338E-01	6.14003E+00	8.97439E-07	167.64
2.55059E-01	6.15480E+00	3.95320E-07	101.55
2.58780E-01	6.16957E+00	2.48516E-07	-103.98
2.62501E-01	6.18434E+00	1.41496E-07	-6.11
2.66222E-01	6.19911E+00	2.22583E-07	-128.28
2.69943E-01	6.21388E+00	7.41041E-08	-111.64
2.73664E-01	6.22865E+00	2.53787E-08	-31.16
2.77385E-01	6.24342E+00	1.71831E-07	-28.73
2.81106E-01	6.25819E+00	2.30235E-07	69.63
2.84827E-01	6.27296E+00	5.10392E-08	19.70
2.88548E-01	6.28773E+00	4.44397E-07	.69
2.92269E-01	6.30250E+00	7.46578E-07	52.27
2.95990E-01	6.31727E+00	7.45336E-08	-104.54
2.99711E-01	6.33204E+00	2.80264E-07	106.23
3.03432E-01	6.34681E+00	2.46024E-07	74.71
3.07153E-01	6.36158E+00	3.05244E-07	89.27
3.10874E-01	6.37635E+00	1.67797E-06	129.81
3.14595E-01	6.39112E+00	4.97746E-07	161.00
3.18316E-01	6.40589E+00	3.09464E-07	136.44
3.22037E-01	6.42066E+00	4.08773E-08	-57.80
3.25758E-01	6.43543E+00	9.31130E-07	102.99
3.29479E-01	6.45020E+00	9.71920E-08	161.10
3.33200E-01	6.46497E+00	2.18441E-07	-150.81
3.36921E-01	6.47974E+00	1.74792E-08	-146.53
3.40642E-01	6.49451E+00	2.47981E-07	56.13
3.44363E-01	6.50928E+00	3.54541E-07	-179.02
3.48084E-01	6.52405E+00	1.70780E-07	-147.83
3.51805E-01	6.53882E+00	1.73445E-08	29.37
3.55526E-01	6.55359E+00	1.46875E-07	-34.24

TABLE IV: ARRAY 4, 52m, SPECTRUM FOR TEMPERATURE PHASES I, II, III.

FREQUENCY (CPD)	PERIOD (HOUR)	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
8.791145E-02	2.73067E+02	8.67507E-04	91.32	3.18275E-04	78.97	5.54954E-03	-85.59
1.75781E-01	1.36537E+02	2.06649E-04	75.17	4.64378E-05	66.44	6.81579E-04	-90.97
2.63472E-01	9.18222E+01	7.72824E-05	70.25	9.82950E-05	113.59	1.27803E-04	-89.85
3.51543E-01	6.82667E+01	1.04270E-05	22.88	1.16349E-05	109.34	1.51756E-04	-93.44
4.39657E-01	5.46133E+01	3.40040E-05	87.24	1.92714E-06	150.36	6.69265E-05	-88.95
5.27764E-01	4.55111E+01	1.70036E-05	119.20	3.50507E-06	83.35	4.41726E-05	-91.39
6.15874E-01	3.90095E+01	1.61191E-05	141.80	1.71312E-07	152.20	3.45400E-05	-85.90
7.03975E-01	3.41377E+01	1.84857E-05	104.28	5.36310E-06	106.39	6.35022E-05	-70.73
7.92081E-01	3.03437E+01	3.04443E-05	72.91	1.34170E-06	-179.68	2.45789E-05	-115.33
8.79904E-01	2.73067E+01	2.68329E-05	79.69	3.06031E-06	126.45	4.37683E-06	-27.20
9.66707E-01	2.49242E+01	1.28288E-05	-6.32	1.67810E-05	6.77	4.59081E-05	-58.26
1.05460E+00	2.27554E+01	7.05741E-07	36.50	7.23495E-07	-42.17	2.31467E-05	-82.03
1.14252E+00	2.10051E+01	4.68241E-07	-27.54	1.82581E-05	98.68	1.70641E-05	-70.25
1.23042E+00	1.95049E+01	3.35719E-06	132.67	3.21215E-06	42.14	4.11183E-05	-64.35
1.31832E+00	1.82044E+01	1.87524E-05	-146.75	1.76239E-06	132.00	2.24275E-05	-96.02
1.40622E+00	1.70667E+01	2.19040E-05	82.85	1.05421E-05	33.63	2.07021E-05	-75.13
1.49412E+00	1.60027E+01	5.38614E-06	74.91	6.27228E-06	127.43	1.45288E-05	-92.13
1.58202E+00	1.51704E+01	1.05900E-05	91.22	6.71141E-06	62.76	5.15657E-06	-53.36
1.66992E+00	1.43719E+01	1.06655E-07	161.53	2.23904E-06	112.80	4.07098E-05	-85.39
1.75781E+00	1.36537E+01	8.18830E-04	150.87	6.27523E-06	114.01	5.78899E-05	-135.57
1.84571E+00	1.30032E+01	1.06132E-05	-24.36	1.60852E-06	-77.14	4.89859E-05	77.77
1.93361E+00	1.24121E+01	1.04940E-05	107.43	6.88666E-06	96.84	2.51278E-05	-59.74
2.02151E+00	1.18725E+01	1.07533E-05	93.30	1.52179E-05	154.11	2.65439E-05	-24.33
2.10941E+00	1.13729E+01	8.86166E-05	49.94	2.05647E-07	-127.53	3.89332E-06	-107.19
2.19731E+00	1.09227E+01	7.77231E-06	127.54	2.92432E-07	-160.79	3.30888E-05	-75.22
2.28521E+00	1.05026E+01	1.40932E-06	61.05	1.59036E-07	-152.65	2.54222E-06	-102.28
2.37311E+00	1.01124E+01	1.13327E-06	29.06	1.12014E-07	30.62	1.23870E-05	-82.77
2.46101E+00	0.97523E+01	4.67336E-07	-70.24	4.83557E-07	-6.07	1.66786E-06	-67.21
2.54891E+00	0.94140E+01	6.95711E-07	-98.94	5.00578E-08	-158.88	9.54409E-06	-84.63
2.63681E+00	0.91022E+01	5.00972E-06	99.24	1.67113E-06	13.46	4.00203E-06	-106.45
2.72471E+00	0.88063E+01	8.46663E-06	13.12	7.58265E-07	104.15	8.02944E-06	-54.02
2.81261E+00	0.85333E+01	5.06890E-06	139.90	2.27270E-06	81.43	8.91606E-06	-104.97
2.90051E+00	0.82745E+01	4.37196E-06	41.14	1.19390E-06	154.08	1.21114E-06	-114.10
2.98841E+00	0.80313E+01	4.02049E-07	-33.97	3.10510E-06	153.98	2.31957E-06	-56.01
3.07631E+00	0.78019E+01	7.40649E-07	-65.48	1.41975E-07	-90.91	8.77810E-06	-94.18
3.16421E+00	0.75851E+01	7.92784E-07	32.71	1.25047E-06	109.46	7.73811E-06	-105.81
3.25211E+00	0.73801E+01	9.59285E-07	114.36	3.35540E-06	147.97	1.76129E-06	-108.67
3.34001E+00	0.71859E+01	2.43621E-07	69.98	1.52803E-06	166.37	1.50790E-06	-56.81
3.42791E+00	0.70017E+01	1.92982E-06	50.69	1.46276E-07	-172.03	1.55578E-05	-84.89
3.51581E+00	0.68266E+01	2.64338E-07	-73.58	5.28216E-07	-150.04	3.14035E-06	-165.87
3.60371E+00	0.66601E+01	2.82381E-06	-73.68	3.52535E-07	41.97	5.48164E-07	-35.38
3.69161E+00	0.65015E+01	2.87838E-06	-132.26	1.74092E-06	79.86	7.25826E-06	-73.50
3.77951E+00	0.63509E+01	8.28445E-06	-135.53	3.14891E-06	143.22	2.37419E-06	109.48
3.86741E+00	0.62066E+01	1.52580E-05	-166.60	5.77735E-06	154.78	3.70731E-05	-20.23
3.95531E+00	0.60691E+01	4.08012E-06	-174.54	6.23636E-06	-151.47	2.60295E-05	-132.82
4.04321E+00	0.59373E+01	5.17298E-07	177.08	2.28233E-06	100.89	1.55066E-06	-46.96
4.13111E+00	0.58099E+01	7.21784E-06	146.44	1.06774E-06	-81.65	3.59221E-06	-105.13
4.21901E+00	0.56889E+01	3.30494E-06	73.44	4.05779E-07	8.37	4.80491E-06	-64.66
4.30691E+00	0.55727E+01	6.46243E-07	114.87	9.14697E-08	150.51	4.63997E-06	-119.53
4.39481E+00	0.54613E+01	2.95444E-07	110.72	7.23842E-07	127.61	5.89071E-06	-71.88
4.48271E+00	0.53542E+01	2.73538E-07	113.85	7.92745E-07	173.74	1.21311E-05	-125.58
4.57061E+00	0.52512E+01	3.34102E-06	96.46	4.03294E-06	-128.26	3.01484E-06	174.13
4.65851E+00	0.51522E+01	1.29597E-06	-111.67	1.61308E-07	-136.03	1.02671E-06	-88.49
4.74641E+00	0.50562E+01	1.00749E-05	135.83	3.89130E-06	-70.14	6.30414E-06	-107.06
4.83431E+00	0.49633E+01	6.45337E-06	3.49	4.82508E-08	61.58	2.55959E-06	165.49
4.92221E+00	0.48733E+01	6.33043E-07	42.33	8.11302E-07	-120.47	8.02730E-07	75.68
5.01011E+00	0.47866E+01	3.47835E-07	107.21	5.38350E-07	-61.42	2.95087E-06	-51.51
5.09801E+00	0.47033E+01	1.45273E-07	-8.39	6.16450E-10	-25.81	4.82549E-06	-77.46
5.18591E+00	0.46225E+01	9.77505E-07	161.88	2.45137E-07	-76.48	1.20442E-06	-124.68
5.27381E+00	0.45511E+01	1.40096E-06	144.12	5.18591E-07	-12.57	1.88194E-06	-87.04
5.36171E+00	0.44765E+01	6.13949E-07	114.07	4.74607E-07	-143.53	1.90884E-06	-95.08
5.44961E+00	0.44047E+01	1.58691E-06	63.22	8.94197E-07	-39.75	6.70122E-06	-126.66
5.53751E+00	0.43369E+01	4.98479E-07	80.99	1.59144E-07	70.29	2.00707E-06	137.44
5.62541E+00	0.42667E+01	1.43046E-06	100.76	4.06307E-07	-86.32	7.95755E-07	-27.75
5.71331E+00	0.42019E+01	4.20207E-07	-121.70	8.16178E-07	-54.08	3.71057E-06	-101.16
5.80121E+00	0.41373E+01	5.13005E-07	171.37	2.88290E-07	2.84	5.53245E-07	-118.71
5.88911E+00	0.40756E+01	8.16094E-07	-18.26	1.52824E-06	58.90	5.46766E-07	-167.49
5.97701E+00	0.40154E+01	3.85447E-07	52.74	9.06171E-07	-93.67	2.27673E-06	-26.23
6.06491E+00	0.39574E+01	2.70426E-07	78.26	9.21258E-07	56.20	5.77700E-06	-141.14
6.15281E+00	0.39009E+01	7.25105E-07	93.47	1.28948E-06	-137.09	8.36649E-07	3.67
6.24071E+00	0.38461E+01	1.17424E-06	82.05	1.45497E-07	-48.82	3.36986E-06	-115.26
6.32861E+00	0.37929E+01	1.47974E-07	-90.44	6.88937E-07	-55.38	9.52679E-07	-128.51
6.41651E+00	0.37406E+01	4.02222E-08	51.81	2.45874E-06	1.12	1.40075E-06	175.04
6.50441E+00	0.36903E+01	3.54989E-07	-177.03	3.42580E-07	144.19	8.16833E-07	83.19
6.59231E+00	0.36409E+01	1.15674E-06	80.04	2.28821E-07	12.96	1.84192E-06	-3.65
6.68021E+00	0.35928E+01	2.22852E-06	-28.18	3.11661E-09	-3.10	1.78471E-06	-74.12
6.76811E+00	0.35432E+01	9.09261E-07	139.19	5.78597E-07	7.97	1.01497E-06	8.54
6.85601E+00	0.34988E+01	5.04100E-07	40.96	2.78959E-07	1.76	6.18812E-06	-75.25
6.94391E+00	0.34564E+01	7.25882E-07	-169.31	1.20944E-07	60.03	2.85353E-06	-130.04
7.03181E+00	0.34133E+01	3.99145E-08	-166.92	5.87115E-07	70.40	1.31979E-07	177.68
7.11971E+00	0.33719E+01	2.62448E-07	56.20	1.54714E-07	-64.62	1.08950E-06	-93.07
7.20761E+00	0.33308E+01	5.69298E-07	20.51	8.55757E-08	40.30	1.16343E-07	-142.53
7.29551E+00	0.32899E+01	5.67486E-07	141.63	3.17807E-07	-3.13	1.58740E-06	-83.30
7.38341E+00	0.32507E+01	7.58249E-07	113.10	5.50998E-07	78.79	3.25939E-07	-163.82
7.47131E+00	0.32125E+01	8.21627E-07	15.77	1.63908E-07	44.99	1.29134E-06	-72.87
7.55921E+00	0.31751E+01	3.14562E-06	-179.17	8.30663E-07	56.46	7.66655E-07	-135.06
7.64711E+00	0.31387E+01	9.95849E-07	89.39	5.42625E-07	175.53	4.31658E-07	100.55
7.73501E+00	0.31030E+01	1.39430E-07	30.70	6.42884E-08	-88.95	2.14109E-06	-28.76
7.82291E+00	0.30681E+01	1.22937E-06	104.01	1.38114E-07	52.51	9.26022E-07	-110.78
7.91081E+00	0.30340E+01	8.38061E-07	85.69	2.84058E-07	-119.77	2.49759E-06	-91.48
7.99871E+00	0.30007E+01	1.85801E-07	46.66	1.35943E-06	-22.42	5.06332E-07	-169.58
8.08661E+00	0.29681E+01	5.30455E-07	-138.02	4.57542E-07	114.78	1.14061E-06	-69.88
8.17451E+00	0.29360E+01	5.34097E-08	-157.21	1.39177E-07	-7.69	4.78379E-07	-146.23
8.26241E+00	0.29044E+01	3.79052E-07	138.84	7.35008E-07	68.90	7.89223E-08	-114.51
8.35031E+00	0.28743E+01	4.59594E-07	141.74	1.48189E-07	166.26	2.35804E-07	-11.33
8.43821E+00	0.28444E+01	2.67176E-07	89.23	8.95079E-08	-75.38	8.91022E-07	-60.51

TABLE IV. ARRAY 4, 77m. SPECTRUM FOR TEMPERATURE PHASES I, II, III.

PERIOD (HOUR)	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
2.73047E+02	4.83706E-04	79.21	1.59274E-05	133.07	3.72512E-03	-70.64
1.36537E+02	3.16225E-04	92.91	1.25854E-05	140.34	1.10035E-03	-81.55
9.10222E+01	1.05947E-04	70.50	5.73008E-06	115.33	2.98056E-04	-110.21
6.82447E+01	2.06240E-05	72.03	1.45032E-05	146.81	9.90739E-05	-45.82
5.46117E+01	1.04215E-05	59.80	5.76409E-07	95.55	1.11159E-04	-45.75
4.55111E+01	6.15821E-06	60.88	1.81047E-06	175.04	9.54210E-05	-40.52
3.90095E+01	3.06094E-05	100.97	5.73349E-06	88.97	8.21707E-05	-93.23
3.41337E+01	4.79141E-06	83.19	9.96349E-07	-90.70	4.12044E-05	-90.48
3.07607E+01	3.92699E-06	163.66	1.10961E-06	157.22	4.88398E-05	-90.64
2.73047E+01	4.12874E-05	95.81	1.91529E-06	-133.60	7.64901E-05	-104.11
2.48242E+01	4.01601E-05	35.57	1.91737E-05	154.20	7.52204E-05	-141.01
2.27554E+01	1.07694E-05	165.70	9.02284E-06	103.57	1.66971E-05	-162.53
2.10051E+01	1.41125E-05	101.99	4.55644E-06	154.35	5.71249E-06	-155.24
1.95049E+01	4.75705E-06	-20.05	4.61574E-06	136.36	6.25997E-07	-58.88
1.82044E+01	1.88490E-05	70.10	2.88749E-06	-139.39	1.13720E-05	-52.70
1.70447E+01	1.98875E-07	8.62	3.46761E-06	-165.64	1.31140E-05	-49.07
1.60427E+01	4.15647E-06	93.69	5.06049E-08	115.44	6.76744E-06	-42.95
1.51704E+01	3.20846E-06	-46.35	1.93544E-06	-173.74	1.33049E-07	-121.12
1.43710E+01	3.58007E-06	134.33	2.49592E-06	-152.10	1.77255E-05	-30.21
1.36537E+01	2.46324E-05	-136.24	8.64129E-07	-81.28	3.15794E-05	-63.25
1.30032E+01	1.21070E-05	150.03	1.68149E-06	-7.26	7.00557E-05	-88.68
1.24121E+01	1.12110E-04	6.13	2.58371E-06	-23.30	9.02767E-05	-142.90
1.18725E+01	1.27352E-05	62.83	3.52244E-07	-75.21	1.65670E-05	-63.72
1.13778E+01	4.02250E-06	85.50	1.25584E-05	-45.75	7.42857E-06	-157.26
1.09227E+01	3.06881E-06	47.98	1.08135E-07	-175.30	5.11419E-06	-97.64
1.05024E+01	1.77808E-05	42.01	1.67297E-06	-21.62	1.24222E-05	-136.42
1.01134E+01	1.99444E-06	174.48	6.98877E-07	-83.26	1.26767E-06	99.18
9.75278E+00	6.47554E-06	66.55	5.66432E-07	124.72	2.22088E-06	-96.52
9.41409E+00	7.26892E-07	-134.67	2.64794E-08	-80.92	1.40224E-06	-129.72
9.10222E+00	5.57002E-06	124.73	4.08800E-07	62.76	9.08497E-07	-124.77
8.80840E+00	8.41125E-06	123.54	3.51147E-08	94.75	2.46642E-06	-152.28
8.53737E+00	2.18547E-06	-15.61	7.34149E-07	-153.87	2.26729E-07	-136.17
8.27675E+00	2.51275E-05	86.63	1.34752E-07	-129.22	4.88498E-07	145.93
7.93137E+00	3.68115E-06	169.18	4.51747E-07	154.04	7.22531E-07	-154.00
7.68199E+00	5.29049E-06	14.35	1.16944E-06	143.73	5.08014E-07	-35.83
7.45819E+00	1.60602E-05	-29.86	7.02746E-08	-64.60	3.36637E-07	-171.96
7.24108E+00	4.56644E-07	91.67	2.58454E-07	-180.12	2.69393E-06	-91.32
7.03524E+00	9.18544E-06	-34.92	2.46334E-08	63.69	4.66012E-07	-172.52
6.84171E+00	2.21444E-06	112.71	7.23815E-07	-56.06	7.81592E-07	160.68
6.66467E+00	2.45839E-07	-61.51	2.03657E-07	26.75	1.12592E-06	62.83
6.49004E+00	2.59375E-06	-116.48	1.22787E-06	1.05	1.70546E-06	-66.22
6.32193E+00	1.63525E-06	-32.61	9.08947E-07	94.23	2.06047E-05	-13.96
6.15792E+00	5.77152E-06	18.52	1.62141E-06	111.35	2.7223E-05	-55.37
6.00644E+00	7.62137E-05	144.58	3.55312E-06	170.92	1.74740E-05	-20.00
5.86714E+00	1.07575E-05	118.76	1.71214E-06	-172.42	4.00471E-06	-69.83
5.74224E+00	1.24989E-06	26.49	2.12090E-06	-54.10	3.37850E-06	-14.82
5.62903E+00	4.75199E-06	112.99	1.72044E-06	-82.84	4.13017E-06	-91.00
5.52889E+00	2.79379E-06	113.14	1.11452E-06	-65.02	4.16114E-06	-74.53
5.43970E+00	5.51291E-06	72.11	1.02644E-06	-19.79	9.46542E-06	-168.33
5.36117E+00	1.41383E-07	69.19	1.07644E-06	-23.79	1.75274E-06	-154.06
5.29255E+00	7.91849E-07	-102.58	5.20414E-07	164.50	1.70717E-06	-162.88
5.23124E+00	3.21480E-06	160.74	6.58026E-07	125.71	4.16371E-07	-157.92
5.17520E+00	3.91164E-05	-104.44	4.79610E-07	-161.43	2.20851E-06	-71.41
5.12347E+00	2.52633E-06	-173.72	3.70225E-07	154.71	1.26314E-05	-186.65
5.07625E+00	1.08040E-06	172.21	4.27578E-08	-43.37	2.58149E-07	-60.20
5.03444E+00	1.61158E-06	25.32	6.88889E-07	-114.49	1.47274E-07	-141.36
5.00044E+00	8.72197E-07	-39.69	1.25271E-07	-54.07	1.29544E-06	-73.06
4.97805E+00	9.63504E-07	101.02	2.18079E-07	-32.64	1.68105E-06	-88.97
4.96224E+00	3.58494E-06	-12.30	1.55070E-07	-12.88	4.40207E-07	164.23
4.95111E+00	4.77738E-05	103.41	1.01597E-06	-178.01	1.79644E-07	117.30
4.94509E+00	4.92474E-06	-56.93	3.19897E-07	-137.68	1.93001E-05	2.56
4.94417E+00	9.14467E-08	-62.15	1.51429E-06	-94.73	2.32245E-06	-54.27
4.94367E+00	2.22904E-06	-107.11	4.74405E-07	-73.65	2.79132E-06	-86.39
4.94347E+00	4.73021E-06	-174.35	7.61502E-07	-38.23	3.35454E-06	-103.42
4.94337E+00	1.59992E-05	-37.23	1.70925E-07	27.43	8.03244E-07	-163.43
4.94337E+00	4.17376E-07	-158.77	5.97434E-07	72.04	3.62807E-08	-57.56
4.94324E+00	4.29897E-06	73.55	3.61531E-07	134.93	2.56094E-07	-108.51
4.94324E+00	1.15357E-05	94.21	2.61444E-07	-134.41	2.29497E-07	-92.58
4.94324E+00	6.37545E-07	38.98	4.63658E-07	-54.66	1.95461E-06	-63.75
4.94324E+00	1.17357E-06	66.28	7.44847E-07	-33.88	1.19471E-07	89.41
4.94324E+00	4.87461E-06	68.20	8.13139E-07	-24.22	6.65078E-07	-82.14
4.94324E+00	4.29019E-07	163.37	3.19825E-07	17.17	6.35239E-07	-56.55
4.94324E+00	1.95361E-06	93.77	4.78800E-07	-35.41	8.61802E-07	-74.67
4.94324E+00	1.22909E-06	-14.35	3.92026E-07	-60.78	1.70658E-06	-56.10
4.94324E+00	2.57529E-07	-83.42	5.45407E-07	-3.73	2.12648E-05	-90.19
4.94324E+00	4.88454E-06	-31.81	1.67854E-06	-1.41	2.76011E-06	-164.58
4.94324E+00	9.76210E-07	140.34	4.47044E-07	30.21	1.42949E-06	179.80
4.94324E+00	7.41002E-07	99.26	1.91775E-06	49.24	1.68476E-08	105.36
4.94324E+00	1.86309E-06	64.05	7.08434E-07	54.01	4.20230E-07	166.00
4.94324E+00	4.22994E-08	141.77	4.99174E-07	100.64	7.08257E-07	28.63
4.94324E+00	2.07621E-06	109.57	4.31690E-07	110.21	1.76694E-05	-19.20
4.94324E+00	1.55957E-07	93.84	1.10936E-07	173.28	8.06819E-07	-104.13
4.94324E+00	2.67384E-06	76.78	3.79384E-07	-141.56	3.56894E-07	-5.19
4.94324E+00	1.28645E-06	88.32	4.15547E-07	-130.70	1.63994E-06	-27.23
4.94324E+00	2.40479E-06	125.23	9.74647E-08	-34.44	1.46772E-06	-70.75
4.94324E+00	1.69943E-06	-74.98	1.68836E-07	-179.11	8.52242E-07	-74.13
4.94324E+00	1.62590E-06	58.95	1.53707E-07	156.93	8.37132E-07	-84.38
4.94324E+00	3.91199E-07	72.39	5.46784E-07	-142.47	3.76079E-06	-87.73
4.94324E+00	1.69044E-06	-169.05	4.05004E-07	-142.76	3.53244E-06	-133.82
4.94324E+00	1.58341E-06	-173.67	2.41334E-07	-14.93	7.28271E-07	-169.64
4.94324E+00	5.15894E-06	121.00	5.67207E-08	-29.16	1.13754E-07	-135.75
4.94324E+00	1.73948E-06	129.82	2.15227E-08	-57.41	3.36247E-09	159.91
4.94324E+00	1.25993E-06	90.70	5.99134E-08	-53.14	1.27744E-06	-60.00
4.94324E+00	2.32445E-06	104.42	8.64134E-08	28.78	4.95444E-07	-120.79
4.94324E+00	1.71802E-06	119.65	1.18662E-07	64.29	6.29573E-07	-112.20
4.94324E+00	1.20097E-07	-118.05	2.99390E-07	128.74	8.10995E-07	-116.77

TABLE IV. ARRAY 4, 102m, SPECTRUM FOR TEMPERATURE PHASES I, II, III.

PERIOD (HOUR)	I		II		III	
	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE	VARIANCE ($^{\circ}\text{C}^2$)	PHASE
2.73047E+02	3.83480E-04	61.62	1.06503E-05	-166.98	3.51111E-03	-58.24
1.76937E+02	1.20841E-04	81.31	3.75524E-06	-99.07	8.15924E-04	-77.88
9.10222E+01	4.71387E-05	81.77	1.23875E-07	-115.73	2.82358E-04	-86.58
6.82647E+01	6.50305E-06	119.04	9.59094E-07	167.42	2.03145E-04	-77.99
5.44177E+01	1.45370E-05	59.34	1.77965E-06	-156.13	1.70988E-04	-87.45
4.55111E+01	6.22623E-06	36.69	1.87688E-06	-135.32	9.59723E-05	-99.20
3.90895E+01	9.75672E-06	90.88	2.19345E-06	-105.64	5.49795E-05	-93.31
3.41337E+01	7.67616E-06	165.90	1.97113E-06	-111.03	6.51109E-05	-88.70
3.07407E+01	1.20399E-06	-79.56	4.49934E-05	-128.37	7.08131E-05	-83.13
2.73047E+01	3.33741E-05	122.09	4.29234E-06	-116.61	1.02785E-04	-87.65
2.48242E+01	3.51937E-06	17.12	4.54563E-06	-98.97	7.82184E-05	-114.04
2.27554E+01	4.30221E-06	-156.35	2.74077E-06	-129.53	1.04742E-05	-131.90
2.10451E+01	4.83941E-06	116.33	7.57589E-07	-106.16	8.14454E-06	-70.48
1.95048E+01	4.71951E-06	69.54	2.98599E-06	-107.77	5.86207E-06	-71.82
1.82044E+01	2.05249E-06	75.25	1.37753E-06	-134.39	4.45276E-06	-43.27
1.70647E+01	5.81041E-06	73.64	6.49457E-06	-140.20	1.52425E-05	-25.85
1.60227E+01	1.33414E-06	22.27	9.46730E-06	-126.59	2.75153E-05	-58.05
1.51706E+01	2.00484E-06	62.26	1.39157E-05	-112.54	1.16803E-05	-76.19
1.43719E+01	1.44911E-05	78.27	1.60936E-05	-112.16	1.79048E-05	-63.57
1.36537E+01	6.31694E-06	-172.46	1.08802E-05	-67.18	3.74449E-05	-63.01
1.30122E+01	8.97875E-07	-174.00	9.05029E-06	-70.53	9.85945E-05	-77.82
1.24121E+01	2.01667E-05	18.55	5.77702E-06	-41.44	1.06011E-04	-140.77
1.18725E+01	9.14731E-07	118.72	3.77159E-06	-61.10	6.63709E-06	-161.78
1.13778E+01	1.18540E-06	-148.77	3.21878E-07	-73.23	2.31709E-05	-125.77
1.09227E+01	4.27658E-06	-63.16	2.47131E-06	-70.76	1.29093E-05	-124.29
1.05024E+01	3.05879E-06	63.34	2.82748E-06	-53.41	6.04655E-06	-117.73
1.01174E+01	4.11624E-07	95.36	4.28599E-06	-32.39	3.70987E-06	-102.56
9.75239E+00	2.33798E-06	26.19	5.50299E-06	-19.17	7.88819E-06	-98.94
9.41619E+00	2.35735E-06	104.53	6.11359E-06	14.60	5.91425E-06	-117.58
9.10222E+00	6.31779E-07	96.44	1.78274E-06	53.93	1.13234E-05	-125.72
8.80880E+00	4.49943E-06	97.19	4.55721E-06	95.45	8.77456E-06	178.43
8.53377E+00	4.17442E-07	-147.43	1.57337E-06	118.31	2.71768E-06	123.82
8.27475E+00	6.52825E-07	-1.67	4.17311E-06	156.80	6.44575E-06	89.93
8.03177E+00	8.45846E-06	55.42	1.79877E-06	178.23	1.07292E-06	38.08
7.80194E+00	1.31061E-06	119.74	2.33707E-06	-154.66	1.00907E-06	77.96
7.58510E+00	2.34264E-06	15.54	1.11033E-06	-146.31	4.56591E-06	-42.36
7.38191E+00	2.14589E-07	156.99	3.62502E-07	-99.29	8.80844E-06	-79.28
7.19509E+00	3.45966E-06	-158.40	1.38156E-06	-170.43	1.28880E-05	-93.55
7.03171E+00	3.18767E-05	34.19	7.92390E-07	-78.99	1.23353E-05	-117.75
6.88247E+00	7.11754E-07	58.37	1.51908E-06	-131.92	3.92247E-06	-117.67
6.64014E+00	2.47239E-06	90.44	2.99992E-07	-49.35	1.93295E-06	-60.71
6.41152E+00	6.10441E-06	-38.74	5.46817E-07	-140.94	2.01272E-05	-77.60
6.19373E+00	3.11591E-06	75.84	2.80867E-07	173.48	2.28966E-05	-138.83
6.00606E+00	1.79228E-06	63.67	5.14586E-07	-148.32	1.18845E-06	155.58
5.84015E+00	3.36917E-08	84.00	1.76981E-06	-143.85	1.25689E-06	-153.38
5.68273E+00	6.40356E-07	120.88	3.74422E-07	-86.66	1.36919E-08	-87.06
5.53923E+00	3.94303E-07	153.99	7.77058E-07	-123.35	1.02047E-05	-150.64
5.40889E+00	2.45452E-06	72.16	1.14545E-06	-121.04	1.44078E-05	157.92
5.29739E+00	9.20404E-07	149.84	8.31371E-07	-97.92	4.22040E-06	147.63
5.19413E+00	3.68147E-07	30.40	1.08445E-06	-89.30	4.03799E-06	136.25
5.10252E+00	2.16912E-06	67.01	2.45539E-07	-96.80	2.10901E-06	129.13
5.02128E+00	9.04003E-07	-174.89	3.75392E-07	-93.91	1.66625E-06	108.22
4.95227E+00	1.12302E-06	45.21	3.87989E-07	-129.11	4.22771E-08	98.62
4.89547E+00	4.45641E-07	174.09	5.21830E-07	-88.03	5.19011E-07	56.69
4.84895E+00	5.02650E-06	105.57	4.21418E-07	-78.33	3.20181E-06	-25.95
4.81419E+00	3.16322E-08	166.59	2.10849E-06	-45.17	7.78115E-07	-64.63
4.79064E+00	3.69954E-06	-53.29	6.03636E-07	1.01	1.70120E-07	-37.56
4.76875E+00	1.15040E-06	40.78	1.11704E-06	45.37	5.39100E-07	77.24
4.62925E+00	1.51218E-07	120.44	8.13734E-07	64.43	1.21963E-06	49.13
4.55111E+00	2.79048E-07	-26.90	5.71818E-07	121.86	1.56134E-07	34.35
4.47459E+00	8.42548E-07	173.92	6.93258E-07	111.46	1.22418E-06	107.32
4.40430E+00	9.50038E-07	175.14	3.77989E-07	-159.34	9.94342E-07	81.71
4.33420E+00	7.31440E-07	66.67	3.59052E-07	-134.58	1.32004E-06	24.97
4.26447E+00	9.54899E-07	9.04	1.04493E-07	-179.77	1.47662E-07	135.03
4.20107E+00	9.21921E-07	130.95	3.14322E-07	-125.03	6.83954E-07	66.58
4.13737E+00	6.62736E-07	48.45	8.96959E-08	-82.96	4.22741E-06	4.11
4.07542E+00	2.11748E-06	134.61	1.43912E-07	-67.84	1.18259E-05	-36.25
4.01569E+00	7.18314E-07	150.86	2.96510E-07	-68.34	6.78696E-06	-65.54
3.95749E+00	1.14223E-06	105.30	3.09381E-07	-10.43	4.65425E-06	-78.80
3.90095E+00	5.49041E-07	94.40	1.30964E-07	28.45	2.66477E-06	-106.58
3.84471E+00	2.00148E-07	69.25	3.83774E-07	74.28	1.64949E-08	-129.72
3.79259E+00	1.32325E-06	74.55	3.56599E-07	101.07	2.12310E-07	-65.78
3.74044E+00	8.86402E-07	108.33	1.99272E-07	143.55	4.59212E-08	.67
3.69009E+00	1.58244E-06	104.76	9.43430E-08	74.54	4.96237E-07	-57.34
3.64098E+00	1.45409E-07	98.24	3.77339E-07	150.76	1.05218E-07	-36.00
3.59298E+00	5.74714E-07	75.74	3.19412E-07	134.88	3.72737E-07	-144.36
3.54632E+00	5.34429E-07	-178.03	1.78471E-07	-164.79	1.16789E-06	129.89
3.50095E+00	2.59161E-07	-99.80	9.01322E-08	174.17	3.70730E-07	16.96
3.45644E+00	1.72990E-05	61.99	3.54135E-08	-151.79	4.28409E-07	-101.83
3.41337E+00	5.06749E-07	81.96	1.27317E-07	-87.14	3.59337E-07	-175.00
3.37119E+00	1.41151E-06	115.09	8.02107E-08	-70.57	1.21331E-08	-138.75
3.33003E+00	5.74675E-07	-19.19	1.24914E-07	-73.04	1.02359E-06	-74.60
3.28994E+00	4.66339E-07	134.87	9.83417E-08	-38.21	1.00257E-06	-109.60
3.25079E+00	6.02547E-07	90.77	1.32250E-07	-9.17	2.68847E-07	-50.32
3.21255E+00	1.22514E-07	93.16	2.86943E-08	11.25	2.21295E-07	10.99
3.17512E+00	1.05004E-08	-60.13	1.13432E-07	-57.50	2.36694E-06	1.18
3.13879E+00	3.28846E-06	75.01	3.03373E-07	-66.54	2.44707E-06	-13.61
3.10303E+00	7.11042E-08	-5.18	2.32951E-07	-36.87	8.19176E-07	13.80
3.06816E+00	3.13813E-07	87.17	6.55841E-07	-26.98	1.48366E-06	34.00
3.03407E+00	3.15505E-07	143.12	4.63984E-08	19.90	1.00040E-07	88.13
3.00073E+00	5.40921E-07	-169.68	1.52710E-07	27.40	6.83662E-08	42.92
2.96812E+00	4.85785E-08	3.87	9.17479E-08	-52.45	7.86401E-08	88.35
2.93628E+00	8.31342E-07	63.16	1.13719E-09	-68.91	5.89371E-07	-21.44
2.90494E+00	1.01940E-06	150.43	6.72309E-08	-53.02	2.38929E-06	-45.12
2.87423E+00	1.04649E-06	-77.94	3.12240E-08	-63.35	5.36577E-06	-65.78
2.84444E+00	8.78552E-07	77.65	4.96199E-08	-42.19	5.17179E-06	-74.61

TABLE IV. ARRAY 4, 132m, SPECTRUM FOR TEMPERATURE PHASES I, II, III.

PERIOD (HOUR)	VARIANCE (°C ²)	PHASE	VARIANCE (°C ²)	PHASE	VARIANCE (°C ²)	PHASE
2.73047F+0	1.50135E-04	70.08	1.15018E-05	-104.60	1.40413E-04	-25.96
1.76537F+0	2.56666E-05	82.47	2.44177E-06	-176.41	3.04457E-05	-113.74
0.10222F+0	6.25340E-06	93.52	3.67123E-05	-114.27	1.05292E-06	-145.42
6.02647F+0	5.78024E-07	51.51	1.54044E-05	-126.12	1.19974E-05	-76.93
5.44137F+0	7.48128E-04	73.50	2.30927E-05	-92.30	3.96070E-05	-99.13
4.55111F+0	9.24732E-07	62.92	2.95718E-04	-94.54	2.49092E-05	-126.54
3.90095F+0	9.51427E-07	20.20	7.61209E-06	-69.19	3.03974E-05	-134.30
7.41377F+0	1.24707E-04	104.63	7.45010E-06	-106.75	2.02691E-05	-124.23
7.07407F+0	1.31991E-07	133.65	4.33164E-06	-66.80	8.03044E-06	-111.86
2.73047F+0	5.04324E-04	125.14	5.46497E-05	-63.92	7.06624E-04	-111.09
2.49242F+0	4.73241E-05	17.41	1.02681E-05	-46.42	2.91764E-06	-130.13
2.27554F+0	9.71018E-07	-143.87	2.76409E-04	-90.86	4.42873E-04	19.44
2.10051F+0	1.47211E-06	115.96	2.20842E-06	-66.80	1.98734E-05	10.83
1.95948F+0	4.62737E-07	153.24	3.35983E-05	-111.68	5.24367E-06	11.98
1.92944F+0	9.40546E-07	73.44	2.37817E-06	-62.49	7.89511E-07	13.15
1.70647F+0	6.40244E-04	118.93	5.47972E-06	-70.94	1.75617E-06	24.10
1.60627F+0	1.49420E-07	113.64	1.76704E-06	-32.52	4.97651E-07	-74.34
1.51704F+0	1.45172E-06	60.89	2.15134E-06	-66.26	3.42677E-06	-123.22
1.43719F+0	1.06614E-06	26.23	1.41536E-06	-65.63	1.67193E-06	177.67
1.36533F+0	4.20541E-04	127.93	2.37672E-06	-70.64	5.05502E-06	-77.70
1.30032F+0	4.73241E-05	-178.15	3.27846E-07	-22.65	5.46492E-05	-44.47
1.26121F+0	1.11744E-06	120.00	2.73634E-05	-112.57	7.27252E-05	-122.24
1.18725F+0	5.70513E-07	-114.59	9.17752E-06	-43.87	1.61544E-05	-151.24
1.13774E+0	2.40434E-06	-106.19	4.37719E-07	-110.03	5.51141E-06	-49.10
1.09227F+0	2.43936E-05	-99.21	1.50797E-06	-91.43	9.31563E-06	-93.95
1.05024F+0	2.27359E-07	-18.91	1.29770E-07	-117.30	4.34515E-06	173.04
1.01174F+0	1.44242E-07	-63.55	9.16257E-07	-94.91	4.52171E-06	131.21
0.79233E+0	4.92244E-07	-43.08	3.57114E-07	-155.84	3.52427E-06	161.05
0.61609E+0	1.74242E-06	-12.52	1.23232E-06	-102.41	6.54649E-06	151.04
0.10222F+0	3.10944E-07	37.29	4.96442E-06	-106.34	3.01441E-06	104.46
0.00409E+0	4.22311E-07	-5.46	2.19590E-06	-66.32	3.17574E-06	100.50
0.53337F+0	1.31517E-07	41.77	2.21142E-06	-64.02	4.73034E-06	133.43
0.27475F+0	1.97640E-04	-5.43	4.22224E-07	-83.98	4.92743E-07	136.42
0.01377F+0	3.71141E-04	52.54	1.44044E-07	41.04	4.49142E-06	-71.74
7.80190F+0	1.76141E-07	76.41	1.20200E-06	156.44	9.51035E-06	-67.41
7.58519F+0	2.41355E-07	154.24	4.93677E-06	-154.65	4.34425E-06	-62.75
7.39018F+0	4.02379E-04	123.52	4.47263E-06	-130.07	2.34222E-06	-65.25
7.19546F+0	3.31122E-04	-19.47	1.76373E-06	-75.23	1.50934E-06	-82.34
7.00171F+0	3.74172E-07	-175.29	4.46321E-07	-71.32	7.36327E-07	37.64
6.82647F+0	4.11644E-04	-127.41	1.23202E-06	50.09	1.22241E-06	41.74
6.64914E+0	4.57972E-07	-46.44	7.36142E-07	170.14	2.40043E-06	-84.19
6.50150E+0	1.46214E-05	-44.63	7.36440E-07	-160.82	4.32212E-06	-130.02
6.35039F+0	1.70231E-06	13.66	1.07273E-06	-106.24	1.73570E-05	171.73
6.20604F+0	1.44055E-04	67.36	1.88707E-06	36.70	1.24041E-05	123.34
6.06815E+0	2.47012E-04	123.24	5.44705E-06	-145.25	2.54770E-07	-80.73
5.93627F+0	2.34242E-04	187.16	2.47843E-06	-52.43	6.55425E-06	-122.45
5.80931E+0	4.14644E-07	-151.47	2.21934E-07	155.34	2.44490E-06	-177.37
5.68989E+0	5.73032E-07	-130.09	2.54163E-07	-143.43	2.01732E-06	89.63
5.57270F+0	5.37242E-07	-49.51	7.42097E-07	-114.48	2.71431E-07	55.83
5.46173F+0	1.44242E-07	-117.34	3.14224E-07	-11.79	4.36706E-07	62.23
5.34425F+0	1.50334E-04	181.53	1.35227E-07	-41.26	4.93409E-07	57.11
5.25124F+0	1.22434E-07	49.90	1.12433E-07	77.37	2.02374E-04	124.04
5.16220F+0	1.22434E-07	49.90	5.21209E-07	-126.73	9.76806E-06	95.53
5.08479F+0	1.14979E-07	97.10	4.46693E-07	-42.94	5.08440E-06	50.45
4.96494F+0	3.15207E-04	-147.00	1.56057E-07	-65.95	8.00753E-07	-74.73
4.87419F+0	1.01614E-07	-106.39	5.71704E-04	-150.39	7.82734E-07	-143.24
4.79064F+0	2.45242E-07	5.74	5.32934E-04	-144.17	7.57197E-07	49.51
4.70905F+0	1.25627E-07	56.28	3.76654E-07	-149.66	2.24640E-06	-6.81
4.62827F+0	1.25974E-07	100.53	1.54937E-07	-112.53	1.76534E-06	-47.94
4.55111F+0	8.20119E-09	-133.19	4.31477E-04	-112.93	2.07459E-06	-74.72
4.47650F+0	1.11793E-08	157.18	7.44837E-09	-132.03	1.95924E-06	-70.75
4.40470F+0	1.24714E-04	-165.75	1.37457E-07	-134.10	1.21301E-06	-40.64
4.33639F+0	1.24644E-07	4.59	1.40425E-07	-25.55	8.89724E-07	-30.05
4.26647F+0	2.21747E-07	14.44	1.16427E-07	-113.14	1.72951E-07	29.13
4.20107F+0	2.49344E-07	41.49	2.22045E-07	-105.64	1.56444E-06	113.61
4.13737F+0	1.24757E-04	166.95	2.13742E-04	63.02	4.51745E-07	129.39
4.07562F+0	1.94134E-07	114.90	4.24004E-08	-172.27	7.32495E-07	-145.52
4.01549F+0	3.44434E-04	161.02	2.77144E-07	-120.24	1.47844E-06	139.45
3.95749F+0	5.70442E-08	179.43	1.36414E-06	-91.00	1.20990E-06	70.80
3.90095F+0	5.47394E-04	-24.50	5.74347E-07	-55.27	2.76168E-07	44.84
3.84691F+0	2.92744E-03	156.27	1.30975E-07	-47.85	3.50566E-07	124.05
3.79290F+0	5.31244E-04	-46.42	7.56524E-04	11.61	4.36864E-07	93.76
3.74044F+0	2.37454E-04	24.84	9.50272E-04	-31.60	9.15307E-08	103.11
3.69090F+0	1.07212E-07	172.87	1.01196E-07	175.79	1.45901E-07	-135.11
3.64089F+0	2.70444E-07	162.53	2.26131E-04	-159.07	4.43244E-07	-69.59
3.59290F+0	3.72309E-07	-171.17	1.47196E-07	-107.77	1.55432E-06	-69.71
3.54632F+0	3.72505E-07	-42.00	7.75434E-04	-13.84	1.02514E-06	-108.26
3.50085F+0	1.75424E-07	-42.14	4.26241E-07	-47.56	1.73177E-07	-9.03
3.45546F+0	2.37709E-07	-14.24	1.31427E-07	-47.60	5.88411E-07	-20.84
3.41377F+0	4.36464E-07	43.86	2.14441E-07	-140.50	2.36837E-07	-24.13
3.37137F+0	2.37677E-07	73.62	1.51170E-07	-142.37	2.01473E-04	127.89
3.33089F+0	1.13411E-04	142.37	9.13451E-07	-106.47	5.22150E-07	116.44
3.29094F+0	1.09434E-04	154.44	4.79742E-07	-75.48	5.24841E-07	131.29
3.25070F+0	9.55905E-04	64.47	5.44420E-07	-77.07	6.44083E-07	162.04
3.21255F+0	5.24844E-07	87.00	2.30266E-07	-78.06	3.27944E-07	174.70
3.17519F+0	5.03521E-07	114.72	7.45202E-08	-24.37	4.87644E-07	-137.09
3.13970F+0	6.65211E-07	143.97	7.54124E-08	111.34	2.25064E-07	-136.43
3.10303F+0	1.99804E-07	-149.03	2.55537E-08	-60.69	1.70903E-07	-115.30
3.06814F+0	1.99220E-07	-56.53	1.16449E-07	-136.75	3.74891E-07	-17.34
3.03407F+0	1.52242E-07	-26.04	2.21440E-07	-147.01	9.55712E-07	-28.93
3.00092F+0	1.50002E-07	43.66	3.22014E-08	23.21	2.97719E-07	3.94
2.96912F+0	1.05774E-07	50.97	4.29373E-08	148.71	1.03519E-06	60.20
2.93720F+0	1.47191E-07	154.14	7.27409E-08	-9.64	4.42630E-07	15.00
2.90609F+0	7.64114E-04	-154.94	6.02245E-08	-173.64	2.54427E-07	-46.13
2.87670F+0	1.14649E-07	-146.21	1.07322E-07	-174.47	3.59117E-07	153.79
2.84644F+0	4.49041E-04	-94.23	5.64373E-08	-78.99	1.46256E-06	80.62

TABLE V: Tidal harmonics used in prediction.

Tidal Line	Amplitude (cm)	Phase* (deg)
Sa	8.38	287
Ssa	6.25	202
K ₁	82.94	155
O ₁	45.81	132
P ₁	24.57	152
Q ₁	7.56	127
J ₁	(3.63)	(166)
M ₁	3.05	149
OO ₁	(1.98)	(177)
RO ₁	(1.74)	(123)
S ₁	(1.68)	(282)
M ₂	106.41	127
S ₂	25.85	153
N ₂	21.24	095
K ₂	7.16	151
NU ₂	4.11	108
MU ₂	3.02	345
L ₂	5.64	187
T ₂	(1.52)	(153)
2N ₂	(2.84)	(063)

*local epic (kappa).

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13. ABSTRACT A description is given of the experiment and the temperature and pressure time-series. Three separate temperature phases are identified—each lasting about 11 days. The last phase is believed to be a lens of warm water intruding from the north. Originating, perhaps, in Possession Sound. An attempt is made to estimate the contribution of mooring motion to the temperature signal. The first temperature phase is investigated for the possible presence of internal waves.			

14. KEY WORDS	LINK A		LINK B		LINK C	
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