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COASTAL WINDS OF THE SOUTHEAST ALASKA PENINSULA

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Pacific Marine Environmental Laboratory
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ABSTRACT. Hourly measurements of wind speed and wind direction from Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island during the latter half of 1984 and the first half of 1985 show evidence of orographic steering of winds in the coastal zone. Surface wind directions at Cherni Island, Thin Point, and Cold Bay often were attributable - 30% of the time at Cherni Island and Thin Point, 50% of the time at Cold Bay - to channeling of the wind by a gap in the Aleutian Range. At Ugaiushak Island 30% of surface winds came from the WNW. It is likely that these winds followed a convoluted path through the mountains from the Meshik River valley to the southwest.

Representations of topographically undisturbed surface winds for the same four locations over the period June 1984 through May 1985 were produced by turning and reducing gradient winds computed from digitized, 6-hourly, sea-level-pressure analyses obtained from the U.S. Navy's Fleet Numerical Oceanography Center. These wind estimates show a more evenly distributed wind direction population, with a slight tendency for winds to dominate from the NW and SE. Monthly correlation coefficients between measured and estimated u and v wind components ranged from 0.48 to 0.94. Because of anomalous winter and spring weather conditions, measured Cold Bay wind statistics for some months of the study do not compare favorably with climate averages. Yearly averages compare more favorably, and these statistics may be representative of normal conditions.

1. INTRODUCTION

The large-scale, undisturbed, marine wind field responds in a predictable manner to the horizontal pressure gradient and its curvature, Coriolis force, and friction. However, winds of the marine coastal zone may be quite different from the large-scale winds because of the dynamic effects of coastal roughness and thermal discontinuities. Along a mountainous coast, the nearshore alterations to the large-scale wind field are chiefly orographic in origin. They may be discussed in terms of the large-scale wind direction with respect to the axis of the mountain range: cross-axis and along-axis; and in terms of the local nature of the mountains: continuous or gapped.

A continuous mountain range acts as a steering or guiding wall to along-axis winds and as a deflecting or blocking wall to cross-axis winds. Along the north coast of the Gulf of Alaska, wind measurements discussed by Reynolds *et al.* (1981) showed that the prevailing nearshore wind paralleled the St. Elias Mountains. As a storm bumps into a continuous mountain range, one may surmise that a local increase occurs in the pressure gradient; this increase manifests itself as a nearshore intensification (jet) of the large-scale, along-axis wind (Fig. 1(a)). Also, Overland (1984) suggests the existence of an along-axis coastal jet during periods of cross-axis wind (Fig. 1(b)). Appendix F to this report gives another example of an along-axis jet during cross-axis wind.

Gaps in a mountain range connect the low-level air masses on either side of the axis. They focus and accelerate cross-axis winds (Weber, 1984 and Fig. 2(a)), and create pressure-gradient-relieving gap winds during along-axis flow (Macklin and Walker, 1986 and Fig. 2(b)).

Additionally, katabatic winds may blow seaward from mountainous terrain (Macklin, *et al.*, 1980), and the diurnal heating cycle can generate local land/sea breezes. These local winds persist on the order of hours to days and extend tens of kilometers seaward before merging into the large-scale marine wind field (Reynolds *et al.*, 1980).

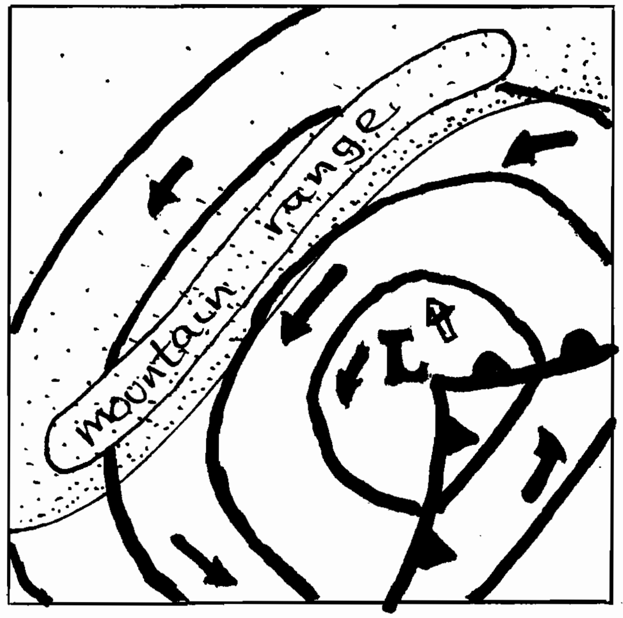
In summary, winds in mountain gaps always tend to blow along the axis of the gap. These winds may be cross-axis winds focused and accelerated by the gap, or they may be true gap winds caused by the low-level, cross-mountain pressure difference during along-axis winds. Similarly, winds at continuous mountain coasts tend to blow along the axis of the mountains. This local, alongshore flow can be a deflection of large-scale, cross-axis winds, or a steering of along-axis winds.

This report documents the wind field of the coastal zone of the southeastern Alaska Peninsula (Fig. 3). Figure 4 is an example of wind variability in the study area. The wind vectors in this figure were produced by averaging over 5 km the winds measured by a research aircraft flying at 100 m altitude. At some adjacent points, the averaged wind speed varies by almost a factor of two, and averaged wind direction changes by nearly 90°!

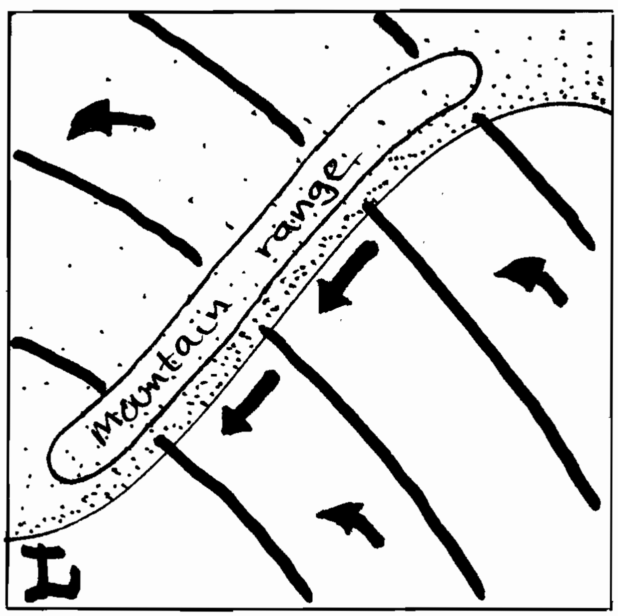
The next section contains a discussion of climatic characteristics of the region's winds. Following is a comparison with climatology and each other, of hourly wind measurements made at four sites during the period June 1984 to November 1985. Finally, to assess the deviation of the coastal zone winds from the large-scale, undisturbed marine flow, surface wind estimates are calculated at each location from digitized sea-level-pressure analyses without incorporating topography into the model. These estimates are then compared with the actual wind measurements.

2. CLIMATOLOGY

In anticipating the winds to be found along the southeast coast of the Alaska Peninsula, one may refer to the information contained in the *Climatic Atlas of the Gulf of Alaska* (Brower *et al.*, 1977). Therein, on a monthly basis, winds have been averaged from two stations in the study area - Cold Bay and Marine Area A (Fig. 4). The Cold Bay data were collected from 1955 to 1974 and averaged 8 reports daily; Marine Area A wind data were assembled from ship reports collected from 1872 to 1974 within the grid formed by latitude 52°N northward to the coast of the Alaska Peninsula and from longitude 156°W to 165°W.



(a)



(b)

Figure 1.--Formation of low-level jet in the coastal zone adjacent to a continuous mountain range during (a) a land-falling storm, and (b) large-scale, cross-axis flow. Dark lines are isobars, arrows depict wind direction and strength.

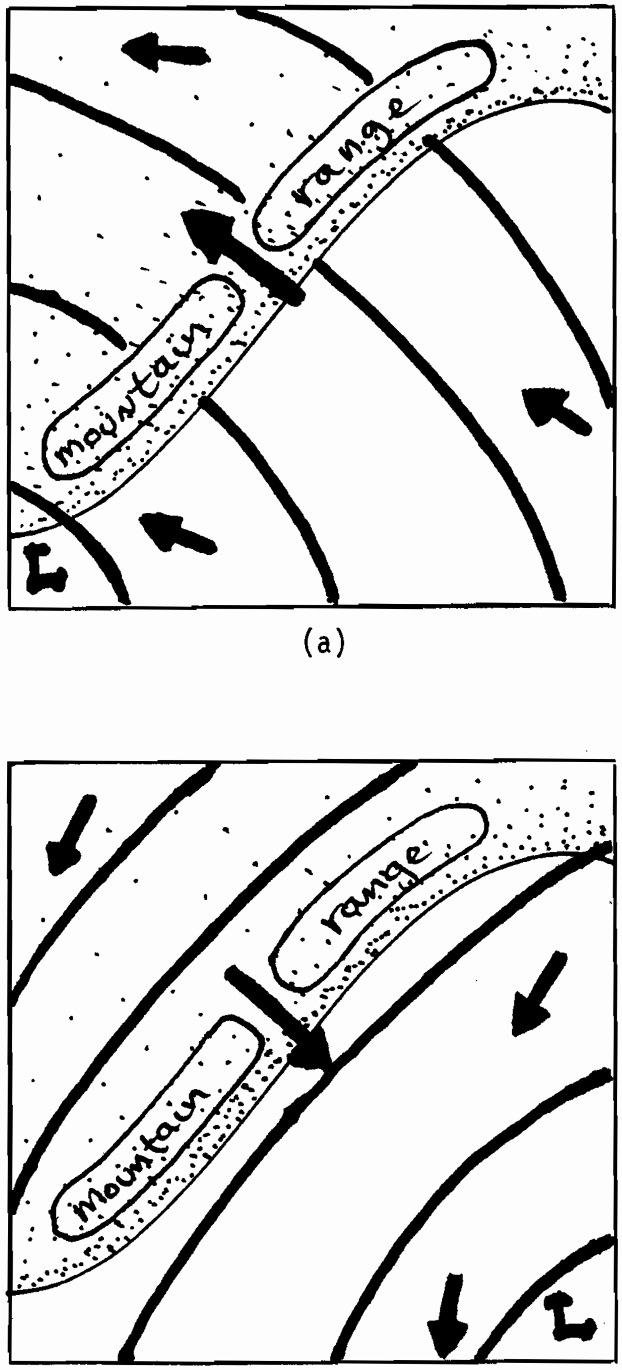


Figure 2.--Gap winds in coastal mountain passes from (a) focusing and acceleration of large-scale, cross-axis winds, and (b) low-level pressure gradient. Dark lines are isobars, arrows depict wind direction and strength.

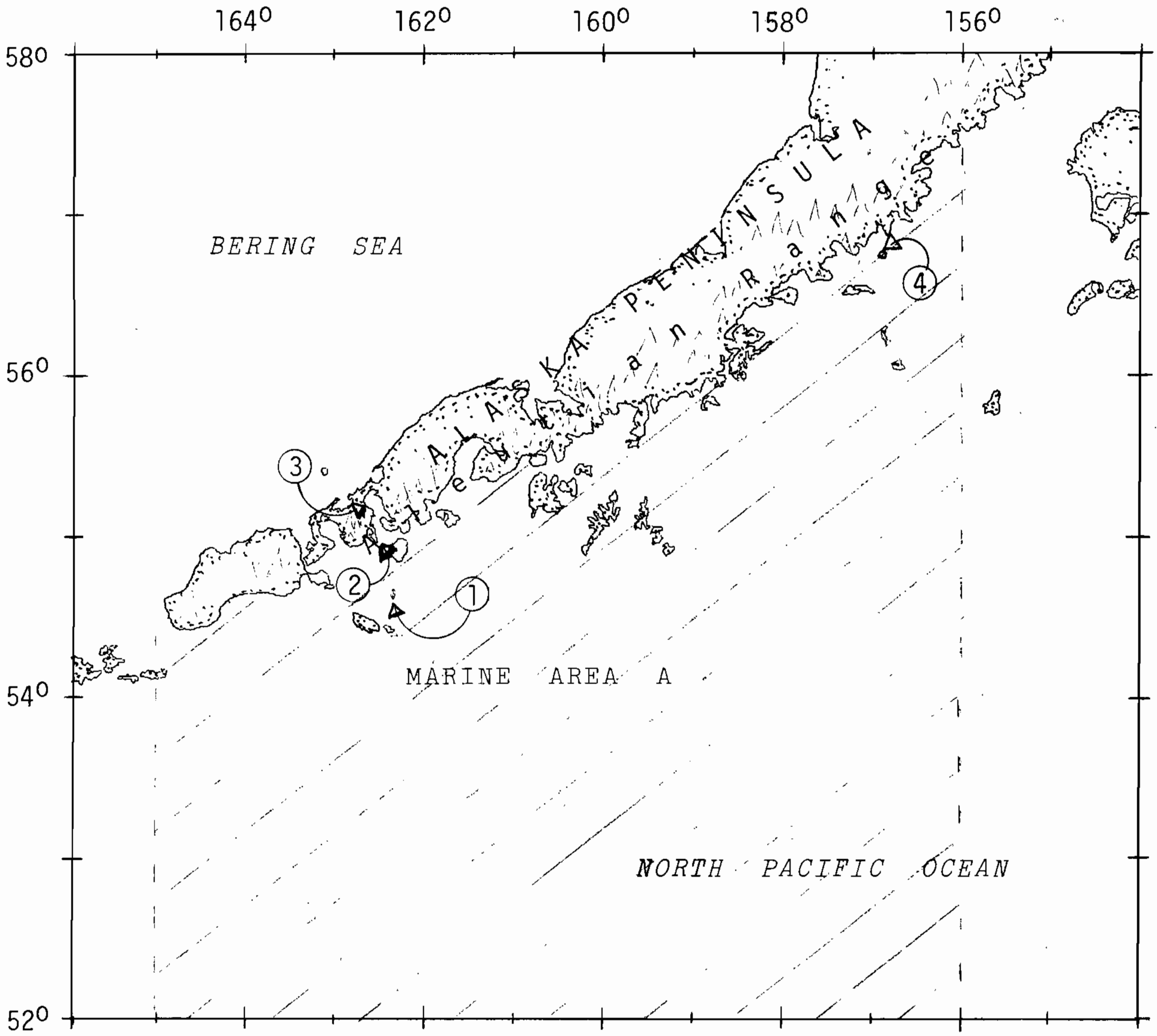


Figure 3.--The Alaska Peninsula showing the Aleutian Range, Marine Area A, and the locations of four weather stations: 1) Cherni Island, 2) Thin Point, 3) Cold Bay, and 4) Ugaiushak Island.

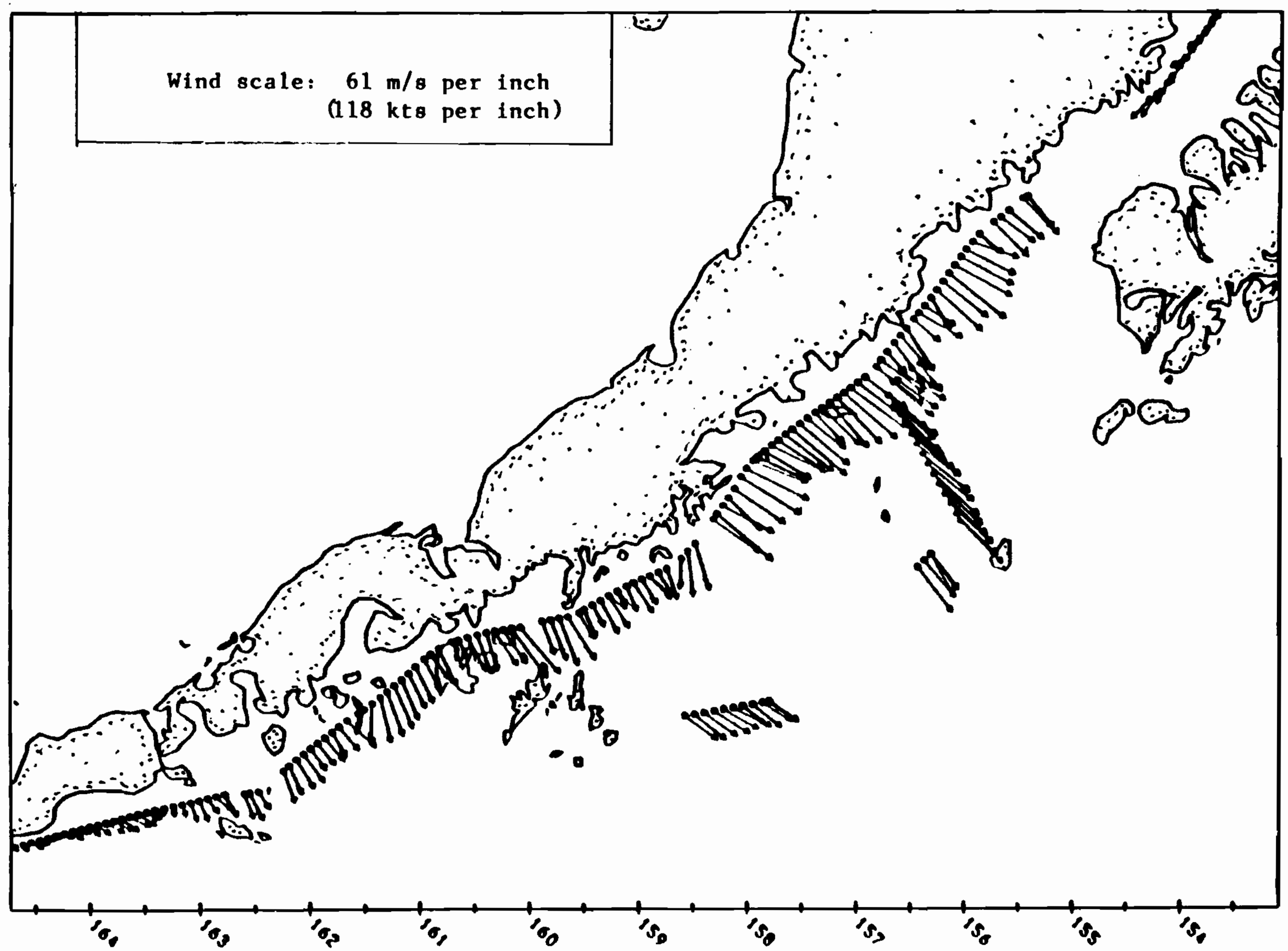


Figure 4.--Coastal winds along the SE coast of the Alaska Peninsula following passage of a cold front on 10 March 1985.

Cold Bay lies in a gap in the Aleutian Range (Fig. 5) which funnels winds from two predominant directions: ESE and WNW. These gap winds have a seasonal distribution shown in Table 1. In the winter, 24% of the winds at Cold Bay are from the W and NW and 38% are from the SE and S. The percentage of gap winds increases through the spring (41% and 34%, respectively) to the summer when the W and NW winds blow 43% of the time and the SE and S winds blow 41% of the time. In the fall the winds prevail from the E and SE (55%) and only occasionally (4%) from the W and NW. Throughout the year, there is little diurnal variation in wind direction; wind speed exhibits a slight to moderate diurnal variation in the spring and summer. It is significant that the vector mean wind at Cold Bay is very small, but the scalar mean wind speed is among the largest of coastal stations around the Gulf of Alaska.

Table 1.--Wind climatology of Cold Bay and Marine Area A (from Brower *et al.*, 1977). Entries give wind direction frequency in percent; speed in m s^{-1}.

	Cold Bay				Marine Area A			
	Jan	Apr	Jul	Oct	Jan	Apr	Jul	Oct
N	21	15	8	2	14	9	7	11
NE	5	3	2	12	9	5	5	4
E	4	2	2	40	14	6	7	6
SE	25	22	27	16	12	10	8	7
S	13	12	14	5	11	13	13	9
SW	5	4	2	3	11	15	18	14
W	10	16	21	2	14	22	25	25
NW	14	25	22	2	13	18	14	23
CALM	3	1	2	18	2	2	3	1
scalar mean wind speed	8.1	8.9	7.0	3.9	9.8	8.9	6.6	10.1
vector mean wind	--- 0.0	--- 0.0	SSW 2.0	WNW 2.3	NNW 0.8	WSW 3.0	WSW 2.6	WNW 4.2
number of observations	4712	4560	4956	6693	2490	3155	4452	3696

Marine Area A, on the other hand, exhibits a more evenly distributed wind direction climatology, as would be expected of an offshore marine environment. Year-round, the dominant wind direction is from the west. The vector mean wind for Marine Area A is representative of the general circulation in this latitude range.

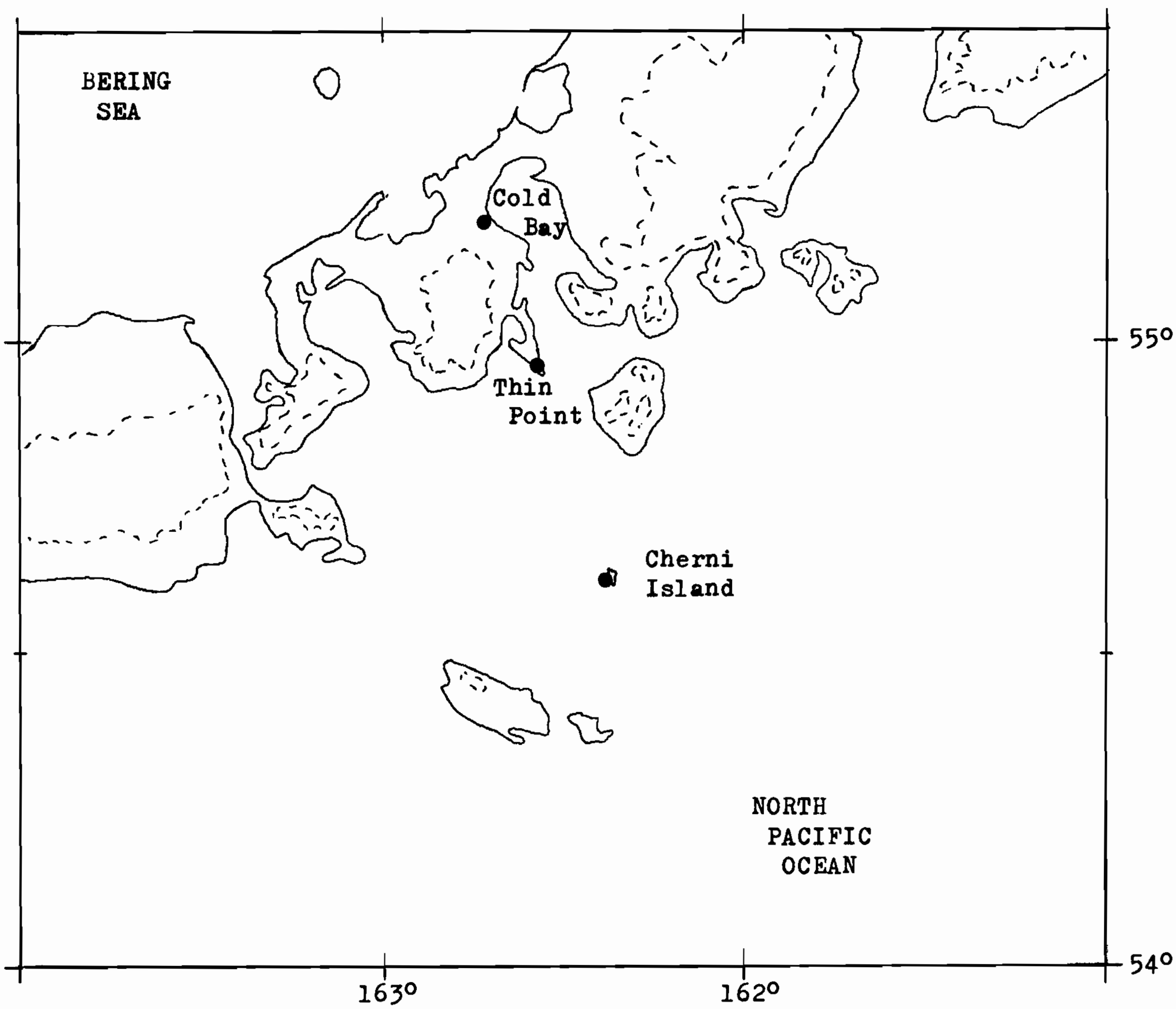


Figure 5.--Locations of the Cherni Island, Thin Point, and Cold Bay weather stations. Terrain higher than 300 m is enclosed by dashed lines.

Cherni Island (Fig. 5) lies 40 km south-southeast of Cold Bay within Marine Area A. Due to its proximity to the east coast of the Peninsula, one might expect it to show a wind climatology that resembles a composite of Cold Bay and Marine Area A, but with some traits of its own. During summer, then, there are likely to be more winds from the W and NW than from any other sectors; the second most likely direction from which the wind could be expected to blow is the SE. In the fall, E and SE winds might dominate, followed next by W and NW winds. Winter could be expected to be similar to fall, with the addition of northerlies. Spring wind conditions, like summer, emphasize flow from the W and NW.

Thin Point (Fig. 5), on a tip of mainland between Cold Bay and Cherni Island, lies at one end of the Cold Bay wind channel and could be expected to experience most of its winds from the NNW or SSE to E. As the station is free of orographic blockage to the east, it is likely that the distribution of easterly winds will be much broader than at Cold Bay.

Satellite pictures of low clouds streaming across the Alaska Peninsula suggest that Ugaiushak Island is protected from offshore winds blowing out of the Meshik River valley (Fig. 6). Because of the island's proximity to the mountain barrier, it is probable to expect that some winds will blow along the mountain axis. Thus, the wind distribution should be similar to Marine Area A (which contains Ugaiushak Island), with the exception of more frequent winds from the NE and SW, and possibly from the NW.

A synoptic climatology for the Alaska coast permits classification of local winds according to recurring, large-scale weather patterns. Overland and Hiester (1980) derive six basic weather patterns: type 1 is described by a low in the Gulf of Alaska, type 2 by an Aleutian low, type 3 by high pressure over northern and interior Alaska, type 4 by a low-pressure center over central Alaska, type 5 by a Pacific anticyclone, and type 6 by a stagnating low off the Queen Charlotte Islands. Given typical pressure patterns for each type, I infer large-scale surface wind directions for the southeast Alaska Peninsula: type 1 - NW, type 2 - S backing (rotating counter-clockwise) to NW as the Aleutian low migrates northward, type 3 - SE to E, type 4 - NW to SW, type 5 - S to SE, and type 6 - N to NW. In summer, types 2, 4, and 5 account for 84% of the occurring weather patterns (32%, 25%, and 27%, respectively). Thus the high climatological summertime occurrence of SE winds is due to the high occurrence of Aleutian lows and Pacific anticyclones, and the high occurrence of NW and W winds stems from low-pressure centers over central Alaska and northward-migrating Aleutian lows. In fall, types 2, 4, 6, and 1 account for 86% (32%, 22%, 17%, and 15%, respectively) of the weather patterns, and the high percentage of autumnal E winds at Cold Bay are attributable to migrating Aleutian lows. Types 2, 6, 1, and 3 occur 90% of the time in the winter (32%, 26%, 16%, and 16%, respectively), implying that the large climate sample of N and NW winds at Cold Bay in the winter are caused by migrating Aleutian lows which track into the Gulf of Alaska or stagnate off the Queen Charlotte Islands, and that E and SE winds are often caused by continental high pressure. In spring, climate types 2, 4, and 6 occur 72% of the time (36%, 18%, and 18%) and cause the dominant NW and SE winds observed at Cold Bay.

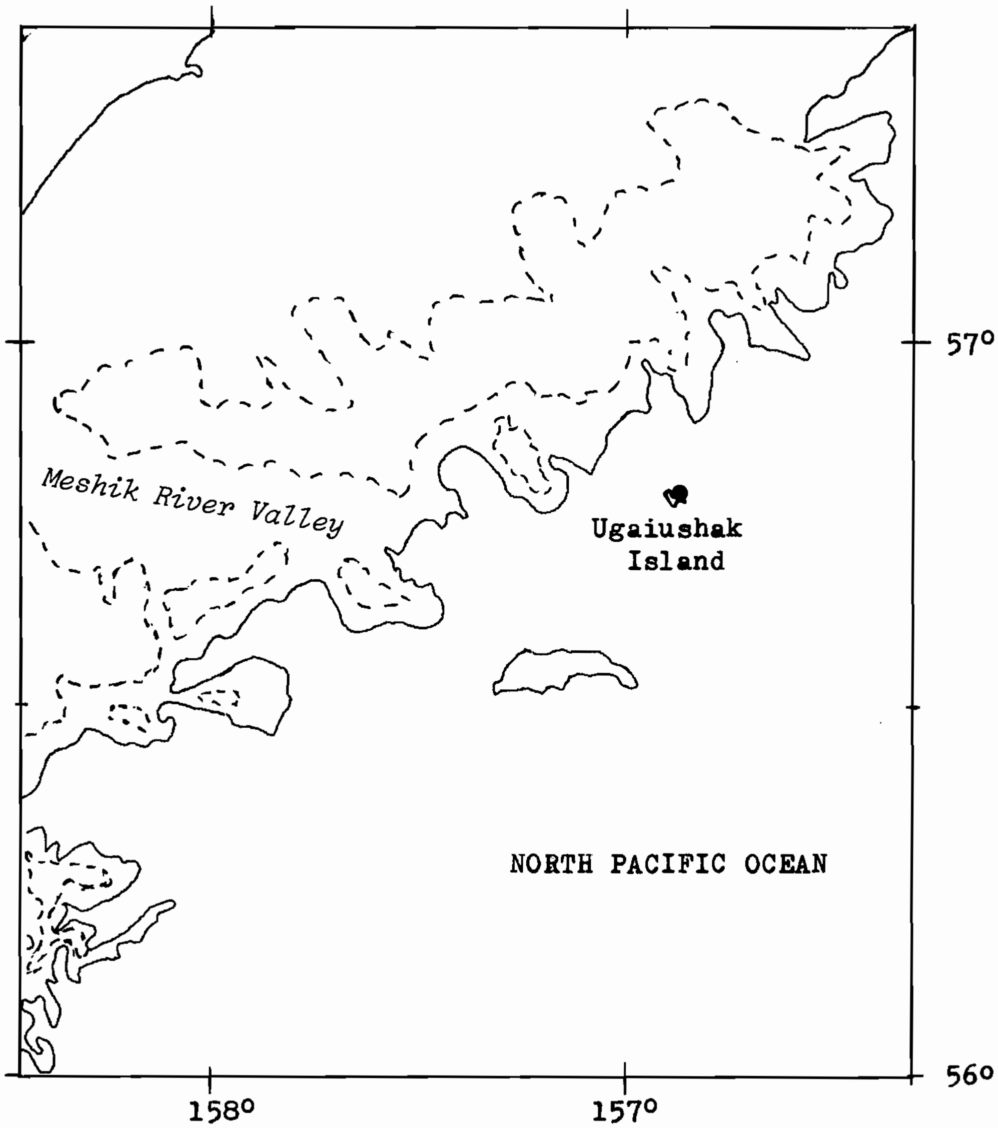


Figure 6.--Location of the Ugaiushak Island weather station. Terrain higher than 300 m is enclosed by dashed lines.

3. METHODS

To measure coastal winds directly, satellite-telemetering weather stations were installed at Cherni Island, Thin Point, and Ugaiushak Island. Cherni Island was instrumented on June 4, 1984. The stations at Thin Point and Ugaiushak Island were erected November 30 and December 2, 1984, respectively. Sites were selected to offer best exposure to winds from all directions, while minimizing wind response to immediate terrain. Figures 5 and 6 indicate the general locations of the weather stations at each site. Each weather station makes hourly measurements of wind speed and direction, air temperature, and barometric pressure. The winds are sensed by an R.M. Young wind monitor and averaged for ten minutes. Air temperature is measured by a radiation-shielded Yellow Springs Instrument thermistor, and pressure is sensed by a Paroscientific digiquartz barometer. Temperature and pressure are sampled instantaneously at the end of the wind averaging period. Each station transmits these data to the GOES-West satellite eight times daily (each three hours) beginning at 0147 GMT. The Thin Point and Ugaiushak stations were procured from a different manufacturer and suffer design flaws which apparently allow condensation to collect within their electronics modules. The Thin Point station was molested by bears.

Wind, temperature, and pressure data are also collected by the National Weather Service's Cold Bay observatory (Fig. 5). Trained personnel take readings at about five minutes before each hour using standard observational techniques and instruments.

The measured winds from these four sites are called "observed" or "measured" winds in this report.

Having direct wind measurements from Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island, it was desirable to fabricate "undisturbed" coastal winds from June 1984 through May 1985. From digitized, 6-hourly (00, 06, 12, and 18 UT), sea-level-pressure distributions obtained from the U.S. Navy's Fleet Numerical Oceanography Center, time series of estimated surface winds at Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island were created using the METLIB-II program library (Macklin *et al.*, 1984; Overland *et al.*, 1980). The shaded part of Figure 7 shows the 4 × 4 sea-level-pressure grid (grid spacing is 381 km at 60° north latitude). From each digitized pressure field, METLIB-II produced grid-point calculations of the gradient wind, then grid-point estimates of the surface wind by applying frictional forces to the gradient wind. This was achieved by reducing the gradient wind by 20% and rotating it 20° to blow towards low pressure. Sample METLIB-II sea-level-pressure and surface-wind fields for 00 UT 18 June 1984 are depicted in Figure 8. Finally, surface wind estimates were derived at the four stations by interpolating grid winds to the appropriate location. METLIB-II winds are called "estimated" or "predicted" in the sections to follow.

Figure 9 summarizes the available wind observations and estimates from the four locations from 1 June 1984 through 30 November 1985. In this figure an observed or estimated wind vector is plotted once each day at 00 UT. Blank portions of a time series indicate missing data due to station absence, station malfunction, or, in the case of METLIB-II estimates, missing digitized pressure data. Clearly, data used for this report are from varying time

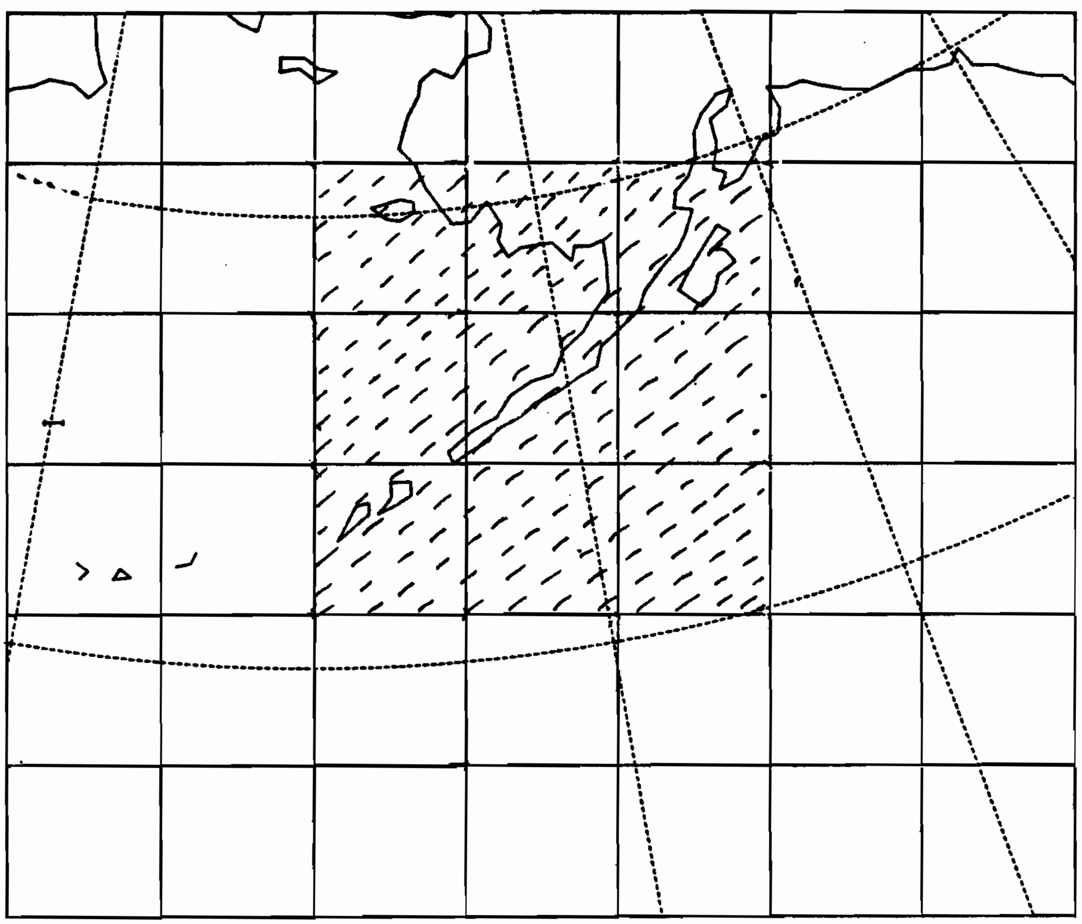
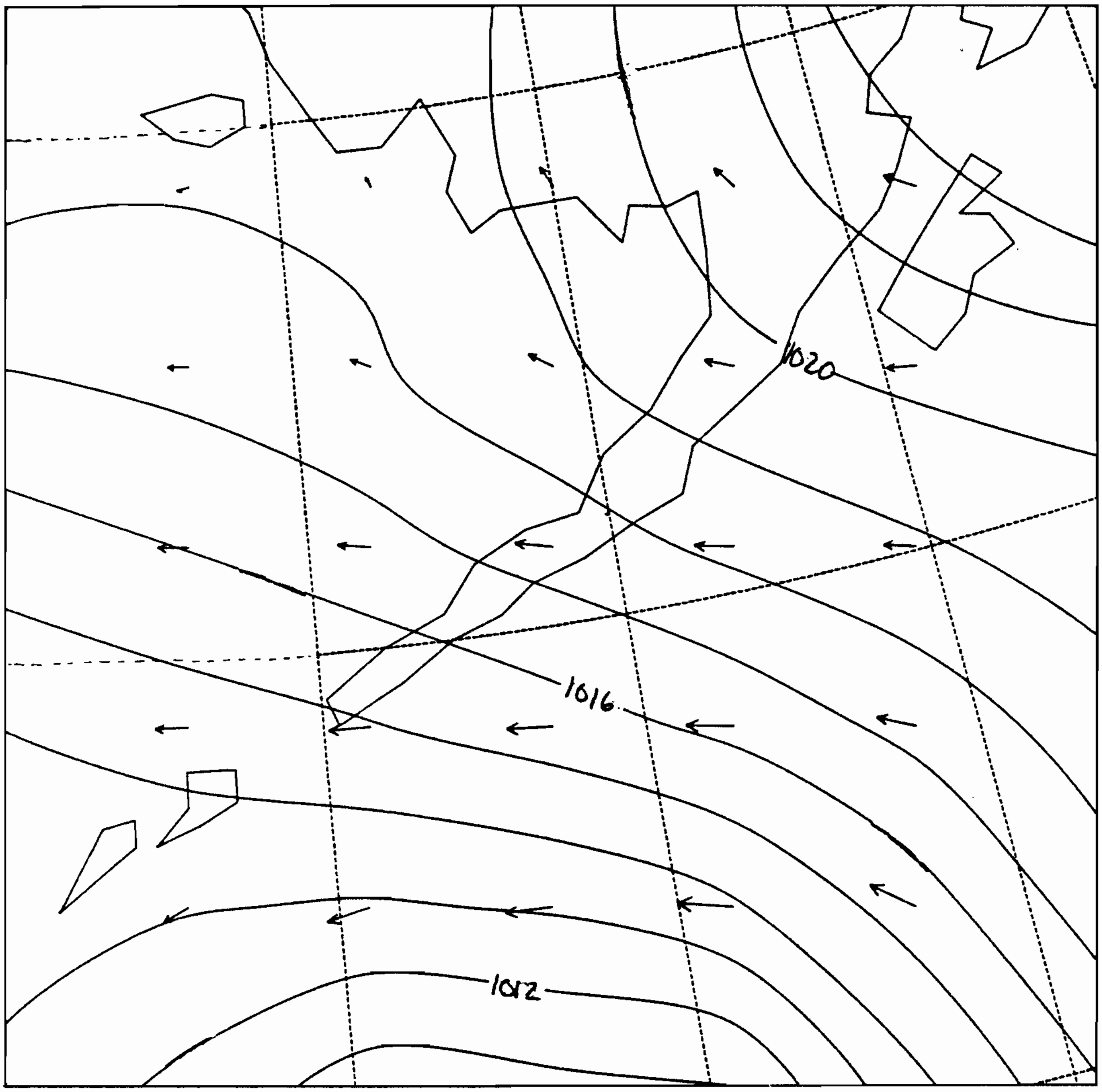


Figure 7.--The 4 × 4 sea-level-pressure grid (shaded area) used in creating METLIB-II wind estimates.



00 GMT 18 JUNE 1984

Figure 8.--Sample sea-level-pressure and surface-wind fields produced by METLIB-II from a digitized sea-level-pressure analysis.

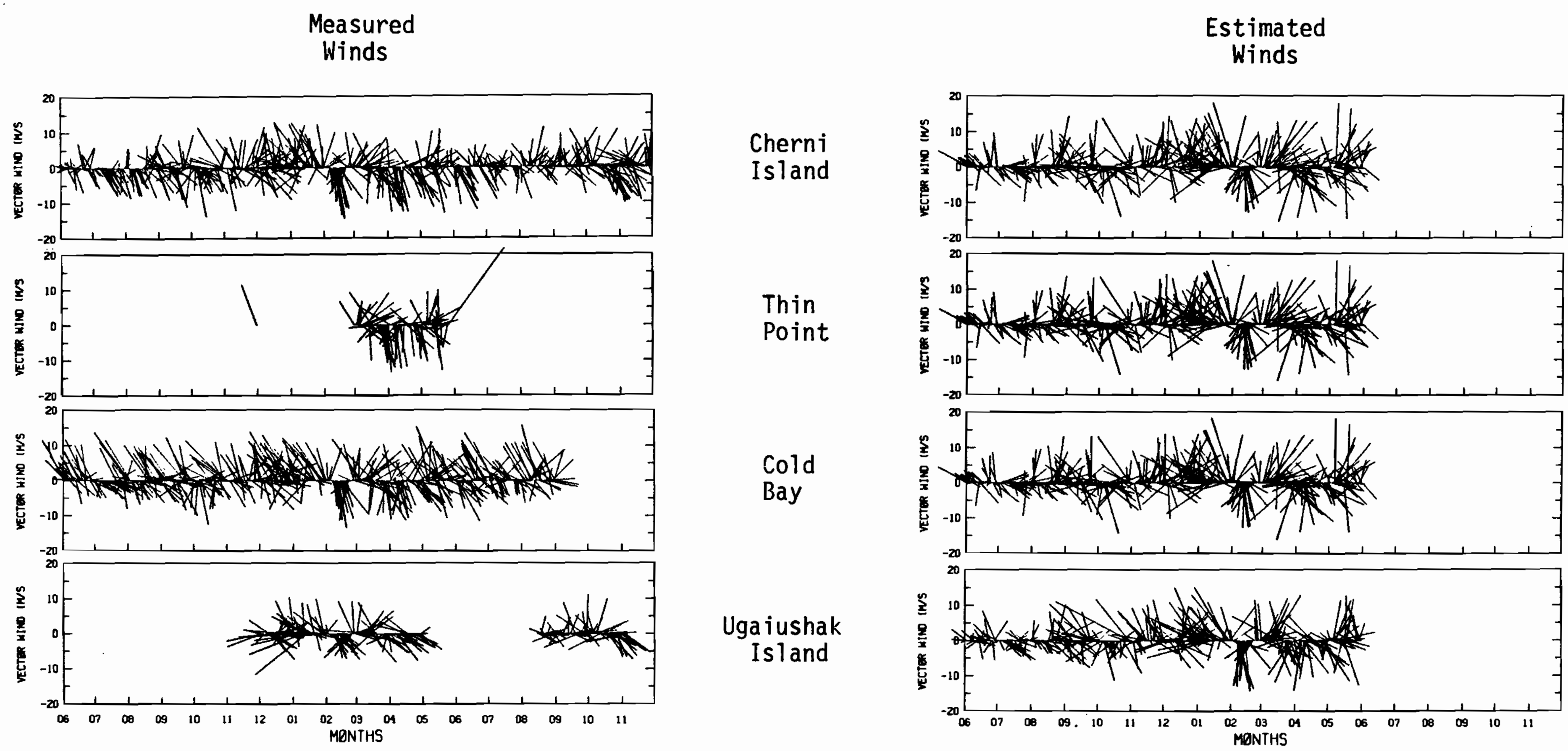


Figure 9.--Vector plots of daily measured and estimated wind vectors for Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island from June 1984 through November 1985. Blank areas indicate periods during which data were not available.

periods depending on their source. For the purposes of summary statistics and correlations, an averaging period of one year - 1 June 1984 through 31 May 1985 - was selected. In the remainder of this report, this is called the "year-period". During the year-period, hourly measured winds are nearly continuous for Cherni Island and Cold Bay; however, the Thin Point and Ugaiushak Island data sets are incomplete. Wind estimates for all four locations are continuous during the year-period. Besides the year-period, monthly statistics and correlations, when available, are also presented in this report, even though they pertain to times outside the year-period.

In correlating winds from the eight sources, eastward (u) and northward (v) components were compared. The magnitude of the correlations between similar components of measured and estimated winds will indicate the ability of the METLIB-II empirical wind model to reproduce actual surface winds. Only the 00, 06, 12, and 18 UT observed winds were used. Correlations were computed using the NAG library routine G02BCF. If either variable in a correlation pair had a missing value, that pair was not used in computing the covariance or correlation except for the mean of the variable that was present. That is, covariances and correlations were based on means computed from all valid data.

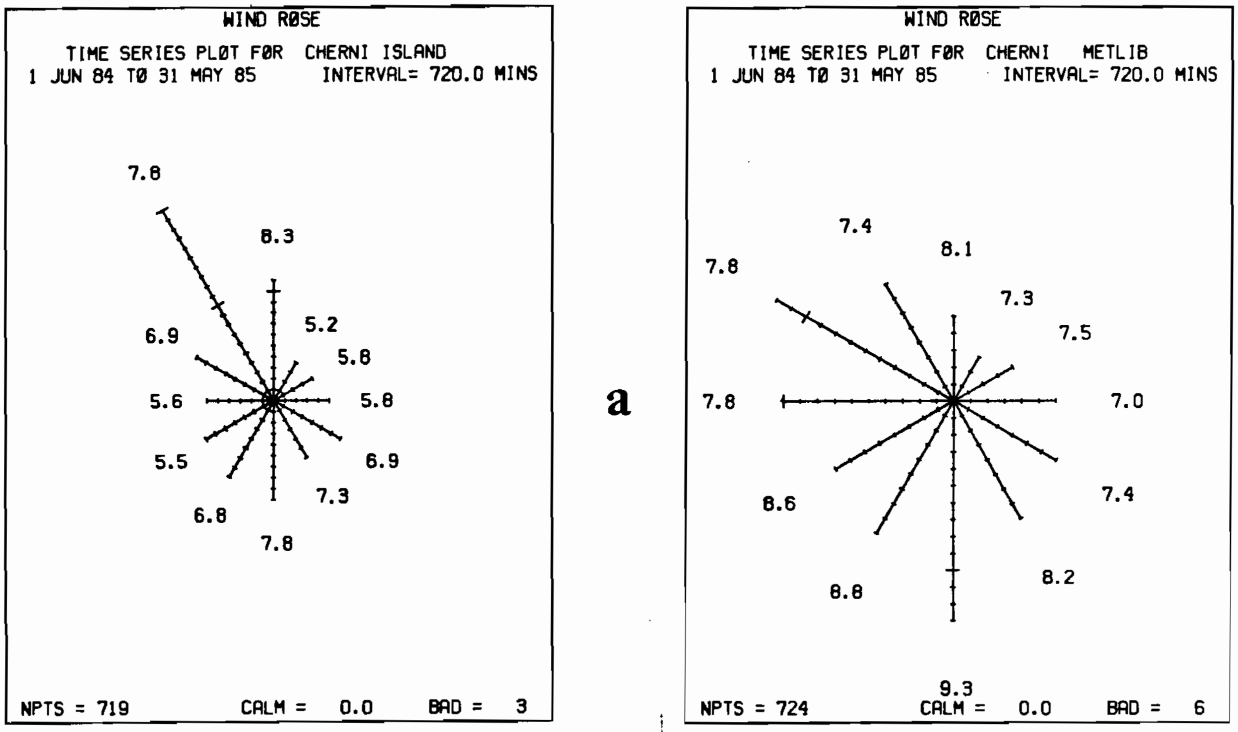
4. RESULTS

Appendix A contains monthly time series of available hourly wind speed, wind direction, air temperature, u and v wind components, vector winds, and station pressure from Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island during the period 1 June 1984 through 30 November 1985. Appendix B contains monthly time series of available six-hourly METLIB-II surface wind and pressure estimates for the same four locations during the period 1 June 1984 through 31 May 1985.

Appendices C and D are the monthly wind roses for observed and estimated winds, respectively. These wind roses display the frequency of occurrence of winds from 12 sectors of the compass and the average wind speed for each sector. Figure 10(a)-(d) contrasts average wind roses from actual observations and corresponding METLIB-II estimates over the year-period at each site.

Table 2 shows wind rose statistics on measurements from the four locations in the eight-point compass format used by Brower *et al.* Entries for January, April, July, and October are from 1985 for January and April and from 1984 for July and October. Thin Point and Ugaiushak Island statistics are incomplete.

Finally, Table 3(a)-(d) lists monthly and year-period statistics of 1) scalar averages of hourly observed data, 2) vector averages of six-hourly observed data, and 3) correlations of six-hourly observed u- and v-component winds with their corresponding estimated wind components. Complete correlations and cross correlations for all eight wind sources are listed in Appendix E.



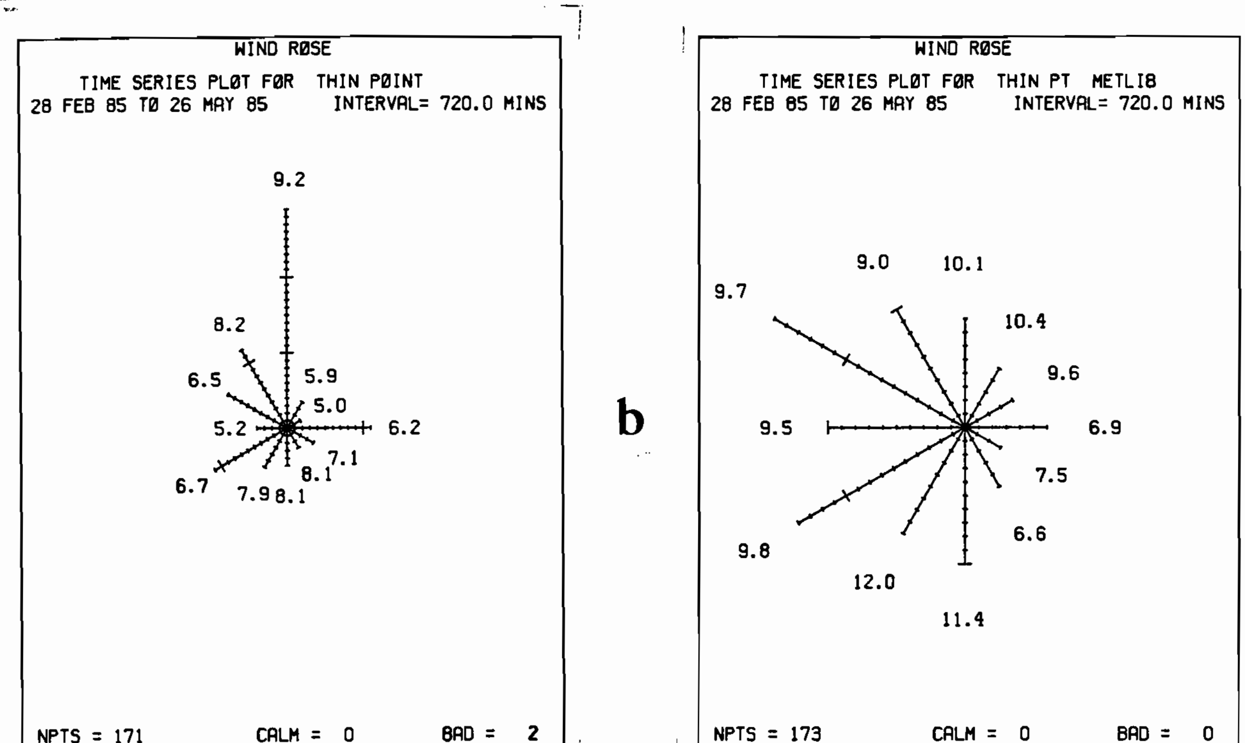
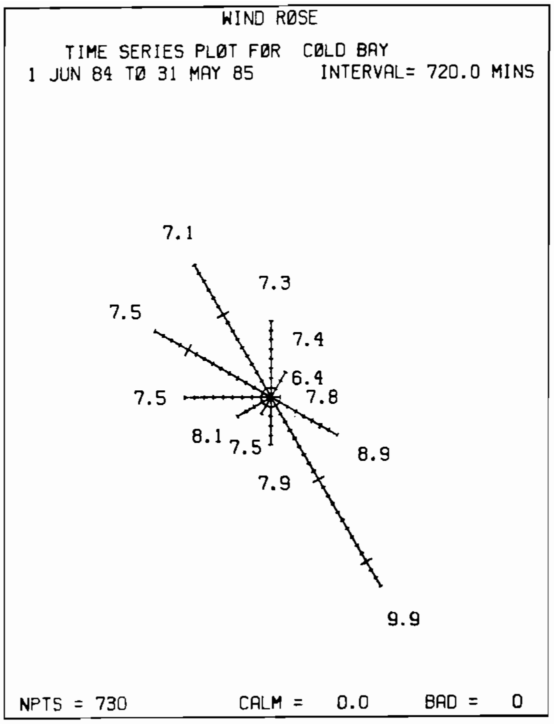


Figure 10.--Wind roses constructed from all available measured and estimated winds during June 1984 through May 1985 for (a) Cherni Island, (b) Thin Point, (c) Cold Bay, and (d) Ugaiushak Island.



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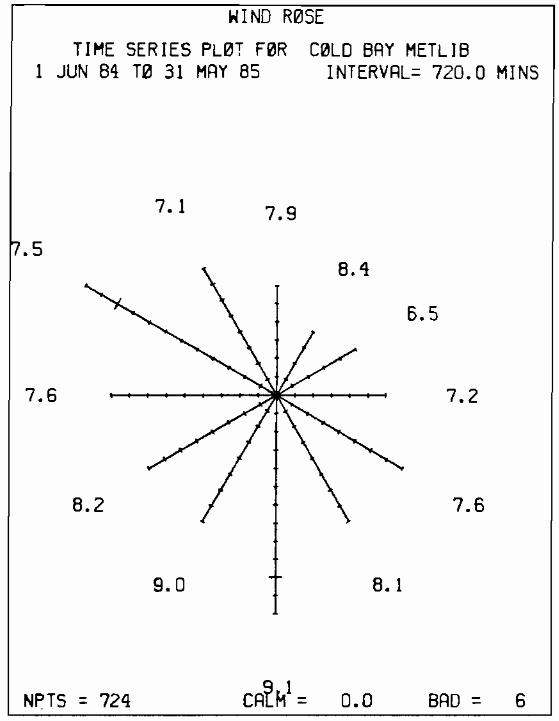

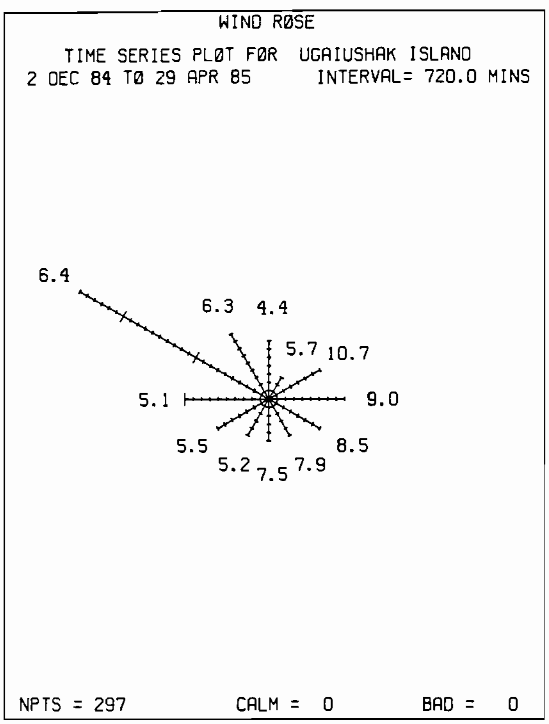

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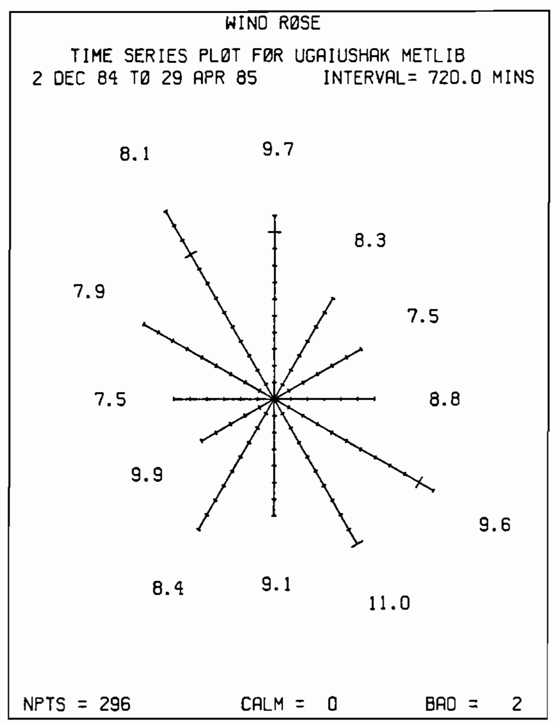

Figure 10.--(Continued).

Table 2.--Summaries of available wind measurements from Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island during July and October 1984 and January and April 1985. Entries give wind direction frequency in percent; speed in m s^{-1}.

	Cherni Island				Thin Point	Cold Bay				Ugaiushak Island	
	Jan	Apr	Jul	Oct	Apr	Jan	Apr	Jul	Oct	Jan	Apr
N	7	38	25	25	58	5	27	10	24	5	5
NE	7	3	3	12	1	3	2	0	3	13	5
E	14	3	4	15	9	13	3	1	6	22	5
SE	27	8	2	9	3	43	12	10	19	23	4
S	28	6	4	3	6	19	7	6	4	14	1
SW	11	8	8	3	7	2	3	0	7	7	4
W	1	7	16	10	8	7	8	40	15	11	22
NW	5	27	38	23	11	4	36	31	22	4	54
CALM	0	0	0	0	0	4	2	2	0	1	0
scalar mean wind speed	8.5	8.1	5.1	7.1	7.6	8.7	8.4	6.8	7.6	8.7	6.2
vector mean wind	SSE 5.4	NNW 5.2	NNW 3.9	N 2.7	N 5.0	SSE 6.0	NNW 4.1	WNW 4.2	N 1.0	E 4.8	WNW 3.7
number of observations	697	705	711	710	717	744	719	744	744	560	469

Table 3a. Monthly and yearly means of Cherni Island data.

Scalar means of wind speed, wind direction, temperature, and pressure were determined from hourly observations. Vector mean wind speed and wind direction, and u- and v-component wind correlations with METLIB u- and v-components were determined from six-hourly observations.

Month	Scalar means of hourly data					Vector means of six-hourly data			Correlation with METLIB winds [95% confidence interval]			
	no. of obs	wind spd (m/s)	wind dir (^oT)	temp (^oC)	pres (mb)	no. of obs	wind spd (m/s)	wind dir (^oT)	u		v	
Jun 84	604	3.9	187	8.1	1007.5	96	0.6	092	0.775	[0.680, 0.844]	0.879	[0.824, 0.918]
Jul	711	5.1	276	9.6	1016.2	115	3.9	329	0.784	[0.702, 0.846]	0.627	[0.501, 0.727]
Aug	743	5.7	268	11.5	1014.6	119	2.5	304	0.756	[0.667, 0.824]	0.927	[0.897, 0.949]
Sep	716	5.8	196	10.4	1003.5	117	0.5	080	0.914	[0.878, 0.940]	0.904	[0.864, 0.933]
Oct	710	7.1	213	6.7	1003.9	115	2.7	360	0.910	[0.872, 0.937]	0.879	[0.829, 0.915]
Nov	711	7.8	230	5.2	992.2	119	2.1	250	0.777	[0.694, 0.840]	0.839	[0.776, 0.885]
Dec	740	8.0	210	4.6	1004.2	118	2.2	236	0.905	[0.866, 0.933]	0.877	[0.827, 0.913]
Jan 85	697	8.5	167	4.2	987.7	114	5.4	149	0.914	[0.878, 0.940]	0.864	[0.809, 0.904]
Feb	664	8.2	219	-0.1	1011.0	110	3.6	347	0.773	[0.685, 0.839]	0.922	[0.888, 0.946]
Mar	726	8.6	238	0.6	1002.4	120	3.3	310	0.830	[0.764, 0.879]	0.917	[0.883, 0.941]
Apr	705	8.1	276	-1.0	1007.9	116	5.2	333	0.750	[0.658, 0.820]	0.895	[0.852, 0.926]
May	718	6.7	227	3.2	1008.0	116	1.4	274	0.876	[0.826, 0.913]	0.938	[0.912, 0.957]
Jun 84-May 85	*719	7.0	224	5.3	1005.0	1375	1.4	315	0.852	[0.837, 0.866]	0.894	[0.883, 0.904]
Jun 85	708	6.0	241	5.6	1011.5	119	2.4	326				
Jul	732	4.2	214	9.0	1012.8	122	0.8	010				
Aug	744	5.2	224	9.7	1013.5	124	1.7	240				
Sep	715	5.7	213	9.6	1010.6	118	1.5	224				
Oct	741	7.9	256	5.4	1008.4	124	3.4	307				
Nov	720	8.2	205	4.8	1010.6	120	1.0	168				

* - scalar variables block averaged over 12 hours

Table 3b. Monthly and yearly means of Thin Point data.

Scalar means of wind speed, wind direction, temperature, and pressure were determined from hourly observations. Vector mean wind speed and wind direction, and u- and v-component wind correlations with METLIB u- and v-components were determined from six-hourly observations.

Month	Scalar means of hourly data					Vector means of six-hourly data			Correlation with METLIB winds [95% confidence interval]	
	no. of obs	wind spd (m/s)	wind dir (^{o}T)	temp (^{o}C)	pres (mb)	no. of obs	wind spd (m/s)	wind dir (^{o}T)	u	v
Nov 84	3	9.9	160	4.3	988.7	0				
Dec	744	7.4		3.7	1003.3	0				
Jan 85	704	8.3		3.4	987.0	0				
Feb	615	8.1	[1]147	-1.7	1010.6	1	2.4	159		
Mar	730	8.3	241	-0.4	1001.5	121	2.8	318	0.743 [0.651, 0.814]	0.934 [0.907, 0.954]
Apr	717	7.6	259	-2.2	1006.7	119	5.0	350	0.663 [0.548, 0.753]	0.880 [0.832, 0.915]
May	575	7.3	200	2.8	1009.4	94	0.8	291	0.837 [0.764, 0.889]	0.940 [0.911, 0.960]
Mar 85-May 85	*346	7.9	240	0.9	1002.9	335	2.8	335	0.743 [0.691, 0.787]	0.926 [0.909, 0.940]

1 - 6 observations
* - scalar variables block averaged over 12 hours from Nov 84 through May 85

Table 3c. Monthly and yearly means of Cold Bay data.

Scalar means of wind speed, wind direction, temperature, and pressure were determined from hourly observations. Vector mean wind speed and wind direction, and u- and v-component wind correlations with METLIB u- and v-components were determined from six-hourly observations.

Month	Scalar means of hourly data					Vector means of six-hourly data			Correlation with METLIB winds [95% confidence interval]			
	no. of obs	wind spd (m/s)	wind dir (°T)	temp (°C)	pres (mb)	no. of obs	wind spd (m/s)	wind dir (°T)	u		v	
Jun 84	720	7.3	181	8.0	1009.6	116	4.1	158	0.738	[0.642, 0.811]	0.753	[0.661, 0.822]
Jul	744	6.8	252	9.4	1019.2	119	4.2	290	0.710	[0.608, 0.789]	0.477	[0.325, 0.605]
Aug	744	8.2	234	11.9	1017.0	119	1.3	242	0.669	[0.556, 0.758]	0.853	[0.795, 0.896]
Sep	720	7.6	189	9.6	1006.3	117	2.3	156	0.863	[0.808, 0.903]	0.844	[0.782, 0.889]
Oct	744	7.6	201	4.9	1007.2	122	1.0	354	0.851	[0.793, 0.894]	0.868	[0.816, 0.906]
Nov	720	7.6	208	2.9	994.0	120	2.3	217	0.742	[0.649, 0.813]	0.752	[0.662, 0.821]
Dec	743	9.4	192	3.0	1005.8	118	3.5	175	0.742	[0.648, 0.814]	0.834	[0.769, 0.882]
Jan 85	744	8.7	147	2.5	990.1	124	6.0	138	0.712	[0.613, 0.789]	0.826	[0.760, 0.875]
Feb	672	8.0	198	-1.9	1013.6	111	3.2	345	0.652	[0.530, 0.748]	0.880	[0.830, 0.916]
Mar	744	9.4	211	-0.9	1005.0	124	2.9	284	0.747	[0.657, 0.816]	0.876	[0.827, 0.912]
Apr	719	8.4	248	-2.6	1010.6	120	4.1	325	0.762	[0.675, 0.828]	0.871	[0.820, 0.908]
May	743	8.7	209	3.2	1010.2	121	2.0	194	0.768	[0.683, 0.832]	0.798	[0.722, 0.855]
Jun 84- May 85	*730	8.1	218	4.2	1007.4	1431	0.9	215	0.763	[0.740, 0.783]	0.833	[0.816, 0.848]
Jun 85	720	8.0	220	5.3	1013.8	120	0.5	227				
Jul	744	6.6	207	9.9	1015.3	124	1.0	112				
Aug	744	8.5	201	10.0	1015.4	124	3.2	194				

* - scalar variables block averaged over 12 hours

Table 3d. Monthly and yearly means of Ugaiushak Island data.

Scalar means of wind speed, wind direction, temperature, and pressure were determined from hourly observations. Vector mean wind speed and wind direction, and u- and v-component wind correlations with METLIB u- and v-components were determined from six-hourly observations.

Month	Scalar means of hourly data					Vector means of six-hourly data			Correlation with METLIB winds [95% confidence interval]			
	no. of obs	wind spd (m/s)	wind dir (°T)	temp (°C)	pres (mb)	no. of obs	wind spd (m/s)	wind dir (°T)	u		v	
Dec 84	712	6.8	207	3.7	1002.7	113	0.7	271	0.887	[0.840, 0.921]	0.796	[0.717, 0.855]
Jan 85	560	8.7	147	4.2	990.7	91	4.8	102	0.884	[0.829, 0.922]	0.671	[0.540, 0.770]
Feb	535	6.3	229	-2.4	1006.2	86	2.7	329	0.611	[0.458, 0.729]	0.783	[0.685, 0.853]
Mar	590	6.3	224	[1]2.4	1001.2	93	2.0	282	0.798	[0.710, 0.862]	0.785	[0.692, 0.852]
Apr	469	6.2	261		1003.9	78	3.7	307	0.702	[0.568, 0.800]	0.729	[0.605, 0.819]
Dec 84-Apr 85	*288	6.8	216	[4]1.9	1000.5	461	0.8	330	0.840	[0.811, 0.865]	0.753	[0.711, 0.790]
Aug 85	387	4.1	212	9.8	[2]1014.8	64	1.2	267				
Sep	717	5.1	205	9.0		119	1.6	229				
Oct	741	6.5	247	2.8	[3]996.6	124	3.6	289				
Nov	103	8.1	250	-4.7	1001.8	18	3.3	351				

1 - 167 observations
2 - 275 observations
3 - 471 observations
4 - 191 observations
* - scalar variables block averaged over 12 hours

5. DISCUSSION

5.1 Climatological representativeness

Subjectively, one may judge the climatological representativeness of the data set by comparing the Cold Bay wind climatology of Table 1 with measured winds presented in Table 2. Neither the October, January, nor April Cold Bay measurements agree well with climate. Though the Cold Bay winds are confined to the expected wind channels, the direction frequencies for these three months are just the opposite of climate. July compares a little better, but is deficient in winds from the southeast. Measured winds from the other three stations are also dissimilar to Cold Bay and Marine Area A climate winds.

Although the month-to-month measured wind characteristics may not be climatologically representative, composites made from the January, April, July, and October climatologies and summaries show better agreement. The year-period tendency was for more winds from the SE than usual and less from the NW. This tendency is also illustrated by the wind rose in Figure 10(c).

The winter and spring Alaskan weather was anomalous. This was reflected in unusual behavior of the Bering Sea ice pack, changes in water properties in the Gulf of Alaska, heavy snows in the Alaskan interior, and other phenomena. Storms in the Alaska region for January and April 1985 were compared with climate storm tracks shown for the same months by Brower *et al.* Qualitative results are presented in Figure 11. January storms which normally track over the Gulf instead turned north into the Bering. This caused onshore winds and warm temperatures along the southeast Alaska Peninsula. In April, when storm activity is generally abating, a succession of storms passed along the study area into the north Gulf where they stalled. Cyclonic circulation around the stalled storms brought outbreaks of cold arctic air and offshore winds to the area.

5.2 Cherni Island winds

The wind rose produced from 6-hourly measured winds over the year-period (Fig. 10(a)) shows that the wind blew from the WNW to N 39% of the time. The remainder of the winds were nearly evenly distributed throughout the other compass sectors. The estimated wind rose in the same figure indicates the wind distribution to be expected had their been no topographical wind influences (except as topography affects the large-scale, sea-level-pressure field). Here winds might have blown from the same sector only 25% of the time.

The Cold Bay gap lies 40 km NNW of Cherni Island. Another gap, south of Cold Bay, is 40 km NW of Cherni Island. Their influence on Cherni Island's winds is indicated by the increased frequency of winds from the NW sector. The WNW to N winds that were also predicted by METLIB-II, one might assume, were large-scale, cross-axis winds focused by the gap (Fig. 2(a)); the remainder might be pressure-gradient winds (Fig. 2(b)). As the mean measured and estimated wind speeds are similar, Cherni Island is apparently far enough from the gaps that deceleration of the jet to ambient levels has occurred.

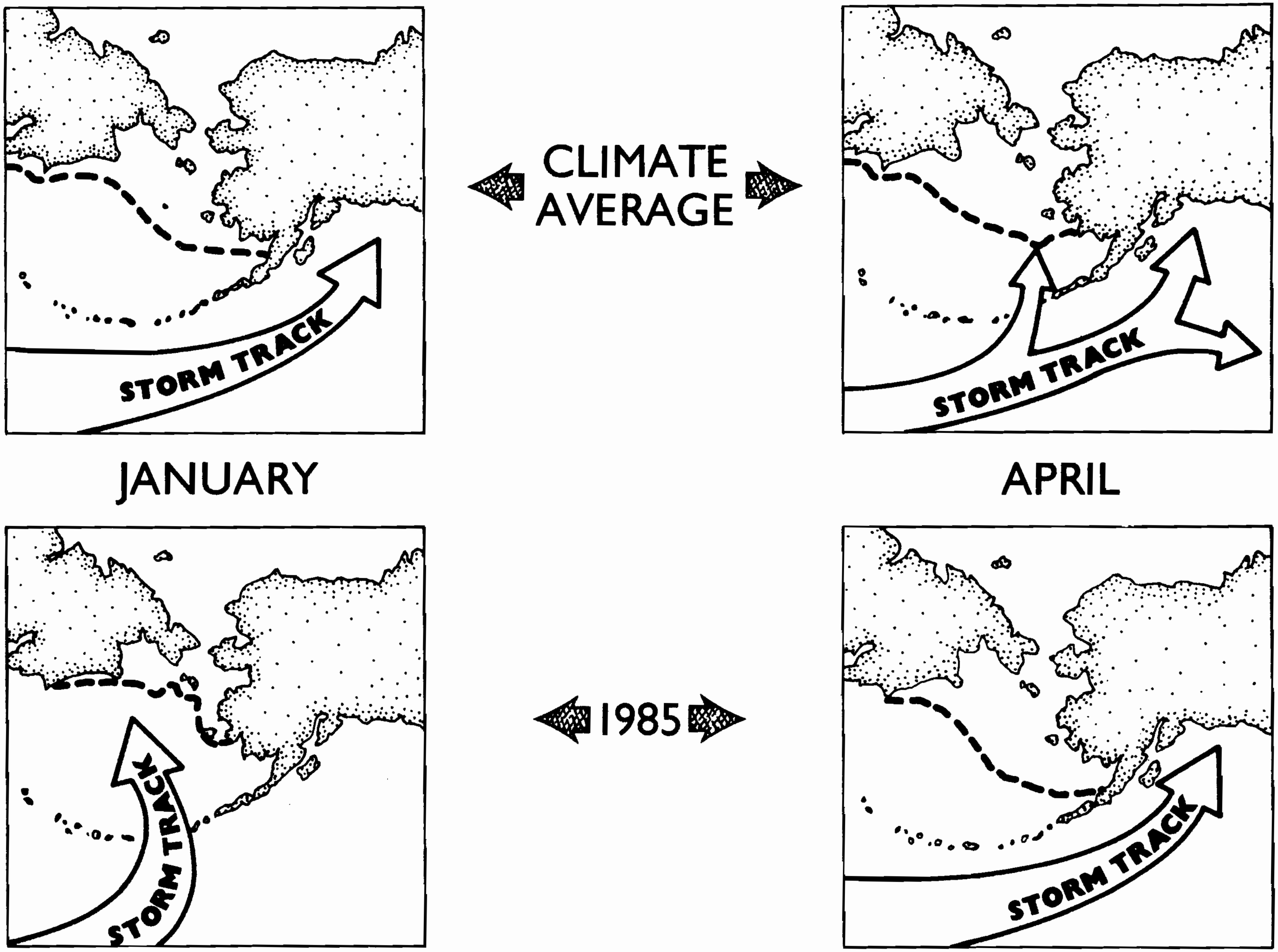

Figure 11.--Comparison of climate and 1985 storm tracks during January and April.

5.3 Thin Point winds

Winds measured at Thin Point from March through May 1985 were predominantly (44% of the time) from the N and NNW. These winds were exiting the Cold Bay gap after having been focused at the gap's western end and accelerated down the gap. Comparing monthly measured and estimated wind roses in Appendices C(2) and D(2), the same pattern emerges. As wind speeds from all compass sectors are lower that those estimated by METLIB-II, it is impossible to estimate the degree of gap-induced acceleration.

5.4 Cold Bay winds

The area just to the west of the Cold Bay weather station collects air flowing in from the west and north. As the air passes the station it is not yet channeled. Figure 10(c) shows that the winds from the west to north occurred 47% of the time during the year-period.

Winds focused by the southeast entrance to the gap near Thin Point were observed 36% of the time at Cold Bay and were mostly confined to the SSE compass sector. Comparison of measured and estimated wind speeds for the dominant sectors suggests that the winds from the SE were accelerated by the gap.

5.5 Ugaiushak Island winds

The measured wind rose in Figure 10(d) shows that at this location the favored wind direction was WNW during the period December 1984 through late April 1985. Inspecting the monthly wind roses in Appendices C(4) and D(4), it should be noted that only in January (which, recall, was an abnormal month with prevailing SE winds) did the measured wind deviate from the pattern described by the year-period rose. When the wind did blow from the WNW, its strength was less than estimated.

As mentioned in Section 2, Ugaiushak Island was thought to be protected from gap winds by the blocking mountain range to the west. In fact, it was expected that the prevailing winds would parallel the coast, as suggested by Figure 1 and documented by Reynolds *et al.* and Appendix F to this report. Thus the great frequency of winds from the WNW was startling. Two explanations come to mind. Figure 6 shows a small valley on the Peninsula directly WNW of Ugaiushak Island. In a convoluted manner, this valley connects with the Meshik River gap. Some air flowing eastward through that gap might follow the convoluted valley, then blow out over Ugaiushak Island. The fact that the wind speed was lower than estimated may be attributed to the twisted path the air followed. Alternately, a large-scale, cross-axis wind blocked by the mountains may already have reestablished itself in the lee of the mountains shoreward of the Island. This mechanism could also account for the reduced wind speeds.

5.6 Correlation of measured and estimated winds

Some differences in wind speed and direction between measured and estimated winds for the four sites have already been mentioned in this section. In general, the estimated wind roses show more evenly distributed wind-direction frequencies. Visual inspection shows that the major wind-direction axes for measured and estimated winds are often similar. This suggests two things: the METLIB-II wind estimates are accurate, and there are preferred large-scale wind directions along the coast.

Table 3 shows the correlation coefficients for the measured and estimated u wind components and for the measured and estimated v wind components. At all four stations, the coefficients indicate significant correlation between measured and estimated winds. These coefficients range from 0.48 to 0.94 with typical values between 0.70 and 0.90. In the Cold Bay gap wind system, the v-components were more correlated than the u, while at Ugaiushak Island the reverse was true.

6. SUMMARY

Coastal mountain ranges affect the nearshore wind field. Unbroken mountainous stretches tend to produce local winds blowing parallel to the range axis. Gaps in ranges, contrarily, almost always have strong winds blowing through them.

Cherni Island lies in the coastal zone about 40 km south-southeast of a gap in the Aleutian Range at Cold Bay. Winds measured at the Island tended to blow from the mountain gap. Thin Point, at the southeast end of the gap, had even more frequently prevailing gap winds from the N and NNW. At Cold Bay winds blowing to the northwest in the gap were faster than estimated by the METLIB-II wind model. Winds from the western end of the gap were not yet narrowly channeled at Cold Bay.

Ugaiushak Island to the north is probably not protected from Meshik River gap winds by the mountains west of the Island. Data indicate that the gap wind may branch, follow a convoluted path through a mountain valley, then blow out to sea over Ugaiushak Island. Observed wind speeds during these events were less than estimated.

In general, the estimated winds were able to explain 50% to 80% of the variance of the measured winds when compared component to component. V-component correlations were higher in the Cold Bay gap wind system, and u-component correlations were higher at Ugaiushak Island.

Although there were some month-to-month disagreements between Cold Bay wind climate and observations, for the year-period as a whole, the weather was probably representative of climate. The winds blew somewhat more from the SE and less from the NW than usual.

7. ACKNOWLEDGMENTS

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This paper is a contribution to the Marine Services Program and Fishery-Oceanography Coordinated Investigations (FOCI) at NOAA's Pacific Marine Environmental Laboratory.

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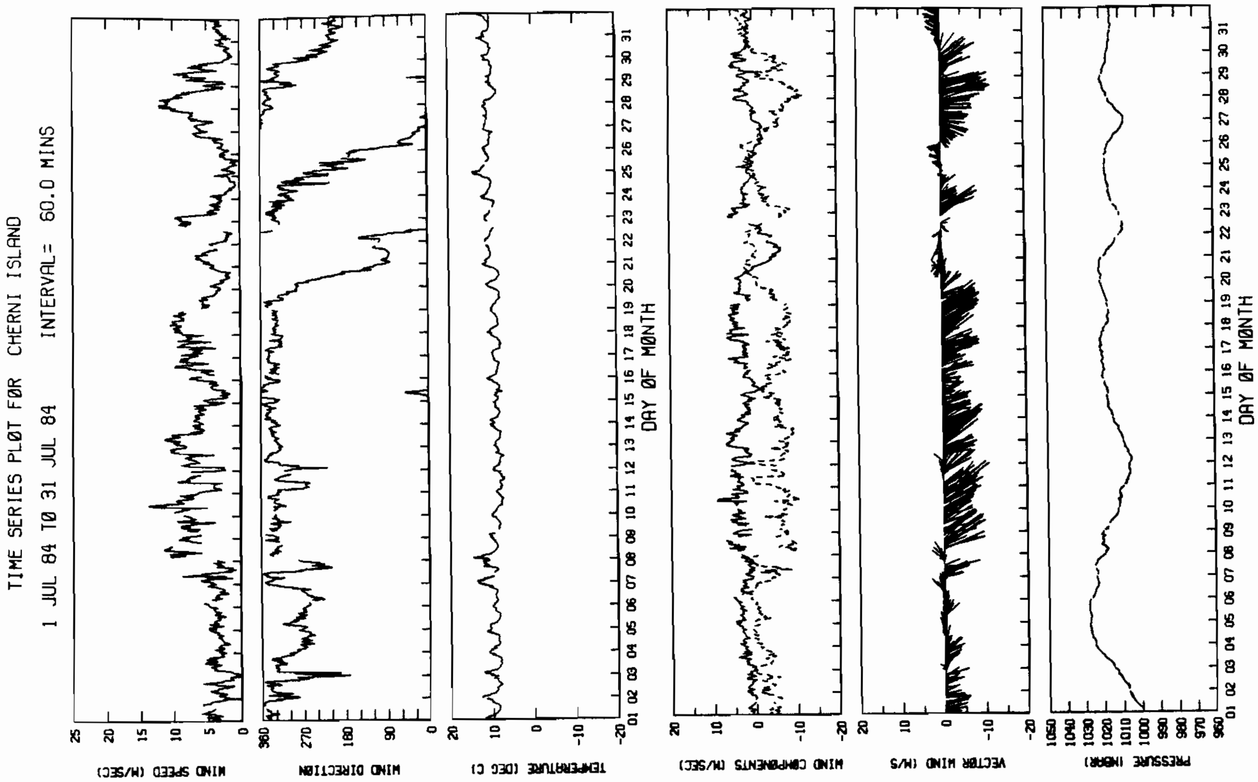
Appendix A

Monthly time series of hourly measurements of wind speed, wind direction, temperature, u and v wind components, vector winds, and barometric pressure during the period 1 June 1984 through 30 November 1985 from weather stations located at:

1. Cherni Island
2. Thin Point
3. Cold Bay
4. Ugaiushak Island

In each time series, wind direction is the direction from which the wind was blowing. Wind components and vector winds indicate the direction towards which the wind was blowing. Pressure is that observed at station elevation, except for Cold Bay's which is sea-level pressure.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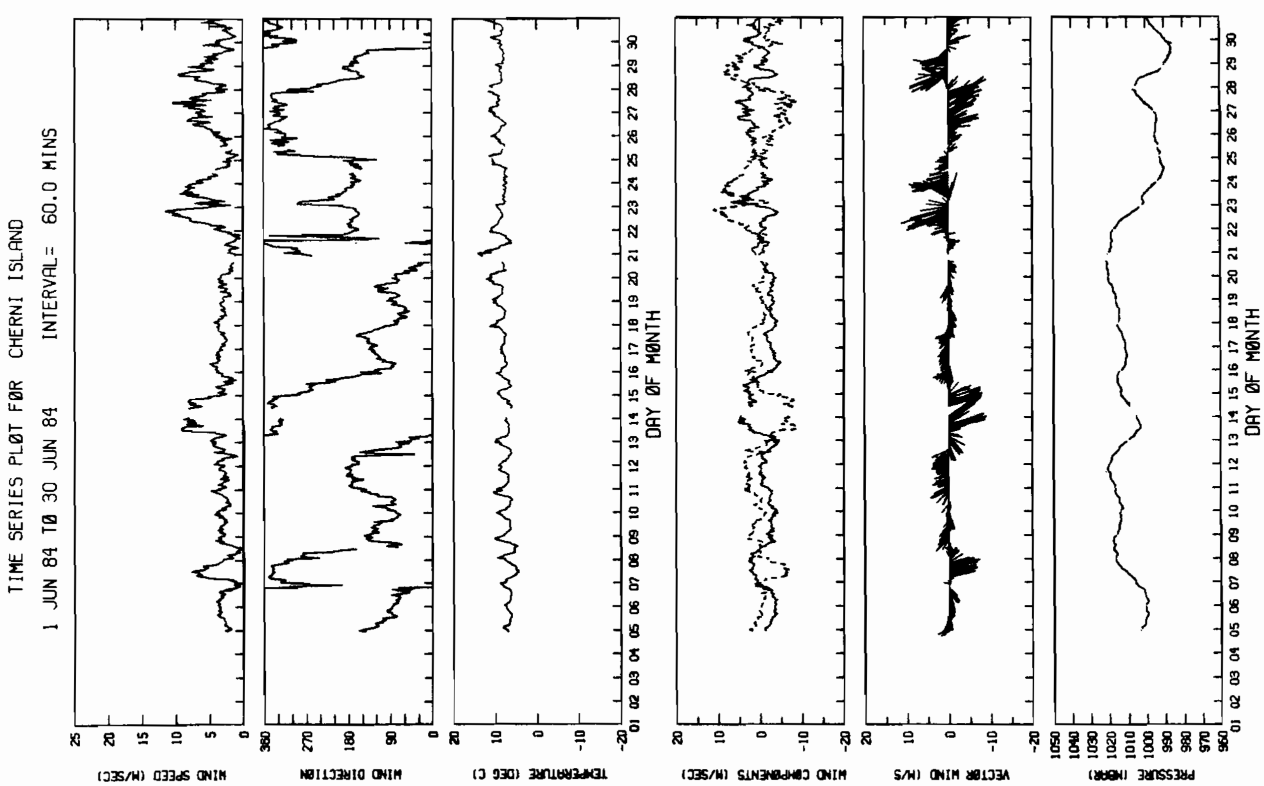
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH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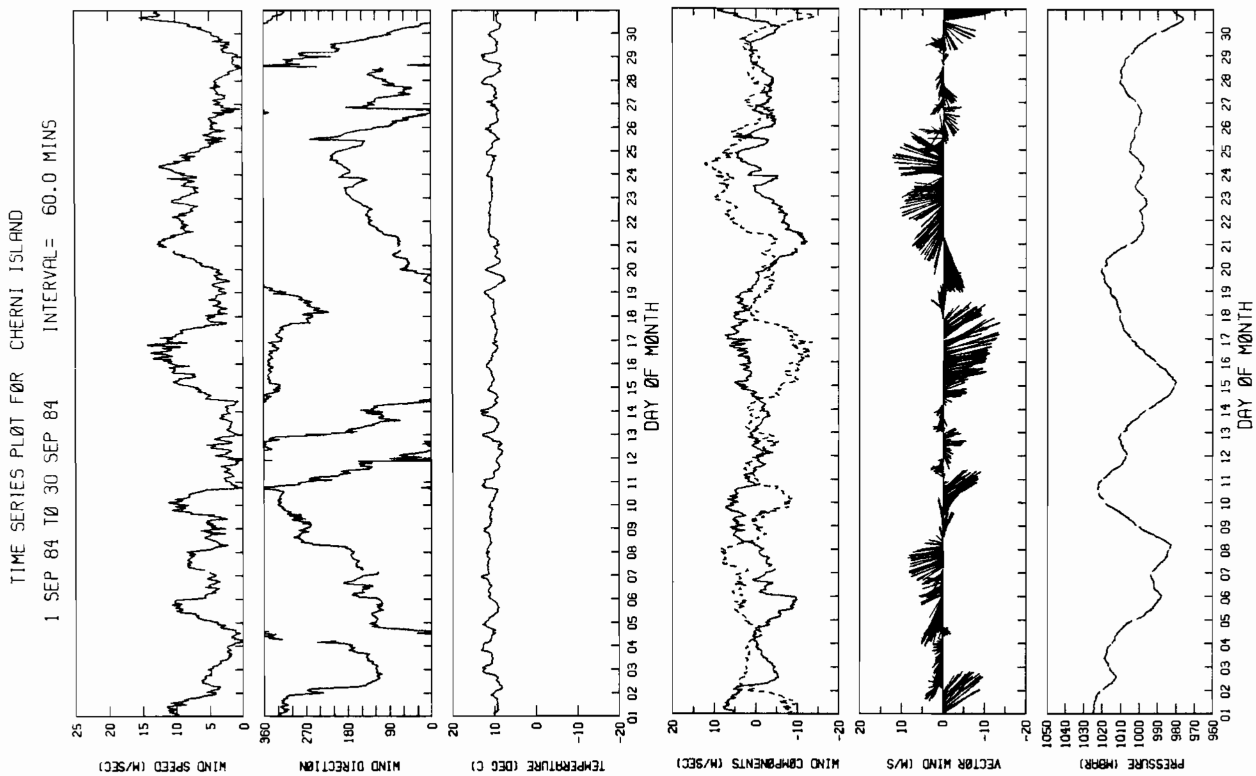
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH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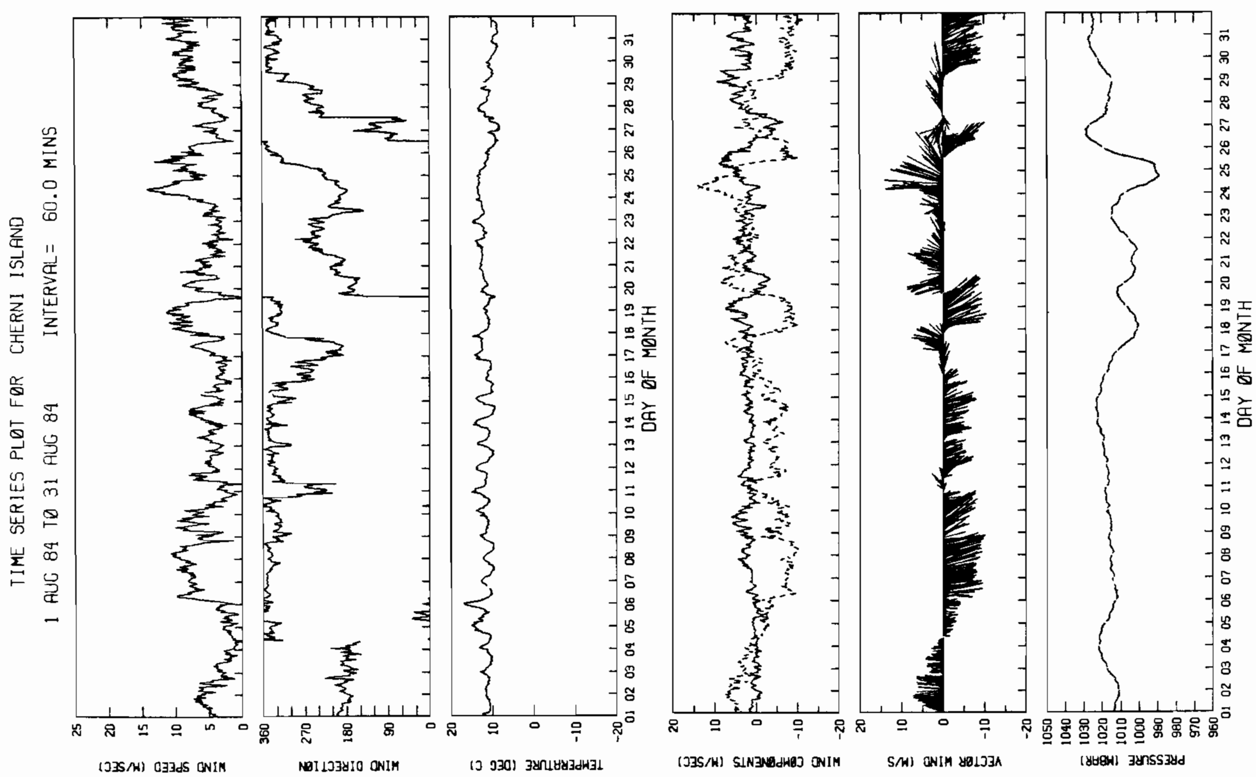
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH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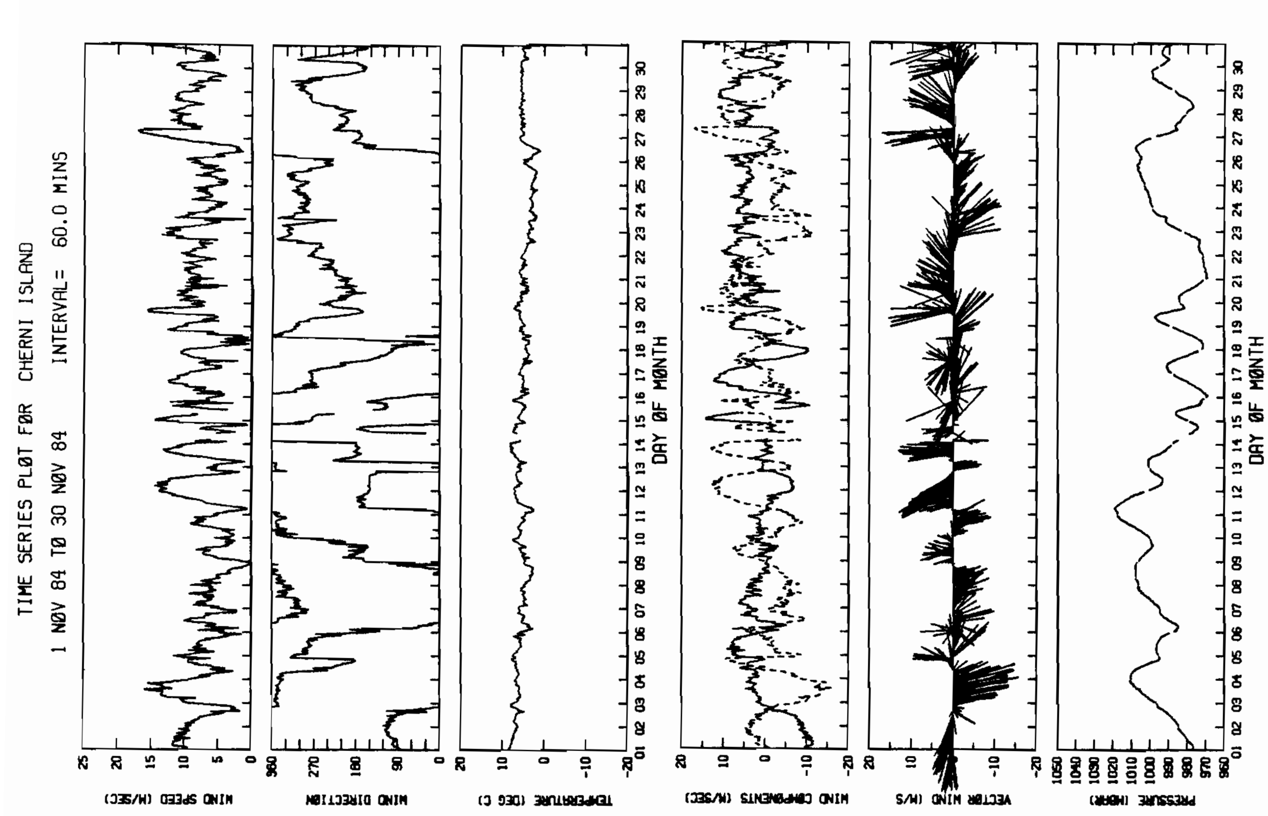
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH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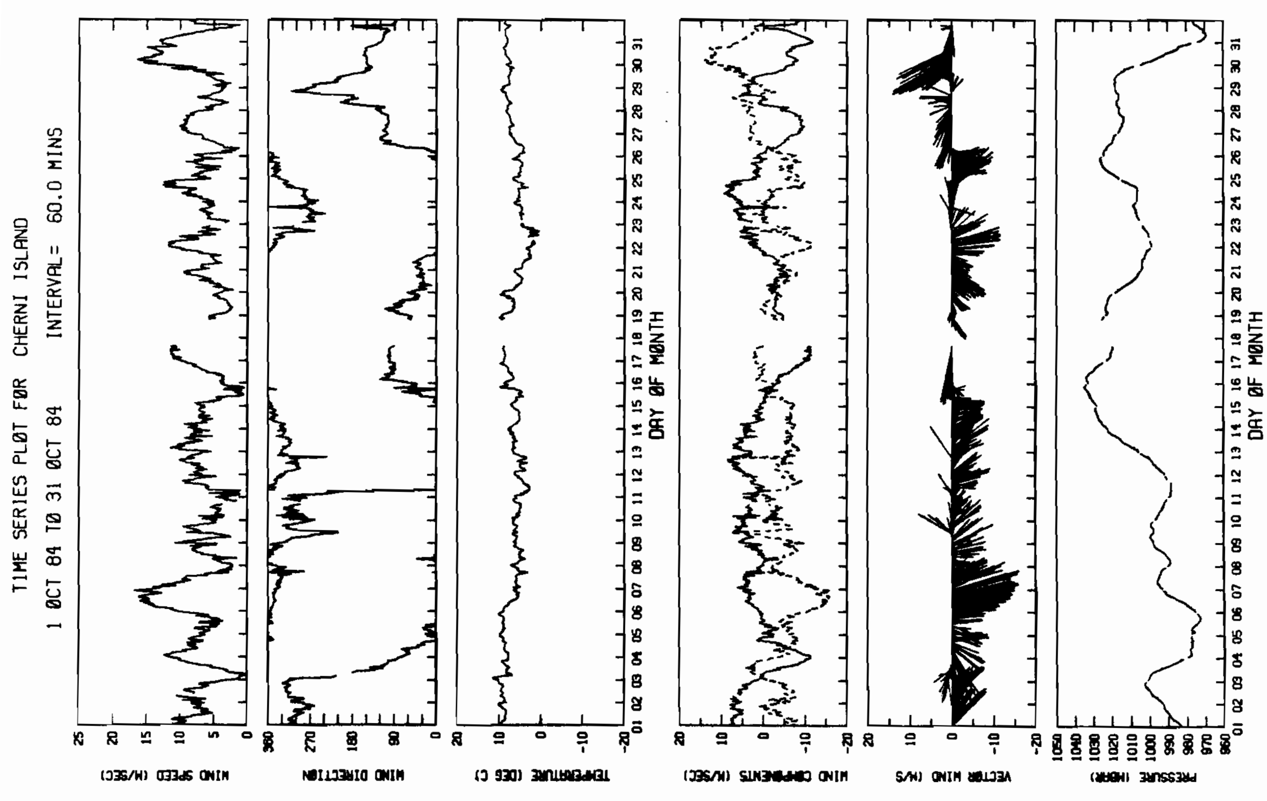
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH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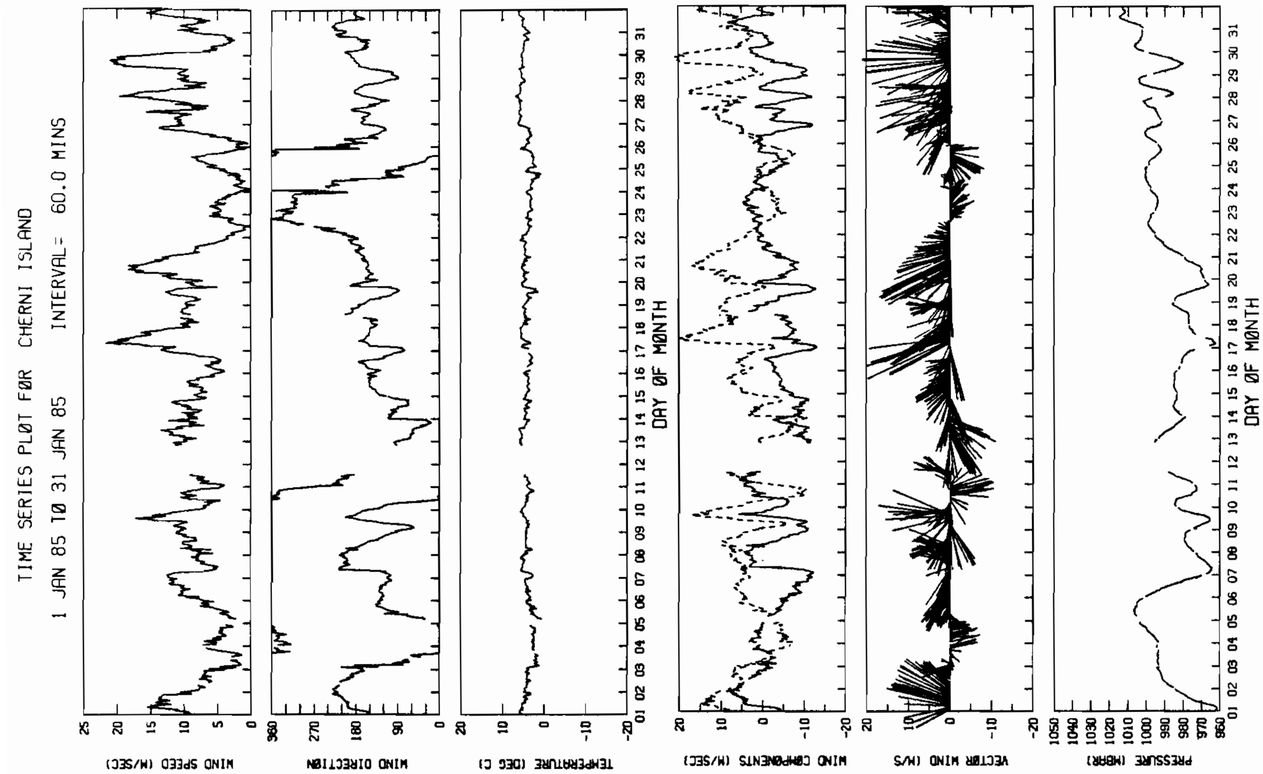
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH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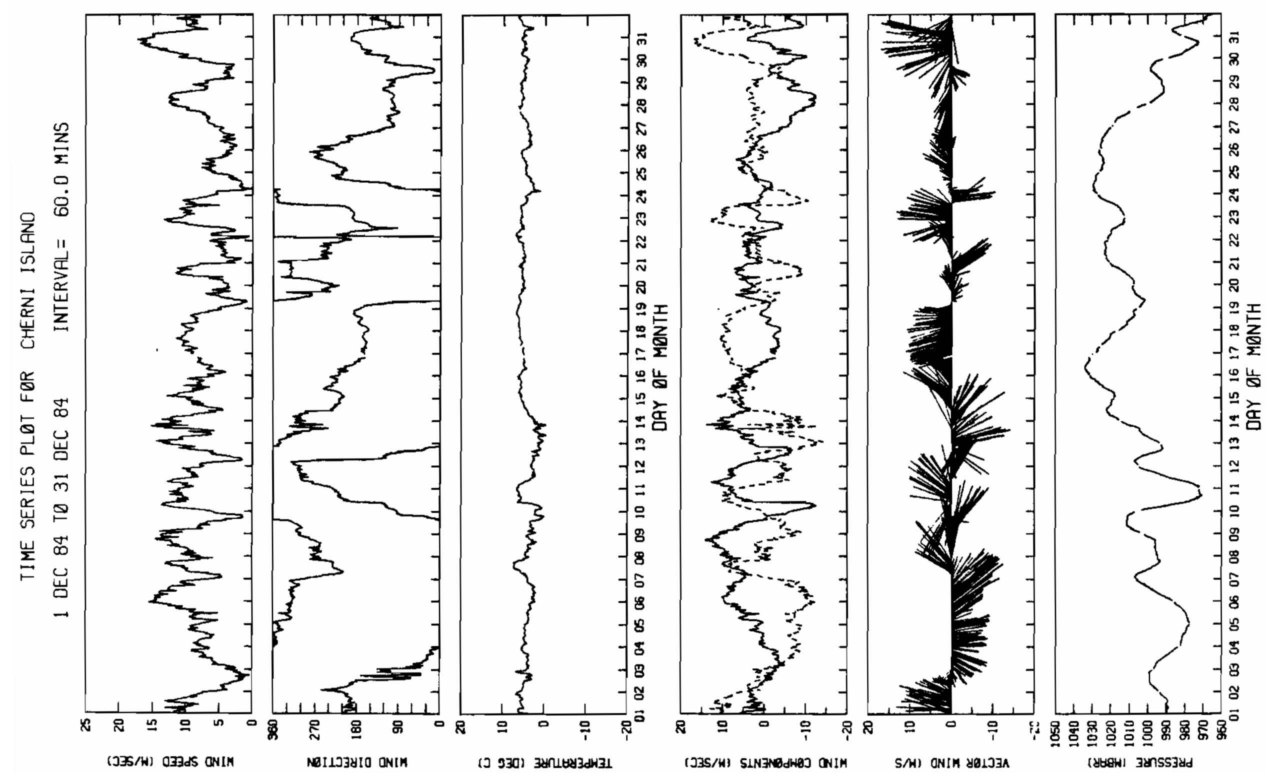
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S)
PRESSURE (MBAR)
DAY OF MONTH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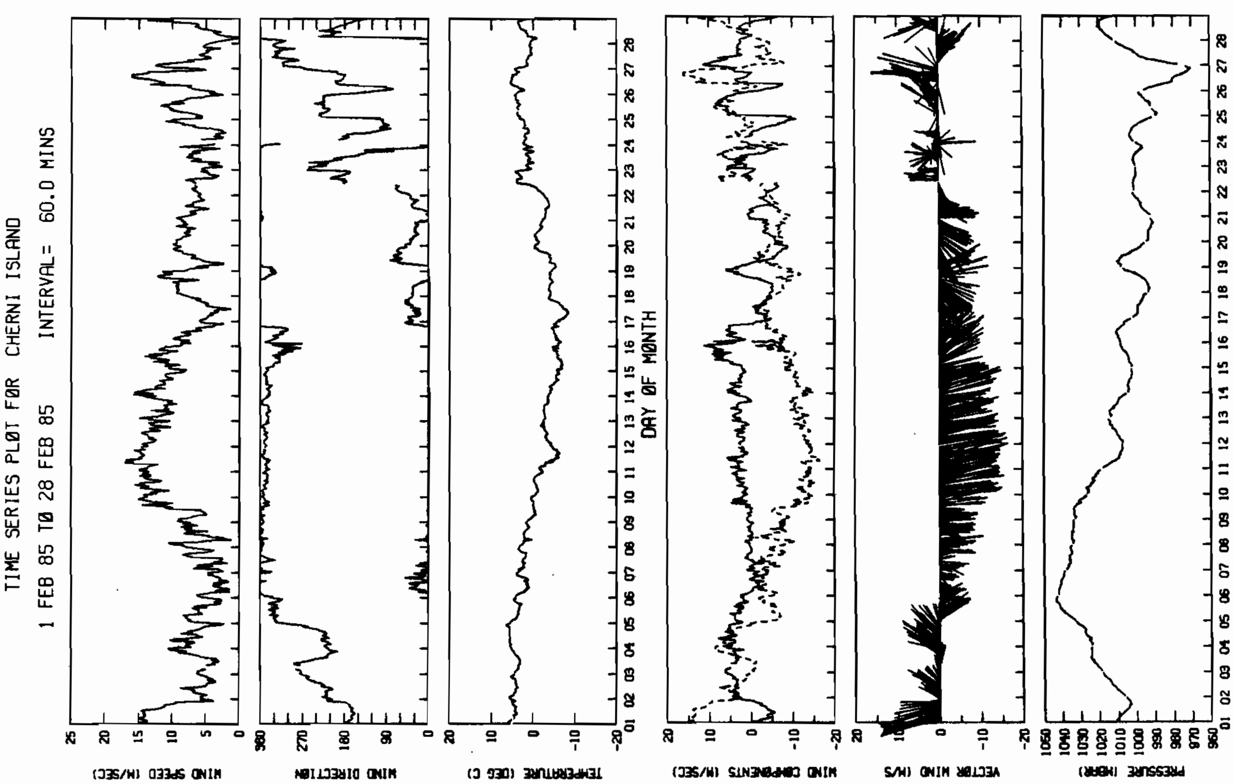
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S)
PRESSURE (MBAR)
DAY OF MONTH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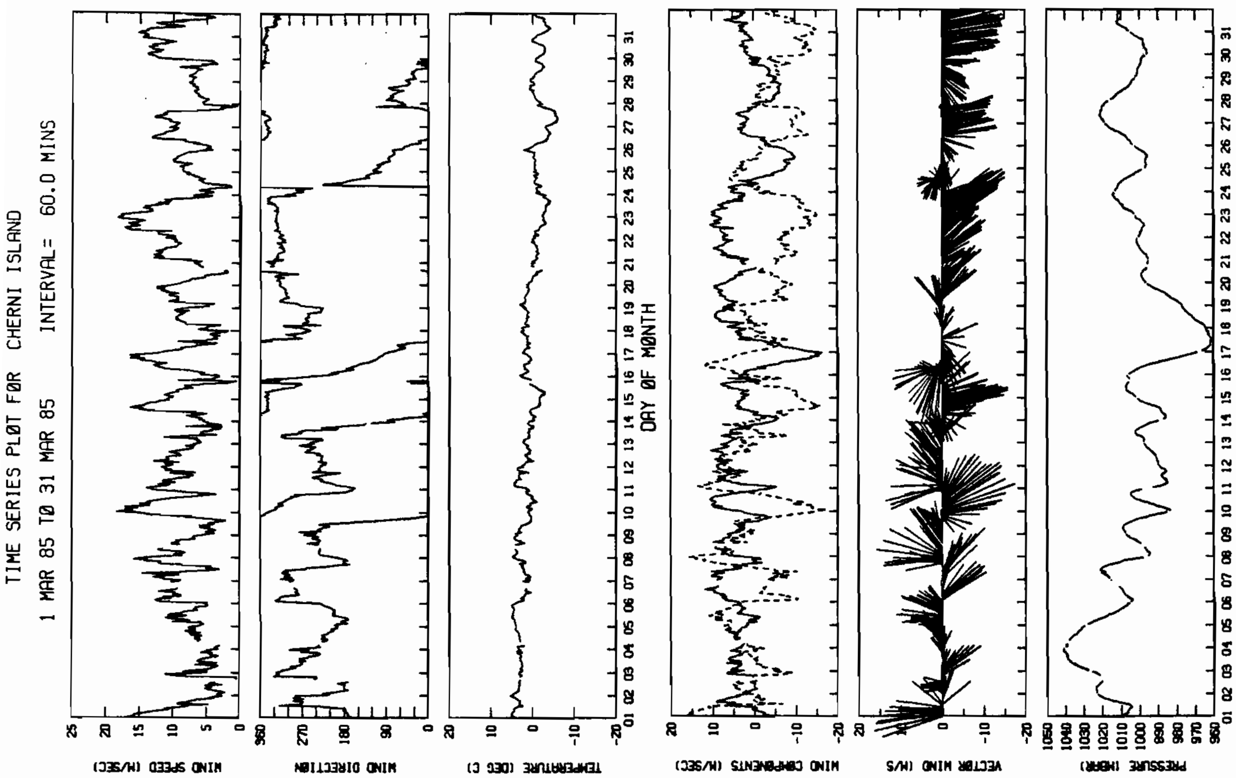
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH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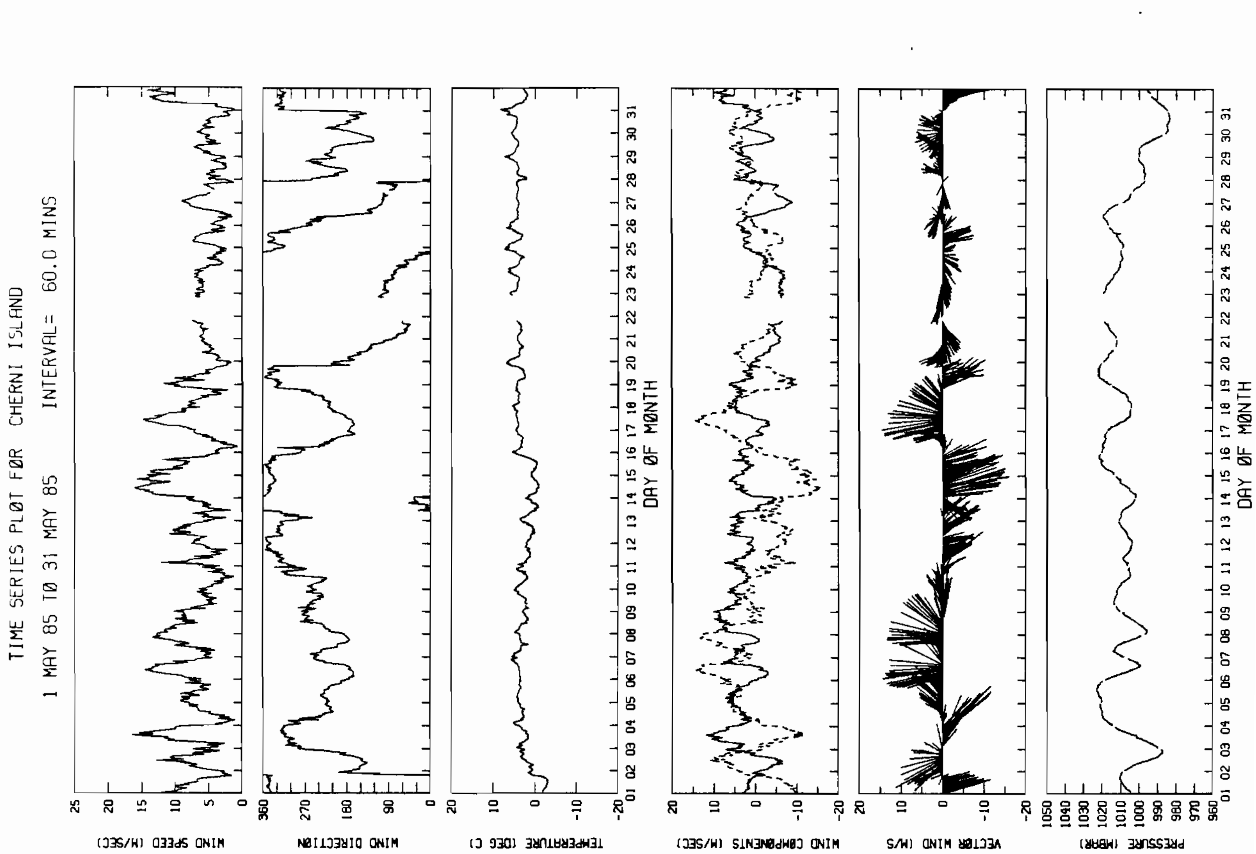
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH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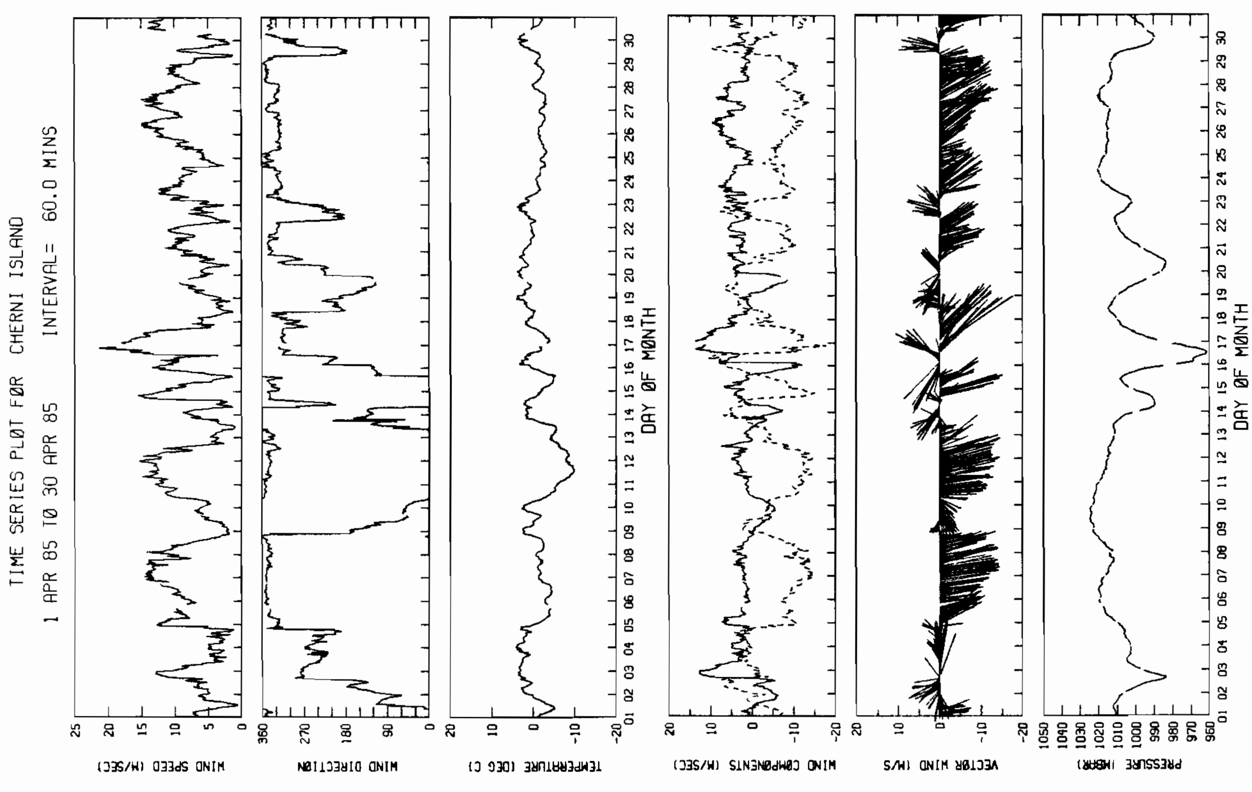
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH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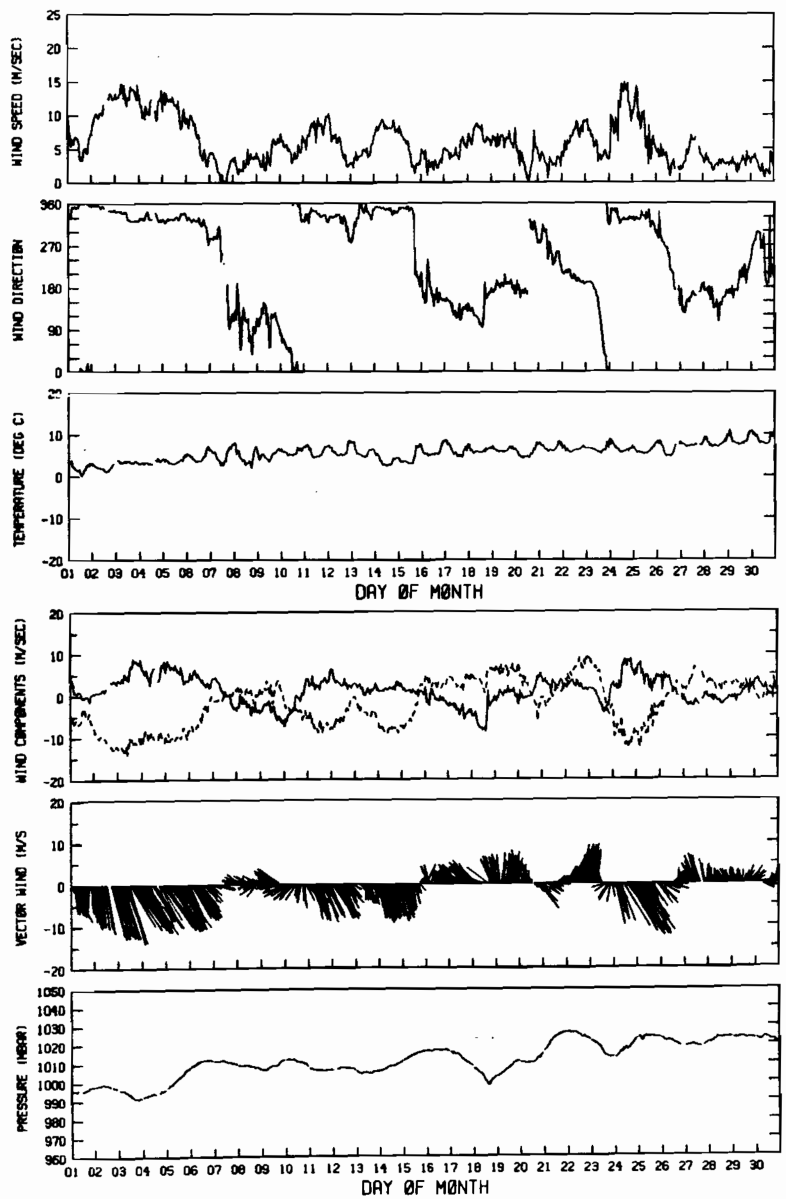
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH

TIME SERIES PLØT FØR CHERNI ISLAND

1 JUN 85 TØ 30 JUN 85 INTERVAL= 60.0 MINS



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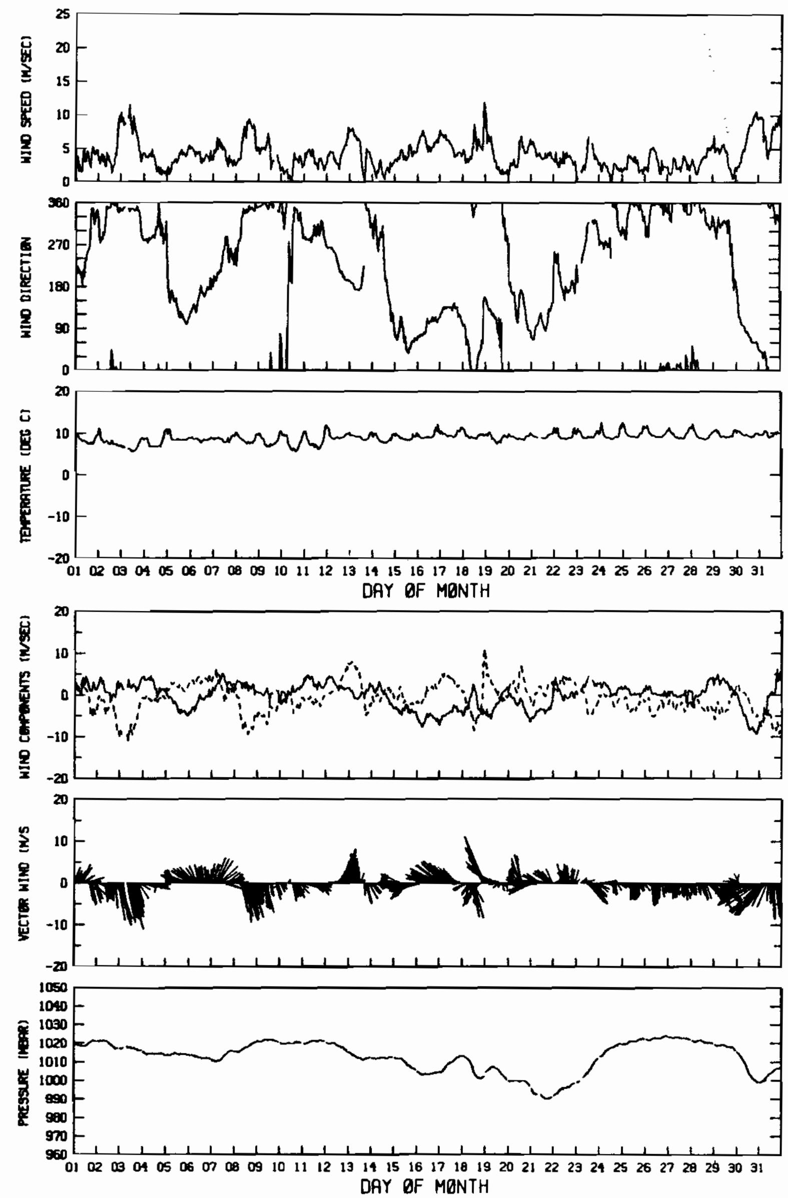
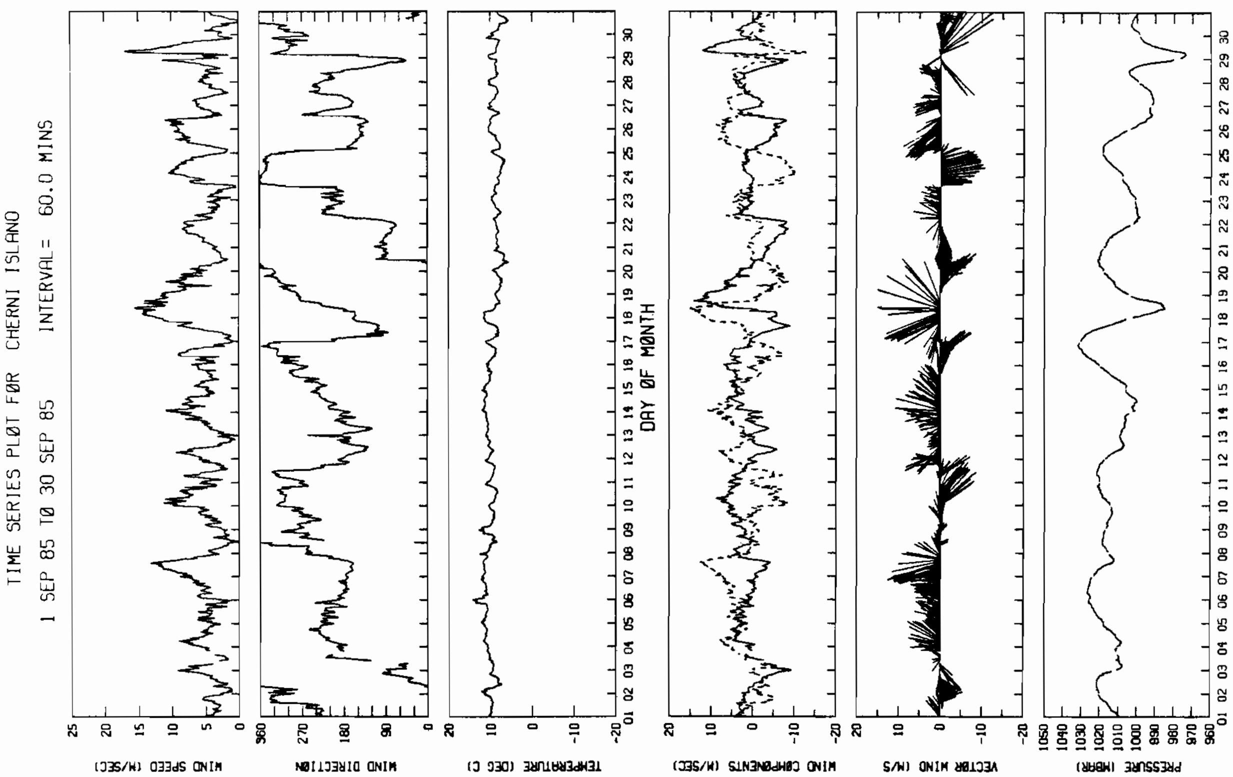
1 JUL 85 TØ 31 JUL 85 INTERVAL= 60.0 MINS

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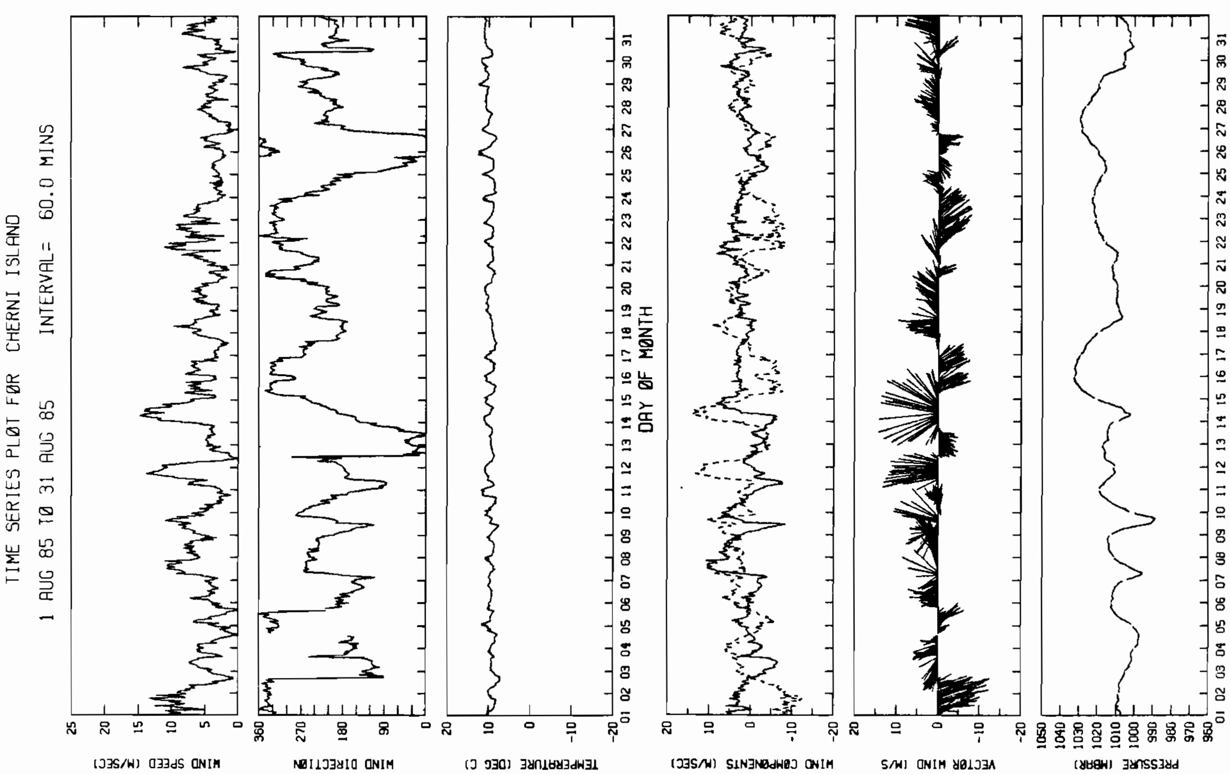
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH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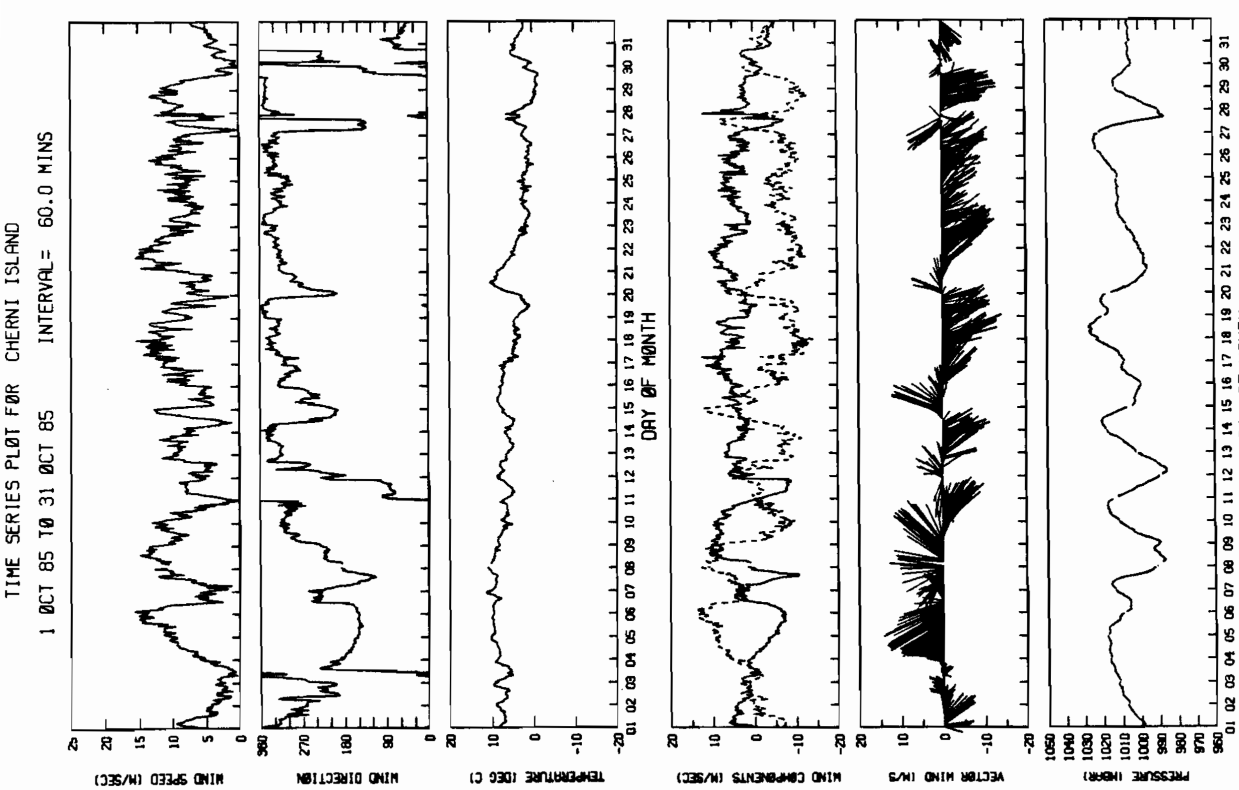
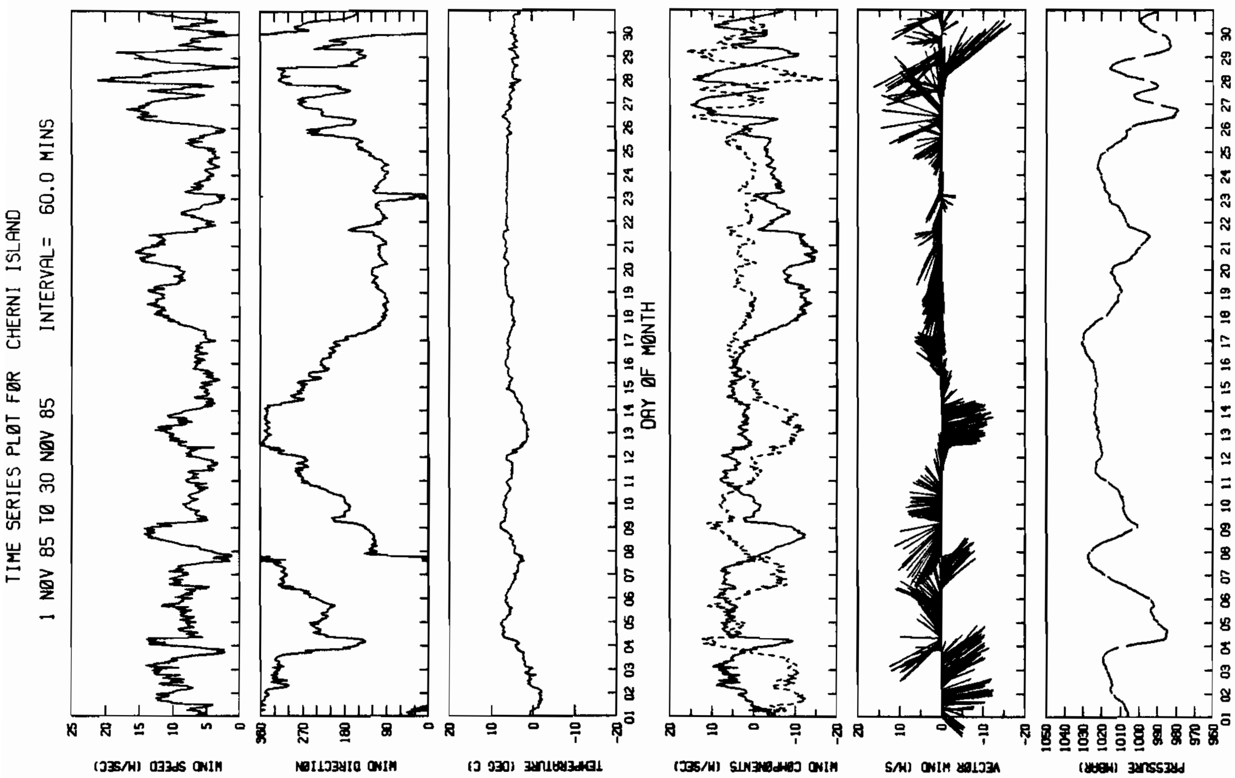
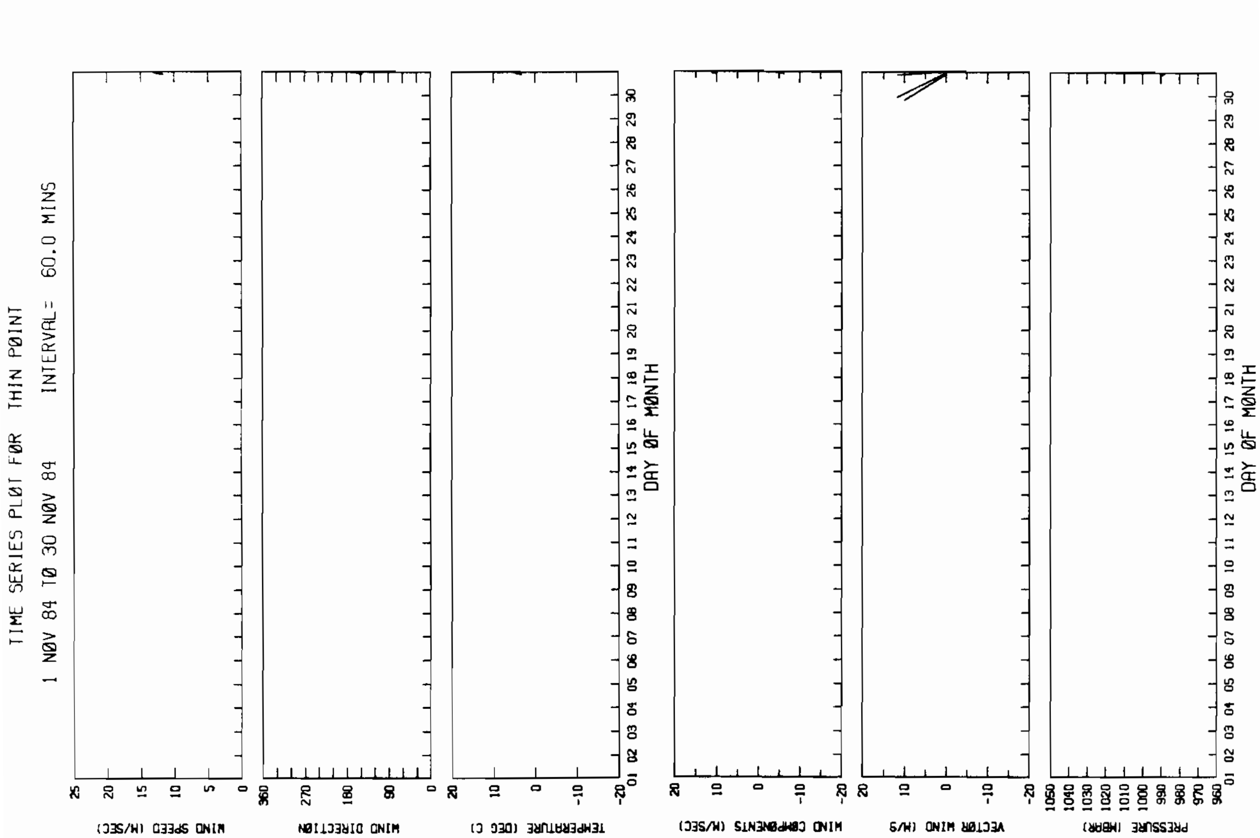
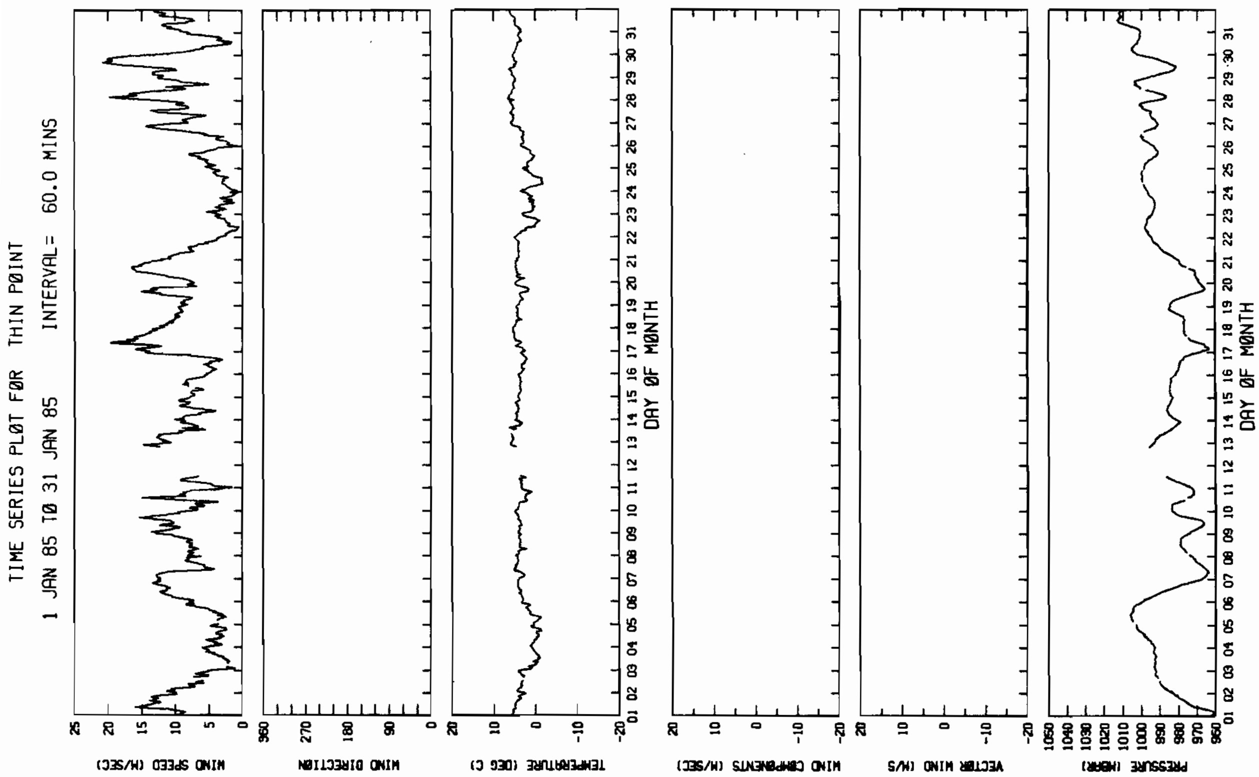
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

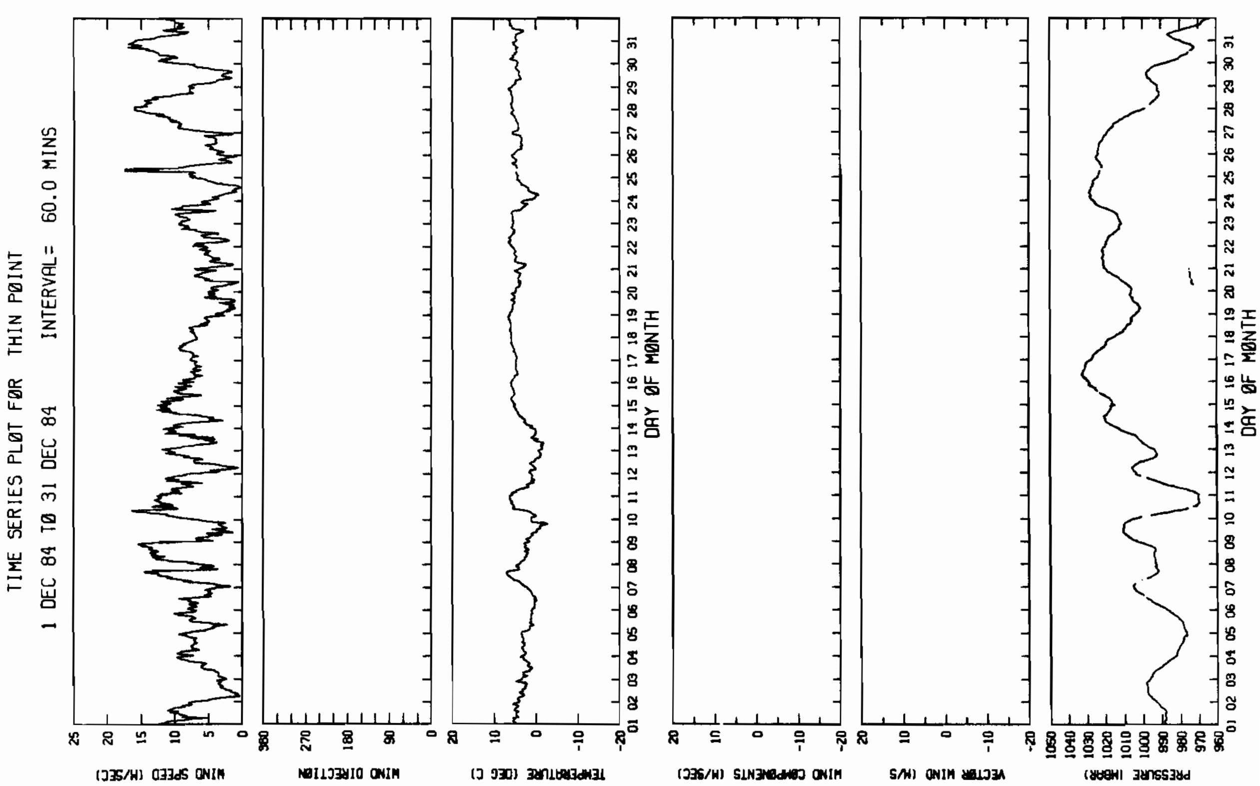

TIME SERIES PLØT FØR CHERNI ISLAND
1 ØCT 85 TØ 31 ØCT 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

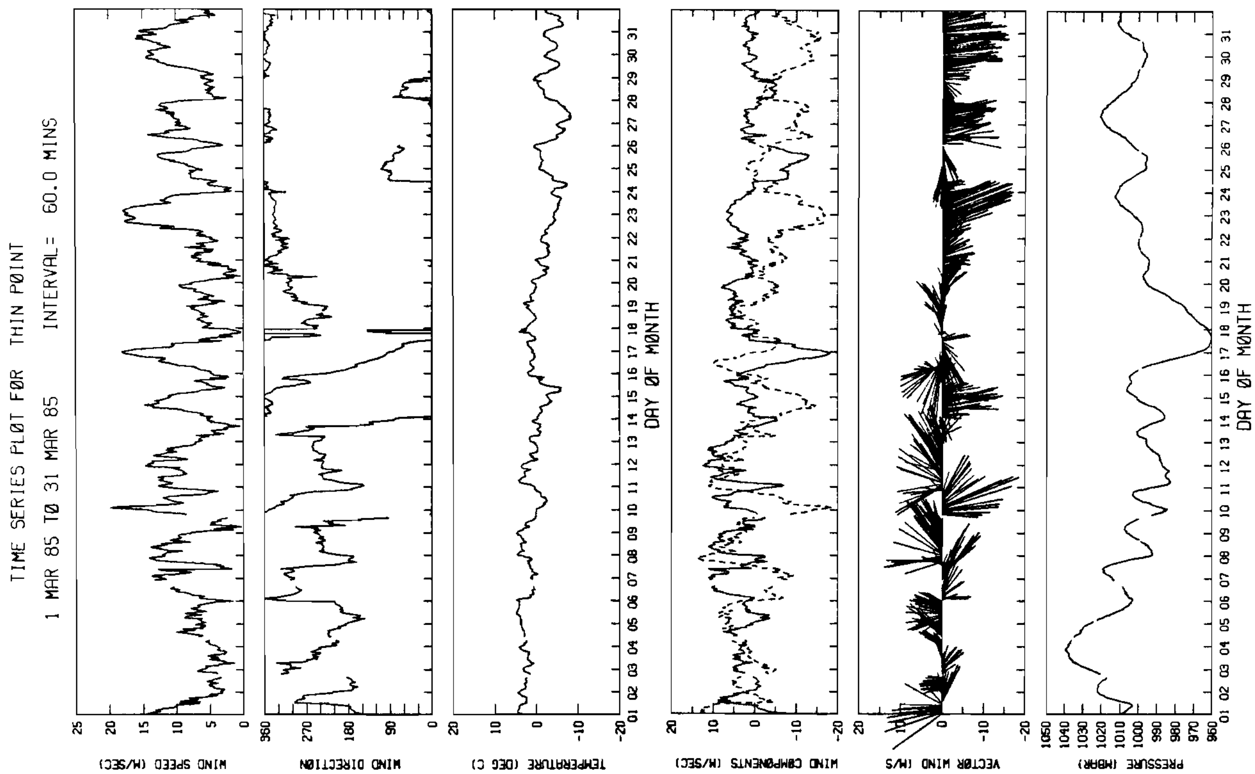

TIME SERIES PLØT FØR CHERNI ISLAND
1 NØV 85 TØ 30 NØV 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

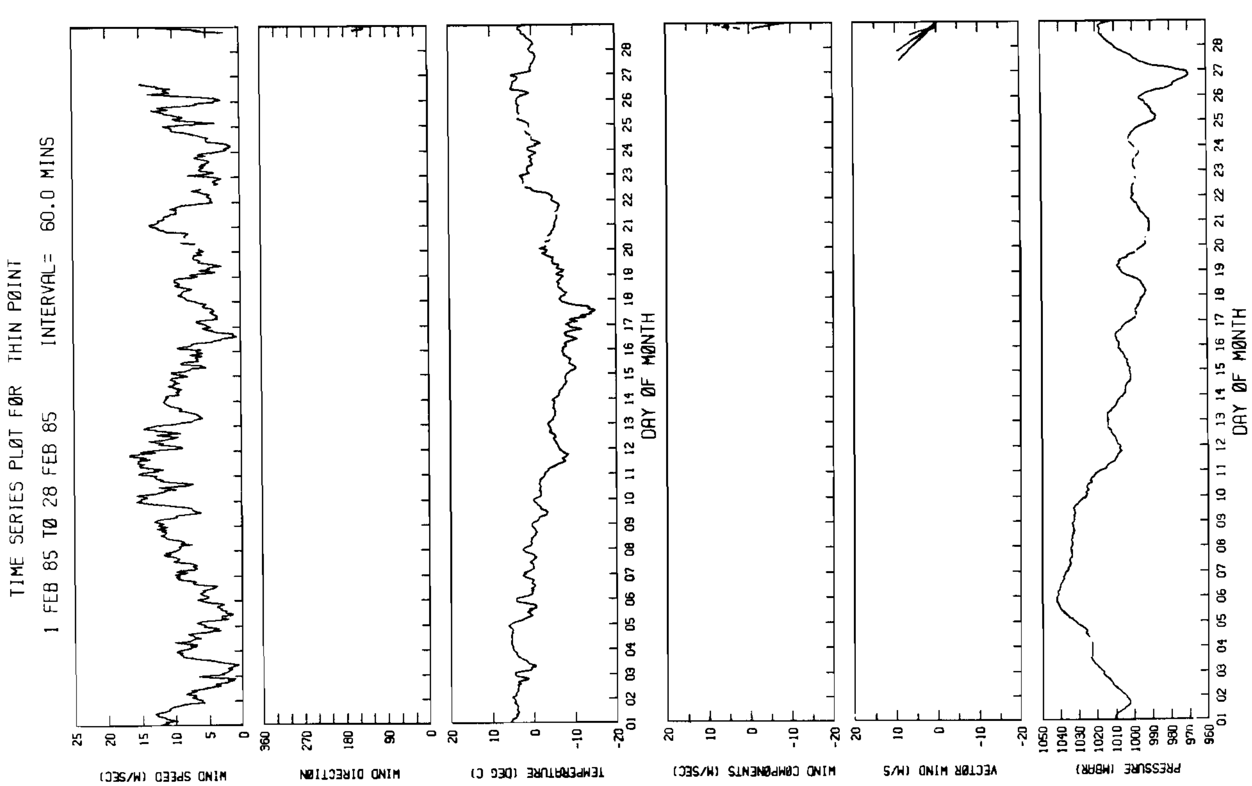


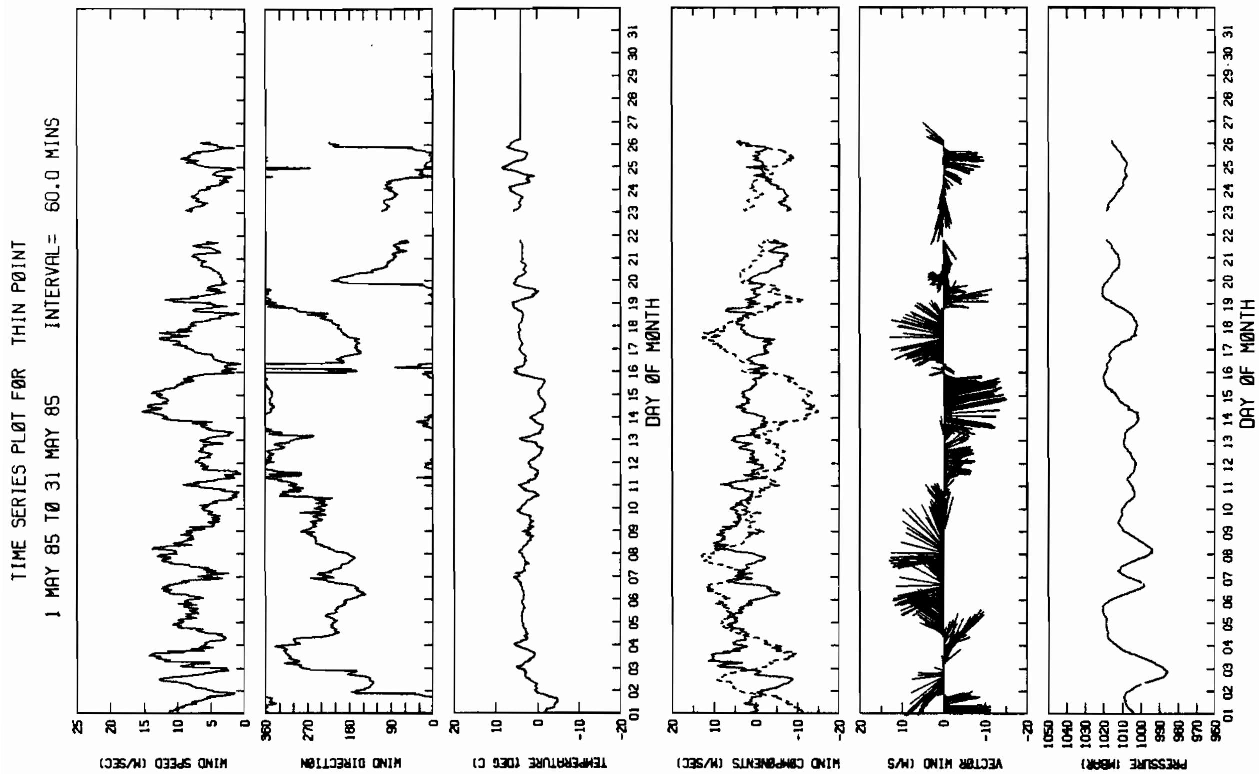
TIME SERIES PLØT FØR THIN PØINT
1 NØV 84 TØ 30 NØV 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH
DAY ØF MØNTH

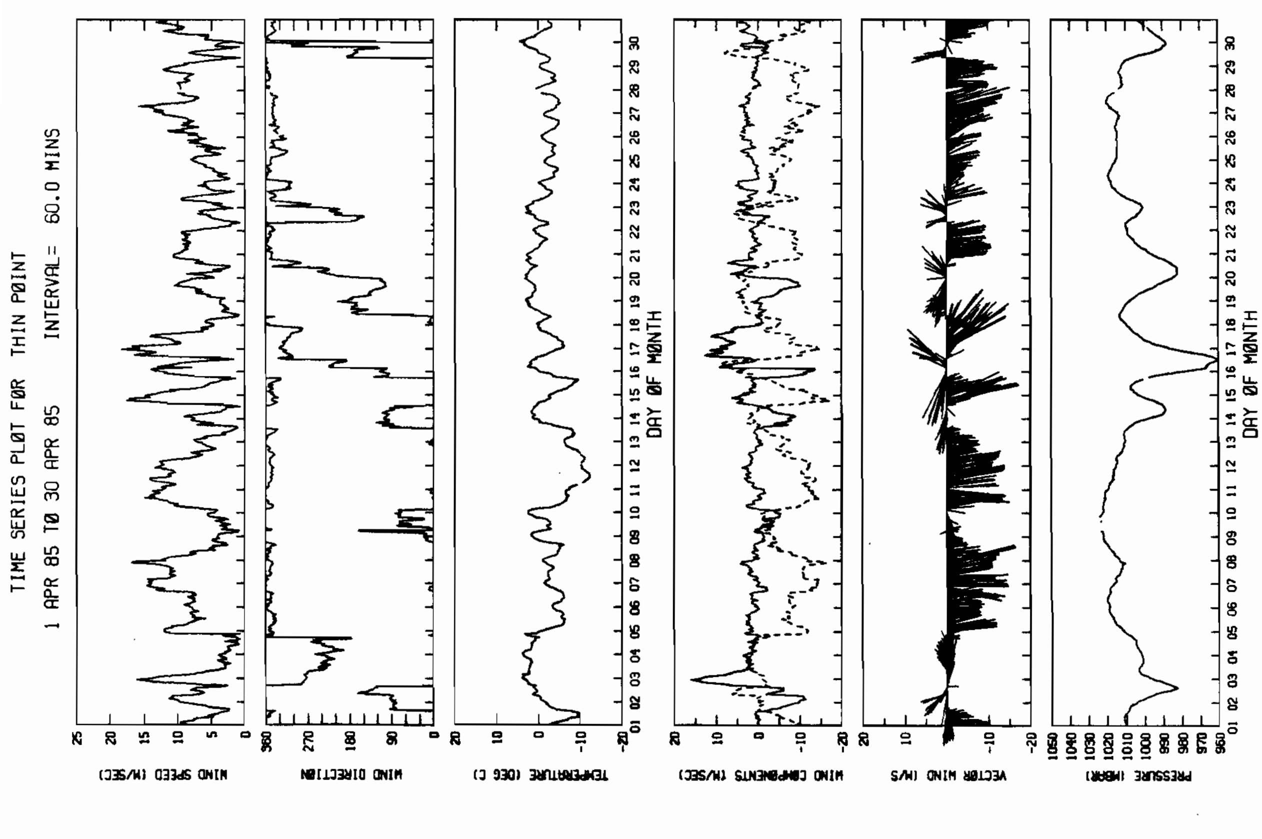

TIME SERIES PLØT FØR THIN PØINT
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

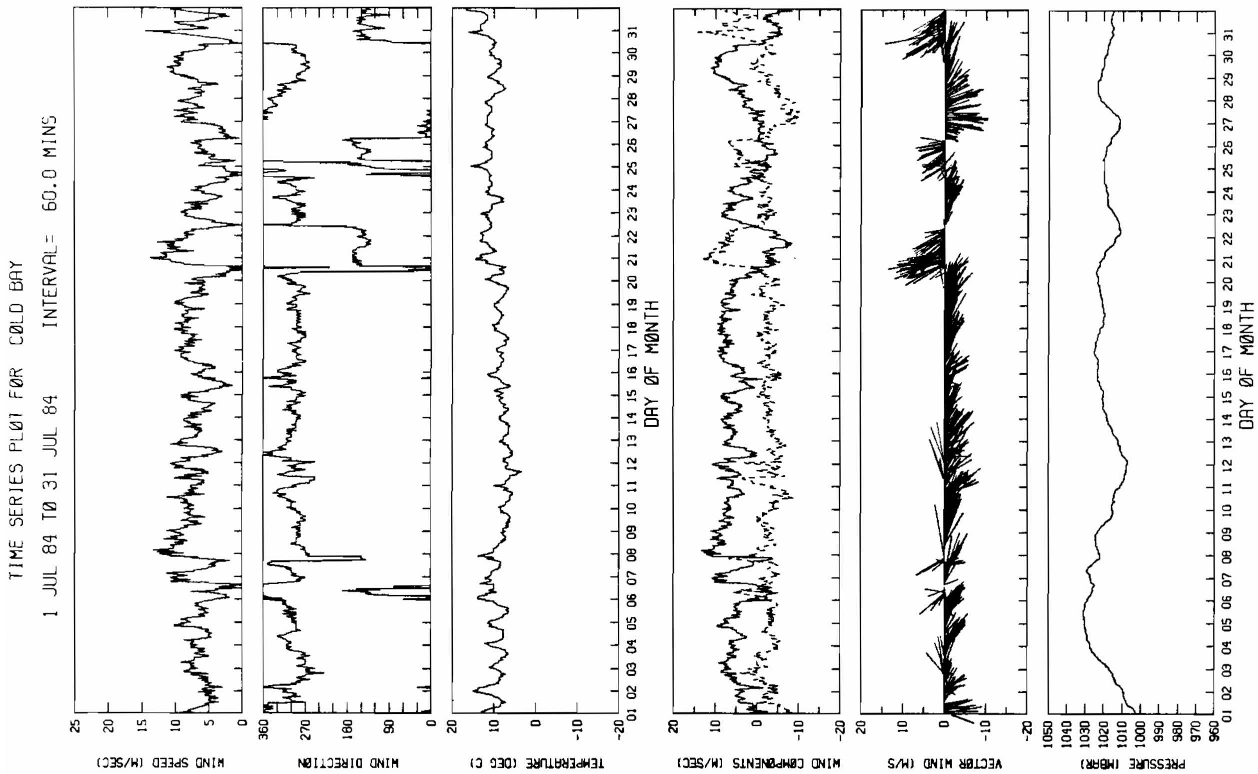

TIME SERIES PLØT FØR THIN PØINT
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

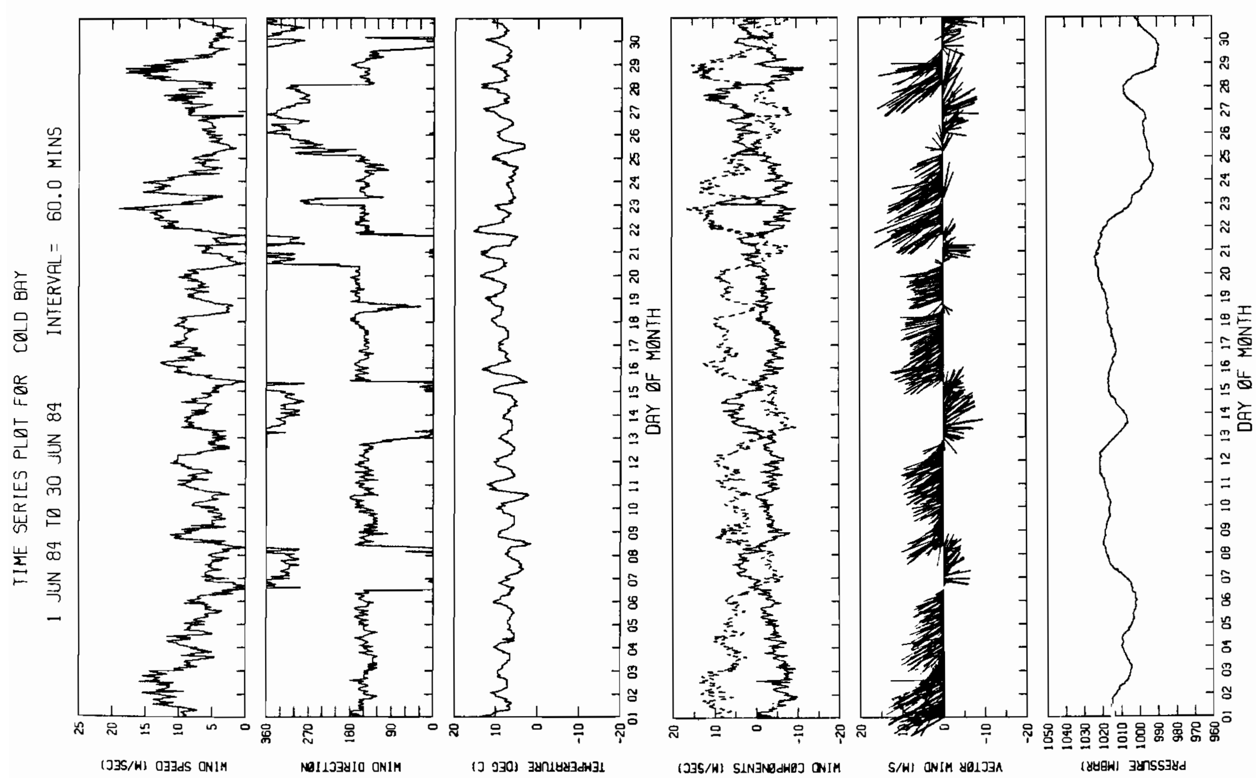

TIME SERIES PLØT FØR THIN PØINT
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

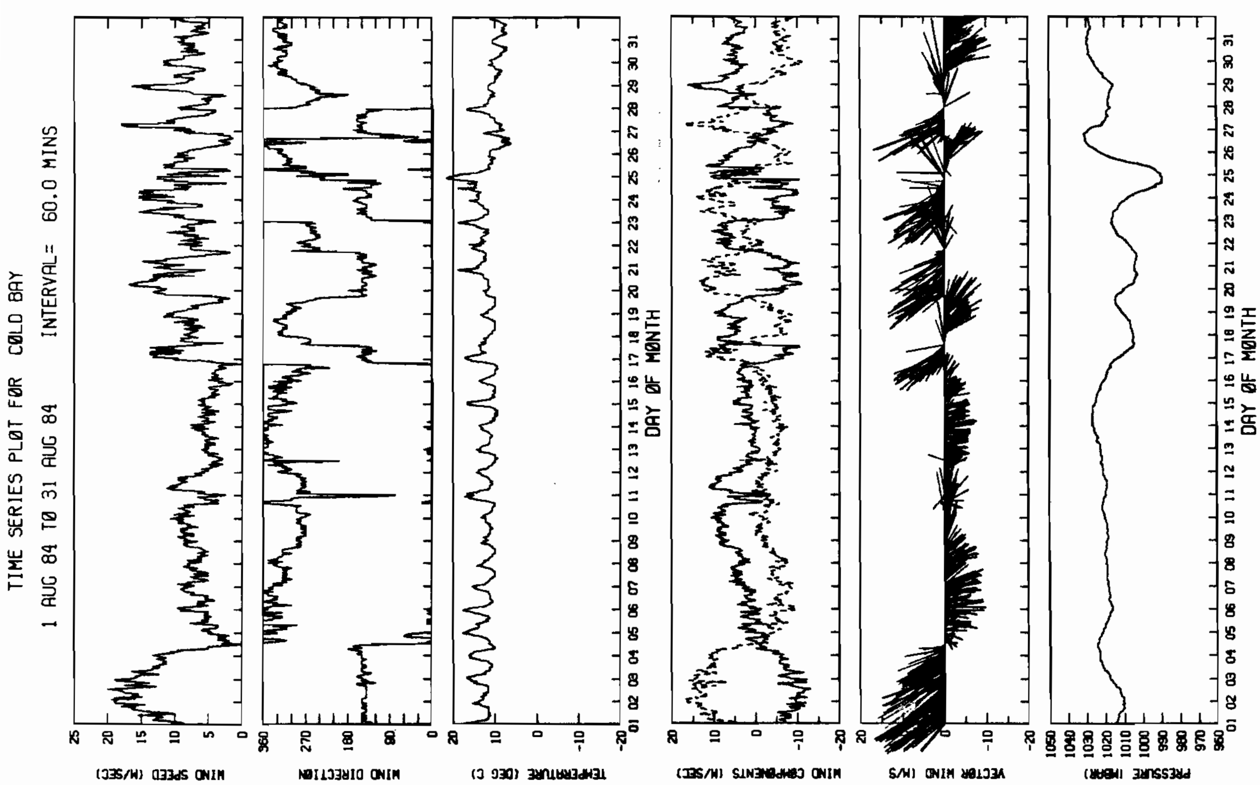

TIME SERIES PLØT FØR THIN PØINT
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

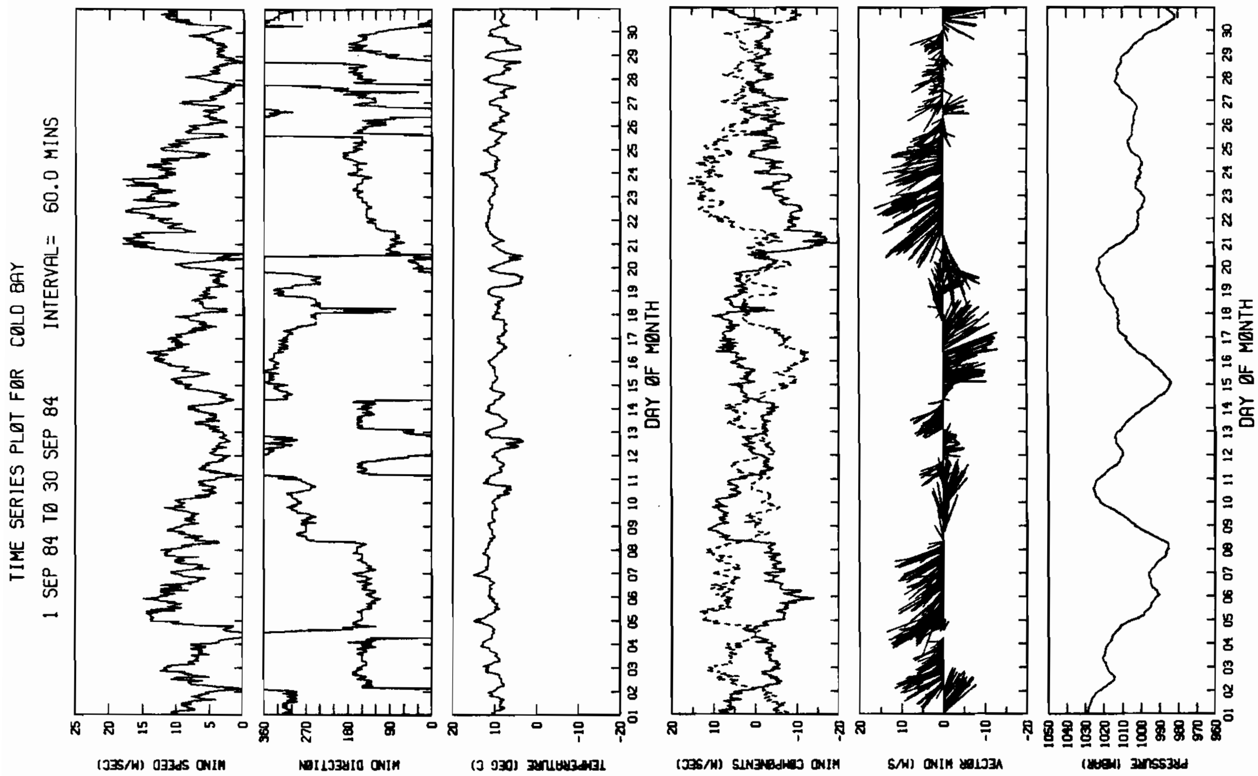

TIME SERIES PLØT FØR THIN PØINT
1 MAY 85 TØ 31 MAY 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

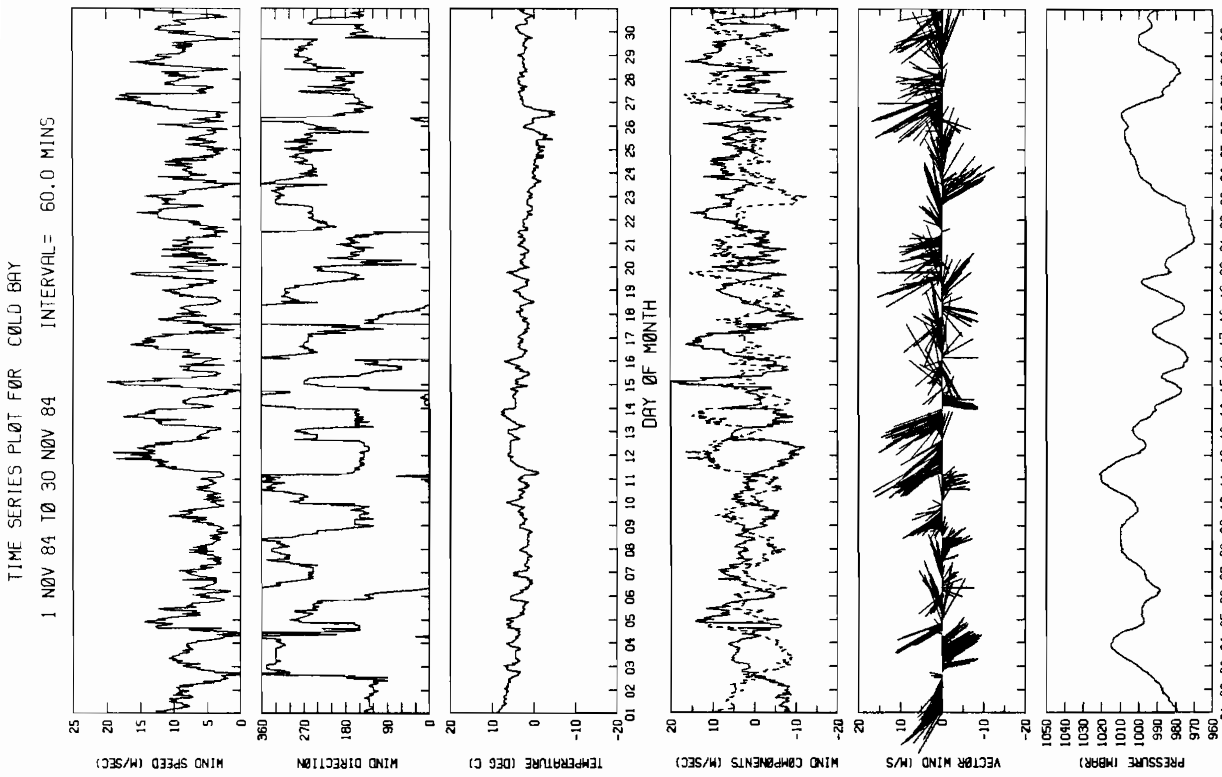

TIME SERIES PLØT FØR THIN PØINT
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

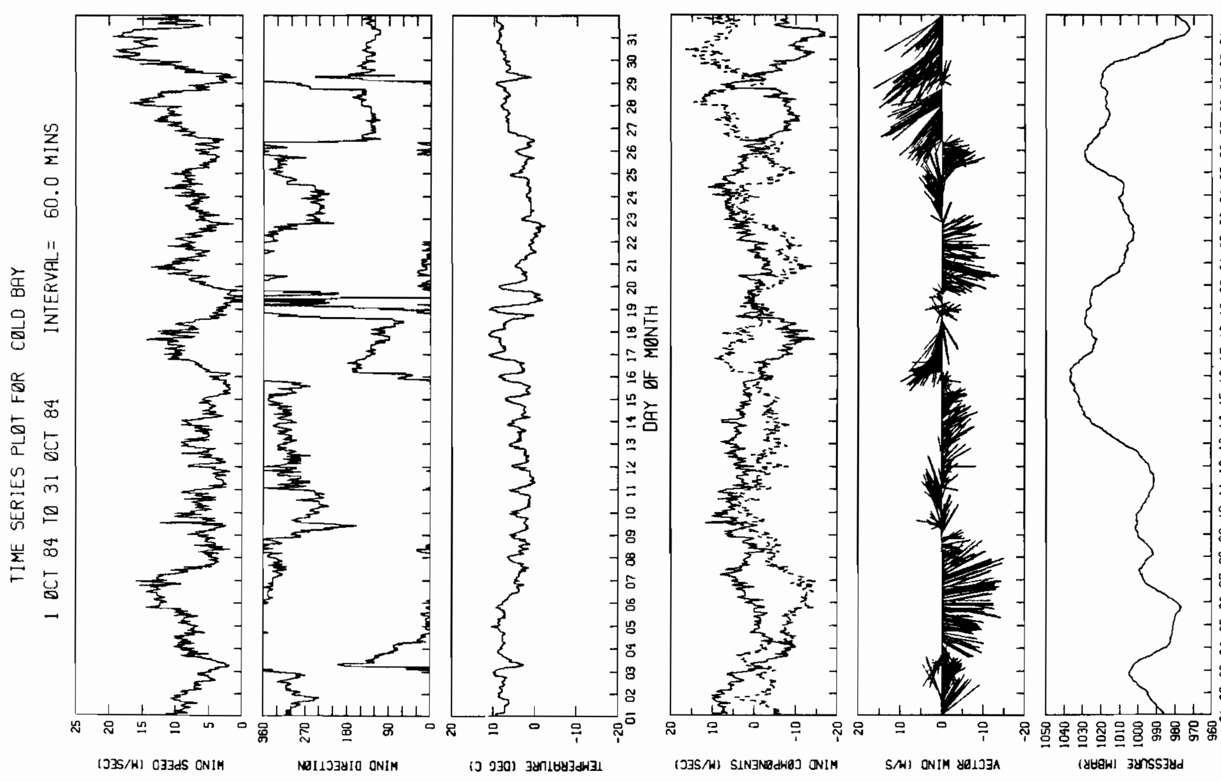

TIME SERIES PLØT FØR COLD BAY
1 JUL 84 TØ 31 JUL 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

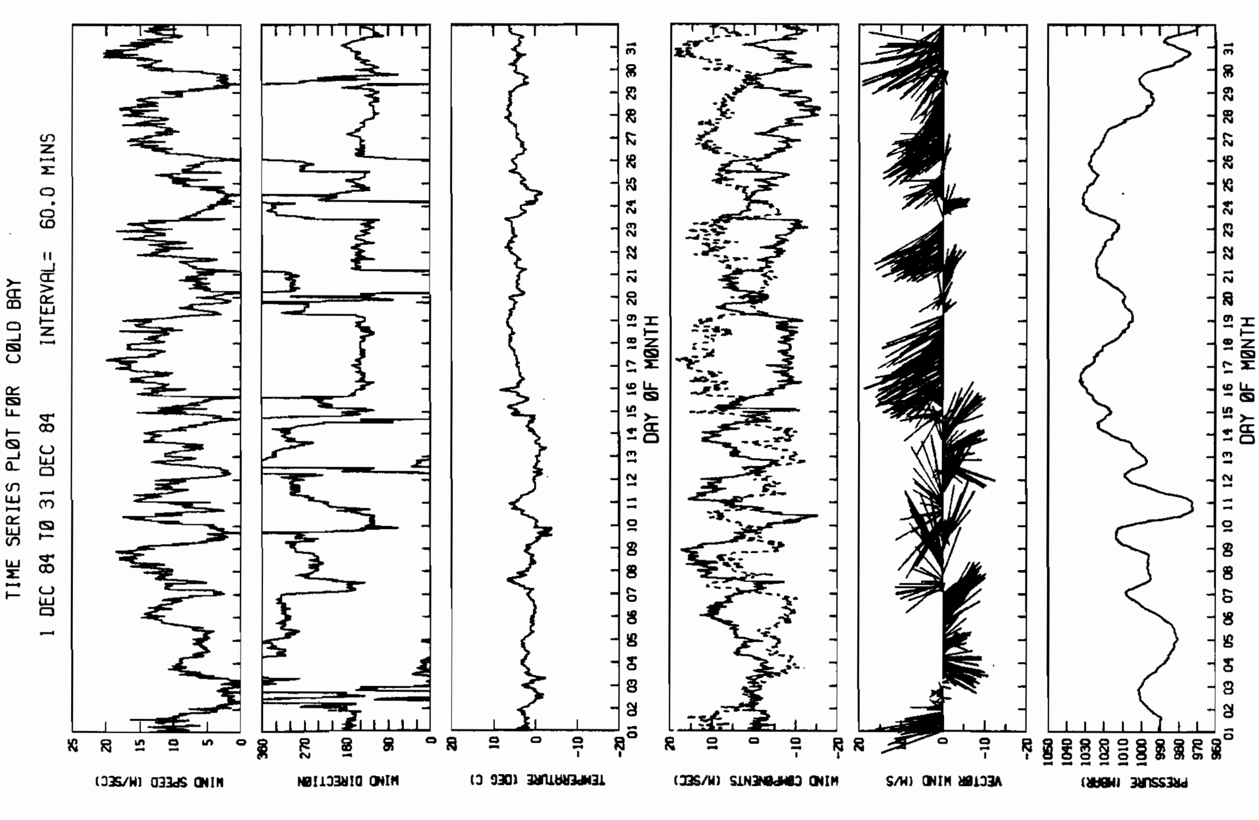

TIME SERIES PLØT FØR COLD BAY
1 JUN 84 TØ 30 JUN 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

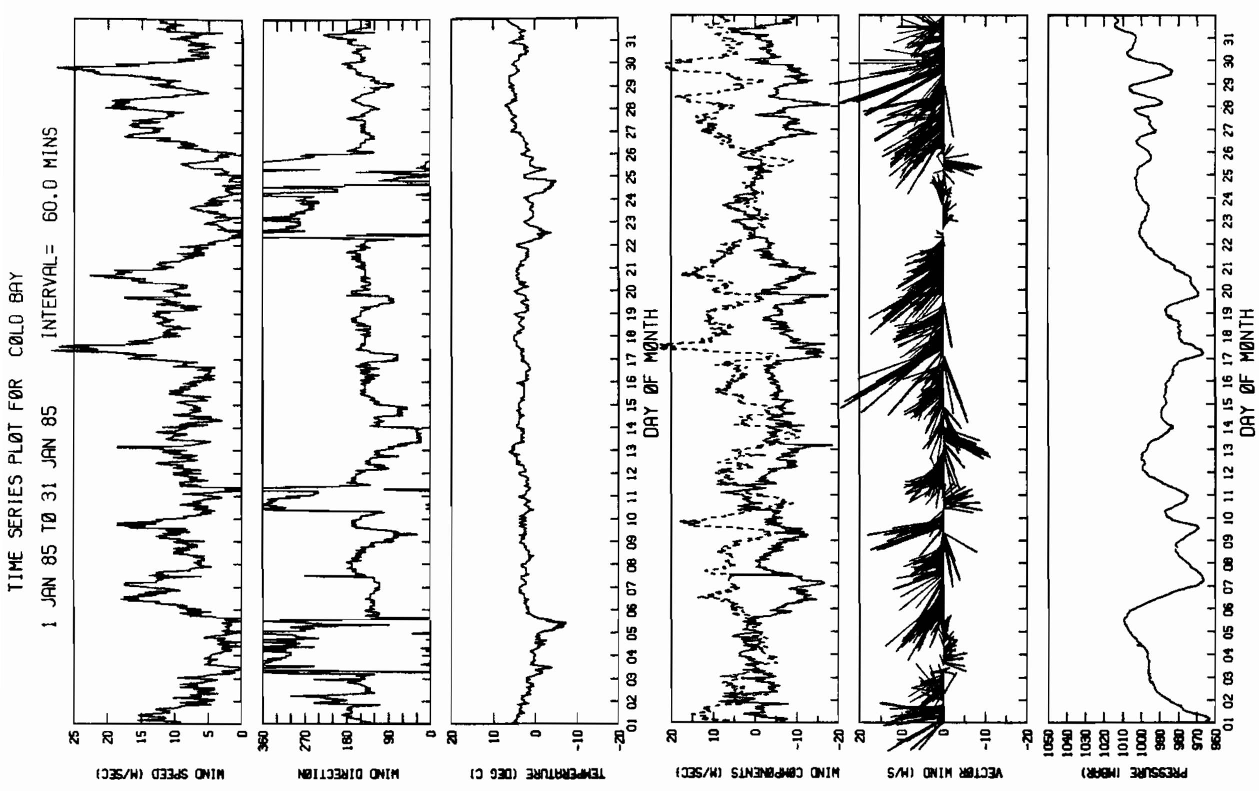

TIME SERIES PLØT FØR CØLD BAY
1 AUG 84 TØ 31 AUG 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

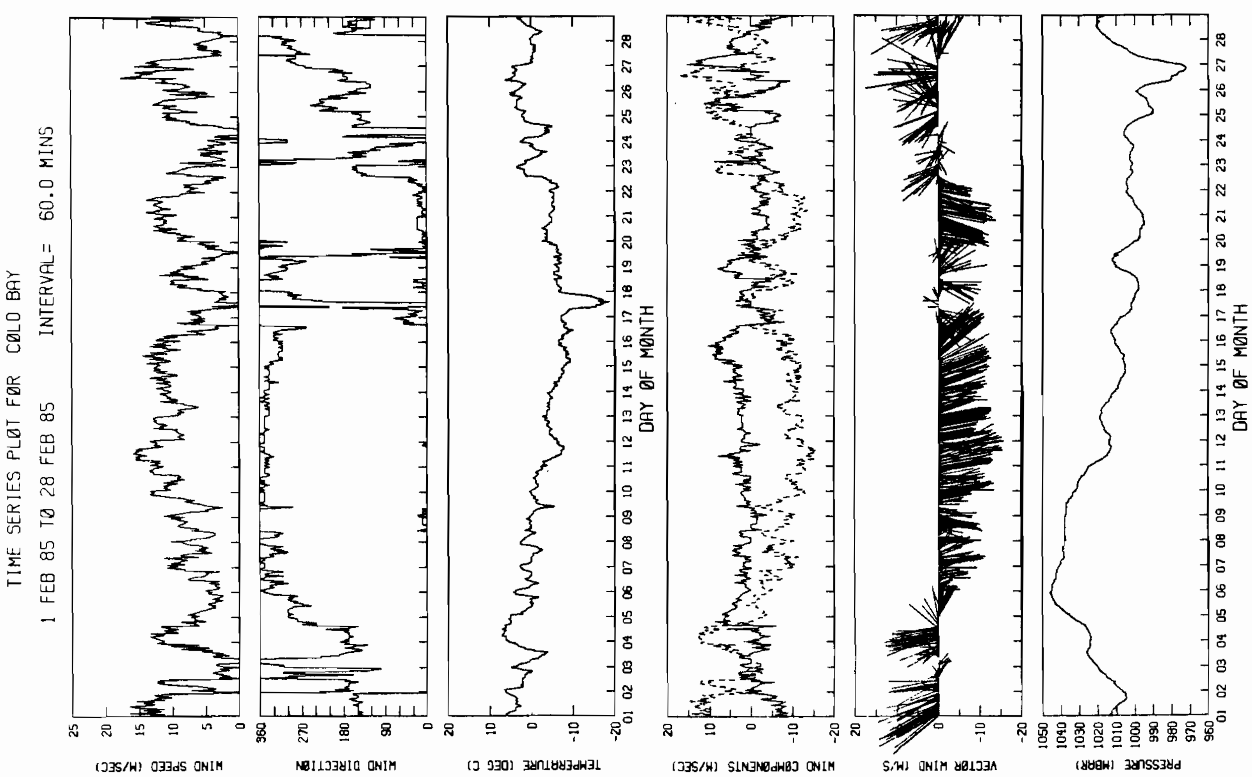

TIME SERIES PLØT FØR CØLD BAY
1 SEP 84 TØ 30 SEP 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

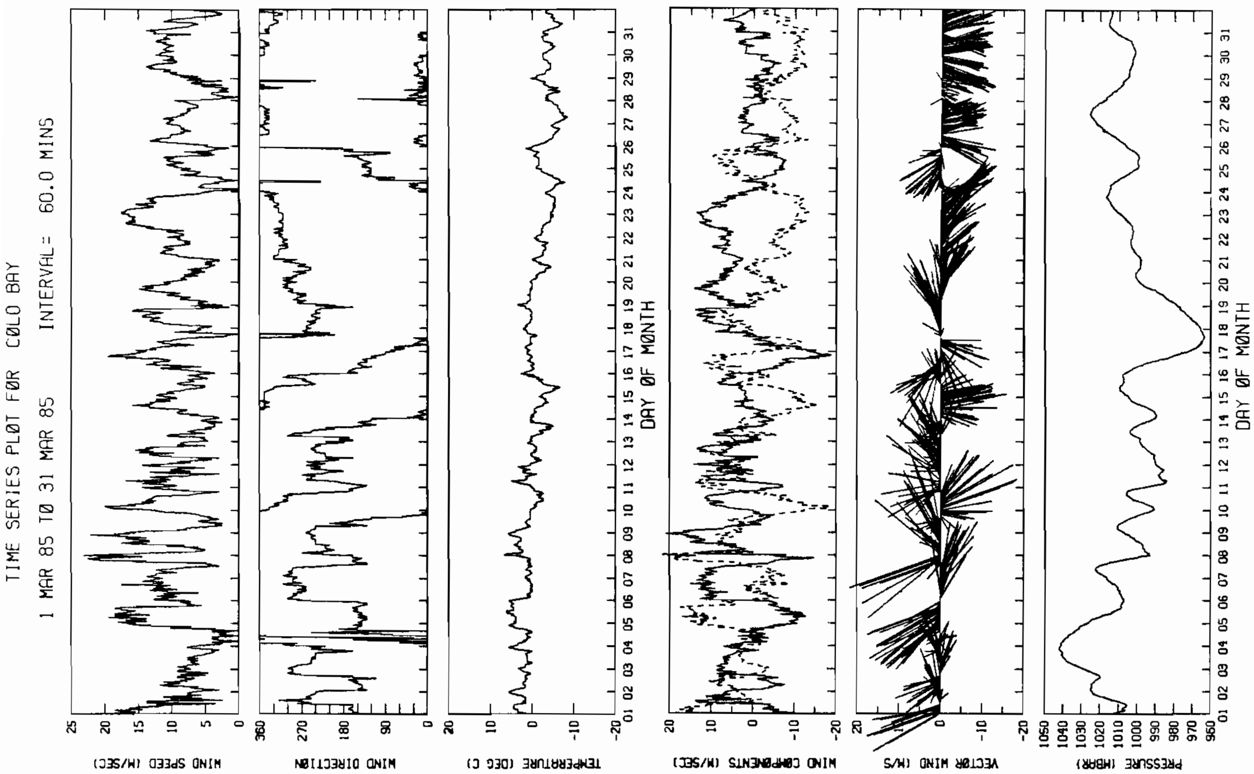

TIME SERIES PLØT FØR CØLD BAY
1 NØV 84 TØ 30 NØV 84
INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH
DAY ØF MØNTH

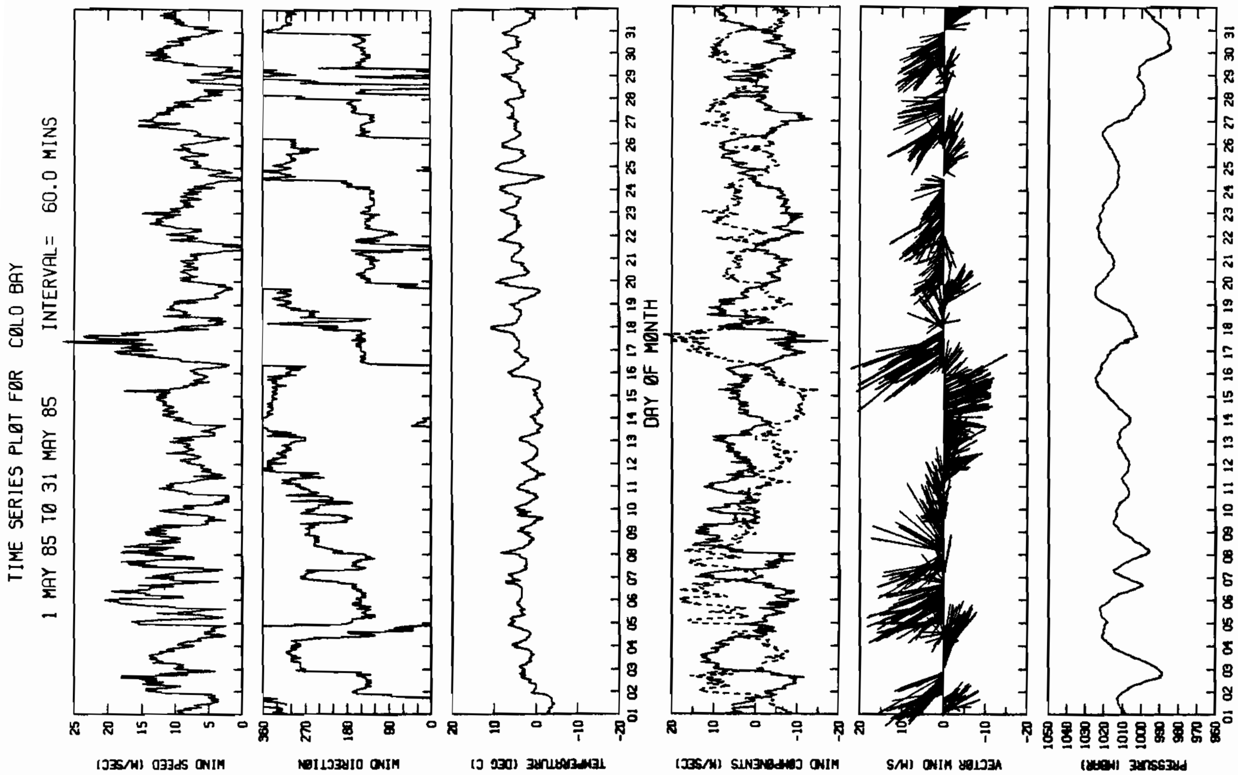

TIME SERIES PLØT FØR CØLD BAY
1 ØCT 84 TØ 31 ØCT 84
INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH
DAY ØF MØNTH

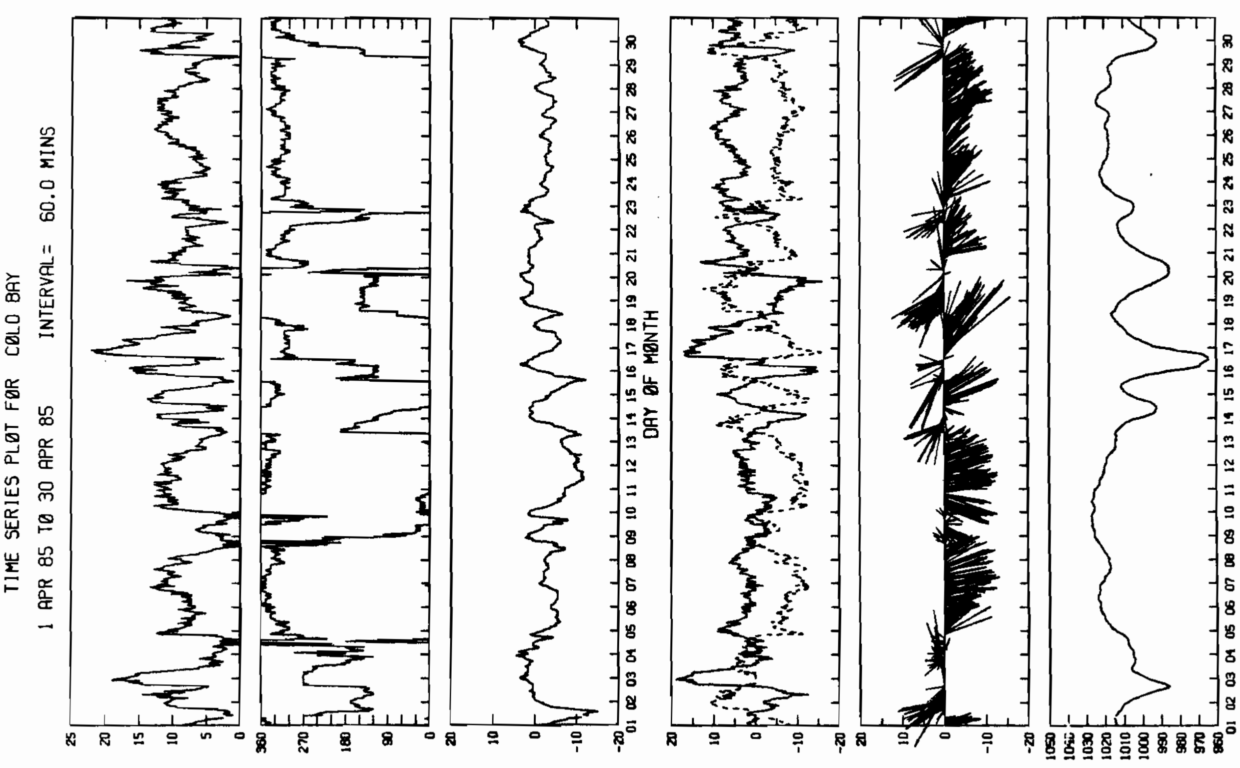

TIME SERIES PLØT FØR COLD BAY
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

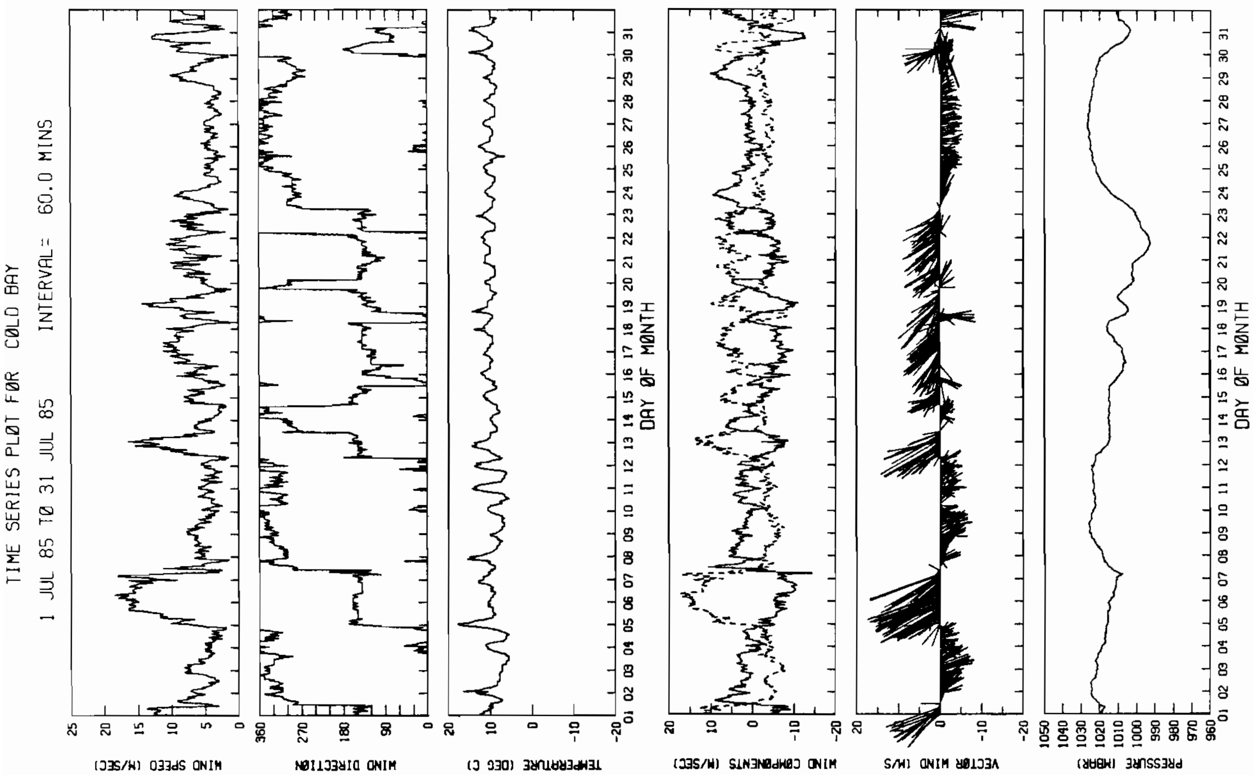

TIME SERIES PLØT FØR COLD BAY
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

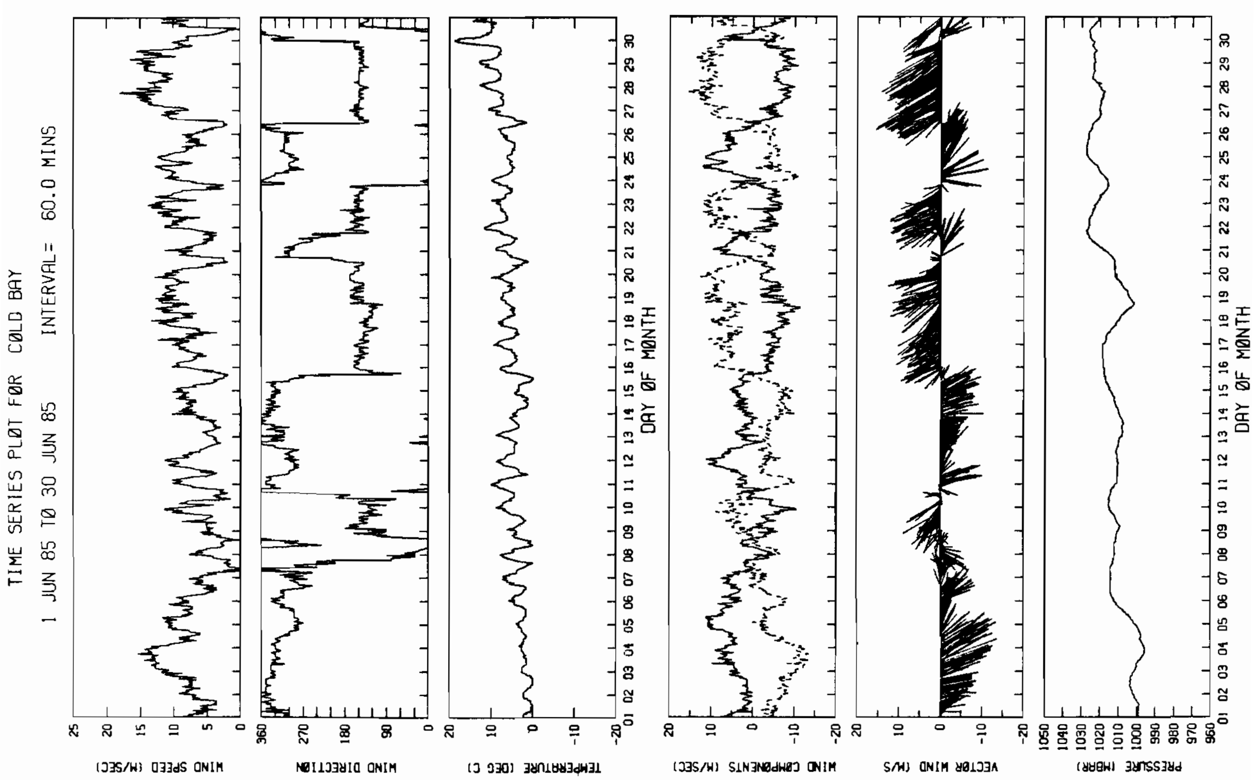

TIME SERIES PLOT FOR COLO BAY
1 FEB 85 TO 28 FEB 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH

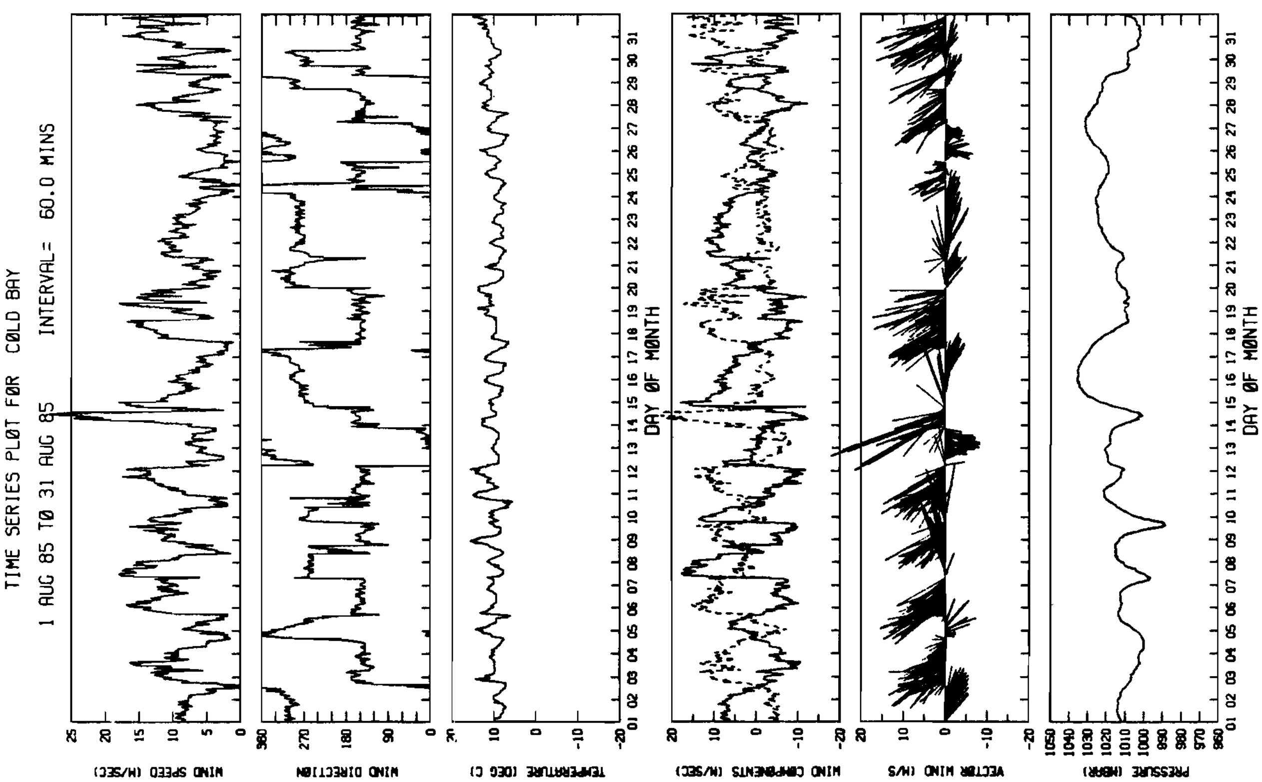

TIME SERIES PLOT FOR COLO BAY
1 MAR 85 TO 31 MAR 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH

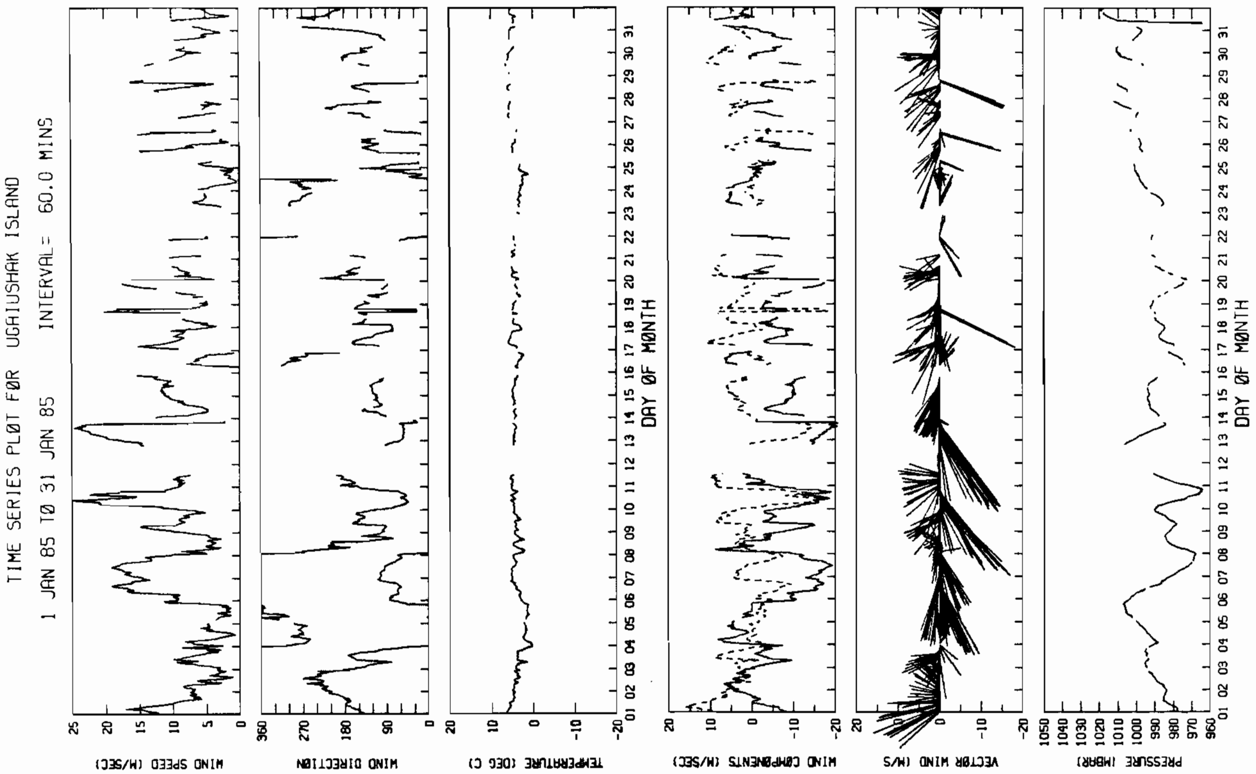

TIME SERIES PLØT FØR CØLD BAY
1 MAY 85 TØ 31 MAY 85
INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

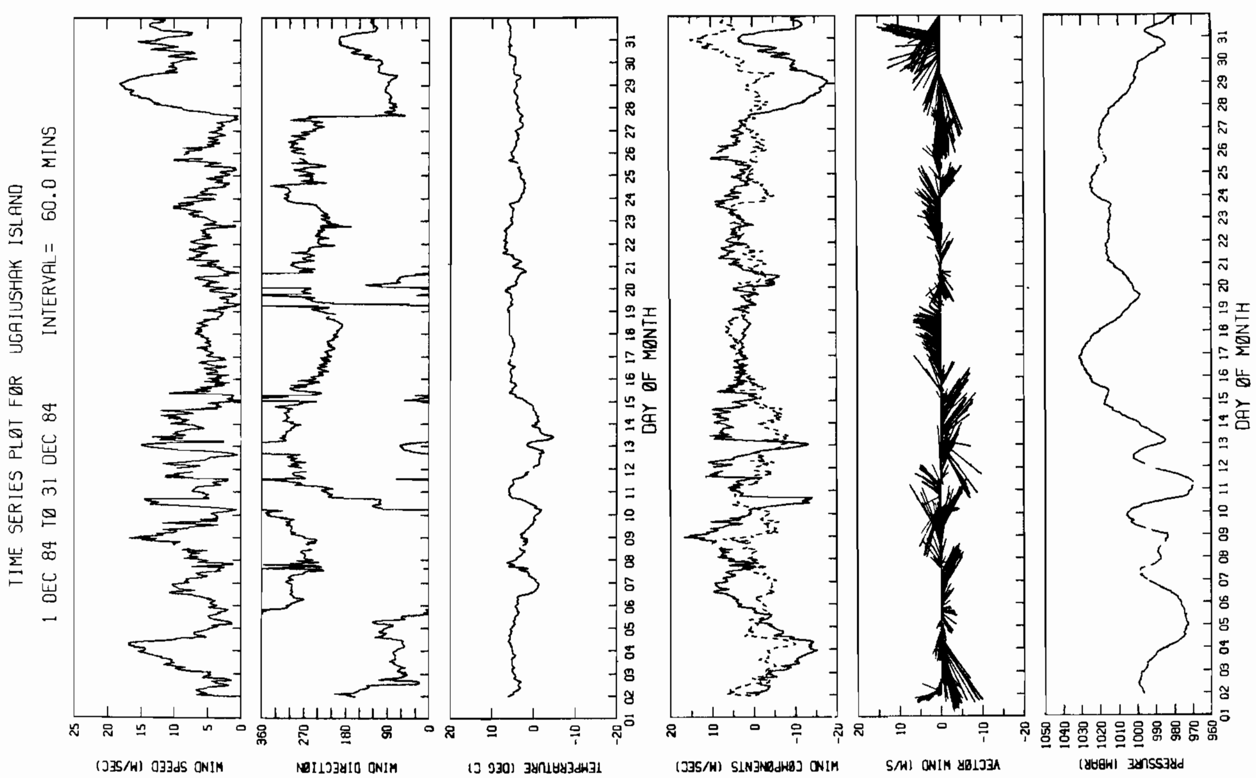

TIME SERIES PLØT FØR CØLD BAY
1 APR 85 TØ 30 APR 85
INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

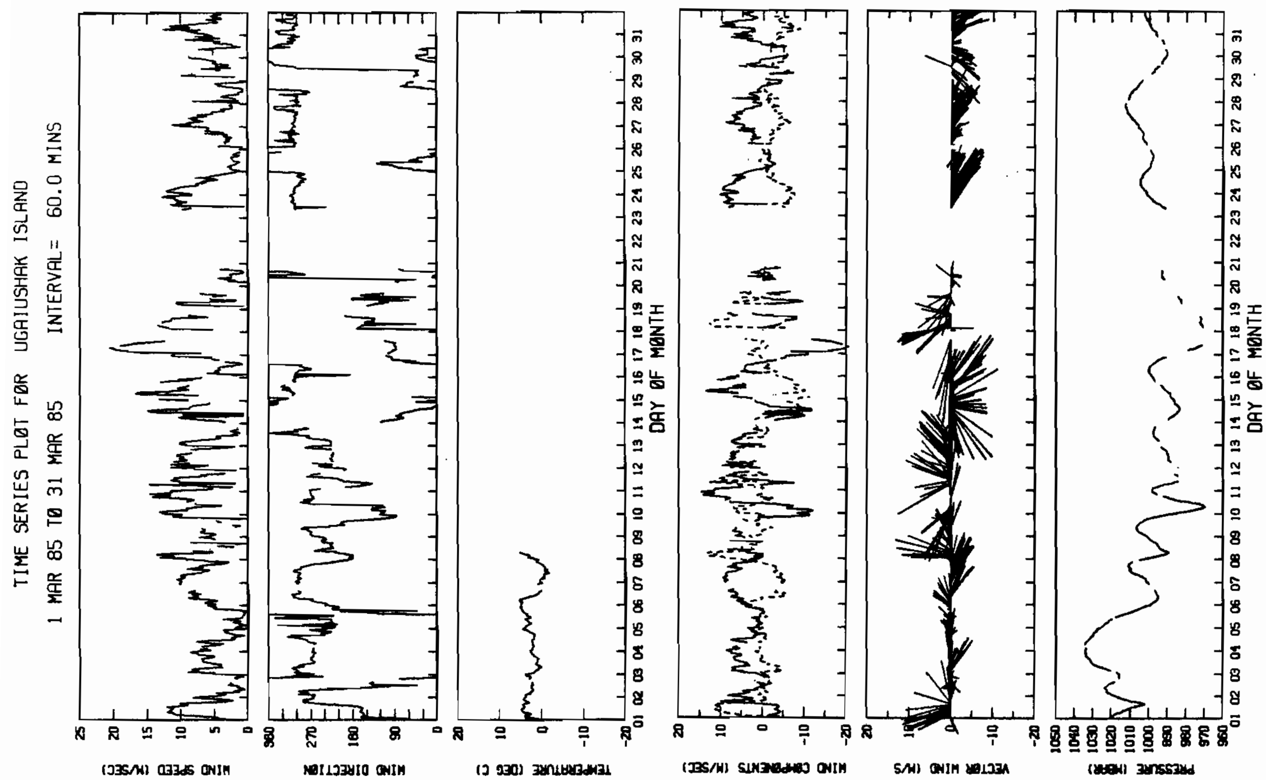

TIME SERIES PLOT FOR COLD BAY
1 JUL 85 TO 31 JUL 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH
DAY OF MONTH

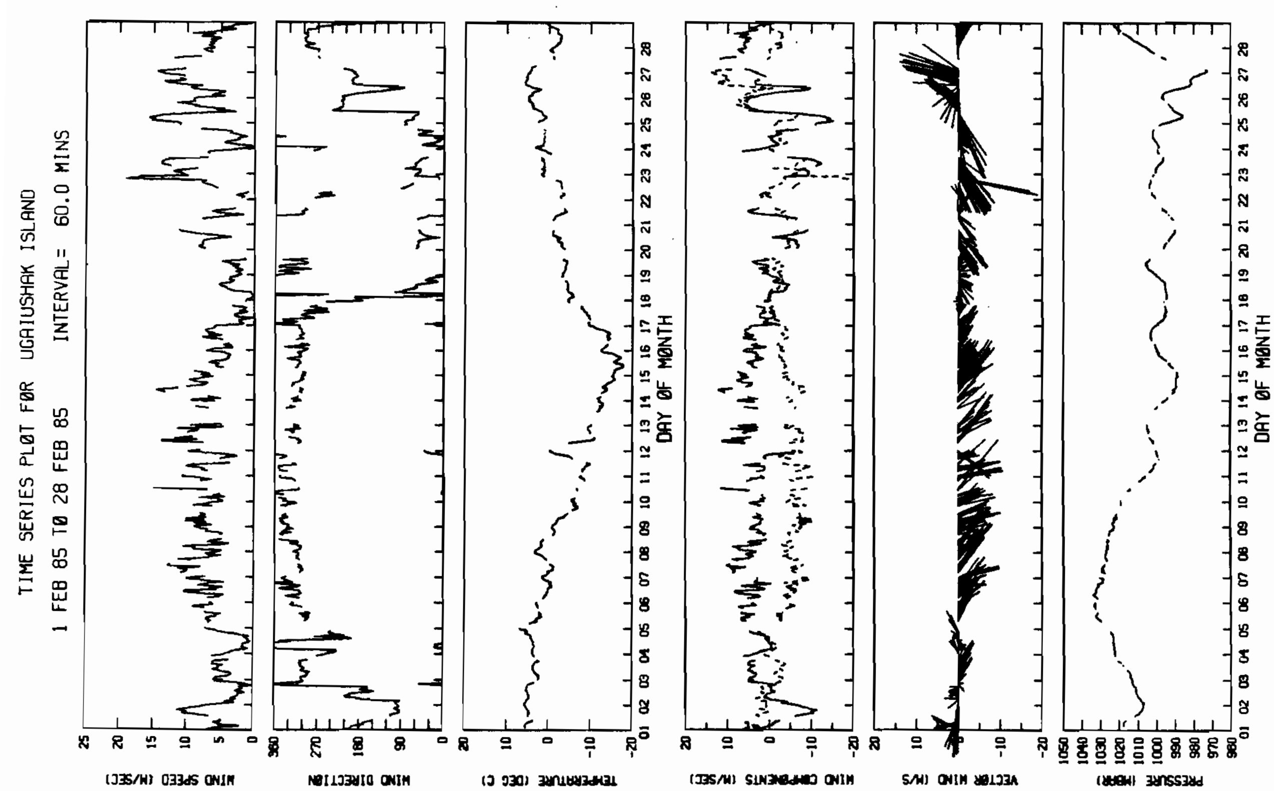

TIME SERIES PLOT FOR COLD BAY
1 JUN 85 TO 30 JUN 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH
DAY OF MONTH

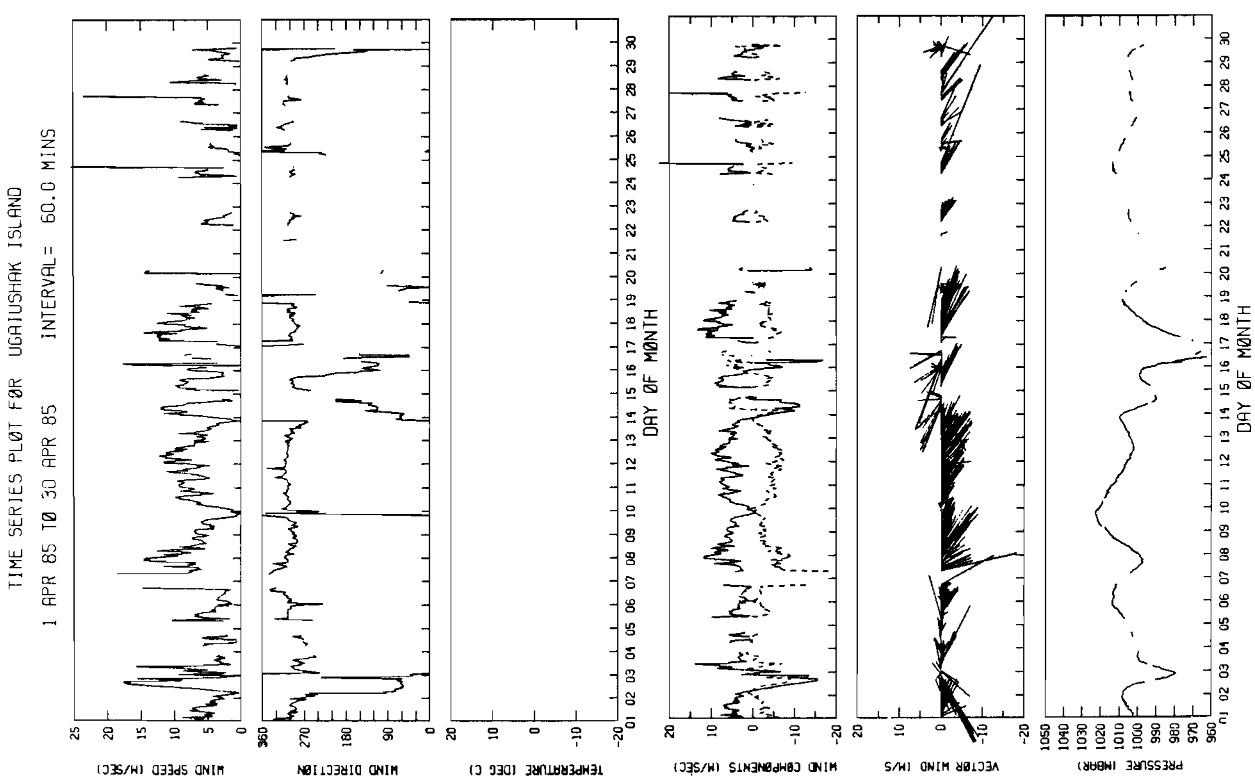

TIME SERIES PLØT FØR CØLD BAY
1 AUG 85 TØ 31 AUG 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
DAY ØF MØNTH
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

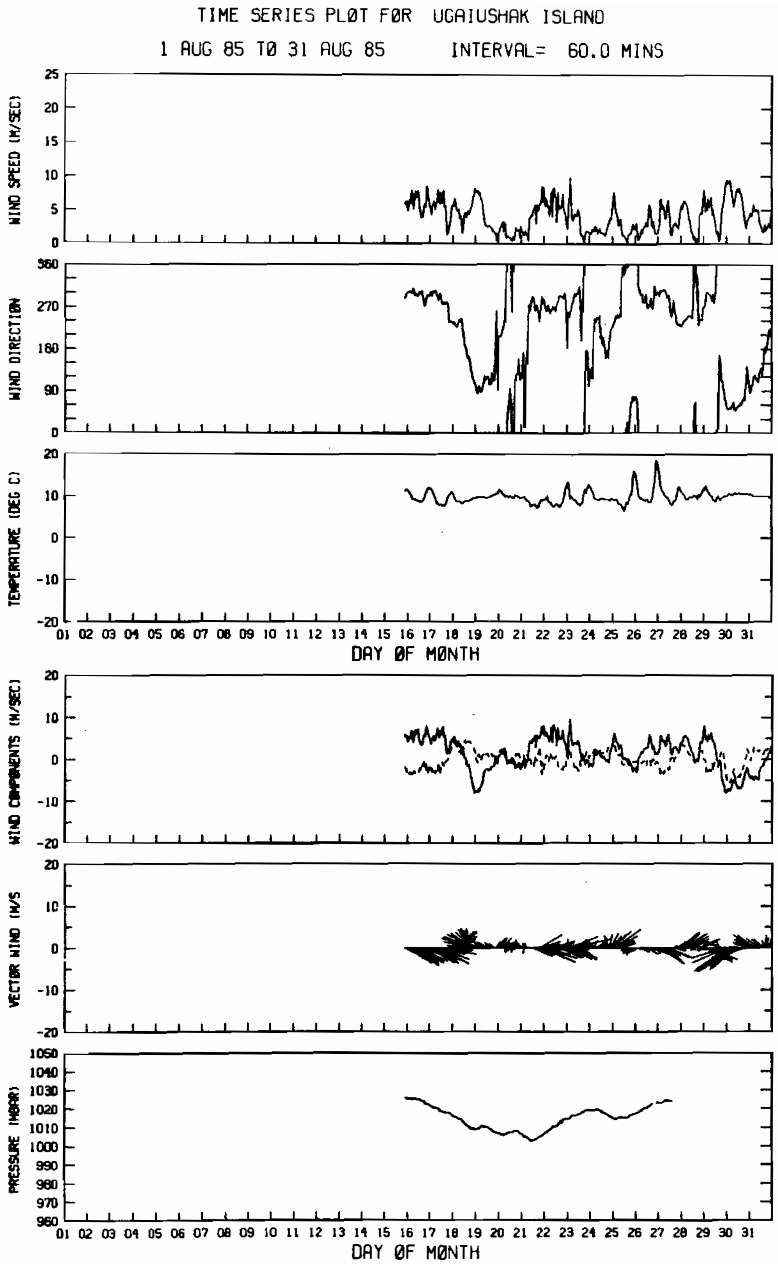

TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

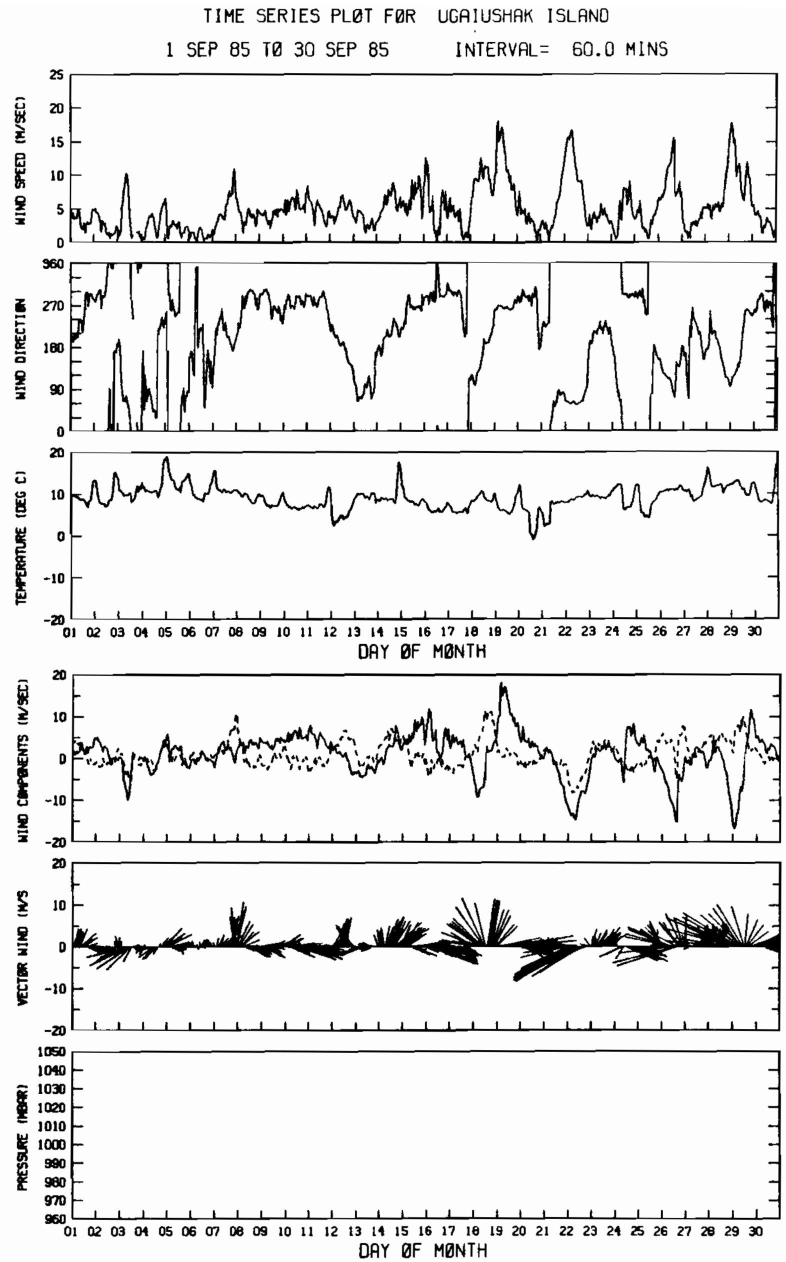

TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

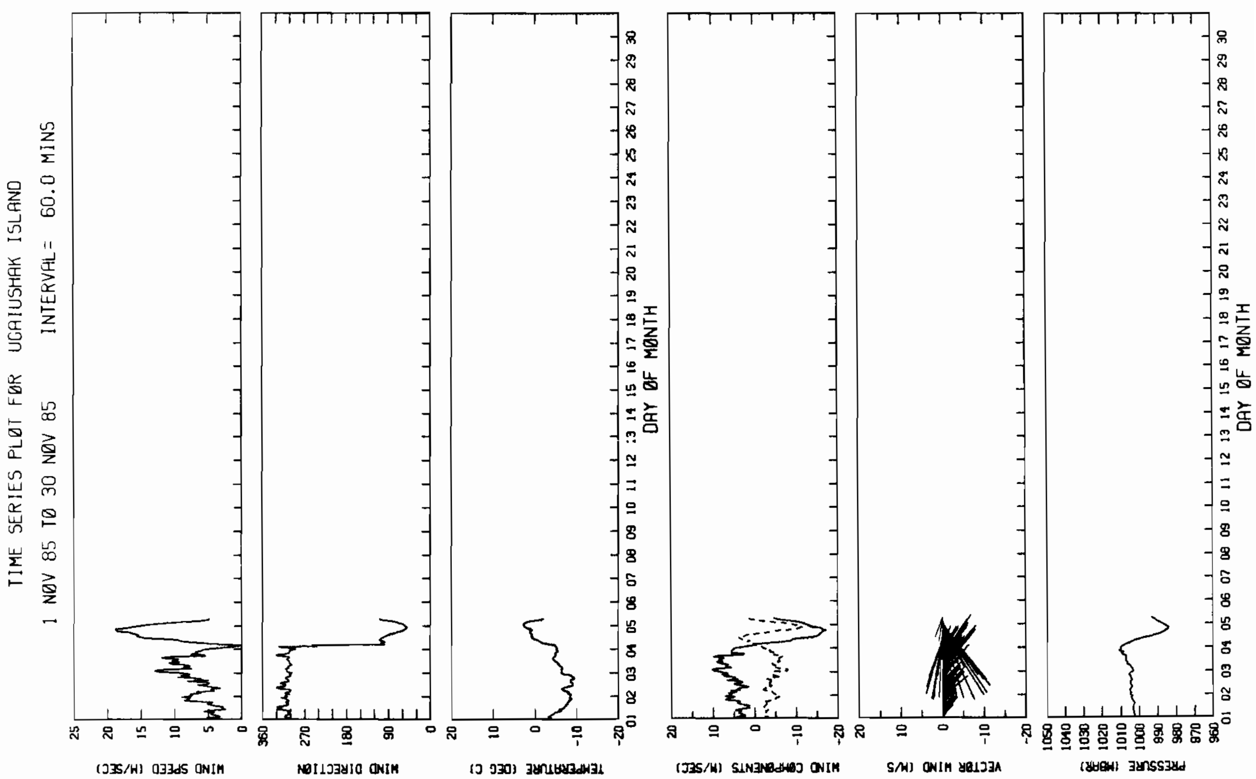

TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

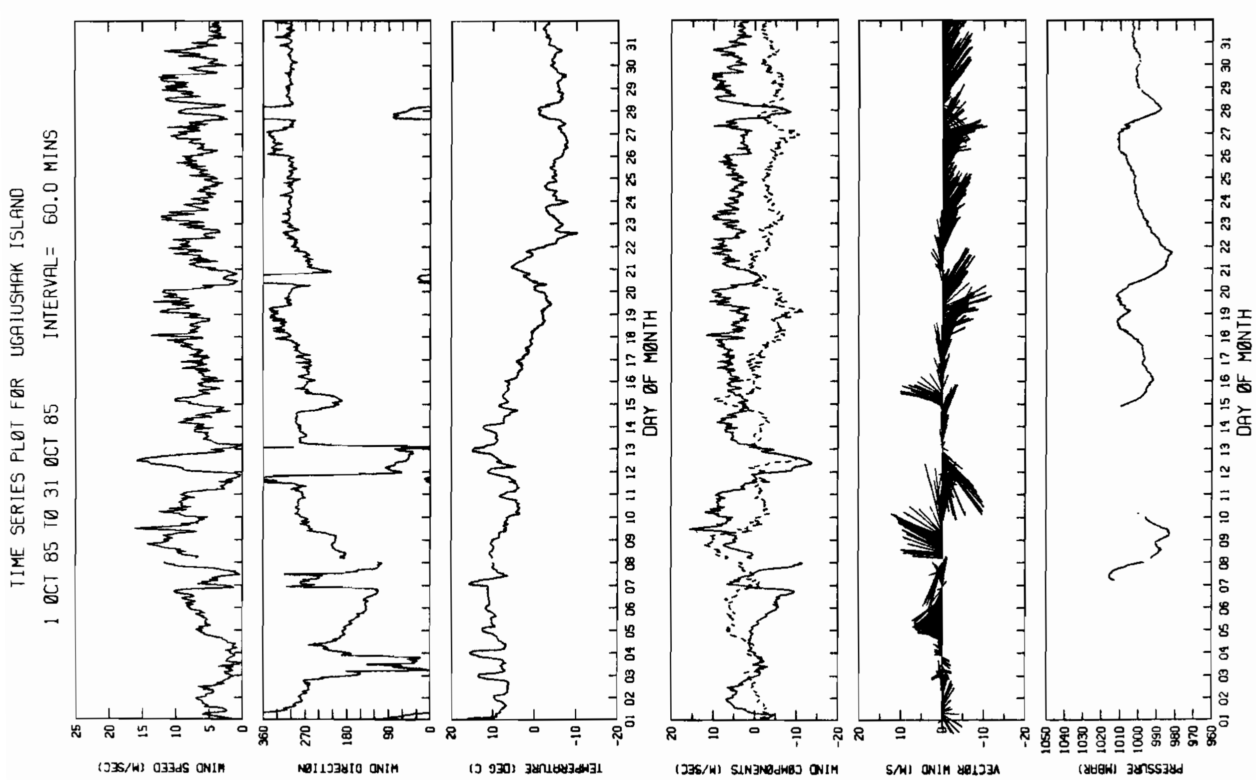

TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 AUG 85 TØ 31 AUG 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
DAY ØF MØNTH
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 SEP 85 TØ 30 SEP 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
DAY ØF MØNTH
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 NØV 85 TØ 30 NØV 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

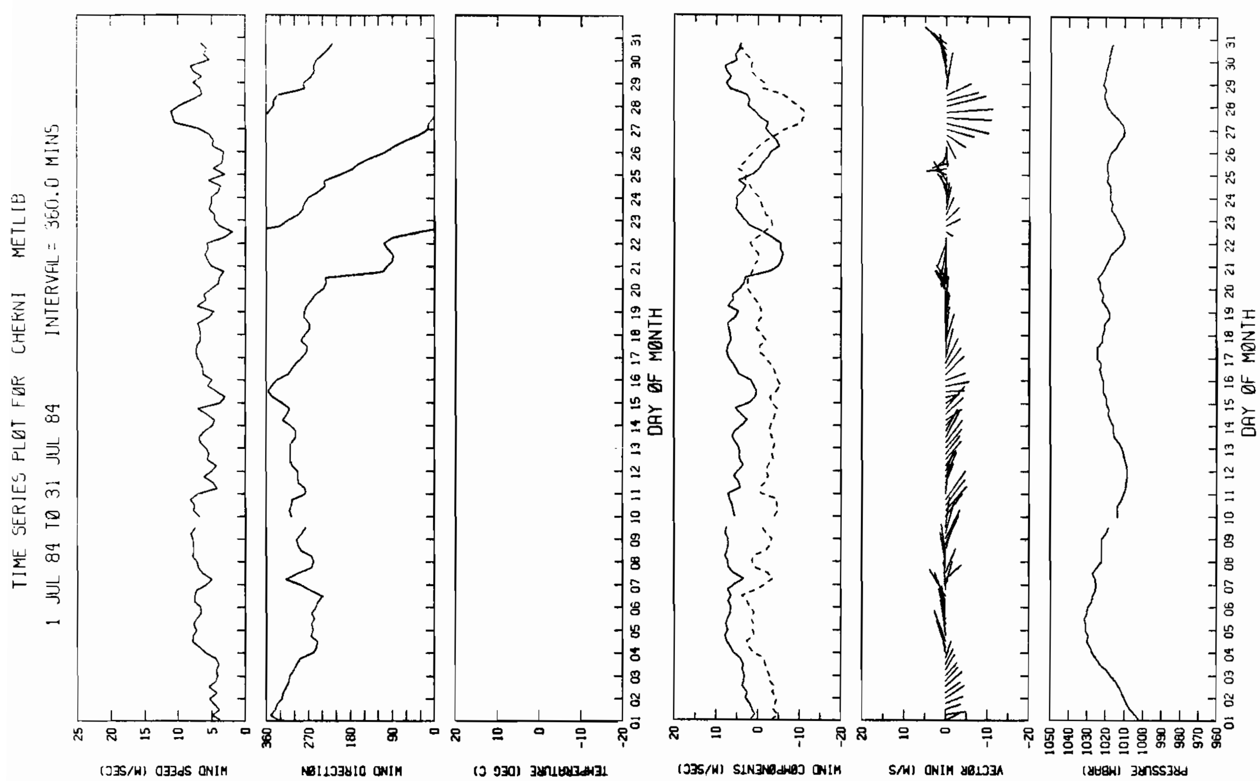

TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 ØCT 85 TØ 31 ØCT 85 INTERVAL= 60.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

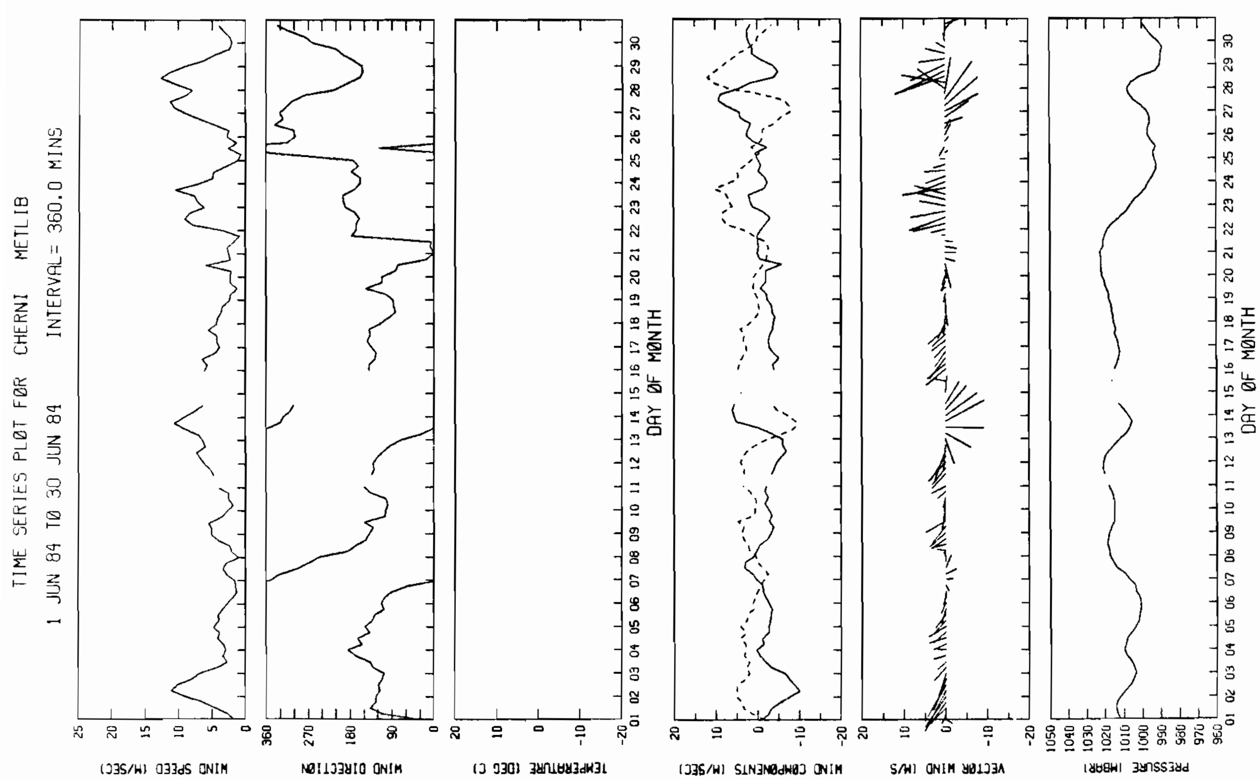
Appendix B

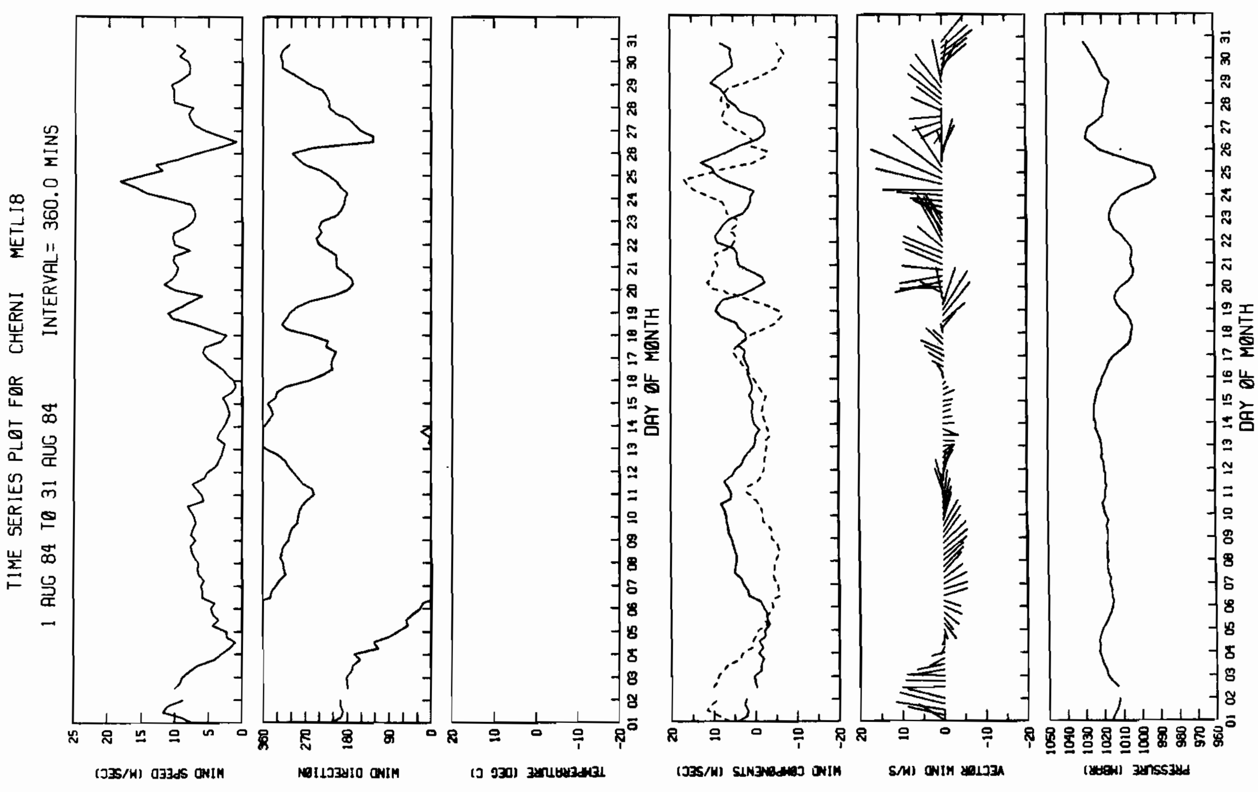
Monthly time series of six-hourly estimates of surface wind speed, wind direction, u and v wind components, vector winds, and barometric pressure during the period 1 June 1984 through 31 May 1985 produced by the METLIB-II program library for locations of weather stations at:

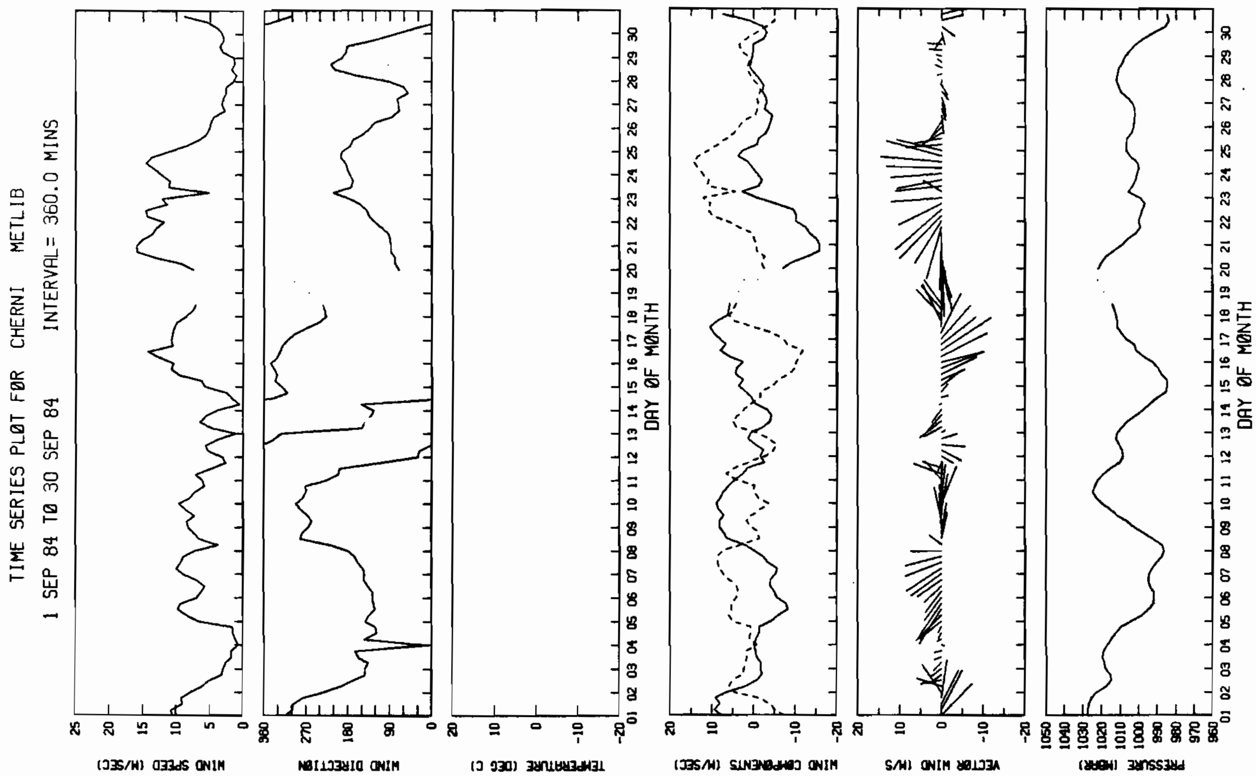
1. Cherni Island
2. Thin Point
3. Cold Bay
4. Ugaiushak Island

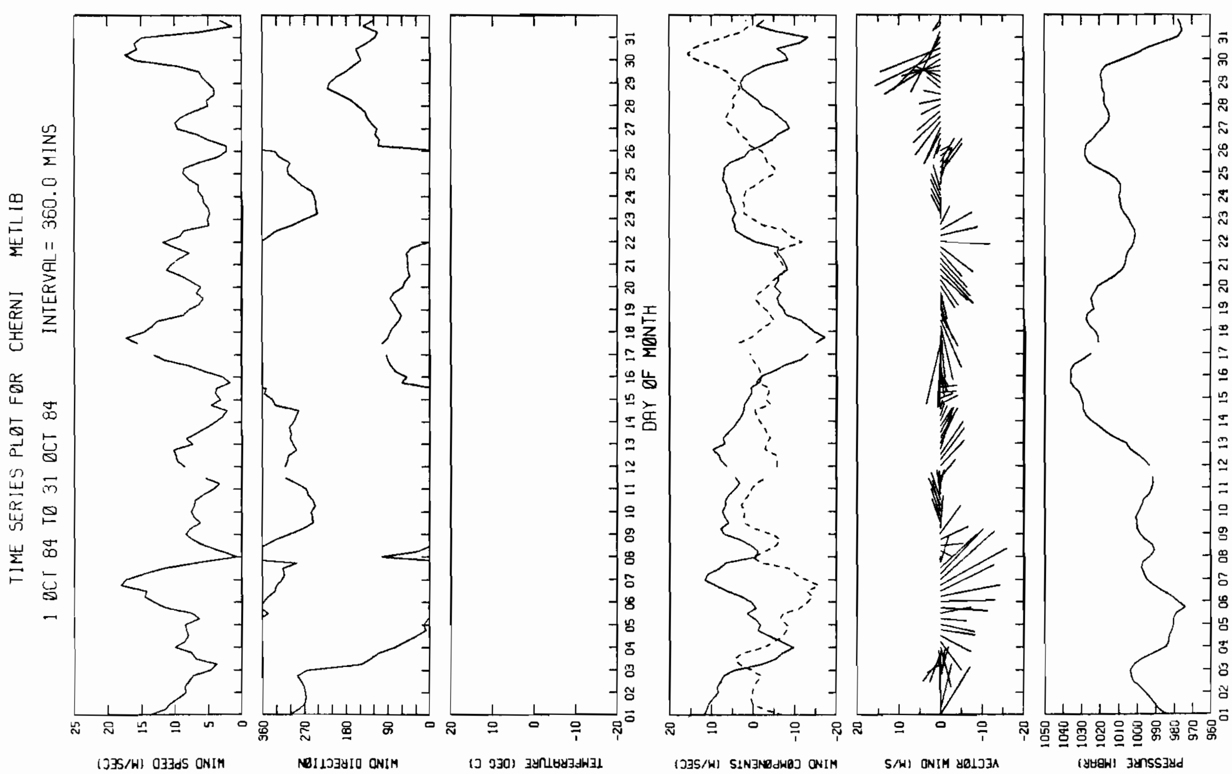
In each time series, wind direction is the direction from which the wind was blowing. Wind components and vector winds indicate the direction towards which the wind was blowing. Pressure is sea-level pressure.

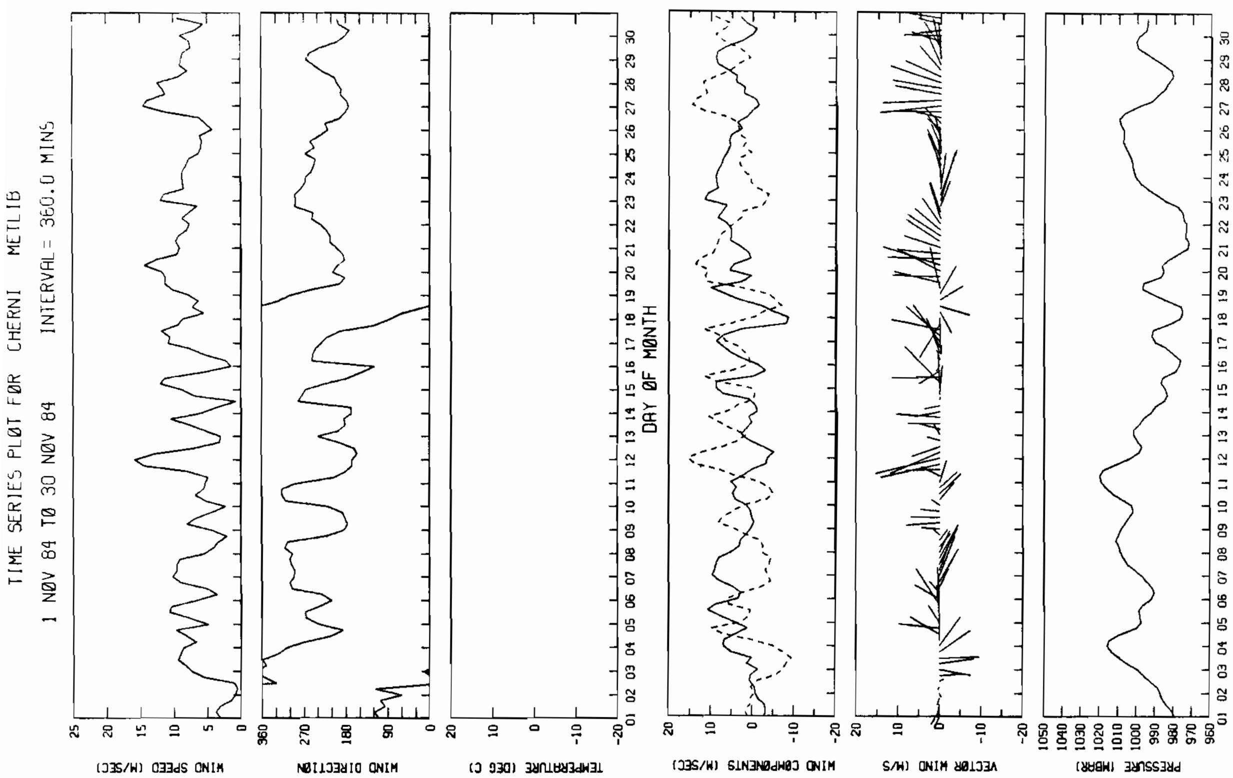

TIME SERIES PLØT FØR CHERNI METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

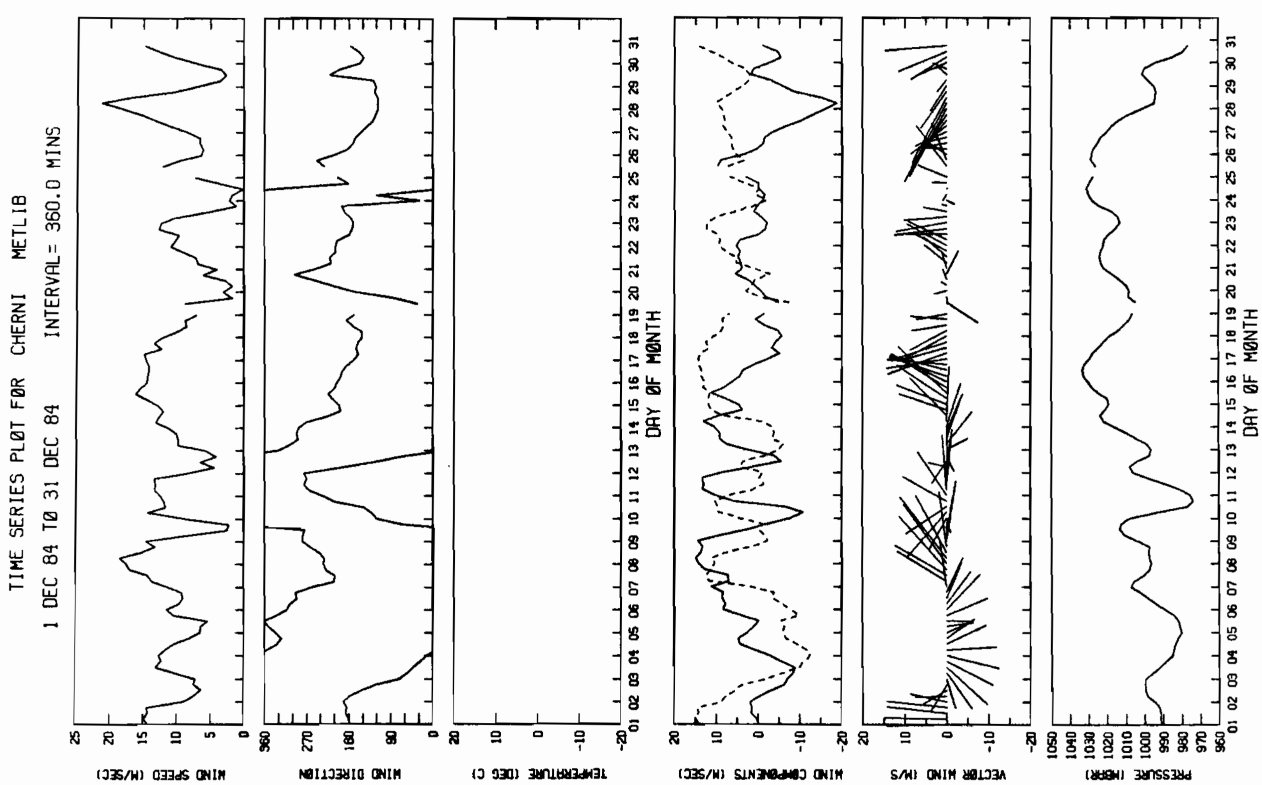

TIME SERIES PLØT FØR CHERNI METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

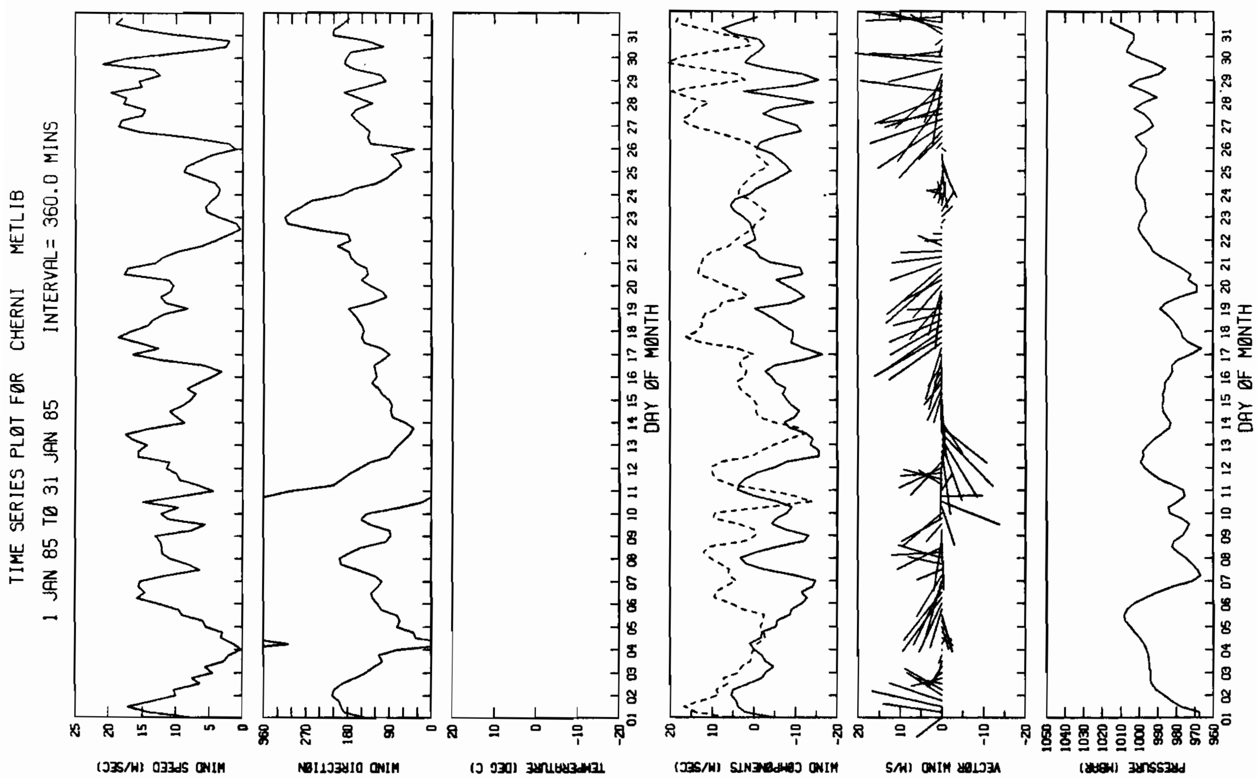

TIME SERIES PLØT FØR CHERNI METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

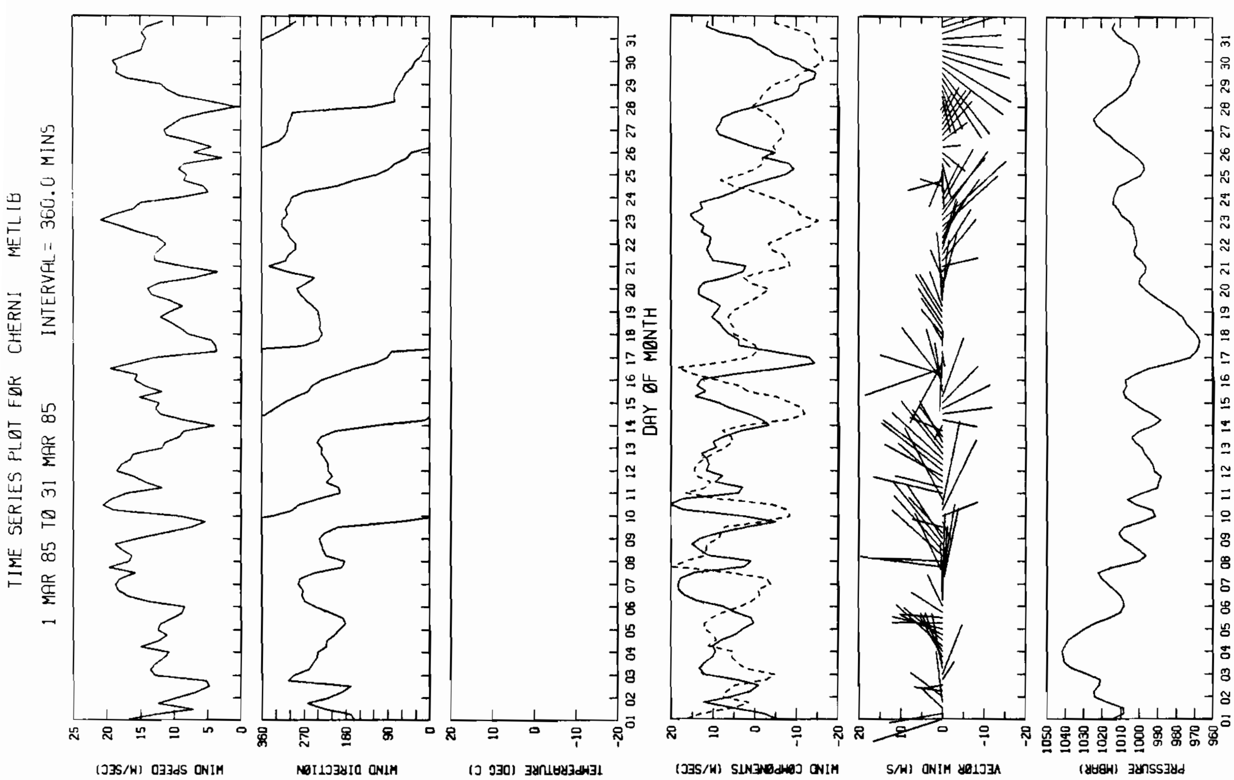

TIME SERIES PLØT FØR CHERNI METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

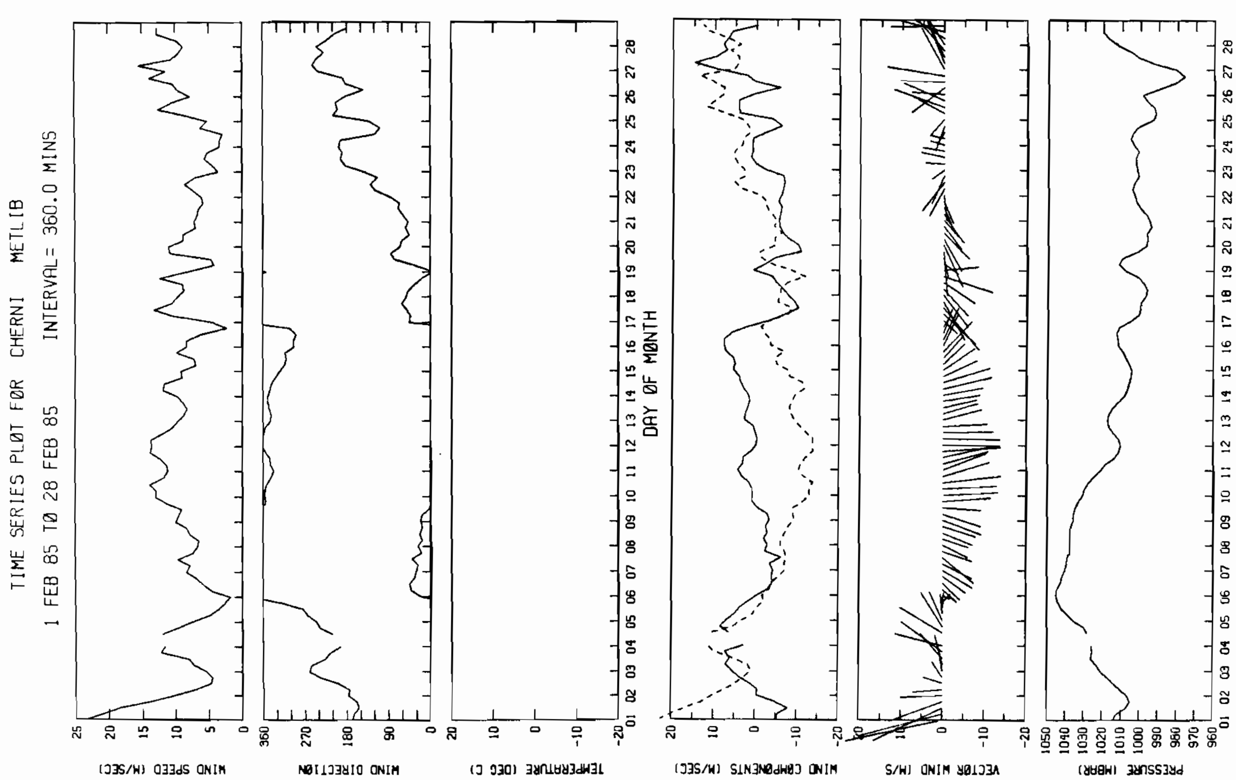

TIME SERIES PLØT FØR CHERNI METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

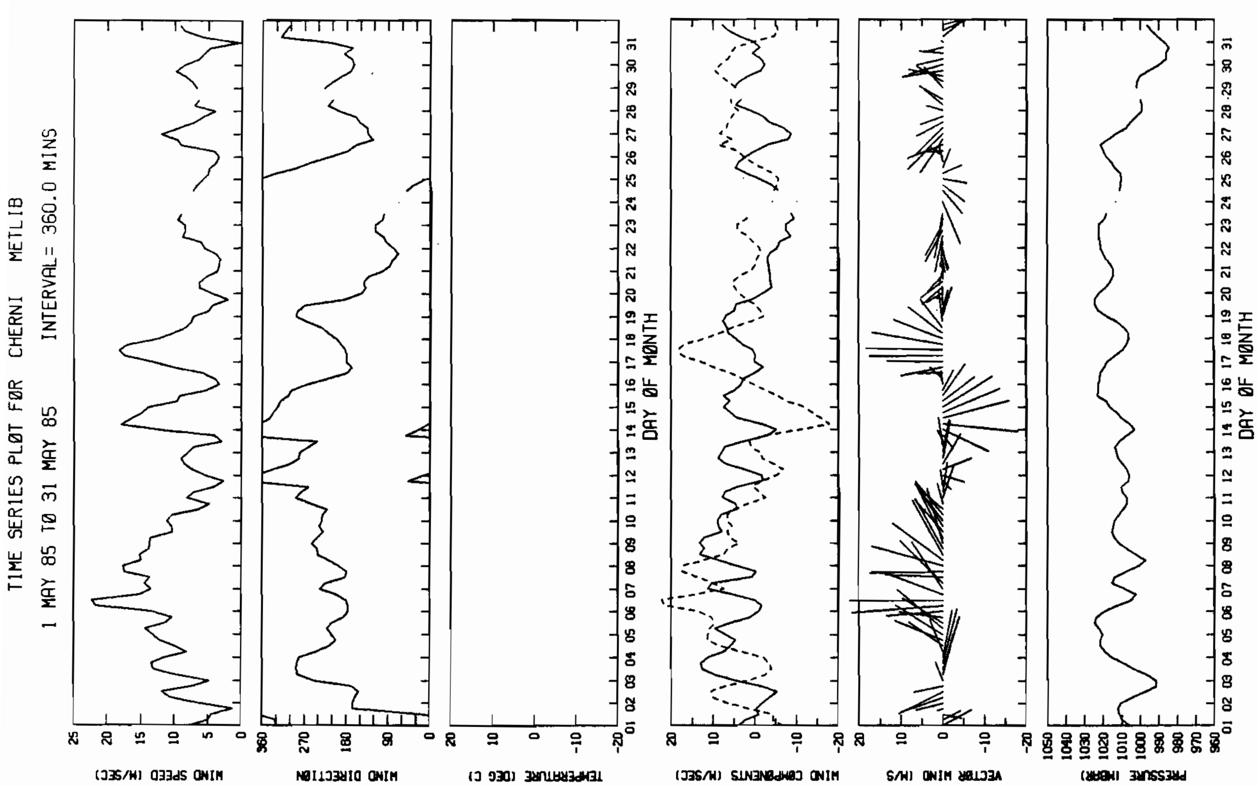

TIME SERIES PLØT FØR CHERNI METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

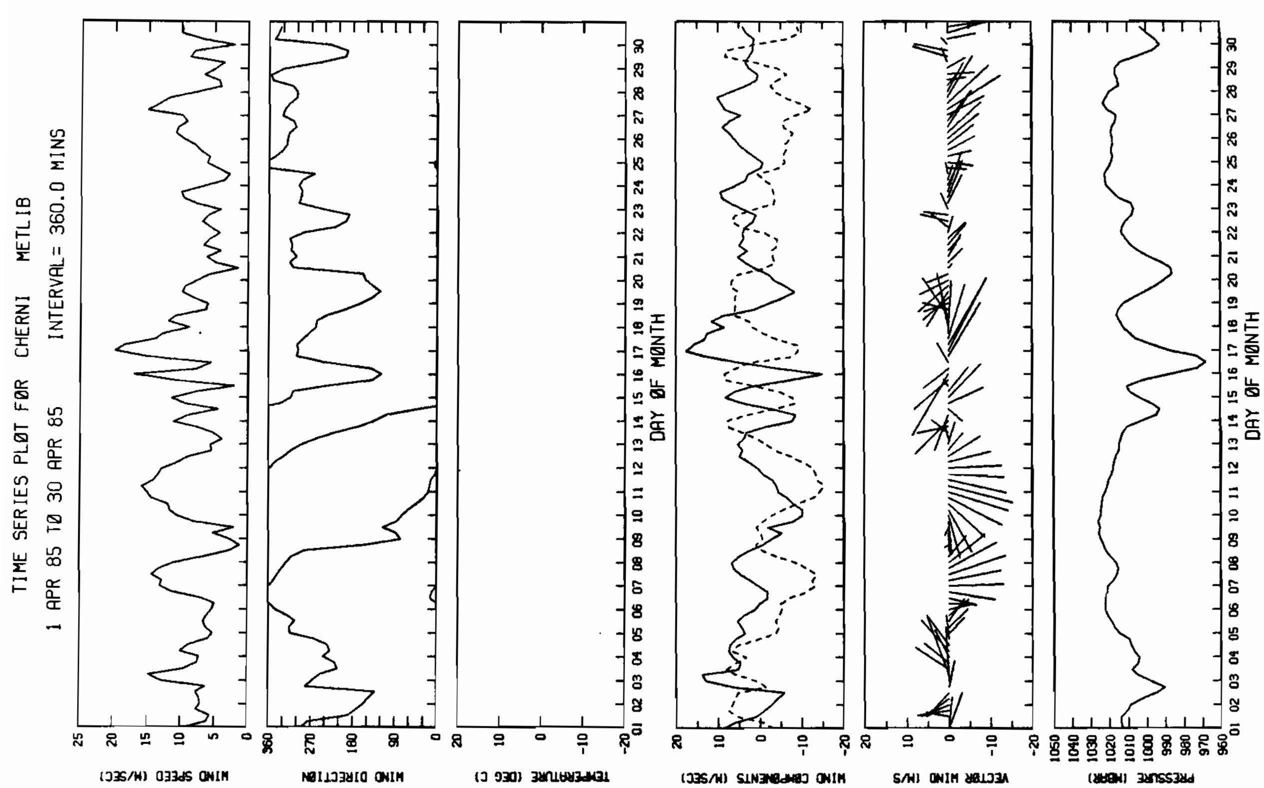

TIME SERIES PLØT FØR CHERNI METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

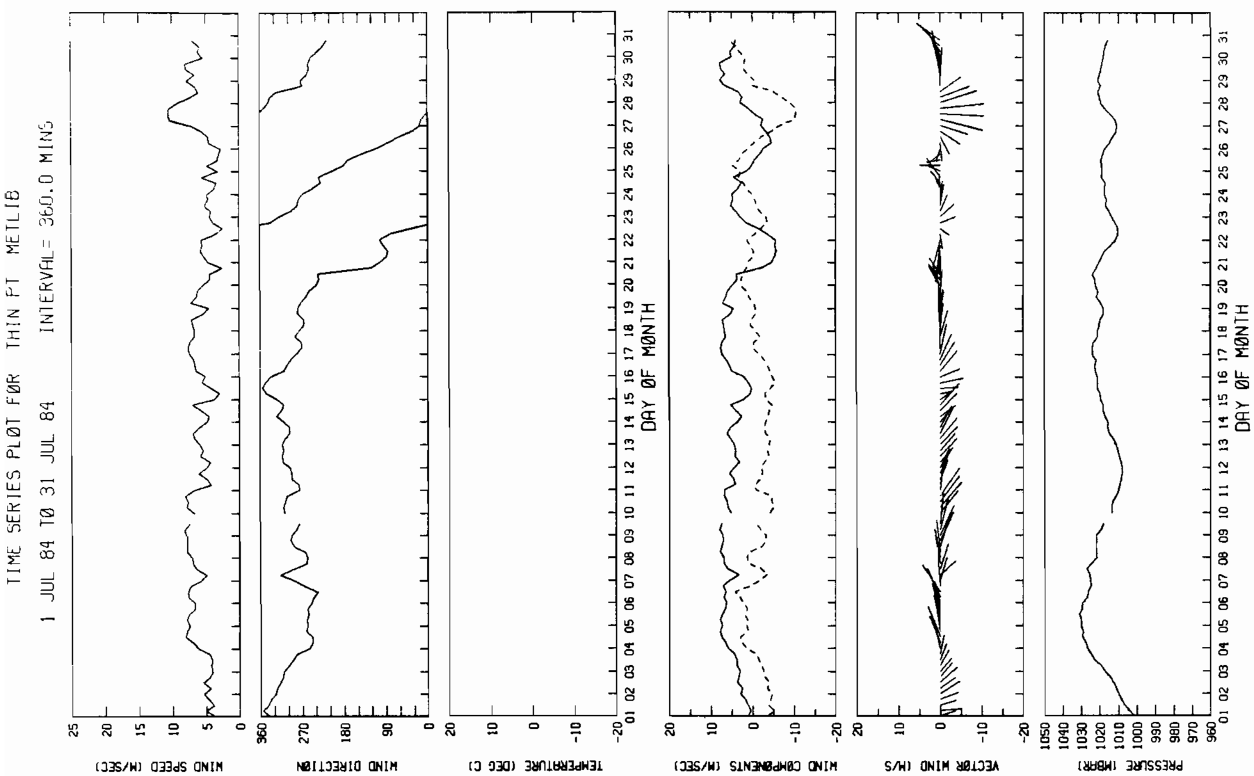

TIME SERIES PLØT FØR CHERNI METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

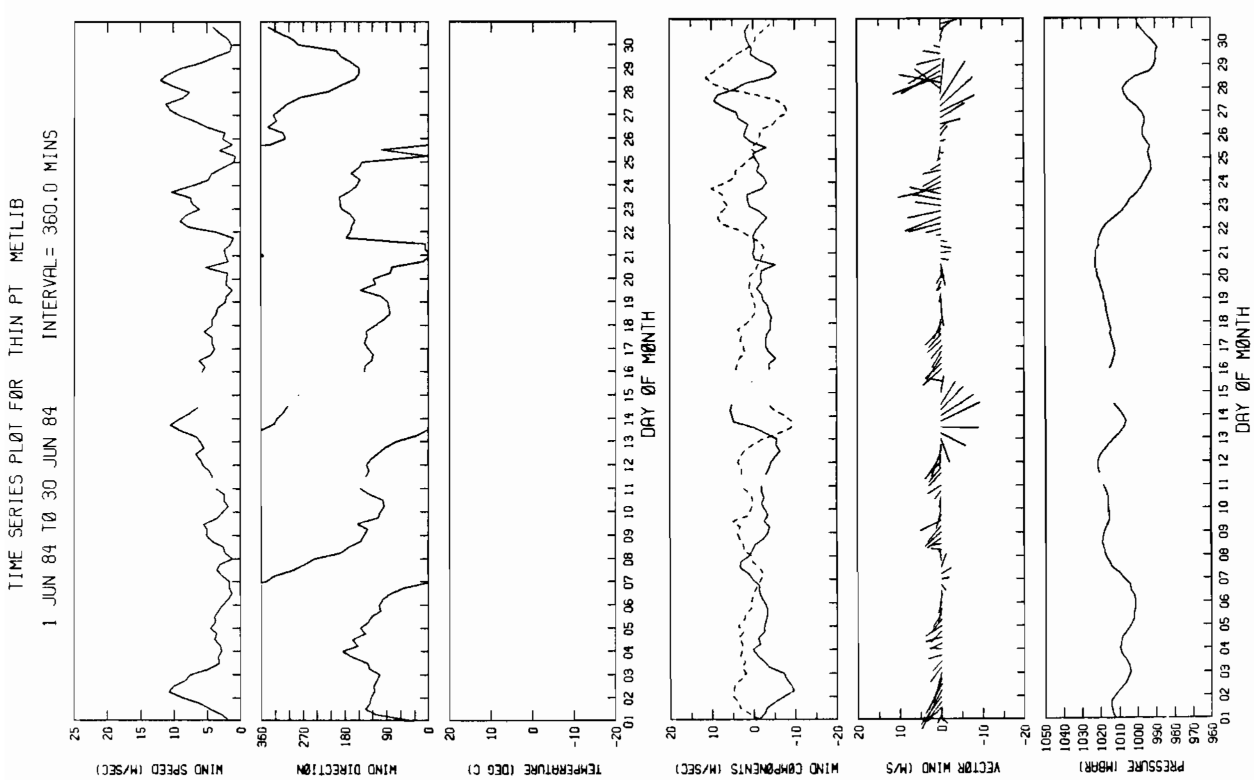

TIME SERIES PLØT FØR CHERNI METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

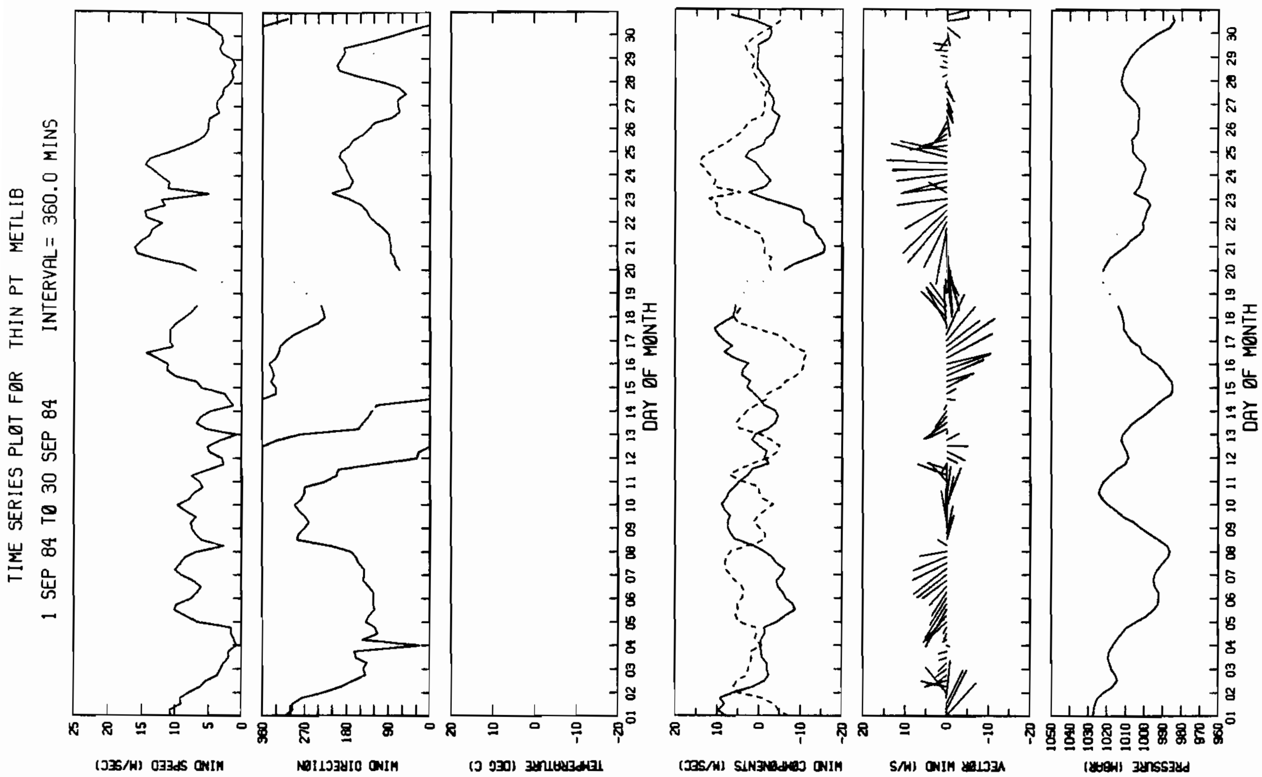

TIME SERIES PLØT FØR CHERNI METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR CHERNI METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

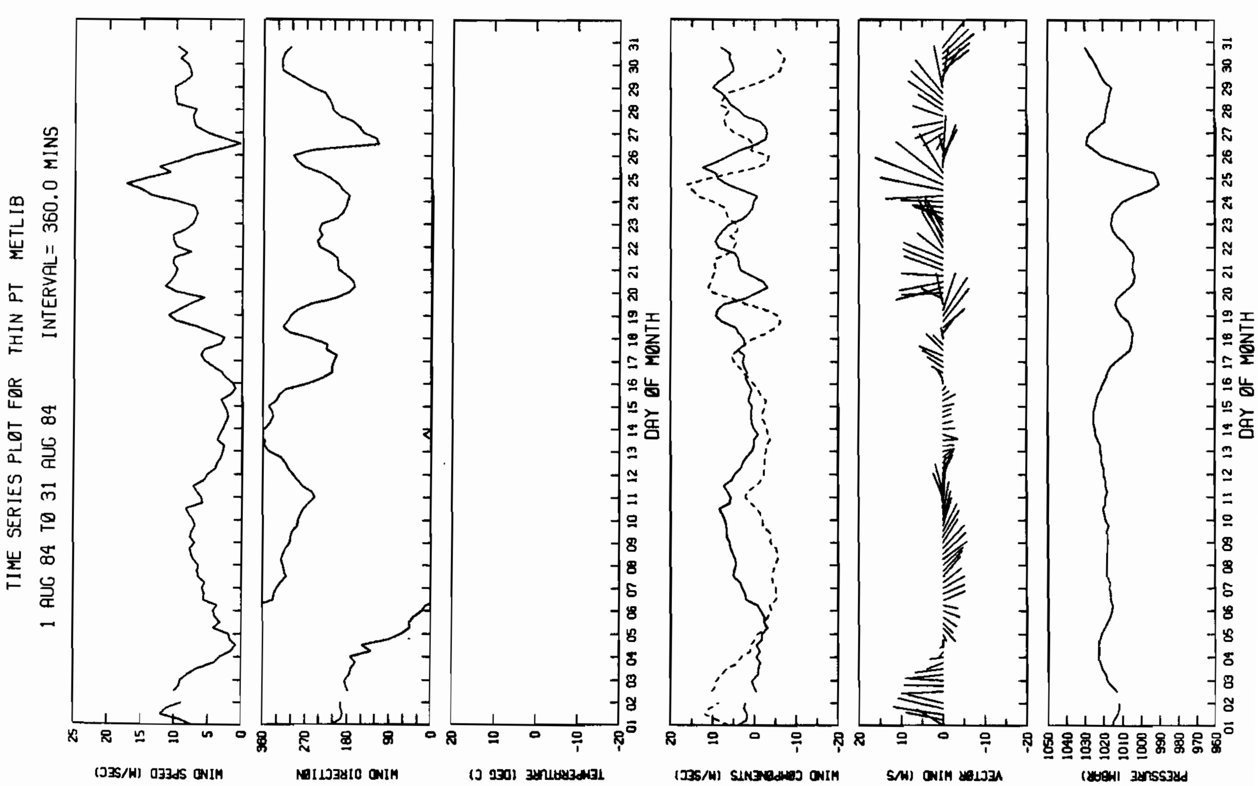

TIME SERIES PLØT FØR CHERNI METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR THIN PT METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

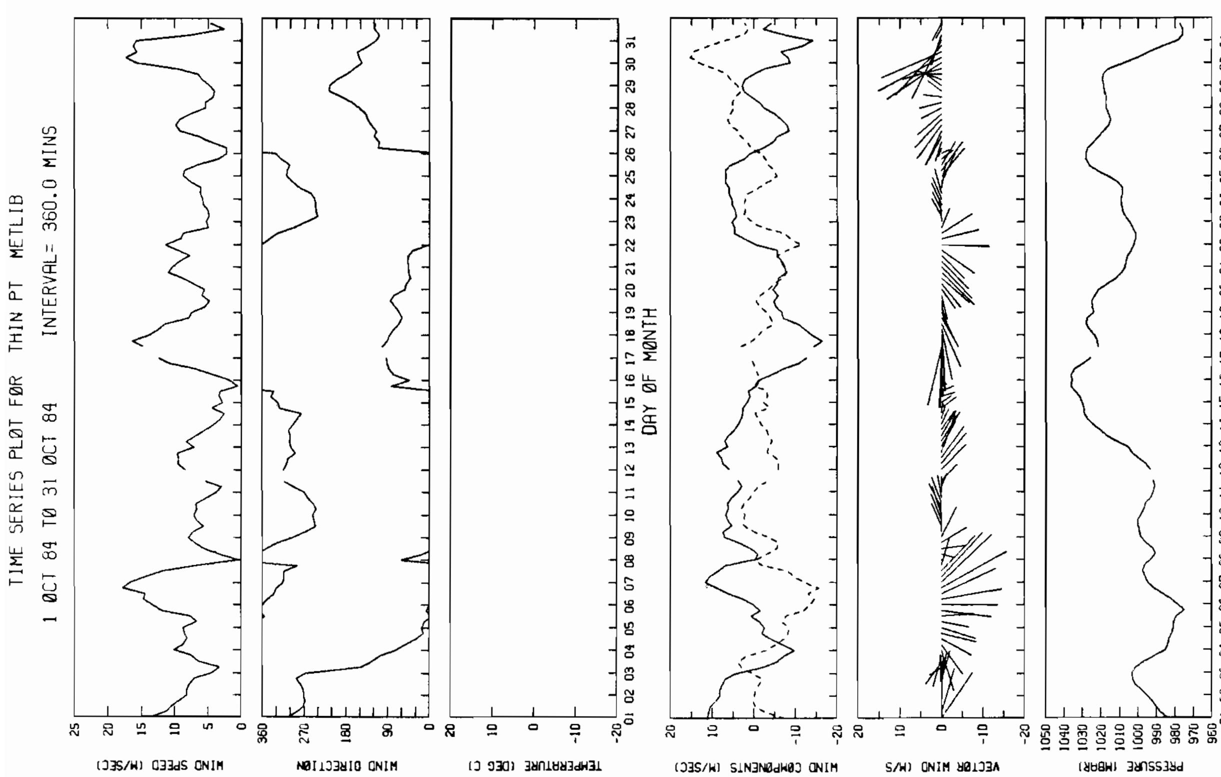

TIME SERIES PLØT FØR THIN PT METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

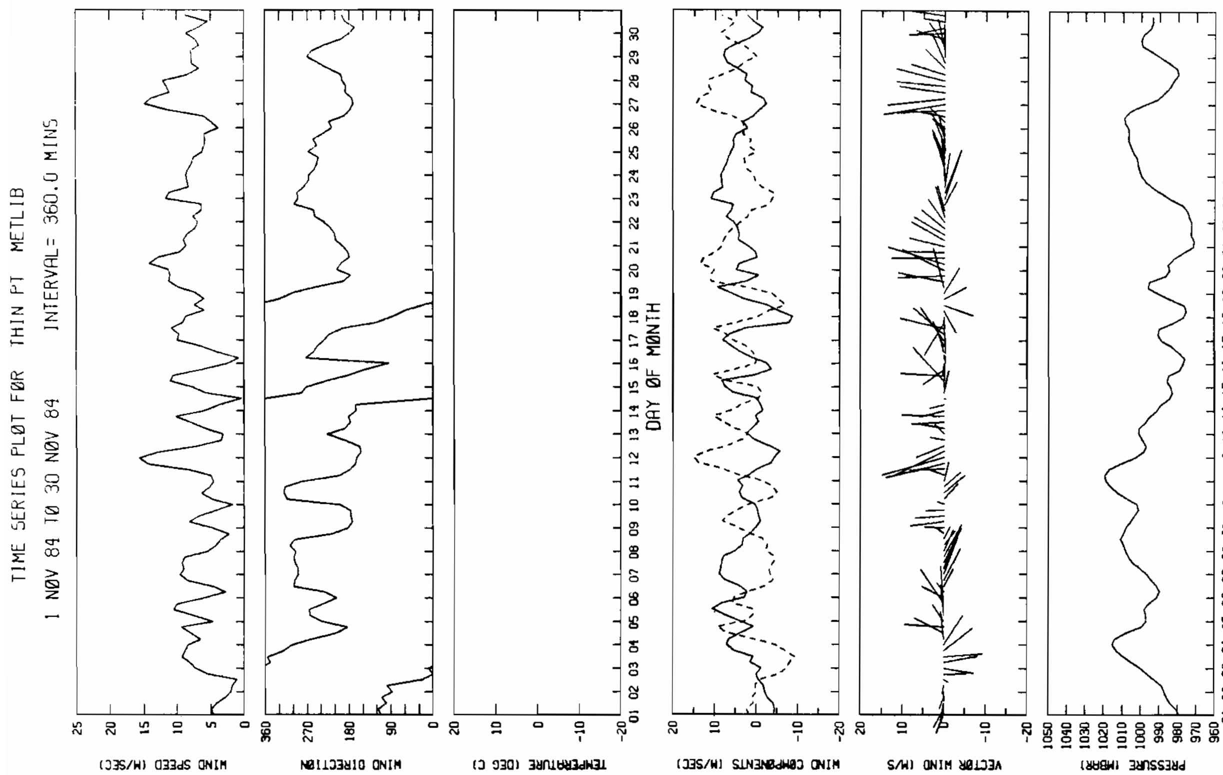


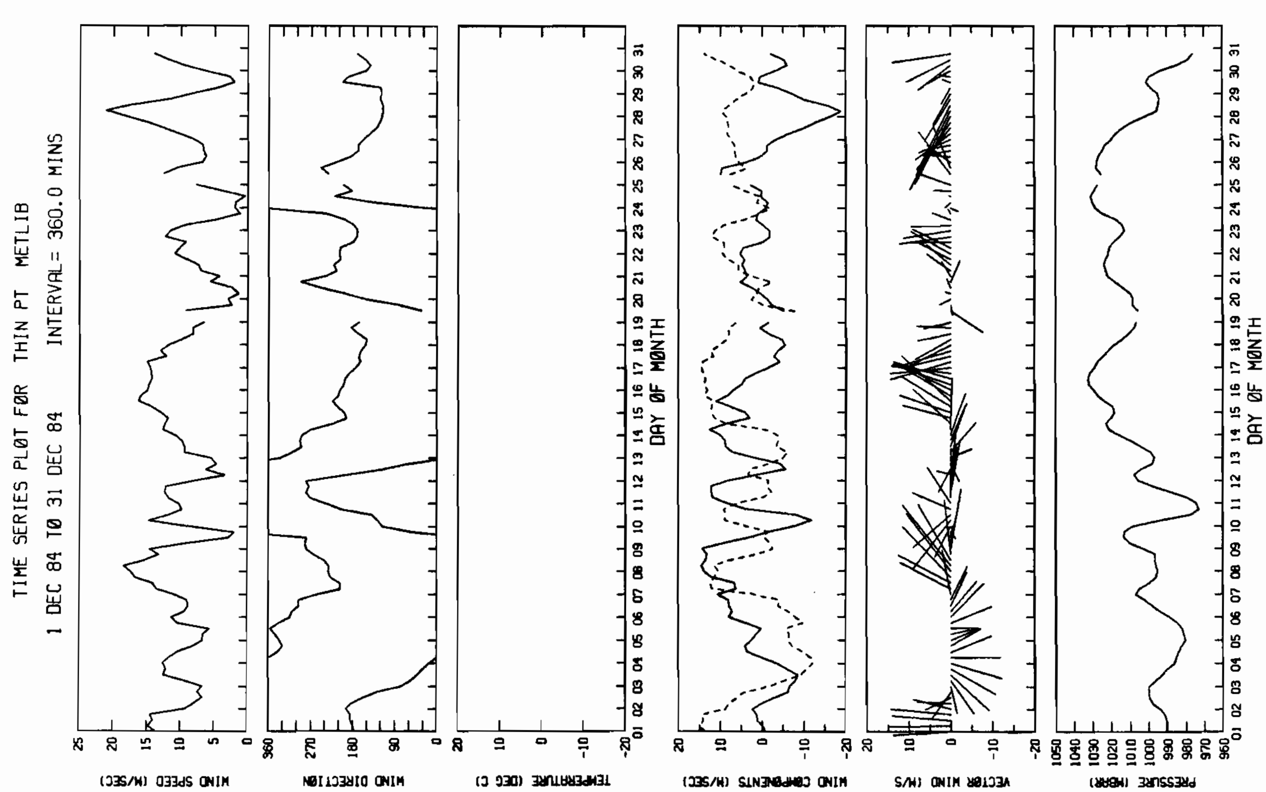
TIME SERIES PLØT FØR THIN PT METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

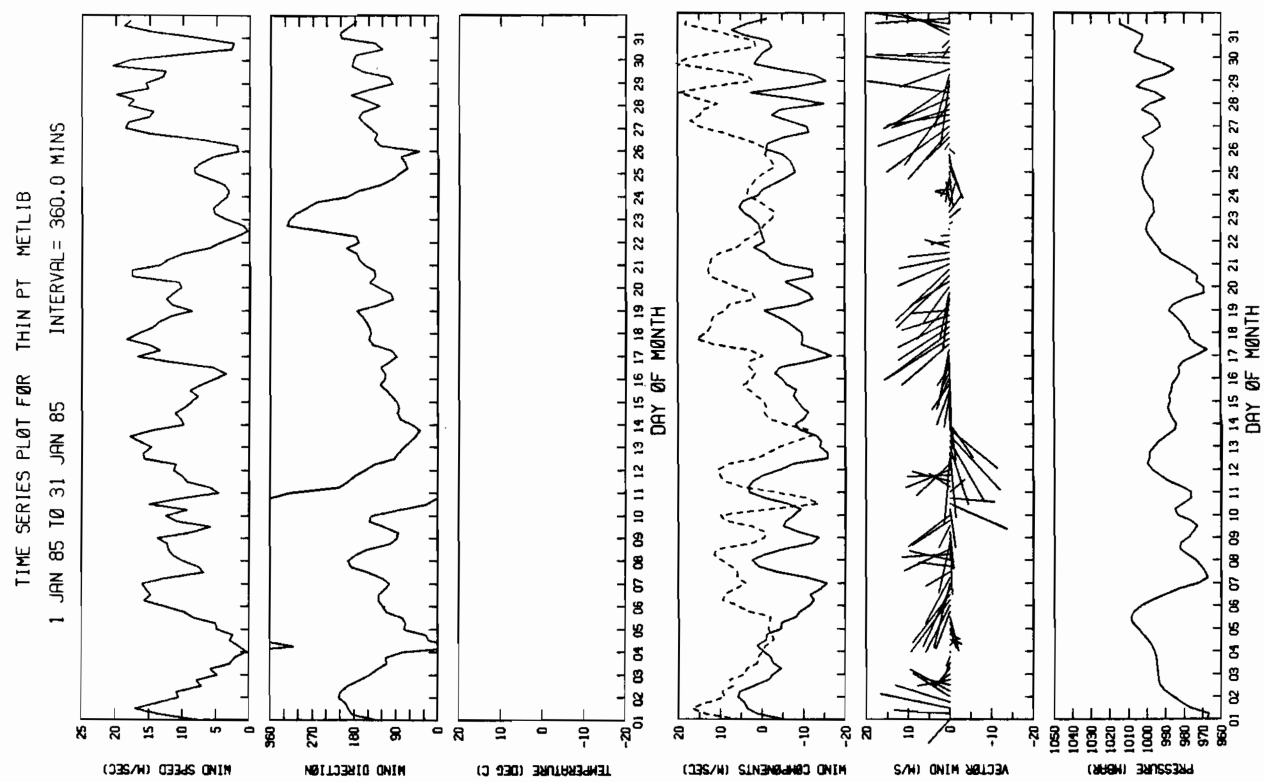


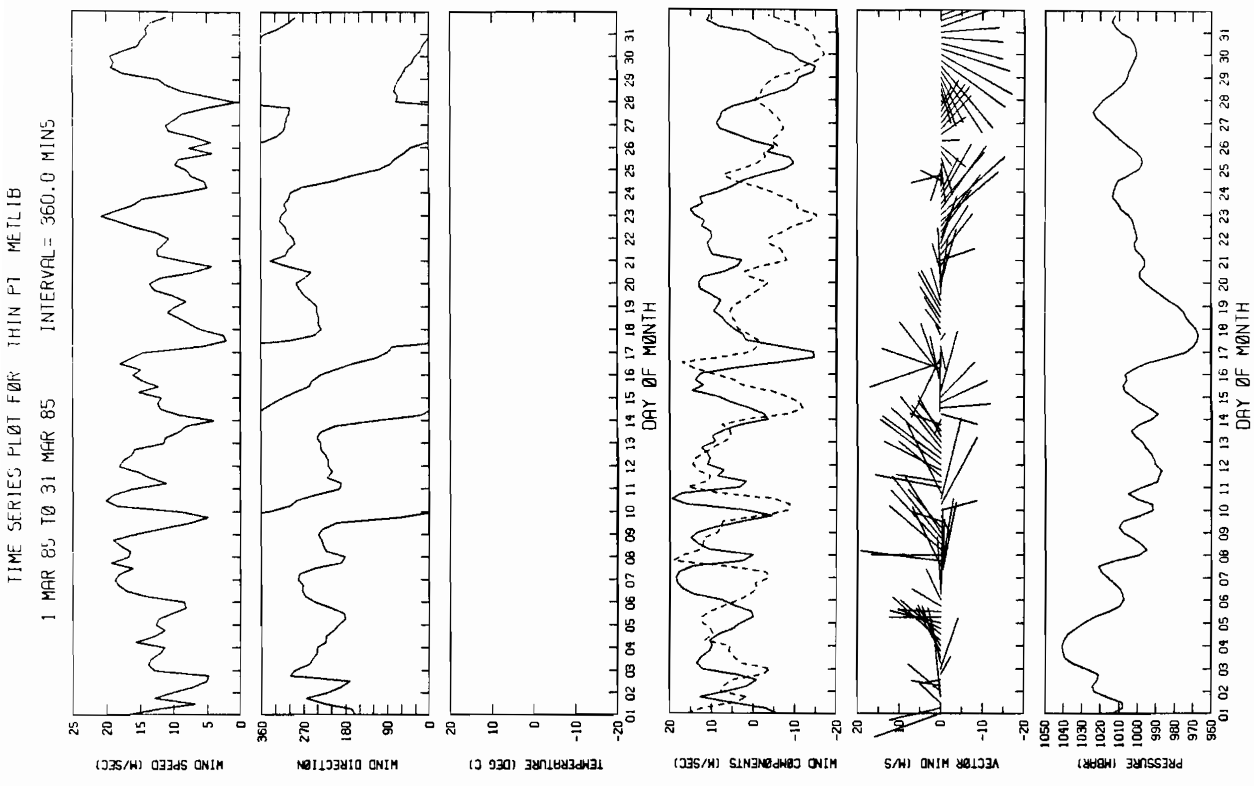
TIME SERIES PLØT FØR THIN PT METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

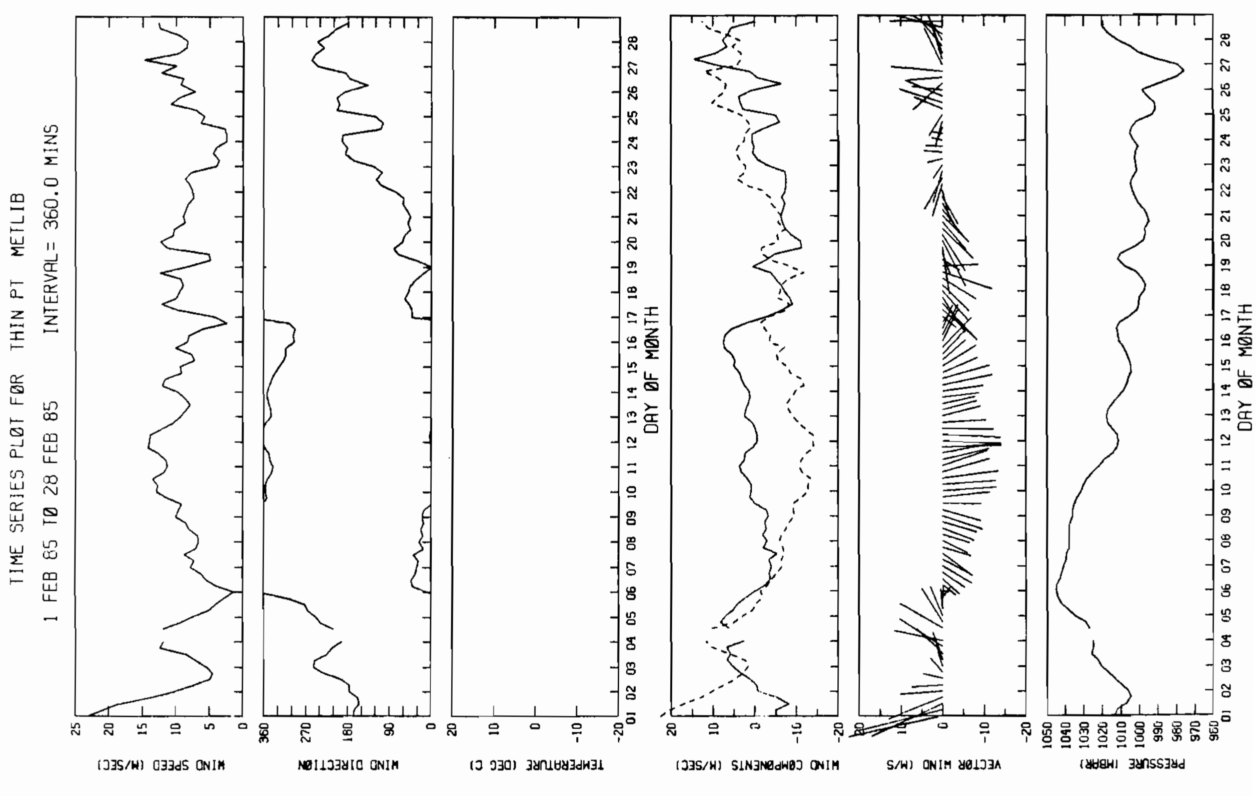

TIME SERIES PLØT FØR THIN PT METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

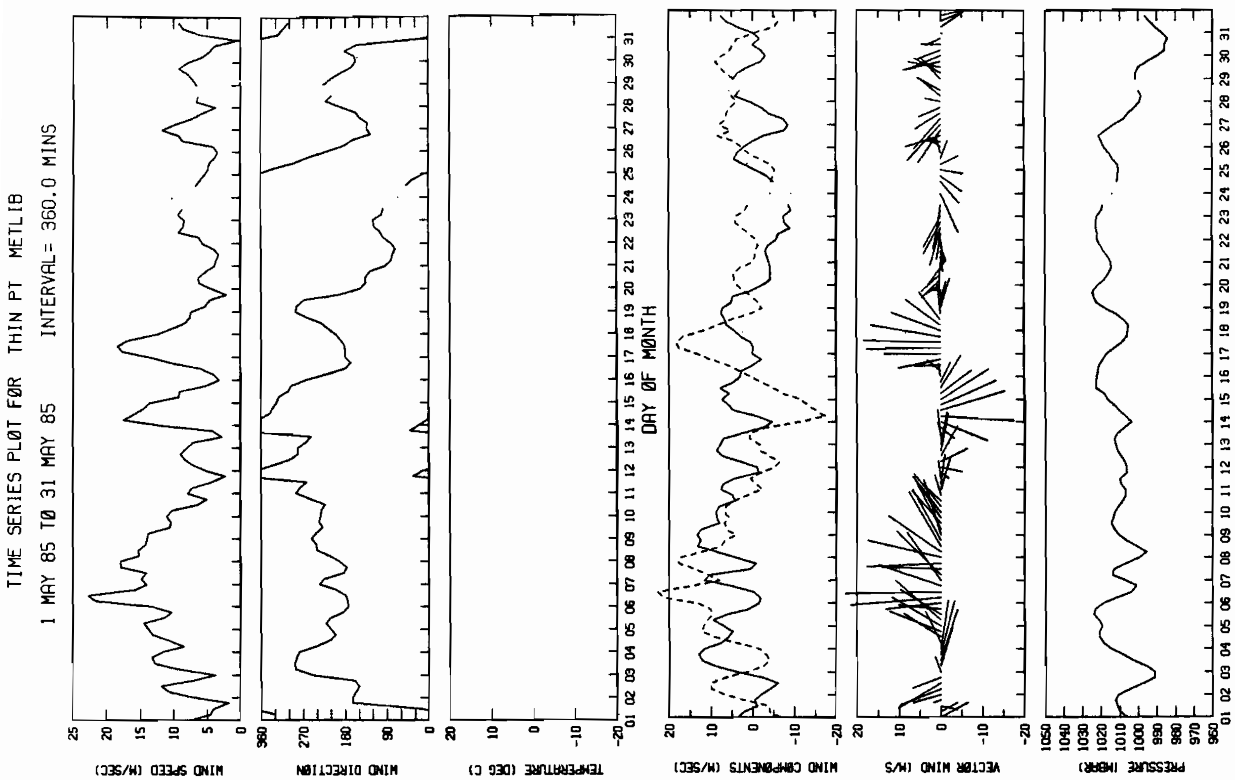

TIME SERIES PLØT FØR THIN PT METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

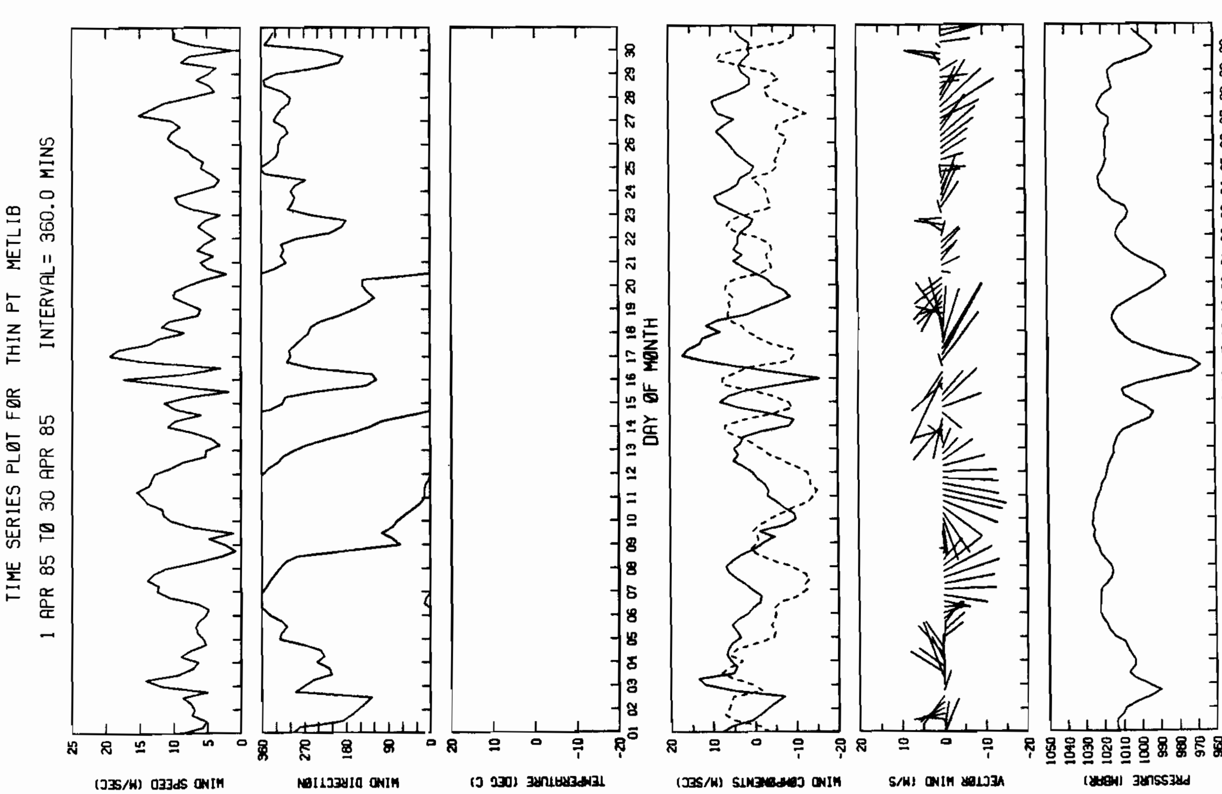

TIME SERIES PLØT FØR THIN PT METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

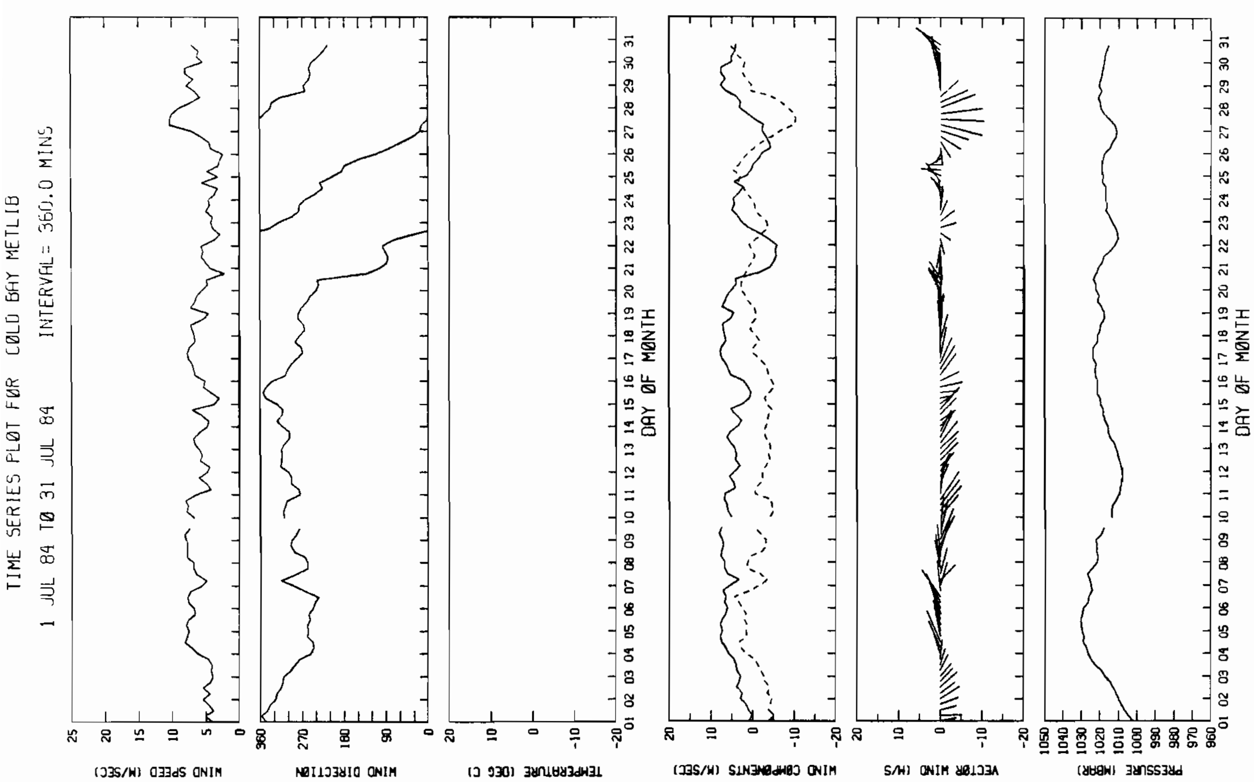

TIME SERIES PLØT FØR THIN PT METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

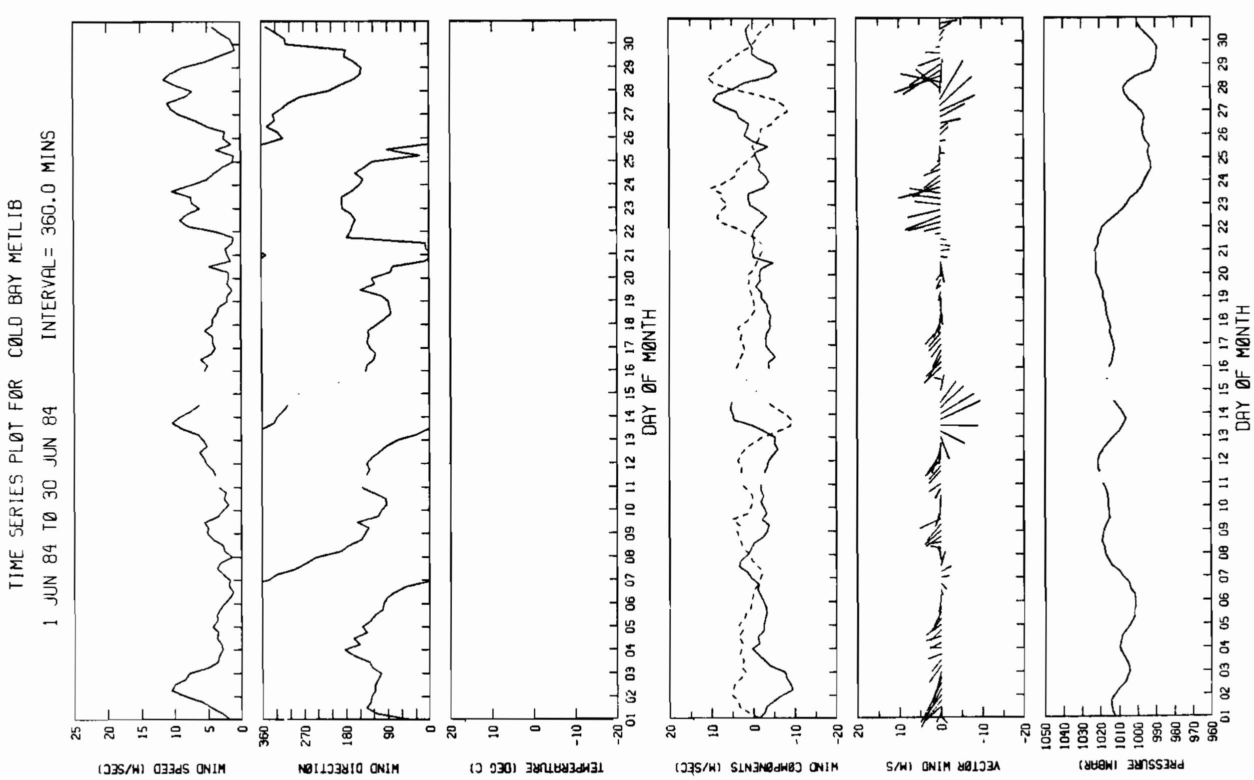

TIME SERIES PLOT FOR THIN PT METLIB
1 MAR 85 TO 31 MAR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH

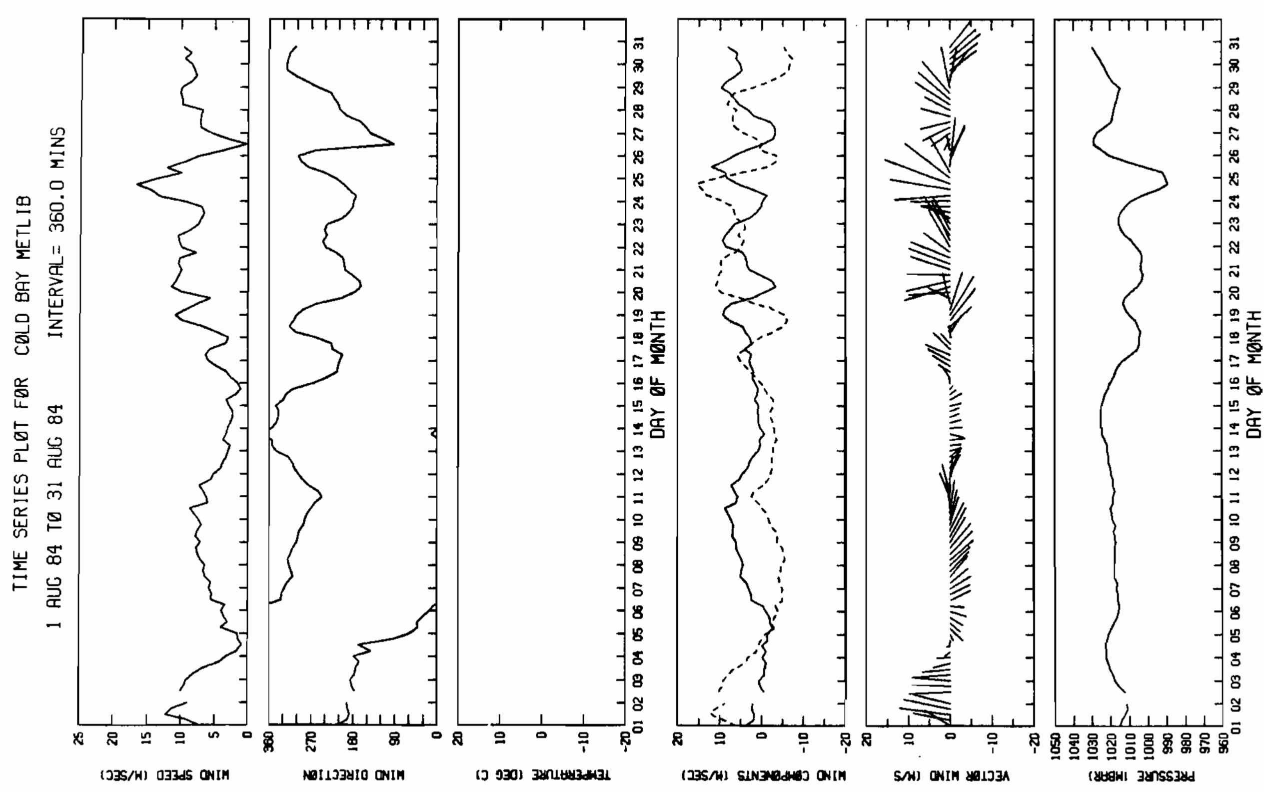

TIME SERIES PLOT FOR THIN PT METLIB
1 FEB 85 TO 28 FEB 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY OF MONTH

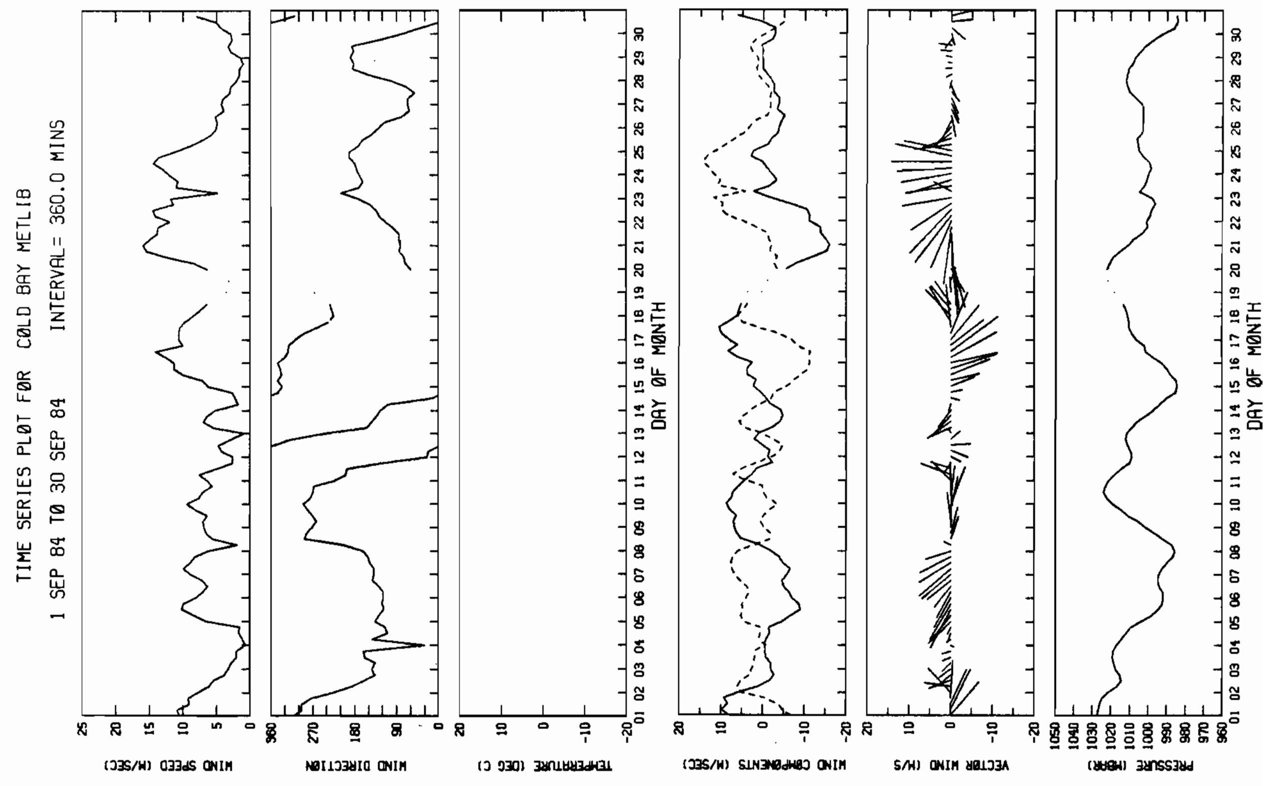

TIME SERIES PLØT FØR THIN PT METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
DAY ØF MØNTH
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)

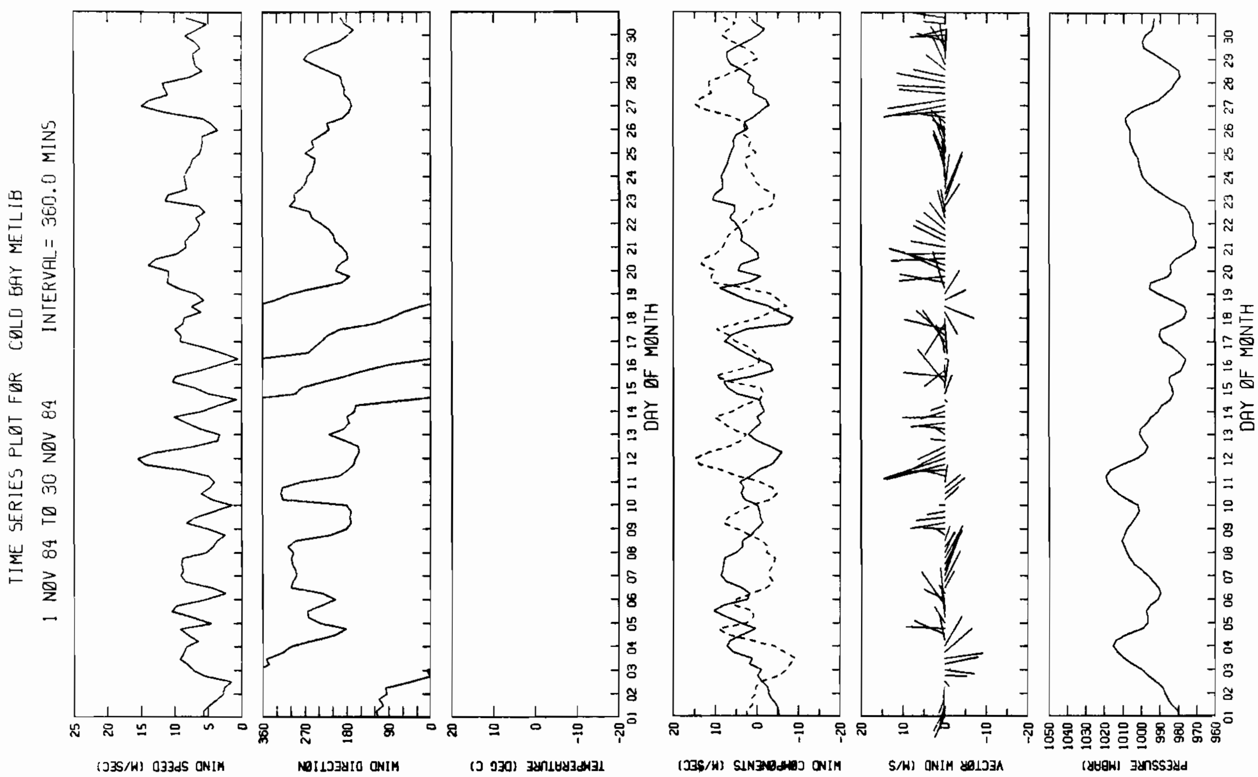

TIME SERIES PLØT FØR THIN PT METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
DAY ØF MØNTH
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)

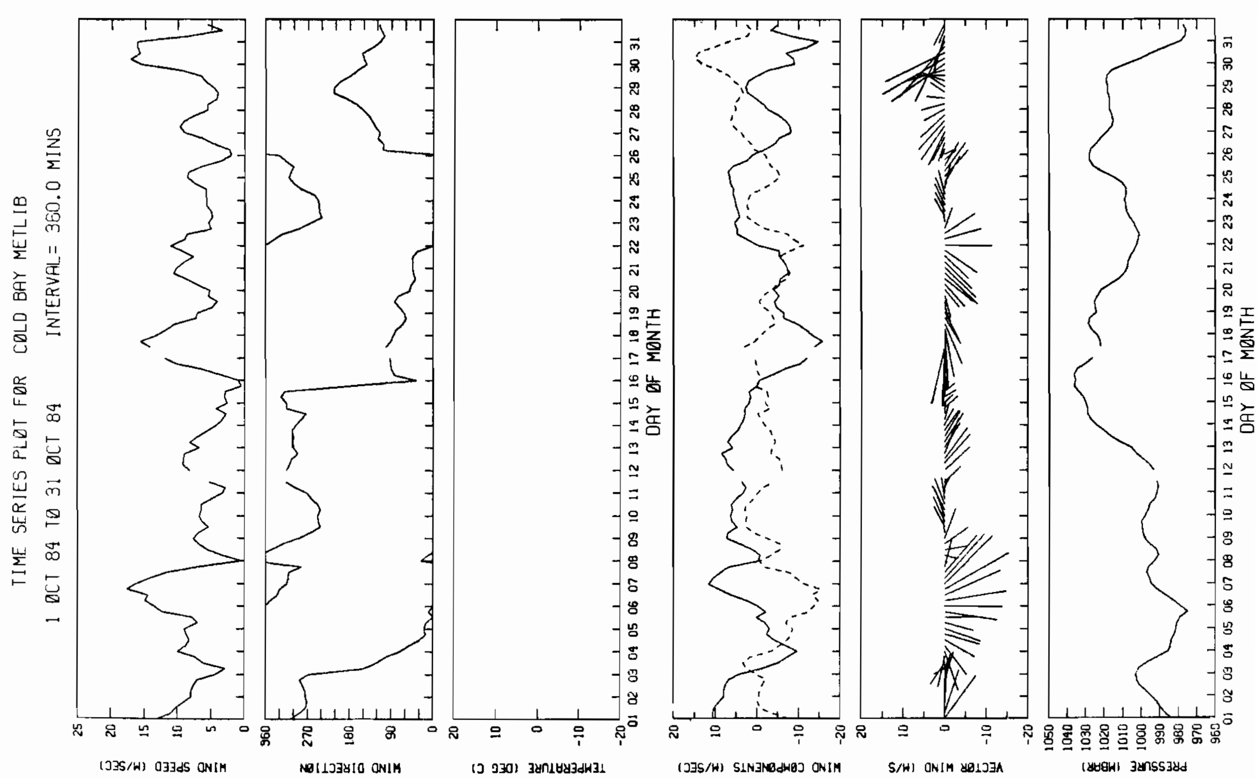

TIME SERIES PLØT FØR COLD BAY METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

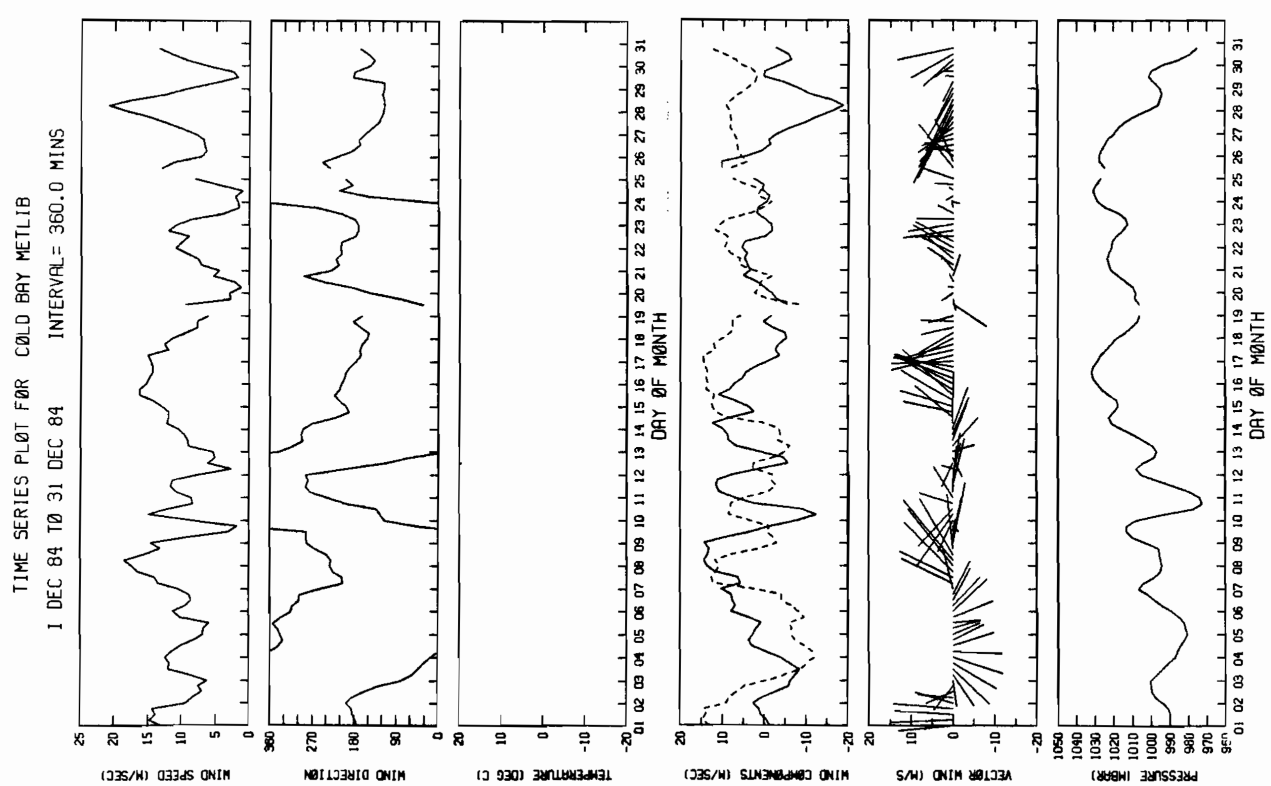

TIME SERIES PLØT FØR COLD BAY METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

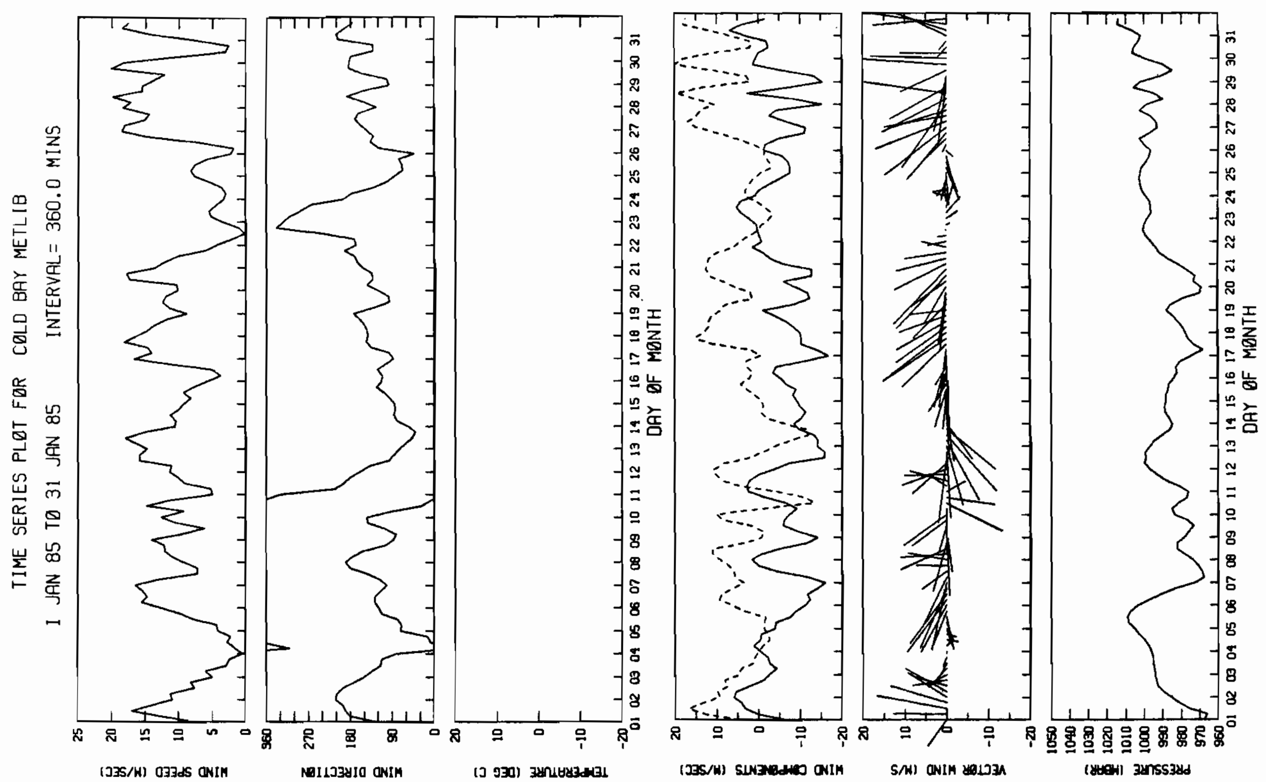

TIME SERIES PLØT FØR COLD BAY METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

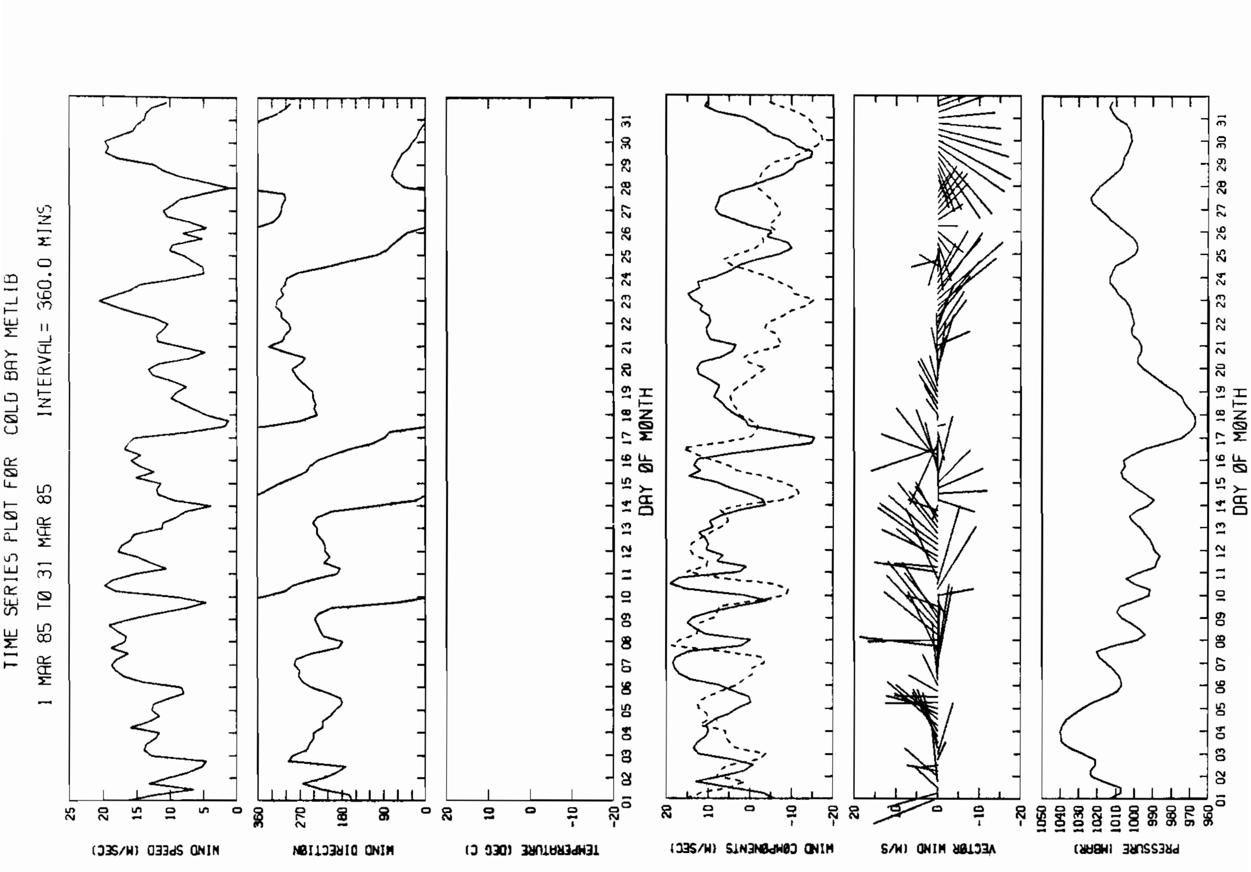

TIME SERIES PLØT FØR COLD BAY METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

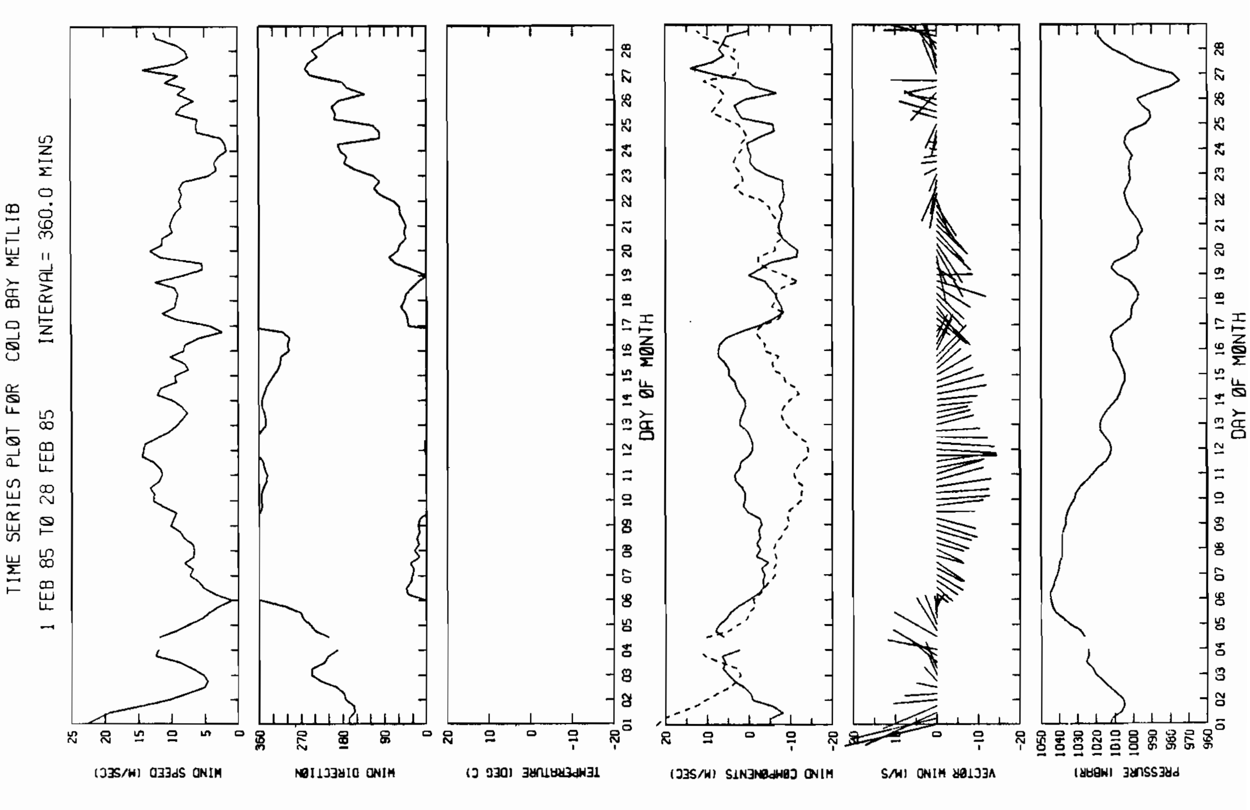

TIME SERIES PLØT FØR CØLD BAY METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

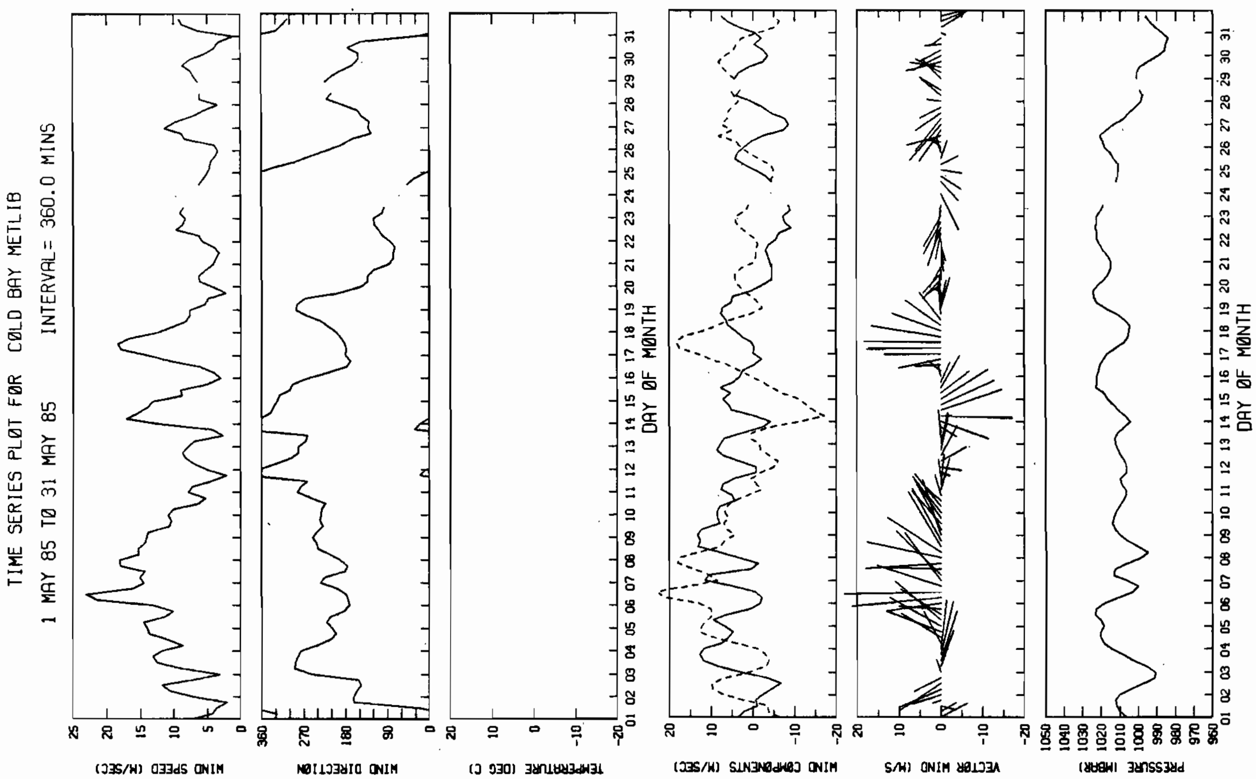

TIME SERIES PLØT FØR CØLD BAY METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

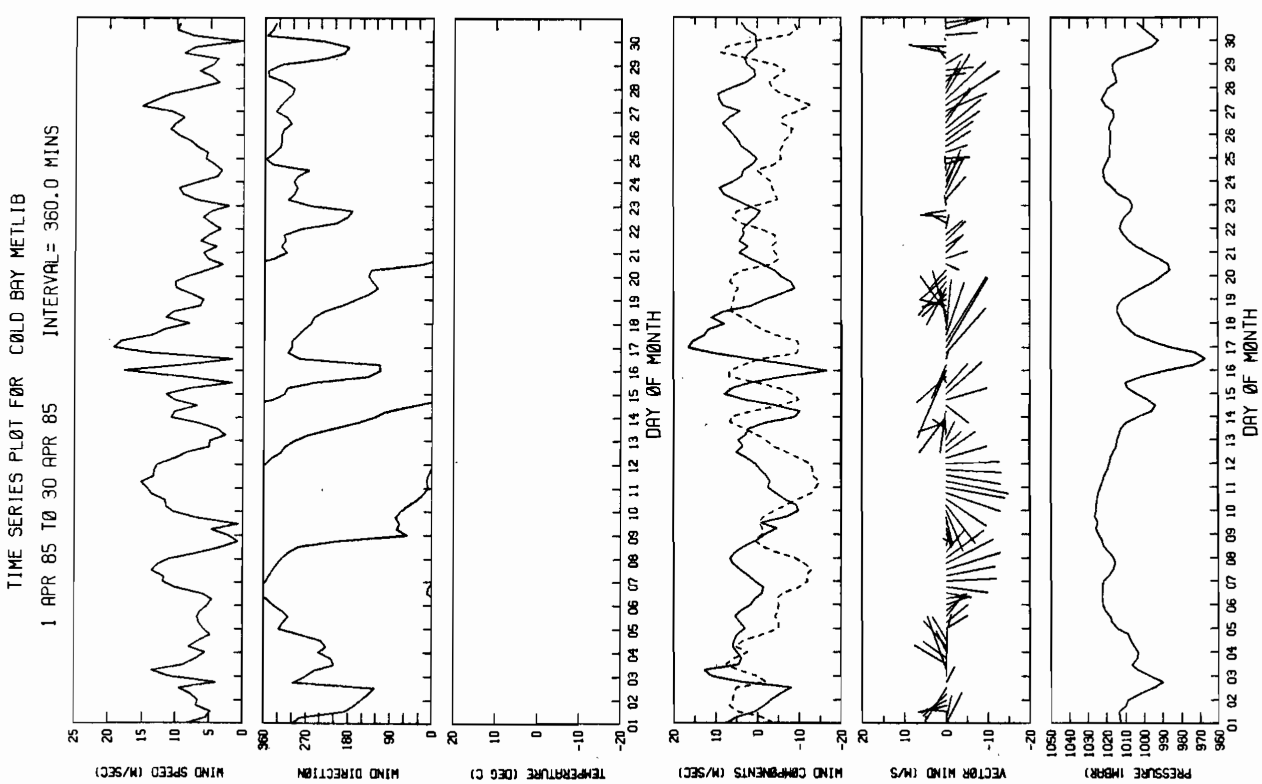

TIME SERIES PLØT FØR COLD BAY METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

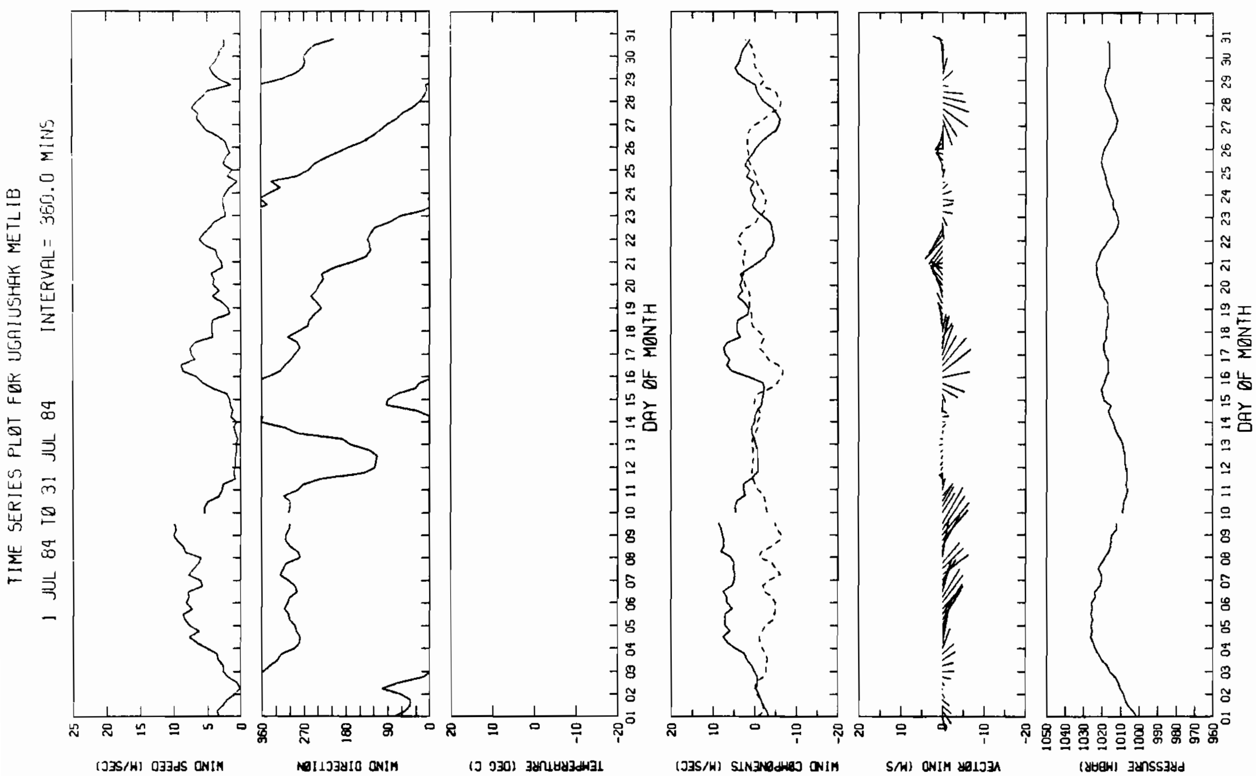

TIME SERIES PLØT FØR COLD BAY METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

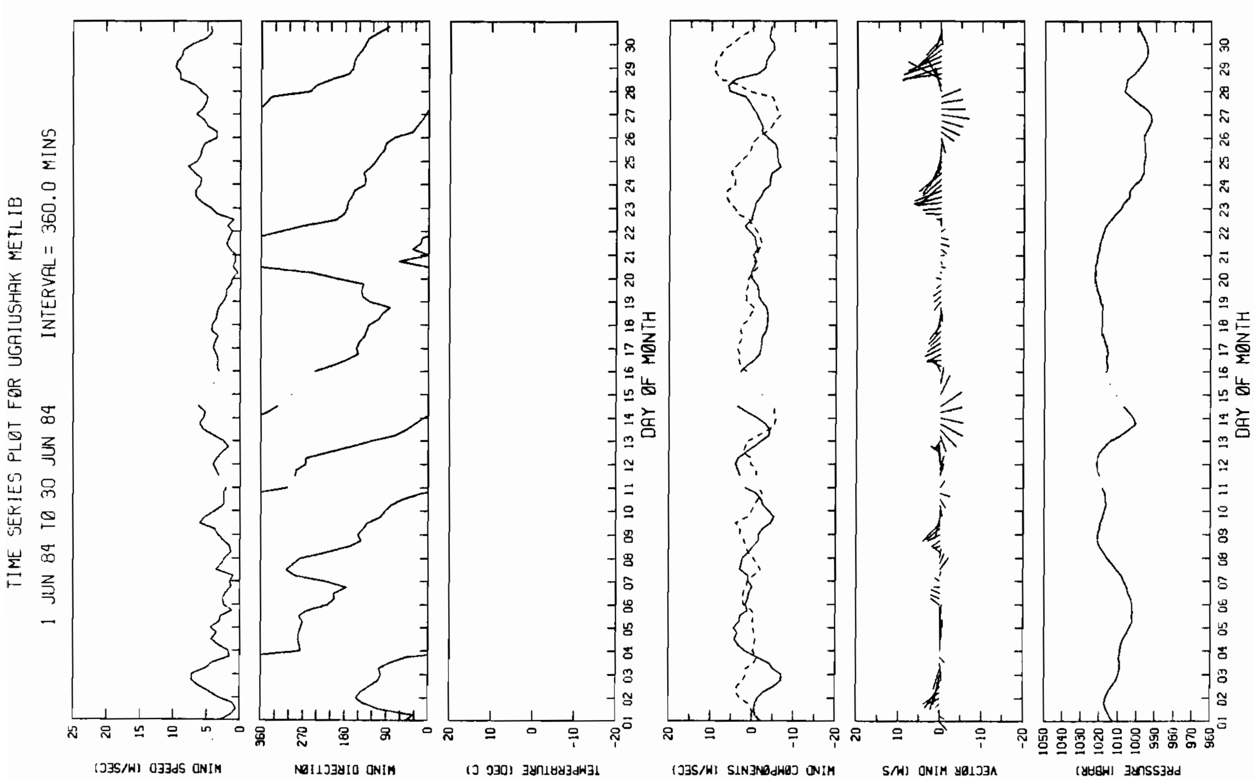

TIME SERIES PLØT FØR COLD BAY METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

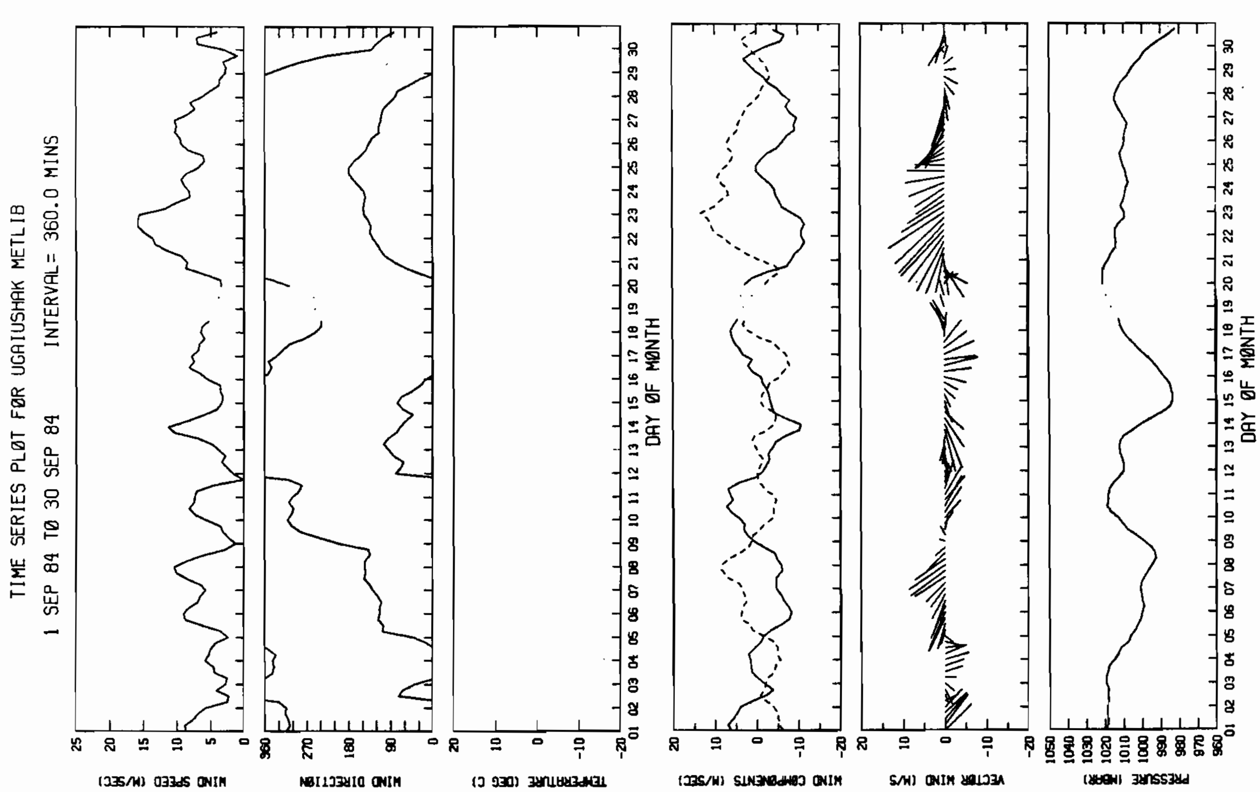

TIME SERIES PLØT FØR COLD BAY METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR CØLD BAY METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

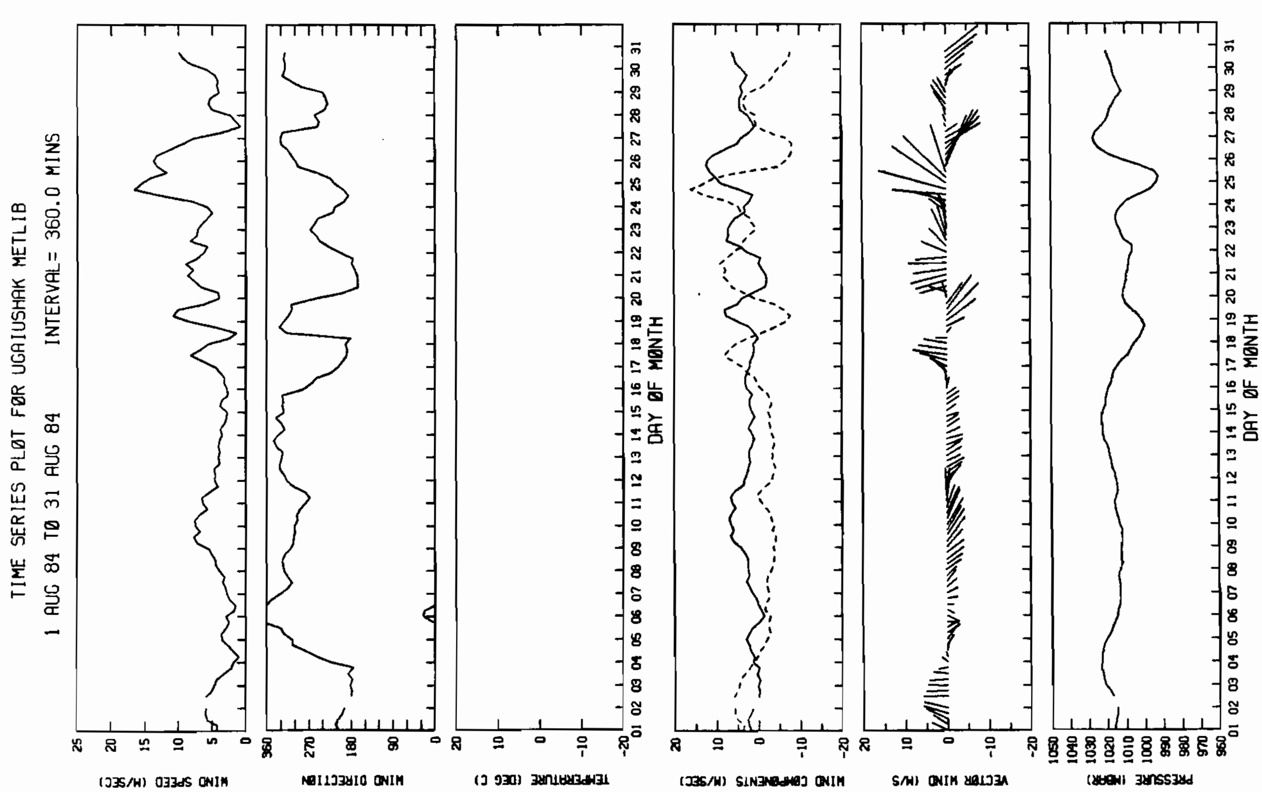

TIME SERIES PLØT FØR CØLD BAY METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

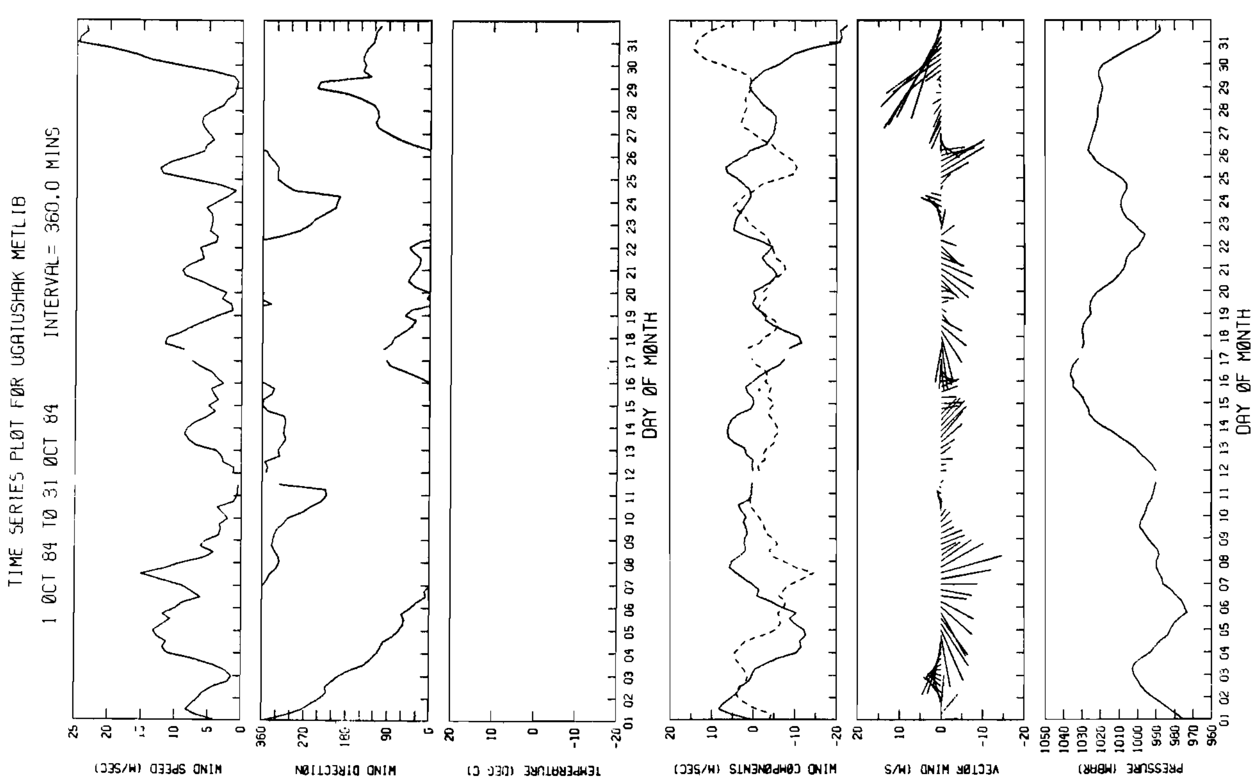

TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

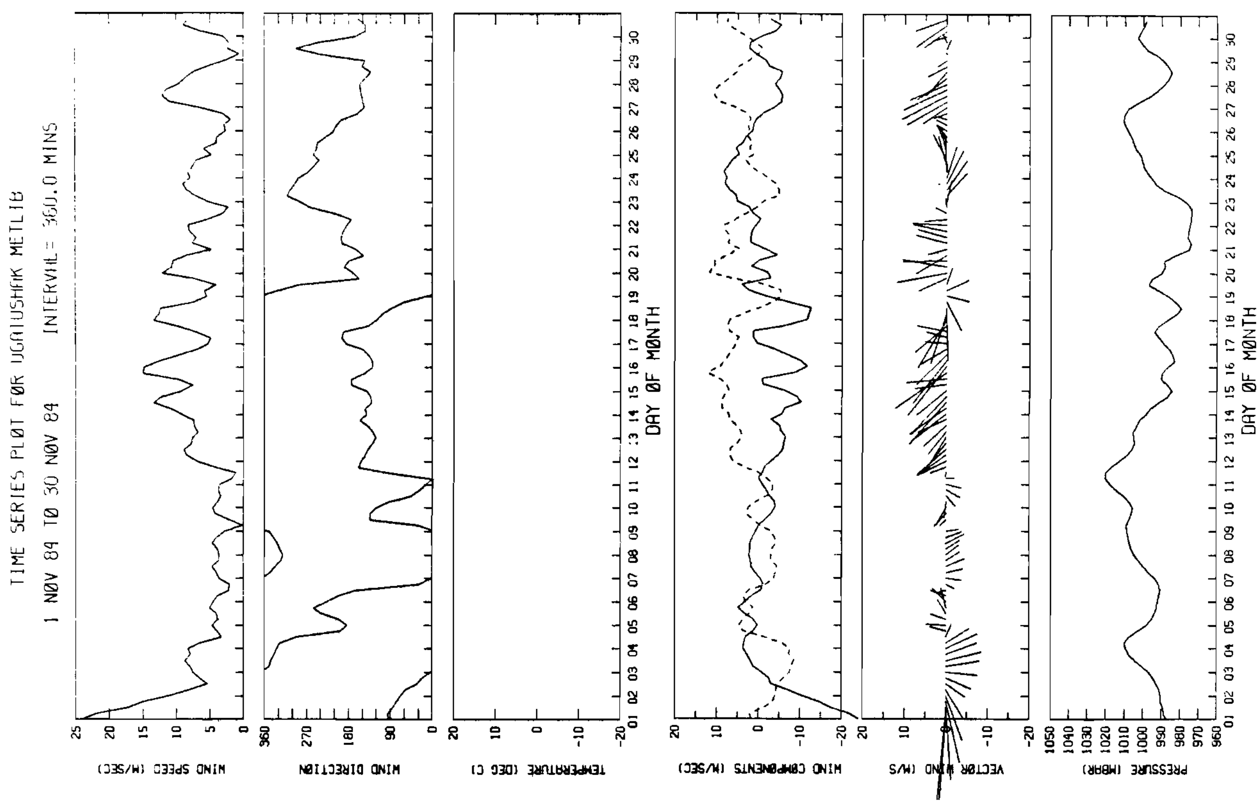


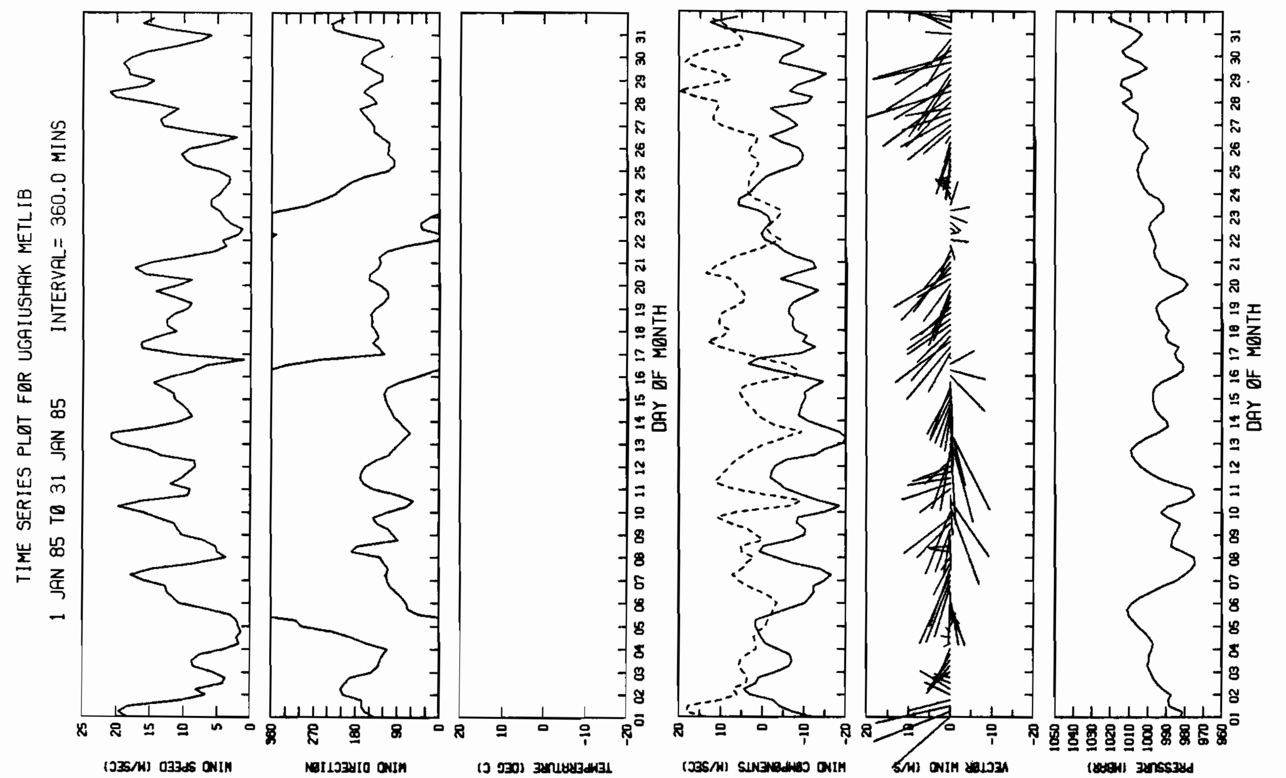
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

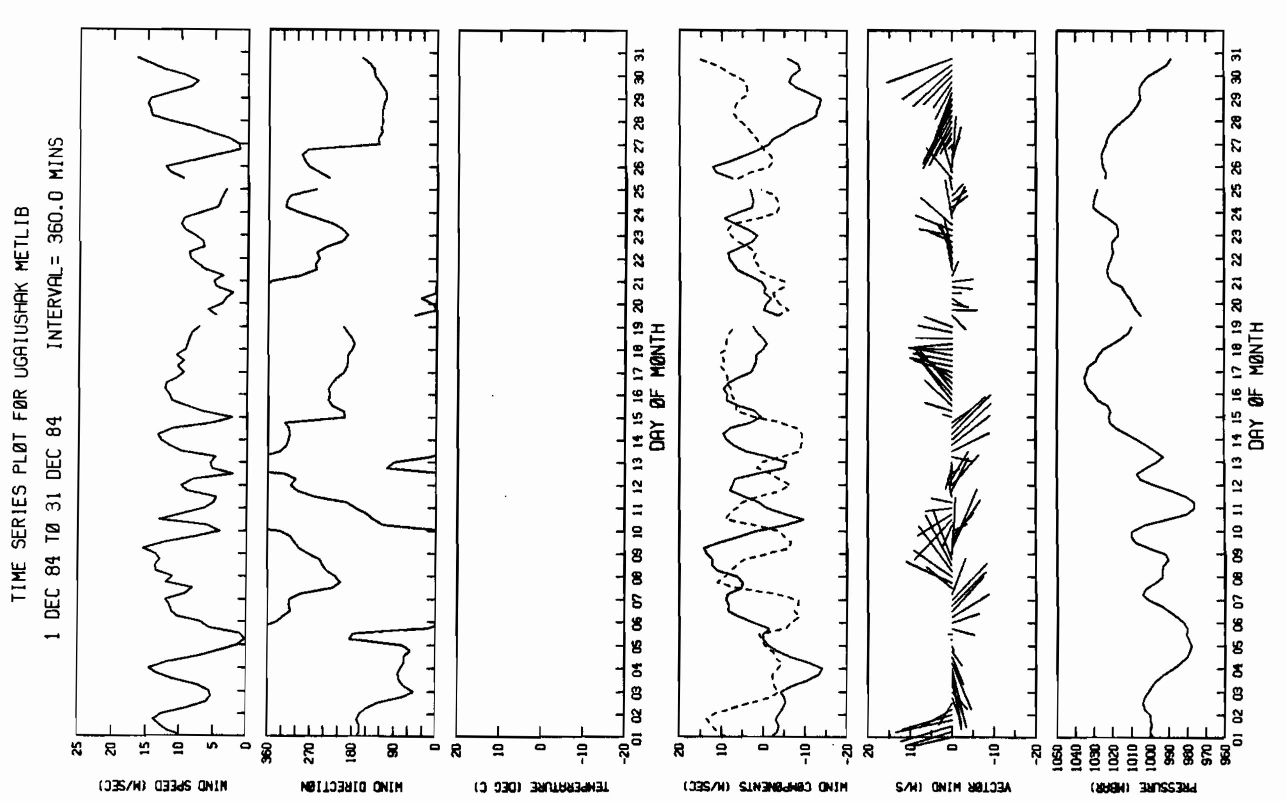


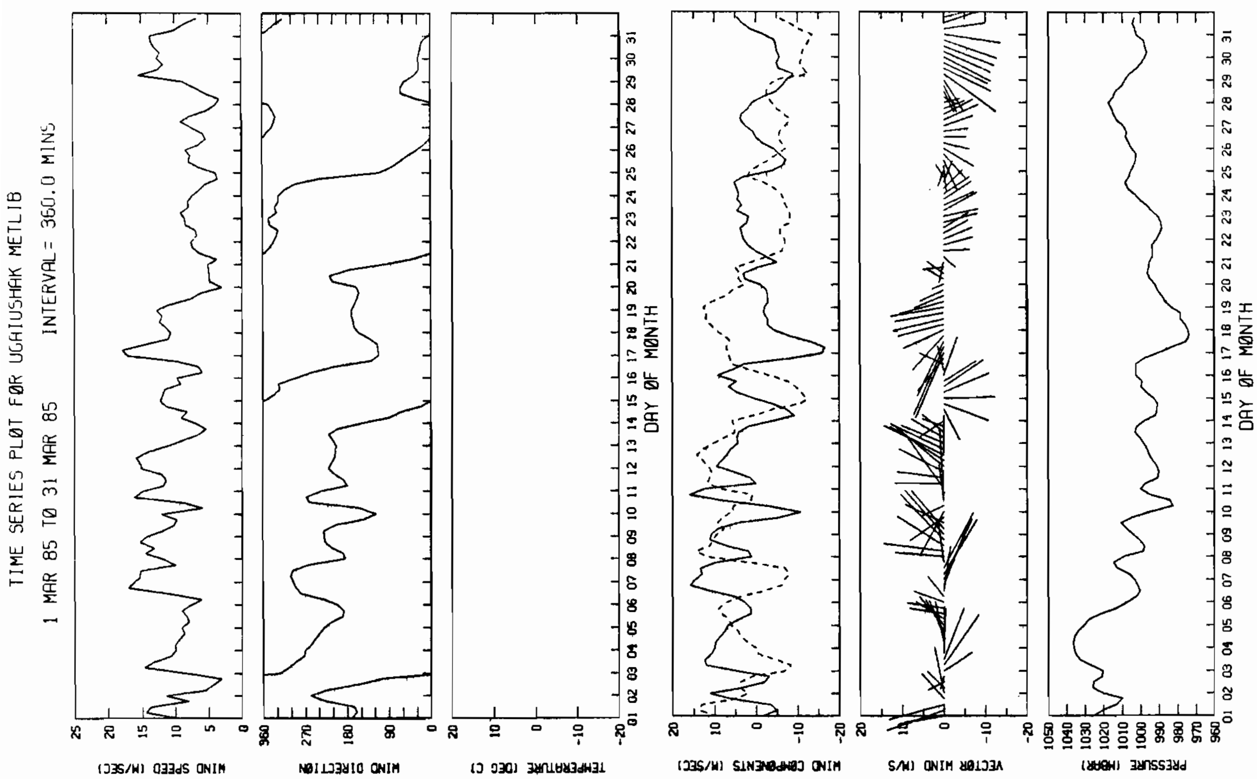
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

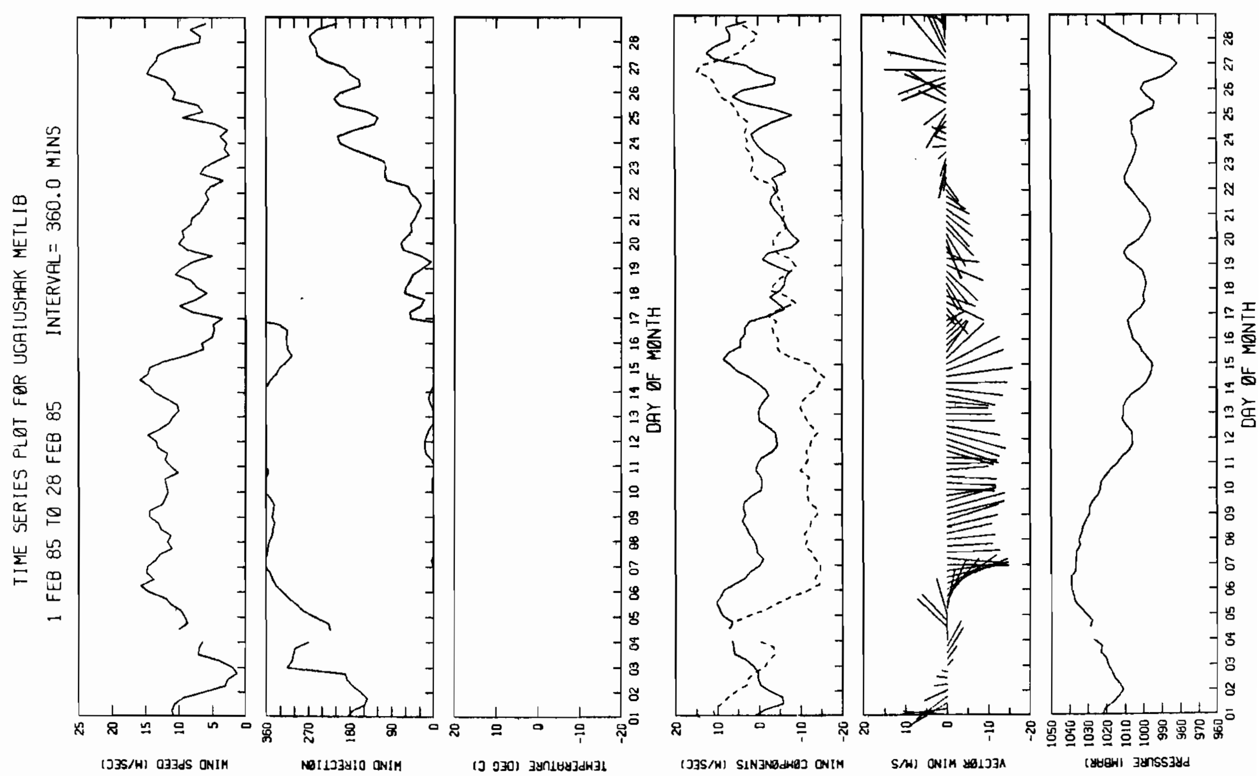

TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

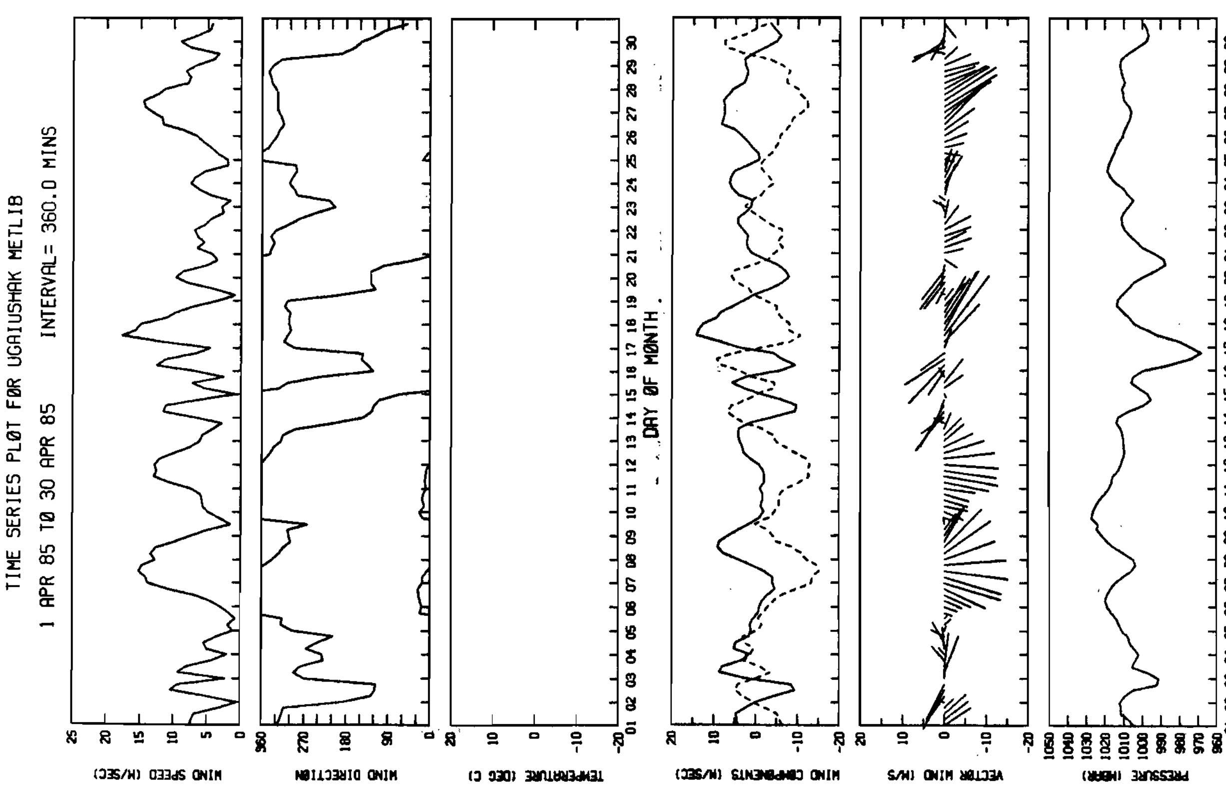

TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH

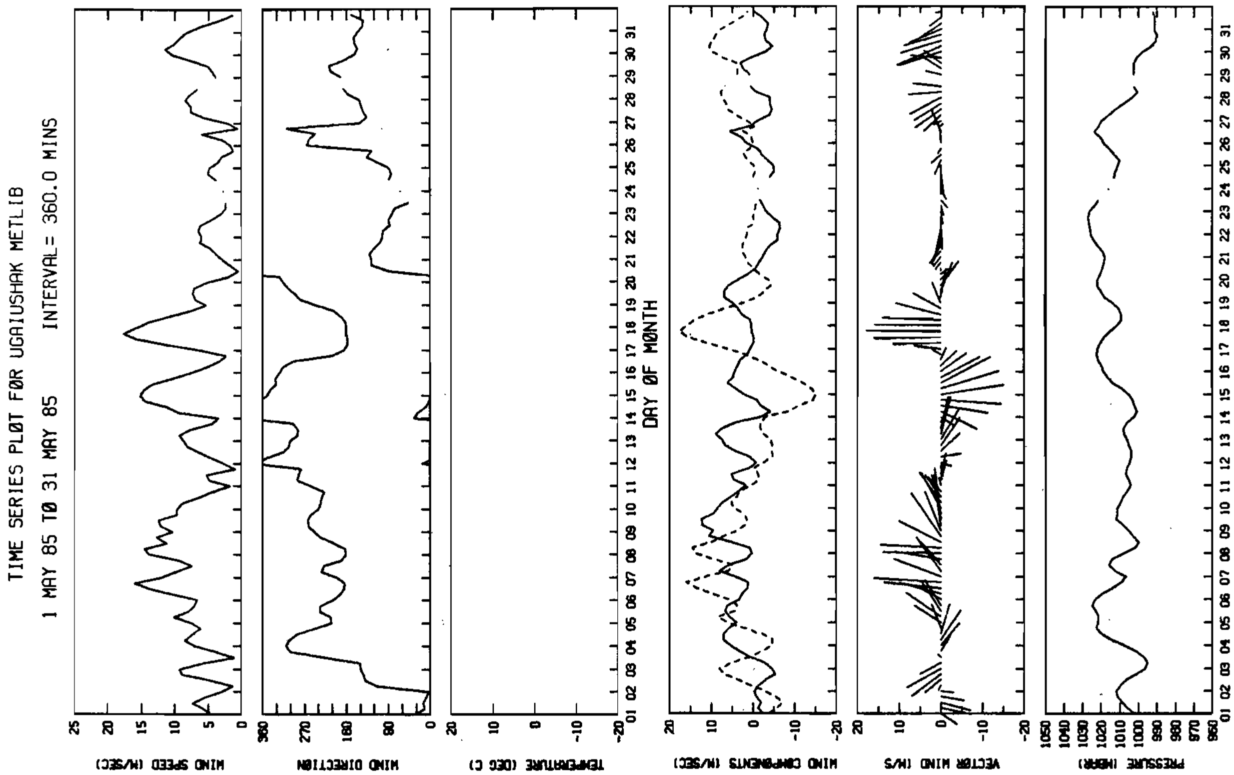

TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S)
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTIØN
TEMPERATURE (DEG C)
WIND CØMPØNENTS (M/SEC)
VECTØR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH


TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

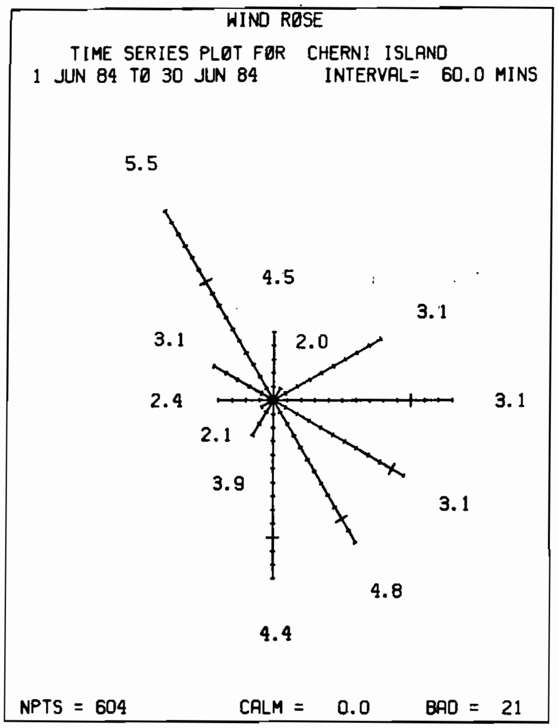

TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
WIND SPEED (M/SEC)
WIND DIRECTION
TEMPERATURE (DEG C)
WIND COMPONENTS (M/SEC)
VECTOR WIND (M/S
PRESSURE (MBAR)
DAY ØF MØNTH

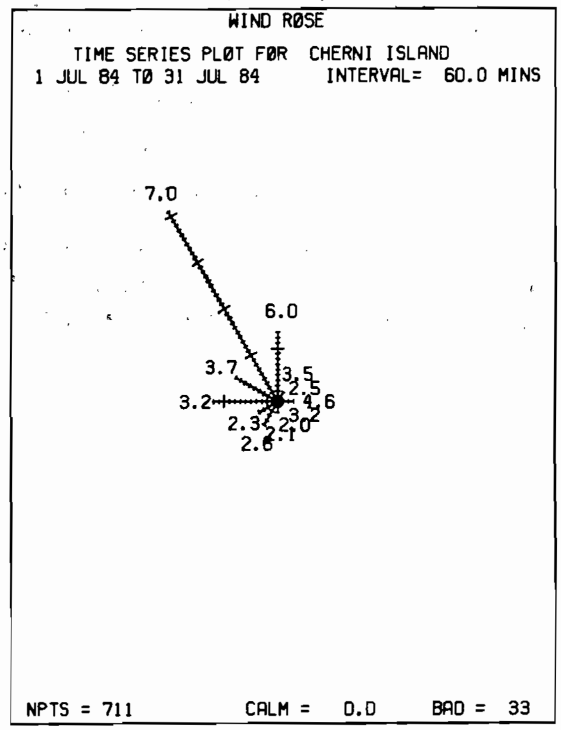
Appendix C

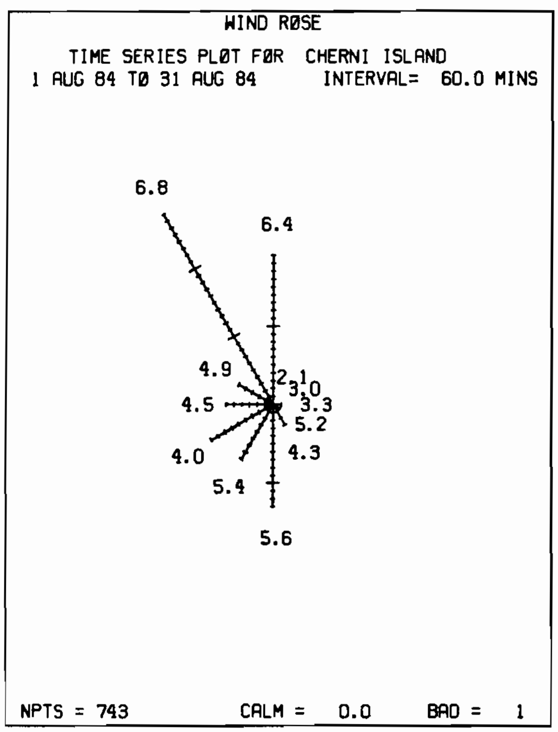
Monthly 12-sector roses of winds measured hourly during the period 1 June 1984 through 30 November 1985 by weather stations at:

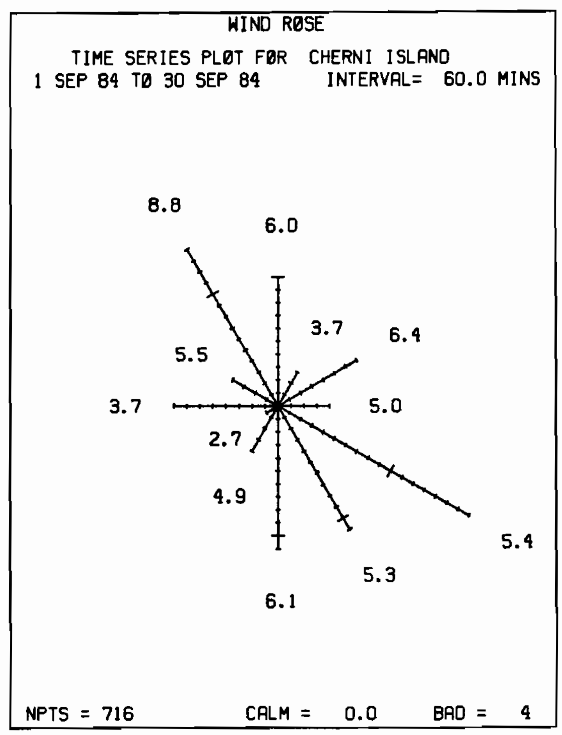
1. Cherni Island
2. Thin Point
3. Cold Bay
4. Ugaiushak Island

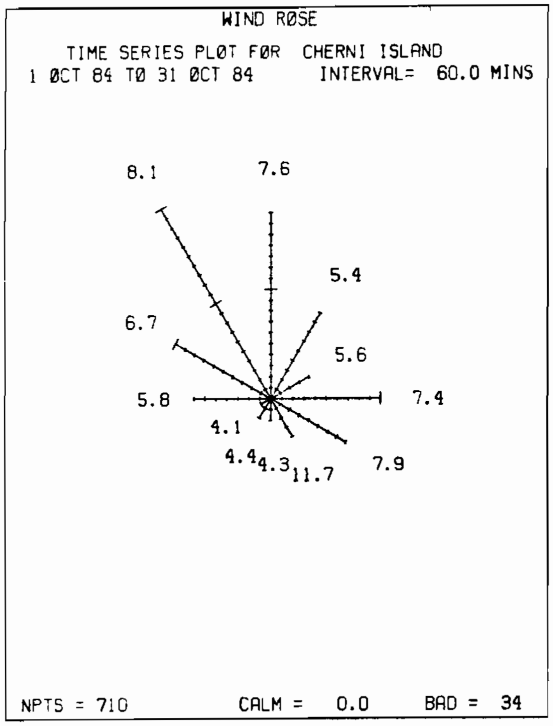
In each rose, tick marks indicate the percentage of observations that wind blew from the indicated direction during the month. Numerals at the end of each rose sector give the average wind speed in m s^{-1} for that sector.

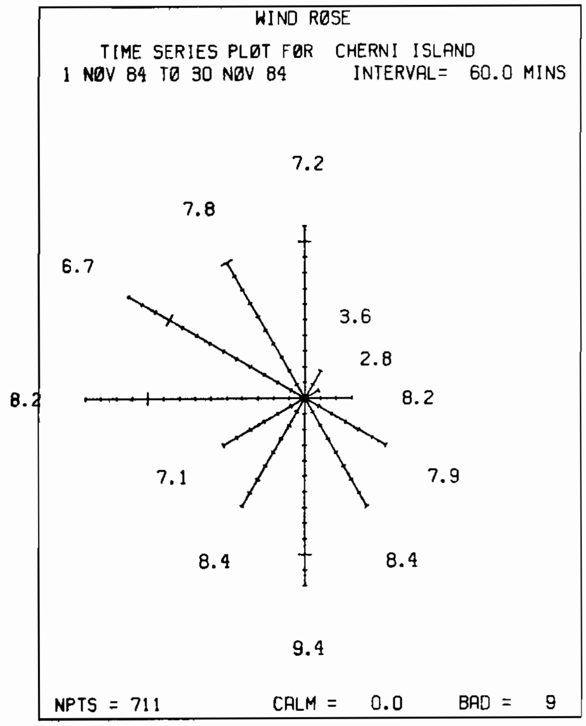

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 JUN 84 TØ 30 JUN 84 INTERVAL= 60.0 MINS
5.5
4.5
3.1
3.1
2.0
2.4
3.1
2.1
3.9
3.1
4.8
4.4
NPTS = 604 CALM = 0.0 BAD = 21

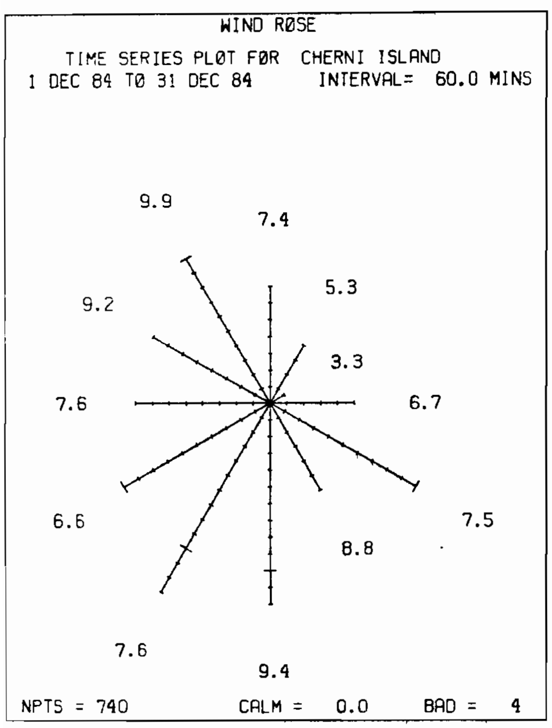

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 JUL 84 TØ 31 JUL 84 INTERVAL= 60.0 MINS
7.0
6.0
3.7
3.2
NPTS = 711 CALM = 0.0 BAD = 33

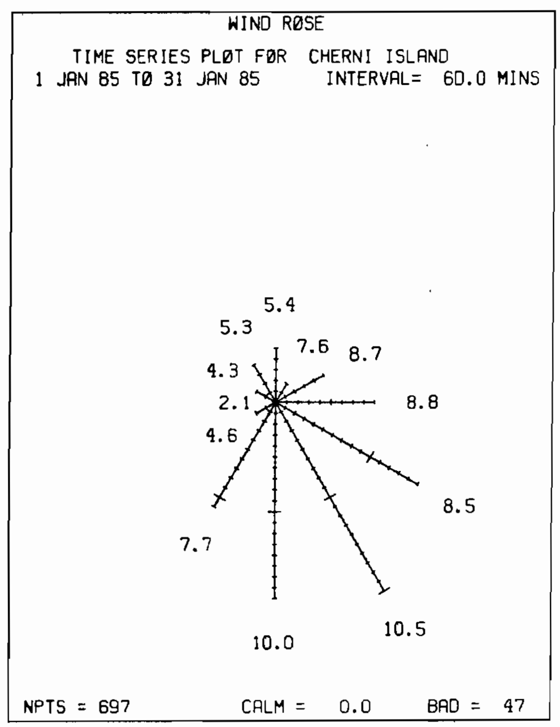

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 AUG 84 TØ 31 AUG 84 INTERVAL= 60.0 MINS
6.8
6.4
4.9
4.5
3.3
5.2
4.0
4.3
5.4
5.6
NPTS = 743 CALM = 0.0 BAD = 1

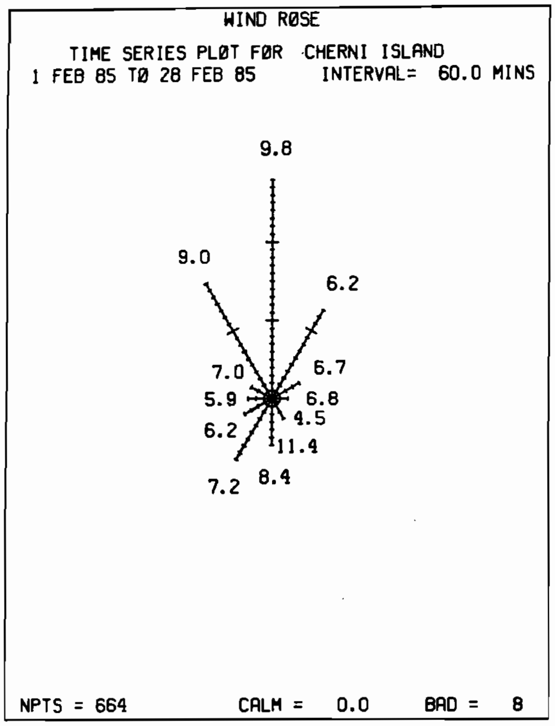

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 SEP 84 TØ 30 SEP 84 INTERVAL= 60.0 MINS
8.8
6.0
3.7
6.4
5.5
3.7
5.0
2.7
4.9
5.4
5.3
6.1
NPTS = 716 CALM = 0.0 BAD = 4

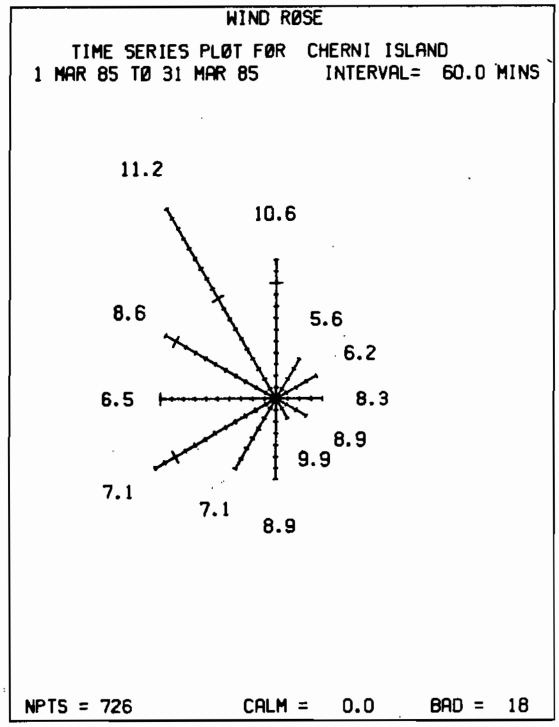

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 60.0 MINS
8.1
7.6
5.4
6.7
5.6
5.8
7.4
4.1
4.4
4.3
11.7
7.9
NPTS = 710 CALM = 0.0 BAD = 34

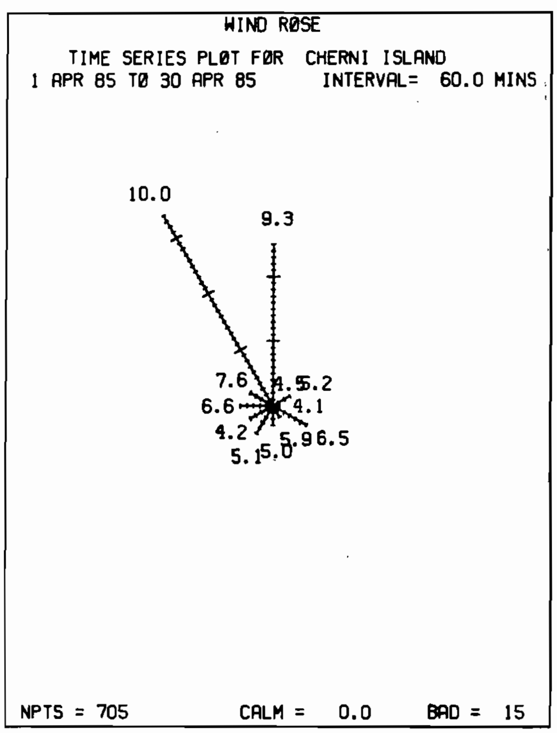

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 NØV 84 TØ 30 NØV 84 INTERVAL= 60.0 MINS
7.2
7.8
6.7
3.6
2.8
8.2
8.2
7.1
7.9
8.4
8.4
9.4
NPTS = 711 CALM = 0.0 BAD = 9

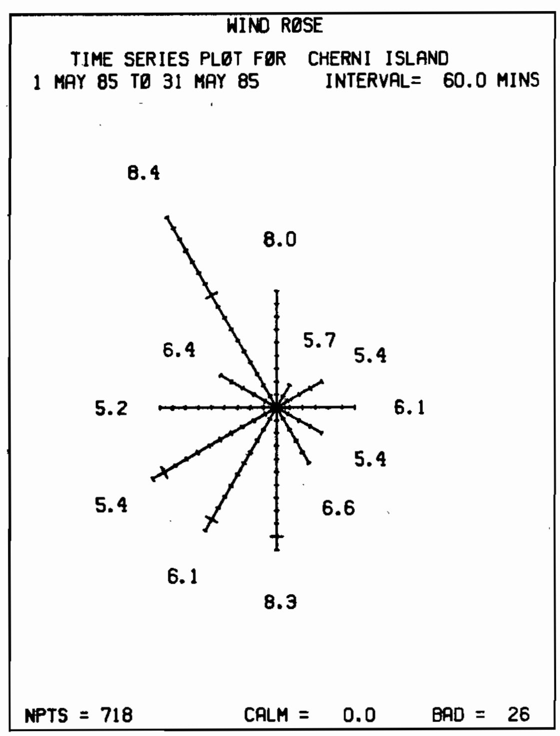

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
9.9
7.4
9.2
5.3
3.3
7.6
6.7
6.6
7.5
8.8
7.6
9.4
NPTS = 740 CALM = 0.0 BAD = 4

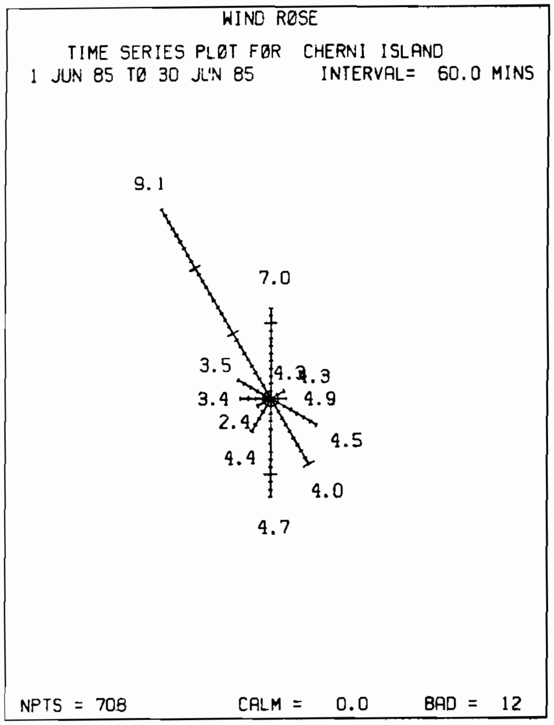

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
5.4
5.3
7.6
8.7
4.3
2.1
8.8
4.6
8.5
7.7
10.0
10.5
NPTS = 697 CALM = 0.0 BAD = 47

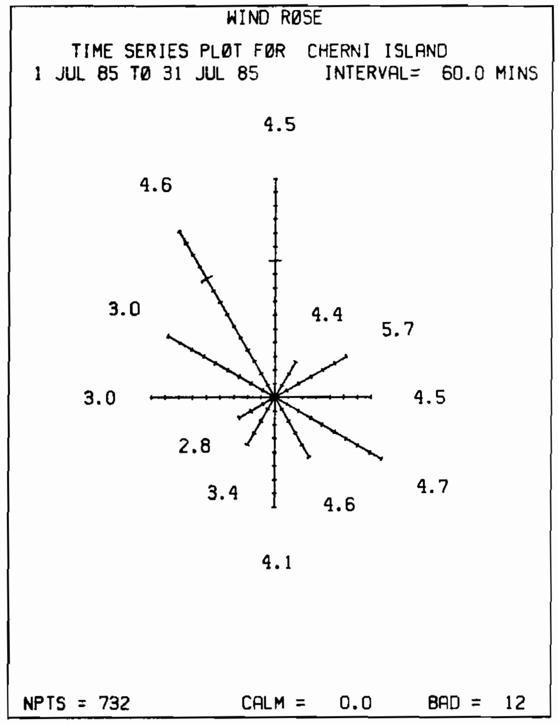

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
9.8
9.0
6.2
7.0
6.7
5.9
6.8
4.5
6.2
11.4
7.2
8.4
NPTS = 664
CALM = 0.0
BAD = 8

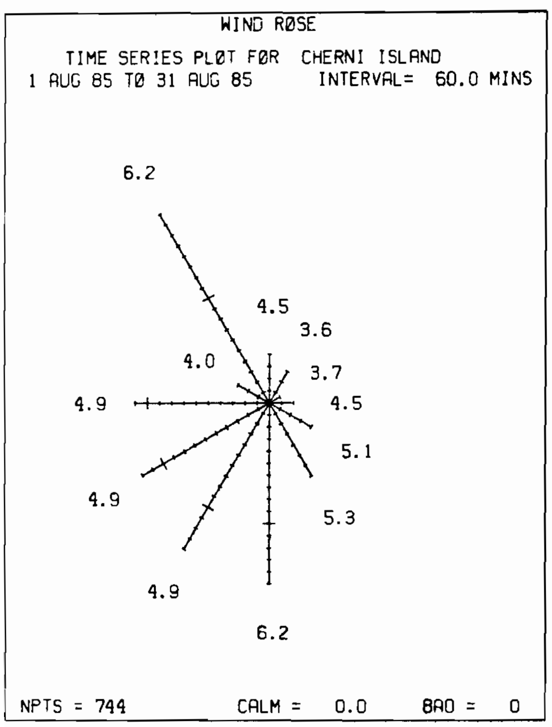

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
11.2
10.6
8.6
5.6
6.2
6.5
8.3
8.9
9.9
7.1
7.1
8.9
NPTS = 726
CALM = 0.0
BAD = 18

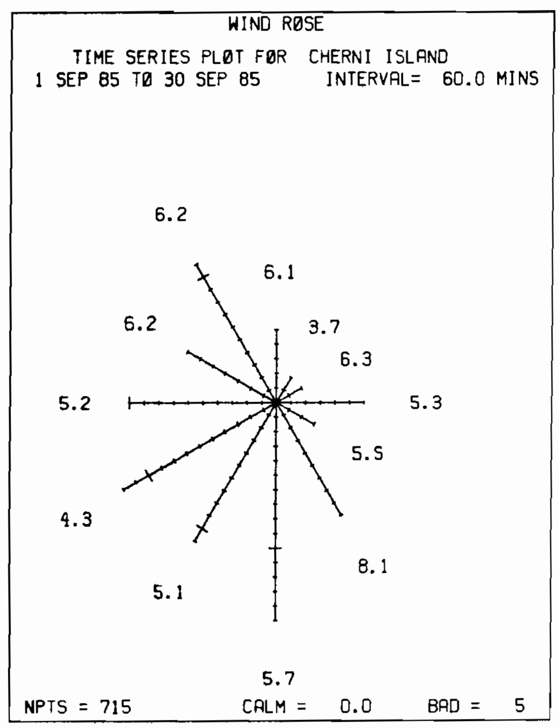

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
10.0
9.3
7.6
4.5
5.2
6.6
4.1
4.2
5.9
6.5
5.1
5.0
NPTS = 705
CALM = 0.0
BAD = 15

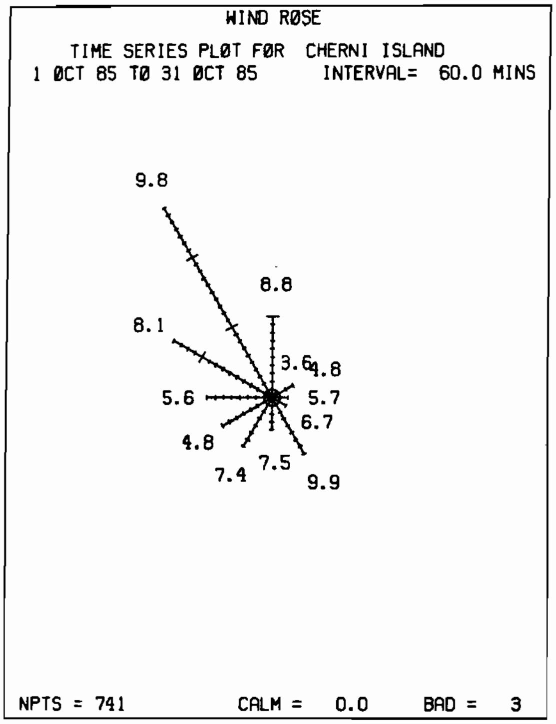

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 MAY 85 TØ 31 MAY 85 INTERVAL= 60.0 MINS
8.4
8.0
6.4
5.7
5.4
5.2
6.1
5.4
5.4
6.6
6.1
8.3
NPTS = 718
CALM = 0.0
BAD = 26

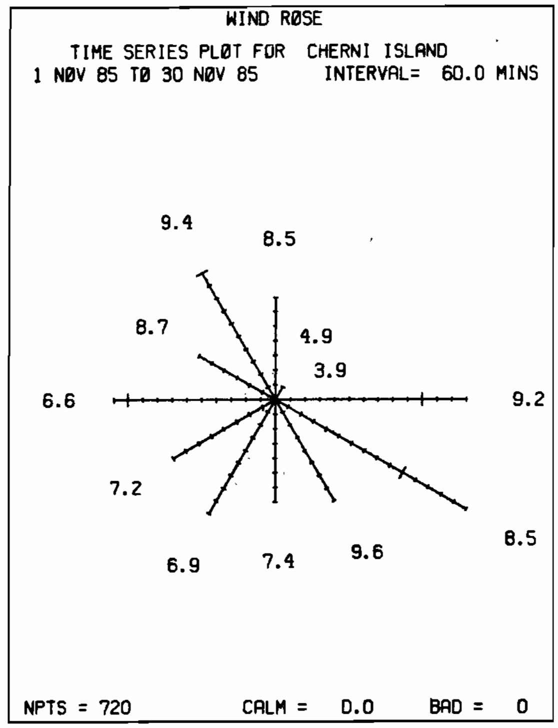

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 JUN 85 TØ 30 JUN 85 INTERVAL= 60.0 MINS
9.1
7.0
3.5
3.4
2.4
4.4
4.9
4.5
4.0
4.7
NPTS = 708 CALM = 0.0 BAD = 12

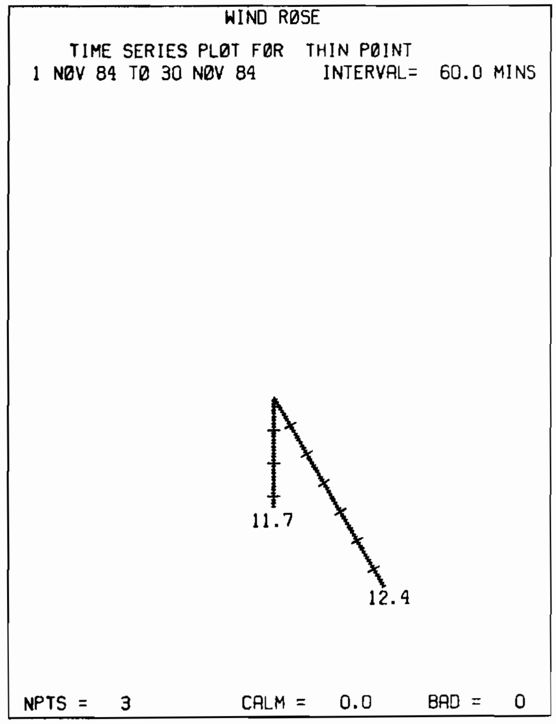

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 JUL 85 TØ 31 JUL 85 INTERVAL= 60.0 MINS
4.5
4.6
3.0
4.4
5.7
3.0
4.5
2.8
3.4
4.6
4.7
4.1
NPTS = 732 CALM = 0.0 BAD = 12

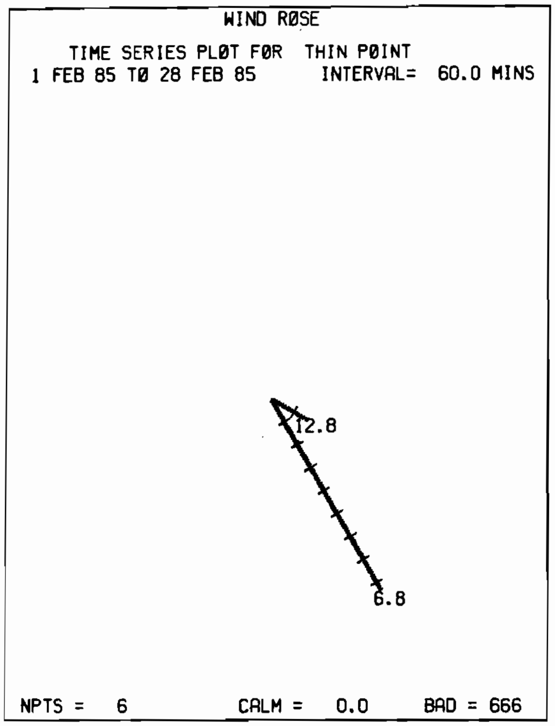

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 AUG 85 TØ 31 AUG 85 INTERVAL= 60.0 MINS
6.2
4.5
3.6
4.0
3.7
4.9
4.5
5.1
4.9
5.3
4.9
6.2
NPTS = 744 CALM = 0.0 BAD = 0

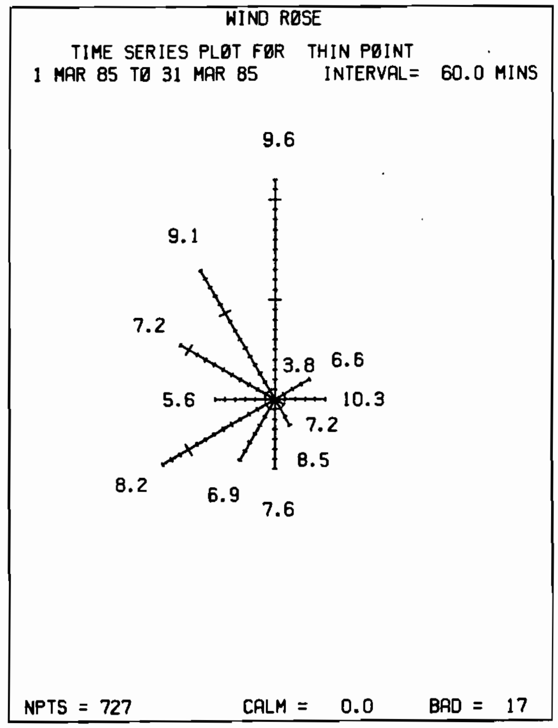

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 SEP 85 TØ 30 SEP 85 INTERVAL= 60.0 MINS
6.2
6.1
6.2
3.7
6.3
5.2
5.3
5.5
4.3
8.1
5.1
5.7
NPTS = 715 CALM = 0.0 BAD = 5

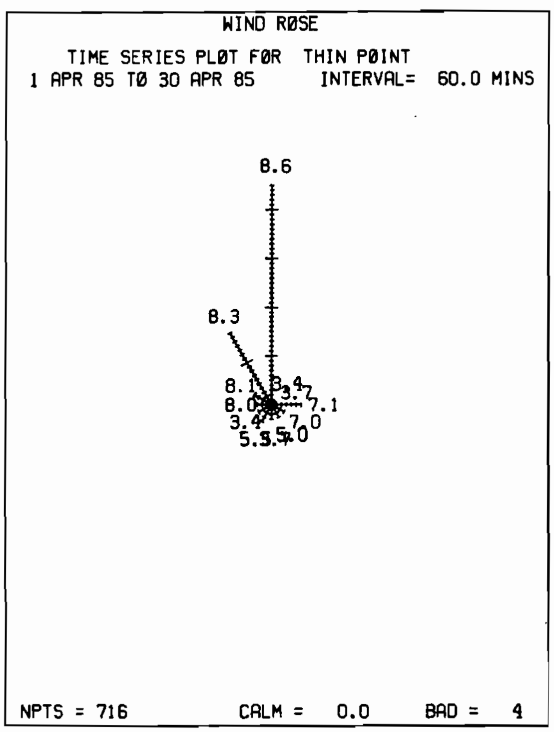

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 ØCT 85 TØ 31 ØCT 85 INTERVAL= 60.0 MINS
9.8
8.8
8.1
3.6
4.8
5.6
5.7
6.7
4.8
7.5
7.4
9.9
NPTS = 741 CALM = 0.0 BAD = 3

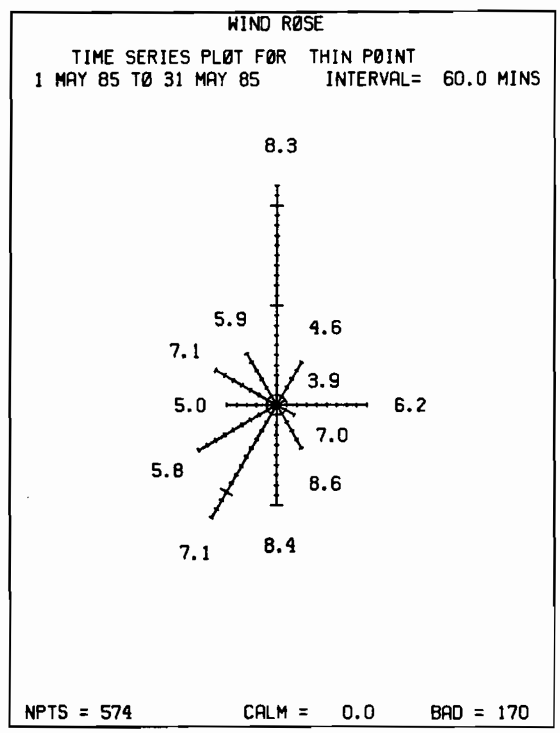

WIND RØSE
TIME SERIES PLØT FØR CHERNI ISLAND
1 NØV 85 TØ 30 NØV 85 INTERVAL= 60.0 MINS
9.4
8.5
8.7
4.9
3.9
6.6
9.2
7.2
8.5
6.9
7.4
9.6
NPTS = 720 CALM = 0.0 BAD = 0

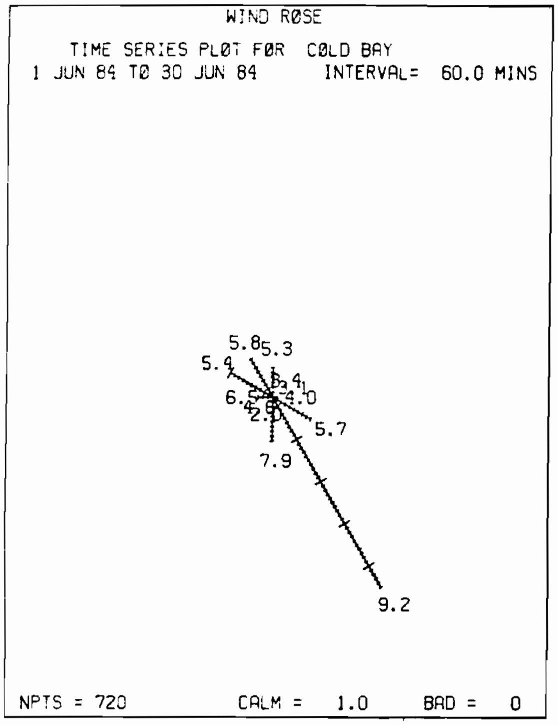

WIND RØSE
TIME SERIES PLØT FØR THIN PØINT
1 NØV 84 TØ 30 NØV 84
INTERVAL= 60.0 MINS
11.7
12.4
NPTS = 3
CALM = 0.0
BAD = 0

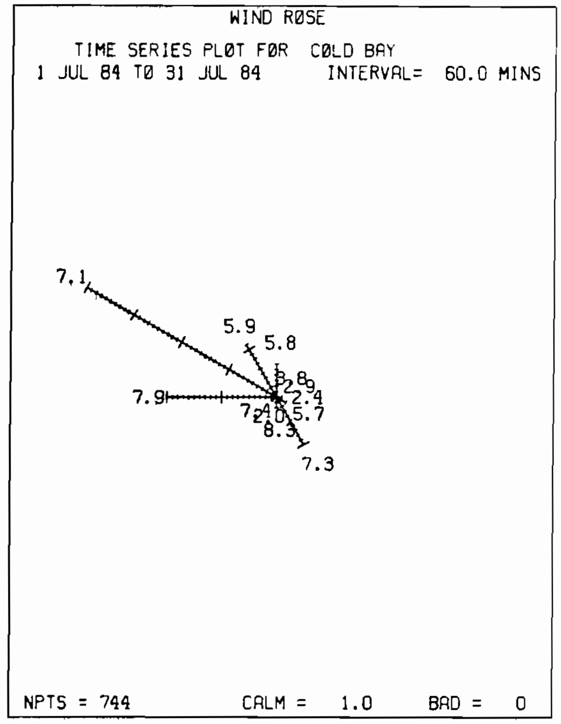

WIND RØSE
TIME SERIES PLØT FØR THIN PØINT
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
12.8
6.8
NPTS = 6
CALM = 0.0
BAD = 666

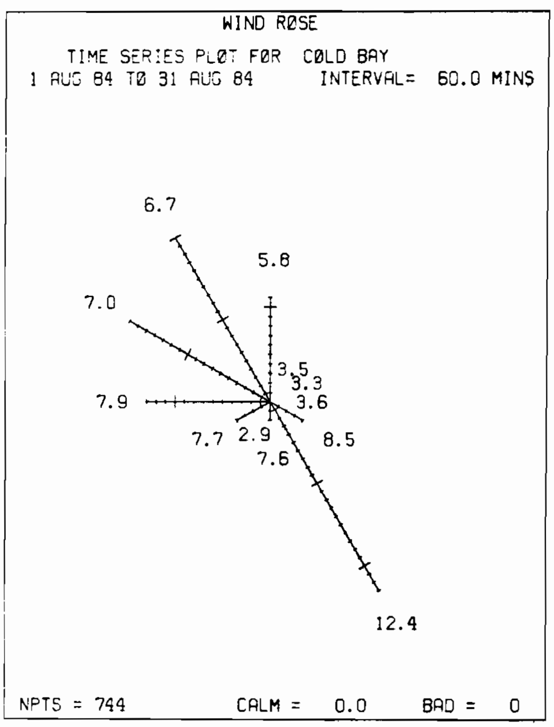

WIND RØSE
TIME SERIES PLØT FØR THIN PØINT
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
9.6
9.1
7.2
3.8
6.6
5.6
10.3
7.2
8.5
8.2
6.9
7.6
NPTS = 727
CALM = 0.0
BAD = 17

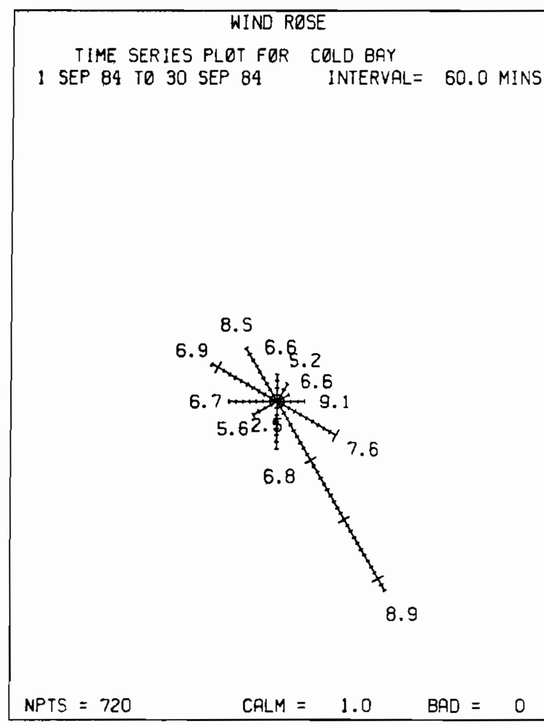

WIND RØSE
TIME SERIES PLØT FØR THIN PØINT
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
8.6
8.3
7.1
NPTS = 716
CALM = 0.0
BAD = 4

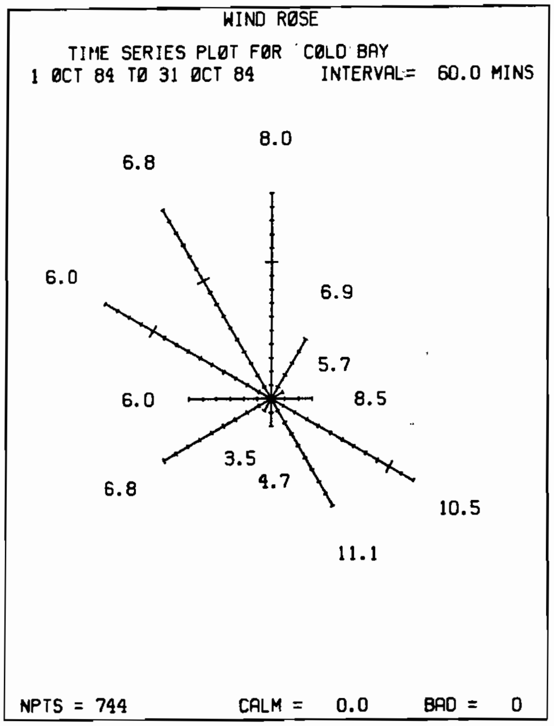

WIND RØSE
TIME SERIES PLØT FØR THIN PØINT
1 MAY 85 TØ 31 MAY 85 INTERVAL= 60.0 MINS
8.3
5.9
4.6
7.1
3.9
5.0
6.2
7.0
5.8
8.6
7.1
8.4
NPTS = 574
CALM = 0.0
BAD = 170

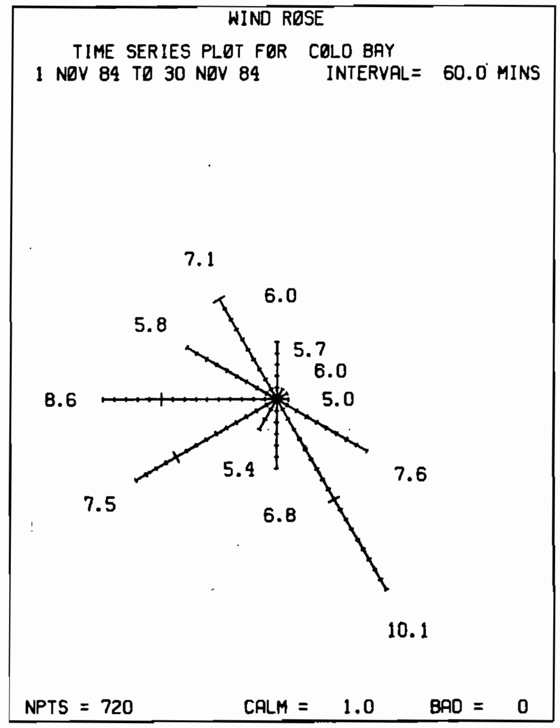

WIND RØSE
TIME SERIES PLØT FØR COLD BAY
1 JUN 84 TØ 30 JUN 84 INTERVAL= 60.0 MINS
5.8
5.3
5.7
7.9
9.2
NPTS = 720 CALM = 1.0 BAD = 0

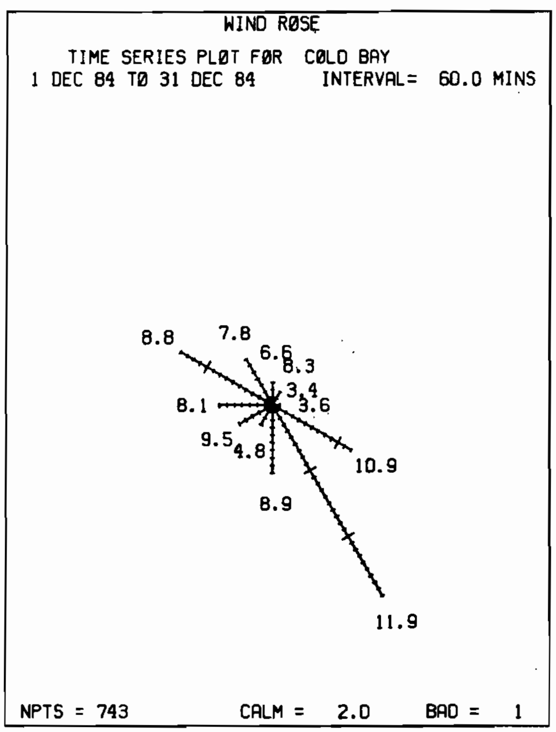

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 JUL 84 TØ 31 JUL 84 INTERVAL= 60.0 MINS
7.1
5.9
5.8
7.9
7.3
NPTS = 744 CALM = 1.0 BAD = 0

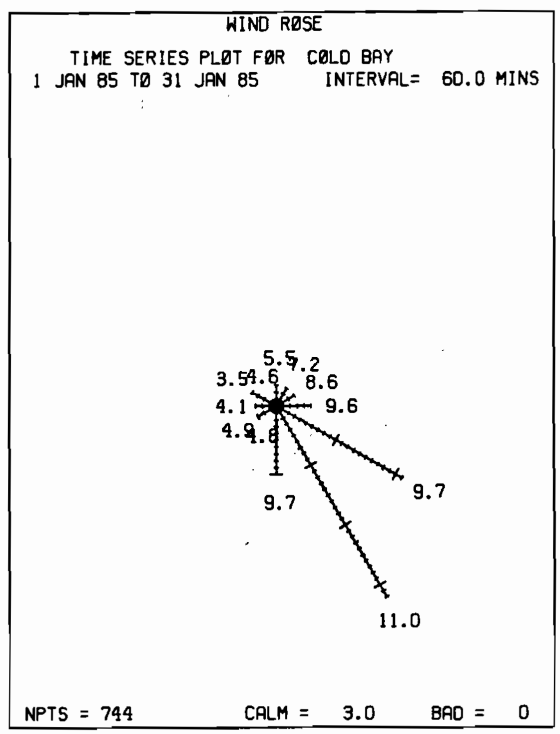

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 AUG 84 TØ 31 AUG 84 INTERVAL= 60.0 MINS
6.7
5.8
7.0
3.6
7.9
7.7
2.9
8.5
7.6
12.4
NPTS = 744 CALM = 0.0 BAD = 0

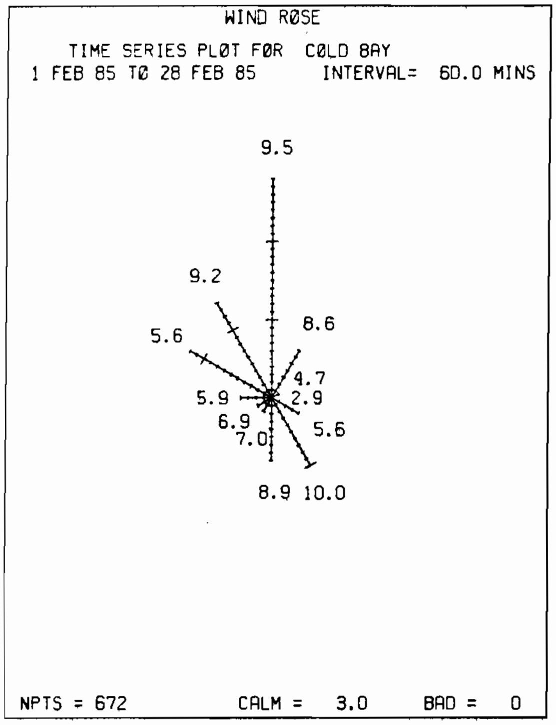

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 SEP 84 TØ 30 SEP 84 INTERVAL= 60.0 MINS
8.5
6.9
6.6
6.7
9.1
7.6
6.8
8.9
NPTS = 720 CALM = 1.0 BAD = 0

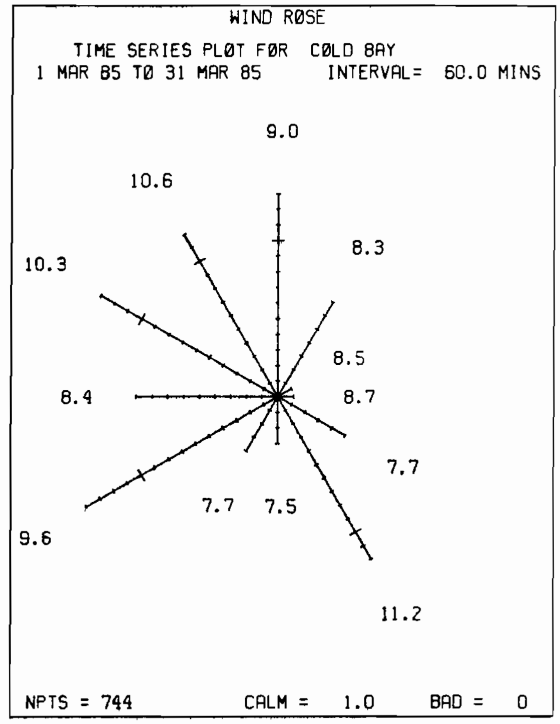

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 60.0 MINS
8.0
6.8
6.0
6.9
5.7
6.0
8.5
3.5
4.7
6.8
10.5
11.1
NPTS = 744 CALM = 0.0 BAD = 0

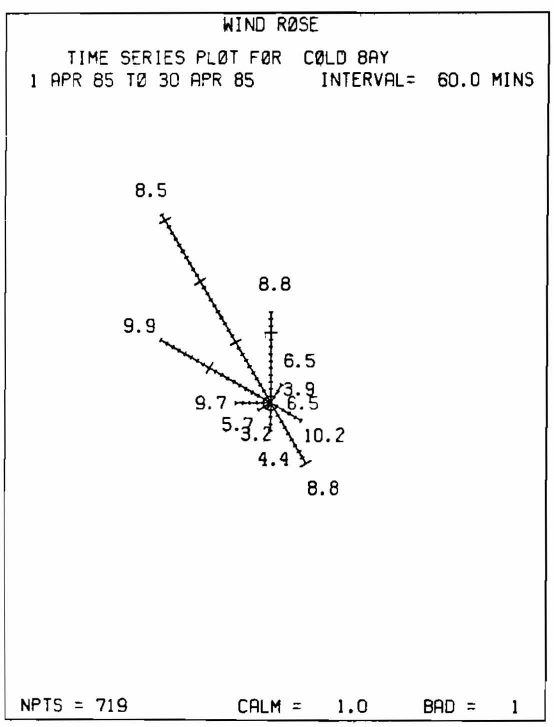

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 NØV 84 TØ 30 NØV 84 INTERVAL= 60.0 MINS
7.1
6.0
5.8
5.7
6.0
8.6
5.0
5.4
7.6
7.5
6.8
10.1
NPTS = 720 CALM = 1.0 BAD = 0

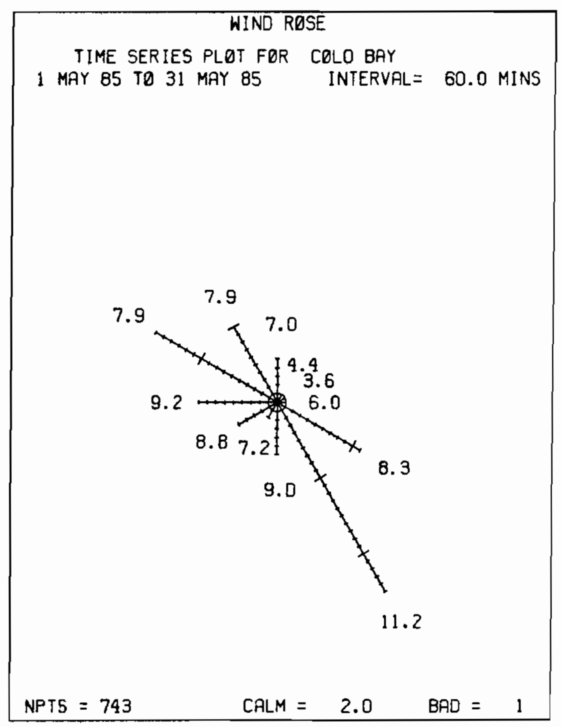

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
8.8
7.8
6.6
8.3
3.4
8.1
3.6
9.5
4.8
10.9
8.9
11.9
NPTS = 743 CALM = 2.0 BAD = 1

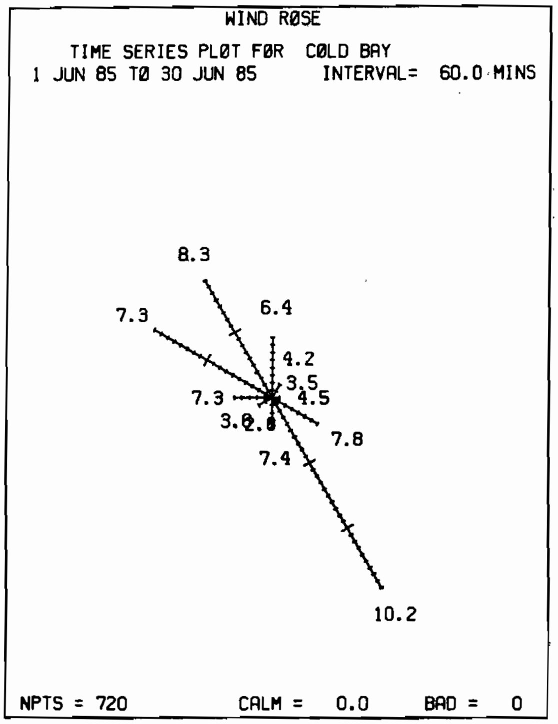

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
5.5
7.2
3.5
4.6
8.6
4.1
9.6
4.9
4.8
9.7
9.7
11.0
NPTS = 744 CALM = 3.0 BAD = 0

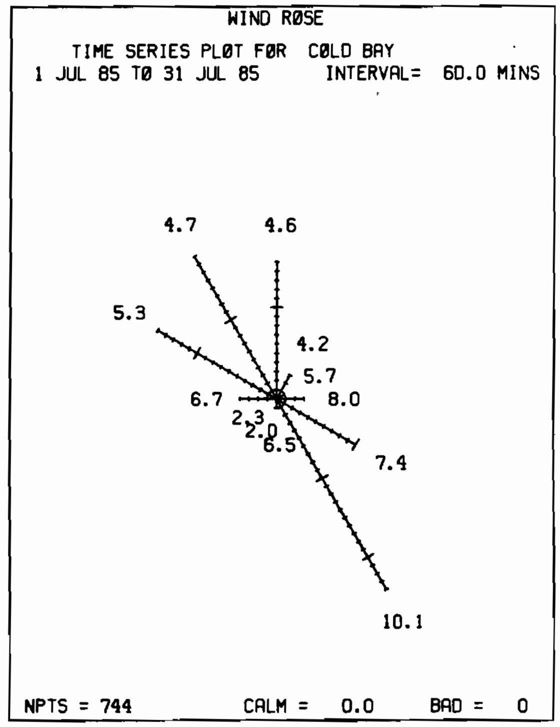

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
9.5
9.2
5.6
8.6
4.7
5.9
2.9
6.9
7.0
5.6
8.9 10.0
NPTS = 672
CALM = 3.0
BAD = 0

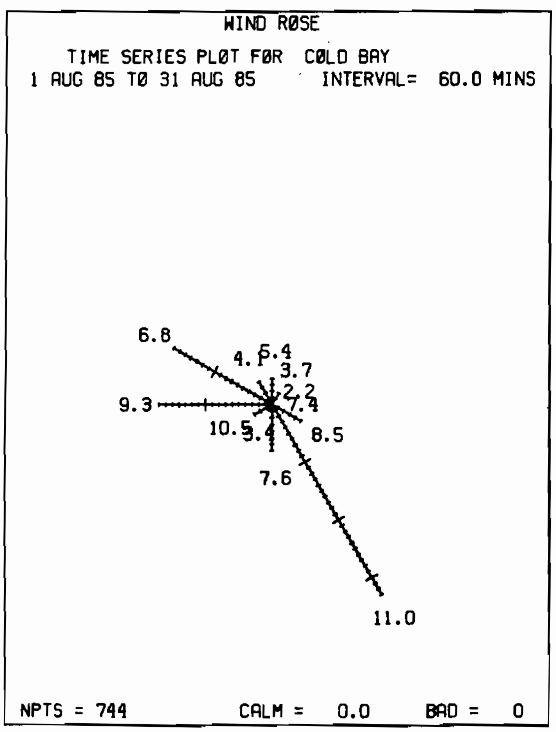

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
9.0
10.6
8.3
10.3
8.5
8.4
8.7
7.7
7.7 7.5
9.6
11.2
NPTS = 744
CALM = 1.0
BAD = 0

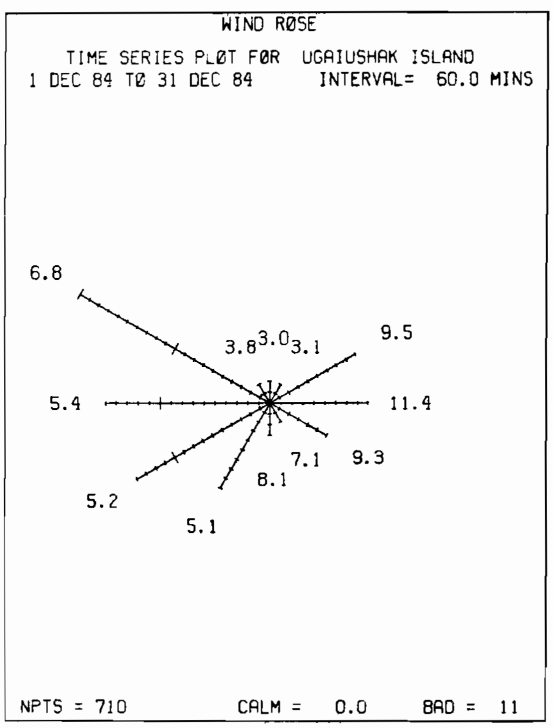

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
8.5
8.8
9.9
6.5
3.9
9.7
6.5
5.7
3.2
10.2
4.4
8.8
NPTS = 719
CALM = 1.0
BAD = 1

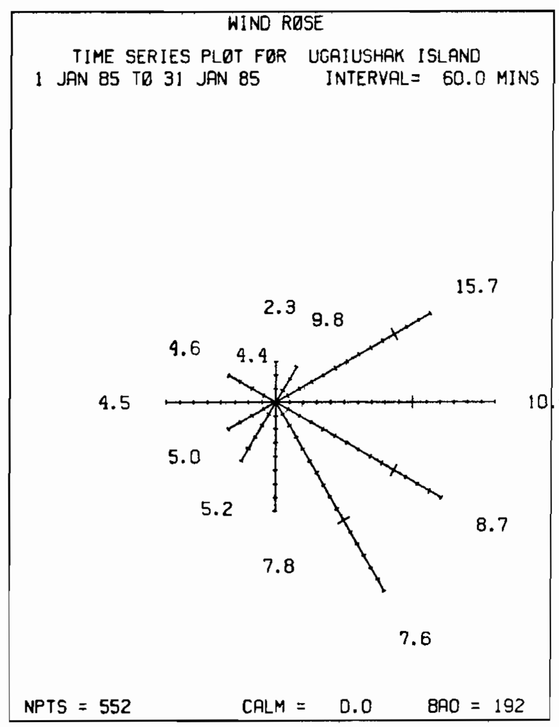

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY
1 MAY 85 TØ 31 MAY 85 INTERVAL= 60.0 MINS
7.9
7.9
7.0
4.4
3.6
9.2
6.0
8.8
7.2
8.3
9.0
11.2
NPTS = 743
CALM = 2.0
BAD = 1

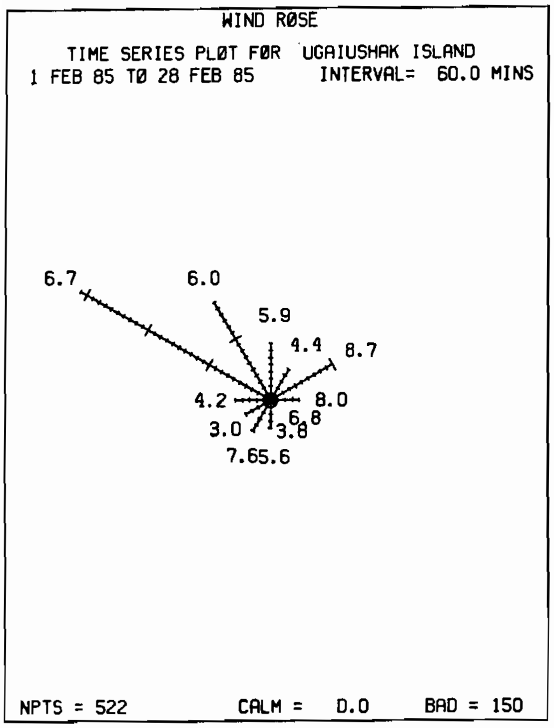

WIND RØSE
TIME SERIES PLØT FØR COLD BAY
1 JUN 85 TØ 30 JUN 85 INTERVAL= 60.0 MINS
8.3
7.3
6.4
4.2
3.5
4.5
7.3
7.8
7.4
10.2
NPTS = 720
CALM = 0.0
BAD = 0

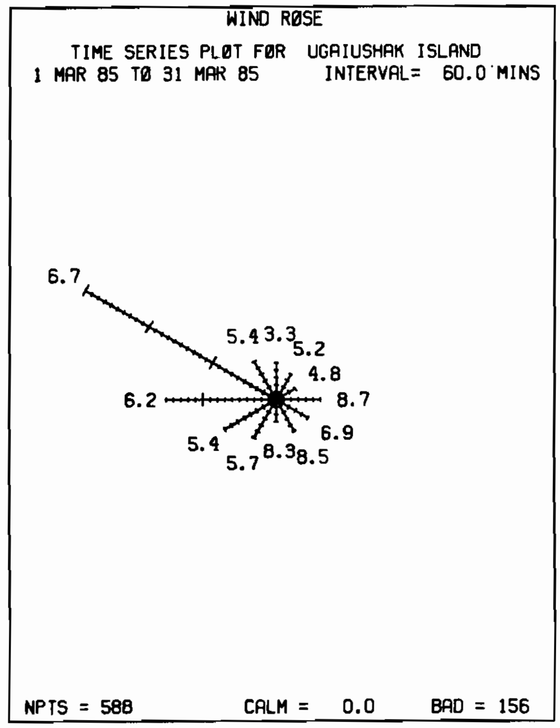

WIND RØSE
TIME SERIES PLØT FØR COLD BAY
1 JUL 85 TØ 31 JUL 85 INTERVAL= 60.0 MINS
4.7
4.6
5.3
4.2
5.7
6.7
8.0
6.5
7.4
10.1
NPTS = 744
CALM = 0.0
BAD = 0

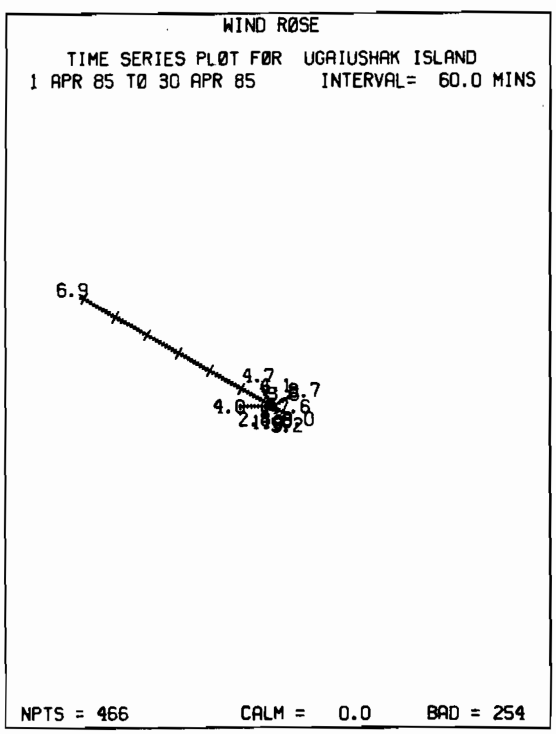

WIND RØSE
TIME SERIES PLØT FØR COLD BAY
1 AUG 85 TØ 31 AUG 85 INTERVAL= 60.0 MINS
6.8
3.7
9.3
8.5
7.6
11.0
NPTS = 744
CALM = 0.0
BAD = 0

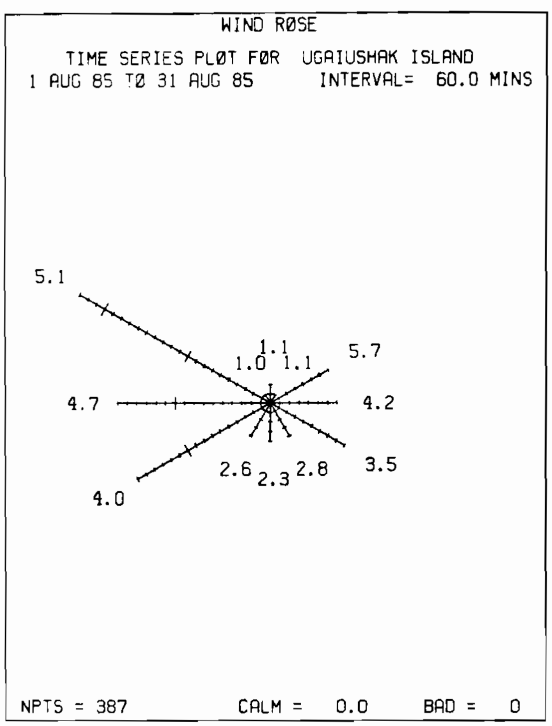

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 DEC 84 TØ 31 DEC 84 INTERVAL= 60.0 MINS
6.8
3.8
3.0
3.1
9.5
5.4
11.4
7.1
9.3
8.1
5.2
5.1
NPTS = 710
CALM = 0.0
BAD = 11

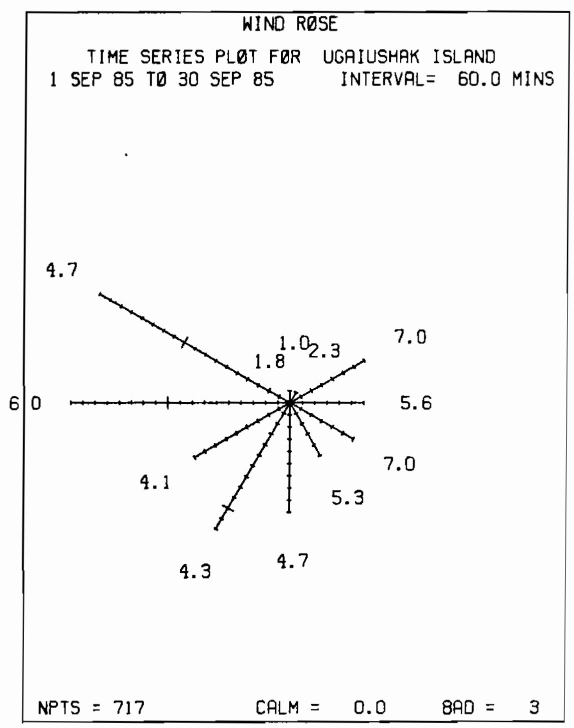

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 JAN 85 TØ 31 JAN 85 INTERVAL= 60.0 MINS
15.7
2.3
9.8
4.6
4.4
4.5
10.9
5.0
5.2
8.7
7.8
7.6
NPTS = 552
CALM = 0.0
BAD = 192

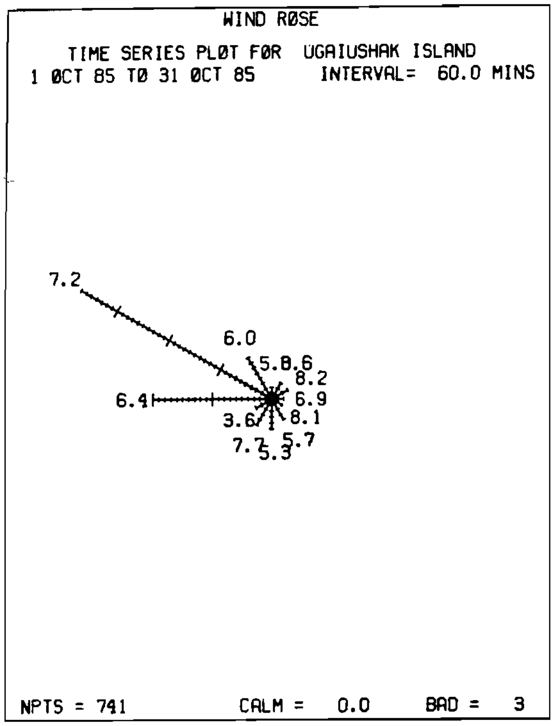

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 FEB 85 TØ 28 FEB 85 INTERVAL= 60.0 MINS
6.7
6.0
5.9
4.4
8.7
4.2
8.0
6.8
3.0
3.8
7.65.6
NPTS = 522
CALM = 0.0
BAD = 150

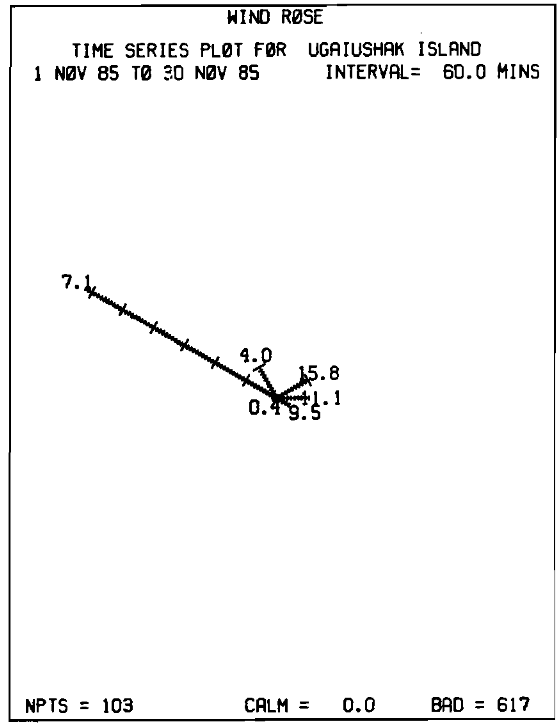

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 MAR 85 TØ 31 MAR 85 INTERVAL= 60.0 MINS
6.7
5.4
3.3
5.2
4.8
6.2
8.7
6.9
5.4
5.7
8.3
8.5
NPTS = 588
CALM = 0.0
BAD = 156


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 APR 85 TØ 30 APR 85 INTERVAL= 60.0 MINS
6.9
4.7
4.0
NPTS = 466
CALM = 0.0
BAD = 254


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 AUG 85 TØ 31 AUG 85 INTERVAL= 60.0 MINS
5.1
1.1
1.0
1.1
5.7
4.7
4.2
2.6
2.3
2.8
3.5
4.0
NPTS = 387
CALM = 0.0
BAD = 0


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 SEP 85 TØ 30 SEP 85 INTERVAL= 60.0 MINS
4.7
1.0
1.8
2.3
7.0
6.0
5.6
7.0
4.1
5.3
4.3
4.7
NPTS = 717
CALM = 0.0
BAD = 3


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 ØCT 85 TØ 31 ØCT 85
INTERVAL= 60.0 MINS
7.2
6.0
6.4
6.9
8.1
8.2
3.6
NPTS = 741
CALM = 0.0
BAD = 3

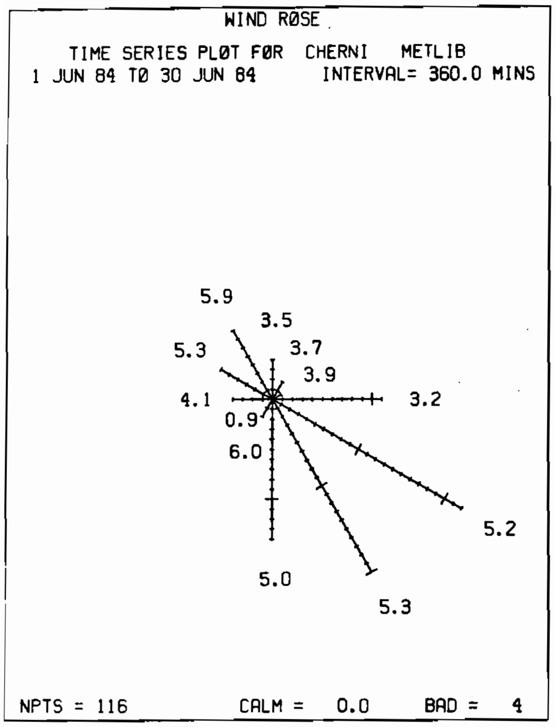

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK ISLAND
1 NØV 85 TØ 30 NØV 85
INTERVAL= 60.0 MINS
7.1
4.0
NPTS = 103
CALM = 0.0
BAD = 617

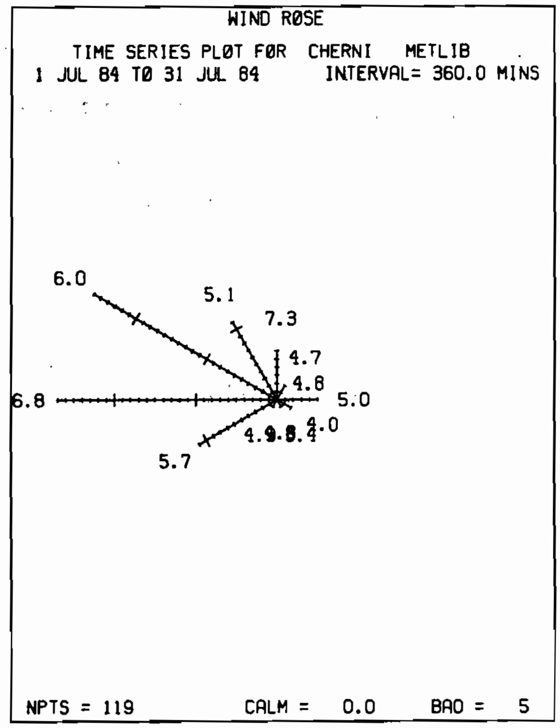
Appendix D

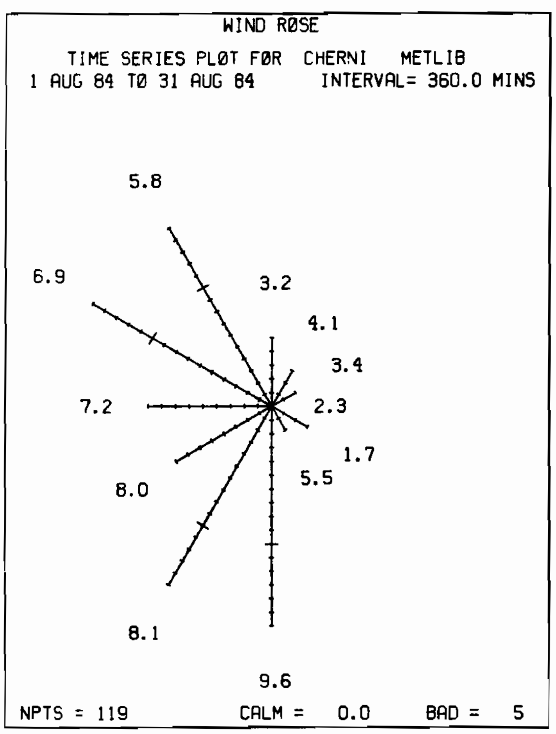
Monthly 12-sector roses of surface winds estimated each six hours during the period 1 June 1984 through 31 May 1985 by the METLIB-II program library for locations of weather stations at:

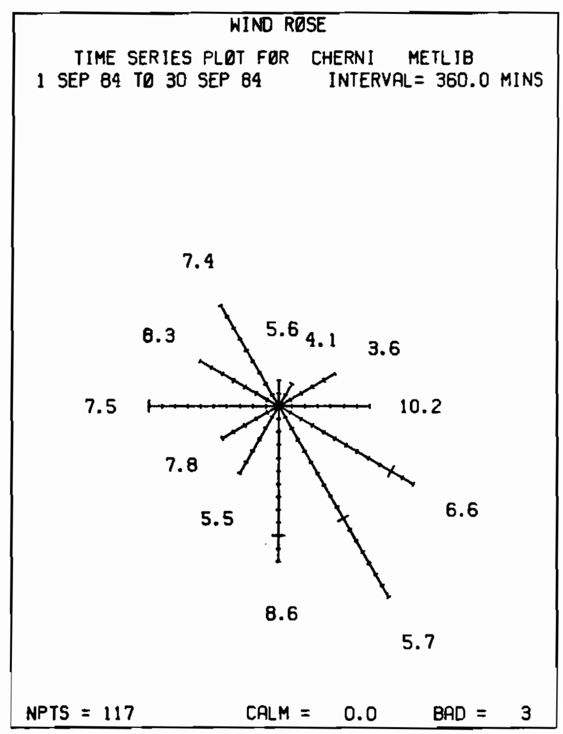
1. Cherni Island
2. Thin Point
3. Cold Bay
4. Ugaiushak Island

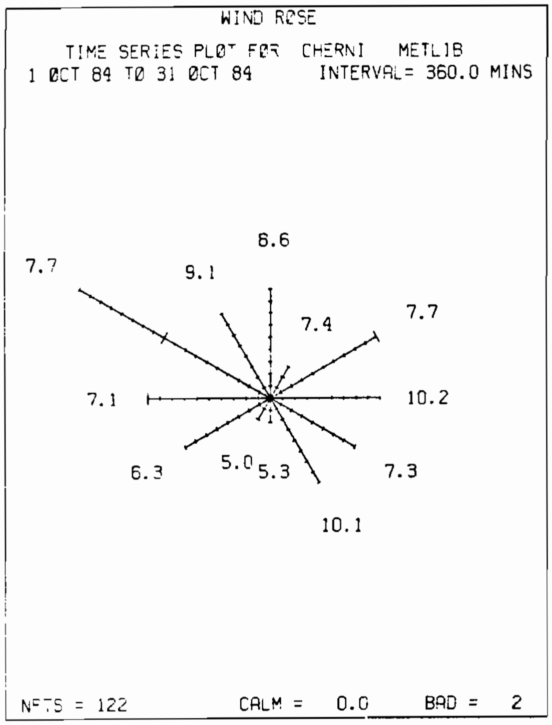
In each rose, tick marks indicate the percentage of observations that wind blew from the indicated direction during the month. Numerals at the end of each rose sector give the average wind speed in m s^{-1} for that sector.

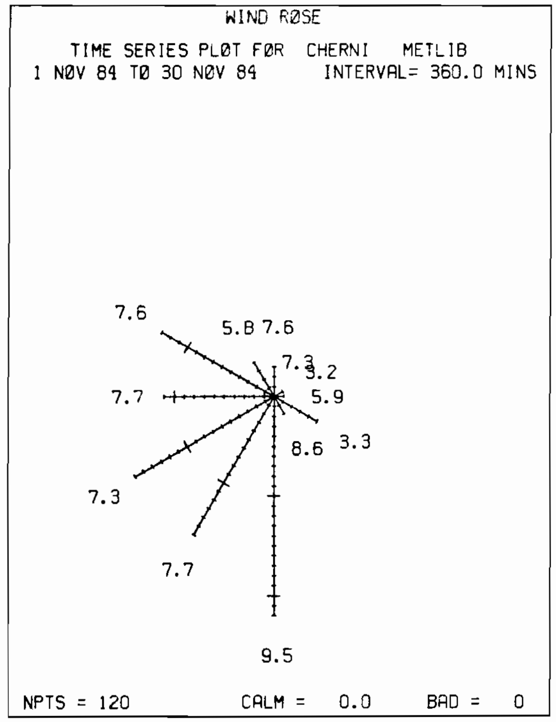

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
5.9
3.5
5.3
3.7
3.9
4.1
3.2
0.9
6.0
5.2
5.0
5.3
NPTS = 116 CALM = 0.0 BAD = 4

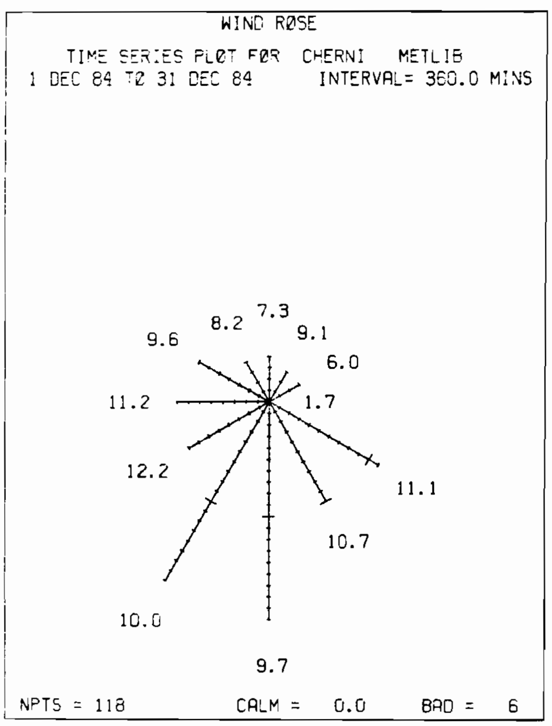

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
6.0
5.1
7.3
4.7
4.8
6.8
5.0
4.0
5.7
NPTS = 119 CALM = 0.0 BAD = 5

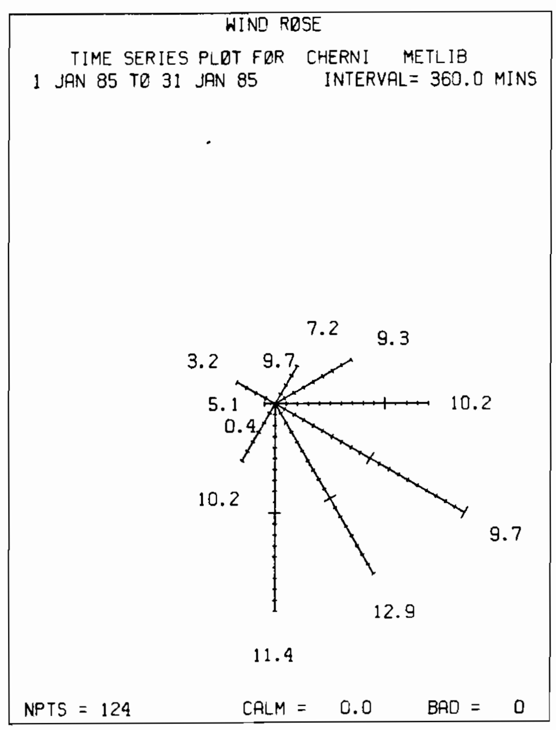

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
5.8
6.9
3.2
4.1
3.4
7.2
2.3
1.7
5.5
8.0
8.1
9.6
NPTS = 119 CALM = 0.0 BAD = 5

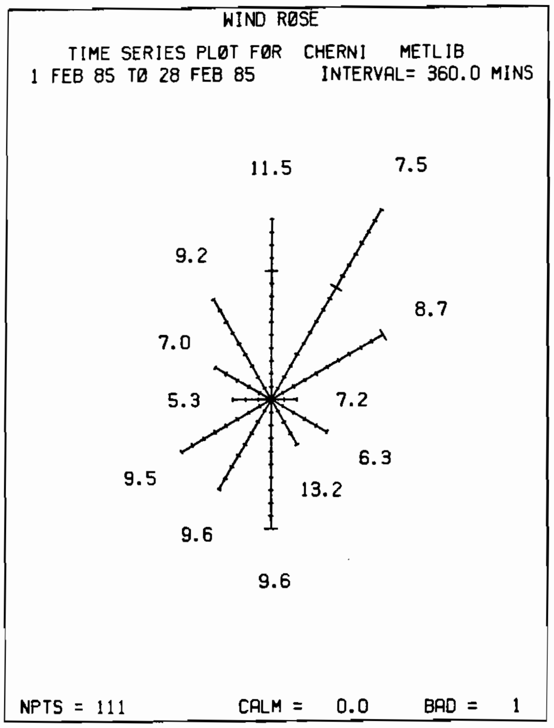

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
7.4
8.3
5.6
4.1
3.6
7.5
10.2
7.8
5.5
6.6
8.6
5.7
NPTS = 117 CALM = 0.0 BAD = 3

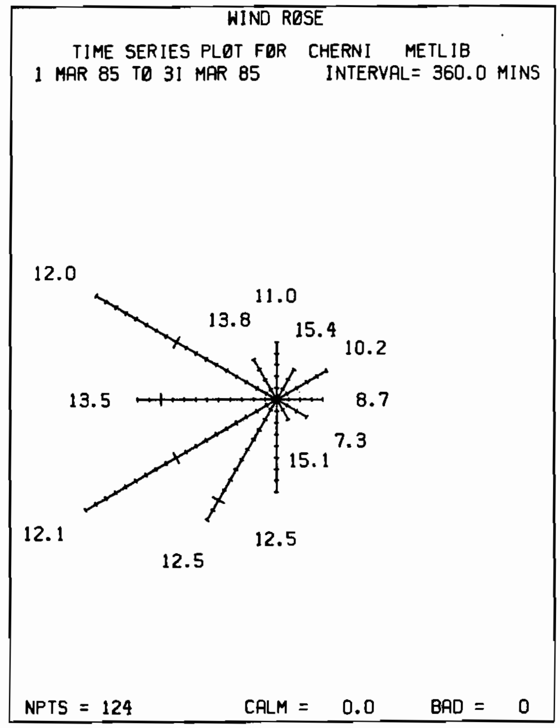

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
6.6
7.7
9.1
7.4
7.7
7.1
10.2
6.3
5.0
5.3
7.3
10.1
NPTS = 122 CALM = 0.0 BAD = 2

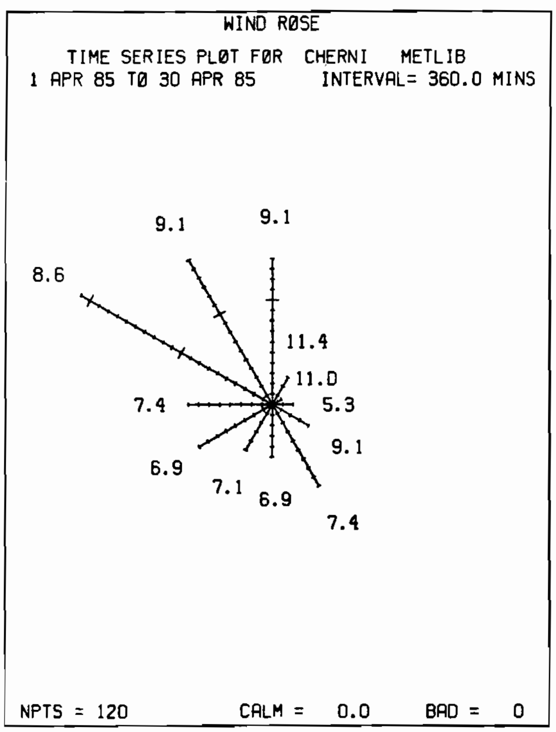

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
7.6
5.8 7.6
7.3
3.2
7.7
5.9
8.6
3.3
7.3
7.7
9.5
NPTS = 120 CALM = 0.0 BAD = 0

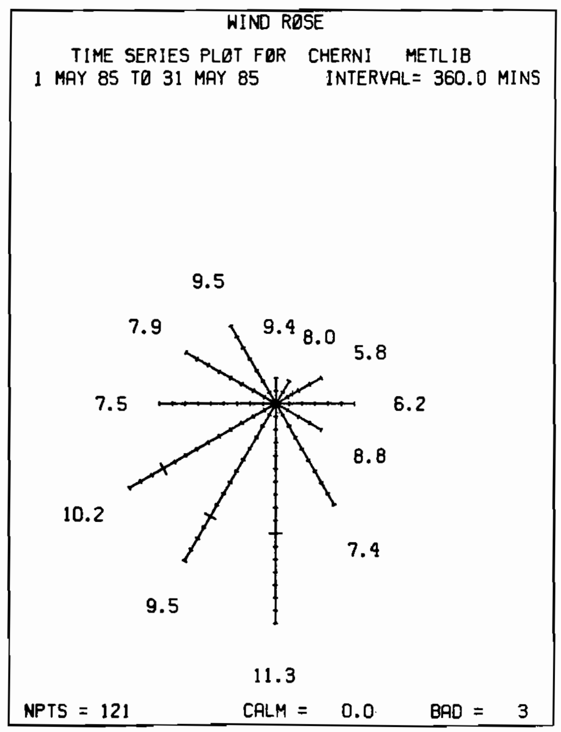

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
9.6
8.2
7.3
9.1
6.0
11.2
1.7
12.2
11.1
10.7
10.0
9.7
NPTS = 118 CALM = 0.0 BAD = 6

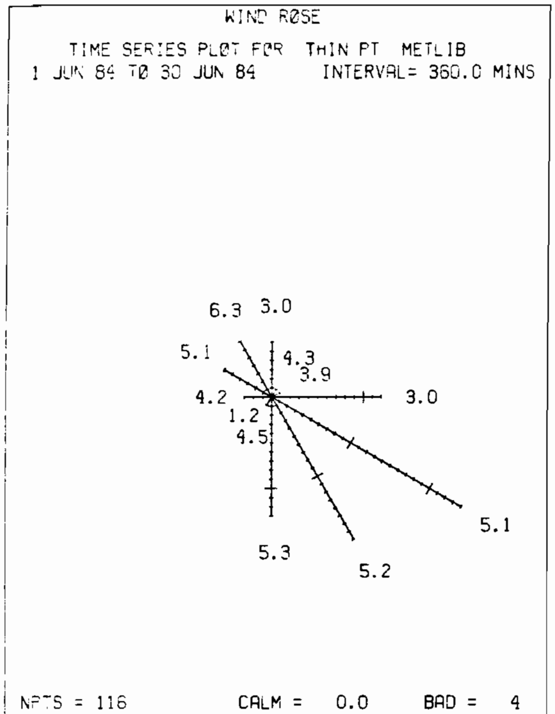

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
7.2
9.3
3.2
9.7
5.1
10.2
0.4
10.2
9.7
12.9
11.4
NPTS = 124 CALM = 0.0 BAD = 0

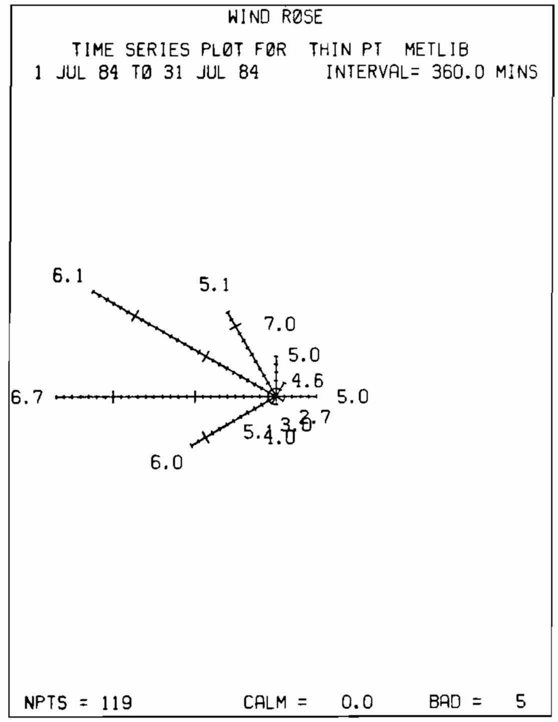

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
11.5
7.5
9.2
8.7
7.0
5.3
7.2
6.3
9.5
13.2
9.6
9.6
NPTS = 111
CALM = 0.0
BAD = 1

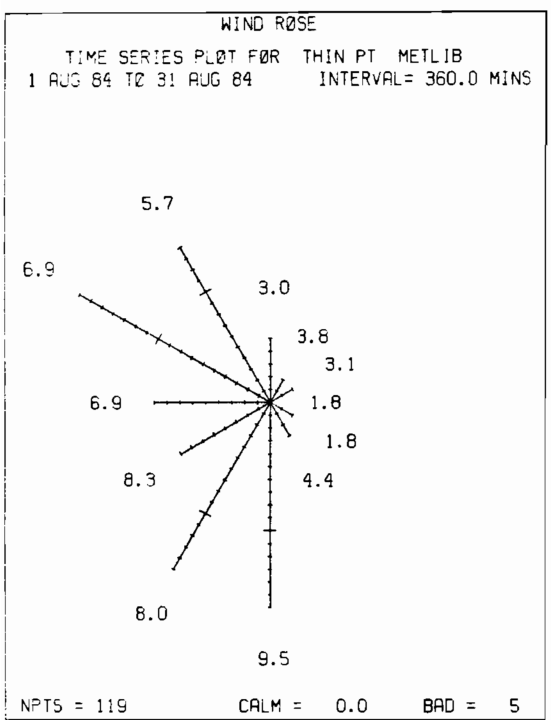

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
12.0
11.0
13.8
15.4
10.2
13.5
8.7
7.3
15.1
12.1
12.5
12.5
NPTS = 124
CALM = 0.0
BAD = 0

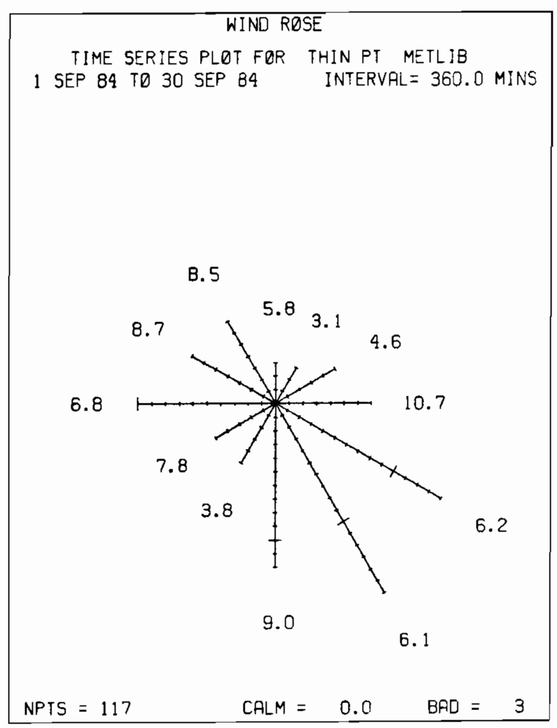

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
9.1
9.1
8.6
11.4
11.0
7.4
5.3
9.1
6.9
7.1
6.9
7.4
NPTS = 120
CALM = 0.0
BAD = 0

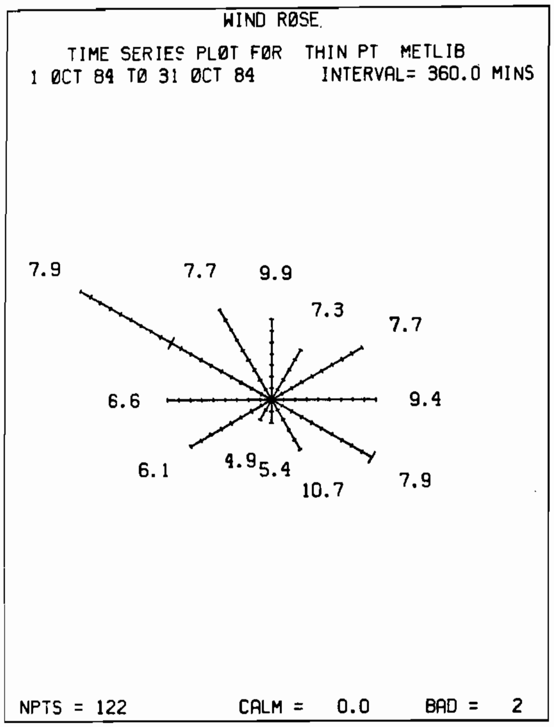

WIND RØSE
TIME SERIES PLØT FØR CHERNI METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
9.5
7.9
9.4
8.0
5.8
7.5
6.2
8.8
10.2
7.4
9.5
11.3
NPTS = 121
CALM = 0.0
BAD = 3

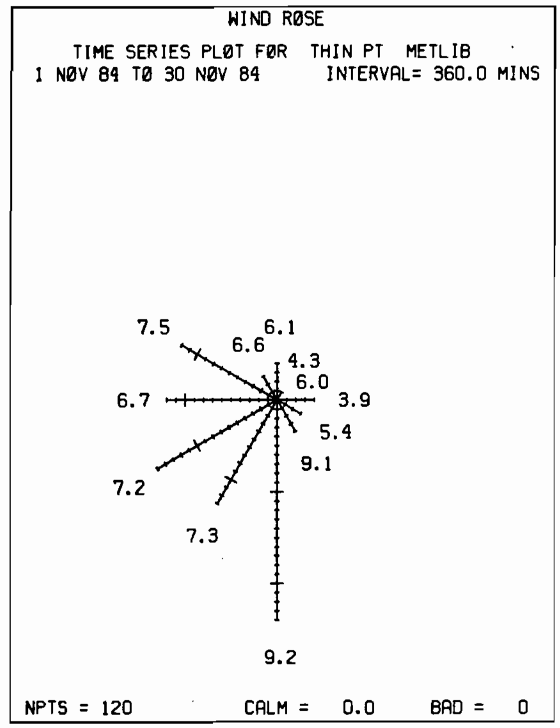

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
6.3
3.0
5.1
4.3
3.9
4.2
3.0
1.2
4.5
5.1
5.3
5.2
NPTS = 116 CALM = 0.0 BAD = 4

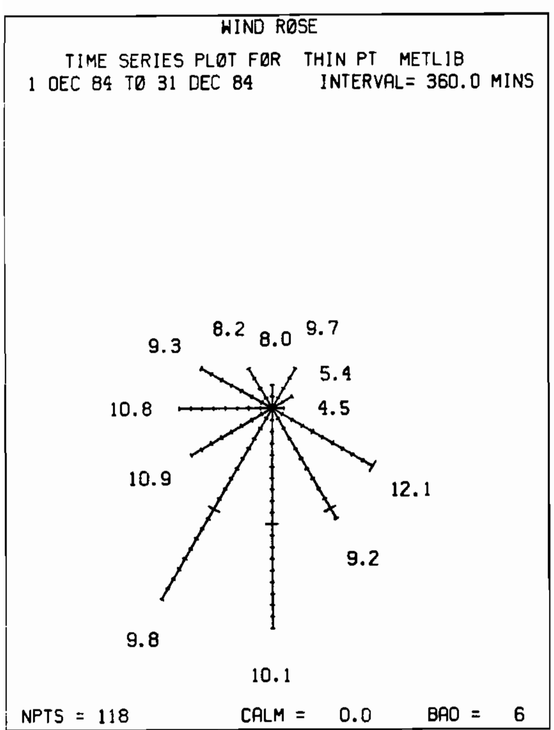

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
6.1
5.1
7.0
5.0
4.6
6.7
5.0
6.0
NPTS = 119 CALM = 0.0 BAD = 5

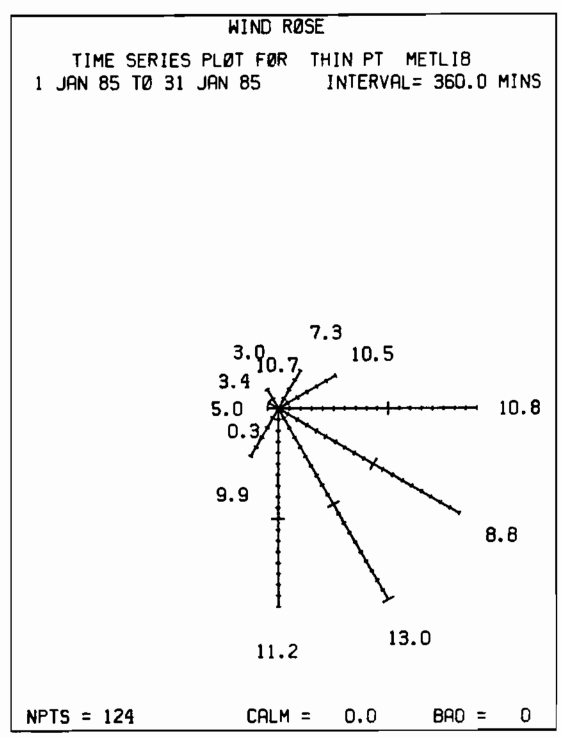

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
5.7
6.9
3.0
3.8
3.1
6.9
1.8
1.8
8.3
4.4
8.0
9.5
NPTS = 119 CALM = 0.0 BAD = 5

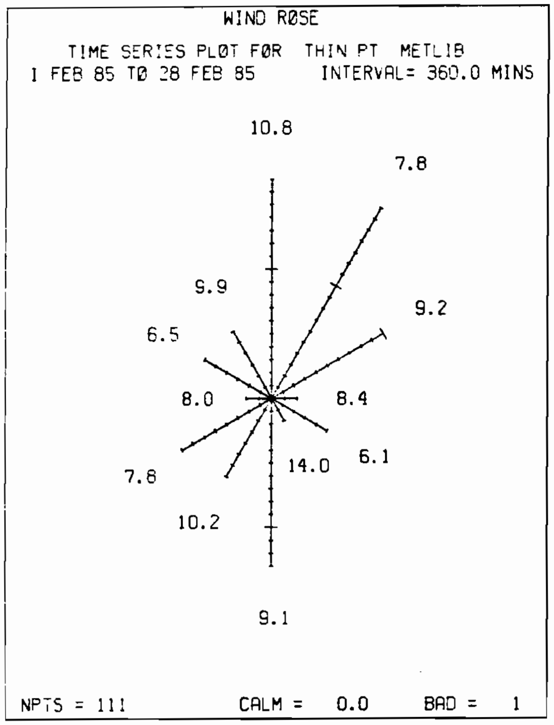

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
8.5
5.8
3.1
8.7
4.6
6.8
10.7
7.8
3.8
6.2
9.0
6.1
NPTS = 117 CALM = 0.0 BAD = 3

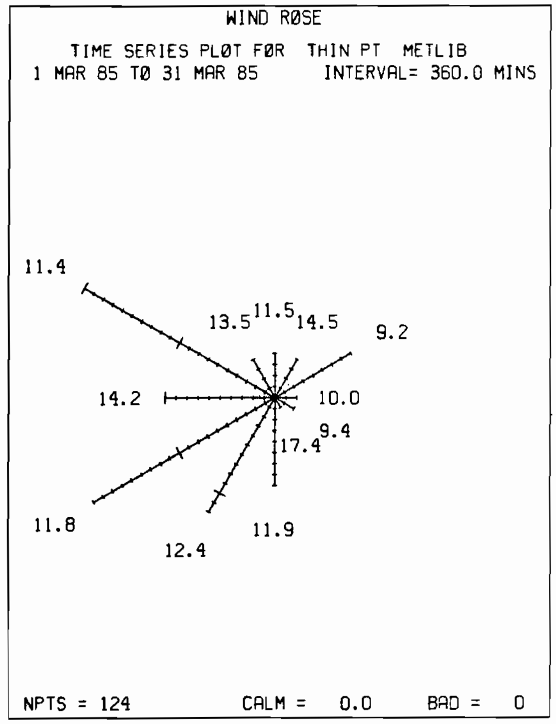

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
7.9
7.7
9.9
7.3
7.7
6.6
9.4
6.1
4.9
5.4
10.7
7.9
NPTS = 122
CALM = 0.0
BAD = 2

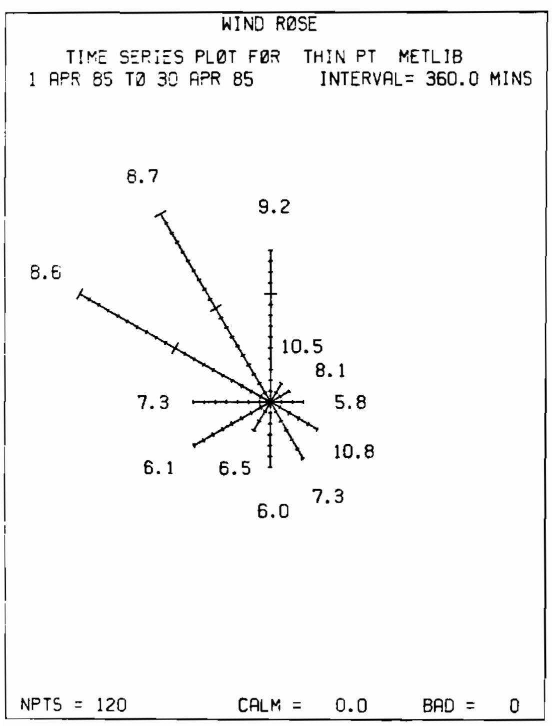

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
7.5
6.1
6.6
4.3
6.0
6.7
3.9
5.4
9.1
7.2
7.3
9.2
NPTS = 120
CALM = 0.0
BAD = 0

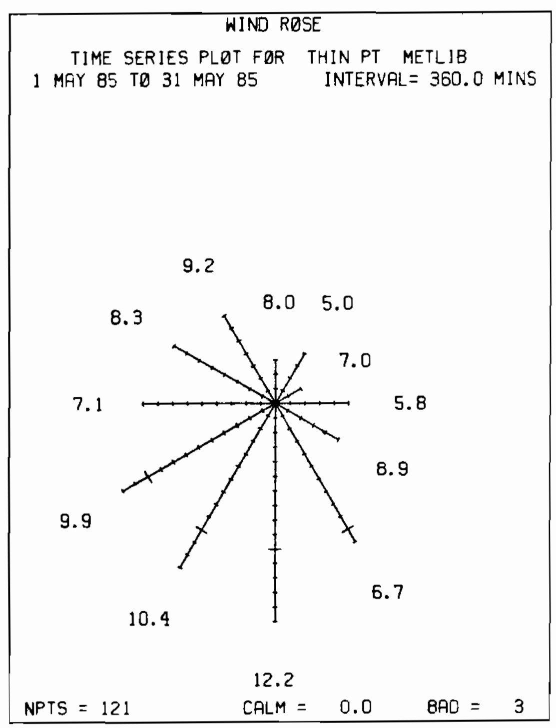

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
9.3
8.2
8.0
9.7
5.4
10.8
4.5
10.9
12.1
9.2
9.8
10.1
NPTS = 118
CALM = 0.0
BAD = 6

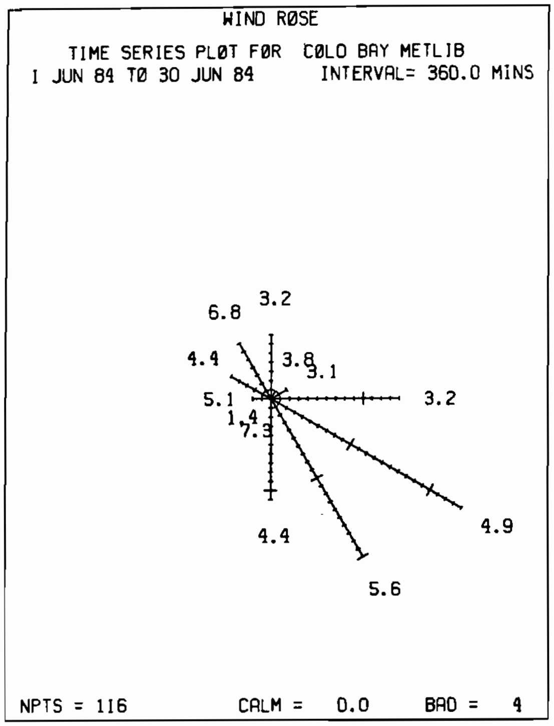

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
7.3
3.0
10.7
10.5
3.4
5.0
10.8
0.3
9.9
8.8
13.0
11.2
NPTS = 124
CALM = 0.0
BAD = 0

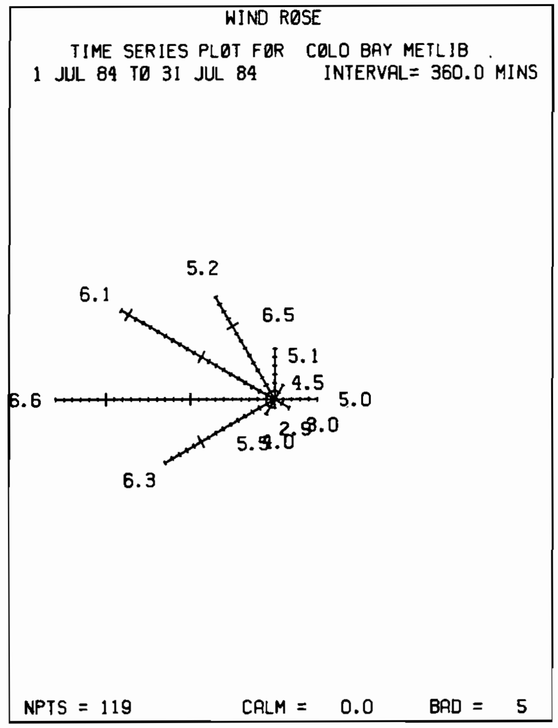

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
10.8
7.8
9.9
9.2
6.5
8.0
8.4
6.1
14.0
7.6
10.2
9.1
NPTS = 111 CALM = 0.0 BAD = 1

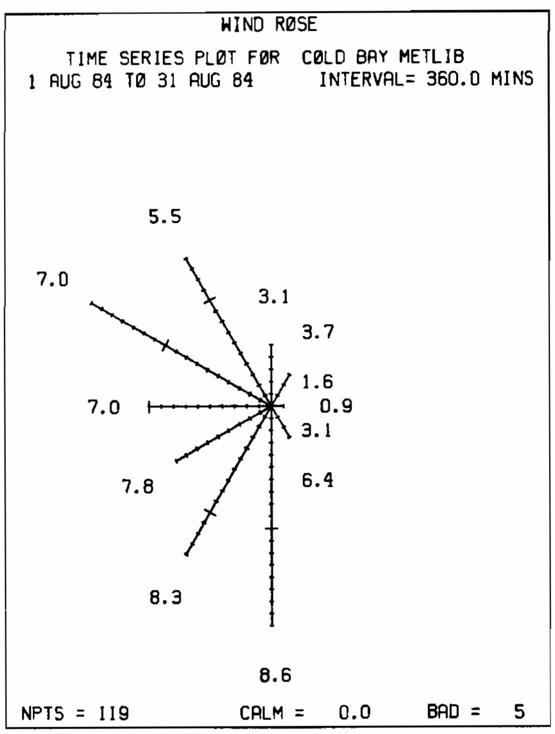

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
11.4
13.5
11.5
14.5
9.2
14.2
10.0
9.4
17.4
11.8
11.9
12.4
NPTS = 124 CALM = 0.0 BAD = 0

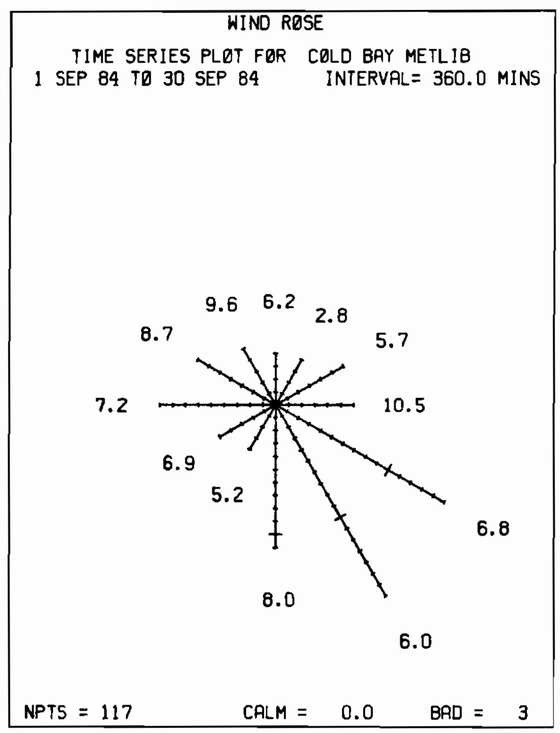

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
8.7
9.2
8.6
10.5
8.1
7.3
5.8
10.8
6.1
6.5
7.3
6.0
NPTS = 120 CALM = 0.0 BAD = 0

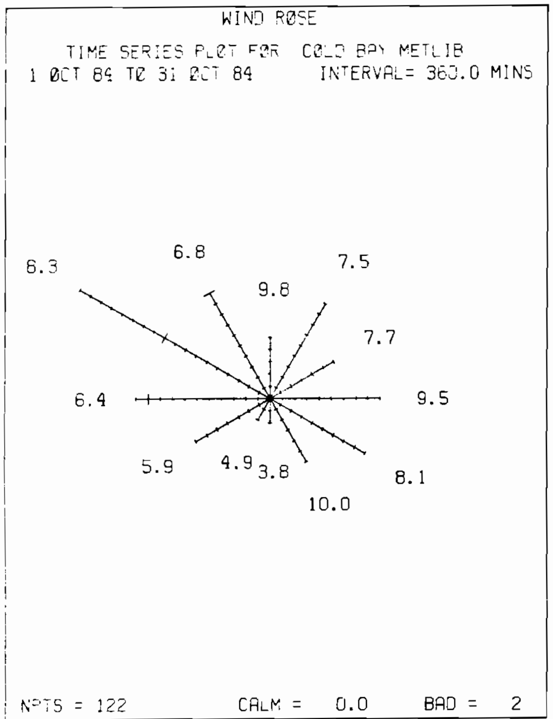

WIND RØSE
TIME SERIES PLØT FØR THIN PT METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
9.2
8.0
5.0
8.3
7.0
7.1
5.8
8.9
9.9
6.7
10.4
12.2
NPTS = 121 CALM = 0.0 BAD = 3

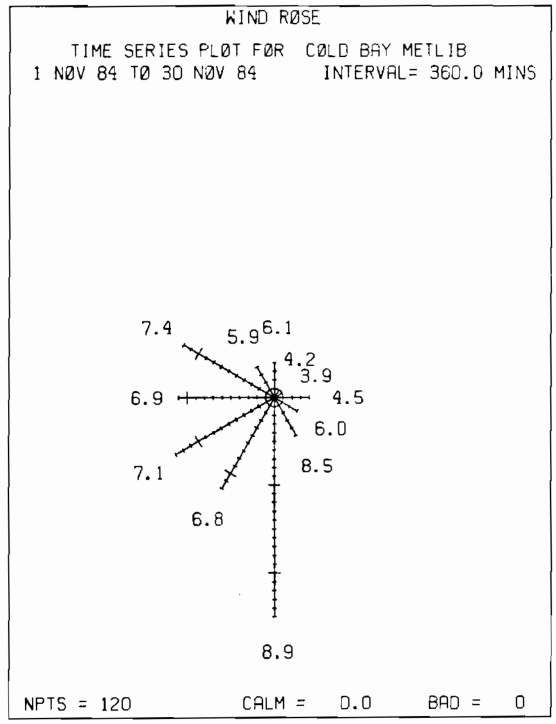

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
6.8
3.2
4.4
3.8
3.1
5.1
3.2
1.4
7.3
4.9
4.4
5.6
NPTS = 116
CALM = 0.0
BAD = 4

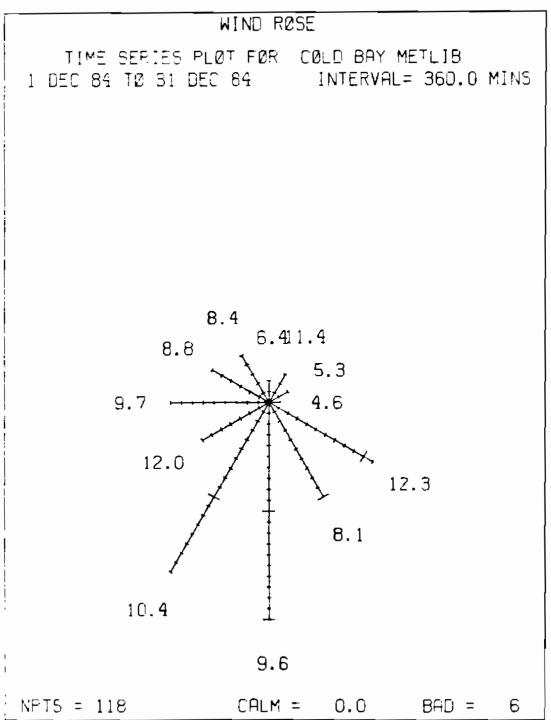

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
5.2
6.1
6.5
5.1
4.5
5.0
6.3
NPTS = 119
CALM = 0.0
BAD = 5

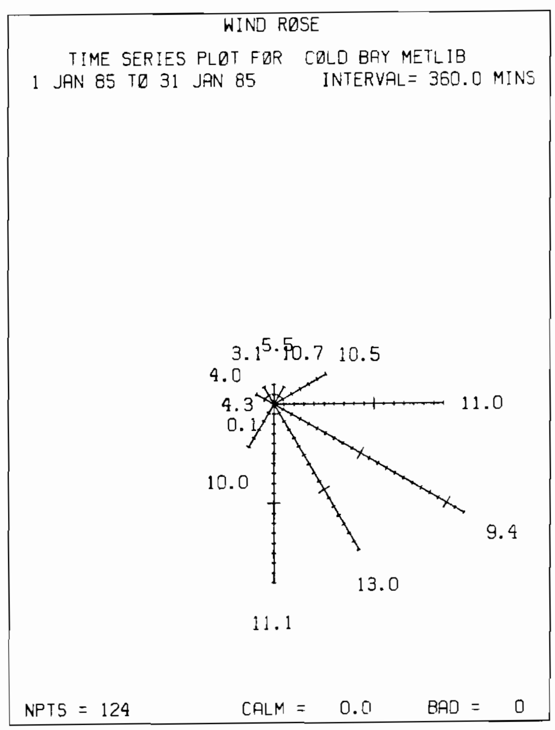

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
5.5
7.0
3.1
3.7
1.6
7.0
0.9
3.1
7.8
6.4
8.3
8.6
NPTS = 119
CALM = 0.0
BAD = 5

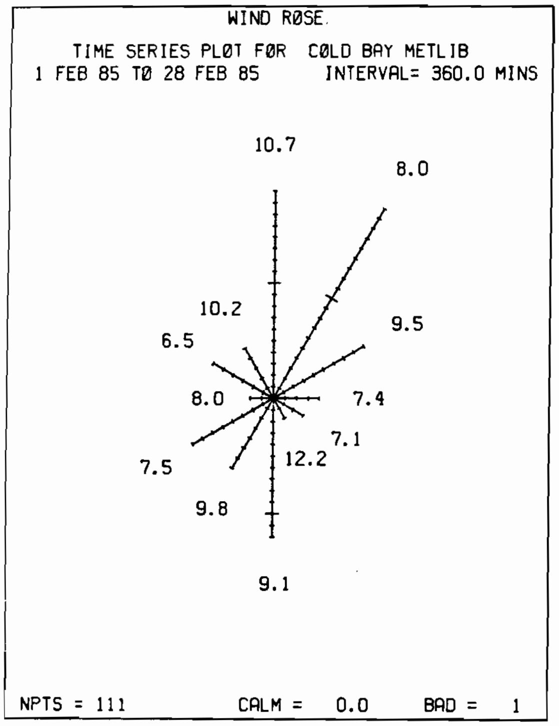

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
9.6
6.2
2.8
8.7
5.7
7.2
10.5
6.9
5.2
6.8
8.0
6.0
NPTS = 117
CALM = 0.0
BAD = 3

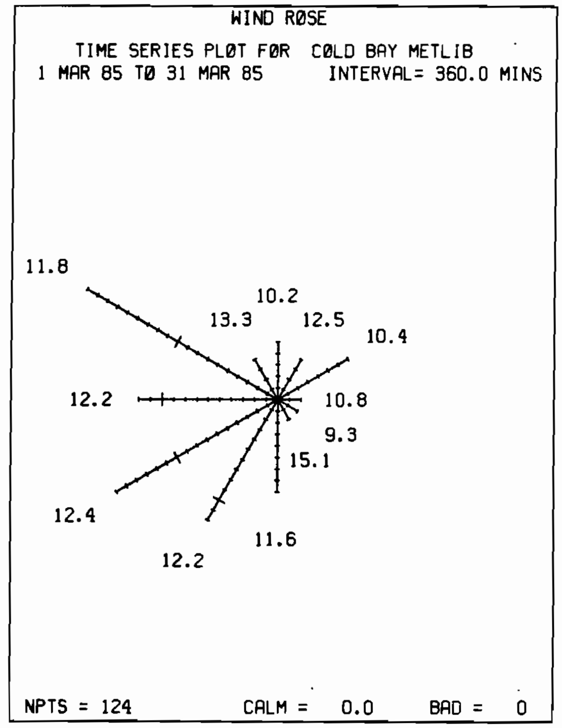

WIND RØSE
TIME SERIES PLØT FØR COLD BAY METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
6.3
6.8
7.5
9.8
7.7
6.4
9.5
5.9
4.9
3.8
8.1
10.0
NPTS = 122 CALM = 0.0 BAD = 2

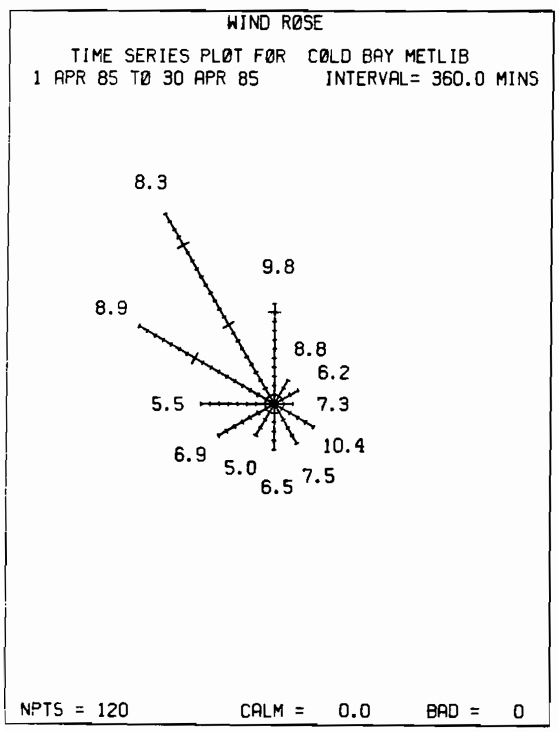

WIND RØSE
TIME SERIES PLØT FØR COLD BAY METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
7.4
5.9
6.1
4.2
3.9
6.9
4.5
6.0
7.1
8.5
6.8
8.9
NPTS = 120 CALM = 0.0 BAD = 0

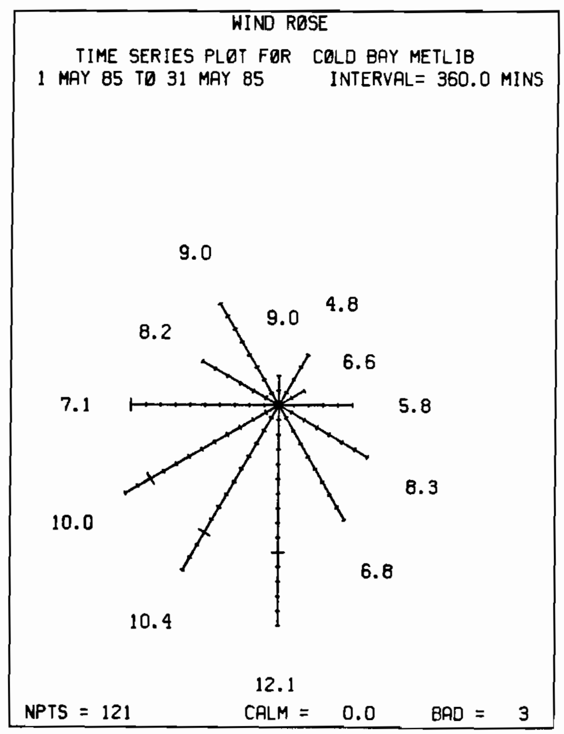

WIND RØSE
TIME SERIES PLØT FØR COLD BAY METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
8.4
8.8
6.4
11.4
5.3
9.7
4.6
12.0
12.3
8.1
10.4
9.6
NPTS = 118 CALM = 0.0 BAD = 6

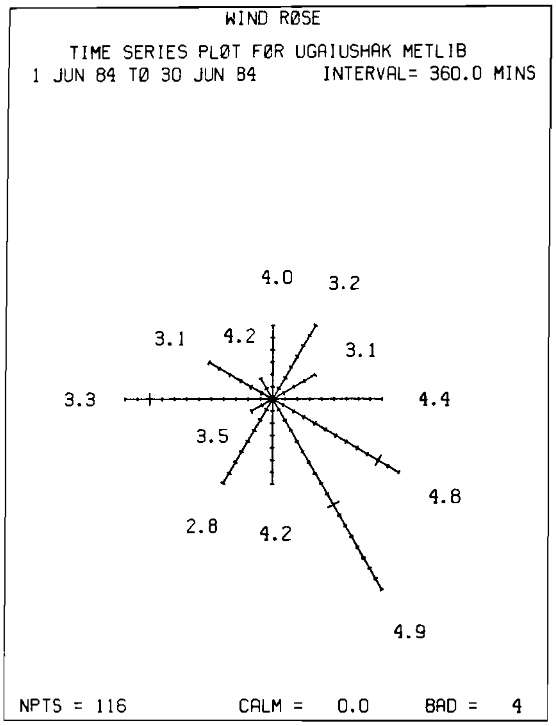

WIND RØSE
TIME SERIES PLØT FØR COLD BAY METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
3.1
5.5
10.7
10.5
4.0
4.3
11.0
0.1
10.0
9.4
13.0
11.1
NPTS = 124 CALM = 0.0 BAD = 0

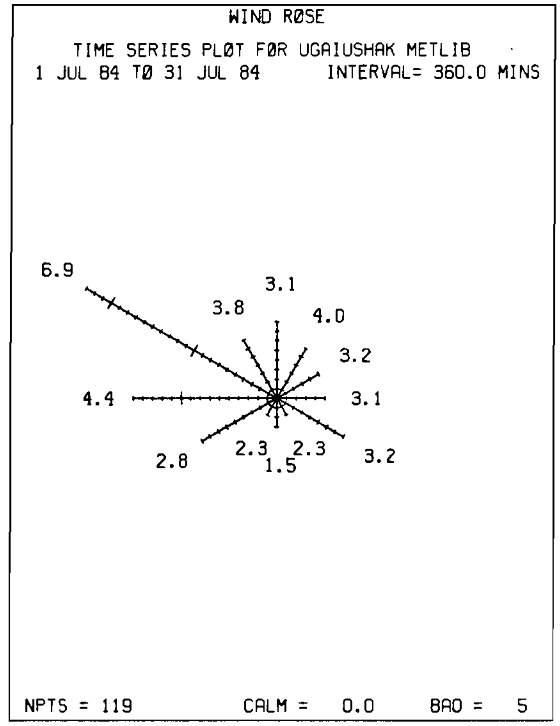

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
10.7
8.0
10.2
9.5
6.5
8.0
7.4
7.1
12.2
7.5
9.8
9.1
NPTS = 111
CALM = 0.0
BAD = 1

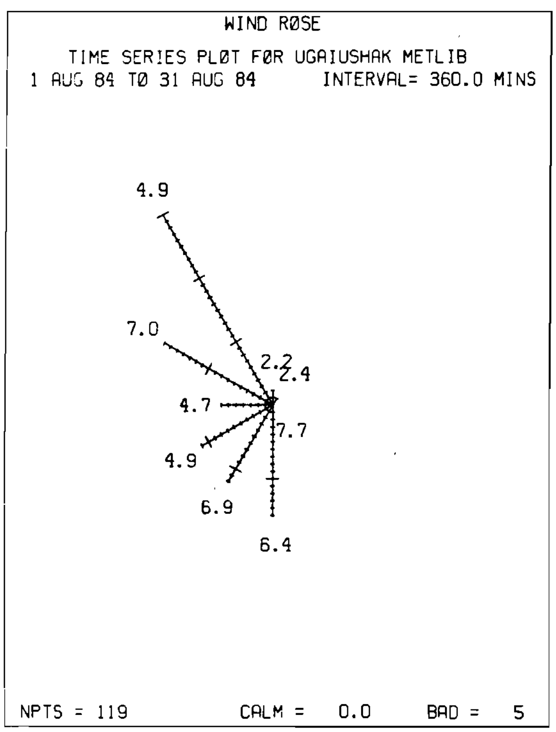

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
11.8
10.2
13.3
12.5
10.4
12.2
10.8
9.3
15.1
12.4
11.6
12.2
NPTS = 124
CALM = 0.0
BAD = 0

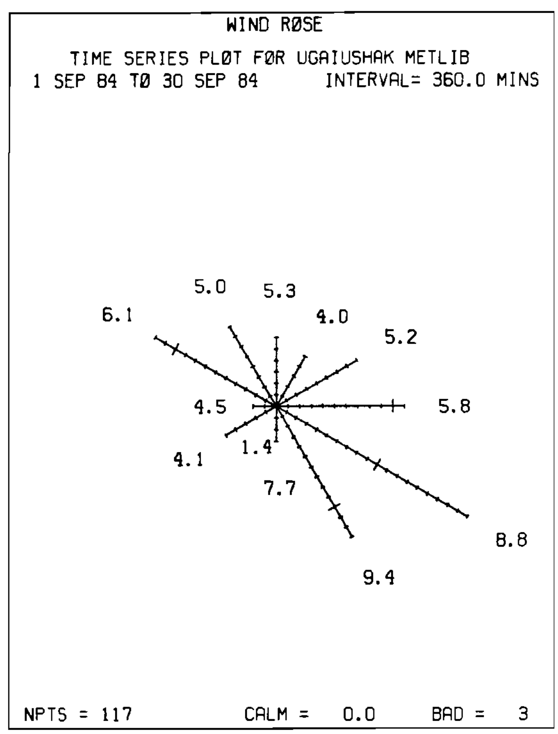

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
8.3
9.8
8.9
8.8
6.2
5.5
7.3
10.4
6.9
5.0
7.5
6.5
NPTS = 120
CALM = 0.0
BAD = 0

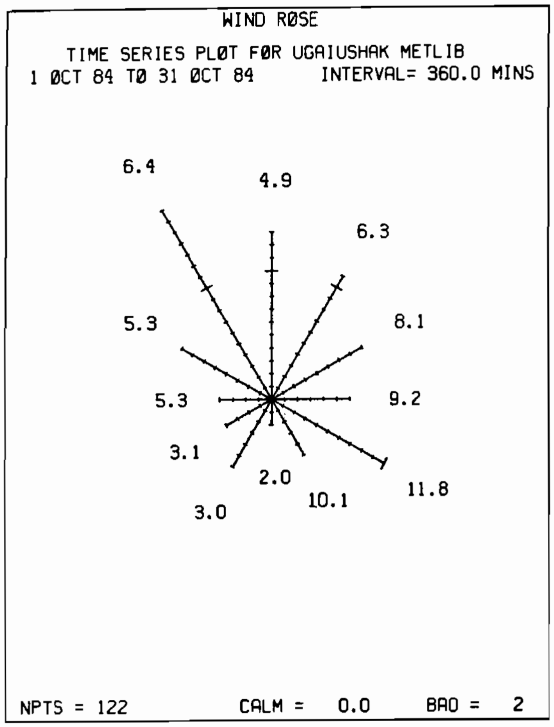

WIND RØSE
TIME SERIES PLØT FØR CØLD BAY METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
9.0
9.0
4.8
8.2
6.6
7.1
5.8
8.3
10.0
6.8
10.4
12.1
NPTS = 121
CALM = 0.0
BAD = 3

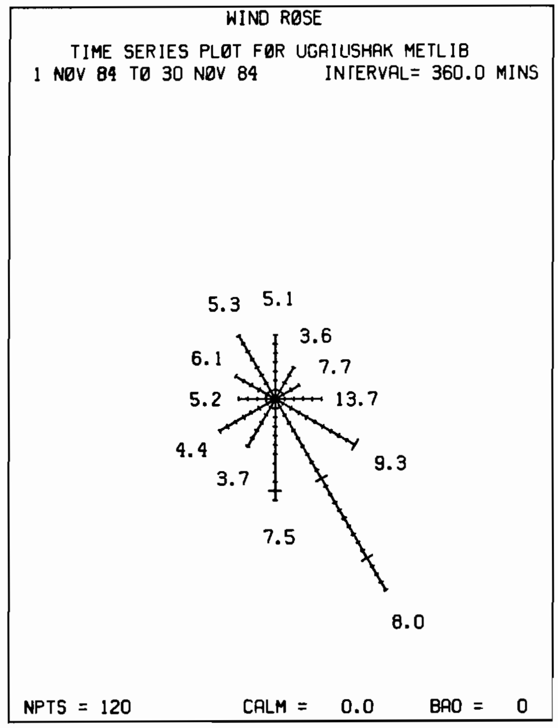

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JUN 84 TØ 30 JUN 84 INTERVAL= 360.0 MINS
4.0
3.2
3.1
4.2
3.1
3.3
4.4
3.5
4.8
2.8
4.2
4.9
NPTS = 116
CALM = 0.0
BAD = 4

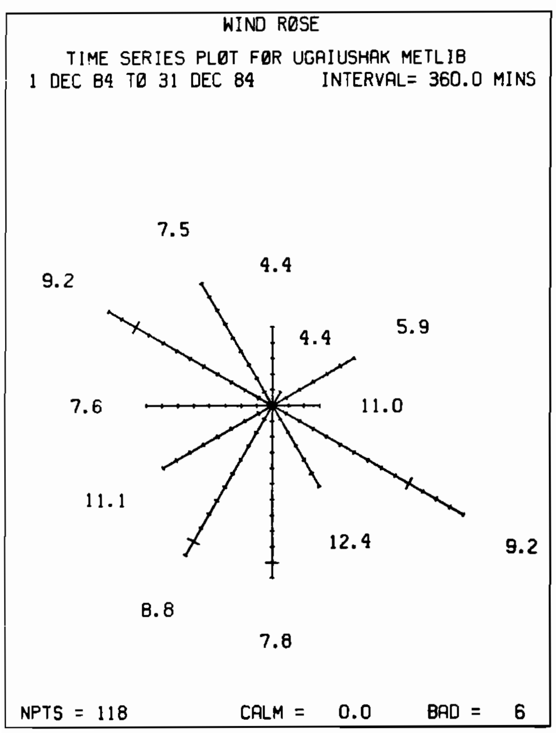

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JUL 84 TØ 31 JUL 84 INTERVAL= 360.0 MINS
6.9
3.1
3.8
4.0
3.2
4.4
3.1
2.8
2.3
2.3
1.5
3.2
NPTS = 119
CALM = 0.0
BAD = 5

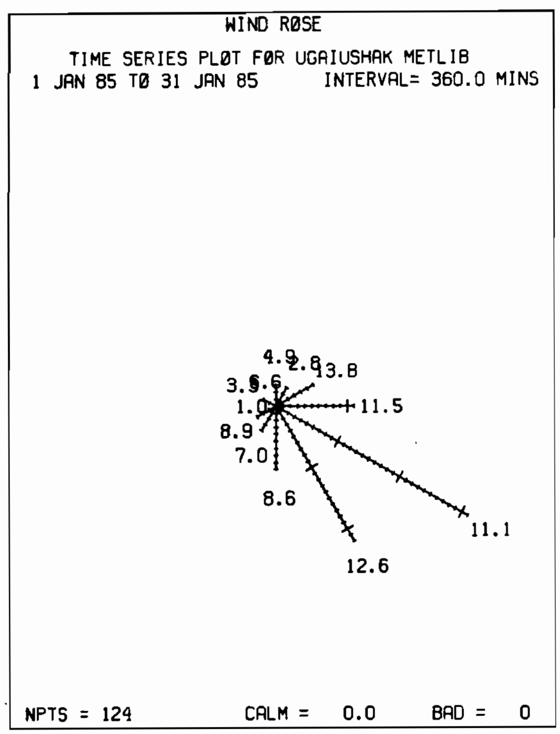

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 AUG 84 TØ 31 AUG 84 INTERVAL= 360.0 MINS
4.9
7.0
2.2
2.4
4.7
7.7
4.9
6.9
6.4
NPTS = 119
CALM = 0.0
BAD = 5

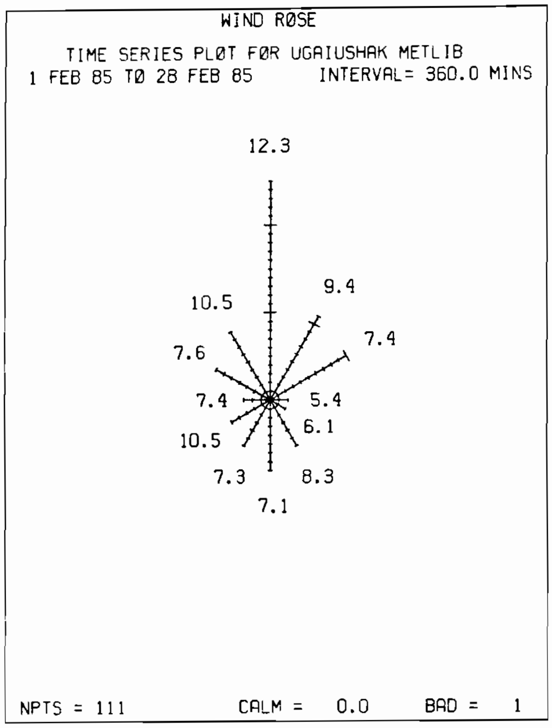

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 SEP 84 TØ 30 SEP 84 INTERVAL= 360.0 MINS
5.0
5.3
6.1
4.0
5.2
4.5
5.8
1.4
4.1
7.7
8.8
9.4
NPTS = 117
CALM = 0.0
BAD = 3

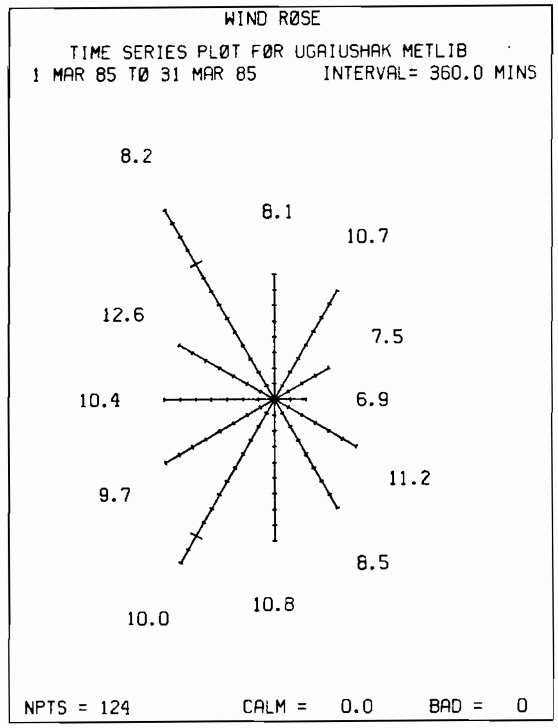

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 ØCT 84 TØ 31 ØCT 84 INTERVAL= 360.0 MINS
6.4
4.9
6.3
5.3
8.1
5.3
9.2
3.1
2.0
10.1
11.8
3.0
NPTS = 122
CALM = 0.0
BAD = 2

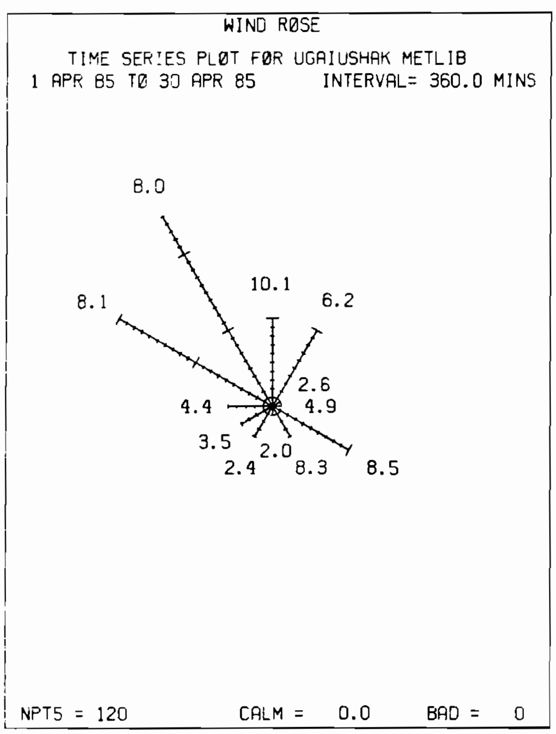

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 NØV 84 TØ 30 NØV 84 INTERVAL= 360.0 MINS
5.3
5.1
3.6
6.1
7.7
5.2
13.7
4.4
9.3
3.7
7.5
8.0
NPTS = 120
CALM = 0.0
BAD = 0

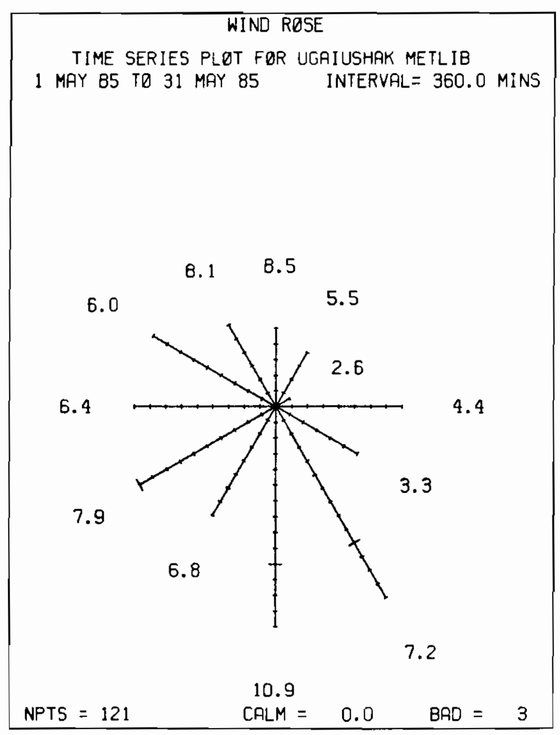

WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 DEC 84 TØ 31 DEC 84 INTERVAL= 360.0 MINS
7.5
4.4
9.2
4.4
5.9
7.6
11.0
11.1
12.4
9.2
8.8
7.8
NPTS = 118
CALM = 0.0
BAD = 6


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 JAN 85 TØ 31 JAN 85 INTERVAL= 360.0 MINS
13.8
11.5
8.9
7.0
8.6
11.1
12.6
NPTS = 124
CALM = 0.0
BAD = 0


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 FEB 85 TØ 28 FEB 85 INTERVAL= 360.0 MINS
12.3
9.4
10.5
7.4
7.6
7.4
5.4
6.1
10.5
7.3
8.3
7.1
NPTS = 111
CALM = 0.0
BAD = 1


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 MAR 85 TØ 31 MAR 85 INTERVAL= 360.0 MINS
8.2
8.1
10.7
12.6
7.5
10.4
6.9
11.2
9.7
8.5
10.8
10.0
NPTS = 124
CALM = 0.0
BAD = 0


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 APR 85 TØ 30 APR 85 INTERVAL= 360.0 MINS
8.0
10.1
8.1
6.2
2.6
4.4
4.9
3.5
2.0
2.4
8.3
8.5
NPTS = 120
CALM = 0.0
BAD = 0


WIND RØSE
TIME SERIES PLØT FØR UGAIUSHAK METLIB
1 MAY 85 TØ 31 MAY 85 INTERVAL= 360.0 MINS
8.1
8.5
6.0
5.5
2.6
6.4
4.4
3.3
7.9
6.8
7.2
10.9
NPTS = 121
CALM = 0.0
BAD = 3

Appendix E

Correlation coefficients between u and v wind components both measured and estimated every six hours for station locations at Cherni Island, Thin Point, Cold Bay, and Ugaiushak Island. If one or both data elements were missing in a correlation pair, that pair was discarded, except that all available data elements of a set were used in computing the mean.

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 6 1 0 0 TO 84 6 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 100	-0.468 100	0	0	0.658 100	-0.616 100	0	0	0.775 96	-0.413 96	0.775 96	-0.414 96	0.771 96	-0.414 96	0.090 96	-0.443 96
	v	-0.468 100	1.000 100	0	0	-0.797 100	0.780 100	0	0	-0.548 96	0.879 96	-0.579 96	0.879 96	-0.601 96	0.877 96	0.036 96	0.719 96
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.658 100	-0.797 100	0	0	1.000 120	-0.759 120	0	0	0.713 116	-0.668 116	0.729 116	-0.666 116	0.738 116	-0.664 116	0.067 116	-0.539 116
	v	-0.616 100	0.780 100	0	0	-0.759 120	1.000 120	0	0	-0.632 116	0.742 116	-0.643 116	0.748 116	-0.649 116	0.753 116	0.034 116	0.503 116
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.775 96	-0.546 96	0	0	0.713 116	-0.632 116	0	0	1.000 116	-0.481 116	0.996 116	-0.483 116	0.987 116	-0.485 116	0.162 116	-0.451 116
	v	-0.413 96	0.879 96	0	0	-0.668 116	0.742 116	0	0	-0.481 116	1.000 116	-0.500 116	0.998 116	-0.514 116	0.994 116	0.150 116	0.758 116
TP_e	u	0.775 96	-0.579 96	0	0	0.729 116	-0.643 116	0	0	0.996 116	-0.500 116	1.000 116	-0.500 116	0.998 116	-0.499 116	0.223 116	-0.489 116
	v	-0.414 96	0.879 96	0	0	-0.666 116	0.748 116	0	0	-0.483 116	0.998 116	-0.500 116	1.000 116	-0.512 116	0.999 116	0.153 116	0.746 116
CB_e	u	0.771 96	-0.601 96	0	0	0.738 116	-0.649 116	0	0	0.987 116	-0.514 116	0.998 116	-0.512 116	1.000 116	-0.510 116	0.265 116	-0.516 116
	v	-0.414 96	0.877 96	0	0	-0.664 116	0.753 116	0	0	-0.485 116	0.994 116	-0.499 116	0.999 116	-0.510 116	1.000 116	0.155 116	0.733 116
UI_e	u	0.090 96	0.036 96	0	0	0.067 116	0.034 116	0	0	0.162 116	0.150 116	0.223 116	0.153 116	0.265 116	0.155 116	1.000 116	-0.269 116
	v	-0.443 96	0.719 96	0	0	-0.539 116	0.503 116	0	0	-0.451 116	0.758 116	-0.489 116	0.748 116	-0.516 116	0.733 116	-0.269 116	1.000 116

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 7 1 0 0 TO 84 7 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 120	-0.474 120	0	0	0.655 120	-0.534 120	0	0	0.784 115	-0.046 115	0.783 115	-0.026 115	0.781 115	-0.014 115	0.546 115	-0.349 115
	v	-0.474 120	1.000 120	0	0	-0.570 120	0.610 120	0	0	-0.305 115	0.627 115	-0.300 115	0.621 115	-0.298 115	0.615 115	0.019 115	0.329 115
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.655 120	-0.570 120	0	0	1.000 124	-0.479 124	0	0	0.718 119	-0.165 119	0.714 119	-0.148 119	0.710 119	-0.138 119	0.455 119	-0.332 119
	v	-0.534 120	0.610 120	0	0	-0.479 124	1.000 124	0	0	-0.421 119	0.513 119	-0.412 119	0.493 119	-0.405 119	0.477 119	-0.057 119	0.418 119
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.784 115	-0.305 115	0	0	0.718 119	-0.421 119	0	0	1.000 119	0.144 119	0.998 119	0.180 119	0.993 119	0.202 119	0.755 119	-0.436 119
	v	-0.046 115	0.627 115	0	0	-0.165 119	0.513 119	0	0	0.144 119	1.000 119	0.152 119	0.996 119	0.155 119	0.989 119	0.450 119	0.440 119
TP_e	u	0.783 115	-0.300 115	0	0	0.714 119	-0.412 119	0	0	0.998 119	0.152 119	1.000 119	0.190 119	0.999 119	0.215 119	0.778 119	-0.442 119
	v	-0.026 115	0.621 115	0	0	-0.148 119	0.493 119	0	0	0.180 119	0.996 119	0.190 119	1.000 119	0.194 119	0.998 119	0.475 119	0.400 119
CB_e	u	0.781 115	-0.298 115	0	0	0.710 119	-0.405 119	0	0	0.993 119	0.155 119	0.999 119	0.194 119	1.000 119	0.220 119	0.792 119	-0.446 119
	v	-0.014 115	0.615 115	0	0	-0.138 119	0.477 119	0	0	0.202 119	0.969 119	0.215 119	0.998 119	0.220 119	1.000 119	0.491 119	0.367 119
UI_e	u	0.546 115	0.019 115	0	0	0.455 119	-0.057 119	0	0	0.755 119	0.450 119	0.778 119	0.475 119	0.792 119	0.491 119	1.000 119	-0.391 119
	v	-0.349 115	0.329 115	0	0	-0.332 119	0.418 119	0	0	-0.436 119	0.440 119	-0.442 119	0.400 119	-0.446 119	0.367 119	-0.391 119	1.000 119

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 8 1 0 0 TO 84 8 31 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 124	-0.208 124	0	0	0.634 124	-0.352 124	0	0	0.756 119	-0.163 119	0.755 119	-0.171 119	0.751 119	-0.178 119	0.404 119	0.094 119
	v	-0.208 124	1.000 124	0	0	-0.597 124	0.812 124	0	0	-0.176 119	0.927 119	-0.227 119	0.927 119	-0.265 119	0.926 119	-0.171 119	0.772 119
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.634 124	-0.597 124	0	0	1.000 124	-0.671 124	0	0	0.627 119	-0.550 119	0.653 119	-0.557 119	0.669 119	-0.563 119	0.500 119	-0.372 119
	v	-0.352 124	0.812 124	0	0	-0.671 124	1.000 124	0	0	-0.237 119	0.842 119	-0.277 119	0.848 119	-0.306 119	0.853 119	-0.241 119	0.639 119
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.756 119	-0.176 119	0	0	0.627 119	-0.237 119	0	0	1.000 119	-0.123 119	0.996 119	-0.127 119	0.988 119	-0.132 119	0.618 119	0.042 119
	v	-0.163 119	0.927 119	0	0	-0.550 119	0.842 119	0	0	-0.123 119	1.000 119	-0.181 119	0.999 119	-0.224 119	0.997 119	-0.134 119	0.805 119
TP_e	u	0.755 119	-0.227 119	0	0	0.653 119	-0.277 119	0	0	0.996 119	-0.181 119	1.000 119	-0.183 119	0.998 119	-0.187 119	0.622 119	0.002 119
	v	-0.171 119	0.927 119	0	0	-0.557 119	0.848 119	0	0	-0.127 119	0.999 119	-0.183 119	1.000 119	-0.225 119	0.999 119	-0.153 119	0.807 119
CB_e	u	0.751 119	-0.265 119	0	0	0.669 119	-0.306 119	0	0	0.988 119	-0.224 119	0.998 119	-0.225 119	1.000 119	-0.227 119	0.621 119	-0.028 119
	v	-0.178 119	0.926 119	0	0	-0.563 119	0.853 119	0	0	-0.132 119	0.997 119	-0.187 119	0.999 119	-0.227 119	1.000 119	-0.167 119	0.806 119
UI_e	u	0.404 119	-0.171 119	0	0	0.500 119	-0.241 119	0	0	0.618 119	-0.134 119	0.622 119	-0.153 119	0.621 119	-0.167 119	1.000 119	-0.294 119
	v	0.094 119	0.772 119	0	0	-0.372 119	0.639 119	0	0	0.042 119	0.805 119	0.002 119	0.807 119	-0.028 119	0.806 119	-0.294 119	1.000 119

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 9 1 0 0 TO 84 9 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 120	-0.395 120	0	0	0.821 120	-0.425 120	0	0	0.914 117	-0.272 117	0.915 117	-0.248 117	0.913 117	-0.226 117	0.678 117	-0.299 117
	v	-0.395 120	1.000 120	0	0	-0.575 120	0.894 120	0	0	-0.404 117	0.904 117	-0.429 117	0.898 117	-0.447 117	0.892 117	-0.354 117	0.702 117
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.821 120	-0.575 120	0	0	1.000 120	-0.577 120	0	0	0.849 117	-0.493 117	0.858 117	-0.473 117	0.863 117	-0.457 117	0.660 117	-0.483 117
	v	-0.425 120	0.894 120	0	0	-0.577 120	1.000 120	0	0	-0.381 117	0.851 117	-0.406 117	0.849 117	-0.425 117	0.844 117	-0.368 117	0.635 117
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.914 117	-0.404 117	0	0	0.849 117	-0.381 117	0	0	1.000 117	-0.302 117	0.998 117	-0.272 117	0.994 117	-0.250 117	0.723 117	-0.351 117
	v	-0.272 117	0.904 117	0	0	-0.493 117	0.851 117	0	0	-0.302 117	1.000 117	-0.329 117	0.998 117	-0.350 117	0.993 117	-0.248 117	0.715 117
TP_e	u	0.915 117	-0.429 117	0	0	0.858 117	-0.406 117	0	0	0.998 117	-0.329 117	1.000 117	-0.298 117	0.999 117	-0.274 117	0.750 117	-0.382 117
	v	-0.246 117	0.898 117	0	0	-0.473 117	0.849 117	0	0	-0.272 117	0.998 117	-0.298 117	1.000 117	-0.317 117	0.999 117	-0.218 117	0.692 117
CB_e	u	0.913 117	-0.447 117	0	0	0.863 117	-0.425 117	0	0	0.994 117	-0.350 117	0.999 117	-0.317 117	1.000 117	-0.293 117	0.787 117	-0.403 117
	v	-0.226 117	0.892 117	0	0	-0.457 117	0.844 117	0	0	-0.250 117	0.993 117	-0.274 117	0.999 117	-0.293 117	1.000 117	-0.195 117	0.671 117
UI_e	u	0.678 117	-0.354 117	0	0	0.660 117	-0.368 117	0	0	0.723 117	-0.248 117	0.750 117	-0.218 117	0.787 117	-0.195 117	1.000 117	-0.567 117
	v	-0.299 117	0.702 117	0	0	-0.483 117	0.635 117	0	0	-0.351 117	0.715 117	-0.382 117	0.692 117	-0.403 117	0.671 117	-0.567 117	1.000 117

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 10 1 0 0 TO 84 10 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 117	-0.467 117	0	0	0.864 117	-0.404 117	0	0	0.910 115	-0.340 115	0.917 115	-0.338 115	0.918 115	-0.336 115	0.689 115	-0.381 115
	v	-0.467 117	1.000 117	0	0	-0.586 117	0.835 117	0	0	-0.471 115	0.879 115	-0.493 115	0.877 115	-0.508 115	0.874 115	-0.318 115	0.705 115
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.864 117	-0.586 117	0	0	1,000 124	-0.467 124	0	0	0.816 122	-0.402 122	0.838 122	-0.403 122	0.851 122	-0.403 122	0.755 122	-0.447 122
	v	-0.404 117	0.835 117	0	0	-0.467 124	1.000 124	0	0	-0.348 122	0.852 122	-0.363 122	0.862 122	-0.375 122	0.868 122	-0.242 122	0.700 122
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.910 115	-0.471 115	0	0	0.816 122	-0.348 122	0	0	1.000 122	-0.281 122	0.997 122	-0.281 122	0.992 122	-0.280 122	0.669 122	-0.274 122
	v	-0.340 115	0.879 115	0	0	-0.402 122	0.852 122	0	0	-0.281 122	1.000 122	-0.303 122	0.998 122	-0.319 122	0.994 122	-0.126 122	0.735 122
TP_e	u	0.917 115	-0.493 115	0	0	0.838 122	-0.363 122	0	0	0.997 122	-0.303 122	1.000 122	-0.301 122	0.999 122	-0.299 122	0.711 122	-0.315 122
	v	-0.338 115	0.877 115	0	0	-0.403 122	0.862 122	0	0	-0.281 122	0.998 122	-0.301 122	1.000 122	-0.316 122	0.999 122	-0.124 122	0.725 122
CB_e	u	0.918 115	-0.508 115	0	0	0.851 122	-0.375 122	0	0	0.992 122	-0.319 122	0.999 122	-0.316 122	1.000 122	-0.313 122	0.737 122	-0.343 122
	v	-0.336 115	0.874 115	0	0	-0.403 122	0.868 122	0	0	-0.280 122	0.994 122	-0.299 122	0.999 122	-0.313 122	1.000 122	-0.121 122	0.716 122
UI_e	u	0.689 115	-0.318 115	0	0	0.755 122	-0.242 122	0	0	0.669 122	-0.126 122	0.711 122	-0.124 122	0.737 122	-0.121 122	1.000 122	-0.474 122
	v	-0.381 115	0.705 115	0	0	-0.447 122	0.700 122	0	0	-0.274 122	0.735 122	-0.315 122	0.725 122	-0.343 122	0.716 122	-0.474 122	1.000 122

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 11 1 0 0 TO 84 11 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 119	-0.294 119	0	0	0.790 119	-0.218 119	0	0	0.777 119	-0.064 119	0.775 119	-0.087 119	0.768 119	-0.105 119	0.545 119	0.054 119
	v	-0.294 119	1.000 119	0	0	-0.538 119	0.835 119	0	0	-0.464 119	0.839 119	-0.491 119	0.842 119	-0.511 119	0.842 119	-0.260 119	0.615 119
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.790 119	-0.538 119	0	0	1.000 120	-0.417 120	0	0	0.742 120	-0.383 120	0.745 120	-0.407 120	0.742 120	-0.425 120	0.407 120	-0.154 120
	v	-0.218 119	0.835 119	0	0	-0.417 120	1.000 120	0	0	-0.323 120	0.737 120	-0.351 120	0.747 120	-0.372 120	0.752 120	-0.217 120	0.472 120
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.777 119	-0.464 119	0	0	0.742 120	-0.323 120	0	0	1.000 120	-0.271 120	0.995 120	-0.286 120	0.985 120	-0.298 120	0.626 120	-0.238 120
	v	-0.064 119	0.839 119	0	0	-0.383 120	0.737 120	0	0	-0.271 120	1.000 120	-0.287 120	0.998 120	-0.302 120	0.994 120	-0.013 120	0.704 120
TP_e	u	0.775 119	-0.491 119	0	0	0.745 120	-0.351 120	0	0	0.995 120	-0.287 120	1.000 120	-0.301 120	0.998 120	-0.312 120	0.679 120	-0.267 120
	v	-0.087 119	0.842 119	0	0	-0.407 120	0.747 120	0	0	-0.286 120	0.998 120	-0.301 120	1.000 120	-0.315 120	0.999 120	-0.021 120	0.682 120
CB_e	u	0.768 119	-0.511 119	0	0	0.742 120	-0.372 120	0	0	0.985 120	-0.302 120	0.998 120	-0.315 120	1.000 120	-0.325 120	0.709 120	-0.289 120
	v	-0.105 119	0.842 119	0	0	-0.425 120	0.752 120	0	0	-0.298 120	0.994 120	-0.312 120	0.999 120	-0.325 120	1.000 120	-0.027 120	0.662 120
UI_e	u	0.545 119	-0.260 119	0	0	0.407 120	-0.217 120	0	0	0.626 120	-0.013 120	0.679 120	-0.021 120	0.709 120	-0.027 120	1.000 120	-0.302 120
	v	0.054 119	0.615 119	0	0	-0.154 120	0.472 120	0	0	-0.238 120	0.704 120	-0.267 120	0.682 120	-0.289 120	0.662 120	-0.302 120	1.000 120

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 12 1 0 0 TO 84 12 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 120	-0.293 120	0	0	0.778 120	-0.377 120	0.570 115	-0.097 115	0.905 118	-0.203 118	0.903 118	-0.204 118	0.898 118	-0.205 118	0.633 118	-0.257 118
	v	-0.293 120	1.000 120	0	0	-0.552 120	0.850 120	0.049 115	0.689 115	-0.260 118	0.877 118	-0.260 118	0.867 118	-0.261 118	0.857 118	-0.077 118	0.759 118
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.778 120	-0.552 120	0	0	1.000 120	-0.621 120	0.396 115	-0.309 115	0.750 118	-0.477 118	0.746 118	-0.477 118	0.742 118	-0.476 118	0.453 118	-0.438 118
	v	-0.377 120	0.850 120	0	0	-0.621 120	1.000 120	0.045 115	0.659 115	-0.320 118	0.845 118	-0.310 118	0.840 118	-0.304 118	0.834 118	-0.044 118	0.702 118
UI_m	u	0.570 115	0.049 115	0	0	0.396 115	0.045 115	1.000 115	0.054 115	0.603 113	0.196 113	0.634 113	0.193 113	0.653 113	0.191 113	0.887 113	-0.177 113
	v	-0.097 115	0.689 115	0	0	-0.309 115	0.659 115	0.054 115	1.000 115	-0.123 113	0.619 113	-0.118 113	0.598 113	-0.115 113	0.578 113	-0.049 113	0.796 113
CI_e	u	0.905 118	-0.260 118	0	0	0.750 118	-0.320 118	0.603 113	-0.123 113	1.000 118	-0.109 118	0.997 118	-0.106 118	0.991 118	-0.104 118	0.701 118	-0.220 118
	v	-0.203 118	0.877 118	0	0	-0.477 118	0.845 118	0.196 113	0.619 113	-0.109 118	1.000 118	-0.101 118	0.998 118	-0.098 118	0.993 118	0.132 118	0.745 118
TP_e	u	0.903 118	-0.260 118	0	0	0.746 118	-0.310 118	0.634 113	-0.118 113	0.997 118	-0.101 118	1.000 118	-0.096 118	0.998 118	-0.093 118	0.737 118	-0.217 118
	v	-0.204 116	0.867 118	0	0	-0.477 118	0.840 118	0.193 113	0.598 113	-0.106 118	0.998 118	-0.096 118	1.000 118	-0.091 118	0.999 118	0.137 118	0.732 118
CB_e	u	0.898 118	-0.261 118	0	0	0.742 118	-0.304 118	0.653 113	-0.115 113	0.991 118	-0.098 118	0.998 118	-0.091 118	1.000 118	-0.086 118	0.760 118	-0.216 118
	v	-0.205 118	0.857 118	0	0	-0.476 116	0.834 118	0.191 113	0.578 113	-0.104 118	0.993 118	-0.093 118	0.999 118	-0.086 118	1.000 118	0.142 118	0.720 118
UI_e	u	0.633 118	-0.077 118	0	0	0.453 118	-0.044 118	0.887 113	-0.049 113	0.701 118	0.132 118	0.737 118	0.137 118	0.760 118	0.142 118	1.000 118	-0.229 118
	v	-0.257 118	0.759 118	0	0	-0.438 118	0.702 118	-0.177 113	0.796 113	-0.220 118	0.745 118	-0.217 118	0.732 118	-0.216 118	0.720 118	-0.229 118	1.000 118

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 1 1 0 0 TO 85 1 31 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 114	0.039 114	0	0	0.763 114	0.027 114	0.490 87	0.201 87	0.914 114	0.137 114	0.921 114	0.143 114	0.922 114	0.147 114	0.648 114	0.072 114
	v	0.039 114	1.000 114	0	0	-0.410 114	0.882 114	0.246 87	0.545 87	0.081 114	0.864 114	0.065 114	0.857 114	0.050 114	0.848 114	0.028 114	0.705 114
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.763 114	-0.410 114	0	0	1.000 124	-0.385 124	0.357 91	-0.129 91	0.674 124	-0.290 124	0.697 124	-0.277 124	0.712 124	-0.267 124	0.552 124	-0.303 124
	v	0.027 114	0.882 114	0	0	-0.385 124	1.000 124	0.167 91	0.402 91	0.046 124	0.833 124	0.034 124	0.831 124	0.021 124	0.826 124	0.007 124	0.640 124
UI_m	u	0.490 87	0.246 87	0	0	0.357 91	0.167 91	1.000 91	0.353 91	0.527 91	0.311 91	0.576 91	0.319 91	0.607 91	0.324 91	0.884 91	0.201 91
	v	0.201 87	0.545 87	0	0	-0.129 91	0.402 91	0.353 91	1.000 91	0.326 91	0.479 91	0.297 91	0.451 91	0.274 91	0.428 91	0.193 91	0.671 91
CI_e	u	0.914 114	0.081 114	0	0	0.674 124	0.046 124	0.527 91	0.326 91	1.000 124	0.205 124	0.996 124	0.201 124	0.988 124	0.197 124	0.682 124	0.132 124
	v	0.137 114	0.864 114	0	0	-0.290 124	0.833 124	0.311 91	0.479 91	0.205 124	1.000 124	0.199 124	0.997 124	0.191 124	0.992 124	0.218 124	0.780 124
TP_e	u	0.921 114	0.065 114	0	0	0.697 124	0.034 124	0.576 91	0.297 91	0.996 124	0.199 124	1.000 124	0.200 124	0.998 124	0.199 124	0.720 124	0.117 124
	v	0.143 114	0.857 114	0	0	-0.277 124	0.831 124	0.319 91	0.451 91	0.201 124	0.997 124	0.200 124	1.000 124	0.195 124	0.998 124	0.220 124	0.767 124
CB_e	u	0.922 114	0.050 114	0	0	0.712 124	0.021 124	0.807 91	0.274 91	0.988 124	0.191 124	0.998 124	0.195 124	1.000 124	0.197 124	0.743 124	0.105 124
	v	0.147 114	0.848 114	0	0	-0.267 124	0.826 124	0.324 91	0.428 91	0.197 124	0.992 124	0.199 124	0.998 124	0.197 124	1.000 124	0.221 124	0.754 124
UI_e	u	0.648 114	0.028 114	0	0	0.552 124	0.007 124	0.884 91	0.193 91	0.682 124	0.218 124	0.720 124	0.220 124	0.743 124	0.221 124	1.000 124	0.019 124
	v	0.072 114	0.705 114	0	0	-0.303 124	0.640 124	0.201 91	0.671 91	0.132 124	0.780 124	0.117 124	0.767 124	0.105 124	0.754 124	0.019 124	1.000 124

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 2 1 0 0 TO 85 2 28 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 111	-0.047 111	1	1	0.642 111	-0.007 111	0.329 86	0.040 86	0.773 110	-0.008 110	0.781 110	0.008 110	0.782 110	0.019 110	0.570 110	-0.010 110
	v	-0.047 111	1.000 111	1	1	-0.399 111	0.898 111	-0.247 86	0.653 86	-0.079 110	0.922 110	-0.093 110	0.925 110	-0.106 110	0.924 110	0.034 110	0.795 110
TP_m	u	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	v	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
CB_m	u	0.642 111	-0.399 111	1	1	1.000 112	-0.344 112	0.333 87	-0.108 87	0.630 111	-0.317 111	0.645 111	-0.312 111	0.652 111	-0.308 111	0.484 111	-0.231 111
	v	-0.007 111	0.898 111	1	1	-0.344 112	1.000 112	-0.234 87	0.615 87	0.015 111	0.870 111	0.008 111	0.878 111	0.001 111	0.880 111	0.079 111	0.795 111
UI_m	u	0.329 86	-0.247 86	1	1	0.333 87	-0.234 87	1.000 87	-0.013 87	0.345 86	-0.197 86	0.401 86	-0.176 86	0.438 86	-0.161 86	0.611 86	-0.308 86
	v	0.040 86	0.653 86	1	1	-0.108 87	0.615 87	-0.013 87	1.000 87	0.107 86	0.671 86	0.089 86	0.657 86	0.074 86	0.645 86	0.025 86	0.783 86
CI_e	u	0.773 110	-0.079 110	1	1	0.630 111	0.015 111	0.345 86	0.107 86	1.000 111	0.110 111	0.995 111	0.121 111	0.985 111	0.127 111	0.732 111	0.151 111
	v	-0.008 110	0.922 110	1	1	-0.317 111	0.870 111	-0.197 86	0.671 86	0.110 111	1.000 111	0.086 111	0.997 111	0.066 111	0.992 111	0.177 111	0.891 111
TP_e	u	0.781 110	-0.093 110	1	1	0.645 111	0.008 111	0.401 86	0.089 86	0.995 111	0.086 111	1.000 111	0.102 111	0.997 111	0.112 111	0.768 111	0.118 111
	v	0.008 110	0.925 110	1	1	-0.312 111	0.878 111	-0.176 86	0.657 86	0.121 111	0.997 111	0.102 111	1.000 111	0.085 111	0.998 111	0.196 111	0.875 111
CB_e	u	0.782 110	-0.106 110	1	1	0.652 111	0.001 111	0.438 86	0.074 86	0.985 111	0.066 111	0.997 111	0.085 111	1.000 111	0.097 111	0.788 111	0.091 111
	v	0.019 110	0.924 110	1	1	-0.308 111	0.880 111	-0.161 86	0.645 86	0.127 111	0.992 111	0.112 111	0.998 111	0.097 111	1.000 111	0.209 111	0.858 111
UI_e	u	0.570 110	0.034 110	1	1	0.484 111	0.079 111	0.611 86	0.025 86	0.732 111	0.177 111	0.768 111	0.196 111	0.788 111	0.209 111	1.000 111	0.032 111
	v	-0.010 110	0.795 110	1	1	-0.231 111	0.795 111	-0.308 86	0.783 86	0.151 111	0.891 111	0.118 111	0.875 111	0.091 111	0.858 111	0.032 111	1.000 111

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 3 1 0 0 TO 85 3 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 120	-0.201 120	0.897 118	-0.103 118	0.782 120	-0.106 120	0.300 92	0.190 92	0.830 120	-0.049 120	0.827 120	-0.031 120	0.824 120	-0.019 120	0.488 120	0.095 120
	v	-0.201 120	1.000 120	-0.156 118	0.931 118	-0.362 120	0.901 120	0.082 92	0.498 92	-0.164 120	0.917 120	-0.159 120	0.912 120	-0.157 120	0.907 120	0.260 120	0.679 120
TP_m	u	0.897 118	-0.156 118	1.000 121	-0.047 121	0.764 121	-0.079 121	0.278 92	0.297 92	0.744 121	0.008 121	0.743 121	0.027 121	0.741 121	0.040 121	0.470 121	0.151 121
	v	-0.103 118	0.931 118	-0.047 121	1.000 121	-0.267 121	0.903 121	0.083 92	0.499 92	-0.024 121	0.935 121	-0.022 121	0.934 121	-0.021 121	0.931 121	0.318 121	0.715 121
CB_m	u	0.782 120	-0.362 120	0.764 121	-0.267 121	1.000 124	-0.251 124	0.214 93	0.136 93	0.752 124	-0.204 124	0.750 124	-0.189 124	0.747 124	-0.180 124	0.347 124	-0.014 124
	v	-0.106 120	0.901 120	-0.079 121	0.903 121	-0.251 124	1.000 124	0.104 93	0.501 93	-0.047 124	0.879 124	-0.043 124	0.878 124	-0.041 124	0.876 124	0.275 124	0.689 124
UI_m	u	0.300 92	0.082 92	0.278 92	0.083 92	0.214 93	0.104 93	1.000 93	-0.224 93	0.487 93	0.144 93	0.522 93	0.166 93	0.542 93	0.182 93	0.798 93	-0.248 93
	v	0.190 92	0.498 92	0.297 92	0.499 92	0.138 93	0.501 93	-0.224 93	1.000 93	0.034 93	0.529 93	0.015 93	0.518 93	0.002 93	0.509 93	-0.046 93	0.785 93
CI_e	u	0.630 120	-0.164 120	0.744 121	-0.024 121	0.752 124	-0.047 124	0.487 93	0.034 93	1.000 124	0.081 124	0.998 124	0.106 124	0.994 124	0.123 124	0.683 124	0.052 124
	v	-0.049 120	0.917 120	0.008 121	0.935 121	-0.204 124	0.879 124	0.144 93	0.529 93	0.081 124	1.000 124	0.083 124	0.998 124	0.083 124	0.995 124	0.399 124	0.757 124
TP_e	u	0.827 120	-0.159 120	0.743 121	-0.022 121	0.750 124	-0.043 124	0.522 93	0.015 93	0.998 124	0.083 124	1.000 124	0.110 124	0.999 124	0.127 124	0.711 124	0.036 124
	v	-0.031 120	0.912 120	0.027 121	0.934 121	-0.189 124	0.878 124	0.166 93	0.518 93	0.106 124	0.998 124	0.110 124	1.000 124	0.110 124	0.999 124	0.424 124	0.746 124
CB_e	u	0.824 120	-0.157 120	0.741 121	-0.021 121	0.747 124	-0.041 124	0.542 93	0.002 93	0.994 124	0.083 124	0.999 124	0.110 124	1.000 124	0.129 124	0.728 124	0.026 124
	v	-0.019 120	0.907 120	0.040 121	0.931 121	-0.180 124	0.876 124	0.182 93	0.509 93	0.123 124	0.995 124	0.127 124	0.999 124	0.129 124	1.000 124	0.441 124	0.736 124
UI_e	u	0.488 120	0.260 120	0.470 121	0.318 121	0.347 124	0.275 124	0.798 93	-0.046 93	0.683 124	0.399 124	0.711 124	0.424 124	0.728 124	0.441 124	1.000 124	-0.003 124
	v	0.095 120	0.679 120	0.151 121	0.715 121	-0.014 124	0.689 124	-0.248 93	0.785 93	0.052 124	0.757 124	0.036 124	0.746 124	0.026 124	0.736 124	-0.003 124	1.000 124

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 4 1 0 0 TO 85 4 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 116	-0.404 116	0.795 115	-0.311 115	0.769 116	-0.383 116	0.094 77	-0.292 77	0.750 116	-0.366 116	0.738 116	-0.368 116	0.726 116	-0.370 116	0.224 116	-0.187 116
	v	-0.404 116	1.000 116	-0.370 115	0.921 115	-0.529 116	0.872 116	-0.474 77	0.571 77	-0.329 116	0.895 116	-0.383 116	0.885 116	-0.422 116	0.873 116	-0.175 116	0.718 116
TP_m	u	0.795 115	-0.370 115	1.000 119	-0.332 119	0.763 119	-0.467 119	0.089 78	-0.267 78	0.662 119	-0.388 119	0.663 119	-0.399 119	0.660 119	-0.407 119	0.260 119	-0.202 119
	v	-0.311 115	0.921 115	-0.332 119	1.000 119	-0.482 119	0.875 119	-0.493 78	0.508 78	-0.294 119	0.883 119	-0.344 119	0.880 119	-0.380 119	0.875 119	-0.128 119	0.671 119
CB_m	u	0.769 116	-0.529 116	0.763 119	-0.482 119	1.000 120	-0.503 120	0.197 78	-0.377 78	0.750 120	-0.461 120	0.759 120	-0.467 120	0.762 120	-0.471 120	0.333 120	-0.270 120
	v	-0.383 116	0.872 116	-0.467 119	0.875 119	-0.503 120	1.000 120	-0.454 78	0.480 78	-0.310 120	0.874 120	-0.358 120	0.874 120	-0.393 120	0.871 120	-0.154 120	0.646 120
UI_m	u	0.094 77	-0.474 77	0.089 78	-0.493 78	0.197 78	-0.454 78	1.000 78	-0.530 78	0.354 78	-0.316 78	0.419 78	-0.293 78	0.463 78	-0.275 78	0.702 78	-0.668 78
	v	-0.292 77	0.571 77	-0.267 78	0.508 78	-0.377 78	0.480 78	-0.530 78	1.000 78	-0.339 78	0.491 78	-0.381 78	0.464 78	-0.410 78	0.442 78	-0.417 78	0.729 78
CI_e	u	0.750 116	-0.329 116	0.662 119	-0.294 119	0.750 120	-0.310 120	0.354 78	-0.339 78	1.000 120	-0.201 120	0.995 120	-0.197 120	0.986 120	-0.194 120	0.587 120	-0.255 120
	v	-0.366 116	0.895 116	-0.388 119	0.883 119	-0.461 120	0.874 120	-0.316 78	0.491 78	-0.201 120	1.000 120	-0.249 120	0.998 120	-0.285 120	0.994 120	0.027 120	0.670 120
TP_e	u	0.738 116	-0.383 116	0.663 119	-0.344 119	0.759 120	-0.358 120	0.419 78	-0.381 78	0.995 120	-0.249 120	1.000 120	-0.242 120	0.998 120	-0.237 120	0.628 120	-0.315 120
	v	-0.366 116	0.885 116	-0.399 119	0.880 119	-0.467 120	0.874 120	-0.293 78	0.464 78	-0.197 120	0.998 120	-0.242 120	1.000 120	-0.276 120	0.999 120	0.045 120	0.643 120
CB_e	u	0.726 116	-0.422 116	0.660 119	-0.380 119	0.762 120	-0.393 120	0.463 78	-0.410 78	0.986 120	-0.285 120	0.998 120	-0.276 120	1.000 120	-0.269 120	0.653 120	-0.357 120
	v	-0.370 116	0.873 116	-0.407 119	0.875 119	-0.471 120	0.871 120	-0.275 78	0.442 78	-0.194 120	0.994 120	-0.237 120	0.999 120	-0.269 120	1.000 120	0.059 120	0.619 120
UI_e	u	0.224 116	-0.175 116	0.260 119	-0.128 119	0.333 120	-0.154 120	0.702 78	-0.417 78	0.587 120	0.027 120	0.628 120	0.045 120	0.653 120	0.059 120	1.000 120	-0.497 120
	v	-0.187 116	0.718 116	-0.202 119	0.671 119	-0.270 120	0.648 120	-0.668 78	0.729 78	-0.255 120	0.670 120	-0.315 120	0.643 120	-0.357 120	0.619 120	-0.497 120	1.000 120

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 5 1 0 0 TO 85 5 31 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 119	-0.195 119	0.891 96	-0.076 96	0.688 119	-0.364 119	0	0	0.876 116	-0.114 116	0.878 116	-0.095 116	0.877 116	-0.080 116	0.492 116	0.023 116
	v	-0.195 119	1.000 119	-0.063 96	0.955 96	-0.537 119	0.829 119	0	0	-0.184 116	0.938 116	-0.208 116	0.933 116	-0.226 116	0.927 116	0.055 116	0.749 116
TP_m	u	0.891 96	-0.063 96	1.000 96	-0.029 96	0.624 96	-0.159 96	0	0	0.835 94	-0.001 94	0.837 94	0.015 94	0.838 94	0.027 94	0.487 94	0.151 94
	v	-0.076 96	0.955 96	-0.029 96	1.000 96	-0.474 96	0.869 96	0	0	-0.085 94	0.942 94	-0.110 94	0.940 94	-0.130 94	0.938 94	0.124 94	0.766 94
CB_m	u	0.688 119	-0.537 119	0.624 96	-0.474 96	1.000 124	-0.619 124	0	0	0.748 121	-0.448 121	0.759 121	-0.433 121	0.768 121	-0.422 121	0.360 121	-0.203 121
	v	-0.364 119	0.829 119	-0.159 98	0.869 96	-0.619 124	1.000 124	0	0	-0.363 121	0.612 121	-0.384 121	0.805 121	-0.400 121	0.798 121	-0.133 121	0.646 121
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0.876 116	-0.184 116	0.835 94	-0.085 94	0.748 121	-0.363 121	0	0	1.000 121	-0.045 121	0.998 121	-0.028 121	0.995 121	-0.016 121	0.649 121	0.047 121
	v	-0.114 116	0.938 116	-0.001 94	0.942 94	-0.448 121	0.812 121	0	0	-0.045 121	1.000 121	-0.067 121	0.999 121	-0.086 121	0.996 121	0.197 121	0.753 121
TP_e	u	0.878 116	-0.208 116	0.837 94	-0.110 94	0.759 121	-0.384 121	0	0	0.998 121	-0.067 121	1.000 121	-0.050 121	0.999 121	-0.036 121	0.665 121	0.025 121
	v	-0.095 116	0.933 116	0.015 94	0.940 94	-0.433 121	0.605 121	0	0	-0.028 121	0.999 121	-0.050 121	1.000 121	-0.067 121	0.999 121	0.209 121	0.742 121
CB_e	u	0.877 116	-0.226 116	0.838 94	-0.130 94	0.768 121	-0.400 121	0	0	0.995 121	-0.066 121	0.999 121	-0.067 121	1.000 121	-0.053 121	0.673 121	0.009 121
	v	-0.080 116	0.927 116	0.027 94	0.938 94	-0.422 121	0.796 121	0	0	-0.016 121	0.996 121	-0.036 121	0.999 121	-0.053 121	1.000 121	0.219 121	0.732 121
UI_e	u	0.492 116	0.055 116	0.487 94	0.124 94	0.360 121	-0.133 121	0	0	0.649 121	0.197 121	0.665 121	0.209 121	0.673 121	0.219 121	1.000 121	-0.110 121
	v	0.023 116	0.749 116	0.151 94	0.766 94	-0.203 121	0.646 121	0	0	0.047 121	0.753 121	0.025 121	0.742 121	0.009 121	0.732 121	-0.110 121	1.000 121

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 6 1 0 0 TO 85 6 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 119	-0.599 119	0	0	0.788 119	-0.523 119	0	0	0	0	0	0	0	0	0	0
	v	-0.599 119	1.000 119	0	0	-0.757 119	0.838 119	0	0	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.788 119	-0.757 119	0	0	1.000 120	-0.721 120	0	0	0	0	0	0	0	0	0	0
	v	-0.523 119	0.838 119	0	0	-0.721 120	1.000 120	0	0	0	0	0	0	0	0	0	0
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 7 1 0 0 TO 85 7 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 122	-0.246 122	0	0	0.666 122	-0.465 122	0	0	0	0	0	0	0	0	0	0
	v	-0.246 122	1.000 122	0	0	-0.571 122	0.711 122	0	0	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.666 122	-0.571 122	0	0	1.000 124	-0.693 124	0	0	0	0	0	0	0	0	0	0
	v	-0.465 122	0.711 122	0	0	-0.693 124	1.000 124	0	0	0	0	0	0	0	0	0	0
UI_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 8 1 0 0 TO 85 8 31 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 124	-0.225 124	0	0	0.678 124	-0.297 124	0.104 64	-0.066 64	0	0	0	0	0	0	0	0
	v	-0.225 124	1.000 124	0	0	-0.622 124	0.778 124	-0.314 64	0.451 64	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0.678 124	-0.622 124	0	0	1.000 124	-0.663 124	0.254 64	-0.390 64	0	0	0	0	0	0	0	0
	v	-0.297 124	0.778 124	0	0	-0.663 124	1.000 124	-0.300 64	0.404 64	0	0	0	0	0	0	0	0
UI_m	u	0.104 64	-0.314 64	0	0	0.254 64	-0.300 64	1.000 64	-0.013 64	0	0	0	0	0	0	0	0
	v	-0.066 84	0.451 64	0	0	-0.390 64	0.404 64	-0.013 64	1.000 64	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 9 1 0 0 TO 85 9 30 23 59.

		CI_m u	CI_m v	TP_m u	TP_m v	CB_m u	CB_m v	UI_m u	UI_m v	CI_e u	CI_e v	TP_e u	TP_e v	CB_e u	CB_e v	UI_e u	UI_e v
CI_m	u	1.000 119	-0.375 119	0	0	-1.000 2	-1.000 2	0.422 119	0.176 119	0	0	0	0	0	0	0	0
	v	-0.375 119	1.000 119	0	0	-1.000 2	-1.000 2	-0.296 119	0.260 119	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	-1.000 2	-1.000 2	0	0	1.000 2	1.000 2	-1.000 2	-1.000 2	0	0	0	0	0	0	0	0
	v	-1.000 2	-1.000 2	0	0	1.000 2	1.000 2	-1.000 2	-1.000 2	0	0	0	0	0	0	0	0
UI_m	u	0.422 119	-0.296 119	0	0	-1.000 2	-1.000 2	1.000 119	-0.017 119	0	0	0	0	0	0	0	0
	v	0.176 119	0.260 119	0	0	-1.000 2	-1.000 2	-0.017 119	1.000 119	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 10 1 0 0 TO 85 10 31 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 124	-0.426 124	0	0	0	0	0.307 124	-0.079 124	0	0	0	0	0	0	0	0
	v	-0.426 124	1.000 124	0	0	0	0	-0.428 124	0.708 124	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_m	u	0.307 124	-0.428 124	0	0	0	0	1.000 124	-0.214 124	0	0	0	0	0	0	0	0
	v	-0.079 124	0.708 124	0	0	0	0	-0.214 124	1.000 124	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 85 11 1 0 0 TO 85 11 30 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 120	-0.350 120	0	0	0	0	-0.122 18	-0.394 18	0	0	0	0	0	0	0	0
	v	-0.350 120	1.000 120	0	0	0	0	-0.670 18	0.415 18	0	0	0	0	0	0	0	0
TP_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_m	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_m	u	-0.122 18	-0.670 18	0	0	0	0	1.000 18	-0.128 18	0	0	0	0	0	0	0	0
	v	-0.394 18	0.415 18	0	0	0	0	-0.128 18	1.000 18	0	0	0	0	0	0	0	0
CI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TP_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CB_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UI_e	u	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	v	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MATRIX OF CORRELATION COEFFICIENTS AND NUMBER OF OBSERVATIONS FOR THE PERIOD 84 6 1 0 0 TO 85 5 31 23 59.

		CI_m		TP_m		CB_m		UI_m		CI_e		TP_e		CB_e		UI_e	
		u	v	u	v	u	v	u	v	u	v	u	v	u	v	u	v
CI_m	u	1.000 1400	-0.299 1400	0.868 330	-0.158 330	0.760 1400	-0.299 1400	0.481 457	-0.002 457	0.852 1375	-0.155 1375	0.852 1375	-0.148 1375	0.849 1375	-0.144 1375	0.594 1375	-0.129 1375
	v	-0.299 1400	1.000 1400	-0.181 330	0.938 330	-0.546 14D0	0.858 1400	-0.165 457	0.603 457	-0.294 1375	0.894 1375	-0.311 1375	0.890 1375	-0.323 1375	0.886 1375	-0.165 1375	0.742 1375
TP_m	u	0.866 330	-0.181 330	1.000 337	-0.109 337	0.722 337	-0.191 337	0.194 171	0.148 171	0.743 335	-0.085 335	0.743 335	-0.073 335	0.742 335	-0.065 335	0.407 335	0.074 335
	v	-0.158 330	0.938 330	-0.109 337	1.000 337	-0.386 337	0.892 337	-0.135 171	0.518 171	-0.086 335	0.928 335	-0.098 335	0.926 335	-0.109 335	0.924 335	0.152 335	0.739 335
CB_m	u	0.760 1400	-0.546 1400	0.722 337	-0.386 337	1.000 1456	-0.529 1456	0.395 464	-0.178 464	0.752 1431	-0.415 1431	0.759 1431	-0.410 1431	0.763 1431	-0.406 1431	0.502 1431	-0.316 1431
	v	-0.299 1400	0.858 1400	-0.191 337	0.892 337	-0.529 1456	1.000 1456	-0.135 464	0.554 464	-0.278 1431	0.833 1431	-0.289 1431	0.834 1431	-0.298 1431	0.833 1431	-0.137 1431	0.683 1431
UI_m	u	0.481 457	-0.165 457	0.194 171	-0.135 171	0.395 464	-0.135 464	1.000 464	-0.068 464	0.552 461	-0.025 461	0.588 461	-0.016 461	0.610 461	-0.010 461	0.840 461	-0.298 461
	v	-0.002 457	0.603 457	0.148 171	0.518 171	-0.178 464	0.554 464	-0.068 464	1.000 464	-0.014 461	0.580 461	-0.028 461	0.564 461	-0.039 461	0.550 461	-0.082 461	0.753 461
CI_e	u	0.852 1375	-0.294 1375	0.743 335	-0.086 335	0.752 1431	-0.278 1431	0.552 461	-0.014 461	1.000 1431	-0.108 1431	0.997 1431	-0.099 1431	0.992 1431	-0.093 1431	0.684 1431	-0.129 1431
	v	-0.155 1375	0.894 1375	-0.085 335	0.928 335	-0.415 1431	0.833 1431	-0.025 461	0.580 461	-0.108 1431	1.000 1431	-0.123 1431	0.998 1431	-0.135 1431	0.994 1431	0.037 1431	0.782 1431
TP_e	u	0.852 1375	-0.311 1375	0.743 335	-0.098 335	0.759 1431	-0.289 1431	0.588 461	-0.028 461	0.997 1431	-0.123 1431	1.000 1431	-0.111 1431	0.999 1431	-0.103 1431	0.716 1431	-0.150 1431
	v	-0.146 1375	0.890 1375	-0.073 335	0.926 335	-0.410 1431	0.834 1431	-0.016 461	0.564 461	-0.099 1431	0.998 1431	-0.111 1431	1.000 1431	-0.122 1431	0.999 1431	0.046 1431	0.771 1431
CB_e	u	0.849 1375	-0.323 1375	0.742 335	-0.109 335	0.763 1431	-0.298 1431	0.610 461	-0.039 461	0.992 1431	-0.135 1431	0.999 1431	-0.122 1431	1.000 1431	-0.113 1431	0.735 1431	-0.166 1431
	v	-0.144 1375	0.886 1375	-0.065 335	0.924 335	-0.406 1431	0.833 1431	-0.010 461	0.550 461	-0.093 1431	D.994 1431	-0.103 1431	0.999 1431	-0.113 1431	1.000 1431	0.053 1431	0.760 1431
UI_e	u	0.594 1375	-0.165 1375	0.407 335	0.152 335	0.502 1431	-0.137 1431	0.840 461	-0.082 461	0.684 1431	0.037 1431	0.716 1431	0.046 1431	0.735 1431	0.053 1431	1.000 1431	-0.258 1431
	v	-0.129 1375	0.742 1375	0.074 335	0.739 335	-0.316 1431	0.683 1431	-0.298 461	0.753 461	-0.129 1431	0.782 1431	-0.150 1431	0.771 1431	-0.166 1431	0.760 1431	-0.258 1431	1.000 1431

Appendix F

Nearshore Ageostrophic Wind Caused By Marine Storm Striking Mountainous Coast

(From "Storm Adjustment Forced by Coastal Mountains", delivered by J.E. Overland at the August 1985 meeting of the International Union of Geologists and Geophysicists, Honolulu, HI).

During March, 1985, NOAA's Pacific Marine Environmental Laboratory and Office of Aircraft Operations conducted a series of WP-3D research aircraft flights over the northern Gulf of Alaska as part of the Fishery Oceanography Experiment (FOX). During one flight, scientists observed a turning and acceleration of the nearshore wind field along a mountainous coast during a storm. They postulate that the wind shift was caused by interaction of the high coastal mountain range with the storm as it moved inland.

The low-pressure cell associated with the storm at 12Z on 15 March 1985 is shown in figure 1. An occluded front had recently passed over the study area represented by the V-shaped sector in the middle of the figure. To measure the coastal winds, 12 Omega dropwindsondes were released from the aircraft while it flew the legs of the V-pattern at 6000 m altitude (450 mb; in figure 1, each "x" denotes the site of a dropwindsonde release). As each sonde fell from its launch altitude to the surface, it telemetered to the aircraft a profile of temperature and humidity at 10-s intervals, and vertically averaged wind velocity at 30-s intervals. In figure 2, the coastal section of the mountain range in the study area is contoured in meters. Here, the coastal range averages well over 2000 m, with some peaks over 6000 m, and has an effective ridge height of 3000 m. Also in figure 2, three wind vectors at each sonde's launch position represent the measured wind velocity at 500 mb (solid vector), 700 mb (dashed vector), and 850 mb (dash-dot vector); the lowest vectors are missing for those sondes with trajectories over mountainous terrain.

The sonde dropped farthest offshore (250 km) shows the undisturbed marine wind field at the three levels. These winds are assumed to be in geostrophic balance. Approaching the coast, one notes increasing shear between the upper- and lower-level winds. This increased shear is caused by the mountain barrier which inhibits the balance between the low-level pressure-gradient force and the Coriolis force, and thus creates the ageostrophic condition. To satisfy the momentum balance, the low-level wind near the mountain accelerates and turns down-gradient. The nearshore 700- and 850-mb wind vectors in figure 2 are examples of low-level jets of this type. Sondes dropped nearest the coast showed greatest low-level geostrophic departure. The altitude reached by the imbalance appears to be inversely proportional to distance from the mountain range, with ageostrophy reaching to greater heights nearer the coast. Although not shown here, a tongue of low-level, cold air extending just offshore was discovered when analyzing temperature data from this flight. This temperature distribution is remarkable, considering the strong, pre-storm, warm advection to the east of most storms of this type.

Ageostrophic behavior of low-level winds and depression of nearshore isotherms as a cyclone approaches a mountainous coast had been predicted by

Overland (1984)[1]. Given an alongshore pressure gradient, the mountains act as a barrier to low-level, onshore, quasi-geostrophically-balanced flow within a Rossby radius (ca. 65 km) of the coast. A new ageostrophic momentum balance must be established either by accelerating winds or by the formation of Kelvin waves. The secondary circulation generated by this geostrophic departure causes downward transport of cold, continental air near the coast and consequent cooling. The turning and acceleration of the low-level winds and the cold, coastal air mass observed in this research flight may be physical manifestations of this theory.

Because of the hazards of operating an aircraft in the vicinity of mountains in storm conditions, the Omega dropwindsonde proved to be an invaluable tool in diagnosing the physics of storm-coast interaction. However, the dropwindsonde is far from an ideal tool for investigating mesoscale weather processes. Even with improvement in sonde-to-sonde intercomparibility and wind resolution, it is doubtful that a dense enough grid of sondes could be launched to adequately sample the mesoscale area. Also, the information derived from a sonde's descent is assigned to a vertical profile at a given point over the earth's surface. Certainly, as the sonde is a free-falling device, and in fact depends upon horizontal translation by the wind to determine wind speed and direction in an atmospheric layer, the final data telemetered are from a location several kilometers removed from the launch position.

The case presented above is a small sample of the enormous potential for discovery involving mesoscale atmospheric motions. It has shown that mountain barriers have important effects on storm systems. Understanding how synoptic-scale weather systems interact with mesoscale topographic features is a vital step in improving weather forecasting. One might hope that a successful application of aircraft-borne doppler radar would provide the critical wind measurements in the vicinity of the mountains needed to refine this research.

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[1] Overland, J. E., 1984: Scale analysis of marine winds in straits and along mountainous coasts. *Mon. Weather Rev., 112*, 2530-2534.