CLIMATIC DATA FOR WILLIAMS LAKE, HUBBARD COUNTY, MINNESOTA 1986

By

D. O. Rosenberry, A. M. Sturrock, and T. C. Winter

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METRIC CONVERSION FACTORS

Multiply	*By*	*To obtain*
meter	3.281	feet
kilometer	0.621	mile
centimeter	0.394	inch
millibar	0.0145	pound per square inch
millibar	1.0197	grams per square centimeter
mile per hour	1.609	kilometer per hour
calories per square centimeter per minute	1.433×10^{-3}	watts per square meter
calories per square centimeter per day	278.96	watts per square meter
calories per square centimeter per day	25.913	watts per square foot

To convert degrees Celsius (°C) to degrees Fahrenheit (°F) use the following formula:

$$(°C \times 9/5) + 32 = °F.$$

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ABSTRACT

Research on the hydrology of Williams Lake, north-central Minnesota includes study of evaporation. Presented here are those climatic data needed for energy-budget and mass-transfer studies, including: water-surface temperature, dry-bulb and wet-bulb air temperatures, wind speed, precipitation, and solar and atmospheric radiation. Some calculated values necessary for these studies, such as vapor pressure and Bowen ratio numbers, also are presented. Data are collected at raft and land stations.

INTRODUCTION

Climatic data are being collected at Williams Lake, Hubbard County, Minnesota, as part of a continuing study by the U.S. Geological Survey of the hydrology of the lake. Williams Lake is one of several lakes in different parts of the United States that have been selected for intensive study of hydrological, and related chemical and biological processes. The rationale for selection of Williams Lake is given by Siegel and Winter (1980). Climatic data from the 1982 season are presented in Rosenberry and others (1988). Data collected in 1983, 1984 and 1985 are presented in Sturrock and others (1984, 1986a, 1986b).

DATA COLLECTION AND PRESENTATION

Data presented here are being collected principally for studies of evaporation. Therefore, the period of record includes only the time when the lake is ice-free. The period of record for 1986 is from April 25 (Julian day 115) to November 3 (Julian day 307). However, due to considerable problems with missing data at the end of the period of record, the interval from Julian day 115 to Julian day 294 is the part of the year for which evaporation will be determined by the energy-budget method. Within table 1 the data are grouped into energy-budget periods, which are defined by the dates thermal surveys of the lake were made. For example, the first energy-budget period is from Julian day 115 through Julian day 146.

Climatic instruments are located on a raft in the middle of the lake, and at a land station located near the northwest shore of the lake. Instruments on the raft include anemometers at 1 and 2 meters above the water surface, a thermistor psychrometer with wet- and dry-bulb temperature sensors fixed at 2 meters above the water surface, and a water-temperature sensor located beneath the raft at a depth of about 1 centimeter. Data from the above sensors (as well as a probe that provides backup temperature, vapor pressure, and humidity data) are recorded by a digital data logger located on the raft. The data logger scans the sensors every minute and calculates hourly and daily averages. In addition, for selected sensors, the daily output includes maximum and minimum values and the time they occur. A totalizing anemometer, which records the cumulative number of miles of air

that passes by it, also is present on the raft as backup for measuring wind speed.

The land station, located in a field 135 meters northwest of the lake, consists of long- and short-wave radiometers; an anemometer and thermistor psychrometer, both at 2 meters above the land surface; and a tipping-bucket rain gage. Data from these sensors are recorded by a data logger, identical to that on the raft, which records hourly totals and averages, daily totals and averages, and selected maximum and minimum values and their associated times of occurrence. Additional backup instruments include an analog hygrothermograph and a manually read rain gage. Calibration checks are made with independent laboratory thermometers, and a spring-driven self-aspirating psychrometer, every few days at both stations.

Data presented here are daily summaries. Raft-station data along with land-station precipitation, and solar and atmospheric radiation data are considered primary. For periods that the primary instruments were not operating properly, daily values were obtained by regression using data from backup instruments, provided a satisfactory statistical relation could be established. Data used to establish regressions were selected so they bracketed the period of missing or inadequate data. Only table 1, which is considered to be the primary source of data for evaporation studies, includes values obtained by regression.

Although only daily values are reported here, hourly values also were recorded. Hourly values are voluminous and expensive to reproduce, but they are available for all or part of the period of record on request.

ADJUSTMENT OF WET-BULB AIR TEMPERATURES AT THE RAFT STATION

During the normal processing of the climatic data, which includes comparisons of primary data with backup data, as well as data-comparison programs that investigate data integrity, it was discovered that the wet-bulb sensor on the raft was indicating consistently lower air temperatures than one would expect. For example, during times when the backup probe at the land station was indicating 100-percent humidity and fog was rising off of Williams Lake, primary instruments at the raft indicated humidity at the raft was less than 100 percent. Also, comparisons of wet-bulb temperatures recorded at the raft with backup wet-bulb temperatures obtained from a portable psychrometer at the raft, indicated that the primary wet-bulb sensor was in error.

To isolate this problem and determine the magnitude of error in the wet-bulb air temperature, the following procedures were used. First, periods when the thermistor psychrometer at the land station indicated 100-percent humidity were determined and the air temperatures measured by the wet- and dry-bulb sensors at the raft station for these periods were compared. During those periods it was assumed that nearly 100-percent humidity also would exist at the raft and that both sensors on the thermistor psychrometer should indicate nearly identical temperatures. Any difference between the two values would be the error of the wet-bulb sensor. Data were available for 583 hourly comparisons. The mean difference between the dry- and wet-bulb values was 0.79 °C; the median difference was 0.77 °C. Differences ranged from -0.88 to 2.91 °C. The standard deviation was ± 0.38 °C.

The second procedure consisted of connecting the thermistor psychrometers from the land and raft stations to the same data logger and operating both thermistor psychrometers side by side for 6 days in March, 1987. Averages of wet-bulb readings taken by the data logger every minute during the 6 days compared. The mean difference between the wet-bulb sensor from the land station and the wet-bulb sensor from the raft station was 0.56 °C; the median difference was 0.47 °C. Differences ranged from -0.08 to 1.85 °C. The standard deviation was ± 0.43 °C.

Therefore, based on two separate procedures that indicated errors of 0.6 and 0.8 °C for the wet-bulb sensor at the raft station, it was decided to adjust all the air temperatures measured by the wet-bulb sensor on the raft by +0.7 °C for the 1986 period of record. All raft wet-bulb values in the following tables, and all other data in the tables that are affected by the raft wet-bulb temperature (atmospheric vapor pressure, Bowen ratio) reflect this adjustment.

ACKNOWLEDGMENT

We are especially indebted to Kenneth Chase for allowing us to place climatic instruments on his property.

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Table 1.--*Summary of 1986 energy budget data*

[C, degrees Celsius; mb, millibars; mi/h, miles per hour; (cal/cm²)/d, calories per square centimeter per day; blank, no data; footnote reference numbers in column headings apply to all pages of table]

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C) 1/	WET-BULB AIR TEMPERATURE (C) 1/	WATER VAPOR PRESSURE (mb) 2/	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C) 1/	WET-BULB AIR TEMPERATURE (C) 1/	ATMOSPHERIC VAPOR PRESSURE (mb)	
115	8.58	8.09	5.80	11.154	7.749	7.34	5.07	7.304	0.085
116	8.97	8.50	7.11	11.452	9.203	8.33	6.70	8.759	0.123
117	9.36	8.85	8.85	11.757	11.360	8.40	8.25	10.811	0.754
118	8.97	4.52	4.39	11.452	8.280	3.48	3.28	7.598	0.825
119	9.50	11.44	7.29	11.869	7.557	10.77	6.44	6.858	-0.264
120	10.02	10.14	8.53	12.290	10.082	9.42	7.86	9.619	-0.032
121	9.19	2.10	1.25	11.623	6.149	1.30	0.38	5.689	0.762
122	9.28	4.60	4.05	11.694	7.808	4.14			0.708
123	9.68	10.09	8.74	12.013	10.408	9.62			-0.150
124	10.90	19.28	16.67	13.034	17.276	19.51	16.93	17.611	1.161
125	12.37	18.71	16.35	14.365	17.057	18.63	16.05	16.562	1.384
126	11.66	6.66	5.99	13.708	8.909	5.83	5.04	8.247	0.612
127	11.32	8.31	7.11	13.403	9.314	8.09	6.62	8.810	0.433
128	10.96	5.82	5.49	13.086	8.816	5.08	4.67	8.261	0.708
129	10.76	11.70	11.15	12.913	12.898	11.11	10.48	12.269	-36.807
130	11.31	14.55	13.84	13.394	15.355	14.25	13.38	14.785	0.971
131	12.41	15.31	14.12	14.403	15.335	15.43	14.07	15.173	1.829
132	13.39	15.52	13.81	15.357	14.678	14.91	13.40	14.392	-1.844
133	14.29	13.67	10.69	16.282	10.935	12.49	9.96	10.614	0.068
134	14.79	15.26	12.52	16.817	12.739	14.69	12.08	12.410	-0.068
135	15.09	13.67	10.41	17.145	10.517	12.88	10.00	10.421	0.126
136	14.93	10.04	7.76	16.969	9.086	8.60	6.52	8.357	0.365
137	14.77	8.88	6.78	16.795	8.517	7.67	5.35	7.448	0.418
138	14.85	8.82	6.27	16.882	7.889	7.75	4.80	6.713	0.394
139	15.26	10.98	7.69	17.334	8.384	10.22	6.65	7.489	0.281
140	15.54	10.96	7.01	17.648	7.486	10.00	6.13	6.956	0.265
141	16.07	12.61	8.15	18.257	7.970	11.40	7.26	7.545	0.198
142	16.43	13.59	9.22	18.681	8.838	12.61	8.64	8.649	0.170
143	16.45	13.31	11.07	18.705	11.739	13.14	10.83	11.486	0.265
144	16.81	14.22	11.69	19.138	12.104	13.81			0.216
145	17.02	14.50	12.79	19.394	13.663	13.72	11.98	12.879	0.258
146	18.11	17.48	13.81	20.775	13.412	16.70	12.87	12.372	0.050

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h) [3]	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 2 METERS (mi/h) [3]	LAND STATION DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h) [3]	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	DAILY TOTALS AT LAND STATION: SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY TOTALS AT LAND STATION: LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
115	8.24	8.41	8.28	0.63	192.3	616.8
116	4.76	4.97	3.81	0.19	418.5	648.8
117	3.34	3.48	2.19	0.56	80.2	699.0
118	8.08	8.20	5.36	0.62	99.9	625.9
119	4.07	4.06	3.03	0.01	588.5	604.4
120	8.63	8.86	7.00	0.53	222.5	650.3
121	11.90	12.23	7.33	0.00	169.7	590.0
122	4.68	4.77	2.98	0.00	671.3	468.1
123	7.18	7.35	2.48	0.00	556.5	568.7
124	8.06	8.46	3.11	0.00	624.4	660.5
125	11.98	12.56	5.48	0.00	511.8	656.5
126	12.56	13.15	9.59	0.02	191.4	646.0
127	5.38	5.66	4.48	0.00	364.8	623.0
128	7.15	7.48	8.18	0.84	74.8	652.1
129	10.15	10.41	6.16	0.20	176.1	711.8
130	7.98	8.19	3.63	0.00	278.5	718.8
131	6.29	6.41	3.06	0.00	430.8	689.1
132	6.00	6.14	3.68	0.23	334.8	695.5
133	2.20	2.06	2.03	0.00	527.4	612.6
134	6.56	6.64	2.71	0.29	590.8	651.0
135	3.53	3.52	2.47	0.02	421.5	629.3
136	5.39	5.34	3.95	0.00	477.7	596.2
137	5.06	5.03	2.60	0.00	561.3	554.4
138	3.47	3.48	2.54	0.00	708.5	532.4
139	5.36	5.38	3.12	0.00	695.1	547.6
140	4.21	4.19	3.00	0.00	725.2	513.6
141	3.66	3.55	2.52	0.00	716.8	552.6
142	5.59	5.65	4.33	0.00	712.6	566.2
143	6.03	6.06	3.60	0.05	358.7	654.7
144	4.04	3.98	2.75	0.24	518.4	665.6
145	2.68	2.56	2.27	0.09	340.3	687.9
146	2.74	2.64	2.10	0.00	687.0	651.2

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	BOWEN RATIO
147	19.54	19.79	14.92	22.718	13.808	18.84	13.97	12.801	-0.016
148	20.64	20.67	15.61	24.318	14.452	20.02	14.77	13.400	-0.002
149	21.95	22.35	17.10	26.352	16.088	21.15	15.92	14.696	-0.023
150	22.56	24.24	18.30	27.348	17.168	22.82	17.16	15.896	-0.097
151	22.91	24.39	18.38	27.935	17.228	23.48	17.42	15.960	-0.081
152	22.18	15.48	12.44	26.724	12.470	14.57	11.57	11.693	0.276
153	21.28	15.30	11.24	25.294	10.716	14.83	10.37	9.711	0.241
154	21.03	20.38	4 16.64	24.909	5 16.508	19.92	15.78	15.241	5 0.045
155	21.02	16.45	12.35	24.893	11.701	15.79	11.48	10.768	0.204
156	20.82	15.08	11.51	24.589	11.272	14.32	10.64	10.441	0.253
157	20.69	16.23	13.22	24.393	13.244	16.32	13.03	12.877	0.235

JULIAN DAY	DAILY AVERAGES AT RAFT STATION		LAND STATION DAILY AVERAGE	DAILY TOTALS AT LAND STATION		
	WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	WIND SPEED AT 2 METERS (mi/h)	PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
147	2.51	2.38	2.01	0.00	697.2	657.0
148	3.27	3.13	1.75	0.00	682.5	672.8
149	2.30	2.16	1.88	0.00	677.2	701.4
150	4.71	4.73	3.84	0.00	664.2	725.3
151	7.38	7.62	5.99	0.00	674.8	726.2
152	4.84	4.94	3.33	0.00	494.9	629.3
153	7.80	8.02	2.67	0.00	699.3	612.5
154	6.69	6.78	2.99	0.53	530.6	729.0
155	4.87	4.91	2.80	0.01	561.5	643.7
156	4.78	4.66	2.50	0.00	641.1	608.0
157	7.75	7.91	3.12	0.00	489.6	699.1

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
158	20.74	17.75	14.72	24.468	14.782	16.99	13.95	13.963	0.181
159	21.01	15.49	11.87	24.878	11.566	14.63	10.79	10.467	0.244
160	21.43	20.17	15.15	25.527	13.963	19.93	14.93	13.735	0.064
161	21.15	17.22	15.44	25.093	16.383	15.91	14.58	15.730	0.265
162	20.36	14.37	13.45	23.902	14.823	13.84	12.76	14.040	0.388
163	20.34	17.37	13.93	23.872	13.684	16.66	13.04	12.673	0.171
164	20.59	16.88	12.26	24.243	11.282	15.81	10.93	9.918	0.168
165	21.35	16.81	12.93	25.403	12.398	16.23	12.08	11.417	0.205
166	20.97	18.62	16.97	24.817	18.263	17.29	15.85	17.069	0.211
167	20.32	13.42	9.84	23.843	9.840	12.89	8.88	8.806	0.290
168	20.75	16.03	12.82	24.483	12.724	15.49	11.92	11.644	0.236
169	20.99	21.07	19.00	24.847	20.621	20.55	18.45	19.860	-0.011
170	22.32	24.58	20.65	26.952	21.774	24.70	20.34	21.034	-0.257
171	22.56	21.04	18.36	27.348	19.364	20.95	17.99	18.698	0.112

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION		LAND STATION DAILY AVERAGE	DAILY TOTALS AT LAND STATION		
	WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	WIND SPEED AT 2 METERS (mi/h)	PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
158	7.81	7.86	4.38	0.25	639.3	682.0
159	3.07	2.86	2.11	0.00	719.3	631.0
160	6.53	6.61	2.00	0.00	633.8	684.9
161	4.46	4.38	1.72	1.18	74.7	758.5
162	4.82	4.84	2.55	0.04	220.7	746.5
163	6.66	6.70	4.17	0.00	630.3	671.5
164	5.29	5.32	3.90	0.07	681.5	657.6
165	3.06	2.85	2.15	0.02	720.1	634.5
166	5.24	5.26	2.03	0.71	132.3	743.1
167	8.11	8.18	4.35	0.00	757.0	582.0
168	3.83	3.76	1.94	0.00	587.2	690.2
169	5.51	5.57	1.89	0.39	306.3	769.1
170	6.55	6.70	3.66	0.00	678.6	765.5
171	7.71	7.81	3.22	0.12	441.2	772.8

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
172	23.03	22.28	20.29	28.139	22.503				0.078
173	22.78	19.82	15.67	27.716	15.109				0.138
174	22.52	16.42	13.61	27.282	13.764				0.265
175	22.49	14.82	11.40	27.232	11.270				0.282
176	22.59	22.46	18.58	27.398	18.877				0.009
177	23.75	25.44	22.19	29.388	24.620				-0.208
178	24.02	20.63	16.86	29.869	16.754				0.152
179	23.98	19.83	16.03	29.797	15.749				0.174
180	23.63	16.41	13.18	29.176	13.063				0.263
181	23.47	17.75	14.33	28.896	14.114				0.227
182	23.51	18.36	16.56	28.966	17.669				0.268
183	23.57	18.87	15.53	29.071	15.475				0.203
184	23.82	21.57	17.43	29.512	17.218				0.108
185	24.58	23.11	20.49	30.888	22.389	22.92	19.97	21.413	0.102
186	24.71	24.00	20.91	31.128	22.713	23.09	20.03	21.428	0.050
187	24.11	19.76	15.08	30.030	14.106	18.76	13.92	12.769	0.161
188	24.55	21.78	17.22	30.832	16.684	21.27	16.33	15.361	0.115
189	24.34	17.87	16.55	30.447	17.969	17.13	15.49	16.530	0.305
190	24.79	20.53	17.77	31.277	18.545	19.92	16.59	16.714	0.197

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h)	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 2 METERS (mi/h)	LAND STATION DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	DAILY TOTALS AT LAND STATION: SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY TOTALS AT LAND STATION: LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
172	4.89	4.90		0.06	400.0	765.2
173	7.73	7.92		0.40	300.0	720.7
174	6.27	6.30		0.01	500.0	683.9
175	3.88	3.79		0.00	744.8	609.3
176	6.32	6.49		0.00	519.0	757.7
177	5.77	5.92		0.02	537.5	803.9
178	5.00	4.93		0.00	671.4	716.0
179	3.92	3.83		0.00	583.2	718.3
180	2.95	2.85		0.00	441.8	681.8
181	4.54	4.50		0.00	687.7	672.5
182	3.83	3.79		0.01	398.5	713.4
183	3.98	3.83		0.11	698.2	686.9
184	7.06	7.20		0.39	711.4	717.7
185	5.05	5.10	4.11	0.37	621.7	766.0
186	8.49	8.81	4.52	0.00	316.3	772.0
187	6.51	6.70	4.92	0.00	737.4	629.6
188	3.68	3.57	2.49	0.00	693.30	669.3
189	3.19	3.21	2.60	0.33	254.0	652.5
190	2.62	2.50	2.01	0.00	650.3	684.7

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DAILY AVERAGES AT LAND STATION: DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	BOWEN RATIO
191	24.49	20.57	18.45	30.722	19.847	20.38	18.07	19.224	0.212
192	23.49	16.05	15.51	28.931	17.265	15.20	14.67	16.344	0.375
193	22.68	15.98	15.39	27.548	17.097	15.52	14.83	16.414	0.377
194	22.49	17.69	16.46	27.232	17.919	16.97	15.66	16.936	0.303
195	22.92	20.14	18.29	27.952	19.810	20.24	18.04	19.256	0.201
196	23.59	21.90	20.59	29.106	23.390	21.45	19.89	22.202	0.174
197	23.69	21.84	21.10	29.282	24.534	21.22	20.45	23.534	0.229
198	24.27	25.76	23.73	30.320	28.026	25.67	23.46	27.436	-0.382
199	25.60	25.00	22.48	32.822	25.572	24.74	21.93	24.487	0.049

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	LAND STATION DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
191	5.84	5.90	2.29	0.01	330.4	714.0
192	4.77	4.90	3.88	1.97	70.8	725.0
193	5.49	5.56	2.07	0.15	215.2	718.0
194	3.45	3.46	1.84	0.05	366.5	703.0
195	5.70	5.79	1.92	0.01	595.7	711.0
196	4.54	4.56	1.98	0.26	469.1	728.0
197	4.92	5.02	3.52	0.00	163.0	793.0
198	5.31	5.47	2.00	0.00	461.8	795.0
199	3.31	3.35	1.98	1.15	630.5	729.0

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
200	25.42	22.25	18.88	32.473	19.613	21.29	17.98	18.458	0.145
201	24.90	18.92	16.32	31.483	16.866	18.30	15.53	15.844	0.240
202	24.77	20.34	16.72	31.240	16.682	19.20	15.65	15.475	0.179
203	25.47	22.87	18.99	32.570	19.431	21.90	18.03	18.159	0.116
204	25.30	25.68	22.30	32.242	24.715	24.93	21.72	23.892	-0.030
205	25.66	24.11	21.29	32.939	23.472	23.11	20.42	22.239	0.096
206	25.92	19.95	16.75	33.450	16.991	18.89	15.43	15.284	0.213
207	25.66	20.91	18.33	32.939	19.389	20.27	17.56	18.310	0.206
208	25.63	21.13	19.56	32.880	21.725	20.41	18.65	20.348	0.237
209	25.45	20.76	19.70	32.531	22.255	19.91	18.58	20.533	0.268
210	25.69	23.20	20.50	32.997	22.351	22.25	19.45	20.770	0.137
211	25.73	22.13	18.88	33.076	19.691	21.12	17.90	18.413	0.158
212	25.27	18.26	15.03	32.185	14.989	16.46	13.46	13.490	0.240
213	24.68	17.39	14.65	31.073	14.894	15.78	13.12	13.372	0.265
214	24.06	16.49	13.52	29.940	13.570	14.75	11.79	11.918	0.272
215	23.91	18.70	15.65	29.672	15.798	17.07	13.96	13.928	0.221
216	24.13	20.39	17.32	30.066	17.775	19.29	16.15	16.316	0.179
217	24.45	20.40	18.55	30.648	20.155	19.55	17.51	18.681	0.227

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h)	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 2 METERS (mi/h)	LAND STATION: DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	DAILY TOTALS AT LAND STATION: SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY TOTALS AT LAND STATION: LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
200	6.34	6.43	3.46	0.00	659.1	688.8
201	5.48	5.61	2.78	0.01	556.4	642.6
202	5.04	5.13	3.27	0.00	635.5	713.0
203	3.44	3.40	2.01	0.00	653.4	750.0
204	7.98	8.29	3.01	0.00	481.9	806.7
205	4.99	5.08	3.09	0.41	500.7	786.8
206	2.77	2.73	1.80	0.00	679.7	697.1
207	6.08	6.19	2.25	0.16	529.0	738.9
208	3.45	3.43	2.15	0.96	410.2	751.5
209	3.10	3.06	1.38	0.04	375.1	749.0
210	4.61	4.66	1.51	0.00	576.1	769.9
211	5.99	6.09	3.60	0.02	603.4	743.2
212	6.81	6.99	4.34	0.00	580.8	692.4
213	6.72	6.79	4.45	0.28	537.6	688.1
214	6.11	6.13	3.08	0.00	562.1	671.7
215	4.14	4.07	2.70	0.00	587.2	698.9
216	3.99	3.99	2.43	0.01	489.2	733.8
217	3.12	3.07	1.88	0.03	497.3	740.1

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DAILY AVERAGES AT LAND STATION: DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	BOWEN RATIO
218	24.24	19.24	18.06	30.265	19.944	18.32	16.98	18.476	0.285
219	23.91	19.08	17.60	29.672	19.159	17.82	16.40	17.725	0.270
220	24.05	20.48	17.26	29.922	17.603	18.94	15.58	15.518	0.170
221	24.08	18.55	16.68	29.976	17.768	17.07	15.22	16.092	0.266
222	23.22	13.69	11.60	28.464	12.307	12.40	10.10	10.877	0.347
223	23.01	15.61	13.05	28.105	13.367	13.64	10.74	11.029	0.295
224	22.69	17.79	15.49	27.565	16.103	16.36	13.97	14.403	0.251
225	22.35	19.04	18.09	27.002	20.133	18.39	17.39	19.205	0.283
226	22.25	19.14	18.17	26.838	20.224	18.28	17.23	18.973	0.276
227	22.93	22.77	19.24	27.969	20.003	21.76	18.23	18.641	0.012

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	LAND STATION: DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
218	4.20	4.16	1.67	0.17	362.0	728.0
219	4.96	5.01	2.88	0.02	374.5	724.4
220	3.80	3.70	2.56	0.00	620.2	712.5
221	3.99	3.91	2.08	0.07	356.1	715.5
222	6.85	6.91	3.67	0.00	453.5	8— 654.3
223	2.81	2.70	1.86	0.00	573.3	654.9
224	5.89	6.00	1.74	0.00	389.0	703.7
225	6.32	6.45	1.84	0.68	156.7	726.5
226	3.34	3.33	1.81	0.31	265.0	727.7
227	4.51	4.60	2.19	0.00	586.4	746.0

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
228	23.08	21.03	17.52	28.224	17.740	20.38	16.75	16.712	0.115
229	22.84	16.59	13.93	27.817	14.188	15.49	12.65	12.799	0.270
230	22.92	18.14	15.63	27.952	16.125	17.16	14.21	14.291	0.238
231	22.95	21.48	19.06	28.003	20.476	20.50	18.04	19.087	0.115
232	22.81	18.93	15.59	27.766	15.542	17.85	14.56	14.442	0.187
233	22.47	14.50	11.89	27.199	12.235	12.87	10.13	10.618	0.313
234	21.84	13.90	13.40	26.175	15.044	12.91	12.36	14.001	0.419
235	21.59	15.83	14.30	25.779	15.304	14.48	12.58	13.339	0.323
236	21.07	15.72	14.67	24.970	16.008	14.34	13.44	14.826	0.351
237	21.19	19.94	17.16	25.155	17.764	19.62	16.56	16.853	0.099
238	20.94	12.72	10.66	24.771	11.501	11.66	9.47	10.437	0.364
239	20.30	10.30	8.51	23.813	9.952	8.29	6.32	8.296	0.424
240	20.23	11.55	9.19	23.710	10.107	10.07	7.31	8.459	0.375
241	19.99	14.83	12.14	23.361	12.414	13.82	11.17	11.563	0.277
242	20.12	17.41	15.55	23.550	16.455	16.46	14.30	14.896	0.225
243	20.35	20.21	19.02	23.887	21.220	19.76	18.46	20.393	0.031

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION		LAND STATION	DAILY TOTALS AT LAND STATION		
	WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
228	3.85	3.88	1.99	0.01	429.9	740.1
229	3.52	3.56	1.91	0.00	583.6	658.0
230	3.66	3.62	1.54	0.00	551.9	690.3
231	7.68	7.91	2.30	0.00	443.3	751.9
232	6.76	6.88	3.09	0.15	460.0	708.9
233	3.76	3.70	1.89	0.00	528.5	641.5
234	6.40	6.49	3.76	0.87	86.8	664.0
235	3.46	3.41	1.95	0.00	529.8	662.3
236	6.39	6.55	2.05	0.01	139.2	683.6
237	4.62	4.69	2.50	0.04	543.2	707.7
238	6.02	6.09	2.71	0.02	396.4	643.1
239	3.79	3.76	2.08	0.00	368.4	613.1
240	3.08	3.00	1.87	0.00	544.7	586.1
241	5.71	5.86	1.81	0.00	502.3	641.0
242	5.91	5.95	2.01	0.00	444.3	692.6
243	4.76	4.85	1.61	0.47	228.4	740.9

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
244	20.38	19.45	19.15	23.931	21.978	18.66	18.40	20.988	0.280
245	20.12	17.69	16.94	23.550	18.810	17.29	16.45	18.160	0.301
246	20.16	18.32	16.94	23.608	18.401	17.31	16.13	17.562	0.208
247	19.85	14.24	11.72	23.159	12.138	12.99	10.45	11.014	0.299
248	19.22	10.55	8.41	22.270	9.652	9.24	7.04	8.631	0.404
249	18.62	9.57	7.70	21.451	9.306	8.01	5.95	7.996	0.438
250	18.24	11.84	8.80	20.946	9.368	9.38	6.40	7.696	0.325
251	18.14	12.64	9.49	20.815	9.836	11.07	7.73	8.384	0.294
252	17.81	11.60	10.92	20.387	12.613	9.80	9.10	11.103	0.470
253	17.36	12.34	12.21	19.816	14.131	11.51	11.32	13.280	0.519
254	17.19	12.88	11.73	19.604	13.030	12.09	10.67	11.922	0.385
255	16.88	11.29	10.28	19.223	11.856	9.94	9.00	10.871	0.446
256	16.61	7.58	6.03	18.896	8.377	6.79	5.03	7.613	0.505
257	16.25	9.24	7.54	18.468	9.308	8.32	6.51	8.529	0.450
258	16.13	9.55	7.41	18.327	8.926	8.51	5.93	7.654	0.411
259	15.68	9.05	7.69	17.807	9.626	7.66	6.26	8.625	0.476
260	15.35	12.37	12.26	17.434	14.190	11.51	11.42	13.434	0.540
261	15.27	11.77	10.73	17.345	12.218	10.98	9.85	11.424	0.401
262	14.98	10.29	10.07	17.024	12.190	9.38	9.16	11.459	0.570
263	14.69	11.22	10.89	16.709	12.813	10.54	10.16	12.162	0.524
264	14.70	15.36	15.16	16.720	17.093	14.72	14.52	16.397	1.038
265	14.99	14.84	12.72	17.035	13.331	14.10	11.92	12.540	0.024
266	15.08	14.55	11.86	17.134	12.156	13.43	10.62	10.984	0.063
267	15.37	16.97	14.00	17.457	14.060	15.78	12.77	12.805	-0.277
268	15.80	19.51	15.26	17.944	14.583	18.83	14.74	14.118	-0.649
269	15.77	15.04	14.17	17.910	15.594	14.08	13.24	14.665	0.185
270	15.99	14.73	13.47	18.164	14.624	13.80	12.23	13.221	0.209
271	15.79	10.53	10.49	17.933	12.657	9.07	8.90	11.289	0.586
272	15.42	12.10	11.44	17.513	13.084	10.74	10.11	11.959	0.441
273	15.41	11.66	9.59	17.501	10.610	9.60	7.16	8.560	0.320
274	15.55	12.03	9.69	17.659	10.517	10.03	7.44	8.660	0.290

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 1 METER (mi/h)	DAILY AVERAGES AT RAFT STATION: WIND SPEED AT 2 METERS (mi/h)	LAND STATION: DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	DAILY TOTALS AT LAND STATION: PRECIPITATION (inches)	DAILY TOTALS AT LAND STATION: SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY TOTALS AT LAND STATION: LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
244	3.02	3.08	1.97	1.07	93.3	735.0
245	8.02	8.25	2.81	0.32	228.2	8 — 709.8
246	5.07	5.27	2.91	0.43	295.2	719.9
247	8.30	8.61	6.60	0.00	391.4	663.5
248	8.00	8.13	4.68	0.00	429.5	604.1
249	6.50	6.59	3.60	0.00	350.7	595.5
250	5.71	5.86	4.21	0.00	509.2	593.9
251	4.18	4.20	2.99	0.00	507.7	584.1
252	4.64	4.65	3.18	0.40	100.6	716.0
253	4.13	4.29	4.25	0.53	48.2	752.0
254	3.51	3.60	3.03	0.24	297.6	686.1
255	6.04	6.23	3.86	0.20	181.6	666.4
256	3.59	3.62	2.20	0.00	426.3	577.7
257	3.74	3.88	3.60	0.00	149.2	664.4
258	3.63	3.80	3.33	0.00	458.2	570.2
259	8.72	8.84	3.19	0.16	214.8	657.0
260	5.14	5.24	2.30	0.41	70.0	740.0
261	3.55	3.74	2.75	0.00	211.6	665.8
262	5.33	5.67	5.90	1.13	48.8	695.2
263	4.62	4.83	4.15	0.00	112.0	721.0
264	4.43	4.53	3.03	0.18	65.4	772.0
265	5.11	5.31	3.58	0.01	357.2	650.9
266	5.05	5.28	3.95	0.00	389.2	589.7
267	7.24	7.44	2.89	0.04	352.0	700.0
268	9.26	9.60	3.77	0.13	399.8	682.0
269	6.81	6.88	3.94	0.00	141.1	694.4
270	4.91	5.03	2.99	0.00	353.8	665.5
271	3.30	3.29	2.62	0.16	44.5	691.5
272	3.47	3.46	2.58	0.00	102.2	674.9
273	3.39	3.43	2.65	0.01	400.5	596.0
274	2.49	2.41	1.54	0.00	305.0	630.9

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION					DAILY AVERAGES AT LAND STATION			BOWEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	ATMOSPHERIC VAPOR PRESSURE (mb)	
275	15.21	12.83	11.82	17.278	13.202	12.12	10.92	12.279	0.343
276	14.79	7.65	6.24	16.817	8.594	6.67	5.12	7.807	0.510
277	14.43	8.94	7.37	16.430	9.265	7.78	5.99	8.200	0.450
278	13.98	6.27	4.13	15.958	6.831	4.87	2.37	5.647	0.496
279	13.51	8.50	6.94	15.478	8.971	7.27	5.38	7.751	0.453
280	13.49	12.81	11.03	15.458	12.001	12.12	10.01	10.925	0.116
281	13.15	5.59	3.98	15.118	7.094	4.23	2.48	6.186	0.554
282	12.80	3.23	1.56	14.776	5.769	1.25	-0.99	4.265	0.624
283	12.19	7.03	6.19	14.196	8.928	5.99	4.99	8.076	0.576
284	11.71	4.03	3.04	13.753	6.962	3.15	1.93	6.247	0.665
285	11.08	1.11	1.23	13.191	6.749	0.22	0.01	5.987	0.910
286	10.57	1.86	0.84	12.751	5.839	0.85	-0.55	4.976	0.740
287	10.25	4.97	2.75	12.481	6.024	4.19	1.67	5.290	0.481
288		4.74	3.46		7.011	3.85	2.23	6.139	
289		7.19	5.95		8.517	5.89	4.15	7.101	
290		6.61	5.69		8.560	5.87	4.54	7.596	
291		9.27	7.61		9.375	8.62	6.61	8.464	
292		12.58	10.46		11.293	11.92	9.43	10.212	
293		11.01	9.20		10.468	9.79	7.42	8.787	
294		11.33	9.56		10.779	9.86	7.45	8.782	

Table 1.--*Summary of 1986 energy budget data*--Continued

JULIAN DAY	DAILY AVERAGES AT RAFT STATION		LAND STATION	DAILY TOTALS AT LAND STATION		
	WIND SPEED AT 1 METER (mi/h)	WIND SPEED AT 2 METERS (mi/h)	DAILY AVERAGE WIND SPEED AT 2 METERS (mi/h)	PRECIPITATION (inches)	SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	LONG-WAVE ATMOS. RADIATION [(cal/cm²)/d]
275	5.78	5.90	2.23	0.00	124.9	690.7
276	5.36	5.69	3.15	0.00	131.4	635.1
277	5.53	5.74	3.28	0.00	256.7	607.8
278	9.45	9.67	5.16	0.00	317.9	519.0
279	5.53	5.73	2.47	0.00	187.0	609.1
280	6.58	6.85	3.94	0.00	246.2	639.8
281	5.53	5.73	2.44	0.00	153.6	549.1
282	3.65	3.73	1.54	0.00	358.0	462.0
283	8.53	8.83	2.68	0.25	28.5	652.3
284	7.23	7.38	3.24	0.02	113.6	599.1
285	6.70	6.80	2.91	0.12	81.1	603.6
286	4.76	4.92	3.21	0.05	200.8	548.1
287	6.18	6.32	3.25	0.03	294.1	531.7
288	5.93	6.18	3.88	0.00	212.3	572.3
289	3.19	3.31	2.31	0.00	303.7	533.4
290	6.35	6.52	2.22	0.00	287.2	526.6
291	6.94	7.18	1.72	0.00	276.1	547.0
292	4.92	5.14	1.73	0.00	247.9	574.6
293	2.18	2.27	1.41	0.00	272.1	575.0
294	2.26	2.32	1.70	0.00	271.3	589.4

Footnotes to table 1:

[1]Measured at 2 meters above water or land surface.

[2]Water-vapor pressure is calculated using surface water-temperature data and assuming the air is completely saturated at the air-water interface.

[3]Elevation above water or land surface.

[4]Calculated by regression equation (see below), which was determined by using air-temperature data from the wet-bulb sensors connected to digital-data loggers at the raft and land stations.

[5]Values are calculated in the normal manner, but filled-in wet-bulb data are used to obtain these values.

[6]Missing period of record was filled in with data collected by an observer, at a site 2.4 kilometers southeast of the tipping-bucket rain gage at the land station.

[7]Missing values were filled in using a relationship between cloud cover (provided by a nearby observer) and shortwave solar radiation.

[8]Missing values were filled in using Brunt's equation (Koberg, 1962).

Regression	Data points	r^2 value
$Y = 0.877 + 0.999X$	15	0.98

Y = Wet-bulb air temperature measured by the sensor at the raft station.
X = Wet-bulb air temperature measured by the sensor at the land station.

Table 2.--*Summary of 1986 temperature data at the raft station*
[C, degrees Celsius; h, hour; blank, no data]

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
115	8.58	8.09	11.19	1121	4.51	0122	5.80
116	8.97	8.50	14.71	1453	4.16	0709	7.11
117	9.36	8.85	11.46	1844	7.50	0635	8.85
118	8.97	4.52	8.03	0006	2.49	2358	4.39
119	9.50	11.44	19.90	1655	0.56	0419	7.29
120	10.02	10.14	12.95	1716	6.01	2400	8.53
121	9.19	2.10	6.10	0009	-0.23	2359	1.25
122	9.28	4.60	11.63	1700	-1.20	0501	4.05
123	9.68	10.09	17.26	1630	-0.50	0452	8.74
124	10.90	19.28	27.29	1707	11.28	0533	16.67
125	12.37	18.71	25.44	1414	8.56	2400	16.35
126	11.66	6.66	9.61	0159	4.87	0530	5.99
127	11.32	8.31	13.75	1806	4.69	0142	7.11
128	10.96	5.82	8.73	0002	3.90	0555	5.49
129	10.76	11.70	15.86	2207	5.39	0003	11.15
130	11.31	14.55	18.14	1417	12.34	0603	13.84
131	12.41	15.31	20.96	1441	11.72	0651	14.12
132	13.39	15.52	19.81	1639	9.26	2400	13.81
133	14.29	13.67	21.22	1624	6.27	0519	10.69
134	14.79	15.26	21.57	1622	5.57	0454	12.52
135	15.09	13.67	19.37	1852	8.12	2325	10.41
136	14.93	10.04	13.48	1652	6.01	2358	7.76
137	14.77	8.88	13.66	1552	3.19	0517	6.78
138	14.85	8.82	16.47	1906	1.52	0420	6.27
139	15.26	10.98	17.35	1816	4.34	0100	7.69
140	15.54	10.96	18.85	1842	2.58	0447	7.01
141	16.07	12.61	20.69	1808	2.14	0524	8.15
142	16.43	13.59	21.75	1618	2.84	0517	9.22
143	16.45	13.31	18.41	1547	8.56	0437	11.07
144	16.81	14.22	20.17	1815	8.12	0422	11.69
145	17.02	14.50	21.84	1842	11.02	2400	12.79
146	18.11	17.48	25.97	1848	9.00	0244	13.81

Table 2.--*Summary of 1986 temperature data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
147	19.54	19.79	29.14	1836	10.58	0511	14.92
148	20.64	20.67	28.17	1311	12.16	0439	15.61
149	21.95	22.35	30.37	1557	14.01	0437	17.10
150	22.56	24.24	30.46	1616	16.12	0332	18.30
151	22.91	24.39	30.55	1707	16.82	0447	18.38
152	22.18	15.48	19.64	0001	10.67	2331	
153	21.28	15.30	21.31	1810	8.38	0451	
154	21.03	20.38	29.58	1431	15.06	0501	
155	21.02	16.45	20.08	1646	12.25	2359	
156	20.82	15.08	20.34	1720	7.41	0441	
157	20.69	16.23	21.31	1307	8.64	0448	13.22
158	20.74	17.75	20.87	1443	10.75	2325	14.72
159	21.01	15.49	21.49	1716	8.82	0458	11.87
160	21.43	20.17	25.09	1619	12.87	0206	15.15
161	21.15	17.22	20.34	0018	15.86	1035	15.44
162	20.36	14.37	16.82	0132	11.72	0952	13.45
163	20.34	17.37	22.54	1523	11.99	2250	13.93
164	20.59	16.88	22.81	1728	9.00	0453	12.26
165	21.35	16.81	24.04	1903	11.11	0313	12.93
166	20.97	18.62	25.18	1852	12.34	0102	16.97
167	20.32	13.42	18.41	1844	9.52	2400	9.84
168	20.75	16.03	21.93	1623	8.20	0251	12.82
169	20.99	21.07	26.32	1814	16.47	0001	19.00
170	22.32	24.58	30.19	1725	18.94	0532	20.65
171	22.56	21.04	25.80	1417	16.74	0501	18.36
172	23.03	22.28	29.14	1331	17.79	2345	20.29
173	22.78	19.82	24.92	1739	14.10	0546	15.67
174	22.52	16.42	20.61	1121	11.11	2349	13.61
175	22.49	14.82	20.78	1836	7.24	0437	11.40
176	22.59	22.46	30.81	1818	14.71	0327	18.58
177	23.75	25.44	29.75	1500	19.11	2357	22.19
178	24.02	20.63	24.21	1611	16.38	2349	16.86
179	23.98	19.83	24.48	1516	14.80	0213	16.03

Table 2.--*Summary of 1986 temperature data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
180	23.63	16.41	18.67	1400	12.25	0503	13.18
181	23.47	17.75	21.93	1533	13.83	0411	14.33
182	23.51	18.36	22.37	1516	15.42	0411	16.56
183	23.57	18.87	25.18	1822	13.48	0419	15.53
184	23.82	21.57	26.32	1423	14.19	0249	17.43
185	24.58	23.11	29.14	1543	18.14	0727	20.49
186	24.71	24.00	27.91	1321	15.15	2306	20.91
187	24.11	19.76	24.74	1737	14.19	0501	15.08
188	24.55	21.78	27.20	1703	16.03	0518	17.22
189	24.34	17.87	22.01	1853	15.15	2314	16.55
190	24.79	20.53	27.56	1553	13.31	0415	17.77
191	24.49	20.57	24.39	1257	17.53	2337	18.45
192	23.49	16.05	17.97	0035	14.62	2353	15.51
193	22.68	15.98	19.73	1615	13.83	0539	15.39
194	22.49	17.69	21.84	1645	15.06	0645	16.46
195	22.92	20.14	24.39	1635	15.06	0223	18.29
196	23.59	21.90	26.24	1654	19.37	0803	20.59
197	23.69	21.84	24.92	1851	18.76	0643	21.10
198	24.27	25.76	30.28	1803	21.13	0220	23.73
199	25.60	25.00	30.37	1439	20.08	2133	22.48
200	25.42	22.25	25.53	1921	17.79	2354	18.88
201	24.90	18.92	23.60	1910	15.68	2331	16.32
202	24.77	20.34	25.53	1649	13.83	0505	16.72
203	25.47	22.87	29.05	1656	16.03	0504	18.99
204	25.30	25.68	29.84	1719	20.69	0314	22.30
205	25.66	24.11	28.00	1553	18.23	2358	21.29
206	25.92	19.95	25.36	1744	15.15	0509	16.75
207	25.66	20.91	24.65	1604	16.38	0105	18.33
208	25.63	21.13	25.71	1415	18.32	0216	19.56
209	25.45	20.76	26.32	1702	17.44	0257	19.70
210	25.69	23.20	28.61	1424	16.12	0530	20.50
211	25.73	22.13	26.50	1358	17.18	2305	18.88
212	25.27	18.26	21.75	1552	14.98	2357	15.03

Table 2.--*Summary of 1986 temperature data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
213	24.68	17.39	21.66	1524	13.13	2321	14.65
214	24.06	16.49	20.96	1703	11.90	0314	13.52
215	23.91	18.70	25.09	1836	13.04	0534	15.65
213	24.68	17.39	21.66	1524	13.13	2321	14.65
214	24.06	16.49	20.96	1703	11.90	0314	13.52
215	23.91	18.70	25.09	1836	13.04	0534	15.65
216	24.13	20.39	27.38	1546	14.98	0532	17.32
217	24.45	20.40	28.00	1438	15.77	0432	18.55
218	24.24	19.24	25.80	1349	16.47	0455	18.06
219	23.91	19.08	23.07	1456	16.30	0533	17.60
220	24.05	20.48	26.15	1826	15.24	0540	17.26
221	24.08	18.55	25.53	1111	14.27	2359	16.68
222	23.22	13.69	17.79	1629	10.75	2358	11.60
223	23.01	15.61	23.42	1817	9.96	0447	13.05
224	22.69	17.79	22.45	1531	11.19	0527	15.49
225	22.35	19.04	21.57	1759	16.91	0751	18.09
226	22.25	19.14	24.65	1855	16.91	0301	18.17
227	22.93	22.77	28.70	1633	15.86	0554	19.24
228	23.08	21.03	25.09	1643	16.47	2344	17.52
229	22.84	16.59	21.13	1538	13.31	2358	13.93
230	22.92	18.14	23.25	1543	12.25	0321	15.63
231	22.95	21.48	26.06	1536	16.12	0445	19.06
232	22.81	18.93	21.84	0120	11.11	2351	15.59
233	22.47	14.50	19.46	1537	7.41	0522	11.89
234	21.84	13.90	15.42	1209	12.43	0635	13.40
235	21.59	15.83	22.28	1751	9.96	0441	14.30
236	21.07	15.72	17.79	1558	13.13	0155	14.67
237	21.19	19.94	24.65	1543	16.74	2400	17.16
238	20.94	12.72	17.00	0007	6.89	2317	10.66
239	20.30	10.30	14.98	1601	5.31	0533	8.51
240	20.23	11.55	19.11	1733	3.72	0505	9.19
241	19.99	14.83	19.81	1635	8.47	0528	12.14
242	20.12	17.41	22.28	1423	12.07	0355	15.55

Table 2.--*Summary of 1986 temperature data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
243	20.35	20.21	22.19	1521	17.88	0601	19.02
244	20.38	19.45	20.78	1527	16.21	2400	19.15
245	20.12	17.69	22.54	1432	15.06	0317	16.94
246	20.16	18.32	21.66	1317	14.27	2400	16.94
247	19.85	14.24	17.09	1414	11.19	2214	11.72
248	19.22	10.55	14.10	1519	7.94	2324	8.41
249	18.62	9.57	13.83	1536	5.83	0615	7.70
250	18.24	11.84	18.23	1656	5.39	0245	8.80
251	18.14	12.64	19.29	1752	6.18	0618	9.49
252	17.81	11.60	15.77	1245	6.89	0557	10.92
253	17.36	12.34	13.04	1615	11.72	0507	12.21
254	17.19	12.88	17.88	1655	9.61	2146	11.73
255	16.88	11.29	15.50	1500	7.32	2355	10.28
256	16.61	7.58	12.34	1618	3.37	0516	6.03
257	16.25	9.24	11.72	1318	7.50	0620	7.55
258	16.13	9.55	14.98	1629	5.74	2358	7.41
259	15.68	9.05	12.34	1248	4.51	0525	7.69
260	15.35	12.37	15.06	1632	10.14	0022	12.26
261	15.27	11.77	14.36	1420	9.96	2007	10.73
262	14.98	10.29	11.55	0511	8.82	2358	10.07
263	14.69	11.22	13.57	1629	8.73	0557	10.89
264	14.70	15.36	18.76	1601	12.25	0230	15.16
265	14.99	14.84	17.70	1618	11.02	2338	12.72
266	15.08	14.55	20.87	1529	9.44	2400	11.86
267	15.37	16.97	23.25	1606	9.35	0226	14.00
268	15.80	19.51	25.36	1453	13.31	2400	15.26
269	15.77	15.04	18.32	1635	11.46	0634	14.17
270	15.99	14.73	19.99	1336	10.49	2344	13.47
271	15.79	10.53	12.34	1044	6.80	0600	10.49
272	15.42	12.10	14.98	1641	8.73	2400	11.44
273	15.41	11.66	18.58	1651	5.74	0608	9.59
274	15.55	12.03	19.64	1347	5.31	0608	9.69
275	15.21	12.83	15.50	1540	9.44	2359	11.82

Table 2.--*Summary of 1986 temperature data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)	DAILY AVERAGE DRY-BULB AIR TEMPERATURE (C)	DAILY MAXIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MAXIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY MINIMUM DRY-BULB AIR TEMPERATURE (C)	TIME OF MINIMUM DRY-BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET-BULB AIR TEMPERATURE (C)
276	14.79	7.65	9.88	0019	5.83	2302	6.24
277	14.43	8.94	13.66	1619	3.90	0646	7.37
278	13.98	6.27	10.84	0004	0.91	2339	4.13
279	13.51	8.50	16.65	1606	0.82	0339	6.94
280	13.49	12.81	20.43	1501	6.80	2341	11.03
281	13.15	5.59	8.12	1120	0.38	2358	3.98
282	12.80	3.23	8.91	1626	-2.69	0639	1.56
283	12.19	7.03	9.00	1917	4.43	2356	6.19
284	11.71	4.03	6.01	1157	2.14	2343	3.04
285	11.08	1.11	2.67	1303	-0.41	2357	1.23
286	10.57	1.86	6.01	1612	-1.29	0530	0.84
287	10.25	4.97	10.40	1434	0.47	0644	2.75
288		4.74	6.71	1654	2.93	0703	3.46
289		7.19	13.13	1618	2.32	0630	5.95
290		6.61	12.25	1520	2.23	0307	5.69
291		9.27	15.86	1501	3.37	0700	7.61
292		12.58	19.81	1522	6.71	0646	10.46
293		11.01	22.81	1612	4.34	2400	9.20
294		11.33	21.31	1543	1.52	0644	9.56
295		13.32	18.06	1620	9.88	0706	12.13
296		8.41	12.34	0002	7.50	0923	8.45
297		7.71	9.96	1438	6.10	0743	6.86
298		8.31	10.75	1332	6.63	0722	7.90
299		8.84	13.57	1519	5.04	0722	8.09
300							
301							
302							
303							
304		3.76	12.69	0032	-4.72	2400	2.88

Table 3.--*Summary of 1986 wind-speed data at the raft station*
[mi/h, miles per hour; h, hour; blank, no data]

JULIAN DAY	DAILY AVERAGE WIND SPEED AT 1 m (mi/h)	DAILY AVERAGE WIND SPEED AT 2 m (mi/h)	DAILY MAXIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MAXIMUM WIND SPEED AT 2 m (h)	DAILY MINIMUM WIND SPEED AT 2 m (mi/h)[1]	TIME OF MINIMUM WIND SPEED AT 2 m (h)
115	8.24	8.41	24.38	0808	0.70	2400
116	4.76	4.97	13.15	0433	0.70	2336
117	3.34	3.48	11.28	1919	0.70	2236
118	8.08	8.20	20.22	0849	0.67	2202
119	4.07	4.06	17.62	1224	0.67	2035
120	8.63	8.86	31.88	1732	0.67	0307
121	11.90	12.23	29.39	0056	2.51	2308
122	4.68	4.77	17.96	1352	0.67	2311
123	7.18	7.35	22.12	1310	0.67	0152
124	8.06	8.46	27.30	1626	0.70	2257
125	11.98	12.56	33.35	2222	3.42	0017
126	12.56	13.15	29.08	0721	2.71	0849
127	5.38	5.66	18.16	1546	0.70	2001
128	7.15	7.48	34.49	1127	0.67	0645
129	10.15	10.41	25.63	1849	2.09	0135
130	7.98	8.19	25.51	1120	0.70	2114
131	6.29	6.41	18.30	1633	0.70	1416
132	6.00	6.14	21.41	1035	0.70	2400
133	2.20	2.06	13.32	1304	0.67	2133
134	6.56	6.64	25.49	1508	0.67	0622
135	3.53	3.52	15.50	0918	0.67	2109
136	5.39	5.34	20.25	1510	0.67	2116
137	5.06	5.03	22.88	1503	0.67	0030
138	3.47	3.48	18.89	1451	0.67	0254
139	5.36	5.38	15.52	1127	0.67	0009
140	4.21	4.19	18.13	1152	0.67	2109
141	3.66	3.55	16.18	0949	0.67	0554
142	5.59	5.65	20.84	1635	0.67	0205
143	6.03	6.06	17.11	1227	0.67	2049
144	4.04	3.98	14.96	1447	0.67	2322
145	2.68	2.56	15.58	1624	0.67	2040
146	2.74	2.64	13.15	1521	0.67	2255
147	2.51	2.38	14.36	1244	0.67	2348
148	3.27	3.13	14.25	1453	0.67	2203
149	2.30	2.16	10.60	1347	0.67	2313
150	4.71	4.73	16.57	1149	0.67	0650
151	7.38	7.62	30.75	1806	0.67	0126
152	4.84	4.94	15.38	0048	0.70	2125
153	7.80	8.02	21.84	1429	0.70	1437
154	6.69	6.78	23.51	1437	0.67	2115
155	4.87	4.91	15.27	1111	0.67	2304
156	4.78	4.66	14.76	1607	0.67	0241
157	7.75	7.91	19.51	1222	0.70	0706
158	7.81	7.86	24.27	1816	0.67	2116
159	3.07	2.86	15.27	1033	0.67	2203
160	6.53	6.61	17.48	1158	0.70	0221

Table 3.--*Summary of 1986 wind-speed data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE WIND SPEED AT 1 m (mi/h)	DAILY AVERAGE WIND SPEED AT 2 m (mi/h)	DAILY MAXIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MAXIMUM WIND SPEED AT 2 m (h)	DAILY MINIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MINIMUM WIND SPEED AT 2 m (h)
161	4.46	4.38	13.57	1708	0.67	0710
162	4.82	4.84	14.79	0205	0.70	2338
163	6.66	6.70	23.59	1628	0.67	2318
164	5.29	5.32	25.20	2023	0.67	2204
165	3.06	2.85	12.35	1331	0.67	2152
166	5.24	5.26	28.32	2305	0.67	2102
167	8.11	8.18	25.09	0757	0.67	2150
168	3.83	3.76	11.51	1855	0.67	0704
169	5.51	5.57	14.87	1000	0.70	1406
170	6.55	6.70	26.02	0048	0.70	1544
171	7.71	7.81	24.35	1745	0.67	2226
172	4.89	4.90	21.98	1431	0.70	2359
173	7.73	7.92	25.66	1344	0.67	0318
174	6.27	6.30	22.85	1530	0.67	0325
175	3.88	3.79	12.38	1717	0.67	1435
176	6.32	6.49	23.62	1046	0.67	2020
177	5.77	5.92	20.99	1530	0.67	2340
178	5.00	4.93	21.10	1122	0.64	0514
179	3.92	3.83	15.72	1327	0.67	2352
180	2.95	2.85	12.13	1210	0.67	1957
181	4.54	4.50	13.35	1608	0.70	2315
182	3.83	3.79	15.18	1709	0.70	2359
183	3.98	3.83	16.29	0918	0.67	0605
184	7.06	7.20	33.78	2351	0.67	0409
185	5.05	5.10	17.36	0204	0.70	2133
186	8.49	8.81	23.00	0447	0.70	2304
187	6.51	6.70	23.48	1456	0.67	0325
188	3.68	3.57	15.47	1150	0.67	0646
189	3.19	3.21	11.08	0102	0.70	2355
190	2.62	2.50	9.92	1334	0.67	2355
191	5.84	5.90	16.66	1106	0.70	1616
192	4.77	4.90	14.11	0653	0.70	2128
193	5.49	5.56	13.74	1304	0.70	1711
194	3.45	3.46	18.13	1255	0.67	2242
195	5.70	5.79	15.04	1232	0.70	0739
196	4.54	4.56	15.10	1305	0.70	2152
197	4.92	5.02	12.47	0619	0.70	1916
198	5.31	5.47	17.45	1803	0.02	1329
199	3.31	3.35	24.95	2121	0.67	2205
200	6.34	6.43	22.23	1415	0.67	1950
201	5.48	5.61	16.83	1236	0.67	2347
202	5.04	5.13	16.63	0900	0.67	0427
203	3.44	3.40	11.76	1235	0.67	0903
204	7.98	8.29	29.28	1403	0.70	0230
205	4.99	5.08	17.05	1341	0.67	0408
206	2.77	2.73	12.21	0936	0.70	2400
207	6.08	6.19	19.26	1639	0.67	0057

Table 3.--*Summary of 1986 wind-speed data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE WIND SPEED AT 1 m (mi/h)	DAILY AVERAGE WIND SPEED AT 2 m (mi/h)	DAILY MAXIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MAXIMUM WIND SPEED AT 2 m (h)	DAILY MINIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MINIMUM WIND SPEED AT 2 m (h)
208	3.45	3.43	16.94	0037	0.67	2243
209	3.10	3.06	12.61	1237	0.67	2241
210	4.61	4.66	15.07	1317	0.67	0642
211	5.99	6.09	19.54	0956	0.67	2142
212	6.81	6.99	19.85	1154	0.67	2230
213	6.72	6.79	26.50	1544	0.70	2353
214	6.11	6.13	19.85	1414	0.67	2112
215	4.14	4.07	12.55	1547	0.67	0156
216	3.99	3.99	12.72	1748	0.67	1016
217	3.12	3.07	11.70	0957	0.70	2400
218	4.20	4.16	16.57	1544	0.67	0302
219	4.96	5.01	17.28	1354	0.67	2349
220	3.80	3.70	14.53	1124	0.67	1947
221	3.99	3.91	19.57	1239	0.67	0044
222	6.85	6.91	18.18	1254	0.67	2111
223	2.81	2.70	13.43	0933	0.67	2332
224	5.89	6.00	18.01	1546	0.70	0603
225	6.32	6.45	13.54	2125	0.70	0359
226	3.34	3.33	15.81	0411	0.67	2328
227	4.51	4.60	19.34	1622	0.70	1214
228	3.85	3.88	14.34	0047	0.67	0402
229	3.52	3.56	13.97	1411	0.67	2322
230	3.66	3.62	12.98	1338	0.67	0708
231	7.68	7.91	20.14	1509	0.78	2124
232	6.76	6.88	21.72	1432	0.67	2313
233	3.76	3.70	15.21	0910	0.67	1333
234	6.40	6.49	17.36	0947	1.55	1150
235	3.46	3.41	11.82	1227	0.67	1046
236	6.39	6.55	16.57	1657	0.67	0001
237	4.62	4.69	15.44	1129	0.70	2311
238	6.02	6.09	21.27	1400	0.67	0018
239	3.79	3.76	19.20	1226	0.67	1753
240	3.08	3.00	12.89	1105	0.67	0757
241	5.71	5.86	17.62	1650	0.70	0514
242	5.91	5.95	19.29	1134	0.70	0549
243	4.76	4.85	14.65	1221	0.70	2400
244	3.02	3.08	15.72	2318	0.70	2013
245	8.02	8.25	19.23	1407	1.92	2357
246	5.07	5.27	15.58	1237	0.67	2045
247	8.30	8.61	22.80	1224	0.70	0022
248	8.00	8.13	19.94	0741	0.70	2023
249	6.50	6.59	22.88	1523	0.70	2354
250	5.71	5.86	25.46	1115	0.67	2321
251	4.18	4.20	16.97	1041	0.67	1852
252	4.64	4.65	14.31	1708	0.67	0704
253	4.13	4.29	13.35	1911	0.70	2357

Table 3.--*Summary of 1986 wind-speed data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE WIND SPEED AT 1 m (mi/h)	DAILY AVERAGE WIND SPEED AT 2 m (mi/h)	DAILY MAXIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MAXIMUM WIND SPEED AT 2 m (h)	DAILY MINIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MINIMUM WIND SPEED AT 2 m (h)
254	3.51	3.60	13.63	1416	0.67	2222
255	6.04	6.23	18.67	1016	0.70	0711
256	3.59	3.62	12.41	1120	0.70	2353
257	3.74	3.88	12.81	1712	0.70	2321
258	3.63	3.80	19.15	0934	0.67	1954
259	8.72	8.84	24.18	1251	0.70	0302
260	5.14	5.24	14.62	0052	0.70	1409
261	3.55	3.74	11.59	1259	0.70	2216
262	5.33	5.67	16.97	0333	0.70	2400
263	4.62	4.83	12.81	2011	0.70	1601
264	4.43	4.53	20.82	1638	0.70	2253
265	5.11	5.31	15.55	1105	0.70	2105
266	5.05	5.28	23.93	1245	0.67	2333
267	7.24	7.44	23.08	1212	0.70	0709
268	9.26	9.60	29.36	1145	0.70	2400
269	6.81	6.88	19.18	0841	0.67	0041
270	4.91	5.03	16.80	1316	0.67	2031
271	3.30	3.29	11.76	1053	0.67	0023
272	3.47	3.46	16.03	1651	0.67	2122
273	3.39	3.43	17.48	1229	0.67	2153
274	2.49	2.41	11.05	0952	0.67	2002
275	5.78	5.90	17.84	2335	0.70	1910
276	5.36	5.69	18.75	0137	0.70	2400
277	5.53	5.74	20.08	2340	0.70	0607
278	9.45	9.67	25.15	1413	0.67	2158
279	5.53	5.73	23.51	1507	0.67	2331
280	6.58	6.85	20.36	1522	0.70	0909
281	5.53	5.73	16.43	1723	0.70	2348
282	3.65	3.73	13.94	2312	0.67	0849
283	8.53	8.83	23.73	0914	1.61	1849
284	7.23	7.38	17.82	1953	1.95	1044
285	6.70	6.80	20.82	1243	2.48	2029
286	4.76	4.92	12.38	2229	0.70	1419
287	6.18	6.32	17.51	1310	0.84	0648
288	5.93	6.18	20.59	1346	0.70	2400
289	3.19	3.31	12.27	1022	0.67	0320
290	6.35	6.52	14.70	1506	0.70	0315
291	6.94	7.18	20.59	1258	2.00	2048
292	4.92	5.14	15.58	1519	0.70	2003
293	2.18	2.27	11.70	1052	0.67	2246
294	2.26	2.32	14.11	1526	0.67	1802
295	3.78	3.95	13.71	1315	0.70	2323
296	3.44	3.48	13.03	0510	0.70	2400
297	4.16	4.34	9.72	0930	0.70	2359
298	1.95	1.91	6.90	1414	0.67	1057
299	1.42	1.37	7.94	0929	0.56	1503

Table 3.--*Summary of 1986 wind-speed data at the raft station*--Continued

JULIAN DAY	DAILY AVERAGE WIND SPEED AT 1 m (mi/h)	DAILY AVERAGE WIND SPEED AT 2 m (mi/h)	DAILY MAXIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MAXIMUM WIND SPEED AT 2 m (h)	DAILY MINIMUM WIND SPEED AT 2 m (mi/h)	TIME OF MINIMUM WIND SPEED AT 2 m (h)
300						
301						
302						
303						
304	2.17	1.68	12.27	1048	0.28	1507

[1] Values of 0.70 or 0.67 are threshold values that represent the minimum windspeed required to turn the anemometer cups.

Table 4.--*Summary of 1986 radiation data at the land station*
[(cal/cm²)/d, calories per square centimeter per day; h, hour; (cal/cm²)/min, calories per square centimeter per minute]

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
115	192.3	1.376	1432	616.8	0.496	1115	0.330	0137
116	418.5	1.501	1356	648.8	0.483	1936	0.381	1254
117	80.2			699.0				
118	99.9	0.357	1423	625.9	0.480	0005	0.333	2141
119	588.5	1.339	1311	604.4	0.479	2349	0.370	0020
120	222.5	1.586	1426	650.3	0.508	1132	0.335	2244
121	169.7	0.720	0908	590.0	0.443	0002	0.286	2400
122	671.3	1.340	1228	468.1	0.399	0558	0.284	0006
123	556.5	1.756	1225	568.7	0.494	1715	0.304	0016
124	624.4	1.257	1225	660.5	0.519	1411	0.397	0432
125	511.8	1.480	1141	656.5	0.566	1221	0.353	2326
126	191.4	1.253	1502	646.0	0.473	1502	0.373	0001
127	364.8	1.331	1423	623.0	0.476	1952	0.384	1745
128	74.8	0.490	1131	652.1	0.465	0154	0.413	0014
129	176.1	1.612	1226	711.8	0.531	2234	0.397	0040
130	278.5	1.334	1117	718.8	0.529	1307	0.431	0012
131	430.8	1.874	1144	689.1	0.528	1134	0.416	2120
132	334.8	1.704	1247	695.5	0.547	1207	0.378	2314
133	527.4	1.452	1250	612.6	0.468	1646	0.369	2238
134	590.8	1.697	1257	651.0	0.538	1847	0.360	0211
135	421.5	1.245	1210	629.3	0.531	0036	0.361	060.
136	477.7	1.523	1229	596.2	0.462	0627	0.339	2336
137	561.3	1.826	1026	554.4	0.476	1347	0.320	2350
138	708.5	1.365	1128	532.4	0.413	0542	0.323	0005
139	695.1	1.429	1301	547.6	0.424	1435	0.330	2344
140	725.2	1.392	1131	513.6	0.400	1441	0.311	0504
141	716.8	1.387	1130	552.6	0.419	1252	0.335	2353
142	712.6	1.386	1132	566.2	0.439	1623	0.321	0137
143	358.7	1.796	1238	654.7	0.525	1255	0.382	0040
144	518.4	1.747	1121	665.6	0.525	1321	0.396	0812
145	340.3	1.973	1146	687.9	0.535	1917	0.402	2240
146	687.0	1.332	1131	651.2	0.492	1316	0.418	2356

Table 4.--*Summary of 1986 radiation data at the land station*--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
147	697.2	1.368	1115	657.0	0.494	1407	0.415	0637
148	682.5	1.357	1407	672.8				
149	677.2	1.302	1310	701.4	0.532	1344	0.442	0006
150	664.2	1.276	1132	725.3	0.550	1420	0.455	0622
151	674.8	1.319	1156	726.2	0.590	1845	0.440	2355
152	494.9	1.836	1333	629.3	0.542	1225	0.376	2204
153	699.3			612.5				
154	530.6	1.543	1342	729.0	0.608	1447	0.424	0316
155	561.5	1.656	1015	643.7	0.535	0030	0.369	2400
156	641.1	1.666	1256	608.0	0.538	1210	0.359	0201
157	489.6	1.482	1255	699.1	0.563	1615	0.387	0433
158	639.3	1.822	1323	682.0	0.559	0558	0.376	2222
159	719.3	1.489	1134	631.0	0.494	2218	0.366	0630
160	633.8	1.395	1326	684.9	0.548	1530	0.397	0106
161	74.7	0.274	1356	758.5	0.560	1655	0.468	2247
162	220.7	1.065	1309	746.5	0.540	0121	0.499	2003
163	630.3	1.783	1201	671.5	0.566	1047	0.378	2358
164	681.5	1.578	1423	657.6	0.532	2012	0.376	0007
165	720.1	1.590	1119	634.5	0.507	0010	0.399	2202
166	132.3	0.723	1626	743.1	0.580	1742	0.422	0009
167	757.0	1.409	1210	582.0	0.511	0002	0.344	0629
168	587.2	1.822	1322	690.2	0.559	1418	0.410	0757
169	306.3	1.612	1305	769.1	0.590	1334	0.485	0629
170	678.6	1.309	1210	765.5	0.590	1550	0.485	0522
171	441.2	1.480	1358	772.8	0.602	1558	0.477	0347
172								
173								
174								
175	744.8	1.399	1209					
176	519.0	1.493	1047					
177	537.5	1.496	1250					
178	671.4	1.764	1214					
179	583.2	1.831	1203					

Table 4.--*Summary of 1986 radiation data at the land station*--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
180	441.8	1.435	1012					
181	687.7	1.391	1115					
182	398.5	1.708	1221					
183	698.2	1.652	1114					
184	711.4	0.080	1903					
185	621.7	1.400	0909	766.0	0.600	2311	0.474	0400
186	316.3	1.639	1343	772.0	0.620	1247	0.406	2237
187	737.4	1.417	1313	629.6	0.498	2339	0.393	0454
188	693.3	1.447	1218	669.3	0.507	0409	0.415	1841
189	254.0	1.440	1533	652.5	0.513	1428	0.387	2158
190	650.3	1.778	1107	684.7	0.532	1120	0.422	0719
191	330.4	1.781	1246	714.0	0.550	1314	0.449	0214
192	70.8	0.258	1309	725.0	0.514	1645	0.476	0016
193	215.2	0.644	0835	718.0	0.529	1402	0.437	1914
194	366.5	1.802	1336	703.0	0.550	1406	0.402	2210
195	595.7	1.867	1051	711.0	0.551	1504	0.450	0839
196	469.1	1.675	1312	728.0	0.568	1744	0.452	2301
197	163.0	0.613	0959	793.0	0.583	1820	0.499	2327
198	461.8	1.521	1414	795.0	0.600	1153	0.501	0044
199	630.5	1.338	1329	729.0	0.594	2047	0.449	0629
200	659.1	1.487	1338	688.8	0.547	0116	0.424	2237
201	556.4	1.592	1244	642.6	0.519	1012	0.379	2155
202	635.5	1.516	1315					
203	653.4	1.368	1347					
204	481.9	1.488	1048					
205	500.7	1.688	1331					
206	679.7	1.324	1138					
207	529.0	1.571	1149					
208	410.2	1.778	1207					
209	375.1	2.072	1030					
210	576.1	1.315	1443					
211	603.4	1.265	1142					
212	580.8	1.617	1151					

Table 4.--*Summary of 1986 radiation data at the land station*--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
213	537.6	1.629	1146					
214	562.1	1.721	1252					
215	587.2	1.223	1240					
216	489.2	1.785	1050					
217	497.3	1.530	1304					
218	362.0	1.428	1141					
219	374.5	1.706	1231					
220	620.2	1.331	1219					
221	356.1	1.649	1131					
222	453.5	1.834	1201					
223	573.3	1.691	1152					
224	389.0	1.493	1102					
225	156.7	1.493	1235					
226	265.0	1.285	1420					
227	586.4	1.248	1215					
228	429.9	1.543	1106					
229	583.6	1.286	1233					
230	551.9	1.384	1226					
231	443.3	1.480	1300					
232	460.0	1.575	1150					
233	528.5	1.291	1241					
234	86.8	0.310	1354					
235	529.8	1.739	1039					
236	139.2	0.721	1512					
237	543.2	1.373	1301					
238	396.4	1.755	1312					
239	368.4	1.653	1146					
240	544.7	1.231	1300					
241	502.3	1.613	1247					
242	444.3	1.264	1411					
243	228.4	1.315	1220					
244	93.3	0.511	1529					
245	228.2	1.135	1248					

Table 4.--*Summary of 1986 radiation data at the land station*--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
246	295.2	1.482	1335					
247	391.4	1.611	1301	663.5	0.544	1506	0.391	2400
248	429.5	1.522	1245	604.1	0.507	0247	0.366	2201
249	350.7	1.570	1214	595.5	0.504	1147	0.344	0604
250	509.2	1.270	1149	593.9	0.465	0719	0.361	2353
251	507.7	1.140	1222	584.1	0.442	2350	0.357	0259
252	100.6	0.462	0746	716.0	0.529	1243	0.434	0038
253	48.2	0.173	1533	752.0	0.526	1156	0.510	2313
254	297.6	1.506	1106	686.1	0.520	0341	0.397	2056
255	181.6	1.376	1252	666.4	0.523	1300	0.366	2030
256	426.3	1.387	1307	577.7	0.459	2321	0.318	0447
257	149.2	0.700	1304	664.4	0.482	1344	0.378	2116
258	458.2	1.409	1154	570.2	0.464	0350	0.347	0701
259	214.8	1.103	1152	657.0	0.504	1617	0.391	0831
260	70.0	0.459	1054	740.0	0.541	1546	0.495	0147
261	211.6	1.261	1052	665.8	0.516	1055	0.384	2215
262	48.8	0.175	1229	695.2	0.504	0930	0.390	0214
263	112.0	0.411	1139	721.0	0.513	2128	0.485	0313
264	65.4	0.393	1244	772.0	0.562	1713	0.510	0222
265	357.2	1.024	1301	650.9	0.542	0027	0.379	2119
266	389.2	0.952	1214	589.7	0.448	1358	0.376	2320
267	352.0	1.025	1127	700.0	0.560	1932	0.391	0004
268	399.8	0.981	1215	682.0	0.553	0646	0.397	2358
269	141.1	0.663	0851	694.4	0.550	1526	0.385	0634
270	353.8	1.151	1154	665.5	0.520	0902	0.390	2018
271	44.5	0.222	1210	691.5	0.501	1109	0.439	0002
272	102.2	1.266	1328	674.9	0.511	0852	0.375	1931
273	400.5	1.004	1338	596.0	0.470	0135	0.367	2037
274	305.0	1.257	1254	630.9	0.494	1346	0.388	2102
275	124.9	0.866	1425	690.7	0.516	1011	0.400	0423
276	131.4	0.860	1441	635.1	0.480	0002	0.361	2229
277	256.7	1.153	1156	607.8	0.485	2007	0.336	0759
278	317.9	1.294	1139	519.0	0.473	0004	0.299	2205

Table 4.--*Summary of 1986 radiation data at the land station*--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm²)/d]	DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm²)/min]	TIME OF MAXIMUM LONG-WAVE ATMOSHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSHERIC RADIATION [(cal/cm²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSHERIC RADIATION (h)
279	187.0	1.385	1146	609.1	0.504	1503	0.381	0001
280	246.2	1.132	1203	639.8	0.520	1245	0.376	0209
281	153.6	0.890	1449	549.1	0.453	1451	0.280	2350
282	358.0	0.896	1208	462.0	0.376	0802	0.275	0135
283	28.5	0.138	0923	652.3	0.485	1920	0.329	0059
284	113.6	0.915	1148	599.1	0.437	0023	0.375	0437
285	81.1	0.412	1144	603.6	0.430	0024	0.406	1451
286	200.8	1.105	1312	548.1	0.418	0810	0.295	0913
287	294.1	1.031	1319	531.7	0.427	2307	0.301	0743
288	212.3	1.046	1340	572.3	0.448	1726	0.333	1517
289	303.7	0.800	1152	533.4	0.427	0805	0.329	2400
290	287.2	0.783	1052	526.6	0.436	0547	0.323	0111
291	276.1	0.744	1202	547.0	0.415	0746	0.332	0056
292	247.9	0.772	1153	574.6	0.455	1255	0.359	0351
293	272.1	0.757	1223	575.0	0.453	0634	0.347	2146
294	271.3	0.744	1206	589.4	0.456	1407	0.366	0907
295	175.4	0.664	1244	624.5	0.514	1813	0.393	0304
296	42.9	0.158	1023	671.1	0.489	0006	0.376	0316
297	219.6	1.058	1222	627.6	0.477	0044	0.344	0924
298	75.3	0.475	1158	673.6	0.482	1449	0.450	2109
299	227.3	0.934	1109	574.6	0.477	0424	0.351	0851
300	236.1	0.700	1201	580.0	0.452	0846	0.375	1911
301	70.3	0.700	1043	606.7	0.476	0934	0.310	2400
302	81.3	0.372	1327	548.4	0.439	1345	0.296	2333
303	136.7	0.809	1047	597.2	0.491	2347	0.298	0129
304	68.4	0.514	1101	553.6	0.492	0039	0.249	2335
305	207.6	0.755	1133	399.1	0.366	0248	0.243	0716
306	141.2	0.944	1107	537.0	0.449	2240	0.262	0043
307	149.6	0.952	1213	496.4	0.443	0001	0.244	2304