

CLIMATIC DATA FOR THE COTTONWOOD LAKE AREA, STUTSMAN COUNTY, NORTH DAKOTA 1982

By

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METRIC CONVERSION FACTORS

<i>Multiply</i>	<i>By</i>	<i>To obtain</i>
meter	3.281	feet
kilometer	0.621	mile
centimeter	0.394	inch
millibar	0.0145	pounds 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 degree Celsius (°C) to degree Fahrenheit (°F) use the following formula:

$$(^{\circ}\text{C} \times 9/5) + 32 = ^{\circ}\text{F} .$$

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ABSTRACT

Research on the hydrology of the Cottonwood Lake area, Stutsman County, North Dakota, includes study of evaporation. Presented here are those climatic data needed for energy-budget and mass-transfer evaporation studies, including: water-surface temperature, sediment temperature, dry-bulb and wet-bulb air temperatures, vapor pressure at and above the water surface, wind speed, and short- and long-wave radiation. Data were collected at raft and land stations.

INTRODUCTION

Climatic data are being collected at the Cottonwood Lake area as part of a continuing study of the hydrology of a group of small lakes and wetlands by the U.S. Geological Survey and the U.S. Fish and Wildlife Service. The Cottonwood Lake area is one of several lake areas 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 the Cottonwood Lake area is given by Winter and Carr (1980).

DATA COLLECTION AND PRESENTATION

Data presented here are being collected principally for studies of evaporation; therefore, data are collected only during the time the lakes are ice-free. Data for 1982 were collected from May 26 (Julian day 146) to September 20 (Julian day 263). Within each data table, the data are grouped according to energy-budget periods; the periods are defined by the dates thermal surveys were made in the lake. For example, the first energy-budget period for 1982 is Julian days 146 through 152.

Climatic instruments are located on a raft near the middle of wetland P1 and at a land station near the edge of the wetland. Instruments on the raft include anemometers at 2 and 3 meters above the water surface, a thermistor psychrometer with dry- and wet-bulb temperature sensors at 2 meters above the water surface, and water-temperature sensors beneath the raft at a depth of about 1 centimeter below the water surface and about 20 centimeters above the sediments. This second water-temperature sensor is referred to in the tables as "lake bottom water temperature." Sediment-temperature sensors are at 0.5 and 1.0 meter below the sediment-water interface.

Data from the above sensors 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 and totals. In addition, for selected

sensors, maximum and minimum values and the times they occur are stored and recorded at midnight of each day. Additional analog instruments for measuring water-surface temperature and wind speed also are located on the raft. These are used to back up the primary instruments for quality control and for filling in missing data.

The land station consists of short- and long-wave radiometers. These data also are recorded by a digital-data logger that operates similarly to the one on the raft. A backup hygrothermograph that records air temperature and relative humidity is located near the edge of wetland P1. Calibration checks with laboratory-quality thermometers and motorized psychrometers are made weekly. Vapor pressure of water (e_w) is calculated by using water-temperature data and assuming the air is completely saturated at the air-water interface.

Data presented here are daily summaries. For periods when 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 the primary source of data for evaporation studies, includes values obtained by regression. Tables 2, 3, and 4 begin at a later day than table 1 because maximum and minimum values were not recorded prior to Julian day 173.

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 to T.C. Winter (see back of title page).

REFERENCE

Winter, T.C., and Carr, M.R., 1980, Hydrologic setting of wetlands in the Cottonwood Lake area, Stutsman County, North Dakota: U.S. Geological Survey Water-Resources Investigations 80-99, 42 p.

Table 1.--Summary of 1982 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]

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC ² VAPOR PRESSURE (mb)	ROSEN KATIO			
146	18.200	15.710	13.720	20.893	14.426	0.223			
147	18.210	16.520	14.320	20.906	14.915	.163			
148	18.720	17.740	14.980	21.585	15.268	.090			
149	17.460	12.150	8.040	19.942	8.157	.261			
150	16.050	10.100	8.150	18.233	9.602	.399			
151	13.030	8.230	8.220	15.000	10.878	.673			
152	14.130	10.580	7.551	16.114	8.488	.269			

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT ³ AT 0.5 METER TEMPERATURE (C)	SEDIMENT ³ AT 1 METER TEMPERATURE (C)	WINDSPEED ⁴ AT 2 METERS (mi/h)	WINDSPEED ⁴ AT 3 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]		
146	18.150	0.163	0.644	5.851	5.851	439.4	679.2		
147	18.290	.567	.643	5.581	5.581	320.0	688.2		
148	18.800	1.011	.645	8.480	8.480	417.5	700.9		
149	17.570	1.488	.641	9.750	9.750	698.2	580.6		
150	16.170	2.239	.664	10.750	10.750	505.9	606.5		
151	13.150	3.258	.872	12.140	12.140	492.0	594.5		
152	14.230	3.993	1.234	6.849	6.849	703.7	561.5		

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT KRAFT STATION										
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (c)	DRY-BULB AIR TEMPERATURE (c)	WET-BULB AIR TEMPERATURE (c)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	RUMEN RATIO	DAILY TOTALS AT LAND STATION			
							SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	WINDSPEED AT 3 METERS (mi/h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	
153	15.390	11.620	6.672	17.479	6.672	0.202	581.7	5.594	601.5	
154	16.810	14.690	9.240	19.138	8.217	.112	648.8	8.520	621.9	
155	16.490	16.400	12.040	18.752	11.291	.007	469.0	13.920	676.0	
156	16.420	16.380	13.760	18.669	14.067	.005	364.1	13.800	684.5	
157	16.830	14.920	13.380	19.162	14.369	.230	309.3	10.930	671.6	
158	14.910	11.050	9.070	16.947	10.278	.335	455.5	13.700	624.5	
159	13.480	8.220	7.710	15.447	10.191	.579	121.5	8.780	599.7	
160	11.600	10.150	8.020	13.654	9.393	.197	420.1	12.770	613.8	
161	14.370	12.770	8.470	16.367	8.355	.115	708.6	5.342	590.3	
162	16.970	14.690	11.320	19.333	11.267	.163	648.6	5.741	636.2	
163	19.170	14.800	9.720	22.200	8.832	.189	701.9	3.189	617.1	
164	19.710	17.930	13.330	22.959	12.375	.097	671.0	7.191	673.1	
165	20.480	16.660	13.640	24.079	13.690	.213	659.4	6.852	662.8	

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION										
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-SURFACE AIR TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	ATMOSPHERIC PRESSURE (mb)	WINDSPEED AT 3 METERS (mi/h)	WINDSPEED AT 2 METERS (mi/h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]
166	21.010	15.850	11.940	11.940	24.878	11.484	11.484	3.900	3.900	651.3
167	20.470	17.350	14.050	14.050	24.064	13.933	13.933	7.396	7.396	693.3
168	18.340	12.130	9.800	9.800	21.078	10.636	10.636	6.784	6.784	635.2
169	16.750	10.940	7.756	7.756	19.065	8.537	8.537	6.057	6.057	614.1
170	16.210	13.500	10.140	10.140	18.421	10.263	10.263	11.950	11.950	642.3
171	16.890	13.500	10.480	10.480	19.235	10.762	10.762	6.946	6.946	636.0
172	18.350	14.640	10.980	10.980	21.091	10.785	10.785	4.045	4.045	654.3
173	19.460	18.440	13.470	13.470	22.605	12.280	12.280	7.756	7.756	694.5
174	21.010	20.790	17.120	17.120	24.878	17.176	17.176	6.283	6.283	736.2
175	19.940	14.540	12.020	12.020	23.289	12.439	12.439	9.950	9.950	662.5
176	20.370	14.130	9.390	9.390	23.916	8.784	8.784	3.686	3.686	650.6
177	20.610	17.750	13.640	13.640	24.273	12.998	12.998	5.191	5.191	690.1
178	22.290	20.330	15.520	15.520	26.903	14.563	14.563	5.045	5.045	719.8
179	19.350	13.610	11.580	11.580	22.451	12.349	12.349	9.550	9.550	653.7

DAILY AVERAGES AT RAFT STATION				DAILY TOTALS AT LAND STATION			
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT TEMPERATURE AT 0.5 METER (C)	SEDIMENT TEMPERATURE AT 1 METER (C)	WINDSPEED AT 3 METERS (mi/h)	WINDSPEED AT 2 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]
166	20.400	8.650	5.204	3.900	3.900	647.3	651.3
167	20.560	9.090	5.423	7.396	7.396	484.8	693.3
168	18.490	9.470	5.644	6.784	6.784	199.8	635.2
169	16.870	9.810	5.859	6.057	6.057	480.3	614.1
170	16.320	10.040	6.104	11.950	11.950	495.2	642.3
171	16.990	10.170	6.337	6.946	6.946	590.6	636.0
172		10.260	6.547	4.045	4.045	575.9	654.3
173		10.390	6.735	7.756	7.756	559.1	694.5
174		10.570	6.919	6.283	6.283	443.5	736.2
175		10.790	7.084	9.950	9.950	484.4	662.5
176		11.060	7.254	3.686	3.686	659.5	650.6
177		11.300	7.440	5.191	5.191	551.8	690.1
178		11.520	7.629	5.045	5.045	604.2	719.8
179		11.730	7.779	9.550	9.550	213.1	653.7

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	ROMEN KALIU			
180	17.810	12.950	10.380	20.387	10.963	0.298			
181	18.310	15.230	10.770	21.038	10.097	.163			
182	19.420	19.830	15.450	22.549	14.758	-.030			
183	22.200	22.190	18.650	26.756	19.229	.001			
184	23.640	23.110	17.330	29.194	16.091	.023			
185	23.390	23.490	18.830	28.757	18.756	-.006			
186	23.110	21.350	18.190	28.275	18.862	.108			
187	22.300	18.390	14.810	26.920	14.561	.183			
188	20.990	17.020	12.730	24.847	11.985	.178			
189	21.870	19.890	16.230	26.223	16.112	.113			
190	20.570	17.000	15.170	24.213	16.069	.253			
191	21.650	18.220	15.560	25.873	15.977	.200			
192	22.530	19.630	15.710	27.299	15.345	.140			
193	6 {24.130	7 {20.430	8 {15.530	30.066	14.517	.138			

DAILY TOTALS AT LAND STATION									
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT AT 0.5 METER TEMPERATURE (C)	SEDIMENT AT 1 METER TEMPERATURE (C)	WINDSPEED AT 2 METERS (mi/h)	WINDSPEED AT 3 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION ((cal/cm ²)/d)	LONG-WAVE ATMOSPHERIC RADIATION ((cal/cm ²)/d)		
180		11.970	7.950		6.027	480.7	639.6		
181		12.100	8.140		7.162	525.8	657.4		
182		12.170	8.320		10.830	582.6	715.4		
183		12.260	8.490		7.762	520.0	755.9		
184		12.410	8.630		5.761	634.8	752.0		
185		12.650	8.780		8.460	341.4	768.0		
186		12.930	8.920		9.230	507.4	746.4		
187		13.210	9.060		8.360	432.0	705.1	5	
188	20.370	13.450	9.230	6.988	6.988	590.1	676.0		
189	21.860	13.620	9.400	8.620	8.620	497.4	724.3		
190	20.560	13.710	9.550	6.548	6.548	380.0	695.9		
191	21.380	13.810	9.720	4.090	4.090	454.6	707.5		
192	22.150	13.910	9.880	4.563	4.563	569.8	715.2		
193				9 {5.750		547.1	720.6		

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR FRESSURE (mb)	ATMOSPHERIC VAPOR FRESSURE (mb)	WOMEN RATIO			
194	24.180	20.480	17.190	30.157	17.505	0.169			
195	23.620	20.480	17.910	29.159	18.875	.177			
196	24.410	23.150	19.290	30.575	19.899	.068			
197	25.410	25.150	21.190	32.454	22.617	.015			
198	21.440	17.150	13.400	25.543	12.985	.198			
199	22.310	17.910	14.460	26.936	14.268	.201			
200	23.620	21.370	17.800	29.159	18.095	.118			
201	24.610	23.690	19.260	30.943	19.493	.046			
202	24.350	20.380	16.920	30.465	17.065	.171			
203	22.770	20.500	16.480	27.699	16.178	.114			
204	24.330	24.830	20.680	30.429	21.720	-.033			
205	24.980	21.800	18.730	31.634	19.637	.153			
206	24.550	19.660	16.580	30.832	16.896	.203			
207	24.430	19.890	15.250	30.612	14.369	.162			
208	23.120	19.090	16.580	28.292	17.260	.211			

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT TEMPERATURE AT 0.5 METER (C)	SEDIMENT TEMPERATURE AT 1 METER (C)	WINDSPEED AT 2 METERS (mi/h)	WINDSPEED AT 3 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]		
194					6.550	511.0	734.0		
195					7.360	464.2	737.7		
196					8.570	589.0	763.1		
197					7.760	458.6	795.7		
198					10.580	612.9	676.1		
199		15.000	10.820		4.635	530.9	693.4	5	
200	21.390	15.040	10.940		4.817	569.1	740.2		
201	22.800	15.100	11.100		5.354	503.5	768.8		
202	23.370	15.110	11.190		6.761	583.7	727.5		
203	22.860	15.170	11.300		8.180	413.9	730.5		
204	22.810	15.300	11.430		6.870	527.1	722.5		
205	23.620	15.400	11.520		5.651	434.3	688.9		
206	23.510	15.480	11.610		3.001	363.7	687.0		
207	22.980	15.600	11.720		3.375	500.6	638.7		
208	22.580	15.680	11.810		4.318	320.8	702.9		

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION											
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (c)		IRY-BULB AIR TEMPERATURE (c)		MET-BULB AIR TEMPERATURE (c)		WATER VAPOR PRESSURE (mb)		ATMOSPHERIC VAPOR PRESSURE (mb)		ROMEN RATIO
	LAKE-SURFACE WATER TEMPERATURE (c)	IRY-BULB AIR TEMPERATURE (c)	IRY-BULB AIR TEMPERATURE (c)	MET-BULB AIR TEMPERATURE (c)	MET-BULB AIR TEMPERATURE (c)	WATER VAPOR PRESSURE (mb)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)		
209	24.090	20.580	20.580	16.600	16.600	29.994	16.347	16.347	16.347	0.149	
210	21.730	17.310	17.310	14.420	14.420	26.000	14.582	14.582	14.582	.224	
211	22.600	19.640	19.640	14.600	14.600	27.415	13.406	13.406	13.406	.122	
212	22.800	22.050	22.050	17.210	17.210	27.749	16.541	16.541	16.541	.039	
213	23.090	23.450	23.450	17.760	17.760	28.241	16.691	16.691	16.691	-.018	
214	23.440	24.120	24.120	19.450	19.450	28.844	16.604	16.604	16.604	-.043	
215	23.150	21.340	21.340	15.280	15.280	28.343	13.498	13.498	13.498	.070	
216	22.710	21.790	21.790	16.690	16.690	27.598	15.741	15.741	15.741	.045	
217	23.830	22.980	22.980	17.980	17.980	29.529	17.414	17.414	17.414	.041	
218	23.300	22.930	22.930	18.430	18.430	28.601	18.322	18.322	18.322	.021	
219	22.720	20.860	20.860	16.820	16.820	27.615	16.574	16.574	16.574	.097	
220	20.000	15.050	15.050	12.110	12.110	23.375	12.256	12.256	12.256	.257	
221	18.460	11.990	11.990	9.800	9.800	21.237	10.725	10.725	10.725	.356	

DAILY AVERAGES AT RAFT STATION						DAILY TOTALS AT LAND STATION				
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (c)		SEDIMENT TEMPERATURE (c)		WINDSPEED AT 3 METERS (mi/h)		SHORT-WAVE SOLAR RADIATION I (cal/cm ² /d)		LONG-WAVE ATMOSPHERIC RADIATION I (cal/cm ² /d)	
	LAKE-BOTTOM WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	SEDIMENT TEMPERATURE AT 0.5 METER (c)	SEDIMENT TEMPERATURE AT 1 METER (c)	WINDSPEED AT 3 METERS (mi/h)	WINDSPEED AT 3 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION I (cal/cm ² /d)	SHORT-WAVE SOLAR RADIATION I (cal/cm ² /d)	LONG-WAVE ATMOSPHERIC RADIATION I (cal/cm ² /d)	LONG-WAVE ATMOSPHERIC RADIATION I (cal/cm ² /d)
209	22.040	15.780	15.780	11.930	2.479	2.479	502.1	502.1	686.8	686.8
210	21.720	15.820	15.820	12.020	7.329	7.329	479.0	479.0	628.8	628.8
211	20.910	15.850	15.850	12.110	4.409	4.409	563.5	563.5	655.2	655.2
212	21.110	15.860	15.860	12.210	3.897	3.897	394.9	394.9	673.8	673.8
213	21.690	15.840	15.840	12.300	5.797	5.797	505.9	505.9	697.0	697.0
214	22.000	15.890	15.890	12.440	8.700	8.700	482.4	482.4	710.6	710.6
215	22.250	15.860	15.860	12.450	3.662	3.662	434.0	434.0	662.8	662.8
216	21.610	15.890	15.890	12.500	5.309	5.309	465.8	465.8	688.2	688.2
217	21.920	15.930	15.930	12.560	5.310	5.310	534.3	534.3	705.0	705.0
218	22.010	15.960	15.960	12.610	6.267	6.267	377.3	377.3	727.2	727.2
219	22.330	16.000	16.000	12.680	8.550	8.550	534.9	534.9	671.5	671.5
220	20.120	16.020	16.020	12.720	9.510	9.510	484.3	484.3	592.0	592.0
221	18.250	16.020	16.020	12.760	5.040	5.040	348.0	348.0	606.3	606.3

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE SURFACE WATER TEMPERATURE (c)	DRY-BULB AIR TEMPERATURE (c)	WET-BULB AIR TEMPERATURE (c)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	ROWLN RATIO	DAILY TOTALS AT RAFT STATION		
							LONG-WAVE SOLAR RADIATION ((cal/cm ²)/d)	SHORT-WAVE SOLAR RADIATION ((cal/cm ²)/d)	LONG-WAVE ATMOSPHERIC RADIATION ((cal/cm ²)/d)
222	19.100	13.010	9.320	22.104	9.393	0.277	554.4	554.4	570.8
223	17.890	16.920	12.320	20.490	11.399	.062	553.6	553.6	595.9
224	17.560	17.330	15.560	20.068	16.544	.038	194.6	194.6	692.6
225	20.620	22.000	16.720	24.288	15.662	-.092	519.6	519.6	687.3
226	20.560	21.820	19.490	24.198	21.157	-.240	244.9	244.9	728.0
227	21.730	20.670	18.590	26.000	20.081	.104	308.9	308.9	713.9
228	22.060	21.880	18.180	26.529	18.504	.013	396.7	396.7	719.6
229	23.700	23.690	19.650	29.299	20.289	.001	476.6	476.6	724.2
230	25.590	25.860	21.170	32.802	22.118	-.015	472.6	472.6	760.7
231	22.680	19.550	16.130	27.548	16.148	.159	250.7	250.7	677.6
232	22.630	20.150	14.850	27.465	13.510	.103	493.7	493.7	647.5
233	22.320	22.990	17.650	26.952	16.774	-.038	423.0	423.0	694.6
234	21.990	18.150	15.000	26.416	15.041	.195	426.3	426.3	643.6
235	20.720	15.410	12.700	24.438	12.959	.267	345.5	345.5	647.3

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (c)	SEDIMENT TEMPERATURE AT 0.5 METER (c)	SEDIMENT TEMPERATURE AT 1 METER (c)	WINDSPEED AT 2 METERS (m/h)	WINDSPEED AT 3 METERS (m/h)	DAILY TOTALS AT LAND STATION			
						LONG-WAVE SOLAR RADIATION ((cal/cm ²)/d)	SHORT-WAVE SOLAR RADIATION ((cal/cm ²)/d)	LONG-WAVE ATMOSPHERIC RADIATION ((cal/cm ²)/d)	
222	17.510	15.980	12.810	2.639	2.853	554.4	554.4	570.8	
223	17.980	15.860	12.860	7.365	10.460	553.6	553.6	595.9	
224	17.410	15.700	12.890	8.250	9.930	194.6	194.6	692.6	
225	18.220	15.590	12.930	3.403	3.633	519.6	519.6	687.3	
226	19.600	15.490	12.940	8.090	8.450	244.9	244.9	728.0	
227	20.210	15.410	12.940	5.792	6.137	308.9	308.9	713.9	
228	20.620	15.380	12.930	6.100	6.267	396.7	396.7	719.6	
229	21.170	15.410	12.930	5.507	5.507	476.6	476.6	724.2	
230	22.260	15.480	12.950	4.700	4.870	472.6	472.6	760.7	
231	22.370	15.540	12.950	4.370	4.635	250.7	250.7	677.6	
232	20.560	15.630	12.950	3.133	3.330	493.7	493.7	647.5	
233	21.360	15.750	13.000	8.080	9.110	423.0	423.0	694.6	
234	20.730	15.770	13.020	4.764	4.972	426.3	426.3	643.6	
235	19.930	15.800	13.060	3.120	3.372	345.5	345.5	647.3	

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	MOON-KATIO			
236	19.330	14.700	11.640	22.423	11.750	0.251			
237	18.890	14.700	11.300	21.816	11.230	.229			
238	16.530	10.110	7.674	18.800	8.950	.377			
239	15.690	9.590	5.400	17.818	6.329	.307			
240	14.030	14.070	10.420	16.010	10.313	-.004			
241	16.300	14.430	11.720	18.527	12.044	.167			
242	13.710	10.330	8.830	15.681	10.396	.370			
243	15.630	16.100	14.670	17.750	15.777	-.138			
244	15.920	15.380	12.520	18.083	12.692	.058			
245	16.220	14.910	10.760	18.432	10.285	.093			
246	18.580	16.890	12.250	21.397	11.308	.097			
247	19.410	20.140	15.250	22.535	14.210	.051			
248	16.860	13.120	9.440	19.198	9.494	.223			
249	16.850	13.950	10.300	19.186	10.212	.187			
250	17.790	19.280	15.700	20.361	15.550	-.179			
251	20.660	23.840	17.750	24.348	16.423	-.232			
252	21.410	22.660	18.630	25.496	18.889	-.109			

DAILY AVERAGES AT RAFT STATION						DAILY TOTALS AT LAND STATION		
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT AT 0.5 METER TEMPERATURE (C)	SEDIMENT AT 1 METER TEMPERATURE (C)	WINDSPEED AT 2 METERS (mi/h)	WINDSPEED AT 3 METERS (mi/h)	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	
236	19.130	15.830	13.100	5.334	5.976	470.0	589.2	
237	18.520	15.830	13.140	6.599	7.450	458.8	627.8	
238	16.580	15.750	13.150	5.408	5.692	364.1	592.8	
239	14.910	15.650	13.180	3.431	3.660	370.4	366.3	
240	14.200	15.490	13.200	6.756	11.490	346.1	611.7	
241	15.580	15.280	13.210	4.423	4.733	333.7	617.1	
242	13.930	15.040	13.180	6.556	7.298	69.9	658.6	
243	13.800	14.890	13.180	3.989	4.184	247.6	703.9	
244	15.930	14.680	13.120	5.100	7.296	304.1	637.7	
245	16.140	14.460	13.060	5.540	6.744	461.9	577.5	
246	16.520	14.390	13.020	2.341	2.577	421.4	619.4	
247	17.640	14.320	12.960	6.711	7.640	429.0	655.3	
248	16.480	14.280	12.890	6.158	7.418	444.0	576.0	
249	16.840	14.280	12.860	7.063	7.798	429.9	583.8	
250	17.870	14.270	12.810	8.570	11.040	384.1	670.7	
251	19.730	14.280	12.800	8.480	8.990	415.7	684.6	
252	21.410	14.280	12.780	7.858	8.150	371.8	694.4	

Table 1.--Summary of 1982 energy-budget data--Continued

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-SURFACE WATER TEMPERATURE (C)	DRY-BULB AIR TEMPERATURE (C)	WET-BULB AIR TEMPERATURE (C)	WATER VAPOR PRESSURE (mb)	ATMOSPHERIC VAPOR PRESSURE (mb)	ROSEN RATIO	DAILY TOTALS AT LAND STATION		
							SHORT-WAVE SOLAR RADIATION [(col/cm ²)/d]	LONG-WAVE RADIATION [(col/cm ²)/d]	
253	21.890	23.090	17.430	26.255	16.292	-0.070	411.8	681.2	
254	17.020	13.800	10.830	19.394	11.092	.224	108.2	649.4	
255	14.310	9.490	8.060	16.303	9.864	.433	147.9	598.3	
256	13.140	9.840	8.130	15.108	9.739	.355	240.9	577.8	
257	10.530	6.200	4.472	12.717	7.318	.464	175.4	586.0	
258	11.600	7.121	4.015	13.654	6.187	.347	416.6	504.0	
259	10.900	9.660	8.720	13.034	10.666	.303	53.2	648.3	
260	11.520	8.950	6.663	13.581	8.343	.284	372.9	532.8	
261	12.970	12.150	7.417	14.941	7.319	.062	391.2	562.7	
262	11.460	6.953	4.817	13.528	7.266	.416	199.1	532.6	
263	10.980	5.536	2.959	13.104	5.936	.439	388.9	504.6	

DAILY AVERAGES AT RAFT STATION									
JULIAN DAY	LAKE-BOTTOM WATER TEMPERATURE (C)	SEDIMENT AT 0.5 METER TEMPERATURE (C)	SEDIMENT AT 1 METER TEMPERATURE (C)	WINDSPEED AT 2 METERS (m/h)	WINDSPEED AT 3 METERS (m/h)	DAILY TOTALS AT LAND STATION			
						SHORT-WAVE SOLAR RADIATION [(col/cm ²)/d]	LONG-WAVE RADIATION [(col/cm ²)/d]		
253	21.860	14.470	12.760	6.974	7.207	411.8	681.2		
254	17.740	14.620	12.740	4.919	7.919	108.2	649.4		
255	14.820	14.760	12.740	2.859	3.087	147.9	598.3		
256	13.450	14.960	12.770	5.779	5.651	240.9	577.8		
257	10.740	14.940	12.780	6.422	9.110	175.4	586.0		
258	10.570	14.730	12.810	4.007	3.534	416.6	504.0		
259	11.080	14.410	12.790	4.751	4.334	53.2	648.3		
260	11.600	14.130	12.760	5.729	6.415	372.9	532.8		
261	12.790	13.870	12.710	5.649	5.521	391.2	562.7		
262	11.640	13.640	12.600	5.268	7.721	199.1	532.6		
263	10.050	14.790	12.520	3.160	2.754	388.9	504.6		

Footnotes to table 1

¹At water surface.

²At 2 meters above water surface.

³Below sediment-water surface.

⁴Above water surface.

⁵Calculated with Koberg's equation.

⁶Calculated by regression equation 1 (see below), which was determined by using data from the water-temperature analog recorder and the thermistor connected to the digital data logger.

⁷Calculated by regression equation 2 (see below), which was determined by using air-temperature data from the hygrothermograph and the dry-bulb sensor connected to the digital data logger.

⁸Calculated by regression equation 3 (see below), which was determined by using humidity data from the hygrothermograph, the psychrometric tables, and the wet-bulb sensor connected to the digital data logger.

⁹Calculated by regression equation 4 (see below) which was determined by using wind-speed data from the totalizing anemometer and the anemometer connected to the digital data logger.

Regression	Data points	r ² value
1. $Y = 1.312 + 1.011x$	20	0.948
2. $Y = 0.527 + 0.945x$	20	0.964
3. $Y = 1.021 + 0.898x$	20	0.970
4. $Y = 0.926 + 0.965x$	20	0.599

Table 2.--Summary of 1982 temperature data at the raft station

[C, degrees Celsius; h, hour; blank, no data]

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE		DAILY AVERAGE LAKE-BOTTOM WATER TEMPERATURE		DAILY AVERAGE SEDIMENT TEMPERATURE AT 0.5 METER		DAILY AVERAGE SEDIMENT TEMPERATURE AT 1 METER		DAILY AVERAGE DRY BULB TEMPERATURE		MAXIMUM DRY BULB TEMPERATURE		TIME OF MAXIMUM DRY BULB TEMPERATURE		MINIMUM DRY BULB TEMPERATURE		TIME OF MINIMUM DRY BULB TEMPERATURE		DAILY AVERAGE WET BULB TEMPERATURE		
	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(C)	(h)	(h)	(C)	(C)	(h)	(h)	(C)	(C)
166	21.010	20.400	8.450	5.204	15.850																11.940
167	20.470	20.560	9.090	5.423	17.350																14.050
168	18.340	18.490	9.470	5.644	12.130																9.800
169	16.750	16.870	9.810	5.859	10.940																7.756
170	16.210	16.320	10.040	6.104	13.500																10.140
171	16.890	16.990	10.170	6.337	13.500																10.480
172	18.350		10.260	6.547	14.640																10.980
173	19.460		10.390	6.735	18.440																13.470
174	21.010		10.570	6.919	20.790																17.120
175	19.940		10.790	7.084	14.540																12.020
176	20.370		11.060	7.254	14.130																9.390
177	20.610		11.300	7.440	17.750																13.640
178	22.290		11.520	7.629	20.330																15.520
179	19.350		11.730	7.779	13.610																11.580
180	17.810		11.970	7.950	12.950																10.380
181	18.310		12.100	8.140	15.230																10.770
182	19.420		12.170	8.320	19.830																15.450
183	22.200		12.260	8.490	22.190																18.450
184	23.640		12.910	8.640	23.110																17.330
185	23.390		12.650	8.780	23.490																18.830
186	23.110		12.930	8.920	21.350																18.190
187	22.300		13.210	9.060	18.390																14.810
188	20.990	20.370	13.450	9.230	17.020																12.730
189	21.870	21.860	13.620	9.400	19.890																16.230
190	20.570	20.560	13.710	9.550	17.000																15.170
191	21.650	21.380	13.810	9.720	18.220																15.540
192	22.530	22.150	13.910	9.880	19.630																15.710
193																					

Table 2.--Summary of 1982 temperature data at the raft station--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (c)		DAILY AVERAGE LAKE-BOTTOM WATER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 0.5 METER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 1 METER TEMPERATURE (c)		DAILY AVERAGE DRY BULB AIR TEMPERATURE (c)		TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)		TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)		DAILY AVERAGE WET BULB AIR TEMPERATURE (c)	
	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE
194																
195																
196																
197																
198																
199	22.310	21.320	15.000	10.820	17.910	24.740	1625	9.960	0454	14.460						
200	23.620	21.390	15.060	10.960	21.370	29.750	1938	14.800	0539	17.800						
201	24.610	22.800	15.100	11.100	23.690	30.720	1320	18.140	0419	19.260						
202	24.350	23.370	15.110	11.190	20.380	25.270	1521	16.030	2359	16.920						
203	22.770	22.860	15.170	11.300	20.500	26.680	1551	12.950	0527	16.480						
204	24.330	22.810	15.300	11.430	24.830	31.430	1716	19.110	0215	20.680						
205	24.980	23.820	15.400	11.520	21.800	25.880	1509	16.820	2350	18.730						
206	24.550	23.510	15.480	11.610	19.660	25.090	1318	15.150	0101	16.580						
207	24.430	22.980	15.600	11.720	19.890	30.190	1305			15.250						
208	23.120	22.580	15.680	11.810	19.090	23.690	1451	14.270	2400	16.580						

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 0.5 METER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 1 METER TEMPERATURE (c)		DAILY AVERAGE DRY BULB AIR TEMPERATURE (c)		TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)		TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)		DAILY AVERAGE WET BULB AIR TEMPERATURE (c)			
	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE	TEMPERATURE			
209	24.090	22.040	15.780	11.930	20.580	28.260	1809	12.950	0429	16.600						
210	21.730	21.720	15.820	12.020	17.310	22.280	1616	11.630	2345	14.420						
211	22.600	20.910	15.850	12.110	19.640	27.560	1733	9.960	0243	14.600						
212	22.800	21.110	15.860	12.210	22.050	29.490	1840	15.940	2337	17.210						
213	23.090	21.690	15.840	12.300	23.450	30.990	1630	16.030	0223	17.760						
214	23.440	22.000	15.890	12.440	24.120	36.790	1335	14.710	2351	19.450						
215	23.150	22.250	15.860	12.450	21.340	28.080	1555	10.930	0519	15.280						
216	22.710	21.610	15.890	12.500	21.790	27.820	1547	14.540	0508	16.690						
217	23.830	21.920	15.930	12.560	22.980	30.460	1608			17.980						
218	23.300	22.010	15.960	12.610	22.930	29.140	1409	17.620	0556	18.430						
219	22.720	22.330	16.000	12.680	20.860	25.360	1339	13.830	2400	16.820						
220	20.000	20.120	16.020	12.720	15.050	19.200	1458	10.140	2358	12.110						
221	18.460	18.250	16.020	12.760	11.990	17.180	1712	6.713	2329	9.800						

Table 2.--Summary of 1982 temperature data at the raft station--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (c)		DAILY AVERAGE LAKE-BOTTOM WATER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 0.5 METER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 1 METER TEMPERATURE (c)		DAILY AVERAGE AIR TEMPERATURE (c)		MAXIMUM DRY BULB AIR TEMPERATURE (c)		TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)		MINIMUM DRY BULB AIR TEMPERATURE (c)		TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)		DAILY AVERAGE WET BULB AIR TEMPERATURE (c)	
	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	SEDIMENT AT 0.5 METER TEMPERATURE (c)	SEDIMENT AT 1 METER TEMPERATURE (c)	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	MAXIMUM DRY BULB AIR TEMPERATURE (c)	MAXIMUM WET BULB AIR TEMPERATURE (c)	MAXIMUM DRY BULB AIR TEMPERATURE (c)	MAXIMUM WET BULB AIR TEMPERATURE (c)	TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)	TIME OF MAXIMUM WET BULB AIR TEMPERATURE (h)	MINIMUM DRY BULB AIR TEMPERATURE (c)	MINIMUM WET BULB AIR TEMPERATURE (c)	TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)	TIME OF MINIMUM WET BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET BULB AIR TEMPERATURE (c)	
222	19.100	17.510	15.980	12.810	13.010	19.810	16.19	4.162	0.351	9.320										
223	17.890	17.980	15.860	12.860	16.920	23.160	16.95	9.260	0.537	12.320										
224	17.560	17.410	15.700	12.890	17.330	22.280	17.23	13.480	0.342	15.560										
225	20.620	18.220	15.590	12.930	22.000	29.140	16.54	13.130	0.236	16.720										
226	20.560	19.600	15.490	12.940	21.820	25.530	18.02	18.230	0.608	19.490										
227	21.730	20.210	15.410	12.940	20.670	26.240	11.20	15.330	2.146	18.590										
228	22.060	20.620	15.380	12.930	21.080	28.790	16.58	16.030	0.458	18.180										
229	23.700	21.170	15.410	12.930	23.690	31.780	16.17	16.210	0.542	19.650										
230	25.590	22.260	15.480	12.950	25.060	32.920	15.43	20.690	0.550	21.170										
231	22.680	22.370	15.540	12.950	19.550	24.650	19.09	11.020	2.337	16.130										
232	22.630	20.560	15.630	12.950	20.150	29.580	18.09	10.230	0.221	14.850										
233	22.320	21.360	15.750	13.000	22.990	31.690	15.32	14.980	0.329	17.650										
234	21.990	20.730	15.770	13.020	18.150	24.120	14.37	12.430	0.541	15.000										
235	20.720	19.930	15.800	13.060	15.410	21.220	14.50	10.580	0.608	12.700										

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (c)		DAILY AVERAGE LAKE-BOTTOM WATER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 0.5 METER TEMPERATURE (c)		DAILY AVERAGE SEDIMENT AT 1 METER TEMPERATURE (c)		DAILY AVERAGE AIR TEMPERATURE (c)		MAXIMUM DRY BULB AIR TEMPERATURE (c)		TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)		MINIMUM DRY BULB AIR TEMPERATURE (c)		TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)		DAILY AVERAGE WET BULB AIR TEMPERATURE (c)	
	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	SEDIMENT AT 0.5 METER TEMPERATURE (c)	SEDIMENT AT 1 METER TEMPERATURE (c)	LAKE-SURFACE WATER TEMPERATURE (c)	LAKE-BOTTOM WATER TEMPERATURE (c)	MAXIMUM DRY BULB AIR TEMPERATURE (c)	MAXIMUM WET BULB AIR TEMPERATURE (c)	MAXIMUM DRY BULB AIR TEMPERATURE (c)	MAXIMUM WET BULB AIR TEMPERATURE (c)	TIME OF MAXIMUM DRY BULB AIR TEMPERATURE (h)	TIME OF MAXIMUM WET BULB AIR TEMPERATURE (h)	MINIMUM DRY BULB AIR TEMPERATURE (c)	MINIMUM WET BULB AIR TEMPERATURE (c)	TIME OF MINIMUM DRY BULB AIR TEMPERATURE (h)	TIME OF MINIMUM WET BULB AIR TEMPERATURE (h)	DAILY AVERAGE WET BULB AIR TEMPERATURE (c)	
236	19.330	19.130	15.830	13.100	14.700	20.960	14.32	8.910	0.527	11.640										
237	18.890	18.520	15.830	13.140	14.700	18.850	12.34	9.700	2.348	11.300										
238	16.530	16.580	15.750	13.150	10.110	15.770	14.28	5.042	2.239	7.674										
239	15.690	14.910	15.650	13.180	9.590	16.820	15.40			5.400										
240	14.030	14.200	15.400	13.200	14.070	21.050	17.10			10.420										
241	16.300	15.580	15.280	13.210	14.430	20.690	15.50	6.273	2.354	11.720										
242	13.710	13.930	15.040	13.180	10.330	12.780	24.00	4.954	0.113	8.830										
243	15.630	13.800	14.890	13.180	16.100	24.390	14.53	11.900	2.241	14.670										
244	15.920	15.930	14.660	13.120	15.380	22.810	14.45	9.700	0.406	12.520										
245	16.220	16.140	14.480	13.060	14.910	21.220	15.34	7.593	0.523	10.760										
246	18.580	16.520	14.390	13.020	16.890	25.970	17.00			12.250										
247	19.410	17.640	14.320	12.960	20.140	29.310	15.19			15.250										
248	16.860	16.480	14.280	12.890	13.120	19.810	15.15			9.440										
249	16.850	16.840	14.280	12.840	13.950	21.840	16.18			10.300										
250	17.790	17.870	14.270	12.810	19.280	27.560	16.53			15.700										
251	20.660	19.730	14.280	12.800	23.840	32.030	16.27	16.650	0.556	17.750										
252	21.410	21.050	14.350	12.780	22.660	28.610	15.55			18.630										

Table 2.--Summary of 1982 temperature data at the raft station--Continued

JULIAN DAY	DAILY AVERAGE LAKE-SURFACE WATER TEMPERATURE (C)		DAILY AVERAGE LAKE-BOTTOM WATER AT 0.5 METER TEMPERATURE (C)		DAILY AVERAGE SEDIMENT AT 1 METER TEMPERATURE (C)		DAILY AVERAGE DRY BULB AIR TEMPERATURE (C)		MAXIMUM DRY BULB AIR TEMPERATURE (C)		TIME OF MAXIMUM DRY BULB AIR (h)		MINIMUM DRY BULB AIR TEMPERATURE (C)		TIME OF MINIMUM DRY BULB AIR (h)		DAILY AVERAGE WET BULB AIR TEMPERATURE (C)	
	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	TEMPERATURE (C)	
253	21.890	21.860	14.470	12.760	23.090	32.740	1644	3.107	17.430									
254	17.020	17.740	14.620	12.740	13.800	20.080	0004	4.015	10.830									
255	14.310	14.820	14.760	12.740	9.490	14.360	1641	4.866	8.060									
256	13.140	13.450	14.960	12.770	9.840			1.523	8.130									
257	10.530	10.740	14.940	12.780	6.200	8.200	1301	0645	4.472									
258	11.600	10.570	14.730	12.810	7.121	14.270	1654	0636	4.015									
259	10.900	11.080	14.410	12.790	9.660	11.990	1347	0005	8.720									
260	11.520	11.600	14.130	12.760	8.950	16.030	1442	2333	6.663									
261	12.970	12.790	13.870	12.710	12.150	22.540	1456	0305	7.417									
262	11.460	11.640	13.640	12.600	6.953	10.840	1546	2400	4.817									
263	10.980	10.050	14.790	12.520	5.536	15.420	1620	0508	2.959									

Table 3.---Summary of 1982 wind-speed data at the raft station--Continued

JULIAN DAY	DAILY WIND SPEED AT 2 METERS (mi/h)			DAILY WIND SPEED AT 3 METERS (mi/h)			DAILY WIND SPEED AT 2 METERS (h)			DAILY WIND SPEED AT 3 METERS (h)		
	AVERAGE	MAXIMUM	TIME OF MINIMUM	AVERAGE	MAXIMUM	TIME OF MINIMUM	AVERAGE	MAXIMUM	TIME OF MINIMUM	AVERAGE	MAXIMUM	TIME OF MINIMUM
194				4.635	15.140	2141	0.600					
195				4.817	19.270	0034	.600					1947
196				5.354	19.530	1411	.600					2154
197				6.761	14.660	0738	.600					2351
198				8.180	23.120	1238	.684					0057
199				8.870	22.640	1545	.600					0555
200				5.651	20.490	0923	.600					0558
201				3.001	10.780	1912	.600					1931
202				3.375	12.740	0906	.600					2400
203				4.318	15.710	1519	.600					1719
204												2400
205												
206												
207												
208												
209				2.479	20.150	2345	0.600					1008
210				7.329	21.620	1116	.600					2400
211				4.409	15.850	1358	.600					1933
212				3.897	12.650	1403	.600					2008
213				5.797	15.650	1658	.600					0010
214				8.700	25.240	1518	.600					2400
215				3.662	11.380	1645	.600					0646
216	3.491	10.100	1542	5.513	16.840	0937	.600					2345
217	5.310	14.240	1024	5.363	14.960	1743	.600					0149
218	6.267	15.590	0231	6.376	19.700	0347	.600					2027
219	8.550	19.390	1511	8.680	24.230	1508	.656					0449
220	9.510	17.270	1407	9.870	22.390	1029	1.222					2057
221	5.040	12.640	1000	5.248	14.630	0902	.600					2359

Table 3.--Summary of 1982 wind-speed data at the raft station--Continued

JULIAN DAY	DAILY WIND SPEED AT 2 METERS				DAILY WIND SPEED AT 3 METERS			
	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	MINIMUM (mi/h)	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	MINIMUM (mi/h)
222	2.639	7.198	2358	0.261	2.853	9.110	1305	0.600
223	7.365	12.860	1509	1.007	10.460	24.740	1346	2.637
224	8.250	12.340	1603	1.007	9.930	22.160	0844	.600
225	3.403	9.100	2320	1.081	3.633	10.560	2251	.600
226	8.090	13.500	1602	1.081	8.450	18.650	1454	.600
227	5.792	13.270	1123	1.641	6.137	19.190	1119	.600
228	6.100	11.970	1114	1.641	6.267	15.980	0822	.854
229	5.507	11.220	1115	.559	5.715	14.260	1056	.600
230	4.700	12.420	0822		4.870	16.950	0822	.600
231	4.370	11.220	0810		4.635	14.240	0850	.600
232	3.133	10.920	0954	.559	3.330	14.090	1013	.600
233	8.080	15.360	1805	.783	9.110	23.660	1006	.600
234	4.764	11.740	1318	.223	4.972	14.410	1317	.600
235	3.120	8.330	0449	.223	3.372	10.360	0445	.600

JULIAN DAY	DAILY WIND SPEED AT 2 METERS				DAILY WIND SPEED AT 3 METERS			
	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	MINIMUM (mi/h)	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	MINIMUM (mi/h)
236	5.354	12.380	1628		5.976	21.030	1541	0.600
237	6.599	11.890	1241		7.450	20.090	1005	.713
238	5.408	11.110	1429		5.692	16.390	1147	.571
239	3.431	10.590	1733		3.660	15.370	1803	.571
240	6.756	11.930	1818		11.490	31.440	1218	2.581
241	4.423	12.080	1458		4.733	14.770	1228	.571
242	6.556	10.630	2259		7.298	22.500	1352	.600
243	3.989	11.820	1705		4.184	25.870	1659	.600
244	5.100	12.450	1328		7.296	27.140	1457	.600
245	5.540	12.380	1604		6.744	23.380	1324	.600
246	2.341	8.870	1222		2.577	10.810	1034	.571
247	6.711	12.860	1734		7.640	19.360	2151	.600
248	6.158	11.110	1456	0.410	7.418	20.860	0134	.600
249	7.063	12.190	1619	.522	7.798	18.620	1253	.600
250	8.570	14.060	1823	.522	11.040	27.570	1530	2.665
251	8.480	15.400	1531	.895	8.990	22.240	1416	.600
252	7.858	14.430	1405	1.081	8.150	18.480	1031	.600

Table 3.--Summary of 1982 wind-speed data at the raft station--Continued

JULIAN DAY	DAILY WIND SPEED AT 2 METERS			DAILY WIND SPEED AT 3 METERS			DAILY WIND SPEED AT 2 METERS			DAILY WIND SPEED AT 3 METERS		
	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)	AVERAGE (mi/h)	MAXIMUM (mi/h)	TIME OF MAXIMUM (h)
253	6.974	15.100	1409	7.207	20.520	1420	7.207	20.520	1420	0.571	0.571	0544
254	4.919	10.180	0001	7.919	28.920	0100	7.919	28.920	0100	.571	.571	2319
255	2.859	8.760	1059	3.087	9.760	0946	3.087	9.760	0946	.571	.571	0456
256	5.779			5.651			5.651					
257	6.422	10.690	1137	9.110	21.960	0801	9.110	21.960	0801	1.449	1.449	2246
258	4.007	10.090	1431	3.534	11.460	0935	3.534	11.460	0935	.571	.571	0514
259	4.751	9.980	2305	4.334	11.690	2256	4.334	11.690	2256	.600	.600	0603
260	5.729	11.850	1612	6.415	20.800	1544	6.415	20.800	1544	.571	.571	2226
261	5.649	13.000	1647	5.521	19.190	1604	5.521	19.190	1604	.571	.571	0539
262	5.268	10.510	0747	7.721	24.200	1509	7.721	24.200	1509	.571	.571	2344
263	3.160	11.140	1204	2.754	13.780	1102	2.754	13.780	1102	.571	.571	2049

Table 4.--Summary of 1982 radiation data at the land station--Continued

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]		DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]		TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]		TIME OF MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)
	SHORT-WAVE SOLAR RADIATION	TOTAL	SHORT-WAVE SOLAR RADIATION	LONG-WAVE ATMOSPHERIC RADIATION							
194	511.0		1.521		1342						
195	464.2		1.388		1355						
196	589.0		1.143		1230						
197	458.6		1.474		1215						
198	612.9		1.221		1227						
199	530.9		1.558		1148						
200	569.1										
201	503.5		1.254		1420						
202	583.7		1.250		1530						
203	413.9		1.534		1238						
204	527.1		1.214		1105	722.5	0.563	0.563	1936	0.443	0037
205	434.3		1.445		1426	688.9	.531	.531	0841	.416	2400
206	363.7		1.461		1312	687.0	.519	.519	1447	.409	2358
207	500.6					438.7					
208	320.8		1.518		1337	702.9	.554	.554	1456	.425	2122

JULIAN DAY	DAILY TOTAL SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]		DAILY MAXIMUM SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]		TIME OF MAXIMUM SHORT-WAVE SOLAR RADIATION (h)	DAILY TOTAL LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	DAILY MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]		TIME OF MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)	DAILY MINIMUM LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	TIME OF MINIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)
	SHORT-WAVE SOLAR RADIATION	TOTAL	SHORT-WAVE SOLAR RADIATION	LONG-WAVE ATMOSPHERIC RADIATION							
209	502.1		1.347		1342	686.8	0.547	0.547	1444	0.438	2253
210	479.0		1.324		1232	628.8	.533	.533	1449	.387	0555
211	563.5		1.230		1213	655.2	.513	.513	2313	.407	0003
212	394.9		0.876		1308	673.8	.500	.500	1238	.436	2327
213	505.9		1.470		1207	697.0	.547	.547	1226	.432	0459
214	482.4		1.216		1235	710.6	.569	.569	1453	.403	2355
215	434.0		1.347		1108	662.8	.543	.543	1456	.390	0420
216	465.8		1.479		1320	688.2	.537	.537	1446	.438	0051
217	534.3		1.134		1033	705.0	.533	.533	1034	.442	0544
218	377.3		1.042		1428	727.2	.561	.561	0216	.449	0731
219	534.9		1.112		1252	671.5	.549	.549	0049	.390	2309
220	484.3		1.603		1307	592.0	.507	.507	1342	.370	2301
221	348.0		1.341		1412	606.3	.495	.495	1618	.344	2356

Table 4.--Summary of 1982 radiation data at the land station--Continued

JULIAN DAY	DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM	
	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]
	TIME OF MAXIMUM SOLAR RADIATION (h)	TIME OF MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)														
222	554.4	1.225	1128	570.8	0.443	0.703	0.344	0.047	0.047	0.047	0.047	0.344	0.047	0.047	0.047	0.047
223	553.6	1.120	1245	595.9	.462	1619	.354	0509	0509	0509	0509	.354	1619	1619	0338	0338
224	194.6	1.231	1414	692.6	.546	1449	.410	0338	0338	0338	0338	.410	1449	1449	0023	0023
225	519.6	1.073	1249	687.3	.504	1925	.430	0023	0023	0023	0023	.430	1925	1925	2343	2343
226	244.9	1.409	1421	728.0	.550	1414	.468	2343	2343	2343	2343	.468	1414	1414	2014	2014
227	308.9	1.259	1117	713.9	.557	1117	.440	2014	2014	2014	2014	.440	1117	1117	0706	0706
228	396.7	1.286	1122	719.6	.561	1544	.455	0706	0706	0706	0706	.455	1544	1544	0543	0543
229	476.6	1.033	1245	724.2	.554	1645	.458	0543	0543	0543	0543	.458	1645	1645	2400	2400
230	472.6	1.024	1239	760.7	.570	1600	.492	2400	2400	2400	2400	.492	1600	1600	2308	2308
231	250.7	1.005	1516	677.6	.530	1317	.390	2308	2308	2308	2308	.390	1317	1317	0019	0019
232	493.7	1.054	1224	647.5	.488	1618	.386	0019	0019	0019	0019	.386	1618	1618	1205	1205
233	426.3	1.259	1215	694.6	.603	1205	.417	1205	1205	1205	1205	.417	1205	1205	0549	0549
234	423.0	1.182	1342	643.6	.520	1546	.390	0549	0549	0549	0549	.390	1546	1546	0358	0358
235	345.5	1.337	1158	647.3	.514	1255	.389	0358	0358	0358	0358	.389	1255	1255		

JULIAN DAY	DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY TOTAL		DAILY MAXIMUM	
	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/d]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]
	TIME OF MAXIMUM SOLAR RADIATION (h)	TIME OF MAXIMUM LONG-WAVE ATMOSPHERIC RADIATION (h)														
236	470.0	1.293	1339	589.2	0.504	1352	0.373	2133	2133	2133	2133	0.373	1352	1352	0059	0059
237	458.8	1.347	1233	627.8	.489	1624	.378	0059	0059	0059	0059	.378	1624	1624	2400	2400
238	364.1	1.267	1409	592.8	.466	1522	.322	2400	2400	2400	2400	.322	1522	1522	0220	0220
239	370.4	1.269	1411	566.3	.478	1720	.306	0220	0220	0220	0220	.306	1720	1720	0116	0116
240	346.1	.954	1309	611.7	.489	1221	.360	0116	0116	0116	0116	.360	1221	1221	2245	2245
241	333.7	1.410	1120	617.1	.502	1357	.364	2245	2245	2245	2245	.364	1357	1357	0636	0636
242	69.9	1.089	1206	658.6	.501	2400	.377	0636	0636	0636	0636	.377	2400	2400	2334	2334
243	247.6	1.281	1158	703.9	.536	0946	.402	2334	2334	2334	2334	.402	0946	0946	2400	2400
244	304.1	1.116	1200	637.7	.491	1549	.374	2400	2400	2400	2400	.374	1549	1549	0517	0517
245	461.9	1.178	1246	577.5	.472	2138	.351	0517	0517	0517	0517	.351	2138	2138	0316	0316
246	421.4	1.161	1319	619.4	.497	2048	.370	0316	0316	0316	0316	.370	2048	2048	0254	0254
247	429.0	1.019	1333	655.3	.521	1458	.399	0254	0254	0254	0254	.399	1458	1458	0640	0640
248	444.0	.975	1237	576.0	.476	0313	.355	0640	0640	0640	0640	.355	0313	0313	0431	0431
249	429.9	.964	1224	583.8	.475	0842	.353	0431	0431	0431	0431	.353	0842	0842	0146	0146
250	384.1	.954	1003	670.7	.527	0933	.393	0146	0146	0146	0146	.393	0933	0933	0609	0609
251	415.7	.931	1223	684.6	.528	1405	.435	0609	0609	0609	0609	.435	1405	1405	2341	2341
252	323.8	.965	1150	694.4	.541	1420	.446	2341	2341	2341	2341	.446	1420	1420		

Table 4.--Summary of 1982 radiation data at the land station--Continued

JULIAN DAY	DAILY TOTAL		DAILY MAXIMUM		DAILY MINIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY MINIMUM		DAILY TOTAL		DAILY MAXIMUM		DAILY MINIMUM	
	SHORT-WAVE RADIATION [(cal/cm ²)/d]	LONG-WAVE RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	SHORT-WAVE SOLAR RADIATION (h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	SHORT-WAVE SOLAR RADIATION (h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION (h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION [(cal/cm ²)/min]	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/d]	SHORT-WAVE SOLAR RADIATION (h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]	SHORT-WAVE SOLAR RADIATION (h)	LONG-WAVE ATMOSPHERIC RADIATION [(cal/cm ²)/min]
253	411.8		0.930	681.2	1221		0.523	681.2	1507		0.417	0.417	0.442					
254	108.2		.534	649.4	1303		.494	649.4	0003		.360	.360	2346					
255	147.9		.686	598.3	1631		.469	598.3	0646		.348	.348	2336					
256	240.9		.840	577.8	1443		.465	577.8	1721		.348	.348	2308					
257	175.4		.997	586.0	1039		.440	586.0	1419		.314	.314	0633					
258	416.6		.940	504.0	1221		.422	504.0	0245		.299	.299	0630					
259	53.3		.271	648.3	0958		.479	648.3	1318		.331	.331	0003					
260	372.9		1.185	532.8	1322		.471	532.8	1349		.338	.338	0503					
261	391.2		.921	562.7	1220		.443	562.7	1939		.350	.350	2400					
262	199.1		.947	532.6	0948		.448	532.6	1557		.299	.299	2349					
263	388.9		.906	504.6	1215		.391	504.6	0725		.299	.299	0012					