

Weather and water quality data summary (1997), University Field Station (Delta Marsh)

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The following is a summary of meteorological and water quality data collected at the Field Station during 1997. The complete data are available as *Microsoft Excel* spreadsheets on Macintosh or PC diskettes. Wind velocity and direction data, pyrhelimeter traces, barometer traces, and hygrothermograph traces are available on request.

Users are advised that the period represented by “daily” values differs between parameters: temperature, precipitation, and anemometer data are collected at 08:00 CST and represent the 24-hour period starting at 08:00 CST on the preceding day. This affects the interpretation of some parameters. For example, the maximum air temperature reported for 1 January ($X^{\circ}\text{C}$) may be the value for 31 December of the previous year if the maximum actually occurred prior to 24:00 or it may be the value for 1 January if the maximum occurred between 00:00 and 08:00. Other daily data, including photosynthetically available radiation and hours of

sunshine, are accurate for the reported calendar day, being cumulative between 00:00 and 24:00 CST. Monthly summary statistics (total, mean, median, minimum and maximum) are calculated for the period starting on the first day of the month, without consideration for the above.

Manual collection of weather data was made possible by instruments provided by the Atmospheric Environment Service of Environment Canada. Daily data were collected by Shirley Dinwoodie, Gordon Goldsborough, Jeff Gowler, Doreen Greening, Mora Gregg, Mike Lavender, Neil Mochnacz, Shane Roersma, and Russ Mead. Hourly data collected by the new automated climate station, starting on 27 November 1997, are not included in these summaries.

Lake water samples were collected by Russ Mead at monthly intervals as part of an ongoing water quality monitoring program of Manitoba Environment. Station WQ666 is approximately 1 km offshore from the UFS.

Table 1. Summary of tables and figures for meteorological and water quality data collected at the University Field Station (Delta Marsh) between January and December, 1997.

Uncorrected daily photosynthetically available radiation ($\text{E}/\text{m}^2/\text{d}$)	Fig. 1
Daily total sunshine	Fig. 2
Daily air temperature ($^{\circ}\text{C}$)	Fig. 3
Daily precipitation (mm)	Fig. 4
Water quality at station WQ666 (Lake Manitoba)	Table 2

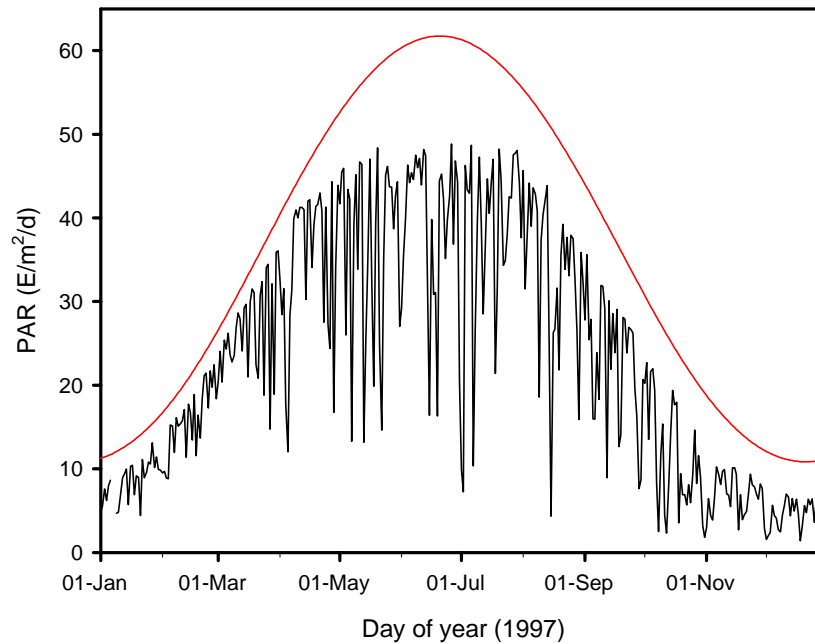


Figure 1. Uncorrected total daily photosynthetically available radiation (PAR - 400 to 700nm; E/m²/d) at the University Field Station (Delta Marsh) in 1997, as reported by PAR sensor Q11490 (installed 16 February 1996 at 8:15 a.m.). The smooth curve represents the maximum daily (cloudless) PAR at the station, as calculated using the SIMSOL computer program (Fee, E. J. 1990. Computer programs for calculating *in situ* phytoplankton photosynthesis. Can. Tech. Rep. Fish. Aquat. Sci. No. 1740, v + 27pp.).

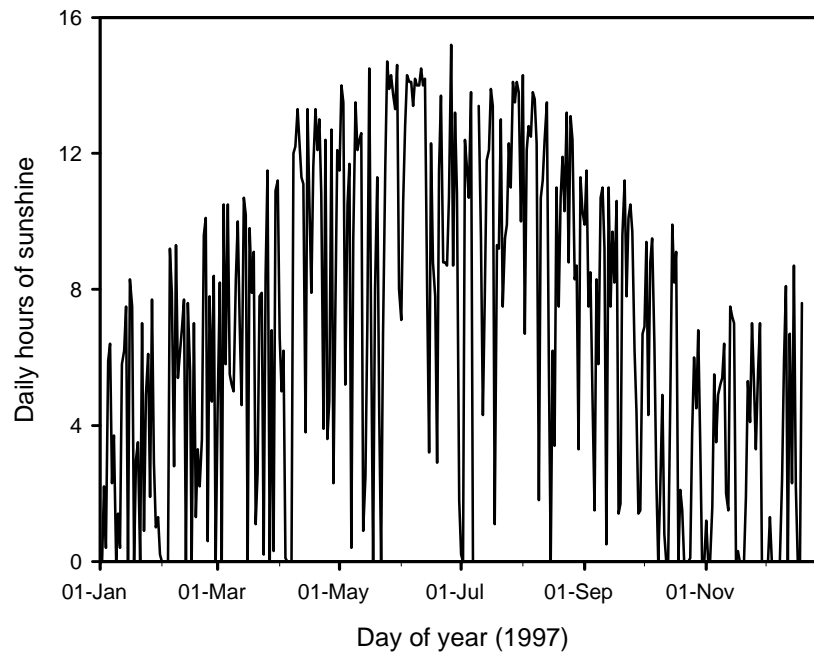


Figure 2. Daily hours of sunshine at the University Field Station (Delta Marsh) in 1997. Data for the last 10 days of the year were not collected. The annual mean was 6.7 hours of sun per day. The range was 0 to 15.2 hours.

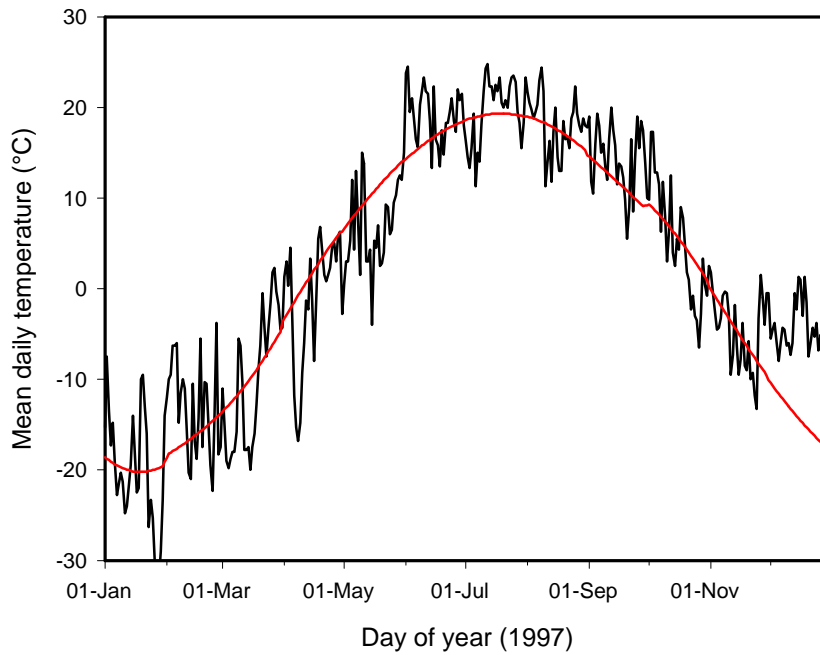


Figure 3. Daily mean air temperature (°C) at the University Field Station (Delta Marsh) in 1997. The smooth curve represents normal daily mean air temperature at the station, as calculated by R.McGinn (pers.comm. 1991). The annual mean daily temperature was +2.5°C. The minimum recorded temperature was -37.5°C and the maximum temperature was 33.0°C.

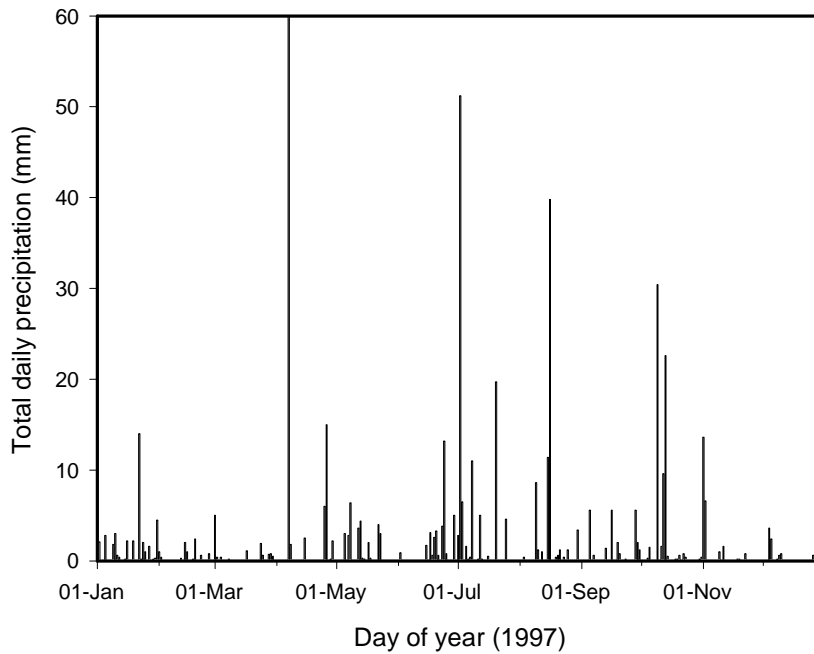


Figure 4. Daily total precipitation (water equivalents in mm) at the University Field Station (Delta Marsh) in 1997. The total annual precipitation was 522 mm, 71% of which fell as rain with the remainder as snow. The maximum amount of precipitation received in a single day was 61 mm (7 April).

Table 2. Water quality at sampling site WQ666 located 1 km offshore from the UFS in Lake Manitoba (1997). Analyses were performed by the Manitoba Department of Environment.

Date	28-Jan	25-Feb	25-Mar	27-Apr	27-May	30-Jun	29-Jul	26-Aug	23-Sep	29-Oct	25-Nov	16-Dec
Time	11:45	9:23	9:26	9:15	15:37	16:38	11:14	9:12			8:50	
Water depth (m)	3.5	3.6	3.6	0.9	3.0	3.4		3.1	2.7	3.0		3.5
Secchi depth (m)	0.5	1.1	1.3	0.8	0.5	0.3		0.5	0.4	0.2		1.3
Coliform - fecal (CFU/100 mL)	<10	<10	<10	<10	<10	<10	10	<10	5	10	<10	<10
Alkalinity - total (mg/L)	257	263	267	38.3	192	205	203	195	202	208	228	231
Alkalinity - bicarb (mg/L)	313	320	325	<40	201	213	199	191	211	247	278	269
Alkalinity - carb (mg/L)	<18	<20	<20	<20	<20	<20	24	23	<20	<20	<20	<20
Alkalinity - hydrox (mg/L)	<10.2	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
pH	8.1	7.92	8.07	9.29	8.49	8.56	8.74	8.73	8.65	8.39	8.28	8.33
Conductivity (μ S/cm)	1830	1860	1910	125	918	1410	1500	1420	1440	1450	1650	1720
Color - true (units)	10	10	10	5	20	15	5	15	<5	20	10	15
Oxygen - dissolved (mg/L)	9	6.9	5.9	13.4	10.5	8.1	8.3	7.5	9.3	12	13	12.2
Solids - dissolved (mg/L)	1100	1100	1100	59	590	840	850	830	830	900	1000	1000
Solids - suspended (mg/L)	<5	<5	<5	<5	12	51	15	19	25	73	16	5
Solids - total (mg/L)	1100	1100	1100	62	600	890	870	850	850	970	1000	1000
Turbidity (NTU)	2.5	2.9	2.8	1.7	13.0	34.0	14.0	16.0	26.0	76.0	17.0	4.4
Ammonia (mg/L)	0.091	0.065	0.021	0.150	<0.02	0.020	<0.02	<0.02	0.090	0.060	0.060	0.050
Chloride - soluble (mg/L)	336		335	12			281			267		
Chlorophyll-a (μ g/L)	<1	<1	<1		4.5	5.0	6.0	6.0	6.0		4.0	3.0
Nitrate+nitrite-N - soluble (mg/L)	0.18	0.34	0.39	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.06	0.08
Phosphorus - total (mg/L)	0.036	0.040	0.038	0.010	0.085	0.093	0.054	0.062	0.076	0.076	0.045	0.032
Phosphorus - total diss (mg/L)	0.029	0.033	0.031	0.002	0.027	0.036	0.015	0.029	0.020	0.017	0.008	0.019
Phosphorus - total part (mg/L)	0.007	0.007	0.007	0.008	0.058	0.057	0.040	0.033	0.056	0.060	0.037	0.013
Sulphate - soluble (mg/L)	238		176	<10			141			136		
Carbon - total (mg/L)	79.8	78.8	81.1	9.4	55.0	58.0	59.0	57.0	60.0	59.0	65.0	70.0
Carbon - inorganic (mg/L)	61.3	62.7	67.1	7.9	44.2	49.0	46.0	45.0	48.0	48.0	53.0	56.0
Carbon - organic (mg/L)	18.5	16.1	14.0	1.5	10.8	9.0	13.0	12.0	12.0	11.0	12.0	14.0
Nitrogen - TKN (mg/L)	0.81	0.99	0.88	0.28	0.81	0.90	1.00	0.80	0.70	0.90	0.90	1.40
Calcium - extractable (mg/L)	50.7		52.6	10.5			38.6			41.6		
Iron - extractable (mg/L)	0.05		0.08	0.02			0.14			0.6		
Magnesium - extractable (mg/L)	60.5		59.7	3.05			52.6			50.1		
Manganese - extractable (mg/L)	0.054		0.079	0.005			0.021			0.045		
Potassium - extractable (mg/L)	18.2		17.1	0.7			15.6			14.7		
Sodium - extractable (mg/L)	228		216	8.37			178			171		
Total anions (meq)	19.6		18.5	1.8			15.2			15.4		
Total cations (meq)	17.9		17.4	1.2			14.4			14.0		
Ion balance error (%)	4.49		3.05	20.30			2.78			4.57		