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CLIMATOLOGICAL MEMORANDUM 98

Percentage frequency of hourly values of
dry-bulb and wet-bulb temperatures
at Tiree 1960 - 74

by

H.J. Baker and Joyce Laing

ORGS UKMO C Duplicate

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CLIMATOLOGICAL MEMORANDUM NO. 98

PERCENTAGE FREQUENCY OF HOURLY VALUES OF DRY-BULB AND WET-BULB TEMPERATURES

AT TIREE 1960-74

BY H J BAKER AND JOYCE LAING

Introduction

Hourly observations of dry-bulb and wet-bulb temperature were made at Tiree, Strathclyde NGR NL 999446 during the 15 years 1960-74. The thermometers were exposed in the standard louvered screen 4 feet (1.25 metres approximately) above short grass. An analysis has been made by computer of these observations to give monthly and annual tables showing the percentage frequency of combinations of dry- and wet-bulb readings in ranges of one degree Celsius. Tables are also given showing the frequency of dry-bulb and wet-bulb temperatures separately.

Explanation of the tables

Tables 1 to 13 contain for each month, and for the year, the distribution of combined dry-bulb and wet-bulb temperature. The ranges of dry-bulb temperature are shown down the left hand side: the ranges of wet-bulb temperature, across the page, are for the sake of brevity given as T (the dry-bulb temperature range for the row) $T-1$ degC, $T-2$ degC etc. Thus if T is 0.1 to 1.0 then $T-1$ is -0.9 to 0.0 and so on.

For any given range of dry-bulb temperature and associated wet-bulb temperature two values are given. The upper figure is the percentage frequency of occurrence within the given range calculated to two places of decimals; the lower figure is the cumulative percentage frequency of occurrence of dry-bulb temperature and associated wet-bulb temperature greater than, or equal to, the lower values in the appropriate range as indicated, calculated to one place of decimals. Entries of 0.0⁺ indicate values of less than .05 per cent but greater than zero.

Example. In Table 1 for January, the percentage frequency of the number of hours with dry-bulb temperature within the range 7.1 to 8.0 deg C and the associated wet-bulb temperature within the range 5.1 to 6.0 deg C (column $T-2$) is 1.78. The cumulative value in this 'box', 30.3, indicates that a dry-bulb temperature of 7.1 deg C or more and an associated wet-bulb temperature of 5.1 deg C or more occurred on 30.3 per cent of the hours. This value is derived from the sum of the upper figures in each box below and to the left of a diagonal through the box concerned to the bottom right of the table, thus:

5.22	8.16	1.78	0.28	0.01
4.03	4.64	0.52	0.04	
2.48	2.15	0.25	0.02	
0.22	0.68	0.04	0.02	
	0.03		0.01	

Slight discrepancies may occur in the last place of decimals due to the rounding off of figures when the percentage frequencies were calculated; the printed cumulative figures are correct rather than those obtained by simple addition of the figures in the table.

Table 14 gives the frequency of dry-bulb temperatures alone and table 15 gives the frequency of wet-bulb temperatures alone. The annual percentage frequencies have been worked from all the data and are not a direct mean of the monthly figures.



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Average of accumulated temperature

Accumulated temperatures are the integrated excess or deficit from a stated base temperature, and are expressed as degree-days or degree-hours. From data given in table 14 the degree-hours can be calculated using the following method.

The average number of degree-hours in any month above a base temperature ($b^{\circ}\text{C}$) is given by the sum of the products obtained by multiplying the entries for that month which refer to temperatures greater than $b^{\circ}\text{C}$ (ie those values lying beneath the entry referring to the range of temperature whose upper limit is b) by $(1/2) \times (N/100)$, $(3/2) \times (N/100)$, $(5/2) \times (N/100)$ etc. respectively, where N is the number of hours in the month. This assumes, in effect, that the entries in the ranges $(b + 0.1)$ to $(b + 1)$, $(b + 1.1)$ to $(b + 2)$ etc. are concentrated at mid-point of the range $(b + 0.5)$, $(b + 1.5)$ etc.

Example. In June (number of hours 720) the average number of degree-hours above 15°C is (from table 14):

$$\begin{aligned} 3.0 \times (1/2) \times (720/100) &= 10.8 \\ 1.9 \times (3/2) \times (720/100) &= 20.5 \\ 1.1 \times (5/2) \times (720/100) &= 19.8 \\ 0.6 \times (7/2) \times (720/100) &= 15.1 \\ 0.3 \times (9/2) \times (720/100) &= 9.7 \\ 0.2 \times (11/2) \times (720/100) &= 7.9 \\ 0.2 \times (13/2) \times (720/100) &= 9.4 \\ 0.1 \times (15/2) \times (720/100) &= 5.4 \end{aligned}$$

98.6

To obtain the number of degree-hours below base $b^{\circ}\text{C}$ the procedure is the same except that the percentages used are those for the temperature ranges below and including the range of temperature which has $b^{\circ}\text{C}$ as its upper limit.

Similar data for other stations in the United Kingdom are published in this series. (See list inside the front cover).

Table 1 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

January

1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-4.9 TO -4.0	0.05 100.0	0.02 100.0							
-3.9 TO -3.0	0.08 99.8	0.10 99.9							
-2.9 TO -2.0	0.09 99.4	0.28 99.7							
-1.9 TO -1.0	0.17 98.4	0.50 99.3	0.04 99.4						
-0.9 TO 0.0	0.20 97.1	0.56 98.3	0.36 98.7						
0.1 TO 1.0	0.39 94.6	0.74 96.9	0.60 97.5	0.03 97.5					
1.1 TO 2.0	0.99 89.6	1.77 94.2	1.28 95.7	0.05 95.8					
2.1 TO 3.0	1.22 82.0	3.24 88.6	2.20 91.4	0.27 91.7					
3.1 TO 4.0	2.48 73.3	4.62 80.8	2.97 84.1	0.60 84.8					
4.1 TO 5.0	2.97 60.6	7.28 70.8	2.66 73.7	0.36 74.1	0.02 74.1				
5.1 TO 6.0	3.37 45.4	8.64 57.6	2.77 60.6	0.22 60.8					
6.1 TO 7.0	4.04 32.5	7.69 42.0	3.31 45.6	0.17 45.8					
7.1 TO 8.0	5.22 19.8	8.16 28.5	1.78 30.3	0.28 30.6	0.01 30.6				
8.1 TO 9.0	4.03 9.7	4.64 14.6	0.52 15.1	0.04 15.1					
9.1 TO 10.0	2.48 3.4	2.15 5.6	0.25 5.9	0.02 5.9					
10.1 TO 11.0	0.22 0.3	0.68 0.9	0.04 1.0	0.02 1.0					
11.1 TO 12.0		0.03 0.0		0.01 0.0					

Table 2 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

February 1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-5.9 TO -5.0	0.01 100.0	0.01 100.0							
-4.9 TO -4.0	0.04 99.9	0.03 100.0							
-3.9 TO -3.0	0.18 99.8	0.11 99.9	0.01 99.9						
-2.9 TO -2.0	0.21 99.1	0.41 99.6	0.03 99.6						
-1.9 TO -1.0	0.37 97.9	0.72 98.9	0.04 99.0						
-0.9 TO 0.0	0.53 95.4	0.99 97.5	0.27 97.8						
0.1 TO 1.0	1.18 90.3	1.82 94.9	1.02 96.0	0.04 96.0					
1.1 TO 2.0	1.47 82.7	2.55 89.1	2.42 91.9	0.09 92.0					
2.1 TO 3.0	1.80 74.3	3.83 81.2	3.10 85.1	0.32 85.5					
3.1 TO 4.0	1.58 63.3	5.38 72.5	2.54 75.6	0.77 76.4	0.02 76.4				
4.1 TO 5.0	1.73 50.7	6.85 61.7	3.25 65.6	0.50 66.1	0.04 66.1				
5.1 TO 6.0	2.36 39.1	6.76 49.0	3.66 53.1	0.61 53.8	0.01 53.8				
6.1 TO 7.0	4.16 27.6	7.04 36.8	2.82 39.8	0.50 40.4	0.01 40.4				
7.1 TO 8.0	4.50 16.4	6.34 23.4	2.07 25.6	0.25 25.8	0.02 25.8				
8.1 TO 9.0	3.81 7.6	4.01 11.9	0.73 12.6	0.05 12.7	0.01 12.7				
9.1 TO 10.0	1.83 2.0	1.67 3.8	0.28 4.0	0.03 4.1					
10.1 TO 11.0	0.06 0.1	0.16 0.2	0.04 0.3						

Table 3 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

March

1960-74

TIME

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-3.9 TO -3.0	0.05 100.0								
-2.9 TO -2.0	0.03 99.8	0.15 99.9							
-1.9 TO -1.0	0.07 99.5	0.22 99.8							
-0.9 TO 0.0	0.29 98.6	0.39 99.4	0.04 99.5						
0.1 TO 1.0	0.61 96.6	0.82 98.3	0.36 98.8						
1.1 TO 2.0	1.07 92.6	1.60 96.0	0.64 96.9	0.05 97.0					
2.1 TO 3.0	1.63 85.7	3.01 91.5	1.30 93.3	0.27 93.6					
3.1 TO 4.0	1.62 75.8	3.88 84.1	2.27 86.9	0.44 87.4	0.02 87.4				
4.1 TO 5.0	2.00 63.6	5.66 74.2	3.36 78.6	0.53 79.1	0.05 79.2				
5.1 TO 6.0	3.02 50.7	6.18 61.6	3.66 66.6	0.82 67.5	0.03 67.6				
6.1 TO 7.0	4.81 37.2	7.58 47.7	3.57 52.4	1.17 53.7	0.15 53.9				
7.1 TO 8.0	4.56 22.1	7.27 32.3	2.58 35.3	1.04 36.4	0.12 36.6	0.01 36.6			
8.1 TO 9.0	4.34 10.4	5.70 17.5	2.58 20.5	0.37 20.9	0.10 21.0				
9.1 TO 10.0	1.81 2.5	3.07 6.1	1.31 7.5	0.41 7.9	0.0 7.9	0.01 7.9			
10.1 TO 11.0	0.06 0.1	0.40 0.7	0.50 1.2	0.09 1.3	0.02 1.3				
11.1 TO 12.0		0.04 0.0	0.14 0.2	0.02 0.2					
12.1 TO 13.0				0.02 0.0					

Table 4 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

April 1960-74

TREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-3.9 TO -3.0	0.0 100.0	0.01 100.0							
-2.9 TO -2.0	0.01 99.9	0.03 100.0							
-1.9 TO -1.0	0.01 99.9	0.02 99.9	0.01 100.0						
-0.9 TO 0.0	0.08 99.6	0.09 99.9	0.04 99.9	0.01 99.9					
0.1 TO 1.0	0.16 98.7	0.39 99.5	0.14 99.7	0.01 99.7					
1.1 TO 2.0	0.47 97.1	0.82 87.6	0.34 99.0						
2.1 TO 3.0	1.08 93.7	1.32 96.6	0.46 97.3	0.08 97.4					
3.1 TO 4.0	1.23 88.4	2.24 92.6	1.09 94.2	0.19 94.4					
4.1 TO 5.0	1.86 80.8	3.37 87.2	1.58 89.2	0.45 89.7					
5.1 TO 6.0	2.15 70.6	4.56 78.9	2.18 81.9	0.37 82.3	0.05 82.4				
6.1 TO 7.0	3.96 58.3	5.57 68.4	2.91 72.2	0.74 73.0	0.05 73.1				
7.1 TO 8.0	5.31 42.6	7.07 54.4	2.86 58.7	0.73 59.6	0.09 59.7				
8.1 TO 9.0	6.87 26.0	6.99 37.3	3.55 42.0	1.32 43.5	0.14 43.6				
9.1 TO 10.0	3.88 10.5	5.44 19.1	3.09 23.4	1.13 24.6	0.12 24.7	0.01 24.7			
10.1 TO 11.0	0.55 1.9	2.44 6.6	2.33 9.8	1.06 11.0	0.06 11.0	0.03 11.1			
11.1 TO 12.0	0.05 0.3	0.52 1.3	1.84 3.6	0.72 4.5	0.14 5.6				
12.1 TO 13.0		0.11 0.3	0.31 0.7	0.25 1.2	0.11 1.3	0.01 1.3			

Table 4 (cont) PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

April

1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
13.1 TO 14.0			0.05 0.2	0.06 0.3	0.13 0.5	0.02 0.5	0.0 0.00	0.1 0.0	0.1 0.0
14.1 TO 15.0				0.03 0.1	0.05 0.2	0.06 0.3	0.0 0.00	0.1 0.0	0.1 0.0
15.1 TO 16.0				0.01 0.0	0.06 0.1	0.05 0.1	0.02 0.1	0.1 0.0	0.1 0.0
16.1 TO 17.0					0.01 0.0	0.01 0.0	0.0 0.0	0.1 0.0	0.1 0.0

Table 5 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

May 1960-74

TIRRE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
0.1 TO 1.0	0.0 100.0	0.04 100.0							
1.1 TO 2.0	0.02 99.8	0.06 100.0	0.01 100.0						
2.1 TO 3.0	0.11 99.4	0.15 99.8	0.06 99.9						
3.1 TO 4.0	0.26 98.6	0.42 99.3	0.17 99.6						
4.1 TO 5.0	0.47 96.7	0.67 98.3	0.30 98.6	0.06 98.7					
5.1 TO 6.0	0.79 93.3	1.42 96.2	0.51 97.2	0.03 97.2					
6.1 TO 7.0	1.59 88.0	2.11 92.5	0.96 94.0	0.36 94.4	0.01 94.4				
7.1 TO 8.0	3.75 78.6	4.46 86.5	1.47 88.8	0.51 89.4	0.04 89.4				
8.1 TO 9.0	5.47 62.7	7.78 74.8	2.34 78.2	0.76 79.1	0.10 79.2				
9.1 TO 10.0	7.64 43.5	8.85 57.3	3.11 61.6	0.93 62.6	0.10 62.7				
10.1 TO 11.0	3.61 21.7	8.53 35.8	3.74 40.8	1.09 42.0	0.12 42.1				
11.1 TO 12.0	1.18 8.7	5.73 18.0	4.36 23.7	1.09 24.9	0.13 25.0				
12.1 TO 13.0	0.21 2.9	2.30 7.5	2.96 11.1	1.17 12.4	0.10 12.5				
13.1 TO 14.0	0.04 0.9	0.51 2.7	1.41 5.0	0.53 5.7	0.09 5.8				
14.1 TO 15.0	0.03 0.3	0.12 0.9	0.73 2.1	0.73 3.0	0.13 3.2	0.03 3.2			
15.1 TO 16.0		0.03 0.3	0.14 0.8	0.27 1.3	0.13 1.4	0.03 1.5			
16.1 TO 17.0			0.05 0.2	0.23 0.6	0.16 0.8	0.03 0.9			

Table 5 (Cont) PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

May 1960-74

TREK

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
17.1 TO 18.0			0.04 0.0	0.07 0.2	0.11 0.3	0.06 0.4	0.01 0.4		
18.1 TO 19.0					0.02 0.1	0.02 0.1	0.01 0.1		
19.1 TO 20.0					0.01 0.0	0.04 0.0			

Table 6 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES.

June 1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)

T T-1 T-2 T-3 T-4 T-5 T-6 T-7 T-8

4.1 TO 5.0	0.02 99.9	0.06 100.0						
5.1 TO 6.0	0.13 99.7	0.07 99.9	0.04 99.9					
6.1 TO 7.0	0.32 99.1	0.35 99.6	0.07 99.7	0.01 99.7				
7.1 TO 8.0	0.68 97.0	1.06 98.7	0.10 98.9	0.01 98.9				
8.1 TO 9.0	1.27 92.9	1.95 96.4	0.48 97.0	0.06 97.1				
9.1 TO 10.0	3.00 83.9	4.73 91.6	0.99 93.1	0.13 93.3	0.01 93.3			
10.1 TO 11.0	5.78 68.0	7.11 80.9	2.03 83.9	0.44 84.4	0.02 84.4			
11.1 TO 12.0	8.19 46.9	9.01 62.2	4.07 68.0	0.91 69.0	0.07 69.1			
12.1 TO 13.0	4.92 24.5	8.42 38.7	4.58 45.0	1.56 46.7	0.09 46.8			
13.1 TO 14.0	1.66 10.4	5.21 19.6	4.18 25.4	1.45 27.1	0.18 27.2			
14.1 TO 15.0	0.11 3.7	2.39 8.7	3.06 12.7	1.44 14.3	0.19 14.6	0.01 14.6		
15.1 TO 16.0	0.01 1.6	0.44 3.6	1.63 6.2	0.77 7.2	0.12 7.3	0.04 7.4		
16.1 TO 17.0	0.0 0.8	0.06 1.6	0.88 3.1	0.78 4.1	0.17 4.3	0.03 4.4		
17.1 TO 18.0	0.0 0.4	0.03 0.8	0.31 1.5	0.48 2.2	0.22 2.4	0.03 2.4		
18.1 TO 19.0	0.0 0.1	0.01 0.4	0.19 0.8	0.31 1.2	0.09 1.4	0.03 1.4		
19.1 TO 20.0		0.0 0.1	0.10 0.4	0.09 0.6	0.08 0.7	0.05 0.7		
20.1 TO 21.0			0.01 0.1	0.06 0.3	0.08 0.4	0.03 0.4	0.01 0.4	
21.1 TO 22.0				0.07 0.1	0.06 0.2	0.01 0.2	0.02 0.2	
22.1 TO 23.0				0.01 0.0	0.04 0.0	0.03 0.1		

Table 7 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

July 1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
6.1 TO 7.0	0.04 100.0	0.01 100.0							
7.1 TO 8.0	0.18 99.7	0.16 100.0							
8.1 TO 9.0	0.47 98.2	0.94 99.6	0.04 99.6						
9.1 TO 10.0	1.37 93.8	2.20 97.7	0.32 98.1	0.02 98.2					
10.1 TO 11.0	2.77 83.7	5.14 92.4	1.43 94.1	0.08 94.2					
11.1 TO 12.0	4.75 68.1	7.12 80.9	2.78 84.5	0.30 84.8	0.01 84.8				
12.1 TO 13.0	9.32 46.7	9.62 63.4	4.08 69.1	0.76 69.8	0.02 69.9				
13.1 TO 14.0	6.90 22.8	8.99 37.4	5.33 44.4	1.52 46.1	0.02 46.1				
14.1 TO 15.0	2.20 7.0	5.47 15.9	4.46 21.5	1.69 23.2	0.11 23.3				
15.1 TO 16.0	0.17 1.4	1.71 4.8	2.57 8.2	0.98 9.3	0.04 9.4				
16.1 TO 17.0	0.02 0.3	0.44 1.2	1.18 2.9	0.77 3.8	0.11 3.9				
17.1 TO 18.0	0.0 0.1	0.05 0.3	0.35 0.8	0.32 1.2	0.10 1.4	0.01 1.4			
18.1 TO 19.0		0.02 0.1	0.13 0.2	0.13 0.4	0.11 0.5	0.03 0.6			
19.1 TO 20.0			0.02 0.0	0.02 0.1	0.04 0.1	0.02 0.1	0.02 0.1		
20.1 TO 21.0				0.01 0.0	0.01 0.0				
21.1 TO 22.0						0.01 0.0			
22.1 TO 23.0					0.01 0.0				

Table 8 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

August 1960-74

TIRRE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
5.1 TO 6.0	0.01 100.0	0.01 100.0							
6.1 TO 7.0	0.14 99.9	0.08 100.0							
7.1 TO 8.0	0.30 99.4	0.30 99.7	0.01 99.8						
8.1 TO 9.0	0.69 98.0	0.83 99.1	0.04 99.1						
9.1 TO 10.0	1.27 94.9	1.36 97.3	0.22 97.6						
10.1 TO 11.0	2.05 87.3	3.02 93.6	0.84 94.7	0.03 94.7					
11.1 TO 12.0	4.74 72.9	6.91 85.2	2.47 88.5	0.25 88.8	0.01 88.8				
12.1 TO 13.0	6.49 51.4	9.90 68.2	3.44 73.6	0.69 74.4	0.02 74.4				
13.1 TO 14.0	7.37 30.8	8.52 44.9	4.92 51.8	1.77 53.8	0.12 53.9				
14.1 TO 15.0	3.84 13.0	6.69 23.5	4.55 29.0	1.83 31.0	0.21 31.2				
15.1 TO 16.0	0.50 3.5	3.31 9.2	2.92 12.9	0.92 14.0	0.12 14.1				
16.1 TO 17.0	0.05 0.8	1.16 3.0	1.72 5.4	0.71 6.2	0.09 6.3				
17.1 TO 18.0	0.0 0.2	0.29 0.8	0.62 1.8	0.63 2.5	0.10 2.6				
18.1 TO 19.0		0.0 0.2	0.18 0.5	0.30 0.9	0.08 0.9				
19.1 TO 20.0			0.13 0.2	0.04 0.3	0.06 0.4				
20.1 TO 21.0			0.01 0.0	0.08 0.1	0.02 0.1	0.02 0.1			
21.1 TO 22.0				0.02 0.0					

Table 9 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

September 1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)

T T-1 T-2 T-3 T-4 T-5 T-6 T-7 T-8

2.1 TO 3.0	0.01 100.0								
3.1 TO 4.0	0.02 100.0								
4.1 TO 5.0	0.05 99.8	0.12 100.0							
5.1 TO 6.0	0.06 99.5	0.24 99.8	0.01 99.8						
6.1 TO 7.0	0.37 98.7	0.36 99.4	0.04 99.5						
7.1 TO 8.0	0.74 96.2	1.09 98.3	0.26 98.7	0.01 98.7					
8.1 TO 9.0	1.03 91.1	2.02 95.4	0.75 96.5	0.08 96.6	0.04 96.6				
9.1 TO 10.0	1.60 83.1	3.49 90.0	1.67 92.4	0.29 92.7					
10.1 TO 11.0	2.64 71.0	5.07 81.5	2.41 84.9	0.61 85.6	0.02 85.7				
11.1 TO 12.0	3.87 54.0	8.46 68.4	3.92 73.8	0.90 74.8	0.08 74.9				
12.1 TO 13.0	5.55 36.2	9.11 50.2	4.35 56.0	1.41 57.6	0.10 57.7				
13.1 TO 14.0	6.19 18.2	9.14 30.6	3.92 35.5	1.39 37.0	0.15 37.2				
14.1 TO 15.0	2.41 5.3	5.02 12.0	2.69 15.3	0.92 16.2	0.12 16.4				
15.1 TO 16.0	0.33 0.8	1.52 2.9	1.49 4.6	0.51 5.2	0.06 5.2				
16.1 TO 17.0	0.0 0.1	0.24 0.4	0.54 1.1	0.20 1.3	0.04 1.3				
17.1 TO 18.0		0.02 0.1	0.10 0.2	0.08 0.3	0.01 0.3				
18.1 TO 19.0			0.40 0.1	0.02 0.1					
19.1 TO 20.0				0.02 0.0	0.01 0.0				

Table 10 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

October 1960-74

TIRRE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
0.1 TO 1.0	0.01 100.0	0.01 100.0					10.0 0.001	0.2 0.001	0.1 TO 1.5
1.1 TO 2.0	0.01 99.9	0.04 100.0					50.0 0.001	0.4 0.001	0.4 TO 1.2
2.1 TO 3.0	0.05 99.7	0.16 99.9					20.0 0.001	0.2 0.001	0.2 TO 1.4
3.1 TO 4.0	0.10 98.9	0.22 99.6	0.10 99.7				30.0 0.001	0.3 0.001	0.3 TO 1.2
4.1 TO 5.0	0.13 97.2	0.68 98.8	0.34 99.3	0.01 99.3			40.0 0.001	0.5 0.001	0.5 TO 1.3
5.1 TO 6.0	0.31 94.7	1.09 97.1	0.62 97.9	0.19 98.1			50.0 0.001	0.8 0.001	0.8 TO 1.5
6.1 TO 7.0	0.92 90.2	1.83 94.4	0.93 95.7	0.25 95.9			60.0 0.001	0.9 0.001	0.9 TO 1.8
7.1 TO 8.0	1.04 82.2	3.28 89.3	1.56 91.6	0.32 92.0	0.01 92.0		70.0 0.001	0.01 0.001	0.01 TO 1.9
8.1 TO 9.0	1.75 70.4	5.10 81.2	2.92 85.0	0.73 85.8	0.03 85.8		80.0 0.001	0.03 0.001	0.03 TO 1.01
9.1 TO 10.0	2.57 57.9	5.68 68.7	4.67 74.4	0.82 75.2	0.05 75.2		90.0 0.001	0.05 0.001	0.05 TO 1.11
10.1 TO 11.0	3.55 45.0	6.15 55.3	4.04 60.4	0.99 61.4	0.02 61.5		100.0 0.001	0.02 0.001	0.02 TO 1.21
11.1 TO 12.0	5.63 31.6	7.38 41.5	3.64 45.6	1.06 46.7	0.03 46.7		110.0 0.001	0.03 0.001	0.03 TO 1.31
12.1 TO 13.0	5.74 16.0	8.40 26.0	2.20 28.4	0.47 28.9	0.03 29.0		120.0 0.001	0.03 0.001	0.03 TO 1.41
13.1 TO 14.0	2.78 5.3	4.49 10.2	1.44 11.8	0.26 12.1	0.02 12.1		130.0 0.001	0.02 0.001	0.02 TO 1.51
14.1 TO 15.0	0.76 1.1	1.21 2.5	0.47 3.0	0.13 3.1	0.02 3.1		140.0 0.001	0.02 0.001	0.02 TO 1.61
15.1 TO 16.0	0.05 0.1	0.22 0.3	0.15 0.5	0.02 0.5	0.03 0.5		150.0 0.001	0.03 0.001	0.03 TO 1.71
16.1 TO 17.0			0.02 0.0	0.02 0.1			160.0 0.001	0.02 0.001	0.02 TO 1.81
17.1 TO 18.0			0.01 0.0		0.02 0.0		170.0 0.001	0.01 0.001	0.01 TO 1.91
18.1 TO 19.0						0.01 0.0			

Table 11 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

November 1960-74

THREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)

	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-1.9 TO -1.0	0.02 100.0								
-0.9 TO 0.0	0.14 99.9	0.04 100.0							
0.1 TO 1.0	0.34 99.3	0.40 99.8	0.03 99.8						
1.1 TO 2.0	0.66 96.7	1.19 98.9	0.07 99.0						
2.1 TO 3.0	0.70 91.6	2.49 95.9	0.91 97.1	0.02 97.1					
3.1 TO 4.0	0.96 84.3	2.93 90.9	1.39 92.7	0.23 93.0					
4.1 TO 5.0	1.10 74.3	4.12 83.3	2.75 87.0	0.45 87.4	0.05 87.5				
5.1 TO 6.0	1.40 62.9	4.66 73.2	3.89 78.1	0.87 79.0	0.02 79.0				
6.1 TO 7.0	1.87 50.5	6.71 61.5	4.91 67.2	0.94 68.2	0.03 68.2				
7.1 TO 8.0	2.58 37.9	6.65 48.6	3.83 52.9	0.74 53.7	0.04 53.7				
8.1 TO 9.0	3.13 25.9	6.48 35.3	3.68 39.4	0.52 39.9					
9.1 TO 10.0	3.77 16.3	5.50 22.7	2.73 25.7	0.39 26.1					
10.1 TO 11.0	4.03 9.0	3.09 12.5	0.92 13.5	0.19 13.7	0.02 13.7				
11.1 TO 12.0	1.64 3.0	1.95 5.0	0.38 5.4	0.05 5.4					
12.1 TO 13.0	0.42 0.8	0.51 1.3	0.09 1.4	0.01 1.4					
13.1 TO 14.0	0.13 0.1	0.22 0.4							
14.1 TO 15.0		0.01 0.0	0.03 0.0						

Table 12 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES .

December 1960-74

195-TREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-6.9 TO -6.0	0.01 100.0						50.0 0.007	0.1- OF 0.1-	
-5.9 TO -5.0	0.01 100.0	0.01 100.0				40.0 0.007	47.0 0.00	0.0 OF 0.0-	
-4.9 TO -4.0	0.02 99.9	0.04 100.0				30.0 8.00	42.0 8.00	0.1 OF 1.0	
-3.9 TO -3.0	0.04 99.8	0.12 99.9				20.0 0.00	33.0 0.00	0.5 OF 1.5	
-2.9 TO -2.0	0.03 99.5	0.13 99.7	0.03 99.8			10.0 0.00	24.5 0.00	0.2 OF 1.5	
-1.9 TO -1.0	0.17 99.1	0.28 99.5	0.08 99.6			0.0 0.00	22.0 0.00	0.4 OF 1.2	
-0.9 TO 0.0	0.29 98.0	0.64 98.9	0.11 99.1	0.01 99.1		0.0 0.00	0.0 0.00	0.2 OF 1.2	
0.1 TO 1.0	0.51 95.5	1.15 97.7	0.26 98.0	0.01 98.0		0.0 0.00	0.0 0.00	0.3 OF 1.0	
1.1 TO 2.0	0.87 91.4	1.71 95.0	0.89 96.1	0.04 96.1		0.0 0.00	0.0 0.00	0.5 OF 1.0	
2.1 TO 3.0	1.42 85.1	2.78 90.5	1.49 92.4	0.18 92.6		0.0 0.00	0.0 0.00	0.8 OF 1.0	
3.1 TO 4.0	1.35 76.5	3.82 83.7	2.21 86.3	0.38 86.7		0.0 0.00	0.0 0.00	0.8 OF 1.8	
4.1 TO 5.0	2.06 64.4	6.10 75.2	2.82 78.5	0.41 79.0		0.0 0.00	0.0 0.00	0.0 OF 1.0	
5.1 TO 6.0	1.88 50.5	7.17 62.4	4.18 67.0	0.55 67.6	0.01 67.6			0.1 OF 1.0	
6.1 TO 7.0	2.37 38.6	6.99 48.6	4.36 53.3	0.43 53.8	0.02 53.8			0.2 OF 1.2	
7.1 TO 8.0	3.24 29.1	5.75 36.2	2.84 39.3	0.31 39.6				0.1 OF 1.0	
8.1 TO 9.0	4.41 20.2	4.97 25.8	1.33 27.2	0.22 27.4	0.03 27.5			0.1 OF 1.0	
9.1 TO 10.0	5.10 11.3	4.10 15.8	0.68 16.5	0.04 16.5				0.2 OF 1.0	
10.1 TO 11.0	2.76 3.3	2.81 6.2	0.39 6.6						

Table 12 (cont) PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

December 1960-74

TREE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB		WET-BULB								
T (DEG C)		T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
11.1 TO 12.0	0.08 0.1	0.35 0.5	0.11 0.6	0.01 0.6						
12.1 TO 13.0		0.06 0.1	0.0 0.1	0.01 0.1						

Table 13 PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

Annual 1960-74

TIRRE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)

	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
-6.9 TO -6.0	0.00+ 100.0								
-5.9 TO -5.0	0.00+ 100.0	0.00+ 100.0							
-4.9 TO -4.0	0.01 100.0	0.01 100.0							
-3.9 TO -3.0	0.03 99.9	0.03 100.0	0.00+ 100.0						
-2.9 TO -2.0	0.03 99.8	0.08 99.9	0.00+ 99.9						
-1.9 TO -1.0	0.07 99.6	0.14 99.8	0.01 99.8						
-0.9 TO 0.0	0.13 99.1	0.23 99.5	0.07 99.6	0.00+ 99.6					
0.1 TO 1.0	0.27 97.9	0.45 98.9	0.20 99.1	0.01 99.2					
1.1 TO 2.0	0.46 95.8	0.81 97.6	0.47 98.2	0.02 98.2					
2.1 TO 3.0	0.67 92.6	1.42 95.3	0.79 96.4	0.10 96.5					
3.1 TO 4.0	0.80 88.3	1.96 92.0	1.06 93.3	0.22 93.5	0.00+ 93.5				
4.1 TO 5.0	1.03 82.3	2.91 87.5	1.42 89.2	0.23 89.4	0.01 89.5				
5.1 TO 6.0	1.29 75.5	3.40 81.3	1.79 83.5	0.30 83.8	0.01 83.8				
6.1 TO 7.0	2.05 68.4	3.87 74.2	1.99 76.6	0.38 77.0	0.02 77.0				
7.1 TO 8.0	2.68 60.1	4.30 66.3	1.61 68.3	0.35 68.7	0.03 68.7	0.00+ 68.7			
8.1 TO 9.0	3.11 51.1	4.28 57.4	1.58 59.4	0.35 59.7	0.04 59.8				
9.1 TO 10.0	3.03 41.9	4.02 48.0	1.61 50.0	0.35 50.4	0.02 50.4	0.00+ 50.4			

Table 13 (cont) PERCENTAGE FREQUENCIES OF DRY-BULB AND ASSOCIATED WET-BULB TEMPERATURES

Annual

1960-74

TIERE

ASSOCIATED WET-BULB TEMPERATURE (DEG C)

DRY-BULB

T (DEG C)	T	T-1	T-2	T-3	T-4	T-5	T-6	T-7	T-8
10.1 TO 11.0	2.34 32.6	3.72 38.9	1.56 40.9	0.38 41.4	0.02 41.4	0.00+ 41.4			
11.1 TO 12.0	2.51 23.8	3.96 30.3	1.98 32.8	0.44 33.3	0.04 33.4				
12.1 TO 13.0	2.72 14.9	4.04 21.3	1.83 23.8	0.53 24.4	0.04 24.4	0.00+ 24.4			
13.1 TO 14.0	2.09 7.4	3.09 12.1	1.77 14.5	0.58 15.2	0.06 15.3	0.00+ 15.3			
14.1 TO 15.0	0.78 2.5	1.74 5.3	1.33 7.0	0.56 7.6	0.07 7.7	0.01 7.7			
15.1 TO 16.0	0.09 0.6	0.60 1.8	0.74 2.8	0.29 3.1	0.05 3.2	0.01 3.2	0.00+ 3.2		
16.1 TO 17.0	0.01 0.2	0.16 0.5	0.37 1.1	0.23 1.3	0.05 1.4	0.01 1.4	0.0 1.4		
17.1 TO 18.0	0.0 0.1	0.03 0.2	0.12 0.4	0.13 0.5	0.05 0.6	0.01 0.6	0.00+ 0.6		
18.1 TO 19.0		0.00+ 0.1	0.04 0.1	0.06 0.2	0.02 0.2	0.01 0.3	0.00+ 0.3		
19.1 TO 20.0			0.02 0.1	0.01 0.1	0.02 0.1	0.01 0.1	0.00+ 0.1		
20.1 TO 21.0			0.00+ 0.0	0.01 0.0	0.01 0.0	0.00+ 0.0	0.00+ 0.1		
21.1 TO 22.0				0.01 0.0	0.01 0.0	0.00+ 0.0	0.00+ 0.0		
22.1 TO 23.0				0.00+ 0.0	0.00+ 0.0	0.00+ 0.0			

Table 14

PERCENTAGE FREQUENCY OF HOURLY DRY-BULB TEMPERATURES

TIREE

1960-74

DRY BULB TEMPERATURE (0.10)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
-69 TO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0+	0.0+
-59 TO	0.0	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0+	0.0+
-49 TO	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0+
-39 TO	0.2	0.3	0.1	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
-29 TO	0.4	0.6	0.2	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1
-19 TO	0.7	1.1	0.3	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0+	0.5	0.2
-9 TO	1.1	1.8	0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.0	0.4
1 TO	1.8	4.1	1.8	0.7	0.0+	0.0	0.0	0.0	0.0	0.0+	0.8	1.9	0.9
11 TO	4.1	6.5	3.4	1.6	0.1	0.0	0.0	0.0	0.0	0.1	1.9	3.5	1.7
21 TO	6.9	9.1	6.2	3.0	0.3	0.0	0.0	0.0	0.0+	0.2	4.1	5.9	2.9
31 TO	10.7	10.3	8.2	4.7	0.9	0.0	0.0	0.0	0.0+	0.4	5.5	7.8	4.0
41 TO	13.3	12.4	11.6	7.3	1.5	0.1	0.0	0.0	0.2	1.2	8.5	11.4	5.6
51 TO	15.0	13.4	13.7	9.3	2.7	0.2	0.0	0.0+	0.3	2.2	10.8	13.8	6.8
61 TO	15.2	14.5	17.3	13.4	5.0	0.8	0.0+	0.2	0.8	3.9	14.5	14.2	8.3
71 TO	15.5	13.2	15.6	16.1	10.2	1.8	0.3	0.6	2.1	6.2	13.8	12.2	8.9
81 TO	9.2	8.6	13.1	18.9	16.5	3.8	1.5	1.6	3.9	10.5	13.8	10.9	9.4
91 TO	4.9	3.8	6.6	13.7	20.6	8.9	3.9	2.8	7.0	13.8	12.4	9.9	9.1
101 TO	1.0	0.3	1.1	6.5	17.1	15.4	9.4	5.9	10.7	14.8	8.2	6.0	8.1
111 TO	0.0+	0.0	0.2	3.3	12.5	22.3	14.9	14.4	17.2	17.7	4.0	0.5	9.0
121 TO	0.0	0.0	0.0+	0.8	6.7	19.6	23.8	20.5	20.5	16.8	1.0	0.1	9.2
131 TO	0.0	0.0	0.0	0.3	2.6	12.7	22.8	22.7	20.8	9.0	0.4	0.0	7.6
141 TO	0.0	0.0	0.0	0.1	1.8	7.2	13.9	17.1	11.1	2.6	0.0+	0.0	4.5
151 TO	0.0	0.0	0.0	0.1	0.6	3.0	5.5	7.8	3.9	0.5	0.0	0.0	1.8
161 TO	0.0	0.0	0.0	0.0+	0.5	1.9	2.5	3.7	1.0	0.0+	0.0	0.0	0.8
171 TO	0.0	0.0	0.0	0.0	0.3	1.1	0.8	1.6	0.2	0.0+	0.0	0.0	0.3
181 TO	0.0	0.0	0.0	0.0	0.0+	0.6	0.4	0.6	0.1	0.0+	0.0	0.0	0.1
191 TO	0.0	0.0	0.0	0.0	0.0+	0.3	0.1	0.2	0.0+	0.0	0.0	0.0	0.1
201 TO	0.0	0.0	0.0	0.0	0.0	0.2	0.0+	0.1	0.0	0.0	0.0	0.0	0.0+
211 TO	0.0	0.0	0.0	0.0	0.0	0.2	0.0+	0.0+	0.0	0.0	0.0	0.0	0.0+
221 TO	0.0	0.0	0.0	0.0	0.0	0.1	0.0+	0.0	0.0	0.0	0.0	0.0	0.0+

0+ less than 0.05 percent

Table 15

PERCENTAGE FREQUENCY OF HOURLY WET-BULB TEMPERATURES

TIREE

1960-74

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Year

WET BULB TEMPERATURE (0.1C)

-69 TO	0.0	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0+	0.0+	0.0+
-59 TO	0.0+	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0+	0.0+	0.0+
-49 TO	0.2	0.2	0.0	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0+
-39 TO	0.4	0.6	0.2	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1
-29 TO	1.0	1.2	0.9	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2
-19 TO	1.4	2.5	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.5
-9 TO	2.5	5.1	0.9	0.9	0.0+	0.0	0.0	0.0	0.0	0.0	0.0	2.5	1.1
1 TO	5.0	7.6	4.0	1.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	4.1	2.1
11 TO	7.6	8.4	6.9	3.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	6.3	3.2
21 TO	8.7	11.0	9.8	5.3	0.9	0.0	0.0	0.0	0.0	0.0	0.0	8.6	4.3
31 TO	12.7	12.6	12.2	7.6	1.8	0.1	0.0	0.0	0.0	0.0	0.0	12.1	5.9
41 TO	15.2	11.6	12.9	10.2	3.5	0.2	0.0	0.0	0.0	0.0	0.0	13.9	6.8
51 TO	12.9	11.5	13.5	12.2	5.2	0.7	0.0+	0.0	0.0	0.0	0.0	11.9	7.1
61 TO	12.7	11.3	15.1	15.8	9.4	2.0	0.3	0.0	0.0	0.0	0.0	9.5	8.3
71 TO	10.1	8.8	11.7	16.6	15.9	4.1	1.5	0.0	0.0	0.0	0.0	8.9	9.0
81 TO	6.2	5.5	7.9	15.5	19.3	9.0	4.4	0.0	0.0	0.0	0.0	8.9	9.2
91 TO	3.2	2.0	2.4	8.6	21.8	15.9	10.1	0.0	0.0	0.0	0.0	8.0	9.4
101 TO	0.3	0.1	0.1	1.5	13.0	21.1	15.6	0.0	0.0	0.0	0.0	3.1	8.8
111 TO	0.0	0.0	0.0	0.3	5.8	22.4	21.4	0.0	0.0	0.0	0.0	0.1	9.0
121 TO	0.0	0.0	0.0	0.0+	1.9	14.1	23.9	0.0	0.0	0.0	0.0	0.0	7.5
131 TO	0.0	0.0	0.0	0.0	0.7	6.7	15.9	0.0	0.0	0.0	0.0	0.0	4.9
141 TO	0.0	0.0	0.0	0.0	0.2	2.1	5.5	0.0	0.0	0.0	0.0	0.0	1.9
151 TO	0.0	0.0	0.0	0.0	0.0+	0.8	1.1	0.0	0.0	0.0	0.0	0.0	0.5
161 TO	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.1
171 TO	0.0	0.0	0.0	0.0	0.0	0.3	0.0+	0.0	0.0	0.0	0.0	0.0	0.0+
181 TO	0.0	0.0	0.0	0.0	0.0	0.1	0.0+	0.0	0.0	0.0	0.0	0.0	0.0+
191 TO	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0+

0+ = less than 0.05 percent.

