

# WOKINGHAM

# METEOROLOGICAL

# DATA

## Wokingham Climatological Station, Emmbrook, Berkshire.

Lat/Long 51°25'N 00°51'W NGR (SU)798701 Altitude 46m ASL.

### Monthly Means and Totals

### NOVEMBER 2016

		Anomaly	Rank in the past 135 years					
Temperature (°C)								
Mean maximum	9.8	-1.1	46 <sup>th</sup> lowest					
Mean minimum	2.3	-1.8	28 <sup>th</sup> lowest					
Daily mean	6.1	-1.4	24 <sup>th</sup> lowest					
Highest maximum	15.8	on 15 <sup>th</sup>	Lowest maximum	5.0	on 30 <sup>th</sup>			
Highest minimum	10.9	on 16 <sup>th</sup>	Lowest minimum	-6.4	on 30 <sup>th</sup>			
Mean grass minimum	-0.9	-2.0	Lowest grass minimum	-10.8	on 30 <sup>th</sup>			
Mean earth @30 cm	9.2	-0.2	Earth @100 cm	11.8				
Frost duration (hrs)	54.2		Rain duration (hrs)	56.3				
Rainfall total (mm)	88.9	129 %	32 <sup>nd</sup> highest					
Highest daily fall	25.6	on 8 <sup>th</sup>						
Number of: Dry days (<0.2mm)	16	Wet days (>0.9mm)	9	days ≥5mm	6			
Sunshine total (hrs)	90.5	Daily mean	3.02	127 %	Sunniest day	8.5 on 2 <sup>nd</sup>		
N° days with: Air frost	7	Ground frost	19	Snow falling	0	Snow lying	0	
Thunder	0	Hail ≥5mm	0	Small hail/ice	0	Fog @09	1 Nil sun	6
Pressure MSL: Mean @09 GMT, mbar	1015.0	+0.6	Highest	1036.6	on 30 <sup>th</sup>	Lowest	970.4	on 20 <sup>th</sup>
Relative humidity: Mean (%)	88.2	Lowest	37	on 28 <sup>th</sup>	Water vapour (g/kg), mean at 09 and 15 GMT			5.3, 5.5
Overall mean wind speed (mph)	5.9	Windiest day	10.4	on 24 <sup>th</sup>	Max gust	44	on 17 <sup>th</sup>	
Wind direction (days)	N 2	NE 7	E 1	SE 0	S 4	SW 9	W 2	NW 5
Least windy day (mph)	2.2	on 30 <sup>th</sup>	Calm; less than 0.5 mph (minutes)			624		

Anomaly = departure from 1981 to 2010 average (degrees C, percent and mbar).

Notes: **Cold and Wet but Very Sunny**

**Temperature:** In terms of the overall mean this is the coldest November since 2010, and before that, 1996. The mean minimum was particularly low, with only 2005 lower (by just 0.1°) since 1993. However, in the longer term there have been 33 colder Novembers since 1882. The highest max is 0.2° above the median, and the lowest max 0.3° above the median. The highest min is also 0.3° above the median, but the lowest min is 2.8° below its median. At -6.4° it is the lowest temperature so far this year, and the lowest for the month since 2010. The record, though, is -8.4°, and was set in 1904. The mean grass min is 2.0° below average, and is lowest since 1998, however the lowest grass min is lowest only since 2010. Earth temperatures at 30 cm and 1 m depth are slightly below average. There was 1 more air frost, but 6 more ground frosts, than average. There were just a few days with above normal temperature this month, namely 14<sup>th</sup> to 17<sup>th</sup>, 21<sup>st</sup>, 22<sup>nd</sup> and 25<sup>th</sup>. Anomalies for daily max and min were all negative up to the 13<sup>th</sup>, and reached -6° for the max on the 8<sup>th</sup>, and -8° for the min on that date. In the milder interlude, anomalies of +5° for the max on the 15<sup>th</sup> and +7° for the min on the 16<sup>th</sup> were the best. From the 21<sup>st</sup> to the 28<sup>th</sup> temperatures were close to normal, but the final 2 days were cold, anomaly -4° for the max on the 30<sup>th</sup>, and -9° for the min on that day. **Rainfall:** The total this November puts it into the wet category, though there were quite a few dry days, and one more than average. There have been several much wetter Novembers in recent years, with over 100 mm being recorded 6 times this millennium, and in 2002 we had the 3<sup>rd</sup> wettest on record with 164.9 mm, nearly twice this month's total. There were two substantial daily falls this month, on the 8<sup>th</sup> and 19<sup>th</sup>, both over 20 mm, and together amount for 52% of the month's total. Also, the 3 days 19<sup>th</sup> to 21<sup>st</sup> saw a total of 38.7 mm. It became largely dry after the 21<sup>st</sup> with only 0.7 mm in the final 9 days. Rainfall duration was only 93% of average, compared with 129 % for the total. There was no thunder, hail or snow this month. The highest rainfall rate was 36 mm/hr at 1240 GMT on the 21<sup>st</sup>.

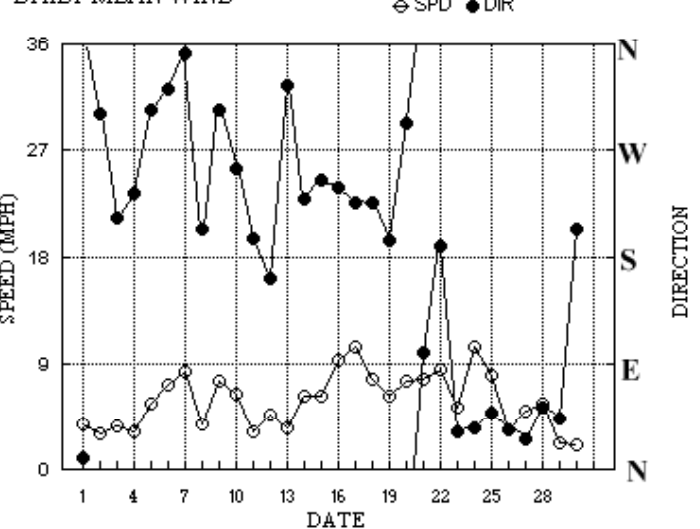
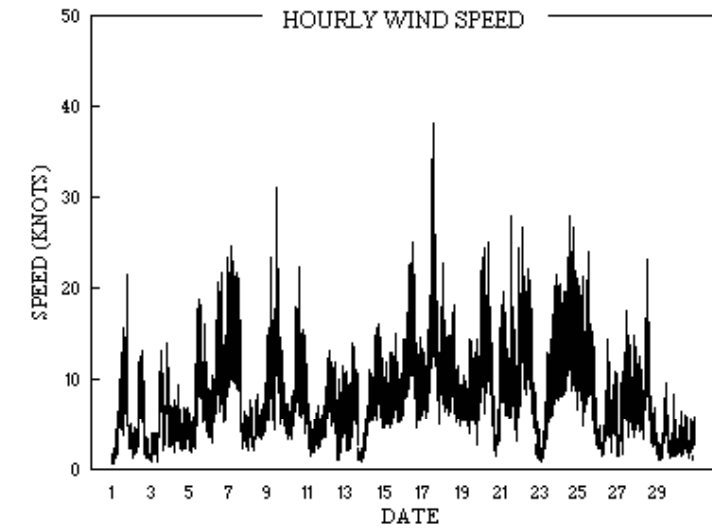
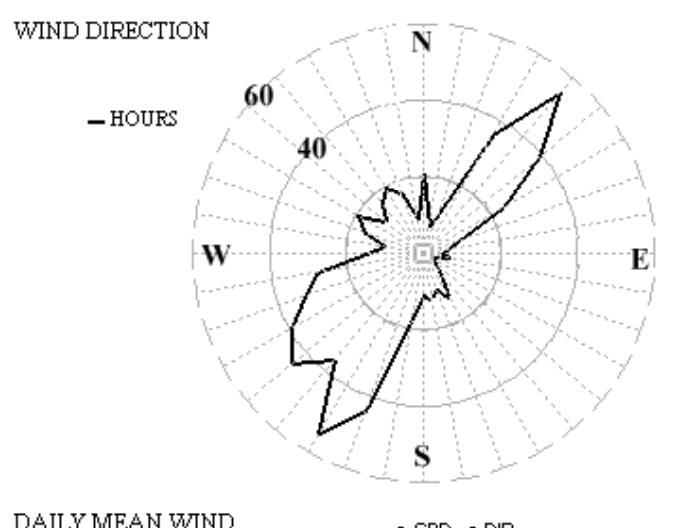
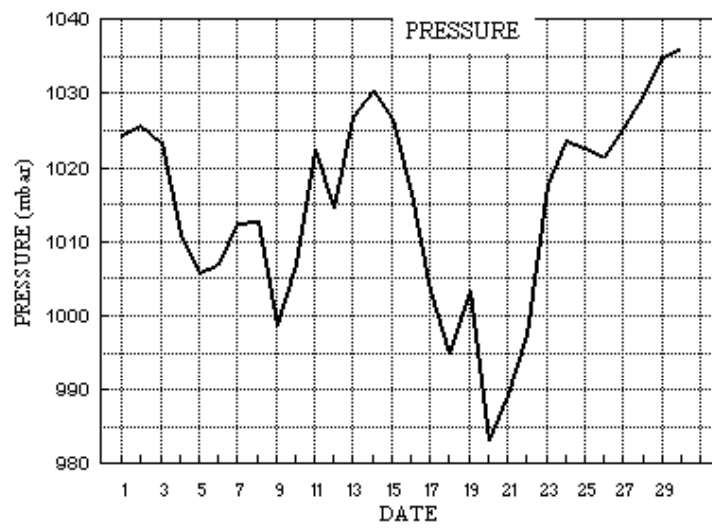
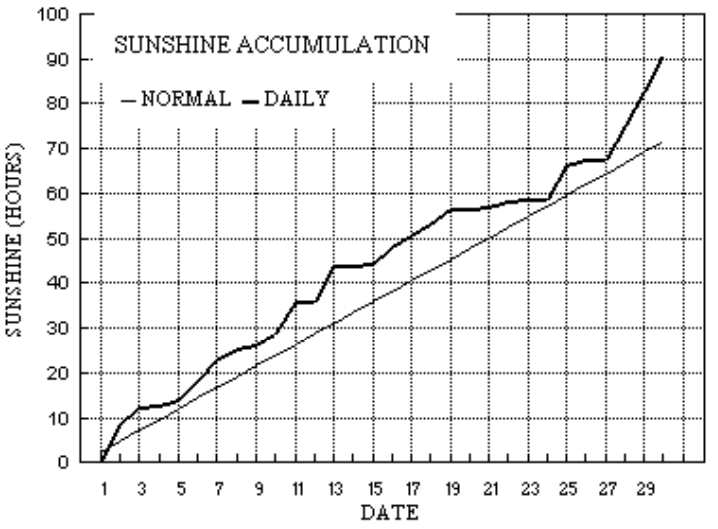
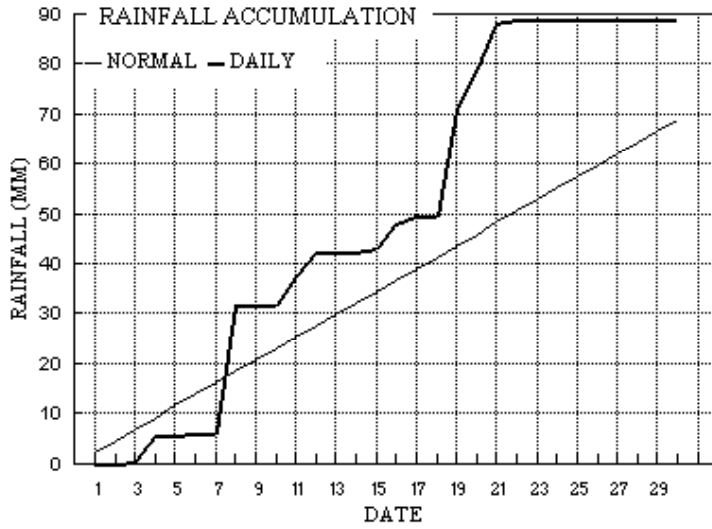
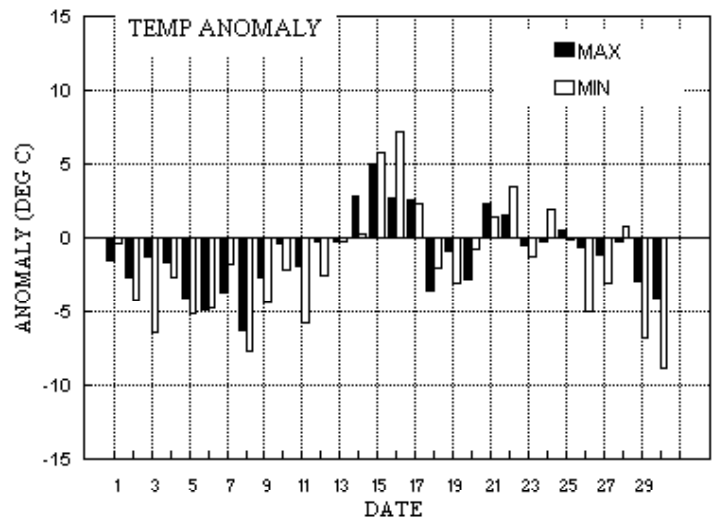
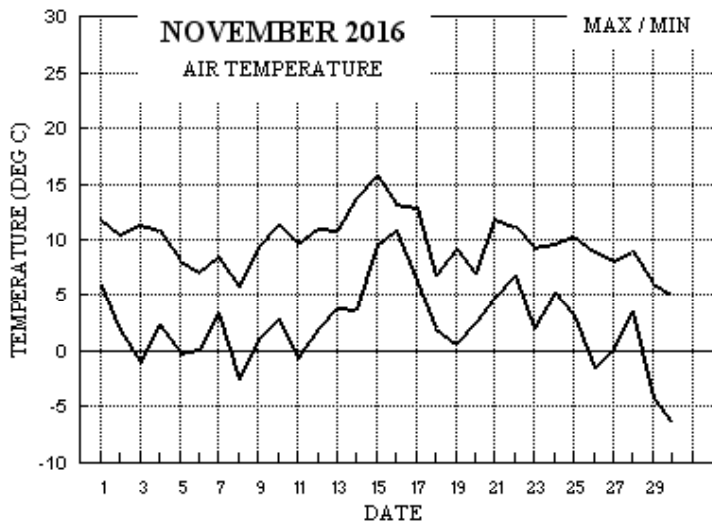
**Sunshine:** This has been a very sunny November with the highest total since 2007, perhaps what we deserve after November last year, the duller on record with a total less than one third of this month's. Days with over 80% of the maximum were the 2<sup>nd</sup>, 13<sup>th</sup>, 25<sup>th</sup> and 28<sup>th</sup> to 30<sup>th</sup>, this last 3 days being almost cloudless throughout. Compared with normal, sunshine accumulation was 4 hours in surplus by the 3<sup>rd</sup>, and this climbed erratically to 12 hours by the 13<sup>th</sup> where it remained until the 19<sup>th</sup>. A dull episode then reduced this to 2 hours by the 24<sup>th</sup>, but the sunny end to the month saw the surplus increase to 19 hours on the 30<sup>th</sup>. Overall there were 18 days with <3 hours, and 7 with =>6 hours. **Wind:** The mean speed this month is 0.5 mph below average, but is lowest only since 2014. The highest gust is exactly average. Daily mean winds were mainly light or moderate, but fresh on the 17<sup>th</sup>, 22<sup>nd</sup> and 24<sup>th</sup>, and falling very light after the 28<sup>th</sup>. Directions were N'ly on the 1<sup>st</sup>, backing SW'ly by the 3<sup>rd</sup>, veering N'ly by the 7<sup>th</sup>, backing S'ly by the 12<sup>th</sup>, temporarily veering NW'ly on the 13<sup>th</sup>, becoming SW'ly from the 14<sup>th</sup> to 19<sup>th</sup>, then veering NW'ly on the 20<sup>th</sup>, becoming E'ly on the 21<sup>st</sup> and S'ly on the 22<sup>nd</sup>, then mainly NE'ly to the end of the month.

Table 1. Mean anomalies (max, min, rain, sun) for specified periods.

From the 1 <sup>st</sup> to the 10 <sup>th</sup>				From the 11 <sup>th</sup> to the 20 <sup>th</sup>				From the 21 <sup>st</sup> to the 30 <sup>th</sup>			
-2.9°	-4.0°	140%	122%	+0.3°	+0.1°	205%	118%	-0.6°	-1.8°	44%	143%

B J Burton FRMetS. Hon. Met. Officer to Wokingham Town Council.

# Wokingham climatological graphs for November 2016



Daily meteorological data.

Emmbrook, WOKINGHAM, Berkshire.

Month: NOVEMBER 2016

Date	Max C	Min C	Rain mm	Grass Min	30cm C	100cm C	Sun hrs	Frost hrs	pp09 mbar	Af Gf	Sf Sl	Th Ha	Ic Fg	Vec mean ddd ff sp	Max gust ddd gg HHhh	High hr ddd ff	Rain HH hrs						
1	11.9	6.0	tr	2.1	12.7	13.8	0.0	0.0	1024.4	0 0 0 0	0 0 0 0	0 0 0 1	10	2.6	3.4	24	22	1838	25	8	18	0.0	
2	10.5	1.8	0.0	-3.6	12.3	13.7	8.5	0.1	1025.8	0 1 0 0	0 0 0 0	0 0 0 0	301	1.9	2.7	338	13	1347	330	6	13	0.0	
3	11.4	-1.0	0.3	-4.5	11.1	13.7	4.0	3.3	1023.4	1 1 0 0	0 0 0 0	0 0 0 0	212	3.1	3.3	186	14	2042	195	7	20	0.4	
4	10.8	2.4	5.3	2.1	10.9	13.5	0.1	0.0	1011.1	0 0 0 0	0 0 0 0	0 0 0 0	233	2.5	2.9	225	10	0931	221	4	09	3.7	
5	8.1	-0.1	0.0	-4.1	10.6	13.3	1.4	0.3	1005.8	1 1 0 0	0 0 0 0	0 0 0 0	304	3.9	4.9	307	19	1250	327	9	13	0.0	
6	7.2	0.1	0.4	-5.3	9.9	13.1	4.3	0.0	1006.9	0 1 0 0	0 0 0 0	0 0 0 0	321	5.9	6.3	355	24	2328	319	9	13	0.5	
7	8.4	3.4	0.0	0.5	9.4	12.9	4.6	0.0	1012.6	0 0 0 0	0 0 0 0	0 0 0 0	352	6.8	7.3	6	25	0406	359	11	10	0.0	
8	5.8	-2.5	25.6	-7.9	8.9	12.7	2.4	6.3	1012.8	1 1 0 0	0 0 0 0	0 0 0 0	203	1.8	3.4	91	11	2326	95	5	23	12.3	
9	9.3	1.0	0.1	2.3	8.5	12.4	1.0	0.0	998.8	0 0 0 0	0 0 0 0	0 0 0 0	303	2.9	6.5	307	31	1156	302	10	12	0.1	
10	11.4	2.9	tr	-1.8	8.5	12.2	2.6	0.0	1006.9	0 1 0 0	0 0 0 0	0 0 0 0	254	5.1	5.7	276	23	1534	267	9	13	0.0	
11	9.7	-0.7	5.7	-5.1	8.5	11.9	6.9	1.6	1022.4	1 1 0 0	0 0 0 0	0 0 0 0	195	1.3	2.9	307	12	0012	319	5	01	3.2	
12	11.1	2.0	4.8	-2.6	8.1	11.7	0.0	0.0	1014.6	0 1 0 0	0 0 0 0	0 0 0 0	162	2.0	4.1	139	13	0514	142	7	05	4.0	
13	10.8	3.9	0.1	-0.7	8.6	11.5	8.0	0.0	1026.7	0 1 0 0	0 0 0 0	0 0 0 0	325	2.3	3.1	334	14	0947	346	7	10	0.2	
14	13.8	3.8	0.1	-0.5	8.5	11.4	0.0	0.0	1030.4	0 1 0 0	0 0 0 0	0 0 0 0	229	5.0	5.5	256	16	1810	257	8	19	0.2	
15	15.8	9.5	0.7	10.9	9.3	11.3	0.4	0.0	1026.5	0 0 0 0	0 0 0 0	0 0 0 0	244	5.3	5.5	272	15	1436	259	7	14	2.0	
16	13.2	10.9	4.7	8.0	10.2	11.2	4.0	0.0	1016.7	0 0 0 0	0 0 0 0	0 0 0 0	238	8.0	8.0	254	25	1206	251	11	11	2.6	
17	12.9	6.3	1.7	4.2	10.3	11.3	2.3	0.0	1003.2	0 0 0 0	0 0 0 0	0 0 0 0	225	8.9	9.0	235	38	1307	226	17	13	1.8	
18	6.7	2.0	0.0	-1.1	9.8	11.4	2.6	0.0	994.9	0 1 0 0	0 0 0 0	0 0 0 0	225	6.6	6.7	260	23	0027	242	10	00	0.0	
19	9.2	0.7	21.1	-4.0	9.0	11.4	3.4	0.0	1003.4	0 1 0 0	0 0 0 0	0 0 0 0	193	3.8	5.4	149	22	2355	228	8	10	11.6	
20	7.0	2.6	8.3	3.9	8.6	11.3	0.0	0.0	983.2	0 0 0 0	0 0 0 0	0 0 0 0	292	0.8	6.6	264	25	0932	263	11	09	7.6	
21	11.9	4.7	9.3	4.6	8.7	11.2	0.4	0.0	989.3	0 0 0 0	0 0 0 0	0 0 0 0	100	4.3	6.8	195	28	1348	157	11	13	4.5	
22	11.2	6.8	0.5	1.4	8.7	11.1	1.2	0.0	997.4	0 0 0 0	0 0 0 0	0 0 0 0	189	6.9	7.3	191	27	0348	173	14	03	0.5	
23	9.4	2.1	tr	-2.1	8.8	11.0	0.4	0.0	1017.5	0 1 0 0	0 0 0 0	0 0 0 0	32	4.4	4.7	41	22	2248	37	9	22	0.0	
24	9.7	5.3	0.0	6.0	8.9	10.9	0.0	0.0	1023.8	0 0 0 0	0 0 0 0	0 0 0 0	36	9.0	9.0	31	28	1357	33	12	14	0.0	
25	10.4	3.2	0.0	-2.0	8.9	10.9	7.7	0.0	1022.7	0 1 0 0	0 0 0 0	0 0 0 0	49	7.0	7.0	72	24	1203	48	10	02	0.0	
26	9.0	-1.5	0.2	-6.0	8.1	10.8	1.2	4.9	1021.5	1 1 0 0	0 0 0 0	0 0 0 0	34	2.8	2.9	36	14	1328	38	6	13	1.1	
27	8.2	0.1	0.0	-0.7	7.8	10.7	0.0	0.0	1025.2	0 1 0 0	0 0 0 0	0 0 0 0	27	4.3	4.3	28	18	1206	28	7	22	0.0	
28	9.0	3.5	0.0	-1.5	7.9	10.6	7.7	2.2	1029.8	0 1 0 0	0 0 0 0	0 0 0 0	53	4.6	4.9	68	23	1422	71	9	14	0.0	
29	6.1	-4.2	0.0	-9.5	7.2	10.5	7.7	17.1	1034.9	1 1 0 0	0 0 0 0	0 0 0 0	44	1.0	2.0	39	10	1336	48	4	11	0.0	
30	5.0	-6.4	0.0	-10.8	6.1	10.3	7.7	18.4	1036.3	1 1 0 0	0 0 0 0	0 0 0 0	203	1.7	1.9	195	7	0845	243	3	13	0.0	
Total			88.9				90.5	54.2															56.3
Mean	9.8	2.3		-0.9	9.2	11.8	3.02	1.8	1015.0					275	0.9	5.1							
Anom	-1.1	-1.8	129%	-2.0	-0.2	-0.0	127%																+0.6
Daily mean		6.1																					
Anom		-1.4																					

Number of days with:

Air frost = 7      Ground frost = 19      Nil sun = 6  
 Snow falling = 0      Snow lying = 0      Thunder = 0  
 Hail=>5mm = 0      Hail<5mm or ice = 0      Fog at 09GMT = 1

Abbreviations.

Max/min = highest and lowest air temperature at 1.2m in 24 hour period ending at 09 GMT  
 Rain = total rainfall and melted snowfall in 24 hour period ending at 09 GMT, millimetres. (Tr = trace, <.05mm).  
 Grass min = Lowest overnight temperature at grass tip level.  
 Sun = hours of bright sunshine, measured electronically. Frost = Number of hours with air temp below 0 deg C.  
 pp09 = Air pressure corrected to mean sea level at 0900 GMT, millibars.  
 Af = Air frost. Gf = Ground frost. Sf = Snow falling. Sl = Snow lying at 09 GMT.  
 Th = Thunder. Ha = Hail =>5mm. Ic = Hail <5mm or ice. Fg = Fog at 09 GMT.  
 Vec mean = 24 hour mean wind vector, ddd = direction in degrees from true north, ff = speed in knots.  
 Sp = 24 hour mean wind speed in knots.  
 Max gust = Highest gust in 24 hours, gg = speed in knots, HHhh = Time, hours and minutes, GMT.  
 High hr = Highest hourly mean wind, HH = hour commencing. Rain Hrs = Duration of rain, 24 hours to 09 GMT. Excludes snow/hail.  
 30cm and 100 cm are earth temperatures at those depths, read at 09 GMT.  
 Anom = Departure from 1981-2010 climatological average.  
 All temperatures in degrees Celsius.

Weather observations. Emmbrook, Wokingham, Berkshire.

Observations at 0900 GMT for NOVEMBER 2016

Date	VV	N	dd	ff	gg	TT	Td	Td	RH	r	PPP	a	ppp	ww	W1	W2	Nh	Cl	h	Cr	Cf	NCh	shs	NCh	shs	NCh	shs	Date	Remarks
1	03	9	33	04	07	8.8	8.8	100	6.9	1024.4	3	009	43	4	4	9	/	/	/	/	/	/					1		
2	56	3	26	05	08	5.2	4.3	94	5.1	1025.8	1	011	10	0	0	1	5	6	0	1	81630	83080					2	COTRA	
3	56	8	19	01	03	2.4	2.0	97	4.4	1023.4	5	002	10	2	2	4	0	9	1	7	84467	88270					3	COTRA Hoar slt Halo 22° part Parhelion	
4	59	7	21	04	07	9.3	7.0	85	6.2	1011.1	7	012	15	2	2	6	5	6	7	1	82630	85650					4	2Ac58 /Ci72 COTRA jpNW-N Rainbow	
5	65	7	30	05	12	5.1	4.3	94	5.2	1005.8	3	009	02	1	1	7	5	5	/	/	81625	87628					5		
6	82	1	31	08	14	3.7	-0.6	74	3.6	1006.9	8	002	02	0	0	0	0	9	0	2	81070						6	COTRA Hoar slt	
7	80	1	36	10	21	5.5	2.3	80	4.5	1012.6	1	016	02	0	0	1	6	4	0	0	81715						7	1Sc30	
8	56	2	21	02	03	1.0	0.0	93	3.8	1012.8	6	003	05	0	0	1	5	7	5	1	81650						8	2Ac65 1Ci72 Ac str vir (fall strk holes) Hoar mod	
9	58	7	28	05	10	5.3	4.9	97	5.4	998.8	1	042	21	6	2	7	7	2	/	/	83704	87706					9		
10	84	7	23	05	08	6.7	5.7	93	5.7	1006.9	3	004	14	2	2	3	5	6	7	1	81640	83650	85358				10	7Ci75 Ac vir	
11	70	7	20	03	04	3.2	2.4	95	4.5	1022.4	2	025	01	1	1	4	5	6	0	1	84633	86075					11	COTRA	
12	45	8	13	05	12	8.9	8.5	97	6.9	1014.6	6	008	63	6	6	7	7	2	2	/	84705	87707	88525				12	RE+RA	
13	65	7	35	03	09	7.5	6.5	93	5.9	1026.7	2	019	03	1	1	1	0	9	8	1	81365	87078					13	COTRA Halo 22° part	
14	60	7	20	06	11	9.5	8.4	92	6.7	1030.4	0	002	05	6	2	3	6	4	7	/	83712	86359	87362				14		
15	62	8	24	06	13	13.8	12.5	92	8.9	1026.5	3	007	02	2	2	8	6	3	/	/	88707						15		
16	81	1	25	10	23	11.3	8.4	82	6.7	1016.7	7	004	02	5	1	1	6	4	0	9	81712						16	1Cc72 1Ci80 COTRA	
17	65	7	21	09	16	8.1	4.7	79	5.4	1003.2	7	030	60	6	2	2	5	6	7	2	82630	86361	86070				17	2Ac58	
18	88	6	21	07	14	3.7	1.8	88	4.4	994.9	3	006	03	1	1	1	6	4	7	2	81710	86068					18	1Ac62 2As65	
19	80	2	20	03	09	2.6	1.7	94	4.3	1003.4	3	010	02	0	0	0	0	9	0	2	82068						19	Hoar slt	
20	25	8	26	11	22	6.1	5.4	96	5.7	983.2	2	121	58	6	5	8	7	2	/	/	85704	87705	88708				20		
21	18	8	06	06	13	7.0	6.9	99	6.3	989.3	8	014	20	6	5	8	7	1	/	/	88702						21		
22	70	6	20	09	20	9.5	7.2	85	6.4	997.4	2	055	02	8	2	6	8	4	0	0	81715	83820					22	3Sc45 2Sc56 Cu med	
23	18	8	02	03	08	5.4	5.3	99	5.5	1017.5	2	022	28	4	2	7	6	1	/	/	83702	87704					23	/Sc40	
24	68	7	03	09	19	9.4	7.2	86	6.2	1023.8	3	021	02	2	2	7	5	4	/	/	85615	87620					24		
25	81	4	03	08	16	4.8	2.7	86	4.5	1022.7	1	005	02	0	0	0	0	9	0	1	81075	84080					25	COTRA	
26	15	8	06	02	05	0.1	-0.0	99	3.8	1021.5	2	003	10	1	1	8	6	1	/	/	88702						26	Hoar mod	
27	58	7	03	06	11	6.6	6.3	98	5.8	1025.2	2	016	20	5	2	7	5	5	/	/	87625						27		
28	75	1	04	03	08	4.7	2.4	85	4.4	1029.8	2	023	01	1	1	1	5	5	0	1	81620						28	1Sc40 1Ci80 COTRA	
29	58	0	02	03	04	-2.9	-3.2	98	2.9	1034.9	2	014	10	0	0	0	0	9	0	0							29	Hoar thk	
30	50	3	21	02	07	-4.5	-5.2	95	2.6	1036.3	3	008	10	0	0	0	0	9	0	1	83080						30	COTRA Hoar thk	

Mean vis = 16.9 km

Mean cloud = 5.5 68%

Mean wind speed = 5.4 kn

Mean gust = 11 kn

Mean TT = 5.6 °C

Mean TdTd = 4.3 °C

Mean RH = 91.5 %

Mean r = 5.3 g/kg

Mean PPP = 1015.0 mbar

See appendix 2 below for full code details

VV = Visibility code (Code FM12-4377)

N = Total cloud amount, oktas

dd = Direction from which wind is blowing, tens of degrees true

ff = 10 minute mean wind speed, knots

gg = Highest gust in past hour, knots

TT = Air temperature at 1.2 m, deg Celsius

TdTd = Dew point temperature at 1.2 m, deg Celsius

RH = Relative humidity at 1.2 m

r = Humidity mixing ratio at 1.2 m, g/kg

PPP = Air pressure reduced to sea level, mbar

a = Characteristic of pressure tendency (Code FM12-0200)

ppp = 3 hr pressure tendency, tenths of mbar

ww = Present weather code (Code FM12-4677)

W1, W2 = Past weather code (Code FM12-4561)-

covers past 3 hours.

Nh = Amount of low cloud present, oktas

Cl = Type of low cloud (Code Fm12-0513)

h = Height of low cloud (Code FM12-1600)

Cm = Type of medium cloud (Code FM12-0515)

Ch = Type of high cloud (Code FM12-0509)

8 groups. 8 = indicator for cloud detail

N = Amount of cloud, oktas

C = Type of cloud (FM12-0500)

hshs = Height of cloud (FM12-1677)

Remarks : COTRA = persistent condensation

trails present.

Weather observations. Emmbrook, Wokingham, Berkshire.

Observations at 1500 GMT for NOVEMBER 2016

Date	VV	N	dd	ff	gg	TT	Td	Td	RH	r	PPP	a	ppp	ww	W1	W2	Nh	Cl	h	Cr	Cl	NCh	shs	NCh	shs	NCh	shs	Date	Remarks
1	50	8	01	07	11	11.5	10.5	93	7.8	1023.8	5	006	50	5	2	8	5	3	/	/	84708	86612	88620				1		
2	86	7	33	05	11	9.8	1.4	56	4.2	1024.5	6	009	02	2	2	1	0	9	3	1	81365	87080					2	1Ci75 COTRA	
3	80	7	24	05	11	10.8	5.2	68	5.5	1019.6	7	022	02	2	2	6	8	6	3	1	82830	85645	87072				3	1Ac65 Cu med	
4	57	7	17	02	05	9.1	8.6	97	7.0	1006.6	8	026	63	6	6	1	7	3	2	/	81708	87535					4	1Cu12 Cu med Cld edge W	
5	78	5	31	08	17	7.4	1.5	66	4.3	1007.2	3	005	01	2	2	5	8	5	0	0	81825	85640					5	Cu hum	
6	84	8	31	06	15	6.5	1.0	68	4.1	1006.2	5	001	02	2	2	8	5	5	/	/	86628	88633					6		
7	86	6	36	07	17	7.8	1.3	63	4.2	1013.9	2	002	02	2	2	6	8	6	0	0	83833	84645					7	Cu hum	
8	68	8	17	04	06	5.5	1.8	77	4.3	1008.8	8	024	03	2	2	1	5	7	7	8	81650	85359	87461				8	/Cs70	
9	70	6	30	10	22	8.7	5.4	80	5.6	1002.6	2	020	25	8	1	6	8	4	0	0	82818	84635					9	3Sc50 Cu med jp all quads vv60k ex p	
10	75	2	26	06	17	9.4	4.1	70	5.1	1007.2	3	004	15	1	1	2	8	6	6	1	81830						10	2Sc56 1Ac58 1Cc72 1Ci75 COTRA Cu med jpN&W Rainb	
11	77	5	19	03	07	8.8	2.7	65	4.5	1022.8	6	005	03	1	1	1	1	5	0	6	81825	85080					11	2Cs77 COTRA Cu hum Parheliion	
12	25	8	22	01	06	11.0	10.5	97	7.9	1014.5	5	000	50	5	2	8	7	2	/	/	86704	88705					12		
13	84	6	33	05	11	10.0	4.9	71	5.4	1028.8	3	006	02	2	2	1	1	5	4	1	81825	86078					13	1Ac65 COTRA Cu hum Parhelia	
14	68	8	22	05	13	12.1	10.6	91	7.8	1028.4	6	019	02	6	2	8	5	4	/	/	87612	88618					14		
15	62	8	26	07	15	15.0	12.8	86	9.1	1025.4	7	009	02	5	2	8	5	3	/	/	82708	87612	88635				15		
16	80	7	23	11	21	12.5	8.4	76	6.9	1013.6	8	022	02	2	2	3	8	5	0	1	81825	83656	87075				16	1Sc40	
17	75	2	24	10	31	11.0	6.0	71	5.9	995.6	6	020	25	8	1	1	1	5	7	8	81825						17	1Ac57 1Cs70 Ch fra/hum Cs edge S	
18	88	3	23	10	18	5.5	1.7	77	4.4	997.6	3	012	02	1	1	1	8	4	0	3	81818	83070					18	1Sc40 COTRA Cu hum Cb top NW	
19	84	8	19	06	12	7.0	2.8	75	4.7	1000.9	6	022	03	2	2	1	1	5	7	7	81825	83362	85466				19	8Cs70 Cu hum	
20	75	8	23	04	10	5.7	3.4	85	4.9	994.4	1	036	02	5	2	8	5	4	/	/	83615	88620					20		
21	58	7	18	10	24	10.9	8.7	86	7.1	985.4	5	004	80	8	6	7	8	4	/	/	81715	85820					21	3Sc50 Cu med Rainbow	
22	72	5	20	09	18	9.7	6.7	81	6.2	1003.8	2	028	25	8	2	5	8	5	0	0	81820	84640					22	2Sc50 Cu med	
23	63	7	02	05	11	8.7	7.0	89	6.2	1018.1	2	002	02	2	2	5	8	5	3	2	81825	85656	87075				23	1Ac62 COTRA Cu med	
24	82	8	04	10	27	9.4	6.5	82	6.0	1022.7	5	007	02	2	2	8	5	4	/	/	86618	88622					24		
25	82	1	05	06	17	8.9	3.4	69	4.8	1020.8	6	011	02	0	0	0	0	9	0	1	81075						25		
26	67	7	04	03	12	7.2	5.5	89	5.6	1020.3	6	007	02	1	1	7	5	4	/	1	83613	87618					26	/Ci75 COTRA	
27	84	7	03	04	15	7.2	3.8	79	4.9	1025.6	2	001	01	2	2	3	8	5	0	1	81825	83628	86080				27	COTRA Cu hum	
28	82	3	07	08	23	6.4	-1.0	59	3.5	1030.8	3	002	02	0	0	0	0	9	0	1	83080						28	COTRA	
29	73	0	06	03	06	5.0	-3.0	56	3.0	1033.7	5	009	02	0	0	0	0	9	0	0							29	Hoar slt in shade	
30	68	5	22	01	06	4.2	-1.8	65	3.3	1034.2	6	017	03	1	1	0	0	9	0	1	81075	85080					30	COTRA Hoar mod in shade	

Mean vis = 29.5 km

Mean cloud = 5.9 74%

Mean wind speed = 6.0 kn

Mean gust = 15 kn

Mean TT = 8.8 °C

Mean Td = 4.7 °C

Mean RH = 76.2 %

Mean r = 5.5 g/kg

Mean PPP = 1014.6 mbar

See appendix 2 below for full code details

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C = Type of cloud (FM12-0500)

hshs = Height of cloud (FM12-1677)

Remarks : COTRA = persistent condensation

trails present.

Wokingham	Hour	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov	16-Nov
Sunshine	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hourly analysis	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2016	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	0.00	0.19	0.00	0.00	0.00	0.32	0.30	0.35	0.00	0.00	0.00	0.00	0.26	0.00	0.00	0.00
	8	0.00	1.00	0.09	0.03	0.00	1.00	0.95	1.00	0.00	0.00	0.49	0.00	1.00	0.00	0.00	0.88
	9	0.00	1.00	0.50	0.00	0.00	1.00	1.00	0.94	0.00	0.02	0.97	0.00	1.00	0.00	0.01	1.00
	10	0.00	1.00	1.00	0.00	0.10	1.00	0.58	0.06	0.00	0.53	1.00	0.00	1.00	0.00	0.21	1.00
	11	0.00	1.00	0.90	0.00	0.01	0.50	0.20	0.08	0.06	0.69	1.00	0.00	0.98	0.00	0.19	0.77
	12	0.00	1.00	0.83	0.00	0.00	0.05	0.21	0.00	0.10	0.09	1.00	0.00	1.00	0.00	0.00	0.09
	13	0.00	1.00	0.43	0.00	0.00	0.46	0.38	0.00	0.41	0.01	1.00	0.00	0.98	0.00	0.00	0.05
	14	0.00	1.00	0.05	0.00	0.07	0.00	0.35	0.00	0.41	0.71	1.00	0.00	1.00	0.00	0.00	0.19
	15	0.00	1.00	0.18	0.00	0.95	0.00	0.39	0.00	0.00	0.41	0.49	0.00	0.82	0.00	0.00	0.00
	16	0.00	0.33	0.00	0.00	0.27	0.00	0.22	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.00	0.00
	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot		<b>0.00</b>	<b>8.52</b>	<b>3.98</b>	<b>0.03</b>	<b>1.41</b>	<b>4.34</b>	<b>4.57</b>	<b>2.44</b>	<b>1.00</b>	<b>2.60</b>	<b>6.94</b>	<b>0.00</b>	<b>8.04</b>	<b>0.00</b>	<b>0.41</b>	<b>3.98</b>

	Hour	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	30-Nov	Mean
	0	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	7	0.00	0.07	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05
	8	0.00	0.70	1.00	0.00	0.00	0.28	0.00	0.00	0.92	0.00	0.00	0.85	0.85	0.83	0.40
	9	0.23	0.48	0.70	0.00	0.00	0.05	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	0.43
	10	0.27	0.00	0.17	0.00	0.00	0.14	0.00	0.00	1.00	0.23	0.00	1.00	1.00	1.00	0.41
	11	0.29	0.00	0.46	0.00	0.00	0.08	0.00	0.00	1.00	0.37	0.00	1.00	1.00	1.00	0.39
	12	0.41	0.42	0.83	0.00	0.00	0.03	0.00	0.00	1.00	0.16	0.00	1.00	1.00	1.00	0.34
	13	0.12	0.02	0.22	0.00	0.08	0.04	0.34	0.00	1.00	0.31	0.00	1.00	1.00	1.00	0.33
	14	0.63	0.68	0.00	0.00	0.31	0.29	0.01	0.00	1.00	0.15	0.00	1.00	1.00	1.00	0.36
	15	0.37	0.25	0.00	0.00	0.02	0.27	0.00	0.00	0.82	0.00	0.00	0.87	0.85	0.86	0.28
	16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
	17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tot		<b>2.32</b>	<b>2.63</b>	<b>3.41</b>	<b>0.00</b>	<b>0.42</b>	<b>1.19</b>	<b>0.35</b>	<b>0.00</b>	<b>7.74</b>	<b>1.23</b>	<b>0.00</b>	<b>7.72</b>	<b>7.70</b>	<b>7.69</b>	<b>90.67</b>

NOVEMBER 2016	T mn	Tx	Time	Tn	Time	RHmn	RH x	Time	RH n	Time	Tdmn	r mn	r x	Time	r n	Time	p mn	p x	Time	p n	Time
1	8.47	12.00	1435	4.72	2359	95.7	100.0	725	85.1	2208	7.8	6.53	8.08	1338	5.04	2359	1024.49	1026.0	2320	1023.4	557
2	4.85	10.57	1413	-0.15	2358	86.9	99.9	736	51.3	1429	2.5	4.51	5.45	1011	3.66	2358	1025.25	1026.1	1030	1024.4	1405
3	5.41	11.51	1234	-1.07	205	85.9	99.8	257	61.9	1348	3.1	4.75	5.97	1216	3.44	204	1021.15	1025.4	4	1016.0	2359
4	7.38	10.99	1106	1.55	2359	92.3	99.4	2359	79.1	1058	6.2	5.93	7.12	1220	4.23	2359	1009.62	1016.1	0	1005.8	1909
5	4.25	8.21	1136	-0.22	343	84.5	100.0	56	63.4	1442	1.7	4.34	5.65	1126	3.49	2359	1006.72	1008.9	2303	1004.7	529
6	3.79	7.28	1326	0.01	401	79.5	93.2	1721	60.0	1328	0.5	3.97	4.78	1814	3.33	441	1007.30	1008.9	16	1005.6	1400
7	4.88	8.56	1234	0.17	2240	80.7	98.5	2255	60.3	1504	1.7	4.31	4.88	1053	3.69	2240	1012.79	1015.3	2014	1008.6	20
8	2.35	5.64	1447	-2.61	723	87.9	99.9	207	69.2	1306	0.4	3.95	4.93	2357	3.06	723	1009.70	1014.5	4	999.7	2359
9	6.24	9.45	1404	3.58	2358	90.6	99.1	552	74.5	1418	4.8	5.39	5.94	1052	4.69	2358	1000.58	1006.9	2358	993.5	435
10	6.71	11.59	1135	2.80	41	84.1	97.9	53	61.4	1346	4.1	5.11	6.56	1134	4.46	1619	1008.12	1014.7	2359	1006.2	451
11	4.13	9.84	1237	-0.78	705	88.2	99.8	758	58.5	1243	2.2	4.42	5.48	1136	3.51	658	1021.10	1023.6	1058	1014.7	0
12	8.97	11.28	1359	3.79	0	94.3	99.4	1904	82.5	410	8.1	6.73	7.94	1547	4.74	0	1016.57	1020.7	2348	1013.6	1312
13	6.87	10.93	1310	3.75	2140	90.3	100.0	731	66.7	1318	5.3	5.45	6.36	5	4.77	2140	1027.42	1031.9	2046	1020.5	0
14	10.01	12.82	2249	4.37	6	92.9	98.8	42	87.7	1028	8.9	7.03	8.46	2358	4.99	0	1029.60	1031.8	0	1027.2	2353
15	13.55	15.86	1122	12.26	506	91.9	96.5	2143	82.5	1124	12.3	8.74	9.51	1049	8.24	506	1025.46	1027.4	0	1021.4	2359
16	11.54	13.30	1331	7.51	2340	87.8	96.7	405	71.8	1426	9.5	7.40	8.86	353	5.84	2359	1015.41	1021.6	0	1010.8	2353
17	8.25	12.98	1306	5.36	2125	81.8	93.8	451	67.6	1308	5.3	5.62	6.97	1246	4.56	2055	1000.24	1010.9	1	992.1	2332
18	4.14	6.83	1244	1.94	751	85.0	94.0	754	72.6	1336	1.8	4.39	5.05	21	4.07	2255	996.14	999.8	2342	992.5	1
19	4.08	7.87	1259	0.60	537	89.3	98.7	2316	67.9	1330	2.4	4.59	6.25	2333	3.84	538	999.82	1004.2	1009	987.3	2359
20	6.22	9.33	323	4.60	2220	92.4	98.5	531	81.0	1759	5.1	5.62	7.15	429	4.64	1759	987.23	996.0	1810	970.4	522
21	8.05	12.00	1325	4.67	0	95.6	99.5	1100	84.2	1355	7.4	6.58	8.62	1315	5.28	0	988.32	994.3	0	983.8	1315
22	8.28	11.32	1130	2.24	2338	88.9	99.4	2341	76.2	1132	6.5	6.12	7.00	358	4.40	2338	999.70	1012.6	2358	985.2	319
23	6.28	9.48	1322	2.04	312	94.6	100.0	316	85.3	2012	5.5	5.59	6.79	1312	4.37	312	1017.41	1021.4	2357	1012.5	8
24	8.63	9.81	947	5.92	2342	85.2	91.2	207	78.4	1612	6.3	5.88	6.49	350	4.76	2351	1022.96	1024.3	1930	1021.3	2
25	6.10	10.50	1256	2.83	2359	82.1	97.8	2343	58.0	1242	3.2	4.71	5.35	1236	4.25	739	1021.96	1023.9	3	1020.6	1427
26	3.55	9.05	1319	-1.56	753	96.2	100.0	442	81.9	1318	3.0	4.72	6.14	1257	3.35	753	1021.24	1022.5	2357	1020.1	1421
27	5.96	8.33	1208	3.41	2019	89.2	99.1	809	75.4	1332	4.3	5.10	5.89	859	4.24	2019	1025.20	1027.5	2344	1022.5	0
28	4.74	9.15	1252	-1.23	2349	73.3	94.5	2353	37.0	1216	0.1	3.78	4.81	950	2.55	1216	1030.08	1033.1	2315	1027.1	432
29	-0.83	6.15	1300	-4.35	735	88.4	98.5	903	53.4	1458	-2.7	3.07	4.17	1156	2.60	2231	1034.24	1036.1	2228	1032.8	409
30	-2.09	5.09	1431	-6.46	800	89.0	97.8	331	61.4	1431	-3.8	2.83	3.65	1155	2.19	800	1035.06	1036.6	918	1033.8	1559
Total																					
Mean	6.02	9.92		1.99		88.2	98.06		69.87		4.11	5.24	6.34		4.21		1014.70	1018.77		1009.93	
Max	13.55	15.86		12.26		96.2	100.00		87.70		12.26	8.74	9.51		8.24		1035.06	1036.62		1033.80	
Min	-2.09	5.09		-6.46		73.3	91.20		37.02		-3.81	2.83	3.65		2.19		987.23	994.27		970.41	

Wokingham Automatic Weather Station  
 AWS samples taken every 0.5 seconds  
 x and n refer to maximum and minimum respectively

**Readings taken at Wokingham Climatological Station, Emmbrook, Berkshire**  
**Lat 51.425 N, Long 0.853 W, NGR (SU) 798701**  
**Altitude 45 m ASL.**

Tmn = 00 to 24 GMT mean air temperature at 1.2 m, deg C  
 RHmn = 00-24 GMT mean relative humidity at 1.2 m, percent  
 TDmn = 00-24 GMT mean dew point at 1.2 m, deg C  
 rmn = 00-24 GMT mean humidity mixing ratio, g/kg  
 pmn = 00-24 GMT mean air pressure reduced to mean sea level, mbar  
 Time = hours and minutes in GMT of extreme values

Temperature and humidity are from an aspirated Vaisala HMP45 unit  
 Pressure is from a Setra CS100 sensor  
 Data is logged on a Campbell Scientific CR10X measurement and control system

# WOKINGHAM METEOROLOGICAL DATA

Wokingham Climatological Station, Emmbrook, Berkshire.

Lat 51°25'N 00°51'W NGR (SU)798701 Altitude 46m ASL

## Seasonal Means and Totals

AUTUMN 2016

				Rank in the past 135 years					
Temperature (°C)									
Mean maximum	15.5	(+0.3)		25 <sup>th</sup> highest					
Mean minimum	7.0	(-0.1)		32 <sup>nd</sup> highest					
Daily mean	11.2	(+0.1)		30 <sup>th</sup> highest					
Rainfall total (mm)	214.9	(111 %)		46 <sup>th</sup> highest					
Sunshine total (hours)	345.4	(106 %)							
N° of:	Dry days	52 (+2)	Wet days	26 (-4)					
Days with:	Air frost	7 (-1)	Ground frost	28 (+6)	Snow falling	0 (-1)	Snow lying	0 (0)	
Thunder	3 (0)	Hail ≥5mm	1 (+1)	Small hail/ice	0 (-1)	Fog @09 GMT	3 (-1)	Nil sun	12 (-3)
Air pressure MSL : Mean @09 GMT (mbar)	1018.2	(+3.1)							

Departure from 1981 to 2010 average shown in brackets.

Notes: **Sunny with Near Average Temperature and Above Average Rainfall**

**Temperature:** The mean temperature this autumn is close to average, but is lowest since 2012. In this millennium 11 autumns have been milder and 5 colder than this year's. The mean maximum is the same as last autumn's but 2014 was higher and 2013 lower. The mean minimum is lowest since 2012. Temperatures followed their normal downward trend throughout the season, from a mean of 16.8° in September to 6.1° in November. This fall in temperature was accentuated as September was mild, anomaly +2.1°, October anomaly -0.3° and November anomaly -1.4°. The season's highest max was 30.5° on the 13<sup>th</sup> September, 6.0° above the median and highest autumn temperature since 1929, and 4<sup>th</sup> highest in 113 years. The lowest max was 5.0° on the 30<sup>th</sup> November, 0.3° above the median. The highest min was 17.5° on the 7<sup>th</sup> September, 2.2° above the median and 5<sup>th</sup> highest in 104 years. The lowest min, -6.4° on the 30<sup>th</sup> November is 2.5° below the median but is lowest only since 2010. The mean grass min, 3.4°, is 0.6° below average, and lowest since 2012. The lowest grass min was -10.8° on the 30<sup>th</sup> November, 2.6° below average and lowest since 2010. The mean earth temperature at 30 cm depth was 13.5°, 0.5° above average, and at 1 m depth the mean of 14.8° is 0.3° above average. A daily value of 19.3° at 30 cm depth on the 7<sup>th</sup> September is a new 37 year record. Although the number of days with air frost is one fewer than average, the duration of air frost, 54.2 hours, is 108 % of average and most since 2010. The first ground frost of the season was on the 1<sup>st</sup> October after 138 frost free days, and the first air frost was on the 2<sup>nd</sup> November after 186 days free of frost. **Rainfall:** This has been an autumn with well above average rainfall, although the total has been exceeded in 5 autumns this millennium. Both September and November were wet months, the former with 183 % of average, but October was dry, having only 39 % of average. The season's wettest day was the 15<sup>th</sup> September, and the 24 hour total of 66.8 mm makes it the 2<sup>nd</sup> wettest day in 113 years, the record being 71.6 mm in autumn 1980. The thunderstorm that produced this autumn's high value also contained hail 1.5 cm diameter, and a rainfall rate of 530 mm/hr, this seasons maximum rate and the highest rate recorded since before 2007, when rainfall rate first became available. Rainfall duration this season was 110.0 hours, 75 % of average. November had the highest duration, 56.3 hours, and October the lowest, 18.5 hours. The number of dry days is 2 more than average, but there was only one dry spell, 6 days ending on the 7<sup>th</sup> October. Estimated soil moisture deficit stood at 155 mm at the start of the season, but had returned close to field capacity by the end. The frequency of thunder was about normal. **Sunshine:** This has been quite a sunny autumn with the highest total since 2012. In this millennium, 7 autumns have been sunnier and 9 less sunny. September was the sunniest month, daily mean 4.35 hours, and November the least sunny, mean 3.02 hours. Compared with average, November fared best with 127 %, and September worst with 91 % of average. September 14<sup>th</sup> was the sunniest day, total 11.8 hours. The number of days with nil sun is 3 fewer than average. Overall there were 45 days with <3 hours, 27 with =>6 hours and 9 with =>10 hours. **Wind:** The mean wind speed of 5.4 mph is 0.7 mph below average. The windiest day was the 24<sup>th</sup> November, mean 10.4 mph, a new autumn record low, 4.4 mph below average. 44 mph was the season's highest gust, 6 mph below average and lowest since 2008. The 29<sup>th</sup> October was the least windy day, mean 1.5 mph, and there were 3288 calm minutes. Daily mean direction/number of days, N,10 NE,19 E,4 SE,2 S,16 SW,27 W,4 NW,9. Compared to average, NE winds were 11 % more frequent, at the expense of W, 8 % less frequent and E and SE combined, 7 % less frequent. **Pressure:** The extremes of pressure this autumn were 1036.6 mbar on 30<sup>th</sup> November and 970.4 mbar on 20<sup>th</sup> November, a span of 66.2 mbar, 10.7 mbar above average. **Humidity:** The overall mean relative humidity was 85.2 %, and the lowest was 37 % on the 28<sup>th</sup> November. The mean water vapour content per kg of air was 7.4 g at 0900 GMT and 7.3 g at 1500 GMT.

**September:** Wet and very warm with below average sunshine. Mean temperature 4<sup>th</sup> highest and mean min 2<sup>nd</sup> highest in 135 years. Highest max 4<sup>th</sup> highest in 113 years. Highest min 5<sup>th</sup> highest in 104 years. Earth temps record highs. 66.8 mm on 15<sup>th</sup> 2<sup>nd</sup> highest fall for any month since before 1904, 34.8 mm fell in 20 minutes. Total span of pressure lowest in the past 41 years. **October:** Dry and sunny with mean temperature below average. Only 3 Octobers have been colder this millennium. Highest min is 4<sup>th</sup> lowest in 104 years. Driest since 1995. **November:** Cold, wet and very sunny. Coldest since 2010 and before that 1996. Mean grass min lowest since 1998. Sunniest since 2007.

Month	Mean Max	Anom	Mean Min	Anom	Rain mm	Anom	Sun hrs	Anom	Mean Wind mph	Max gust	Mean pressure	Anom
Sep	21.3°	+1.9	12.2°	+2.2	98.3	183%	130.5	91%	6.0	32	1017.3	+0.6
Oct	15.3°	+0.1	6.6°	-0.6	27.7	39%	124.4	112%	4.4	31	1022.1	+7.8
Nov	9.8°	-1.1	2.3°	-1.8	88.9	129%	90.5	127%	5.9	44	1015.0	+0.6



## **Explanation and definition of some of the terms used in the Wokingham Weather Reports.**

**Average:** Generally refers to the 30 year climatological average, currently 1981 to 2010. This will be next updated in 2020. For some parameters, notably wind, the climatological average is not available, and if the word average is used in the context of wind, it refers to the average for the period for which data is held, namely 1988 to present.

For sunshine, there was a change, in July 1999, in the type of instrument used to detect sunshine amount, making the climatological average based on the old instrument of little use. In general, the new instrument produces higher values in the winter half year, and lower ones in the summer half, than the old type, due to a combination of faster reaction and higher sensitivity than the old type. The average used in this case is based on a theoretical equivalent 1981 to 2010 average, drawn from comparison with the Met Office published tables of departure from climatological average sunshine in the months since 2000 for their area 'Southern England'. Users of the Wokingham Monthly Weather reports should be aware of this, and regard anomalies for sunshine published therein as a guide only, until such time has elapsed since the introduction of the new instrument that a genuine average becomes available.

**Mean:** The mean of the data under discussion, often the monthly mean of daily data. The mean is obtained by summation of the individual values and dividing by the number of values. The term 'daily mean' in respect of temperature is defined as '(max + min) / 2'. A true daily 24 hour (00 to 24 GMT) mean temperature is available from the Automatic Weather Station (AWS), and is currently published on page 7 of the Wokingham Monthly Weather report, on the Wokingham Weather web site, page 1. <http://www.woksat.info/wwp1.html>

**Anomaly:** When a value is given for anomaly, this will have one of the following meanings:

- a): The departure of a mean from the current climatological average.
- b): The departure of a value on a particular day from the average for that day, (this need not be a climatological average).

When the word anomaly is used in respect of temperature, any values given are in °C. In respect of rainfall or sunshine, percent. In respect of wind, mph. In respect of pressure, millibars (hpa).

**Categories:** Reference may be made in the reports to 'categories'. Each category has a strict statistical range, as outlined below.

**Temperature:** The terms cold/mild are used in the winter half year, and cool/warm in the summer half. The term 'normal' is used when the individual mean (monthly, seasonal or annual) value is within 20 % of the median of all ranked values for that month/season/year.

**Mild/warm:** The value lies between 10 % and 30 % below the highest value in the ranked series.

**Very mild/very warm:** The value lies within 10 % of the highest value in the ranked series.

**Cold/cool:** The value lies between 10 % and 30 % above the lowest value in the ranked series.

**Very cold/very cool:** The value lies within 10 % of the lowest value in the ranked series.

**Sunshine:** The terms for sunshine are very sunny, sunny, normal, dull and very dull.

The definition of these terms follow the same rules as for temperature.

**Rainfall:** The terms for rainfall are very dry, dry, normal, wet and very wet.

The definition of the term 'normal' follows the same rule as for temperature and sunshine.

**Wet:** The value lies between 10 % and 30% of the highest value in the ranked series.

**Very wet:** The value lies within 10 % of the highest value in the ranked series.

**Dry:** The value lies between 10 % and 30 % above the lowest value in the ranked series.

**Very dry:** The value lies within 10 % of the lowest value in the ranked series.

**Long-term:** Mention may be made in the reports to the 'long-term'. The long-term record comprises a temperature/rainfall/sunshine data series compiled from records of various weather stations in the Wokingham area in the years prior to the establishment of the weather station at Emmbrook in 1976 together with data from this station.

In the case of monthly max, min and mean temperature and of rainfall total the series starts in 1882. For temperature extremes, the highest max and lowest min go back to 1904, and lowest max and highest min to 1913.

**Rank:** The word rank refers to the position of a value for a particular month/season/year in the ranked series, and may be expressed relative to either the highest or lowest value in the series. The central value in the ranked series is known as the **median**. This value may be different from the average of the whole series if the population is skewed. It can also be different from the climatological average which only refers to a 30 year period.

**Month:** Calendar month.

**Season:** Spring, March to May.

Summer, June to August

Autumn, September to November

Winter, December to February.

When discussing 'winter', if a single year is given this refers to the year in which the January/February fall.

**Annual or Year:** The calendar year, 1<sup>st</sup> January to 31<sup>st</sup> December.

**The climatological day:** runs from 0900 to 0900 GMT. The max temperature and rainfall read at 0900 hours are attributed to the previous day (thrown back), as is the duration of measurable rain. The min temperature and grass min read at 0900 hours are attributed to the day of reading. Pressure read at 0900 GMT, and the monthly mean pressure is the mean of the 0900 GMT readings. Sunshine data, wind data, rainfall rate data and 24 hour data from the AWS use the normal 00-24 GMT day.

**Frost:** An air frost day is recorded when the minimum temperature read at 0900 GMT on that day is  $-0.1^{\circ}\text{C}$  or below. A ground frost day is recorded when the grass minimum temperature read at 0900 GMT on that day is  $-0.1^{\circ}\text{C}$  or lower.

Duration of air frost is defined as the number of minutes that the AWS one minute average temperature is below  $0.0^{\circ}\text{C}$ , and the day runs from midnight to midnight.

**Snow:** A day with snow falling is triggered if snow falls at any time in the 24 hours from midnight on that day. A day with snow lying is entered if there is at least 50% snow cover at the 0900 GMT observation.

Snow depth is the depth of undrifted snow. Snow that collects in the raingauge funnel is melted and the amount recorded as rainfall.

**Hail:** A day of hail is recorded if hailstones 5 mm or more in diameter are observed or recorded on the hail pad in a 24 hour period starting at midnight.

A day of small hail is recorded if hailstones less than 5 mm diameter are observed or recorded in a 24 hour period starting at midnight. The term small hail also includes various other types of ice meteor such as ice pellets, snow grains and some types of snow pellets.

**Fog:** A day with fog is recorded if the horizontal visibility at 0900 GMT is below 1000 m.

**Thunder:** A day of thunder is recorded if thunder is heard in the 24 hour period from midnight on that day. The appearance of lightning without thunder being heard does not qualify as a thunder day.

**Trace of rainfall:** A trace of rain, entered as 'tr' in the daily log, is recorded if rain is observed to fall but is of insufficient quantity to collect in the raingauge, or if the amount of rain in the gauge is less than 0.05 mm.

**Dry spell:** A dry spell is defined as a period of 5 or more consecutive dry days.

**Dry day:** A dry day is one with less than 0.2 mm of rainfall.

**Rain day:** A rain day is one with 0.2 mm or more of rainfall.

**Wet day:** A wet day is one having 1.0 mm or more of rainfall.

## Appendix 2.

Explanation and decode for code figures used in the Wokingham 0900 and 1500 GMT observations

**VV** : Visibility.

Code figures 00 to 50 are in km and tenths e.g. 01 = 0.1 km = 100 m, 33 = 3.3 km, 50 = 5.0 km

Code figures 60 to 80. Subtract 50 to obtain visibility in km. e.g. 56 = 6 km, 65 = 15 km, 77 = 27 km.

Code figures 81 to 89. Subtract 50 and add 5 for every one above 80. e.g. 83 = 45 km, 86 = 60 km.

Code figure 89 = visibility above 70 km.

**N** : Total cloud amount in okta (eighths of sky covered). 9 = sky obscured (e.g. by fog or snow)

**dd** : Wind direction in tens of degrees from true north. Wind is measured at a height of 10 m, and the direction is the mean over a period of 10 minutes ending at the observation time.

**ff** : Wind speed in knots, measured at 10 m, and is the mean over a period of 10 minutes ending at observation time.

**gg** : Wind gust in knots at 10 m. The highest gust in the 60 minutes up to observation time.

**TT** : Air temperature at 1.2m, degrees C and tenths.

**TdTd** : Dew point temperature at 1.2m, degrees C and tenths.

**RH** : Relative humidity at 1.2m, %.

**r** : Humidity mixing ratio (amount of water vapour per kg of air), grams and tenths.

**PPP** : Air pressure reduced to MSL, millibars and tenths.

**a** : Characteristic of pressure tendency during the past 3 hours.

Code figures 0 to 3, pressure higher than 3 hours ago, 5 to 8, pressure lower than 3 hours ago

Code figure 0 = Increasing then decreasing, pressure the same as or higher than 3 hours ago

1 = Increasing then steady or increasing more slowly

2 = Increasing steadily or unsteadily

3 = Decreasing or steady then increasing, or increasing then increasing more rapidly

4 = Steady, pressure the same as 3 hours ago

5 = Decreasing then increasing, pressure lower than 3 hours ago

6 = Decreasing then steady or decreasing more slowly

7 = Decreasing steadily or unsteadily

8 = Steady or increasing then decreasing, or decreasing then decreasing more rapidly

**ppp** : 3 hour pressure tendency in tenths of a millibar

**ww** : Present weather code figures, 00 to 99.

Present weather decode:

00 = Cloud development not observed or not observable

01 = Clouds generally dissolving or becoming less developed

02 = State of sky on the whole unchanged

03 = Clouds generally increasing or becoming more developed

04 = Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes.

05 = Haze, visibility reduced by extremely small dry particles (RH less than appx. 95 %)

06 = Widespread dust in suspension, not raised by the wind near the station at the time of the observation

07 = Dust or sand raised by the wind at or near the station at the time of the observation, but no well-developed dust whirls or sand whirls, and no duststorm or sandstorm seen: In marine environments, blowing spray at the station.

08 = Well-developed dust or sand whirls seen at or near the station during the preceding hour or at the time of the observation, but no duststorm or sandstorm.

09 = Duststorm or sandstorm within sight at the time of the observation, or at the station during the preceding hour

10 = Mist  
11 = Patches of shallow fog not deeper than 2 metres on land  
12 = More or less continuous shallow fog not deeper than 2 metres on land  
13 = Lightning visible, no thunder heard  
14 = Precipitation within sight, not reaching the ground  
15 = Precipitation within sight, reaching the ground more than 5 km from the station  
16 = Precipitation within sight, reaching the ground, near to but not at the station  
17 = Thunderstorm, but no precipitation at the time of the observation  
18 = Squalls at or within sight of the station at the time of the observation or during the preceding hour  
19 = Funnel cloud(s) at or within sight of the station at the time of the observation or during the preceding hour

20 = Drizzle (not freezing) at the station during the preceding hour but not at the time of the observation  
21 = Rain (not freezing) at the station during the preceding hour but not at the time of the observation  
22 = Snow at the station during the preceding hour but not at the time of the observation  
23 = Rain and snow or ice pellets at the station during the preceding hour but not at the time of the observation  
24 = Freezing drizzle or freezing rain at the station during the preceding hour but not at the time of the observation  
25 = Shower(s) of rain at the station during the preceding hour but not at the time of the observation  
26 = Shower(s) of snow or rain and snow at the station during the preceding hour but not at the time of the observation  
27 = Shower(s) of hail or rain and hail at the station during the preceding hour but not at the time of the observation  
28 = Fog or ice fog at the station during the preceding hour but not at the time of the observation  
29 = Thunderstorm, with or without precipitation at the station during the preceding hour but not at the time of the observation

30 = Slight or moderate duststorm or sandstorm has decreased during the preceding hour  
31 = Slight or moderate duststorm or sandstorm with no appreciable change during the past hour  
32 = Slight or moderate duststorm or sandstorm has begun or increased during the past hour  
33 = Severe duststorm or sandstorm has decreased during the preceding hour  
34 = Severe duststorm or sandstorm with no appreciable change during the past hour  
35 = Severe duststorm or sandstorm has begun or increased during the past hour  
36 = Slight or moderate drifting snow generally below eye level  
37 = Heavy drifting snow generally below eye level  
38 = Slight or moderate blowing snow generally above eye level  
39 = Heavy blowing snow generally above eye level

40 = Fog or ice fog at a distance at the time of the observation, but not at the station during the preceding hour, the fog extending to a level above that of the observer.  
41 = Fog or ice fog in patches  
42 = Fog or ice fog, sky visible has become thinner during the past hour  
43 = Fog or ice fog, sky invisible has become thinner during the past hour  
44 = Fog or ice fog, sky visible no appreciable change during the past hour  
45 = Fog or ice fog, sky invisible no appreciable change during the past hour  
46 = Fog or ice fog, sky visible has begun or become thicker during the past hour  
47 = Fog or ice fog, sky invisible has begun or become thicker during the past hour  
48 = Fog, depositing rime, sky visible  
49 = Fog depositing rime, sky invisible

50 = Drizzle, not freezing, intermittent slight at time of observation  
51 = Drizzle, not freezing, continuous slight at time of observation  
52 = Drizzle, not freezing, intermittent moderate at time of observation  
53 = Drizzle, not freezing, continuous moderate at time of observation  
54 = Drizzle, not freezing, intermittent heavy at time of observation  
55 = Drizzle, not freezing, continuous heavy at time of observation  
56 = Drizzle, freezing, slight  
57 = Drizzle, freezing, moderate or heavy (dense)  
58 = Drizzle and rain, slight  
59 = Drizzle and rain, moderate or heavy

60 = Rain, not freezing, intermittent slight at time of observation  
61 = Rain, not freezing, continuous slight at time of observation  
62 = Rain, not freezing, intermittent moderate at time of observation  
63 = Rain, not freezing, continuous moderate at time of observation  
64 = Rain, not freezing, intermittent heavy at time of observation  
65 = Rain, not freezing, continuous heavy at time of observation  
66 = Rain, freezing, slight  
67 = Rain, freezing, moderate or heavy  
68 = Rain or drizzle and snow, slight  
69 = Rain or drizzle and snow, moderate or heavy

70 = Intermittent fall of snowflakes slight at time of observation  
71 = Continuous fall of snowflakes slight at time of observation  
72 = Intermittent fall of snowflakes moderate at time of observation  
73 = Continuous fall of snowflakes moderate at time of observation  
74 = Intermittent fall of snowflakes heavy at time of observation  
75 = Continuous fall of snowflakes heavy at time of observation  
76 = Diamond dust (with or without fog)  
77 = Snow grains (with or without fog)  
78 = Isolated star-like snow crystals (with or without fog)  
79 = Ice pellets

80 = Rain shower(s), slight  
81 = Rain shower(s), moderate or heavy  
82 = Rain shower(s), violent  
83 = Shower(s) of rain and snow mixed, slight  
84 = Shower(s) of rain and snow mixed, moderate or heavy  
85 = Snow shower(s), slight  
86 = Snow shower(s), moderate or heavy  
87 = Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed, slight  
88 = Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed, moderate or heavy  
89 = Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder, slight  
90 = Shower(s) of hail, with or without rain or rain and snow mixed, not associated with thunder, moderate or heavy

91 = Slight rain at time of observation, thunderstorm during the past hour but not at time of observation  
92 = Moderate or heavy rain at time of observation, thunderstorm during the past hour but not at time of observation  
93 = Slight snow, or rain and snow mixed, or hail at time of observation, thunderstorm during the past hour but not at time of observation  
94 = Moderate or heavy snow, or rain and snow mixed, or hail at time of observation, thunderstorm during the past hour but not at time of observation  
95 = Thunderstorm, slight or moderate, without hail but with rain and or snow at time of observation  
96 = Thunderstorm, slight or moderate, with hail at time of observation  
97 = Thunderstorm, heavy, without hail but with rain and or snow at time of observation  
98 = Thunderstorm combined with duststorm or sandstorm at time of observation  
99 = Thunderstorm, heavy, with hail at time of observation

Hail includes large hail, small hail and snow pellets.

**W1, W2 :** Past weather (for 0900 and 1500 GMT observations, the period covered is 3 hours)

Code figures:

- 0 = Cloud covering half or less of the sky throughout the period
- 1 = Cloud covering more than half the sky during only part of the period
- 2 = Cloud covering more than half the sky throughout the period
- 3 = Sandstorm, duststorm or blowing snow
- 4 = Fog or ice fog or thick haze (visibility less than 1000 m)
- 5 = Drizzle
- 6 = Rain
- 7 = Snow or rain and snow mixed
- 8 = Shower(s)
- 9 = Thunderstorm(s) with or without precipitation

**Nh :** Amount of low cloud, or medium cloud if no low cloud present, okta

**Cl :** Type of low cloud

- 0 = No low cloud
- 1 = Cumulus with little vertical extent and seemingly flattened, or ragged Cumulus other than bad weather, or both
- 2 = Cumulus of moderate or strong vertical extent, either accompanied or not by other Cumulus or Stratocumulus all having their bases at the same level
- 3 = Cumulonimbus whose summits, at least partially, lack sharp outline, but are neither clearly fibrous (cirriform), nor in the form of an anvil; Cumulus, Stratocumulus or Stratus may also be present
- 4 = Stratocumulus formed by the spreading out of Cumulus; Cumulus may also be present
- 6 = Stratus in a more or less continuous sheet or layer, or ragged shreds, or both, but no Stratus fractus of bad weather
- 7 = Stratus fractus of bad weather or Cumulus fractus of bad weather or both (pannus), usually below Altostratus or Nimbostratus
- 8 = Cumulus and Stratocumulus other than that formed by the spreading out of Cumulus, the bases of the Cumulus and Stratocumulus are not at the same level.
- 9 = Cumulonimbus, the upper part of which is clearly fibrous (cirriform), often in the form of an anvil, either accompanied or not by any other type(s) of low cloud
- / = Types of low cloud invisible due to darkness, fog, blowing dust or sand or other similar phenomena.

'Bad weather' denotes the conditions which generally exist during precipitation and a short time before and after.

**Cm :** Type of medium cloud.

- 0 = No medium cloud.
- 1 = Altostratus, the greater part of which is semi-transparent; through this part the sun or moon may be weakly visible, as through ground glass
- 2 = Altostratus, the greater part of which is sufficiently dense to hide the sun or moon, or Nimbostratus
- 3 = Altocumulus, the greater part of which is semi-transparent; the various elements of the cloud change only slowly and are all at a single level
- 4 = Altocumulus in patches (often in the form of almonds or fishes), the greater part of which is semi-transparent ; the clouds occur at one or more levels and the elements are continually changing in appearance
- 5 = Altocumulus in bands semi-transparent, of Altocumulus in one or more fairly continuous layers (semi-transparent or opaque), progressively invading the sky; these Altocumulus clouds generally thicken as a whole
- 6 = Altocumulus resulting from the spreading out of Cumulus (or Cumulonimbus)
- 7 = Altocumulus in two or more layers, usually opaque in places, and not progressively invading the sky; or opaque layer of Altocumulus not progressively invading the sky; or Altocumulus together with Altostratus or Nimbostratus
- 8 = Altocumulus with sproutings in the form of small towers or battlements, or Altocumulus having the appearance of cumuliform tufts
- 9 = Altocumulus of a chaotic sky, generally at several levels
- / = Types of medium cloud invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.

**Ch :** Type of high cloud

0 = No high cloud

1 = Cirrus in the form of filaments, strands or hooks, not progressively invading the sky.

2 = Dense cirrus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus with sproutings in the form of small turrets or battlements, or Cirrus having the appearance of cumuliform tufts

3 = Dense Cirrus, often in the form of an anvil, being the remains of the upper part of Cumulonimbus, or where the rest of the Cumulonimbus is below the horizon

4 = Cirrus in the form of hooks or filaments, or both, progressively invading the sky; they generally become denser as a whole

5 = Cirrus (often in bands converging towards one or two opposite points on the horizon) and Cirrostratus, or Cirrostratus alone; in either case they are progressively invading the sky, and generally growing denser as a whole, but the continuous veil does not reach 45 degrees above the horizon.

6 = Cirrus (often in bands converging towards one or two opposite points on the horizon) and Cirrostratus, or Cirrostratus alone; in either case they are progressively invading the sky, and generally growing denser as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered

7 = Veil of Cirrostratus covering the celestial dome.

8 = Cirrostratus not progressively invading the sky and not completely covering the celestial dome

9 = Cirrocumulus alone, or accompanied by Cirrus or Cirrostratus, or both, but Cirrocumulus is predominant.

/ = Types of high cloud invisible owing to darkness, fog, blowing dust or sand or other similar phenomena, or more often because of the presence of a continuous layer of lower clouds.

**8 Groups**

**N** = Amount of cloud reported by C, okta.

**C** = Type of cloud

0 = Cirrus (Ci)

1 = Cirrocumulus (Cc)

2 = Cirrostratus (Cs)

3 = Altocumulus (Ac)

4 = Altostratus (As)

5 = Nimbostratus (Ns)

6 = Stratocumulus (Sc)

7 = Stratus (St)

8 = Cumulus (Cu)

9 = Cumulonimbus (Cb)

/ = Cloud type not visible owing to darkness, fog, duststorm, or other analogous phenomena.

**hshs** = Height of cloud above station level reported by type C

00 to 50 = Height in hundreds of feet

51 to 55 Not used

56 to 80 = Subtract 50 to obtain cloud height in thousands of feet

81 to 88 = Height of cloud between 35000 and 70000 ft in 5000 ft steps.