

Radcliffe Meteorological Station

Oxford University Centre for the Environment

The Weather at Oxford in 2015

This year Radcliffe Meteorological station celebrated its 200th year of daily weather measurements. Following from the warmest year on record in 2014, 2015 continues the trend of very warm annual temperatures, ranking in the top 13 warmest years in our 200-year record of daily measurements. The top 14 warmest years have all occurred in the last thirty years. This can be attributed to both warmer maximum temperatures and warmer minimum temperatures; both of which were significantly above average. All months but one experienced average temperatures above the long term mean. November and December were exceptionally warm, ranking second and first respectively in our record. In addition to higher temperatures, it was slightly drier than average over the year, with a total rainfall of 549mm, almost 100mm below the mean.



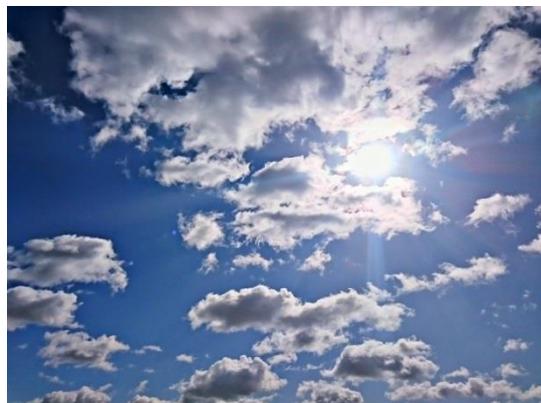
January kicked off the year with sunny conditions, following on from December 2014, the sunniest December in our RMS record. The January total of 81.9 hours was well above the long-term mean of 54.9, ranking in the top 12 Januaries on record. The number of rain days was also significantly above average, though the total amount of rainfall remained close to the mean. Air temperature was slightly above average for this time of year, though not unusually so.

Sunny conditions continued into **February**. In December to February, 259.1 hours of bright sun were recorded; the second sunniest **winter** since our record began, and only 1.5 hours less than the record holder (1950-1951). This is in keeping with the recent trend toward sunnier winters. Several hypotheses have been proposed to explain this trend. One causal factor could be the falling levels of air pollution enabling more sun to penetrate to the surface. It is interesting to note that, the winter did not rank as particularly warm despite the sunny skies. However, as sunny days are often accompanied by cloud-free nights, more heat can escape the lower atmosphere, thereby reducing night-time temperatures and the overall mean air temperature.



The Campbell-Stokes recorder on one of the only two days of snow this year

The start to spring was unexceptional. Temperatures in **March** were slightly above average for the time of year, but not unusually so. The nights tended to be significantly warmer than



Sunshine and not much rain were the defining characteristics of April 2015

average with minimum temperatures only dropping to a low of -1.2°C . In **April**, we experienced very warm maximum temperatures, with the mean maximum value of 16.1°C ranking 5th in our record. The mean temperature at 30cm below ground was also in the top 5 warmest recorded at 11.1°C . It was also a sunny month, with 63.8 hours more sunshine than is expected at this time of year. The high sunshine went hand in hand with a low number of rain days (8), which is in the bottom 20 of our record. After an unusually warm April, air temperatures in **May** settled down and were closer to the long term mean.

Average temperatures increased steadily throughout **June**, culminating in a particularly warm week towards the end. The highest maximum temperature of 29.7°C (30th June), ranked in the top 15 hot June days in our 135 year record. Interestingly however, minimum temperatures were generally below the mean for June. This brought the average temperature for the month down to 15.4°C , in line with the long-term average for June. **July** began with very high temperatures, following on from the warm week at the end of June. On July 1st we recorded the third hottest July maximum temperature (33.5°C) in our records since 1881, and the hottest since 2006. Despite this warm start, as the month continued temperatures settled and the mean air temperature was only slightly above the mean (17.3°C , +0.7). Total rainfall and number of

rain days were slightly below average for the month. However, the 31.9mm of rain which fell on the 24th was the wettest July day for seven years and in the top 25 in our long term record.

Following some interesting weather in July, **August** was fairly normal. The mean temperatures were slightly above, but within a degree of the long term mean. Other variables showed little variation from their respective means. In this month we learnt that magpies are attracted to the shiny sun recorder and we lost several of our recording cards (see photo below)/. This left our August sunshine record a little incomplete. Sunshine data from this month was borrowed from the nearby station in the Physics department, and total sunshine hours were fairly average for August.

In **September**, Oxford experienced cooler than average temperatures. Mean maximum, minimum and daily temperatures were all below average, but not significantly so. Ground temperatures tended to be colder than is usual for this time of year with mean minimum grass (5.2°C) and concrete (7.6°C) temperatures both significantly lower than the long term mean, with the latter ranking as the joint coolest (with 2006) in our 29-year record. **October** reverted to the trend of warmer than average temperatures. Notably, the lowest temperature recorded was 2.7°C (on the 26th), which is unusually high for this time of year. Ground temperature followed much the same pattern, with fewer days of ground frost days experienced in October than normal.

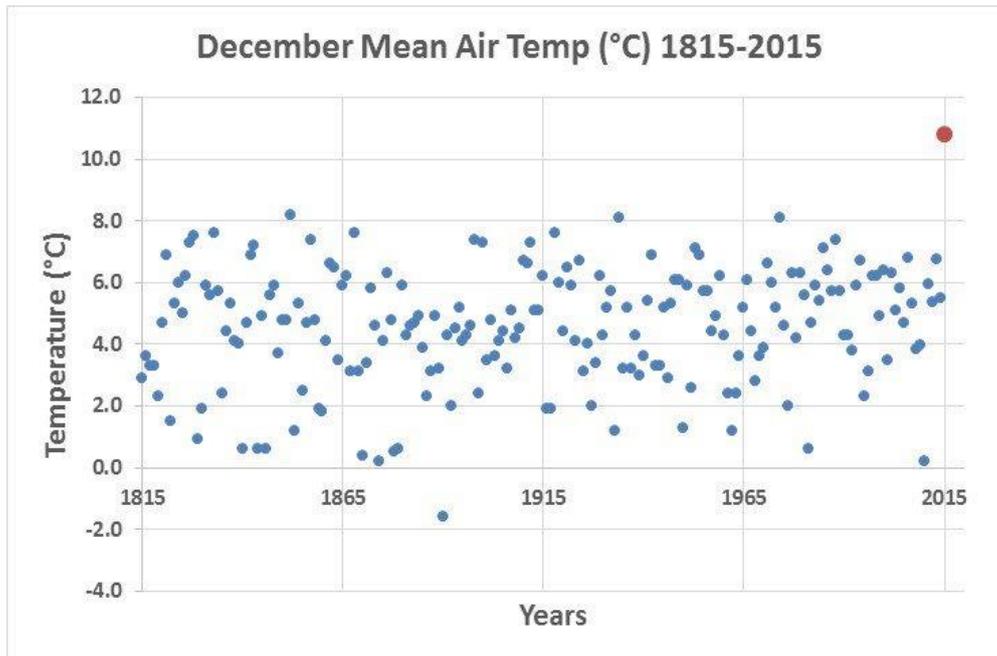


The sad fate of several of our sun cards

November was significantly warmer than average across a number of variables. It ranks as the second warmest November (10.1°C) in the 200 year record, behind 1994 which had an average air temperature of 10.4°C. This was due to both warmer days and milder nights. The mean maximum air temperature of 13.2°C was well above average, ranking as the second warmest November value after 2011. The mean minimum air temperature of 7.4°C was also in excess of two standard deviations from the long term mean, ranking as the second warmest in the record, behind 1994 with 8.4°C. The mean 30cm temperature of 10.7°C was the second warmest recorded in our record, behind 1994 (10.8°C) and tied with 2011.

November had fairly average rainfall totals, although rain was spread over significantly more days than usual for this time of year (22). The high number of rain days may explain the fewer recorded hours of sunshine, with only just over half the amount of sunshine usually seen in November. This places November 2015 as the 5th least sunny November in over 100 years.

December was exceptionally mild in Oxford. Record high temperatures were recorded across every temperature metric. Mean minimum temperature was 6.1°C above average, with the lowest temperature reached (3.5°C), extremely high for this time of year. Maximum temperatures were also exceptionally high, with the previous record maximum of 15.2°C (1985, 2001) surpassed by twice, first on the 17th (15.8°C) and then on the 18th December (15.9°C). Accordingly, the mean air temperature of 10.8°C was 6.2 degrees above average for this time of year, beating the previous record, set in 1852, by 2.6 degrees. Interestingly, the mean temperature also surpassed the record mean temperatures in November (10.4), January (7.7), February (8.0) and March (9.5). The following graph shows the December 2015 mean air temperature with respect to our long term record.



Records were also broken across a number of other temperature variables. These are outlined in the table below.

Temperature Metric	December 2015	Previous record	Difference from previous record
Mean air (°C)	10.8	8.2	+2.6
Mean maximum (°C)	13.6	10.6	+3.0
Absolute maximum (°C)	15.9	15.2	+0.7
Mean minimum (°C)	8.2	5.9	+2.3
Absolute minimum (°C)	3.5	1.2	+2.3
Mean min. grass (°C)	5.4	3.8	+1.6
Absolute min. grass (°C)	-1.7	-2.0	+0.3
Mean min. concrete (°C)	6.3	3.3	+3.0
Absolute min. concrete (°C)	0.7	-2.3	+3.0
Mean soil temperature (30cm) (°C)	9.6	8.2	+1.4
Ground frost days (days)	1	5	-4

A reminder that full details of the monthly weather for 2015 can be found on our website: <http://www.geog.ox.ac.uk/research/climate/rms/>. You can also follow updates from the station on our twitter account @RMS_Oxford.

Amy Creese and Callum Munday, RMS Observers, 04/01/2015

RMS 200

In 2015 RMS celebrated 200 years of daily weather recordings, the longest record of daily temperature and rainfall observations in the UK. On the 15th May, we joined with representatives from the Met Office and Royal Meteorological Society to recognise this occasion and receive a long-service award.

In accepting this award, Professor Richard Washington, Station Chief, said: *“We are delighted that the Met Office should recognise the University's contribution in this way. It provides a moment to pause and remember those with the foresight to embark on extraordinary efforts to record the weather each day so long ago - long before the justification of climate change was to hand. Ours is an old planet yet one with a very young observational record. But without those 200 years of data, nature, and the way we are influencing it, would be so much harder to understand.”*

In addition to hosting guests and perusing historical records, the two current observers, Amy and Callum, were interviewed by BBC South Today.



February 1772				
8	20	29	54	18 3/4
9	5	29	54	18
10	7	29	50 1/2	19
19	35	29	29	29 +
5	0	29	26	32 1/2 N.W.
2	30	29	26	34 S.W.
3	0	29	25 1/2	29 1/2
10	5	29	28	27 +
19	25	29	49 1/2	14
6	1	29	54 +	26 3/4
2	25	29	55	26 +
5	15	29	59	20
6	15	29	61 1/2	19 3/4
7	35	29	63	20 3/4
9	5	29	63 +	24
10	10	29	64	24 1/2
19	50	29	64 +	26
7	0	29	71	22

