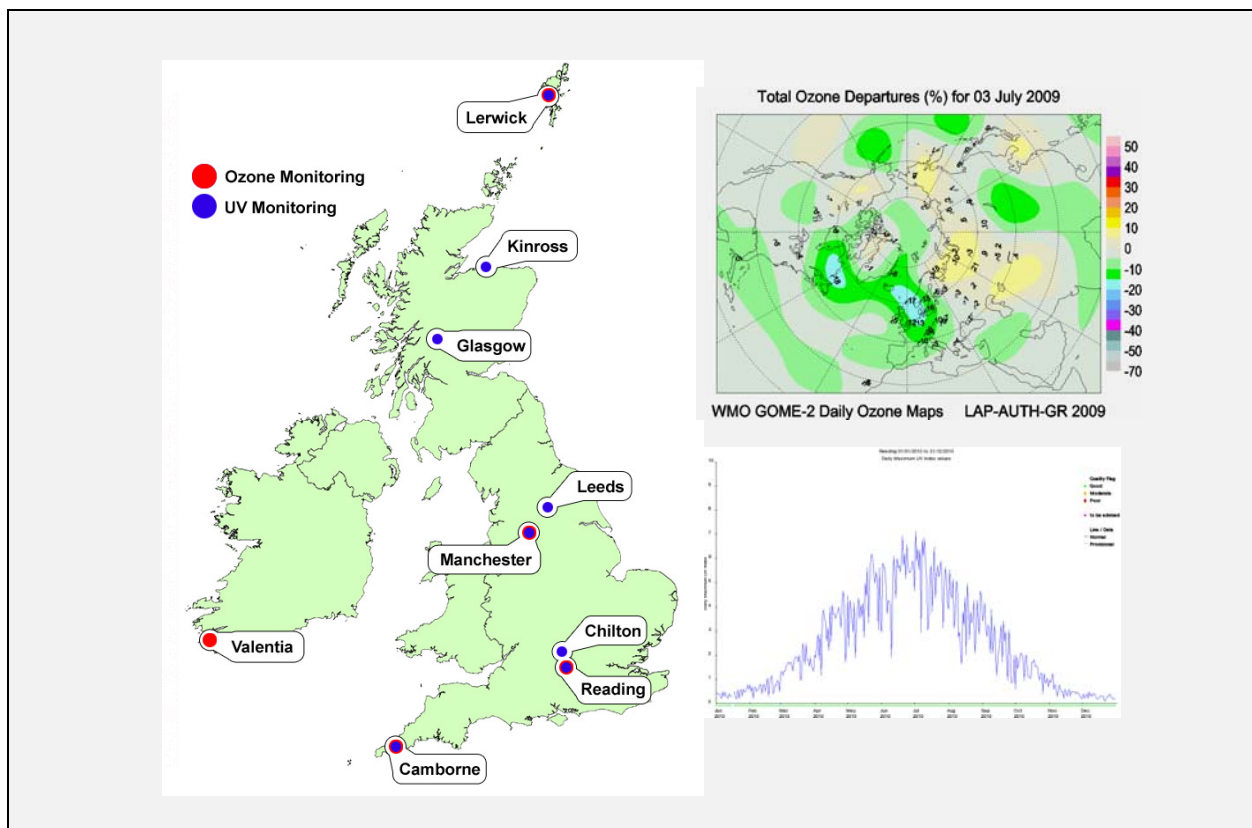


# Baseline Measurement and Analysis of UK Ozone and UV

Defra Annual Report Contribution 2012



Report for Defra

Restricted Commercial

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# 1 Introduction

The Department for Environment, Food and Rural Affairs (Defra) let a contract for the Baseline Measurement and Analysis of UK Ozone and UV to a project team led by AEA. The other members of the project team are the Met Office, the University of Manchester, the University of Reading and Imperial College. Each has specific individual responsibilities for the monitoring, reporting or analysis of stratospheric ozone and UV.

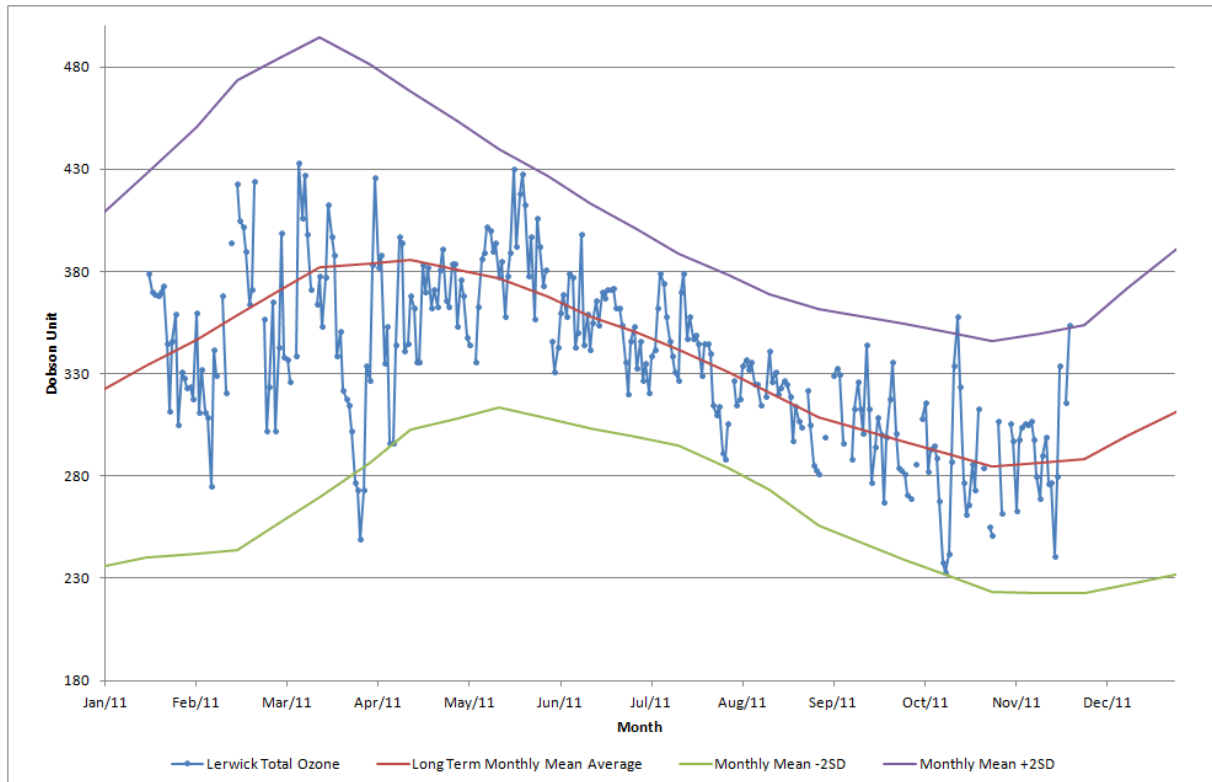
The current contract runs from the 16<sup>th</sup> October 2010 to 30<sup>th</sup> September 2015. This report comprises of the project teams contribution to the 2011 Defra annual report.

In-line with the submissions made in previous years this report therefore provides the following:

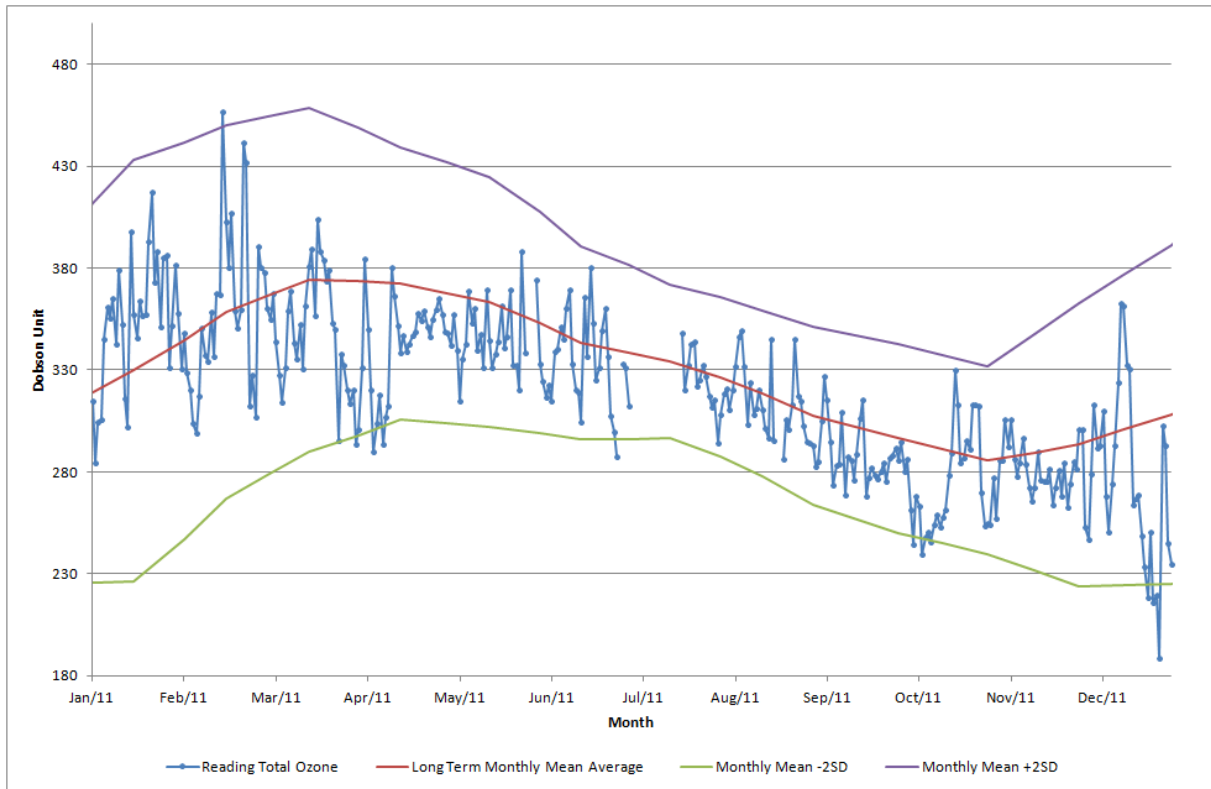
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- Reading and Lerwick Total Daily Ozone Column plots for 2011.
  - Low ozone events for 2011.
  - Reading Daily UV index values for 2011.
  - Climatology values to be used for 2012 (based on 2011 data)
-

## 2 2011 Daily Total Ozone Measurements

During 2011 measurements continued to be made at Lerwick, with a Dobson Spectrophotometer, and at Reading with a Brewer Spectrophotometer. Figure 1 and Figure 2 below illustrate the seasonal variation recorded at these locations.



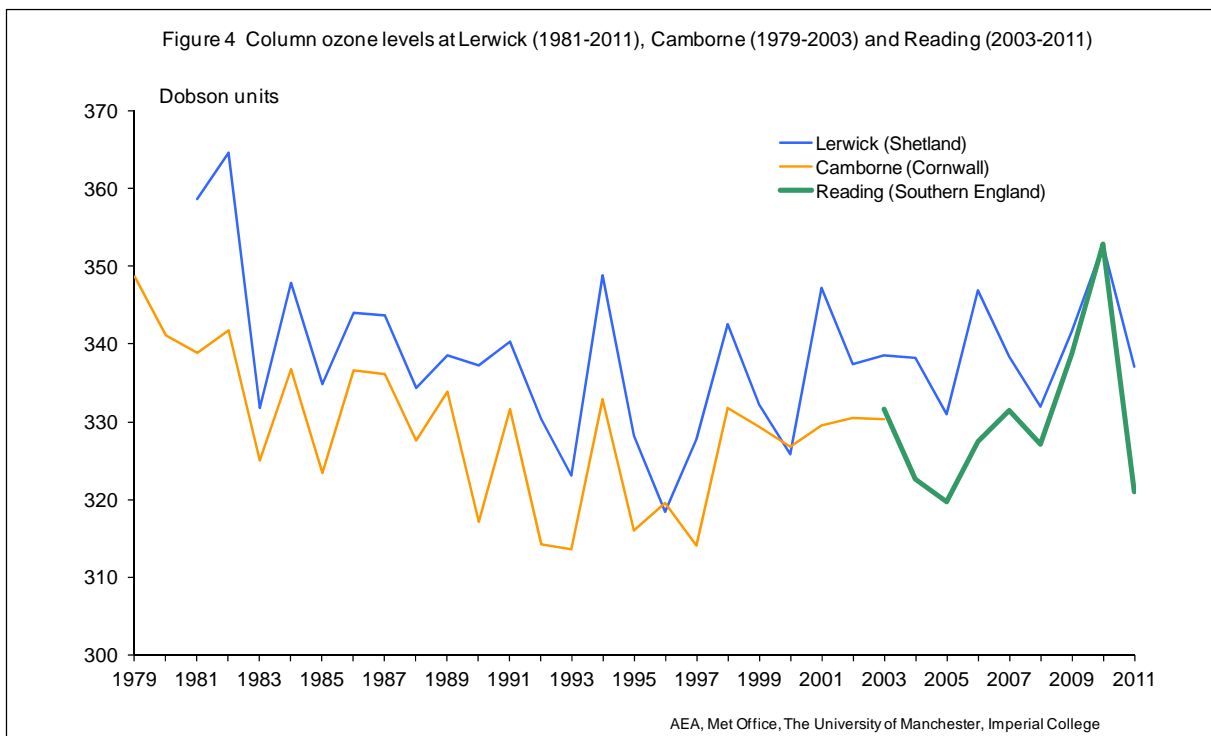
**Figure 1 Daily Total Ozone at Lerwick, 2011**



**Figure 2 Daily Total Ozone at Reading, 2011**

## 2.1 Annual Mean Column Ozone

Annual means were calculated for 2011 and appended to the column ozone chart and table in Figure 3 and Table 1 respectively. These data have also been updated within the Defra Excel reporting format.



**Figure 3 Column ozone levels at Lerwick (1981-2011), Camborne (1979-2010) and Reading (2003-2011) (Source: AEA, Met Office, The University of Manchester, and Imperial College)**

**Table 1 Annual Mean Column levels at Lerwick, Camborne, and Reading: 1979-2011 (Dobson Units) (Source: AEA, Met Office, The University of Manchester, and Imperial College)**

Year	Lerwick (Shetland) (D.U)	Camborne (Cornwall) (D.U)	Reading (Southern England) (D.U)
1979		348.7	
1980		341.1	
1981	358.7	338.8	
1982	364.6	341.8	
1983	331.8	325.1	
1984	347.8	336.8	
1985	334.8	323.3	
1986	344.1	336.7	
1987	343.6	336.2	
1988	334.3	327.7	
1989	338.5	333.9	
1990	337.2	317.1	
1991	340.3	331.5	
1992	330.4	314.3	
1993	323.0	313.5	
1994	348.8	332.8	
1995	328.2	316.0	
1996	318.5	319.6	
1997	327.8	314.0	
1998	342.6	331.8	
1999	332.3	329.4	
2000	325.8	326.7	
2001	347.3	329.6	
2002	337.4	330.6	
2003	338.5	330.4	331.7
2004	338.1		322.6
2005	331.0		319.7
2006	346.9		327.4
2007	338.3		331.5
2008	332.0		327.2
2009	341.7		338.7
2010	352.8		352.9
2011	337.0		321.0



## 3 Low Ozone Events for 2011

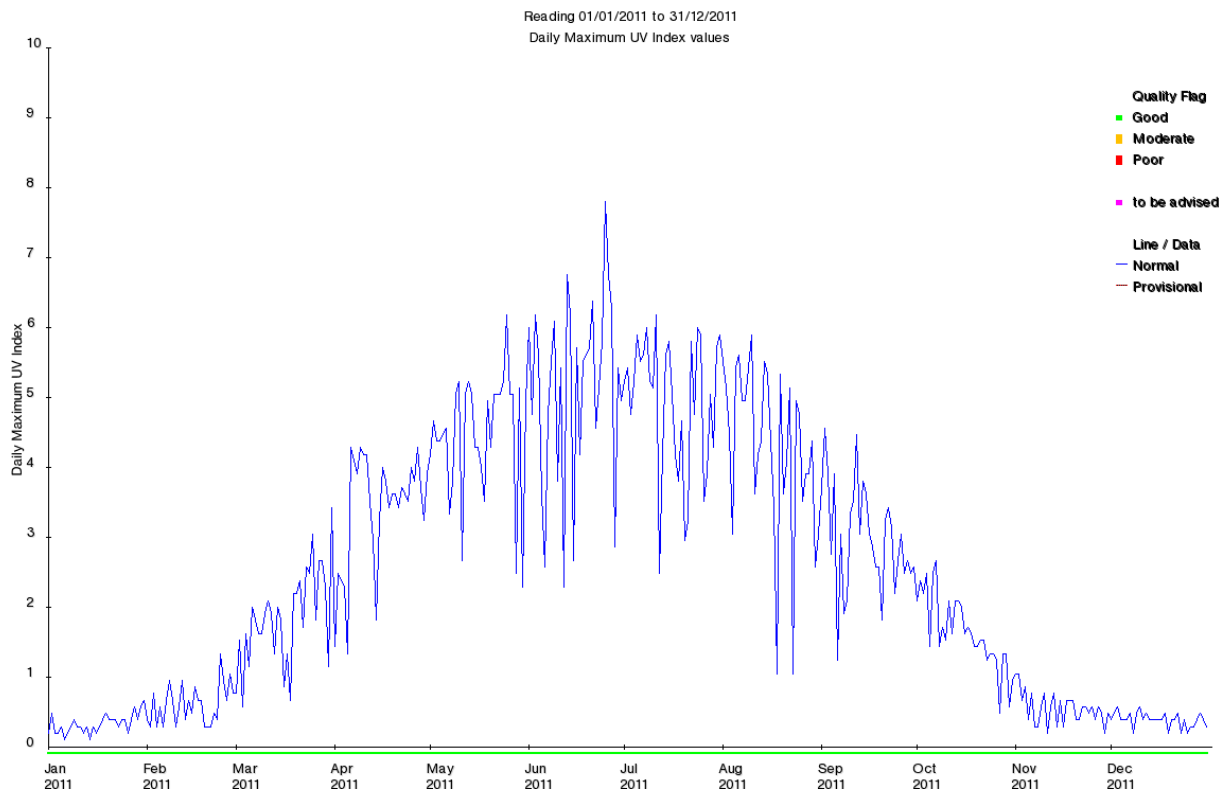
The number of Low Ozone Events (greater than 2 s.d. of the long term monthly mean) during 2011 were 5 at Lerwick and 9 at Reading and are show in Table 2. These events were reported to Defra.

**Table 2** Table illustrates the days where the best daily value was greater than 2 s.d of the long term monthly mean.

Date	Site
27-Mar-11	Lerwick
28-Mar-11	Lerwick
29-Mar-11	Lerwick
30-Mar-11	Lerwick
31-Mar-11	Reading
6-Apr-11	Reading
9-Apr-11	Reading & Lerwick
27-Jun-11	Reading
8-Oct-11	Reading
23-Dec-11	Reading
25-Dec-11	Reading
26-Dec-11	Reading
27-Dec-11	Reading

## 4 UV Index

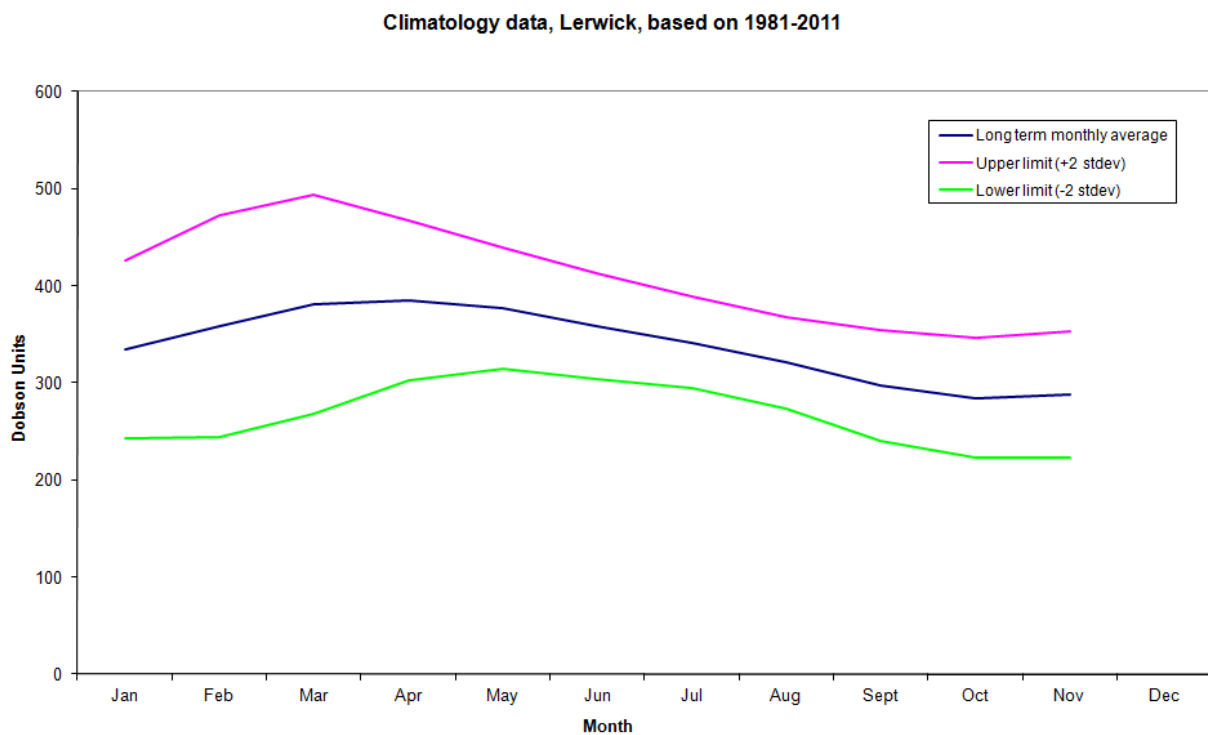
Spectral data from the DM150 UV instrument at Reading are converted to a simple UV index comparable with the results from the Health Protection Agency (HPA) broadband UV monitoring network. The measurement data and plots of the daily UV index and of the maximum daily (see Figure 6) UV index throughout the year are available on the website one day in arrears for public information.



**Figure 4 Reading Daily UV index values for 2011**

## 5 Ozone Climatology 2011

The long-term monthly means and standard deviations for both Lerwick and Reading sites have been updated to include 2011. These data have been applied to the website graphs for 2012 and are also being used to determine the lower limit to trigger a low ozone alert. Figure 7 and Figure 8 illustrate the new long-term monthly averages with both upper and the lower limits.



**Figure 5 Climatology data, Lerwick, based on 1981-2011**

Climatology data, Reading, based on 2003-2011

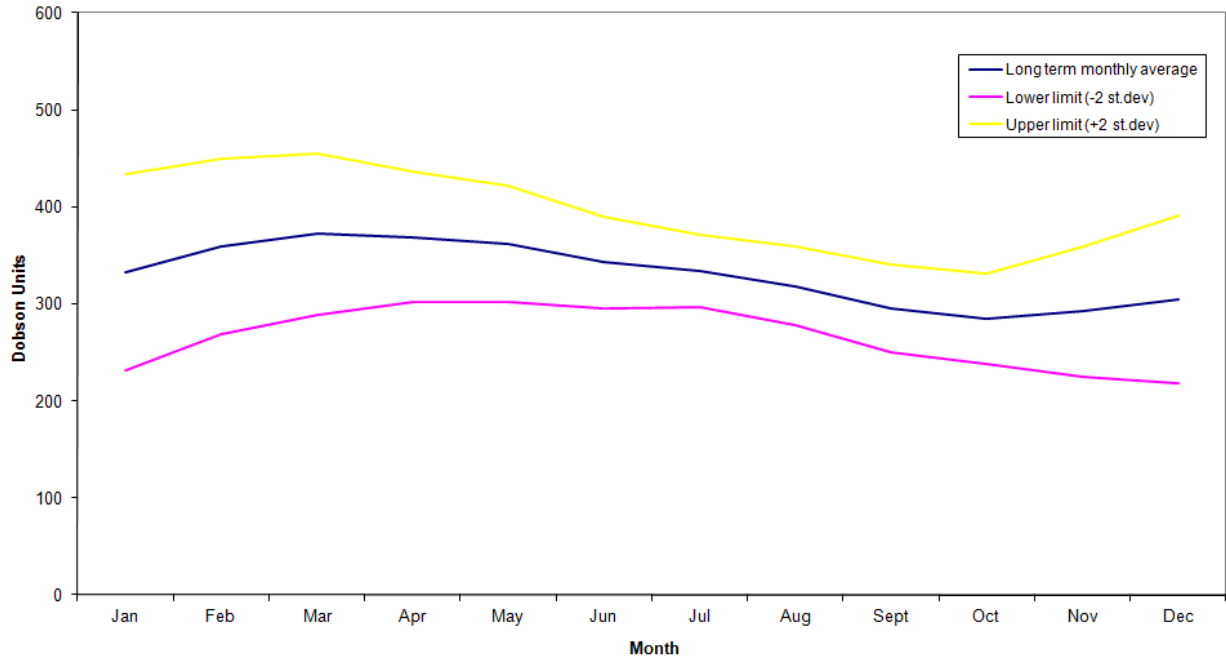


Figure 6 Climatology data, Reading, based on 1981-2011



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