

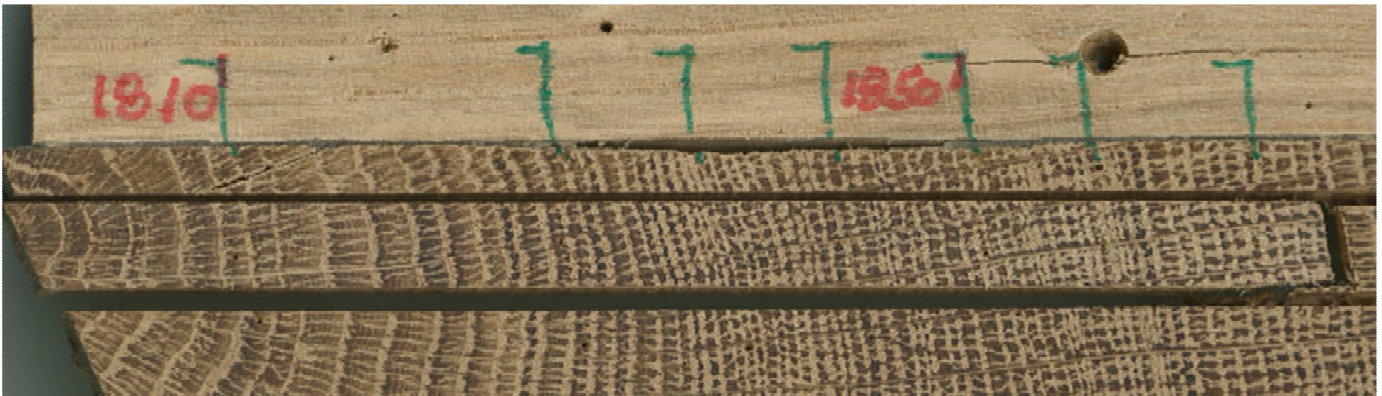
The Weather of 1826

Learning Objectives:

- Extreme weather - the impact of historical droughts on people in the UK.
- The difference between weather and climate.
- Data skills – line graphs and averages (mean).
- Critical thinking.

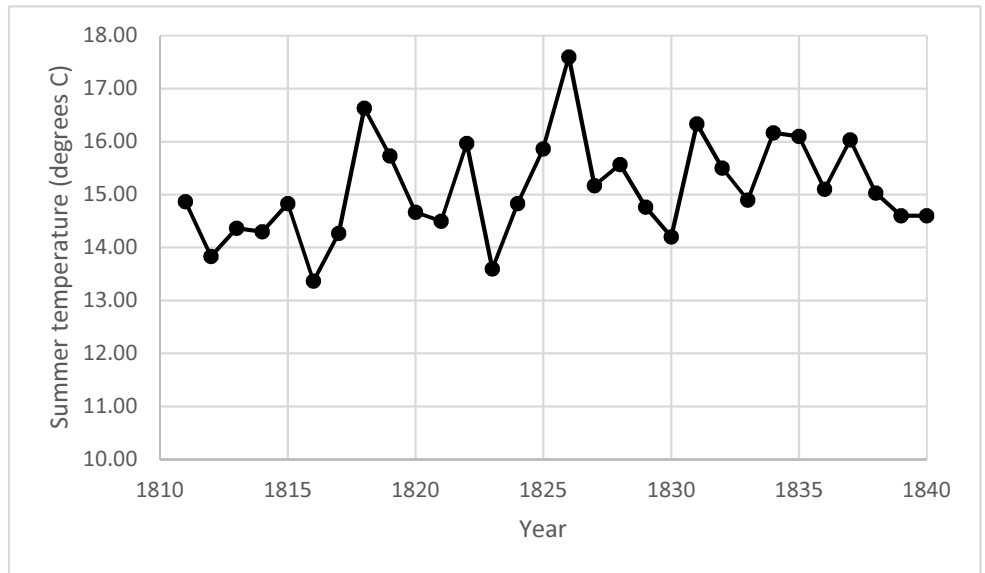
Trees growing in cool places respond to temperature changes – in warmer summers, they grow more and in cooler summers they grow less. The width of the tree rings is therefore a useful record of past temperatures, particularly for years before thermometers were in widespread use.

We are going to look at a piece of wood which came from an oak tree which grew at Blenheim Palace, Oxfordshire from 1788 – 2010, and which forms the basis of the One Oak (<https://sylva.org.uk/oneoak/>) project and was kindly provided by Dr Dan Miles (Oxford University). Oxfordshire is not a region where tree growth is regularly limited by temperature, but across this region, there is a tendency for trees to grow wide rings during warm summers when moisture is abundant, and to form narrow rings during cool summers or when moisture is limited. Remember also that this is just one tree and many factors other than weather (e.g. age, damage, disease, woodland management) can also affect tree growth – so it will reflect year to year variability in the weather affecting tree growth more faithfully than longer-term trends or tendencies. To be able to use tree rings to reconstruct the climate of the past requires samples from many trees and statistical analyses to extract a robust climatic signal from the tree-ring series – the data actually used in this exercise has been obtained in this way.



- 1) Can you identify the growth ring from 1826 on the photo? Make a mark to show where it is.

Year	Temperature (°C)
1840	14.60
1839	14.60
1838	15.03
1837	16.03
1836	15.10
1835	16.10
1834	16.17
1833	14.90
1832	15.50
1831	16.33
1830	14.20
1829	14.77
1828	15.57
1827	15.17
1826	17.60
1825	15.87
1824	14.83
1823	13.60
1822	15.97
1821	14.50
1820	14.67
1819	15.73
1818	16.63
1817	14.27
1816	13.37
1815	14.83
1814	14.30
1813	14.37
1812	13.83
1811	14.87
Average (mean):	15.11

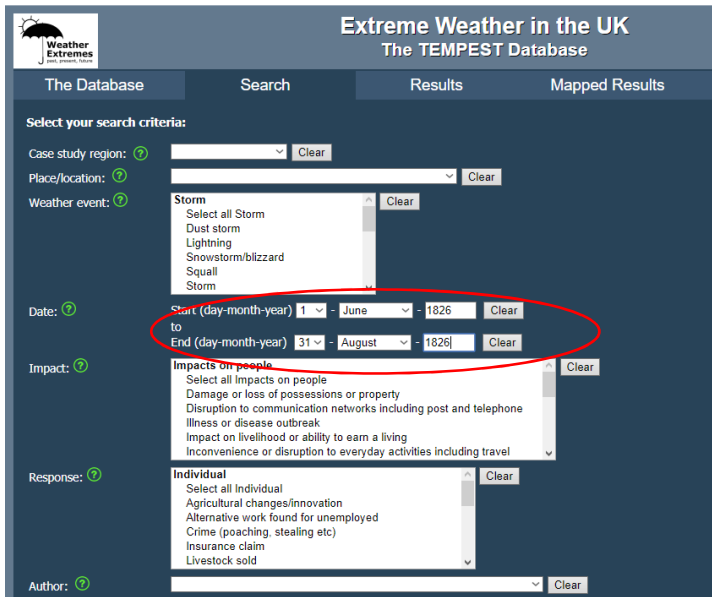


This table and graph show the year to year summer temperatures from 1811 to 1840 at the place where the tree from which this wood sample was taken was growing.

Climate is usually defined as being the 30-year average of weather.

- 2) Calculate the average summer temperature at the place where the tree from which this wood sample was taken was growing and write your answer in the table.
- 3) Circle the dot representing the summer temperature in 1826 on the graph.
- 4) Draw a horizontal line across the graph showing the mean temperature you calculated.
- 5) What was the summer temperature in 1826?
- 6) How much warmer was it in 1826 than the 30-year average temperature (the climate)?

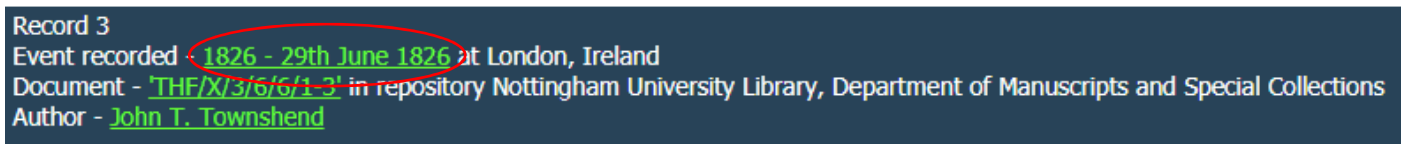
This difference in temperature doesn't sound a lot, but to see what impact it had on the people living in the UK at the time, go to <https://www.nottingham.ac.uk/geography/extreme-weather/search/> and click on the 'Search' tab. In the date section, select the dates between 1st June 1826 and 31st August 1826.



The screenshot shows the 'Extreme Weather in the UK' search interface. The 'Date' section is highlighted with a red circle, showing 'Start (day-month-year)' set to '1 - June - 1826' and 'End (day-month-year)' set to '31 - August - 1826'. Other search criteria include 'Weather event' (Storm), 'Impact' (Impacts on people), and 'Response' (Individual).

And click on 'Search' at the bottom of the page.

Read some of the reports of the weather that summer and the impacts it had on people living at the time, by clicking on the link next to the 'event recorded' lines.



Record 3
Event recorded - 1826 - 29th June 1826 at London, Ireland
Document - THF/X/3/6/6/1-3 in repository Nottingham University Library, Department of Manuscripts and Special Collections
Author - John T. Townshend

- 7) Write a newspaper article as if you were a reporter at the time. Remember that before social media, television and radio, newspapers were one of the only ways people could find out what was going on elsewhere in the country. You may like to use your atlas to find out where the places referred to are.

Differentiation: Weaker students could be directed towards specific records such as

- February 1826 – September 1826 at Yorkshire, UK wide, Lincolnshire, Nottinghamshire, Midlands, Derbyshire, Staffordshire, Ossington
- 1st June – 31st August 1826 at Boston, Fulletby

Extension exercise: putting 1.5°C global temperature rise in context (see for example <http://www.metlink.org/ipcc-1-5-degree-report/>, <https://www.carbonbrief.org/scientists-compare-climate-change-impacts-at-1-5c-and-2c/1-5c-vs-2c-final>, http://awsassets.panda.org/img/original/1_5c_infographic_final_high_res_final.jpg);