

# Learning About Past Weather at the Tower of London

Today, we can measure the atmosphere using instruments on the ground, on boats, on ocean buoys, on aeroplanes, on satellites and with radar. But if we want to know what the weather was doing before we had these sorts of instruments, we have to look at other ways temperature and rainfall are recorded.

Trees respond to the weather – and they can live a long time, recording the weather over tens or even hundreds of years in their annual growth rings. What's more, wood from trees which lived a long time ago can be found in old furniture, in houses and ships and also preserved in lakes, permafrost or bogs.

Look at the stump of a recently felled tree, and you'll see the rings – one pair of light and dark rings for each year of the tree's growth. The tree grew light coloured wood in spring and early summer, and dark coloured wood in late summer and autumn.

Oak trees are particularly useful – they live long and were well used in houses and ships, particularly in Medieval times.

By looking at the wood in the growth ring, we can analyse the carbohydrates that the tree made using photosynthesis. The ratios of the different isotopes of carbon in the ring, for example, can tell us how fast photosynthesis was occurring. That relates to summer sunshine and temperature. In a similar way, the ratios of the different isotopes of oxygen in the ring can tell us how wet the summer was.



**Key to Images**

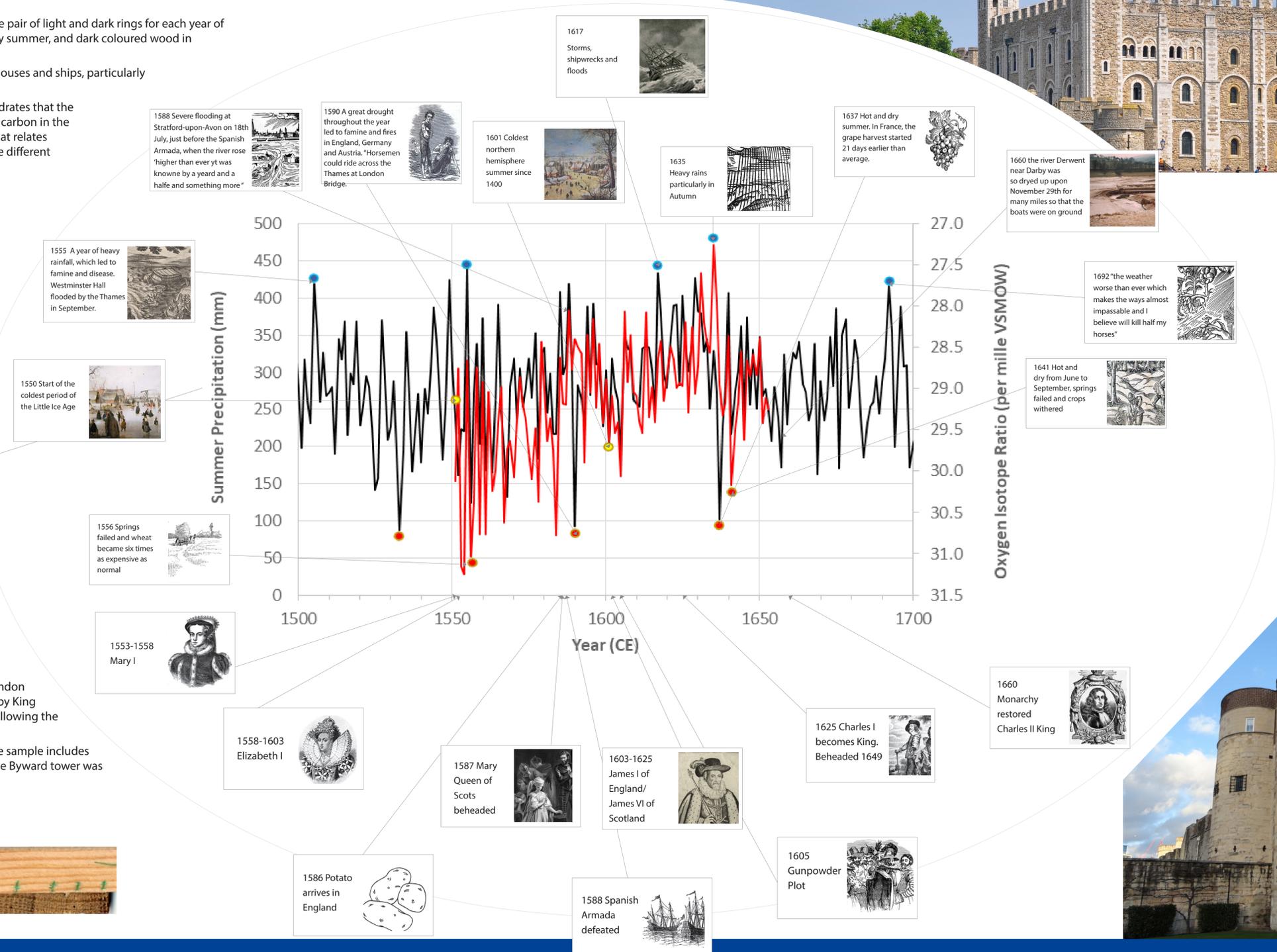
- 1 Tower of London
- 2 Byward Tower, Tower of London
- 3 Windlass in Byward Tower
- 4 Sample of wood from the windlass

Graph showing the relationship between oxygen isotopes measured in a sample of tree-rings from the Byward Tower windlass, Tower of London (red) and reconstructed summer precipitation (mm) for the south central England region (black).

William the Conqueror built the Tower of London as a fortress in the 1070s. In Tudor times, the Tower became a state prison. Now over three million people a year visit, attracted by the Crown Jewels and the many stories which surround the Tower.

The Byward Tower is found at the south-west corner of the Tower of London complex and is now used as the main entrance for visitors. It was built by King Henry III between 1238 - 1272 and was further strengthened in 1381 following the Peasants' revolt, during King Richard II's reign.

Our oak sample comes from a windlass which operated a portcullis. The sample includes the period 1550-1650 and the tree was felled in 1656, possibly when the Byward tower was being refurbished or upgraded during Cromwell's Commonwealth



For teaching resources linked to using tree rings to study past climate change go to <http://www.metlink.org/secondary/using-tree-rings-for-past-weather-and-climate>