1 Introduction

In this section, the temperature data from Uppsala will be analysed with the aid of histograms, which show the mean daily temperatures from 1722 until 2013. Each histogram will show data for a specific day of the year, so it may be enlightening to look at all 366 potential histograms, though this would not be practical. Instead, a few specific dates will be chosen to analyse the histogram distribution. It will then be determined how useful these results will be in determining the beginning of Spring.

2 Extracting the data

The Uppsala temperature data was given as a space seperated list, with the first three columns representing the year, month and day respectively. The fourth column included the mean temperature of that day unadjusted for urban effect, whereas the fifth column held the same, but adjusted for urban effect. The temperatures to be plotted were those in the fifth column. The sixth held an id number to represent the weather station that the temperature was recorded from. For the purposes of this project, only Uppsala data was needed, which had an id of 1.

The function to extract the required information took two arguments: a day and a month. Firstly, each column was streamed into a vector. This was easier and safer than using an array, since vectors dynamically change size. A for loop was then run which streamed the appropriate vector elements for the chosen month and day into another file. This also only streamed the data with an id of 1. The data in the file was then streamed back into another vector, which was then used to plot the histogram

3 Results and Discussion

Clearly 1 shows that very generally, the temperature in Uppsala at the vernal equinox tends to be below 0 degrees, which is colder than previously expected, especially given the previous results from this report. However, the rather high standard deviation shown in 1 displays just how much variation in temperature there is over 300 years. The range is also expectedly quite large, owing to the large quantity of data. Also, there have been several cases of extremely cold temperatures, which could have altered the mean.

Comparing 2 to 1, the mean temperature has clearly increased significantly even after just one week, with the mean temperature now being above freezing. Notably, the standard deviation has also decreased slightly, so the spread of results for this day is slightly lower than on the previous histogram, though is still quite high.

The same trend continues one week on from this, as shown by 3. The mean temperature has again increased significantly , though by a smaller value this time. Most notably, the spread of data has decreased, resulting in a visibly thinner histogram, resulting in a lower standard deviation.

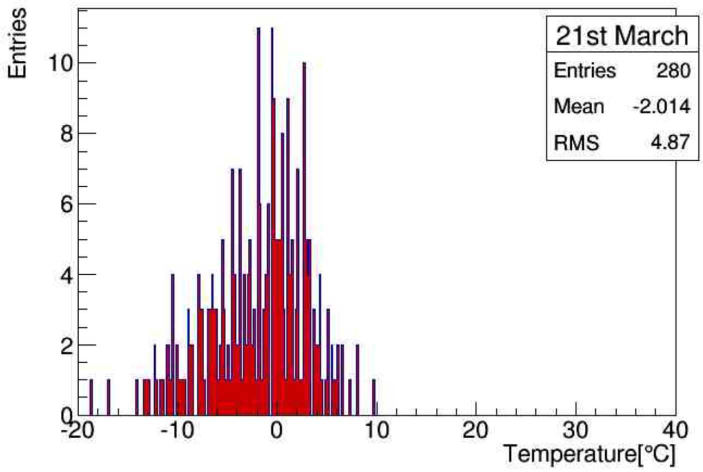

Figure 1: Histogram showing temperatures from 1722-2013 at 21.3

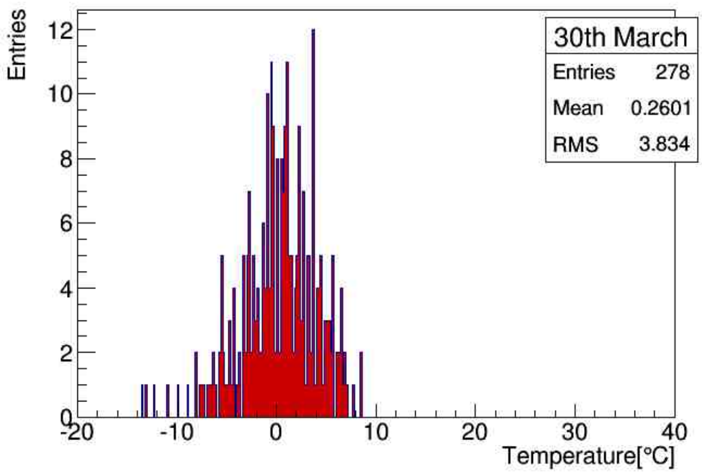

Figure 2: Histogram showing temperatures from 1722-2013 at 30.3

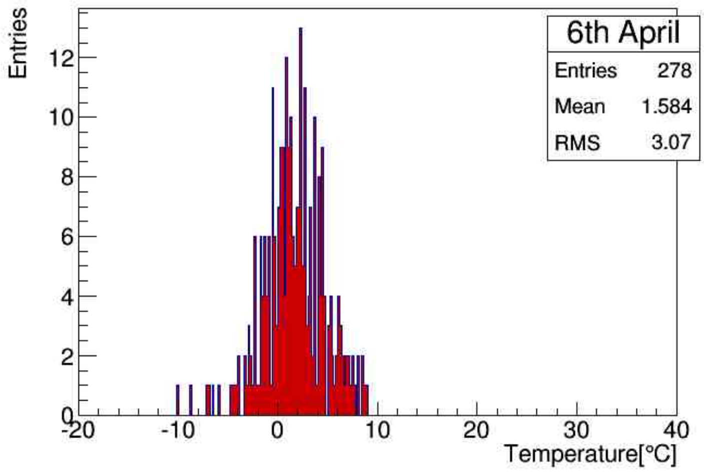

Figure 3: Histogram showing temperatures from 1722-2013 at 6.3

4 Conclusion

The results show that the large amount of data nevertheless still shows the expected trend of increasing temperature from week to week, despite large standard deviation and recurring data from very cold years, which can be seen on the left side of all the histograms. Theoretically, it would be possible to find the mean warmest and coldest day between 1722-2013, but this would require repeatedly running the aforementioned function until the minimum and maximum values were found It would also be difficult to determine the beginning of Spring(Using the temperature definition) using this program, as a similar brute force method would be required, and it would be difficult to plot the results.