Subfile Example

Alexander Ekman, Jessamy Mol, Emelie Olsson, Shi Qiu

1 Introduction

This is the introduction

2 Hot and Cold

This is the hot and cold part

3 The beginning of the seasons

A recent article by SVT Nyheter showed the season on the 1st of November for different areas in Sweden, as can be seen in Figure 1. According to this article it was already winter in the north of Sweden while in the most south part, including Lund, it was still summer. This did not seem to correspond to what one might observe when looking out the window in Lund, the ground was already covered with red leaves even though it was still summer according to SVT Nyheter. So which definition of the season are there and when do the seasons start in Lund.

Figure 1: The season in different areas in Sweden on the 1st of November. Image from [1].

3.1 Definition of the Seasons

[2]

3.2 Method

3.3 Results

4 tempDay

Two functions were created, both giving the temperature of a certain day. The difference is that one takes the date (month, day) as input and the other one takes the day number as input. To
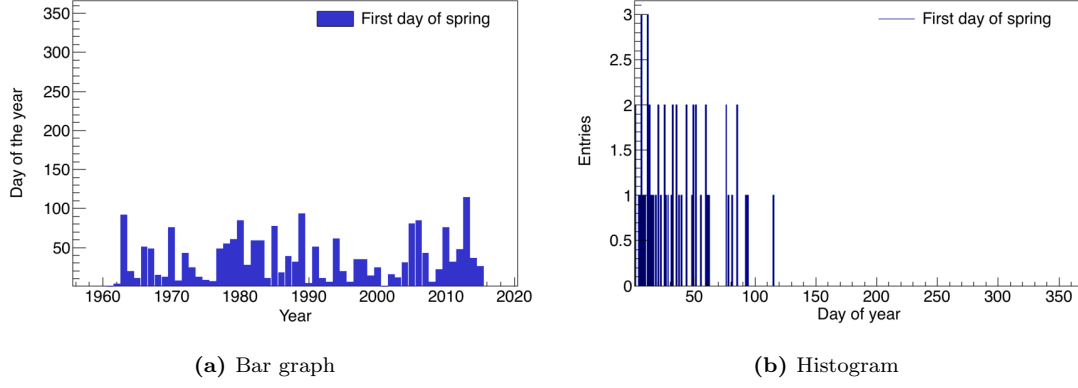
(a) Bar graph

(b) Histogram

Figure 2: The first day on which spring starts for each year in Lund is shown in (a). While (b) shows the number of times spring starts on a certain day in the year.
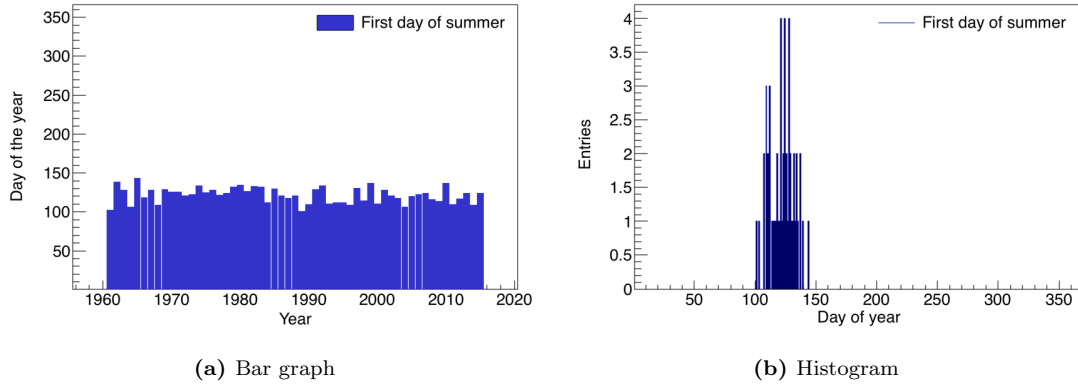

(a) Bar graph

(b) Histogram

Figure 3: The first day on which summer starts for each year in Lund is shown in (a). While (b) shows the number of times summer starts on a certain day in the year.
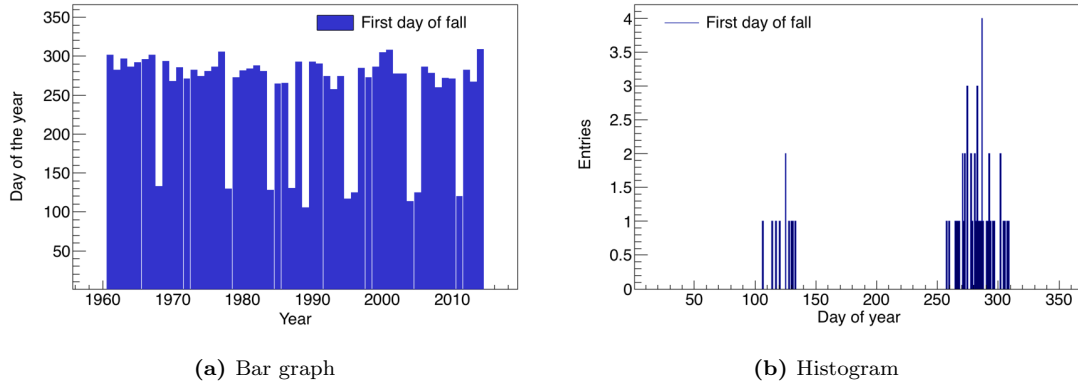

(a) Bar graph

(b) Histogram

Figure 4: The first day on which fall starts for each year in Lund is shown in (a). While (b) shows the number of times summer starts on a certain day in the year.

make it as simple as possible, the function that takes day number as input first coverts it into month and day, so that the functions after that is identical.

The algorithm itself is straightforward. First, the dates in the data that matches the input date are found. Temperatures for every year is then stored in a vector, which is plotted in a histogram. A histogram for the 19th of July in Uppsala, for the years from 1722 to 2013, is shown in Fig. 7. From the histogram it is possible to get both the mean and the standard deviation. For Fig. 7,
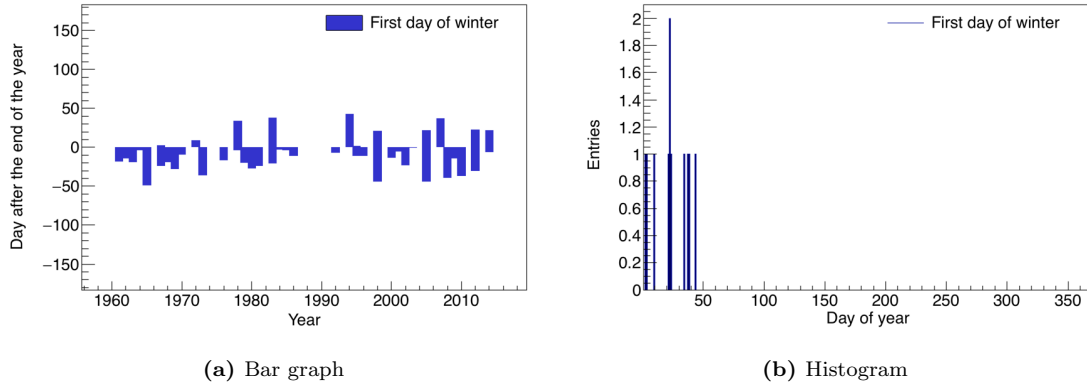
2

(a) Bar graph

(b) Histogram

Figure 5: The first day on which winter starts for each year in Lund is shown in (a). The day is given relative to the start of a new year, all negative numbers are before the 1st of January and all the positive numbers are on or after the 1st of January. The number of times spring starts on a certain day in the year in given in (b).

the mean is 99 and the standard deviation 99. If we want to know the probability for a certain temperature on the given day, we can use the mean and the standard deviation and assume a Gaussian distribution. The black line in Fig. 7 is a Gaussian fitted to the histogram, to see if it is a reasonable assumption. For Uppsala the data contains enough years to give more than 250? counts, so the Gaussian fit is sensible. Some of the other data sets would give a lot less data points, as in Fig. ??, and the Gaussian fit is not as good.
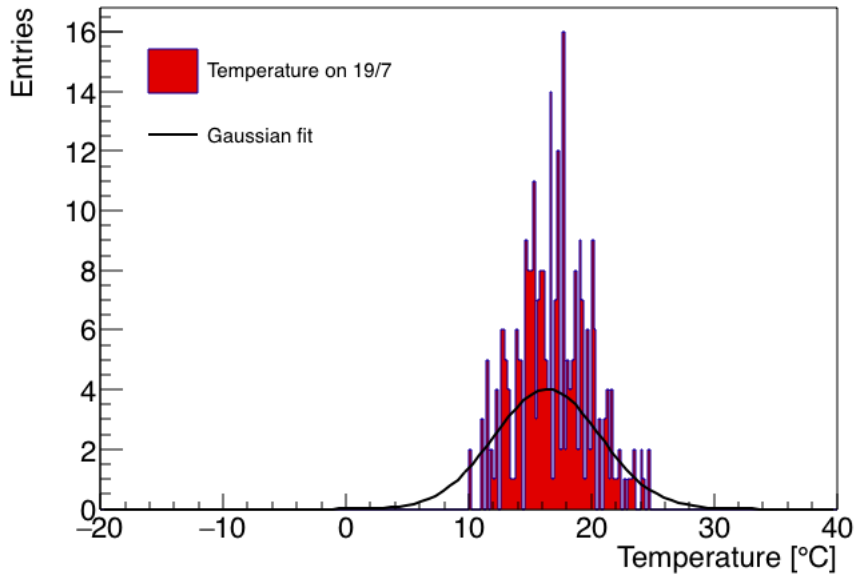
5   tempExtrap

This is the tempExtrap

Figure 6: The temperatures on July 19th in Uppsala for the years between 1722 and 2013. The black line is a Gaussian fitted to the histogram.

References

[1] SVT Nyheter. Vintern 2017-2018. `https://www.svt.se/vader/vintern20172018`. Accessed: 2017-11-09.

[2] Sveriges meteorologiska och hydrologiska institut (SMHI). Årstider. `https://www.smhi.se/kunskapsbanken/meteorologi/arstider-1.1082`. Accessed: 2017-11-09.
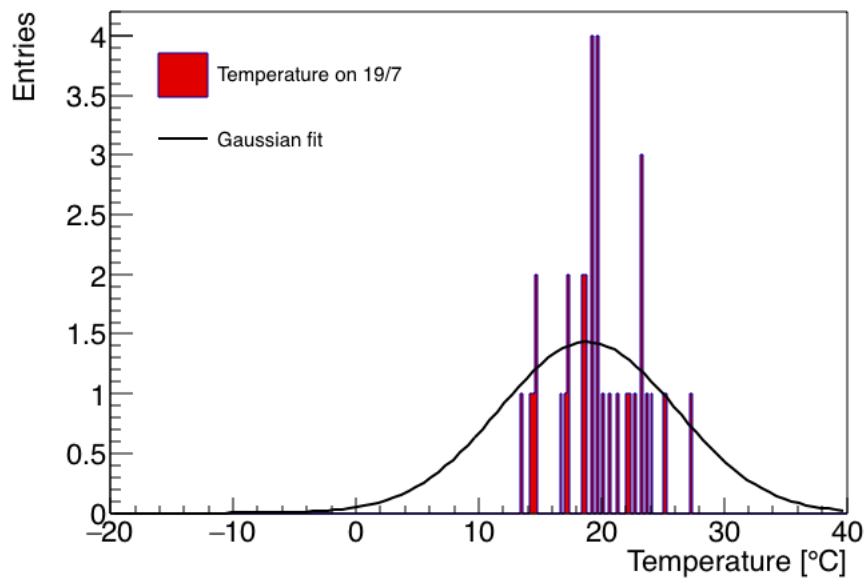
Figure 7: The temperatures on July 19th in Lund between 1961 and 2014. The black line is a Gaussian fitted to the histogram.