The start of spring

- Different definitions of seasons and their time period
- We use the meterological definition given on SMHI:s webpage

Meterological definition used

If the daily average temperature is above 0 °C but below 10 °C, we call this for a day with spring temperature. If this occurs seven days in a row, we say that spring arrived the first of these days. Even if there is a return to lower temperatures then it is still counting as spring.

...

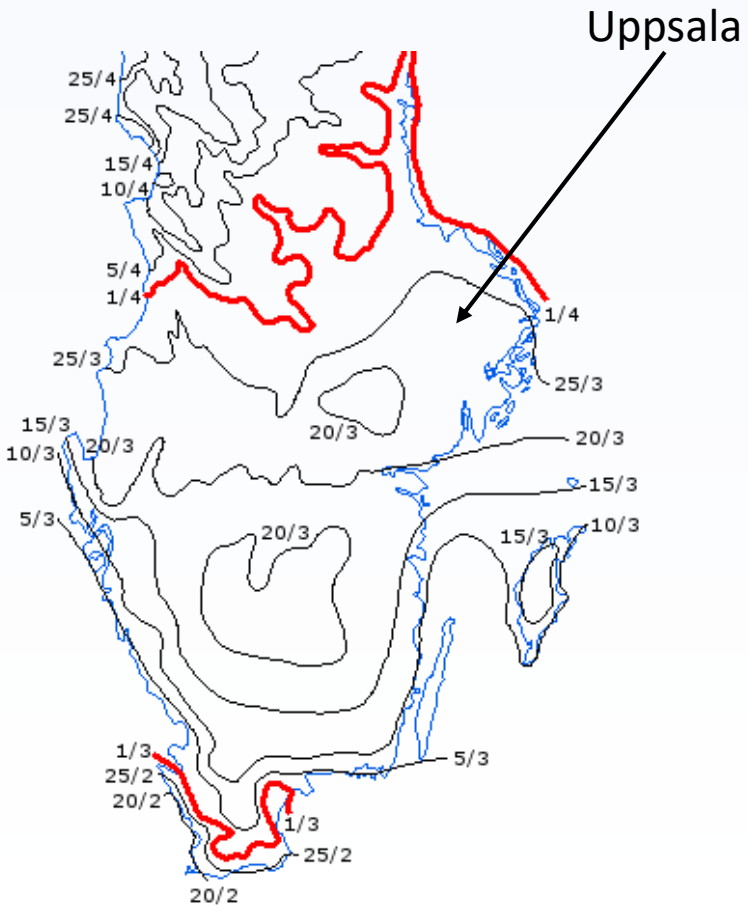
The start of spring can not occur before the 15th of febuary.

...

Spring can, at latest, occur the 31th of July.

Map of spring arrival

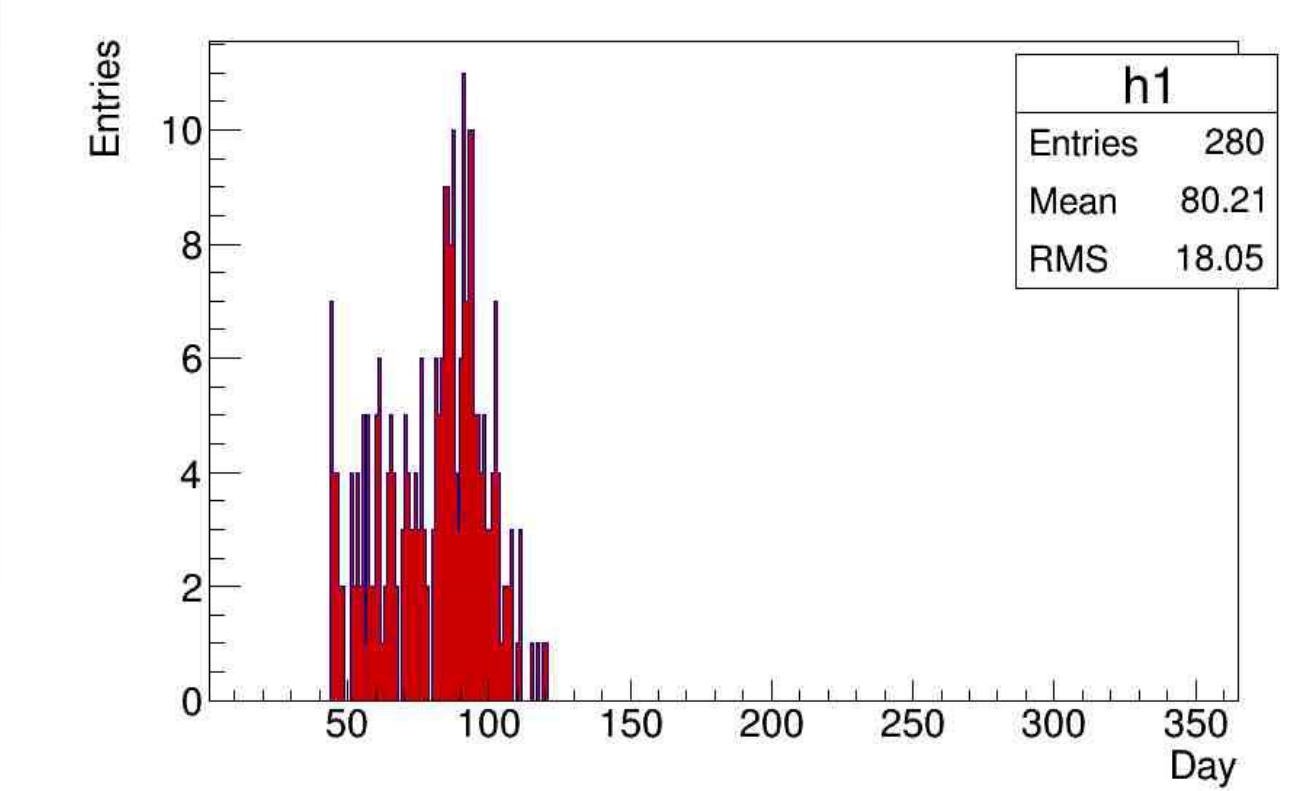
- Figure show the typical date of spring arrival (not only for 2013)
- For Uppsala spring occur near the end of March



Source: https://www.smhi.se/vadret/vadret-i-sverige/arstidskarta/ank_var_2013.html

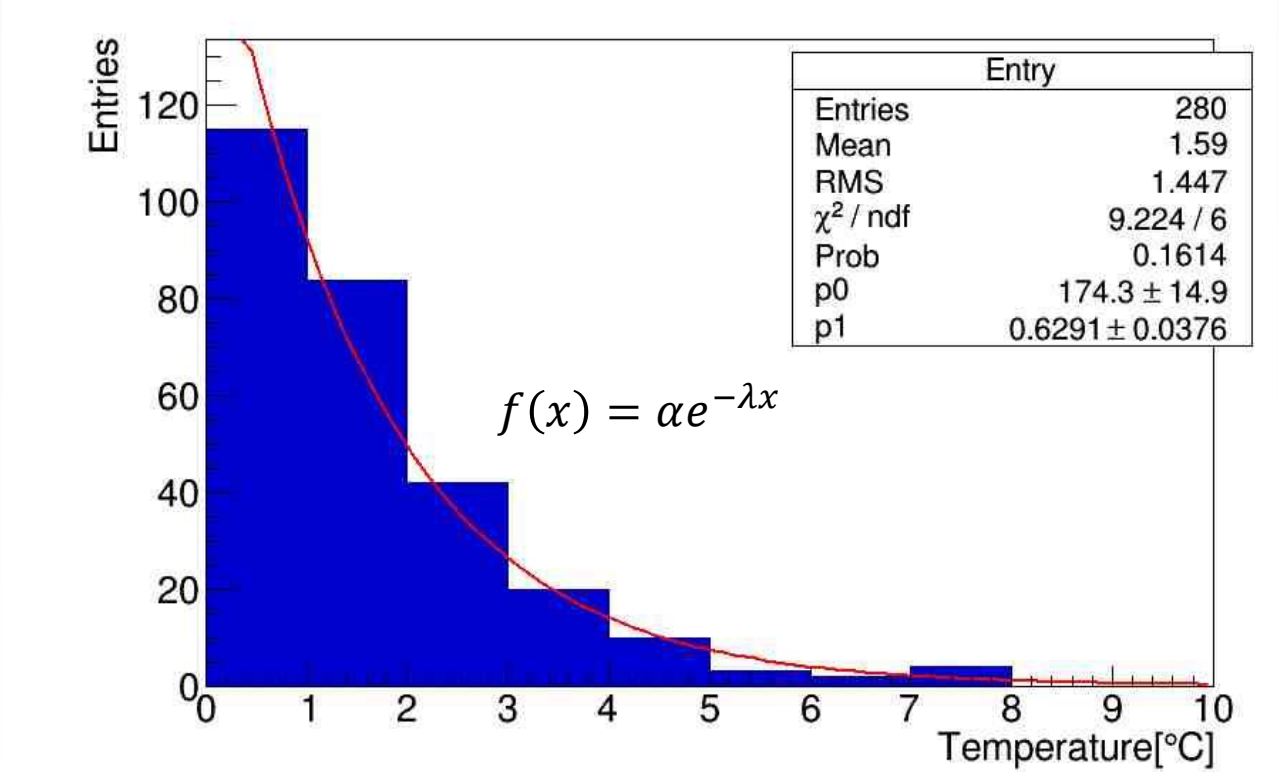
Histogram of spring dates

- Days span from 1 to 365
- Leap years are shifted by 1 day
- Mean at day 80 represent 20th of March or 21th of March if it’s a leap year
- Standard deviation roughly 2.5 weeks



Temperature of determined dates

- Gradual increase in temperature yield decaying shape
- Fit using a exponential function
- p0 represent α
- p1 represent λ



Code

- Create two histograms

```
TH1I *hDays = new TH1I("h1","Spring hist;Day;Entries", 365, 1, 365); //Histogram of days
TH1D *hTemp = new TH1D("Entry", "Temperature on first day of spring;Temperature[#circC];Entries", 10, 0, 10); //Histogram of temps
```

- Read data (+check conditions)

```
hDays->Fill(dayCount - (daysWeek+1));
hTemp->Fill(sTemp);
```

- Plot data

```
//Draw extracted data
TCanvas* can = new TCanvas("canSpringDay", "Spring day", 900, 600);
hDays->SetFillColor(kRed +1);
hDays->Draw();
TCanvas* can2 = new TCanvas("canSpringDayTemp", "Temperature on first spring day", 900, 600);
hTemp->SetFillColor(kBlue+1);
hTemp->Draw();
//Define and fit exponential function to temperature histogram
TF1* fitExp = new TF1("Exponential", "[0]*exp(-[1]*x)", 0, 10);
fitExp->SetParameters(0,100);
fitExp->SetParameters(1,1);
hTemp->Fit(fitExp);
```