

# Introduction

We look at the GISTEMP dataset as part of the first programming assignment for the Data Visualization course on Coursera.

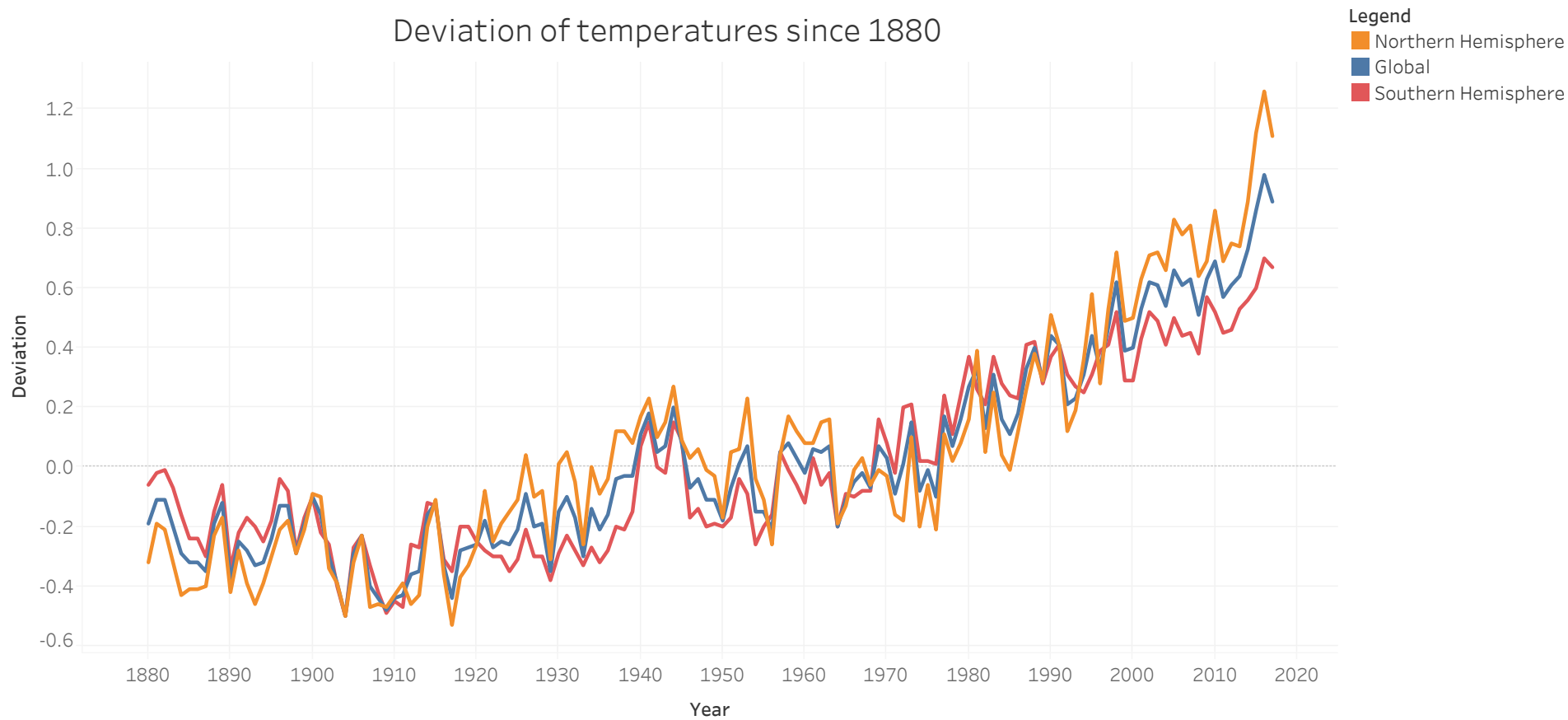
The GISS Surface Temperature Analysis (GISTEMP) is an estimate of global surface temperature change. Data is provided in the form of CSV ([link](#)).

## **Note:**

I used Tableau for creating the visualizations. Although Tableau is quite powerful and easy to use, the high level abstraction is quite restrictive and prevents us from freely using features based on our own requirements.

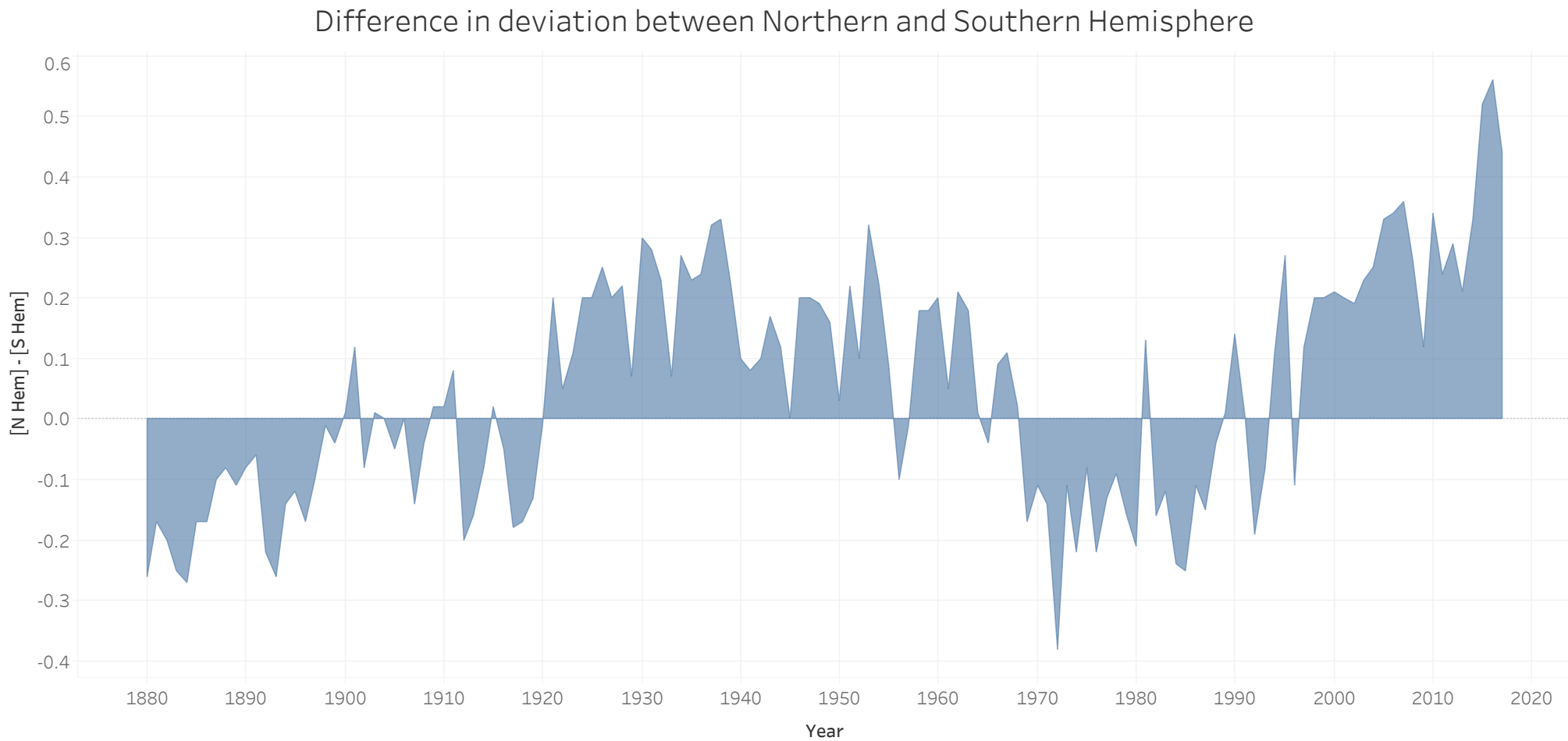
This work was done by Mohit Surana

Initially, I chose to import the data into Tableau and visualize it to get a feel of the data. It looks like two trends are apparent: 1) Global temperatures decreased between the 1880s and the 1910s after which it has been increasing, and 2) Northern Hemisphere has slightly higher temperatures than the Southern hemisphere. This graph has too much criss crossing of lines and I thought I could instead look at the data a bit differently.



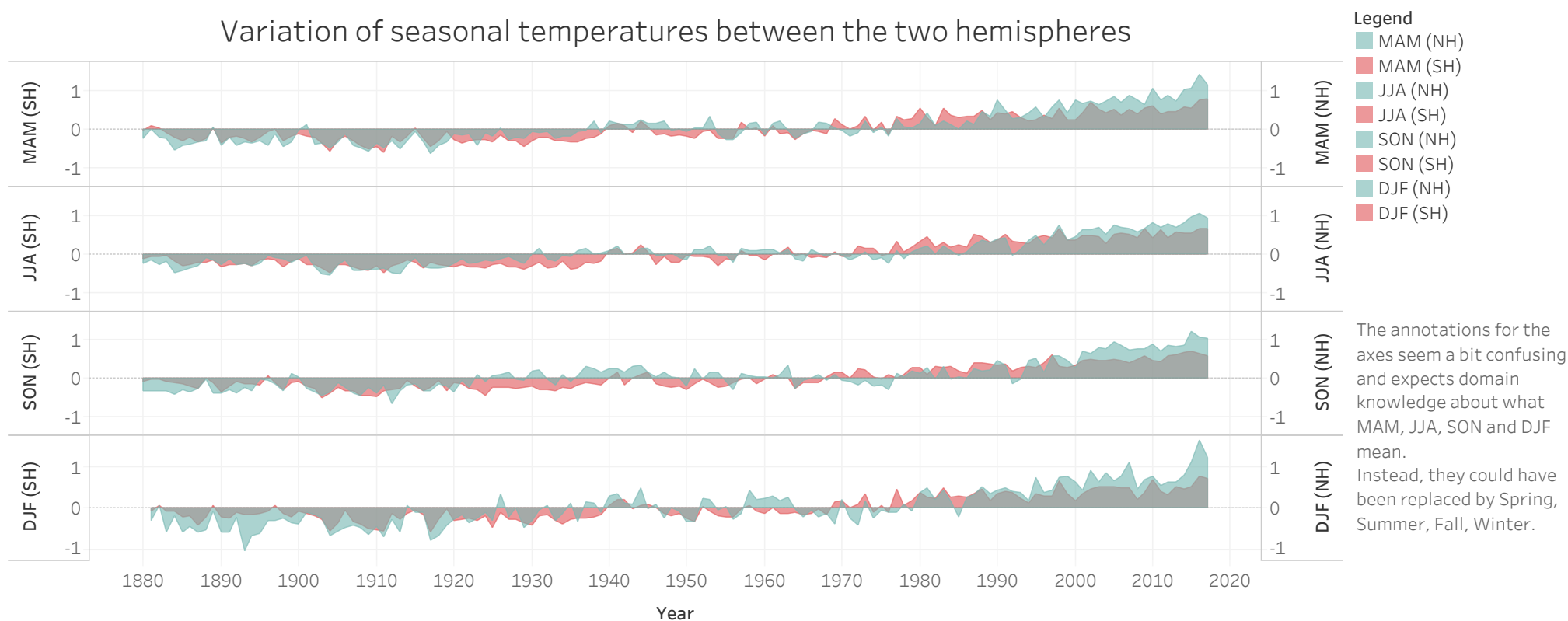
Here, I have taken care of the fact that quantitative data is well represented via position. Different categories (nominal data) are differentiated through the use of colours (hue)

I wanted to see the difference in trends between the two hemispheres. One would expect the same trends on both the hemispheres but surprisingly, we see that during different time periods, the behaviour in the two hemispheres is quite different. It would be interesting to look at the points where the trend reverses and that would help identify historical events. It would have been better to colour the regions above the x-axis as one colour and the region below in another but due to technical difficulties, I was not able to do so.



The season wise distribution (3 month periods) for the temperature difference which may seem quite heavy at a first glance, ends up becoming interesting stories as we dissect the visual data. I noticed that in general, most of the seasons follow similar trends - slow increase with time due to global warming. Some points of interest are the winter of 1893 in the Northern Hemisphere, period from 1920-1940 (hot years in the Southern Hemisphere), and the spike in the Northern Hemisphere in the recent years.

## Variation of seasonal temperatures between the two hemispheres



### Explanation for unusual trends:

- Winter of 1893 in the Northern Hemisphere - (couldn't find out why)
- Hot years in the period from 1920-1940 - traced back to the emission of green house gases (link: <http://www.climatecentral.org/news/scientists-trace-climate-heat-link-to-1930s-20115>)
- Spike in the Northern Hemisphere in the recent years - Fast pace of tech revolution led to a huge increase in all factors that contribute to global warming

# Conclusion

We looked at the GISTEMP dataset and used the concepts from the first two weeks of the Data Visualization course on Coursera.

We uncovered certain underlying trends like global warming and learnt about historical reasons that prompted climate change over the years.

There is scope for a lot more analysis -- we have data at a finer granularity both in terms of latitude belts instead of the hemisphere level, and in terms of monthly measurements instead of season wise measurements. Often, it is better to get an overview first and if required, we can drill down and delve into the finer details to better understand what is happening.

## References:

- GISTEMP Team, 2018: GISS Surface Temperature Analysis (GISTEMP). NASA Goddard Institute for Space Studies. Dataset accessed 20YY-MM-DD at <https://data.giss.nasa.gov/gistemp/>.
- Hansen, J., R. Ruedy, M. Sato, and K. Lo, 2010: Global surface temperature change, Rev. Geophys., 48, RG4004, doi:10.1029/2010RG000345.