Assignment 4: Comparison between Athens' and Thessaloniki's weather patterns

1 Region and Domain

State the region and the domain category that your data sets are about.

Regions: Athens, Attica, Greece - Thessaloniki, Central Macedonia, Greece

Domain Category: Weather Patterns

2 Research Question

You must state a question about the domain category and region that you identified as being interesting.

What weather patterns do the two biggest Greek cities follow (Athens, Thessaloniki), and which city shows overall the highest temperatures?

3 Links

You must provide at least two links to publicly accessible datasets. These could be links to files such as CSV or Excel files, or links to websites which might have data in tabular form, such as Wikipedia pages.

Athens' weather patterns (2004-2015)

Thessaloniki's weather patterns (2004-2015)

Jupyter notebook code

4 Discussion

You must contribute a short (1-2 paragraph) written justification of how your visualization addresses your stated research question.

For the completion of the *Applied Plotting, Charting & Data Representation in Python* coursera course, I decided to compare the annual weather patterns between the two largest Greek cities, Athens and Thessaloniki. The data were acquired from The National Centers for Environmental Information (NCEI) Daily Global Historical Climatology Network (GHCN-Daily) (the data files for the two cities were uploaded to the coursera's jupyter notebook data folder).

To answer the stated question, two subplots were created with python's **matplotlib** plotting package. The two data-sets were manipulated in the same manner as the given data of Ann Arbor, Michigan, USA for the second assignment.

Since the query consists of two parts, two subplots were generated. The first part of the question (i.e weather patterns for Athens and Thessaloniki) concerns the first subplot. This visual shows the annual low and high temperatures patterns that both cities followed for the 2004-2015 period. The plot indeed agrees with the notion that Athens has a milder climate, as it is souther (and thus closer to the equator) than Thessaloniki.

For the second part, the mean temperatures were identified and compared. Here, the graph shows the annual overall temperatures for 2004-2015. To compare them, the **fill_between** command was used. Hence, it is evident that Thessaloniki has a colder climate. Nonetheless, there are periods where this pattern changes. More specifically, the overall temperature seems higher (filled red area) during early March, mid-June and late October.

5 Image

You must upload an image which addresses the research question you stated. In addition to addressing the question, this visual should follow Cairo's principles of truthfulness, functionality, beauty, and insightfulness.

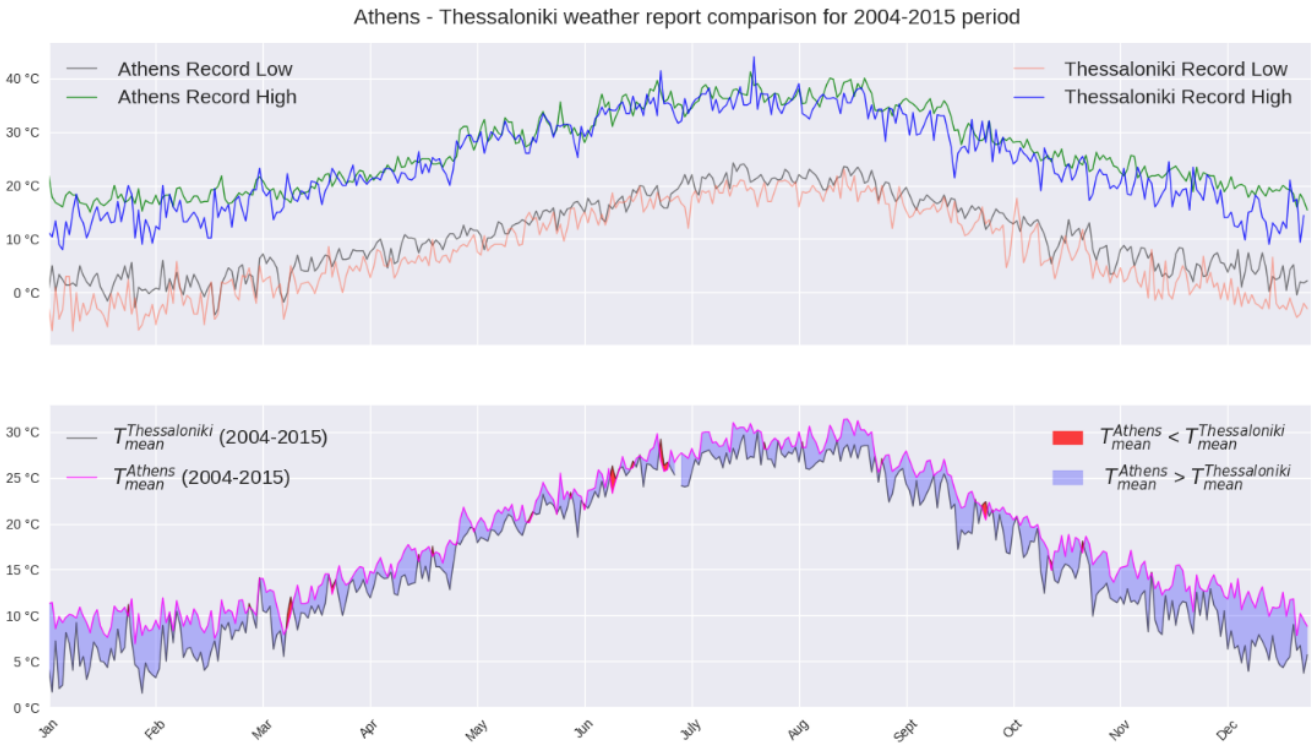

Figure 1: Upper: Record lows and highs for both cities. Lower: Comparison between their mean temperatures.

5.1 Cairo's Principles

- **Truthfulness:** Both datasets were extracted from a reliable website (https://www.ncdc.noaa.gov/). Both data cleaning and data visualization step have done carefully, and data from both datasets are on the same scale.
- **Beauty:** Regarding beauty, it is important to know our audience. However, the chart was created for a report. Thus, colors, labeling, and filled areas were chosen in such a way that the chart would please the eye of the decoder.
- **Functionality:** A crucial parameter for a graph to be functional is the *data-ink ratio*. Endeavors to increase the functionality of our visualizations were made by tweaking that ratio. For instance, instead of labeling the y ticks, the degrees Celsius symbol was added to the y-axis arithmetic values.
- **Insightfulness:** Both subplots answer different parts of the stated question. They both reveal trends and the viewer understands in greater depth the temperatures that occur in Athens and Thessaloniki.