Project 1: Explore Weather Trends

1. Steps taken

A. Extracting data

For data extraction I used the following SQL query:

```
1   SELECT global_data.year, global_data.avg_temp as
    avg_temp_global, city_data.city, city_data.avg_temp
    AS avg_temp_local
2   FROM global_data
3   INNER JOIN city_data ON global_data.year =
    city_data.year
4   WHERE city='Warsaw';
```

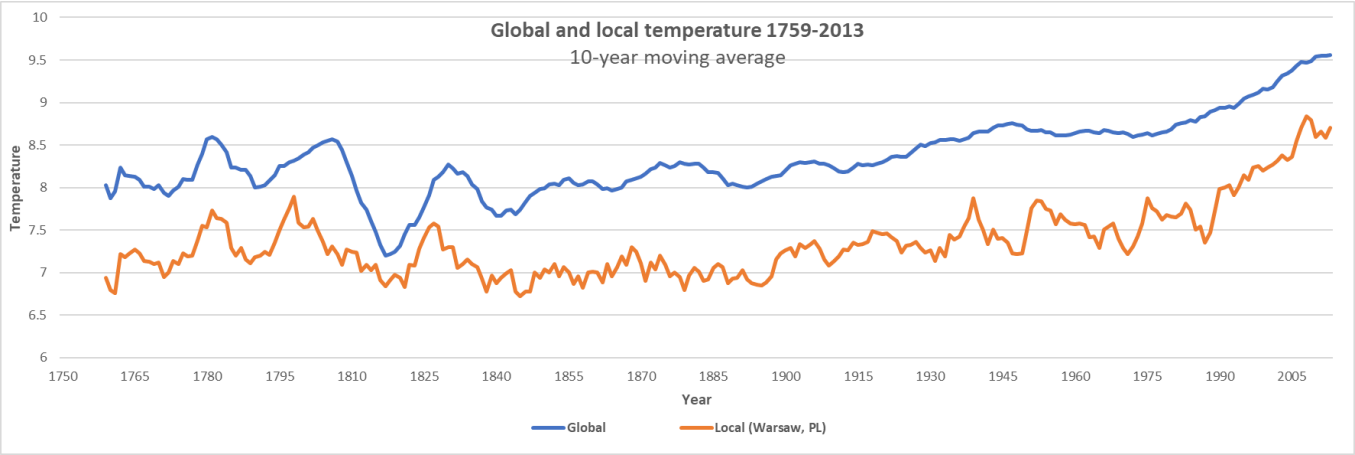
I thought there is purpose in having both city and global temperatures extracted in one go, hence the INNER JOIN.
I wanted meaningful column names, so I used aliases.

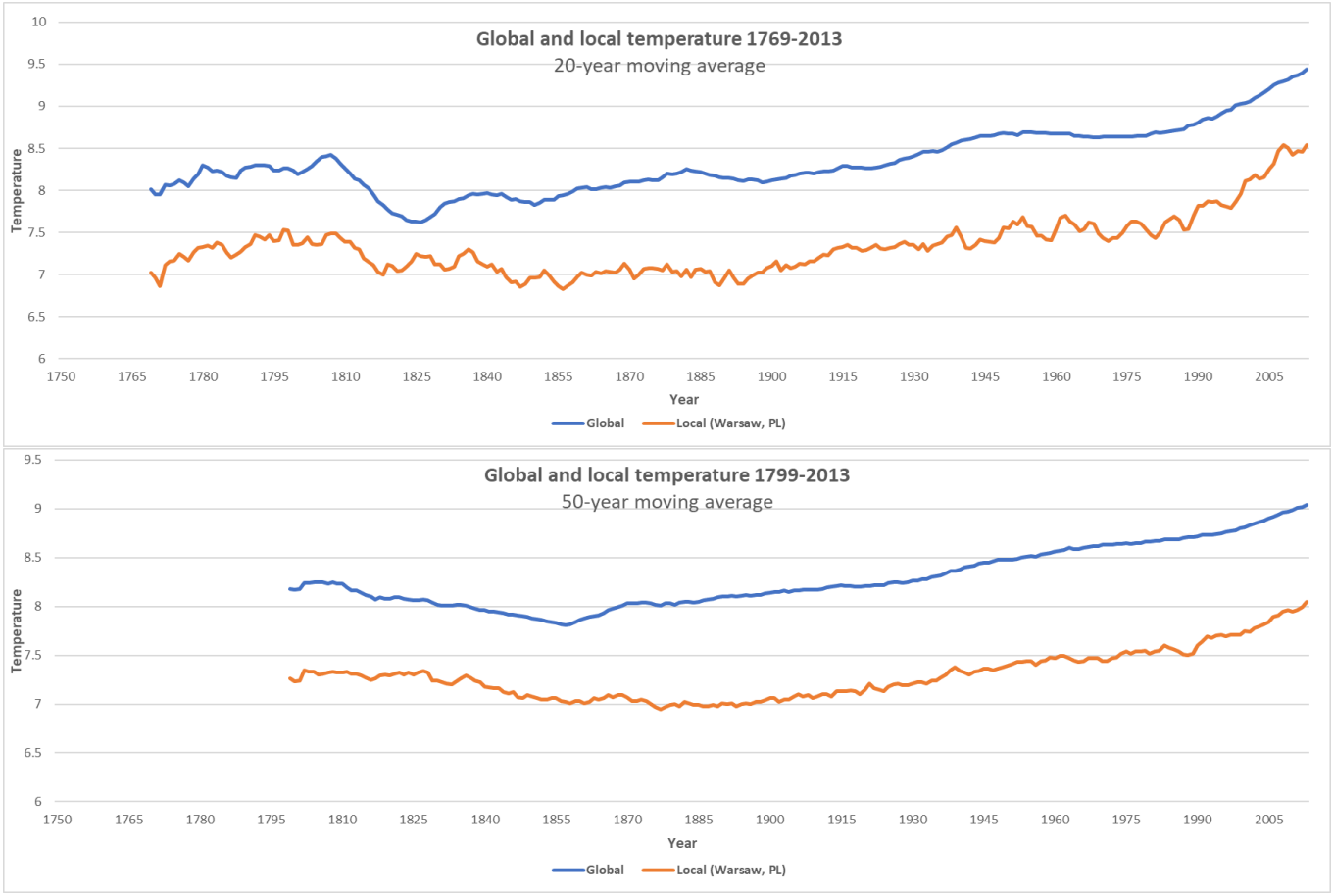
B. Calculating moving averages & creating line chart

To play with extracted data I used MS Excel.

I. I added columns for moving average corresponding to local (specific city) and global temperatures.
II. At first, I started with 10-year moving average, rounded to 2 decimal places.
Calculated for the first ten temperature records, eg. *=ROUND(AVERAGE(B2:B11), 2)* and then copied the formula down for remaining rows.
III. Selected contents from *year*, *avg_temp_global_10yMA* and *avg_temp_local_10yMA* and inserted a line chart.
IV. Formatted the chart: axes, units, key, title.
V. After seeing how the input data translated into a line chart, I went on and repeated above steps for 20-year moving average and then 50-year moving average.

2. Charts





3. Observations

I tried smoothing out the local temperature line by adapting 50-year MA.
However after consideration, the chart produced with 20-year MA's pinpoints one aspect:
global temperature seems steadier over the years, whereas local temperature has visible bumps along 5–10-year periods. Reason may be that yearly global temperature itself is an average of multiple values measured across different places. Or the particular location in question may have a more volatile climate.

All below observations relate to 50-year MA chart.

I. The chosen city is cooler on average compared to global average.
II. The difference is consistent over time at roughly 1 unit.
Slight exception applies to the time around 1815-1840, when the difference was at about 0.7 units.
III. In the period 1860-1875 we can notice an irregularity between the two lines.
Global temperature is rising, whereas local temperature takes a decline.
IV. Overall, the temperature is rising steadily for the past 150 years.
Before, in the years 1800-1860 the temperature was dropping.