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Outline of Data Extraction and Preparation

Tools

SQL and Excel were used to complete this exercise.

Moving Average Calculation

For annual time series data arranged in a column, the first 3-year moving average is calculated as the average of the current year and previous two years. The moving average cannot be calculated for the first two years.

Key Considerations for Data Visualization

Because the purpose of this exercise is to compare two data sets, the data is truncated to years where both global and local data is available. In this case, the local temperature time series is shorter than global time series.

Effective data visualizations should emphasize the data with minimal graph clutter, clear titles, labels, and a data legend.

SQL Queries for Data Extraction

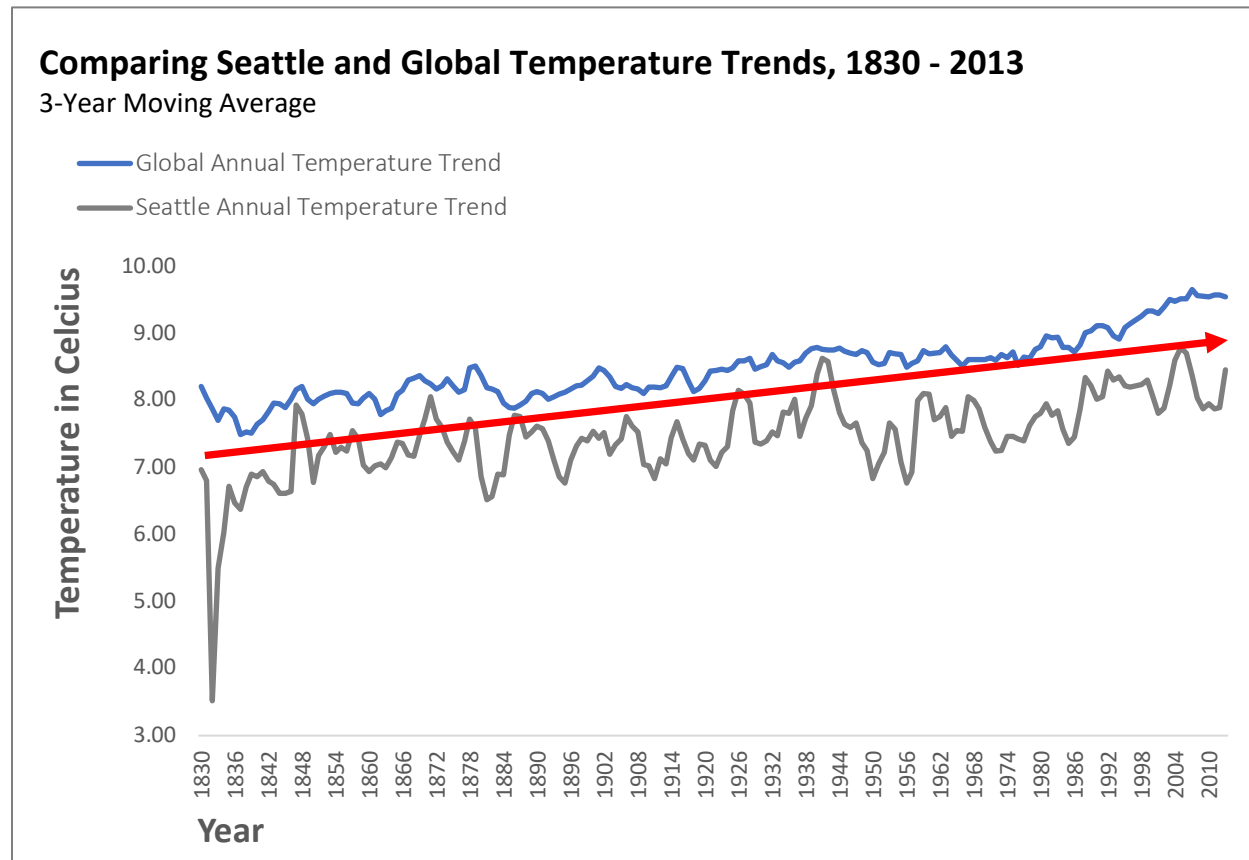
City level data

```
SELECT
    city_data.year AS year,
    city_data.city AS city,
    city_data.country AS country,
    city_data.avg_temp AS avg_temp
FROM city_data
WHERE city = 'Seattle';
```

Global data

```
SELECT
    global_data.year AS year,
    global_data.avg_temp AS avg_temp
FROM global_data;
```

Create a line chart comparing moving average of Seattle temperatures with global temperatures.



Observations about local and global temperature trends – similarities and differences

1. Local Seattle temperatures are **consistently cooler** compared to the global average, which is expected given that Seattle is located relatively north of the equator.
2. Changes in local Seattle temperatures appear to be **correlated** with changes in global temperature over time. Particularly in the second half of the twentieth century (1950 – 2000) there appears to be a slight cooling followed by warming. The **correlation coefficient** between Seattle and global temperatures is **0.69**, a strongly positive (upward) linear relationship.
3. Changes in local Seattle temperatures over time display greater **volatility** than global temperatures (Seattle temperature spikes - highs and lows - are greater than global temperature spikes).
4. Overall, local and global temperature trends show an **increase in temperatures** over the time series. The world is getting warmer. This trend is highlighted with a red arrow.

Thanks for reviewing this exercise!