Does global warming exist?

EDA and Time Series Forecasting for the next 10 years.

Ed Eldepssi

Objectives:

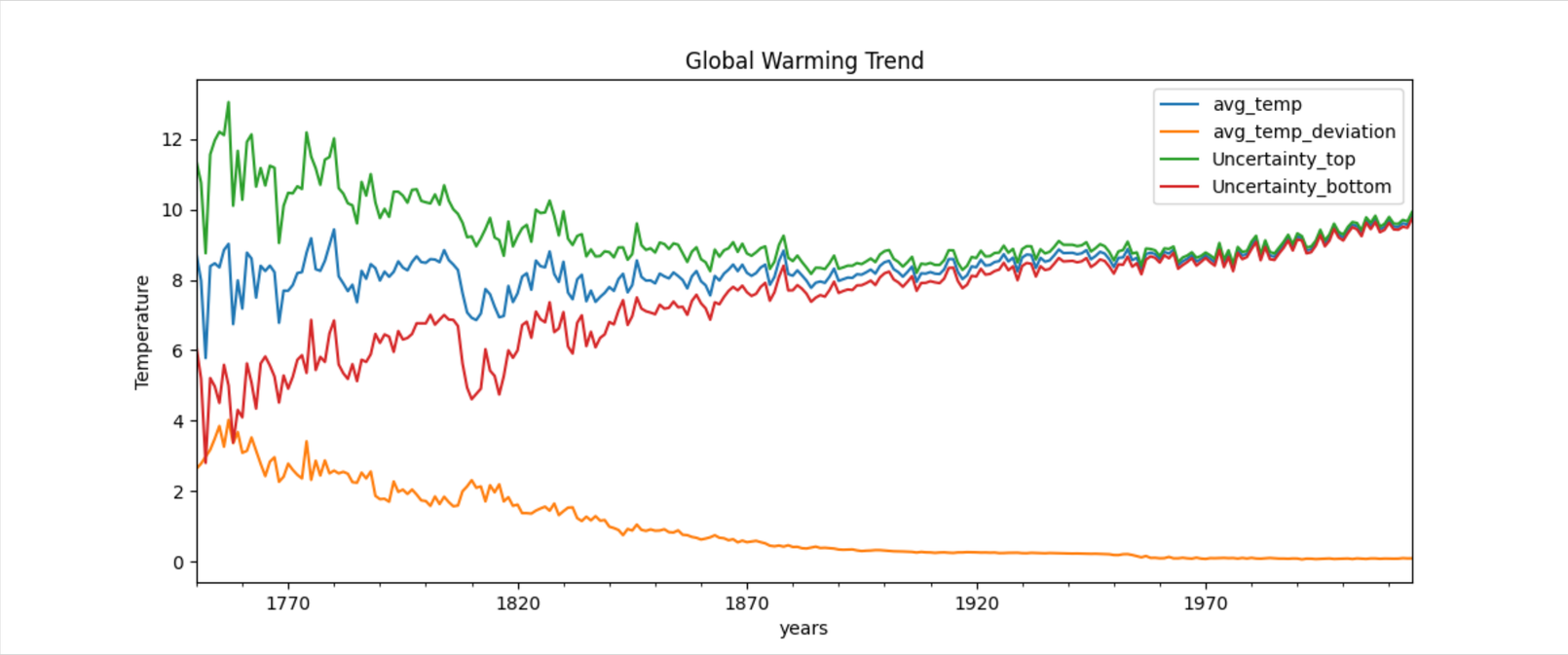
Does global warming exist?
How does average temperature change each season?

What countries are highly effected by global warming in the?
Forecast global warming changes for the next 10 years.

Exploratory Data Analysis

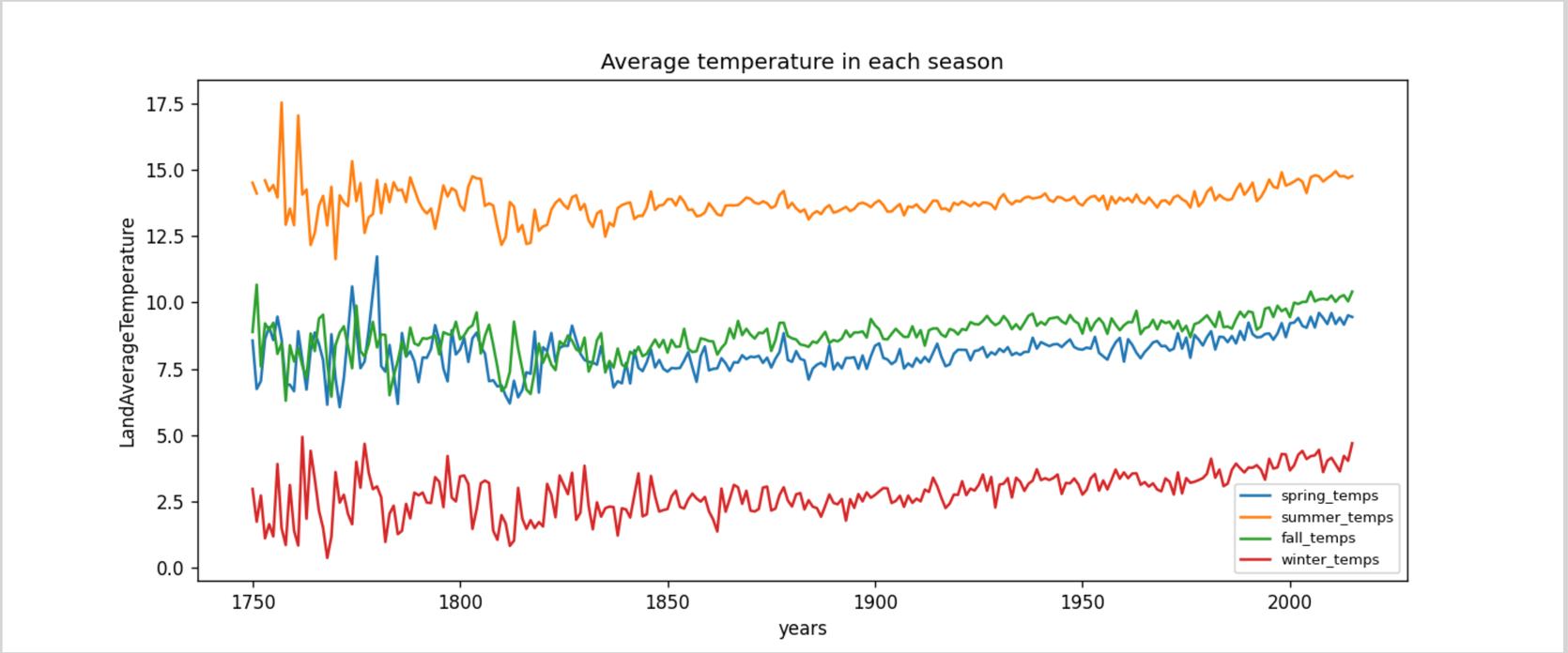
Global warming does exist!

Based on my analysis, we can see that Global Warming does exist because land average temperature is increasing since 1770, especially the fastest temperature growth have happened approximately from 1970 until 2015

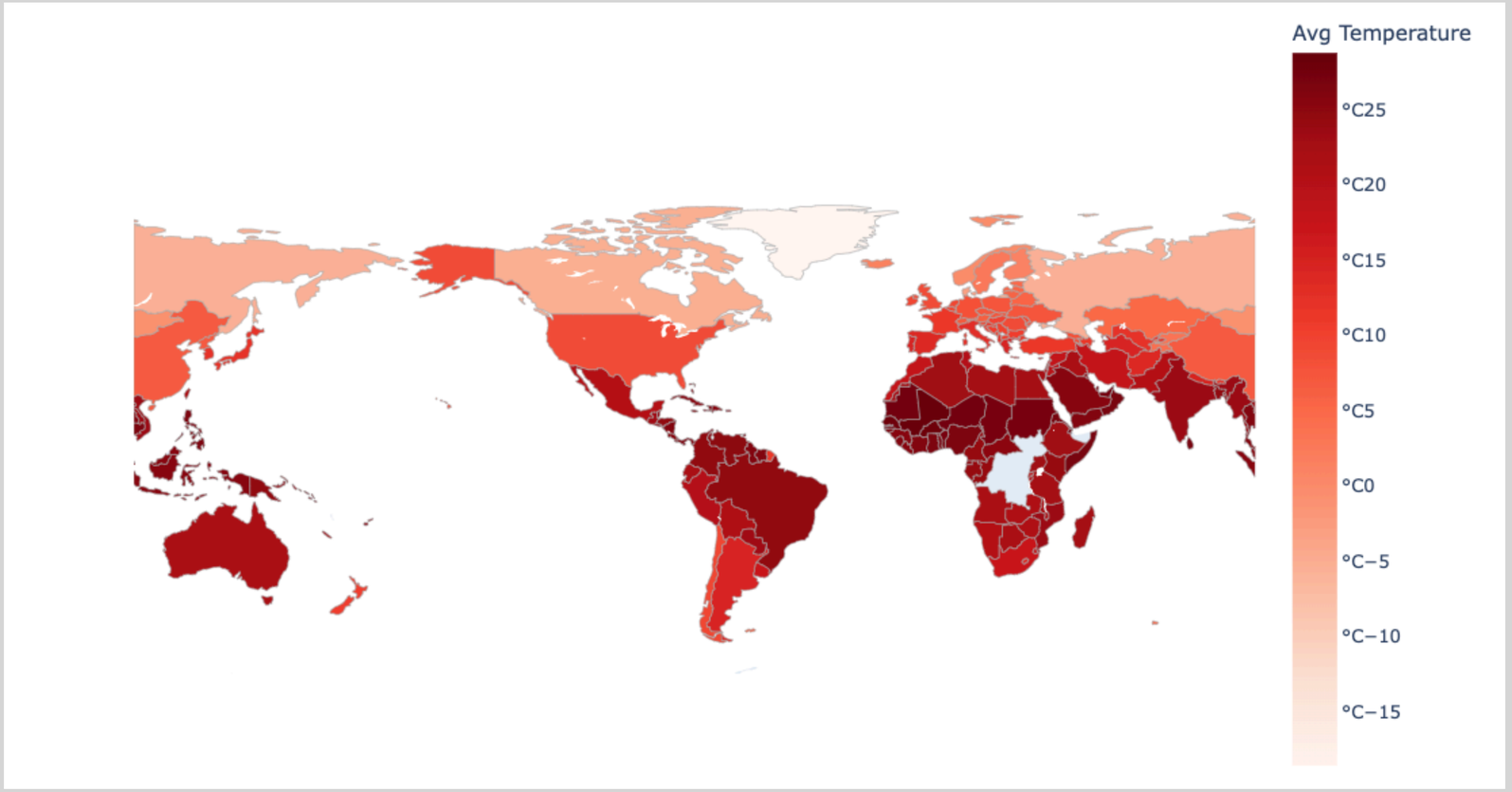


Average temperature in each season:

We can notice that average temperature is raising over the years across all years, spring season is usually the hottest season, then summer, followed by fall, and winter is the least hot season for earth temperature.

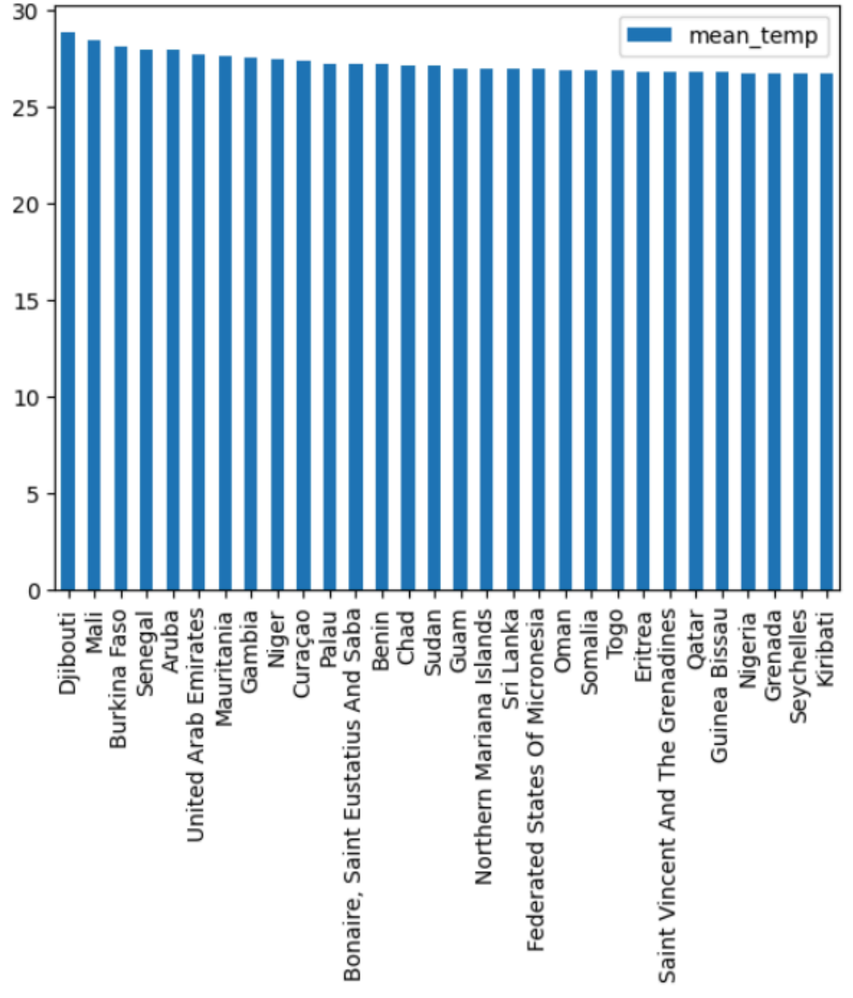


Countries with highest land temperature.

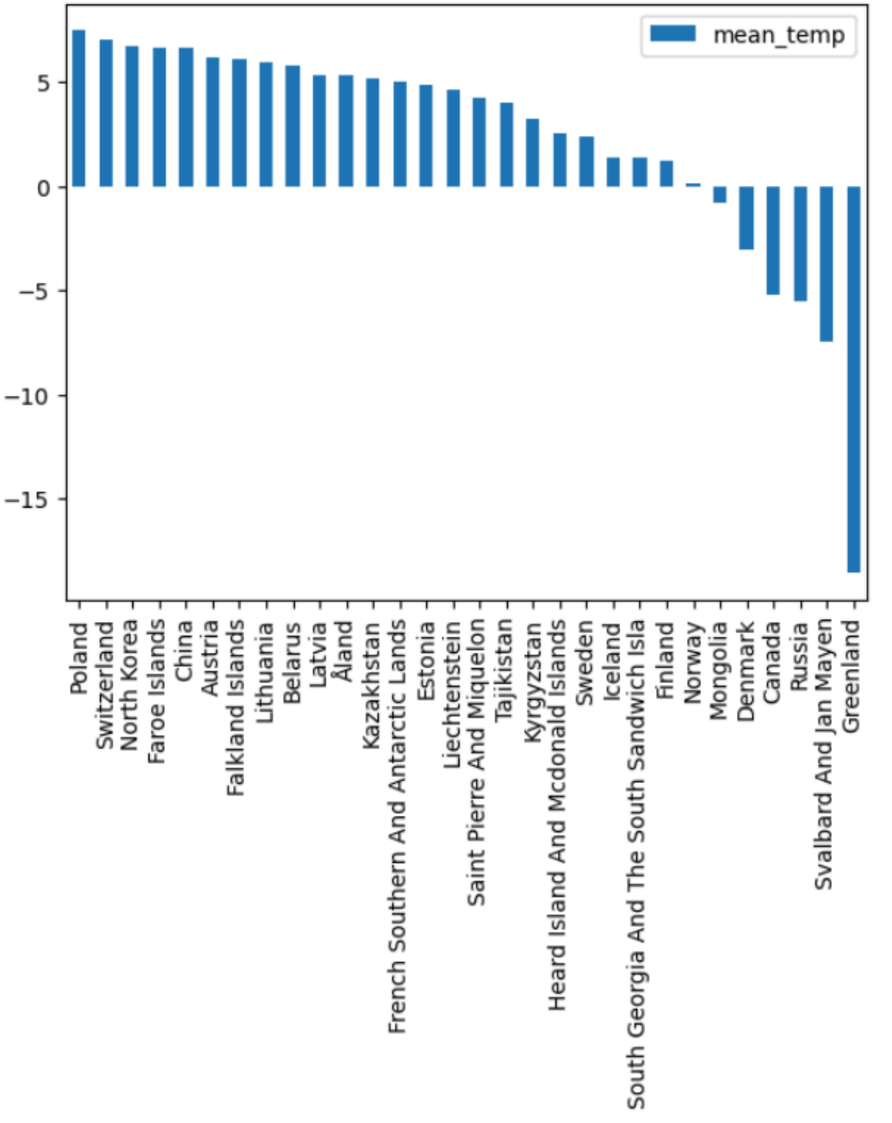


We can notice that countries like Djibouti, Mali, Burkina Faso, Senegal, Aruba, United Arab Emirates, Mauritania, Gambia, and Nigeria has the highest average temperature, however countries like Poland Switzerland, North Korea, Faroe Islands, China, Austria, Falkland Islands, Lithuania, and Belarus has the lowest average land temperature.

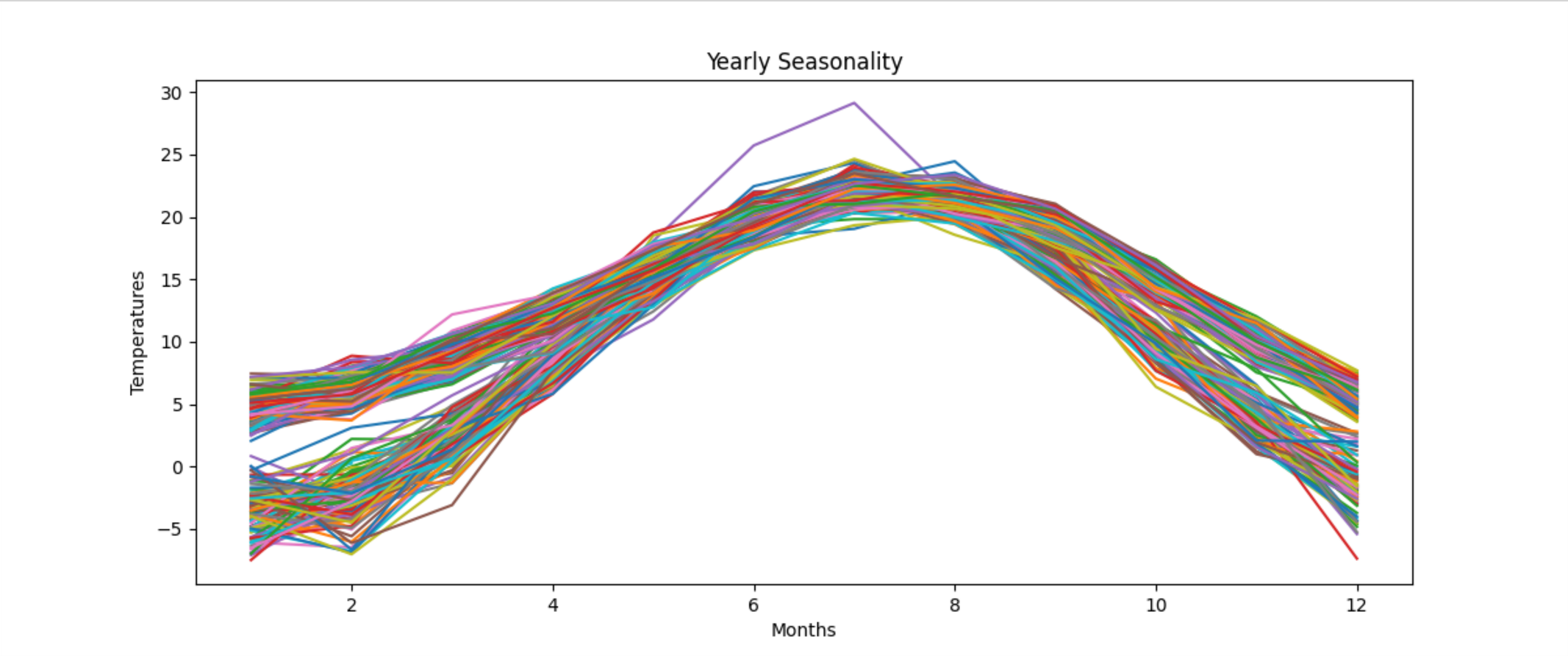
Countries with Highest land temperature



Countries with lowest land temperature

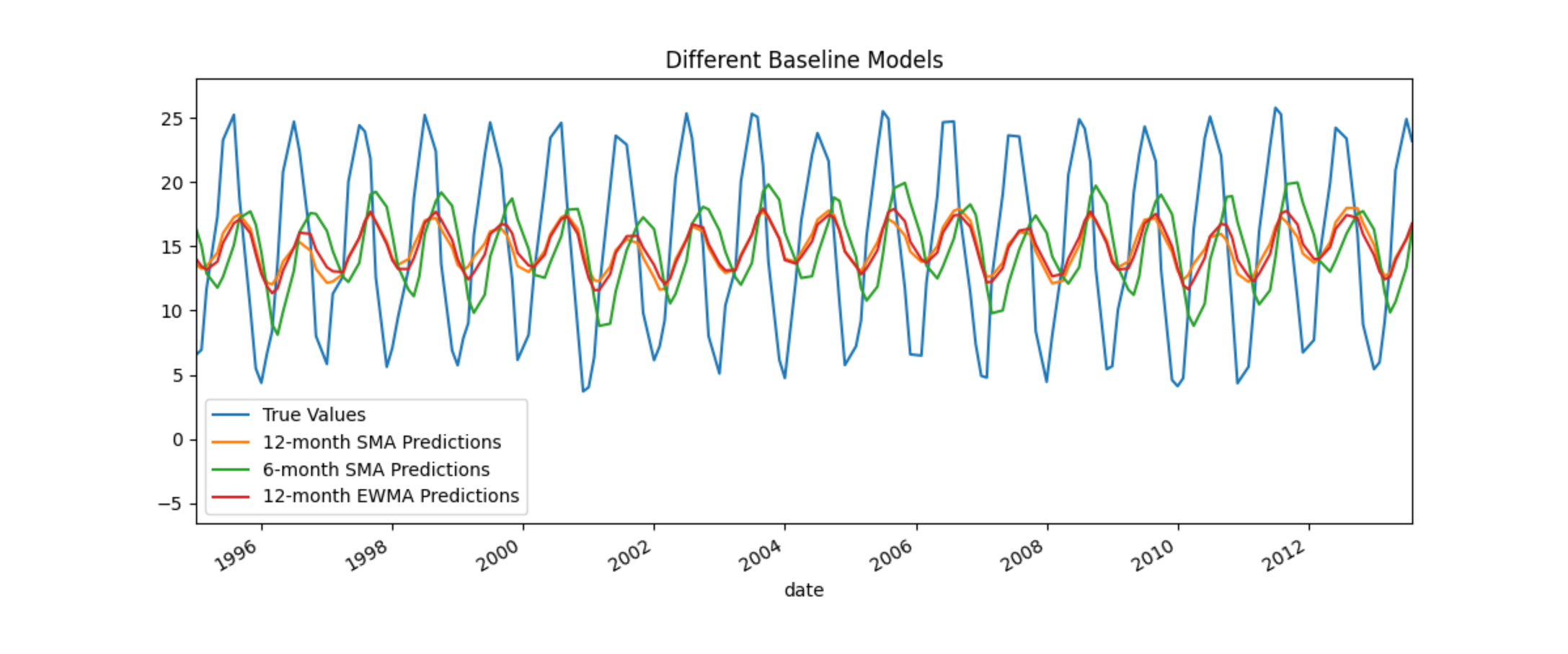


Seasonality Check:



We can notice seasonality each year, temperature gets to peak during July and August, start to drop from September, and reaches the lowest temperature from December until February.

Baseline model using moving average



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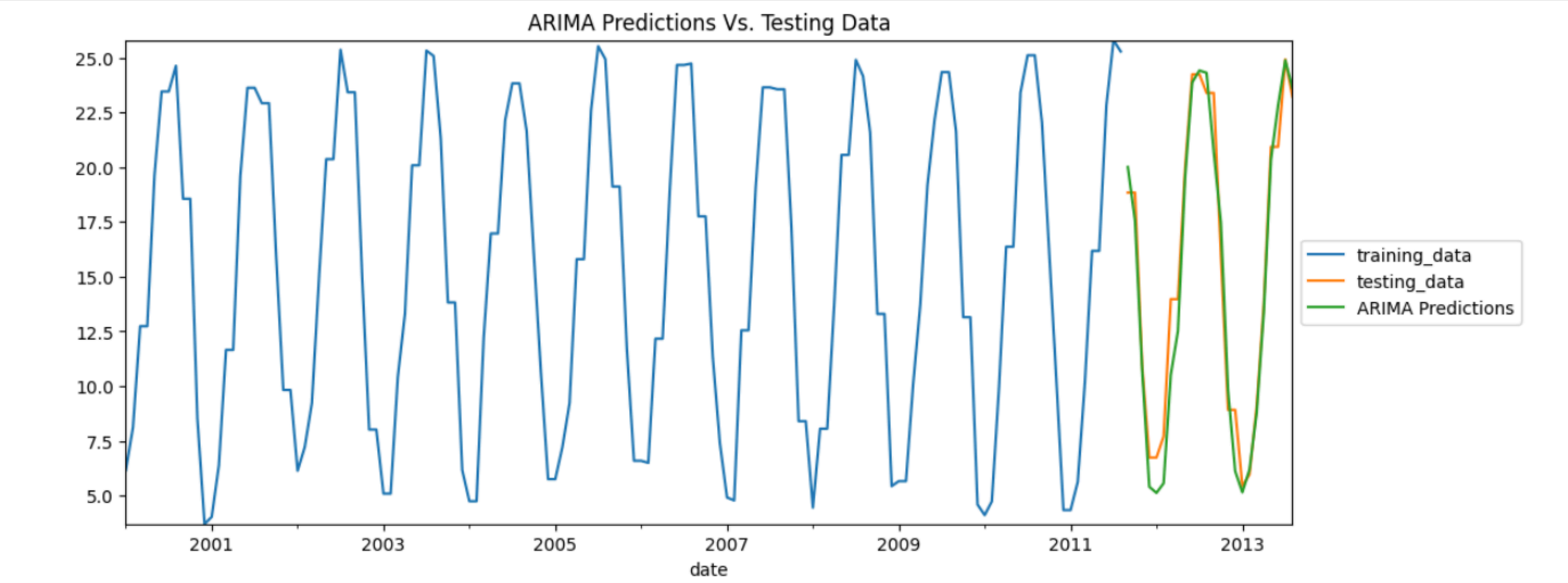
ARIMA Model Predictions:



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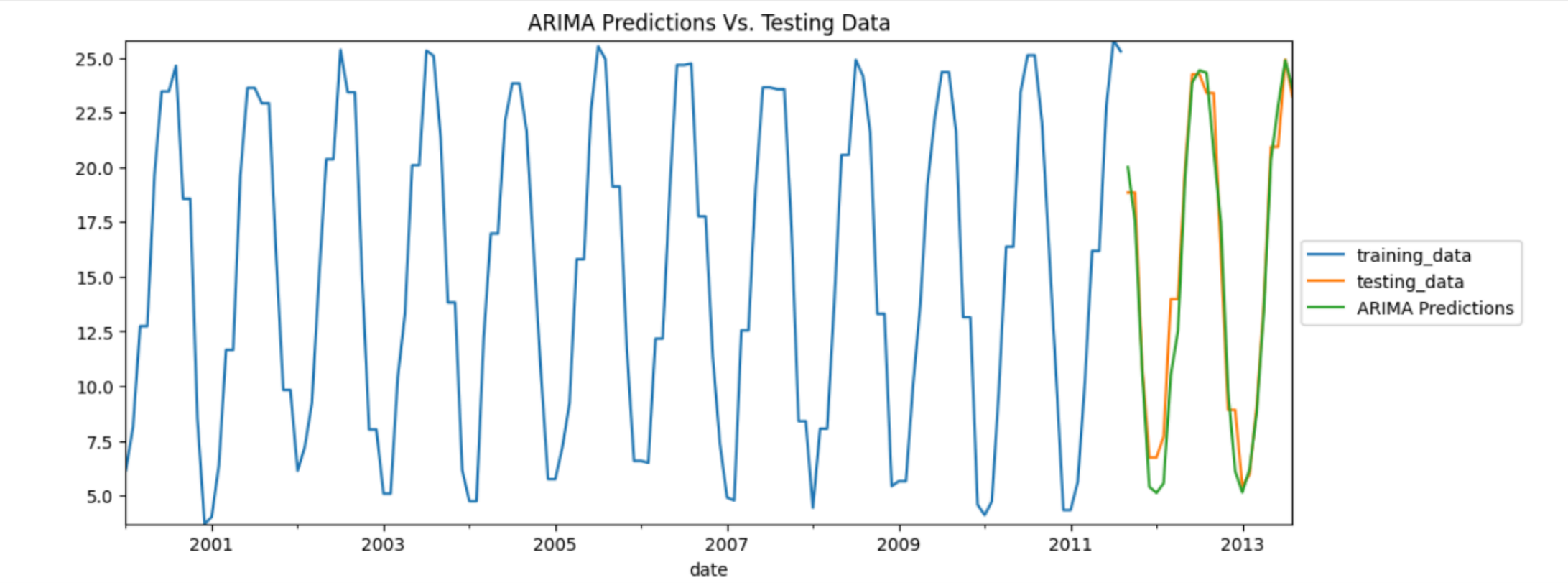
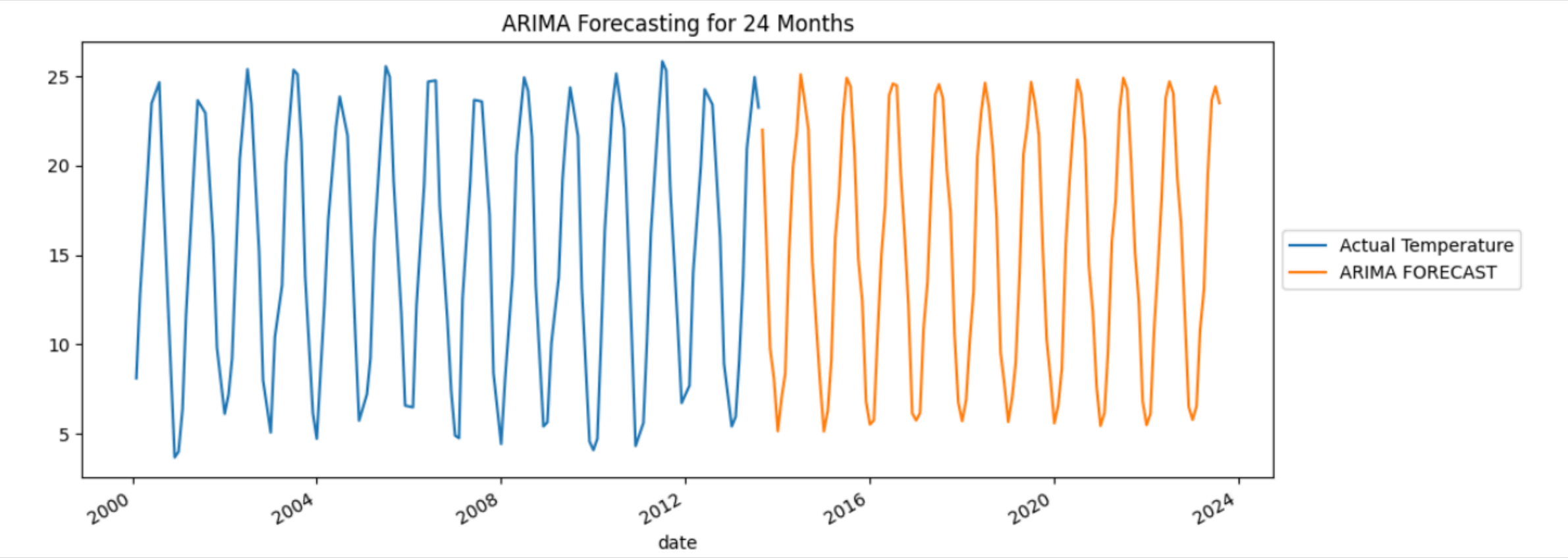


Now we can notice that our ARIMA model is performing with a MSE of 1.4, which is better than or baseline moving average model with MSE of 6.46.

ARIMA Forecasting for 10 years in the future:



Thank you.