Analyses of population on parameters of weather

1. Motivation

Two of the primary challenges confronting the global community today are excessive population growth and the escalating issue of climate change. While initially these concerns might seem disparate, they are intricately intertwined. The burgeoning population directly fuels the progression of climate change, which consequently leads to profound repercussions, particularly in economically disadvantaged regions. Understanding the correlation between population growth and climate change is pivotal in addressing both dilemmas. Excessive population growth results in overflowing landfills inundated with plastic waste, widespread deforestation, and pervasive pollution stemming from heavy reliance on fossil fuels. The proliferation of population translates to an increase in industrialized agriculture, heightened consumption rates, surpassing the Earth's capacity to sustain. In my humble opinion, tackling climate change necessitates addressing the establishment of sustainable population levels.

2. Introduction

The project analyzes the average temperature and snow cover in winter, in the month of January, in selected countries of Central, Southern and Eastern Europe since 1960 and compares them with the development of the population in the given countries. Subsequently, by creating a trend line, it detects the trend of increasing or decreasing temperature or snow layer.

3. Analysis

3.1 Data

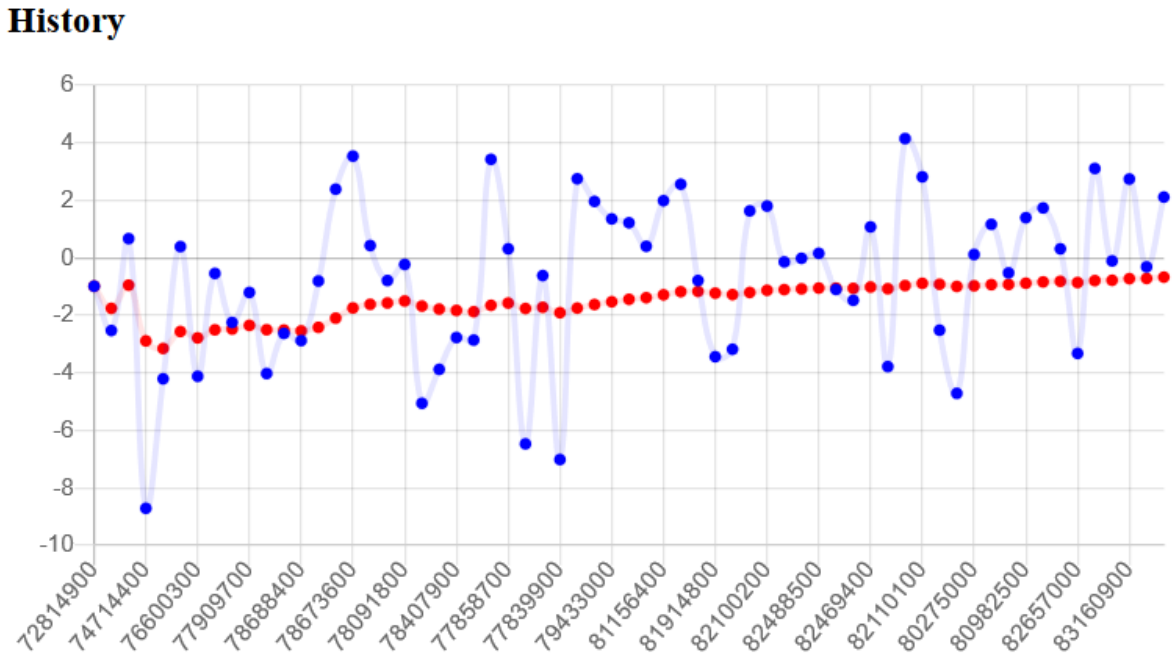
We use climate data from the ERA5-Land Historical Monthly Means model, which provides information on temperature and snow cover at specified coordinates as a function of time. In combination with the database of cities in Central Europe, where we find their coordinates, we can find out the temperature and snow layer in thousands of cities in Central Europe.

3.2 Data processing

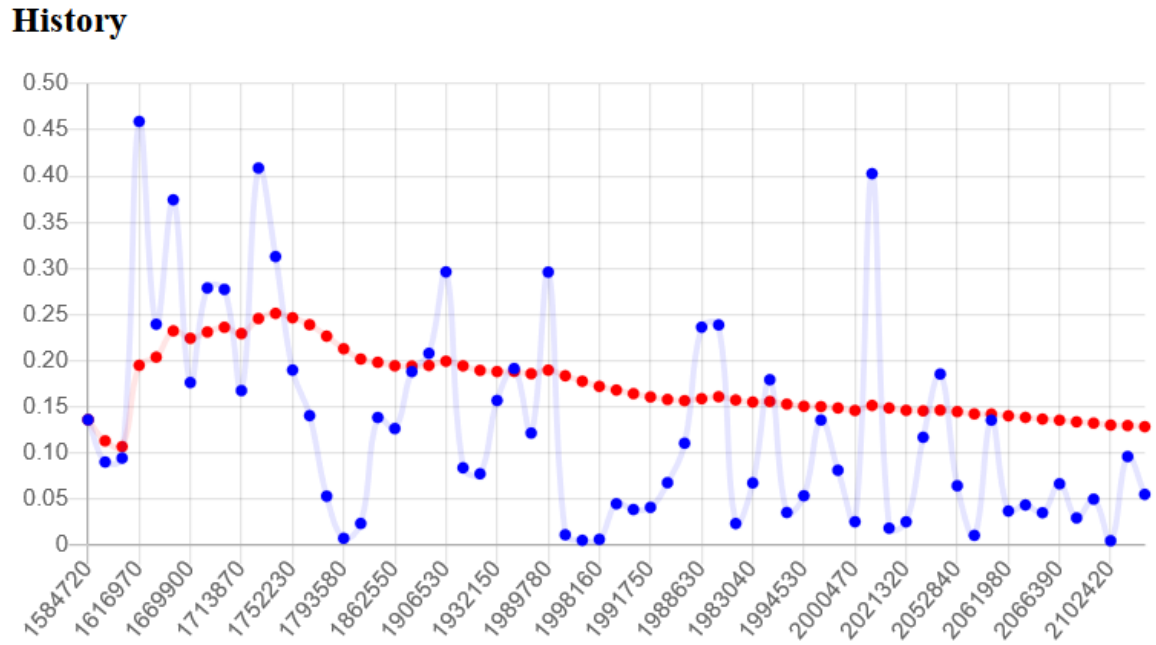
The obtained meteorological data for different cities in specific countries are averaged within the entire country and thus create an average picture of the entire country. These data are then entered into the MySQL database.

3.3 Graphical display of data

The output of the obtained data are graphic displays on the website. The user can see specific meteorological data and compare it with the development of the population in the given country. The graph will also plot the resulting trend, be it constant, increasing or decreasing.



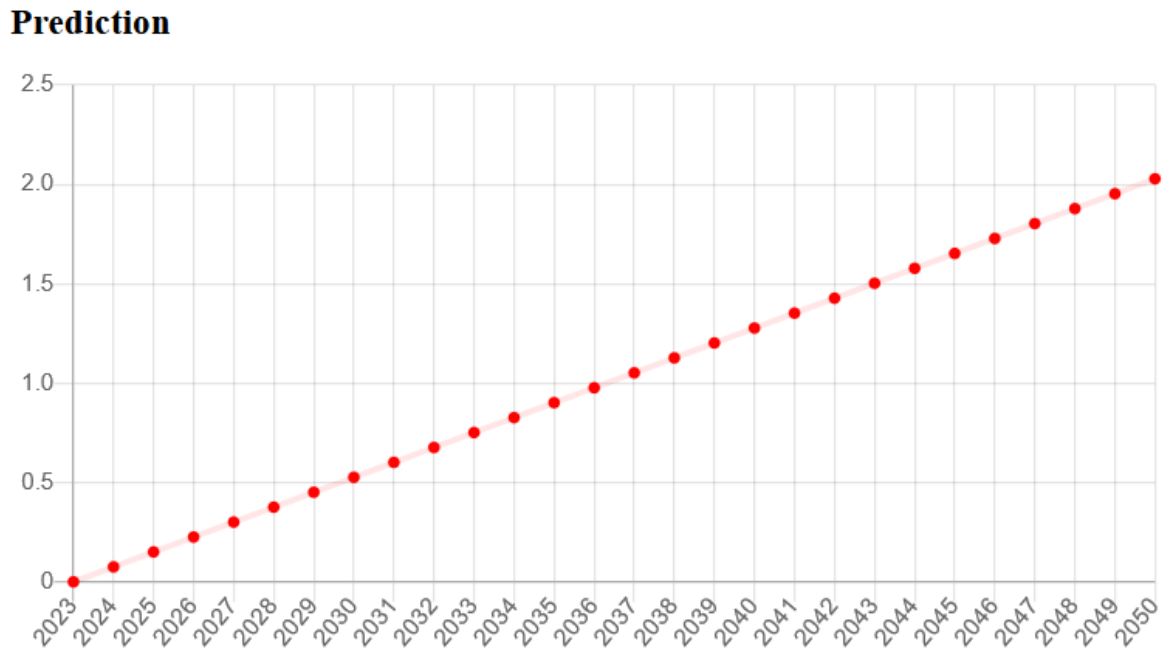
Graph 1 Graph of average temperatures (in Celsius) in January compared to population in Austria



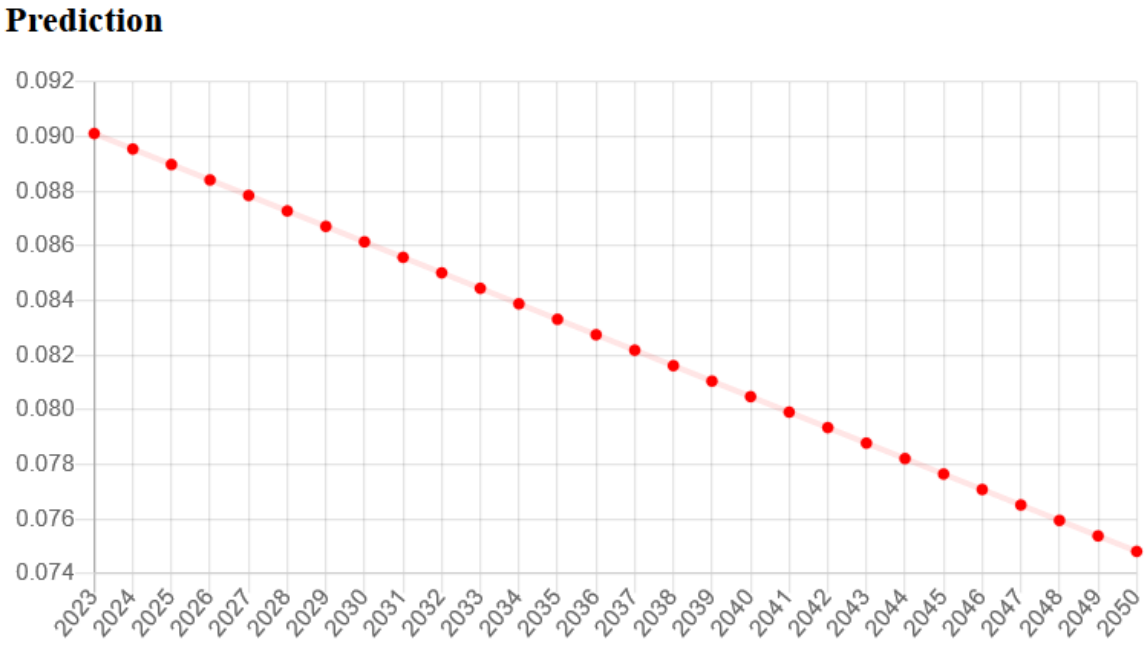
Graph 2 Graph of average snow layer (in meters) in January compared to population in Austria

3.4 Prediction

The system can mathematically predict the weather trend thanks to the data obtained over the past years. Based on the data, it will display the curve of the estimated development until 2050.



Graph 3 Estimated growth of the average temperature for the month of January until 2050



Graph 4 Estimated decrease in the average amount of snow in the month of January until 2050 (in meters)

4. What do scientists say about the impact of population growth on the climate?

Several professional articles confirm that there is a connection between population growth and global warming. This confirms the correctness of our analysis, which could thus be used to monitor the historical impact as well as to predict future developments. For example, in countries and areas with high population growth.

Sources

https://www.populationmedia.org/the-latest/population-growth-and-climate-change

https://populationconnection.org/resources/population-and-climate/

https://www.scientificamerican.com/article/population-growth-climate-change/