Michigan Outoor Recreation Search Interest: Third Installment

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In previous installments, I looked at Google search interest for 10 different forms of outdoor recreation in Michigan. In this installment, I will introduce four weather variables for Michigan: maximum temperature, minimum temperature, precipitation, and snow depth. Subsquent installments will investigage the correlation of these variables with outdoor recreation search interest.

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I acquire daily historical weather data from weather.gov. This data is available for download for a great assortment of weather stations throughout Michigan. However, the data availability for different variables and stations is very mixed.

I only look at station days that have values for all four of my variables of interest (max and min temperature, precipation, and snow depth) for at least 95% of the days. The number of stations meeting this criteria is 105.

I then impute missing values for each station. For precipitation and snow depth, I impute missing values with zero. For minimum and maximum temperature, I use a linear interpolation.

Subsequently, I average the value for each variable and day for all 105 stations. If this data is someday used for forecasting, I will not derive weather forecasts for all of these stations. However, for initial analytical purposes, I will use an average of all of the stations.

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Below, I look at the average trend for the three variables.

Below is the trend for maxium temperature. While the summer peaks are similar, the final two winters were warmer than the first two.

Michigan Maximum Temperature Trend
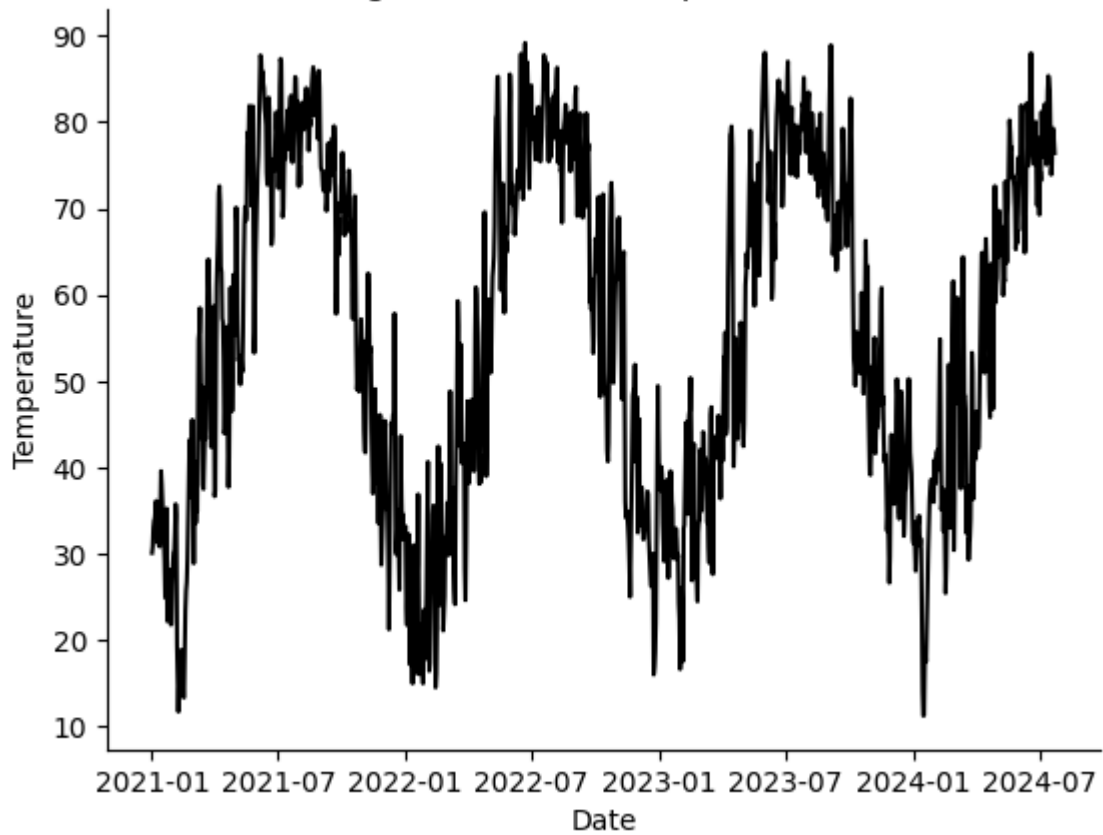
The minimum temperature, like maximum temperature, has relatively constant summer peaks. However, the warmer winters in 2022 and 2023 are even more pronounced when looking at minimum temperatures as maximum temperatures.

Michigan Minumum Temperature Trend
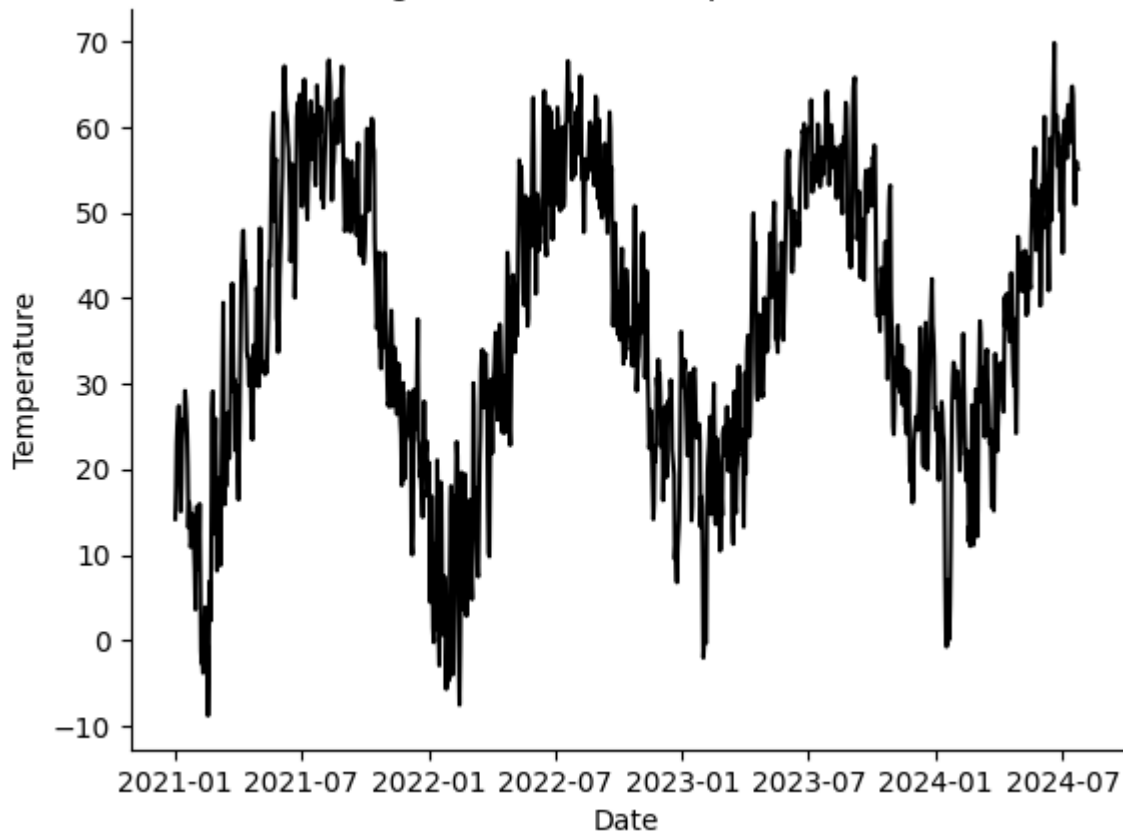
As could have been expected, precipitation shows less of a seasonal trend than temperature. However, we know that while temperature shows more variation in the winter, precipitation generally shows more variation in the summer.

Michigan Precipitation Trend
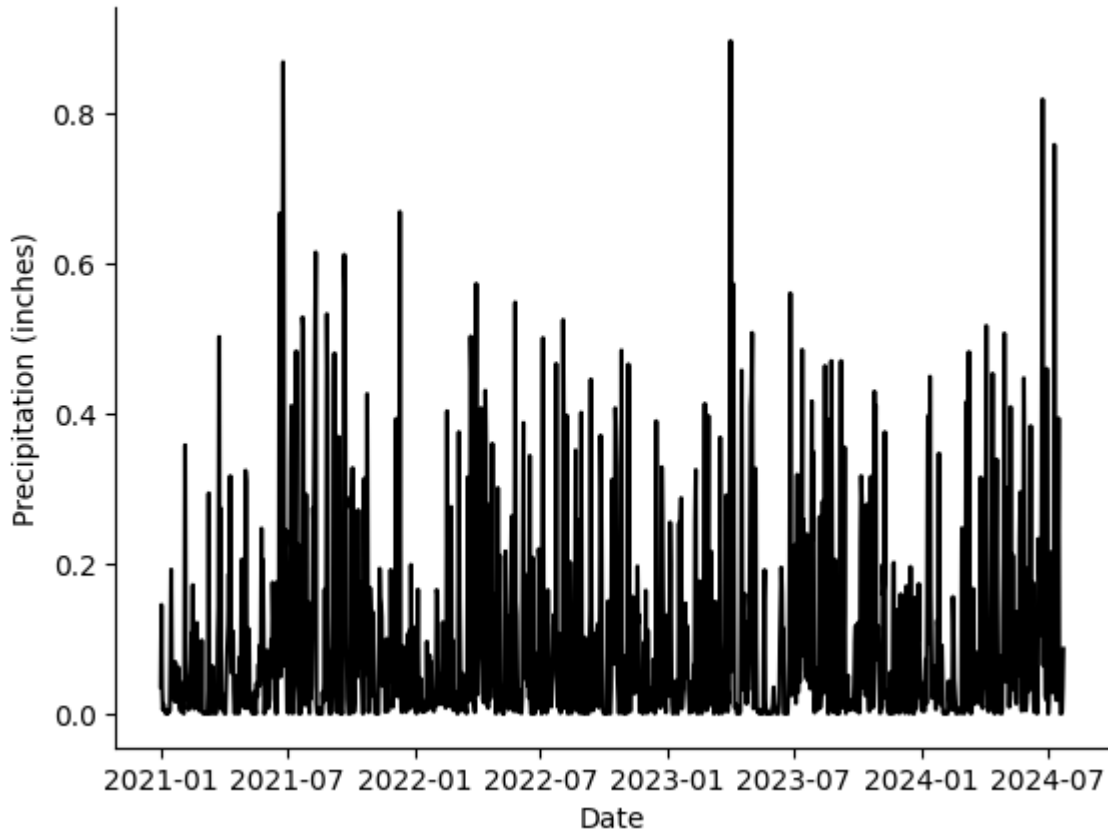
Unsurprisingly, snow depth is extremely seasonal with positive snow depth mostly in the winter and early spring. Early 2021 showed the highest snow depth. While the final three years show similar peaks, analysis of the bulk of the distribution tells a different story. Snow depth in winter 2023-2024 was relatively short in duration durign January with low levels otherwise. Also, snow depth during 2022-2023 showed a lot of variance.

Michigan Snowdepth Trend