Bayesian Data Analysis
Fall 2017
HW3p: Programming Homework #3
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1.)

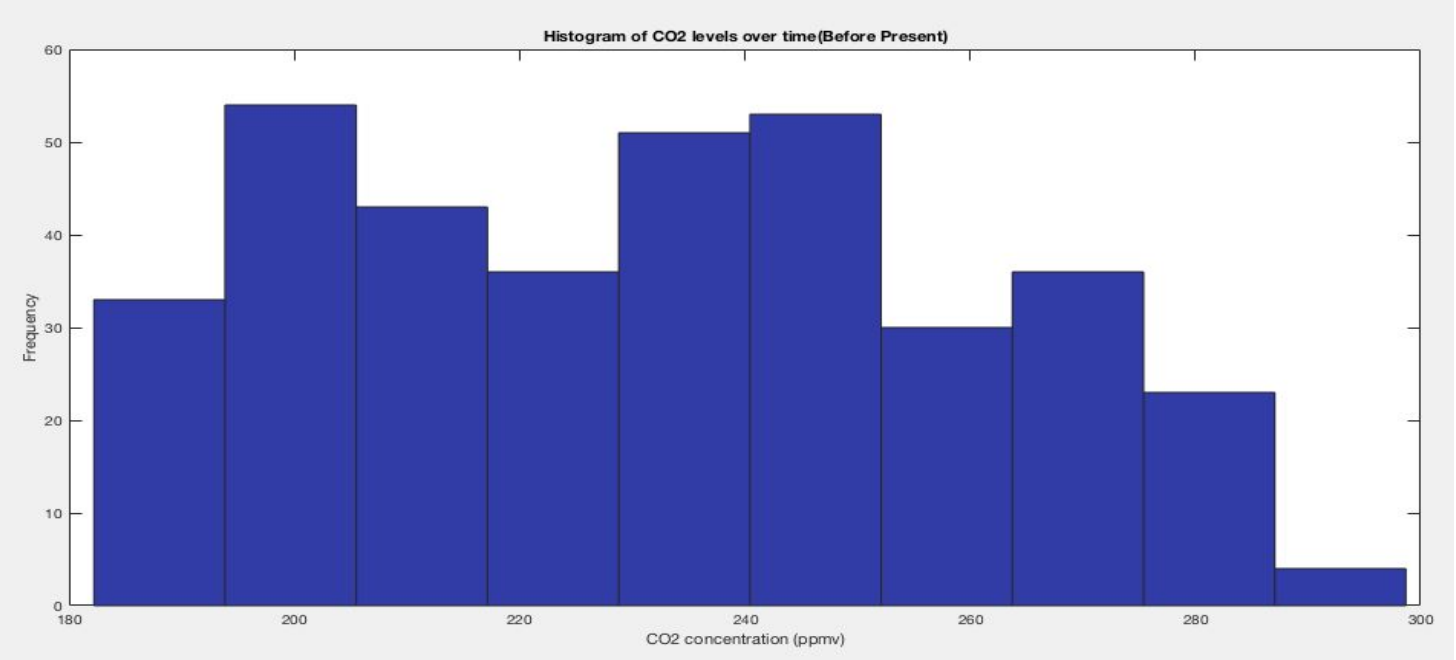
a.) I found the range of variability of CO2 in the Vostok data set to be:

- Min: 182.200000
- Max: 298.700000

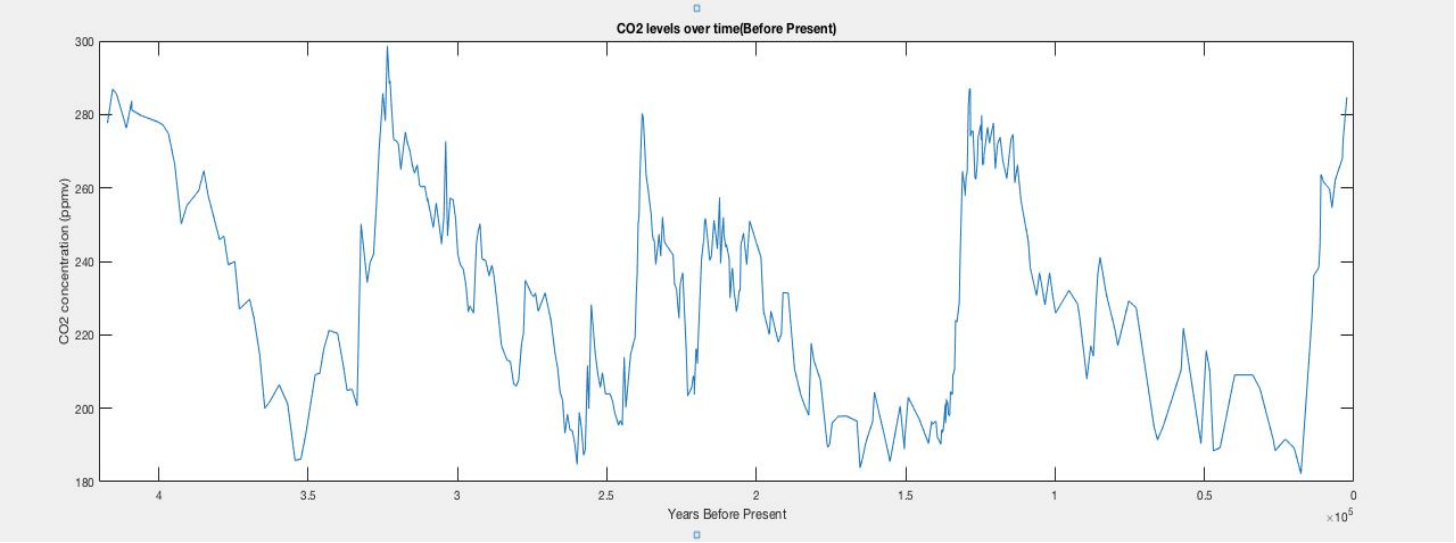
b.) Mean of C02 levels: 232.186501.

c.) Standard deviation of CO2 levels: 28.485936.

d.) Below is a histogram and line graph of the CO2 levels over time (before present)

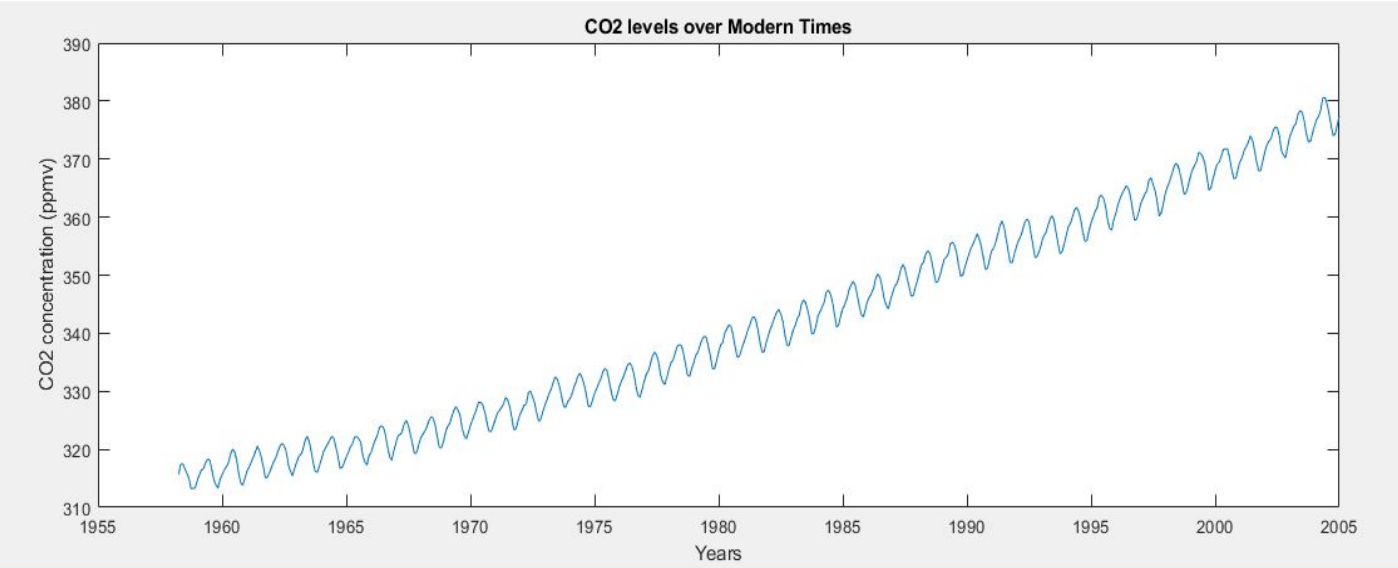


You can see there is a decent distribution of the different CO2 levels.

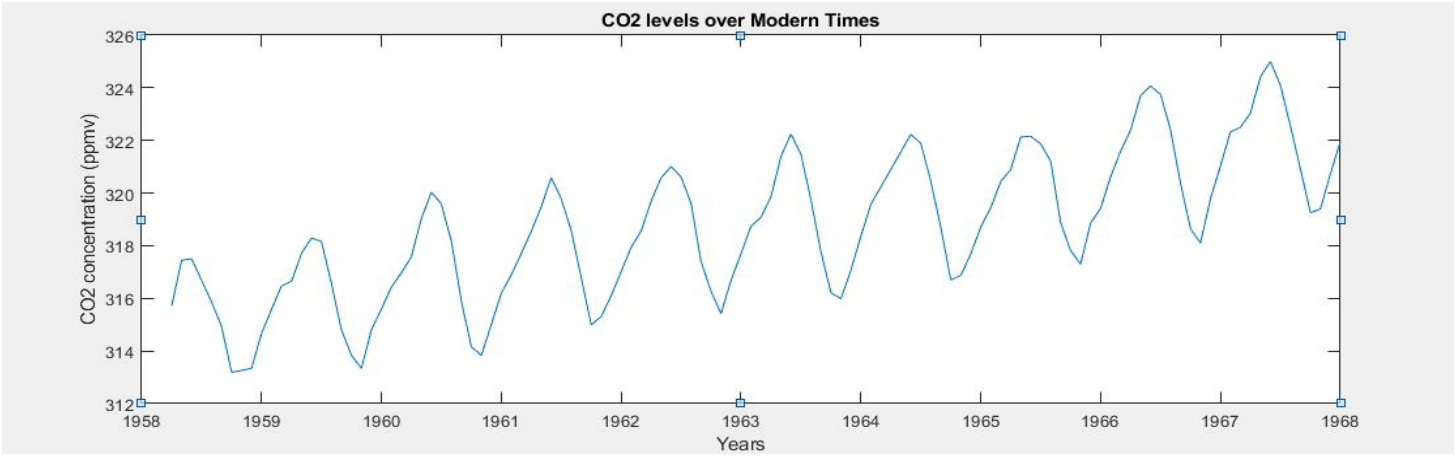


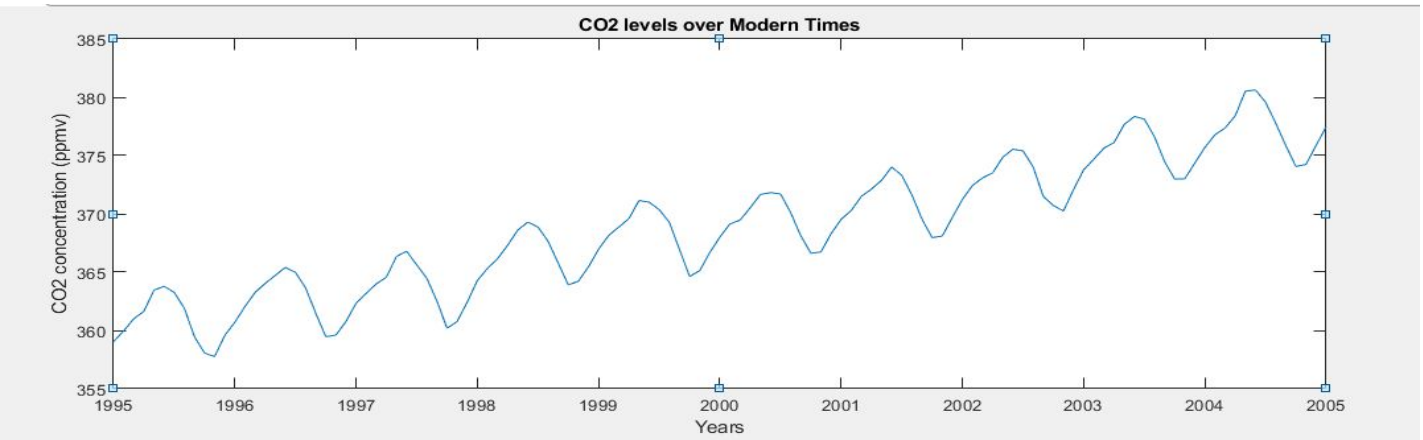
2.)

Below is a plot of the CO2 levels over modern time(1955-2005):



a.) To roughly determine the periods of oscillation, I observed the graph in 10 year periods at both the first decade of data as well as the last decade of data:



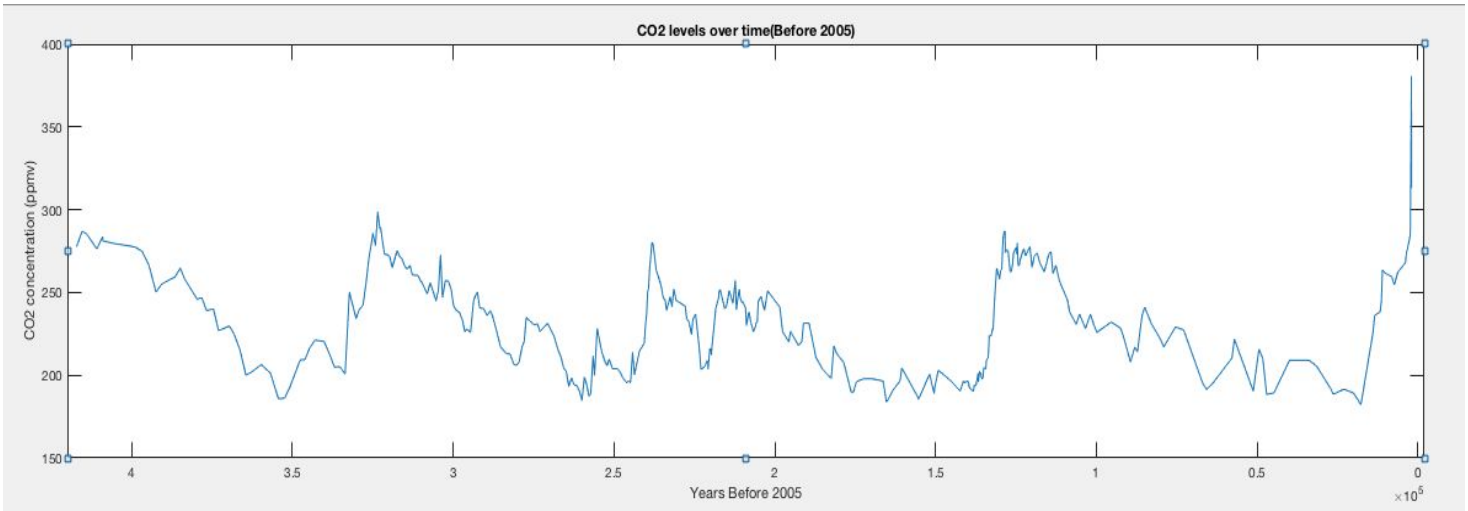


In doing so, I found the oscillations appear to happen once a year with the peaks occurring towards the middle of the year. I estimate a possible cause of this could be due to higher gas consumption during the nicer parts of the year. People travel more during the warmer parts of the year thus increasing CO2 output.

3.)

a.) I found the CO2 level in may of 1986 to be roughly about 350.23 ppmv.

b.) Given the standard deviation of the Vostok data and visualizing the data below, you can see that this rapid increase is highly unlike the cyclical periods seen before. This increase is much higher than anything observed previously.



c.) (extra credit) I would have absolutely no idea of how to go about this.

d.) This analysis is compelling because it shows that something irregular is happening, and at a rapid rate.

e.) I would say this analysis is insufficient because we didn't correlate the rise of CO2 with any significant cause. I merily speculated that perhaps travel increases the rise but show no data to support this. I think showing the effects these levels have had on the ice caps could have also made this a better analysis.