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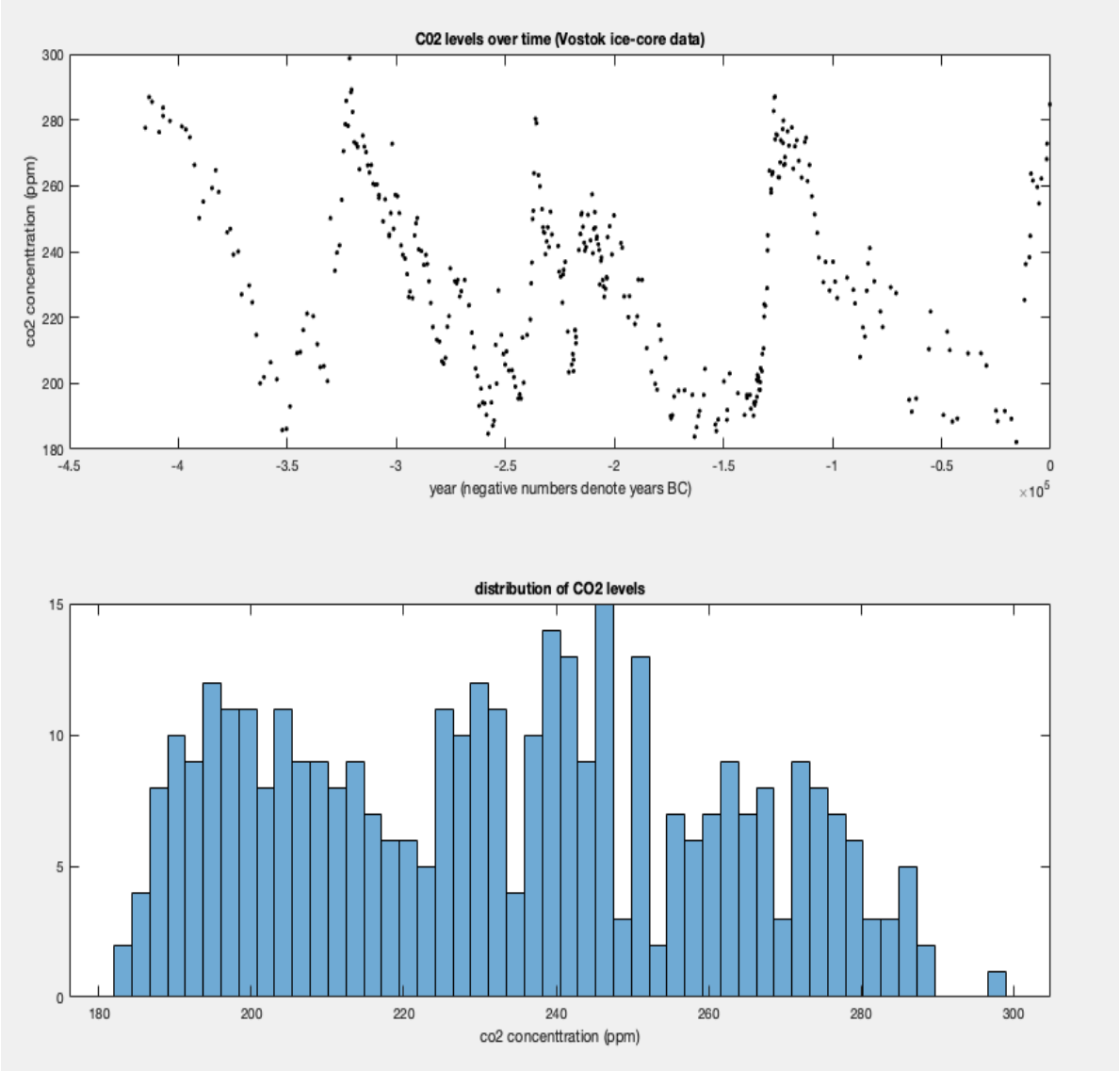
VOSTOK ICE CORE DATA

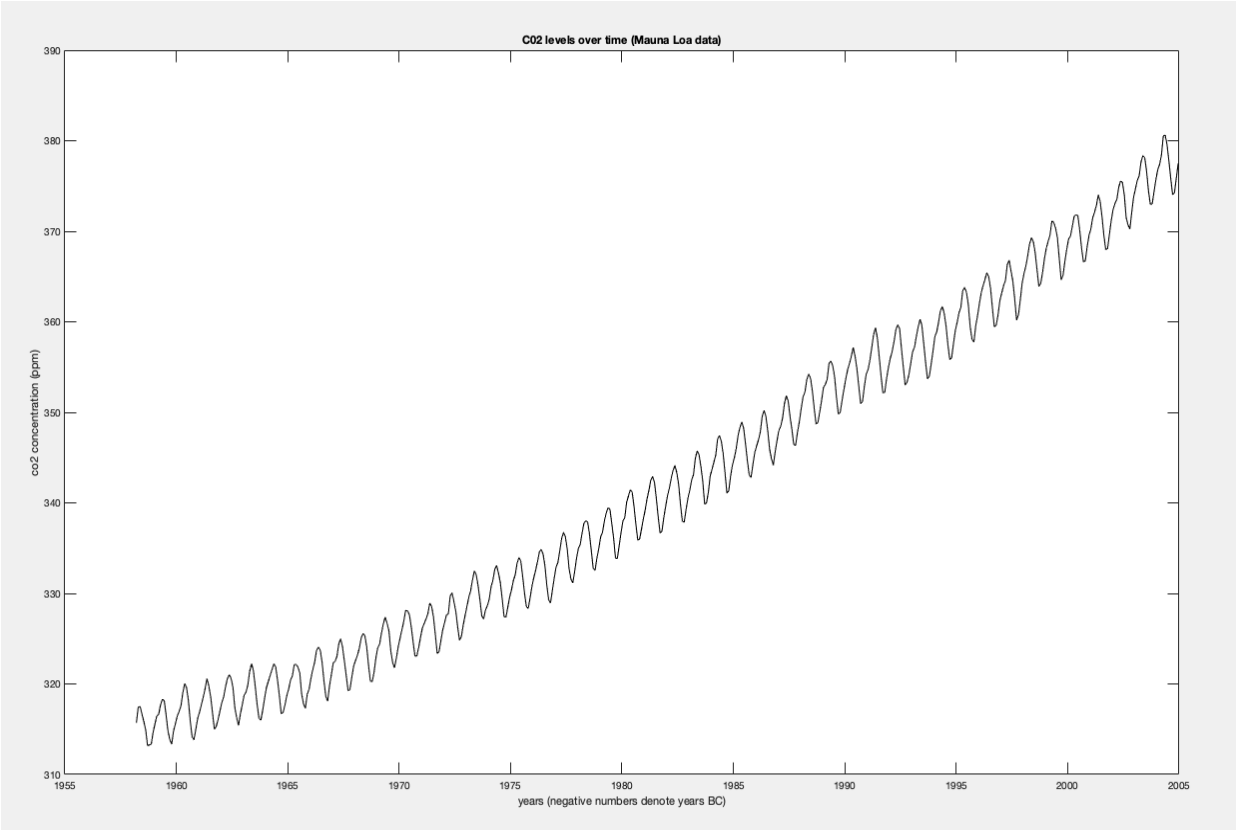
Range of variability of co2 levels:	1.822000e+02 to 2.987000e+02
Mean of co2 levels:	2.321865e+02
Standard deviation of co2 levels:	2.848594e+01

Note: The time axis in both graphs using the Vostok data shows years BC as negative numbers and years AD as positive numbers.

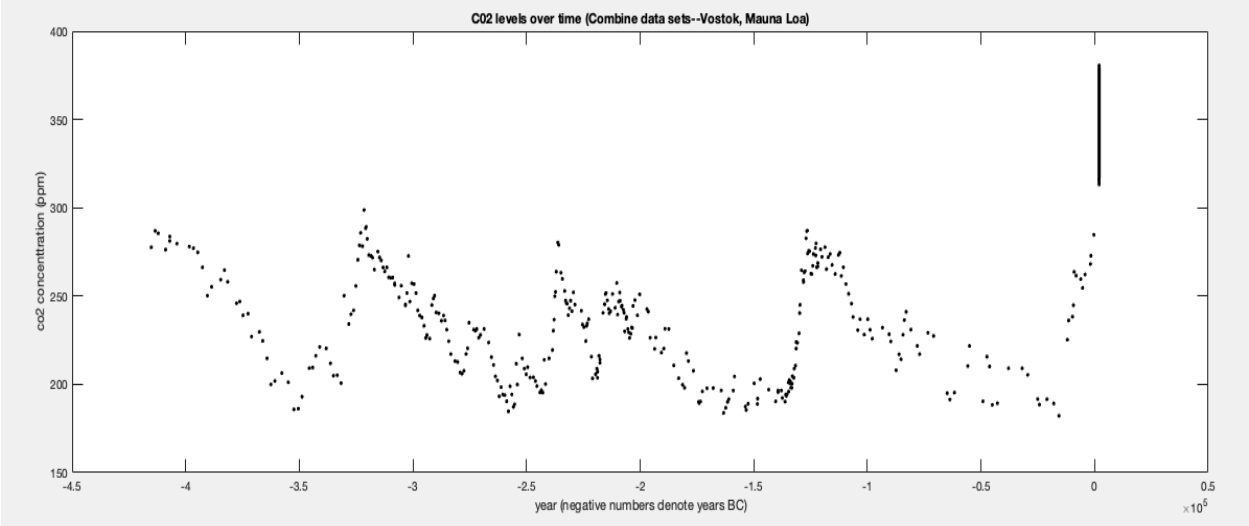


MAUNA LOA DATA

Mauna Loa Data shows CO2 levels oscillating at a period of 1 year. The fluctuations occur because of a "cyclic variation of about 5 ppmv in each year corresponding to the seasonal change in uptake of CO2 by the world's land vegetation. Most of this vegetation is in the northern hemisphere, since this is where most of the land is located. From a maximum in May, the level decreases during the northern spring and summer as new plant growth takes carbon dioxide out of the atmosphere through photosynthesis." (https://en.wikipedia.org/wiki/Keeling_Curve)



COMBINE VOSTOK AND MAUNA LOA DATA



CO2 Level in May 1986: 350.21 ppmv

We could define any spike in co2 reaching 342 ppmv, the mean among the modern (Mauna Loa) data, as on par with our modern spike. Given a standard deviation of 28.5 for the Vostok ice core data, a spike of to this level would be nearly four standard deviations from the mean value of 232 ppmv. It is very unlikely for the modern spike in co2 levels to be one of many natural fluctuations.

The Vosok dataset contains 363 CO2 measurements scattered over 415,000 years leading up to the birth of Christ. On the high end, a measurement of rougly 300 ppmv is the most extreme outlier, exceeding a deviation from the mean of 2*(standard deviation). This value is still 13 ppmv shy of the lowest CO2 level take from the Mauna Loa data. Informally speaking, it's compelling that nowhere prior to the industrial revolution do we see any hint that CO2 levels might have even approached the levels attained in modern atmospheres.

This analysis is still far from complete, as most gaps in between data points on the Vostok timeline are large enough to contain many 47 year periods. If a spike similar to our modern one exists within the time period ranging from 415000 BC to 300 BC, it is possible that it's relatively small and very difficult to find.