

The Atmospheric Carbon Dioxide Curve

Introduction: Since the onset of the industrial revolution in 1885, fossil fuel consumption has increased dramatically. Fossil fuel consumption rises from the growing industrial demands for merchandize production, nuclear weapons, and transportation that accompanies the fast life of industrial societies. An observed cause and effect relationship with the accelerated industrial activities is the increase in certain atmospheric gases such as carbon dioxide (CO₂, the gas we exhale), and Methane (CH₄, a biological product gas from many agricultural activities). In this exercise, we are to learn how to download the atmospheric carbon dioxide measurements from a credited web page, plot the data using Excel, and interpret the diagram by providing three to five sentences in the caption that explains the graph.

Goals:

- Learn how to download data, and give appropriate credit.
- Practice graphing skills illustrated in part one of this workshop using Excel.
- Learn to effectively speak about a chart.
- Learn how to insert a caption for a chart.

Go to www.google.com and start a search using the key word phrase “Quantitative Environmental Learning Project”. The home page will have many top line icons. Click on “Data”.

The navigation window will appear with two columns “Mathematical Data” and “Environmental Data”. Under “Environmental Data” you will find many data sets categorized by topic, click on Air Pollution.

Choose Data Set # 78 Mauna Loa CO₂ (1959 – 2002)

A new window will open showing a graph that represents the data and four file options for the format on which you will download the data. Click on Excel file and save to your desktop (or wherever you save material from this class). Note that in the same web page you can access information about the data and even explore using a program called Stat Crunch. Remember that the graph must be plotted using Excel software only.

Hint 1: if you are unfamiliar with Excel, visit a web site with a tutoial on how to plot a graph with Excel!

Now that you have the data saved in an Excel spreadsheet, highlight the two columns by right clicking on the heading of the data and scroll down to the end of the columns.

Click on Chart Wizard in the Excel tool bar and select the scatter plot diagram. Click “next” following the 4 steps given in “Chart Wizard”, then click “Finish”.

Your assignment is to provide the graph with a caption and one paragraph explaining the fluctuations you notice in the CO₂ graph.

Hint 2: To add a caption to a graph:

Highlight the chart in Excel by left clicking on the chart and clicking “CTRL-c” simultaneously. Embed the chart in a blank word document, by clicking “CTRL-v”. Do not forget to save the document. While you have that document open, right click on the chart and choose “add a caption”. Save your document.

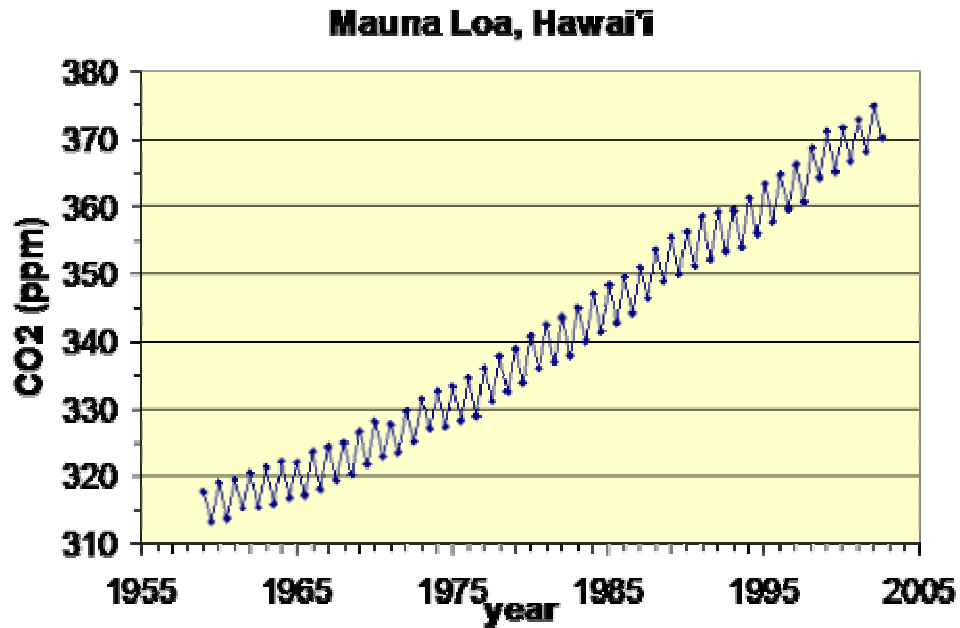


Figure 1: Atmospheric Carbon dioxide concentration curve from 1950 - 2002 (Keeling and Whorf 2004). The curve illustrates two phenomenon: the continuing increase in carbon dioxide concentration, and the seasonal fluctuations in CO₂ concentration.

References

Keeling, C.D. and Whorf, T.P. (2000) Atmospheric CO₂ records from sites in the SIO air sampling network. In Trends: A Compendium of Data on Global Change. Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S. Department of Energy, Oak Ridge, Tenn., U.S.A.