

A New Look at Anthropogenic Atmospheric Carbon Dioxide

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When seasonal variations are removed, and the pre-industrial level of carbon dioxide (280 ppm) is subtracted, the atmospheric carbon dioxide level as measured at Mauna Loa Observatory and for the global network closely follow an exponential function with a doubling time of about 30 years (see black dashed line in the figure). Even during the 1970's, when fossil fuel emissions dropped sharply in response to the "oil crisis" of 1973, the anthropogenic atmospheric carbon dioxide level continued increasing exponentially at Mauna Loa. Since the growth rate (time derivative) of an exponential has the same characteristic lifetime as the function itself, the carbon dioxide growth rate is also doubling every 30 years. This explains the observation that for linear growth rates, carbon dioxide increased from less than 1 ppm per year to more than 2 ppm per year in the past 40 years. It is argued that this is expected since world population and Gross Domestic Product are increasing exponentially with similar rates of growth.

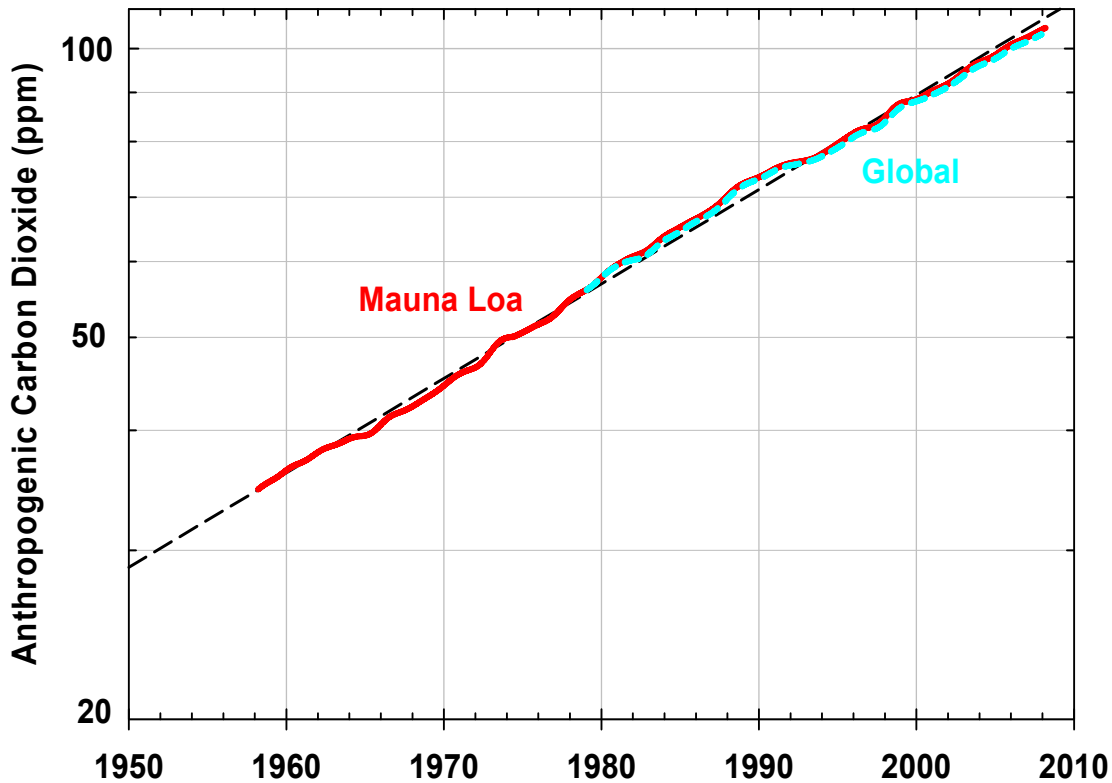


Figure 1. Deseasonalized, anthropogenic, atmospheric carbon dioxide measured at Mauna Loa Observatory (red curve) and the global average (cyan dashed curve) plotted versus time on a semi-logarithmic scale. The straight black dashed line is an exponential relation with a doubling time of about 30 years (about 2.3% per year).