The keeling curve

The Keeling CurveOver fifty years ago, Charles David Keeling was the first man to measure and track the amount of carbon dioxide in the atmosphere. He set up a gas analyzer on top of Hawaiis Mauna Loa that has been tracking the steady increase of carbon dioxide in the atmosphere released by the burning of fossil fuels. The graph called the Mauna Loa curve, is also known today as ??? The Keeling Curve??? and has come to be one of the most recognizeable images in modern science. Dr. Martin Heimann wrote in the science journal ??? Nature??? that ??? If the world today realizes it has a problem and needs to curb emissions of greenhouse gases, it in large part owes this knowledge to Keelings painstaking efforts.

??? Of course Charles Keeling didnt just wake up one day and come up with this idea, he was actually a member of the Wilderness Society for much of his life before he ever started to think about recording global atmospheric carbon dioxide. While attending the University of Illinois Charles Keeling got hooked back country camping in the Cascades. A year later he was at Northwestern University and came across a book titled ??? Glacial Geology and the Pleistocene Epoch??? by Richard Foster Flint. This possibility of pursuing a science career while spending time in his beloved mountains intrigued him to no end.

??? I imagined climbing mountains while measuring the physical properties of glaciers,??? he later wrote, and chose a minor in geology. (Keeling, Paul)Initially, Keeling set out to test whether carbonate in rivers and ground waters was in balance with carbon dioxide in the nearby air which required Keeling to sample sites remote from human sources of carbon dioxide. He

began by designing a manometer that measured carbon dioxide more accurately than methods used in the past.

Keeling then formulated a method for measuring carbon dioxide in the atmosphere continuously. After taking a position at Scripps, he initiated and supervised carbon dioxide monitoring near the top of Hawaiis 13, 000 foot Mauna Loa. Then in March of 1958 the data began to register on continuous strip charts. Two years later Charles Keeling reported that carbon dioxide in the atmosphere was rising. (Keeling, Paul)The concentration of carbon dioxide is described in units of parts per million by volume (ppm/ppmv). Parts per million by volume is the same as what chemists call the ??? mixing ratio??? of a mixed gas, in this case the ratio of carbon dioxide molecules with all other air molecules, because equal volumes of gas at equal pressure hold equal numbers of molecules.

(W. H. Berger)One interesting aspect of The Keeling Curve is the seasonal decrease of carbon dioxide by a few parts per million in the northern hemisphere during spring and summer while vegetation grows, and the rise of carbon dioxide in the winter months. Many studies have shown that increased concentrations of carbon dioxide act as a plant fertilizer. Not only changing the climate, but the biosphere as well due to increased plant growth. (Bowman, David)The Keeling Curve has tracked the increase of 64 parts per million of carbon dioxide in the atmosphere over the past 46 years.

Now that may not seem like much at first glance, but studies of ice cores in Antarctica do show that this does in fact represent a great difference from previous levels for at least the past 400, 000 years where carbon carbon

dioxide fluctuated from 280 parts per million to 180.(Bowman, David)Before the industrial era, carbon dioxide in the atmosphere was between 275 and 280 ppmv for several thousand years. This fact is known from the composition of ancient air trapped in polar ice. The average value of carbon dioxide in 1958, when Dr. Keeling started his measurements, was near 315 ppmv. The ppmv by the year 2000 had risen to about 367 ppmv, higher than pre-industrial values by one third. (W.

H. Berger)The most striking evidence of the atmospheres tremendous reactivity is the seasonal change seen in the carbon dioxide concentration. The range of change is a full 0. 3 percent every year.(W. H.

Berger)Works CitedBowman, David Nature Australia Summer2005/2006, Vol. 28 Issue 7, p80. EBSCOhost. Libdb. 3 March 2010. Keeling, Paul M. The Path to Mauna Loa. Wilderness; 2008/2009, p12-14.

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W. H. Berger, Ph. D Professor of Oceanography, UCSD Global Change and Global Warming 2002 http://earthguide. ucsd. edu/globalchange/keeling_curve/01. html