Human Caused Climate Change? A Skeptical Look at the Narrative

CO2

(fifth PDF of 12)

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Other PDFs on various subjects, exposing the machinations behind the mainstream narrative about our world, can be found here on my website.

Should anyone feel like supporting my continuing this work, a donation button is to be found on my website (left sidebar and on a page shown in the menu). Thank you.

Note: Please read the first PDF, *Introduction to Human Caused Climate Change? A Skeptical Look at the Narrative* first, where the intent and scope of this project are explained.

Note: Text that is indented both from the right and left (like this paragraph) is quoted from the noted source.

Sections

CO2 - The Insidious Villain

This could be in the *Grift* section or the *Fear Mongering, Propaganda Tactics and Media Nonsense* section, as it is something totally insane that is repeated and repeated so it sinks in regardless of having any connection to reality. And that is the messaging that CO2 is a pollutant, poisonous, toxic, dangerous.

Yes, even the most benign substances can be harmful for people if exposed to very high concentrations, but the way CO2 is characterized is like a Bond villain; the hero being us pulling together to obtain "Zero Carbon".

Carbon Dioxide is Not Poisonous

First of all, let's be clear that CO2 is not poisonous.

An article on the Kaiterra website by Dianna Smith, Is Carbon Dioxide Harmful to People?, discusses CO2 and gives a chart showing effects of increased CO2 on people:

> CO2 is not poisonous; as a gas, CO2 itself will not hurt you. This is an important fact to remember, as carbon dioxide is a vital part of the environment. The human breathing mechanism actual revolves around CO2, not oxygen. Without carbon dioxide, humans wouldn't be able to breathe. It's only when CO2 gets concentrated do you have to worry.
>
> Carbon dioxide acts as a simple asphyxiant; in other words, as CO2 levels in a closed room rise, carbon dioxide replaces the oxygen your body needs. When your body can't get oxygen, it slows down and does not function properly. Because carbon dioxide is an asphyxiant, it mostly affects your brain.

Rather than showing information from the chart in Dianna Smith's article, better directly from the USDA. On the USDA website a PDF, Carbon Dioxide - Health Hazard Information Sheet, published by the FSIS (Food Safety and Inspection Service) Environmental Safety and Health Group, is an industry safety publication. In it they discuss the safe levels of CO2 in the workplace. In a section, *What are the symptoms of different levels of exposure?*, they list different concentrations and possible or likely effects on a person. OSHA considers 5,000 ppm to be acceptable exposure for a full work day:

> 5,000 ppm (0.5%) OSHA Permissible Exposure Limit (PEL) and ACGIH Threshold Limit Value (TLV) for 8-hour exposure
>
> 10,000 ppm (1.0%) Typically no effects, possible drowsiness
>
> 15,000 ppm (1.5%) Mild respiratory stimulation for some people

The U.S. Environmental Protection Agency's 2009 CO2 Endangerment Finding

Following is a quick look at the codifying of CO2 as a pollutant by the EPA and resistance to it in the form of a petition to repeal it.

In 2009 greenhouse gases were officially declared a threat to public health and consequently able to be regulated by the EPA in their Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act:

> On December 7, 2009, the Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:
>
> - **Endangerment Finding**: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF6)—in the atmosphere threaten the public health and welfare of current and future generations.
> - **Cause or Contribute Finding**: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution that threatens public health and welfare.
>
> These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite for implementing greenhouse gas emissions standards for vehicles and other sectors.

One the web page they also have links to their Technical Support Document for the Findings, and to other related material, even extensive documentation of submitted public comments to the EPA.

The Center for the Study Of Carbon Dioxide and Global Change Petition

Not everyone agrees that the case the EPA made for their decision was scientifically sound. One example is the *Center for the Study Of Carbon Dioxide and Global Change*, (*CO2 Science* website) who, in a March 9, 2020 document, Petition to the United States Environmental Protection Agency For Repeal of EPA's 2009 Endangerment Finding, petitioned the EPA for the repeal of their Endangerment Finding. It is a 139 page PDF that goes deep into the science challenging the conclusions and in particular the models used for the EPA's scientific basis.

Their basic premise:

> There is nothing unusual or unnatural about Earth's current warmth or rate of warming. Historic and modern records of atmospheric CO2 and temperature violate established principles of causation. Model-based temperature projections since 1979 artificially inflate warming (compered to observations) by a factor of three, invalidating the models and all their ancillary claims associated with greenhouse gas-induced warming.
>
> There is no debate as to whether or not atmospheric carbon dioxide, or CO2, is a so-called greenhouse gas. When present in the atmosphere, this one-carbon and two-oxygen molecule indeed has the capacity to absorb infrared radiation and warm the planet. There is also no debate as to

whether or not the concentration of atmospheric CO2 is rising; over the past two centuries it has increased from a meager 0.028% of the atmosphere by volume to a still-meager 0.041% today.

At any given moment, Earth's temperature is a product of a multitude of forcing and feedback factors carbon dioxide being only one of them. And although the air's CO2 content is indeed rising, this atmospheric trace gas is not nearly as capable of raising global temperatures or initiating threats to human health and welfare that the EPA Endangerment Finding claims.

Plants Love CO2

We all learned in school that the oxygen we need to live comes from plants as we breathe in (roughly 78 percent nitrogen and 21 percent oxygen). The plants themselves are able to live and grow because they use CO2 in the atmosphere. And it seems they thrive when given more than is normally found in the air.

CO_2 Supplementation

In fact, greenhouse growers add CO2 to their greenhouses to increase plant growth. This from the Oklahoma State University website, March 2017, CO_2 Supplementation:

> In general, CO2 supplementation is the process of adding more CO2 in the greenhouse, which increases photosynthesis in a plant. Although benefits of high CO2 concentration have been recognized since the early 19th century, growth of the greenhouse industry and indoor gardening since the 1970s has dramatically increased the need for supplemental CO2. The greenhouse industry has advanced with new technologies and automation. With the development of improved lighting systems, environmental controls and balanced nutrients, the amount of CO2 is the only limiting factor for maximum growth of plants. Thus, keeping the other growing conditions ideal, supplemental CO2 can provide improved plant growth. This is also called 'CO2 enrichment' or 'CO2 fertilization.'

Growing Plants with Carbon Dioxide

From the Ceres website, September 10, 2020, a detailed article about using CO2 in greenhouses, Growing Plants with Carbon Dioxide:

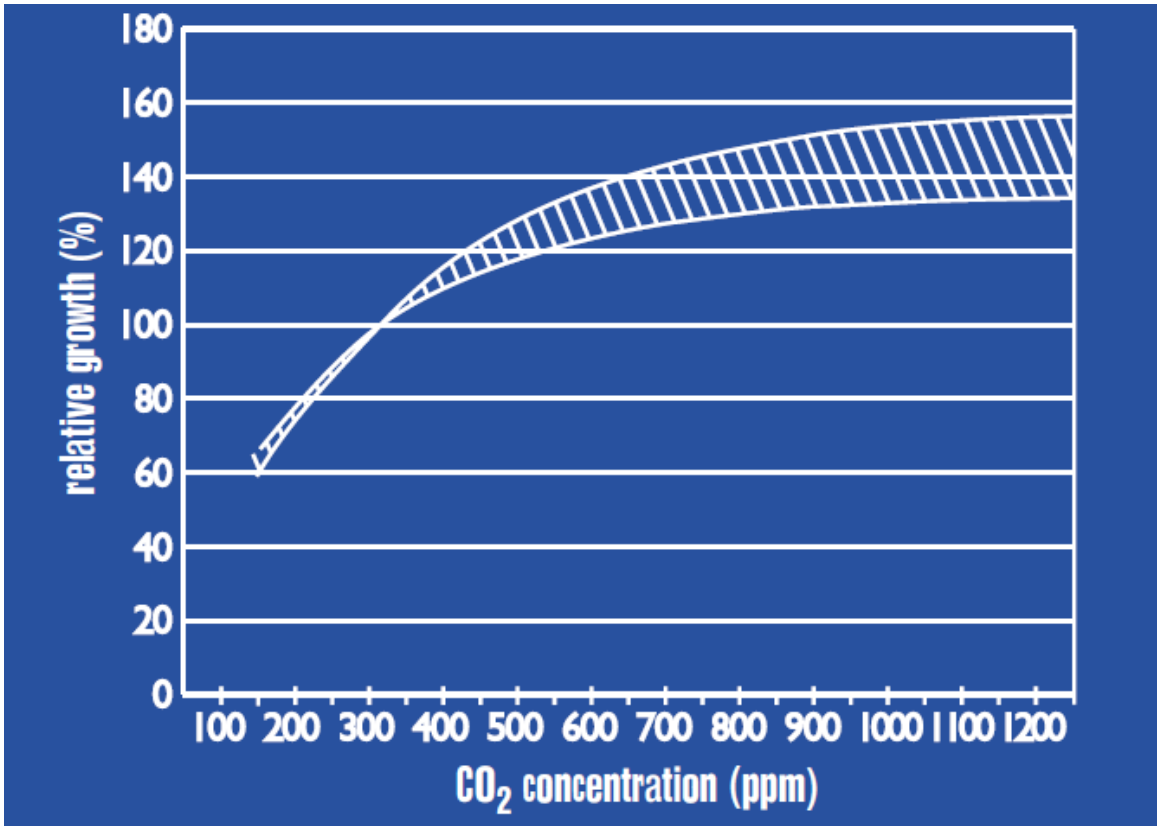
> CO2 supplementation is a common and highly beneficial practice in modern horticulture. This document will explain why, when, and how supplementation is important and what the potential outcomes can be.

Carbon dioxide is therefore vital and necessary for plants to thrive, whether they are C3, C4 or CAM. The difference between the categories is how they assimilate the carbon dioxide to be used as a source of energy and build carbohydrates.

Figure 1 below summarizes data from 60 scientific greenhouse experiments worldwide and shows:

- lower levels of carbon dioxide than ambient can decrease plant growth 30-40% (at 150 ppm)
- Conversely, with a CO2 level about 500 ppm plant growth increased by 15-25%.
- Between 340 ppm – 700 ppm, CO2 can increase growth by 30-40%.

The wide band is due to variation between crops and to conditions. This graph is based on data from about 60 publications of experiments worldwide in many greenhouse crops. (Source: Nederhoff, 1994).



Higher Concentrations of CO2 Also Improve Plants' Water Efficiency

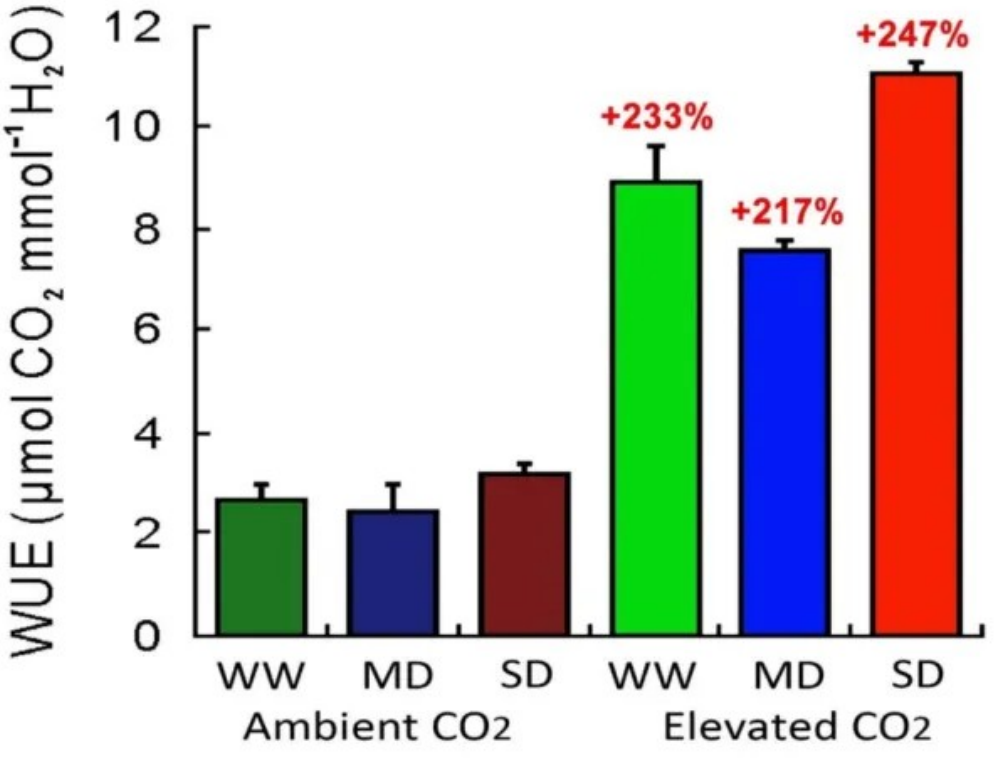
On the Watts Up With That website a May 20, 2022 article by Craig D. Idso, CO2 Enrichment Improves Plant Water-Use Efficiency, looks specifically at another benefit of growing plants with higher concentrations of CO2, improved water usage efficiency:

The smaller pore openings make it more difficult for water within the sub-stomatal cavities of the leaves to escape to the air. Consequently, elevated CO2 not only enhances plant photosynthesis and growth, it also reduces plant water loss by transpiration, which combination of factors improves plant water use efficiency.

The magnitude of this incredible benefit varies by plant and growing conditions. Nevertheless, most plants experience water use efficiency gains on the order of 70 to 100%–or more—for a doubling of atmospheric CO2 (see and read reviews of multiple peer-reviewed studies under subheadings of Water Use Efficiency here on my CO2 Science website).

As an example of this phenomenon, Figure 1 shows the effects of elevated CO2 and plant water supply on the water use efficiency of soybeans. The plants were grown in controlled-environment greenhouses for 40 days under ambient or twice ambient CO2 concentrations and one of three water treatments: well-watered, moderate drought or severe drought.

Regardless of watering treatment, the scientists who conducted this study found that a doubling of CO2 significantly increased the water use efficiency of these plants by a whopping 217 to 247%!



WW = well-watered, MD = moderate drought, SD = severe drought

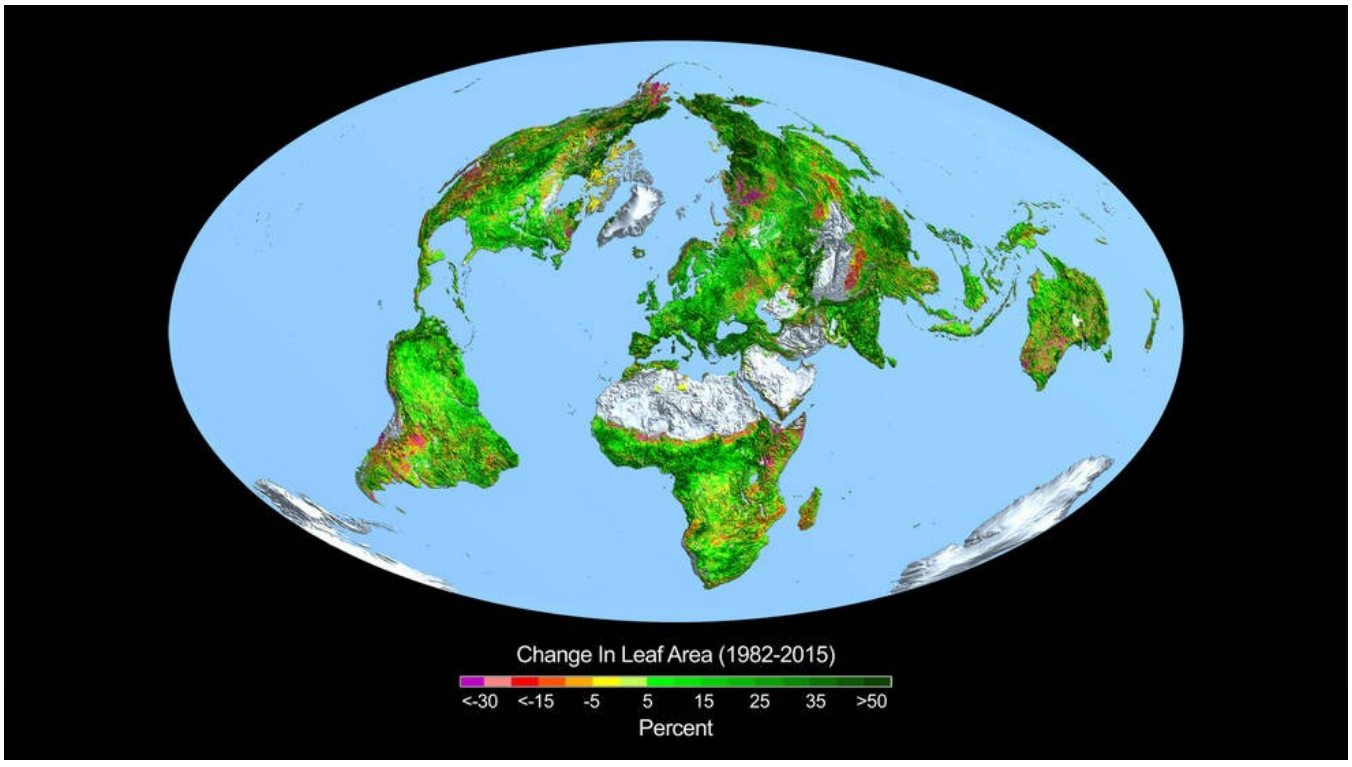
Source: Wang *et al.* (2017). *Pedosphere* **27**: 846-855.

Figure 1 (above). Water use efficiency (WUE) of soybean plants grown for 40 days under various water-supply treatments (WW = well-watered; MD = moderate drought; SD = severe drought) and atmospheric CO2 (ambient and elevated, elevated = twice ambient). The numbers in red text indicate the percent enhancement of plant WUE under elevated CO2 for a given water supply treatment. Source: Wang et al. (2017).

Leaves Love CO2

From the NASA website, an April 26, 2016 article, Carbon Dioxide Fertilization Greening Earth, Study Finds, looks at results of a study that shows our villainous CO2 is responsible for greening the planet dramatically:

> From a quarter to half of Earth's vegetated lands has shown significant greening over the last 35 years largely due to rising levels of atmospheric carbon dioxide, according to a new study published in the journal *Nature Climate Change* on April 25.
>
> The greening represents an increase in leaves on plants and trees equivalent in area to two times the continental United States.
>
> Results showed that carbon dioxide fertilization explains 70 percent of the greening effect, said co-author Ranga Myneni, a professor in the Department of Earth and Environment at Boston University. "The second most important driver is nitrogen, at 9 percent. So we see what an outsized role CO2 plays in this process."



CO2 Science

CO2 Science is a website that focuses on just that. They call themselves, *Center for the Study of Carbon Dioxide and Global Change*. A page that is one of their "position papers", Carbon Dioxide and Global Warming - Where We Stand on the Issue, summarizes the issues about CO2 based on their decades of work on the subject.

The first and last paragraphs of the article:

> There is little doubt the air's CO2 concentration has risen significantly since the inception of the Industrial Revolution; and there are few who do not attribute the CO2 increase to the increase in humanity's use of fossil fuels. There is also little doubt the earth has warmed slightly over the same period; but there is no compelling reason to believe that the rise in temperature was caused by the rise in CO2. Furthermore, it is highly unlikely that future increases in the air's CO2 content will produce any global warming; for there are numerous problems with the popular hypothesis that links the two phenomena.
>
> Our policy prescription relative to anthropogenic CO2 emissions is thus to leave well enough alone and let nature and humanity take their inextricably intertwined course. All indications are that both will be well served by the ongoing rise in atmospheric CO2.

Two CO2 Science Videos

Watch their 1992 video, The Greening of Planet Earth.

From their page about it*:*

> The Greening of Planet Earth examines the role that CO2 plays as one of nature's basic building blocks of life in the process of photosynthesis and the evolution of the earth's biosphere. Evidence is presented to show how current CO2 levels, which are 30 percent higher than in the pre-industrial era, have greatly enhanced the growth of trees and other plants. Results from controlled studies show how a doubling of CO2 in the atmosphere, which is expected to occur over the next century, will increase crop yields by 30 to 40 percent, double the water-use efficiency of most of the earth's vegetation and possibly triple the productivity of forests. The impact and implications of such change are far-reaching.

And check out their 1998 follow-up video: The Greening of Planet Earth Continues

Also, check out their page of 5 links, each to a page of links to videos.

And their YouTube channel

Here are links to several articles on the CO2 Science website:

Energy, Carbon Dioxide and Earth's Future - Pursuing the Prudent Path

The Greenhouse Effect, A Summary of Wijngaarden and Happer

Roger Revelle, the Father of CO2 Monitoring vs. Al Gore

Roger Revelle was an oceanographer who taught at Harvard University in the late 1960s, at which time Al Gore was one of his students. An October 31, 2020 article, Roger Revelle – the backstory of the father of Atmospheric CO2 monitoring, on the CO2 Coalition website tells the "backstory":

> Revelle was unsure about the eventual impact of human carbon dioxide emissions on climate, but he did show that all carbon dioxide emitted by man would not be absorbed by the oceans... This meant that human emissions of carbon dioxide would accumulate in the atmosphere and that the CO2 atmospheric concentration would increase, probably causing Earth's surface to warm at some unknown rate. This is not an alarming conclusion, as Revelle well knew, but Al Gore turned it into one.

In a paper titled, *What To Do about Greenhouse Warming: Look Before You Leap*, written by Revelle along with friend S. Fred Singer and Chauncey Starr, their conclusion caused a bit of a problem for Gore. The CO2 Coalition article continues:

> In 1992, after Singer, Revelle and Starr published their *Cosmos* article, their statements caused Al Gore, who was running for Vice-President at the time, some problems. Gore had just published *The Earth in the Balance* (Gore, 1992) and in it he credited Revelle with discovering that human emissions of carbon dioxide were causing Earth to warm and this could be very dangerous. Yet, Singer, Revelle and Starr's paper said:
>
> "Drastic, precipitous—and, especially, unilateral—steps to delay the putative greenhouse impacts can cost jobs and prosperity and increase the human costs of global poverty, without being effective. Stringent economic controls [on CO_2 emissions] now would be economically devastating particularly for developing countries…" (Singer, Revelle, & Starr, 1991)

The article has more interesting information about Revelle and Gore. Here, I think the author identifies the essence of the problem with the current narrative:

> To a scientist, like Roger Revelle, the uncertainty was obvious. Politicians, like Al Gore and most of the news media do not do uncertainty, everything must be black and white and false dichotomies are how they

think. Notice Al Gore presumptively writes “would be forcing” when Revelle would clearly write “could be forcing.” The difference between a politician with an agenda and a scientist who understands uncertainty.

And finally from the Singer, Revelle, Starr paper, What To Do about Greenhouse Warming: Look Before You Leap, they look soberly at what we know and don't know about the increasing of CO2:

> The scientific base for greenhouse warming (GHW) includes some facts, lots of uncertainty and just plain lack of knowledge requiring more observations, better theories and more extensive calculations. Specifically, there are reliable measurements of the increase in so-called greenhouse gases in the earth's atmosphere, presumably as a result of human activities. There is uncertainty about the strength of sources and sinks for these gases, i.e., their rates of generation and removal. There is major uncertainty and disagreement about whether this increase has caused a change in the climate during the last century. There is also disagreement in the scientific community about predicted future changes as a result of further increases in greenhouse gases. The models used to calculate future climate are not yet good enough because the climate balancing processes are not sufficiently understood, nor are they likely to be good enough until we gain more understanding through observations and experiments.

For a short segment on a television news show about the subject see: The Global Warming Scam: Roger Revelle vs Al Gore

Human Produced CO2 Compared with Nature's CO2 Emissions

A February 25, 2009 article by E.M.Smith on the *Musings from the Chiefio* website, The Trouble With C12 / C13 Ratios, looks at Nature's contribution to CO2 in the atmosphere, which can't easily be measured compared with human produced CO2. After the first two paragraphs shown below, the author continues his musings while reflecting on the possibilities based on findings and studies from a number of sources.

From the article:

> It is often asserted that we can measure the human contribution of CO2 to the air by looking at the ratio of C12 to C13. The theory is that plants absorb more C12 than C13 (by about 2%, not a big signature), so we can look at the air and know which came from plants and which came from volcanos and which came from fossil fuels, via us. Plants are ‘deficient’ in C13, and so, then, ought to be our fossil fuel derived CO2.

The implication is that since coal and oil were from plants, that “plant signature” means “human via fossil fuels”. But it just isn’t that simple. Take a look at the below chart. We are 5.5 and plants are putting 121.6 into the air each year (not counting ocean plants). There is a lot of carbon slopping back and forth between sinks and sources. Exactly how closely do we know the rate of soil evolution of CO2, for example?

Where Carbon Goes