

CO2 Coalition's not so Golden Science

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Abstract

A CO2 Coalition (2024) special document (hereinafter CO2C) argues that human CO2 emissions cause all or most of the CO2 increase, hereinafter Hypothesis (1) or H(1).

CO2C argues its “evidence” proves H(1) is true, while the scientific method says “evidence” cannot prove a hypothesis is true.

CO2C claims its carbon mass balance formulation proves H(1) is true, but CO2C omits human carbon outflow from the atmosphere to fake the conclusion that H(1) is true.

CO2C ignores and censors many peer-reviewed proofs that H(1) is false, including Berry’s argument that uses IPCC’s own data to prove deductively that H(1) is false.

CO2C shows the CO2 Coalition sides with the plaintiffs in the *Our Children’s Trust Lighthiser v. Trump* climate lawsuit and therefore is ethically, scientifically, and professionally unqualified to assist Trump’s defense.

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1. INTRODUCTION

1.1 Overview

The United Nations (UN) *Intergovernmental Panel on Climate Change* (IPCC, 2013) claims human CO₂ emission causes dangerous climate change is based on three hypotheses, hereinafter called H(1), H(2), and H(3):

1. Human CO₂ causes most of the increase in atmospheric CO₂ above 280 ppm.
2. The CO₂ increase above 280 ppm causes most global warming.
3. This global warming causes dangerous climate change.

Here, we define human CO₂ to be the amount of human CO₂ produced by burning carbon fuels. We do not consider other causes of human CO₂ emissions, like land use because all political focus is on the use of carbon fuels.

H(1) is the subject of this paper because it has the most disagreement among those who otherwise disagree with the IPCC.

The CO₂ Coalition published a [special report](#) (Engelbeen et al., 2024) entitled “*The Human Contribution to Atmospheric Carbon Dioxide – How Human Emissions Are Restoring Vital Atmospheric CO₂*”, hereinafter called CO₂C. (We re-posted this special report [here](#).)

CO₂C tries to prove H(1) is true. This paper proves CO₂C’s attempts fail and H(1) is false.

The CO₂ Coalition published a second special report (Lindzen and Happer, 2025) entitled “*Greenhouse Gases and Fossil Fuels Climate Science*,” hereinafter called RLWH. RLWH is in a link inside the special report entitled, “*Gold Standard Science*,” by the same authors.

RLWH is excellent, of course, given the professional excellence of its authors. However, it makes one error. It assumes H(1) is true.

RLWH also references Koonin (2021). Koonin wrote – before H(1) was widely questioned in science literature – in his excellent book, *Unsettled* (page 68):

Carbon dioxide is the single human-caused greenhouse gas with the largest influence on the climate. But it is of greatest concern also because it persists in the atmosphere/surface cycle for a very long time. About 60 percent of any CO₂ emitted today will remain in the atmosphere twenty years from now, between 30 and 55 percent will still be there after a century, and between 15 and 30 percent will remain after one thousand years.

The simple fact that carbon dioxide lasts a long time in the atmosphere is a fundamental impediment to reducing human influences on the climate. Any emission adds to the concentration, which keeps increasing as long as emissions continue. In other words, CO₂ is not like smog, which disappears a few days after you stop emissions; it takes centuries for the excess carbon dioxide to vanish from the atmosphere. So modest reductions in CO₂ emissions would only slow the increase in concentration but not prevent it. Just to stabilize the CO₂ concentration, and hence its warming influence, global emissions would have to vanish.

Neither Lindzen, Happer, nor Koonin (2021) have made any public arguments to support or deny their belief in H(1). Therefore, we conclude CO2C presents their best arguments in support of H(1).

1.2 The importance of H(1) truth

President Trump has issued three Executive Order's related to climate:

4. EO 14154 – Unleashing American Energy
5. EO 14156 – Declaring a National Energy
6. EO 14261 – Reinvigorating America's Beautiful Coal Industry

President Trump's first Executive Order on Climate intends to stop the effects of climate alarmism:

“My Administration is committed to unleashing American energy, especially through the removal of all illegitimate impediments to the identification, development, siting, production, investment in, or use of domestic energy resources — particularly oil, natural gas, coal, hydropower, geothermal, biofuel, critical mineral, and nuclear energy resources.”

To cure the climate alarmism disease, however, Trump must defeat the dominating groupthink belief in climate alarmism. Achieving this goal can be President Trump's major achievement.

On May 29, 2025, *Our Children's Trust* (OCT) filed *Lighthiser v. Trump* (LvT) that intends to overturn Trump's Executive Orders on climate.

OCT filed in the US District Court in Butte, Montana, because OCT won its *Held v Montana* (HvM) climate lawsuit in 2023 in Montana. OCT is using the same well-prepared legal and expert team they used to win HvM. LvT is the same lawsuit as HvM but applied to federal law.

To assure defeat of LvT, Trump must prove in court that IPCC's three key hypotheses H(1), H(2), and H(3) are false. Logically, proving only one of these hypotheses false would win. But, given the power of emotions in a trial, allowing the plaintiffs to win H(1) may allow them to win their lawsuit.

Defeating a lawsuit like LvT is a team effort and has no place for Lone Rangers. Every member of the team must work together like the Blue Angels. An expert on the team who believes H(1) is true would cripple the best defense team. No coach puts a guy with one leg on his track relay team.

Therefore, it's past time to settle this issue of H(1).

1.3 The rules of science

John Kemeny taught the *Philosophy of Science* at Dartmouth College (Kemeny, 1959). After Caltech gave me a BS in engineering, Dartmouth College gave me a teaching fellowship in

physics. This gave me the opportunity to study under Kemeny, who opened my mind to a whole new world on how to think.

Born in Budapest in 1926, Kemeny came to America in 1940. As a mathematician, he worked in the theoretical division of the Manhattan Project at Los Alamos from 1945 to 1948, with fellow Hungarians, John von Neumann and Leo Szilard. While working on his PhD degree, Kemeny was a special assistant in mathematics to Albert Einstein from 1948 to 1949. Kemeny learned the scientific method from Albert.

Kemeny was such a remarkable teacher that I can still see him lecturing to his class. In the evenings, I and other students watched Kemeny invent the Basic computer language.

“Robert” left the following comment about Kemeny in a post on edberry.com:

*I just discovered your webpage. Professor **Kemeny** would have been delighted. I took his philosophy of science course in 1964 with 6 other students. He sat on the corner of a desk and mesmerized me. I have treasured my copy of his book, “A Philosopher Looks at Science.”*

Kemeny’s other excellent class, *Probability and Markov Chains*, (Kemeny, 1960) was equally important. Kemeny talks about Markov Chains in his philosophy book. Both courses opened doors to thinking that I did not know existed and turned out to be critical to my PhD thesis and to my professional life.

The philosophy of science and the scientific method are the core studies relevant to theoretical physics of climate change.

The scientific method began at least 2400 years ago when Aristotle added the induction process to the scientific method. Since Aristotle, other scientists and philosophers have improved the scientific method, right up to Einstein.

Figure 1 shows Kemeny’s diagram of the scientific method.

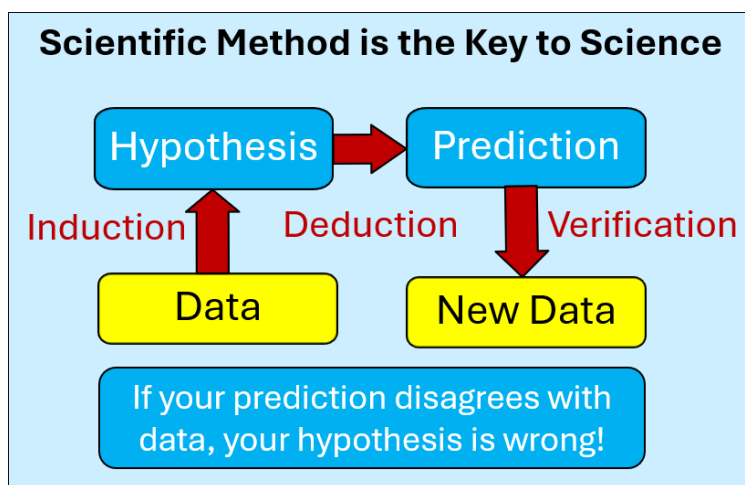


Figure 1. The scientific method uses data to create a hypothesis by induction. Then it uses deduction to make a prediction and uses new data to verify the prediction. If the prediction disagrees with data, the hypothesis is wrong.

The scientific method says we must evaluate a scientific hypothesis by using it to make predictions.

Good predictions do not and cannot prove a hypothesis is true. There is no such thing in science as using evidence to prove a hypothesis is true, but CO2C claims its evidence proves $H(1)$ is true.

It is impossible to prove a hypothesis is true because the next test may prove it is false. However, one bad prediction proves the hypothesis is false.

John Kemeny at Dartmouth and Richard Feynman at Cornell and later Caltech led the teaching of the scientific method in America. Unfortunately, far too many PhD scientists never learn the scientific method. They think they can make up their own rules for science.

Data alone prove nothing in science.

There are only two uses of data in science. First, we use data to formulate a hypothesis that uses data to predict a future event. Second, we use new data to evaluate the hypothesis predictions.

If any prediction is false, the hypothesis (or theory) is false. Feynman taught that this rule is the key to science.

Feynman emphasized that it does not matter how beautiful your hypothesis is or how smart you are or how distinguished you are or how many papers you have published or how many people agree with you.

Feynman and Kemeny said, “If your prediction is wrong, your hypothesis is wrong.”

If we do not follow these rules, we are not doing science.

CO2C does not follow these rules and is not doing science.

1.4 Papers that show $H(1)$ is false

Ato (2025) shows the assumption that the CO2 level was at 280 ppm in 1750 is flawed and the reconstruction of ice core data, as used by CO2C is also flawed. He concludes that human CO2 has no significant effect on the CO2 level and that natural CO2 cause the CO2 increase.

Roth (2025) shows natural CO2 emissions are the primary cause of the CO2 increase and that CO2C’s arguments are flawed. The $^{13}\text{C}/^{12}\text{C}$ data are not useful because of unresolved contradictions. The only good isotope data for resolving the effect of human CO2 on the CO2 level are the D^{14}C data.

Robbins (2025) shows how SST and CO2 data since 1995 indicate the human-caused CO2 increase is less than 10 percent of the total increase and “perhaps” closer to 5 percent.

Humlum et al. (2012) show incoming solar radiation modulated by cloud cover controls SST.

Berry (1967, 1969) and Berry and Reinhardt (1974 a, b, c, d) showed how the distribution of cloud droplet nuclei controls how fast warm clouds rain, which influences cloud lifetime and may influence average cloud cover.

Koutsoyiannis et al. (2023) show global temperature changes lead CO2 level changes by an average of 12 months. Humlum et al. (2013) also found temperature leads CO2 level by about 12 months.

MacRae (2008) found temperature changes lead CO2 changes by an average of 9 months for data from 1980 to 2007. Kuo et al. (1990) found temperature change leads CO2 change by 5 months from 1960 to 1990.

Since global temperature changes can control natural CO2 emission but not human CO2 emissions, these studies show the natural CO2 level dominates over the human CO2 level.

Munshi (2017) found the correlation between human CO2 emissions and changes in the CO2 level is zero, which means human CO2 has little effect on the CO2 level.

CO2C ignores published papers by Ato (2025), Berry (2018, 2019, 2021, 2023 a, 2023 b), Harde (2017, 2019), Harde and Salby (2021), Humlum, Stordahl, and Solheim (2012), Jaworowski (1994, 2007), Jaworowski, Segalstad and Hisdal (1992), Jaworowski, Segalstad and Ono (1992), Koutsoyiannis (2023, 2024), Kuo et al. (1990), MacRae (2008), Munshi (2017), Robbins (2025), Roth (2025), Salby (2012), Salby and Harde (2021, 2022), Schroder (2022), Segalstad (1998) that prove or help prove H(1) is false.

1.5 The null hypothesis

The null hypothesis says we must assume weather and climate changes are natural unless proven to be human caused. The burden of proof is upon the side that argues for human cause.

In the 1960's and 1970's, America's National Science Foundation and other agencies funded weather modification research that carefully followed the scientific method. Climate scientists must assume the null hypothesis which is that climate changes are natural until proven to be human caused.

While we cannot do randomized climate experiments with only one Mother Earth, we still must use the null hypothesis in theoretical research about human-caused climate change.

CO2C ignores the null hypothesis when it fails to prove wrong the many papers that prove H(1) is false.

1.6 CO2C's high-level errors

The IPCC claims H(1) is true "with a very high level of confidence." Yet, the IPCC censors and ignores evidence that proves H(1) is false. CO2C follows the IPCC.

On censorship, RLWH wrote,

"ignoring contradictory facts and science ... to support a theory ... [is a] egregious violation of the scientific method."

CO2C thinks its evidence proves H(1) is true. CO2C chooses only data that support their belief that H(1) is true. This is confirmation bias and it contradicts the scientific method.

The scientific method requires scientists to evaluate hypotheses by checking their predictions. Science progresses not by claiming a hypothesis or theory is true but by proving a hypothesis or theory is false.

Aristotle warned us that claims of evidence, consensus, and authority – which CO2C uses – do not prove a hypothesis is true.

IPCC's Executive Summary assumes human emissions caused all CO2 increase above 280 ppm,

“Abundant published literature” shows with “considerable certainty” that human CO2 caused all the increase in atmospheric CO2.”

The US Global Change Research Program Climate Science Special Report (USGCRP) parrots the IPCC with similar claims,

“This assessment concludes, based on extensive evidence, that it is extremely likely that human activities, especially emissions of greenhouse gases, are the dominant cause of the observed warming since the mid-20th century.”

The IPCC and GCRP claim there are “no convincing alternative explanations” other than their theory to explain the “observational evidence.” Therefore, they censor all such evidence.

CO2C follows the IPCC and claims to do what the scientific method says is impossible, namely, to “conclusively” prove a hypothesis is true.

CO2C says,

“We use multiple lines of scientific evidence to demonstrate that nearly all the increase in atmospheric CO2 is from human emissions, most of which are from fossil fuel use. Each of these lines of evidence confirms humans’ role in the increase of atmospheric carbon dioxide. Together, they provide conclusive proof that the recent CO2 increase is primarily due to human activity, not nature.”

CO2C adds the irrelevant claim of consensus, showing the authors need emotional support for their position,

“Most scientists accept that human use of fossil fuels ... is the main cause of the recent increase in CO2 concentrations in the atmosphere.”

On consensus, RLWH wrote,

“Instead, they based their analysis and thus all recommendations on peer review and consensus, which provide opinions but have no value as scientific evidence.”

CO2C acknowledges that some scientific papers disagree with its conclusions:

“Some recently published studies allege that most of or all the recent carbon dioxide increase is the result of natural causes rather than from human emissions.”

CO2C does not reference the opposing publications, nor does it prove any of them are wrong. This means the proofs in the opposing publications still stand and override all CO2C’s claims that H(1) is true.

CO2C has science backwards. It argues H(1) is true without showing there are errors in the published papers that prove H(1) is false. CO2C censors important information.

CO2C claims evidence can prove a hypothesis is true. It can’t. It is impossible to prove a hypothesis is true but it is possible to prove a hypothesis is false.

All CO2C’s arguments fail because, according to the scientific method, no amount of evidence or “lines of evidence” can prove a hypothesis is true.

2. Berry’s carbon cycle formulation

2.1 The Climate Equivalence Principle

The *Climate Equivalence Principle* (Berry, 2018, 2020,2021, 2023) is that human and natural carbon atoms and their CO₂ molecules behave the same and follow the same rules because they are identical.

It is impossible for human CO₂ to act differently in the atmosphere than natural CO₂ at any time and place because they are identical. At any given time and place, human and natural CO₂ flow out of the atmosphere and out of any carbon reservoir at the same rate.

Physics requires that human and natural carbon cycles obey the same rules at the same times. Yet, CO2C says human carbon stays in the atmosphere longer than natural CO₂. It can’t.

The IPCC and the CO₂ Coalition argument violate the *Climate Equivalence Principle*.

The IPCC, CO2C, and Koonin (2023) assume incorrectly that human and natural CO₂ flow out of the atmosphere at different rates. This error leads to the faulty conclusion that human CO₂ causes most of the CO₂ increase.

The Climate Equivalence Principle is why we cannot directly measure the amount of human and natural CO₂ in the air. We can measure only their total.

Therefore, we must use other means to estimate the relative effects of human and natural CO₂ on the CO₂ increase above 280 ppm (or 590 GtC).

2.2 IPCC’s carbon cycle data

IPCC makes it clear that H(1) is about the “fast” carbon cycle that changes CO₂ levels during human lifetimes. Human CO₂ emissions move carbon from IPCC’s slow carbon cycle to the fast carbon cycle.

IPCC’s fast carbon cycle has four primary carbon reservoirs, Land, Air, Surface Ocean, and Deep Ocean.

In Figure 2, IPCC's natural carbon cycle is at equilibrium, by IPCC's definition. This means its levels are constant and the flows between each pair of reservoirs are equal.

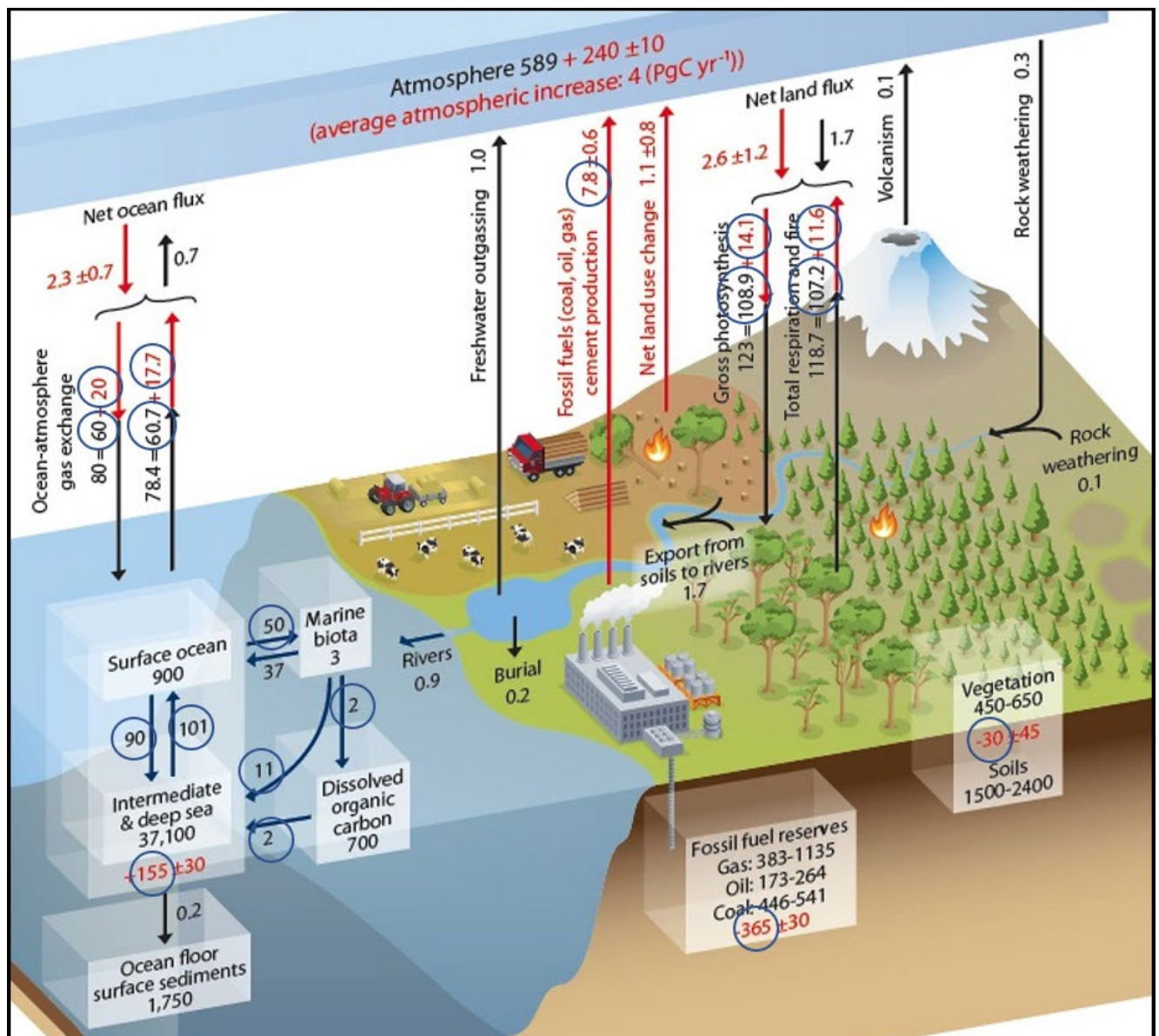


Figure 2. IPCC's (2013, p. 471, Fig. 6.1) that shows IPCC's natural carbon cycle (in black) and human carbon cycle (in red).

Figure 3 is a simple view of IPCC's level and flow data in Figure 2 for IPCC's natural fast carbon cycle and human carbon cycle.

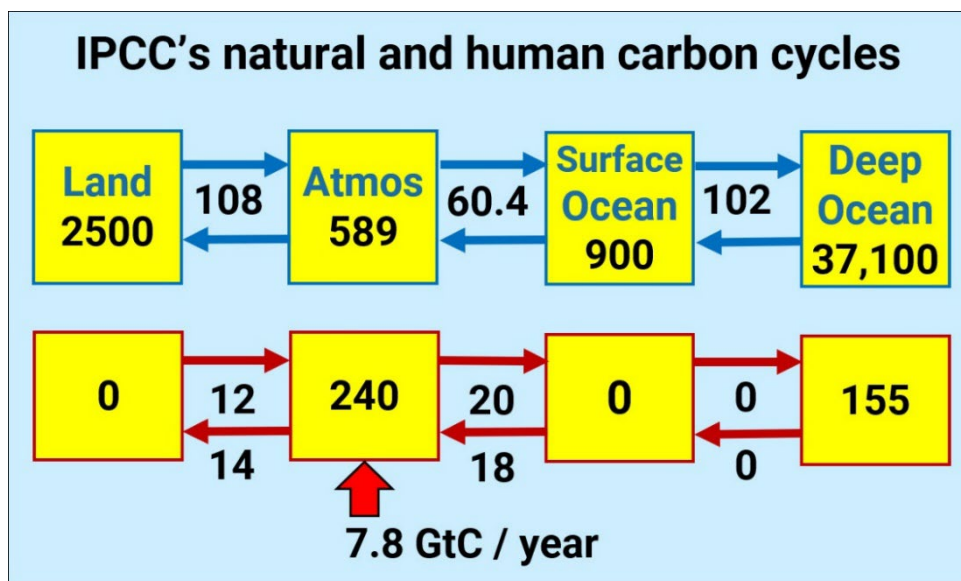


Figure 3. Data from Figure 2 show the carbon levels and flows for IPCC's natural carbon cycle (top row) and human carbon cycle (bottom row). Levels are in GtC or PgC of carbon. Flows are in GtC per year. Human-caused carbon inflow varies from year to year.

CO2C does not recognize that IPCC's natural carbon cycle at equilibrium contains information that allows one to calculate IPCC's true human carbon cycle.

Berry used the information in IPCC's natural carbon cycle to obtain IPCC's e-times and then to prove IPCC's human carbon cycle is incompatible with H(1). Berry proved H(1) is false according to IPCC's own data.

2.3 Berry's formulation of IPCC's carbon cycle.

Berry's formulation of IPCC's carbon cycle broke the consensus on H(1).

On consensus, RLWH wrote,

"Historically, the consensus of scientists has often turned out to be wrong. Many of the greatest scientists in history are great precisely because they broke with consensus."

The scientists who prove H(1) is false broke with the consensus.

Here are the first eight equations of Berry's carbon cycle formulation taken from Berry (2019, 2021, and 2023a)

Yes, it's a little math but without it, there is little basis to argue that H(1) is true or false. The IPCC should have done this formulation. CO2C should have studied this formulation.

Berry's first hypothesis is the universally accepted continuity equation for the conservation of carbon mass:

$$dL / dt = \text{Inflow} - \text{Outflow} \quad (1)$$

where,

L = carbon level (PgC)

t = time (years)

dL / dt = rate of change of L (PgC / year)

Inflow = carbon inflow (PgC / year) into the carbon reservoir.

Outflow = carbon outflow (PgC / year) out of the carbon reservoir.

When,

$$\text{Outflow} = \text{Inflow}$$

then

$$dL/dt = 0.$$

The flows continue while the level is constant. CO₂ does not accumulate in the atmosphere. CO₂ simply seeks the balance level defined by the inflow.

Berry's second hypothesis is that outflow is proportional to level divided by a time,

$$\text{Outflow} = L / T_e \quad (2)$$

where T_e is the "e-time," so defined because it is an exponential time. Berry's e-time T_e is the same as IPCC's turnover time, T (IPCC, 2007, p. 948).

Berry uses T_e as his only reference time because T_e is the ONLY reference time that has an exact, meaningful, mathematical definition and T_e is the only time-response definition that agrees with systems engineering models.

T_e is the time for the level to move $(1 - 1/e)$ of the distance from its present level to its balance level.

Substituting (2) into (1) we get,

$$dL / dt = \text{Inflow} - L / T_e \quad (3)$$

When dL/dt is zero, the level will be at its balance level, L_b , defined as,

$$L_b = \text{Inflow} * T_e \quad (4)$$

Substitute (4) for *Inflow* into (3) to get,

$$dL / dt = - (L - L_b) / T_e \quad (5)$$

Equation (4) shows how inflow sets the balance level. Equation (5) shows the level always moves toward the balance level set by the inflow. The variables L , L_b , and T_e are functions of time.

In the special case when L_b and T_e are constant, which means *Inflow* is constant according to (4), there is an analytic solution to (5). Rearrange (5) to get,

$$dL / (L - L_b) = - dt / T_e \quad (6)$$

Then integrate (6) from L_0 to L on the left side, and from 0 to t on the right side to get,

$$\ln [(L - L_b) / (L_0 - L_b)] = - t / T_e \quad (7)$$

where

L_0 = Level at time zero ($t = 0$)

L_b = the balance level for a given inflow and T_e

T_e = time for L to move $(1 - 1/e)$ from L to L_b

$e = 2.7183$

We define half-life, T_h , as the time for the level to fall to half its original level. Then (7) becomes,

$$\ln (1/2) = - T_h / T_e \quad (7a)$$

$$T_h = T_e \ln (2) = 0.6931 T_e \quad (7b)$$

The original integration of (6) has two absolute values, but they cancel each other because both L and L_0 are always either above or below L_b .

Raise e to the power of each side of (7), to get the level as a function of time,

$$L(t) = L_b + (L_0 - L_b) \exp(- t / T_e) \quad (8)$$

Equation (8) is the analytic solution of (5) when L_b and T_e are constant.

Equations (1) and (2) are the only hypotheses in Berry's (2021, 2023) mathematical formulation of IPCC's carbon cycle. The rest of Berry's formulation is deductive. No one has found any errors in Berry's deduction.

Using only equations (1) and (2), Berry derived in mathematical form all the flow equations necessary to replicate IPCC's carbon cycle. Neither the IPCC nor anyone else has done this.

Even the IPCC accepts Berry's two hypotheses which are standard in physics, chemistry, pharmacological models, and systems engineering.

Berry's formulation is the only known published formulation of IPCC's natural carbon cycle. Berry's formulation follows systems engineering principles, where levels set outflows and outflows set new levels. Berry's formulation also follows the method of Markov Chains.

Berry (2021) shows how his formulation of IPCC's natural carbon cycle reduces to an R-C electrical circuit that reproduces the well-known equations for electrical circuits, which gives additional credibility that Berry's formulation is valid.

Figure 4 illustrates how Inflow sets the Balance Level and Outflow equal the Level divided by the e-time, which causes the level to move to the Balance Level.

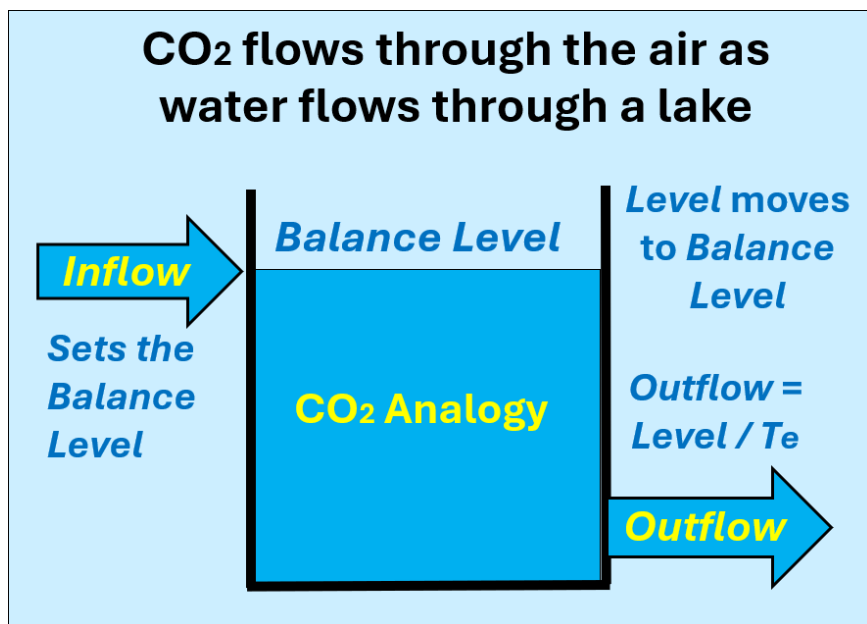


Figure 4. Inflow sets the Balance Level. Outflow equal the Level divided by the e-time. This causes the level to move to the Balance Level.

Berry's equation (4) defines balance levels and shows how *Inflow* and *Te* set the balance level for each reservoir in the system.

Equation (4) explains how the natural CO2 level could stay constant at 280 ppm. The only thing required is a constant inflow which sets a balance level.

Similarly, human CO2 inflow sets a balance level for human CO2. If the inflow remains constant, its level will move to its balance level where outflow equals inflow. Thereafter, there is no change in the CO2 level.

CO2 does not "accumulate" in the atmosphere. CO2 in the atmosphere increases vegetation that absorbs more CO2.

CO2C cites no formulation to explain how the natural CO2 level might have stayed constant even though this explanation is necessary to support CO2C's conclusions. Berry explains this with equation (4).

Without an explanation, CO2C has no basis to argue that H(1) is true.

Figure 5 illustrates how fast a level approaches its balance level.

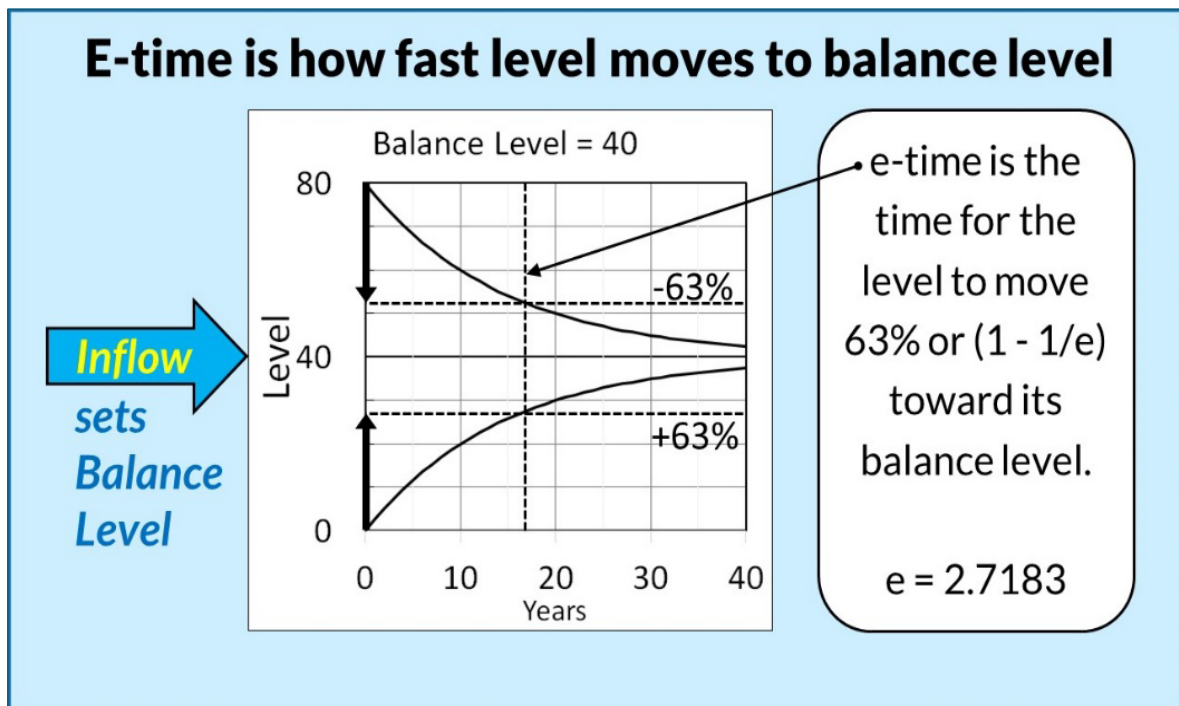


Figure 5. A level moves toward its balance level in proportion to the difference between the level and its balance level. That causes the approach to decrease its rate as it gets closer to the balance level.

2.4 Berry e-times in IPCC's natural carbon cycle.

Berry's (2) calculates the e-times for IPCC's natural carbon cycle at equilibrium.

Figure 6 shows Berry's calculated e-times for each outflow node in red.

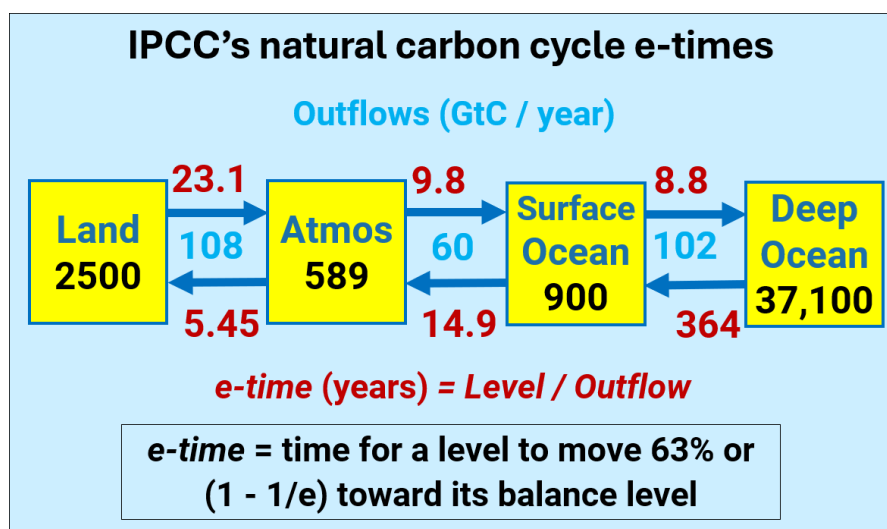


Figure 6. The red numbers show IPCC's e-times for each outflow node.

The overall e-time for CO₂ in the atmosphere is the combination of the two natural outflows from the atmosphere. IPCC's data shows the overall T_e for CO₂ in the atmosphere is 3.5 years, approximating IPCC's claimed value of about four years.

Using the sum of Atmosphere outflows, we get,

$$\begin{aligned}\text{Outflow}(a+b) &= \text{Outflow}(a) + \text{Outflow}(b) \\ \text{Level} / T_e(a+b) &= \text{Level} / T_e(a) + \text{Level} / T_e(b) \\ 1 / T_e(a+b) &= 1 / T_e(a) + 1 / T_e(b) \\ 1 / T_e(a+b) &= 1 / 5.45 + 1 / 9.8 = 1 / 3.5\end{aligned}\tag{9}$$

Therefore, IPCC's overall T_e for atmospheric CO₂ is 3.5 years.

IPCC (2007, p. 948) says the overall e-time for atmospheric CO₂ is about 4 years. The close agreement between IPCC "about 4 years" with the 3.5-year e-time (9) inside its own data suggests some scientists who once worked for the IPCC may have figured out IPCC's carbon cycle.

Berry used these six e-times to calculate how IPCC's carbon cycle evolves with time.

Such a formulation is necessary if we are to determine the cause of the CO₂ increase.

2.5 Human and natural carbon cycles are independent.

According to (2), outflow is a linear function of level. Therefore, we can add separate carbon cycles that have the same T_e to get a total carbon cycle:

$$\begin{aligned}\text{Outflow}_N &= \text{Level}_N / T_e \\ \text{Outflow}_H &= \text{Level}_H / T_e \\ \text{Outflow}_N + \text{Outflow}_H &= (\text{Level}_N + \text{Level}_H) / T_e\end{aligned}$$

This means we can, and should, calculate human and natural carbon cycles independently because this gives us information about each carbon cycle, which data cannot give.

We should also calculate all different forms of carbon independently, e.g., human CO₂, natural CO₂, ¹²CO₂, ¹³CO₂, ¹⁴CO₂.

This is the *superposition principle* that applies to all linear systems. It says the net response caused by two or more stimuli is the sum of the responses caused by each stimulus individually. So, if input A produces response X and input B produces response Y then input (A + B) produces response (X + Y).

Dalton's law of partial pressures applies to a linear system. It says the total pressure in a mixture of non-reacting gases equals the sum of the partial pressures of the individual gases. It also says each individual gas flows independently.

Equation (2) is compatible with all applicable physical and chemical laws. It is the simplest hypothesis for carbon cycle models (thereby obeying Occam's Razor) and IPCC agrees with

it. Berry's formulation uses it to exactly replicate IPCC's natural carbon cycle. No one else has done this.

By replicate, we don't mean a static solution. We mean a dynamic solution where we can begin with levels out of equilibrium and the numerical solution moves the levels back to their original balance levels.

Berry's carbon cycle model, using IPCC's e-times, exactly predicts IPCC's carbon cycle based on IPCC's data. This makes Berry's model prediction of IPCC's true human carbon cycle credible.

CO2C has no alternative explanation of IPCC's carbon cycles.

2.6 The long-term effect of human carbon is small.

The total amount of human carbon added to the carbon cycle as of 2025 is about one percent of the carbon in the fast natural carbon cycle. One percent. Yet, humans are quick to believe that their one percent distorts the equilibrium CO2 level of nature's 99 percent.

Figure 7 shows IPCC's equilibrium percentages for its natural and human carbon cycle, assuming human-caused CO2 inflow stopped. The *Climate Equivalence Principle* says the human equilibrium percentages are identical to the natural equilibrium percentages.

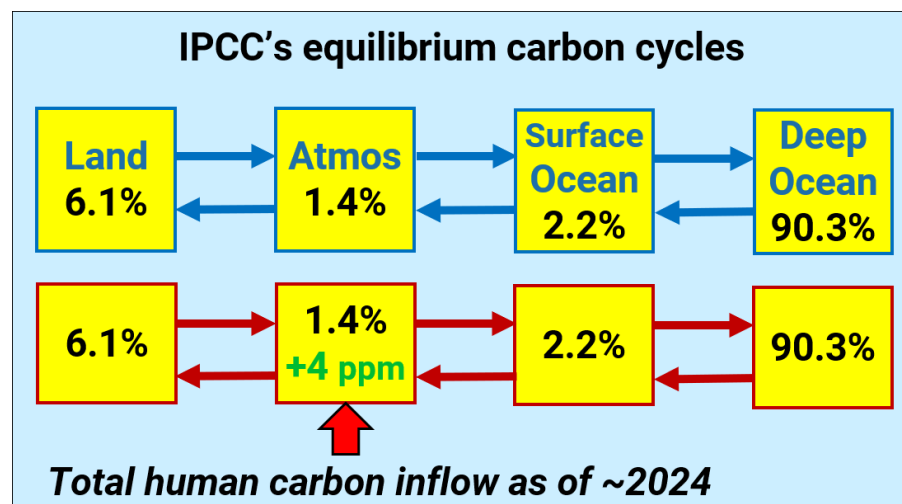


Figure 7. IPCC's equilibrium percentages for its natural and human carbon cycle, assuming human-caused CO2 inflow stopped. As of 2024, only 1.4% (about 4 ppm) of human carbon will be in the atmosphere at equilibrium using IPCC's data.

According to IPCC's data, only 1.4% of human carbon will be in the atmosphere at equilibrium. This 1.4% is about 4 ppm for all human CO2 emissions through 2024.

Therefore, at equilibrium, total human CO2 emissions cause no significant change to the natural carbon cycle. So, any significant effect of human CO2 on atmospheric CO2 must be in the non-equilibrium condition caused by continuing human CO2 inflow into the atmosphere.

Increased use of nuclear power, for example, will allow the human CO₂ level to move toward its balance level.

2.7 Berry's carbon cycle proof that H(1) is false.

Figure 8 shows the logical path Berry used to prove H(1) is false using IPCC's own data.

IPCC's carbon cycle data show its natural carbon cycle is in equilibrium at 280 ppm. But rather than allow IPCC's carbon cycle to use the same e-times and flow equations as IPCC's natural carbon cycle, IPCC simply forced its human carbon cycle to agree with H(1).

Berry (2019, 2021, 2023a) derived IPCC's natural carbon cycle as explained above. Since IPCC's human carbon cycle must use the same e-times as IPCC's natural carbon cycle, according to the *Climate Equivalence Principle*, Berry calculated IPCC's "true" human carbon cycle.

IPCC's true human carbon cycle shows human CO₂ causes only 8% or 33.6 ppm of the 420 ppm of CO₂ in the atmosphere. This proves IPCC's H(1) that claims human CO₂ is 33% or 140 ppm of the 420 ppm of CO₂ in the atmosphere is wrong.

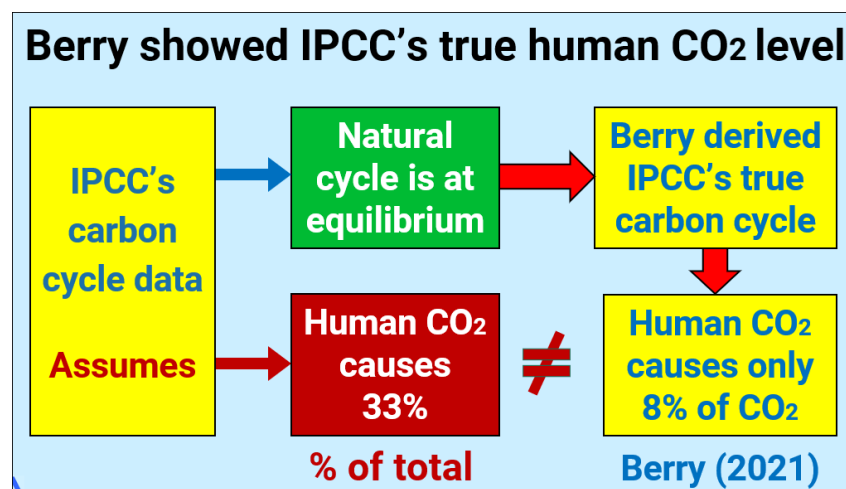


Figure 8. IPCC defines its natural carbon cycle (green) and postulates its human carbon cycle (red). Berry's formulation uses IPCC's natural carbon cycle e-times to calculate IPCC's true human carbon cycle (yellow), which proves IPCC's human carbon cycle (red) is false, according to IPCC's own data.

The late Richard Courtney, UK professional scientist and reviewer of climate physics papers, wrote three times that Berry's calculation of IPCC's true human carbon cycle is "the ONLY true breakthrough in climate science since 1980."

2.8 D14C proves H(1) is false.

Figure 9 shows the D14C plot using data from Turnbull et al. (2017). The bomb tests increased D14C to about 170 percent of its long-term balance level of 100 percent.

After 1970, D14C decreased and returned to its balance level in a manner that exactly follows Berry's equation (8) for the return of a level to its balance level.

CO2C argues that the decreasing D14C level proves human CO₂ is a significant part of atmospheric CO₂.

However, D14C data prove just the opposite. CO2C's error is to use the actual D14C level when it should use the Dela14C balance level.

CO2C concludes,

The decrease of the $^{14}\text{C}/\text{C}$ ratio in the atmosphere supports the fact that fossil fuels are the cause of the CO₂ increase in the atmosphere.

CO2C makes a significant physics error and gets the opposite of the correct answer.

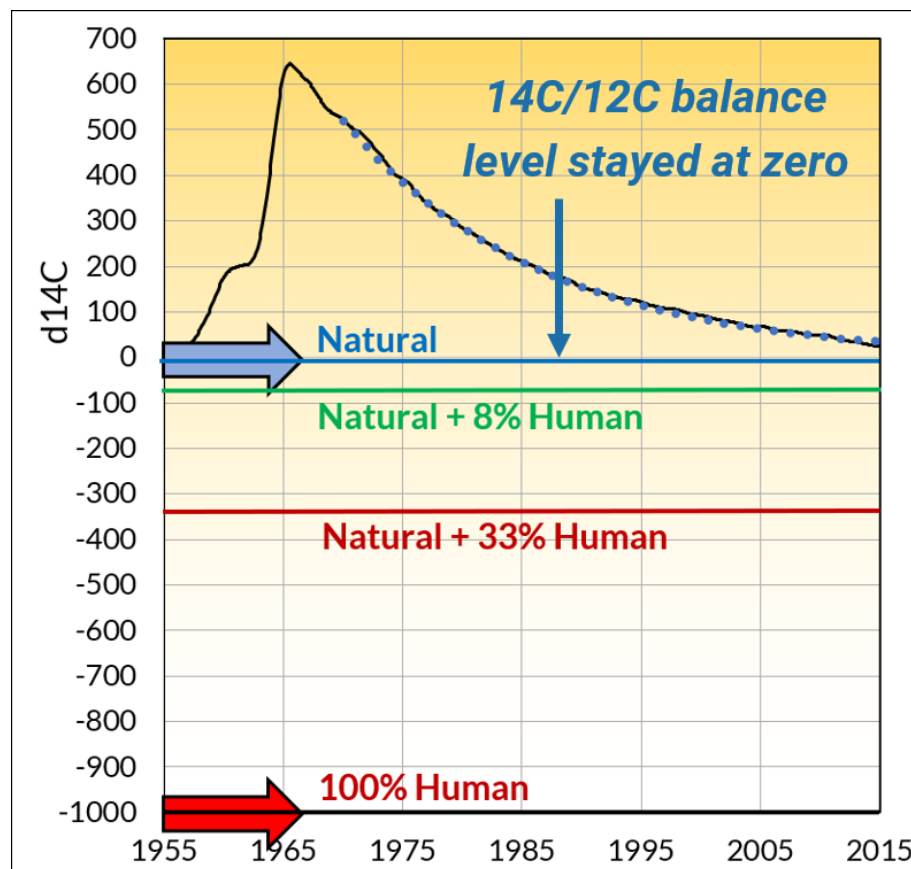


Figure 9. D14C (Turnbull et al., 2017, blue line) increased to 165% of its long-term balance level of 100% due to the bomb tests, but it has returned to its balance level as predicted by equation (8). Its return proves the D14C balance level remained constant within a few percent.

Berry (2023) used (8) to accurately curve-fit the D14C data (shown by the dots in Figure 9) using a balance level of zero and an e-time of 16.5 years.

Equation (8) describes how a level approaches its balance level and (8) is derived from (2). It is remarkable that the D14C level, the ratio of ^{14}C to ^{12}C , returns to its original balance level after a severe perturbation. This is why carbon dating uses D14C and not ^{14}C , which does not have a stable level.

The constant D14C balance level proves human CO_2 has no measurable effect on the CO_2 level. Because human CO_2 has a D14C of zero, if human CO_2 had caused all the CO_2 increase, human CO_2 would have diluted the D14C balance level and reduced it by 33%, which would be -330 in Figure 9. Then the return of D14C to its balance level would have returned to the -330 level.

Many people don't understand balance levels because they do not realize that balance levels are set by continuing inflows. No level stays constant all by itself. Every level is either already at its balance level or returning to its balance level, like D14C has done.

If human CO_2 emissions had caused the D14C balance level to decrease after 1970, Berry's curve fit using (8) would have shown a continuing decrease in the D14C balance level accompanied by a change in e-time. D14C data show this did not happen.

This proves the human CO_2 balance level is less than about 2 percent of total CO_2 in the atmosphere, proving H(1) is false.

CO_2C argues "the Suess Effect dilution also lowered D14C." The Suess Effect is not a cause. It is a result of human CO_2 inflow that dilutes natural CO_2 . Berry's accurate curve fit shows human CO_2 causes no significant "Suess effect dilution."

2.9 D14C explains ^{14}C increase.

Figure 10 shows how D14C data prove natural CO_2 caused the ^{14}C increase.

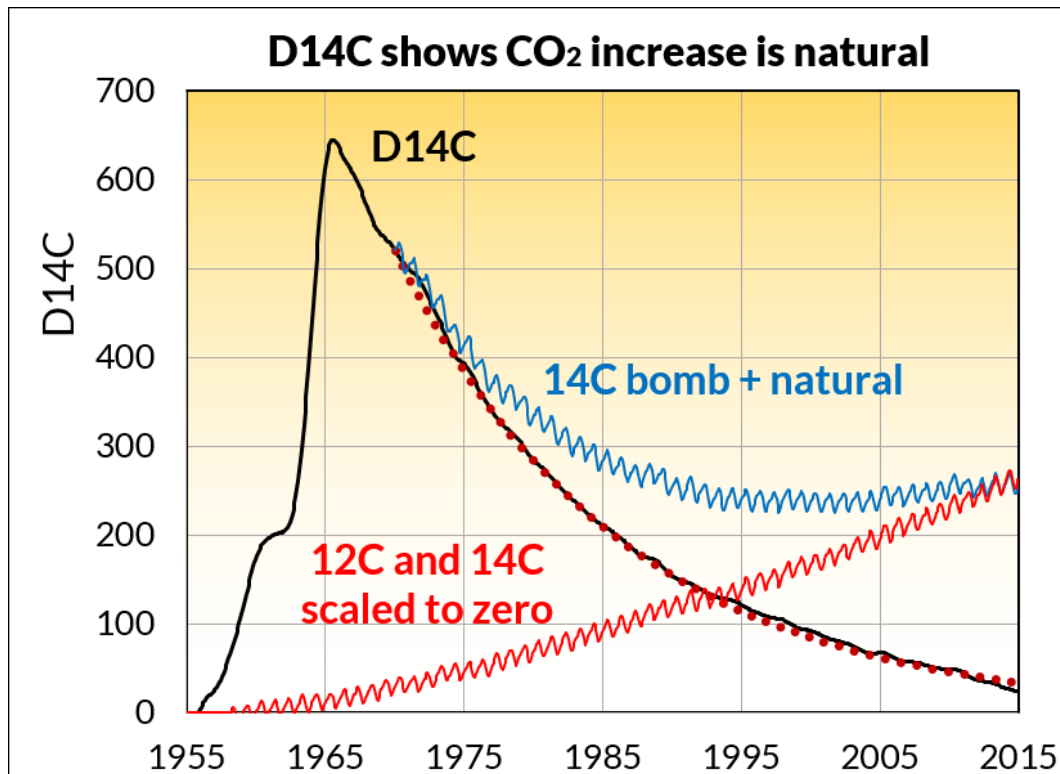


Figure 10. D14C data (Turnbull et al., 2017, black line) returns to its original balance level of zero with a constant e-time of 16.5 years (red dotted line). 12C data (red dashed line) and 14C (blue jagged line) increase while keeping Delta 14C balance level constant at zero.

Although the bomb tests increased D14C to 170 percent, its balance level remained near zero, as proved by the curve fit to D14C, even as carbon-12 has increased. This shows the 14C increase is natural and not caused by human CO₂ emissions.

If the natural 12C level had remained constant, the 14C line would have matched the D14C line. However, the 12C level increased during this time and caused 14C to go above the D14C line to keep the D14C balance level near zero, proving natural CO₂ not human CO₂ caused the CO₂ increase.

If human CO₂ dominated the CO₂ increase, then D14C would have decreased well below its historical balance level.

The 14CO₂ e-time is the same as the D14C e-time because if 12CO₂ had not increased, the 14CO₂ curve would have exactly matched the D14C curve. This means the e-time of 12CO₂ is less than 16.5 years. It can't be 50 years.

3. The 2024 CO2C Paper

3.1 CO2C's Carbon Mass Balance error

CO2C' says its Carbon Mass Balance proves H(1) is true. Unfortunately, CO2C's Carbon Mass Balance is not physics.

CO2C says,

Mass Balance Conclusions

Anthropogenic emissions of fossil CO₂ are much larger than the measured increase in the amount of CO₂ in the atmosphere. Therefore, the natural CO₂ "sinks" are nearly always larger than natural CO₂ "sources."

Any theory that leads to a substantial increase of CO₂ in the atmosphere due to natural factors violates the mass balance and thus cannot be correct.

CO2C also says,

"This "mass balance" calculation shows that atmospheric CO₂ has increased by less than the amount of CO₂ emitted by human activity every year since 1958, So, the net natural CO₂ fluxes have been negative in all the last 66 years....

"That is, nature is removing CO₂ from the atmosphere rather than adding to the total.

"As long as the CO₂ increase in the atmosphere is less than what humans emit per year, nature is a net sink and can't be the cause of the overall increase because that would violate the mass balance.

"Since nature is removing large amounts ... every year ... the rise in atmospheric CO₂ cannot be from natural causes."

CO2C shows no concept of the physics that it tries to describe.

The **sum of natural CO₂** emissions also exceeds the measured increase in the CO₂ level. This proves CO2C's argument using the sum of human emissions is irrelevant and proves nothing about the cause of the CO₂ increase.

Physics is about using mathematical equations to describe things like carbon mass balance. CO2C has no equations to describe its carbon mass balance hypothesis. CO2C makes big claims about carbon mass balance via handwaving arguments that are wrong.

By comparison, Berry uses simple math to describe IPCC's carbon cycles.

Berry's (1) applies equally to human and natural carbon flows:

$$dL / dt = \text{Inflow} - \text{Outflow} \tag{1}$$

CO2C agrees with (1) but CO2C does not understand that (1) applies to both human and natural carbon cycles independently.

Berry's (2) assumes the Outflow of human and natural carbon cycles is a linear function of Level. This means the human and natural flows and levels are independent.

$$\text{Outflow} = L / T_e \quad (2)$$

The IPCC correctly treats the human and natural carbon cycles independently and uses (2).

Berry's (4) show that inflow multiplied by the e-time set a balance level for each reservoir.

$$L_b = \text{Inflow} * T_e \quad (4)$$

Human carbon inflow into the atmosphere sets a human balance level. Natural carbon inflow into the atmosphere sets a natural balance level. The human and natural carbon inflow and balance levels add up. But the equations keep track of human and natural inflows, outflows, and balance levels that we cannot directly measure.

CO2C's argues that *"natural CO₂ "sinks" are nearly always larger than natural CO₂ sources."*

CO2C's argument is wrong because it adds *human CO₂ outflow* as an additional *natural CO₂ sink*, which is a major physics error.

CO2C's arguments (quoted above) show CO2C has moved human outflow in the human (1) to the natural outflow in the natural (1).

CO2C's error makes the (1) for CO2C's human carbon cycle look like (10):

$$dL / dt = \text{Human Inflow} \quad (10)$$

And CO2C's (1) for natural carbon look like (11):

$$dL / dt = \text{Natural Inflow} - \text{Natural Outflow} - \text{Human Outflow} \quad (11)$$

This is CO2C's Carbon Mass Balance error. CO2C moved Human Outflow from (10 to (11).

CO2C relies on its invalid (11) to invalidly claim, "nature is an "absorber." CO2C extends this physics error to conclude the ridiculous idea that nature can't be a "source" because nature is an "absorber."

CO2C's carbon mass balance error disqualifies all CO2C's arguments and conclusions and makes the CO2 Coalition part of the scientific problem, not the solution.

CO2C's arguments are simply handwaving. CO2C has no model of IPCC's carbon cycle.

Berry keeps these flows independent and gets the correct answers. The CO2 Coalition censors Berry's correct answers, and gets the wrong answers, thereby dumbing down both itself and the public.

Imagine the CO2 Coalition as an accountant for two different businesses, *Human* and *Natural*. Here, the CO2 Coalition incorrectly assigns *Human* expenses to *Natural* expenses.

CO2C's bookkeeping error, made universally by the CO2 Coalition, the IPCC, and virtually all scientific organizations, causes them to believe human carbon causes all the CO2 increase.

This bookkeeping error is the basis of the whole climate-change fraud and the CO2 Coalition falls for this error.

3.2 CO2C's references are not clean.

CO2C uses references that assume H(1) is true, which makes CO2C's arguments circular. Battle et al. (2000), Bender et al. (2005), Graven (2015), IPCC documents, and the Bern model assume H(1) is true.

On this subject, RLWH wrote,

No matter how distinguished the group, their reliance on "peer reviewed literature" rather than the scientific method means their opinions have no value as scientific knowledge. Theories only become reliable science when their predictions agree with observations.

3.3 CO2C claims cause-effect in absence of correlation.

Munshi (2017) shows there is no correlation between annual human carbon emissions and annual increase in the CO2 level. His detrended correlation analysis of annual emissions and annual changes in atmospheric CO2 found no evidence that changes in atmospheric CO2 are related to fossil fuel emissions at an annual time scale.

If there is no correlation, there is no cause-effect relationship. Therefore, we must reject H(1).

3.4 CO2C misinterprets the Bern model.

CO2C thinks the Bern model proves human CO2 slows the outflow of CO2 from the atmosphere.

CO2C says,

"The IPCC uses the Bern and similar models, which predict a saturation of natural CO2 sinks and a consequent slowdown of natural CO2 removals from the atmosphere."

"That leads to a prediction of a long atmospheric lifetime for CO2 additions to the atmosphere and a "long tail" in the theoretical CO2 decay curve should such additions cease."

The Bern model IS NOT "evidence" of a slowdown of the outflow of CO2 from the atmosphere because the Bern model assumes H(1) is true.

Berry's equation (8) produces a "long tail" as a level approaches its balance level. A "long tail" has nothing to do with the Bern model or with human CO2 "saturation" or slowing the outflow of natural CO2 from the atmosphere. Berry's carbon cycle formulation properly explains the "long tail."

3.5 CO2C violates the Climate Equivalence Principle

CO2C claims human emissions, which are about 5 percent of the total inflow of CO2 into the atmosphere, stays in the atmosphere longer than natural CO2 inflow, which is about 95 percent of total inflow. This would occur only if the e-time of human CO2 is greater than the e-time of natural CO2.

CO2C's claim violates the *Climate Equivalence Principle* and destroys CO2C's arguments.

IPCC (2013) assumes its Bern model applies only to human CO2. However, that hypothesis is invalid because it violates the Climate Equivalence Principle. All valid models must treat human and natural CO2 the same.

3.6 CO2C cannot explain how natural CO2 stayed at 280 ppm.

CO2C's Carbon Mass Balance model has no equations. Therefore, it cannot explain how natural CO2 emissions stayed constant at 280 ppm. Therefore, CO2C's model is invalid.

3.6a Graven misinterpretation

CO2C's Figure 1.3.2 shows Graven's (2015) interpretation of the D14C data. But Graven assumes H(1) is true. Therefore, Graven's argument cannot prove H(1) is true.

CO2C does not understand that only Graven's "Observed" line is data. Graven's "No Fossil" and "No Bombs" lines assume H(1) is true and have no meaning unless H(1) were true.

Show Figure (to be added)

CO2C used "Graven's simulation" followed by a complicated, incorrect argument. CO2C missed the fact that Graven (2015) assumed H(1) is true in deriving his argument and conclusions.

On this subject, RLWH wrote,

"Peer-reviewed climate science publications should not be viewed as reliable science and do not determine scientific validity. All must be ultimately tested by the scientific method and rejected if their theories are not validated by observations."

3.7 Clear evidence of assuming the conclusion

Figure 11 shows CO2C's Figure 1.4.2. from which CO2C concludes:

Oxygen Conclusions

The production of extra O₂ in the atmosphere excludes a net contribution from the whole biosphere to the CO₂ increase in the atmosphere.

As both oceans and vegetation are net sinks for CO₂ and other sinks/sources (carbonate rock weathering, volcanic eruptions and vents) are much slower and/or smaller, this also means that nature – as a whole– is a net sink for CO₂ and thus cannot be a net source.

The claim that “nature is a sink and therefore cannot be a source is another way to say that human carbon caused all the increase.

However, this argument is circular because it requires them to define the outflow of human carbon from the atmosphere to land and oceans as “a natural sink.”

Whereas the correct formulation of this problem is to separate human carbon flows from natural carbon flows. IPCC and CO2C already assume the natural carbon cycle is at equilibrium with constant inflow and equal outflows.

Therefore, we must define the human carbon cycle independently and let human carbon flow using the same rules the govern the natural carbon cycle. Each cycle has its inflows and outflows.

The human carbon cycle does not produce a new natural outflow. Human carbon has its own outflow, independent of the natural carbon cycle.

This is an IQ test.

Can you understand that we must treat human and natural carbon cycles independently?

Can you find the logical error in Figure 11?

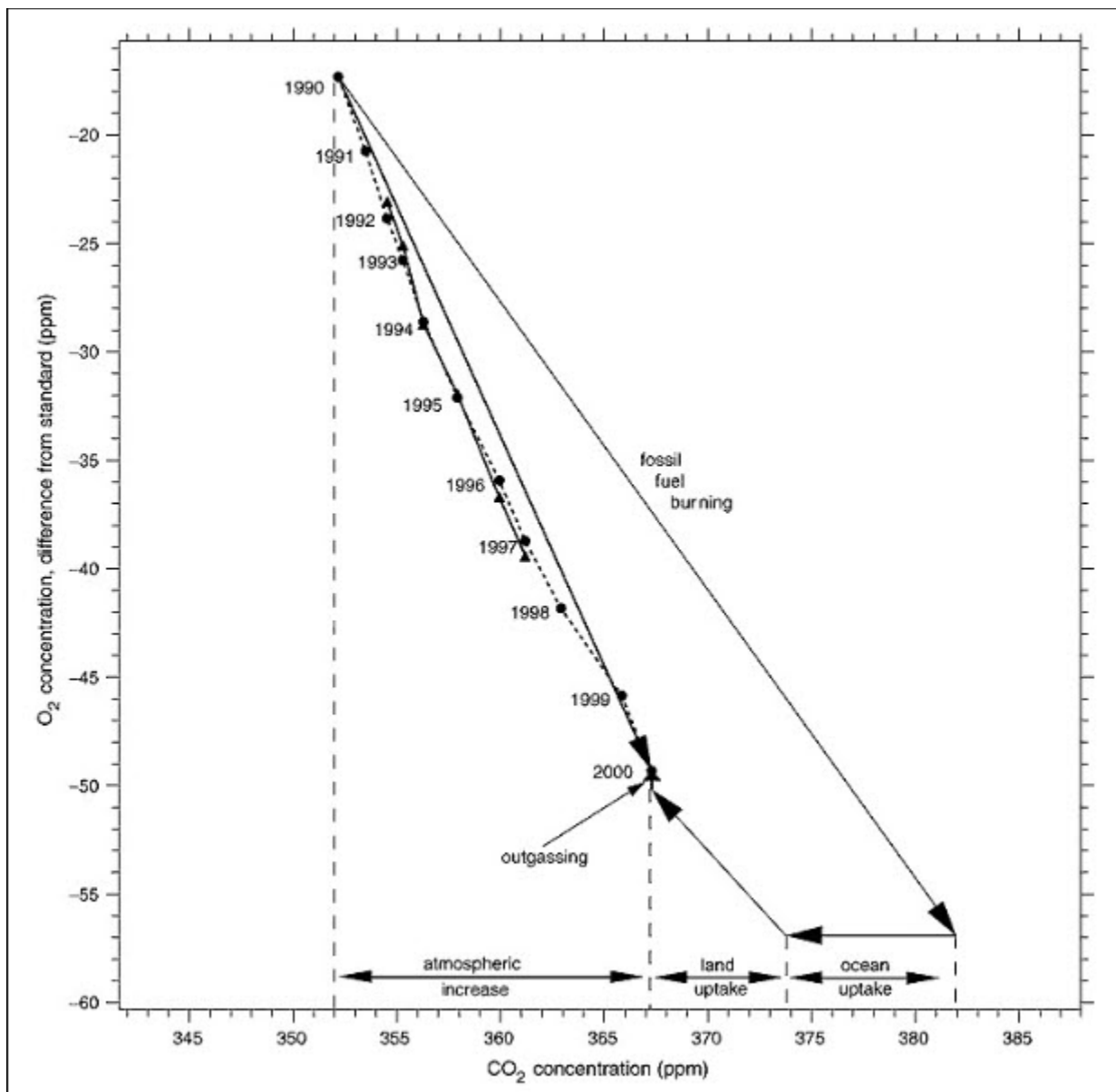


Figure 11. This is CO2C's Figure 1.4.2, taken from the IPCC. CO2C boasts that this figure proves human carbon causes most of the CO₂ increase. The "outgassing" data from 1990 to 2000 are OK. But the IPCC and CO2C have made a stupid logical error in this plot that defeats their argument.

Rather than tell you this error now, I will give you the opportunity to find it yourself. When you find it, you may be the first to explain this error in a comment below.

3.8 CO2C's other arguments are invalid.

CO2C's claims ¹³C/¹²C, Oxygen, Ocean pH and pCO₂, Process Characteristics, Ice Core CO₂, and Stomata CO₂ prove H(1) is true. However, CO2C's argument's use CO2C's invalid

Carbon Cycle Model, insufficient data, invalid data, prior assumptions that H(1) is true, and the scientific method that says evidence cannot prove a hypothesis is true.

4. Conclusions

A CO2 Coalition (2024) special document (hereinafter CO2C) argues that human CO2 emissions cause all or most of the CO2 increase, hereinafter Hypothesis (1) or H(1).

Hypothesis H(1) says human CO2 emissions cause all or most of the CO2 increase.

UN IPCC, 97% of all scientists, all major scientific organizations, and the CO2 Coalition say H(1) is true. But the scientific method says these arguments are invalid. The only thing we can prove in science is that a hypothesis is false.

CO2C says its “evidence” proves H(1) is true. But the scientific method says evidence cannot prove a hypothesis is true. Therefore, all CO2C’s arguments fail.

CO2C claims its carbon mass balance formulation proves H(1) is true, but CO2C omits human carbon outflow from the atmosphere to fake the conclusion that H(1) is true.

CO2C’s Carbon Mass Balance error nullifies all CO2C arguments.

CO2C ignores many peer-reviewed proofs that H(1) is false, including Berry’s argument that uses IPCC’s own data to prove deductively that H(1) is false. The late Richard Courtney said Berry’s research “the only true breakthrough in climate change” science since 1980.

CO2C has no argument except handwaving. CO2C is not doing science.

Proofs that H(1) is false include,

- a. IPCC’s carbon cycle data proves IPCC’s H(1) is false.
- b. D14C data show human CO2 is a negligible part of atmospheric CO2.
- c. No correlation between human CO2 emissions and the increase in the CO2 level.
- d. Temperature change leads CO2 change also proves human CO2 is negligible.
- e. SST data show human CO2 is a negligible part of atmospheric CO2.

Proofs that H(1) is false override all claims that H(1) is true.

President Trump must use proofs that H(1) is false to defend his executive orders on climate from the *Our Children’s Trust* Lighthiser v. Trump climate lawsuit.

5. REFERENCES

Ato, D, 2025: Pitfalls in Global Warming and Climate Change Research: Flaws in Ice Core Reconstruction of Atmospheric CO2 – The Naked King of 280 ppm at the Industrial Revolution. *Science of Climate Change*. Vol. 5.1 pp 1-30,
<https://doi.org/10.53234/scc202501/04>

Battle et al., 2000: Global Carbon Sinks and Their Variability Inferred from Atmospheric O₂ and d¹³C, Science 287, 31 March 2000,
<http://www.sciencemag.org/cgi/reprint/287/5462/2467.pdf>

Bender et al., 2005: Atmospheric O₂/N₂ changes, 1993–2002: Implications for the partitioning of fossil fuel CO₂ sequestration,
http://www.bowdoin.edu/~mbattle/papers_posters_and_talks/BenderGBC2005.pdf

Berry, E.X. 1967: *Cloud droplet growth by collection*. J. Atmos. Sci. 24, 688-701. DOI:
[https://doi.org/10.1175/1520-0469\(1967\)024<0688:CDGBC>2.0.CO;2](https://doi.org/10.1175/1520-0469(1967)024<0688:CDGBC>2.0.CO;2)

Berry, E.X. 1969: *A mathematical framework for cloud models*. J. Atmos. Sci. 26, 109-111.
https://moam.info/a-mathematical-framework-for-cloud-models-edberrycom_59a6a1c81723dd0c40321bda.html

Berry, E. X and Reinhardt, R.L. 1974a: *An analysis of cloud drop growth by collection. Part I. Double distributions*. J. Atmos. Sci., **31**, 1814–1824.
https://journals.ametsoc.org/view/journals/atsc/31/7/1520-0469_1974_031_1814_aaocdg_2_0_co_2.xml

Berry, E. X and Reinhardt, R.L. 1974b: *An analysis of cloud drop growth by collection. Part II. Single initial distributions*. J. Atmos. Sci., **31**, 1825–1831.
https://journals.ametsoc.org/view/journals/atsc/31/7/1520-0469_1974_031_1825_aaocdg_2_0_co_2.xml

Berry, E. X and Reinhardt, R.L. 1974c: *An analysis of cloud drop growth by collection. Part III. Accretion and self-collection*. J. Atmos. Sci., **31**, 2118–2126.
https://journals.ametsoc.org/view/journals/atsc/31/8/1520-0469_1974_031_2118_aaocdg_2_0_co_2.xml

Berry, E. X and Reinhardt, R.L. 1974d: *An analysis of cloud drop growth by collection. Part IV. A new parameterization*. J. Atmos. Sci., **31**, 2127–2135.
https://journals.ametsoc.org/view/journals/atsc/31/8/1520-0469_1974_031_2127_aaocdg_2_0_co_2.xml

Berry, E.X, 2019: *Human CO₂ emissions have little effect on atmospheric CO₂*. International Journal of Atmospheric and Oceanic Sciences. Volume 3, Issue 1, June, pp 13-26.
<https://doi.org/10.11648/j.ijaos.20190301.13>

Berry, E.X, 2020: *Climate Miracle: There is no climate crisis. Nature controls the climate*. Published in the United States by Amazon. 70 pp.
<https://www.amazon.com/dp/B08LCD1YC3/>

Berry, E.X, 2021: *The Impact of Human CO₂ on Atmospheric CO₂*, Science of Climate Change, vol. 1, no.2, pp 1-46. <https://doi.org/10.53234/scc202112/13>

Forrester, J.W., 1968, 2022: *Principles of Systems*. System Dynamics Society. 392 pp.
[Principles of Systems: Text and Workbook Chapters 1 through 10: Forrester, Jay W: 9781935056188: Amazon.com: Books](https://www.amazon.com/dp/B08LCD1YC3/)

- Berry, E.X, 2018: A fatal flaw in global warming science. Basic Science of a Changing Climate. Porto University, Portugal. Sep 7; 2018.
https://www.portoconference2018.org/uploads/1/1/7/3/117342822/11_edwinberryportos ep7final.pdf
- Berry, E.X, 2019: Human CO₂ emissions have little effect on atmospheric CO₂. International Journal of Atmospheric and Oceanic Sciences. Volume 3, Issue 1, June, pp 13-26. <https://doi.org/10.11648/j.ijaos.20190301.13>
- Berry, E.X, 2020: ***Climate Miracle: There is no climate crisis. Nature controls the climate.*** Published in the United States by Amazon. 70 pp.
<https://www.amazon.com/dp/B08LCD1YC3/>
- Berry, E.X, 2021: *The Impact of Human CO₂ on Atmospheric CO₂*, Science of Climate Change, vol. 1, no.2, pp 1-46. <https://doi.org/10.53234/scc202112/13>
- Berry, E.X, 2023a: Nature Controls the CO₂ Increase. Science of Climate Change, Vol. 3.1. <https://doi.org/10.53234/scc202301/21>
- Berry, E.X, 2023b: Nature Controls the CO₂ Increase II. Science of Climate Change, Vol. 3.2. <https://doi.org/10.53234/scc202304/11>
- Engelbeen F, Hannon R, Burton D (2024). The Human Contribution to Atmospheric Carbon Dioxide. CO₂ Coalition. <https://doi.org/10.31219/osf.io/het6n>
- Graven HD, 2015: Impact of fossil fuel emissions on atmospheric radiocarbon and various applications of radiocarbon over this century, Earth, Atmospheric, and Planetary Sciences 112 (31) 9542–9545, DOI: <https://doi.org/10.1073/pnas.1504467112>
- Harde, H. 2017: *Scrutinizing the carbon cycle and CO₂ residence time in the atmosphere.* Global and Planetary Change. 152, 19-26. <https://doi.org/10.1016/j.gloplacha.2017.02.009>
- Harde, H. 2019: *What Humans Contribute to Atmospheric CO₂: Comparison of Carbon Cycle Models with Observations.* International Journal of Earth Sciences. Vol. 8, No. 3, pp. 139-159. <http://www.sciencepublishinggroup.com/journal/paperinfo?journalid=161&https://doi.org/10.11648/j.earth.20190803.13>
- Harde, H. and Salby, M. L. 2021: *What Controls the Atmosphere CO₂ Level?* Science of Climate Change, Vol. 1, No. 1, August 2021, pp. 54-69.
<https://doi.org/10.53234/scc202111/28>.
- Humlum, Ole, Kjell Stordahl, Jan-Erik Solheim (2012): The phase relation between atmospheric carbon dioxide and global temperature.
https://www.researchgate.net/publication/257343053_The_phase_relation_between_atmospheric_carbon_dioxide_and_global_temperature
- IPCC (2007, p. 948) PCC. 2007: Climate Change 2007 - The Physical Science Basis. *Contribution of Working Group 1 to the Fourth Assessment Report of the IPCC*. Annex 1: Glossary: Lifetime. <https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-annexes-1.pdf>

IPCC (2013, pp. 470-471) (2013, p. 471, Figure # 6.1) Carbon and Other Biogeochemical Cycles. https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_Chapter06_FINAL.pdf

Jaworowski Z., 1994: Ancient atmosphere- Validity of ice records, Environ. Sci. & Pollut. Res. 1, 161–171 (1994) <https://doi.org/10.1007/BF02986939>

Jaworowski, Z., 2007: CO₂: The greatest scientific scandal of our time. 21st CENTURY Science & Technology. https://21sci-tech.com/Articles%202007/20_1-2_CO2_Scandal.pdf

Jaworowski Z., Segalstad T.V., Hisdal V., 1992: Atmospheric CO₂ and global warming: a critical review. 2nd edition, 1992. https://www.researchgate.net/publication/307215789_Atmospheric_CO2_and_global_warming_a_critical_review_2nd_edition

Jaworowski Z., Segalstad T.V., Ono N., 1992: Do glaciers tell a true atmospheric CO₂ story? The Science of The Total Environment 114(12):227-284. [https://doi.org/10.1016/0048-9697\(92\)90428-U](https://doi.org/10.1016/0048-9697(92)90428-U)

Kemeny, J., 1959: **A Philosopher looks at Science**. <https://www.amazon.com/gp/product/B0020PK0BM?ie=UTF8&creativeASIN=B0020PK0B>

Kemeny, J.G., J.L. Snell, 1960: *Finite Markov Chains*. Springer. 238 pp. [Amazon.com: Finite Markov Chains: With a New Appendix "Generalization of a Fundamental Matrix" \(Undergraduate Texts in Mathematics\): 9780387901923: Kemeny, John G., Snell, J. Laurie: Books](https://www.amazon.com/Finite-Markov-Chains-With-a-New-Appendix-Generalization-of-a-Fundamental-Matrix/dp/002187588X)

Pickering, K., 2016: *Comment on cause of CO₂ increase*. Murry Salby: Atmospheric Carbon, 18 July 2016 (edberry.com)

Murry Salby: Atmospheric Carbon, 18 July 2016 - edberry.com

Murry Salby: Atmospheric Carbon, 18 July 2016 with Pickering comments - edberry.com

Koonin, S. E., 2021: **Unsettled: What Climate Science Tells Us, What it Doesn't, and Why It Matters**. [Amazon.com: Unsettled: What Climate Science Tells Us, What It Doesn't, and Why It Matters \(Audible Audio Edition\): Steven E. Koonin, Jay Aaseng, BenBella Books: Audible Books & Originals](https://www.amazon.com/Unsettled-What-Climate-Science-Tells-Us-What-It-Doesn-t-and-Why-It-Matters/dp/B09588888X)

Koutsoyiannis, D., C. Onof, Z.W. Kundzewicz, and A. Christofides, 2023: On Hens, Eggs, Temperatures and CO₂: Causal Links in Earth's Atmosphere. *Sci* **2023**, 5(3), 35; <https://doi.org/10.3390/sci5030035>

<https://edberry.com/koutsoyiannis/>

Koutsoyiannis D., 2024: Net Isotopic Signature of Atmospheric CO₂ Sources and Sinks: No Change since the Little Ice Age, *Sci* 2024, 6(1), 17. <https://doi.org/10.3390/sci6010017>

Kuo, C., Lindberg, C., and Thomson, D. 1990: *Coherence established between atmospheric carbon dioxide and global temperature*. *Nature* 1990, 343, 709–714. <https://www.nature.com/articles/343709a0>

MacRae, A. 2008: *CO₂ is not the primary cause of global warming: the future cannot cause the past*. Icecap. [http://icecap.us/images/uploads/CO₂vsTMacRae.pdf](http://icecap.us/images/uploads/CO2vsTMacRae.pdf))

Lindzen, R. and W. Happer, 2025: Greenhouse Gases and Fossil Fuels Climate Science. (which seems to have disappeared from their website, but the link to it is in the next reference.

Lindzen, R. and W. Happer, 2025: Gold Standard Science. (“Draws from” Lindzen, R. and W. Happer, 2025.) <https://co2coalition.org/publications/gold-standard-science/>

Munshi, J. 2017: Responsiveness of atmospheric CO₂ to fossil fuel emissions: Updated. SSRN; 2017. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2997420

Robbins, B., 2015: Atmospheric CO₂: Exploring the Role of Sea Surface Temperatures and the Influence of Recent Anthropogenic CO₂ Emissions. Science of Climate Change, 5.1 <https://doi.org/10.53234/scc2024xx/xx>

Roth, E., 2025: About the Origin of CO₂ in the Atmosphere: Some Annotations to a Study of the CO₂ Coalition. Science of Climate Change, 5.1. <https://doi.org/10.53234/scc202501/05>

Salby, Murry, 2012: **Physics of the Atmosphere and Climate**. Cambridge University Press. 666 pp. [https://www.amazon.com/Physics-Atmosphere-Climate-Murry-Salby/dp/0521767180/ref=mt_hardcover?encoding=UTF8&me=.](https://www.amazon.com/Physics-Atmosphere-Climate-Murry-Salby/dp/0521767180/ref=mt_hardcover?encoding=UTF8&me=)

Murry Salby: Atmospheric Carbon, 18 July 2016 with Pickering comments - edberry.com

Murry Salby: Atmospheric Carbon, 18 July 2016 - edberry.com

Pickering, K., 2016: *Comment on cause of CO₂ increase*. Murry Salby: Atmospheric Carbon, 18 July 2016 (edberry.com)

[Salby, M.L. and Harde, H. 2021: Control of Atmospheric CO₂: Part I: Relation of Carbon 14 to the Removal of CO₂. Science of Climate Change, 1, no.2. <https://doi.org/10.53234/scc202112/210>](#)

[Salby, M.L. and Harde, H. 2022: Theory of Increasing Greenhouse Gases. Science of Climate Change, Vol. 2.3, pp 212-238. <https://doi.org/10.53234/scc202212/17>](#)

Scarborough, J.B. 1966: *Numerical Mathematical Analysis*. Sixth Edition. The John Hopkins Press. 608 pp. Numerical Mathematical Analysis: Scarborough, Dr. William, Scarborough, James B.: 9780801805752: Amazon.com: Books

Segalstad, T.V. 1998: Carbon cycle modelling and the residence time of natural and anthropo-genic atmospheric CO₂: on the construction of the Greenhouse Effect Global Warming dogma. In: Bate, R. (Ed.): Global warming: the continuing debate. ESEF, Cambridge, U.K. (ISBN 0952773422): 184-219. <http://www.CO2web.info/ESEF3VO2.pdf>

Schroder, H., 2022: *Less than half of the increase in atmospheric CO₂ is due to the burning of fossil fuels* Science of Climate Change vol. 2, no. 3, pp 1-19.

<https://doi.org/10.53234/scc202112/17>

Turnbull, J.C., Mikaloff Fletcher, S.E., Ansell, I., Brailsford, G.W., Moss, R.C., Norris, M.W., and Steinkamp, K. 2017: *Sixty years of radiocarbon dioxide measurements at Wellington, New Zealand: 1954–2014*. Atmos. Chem. Phys., 17, pp. 14771–14784.

<https://doi.org/10.5194/acp-17-14771-2017>