Clintel Workshop on Recent Research Developments on Atmospheric Temperature, Carbon Dioxide, and Their Relationship

Luzitania Room, Santorini Building, Campus of the National Technical University Athens
19 September 2024

Fundamental ideas in climate research: How they evolved and how correct they are

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The importance of the biosphere
Are humans part of it? Do they have a right to live?

- *Life makes geology. Life is not merely a geological force, it is **the** geological force. Virtually all geological features at Earth's surface are bio-influenced, and are thus part of Vernadsky's biosphere.*

(Lynn Margulis et al. in the foreword to the English translation of Vernadsky's (1926) book Biosfera; Vernadsky, 1998.)

- *Human populations are geologically very high. And they need food.*

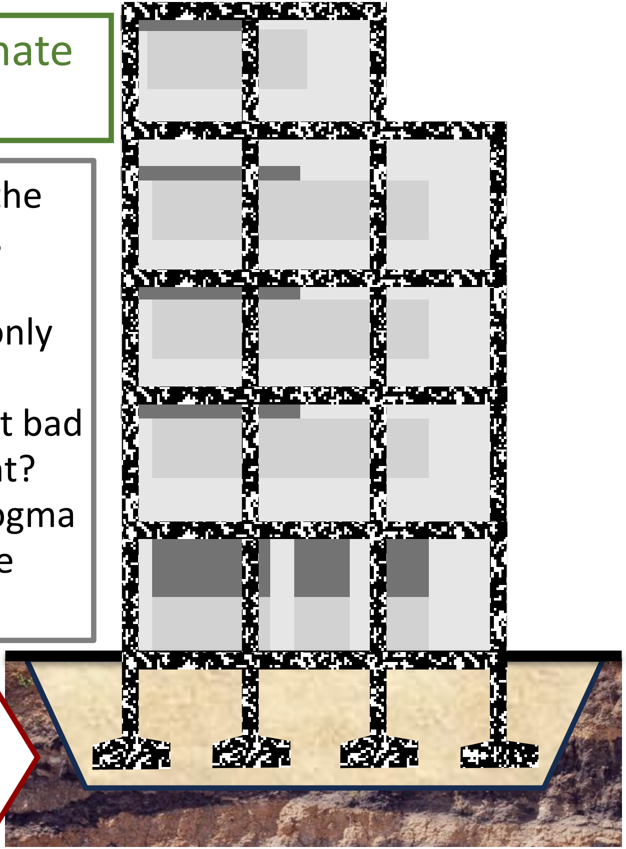
(Nick Stokes in [New Study: CO2's Atmospheric Residence Time 4 Years…Natural Sources Drive CO2 Concentration Changes – Watts Up With That?](), a post referring to Koutsoyiannis, 2024)

Inspecting the climate edifice

“Sceptics” usually argue with the climate establishment about the penthouse.

Why do (mainstream) “sceptics” accept the debating space (the penthouse) that was defined by the climate establishment?

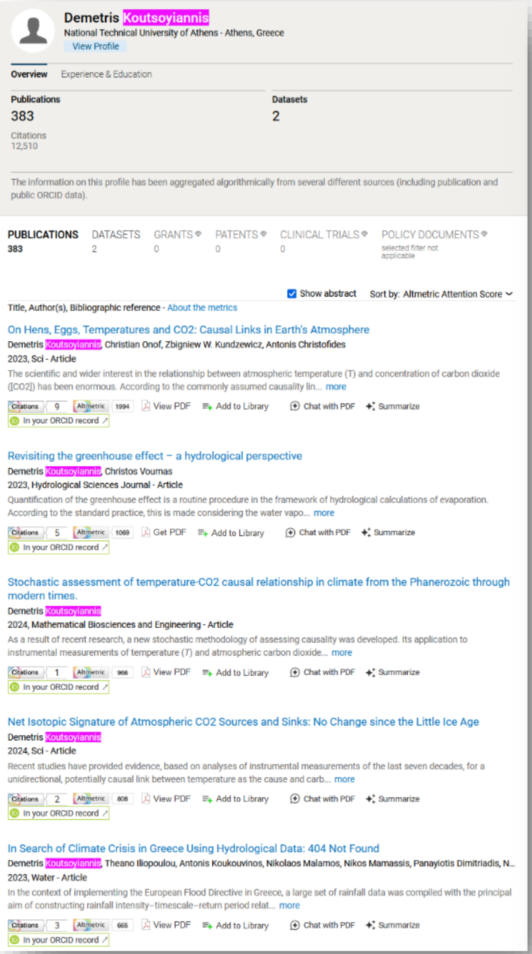
1. Is the underlying science correct and only details need to be discussed?
2. Should sceptics prove that they are not bad guys, distanced from the establishment?
3. Should sceptics, confess faith in the dogma “Humans are responsible” and become climissioners to save the planet?



I have been working on inspecting the (shaky) foundation, i.e., the relationship between temperature and CO_2.

My recent work on climate…

- … is documented in 13 peer-reviewed papers published in mainstream journals in the last 5 years.
- In addition: 2 book chapters; 2 replies to commentaries (1 rejected); 1 preprint (currently rejected by 3 journals).
- Excepting one (lower-left corner), they received no funding but were conducted out of scientific curiosity.
- Most of them have been among the top-visited papers of the respective journals.
- The high altimetric scores (seen on the right), show that all were heavily discussed in informal media (blogs, X, news, etc.).
- All withstood well post-publication criticisms (mostly by “sceptics” ☺).



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On Hens, Eggs, Temperatures and CO2: Causal Links in Earth's Atmosphere
Demetris Koutsoyiannis, Christian Onof, Zbigniew W. Kundzewicz, Antonis Christofides
2023, Sci - Article
The scientific and wider interest in the relationship between atmospheric temperature (T) and concentration of carbon dioxide ([CO2]) has been enormous. According to the commonly assumed causality lin... more
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Revisiting the greenhouse effect – a hydrological perspective
Demetris Koutsoyiannis, Christos Vournas
2023, Hydrological Sciences Journal - Article
Quantification of the greenhouse effect is a routine procedure in the framework of hydrological calculations of evaporation. According to the standard practice, this is made considering the water vapo... more
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Stochastic assessment of temperature-CO2 causal relationship in climate from the Phanerozoic through modern times.
Demetris Koutsoyiannis
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As a result of recent research, a new stochastic methodology of assessing causality was developed. Its application to instrumental measurements of temperature (T) and atmospheric carbon dioxide... more
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Net Isotopic Signature of Atmospheric CO2 Sources and Sinks: No Change since the Little Ice Age
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In Search of Climate Crisis in Greece Using Hydrological Data: 404 Not Found
Demetris Koutsoyiannis, Theano Iliopoulou, Antonis Koukouvinos, Nikolaos Malamos, Nikos Mamassis, Panayiotis Dimitriadis, N...
2023, Water - Article
In the context of implementing the European Flood Directive in Greece, a large set of rainfall data was compiled with the principal aim of constructing rainfall intensity–timescale–return period relat... more
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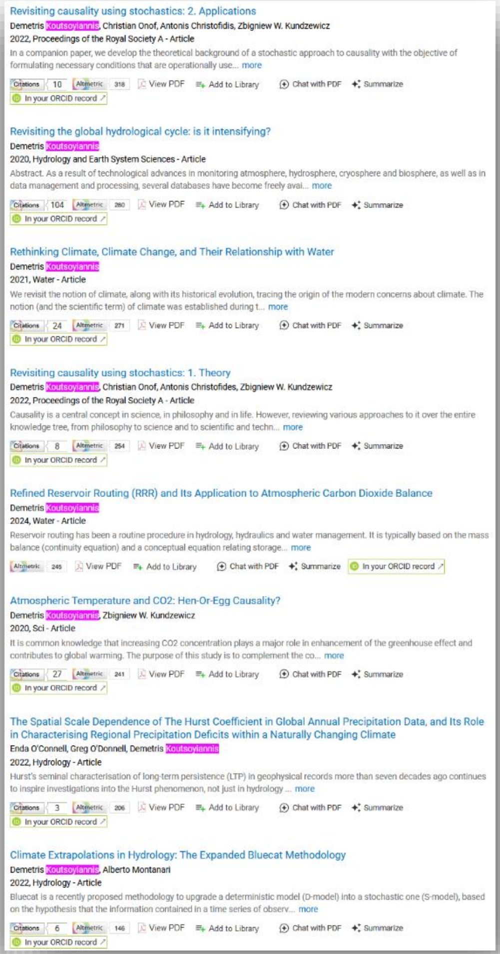

Revisiting causality using stochastics: 2. Applications
Demetris Koutsoyiannis, Christian Onof, Antonis Christofidis, Zbigniew W. Kundzewicz
2022, Proceedings of the Royal Society A - Article
In a companion paper, we develop the theoretical background of a stochastic approach to causality with the objective of formulating necessary conditions that are operationally use... more
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Revisiting the global hydrological cycle: is it intensifying?
Demetris Koutsoyiannis
2020, Hydrology and Earth System Sciences - Article
Abstract. As a result of technological advances in monitoring atmosphere, hydrosphere, cryosphere and biosphere, as well as in data management and processing, several databases have become freely avai... more
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Rethinking Climate, Climate Change, and Their Relationship with Water
Demetris Koutsoyiannis
2021, Water - Article
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Revisiting causality using stochastics: 1. Theory
Demetris Koutsoyiannis, Christian Onof, Antonis Christofides, Zbigniew W. Kundzewicz
2022, Proceedings of the Royal Society A - Article
Causality is a central concept in science, in philosophy and in life. However, reviewing various approaches to it over the entire knowledge tree, from philosophy to science and to scientific and techn... more
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Refined Reservoir Routing (RRR) and Its Application to Atmospheric Carbon Dioxide Balance
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Atmospheric Temperature and CO2: Hen-Or-Egg Causality?
Demetris Koutsoyiannis, Zbigniew W. Kundzewicz
2020, Sci - Article
It is common knowledge that increasing CO2 concentration plays a major role in enhancement of the greenhouse effect and contributes to global warming. The purpose of this study is to complement the co... more
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The Spatial Scale Dependence of The Hurst Coefficient in Global Annual Precipitation Data, and Its Role in Characterising Regional Precipitation Deficits within a Naturally Changing Climate
Enda O'Connell, Greg O'Donnell, Demetris Koutsoyiannis
2022, Hydrology - Article
Hurst's seminal characterisation of long-term persistence (LTP) in geophysical records more than seven decades ago continues to inspire investigations into the Hurst phenomenon, not just in hydrology... more
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Climate Extrapolations in Hydrology: The Expanded Bluecat Methodology
Demetris Koutsoyiannis, Alberto Montanari
2022, Hydrology - Article
Bluecat is a recently proposed methodology to upgrade a deterministic model (D-model) into a stochastic one (S-model), based on the hypothesis that the information contained in a time series of observ... more
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An omniscient bot's help to inspect the foundation

- **Questions to ChatGTP**
  - **Q1**. Can you help me to trace out the development of the idea that human CO_2 emissions cause temperature increase? Which were the milestones in this development?
  - **Q2**. Did anyone provide a proof of the causal relationship?
- On **Q1**, the ChatGTP identified the milestone publications: **Svante Arrhenius** (1896); **Guy Stewart Callendar** (1938); **Charles David Keeling** (1960).
- The ideas in these publications, which are mostly wrong (see next), are still widely accepted.
- On **Q2**, the bot gave a reply that in logical terms is non-affirmative (*my emphasis in red*):
  - ***Conclusion: A Convergence of Evidence***
  - *While no single experiment or piece of evidence provides "proof" in the strictest sense, the overwhelming convergence of theoretical predictions, empirical observations, and modeling results provides a robust causal link between human CO_2 emissions and global temperature increases. This conclusion is supported by decades of research across multiple scientific disciplines and is now a central tenet of climate science.*
- I believe I have provided evidence to the contrary, opposing the "*overwhelming convergence*".

Arrhenius’s (1896) first fundamental error

- Svante Arrhenius (Swedish physicist and chemist; 1859 –1927) supported the idea that changes in atmospheric carbon dioxide concentration caused the temperature changes. He stated:

  > *Conversations with my friend and colleague Professor Högbom* […]*, led me to make a preliminary estimate of the probable effect of a variation of the atmospheric carbonic acid on the temperature of the earth. As this estimation led to the belief that one might in this way probably find an explanation for temperature variations of 5–10 °C, I worked out the calculation more in detail and lay it now before the public and the critics.*

- Arrhenius was aware of several other possible causes of temperature variations but, following De Marchi (1895), he rejected them all.
- Subsequent research has provided evidence that De Marchi and Arrhenius were wrong: Milanković (1935, 1941, 1998); Hays et al. (1976); Roe (2006); Shaviv et al. (2023); Koutsoyiannis (2024b).

Arrhenius's (1896) second fundamental error

- Arrhenius, based on Högbom's (1894) work which he quoted, thought that "vegetative processes" (respiration and photosynthesis) can be omitted:

  The processes named under (4) [decomposition of carbonates] *and (5)* [liberation of carbonic acid—meaning CO_2—from minerals] *are of little significance, so that they may be omitted*. *So too the processes (3)* [combustion and decay of organic bodies] *and (7)* [consumption of carbonic acid by vegetative processes], *for the circulation of matter in the organic world goes on so rapidly that their variations cannot have any sensible influence*.

- Note that the processes that "may be omitted" provide 96% of the total CO_2 inputs to the atmosphere (see next slides). At Arrhenius's time, this must have been 98%.

Callendar's inaccurate estimates

- Guy Stewart Callendar (English steam engineer and inventor; 1898 –1964) made a vastly inaccurate estimate of the human additions of CO_2 that remain in the atmosphere (Callendar, 1938):

  *By fuel combustion man has added about 150 000 million tons of carbon dioxide to the air during the past half century. The author estimates from the best available data that approximately **three-quarters of this has remained in the atmosphere**.*

- Like Arrhenius, Callendar fully neglected the effect of the natural CO_2 inputs and outputs:

  The general conclusion from a somewhat lengthy investigation on the natural movements of carbon dioxide was that there is no geological evidence to show that the net offtake of the gas is more than a small fraction of the quantity produced from fuel.

- He derived the "3/4" estimate in the following manner:

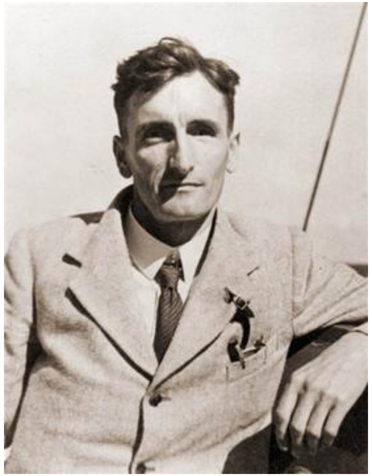
  The actual CO_2, added in the last 40 years was equal to an increase of 8%; the observed and calculated values agreed in giving an effective increase of about 6%.

- The above statement appears in Callendar's reply to a comment by J.H. Coste, published along with the paper. Coste disputed the accuracy of measurements, doubted if "*the differences* […] *were real,*" and stated that [CO_2] was 400 ppm before it became 300 ppm.
- Notably, Coste was the only one of six commentators to emphasize the role of natural emissions.

Callendar's optimistic view of human emissions

- Callendar (1938) estimated that human CO_2 emissions cause a temperature increase of 0.3 °C/century and predicted for the 21st century a total temperature increase at +0.39 °C, corresponding to a polar displacement of climate zones of 87 km.
- He regarded these changes as beneficial:

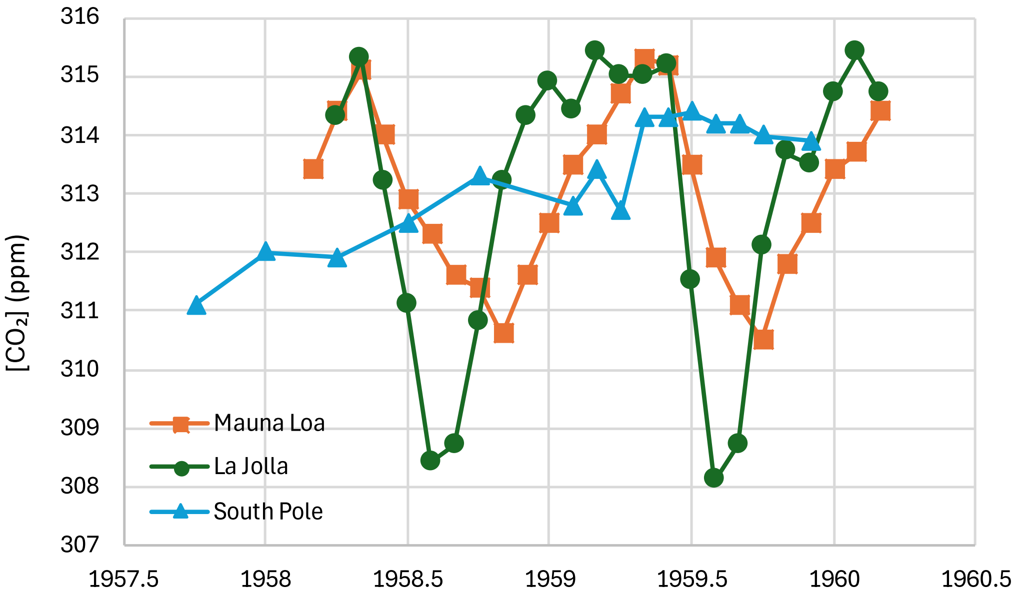
> *In conclusion it may be said that the combustion of fossil fuel, whether it be peat from the surface or oil from 10,000 feet below, is likely to prove beneficial to mankind in several ways, besides the provision of heat and power.* […]
> ***In any case the return of the deadly glaciers should be delayed indefinitely*.**



Keeling's (1960) first reporting on his measurements and his puzzling results

- Charles David Keeling (American scientist; 1928 –2005) was the father of systematic [CO_2] observations at 3 stations, Mauna Loa, La Jolla and South Pole; the plot of the former data series has become known as the Keeling curve.
- Keeling (1960) published the measurements of the first two years in tabulated form.
- He must have expected to see rising trends, but found seasonal variation, as seen in his Abstract:

  A systematic variation with season and latitude in the concentration and isotopic abundance of atmospheric carbon dioxide has been found in the northern hemisphere. In Antarctica, however, a small but persistent increase in concentration has been found.
- Nb., temperature was not rising then.



The graph was constructed from Keeling's (1960) tabulated data. Keeling included separate graphs for Mauna Loa and South Pole, but not for La Jolla.

Keeling's (1960) additional remarks

- Observing the seasonality in the CO_2 changes, he correctly attributed it to the plants:

  These data, therefore, indicate that the seasonal trend in concentration observed in the northern hemisphere is the result of the activity of land plants.

- However, he subsequently dismissed the function of plants and oceans.
- Specifically, from the trend in Antarctica alone, he concluded that the increase in CO_2 concentration results from the combustion of fossil fuels and that the oceans have no effect in reducing human CO_2 emissions:

  [O]*ne might be led to conclude that the oceans have been without effect in reducing the annual increase in concentration resulting from the combustion of fossil fuel. Since the seasonal variation in concentration observed in the northern hemisphere is several times larger than the annual increase, it is as reasonable to suppose, however, that a small change in the factors producing this seasonal variation may also have produced an annual change counteracting an oceanic effect.*

The Keeling plot

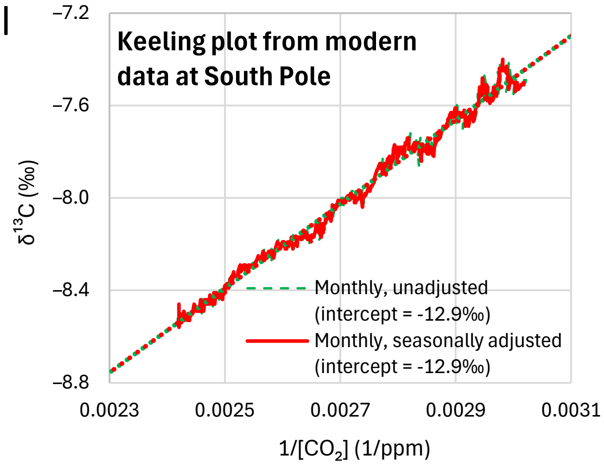
- An observed decrease in the abundance of the isotope ^{13}C in the atmospheric CO_2 has been attributed to human CO_2 emissions and termed the *Suess Effect* after Suess (1955), who published the first observations, albeit using ^{14}C data:

  The decrease can be attributed to the introduction of a certain amount of C^{14}-free CO_2 into the atmosphere by artificial coal and oil combustion...

- To study the isotopic synthesis of atmospheric CO_2, Keeling (1958, 1961) introduced empirically, after data exploration, a linear plot relating the atmospheric CO_2 concentration, $[CO_2]$, and the standard metric of the ^{13}C abundance in the atmosphere, $\delta^{13}C$.
- Koutsoyiannis (2024a) reintroduced it in a rigorous theoretical manner, based on the differential equation describing the phenomenon, and defined it as:

  A Keeling plot is a plot of $\delta^{13}C$ *vs.* $1/[CO_2]$*, where the values of* $\delta^{13}C$ *and* $[CO_2]$ *are simultaneous.*

- If the plot supports a linear relationship, then its intercept quantifies the net input signature $\delta^{13}C_I$ (sources – sinks).
- The Keeling plot proved to be a useful tool, as it can provide insights different from those initially assumed to reflect the Suess Effect.



Keeling and the "airborne fraction" (ABF)

- Keeling (1973) introduced the concept of the "*fraction of the industrial input* [that] *is remaining air-borne*". He attributed this concept to Callendar (1938) and later studies by Callendar and others.
- This is still in use today under the name *airborne fraction*; see e.g., IPCC (2021) AR6's glossary:

  Airborne fraction *The fraction of total carbon dioxide (CO_2) emissions (from fossil fuels and land-use change) remaining in the atmosphere.*

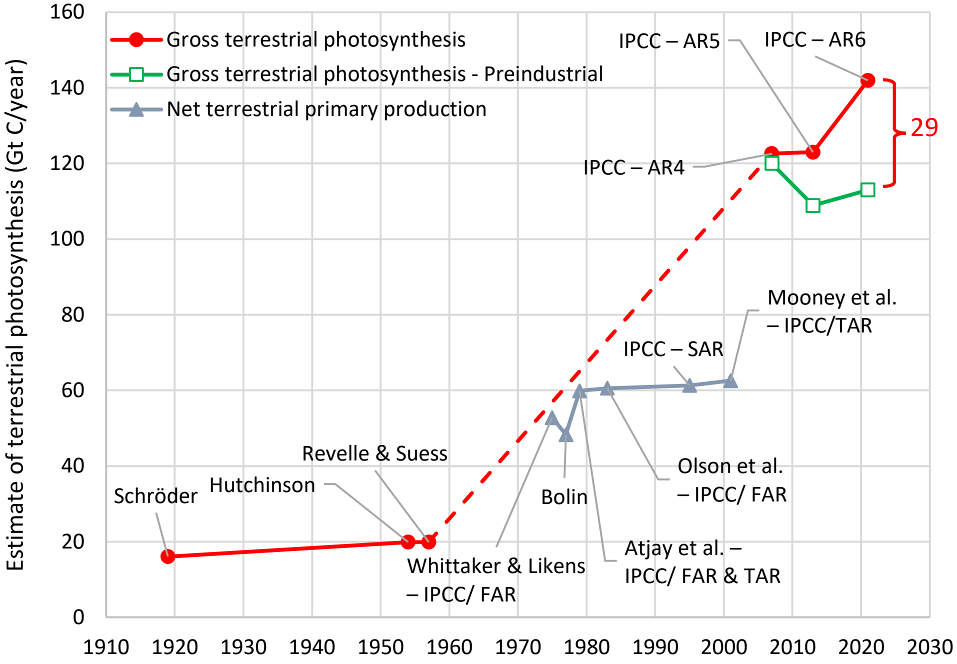
- This is the **logical definition**, defining a quantity, here denoted as ABF_L.
- However, there is a different, **computational definition**, ABF_C, presumably of the same concept. This is again attributed to Keeling by Bolin (1977), who stated:

  Keeling defines the airborne fraction as the ratio of the annual increase of carbon dioxide in the atmosphere to the annual output, which has varied […]*, the average being close to 50 percent.*

- The two definitions are fully inconsistent with each other and result in radically different estimates.
- The difference lies in the fact that the computational definition (ABF_C) erroneously assumes that the increase of atmospheric [CO_2] is entirely due to human emissions.
- Most authors used the incorrect definition ABF_C, but still their estimates diverge (Callendar, 1938: **75%**; Callendar (1940): **~100%**—"*all this extra gas* [produced from fuel] *has remained in the air*"; Machta, 1973: **65%**; Ekdahl and Keeling, 1973: **49%**; Bolin, 1977: **40 ± 5%**; IPCC, 2021: **44%**).
- However, Revelle and Suess (1957) disputed such estimates: "*Most of the excess CO_2, from fuel combustion may have been transferred to the ocean*".

The underestimation or neglect of biosphere's role

- Complete quantification of all components of carbon balance has been provided by IPCC only after 2007 (Assessment Reports 4-6 – AR4 – AR6).
- The misestimation dominating in early periods is exemplified by the graph below, which reviews estimates of the component most studied, i.e., terrestrial photosynthesis (or primary production).
- Before 1970, the estimates were too low. (Nb., similar were those of land respiration: 15 – 25 Gt C/year per Leith, 1963).
- The IPCC Assessment Reports 1-3, provided estimates of the net (not the gross) primary production, which were nearly constant at 60 Gt C/year.
- The subsequent reports gave estimates for the gross photosynthesis—also for preindustrial conditions.
- Only the last report (IPCC, 2021) estimated a large difference between current and preindustrial conditions.



Understanding and modelling the CO_2 dynamics

The studies are based on data, fully excluding anything originating from climate models.

The models developed are simple, transparent and reproducible in a spreadsheet.

The data are measurements of $[CO_2]$, $\delta^{13}C$, $\Delta^{13}C$, and anthropogenic emissions.

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Net Isotopic Signature of Atmospheric CO_2 Sources and Sinks: No Change since the Little Ice Age

by Demetris Koutsoyiannis

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Sci **2024**, *6*(1), 17; https://doi.org/10.3390/sci6010017

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(This article belongs to the Special Issue Feature Papers—Multidisciplinary Sciences 2023)

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Abstract

Recent studies have provided evidence, based on analyses of instrumental measurements of the last seven decades, for a unidirectional, potentially causal link between temperature as the cause and carbon dioxide concentration ($[CO_2]$) as the effect. In the most recent study, this finding was supported by analysing the carbon cycle and showing that the natural $[CO_2]$ changes due to temperature rise are far larger (by a factor > 3) than human emissions, while the latter are no larger than 4% of the total. Here, we provide additional support for these findings by examining the signatures of the stable carbon isotopes, 12 and 13. Examining isotopic data in four important observation sites, we show that the standard metric $\delta^{13}C$ is consistent with an input isotopic signature that is stable over the entire period of observations (>40 years), i.e., not affected by increases in human CO_2 emissions. In addition, proxy data covering the period after 1500 AD also show stable behaviour. These findings confirm the major role of the biosphere in the carbon cycle and a non-discernible signature of humans.

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Refined Reservoir Routing (RRR) and Its Application to Atmospheric Carbon Dioxide Balance

by Demetris Koutsoyiannis

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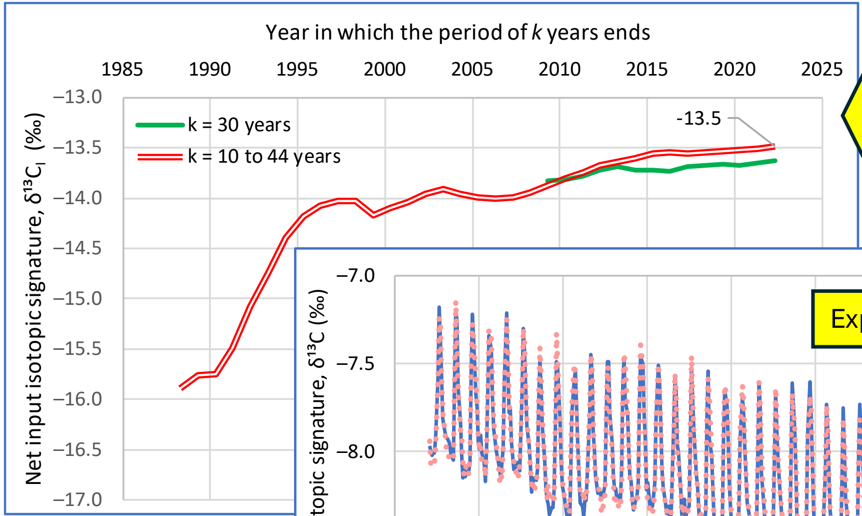
Abstract

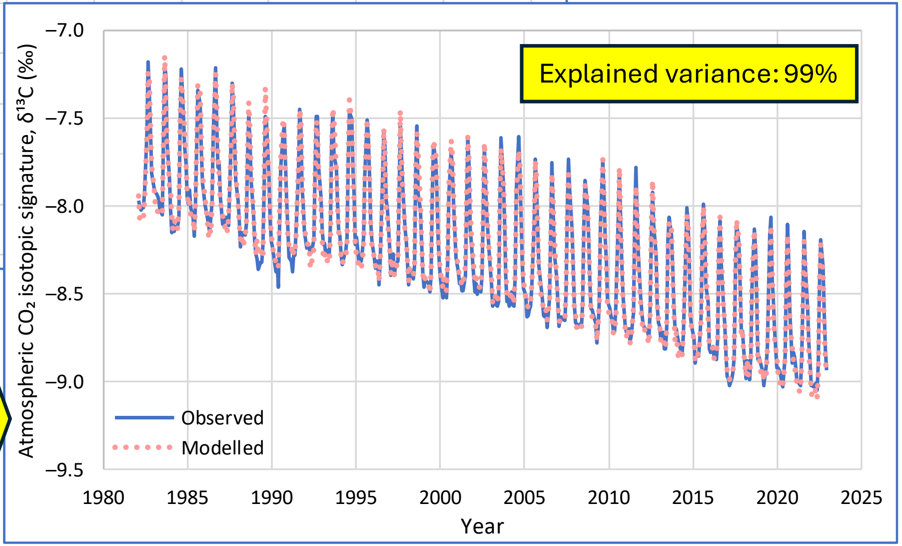
Reservoir routing has been a routine procedure in hydrology, hydraulics and water management. It is typically based on the mass balance (continuity equation) and a conceptual equation relating storage and outflow. If the latter is linear, then there exists an analytical solution of the resulting differential equation, which can directly be utilized to find the outflow from known inflow and to obtain macroscopic characteristics of the process, such as response and residence times, and their distribution functions. Here we refine the reservoir routing framework and extend it to find approximate solutions for nonlinear cases. The proposed framework can also be useful for climatic tasks, such as describing the mass balance of atmospheric carbon dioxide and determining characteristic residence times, which have been an issue of controversy. Application of the theoretical framework results in excellent agreement with real-world data. In this manner, we easily quantify the atmospheric carbon exchanges and obtain reliable and intuitive results, without the need to resort to complex climate models. The mean residence time of atmospheric carbon dioxide turns out to be about four years, and the response time is smaller than that, thus opposing the much longer mainstream estimates.

Graphical abstract of the *Sci* (2024) paper

- The atmospheric $\delta^{13}C$ has been decreasing (see lower graph).
- However, the net input signal of the atmospheric $\delta^{13}C_I$ is not decreasing—in some cases it is increasing (see upper graph).
- A constant $\delta^{13}C_I \approx -13‰$ at an overannual time scale is representative across the entire globe for the entire period of measurements.
- The same value holds for proxy data after the Little Ice Age.
- These support the conclusion that natural causes drove the $[CO_2]$ increase.
- A human-caused signature (Suess effect) is non-discernible.



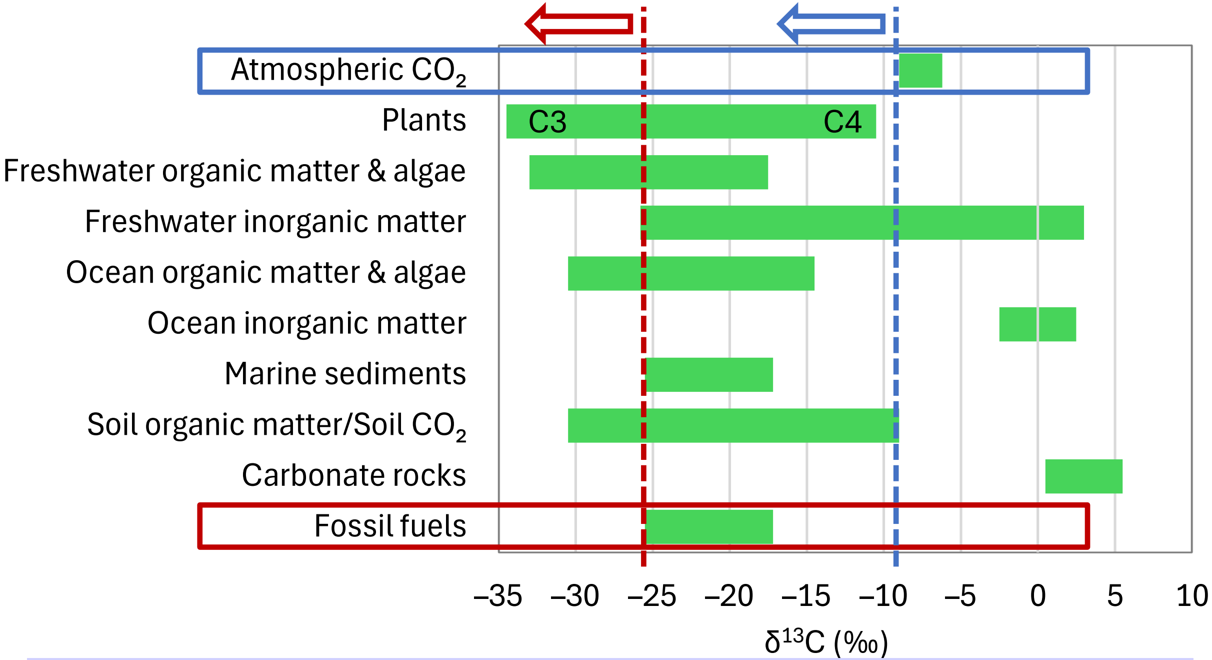
Diagnostic results at Mauna Loa, Hawaii: Increasing (rather than decreasing) net input isotopic signature



Modelling results at Barrow, Alaska: Perfect model performance by considering nothing more than natural seasonality

Why the Suess effect does not have a logical basis

- Fossil fuels have a small δ^{13}C signature, down to –26‰ and hence their input δ$^{13}C_I$ is low.
- However, C3 plants (e.g., evergreen trees, deciduous trees and weedy plants) have much lower δ^{13}C values than fossil fuels, down to – 34‰, and thus their input δ$^{13}C_I$ is even lower.
- Lower values than in fossil fuels, also appear in other CO_2 sources.
- When the C3 plants (and many other organisms) respire, they emit to the atmosphere low δ$^{13}C_I$, decreasing the atmospheric δ^{13}C content.
- It is therefore absurd to suggest that it is the emissions from burning fossil fuels (the 4% of the total) that cause the atmospheric δ^{13}C value to fall.



Graph source: Koutsoyiannis (2024d) after grouping similar categories from Trumbore and Druffel (1995).

Definitions and Glossary of the *Water* (2024) paper: Trying to bring rigour to climate by employing stochastics

***Impulse response function* (*IRF*, $g_h(h)$)**: A system's output at a time distance (lag) h from the time in which the system is perturbed by an input that is an (instantaneous) impulse of unit mass (a Dirac delta function). It is also expressed in dimensionless form, $g(\eta) = g_h(\eta W_0) W_0$. An interesting property (proposition 1) is that the IRF is identical to the probability density function of the residence time for the case that the input is an impulse function.

Reservoir, linear: A reservoir in which the outflow is proportional to storage. Any other type of storage–outflow relationship defines a *nonlinear reservoir*.

Reservoir, sublinear: A reservoir in which the outflow is proportional to storage raised to a power $b < 1$.

Reservoir, superlinear: A reservoir in which the outflow is proportional to storage raised to a power $b > 1$.

***Residence time* ($\underline{W}$)**: The time duration that a particle (molecule) spends in the reservoir from its entry to its exit. Excepting the (unrealistic) case of a perfectly regular (laminar) flow, the residence time is different for different molecules and is therefore represented as a stochastic variable (hence the underscore in the notation).

***Residence time, characteristic* (W_0)**: The time that is defined as the ratio $W_0 := S_0/Q_0$, where S_0 and Q_0 represent the initial conditions of storage and outflow, respectively, at time $t = 0$. In general, W_0 depends on the initial conditions. In a linear reservoir it is equal to the mean residence time, μ_W.

***Residence time, mean* (μ_W)**: The mean of the stochastic variable $\underline{W}$, which represents the residence time. It may also be expressed in dimensionless form, $\mu_w = \mu_W/W_0$. In a linear reservoir, the mean residence time is equal to the characteristic residence time $\mu_W = W_0$, and the dimensionless mean residence time is $\mu_w = 1$. In a sublinear or superlinear reservoir, a simple approximation of the mean residence time is given by Equation (41).

***Residence time, median* ($W_{1/2}$)**: The median of the stochastic variable $\underline{W}$, which represents the residence time. It may also be expressed in dimensionless form, $w_{1/2} = W_{1/2}/W_0$. In a linear reservoir, the median residence time is smaller than the mean residence time by the factor ln 2 = 0.69. In a sublinear or superlinear reservoir, a simple approximation of the median residence time is given by Equation (41).

Response time, mean: The mean of the IRF, in dimensional form (μ_h) or dimensionless form ($\mu_\eta = \mu_h/W_0$). In a linear reservoir, the mean response time is equal to the mean residence time and to the characteristic residence time, $\mu_h = \mu_W = W_0$, and the dimensionless ones are $\mu_\eta = \mu_w = 1$. In a sublinear reservoir, the mean response time is generally smaller than the mean residence time. In a sublinear or superlinear reservoir, the mean response time is determined from the exact Equation (44).

Response time, median: The median of the IRF, in dimensional form ($h_{1/2}$) or dimensionless form ($\eta_{1/2} = h_{1/2}/W_0$). In a linear reservoir, the median response time is smaller than the mean response time by the factor ln 2 = 0.69. In a sublinear reservoir, the median response time is generally smaller than the median residence time. In a sublinear or superlinear reservoir, the median response time is determined from the exact Equation (44).

A contrast with the "intentionally vague"* IPCC terminology

- IPCC (2021) uses the terms *lifetime*, *turnover time*, *global atmospheric lifetime*, *response time*, *adjustment time*, *half-life* or *decay constant*, none of which is clear enough to allow quantification and even to allow distinguishing which one is referred to each time.
- In particular, when referring to CO_2 (and in contrast to other substances), IPCC is as vague as possible, e.g.:
  - [T]*he concept of a single, characteristic atmospheric lifetime is not applicable to* CO_2 (IPCC, 2013, p. 473).
  - *No single lifetime can be given* [for CO_2]. *The impulse response function for* CO_2 *from Joos et al. (2013) has been used* (IPCC, 2013, p. 737).
  - *Lifetime* [for well-mixed greenhouse gases] *is reported in years: # indicates multiple lifetimes for* CO_2 (IPCC, 2013, p. 302; see also p. 1017).
- IPCC insists on the weird idea that the behaviour of the CO_2 depends on its origin and that CO_2 emitted by anthropogenic fossil fuel combustion has higher residence time than naturally emitted:
  - *Simulations with climate – carbon cycle models show multi-millennial lifetime of the anthropogenic* CO_2 *in the atmosphere* (IPCC, 2013, p. 435).

* "Intentionally vague" has been quoted from MIT's *Climate Portal Writing Team Featuring Guest Expert Ed Boyle, How Do We Know How Long Carbon Dioxide Remains in the Atmosphere?*, 2023. https://climate.mit.edu/ask-mit/how-do-we-know-how-long-carbon-dioxide-remains-atmosphereEstimates. The full phrase is: "*Estimates for how long carbon dioxide* (CO_2) *lasts in the atmosphere* […] *are often intentionally vague, ranging anywhere from hundreds to thousands of years.*"

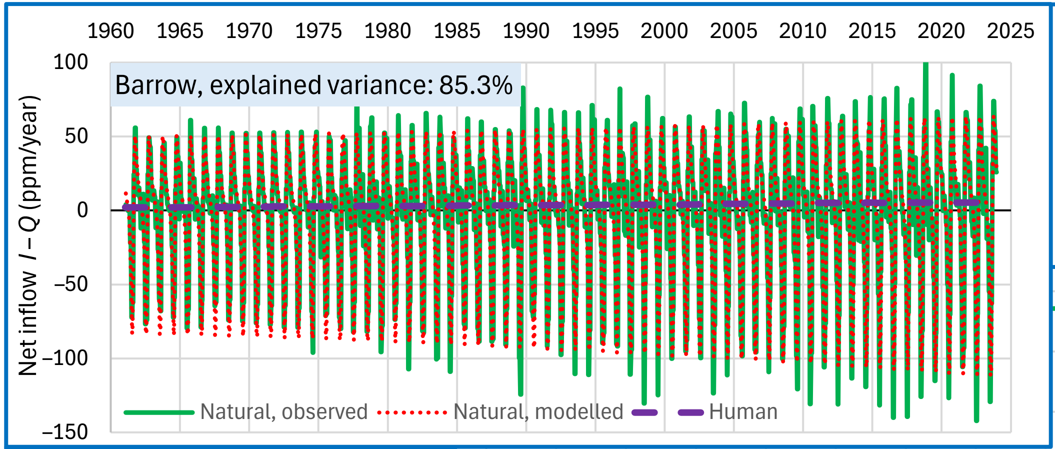
Graphical abstract of the *Water* (2024) paper

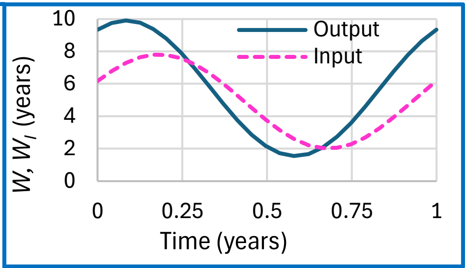
Evidently (and contrary to popular beliefs), the CO_2 mean residence time (W) in the atmosphere is:

a) independent of the origin (human or not);

b) about 4 years on overannual basis (there is no multi-millennial lifetime);

c) seasonally varying with lowest value < 2 years.

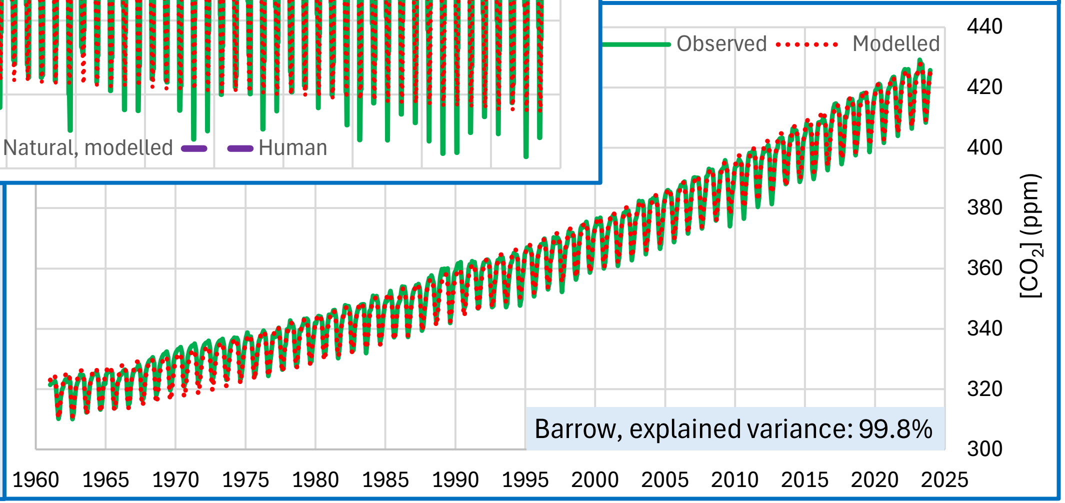




Mean residence time (W)**:** 3.9 years (seasonal variation: 1.6 – 9.9 years).

Net inflow seasonal variation range: 130 ppm/year in 1960s; 240 ppm/year now (**biosphere expansion**—compare with human emissions of max 5 ppm/year).

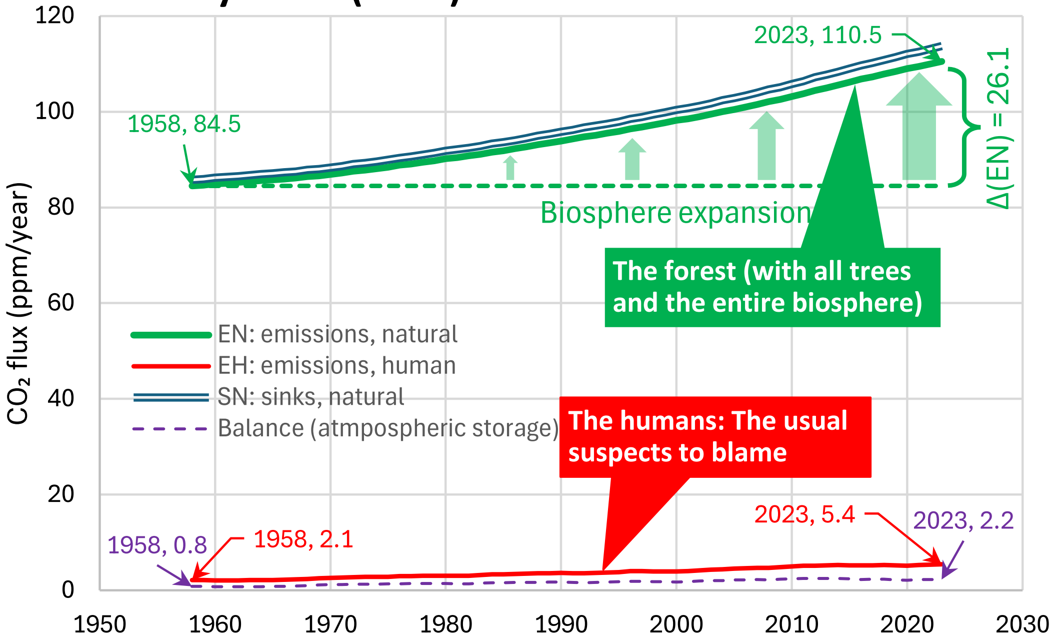
Model performance: excellent.



The biosphere expansion and related questions (& Answers)

1. Has the biosphere expansion (the upsurge Δ(EN) = 26.1 ppm CO_2/year) been caused by the human emissions (2.1 – 5.4 ppm CO_2/year)?
   Answer: No*
2. Atmospheric carbon accumulation is less than half of human emissions. Does this demonstrate that natural processes have not added CO_2 to the atmosphere?
   Answer: No
3. Nature (land and oceans) is a net sink. Is it proof that the CO_2 rise is caused by humans?
   Answer: No
4. Does the Koutsoyiannis (2024c) model violate mass balance?
   Answer: No

Koutsoyiannis (2024) model results on annual scale

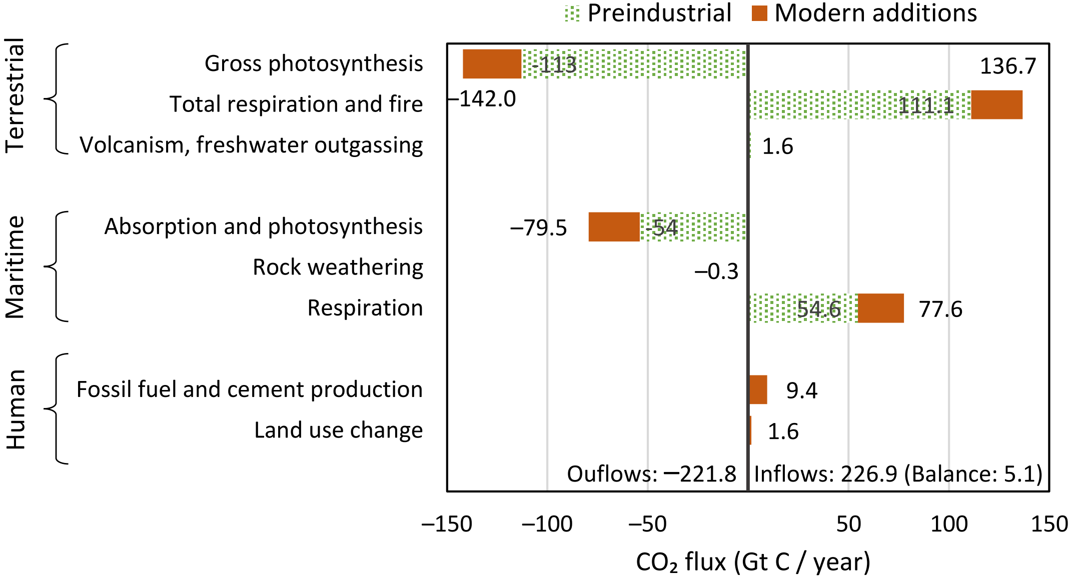


The graph was prepared from the Koutsoyiannis (2024c) model results, after aggregation to the annual scale.

* IPCC replies: Yes. This is inferred from the following quotation: "*Emissions from natural sources, such as the ocean and the land biosphere, are usually assumed to be constant, or to evolve in response to changes in anthropogenic forcings or to projected climate change.*" (IPCC, 2021, p. 54)

My results are consistent with the IPCC (AR6) carbon balance

1. Per IPCC, humans are responsible for only 4% of carbon emissions.
2. The vast majority of changes in the atmosphere since 1750 (red bars in the graph) are due to natural processes, respiration and photosynthesis.
3. The increases in both CO_2 emissions and sinks are due to the temperature increase, which expands the biosphere and makes it more productive.
4. The terrestrial biosphere processes are much more powerful than the maritime ones in terms of CO_2 production and absorption.

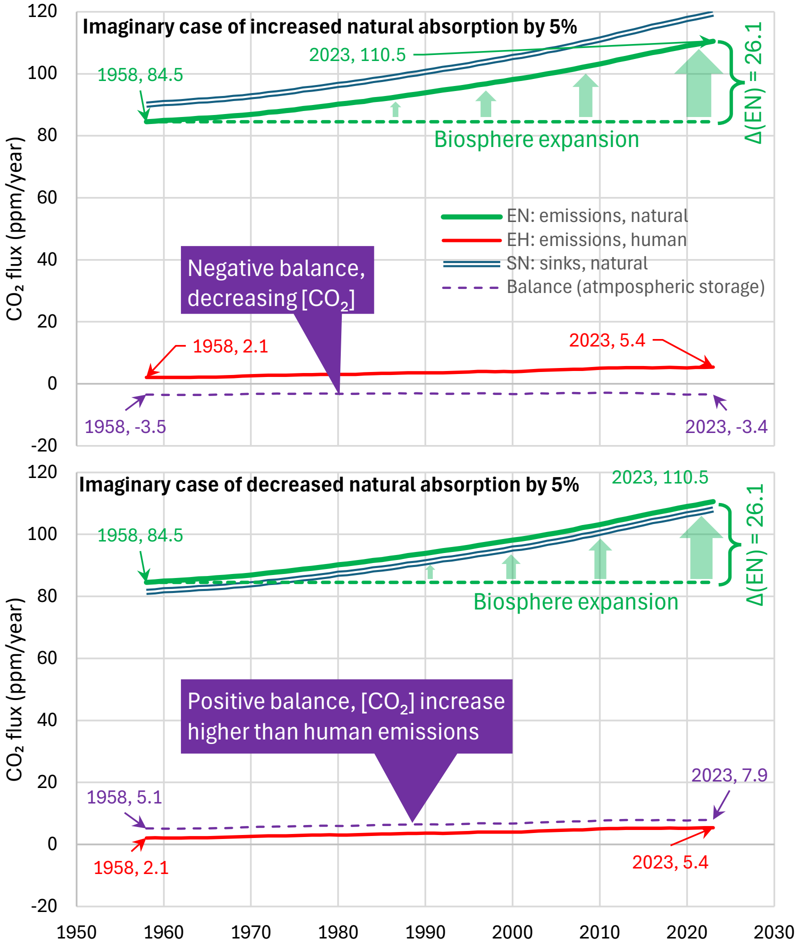


The estimates are "official" from IPCC (2021; Fig. 5.12). The presentation in the figure above is "unofficial", adapted from Koutsoyiannis (2024c).

5. The CO_2 emissions by the ocean biosphere alone are much larger than human emissions.
6. The modern (post-1750) CO_2 additions to pre-industrial quantities (red bars in the right half of the graph) exceed the human emissions by a factor of ~4.5. In the most recent 65 years, covered by measurements, the increase in natural emissions is ~3.5 times greater than the CO_2 emissions from fossil fuels.

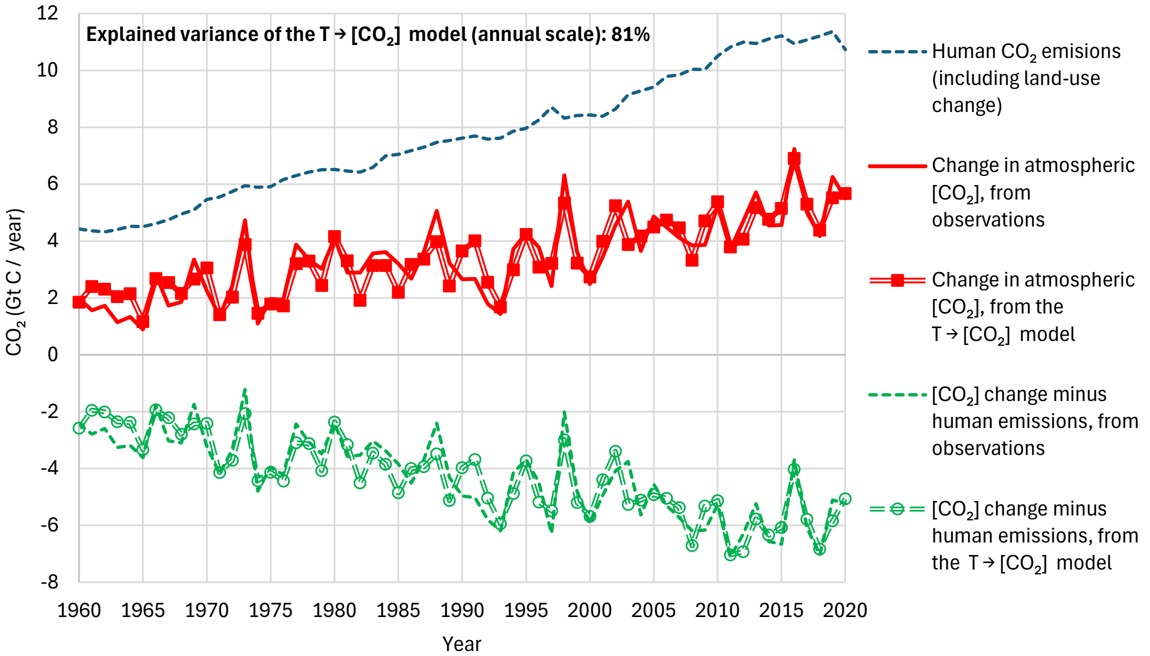
Mass balance is obtained from all inputs and outputs—and entails degrees of freedom

- The natural CO_2 inflows and outflows are more than an order of magnitude (~25 times) higher than the human emissions.
- It is ludicrous to talk about mass balance focusing on what humans emit.
- The natural CO_2 inflows and outflows are fundamentally different—respiration and photosynthesis, respectively.
- It is ludicrous to assume that biosphere emissions and sinks are constant or have zero difference.
- Not only do the results of Koutsoyiannis (2024c) respect the mass balance, but so do the imaginary cases shown in the graph, in which absorption is changed by ±5%.



The “Scientific Sword Excalibur” to attack my climate papers

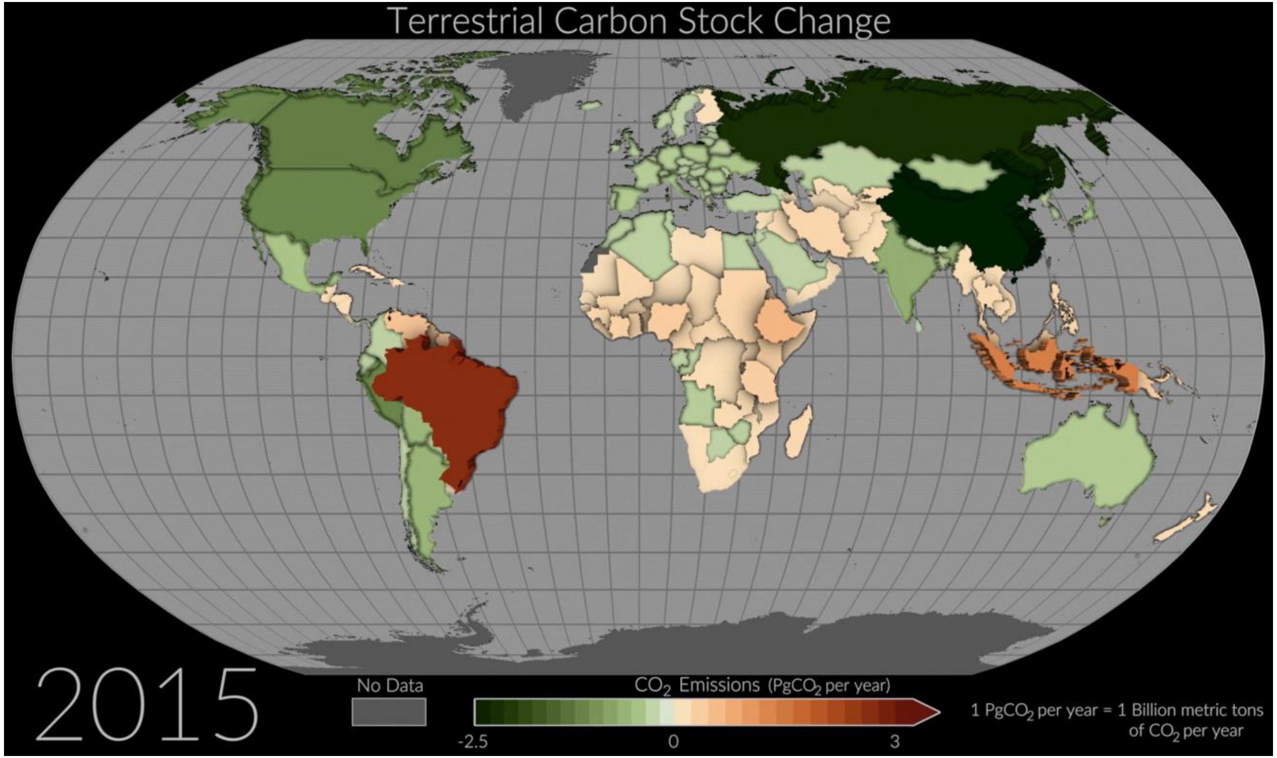
- The relationship between human emissions and atmospheric CO_2 accumulation has been used as if it were a “weapon” to falsify my findings.
- The fact that the former is higher than the latter is thought to prove the human origin of the [CO_2] increase.
- The idea, possibly due to Cawley (2011), was used by him et al. as pressure for retraction of the papers by Koutsoyiannis et al. (2022a,b).
- It was copied by reviewers of my later papers, and by Ferdinand Engelbeen et al. in several forums.
- However, their graph says nothing about causality.
- In contrast, my version, seen on the right, is consistent with the causality direction *T* → [CO_2].



Graph Source: Koutsoyiannis (2024e). See Appendix C for the details of the toy model that produced it.

Natural CO_2 emissions: Is nature a net sink everywhere?

- Humans are not the only net emitter.
- Large parts of the Earth are natural net emitters (e.g. Brazil, Indonesia and most African countries).
- Other parts are net sinks; therefore, those worried about the increasing atmospheric CO_2 can exclaim: “Glory to Russia, Glory to China!” (see map).



Source: NASA, https://svs.gsfc.nasa.gov/5081/ based on data by Byrne et al. (2022), further described in Byrne et al. (2023). Note that the convention used is “Positive flux = decrease in land carbon”

Earth functions as a whole: separating and isolating subsystems at will is absurd

- The entire Earth system (excluding atmosphere—in set notation: {EARTH}) is a net emitter: +5.1 Gt C/year.
- Human emissions by fossil fuel combustion ({HEFF}) are a net (and pure) emitter: +9.4 Gt C/year > +5.1 Gt C/year.
- The subset {EARTH} – {HEFF} is necessarily a net sink: (+5.1) – (+9.4) = –4.3 Gt C/year < 0.
- **But why adhere to the {EARTH} – {HEFF} subset? Mathematics allows us to construct more subsets.**
- Brazil (BRA) is a net emitter overall.
- In particular, Brazil's soil respiration {BRASR} is a net (and pure) emitter: +11.3 Gt C/year*. (Note: Like humans, soils do not absorb carbon as they do not photosynthesize).
- The subset {EARTH} – {BRASR} is necessarily a net sink: (+5.1) – (+11.3) = –6.2 Gt C/year < 0.
- Hence, those who blame humans for rising atmospheric CO_2 concentrations could equivalently blame Brazil's soils (or the soils of another country of choice, based on the map in the previous slide).
- They may also say that in Brazil's soils, microbes' *populations are geologically very high* (cf. slide 2).

* According to the Global Database of Soil Respiration Data, Version 5.0 (Jian et al., 2021, https://daac.ornl.gov/cgi-bin/dsviewer.pl?ds_id=1827), the average from 169 data values of annual carbon flux from soil respiration in Brazil is 1332 g C/m^2. For the entire area of Brazil (8 515 767 km^2) this translates to 11.3 Gt C/year.

Acknowledgement: Thanks to Mark Johnson for sharing his idea of devising a counterexample to illustrate that conventional wisdom suffers from selection bias – by singling out human emissions from all the other causes of CO_2 emission (despite it being relatively small).

Revisiting Keeling's "airborne fraction"

- We distinguish between the two different definitions of airborne fraction (ABF):

  $\mathrm{ABF_L}$: **Logical**—IPCC's glossary definition: *"The fraction of total carbon dioxide (CO_2) emissions remaining in the atmosphere"*

  $\mathrm{ABF_C}$: **Computational**—Keeling's quantitative definition (which is actually used by IPCC, despite stating otherwise in its glossary), based on the erroneous assumption that the increase of atmospheric [CO_2] is entirely due to human emissions.
- Koutsoyiannis (2024c) calculated $\mathrm{ABF_L}$ for the period 1850 to date (the period for which emission data are available) as follows:

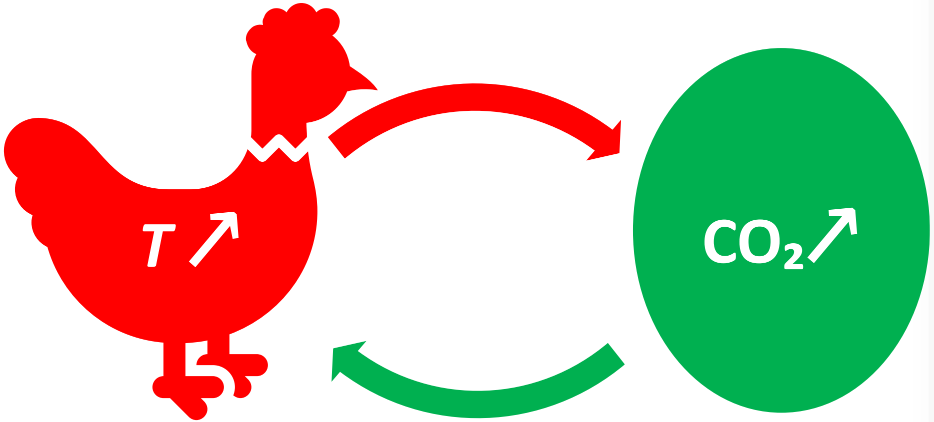
$$\mathrm{ABF_L} \coloneqq \frac{M_\mathrm{R}}{M_\mathrm{A}} = \frac{\int_{t_0}^{t_\mathrm{c}} \mathrm{e}^{(t-t_\mathrm{c})/W_0} \mathrm{d}m_\mathrm{A}(t)}{\int_{t_0}^{t_\mathrm{c}} \mathrm{d}m_\mathrm{A}(t)} = \frac{163\ \mathrm{Gt\ CO_2}}{2612\ \mathrm{Gt\ CO_2}} = \frac{20.9\ \mathrm{ppm\ CO_2}}{334.9\ \mathrm{ppm\ CO_2}} = 6\%$$

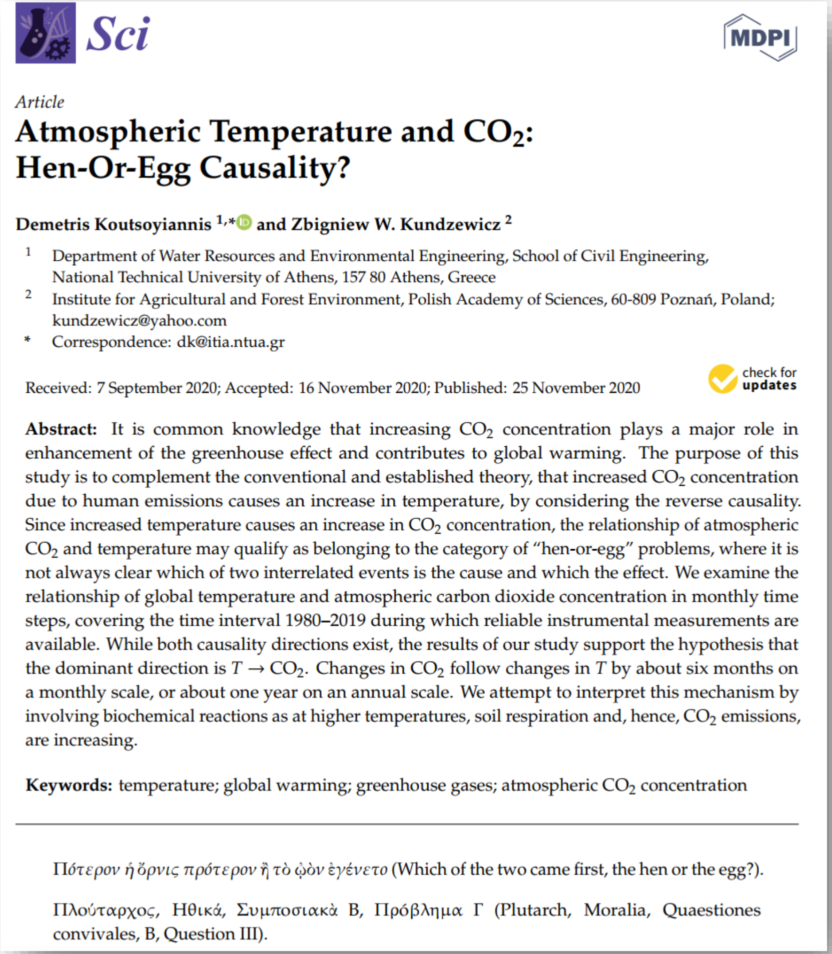
- In this M_R is the total remaining mass, M_A is the total mass of anthropogenic emissions, $t_0 = 1850$ (year), $t_\mathrm{c} = 2023$ (year), $W_0 = 4$ years is the mean residence time, and $\mathrm{d}m_\mathrm{A}(t)$ is the mass that entered the atmosphere from anthropogenic emissions at time $[t, t + dt]$.
- Assuming that in 1850 [CO_2] was 285 ppm, the (erroneous) $\mathrm{ABF_C}$ is:

$$\mathrm{ABF_C} \coloneqq \frac{\Delta M_{[\mathrm{CO_2}]}}{M_\mathrm{A}} = \frac{(421.7 - 285)\ \mathrm{ppm\ CO_2}}{334.9\ \mathrm{ppm\ CO_2}} = 41\%$$

- Nb., Stallinga's (2021) $\mathrm{ABF_L}$ estimate is 10% and IPCC's (2021) most recent $\mathrm{ABF_C}$ estimate is 44%.

Causal relationship between CO_2 & temperature: “ὄρνις ἢ ᾠὸν;” (“hen or egg?”)





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Article

Atmospheric Temperature and CO_2: Hen-Or-Egg Causality?

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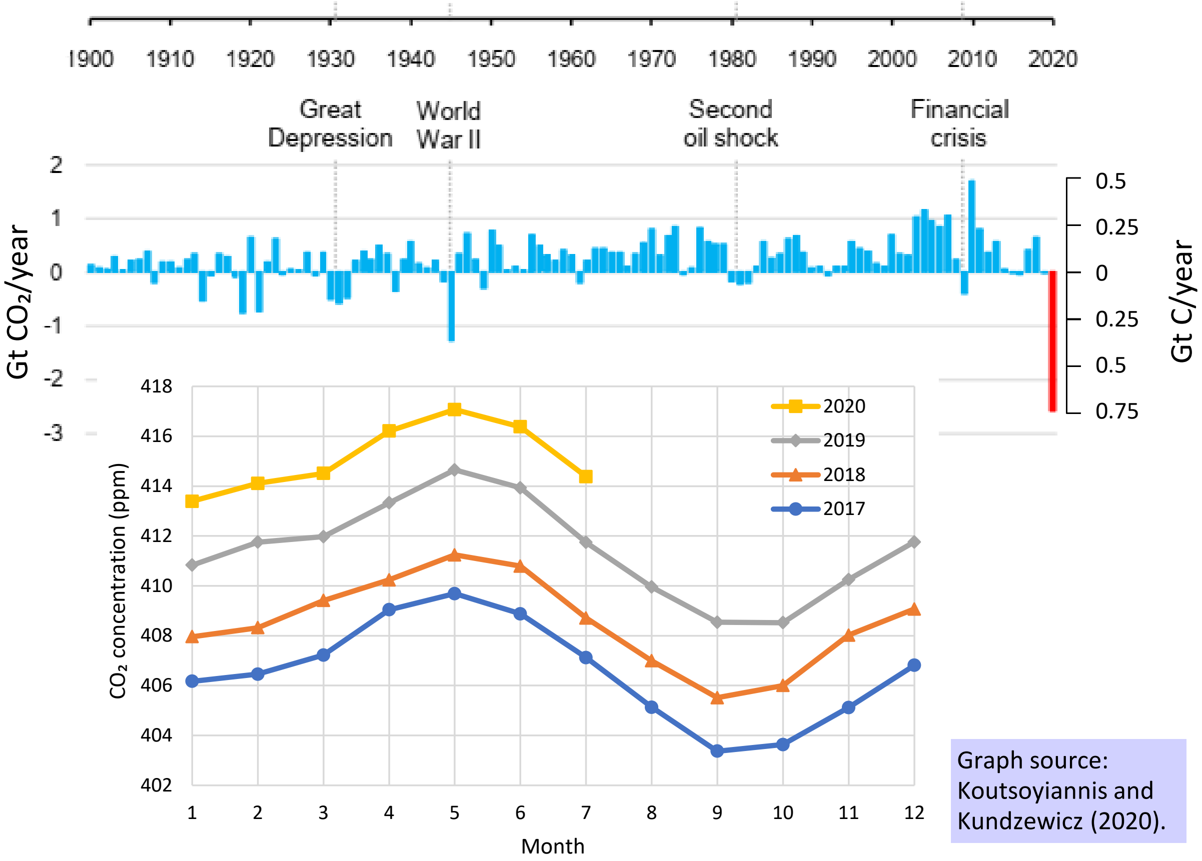
Abstract: It is common knowledge that increasing CO_2 concentration plays a major role in enhancement of the greenhouse effect and contributes to global warming. The purpose of this study is to complement the conventional and established theory, that increased CO_2 concentration due to human emissions causes an increase in temperature, by considering the reverse causality. Since increased temperature causes an increase in CO_2 concentration, the relationship of atmospheric CO_2 and temperature may qualify as belonging to the category of “hen-or-egg” problems, where it is not always clear which of two interrelated events is the cause and which the effect. We examine the relationship of global temperature and atmospheric carbon dioxide concentration in monthly time steps, covering the time interval 1980–2019 during which reliable instrumental measurements are available. While both causality directions exist, the results of our study support the hypothesis that the dominant direction is $T \rightarrow CO_2$. Changes in CO_2 follow changes in T by about six months on a monthly scale, or about one year on an annual scale. We attempt to interpret this mechanism by involving biochemical reactions as at higher temperatures, soil respiration and, hence, CO_2 emissions, are increasing.

Keywords: temperature; global warming; greenhouse gases; atmospheric CO_2 concentration

Πότερον ἡ ὄρνις πρότερον ἢ τὸ ᾠὸν ἐγένετο (Which of the two came first, the hen or the egg?).

Πλούταρχος, Ηθικά, Συμποσιακὰ Β, Πρόβλημα Γ (Plutarch, Moralia, Quaestiones convivales, B, Question III).

The beginning: The COVID unfortunate experiment



Graph source: Koutsoyiannis and Kundzewicz (2020).

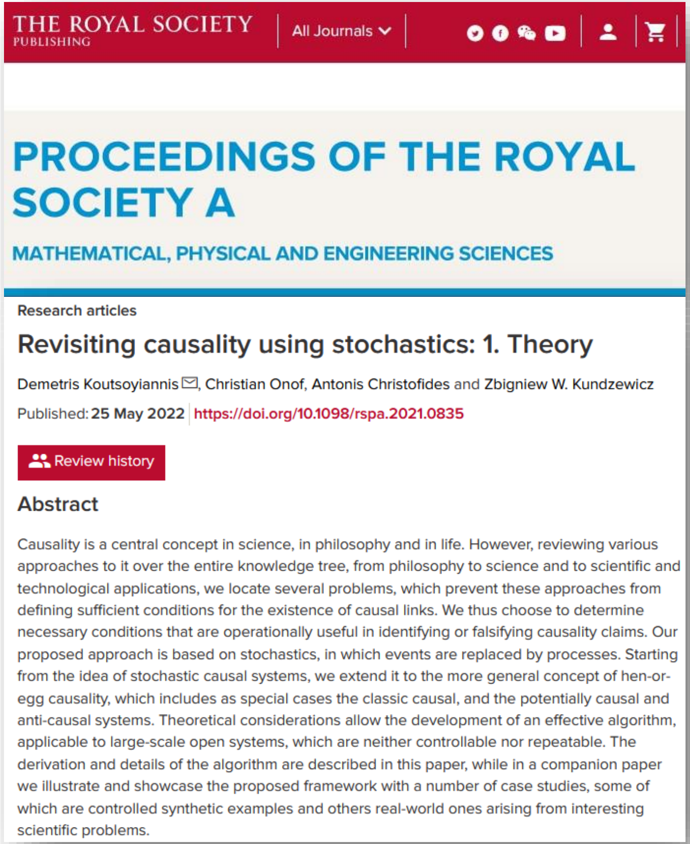
- COVID-imposed lockdowns caused the largest reduction in human CO_2 emissions in history.
- The global CO_2 emissions were over 5% lower in the first quarter of 2020 than in that of 2019 (IEA, 2020).
- However, the increasing pattern of atmospheric CO_2 concentration, as measured in Mauna Loa, did not change.

Development and application of a new causality framework

We have not applied an existing method but developed a new one with some importance as:

a) Causality is a central concept in **science**, **philosophy** and **life**, with very high **economic** importance.

b) Recently causal inference has become an **arena of enormous interest**.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Research articles

Revisiting causality using stochastics: 1. Theory

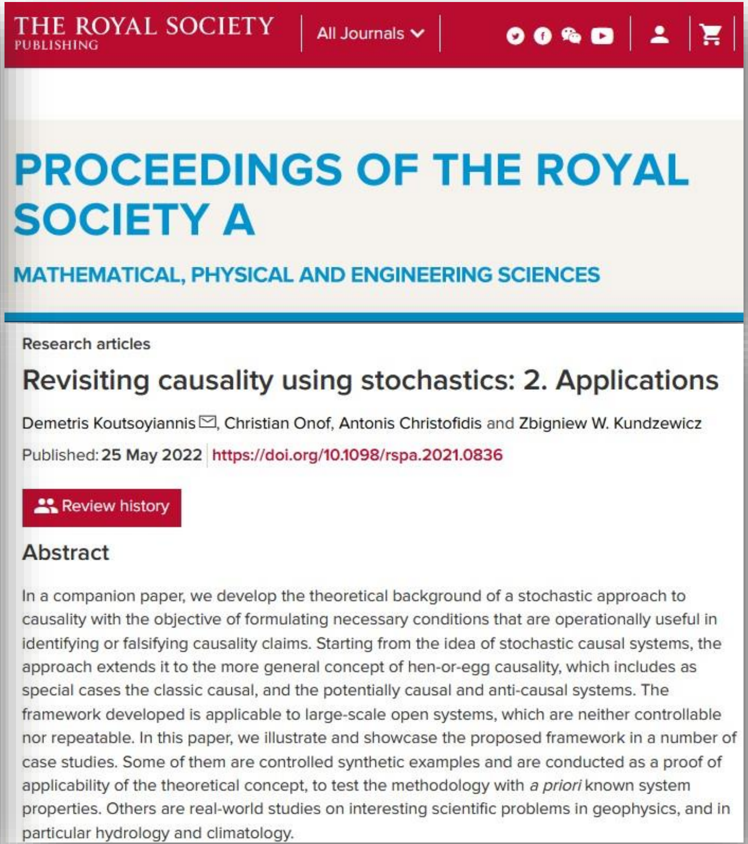
Demetris Koutsoyiannis, Christian Onof, Antonis Christofides and Zbigniew W. Kundzewicz

Published: 25 May 2022 https://doi.org/10.1098/rspa.2021.0835

Review history

Abstract

Causality is a central concept in science, in philosophy and in life. However, reviewing various approaches to it over the entire knowledge tree, from philosophy to science and to scientific and technological applications, we locate several problems, which prevent these approaches from defining sufficient conditions for the existence of causal links. We thus choose to determine necessary conditions that are operationally useful in identifying or falsifying causality claims. Our proposed approach is based on stochastics, in which events are replaced by processes. Starting from the idea of stochastic causal systems, we extend it to the more general concept of hen-or-egg causality, which includes as special cases the classic causal, and the potentially causal and anti-causal systems. Theoretical considerations allow the development of an effective algorithm, applicable to large-scale open systems, which are neither controllable nor repeatable. The derivation and details of the algorithm are described in this paper, while in a companion paper we illustrate and showcase the proposed framework with a number of case studies, some of which are controlled synthetic examples and others real-world ones arising from interesting scientific problems.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Research articles

Revisiting causality using stochastics: 2. Applications

Demetris Koutsoyiannis, Christian Onof, Antonis Christofidis and Zbigniew W. Kundzewicz

Published: 25 May 2022 https://doi.org/10.1098/rspa.2021.0836

Review history

Abstract

In a companion paper, we develop the theoretical background of a stochastic approach to causality with the objective of formulating necessary conditions that are operationally useful in identifying or falsifying causality claims. Starting from the idea of stochastic causal systems, the approach extends it to the more general concept of hen-or-egg causality, which includes as special cases the classic causal, and the potentially causal and anti-causal systems. The framework developed is applicable to large-scale open systems, which are neither controllable nor repeatable. In this paper, we illustrate and showcase the proposed framework in a number of case studies. Some of them are controlled synthetic examples and are conducted as a proof of applicability of the theoretical concept, to test the methodology with *a priori* known system properties. Others are real-world studies on interesting scientific problems in geophysics, and in particular hydrology and climatology.

Milestones in causality—Philosophical reflections

Aristotle (384 – 322 BC; Image source: Visconti, 1817):

> *that which when present is the cause of something, when absent we sometimes consider to be the cause of the contrary*.

Plutarch (AD 46 –119; Greek Middle Platonist philosopher):

> First posed the *hen or the egg* type of causality as a philosophical problem: *“Πότερον ἡ ὄρνις πρότερον ἢ τὸ ᾠὸν ἐγένετο”* (Πλούταρχος, Ηθικά, Συμποσιακὰ Β, Πρόβλημα Γ).

David Hume (1711– 1776; Scottish Enlightenment philosopher):

> the concept of a cause is merely a way we use to describe regularities.

Immanuel Kant (1724–1804, German Enlightenment philosopher):

(a) causality is understood in terms of rule-governedness;

(b) the temporal causal order is irreversible.

Theoretical probabilistic approaches to causality

Patrick Suppes (1922 –2014; American philosopher—Stanford Univ.)

Definition: *An event $B_{t'}$* [occurring at time *t′*] *is a* prima facie *cause of the event A_t* [occurring at time *t*] *if and only if* (i) $t' < t$, (ii) $P(B_{t'}) > 0$, (iii) $P(A_t|B_{t'}) > P(A_t)$ Suppes (1970)

Note: The definition is not very useful as it almost identifies causality with dependence: In fact, it says that any two events that are neither synchronous nor independent establish a (*prima facie*) causal relationship.

David Cox (1924 –2022; British statistician—Oxford)

To the above three conditions of the **definition** he added a fourth: (iv) *there is no event $C_{t''}$ at time $t'' < t' < t$ such that* $P(A_t|B_{t'}C_{t''}) = P(A_t|\overline{B}_{t'}C_{t''})$. Cox (1992)

Note: While this addition is certainly a theoretical advance, it is impractical: One cannot enumerate all events that happened before time *t′* and calculate their related conditional probabilities.

Applied probabilistic approaches to causality

Clive Granger (1934 – 2009; British-American econometrician—Univ. Nottingham and Univ. California, San Diego; Nobel in Economics, 2003)

Mostly known for the so-called "**Granger causality test**", based on the linear regression equation $\underline{y}_\tau = \sum_{j=1}^{\eta} a_j \underline{y}_{\tau-j} + \sum_{j=1}^{\eta} b_j \underline{x}_{\tau-j} + \underline{\varepsilon}_\tau$. If the coefficients b_j are nonzero, the interpretation is that the process $\underline{x}_\tau$ causes $\underline{y}_\tau$.

Granger (1969)

Notes: The framework may be problematic, both formally and logically:

- Formally testing hypotheses in geophysics can be inaccurate (by orders of magnitude) due to time dependence.
- The test is about prediction, which is fundamentally different from causality.

Judea Pearl (born 1936; Israeli-American computer scientist and philosopher)

He proposed a framework for causality combining probability with **graph theory**.

Pearl (2009); Pearl et al. (2016)

Notes: The framework is problematic, both formally and logically:

- In using conditional probability, the chain rule is used inappropriately.
- It is based on the assumption that we already have a causal graph—a way of identifying causes.

Our approach to causality

- Our review of approaches to causality over the entire knowledge tree, from philosophy to science and to technological and socio-political application, highlighted the **major unsolved problems**.
- Our method posited a modest objective: To determine **necessary conditions** that are operationally useful in identifying or falsifying causality claims; sufficient conditions are not sought.
- The necessary conditions are useful in two respects:
  - In a deductive setting, to falsify a hypothesized causality relationship by showing that it violates the necessary condition.
  - In an inductive setting, to add evidence in favour of the plausibility of a causality hypothesis.
- Our method replaces events with **stochastic processes**. It is fully based on stochastics—a superset of probability and statistics, with time playing an essential role.
- The method is based on a reconsideration of the concept of the impulse response function (IRF).
- Real-world data, namely time series of observations, constitute the only basis of the method.
- Model results and so-called *in silico experimentation* are categorically excluded. On the contrary, our method provides a test bed to identify whether or not the latter are consistent with reality.
- The general setting of the method is for the *Hen-Or-Egg* case, i.e., bidirectional causality, while the unidirectional cases of a *causal system* (causality direction according to the hypothesis) or an *anticausal system* (causality direction opposite to the hypothesis) are derived as special cases.
- The logical and mathematical principles of the framework are summarized in Appendices B and C.

Further development and application of the framework

The *Sci* (2023) paper extended the approach to multiple scales and the application to a longer period covered by instrumental data.

The *MBE* (2024) paper refined the methodology and also used proxy data covering the entire Phanerozoic.

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On Hens, Eggs, Temperatures and CO_2: Causal Links in Earth's Atmosphere

by Demetris Koutsoyiannis [1,*], Christian Onof [2], Zbigniew W. Kundzewicz [3] and Antonis Christofides [1]

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Abstract

The scientific and wider interest in the relationship between atmospheric temperature (T) and concentration of carbon dioxide ([CO_2]) has been enormous. According to the commonly assumed causality link, increased [CO_2] causes a rise in T. However, recent developments cast doubts on this assumption by showing that this relationship is of the *hen-or-egg* type, or even unidirectional but opposite in direction to the commonly assumed one. These developments include an advanced theoretical framework for testing causality based on the stochastic evaluation of a potentially causal link between two processes via the notion of the impulse response function. Using, on the one hand, this framework and further expanding it and, on the other hand, the longest available modern time series of globally averaged T and [CO_2], we shed light on the potential causality between these two processes. All evidence resulting from the analyses suggests a unidirectional, potentially causal link with T as the cause and [CO_2] as the effect. That link is not represented in climate models, whose outputs are also examined using the same framework, resulting in a link opposite the one found when the real measurements are used.

Mathematical Biosciences and Engineering

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Stochastic assessment of temperature–CO_2 causal relationship in climate from the Phanerozoic through modern times

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Special Issue: A Commemorative Issue in Honour of Patricia Román Román: Stochastic modeling and forecasting in dynamic systems

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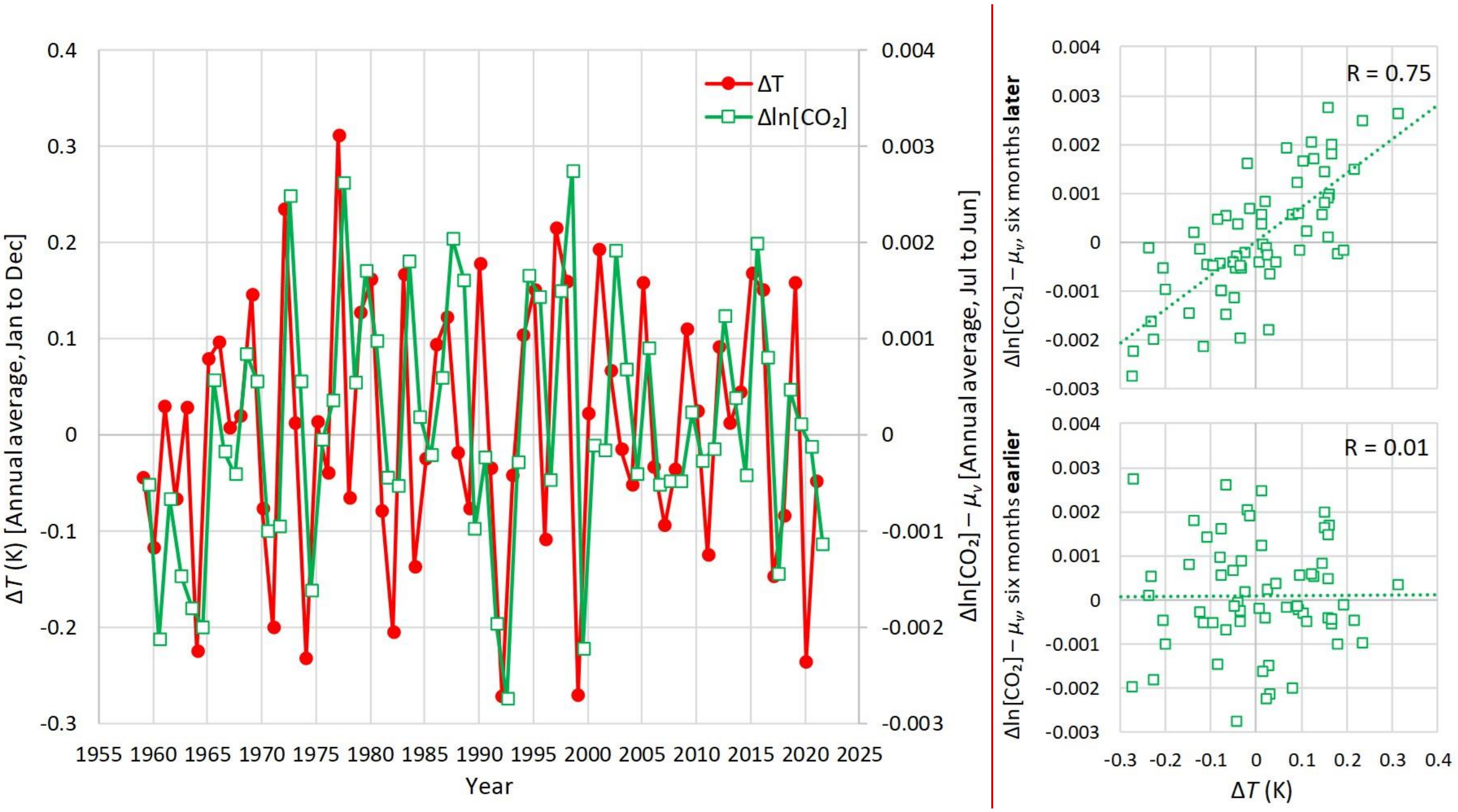
As a result of recent research, a new stochastic methodology of assessing causality was developed. Its application to instrumental measurements of temperature (T) and atmospheric carbon dioxide concentration ([CO_2]) over the last seven decades provided evidence for a unidirectional, potentially causal link between T as the cause and [CO_2] as the effect. Here, I refine and extend this methodology and apply it to both paleoclimatic proxy data and instrumental data of T and [CO_2]. Several proxy series, extending over the Phanerozoic or parts of it, gradually improving in accuracy and temporal resolution up to the modern period of accurate records, are compiled, paired, and analyzed. The extensive analyses made converge to the single inference that change in temperature leads, and that in carbon dioxide concentration lags. This conclusion is valid for both proxy and instrumental data in all time scales and time spans. The time scales examined begin from annual and decadal for the modern period (instrumental data) and the last two millennia (proxy data), and reach one million years for the most sparse time series for the Phanerozoic. The type of causality appears to be unidirectional, $T \to$[CO_2], as in earlier studies. The time lags found depend on the time span and time scale and are of the same order of magnitude as the latter. These results contradict the conventional wisdom, according to which the temperature rise is caused by [CO_2] increase.

The graphical abstract of the *Sci* (2023) paper

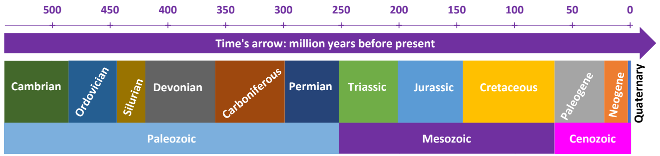
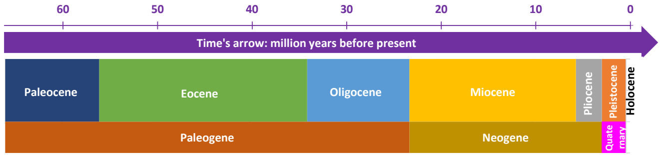
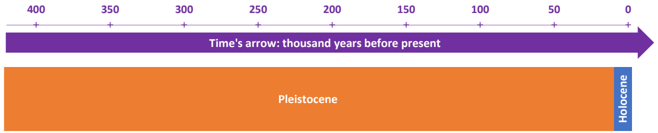
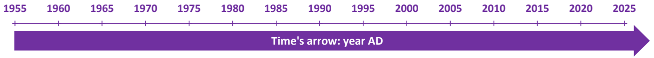
Quiz: what is (potentially) the cause and what is the effect?



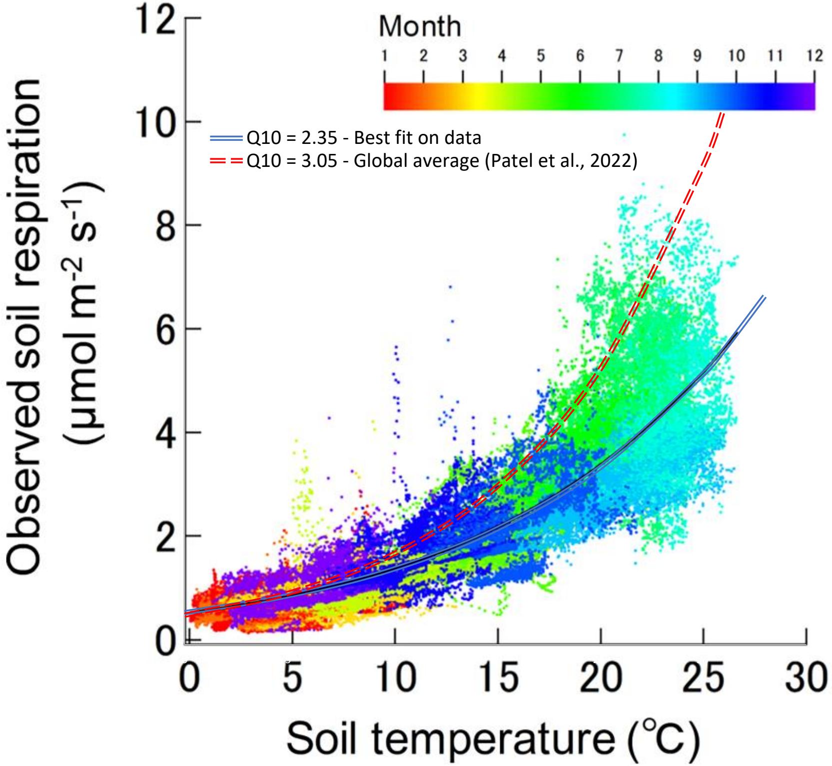
What does it take to tell cause from effect?

“The extensive analyses made converge to the single inference that change in temperature leads, and that in carbon dioxide concentration lags. This conclusion is valid for both proxy and instrumental data in all time scales and time spans.”

Source: Koutsoyiannis (2024b, abstract and graphical abstract).

<table>
<tr><th colspan="4">Summary of time lags (in years) of the $T \rightarrow [CO_2]$ potentially causal relationship
(positive in all cases, meaning that $[CO_2]$ lags behind T change)</th></tr>
<tr><th>Period</th><th></th><th>Analyzed timescale</th><th>Time lags, $h_{1/2}, \mu_h$</th></tr>
<tr><td>Phanerozoic</td><td>
</td><td>10^6</td><td>2.3×10^6, 6.4×10^6</td></tr>
<tr><td>Cenozoic</td><td>
</td><td>10^5</td><td>7.6×10^5, 9.1×10^5</td></tr>
<tr><td>Late Quaternary</td><td>
</td><td>500
1000</td><td>1200, 3300
1200, 4500</td></tr>
<tr><td>Common Era</td><td>
</td><td>1
10</td><td>25, 33
26, 33</td></tr>
<tr><td>Modern (instrumental)</td><td>
</td><td>1
10</td><td>0.6, 0.7
3.2, 3.3</td></tr>
</table>

A note for those who find it hard to believe that a rise in temperature will increase the natural CO_2 emissions



Living organisms love warm conditions and increase their respiration with temperature exponentially:

$$R(T) = R(T_0)Q_{10}^{(T-T_0)/10}$$

(Q_{10} is a parameter—dimensionless).

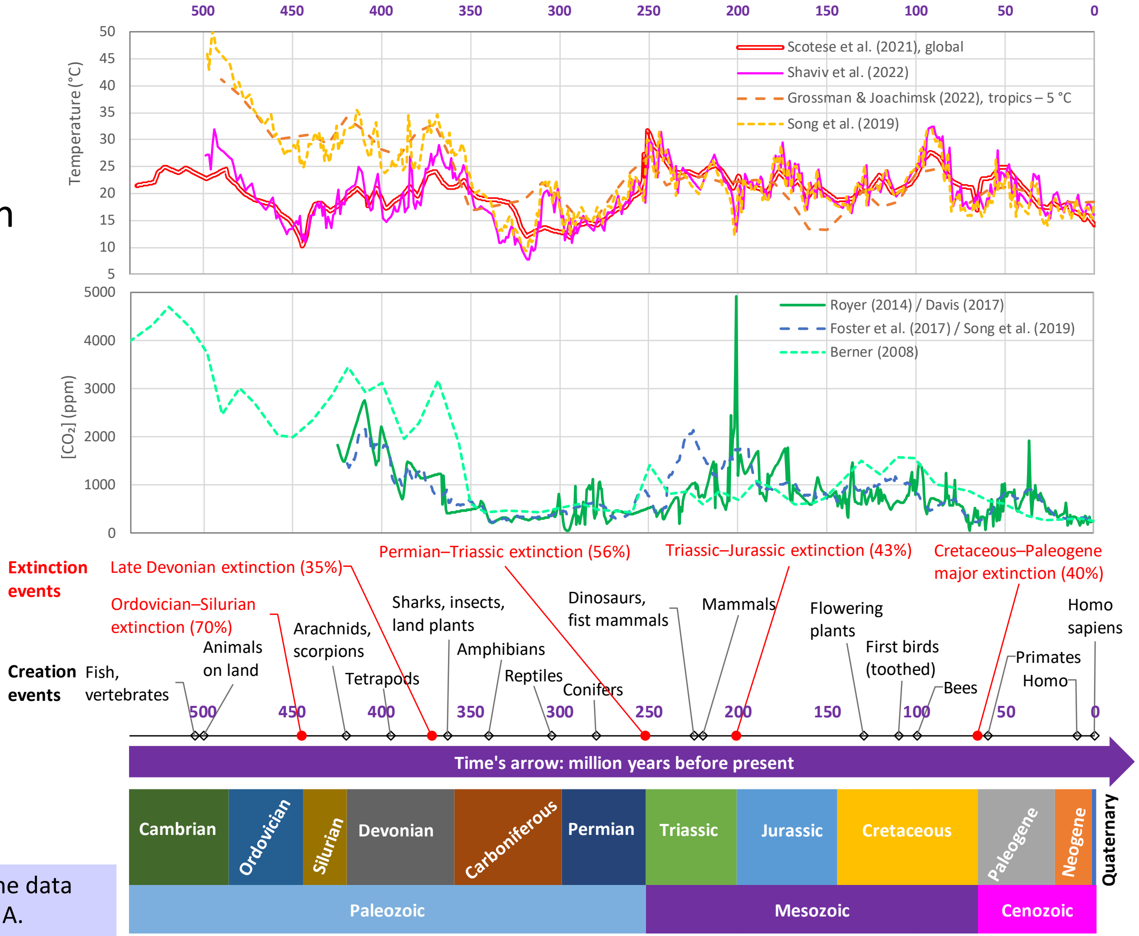
Graph with soil respiration and temperature data during 2005-10 in a temperate evergreen coniferous forest area in Japan, adapted from Makita et al. (2018).

Global average Q_{10} value from Patel et al. (2022).

Photo from Moore et al. (2021)

A note on paleoclimatic data

- The temperature and [CO_2] changes seem to have been much larger than Arrhenius imagined.
- Temperature range could have been as high as 40 °C.
- [CO_2] range appears to be higher than an order of magnitude.
- In general [CO_2] changes followed those in temperature, but there were periods of antithesis or decoupling.
- The role of the evolving biosphere must have been dominant.



Source: Koutsoyiannis (2024b), in which the origin of the data series can be found. Additional graphs are in Appendix A.

The importance of CO_2 as a greenhouse gas

The importance of CO_2 as a greenhouse gas is inferred by comparison with H_2O.

The paper on the left has been published.

The paper with the title shown on the right was rejected by 3 journals. All rejection material (73 pages) is compiled as SI.

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Hydrological Sciences Journal ›
Volume 69, 2024 - Issue 2

Research Article

Revisiting the greenhouse effect – a hydrological perspective

Demetris Koutsoyiannis & Christos Vournas

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ABSTRACT

Quantification of the greenhouse effect is a routine procedure in the framework of hydrological calculations of evaporation. According to the standard practice, this is made considering the water vapour in the atmosphere, without any reference to the concentration of carbon dioxide (CO_2), which, however, in the last century has increased from 300 to about 420 ppm. As the formulae used for the greenhouse effect quantification were introduced 50–90 years ago, we examine whether these are still representative or not, based on eight sets of observations, distributed across a century. We conclude that the observed increase of the atmospheric CO_2 concentration has not altered, in a discernible manner, the greenhouse effect, which remains dominated by the quantity of water vapour in the atmosphere, and that the original formulae used in hydrological practice remain valid. Hence, there is no need for adaptation of the original formulae due to increased CO_2 concentration.

Relative importance of carbon dioxide and water in the greenhouse effect: Does the tail wag the dog?

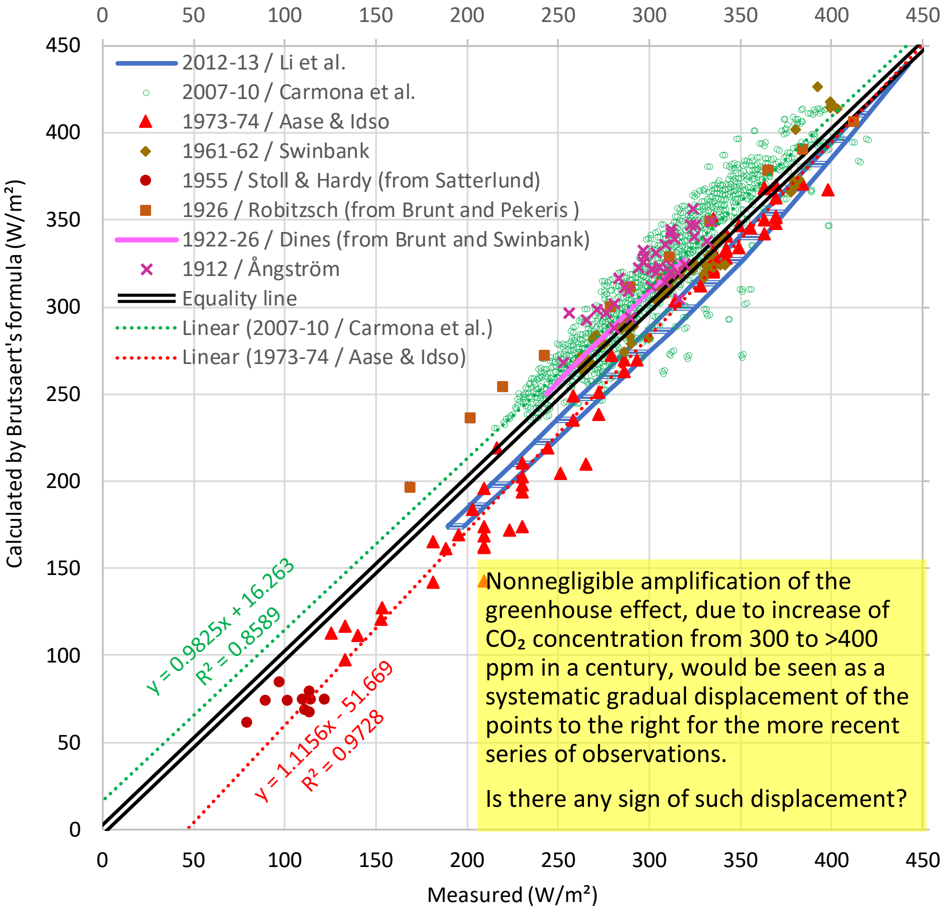
by Demetris Koutsoyiannis, National Technical University of Athens

Supplementary Materials: Earlier reviews and rejections of the paper

Contents

Graphical abstract of the *HSJ* (2024) paper

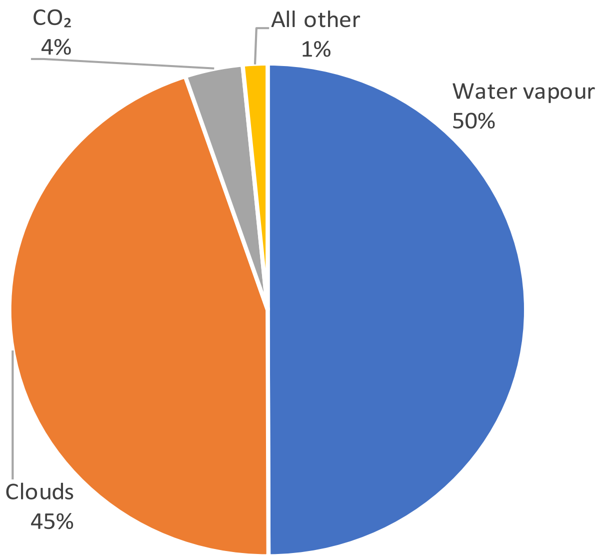
- While "climate science" babbles about CO_2 as the determinant greenhouse gas, hydrology routinely quantifies the greenhouse effect for 70 years.
- This is necessary in evaporation calculations and the related formulae are based on data of atmospheric moisture.
- The paper was based on a century-long collection of data on downwelling longwave radiation at the surface.
- The analysis of this data set shows that there is no discernible effect on the greenhouse intensity, despite the increase of atmospheric [CO_2] from 300 to >400 ppm in a century.



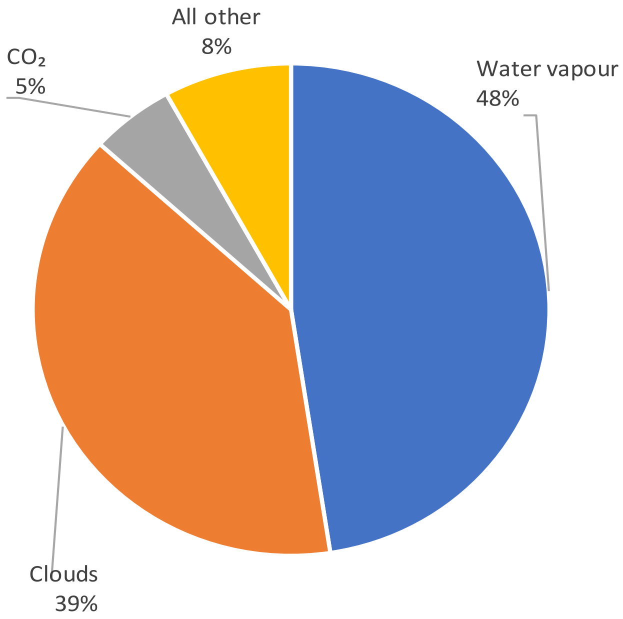
A figure from the multi-rejected paper

- The study was based on the standard theory and an established model of radiation in the atmosphere (MODTRAN), as well as on satellite radiation data.
- The chart on the left explains the findings of the *HSJ* paper: there could not be a discernible effect of the [CO_2] increase in a century on the downwelling LW radiation.
- The chart on the right suggests that the same should have been the case (macroscopically) with the outgoing LW radiation (if data existed).

Contribution of the greenhouse drivers to the downwelling LW radiation flux



Contribution of the greenhouse drivers to the outgoing LW radiation flux



Conclusions and final remarks

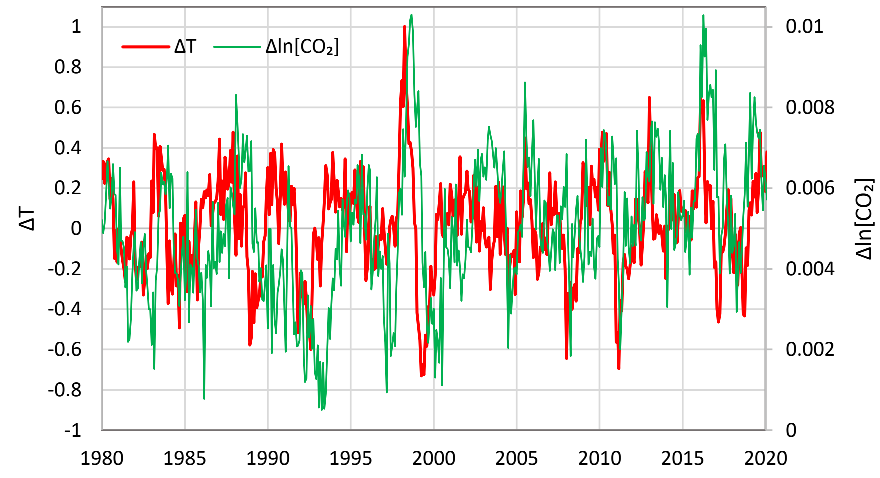
- The history of laying the foundations of the modern climate edifice is afflicted by erroneous assumptions and speculations—with a few bright exceptions.
- In scientific terms, the case of the magnified importance of CO_2, the focus on human emissions thereof, and the neglect of the ~25 times greater natural CO_2 emissions, constitute a historical accident.
- This accident was exploited in non-scientific (politico-economic) terms—mostly dark ones (see Appendix D).
- By spreading climillions to scientists (more accurately: sophists) who promoted their aims, political elites created positive feedback which tends to a runaway.
- For complex systems, observational data are the only scientific test bed for making hypotheses and assessing their validity.
- The real-world data do not agree with the mainstream science (sophistry).
- The results I have presented are scientific and therefore may not be relevant to the climate narrative, which has a non-scientific aim.

Thank you for your attention

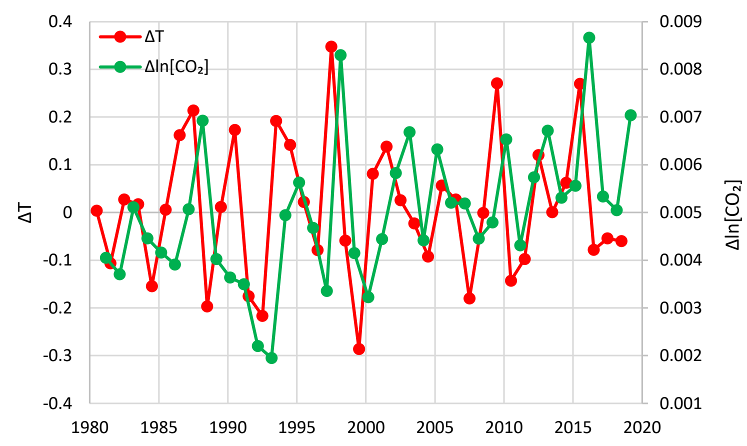
Appendix A: Additional graphs

Instrumental temperature and CO_2 data in search of causality

Differenced monthly time series of global temperature (UAH) and logarithm of CO_2 concentration (Mauna Loa)



Annually averaged time series of differenced temperatures (UAH) and logarithm of CO_2 concentration (Mauna Loa). Each dot represents the average of a one-year duration ending at the time of its abscissa.

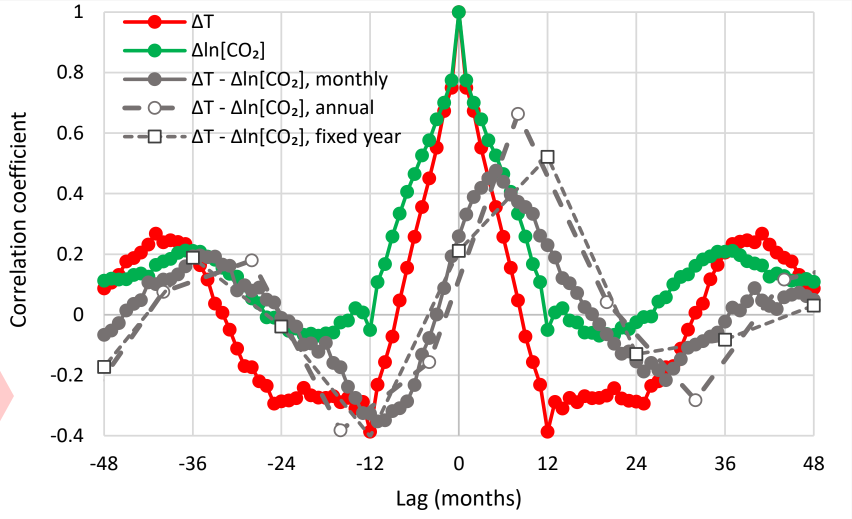


Which is the cause and which the effect?

Graphs from Koutsoyiannis and Kundzewicz (2020). Notice that logarithms of CO_2 concentration are used for linear equivalence with temperature. The differenced processes represent changes in the original processes.

Changes in CO_2 follow changes in global temperature

Auto- and cross-correlograms of the differenced time series of temperature (UAH) and logarithm of CO_2 concentration (Mauna Loa)



Which is the cause and which the effect?

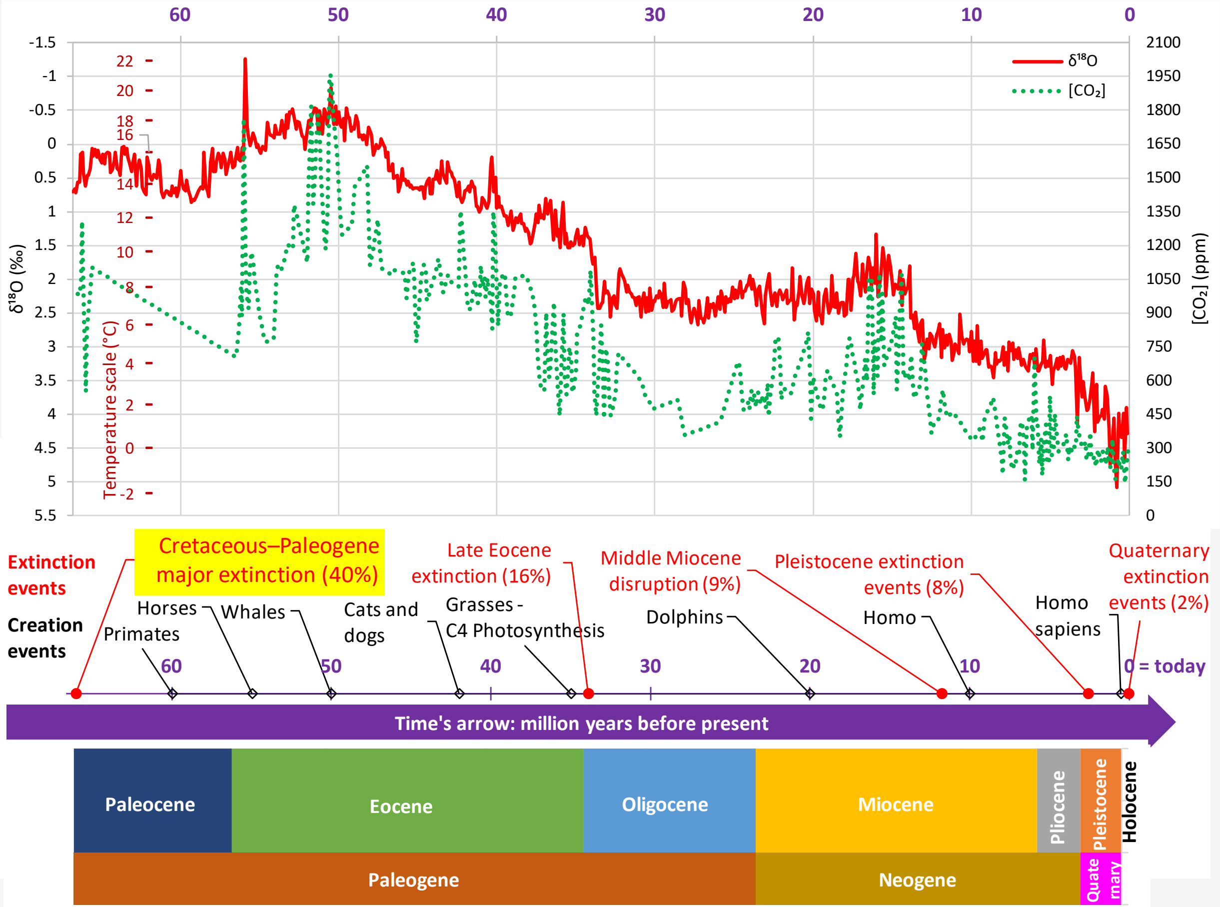
Maximum cross-correlation coefficient (MCCC) and corresponding time lag in months

	Monthly time series		Annual time series – sliding annual window		Annual time series – fixed annual window	
Temperature - CO_2 series	MCCC	Lag	MCCC	Lag	MCCC	Lag
UAH – Mauna Loa	0.47	5	0.66	8	0.52	12
UAH – Barrow	0.31	11	0.70	14	0.59	12
UAH – South Pole	0.37	6	0.54	10	0.38	12
UAH – Global	0.47	6	0.60	11	0.60	12
CRUTEM4 – Mauna Loa	0.31	5	0.55	10	0.52	12
CRUTEM4 – Global	0.33	9	0.55	12	0.55	12

Graph and table from Koutsoyiannis and Kundzewicz (2020).

Changes during the Cenozoic

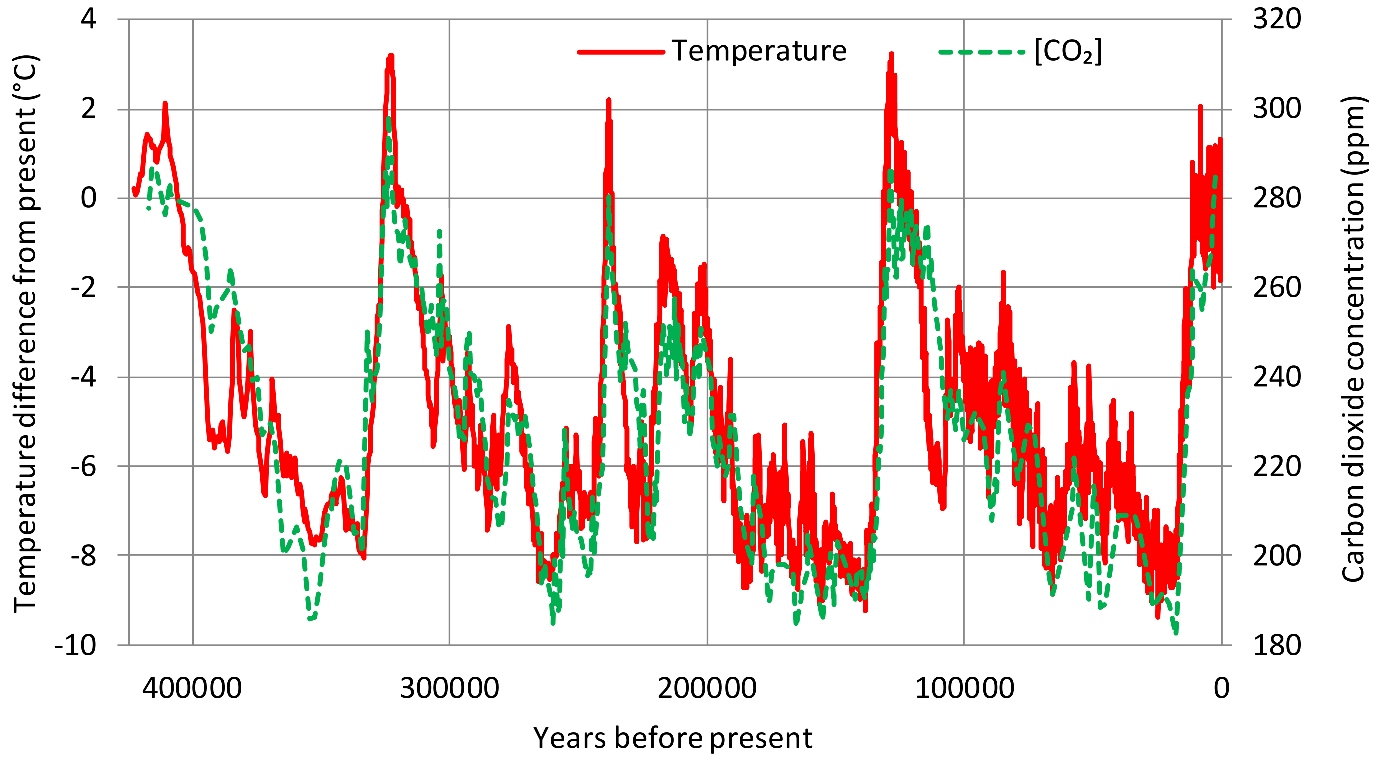
- Temperature range could have been as high as 22 °C, with the highest values appearing about 50 million years before present.
- $[CO_2]$ range appears to be higher than an order of magnitude.
- $[CO_2]$ changes followed those in temperature.
- The role of the vastly evolving biosphere must have been dominant.



Source: Koutsoyiannis (2024b), in which the origin of the data series can be found.

Changes during the Late Quaternary

- The ice core data from Antarctica (Vostok) show the alternation of glacial and (shorter) interglacial periods.
- Temperature range could have been as high as 12 °C.
- $[CO_2]$ changes followed those in temperature.

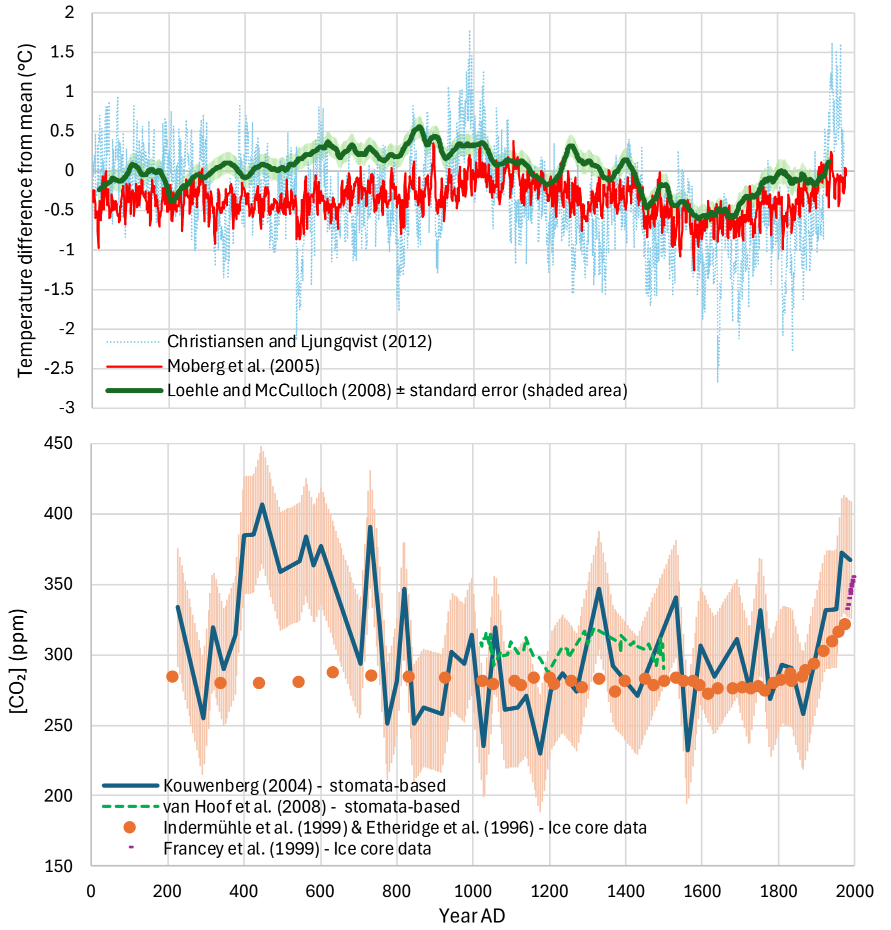


Source: Koutsoyiannis (2024b), in which the origin of the data series can be found.

Changes during the Common Era

- The reconstruction of temperature and [CO_2] series has been an issue of controversy, and estimates diverge for both processes.
- Yet one pair of reconstructions (the Loehle and McCulloch series for temperature, and the ice core data of Indermühle et al. / Etheridge et al. merged with those of Francey et al. for [CO_2] for a later period) exhibit correlation, which provides a basis for causality analysis.
- Causality analyses made for both the annual and decadal scales showed that [CO_2] changes followed those in temperature.

Source: Koutsoyiannis (2024b), in which the origin of the data series can be found.



Appendix B: Details of the stochastic framework on causality

Premises of the developed methodology for causality

- The framework developed by Koutsoyiannis et al. (2022a,b) is for **open systems** (in particular, **geophysical** systems), in which:
  - **External influences** cannot be controlled or excluded.
  - Only a **single realization** is possible.
  - There is **dependence** in time.
- Our framework is not formulated on the basis of events, but of **stochastic processes**.
- It is understood that only **necessary conditions of causality** can be investigated using stochastics. The usefulness of this objective lies in its ability:
  - to **falsify** an assumed causality and
  - to add statistical evidence, in an **inductive** context, for **potential causality** and its direction.
- The only "hard" requirement kept from previous studies is the **time precedence** of the cause from the effect (also highlighted by philosophers, particularly Kant).

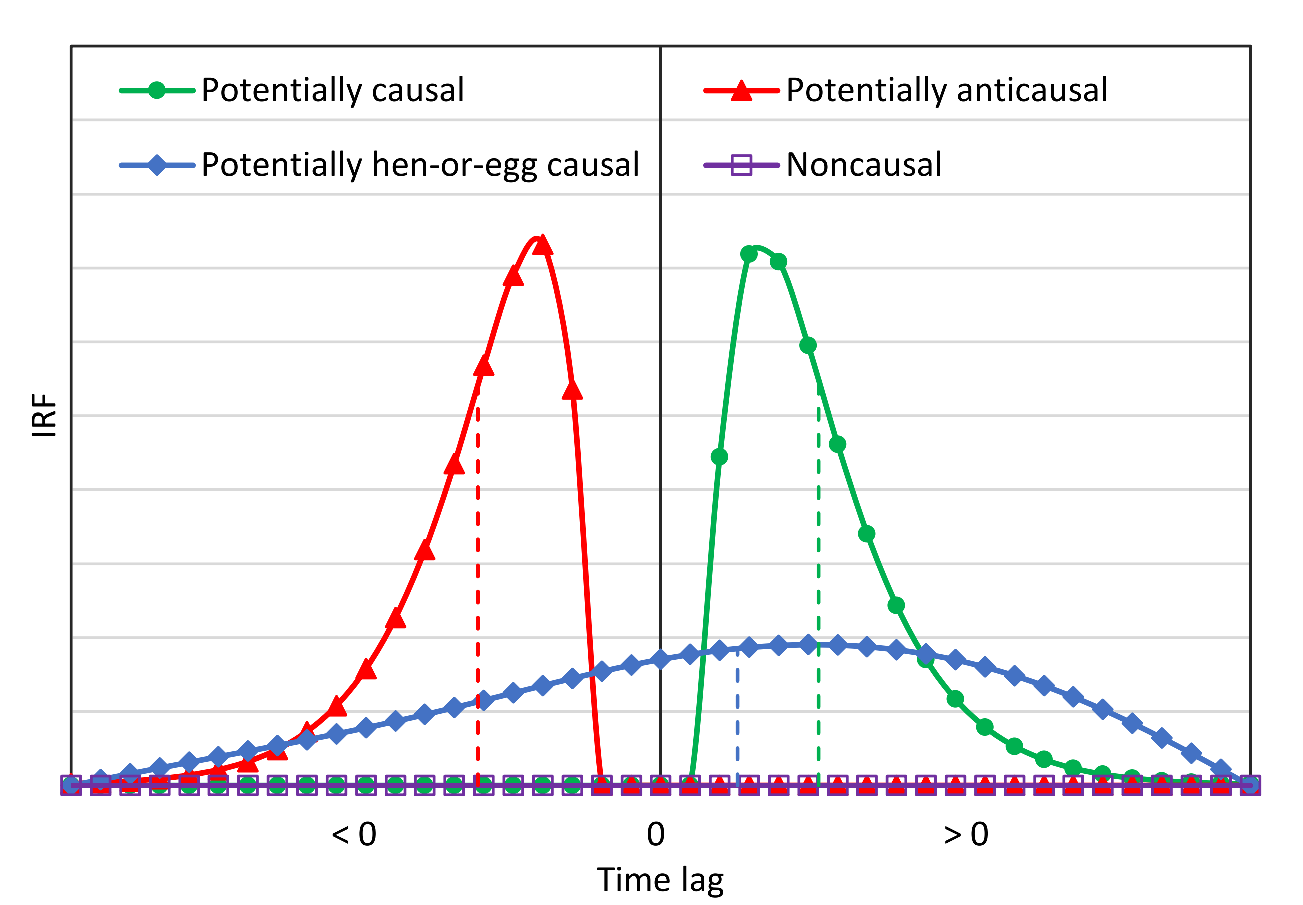
Mathematical representation

- Any two stochastic processes $\underline{x}(t)$ and $\underline{y}(t)$ can be related by

$$\underline{y}(t) = \int_{-\infty}^{\infty} g(h)\underline{x}(t-h)\mathrm{d}h + \underline{v}(t)$$

  where $g(h)$ is the **Impulse Response Function** (IRF) and $\underline{v}(t)$ is another process uncorrelated to $\underline{x}(t)$.
- There exist infinitely many pairs $(g(h), \underline{v}(t))$ of which we find the least squares solution (LSS): the one minimizing $\mathrm{var}\left[\underline{v}(t)\right]$, or maximizing the explained variance $e \coloneqq 1 - \mathrm{var}\left[\underline{v}(t)\right]/\mathrm{var}[\underline{y}(t)]$.
- Assuming that the LSS $g(h)$ has been determined, the system $(\underline{x}(t), \underline{y}(t))$ is:
  1. **potentially causal** if $g(h) = 0$ for any $h < 0$, while the explained variance is non negligible;
  2. **potentially anticausal** if $g(h) = 0$ for any $h > 0$, while the explained variance is non negligible (this means that the system $(\underline{y}(t), \underline{x}(t))$ is potentially causal);
  3. **potentially hen-or-egg (HOE) causal** if $g(h) \neq 0$ for some $h > 0$ and some $h < 0$, while the explained variance is non negligible;
  4. **noncausal** if the explained variance is negligible.
- The framework of causality identification is constructed for case 3, with all other three cases resulting as special cases.

Illustration of the four different cases of potential causality



Additional mathematical considerations

- We also set additional desiderata for:
  (a) an **adequate time span** $\mathbb{h}$ of h (the **causal action is not instant**);
  (b) a **nonnegative** $g(h) \geq 0$ for all $h \in \mathbb{h}$ (replacing $\underline{x}(t)$ with $-\underline{x}(t)$ for negative correlation);
  (c) a **smooth** $g(h)$ assured by a constraint $E \leq E_0$, where E is determined in terms of the second derivative of $g(h)$ ($E \coloneqq \int_{-\infty}^{\infty} \left(g''(h)\right)^2 \mathrm{d}h$) and E_0 is a positive number.
- Although the theoretical framework is formulated in terms of **natural (i.e., continuous) time**, the estimation of the IRF relies on data in an inductive manner, and data are only available in **discrete time**. Conversion of the continuous- to a discrete-time framework results in

$$\underline{y}_\tau = \sum_{j=-\infty}^{\infty} g_j \underline{x}_{\tau-j} + \underline{v}_\tau$$

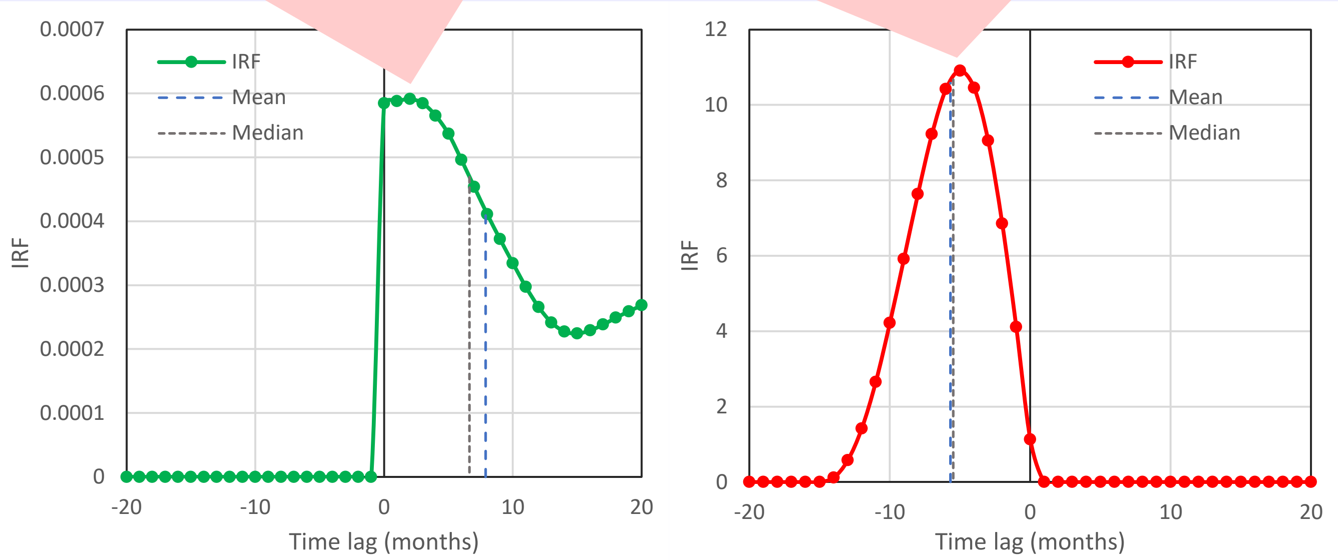
where the sequence g_j is related with precise equations to the function $g(h)$.

- Furthermore, any data set is finite and allows only a finite number of g_j terms to be estimated. Therefore, in the applications, the summation limits $\pm\infty$ are replaced by (L, U), $L \leq 0 \leq U$, assuming that $g_j = 0$ outside of the interval (L, U); the $|L|, U$ should be chosen much lower than the length of the dataset.
- A **solver** can be used to resolve the **constrained optimization problem**: The determination of g_j is based on the minimization of $\mathrm{var}\left[\underline{v}(t)\right]$ subject to the constraints.

Application to the temperature and [CO_2] relationship

Treating the system (T,[CO_2]) as potentially HOE causal, we conclude that it is potentially causal (mono-directional) with explained variance 31%

Treating the system ([CO_2], T) as potentially HOE causal, we conclude that it is potentially anticausal (counter-directional) with explained variance 23%



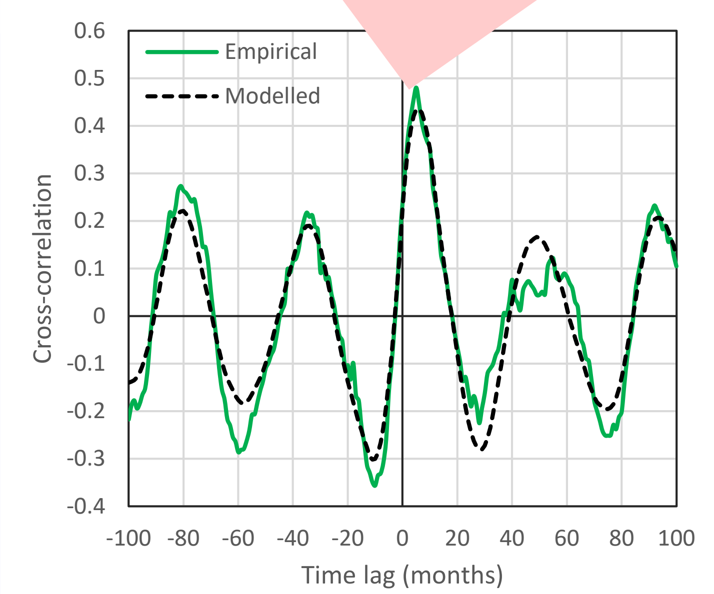
Graph source: Koutsoyiannis et al. (2022a).

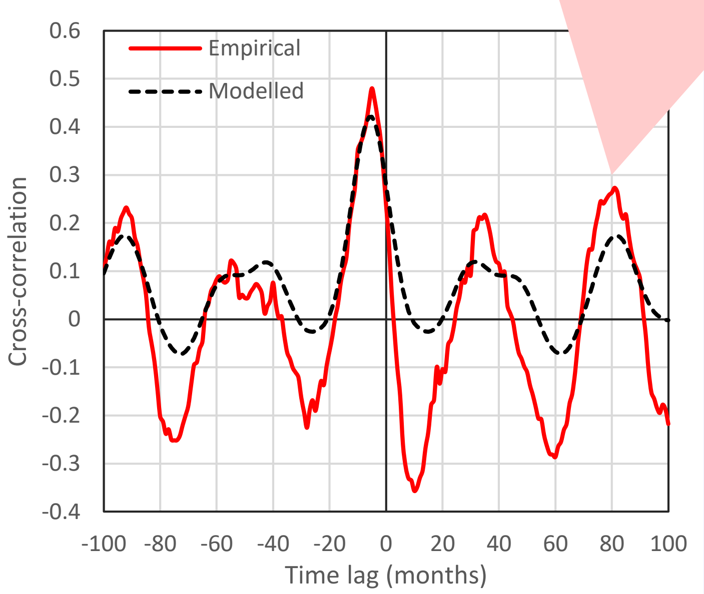
Conclusion: The common perception that increasing [CO_2] causes increased T **can be excluded** as it violates the necessary condition for this causality direction.
In contrast, the causality direction $T \rightarrow$ [CO_2] is plausible.

Additional evidence

Cross-correlation function of the causal system (T,[CO_2]) obtained from its IRF and the autocorrelation function of T.

Cross-correlation function of the anticausal system ([CO_2], T) obtained from its IRF and the autocorrelation function of [CO_2].



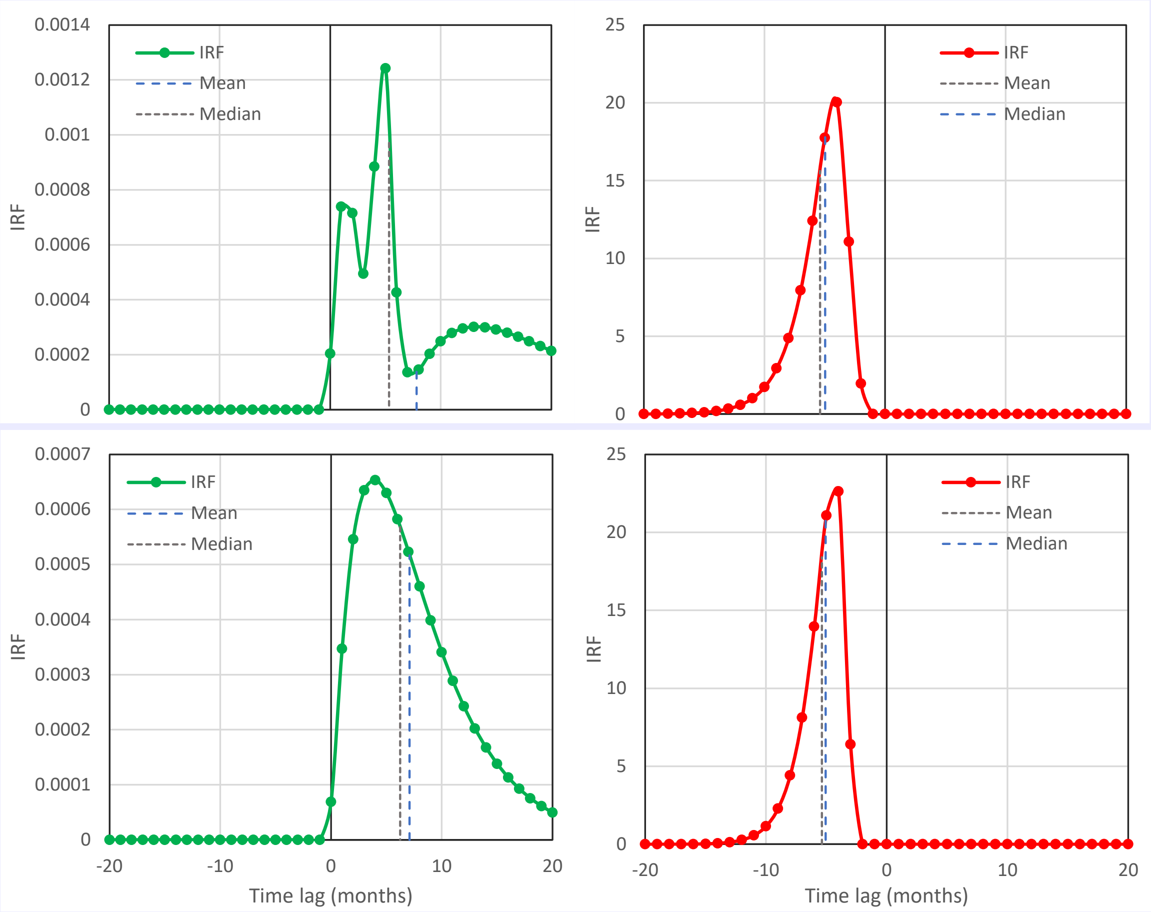


Graph source: Koutsoyiannis et al. (2022b).

Conclusion: The causal system (T,[CO_2]) is more consistent to reality than the anticausal system ([CO_2], T). This adds evidence that the actual causality direction is $T \rightarrow$ [CO_2].

More additional evidence

- For those fearing that our algorithm may produce incorrect results, a different algorithm was additionally used, whose results are shown in the graphs on the right.
- Namely a parametric IRF was constructed based on alpha basis functions (4 in upper graph, just one in lower graph).
- These results confirm that (*T*, [CO_2]) is potentially causal and ([CO_2], *T*) potentially anticausal.
- This adds evidence that the causality direction is *T* → [CO_2].



Graph source: Koutsoyiannis et al. (2022b).

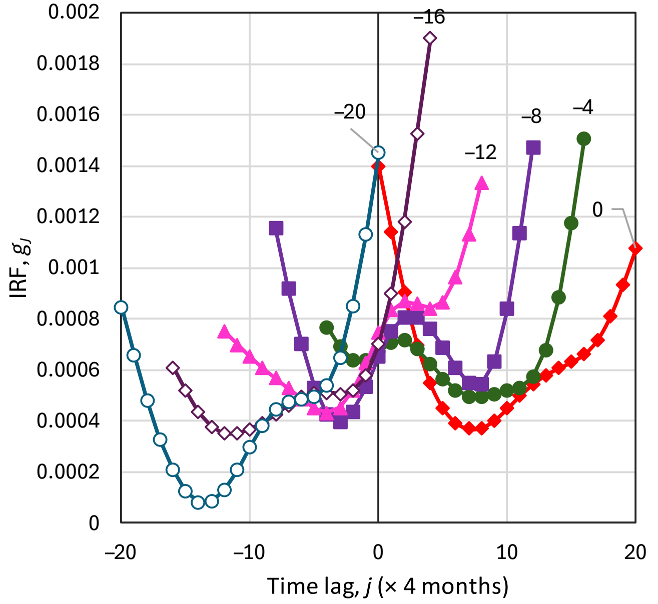
Evidence at the decadal scale

A different variant of the method (left graph) is here applied at the decadal time scale to the South Pole [CO_2] data with global ERA5 temperature data. The examined direction is $T \rightarrow [\mathrm{CO_2}]$.

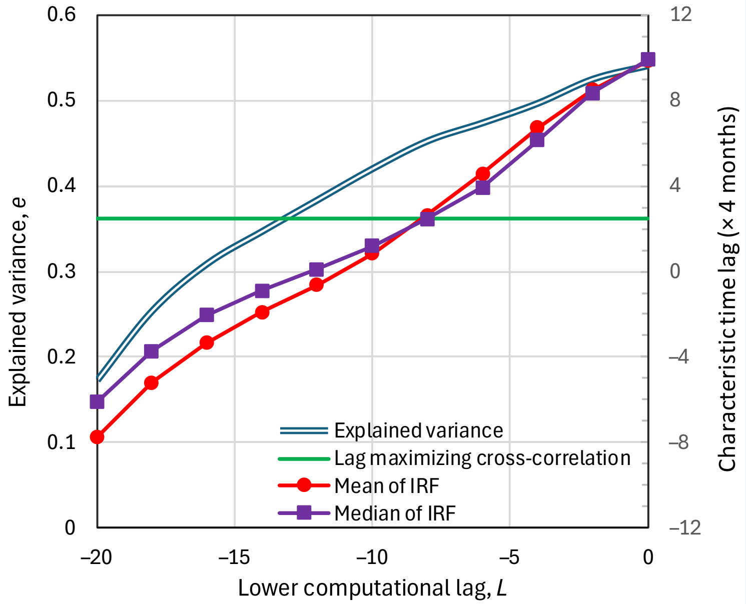
In this variant, the lower computational lag L slides from –20 to 0, while the total number of IRF values g_j is kept constant, 21.

The explained variance is maximized for $L = 0$, suggesting a causal system (right graph).

Estimated IRFs for the indicated lower computational lag, *L* (marked at the high end of each curve)



Explained variance and characteristic time lags as functions of the lower computational lag, *L*



Graph source: Koutsoyiannis (2024).

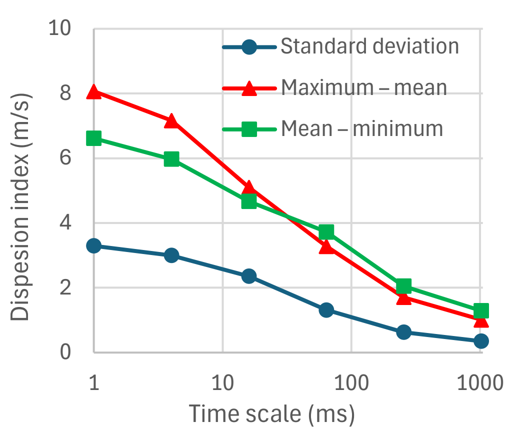
Appendix C: Miscellaneous logical and methodological issues

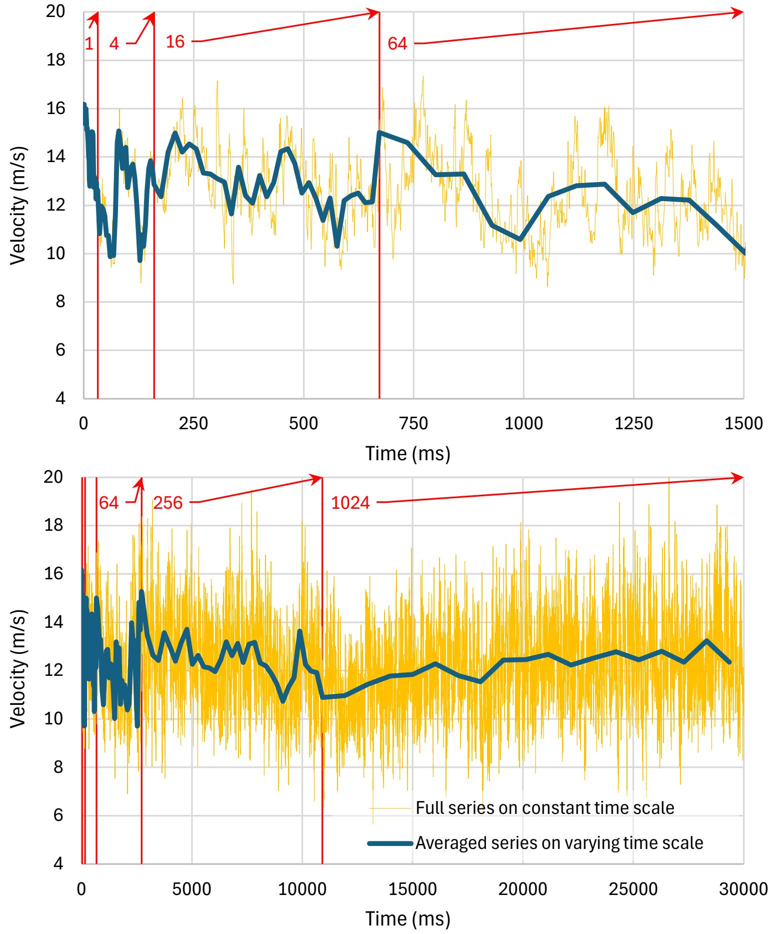
A note on the (misleading) common practice of merging data of different time resolutions

The graph shows a long turbulent velocity time series, plotted for varying time scales, from 1 to 1024 ms, with each increased one being a quadruple of the immediate smaller time scale; (upper) the first 1500 terms; (lower) 30 000 terms. Numbers in red, followed by the arrows, show the averaging scale.

The dispersion severely decreases for increasing time scale of averaging.

For instance, the maximum distance from mean at scale 1 ms is 8 times higher than that at scale 1024 ms.





Source of graph on the right: Koutsoyiannis (2024b), after adaptation.

The IRF in differenced and cumulative processes

- Let two stochastic processes $\underline{x}_\tau$ and $\underline{X}_\tau$ related by a summation or difference operation, i.e.,

$$\underline{X}_\tau = \sum_{j=1}^{\tau} \underline{x}_j \Leftrightarrow \underline{x}_\tau = \underline{X}_\tau - \underline{X}_{\tau-1}$$

- The process $\underline{x}_\tau$ denotes the change in time of $\underline{X}_\tau$. We call $\underline{x}_\tau$ and $\underline{X}_\tau$ the differenced process and the cumulative processes, respectively.
- We assume that the process $\underline{y}_\tau$ is related to $\underline{x}_\tau$ by an IRF g_j plus an unexplained component $\underline{v}_\tau$, i.e.:

$$\underline{y}_\tau = \sum_{j=-\infty}^{\infty} g_j \underline{x}_{\tau-j} + \underline{v}_\tau$$

- If we define the cumulative processes $\underline{Y}_\tau = \sum_{j=1}^{\tau} \underline{y}_j$, $\underline{V}_\tau = \sum_{j=1}^{\tau} \underline{v}_j$, then it can be easily shown that

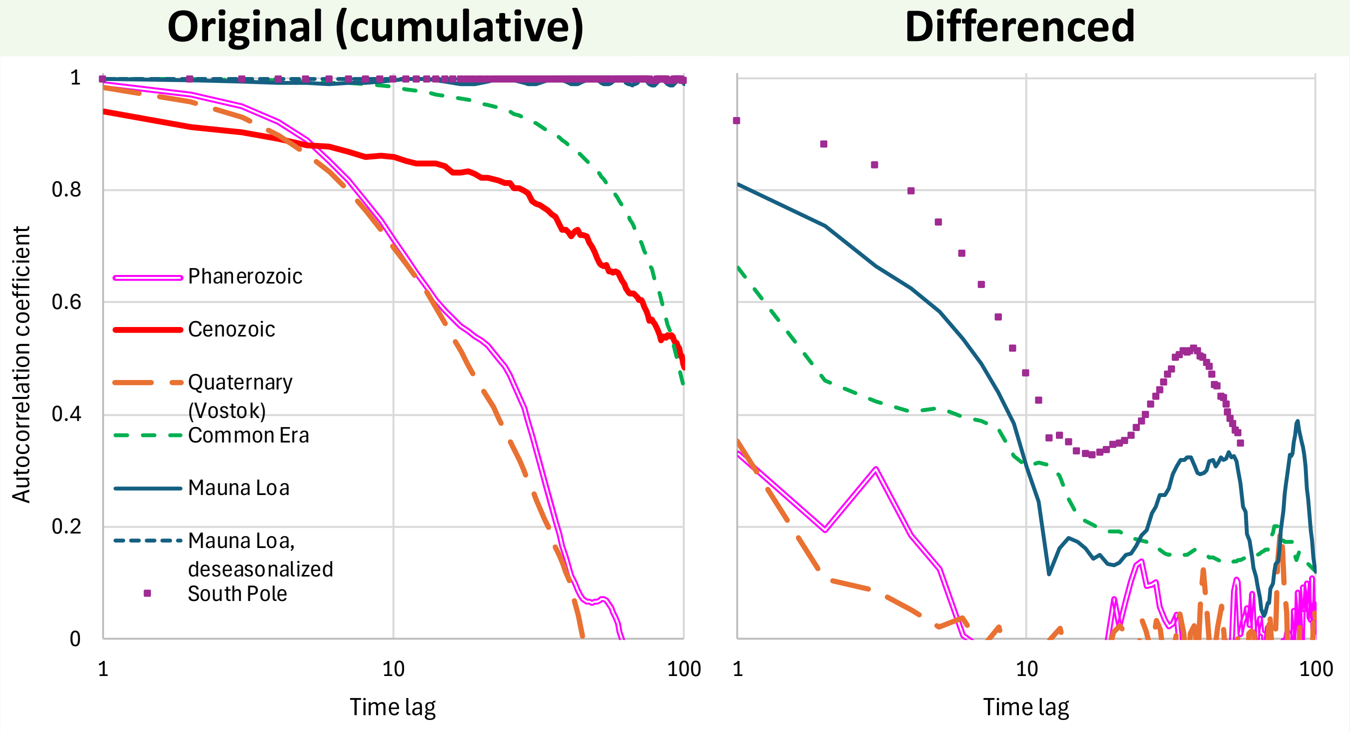
$$\underline{Y}_\tau = \sum_{j=-\infty}^{\infty} g_j \underline{X}_{\tau-j} + \underline{V}_\tau$$

- In other words, the same IRF applies to both the cumulative and differenced processes (even though in the estimation from data differences may appear). This provides an alternative estimation option for the IRF in the case that the original process does not allow estimation of IRF.
- This happens when the autocorrelation is very high (see next).

The prohibitively high autocorrelations in $[CO_2]$ instrumental time series

The graphs show the autocorrelation functions of the $[CO_2]$ time series. The time lag is in discrete time j, i.e. dimensionless, and, to make it dimensional, we should multiply by the time step Δ of each series ($h = j\Delta$).

The instrumental series (Mauna Loa, South Pole) have prohibitively high autocorrelations (see next).



Source of graph: Koutsoyiannis (2024b); See additional information in Koutsoyiannis and Kundzewicz (2020, pp. 14 - 16); Koutsoyiannis et al. (2022b, Sections 1 and 2.3, and Supplementary Information, section SI2.3); Koutsoyiannis (2024e, Replies to Comments R2-4.9, R2-5.1, R2-5.14).

Why high autocorrelation makes inference from data impossible

- The Mauna Loa [CO_2] time series has an autocorrelation coefficient of $r_{100} = 0.989$ at time lag $\eta = 100$.
- Assuming for simplicity and convenience a discrete-time Markov (AR(1)) model, whose autocorrelation function is $r_\eta = r^\eta$, and solving for r we find $r = r_\eta^{1/\eta} = 0.99989$.
- The "equivalent" (or "effective") sample size n' in the classical statistical (IID) sense, i.e. the sample size of a hypothetical classical statistical (IID) sample of a variable $\underline{x}$ with variance γ_1 at scale 1 is $n' = \gamma_1/\gamma_n$ where γ_n is the variance at scale n (Koutsoyiannis, 2023, p. 127).
- For the discrete-time Markov model we have (Koutsoyiannis, 2023, p. 108):

$$\frac{\gamma_n}{\gamma_1} = \frac{1}{n\,(1-r)^2}\left(1 - r^2 - \frac{2r(1-r^n)}{n}\right)$$

- After the algebraic operations with $r = 0.99989$, we find that for $n = 100 \rightarrow n' = 1.004$ and for $n = 1000 \rightarrow n' = 1.04$. This means that a time series of 1000 values is equivalent to a sample with 1 data point in the classical statistical sense.
- This will not enable any inference from data.
- However, by differencing we get a low value, $r_{100} = 0.12$, yielding for $n = 1000 \rightarrow n' = 786$, and therefore making inference possible.

A toy model in cumulative terms

- While the IRF identification was based on the differenced series, it is also valid for the cumulative process, whose values are readily derived from the differences.
- While the main scope of Koutsoyiannis et al. (2023) was diagnostic, rather than modelling, a toy model was also formulated.
- The toy model has the expression:

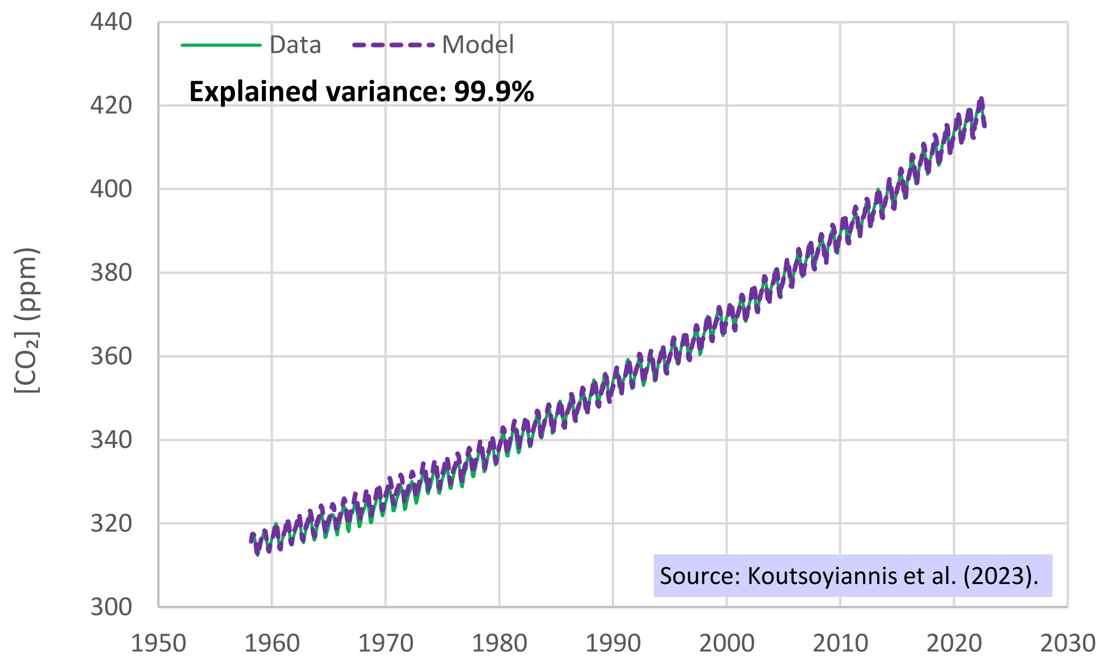
$$\Delta \ln[\mathrm{CO_2}] = \sum_{j=0}^{20} g_j \Delta T_{\tau-j} + \mu_v$$

$$g_j = 0.00076\, j^{0.67} e^{-0.2j}/\mathrm{K}$$

$$\mu_v = 0.0034\,(T_4/\mathrm{K} - 285.84)$$

where T_4 is the average temperature of the previous 4 years and K is the unit of kelvin.

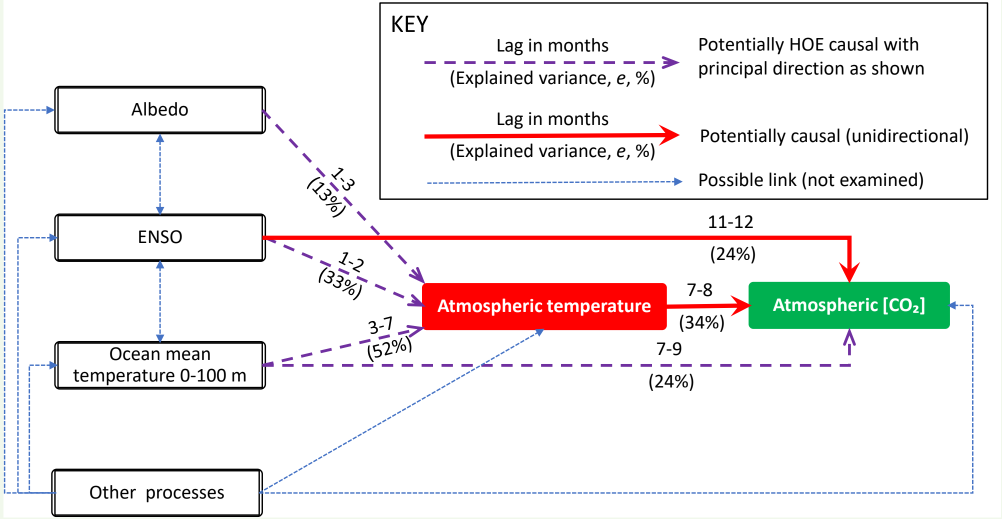
- By aggregation and exponentiation we find the time series of $[\mathrm{CO_2}]$ from earlier values of *T*.
- The agreement with the actual $[\mathrm{CO_2}]$ series is impressive.



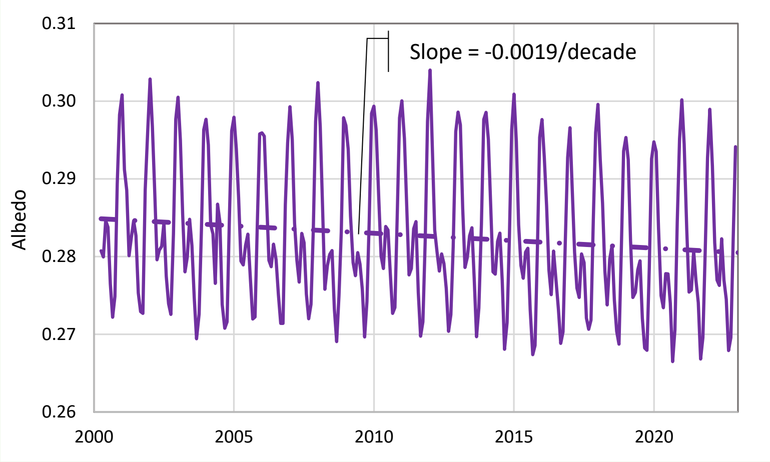
What might have caused the recent increase in atmospheric temperature?

Additional questions instead of an answer: Should the temperature be stable? What caused the huge changes in global temperature during the Phanerozoic, which may have reached 40°C?

Schematic of possible causal links in the climatic system, with noted types of potential causality, unidirectional or HOE, and its direction.



TOA albedo time series (continuous line), as provided by NASA's CERES data set, along with linear trend (dashed line)



Source of graphs: Koutsoyiannis et al. (2023).

Causal behaviour in climate models

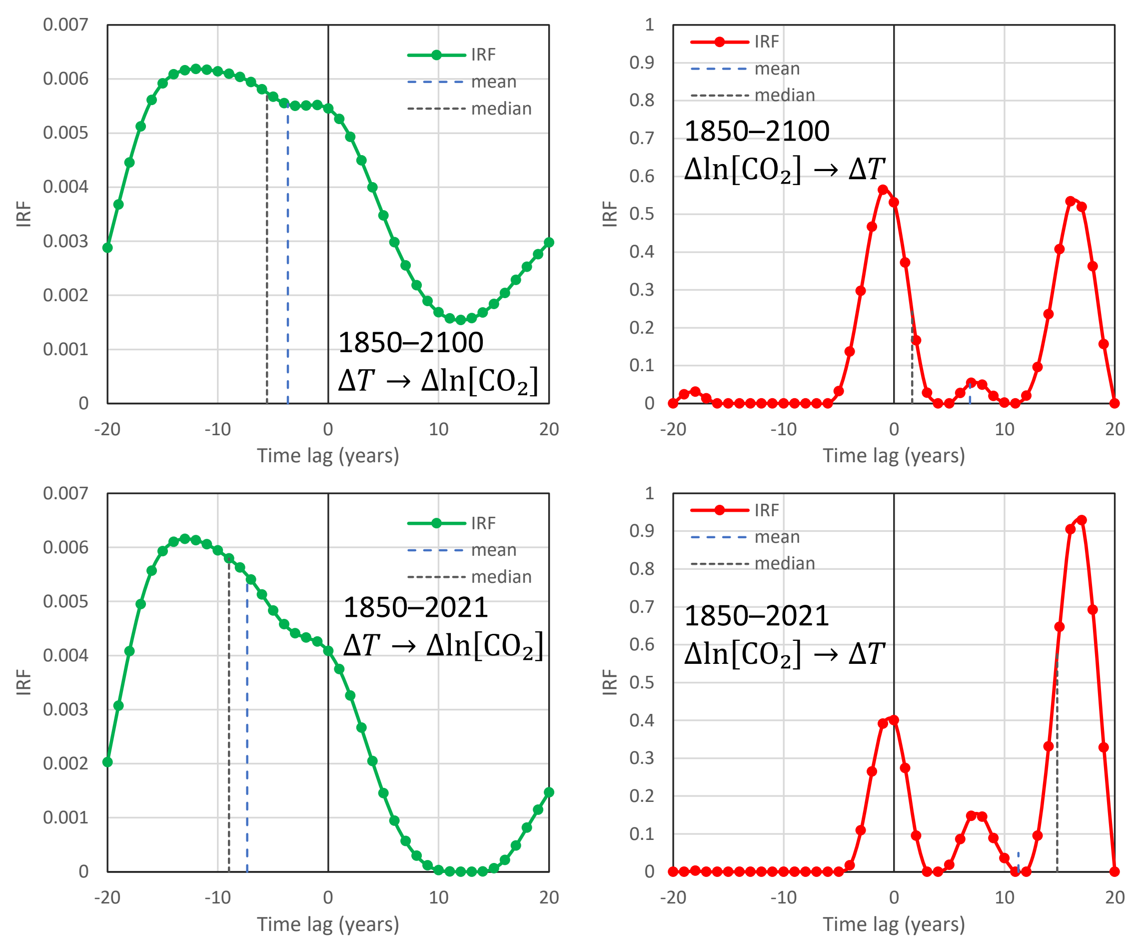
The graphs show the IRFs for climate model outputs of T and $[CO_2]$

Namely, the CMIP6 mean temperature (T) and SSP2-4.5 $[CO_2]$ time series, respectively.

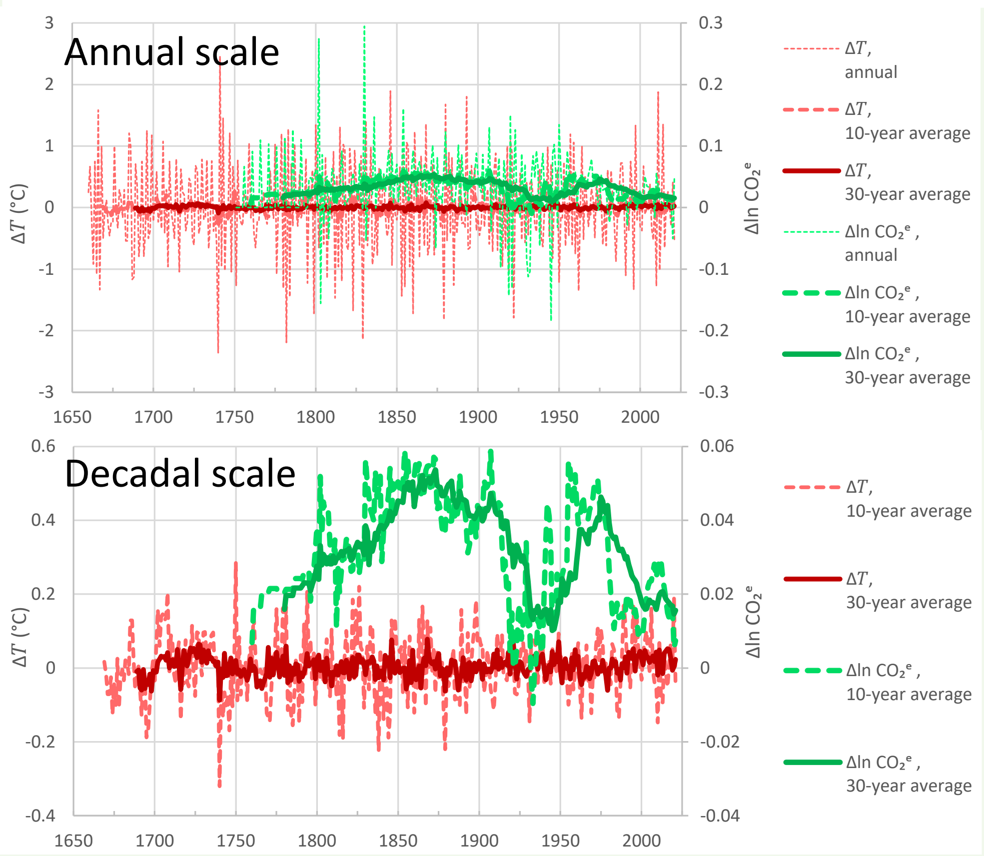
In all cases, the lags are negative in the direction $\Delta T \rightarrow \Delta\ln[CO_2]$ and positive in the direction $\Delta\ln[CO_2] \rightarrow \Delta T$, suggesting a HOE causality with principal direction $\Delta\ln[CO_2] \rightarrow \Delta T$.

This is opposite to the results found when real measurements are used .

Source of graphs: Koutsoyiannis et al. (2023).



Is atmospheric temperature correlated with human CO_2 emissions?

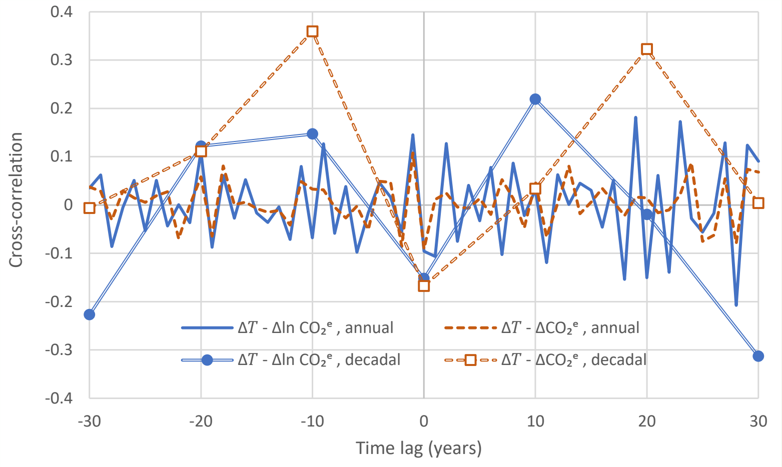


Both quantities have been increasing.

Correlating two time series with similar trends in substantial parts is pointless (results are spurious).

Instead, the changes in the series (differenced processes) should be analysed.

Such analyses of changes, based on temperature data of Central England (beginning in 1659), do not show any correlation (graph below).



Source of graphs: Koutsoyiannis et al. (2023) – Supplement (Sect. SI2).

Appendix D: Some notes on the climate agenda

The key persons who imposed the climate agenda

Rockefeller Family

John D. Rockefeller | John D. Rockefeller Jr. | Nelson Rockefeller

They have been known as the emperors of oil.

They are less known for their global control policies, which include the climate agenda.

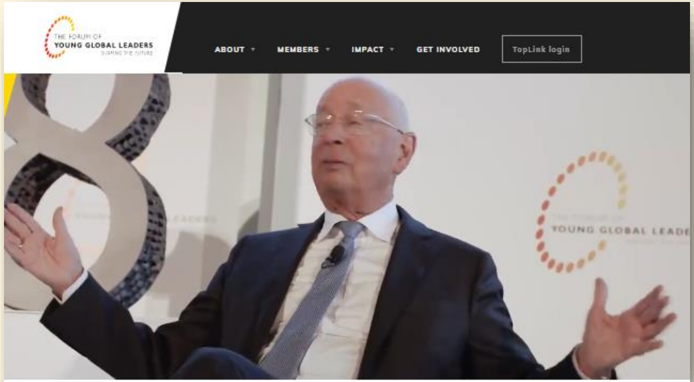
Today their foundations are not dealing with oil, but with climate salvation and other "philanthropies".

Henry Kissinger

In Greece he is mainly known for the destruction of Cyprus, together with his student (at Harvard) Bülent Ecevit.

He is less known for the fact that, as a Rockefellers' man, he brought climate change into the international political arena.

Klaus Schwab



He was Kissinger's student. He is mainly known as the head of WEF – Davos.

WEF maintains a school of leaders, from which the political leadership of Europe has graduated, not excluding the Greek prime minister.

He coordinates issues of global hegemony, including the climate crisis.

More information: Nordangård (2019); Koutsoyiannis (2020b, 2021).

Historical documentation

The "climate agenda" was launched by Henry Kissinger in 1974 (then the powerful US Secretary of State and of Homeland Security).

The World Meteorological Organization (WMO) responded immediately – within a month of Kissinger's speech in the UN General Assembly.

Koutsoyiannis (2020b, 2021)

NEWS RELEASE BUREAU OF PUBLIC AFFAIRS

US Department of State
Office of Media Services

U.N. Speech Text:
CHALLENGES OF INTERDEPENDENCE
REVIEWED BY SECRETARY KISSINGER

April 15, 1974

FOR IMMEDIATE

SEP 26 1975

Address by Secretary of State Henry A. Kissinger before the Sixth Special Session of the United Nations General Assembly
New York, N.Y., April 15, 1974.

Mr. President, Mr. Secretary General, distinguished delegates, and gentlemen.

Kissinger(1974)

-- The poorest nations, already beset by man-made disasters, have been threatened by a natural one: the possibility of climatic changes in the monsoon belt and perhaps throughout the world. The implications for global food and population policies are ominous. The United States proposes that the International Council of Scientific Unions and the World Meteorological Organization urgently investigate this problem and offer guidelines for immediate international action.

Distr.: RESTRICTED

WORLD METEOROLOGICAL ORGANIZATION

EXECUTIVE COMMITTEE

TWENTY-SIXTH SESSION, GENEVA, 1974

EC-XXVI/Doc. 70
(23.V.1974)

ITEM 5.6 (3)

Original: ENGLISH

ENVIRONMENTAL POLLUTION AND OTHER ENVIRONMENTAL QUESTIONS

Implications of possible climatic changes

(Presented by the Secretary-General)

Summary

This document conveys to the Executive Committee a request from the Government of the United States of America to consider the problem of the implications of possible climatic changes on the well-being of man. The present WMO activities in this field are reviewed

Reproduced from: Lewin (2017)

WMO (1974)

Implications of possible climatic changes

5.6.25 The Executive Committee discussed a request from the Government of the United States of America to consider certain problems of climatic change in relation to the current and planned activities of WMO. This request had stemmed from a statement made by the Secretary-of-State at the sixth special session of the United Nations General Assembly in which he had called attention to the possibility of climatic changes which could have serious implications for global food and population policies. In this connexion, the Committee also noted the decision of the second session of the Governing Council of UNEP that the Executive Director should continue his activities relating to "outer limits", particularly climatic change.

Fast forward through time: Climate crisis and the “great reset”

The revealing book whose first author is Klaus Schwab, head of the WEF, is dominated by references to climate change and professes to save the world through a “great reset”, which includes:

- economic reset,
- societal reset,
- geopolitical reset,
- environmental reset,
- industry and business reset,
- and even individual reset.

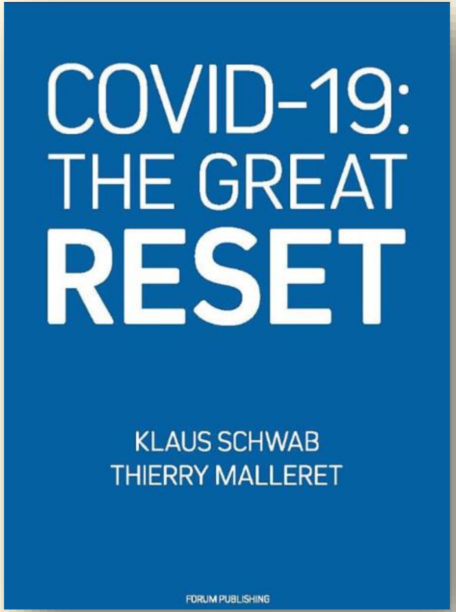
Number of occurrences of the following expressions in the book		
Climate change	37	
Global warming	4	43
Climate crisis	24	
COVID-19 pandemic	14	
Great reset	13	
Global order	7	

Sources: Koutsoyiannis(2021), Koutsoyiannis and Sargentis(2021)

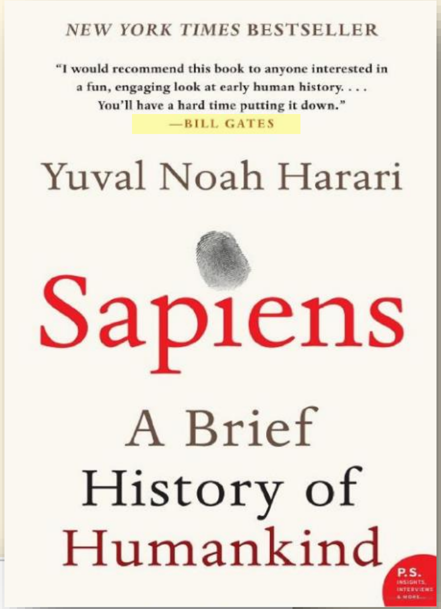
Most interesting quotation from the book:
“Predicting is a guessing game for fools”

Also interesting is the fact that the policies proposed are based on long-term climate model predictions.

Intimidation of the population with catastrophic predictions reinforces the foolishness.



Harari's (WEF's consultant) "New Global Empire": An avowed goal



ABOUT

Official U.S. edition with full color illustrations throughout.

#1 New York Times Bestseller

The Summer Reading Pick for President Barack Obama, Bill Gates, and Mark Zuckerberg, now available as a beautifully packaged paperback

The New Global Empire

Since around 200 BC, most humans have lived in empires. It seems likely that in the future, too, most humans will live in one. But this time the empire will be truly global. The imperial vision of dominion over the entire world could be imminent.

As the twenty-first century unfolds, nationalism is fast losing ground. More and more people believe that all of humankind is the legitimate source of political authority, rather than the members of a particular nationality, and that safeguarding human rights and protecting the interests of the entire human species should be the guiding light of politics. If so, having close to 200 independent states is a hindrance rather than a help. Since Swedes, Indonesians and Nigerians deserve the same human rights, wouldn't it be simpler for a single global government to safeguard them?

The appearance of essentially global problems, such as melting ice caps, nibbles away at whatever legitimacy remains to the independent nation states. No sovereign state will be able to overcome global warming on its own. The Chinese Mandate of Heaven was given by Heaven to solve the problems of humankind. The modern Mandate of Heaven will be given by humankind to solve the problems of heaven, such as the hole in the ozone layer and the accumulation of greenhouse gases. The colour of the global empire may well be green.

Harari (2014)

Is there a climate crisis?

News
European Parliament

Headlines | Press room | Agenda | FAQ | The new Parliament and the new Commission

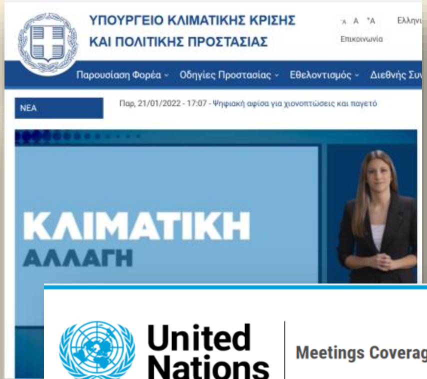
The European Parliament declares climate emergency

Press Releases | PLENARY SESSION | ENVI | 28-11-2019 - 13:01

- Commission must ensure all proposals are aligned with 1.5 °C target
- EU should cut emissions by 55% by 2030 to become climate neutral by 2050
- Calls to reduce global emissions from shipping and aviation

"Parliament declares climate emergency. MEPs want immediate and ambitious action to limit effects of climate change"© 123RF/EU–EP

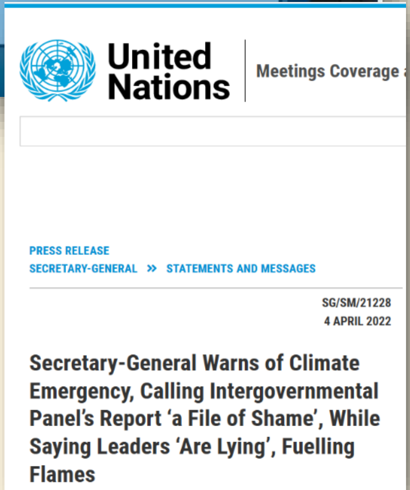
EU should commit to net-zero greenhouse gas emissions by 2050 at the UN Conference, says Parliament.



ΥΠΟΥΡΓΕΙΟ ΚΛΙΜΑΤΙΚΗΣ ΚΡΙΣΗΣ
ΚΑΙ ΠΟΛΙΤΙΚΗΣ ΠΡΟΣΤΑΣΙΑΣ

Παρουσίαση Φορέα | Οδηγίες Προστασίας | Εθελοντισμός | Διεθνής Συ

ΝΕΑ | Παρ, 21/01/2022 - 17:07 - Ψηφιακή αφίσα για χιονοπτώσεις και παγετό



United Nations | Meetings Coverage

PRESS RELEASE
SECRETARY-GENERAL » STATEMENTS AND MESSAGES

SG/SM/21228
4 APRIL 2022

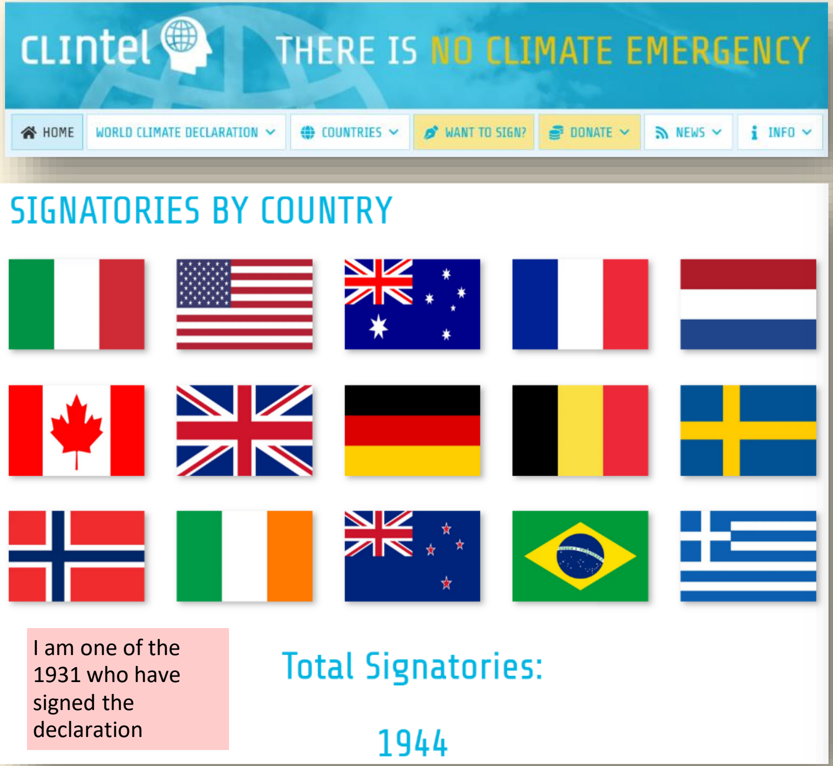
Secretary-General Warns of Climate Emergency, Calling Intergovernmental Panel's Report 'a File of Shame', While Saying Leaders 'Are Lying', Fuelling Flames

https://www.europarl.europa.eu/news/en/press-room/20191121IPR67110/

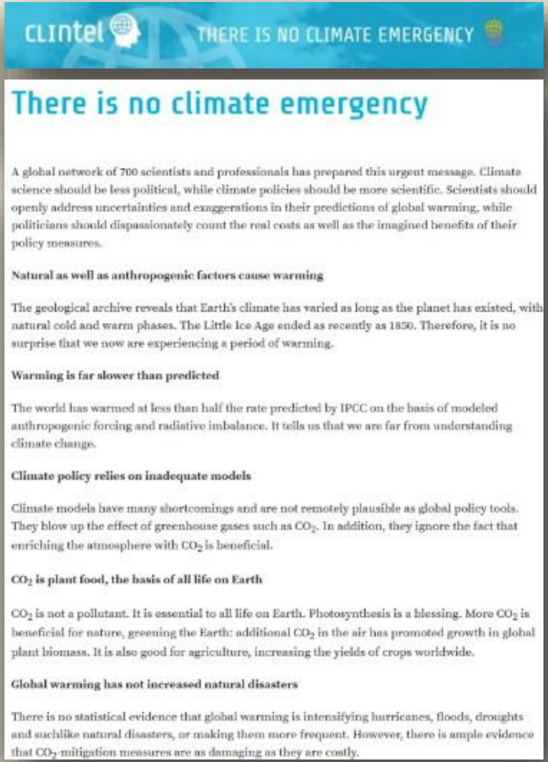
https://www.civilprotection.gr/en
https://press.un.org/en/2022/sgsm21228.doc.htm

- **Question 1**: Given: (a) the decision of the European Parliament (11/2019), (b) the creation of a Ministry of Climate Crisis in Greece (9/2021) and (c) the announcement of the UN (4/2022), is there a climate crisis or not?
- **Question 2**: If yes, does it exist as a physical fact or as a political fact?
- **Question 3**: Which one is more feared? A natural climate crisis? Or a political "climate crisis"?

>1900 scientists’ answer



I am one of the 1931 who have signed the declaration



There is no climate emergency

A global network of 700 scientists and professionals has prepared this urgent message. Climate science should be less political, while climate policies should be more scientific. Scientists should openly address uncertainties and exaggerations in their predictions of global warming, while politicians should dispassionately count the real costs as well as the imagined benefits of their policy measures.

Natural as well as anthropogenic factors cause warming

The geological archive reveals that Earth's climate has varied as long as the planet has existed, with natural cold and warm phases. The Little Ice Age ended as recently as 1850. Therefore, it is no surprise that we now are experiencing a period of warming.

Warming is far slower than predicted

The world has warmed at less than half the rate predicted by IPCC on the basis of modeled anthropogenic forcing and radiative imbalance. It tells us that we are far from understanding climate change.

Climate policy relies on inadequate models

Climate models have many shortcomings and are not remotely plausible as global policy tools. They blow up the effect of greenhouse gases such as CO_2. In addition, they ignore the fact that enriching the atmosphere with CO_2 is beneficial.

CO_2 is plant food, the basis of all life on Earth

CO_2 is not a pollutant. It is essential to all life on Earth. Photosynthesis is a blessing. More CO_2 is beneficial for nature, greening the Earth: additional CO_2 in the air has promoted growth in global plant biomass. It is also good for agriculture, increasing the yields of crops worldwide.

Global warming has not increased natural disasters

There is no statistical evidence that global warming is intensifying hurricanes, floods, droughts and suchlike natural disasters, or making them more frequent. However, there is ample evidence that CO_2-mitigation measures are as damaging as they are costly.

- As a physical reality, there is no climate crisis/ emergency.

Personal opinion

- It exists as a political fact.
- As such, it is politically and geopolitically targeted, and is extremely dangerous.

https://clintel.org/world-climate-declaration/ – https://clintel.org/greece-wcd/

African farmers agree (they no longer accept the Euro-American bullying rhetoric that using oil will cause climate crisis)

Jusper Machogu @JusperMachogu · Jun 16

An av African consumes less electricity than an American refrigerator i.e. In a month,
my family of 6 consumes ~14 kWh compared to 45 kWh for the fridge or 1200 kWh for the American. Africa has 17% of 🌎 pop but consumes 5% of 🌎⚡

🧵 for anti-African BBC'S, Marco Silva.

ECONOMICS AND POLICY ECONOMIC HARM FOSSIL FUELS

Wrong, BBC, the Popular Kenyan Farmer Is Right, There Is No Climate Emergency, Africa Does Need Fossil Fuels

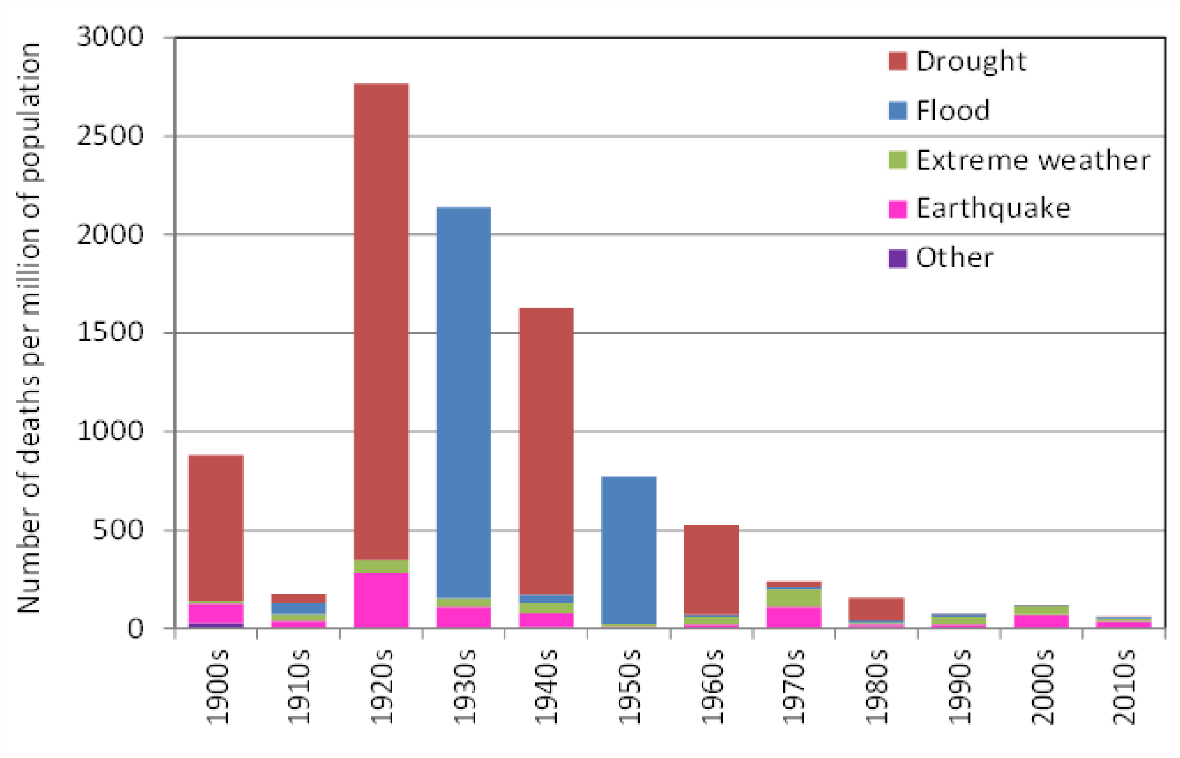
By Linnea Lueken June 18, 2024 0

Facebook Twitter Pinterest Email

Screenshot from X of a photo posted by Machogu: https://x.com/JusperMachogu/status/1800013619838546241

https://x.com/JusperMachogu/status/1802426012883730889 – https://climaterealism.com/2024/06/wrong-bbc

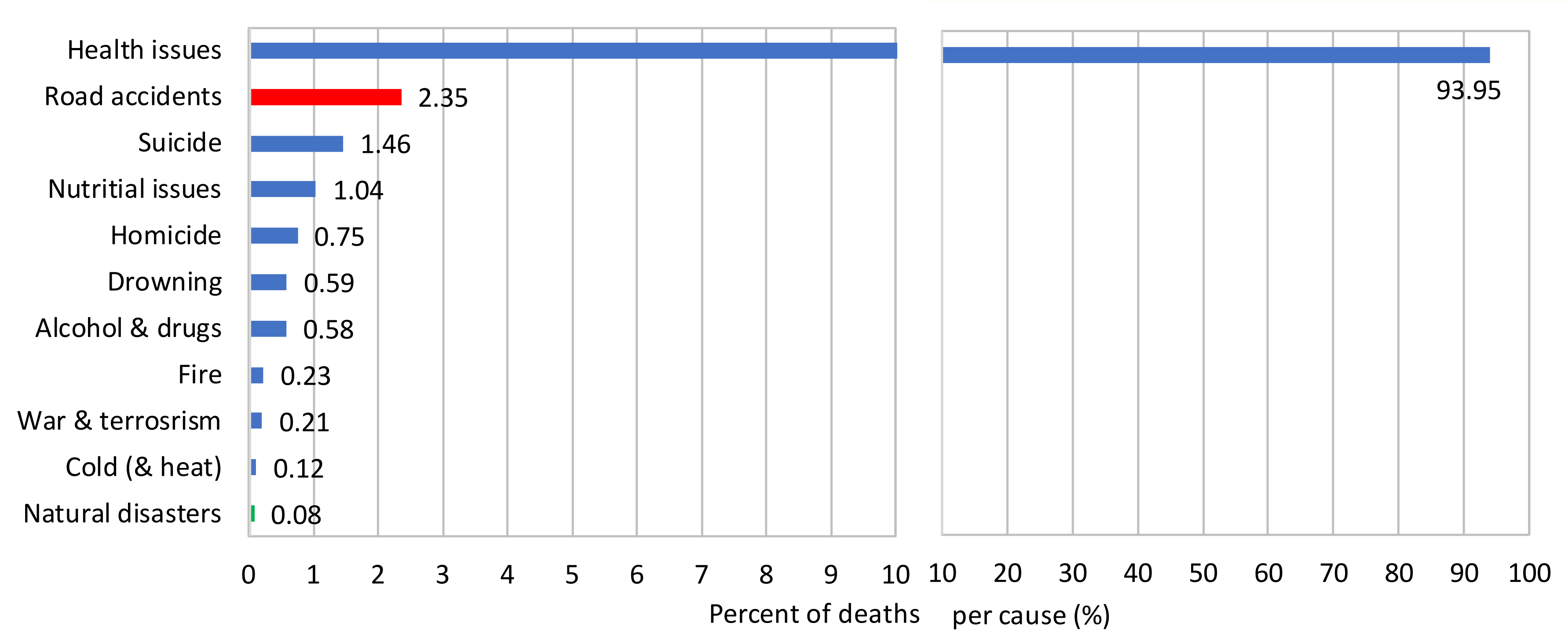
It takes technology and strong economy to solve problems and improve safety and well-being



- Clearly, safety against natural disasters has improved dramatically over the past century.
- This mainly concerns droughts and floods.
- Only earthquakes remain a significant problem.

Source: Koutsoyiannis(2023)

Question for thought: Why has the smallest risk on the list been elevated as the top global policy issue?



Source: Koutsoyiannis(2023) – Reference decade 2010

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