



More Comments to Engelbeen's Discussion Paper

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Abstract

The late Ernst-Georg Beck wrote a monumental article titled “*Reconstruction of Atmospheric CO₂ Background Levels since 1826 from Direct Measurements near Ground*“, published in this journal in 2022 (Beck, 2022).

Beck's results are controversial, especially because his reconstruction showed a pronounced peak in atmospheric CO₂ around 1940, which is contrary to the common understanding of the CO₂ history based on ice-core measurements. Beck's paper was commented by Ferdinand Engelbeen (Engelbeen 2023), and thereafter, the editor invited to an Open Review process of Engelbeens article. The result of the Open Review process is summarized in this paper, with contributions from three named contributors and one unidentified blogger.

Keywords: Historic CO₂ levels, Ground observations of CO₂.

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1. Introduction

The late Ernst-Georg Beck wrote a monumental article titled “*Reconstruction of Atmospheric CO₂ Background Levels since 1826 from Direct Measurements near Ground*“, published in this journal in 2022 (Beck 2022).

Beck's results are highly controversial, especially so because of data that showed a pronounced peak in atmospheric CO₂ around 1940, which is contrary to the common understanding of the CO₂ history based on ice-core observations.

A critique of Beck's article, by Ferdinand Engelbeen (Engelbeen, 2023) was posted on the SCC website with an invitation to an Open Review process, in addition to a few invited reviewers. However, mostly because our journal is not widely known, we got only one unexpected reply, from an unidentified blogger.

It may also interest our readers that Hermann Harde (Harde 2023) has shown that the observed CO₂ concentration changes during 1940 – 50 not only correlate with observed temperatures, but can also quantitatively be explained, mainly in terms of the temperature dependent soil respiration and release from the sea (Henry's law).

2. Francis Massen¹

Ferdinand Engelbeen (FE) makes a well-documented critique of Beck's paper, and I accept many

¹ Luxembourg. He also gave a longer review, sent to Engelbeen.

of his points. Most importantly, I agree that the famous 1942 peak in Beck's reconstruction is probably an artefact. When I wrote the Klima 2009 paper with Beck (Massen and Beck 2011), I was uneasy seeing the "fingerprint" plot of the Giessen data: as FE writes, there really are too few (CO₂, wind-speed) pairs with high wind velocities, so that even if the fitting gives a result close to 392 ppmv, the paucity of high wind data points makes this at least questionable.

But there remain at least some points that do not invalidate a priori Beck's estimation of higher CO₂ background values than those commonly considered at a certain time. The stomata proxy curve (Fig. 7 in FE's discussion) shows high ~370 ppmv in 1950; now this peak value and the ice-core data (310 ppmv) lie within the error margin of the stomata based reconstruction. So, does this mean that 370 ppmv is a priori impossible? I would say no, as the error range is the domain of all possible values.

A second point for attention is FE's Table 1, which resumes the investigations (of the scientific literature of historic CO₂ measurements) by the Barrow Point researchers. It is interesting to compare the data to the ice-core data curve from the 10 reports given by Engelbeen (2023): 4 give results that deviate distinctly from the usually lower ice core data, given in brackets:

Nansen & Petterson (1880):	300 - 320	[291]
Müller (1928):	240 - 300	[306]
Lockart & Court (1942):	300 - 1700!	[310]
Hock (1952):	400	[312]

I do not understand how FE's comment on the 400 ppmv value as being "within the margins of the method used" does rule out that value as impossible.

Conclusion

As many authors before him, Beck certainly has made errors, and many points are not defined clearly enough. What remains is that no other work of such a wide span has been made by others after his death. I am waiting with impatience for a fresh group of researchers to take up the problem and re-investigate the historic CO₂ measurements, using possible new selection criteria, new data evaluation techniques and so on.

Meanwhile Beck's work, with all its critical points, remains what J-E. Solheim correctly calls a "monumental" work.

3. Ove Huus²

Beck's extensive work with direct measurements of atmospheric CO₂ is of great importance and could have added valuable and significant early knowledge and critique to the correctness of the so-called hockey stick development curve supplied by IPCC to politicians via Callendar and Keeling.

Historic CO₂ proxy values from ice core pores have in general proven to be too low and stable compared with proxies from Stomata and direct measurements.

The process of creating ice from snow via firn depends on location and seems not well understood and documented. The process itself takes place under significantly different climate circumstances in the Antarctic and Arctic - which will influence the results and make direct comparison questionable. Drilling, collecting and transferring ice cores for analyzing data also depends on methods and skills and seems to lack stringent standards and procedures.

² Norway

How the IPCC have transferred and connected their proxy ice core CO₂ data from Antarctica to the Mauna Loa direct measured CO₂ data - seems also highly questionable. These facts have been disclosed, criticized and published by several scientists i.e. Ernst-Georg Beck (Beck 2007), Zbigniew Jaworowski (Jaworowski 2007) and recently by David Dilley (Dilley 2023).

In SCC Volume 2.3, Harald Yndestad (Yndestad 2022) reveals and explains the vital dynamic connection between Atlantic Sea Surface temperatures and Beck's atmospheric CO₂ data. The role of ocean latent energy and atmospheric CO₂ forcing from changing tide and the moon plays here a vital part.

The reason for the high CO₂ atmospheric content around 1945 seems well documented through various temperature records – specifically across the US by the HadCRUT4 series – just prior to 1945.

4. Victor M. Velasco³

One of the major challenges in reconstructing any variable is calibrating historical data that was gathered using different methodologies and instruments.

The untimely death of Ernst-Georg Beck(†) is a significant obstacle as he is the author who could have addressed Ferdinand Engelbeen's critiques. However, I have not seen any quantification from Engelbeen that demonstrates potential errors in CO₂ reconstructions by Beck†. Moreover, H. Yndestad's wavelet spectral analysis does not seem to be contested.

All reconstructions of any variable have inherent precision and uncertainty. For instance, there are at least two Total Solar Irradiance (TSI) reconstructions: one by the ACRIM missions and the other by PMOD. To date, no reconciliation exists between these two reconstructions, and it is unknown which one is accurate. Both reconstructions have supporters and critics, and each of the authors defend their work. However, discrediting colleagues' work without mathematical proof seems unethical in scientific research, as qualitative comparisons can be subjective.

Prior to the industrial revolution, there was limited discussion about the significant European forest fires that polluted the air and the global environment. Therefore, the quantity of CO₂ released into the atmosphere is substantial, as seen in Ernst-Georg Beck's reconstruction and Ferdinand Engelbeen's Figure 3. Historical drought indices can provide additional information about atmospheric CO₂, as forests, after oceans, are major CO₂ sinks.

5. Unknown

Ferdinand Engelbeen has a comment that many of the observations are unsuited for background CO₂- levels. "The huge CO₂ level around 1940 is physically impossible and contradicts other proxies (Englebeen 2023)." He also questions the validity of the "new" method with windspeed at Giessen in 1940 to measure the background-level for CO₂. Too few and too much spread he writes for this site. But Kauko et al. (1935) measurements from airplanes over Helsinki shows 361-375 ppm CO₂. The data from the windspeed method etc. at Giessen from 1940, may still be close to the real background, since Kauko et al. (1935) also indicates higher levels.

From Becks article:

"This indicates that in 1935 Kauko had measured the real background CO₂ in the air over Helsinki (lat 60.1 long 25E) of 361 ppm ±0.33 % in Dec. 7th and 375 ppm ±0.33 % at 1000 m in Feb. 20th over the clouds. For an estimation of the CO₂ background average for 1935 the modern seasonal averages listed in Globalview CO₂ at similar latitudes of Pallas Finland, lat 68N, Baltic Sea lat 55N, Zotino lat 60N and Shetland lat 60.1N from Globalview-CO₂ are helpful. Globalview MBL

³ Mexico

CO₂ data since 1980 are comparable to historic times because they exhibit about the same high atmospheric CO₂ range of about 360–380 ppm as the historic data to be evaluated"

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Guest Editor

Stein Storlie Bergsmark

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References

- Beck, EG. (2007), *180 Years of Atmospheric CO₂ Gas Analysis by Chemical Methods*, Energy and Environment, Vol 18 Issue 2, <https://doi.org/10.1177/0958305X0701800206>
- Beck, EG. (2022), *Reconstruction of Atmospheric CO₂ Background Levels since 1826 from Direct Measurements near Ground*, Science of Climate Change, Vol 2.2. (<https://doi.org/10.53234/scc202112/16>)
- Dilley, D. (2023), *Finally, Proof - Rise in Atmospheric Carbon Dioxide is Mostly Natural*, <https://www.youtube.com/watch?v=qNSPiMmuIvI&t=947s>
- Engelbeen, F. (2023), *About Historical CO₂ Levels. Discussion of Direct Measurements near ground since 1826 by E.-G. Beck*, Science of Climate Change, Vol 3.2, (<https://doi.org/10.53234/SCC202301/33>)
- Harde, H. (2023), *About Historical CO₂-Data since 1826 – The Peak 1940 – 50 explained*, Journal of Climate Change, Vol. 3.2 2023, <https://doi.org/10.53234/scc202304/21>
- Jaworowski, Z. (2007), *CO₂: The Greatest Scientific Scandal of Our Time*, Eir Science, March 16, 2007, <https://www.co2web.info/Jaworowski%20CO2%20EIR%202007.pdf>
- Massen, F., Beck, EG. (2011), *Accurate Estimation of CO₂ Background Level from Near Ground Measurements at Non-Mixed Environments*. In: Leal Filho, W. (eds) *The Economic, Social and Political Elements of Climate Change*. Climate Change Management. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-14776-0_31
- Yndestad, H. (2022), *Lunar Forced Mauna Loa and Atlantic CO₂ Variability*, Science of Climate Change, Vol 2.3, <https://doi.org/10.53234/scc202212/13>