



About Historical CO₂ Levels

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Discussion of Direct Measurements near Ground since 1826 by G. E. Beck

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1. Data for background CO₂ level

Ernst Georg Beck estimated a CO₂ background time-series from 1826 to 1960. In a discussion from Ferdinand Engelbeen, he has a comment ha many of them are unsuited for background CO₂-levels. The huge CO₂ level around 1940 is physical impossible and contradicts other proxy's. (Englebeen 2023).

Beck collected approximately 100.000 data series from approximately 900 stations. He estimated 20-50 % variations in the period 1826-1855, 2.6-10 % variations from 1855-1865, and 3 % variations from 1865-1960. The computed 3 % variations from mean values confirm the estimated CO₂ background level for the period 1850 to 1960 (Beck 2022).

The huge CO₂ level was close to 370 ppm in 1940. The CO₂ level at Mauna Loa was approximately 370 ppm in 2000. The global sea surface sea temperature in 1940 had a coincidence to global sea surface temperature in 1980. This coincidence supports a possible relation between global sea temperature variation and a CO₂ background level variation.

2. The CO₂ background signature

The historical CO₂ time-series from 1826-1960 represents a mean CO₂ background level from all sources. The most dominant source is revealed by computing the time-series signature (period and phase relations). A signature analysis of the time-series (Yndestad 22a; Yndestad 22b) reveals that:

The CO₂ signature from 1850-1960 coincides with the Mauna Loa atmospheric CO₂ growth variability signature, the global sea surface temperature variability signature, and the lunar nodal tide variability signature. This is strong evidence of a lunar forced global sea temperature variation and the historical atmospheric CO₂ background level.

Atmospheric CO₂ variations have a maximum growth rate when global sea surface temperature variations have a maximum state. The $\pi/2$ (rad) phase lag between global sea temperature

variations and atmospheric CO₂ variations, reveals that atmospheric CO₂ variations are controlled by global sea temperature variations.

The historical CO₂ level time-series from 1826 to 1960, and the Mauna Loa CO₂ timer-series cover a total period of 200 years. The long historical time-series, and better analysis methods, have opened a new perspective on climate science.

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