NZCLIMATE TRUTH NEWSLETTER NO 337
NOVEMBER 24TH 2014

ATMOSPHERIC CONCENTRATION OF CARBON DIOXIDE

Early chemical measurements of the concentration of carbon dioxide in the earth's atmosphere have been suppressed by the Intergovernmental Panel on Climate Change.

Chapter 1 of the IPCC Fourth Report[1,] entitled "Historical overview of Climate Change Science" makes no mention of any early measurements.

Weart[2] in his "History of the Carbon Dioxide Greenhouse Effect" also makes no mention of them.

Yet Beck[3] has provided an annotated list with links to internet access of almost 200 references to peer reviewed academic scientific journal articles containing some 40,000 measurements of atmospheric carbon dioxide by chemical methods between 1800 and 1960. Comprehensive data sets in more than 390 papers were ignored despite contributions from prominent scientists like Robert Bunsen, Konrad Roentgen, and J S Haldane or the Nobel Prize winners August Krogh and Otto Warburg.

The earliest listed publication in 1800, and others. from 1809-1816, are by Theodore de Saussure. He was the son of Horace-Benedict de Saussure, who invented the Hot Box (which resembled a greenhouse) which was the basis of the theory of the climate developed by]Jean Baptiste Joseph Fourier in 1822 and 1824 which is claimed to have originated the greenhouse effect. Yet the measurements of atmospheric carbon dioxide by de Saussure"s son are completely ignored.

Other early references by Letts and Blake 1802 and 1719-15 from The Royal Dublin Society give an additional list of early measurements.

Beck[4-5] has published several summaries and commentaries on the early measurements and include an argument with Ralph Keeling[6].

Most of the early measurements were from Northern Europe. Beck considered that the earliest measurements were subject to various errors but the widespread use of more reliable equipment, particularly the Pettenkoffer titrimetric method in 1812 led to high accuracy, with a maximum 3% error reducing to 1% for the data of Henrik Lundegardh (1920–26)., . .

The measurements selected by Beck were from rural areas or the periphery of towns, under comparable conditions of a height of approx. 2 m above ground at a site distant from potential industrial contamination. They showed a variation with time of day, of season, and of wind speed and direction, making it difficult to derive a local average, There were frequent measurements of concentrations higher than those reported as background concentrations by NOAA at present.

These measurements were carried out by real people with proper instruments in a large number of localities. They give a much better appreciation of variability and change in atmospheric carbon dioxide concentration over the period than the deductions from gas

trapped in ice cores which are from unrepresentative locations and subject to much uncertainty[7].

In 1958 Charles. Keeling, introduced a new technique for the accurate measurement of atmospheric CO2 using cryogenic condensation of air samples followed by NDIR spectroscopic analysis against a reference gas, using manometric calibration. Subsequently, this technique was adopted as an analytical standard for CO2 determination throughout the world, including by the World Meteorological Association.

The climate models sponsored by the Intergovernmental panel on Climate Change are based on the belief that the global climate has a “balanced“ energy which is only changed by increasing concentrations of carbon dioxide and other greenhouse gases. These gases are assumed to be well-mixed so that their concentration, all over the world, is a constant at any one particular time. Increasing only with human emissio

In order to support this theory Keeling at the Scripps Institution of Oceanography, “discovered” that there was an almost consistent “background” concentration of carbon dioxide which could be identified from suitable sites and shown to increase with carbon dioxide emissions, which could be considered to apply globally.

The procedure required to indentify this ***background*** is described in some detail by Tans and Thoning[8] for the observatory at Mauna Loa.

Measurements whose standard deviation fell below a specified minimum were rejected On average, over the entire record, there are 13.6 retained hours per day with *background* CO2. The rest were rejected as “noise”. .

Beck[9] has discussed the Mauna Loa measurements..Comparison between old wet chemical and new physical methods in 1958 and 1967 on sea and land give a difference of about +10 ppm for the new procedure

A similar procedure has been described for New Zealand [10]

At Baring Head maritime well mixed air masses come from the Southerly direction, and a baseline event is normally defined as one in which the local wind direction is from the South and the standard deviation of minute-by-minute CO_2 concentrations is <<0.1 ppmv for 6 or more hours

This “background” concentration is supposed to be well- mixed and to be unaffected by sources and sinks.

Yet the oceans are themselves contaminated with sources and sinks[11]

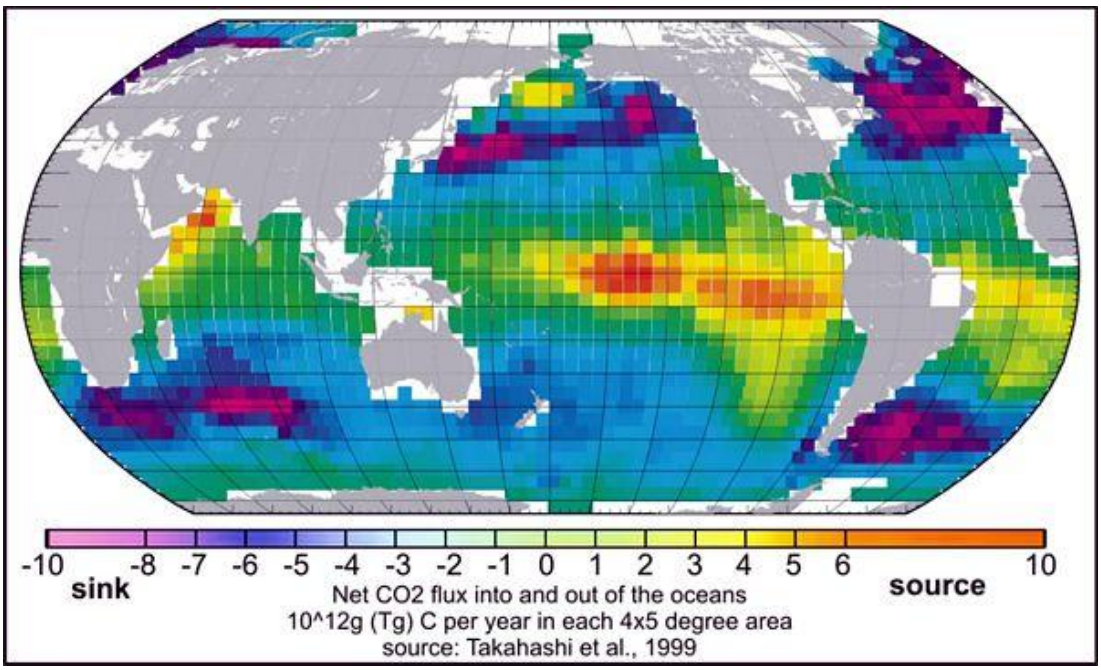

Figure 1, CO2 flux for the oceans[11]

The region around Mauna Loa includes areas with CO2 emissions, and much of the rest is a sink. It is understandable how difficuli it is to get a sufficiently constant sample.

In order to claim that there is such a thing as a background CO2 it has been necessary to ensure that all measurements everywhere in the world are made from samples from over the oceans. Measurements ove land surfaces have been comprehensively discouraged.

Yet the greenhouse effect is about *emissions,* namely “contamination” It is crazy, to take all this trouble to make measurements which do not involve the emitted gases themselves, but only a small fraction that is considered to be well- mixed, then to claim that it is these ***background*** figures which apply to the entire atmosphere.

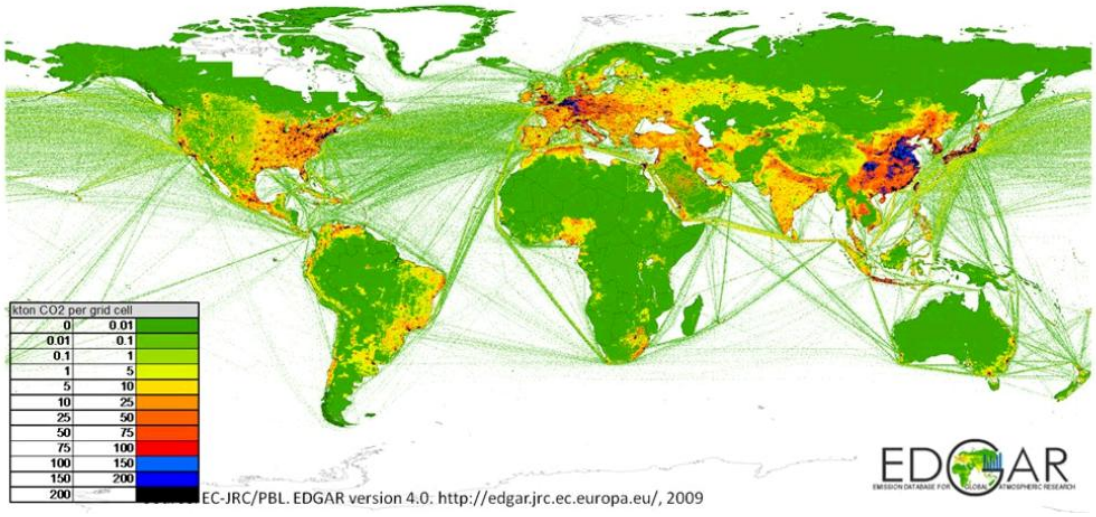

Figure 2 Distribution of carbon dioxide emissions[12]

This map shows that actual local concentrations of carbon dioxide are greatest over the

three large industrial areas. Since the supposed greenhouse effect is dependent on the logarithm of the carbon dioxide concentration, this means that above these areas the effect of increases is negligible or zero and the main supposed effects are on the areas with low current concentrations.

But this map does not tell the whole story.

Satellite measurements of carbon dioxide levels in the atmosphere have recently improved with the Atmospheric Infra Red Sounder (AIRS) on NASA;s Aqua level 3 satellite, which is able to provide monthly figures for mid troposphere concnetrations .

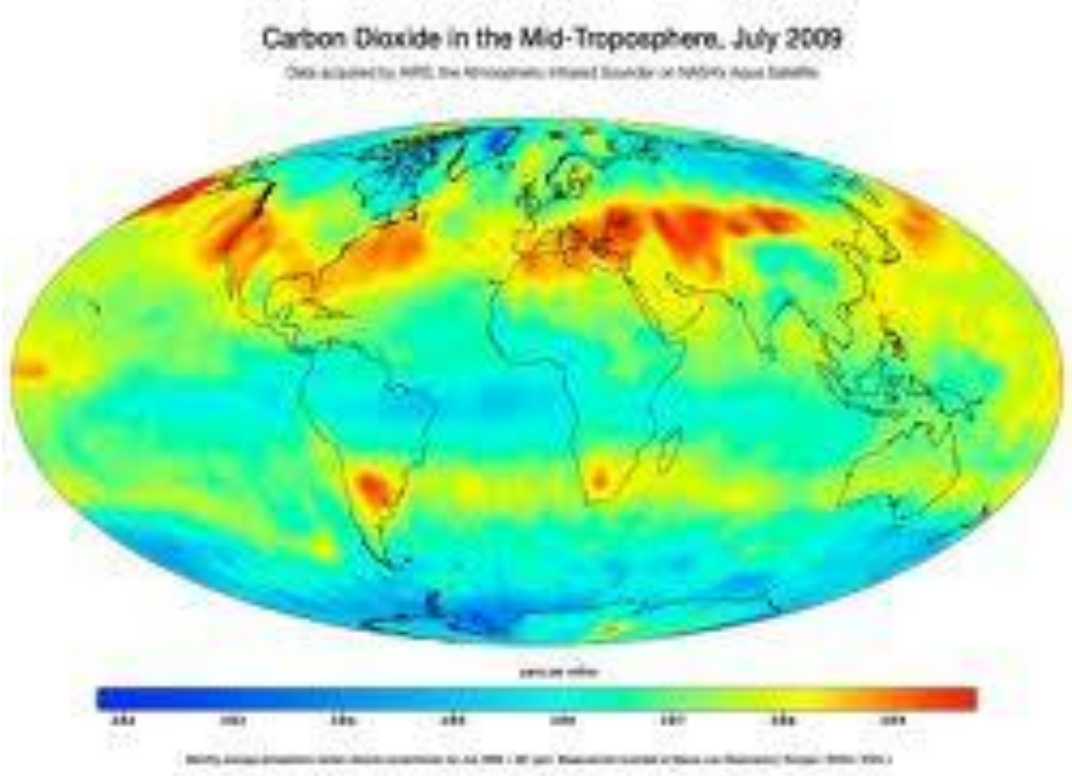

Figure 3 Average carbon dioxide concentration in the mid troposphere July 2009[14]

The AIRS NASA map[14] for July 2009 which shows average CO2 concentration in the mid troposphere for July 2009 is in Figure 3

This shows that for the mid troposphere regions the high emissions from the industrial countries are circulated, by the atmosphere, so that they are no longer above the regions of emission. Since this is a time as well as a column average the actual carbon dioxide concentration at any small region in the atmosphere is changing all the time and an overall figure above a particular place on the earth is continuously varying and ccurrently unpredictable.

It also means that measurements taken just above the earth's surface do not provide a fair guide to the influence of carbon dioxide at that place on the surface.

So carbon dioxide is not well-mixed in the atmosphere and the overall global models are no longer relevant.

.
NASA has even provided an animated video[14] based on a model of what they think happens. It shows that actual carbon dioxide concentrations vary with time and level everywhere in the atmosphere. The new OC-2 satellite promises to make individual time- and level-based measurements[15] A global model is no longer relevant

.At least carbon dioxide can be shown to be beneficial [16]

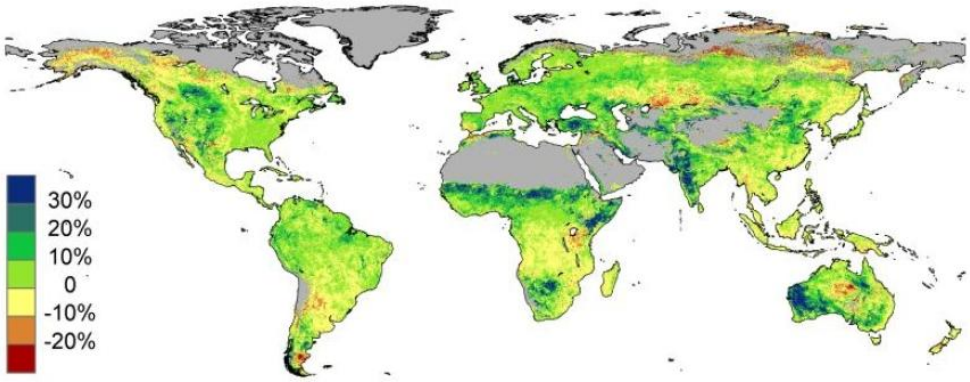

Figure 4. Enhancement of photosynthesis by increases of carbon dioxide[!%]

It is worth quoting the abstract of the paper by Randall et al 2013

Satellite observations reveal a greening of the globe over recent decades. The role in this greening of the "CO_2 fertilization" effect—the enhancement of photosynthesis due to rising CO_2 levels—is yet to be established. The direct CO_2 effect on vegetation should be most clearly expressed in warm, arid environments where water is the dominant limit to vegetation growth. Using gas exchange theory, we predict that the 14% increase in atmospheric CO_2 (1982–2010) led to a 5 to 10% increase in green foliage cover in warm, arid environments. Satellite observations, analyzed to remove the effect of variations in precipitation, show that cover across these environments has increased by 11%. Our results confirm that the anticipated CO_2 fertilization effect is occurring alongside ongoing anthropogenic perturbations to the carbon cycle and that the fertilization effect is now a significant land surface process.

REFERENCES

1 .Le Treut, H., R. Somerville, U. Cubasch, Y. Ding, C. Mauritzen, A. Mokssit, T. Peterson and M. Prather, 2007: Historical Overview of Climate Change. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

2 Weart S 2011, The Carbon Dioxide Greenhouse Effect. http://www.aip.org/history/climate/co2.htm#S1. http://www.aip.org/history/climate/co2.htm

3. Beck, E-G, *CO2* 1800-1960 Historical References, Chemical Met**hods** http://www.biomind.de/realCO2/literature/CO2literature1800-1960.pdf

4 Beck, E-G, 2007.180 Years of Atmospheric Gas Analysis by Chemical Methods, *Energy and Environment 18 259-281.*

5 Beck E-G Evidence of variability of atmospheric CO2 concentration during the 20th century http://www.biomind.de/realCO2/literature/evidence-var-corrRSCb.pdf

6 Keeling R. Comment + reply from author on "180 Years of atmospheric CO_2 gas analysis by chemical methods by"by Ernst-Georg Beck,*Energy and Environment, Vol. 18(2), 259-282, 2007.*

7 Jaworowski, Z. 2007. CO2: The Greatest Scientific Swindle of Our Time. *EIR Science* (March), 38-55.

8 Pieter Tans and Kirk Thoning. How we measure background CO2 at Mauna Loa http://www.esrl.noaa.gov/gmd/ccgg/about/co2_measurements.pd.

9 Beck E-G 50 Years of Continuous Measurement of CO2 on Mauna Loa*. Energy and Environment* ***19*** *No. 7 2008.*

10 Manning M R, A.J. Gomez, and K.P. Pohl Trends http://cdiac.ornl.gov/trends/co2/baring.html.

11 Takahashi T et al., 1999 *Deep-Sea Research II 49 (2002) 1601–1622* Global sea–air CO2 flux based on climatological surface ocean pCO2, and seasonal biological and temperature effects http://www.ldeo.columbia.edu/~csweeney/papers/taka2002.pdf http://www.seafriends.org.nz/issues/global/acid2.htm

12 EDGAR Emission Database for Global Atmospheric Research http://edgar.jrc.ec.europa.eu/part_CO2.php.

13 Climate Change Indicators http://scentofpine.org/indicators/

14 NASA | A Year in the Life of Earth's CO2 https://www.youtube.com/watch?v=x1SgmFa0r04

15 Orbiting Carbon Observatory OCO-2 http://oco.jpl.nasa.gov/

16 Randall J. Donohue, Michael L. Roderick, Tim R. McVicar, Graham D. Farquhar. Impact of CO_2 fertilization on maximum foliage cover across the globe's warm, arid environments. *Geophysical Research Letters*, 2013; DOI: 10.1002/grl.50563

Cheers

Vincent Gray

75 Silverstream Road
Crofton Downs
Wellington 6035
New Zealand
064 4 9735939