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The part of natural CO2 emissions: dynamite conference by Prof. Murry Salby

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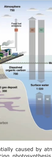
From time to time you stumble on a conference that promises to be so crystal clear, so common-sense and scientific at the same time, that it nearly blows you out of you socks. One such lecture is that of Prof. Murry Salby, chair of Climate Science at the Australian Macquarie University. By chance I found a link on this really outstanding conference in a comment at Lubos Motl blog The Reference Frame, and than a discussion at Joanne Nova's blog.

The title of the conference given the 2nd August 2011 at the Sydney Institute seems innocuous: *"Global Emission of Carbon Dioxide: The Contribution from Natural Sources"*, but the content is pure dynamite! A video (vodcast) of the conference and the following Q&A can be found **here**. Please take the time to watch it.

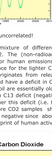
In this blog I will make some comments on the conference (after listening through it for 3 times), illustrated with screen-shots (some with additional art) taken from the vodcast. I presume that the Sydney Institute will tolerate this slight breach of copyright!

Prof. Salby starts with a picture from the IPCC showing the global carbon fluxes: natural emissions and sinks are about 150 Gt per year, human emissions are 5 Gt/y. These numbers are a bit on the low side, actual ones seems more like 152 an 7. But what is clear is that human emissions do represent only a tiny part of the natural fluxes.



Natural emissions are essentially caused by atmospheric temperature and moisture (both influencing photosynthesis, microbial action and ocean uptake). Volcanic or geological emissions (episodic or continuous) do play a minor role only. So natural emissions change independently from human emissions. A first point to show is that the regional atmospheric CO2 concentrations (one should say "mixing ratio", but I will stick to the shorter term of "concentration") are not found in the regions where human emissions are the highest (i.e. in the industrial regions of the US, Europe and Asia) but above the Amazon and the tropical Africa, as shown in the next picture showing what the satellites observe:

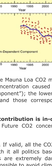
A second point to watch are the yearly changes in global atmospheric CO2 concentration and total carbon emissions by human activity:



These variations are totally uncorrelated!

Atmospheric carbon is a mixture of different isotopes, the most frequent by far being C12. The (non-radioactive) isotope C13 is usually taken as a proxy for human emissions. The story goes like this: Plants have a preference for the lighter C12, so an atmosphere where much of the CO2 originates from released carbon that was stored in plant matter should have a deficit in C13 (called delta-C13). As fossil fuels like coal and oil are essentially old plants, burning them would release carbon with a C13 deficit (negative delta-C13) and the more we will burn, the higher this deficit (i.e. the more negative the observed delta-C13). Ice core CO2 samples show that indeed delta-C13 becomes strongly more negative since about 1960. So this would be the non-disputable fingerprint of human activity!

The problem with this IPCC conform conclusion is that it is based on the hypothesis that natural emissions do NOT lower the delta-C13. If it can be shown that indeed they do, the whole CO2 by human scare collapses!



This upper picture shows the Mauna Loa CO2 measurements with the blue line indicating the concentration caused by natural emissions ("Circulation-Dependent Component"); the lower shows the delta_C13 observations as red dots and those corresponding to the natural carbon cycle as a blue line.

Conclusion: the human contribution is in-distinguishable from the natural component! Future CO2 concentrations can only be marginally predicted.

This conclusion is dynamite. If valid, all the CO2 scare of the last 20-30 years collapses, and with it all politics based on the assumption that human CO2 emissions are extremely dangerous and must be forcibly reduced as fast as possible to avoid climate disruption.

Prof. Salby (a former IPCC contributor) stresses that the above considerations of the importance of natural CO2 emissions have been ignored in IPCC's AR4.

He concludes with this marvelous sentence: *"Anyone who thinks the science in this complex issue is settled, is in fantasia".*

Dr. Roy Spencer wrote in his blog a **comment** also questioning our knowledge of the human contribution:

> *"… the human source represents only 3% (or less) the size of the natural fluxes in and out of the surface. This means that we would need to know the natural upward and downward fluxes to much better than 3% to say that humans are responsible for the current upward trend in atmospheric CO2. Are measurements of the global carbon fluxes much better than 3% in accuracy?? I doubt it."*
>
> *"…The interannual relationship between SST and dCO2/dt is more than enough to explain the long term increase in CO2 since 1958. I'm not claiming that ALL of the Mauna Loa increase is all natural…some of it HAS to be anthropogenic… but this evidence suggests that SST-related effects could be a big part of the CO2 increase"*
>
> *"… I've been analyzing the C13/C12 ratio data from Mauna Loa…just as others have found, the decrease in that ratio with time (over the 1990-2005 period anyway) is almost exactly what is expected from the depleted C13 source of fossil fuels. But guess what? If you detrend the data, then the annual cycle and interannual variability shows the EXACT SAME SIGNATURE. So, how can decreasing C13/C12 ratio be the signal of HUMAN emissions, when the NATURAL emissions have the same signal???"*
>
> …
>
> Please read also this **comment** of Richard S. Courtney with extracts from the paper "Rorsch A, Courtney RS & Thoma D, "The Interaction of Climate Change and the Carbon Dioxide Cycle" E&E v16n02 (2005)".
>
> Richard S. Courtney writes *"the carbon cycle cannot be very sensitive to relatively small disturbances such as the present anthropogenic emissions of CO2"*
>
> and
>
> *"… it would appear that the relatively large increase of CO2 concentration in the atmosphere in the twentieth century (some 30%) is likely to have been caused by the increased mean temperature that preceded it. The main cause may be desorption from the oceans. The observed time lag of half a century is not surprising. Assessment of this conclusion requires a quantitative model of the carbon cycle, but as previously explained such a model cannot be constructed because the rate constants are not known for mechanisms operating in the carbon cycle"*

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7 Responses to "The part of natural CO2 emissions: dynamite conference by Prof. Murry Salby"

Judy Ryan Says:
January 12, 2013 at 03:02 | Reply

This is fantastic. Somehow we now have to get this info to the Australian public.

Professor Murry Salby To Calienge "Global Warming" In Presentation At The Helmut Schmidt University Says:
April 5, 2013 at 15:20 | Reply

[…] for Climate and Energy (EIKE) and Die kalte Sonne sites have announced that renown scientist Murray Salby will be speaking on climate in […]

On the post-retirement revolutionaries of climate science Says:
April 19, 2013 at 22:07 | Reply

[…] views on the relationship between CO2 and global temperatures on longer and shorter timescales, and is hailed by some blogs as a Galileo revolutionising climate science. This blog is about the […]

Ferdinand Engelbeen Says:
April 20, 2013 at 11:06 | Reply

Sorry to disappoint you: there is somewhere a gross error in the "natural" component of the 13C/12C ratio. The oceans can't be the cause of the decline, simply because the oceanic ratio is (higher) than of the atmosphere. Any substantial extra release from the oceans would increase the 13C/12C ratio in the atmosphere, not lower it. Moreover, Roy Spencer confuses the seasonal growth and decay of vegetation – mainly in the NH – with the long term decline. But vegetation in general, the only other source of low 13C, is growing, thus in fact using preferentially more 12CO2 and thus leaving relative more 13CO2 in the atmosphere, the opposite of what is seen as trend.

As both the oceans and the biosphere are proven sinks for CO2, not sources, that simply refutes the whole Salby thesis. See e.g.:

Click to access BerndeCBC2005.pdf

For further discussion that humans are responsible for the increase in CO2 (the influence of the increase on temperature is an entirely different topic): http://www.ferdinand-engelbeen.be/klimaat/co2_measurements.html#The_mass_balance

Terry Goldman Says:
June 12, 2013 at 18:44 | Reply

Not that I think the IPCC has it right, but don't we know a lower bound on the human contribution by adding up known sources? Even industrial activity in China should be reasonably available and just about everywhere else it is certainly trumpeted. This is distinct from the question of whether or not it is important to the global climate. The essential questions remain: What is the response coefficient of global temperature to atmospheric CO2 concentration? And does this concentration lag or lead (as in Courtney's comment)?

Typo: last 2 digits missing: "delta-C13 becomes strongly more negative since about 197"

fmassen Says:
June 13, 2013 at 17:31 | Reply

Thanks for the typo…has been corrected (1960): see instance http://90.photobucket.com/albums/k247/dfm1353/HumanFingerprint.png)

The SALBY Hamburg conference: phase lag between CO2 and temperature | meteoLCD Weblog Says:
June 16, 2013 at 12:05 | Reply

[…] and MP4 version here). His presentation was similar, but not identical to that I discussed in a previous post. It was quite technical in several parts (the video shows a very silent public, but this could […]

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