2nd part

- B2-b- Direct measurements since 1880

Since the time we have been using the thermometer, more values that are reliable are available but the conditions for making measurements are difficult to standardize and accuracy is worse than decimals published.

The weather stations were once far from cities often-near airports and now they are surrounded with homes and local heat sources. The measures at sea on boats have insulation problems into the buckets and corrections are questionable.

The worst is that the major historical reconstructions are often property of the authors who refuse to give details of the sources and corrections (Jones).

The climate has become a religion for some and is not conducive to transparency.

Differences sources give curves with deviations in the order of 0.4 ° C

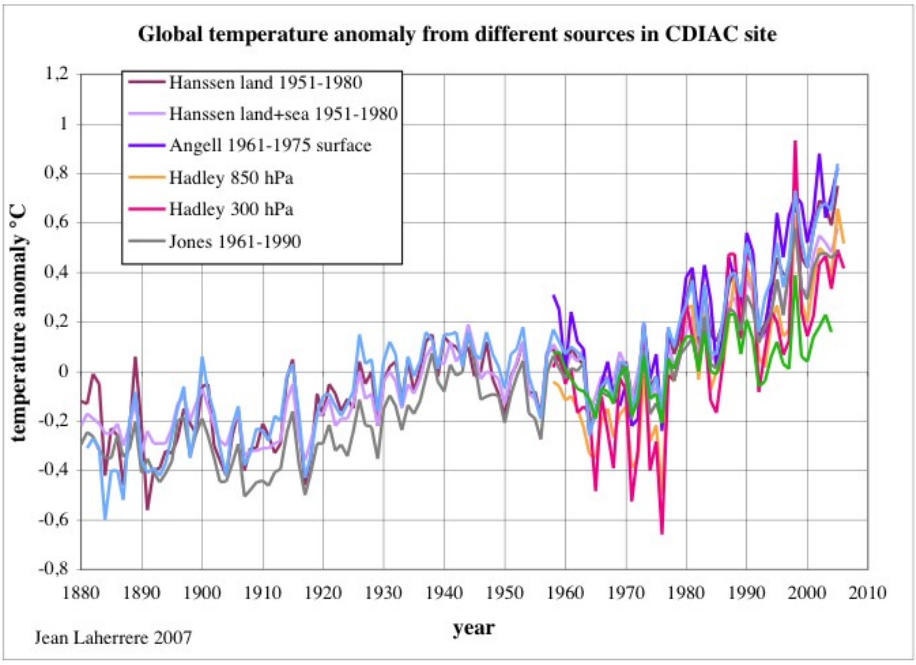

Figure 28: World temperature anomalies 1880-2005 according to several sources

The temperature on earth varies more than the temperature at sea, which is normal because much more energy is needed to heat air than water.

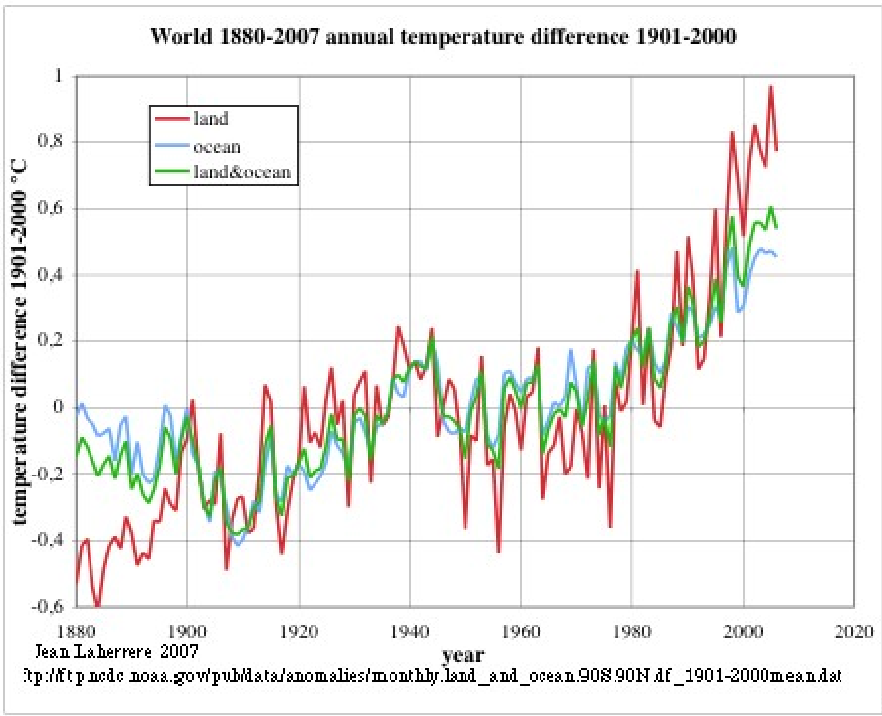

Figure 29: World temperature anomalies 1880-2005 at land and at sea according to NOAA

The big problem to get a global temperature is to obtain representative averages, but the density of the measures is very uneven as well as is their quality.

Courtillot (letter 21 Academy of Sciences, spring 2007) notes that there are more modellers than data observers and that "*defining the average temperature of the lower atmosphere in the world is a very difficult issue and there are few laboratories in the world who are interested in it*". He adds about the Jones temperature curve since 1850 "*we have growing doubts about the validity of a calculation that for the moment we do not have all the elements to resume*" and for Europe "*we do not see any trend of increase from 1900 to 1980, but an unusually cold year in 1940 and a jump significant (about half a degree) and fast in 1985-1987, whose origin we have yet not understood. And since that jump, for 20 years, the trend has been flat again.*"

Indeed for the US where data are easier to average and cycles have not been observed but the centennial trend asks to wait for a few more decades. The record temperature is always 1934 at 1.25 ° C while 1998 was only 1.23 ° C.

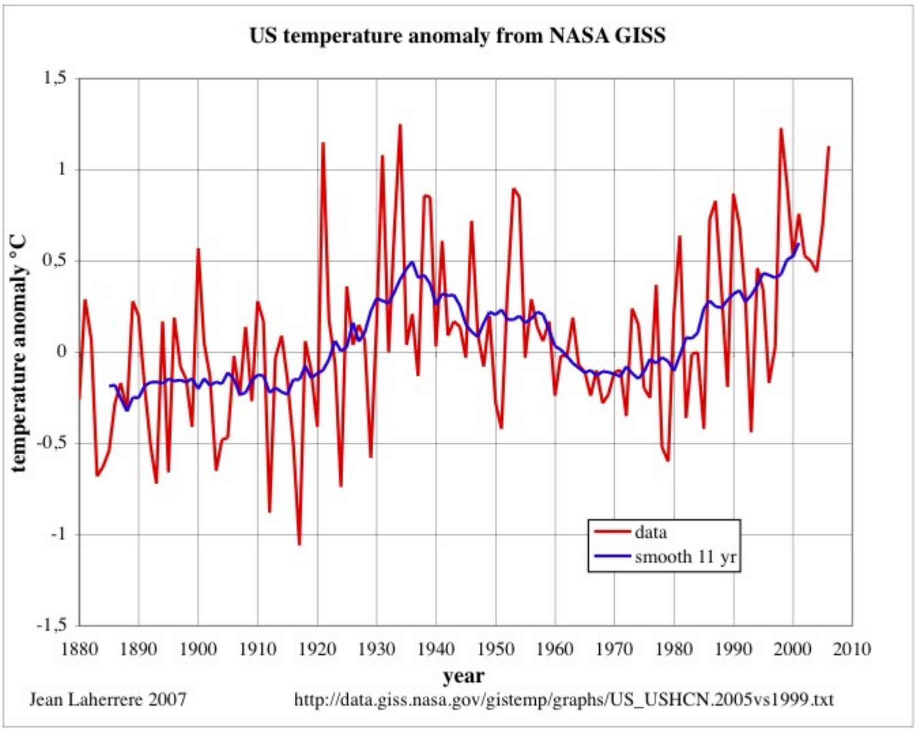

Figure 30 : temperature anomalies according to the US NASA GISS 1880-2004

In general, the global average is calculated with a 5° x 5° grid.

For the 1901-1996 period, the major changes are in the Arctic where measures are made especially in winter at airports in operation, and in Russia, where the measures are questionable (made in the gulags), and many cells are missing. The average outcome of this map is so poor.

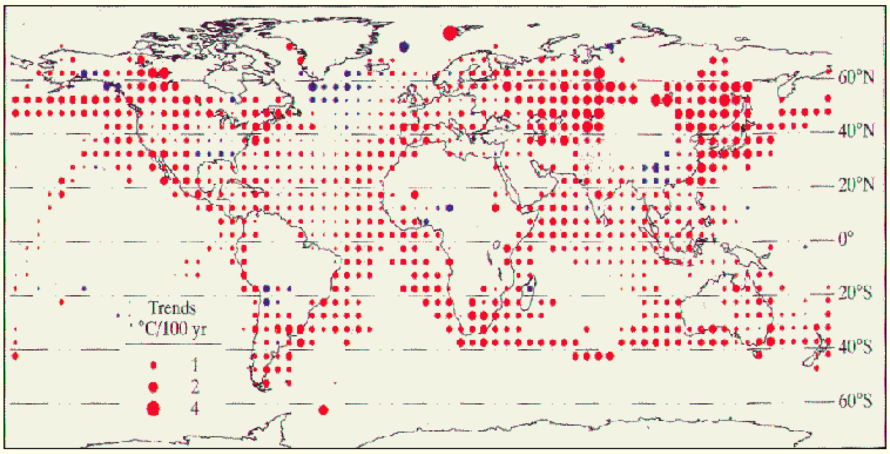

Figure 31: Surface Temperature Trends (1901-1996) in °C/100 years for 5° x 5° grids (from Karl 1998)

Spitzberg shows a record rise next to the record drop in Iceland!

For the 1976-1998 period measurement density is better with a sharp increase in Eastern Siberia.

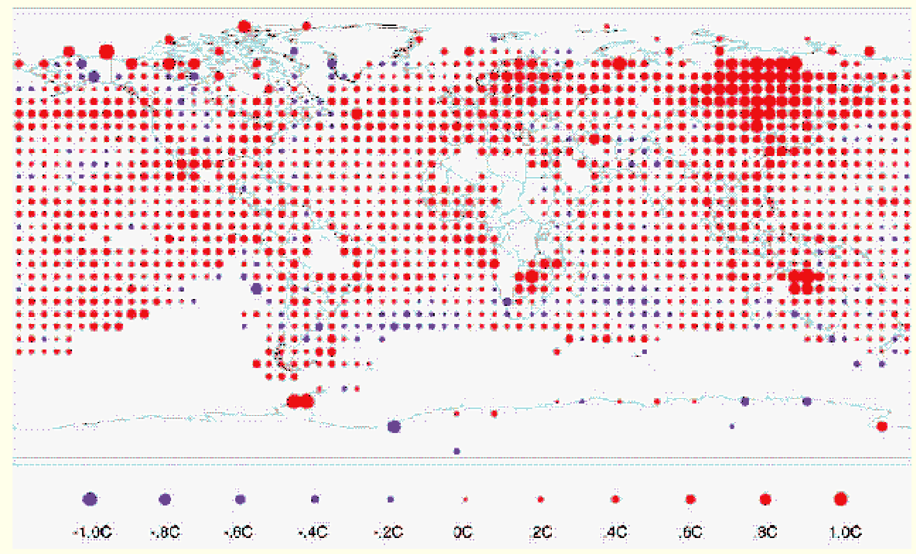

Figure 3 Annual Surface Temperature Trends (°C/decade) 1976-1998 for 5°x5° grids

Figure 32: Annual Surface Temperature Trends (°C/decade) 1976-1998 for 5° x 5° grids

It turns out that the Arctic heats up more than the tropics, but also cools down more, as shown by measurements of the Arctic Ocean with a drop of 1.5 ° C from 1940 to 1970. Therefore the sharp rise in the Arctic today is not surprising,!

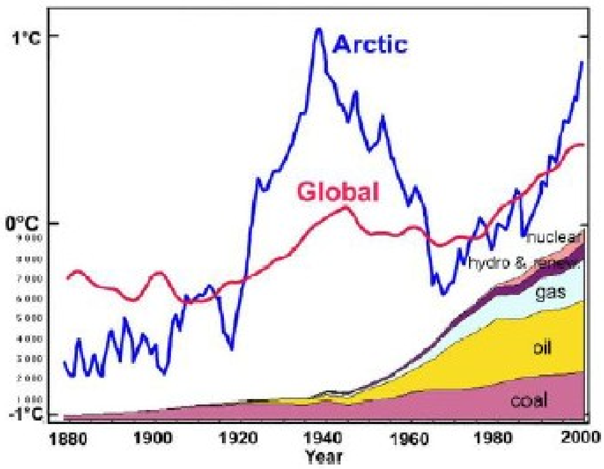

Figure 2: Red – global average change (IPCC Reports). Blue – data from stations along the coastline of the Arctic Ocean (Polyakov et al., 2002). The figure shows also the amount of various sources of energy used during the last century; gas, oil, and coal all release CO_2.

Figure 33: temperature change in the Arctic compared to the World 1880-2000

Http://www.iarc.uaf.edu/highlights/2007/akasofu_3_07/Earth_recovering_from_LIA_R.pdf

The distribution of temperatures on the planet over the period 1947-2007 (Tom Quirk site Lavoisier group) shows a peak at 23°C for a range of -58°C to 33°C. The concept of average global temperature is not clear when it comes to 15°C.

Figure 3

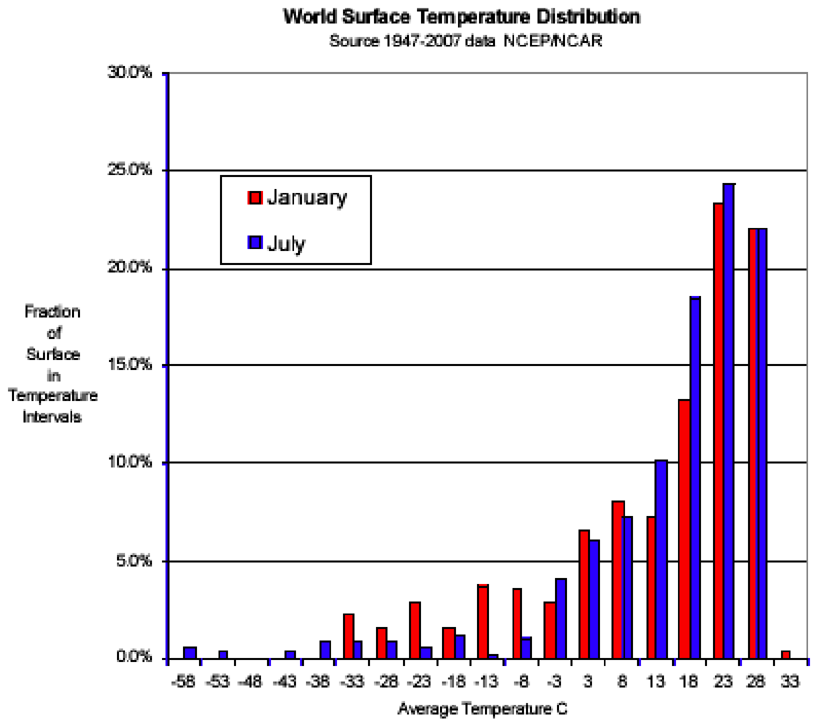

Figure 34: World surface temperature Distribution in surface % per interval

The average temperature around 14°C in France is exceeded by more than half of the planet. 15°C corresponds to 50% of the surface, but should we not distinguish between sea and land?

Figure 4

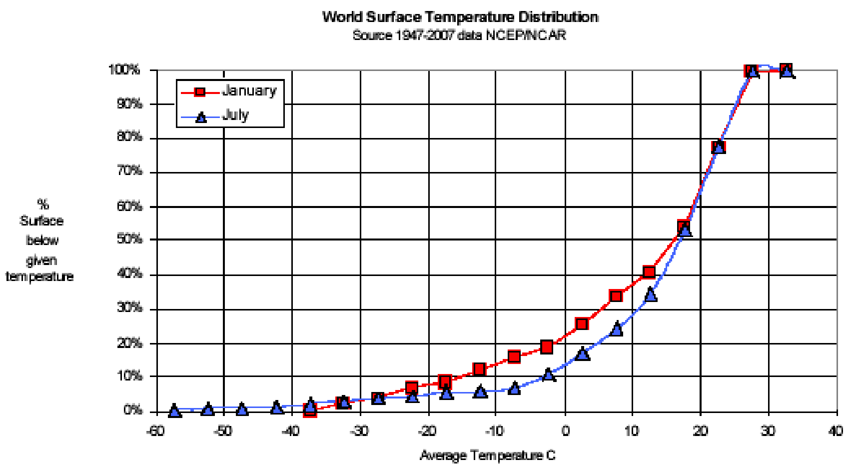

Figure 35: Distribution of temperature as a % of the surface for a given temperature

The temperatures at less than 0°C represent 20%, temperatures at less than -20°C in the range of 5%. One can therefore ask whether the temperatures of polar ice are representative of global mean temperature, especially as figure 33 shows that the polar temperatures are much amplified compared with latitudes that are more equatorial.

The temperature range is from -60°C and 33°C. In France, it is from 10°C (Lille) to 16°C (Marseille).

Fig. II.2 – Températures moyennes et annuelles de la France (en °C)
(A : altitudes non compensées ; B ; ramenées au niveau de la mer)

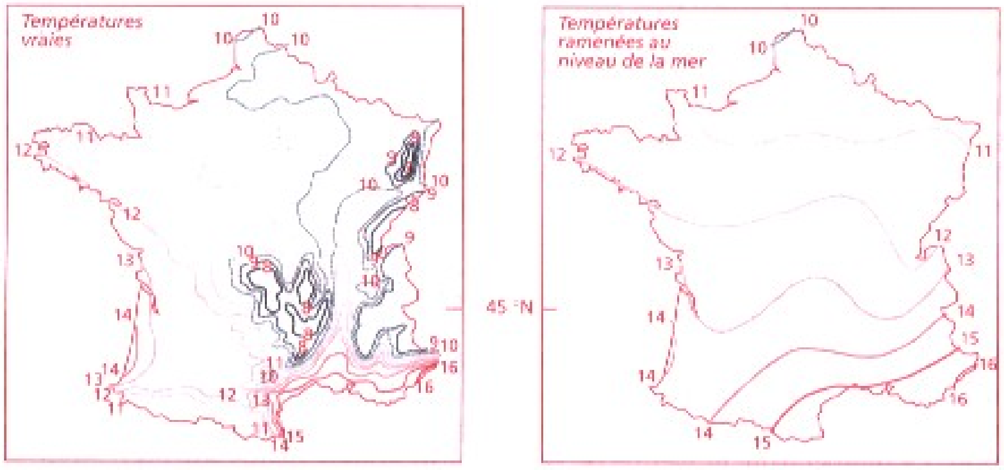

Figure 36: The average temperature in France according Tabeaud 2000

The range of temperatures on the planet is considerable and a 4°C increase forecast by the IPCC, which is said by some intolerable seems small in comparison: it is less than moving from Lille to Marseilles!

Personally, as a geophysicist, I worked on the ground (episodically) lying in a tent (now it is in air conditioned caravans) at -40°C in the Northern Territories of Canada, and at +45°C in the Sahara. Man can resist to all temperatures of the earth!

The global temperatures of the last millennium are therefore imprecise being imprecise substitutes, and are millennium averages for measurements in the ice because of their long standing presence with the open air in the firn. For those of the last century with direct but little homogeneous measurements, it is a little better, but estimating worldwide average is difficult. For those of recent decades, it is necessary to rely on more reliable data and homogeneous namely satellite data.

The IPCC AR4 2007 report shows temperatures between 1960 and 2005 with four levels, three in the troposphere, which have been increasing since 1965 and one in the stratosphere, which declines, but with peaks corresponding to Pinatubo and El Chichon volcanic eruptions.

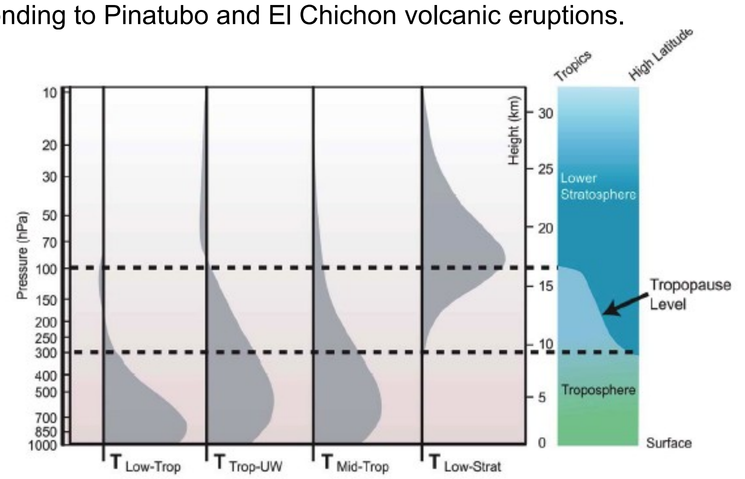

Figure 3.4.1. Vertical weighting functions depicting the layers sampled by satellite MSU measurements and

Figure 37: satellite measurement altitudes AR4

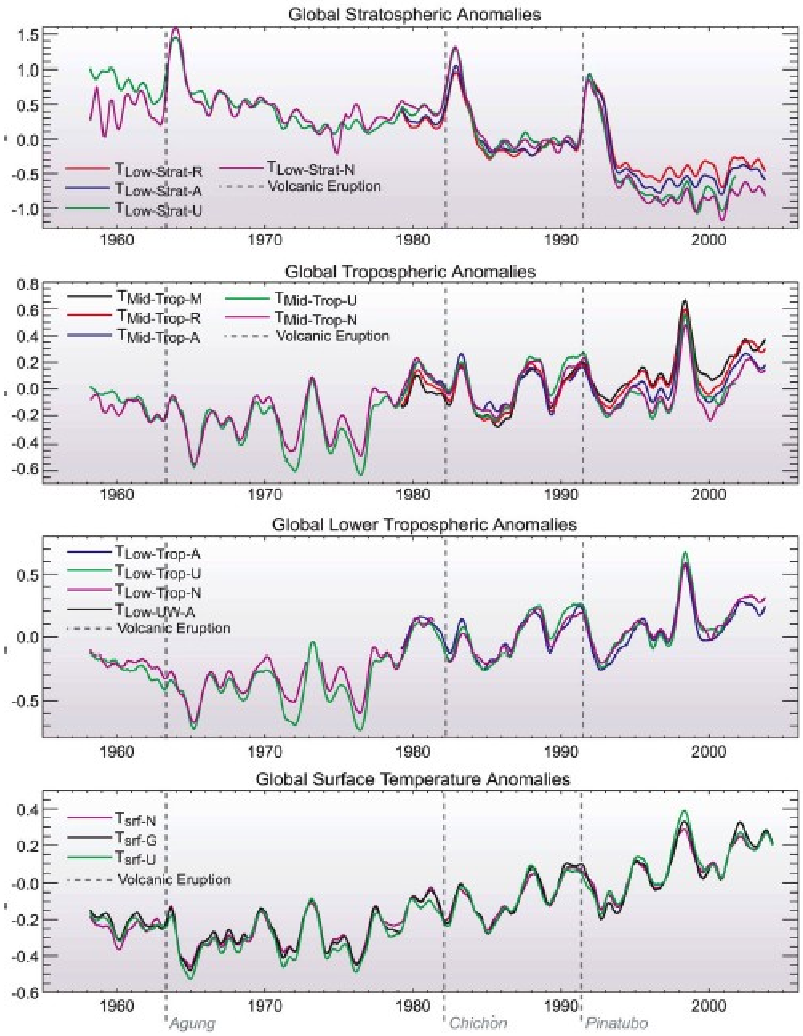

Figure 3.4.2. Observed surface and upper air temperatures. Bottom: surface records from NOAA (srf-N),

Figure 38: stratospheric and tropospheric temperature anomalies AR4

The cooling in the upper atmosphere was first denied, accusing the drift satellite of loosing altitude, because it seems inconsistent with the principle that the temperature depends mainly on the greenhouse effect.
The El Nino phenomena (red dots) that are difficult to predict have a major impact on the temperature, more than volcanic eruptions (blue bars), including in 1998.

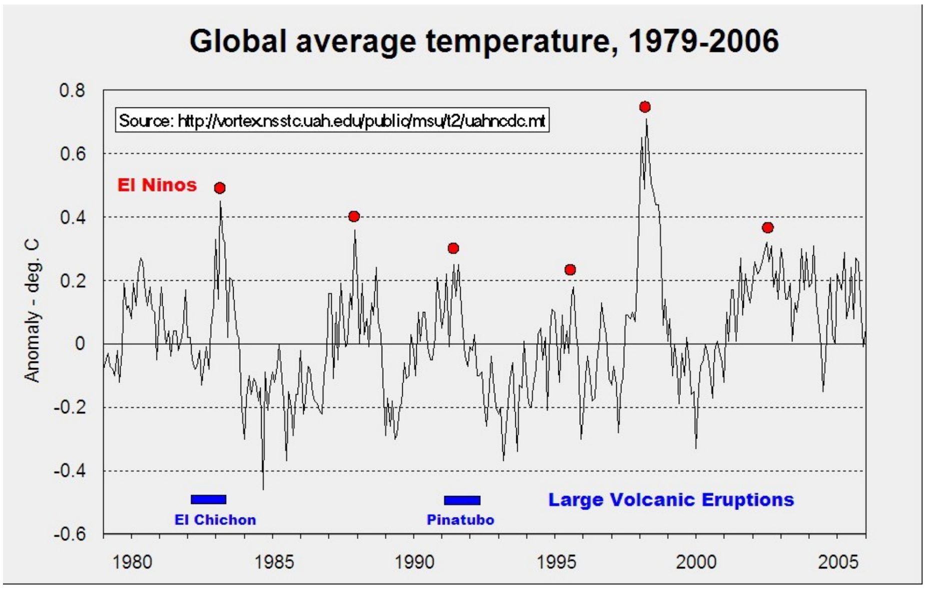

Figure 39: global mean temperature anomalies after the University of Alabama (national space science & technology centre)

- B2-c- Temperature models

The models require Monte Carlo simulations on equations and data leading to many months calculation of the most powerful computers and monstrous files (40 TB): For a 2° x 2° mesh, 30 to 45 levels, 2 models = 40 000 hours = 6 to 12 months. Meteorology No. 55 nov.2006: Simulation of recent and future climate models by the CNRM and IPSL Dufresne et al: *The modeling of clouds is identified for several years as a major source of uncertainty in these estimates (Cess and al 1990).*

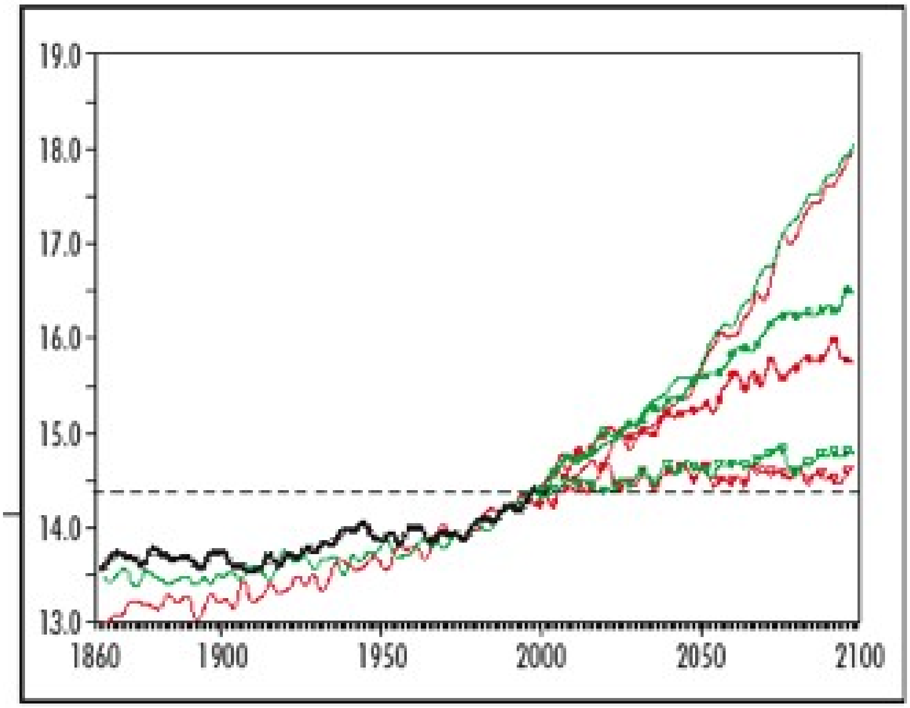

Figure 40 Evolution of temperature for 2 models CNRM and IPSL 1860-2100

On these two models (red and green), cooling from 1945 to 1975 does not appear and calibration with the past (black) is wrong, leading to highly questionable projections of future temperature.

The difference of two models on the map is considerable, casting doubt on their validity!

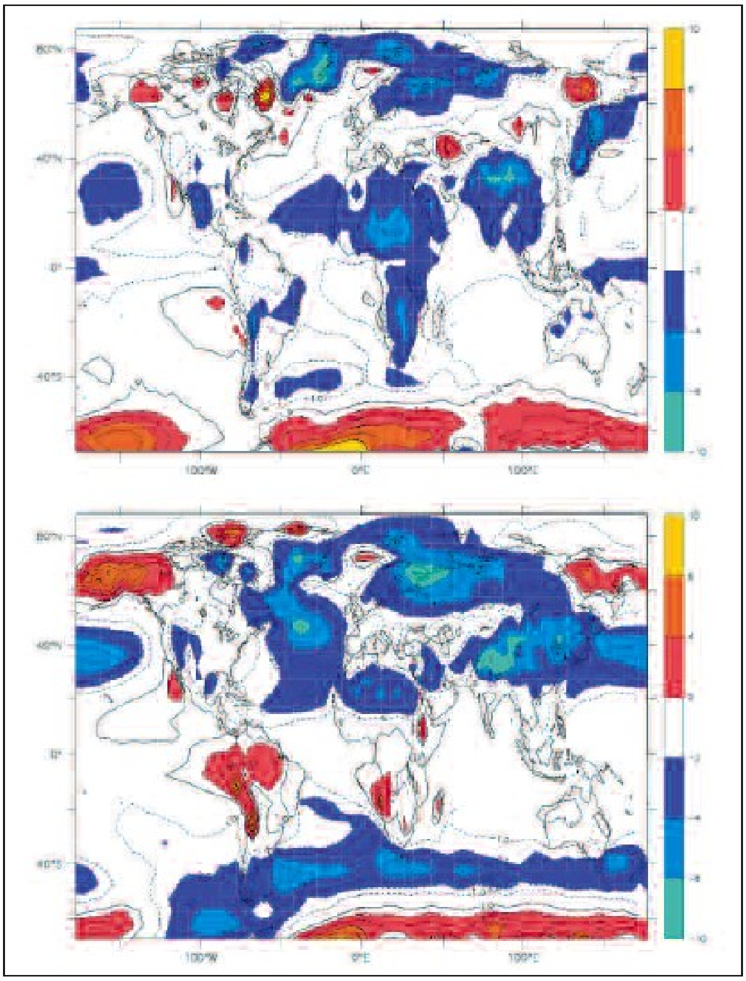

Figure 41: Differences between annual temperatures of the air near the surface simulated by CNRM-CM3 (top) and IPSL-CM4 (bottom) models and temperatures observed (data from CRU) on average over the period 1960 - 1987 23 WHITE PAPER

The comparisons of the two French models led to believe that we are far from having efficient models and that the results are unreliable.

- B2-d- IPCC Simulation

The IPCC simulation can be broken down into natural and man-made.

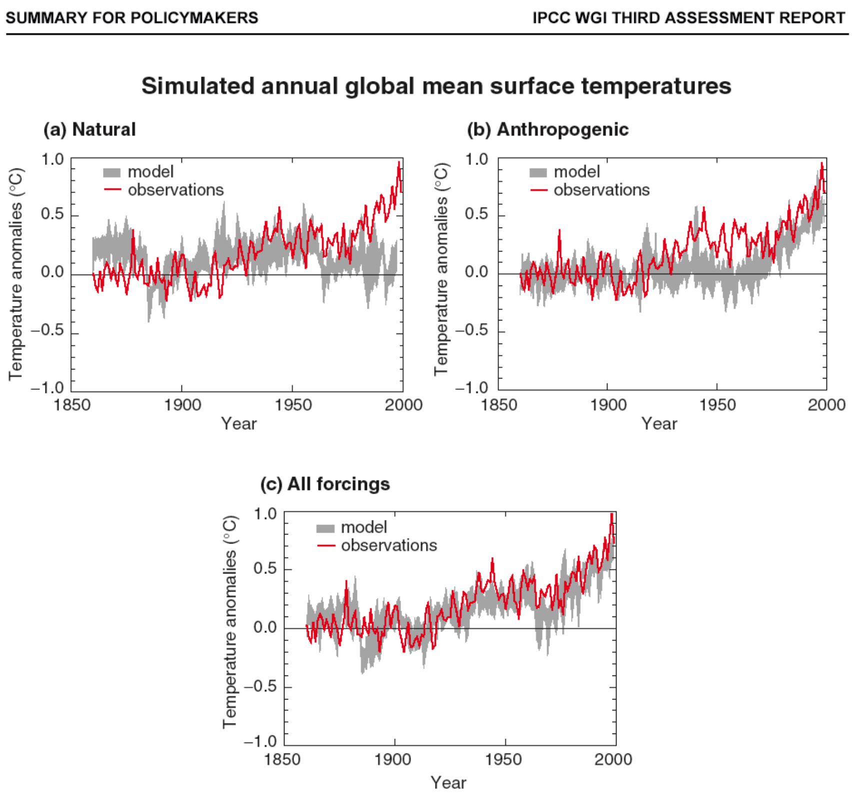

Figure 41: Simulation by 2001 IPCC for anthropogenic and natural temperature

The increase due to human activity is mainly due to fossil fuel consumption and the correlation between the IPCC model and reality (positive CO2 and negative SO2) seems mediocre.

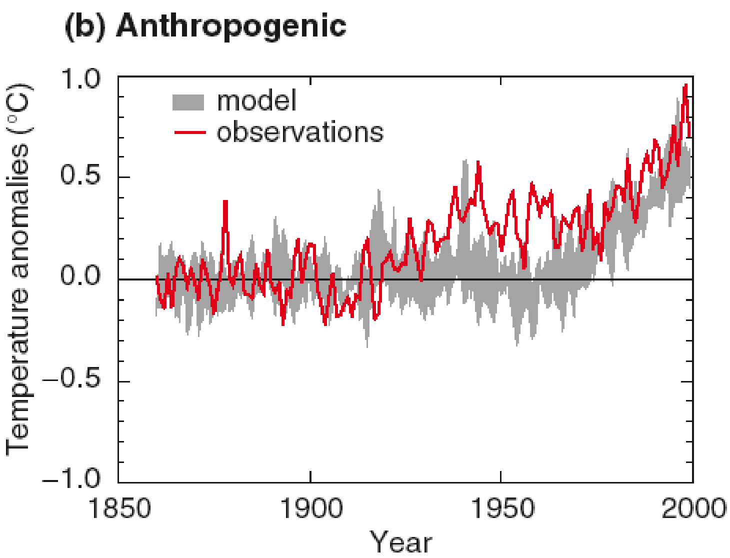

Figure 42: 2001 Simulation by IPCC for anthropogenic initial temperature

The local peak-time of 0.5°C IPCC model (in gray) in 1940 seems far greater than the reality, especially in view of the palm of the depression in 1930 before and the reduction of the war after! The IPCC model is a black box and it is difficult to distinguish the positive effects of emissions (CO2) and negative emissions (SO2).

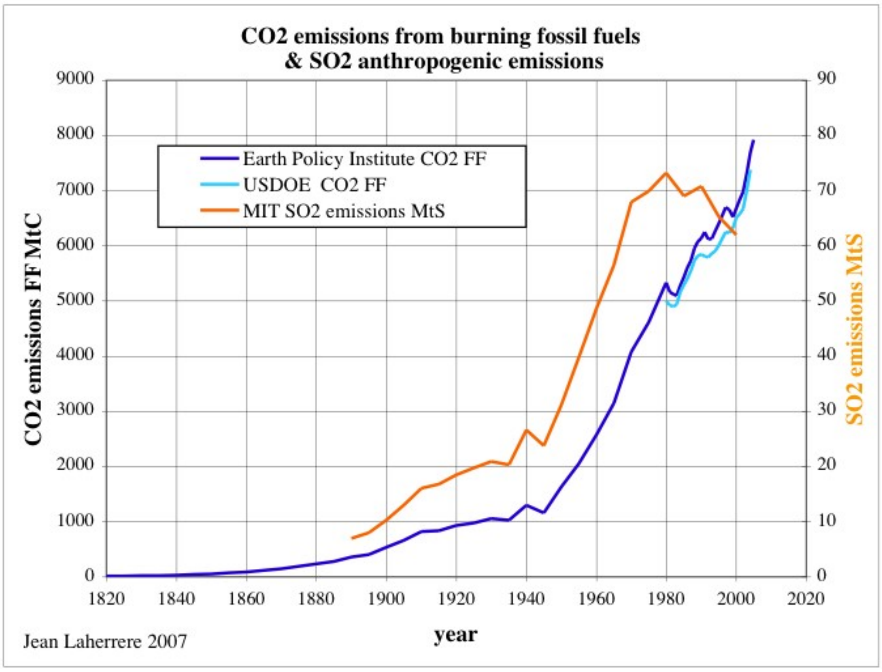

Figure 43: CO2 and SO2 from fossil fuels 1820-2005

- B2-e- Cyclicity

Klyashtosin & Lyubushin 2003 observe a 60 year cyclicity and they forecast a temperature peak around 2010, backed up by K. Abdusamatov (RIA Novosti on August 25, 2006), who thinks that a cool period cold such as a small ice age will begin around 2012-2015 and will reach its peak in 2022-2060.

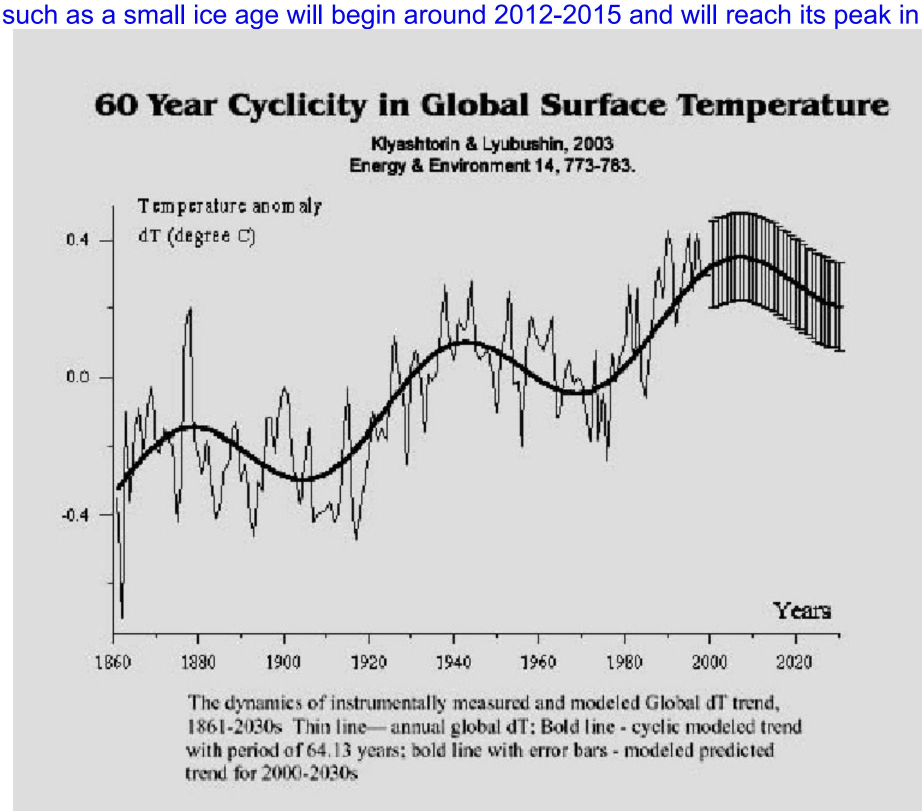

Figure 44: cycle of 60 years for global temperature according Klyashtosin

The temperature curve can be compared to a curve shifted by 60 years. We see a better correlation if one increases by 0.4 ° C. The trend is rising for the 60 year cycle, but there are probably other longer cycles = 1500 year cycles? Singer 2007 "*Unstoppable global warming every 1 500 years*"

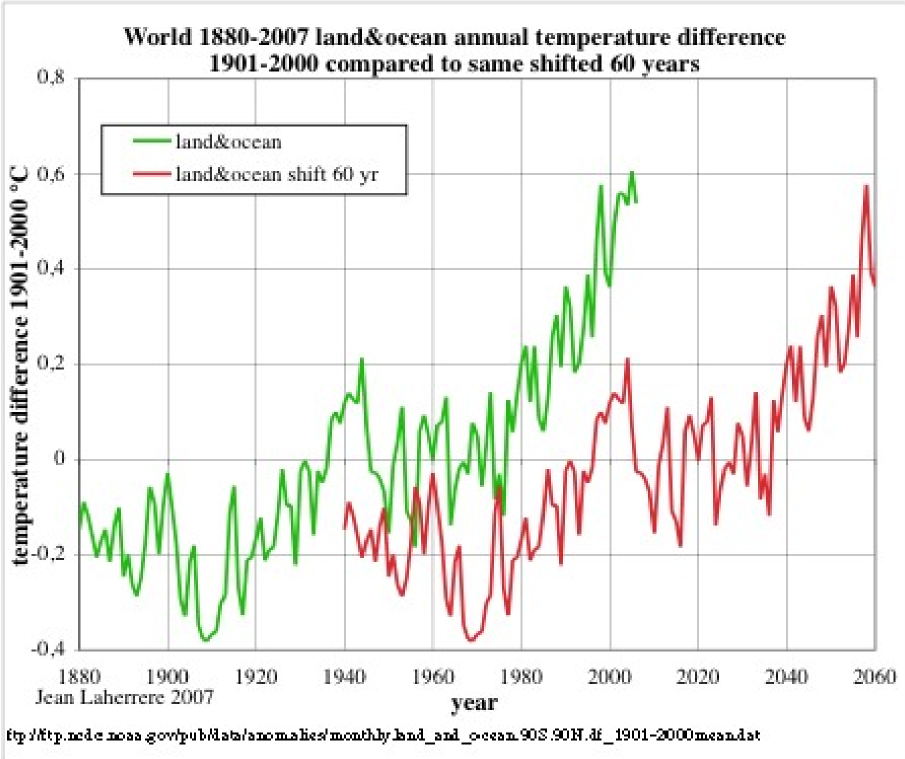

Figure 45: Global temperature compared to the curve shifted by 60 years

C - CO2

- C1- past of CO2

What does the past say for CO2? At the creation of the earth, CO2 was 100 000 times higher than the current rate; it then declined sharply to 10 times 600 Ma ago; it rose to 20 times and then down to 1 time at the Carboniferous, rose to 5 times 100 Ma ago to back down to 1 time in Quaternary.

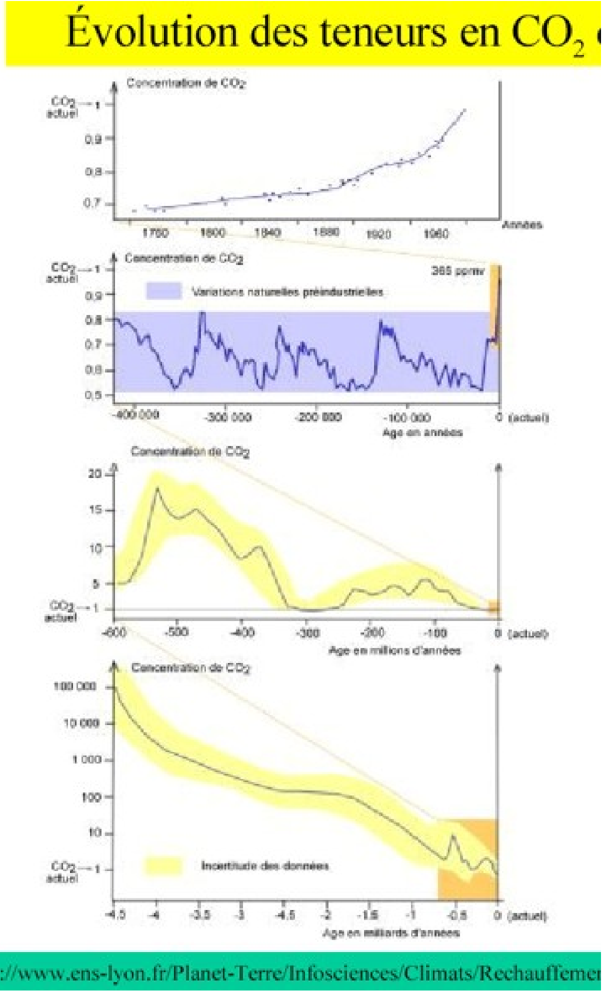

Figure 46: levels of CO2 rates from 4.5 billion years (P. Thomas 2000)

Francois et al (Carnets de Géologie Memoir 2005/02, Abstract 02 "*modélisation des variations du CO2 atmosphérique à l'échelle des temps géologiques*) shows a more detailed curve over 500 Ma.

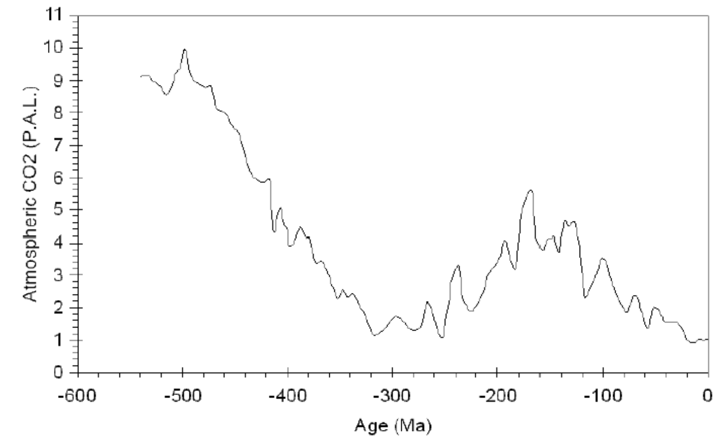

Figure 1: Model of the evolution of atmospheric CO_2 over Phanerozoic times. CO_2 levels are expressed as multiples of the Pre-industrial Atmospheric Level (P.A.L. = 280 ppm). It is a time-dependent multi-box model of the carbon

Figure 47: changing rates of CO2 from 500 Ma

But there has been a very different interpretation in detail, including the Cambrian and Devonian.

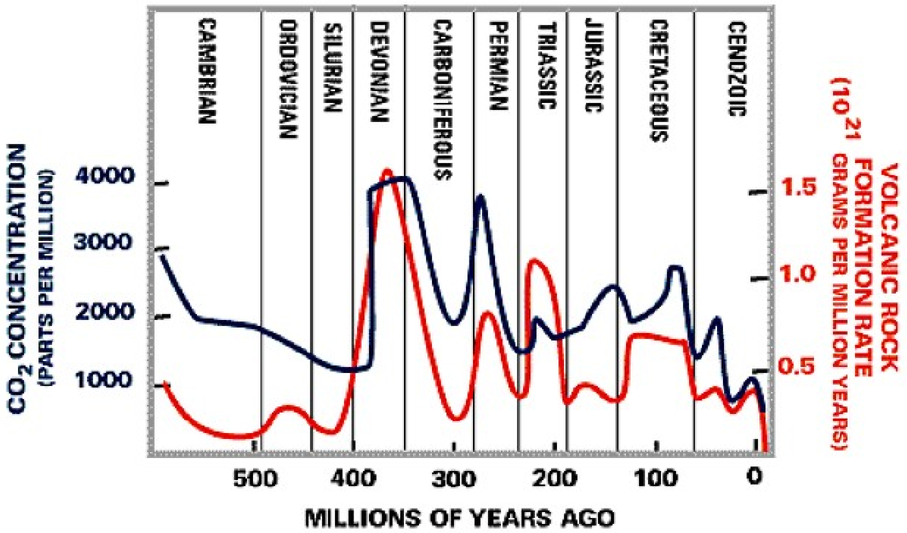

Figure 6. The relationship between CO2 concentration in the atmosphere and volcanic activity on earth.

Figure 48: a different graph and correlation with the volcanism
Http://www.globalchange.umich.edu/globalchange1/current/lectures/kling/carbon_cycle/carbon_cycle_new.html

For the last 10 000 years the IPCC has a hockey stick interpretation of the measures resulting in ice which are averaged over several millennia and connected to the recent annual measures!

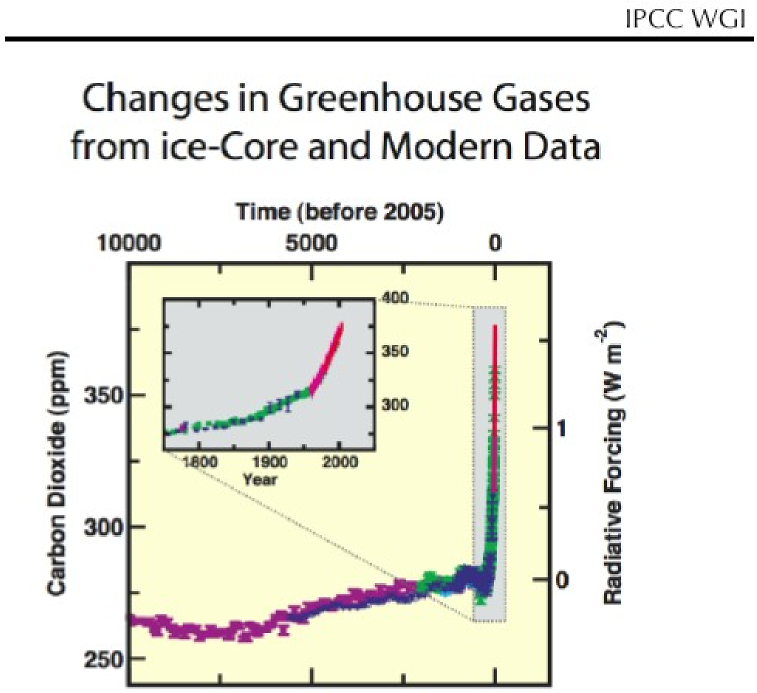

Figure 49: CO2 concentration over 10 000 years IPCC AR4

CO2 measurements in the cores of Antarctica for the past millennium are calibrated on direct measurements of Mauna Loa (Hawaii) through assumptions about the shift bubble age and ice age (see Chapter ice).

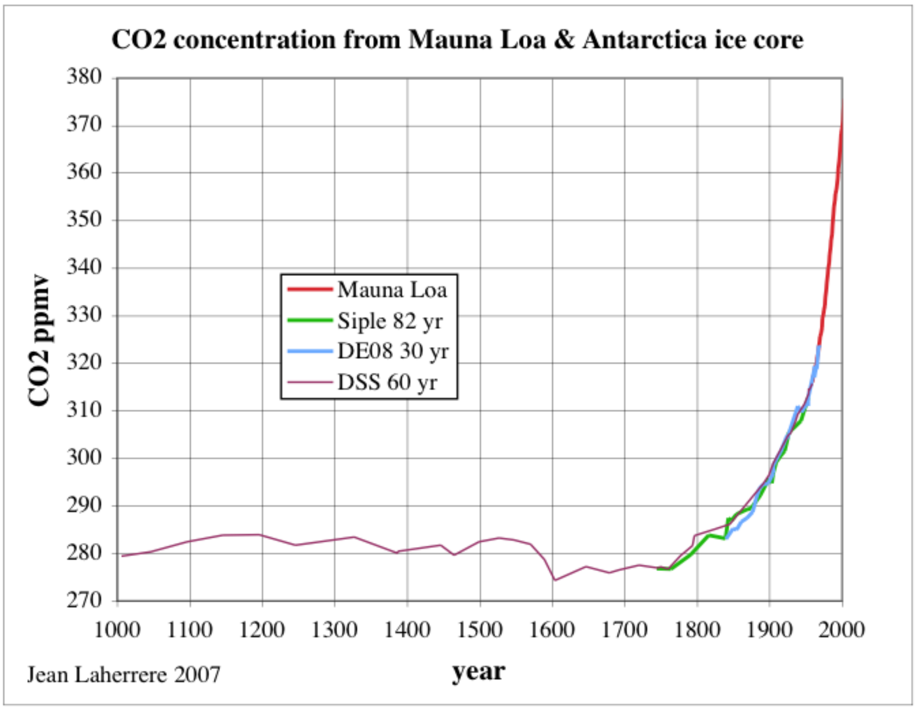

Figure 50: CO2 from the cores of Antarctica hold on the measures of Mauna Loa

- C2- CO2 Datation

We have seen, in the chapter on firns, the smoothing of the composition of gas bubbles remaining in communication with the atmosphere for thousands of years. Only sites with high accumulation (100 cm/y) provide recent values with a smoothing over less than a century. The Sipple, DE08 and DSS sites correspond to a close-off duration of the bubbles very low compared to Vostok and Dome C.
Measurements of CO2 over the period 1500-1998 does not practically change with a smoothing of 50 years or even 100 years, which shows that the measures are already smoothed.

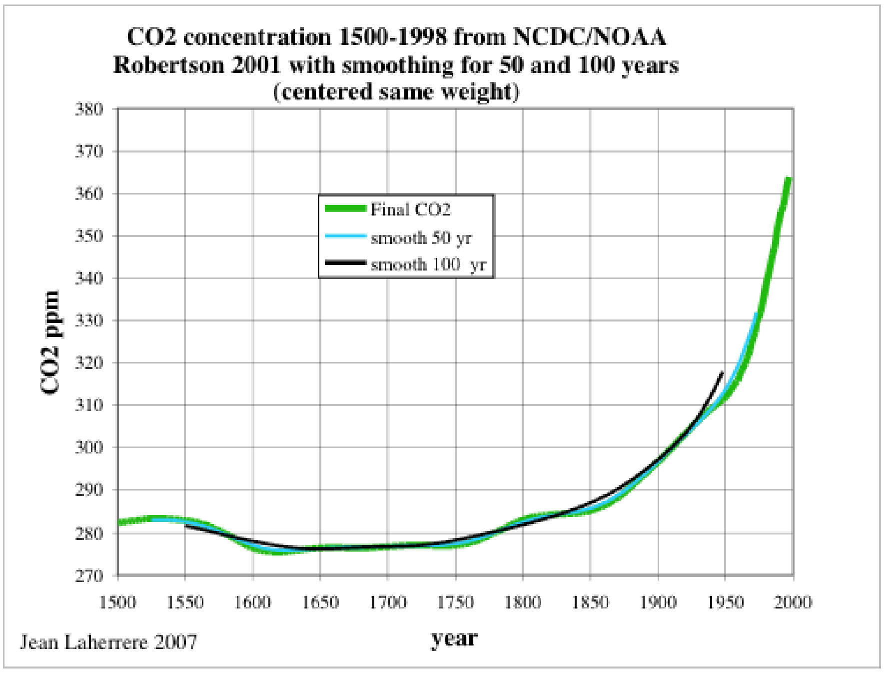

Figure 51: 1500-1998 CO2 according to NOAA with 50 and 100 year smoothing

In addition, recent CO2 chart is based on the site of Siple and interpretation of Neftel 1994.

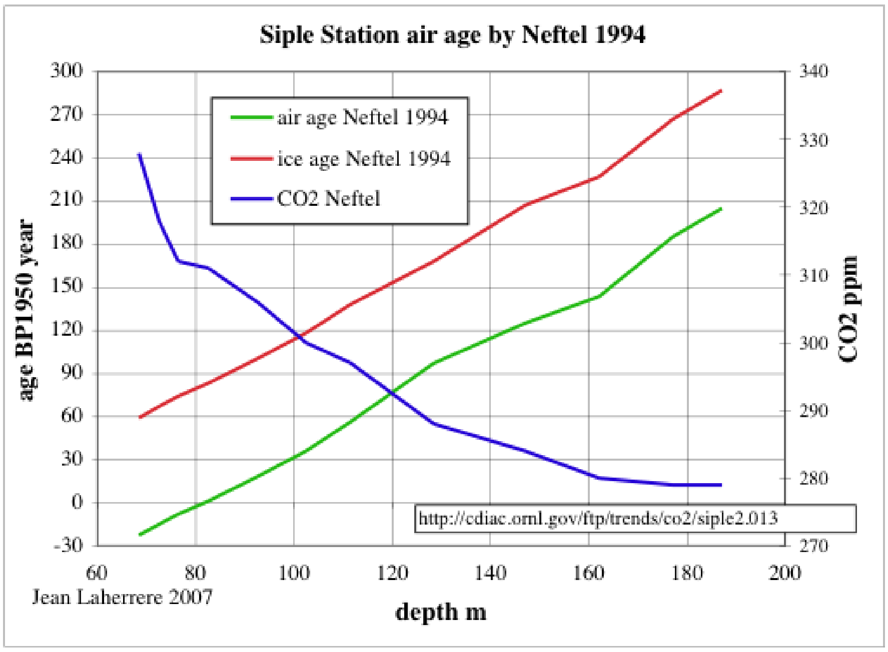

Figure 52: bubble age & CO2 at Siple station Neftel 1994

Unfortunately, a more recent interpretation (Blunier et al 2002) is contradictory giving at 180m a bubble age over 2000 years versus 200 years for Neftel. If Blunier is right, we need to eliminate the values of Neftel for CO2 from recent centuries. It should be noted that Blunier begins at 180m where Neftel finishes: obvious confrontations must be avoided!

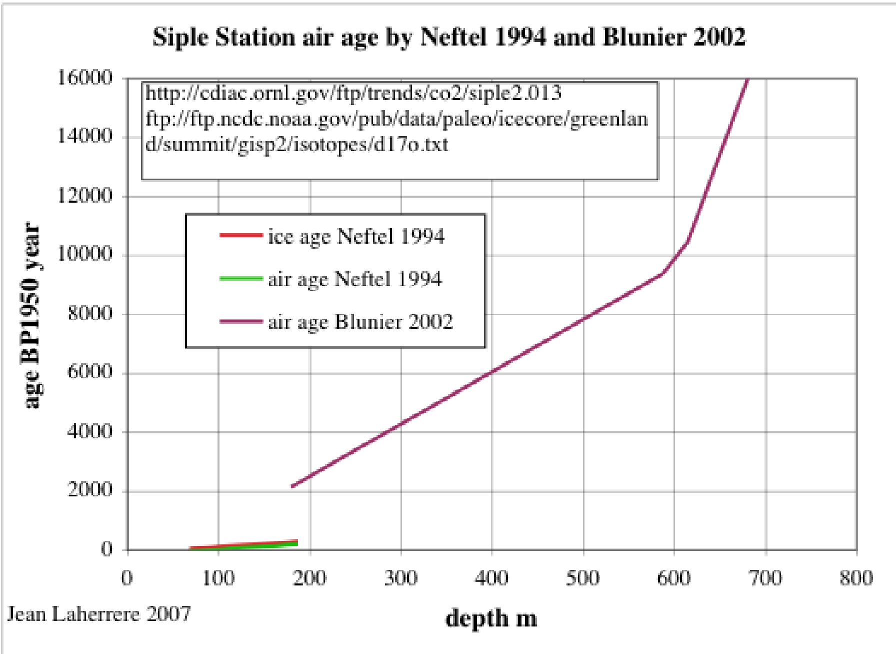

Figure 53: bubble age at Siple station by Neftel 1994 and Blunder 2004

The interpretation of Neftel, the basis of all recent CO2 hockey stick curves is therefore unreliable!
The sites of Greenland that could confirm this were declared unreliable because there are chemical reactions in ice, which disrupts CO2.

The measures on other sites with low accumulation, thus with millennium bubble closeoff, are smoothed (averaged), and started there millennia ago. But the next graph (Thesis Blandine Bellier June 22, 2004 LCCE "*Etudes des variations du cycle du carbone au cours de l'holocène a partir de l'analyse couplée CO2-CH4 pièges dans les glaces polaires*") at these sites show values that go back to almost pre-industrial age?

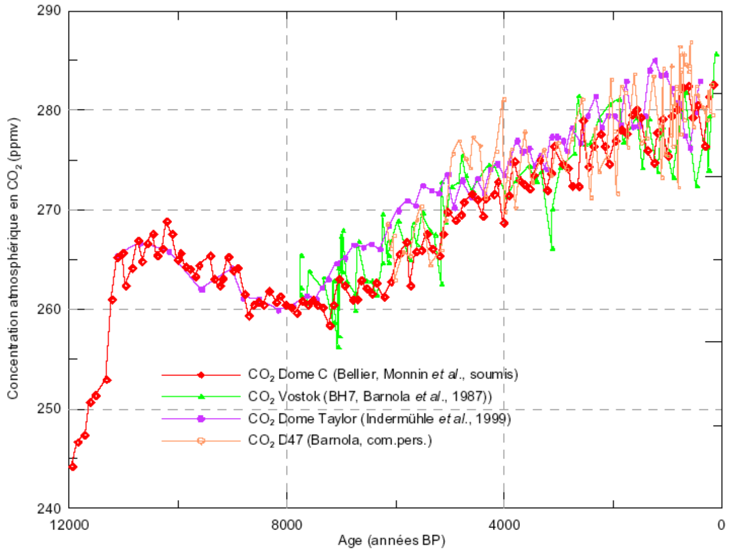

Figure IV.4- Comparaison des profils de concentration en CO_2 atmosphérique enregistrés en plusieurs sites antarctiques

Figure 54: CO2 concentrations on 12 000 years from various sites in Antarctica

However, Dome C is given with an accumulation of 2.7 cm/y and a delta age of 2 000 years (Vostok BH7 (2.2 cm/y and 2 500 years) and D47 (20 cm/y and 210 years). Paper by Monnin et al -Science V.291 2001- at Dome C only begins at 353 m and 9 067 years BP and 265 ppm.
In 2004, Monnin gives at 100 m depth a CO2 concentration of 280 ppm for an age of 173 years BP i.e. year 1777 while closeoff bubble age at Dome C with an accumulation rate of about 2 cm/y should far exceed millenium. This graph (age BP) should not arrive too close from today. I am lost!

- C3- Omission and censorship on CO2

The authors often seem tented to delete the values they deem contrary to their ideas considering them as artefact. Jarowoski has identified many chemical measurements of CO2 in the atmosphere made in the past by many scientists (including Nobel Prize), and he finds that most of these measures had been censored in the recent studies, dismissed as artefacts without any justification as unrepresentative, which is arbitrary and censorship. Of course, certain measures are dubious, but those of the ice are equally! Climatologists do not know how to deal with uncertainty!

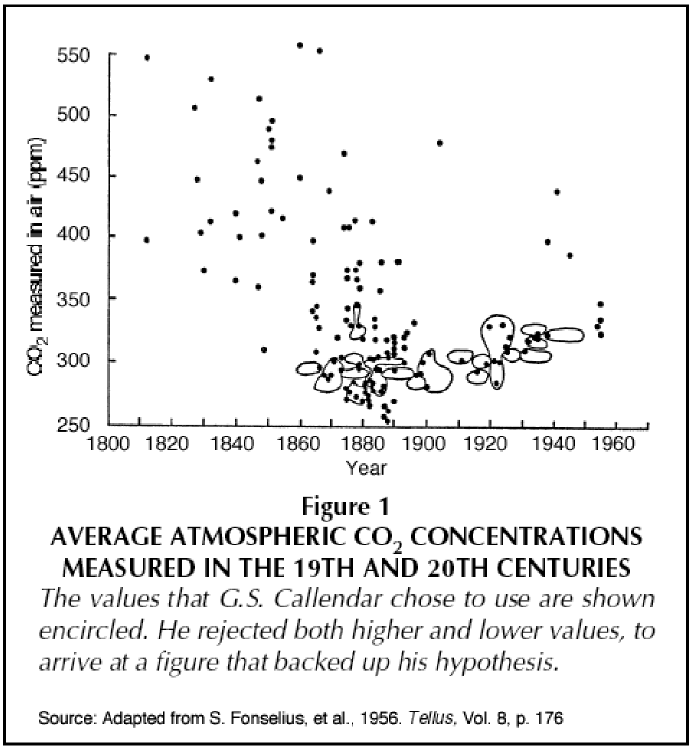

Figure 55: censored CO2 measures 1800-1960 from Jarowoski 1997

Beck 2006 (180 years accurate CO2 -Gas analysis of air by chemical methods) also found very different measures measurements in ice cores.

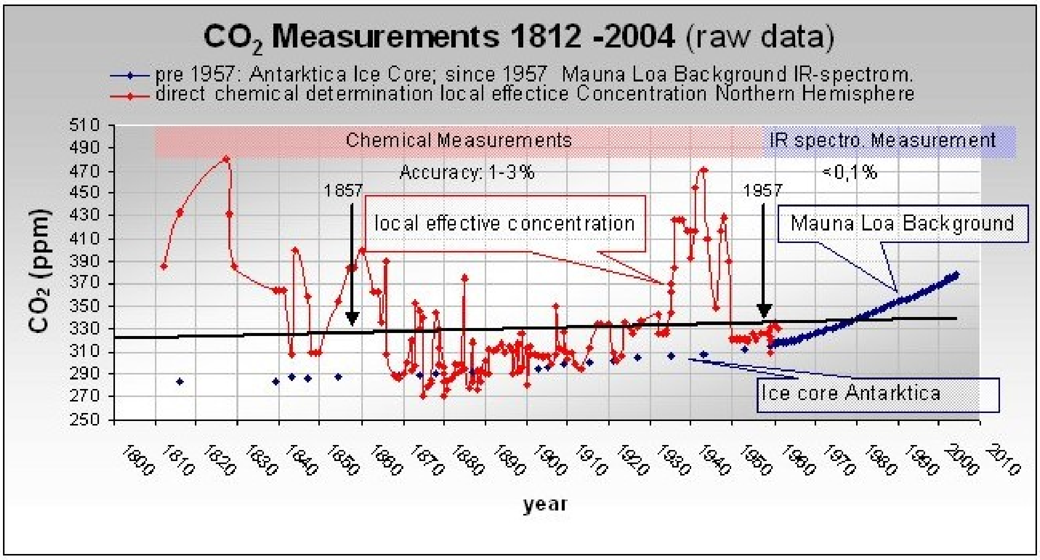

Figure 56: CO2 1812-2004 chemical measurements compared to measurements of ice after Beck

If old, direct and local measures, probably heterogeneous in the atmosphere are censored, what with measures from stoma of fossil plants which resembles measurements of ice? They are much more mixed.

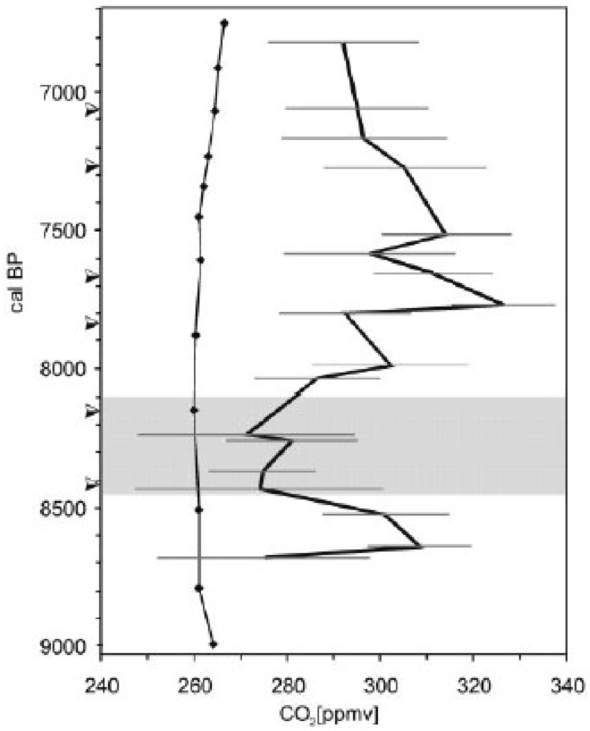

Fig. 2. Reconstructed CO_2 concentrations for the time interval between ≈8,700 and ≈6,800 calendar years B.P. based on CO_2 extracted from air in Antarctic ice of Taylor Dome (left curve; ref. 2; raw data available via www.ngdc.noaa.gov/paleo/taylor/taylor.html) and SI data for fossil *B. pendula* and *B. pubescens* from Lake Lille Gribsø, Denmark (right curve; see Table 1). The

Figure 57: CO2 measures on the stoma and ice 9000-6800 BP after Wagner

It is clear that the ice measures are averaged and lower than measures in the stomata. Same finding for the period 800-2000

Figure 13

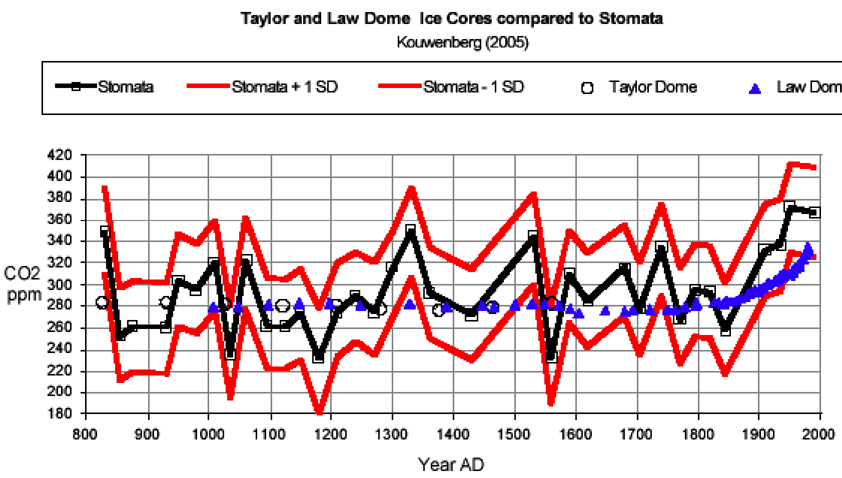

Figure 58: CO2 measures on the stoma and ice 800-2000 according Quirk 2007

- C4- CO2 smoothing

A millennium average of *local* CO2 measures from the stomata would be much closer to the smoothed value from ice cores thanks to the openness in the firn and to the interval between measurements for samples of 50 cm cores.

An average over 200 years (smoothing carried with the same weight at the end) on the measures of stomata gives a curve similar to that of the cores.

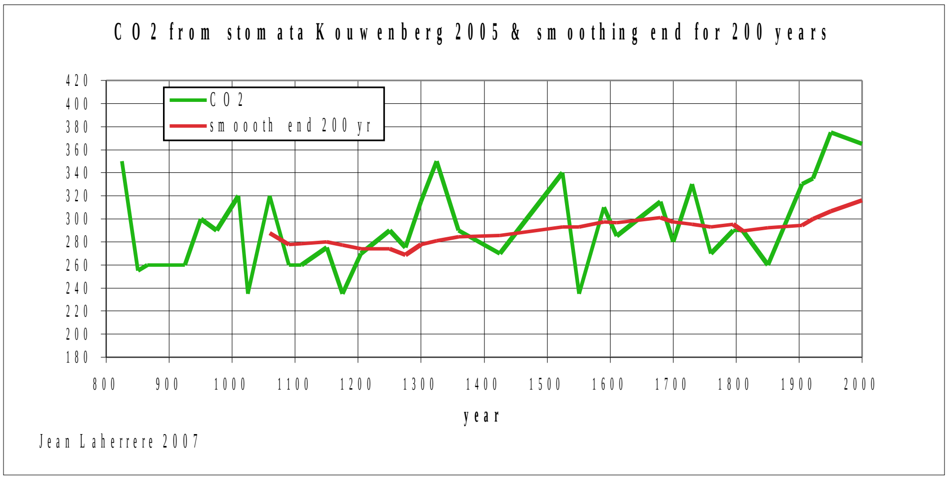

Figure 58a: CO2 measures on stomata 800-2000 and averaged over 200 years

Most published measures of concentration are from the site of Hawai Mauna Loa away from pollution. The CO2 varies within the day and with season; it is necessary to have a continuous curve that we average. The anthropic CO2 emission has been added and the coincidence is far from perfect. It must be said that if man currently injects 7 tons of CO2, only half stays in the atmosphere and the rest disappears into pits poorly identified and poorly quantified, namely ocean and land.
The concentration of atmospheric CO2 varies with the day and the night, the seasons and the nearby plants. The site of the volcano Mauna Loa in Hawaii away from pollution permits to detect a trend over a long period

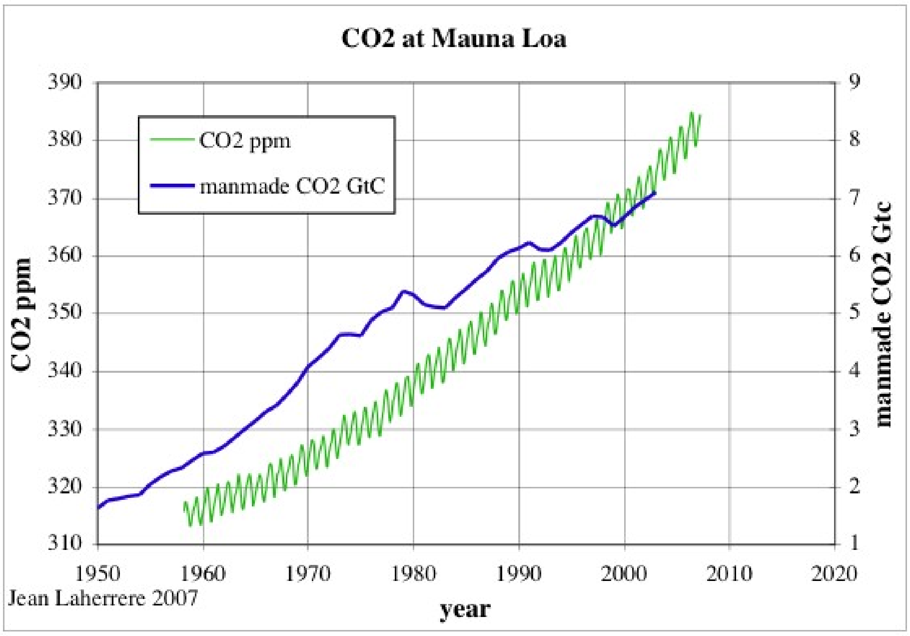

Figure 59: CO2 atmosphere direct measurements 1958-2007 at Mauna Loa & Human emissions of CO2 1950-2004

The human contribution through fossil fuels consumption would be minor: a maximum of 4%of atmospheric CO2 based on calculations made from the distribution of carbon isotopes - Sundquist 1985 (The carbon cycle and atmospheric CO2).
However, we could see at times a certain correlation between the increase of annual world atmospheric CO2 and human emissions of CO2 according to NOAA and USDOE / EIA, but data are different and nothing can be concluded!

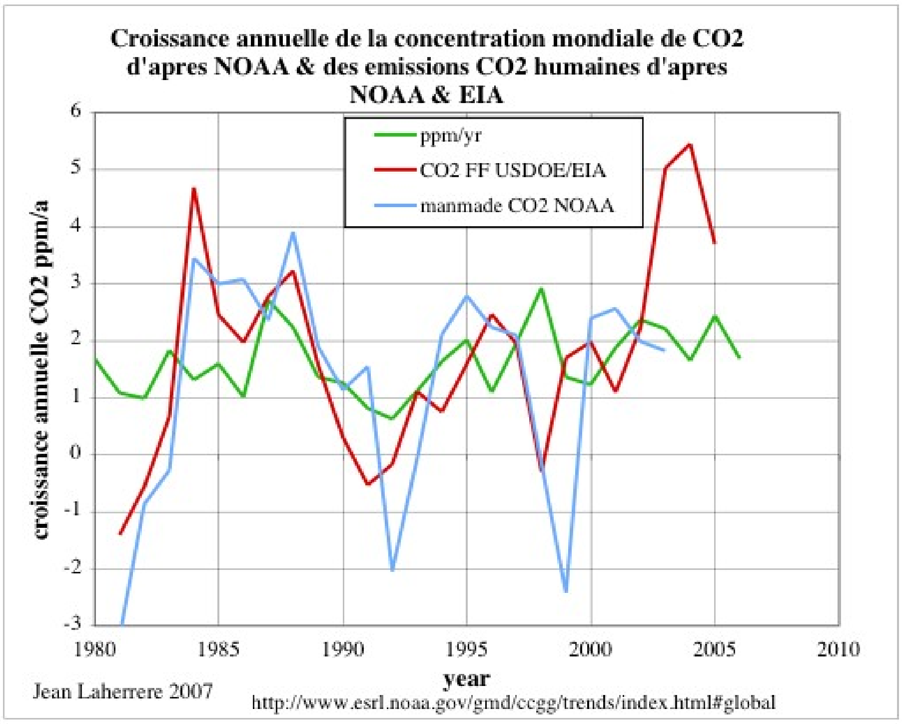

Figure 60: annual growth of CO2 atmosphere and global CO2 human emissions from NOAA and USDOE / EIA

Details of CO2 anthropogenic emissions show that the most important elements are liquids and solids, and gases (half less) and the rest unimportant

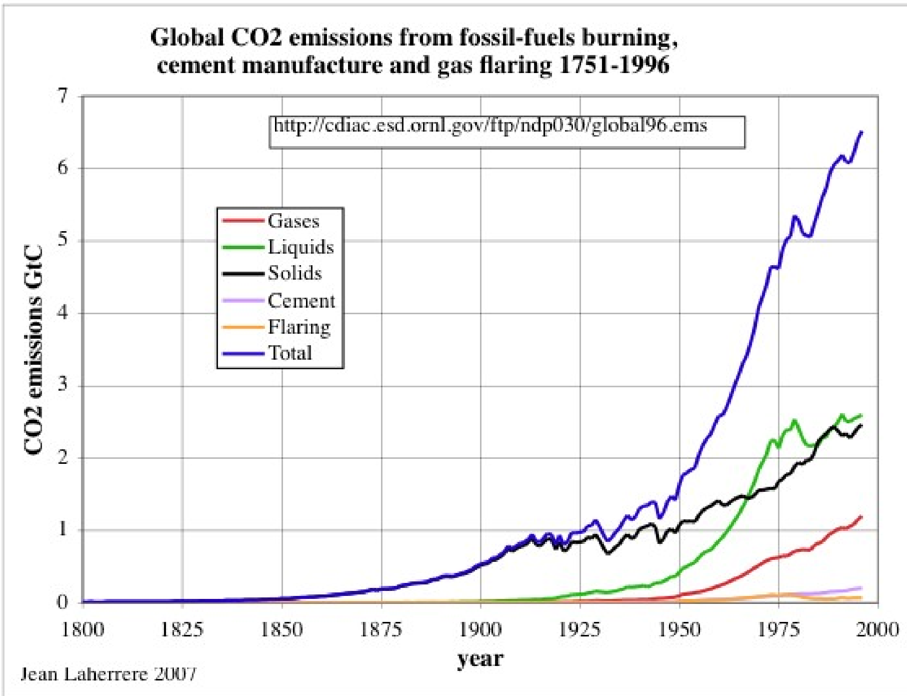

Figure 61: global emissions of CO2 from human beings after CDIAC

The increase in emission of CO2 seems bound to the increase in the worldwide population with a take off during the Thirty Glorious and a recent slowdown.

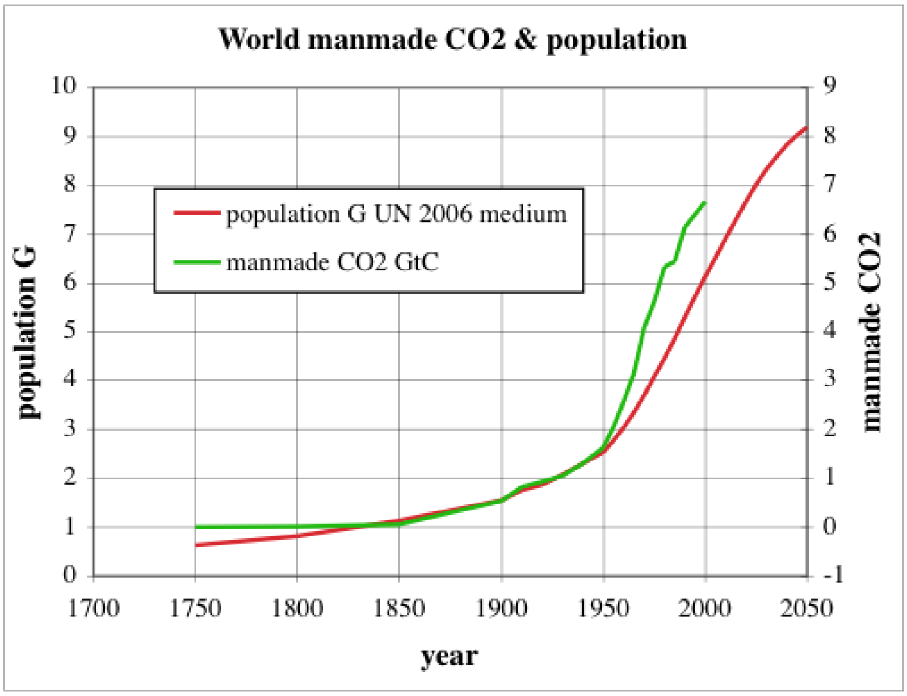

Figure 62: human emissions of CO2 and population 1750-2050

- C5- CO2 Solubility

The solubility of CO2 in the sea is a very important factor, which explains why, when sea temperature rises, dissolved CO2 goes into the atmosphere, because the solubility decreases. One talks of 1% concentration per °C or by dividing the solubility by 2 with an increase of 20°C.
The curve is as follows for a pressure of one bar (at sea surface).

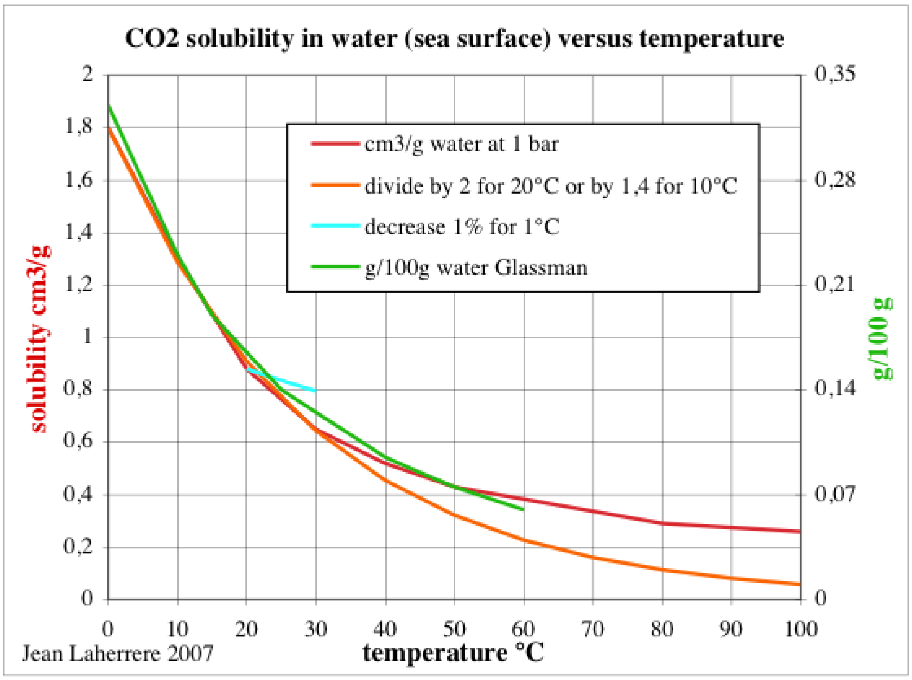

Figure 63: solubility of CO2 in seawater at surface as a function of temperature

The pressure is also very important and in reality does not follow the ideal gas law. We must make in situ measurements, and they are rare (or secret because dealing with submarine issues). Deep waters have a very different solubility (see the case of methane). Under pressure CO2 is transformed to hydrate, which is lighter than water up to a depth of 3 000 m or deeper, CO2 hydrate remains in the bottom (through sequestration).

Glassman 2006 (the acquittal of carbon dioxide *http://www.rocketscientistsjournal.com/2006/10/co2_acquittal.html*) found a correlation between the solubility of CO2 in the water and the concentrations of CO2 in the ice cores of Vostok.

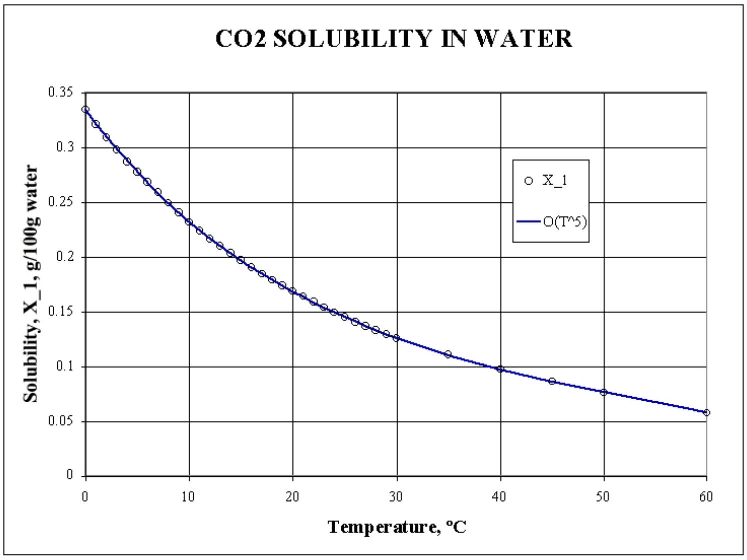

Figure 64: solubility of CO2 in water according to Glassman

Glassman overlays solubility curve at Vostok on the values of CO2 as a function of temperature with a delay of 1 073 years. The mean curve (blue) coincides with the solubility curve (red).

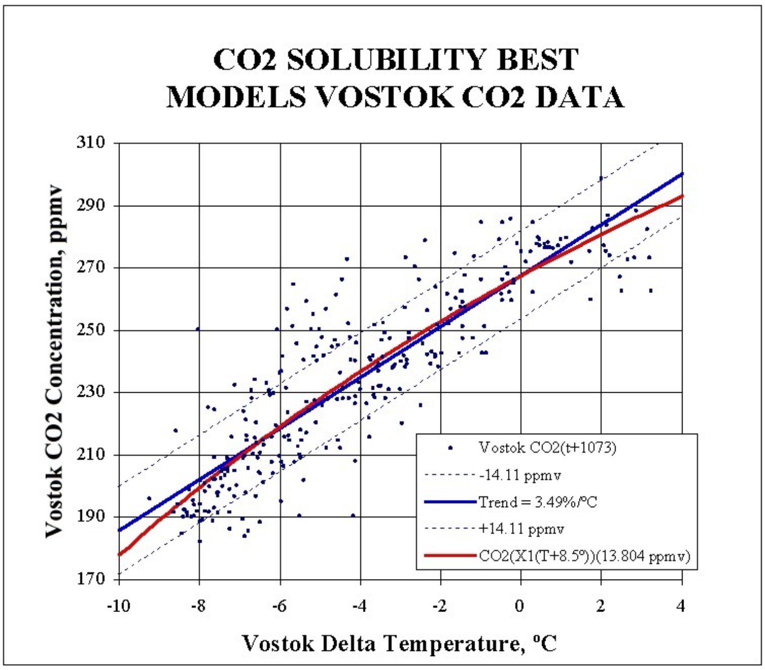

Figure 65: Vostok: CO2 versus temperature shifted 1 000 years and solubility curve according to Glassman

Glassman concludes that the only mechanism is the temperature releasing CO2 from the sea. It infers from this the concept of CO2 flow in deep water currents.

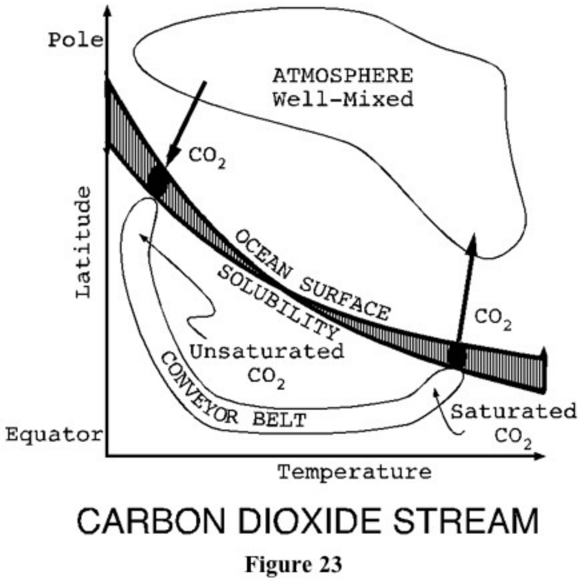

Figure 66: Concept of CO2 in the ocean after Glassman

However, this figure seems overly simplistic because it ignores the pressure factor in deep water currents that change dramatically solubility. For methane solubility is multiplied by more than 100 at 3 000 m. In the atmosphere above the upwelling, there should be concentrations well in excess of CO2 and CH4, but perhaps no one did not look for it!

- C6- CO2 life time

The CO2 has a lifetime that is hard to measure. One talk about half-life for a quantity halved. One also talks about time of residence. A portion disappears quickly, but then still a small part remains for a long time. Estimates of life (?) range from 2 to 200 years, with an average of 100 years.
Some see a significant portion remaining thousands of years.

http://www.globalwarmingart.com/wiki/Image:Carbon_Dioxide_Residence_Time_png

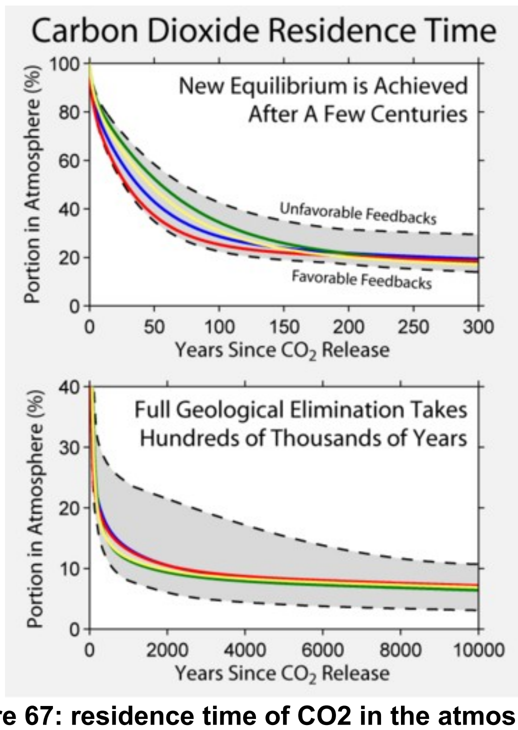

Figure 67: residence time of CO2 in the atmosphere

Tom Quirk 2007 («*Everyone is entitled to their own opinion but not their own facts*" A presentation to The Lavoisier Group's 2007 Workshop *'Rehabilitating Carbon Dioxide'* Melbourne) shows that the C14 will disappear very quickly in the atmosphere.

Figure 19

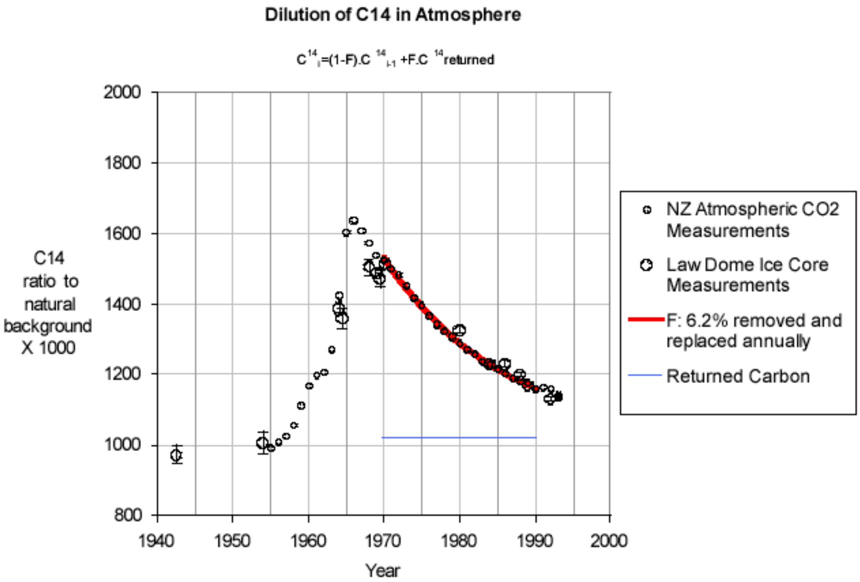

Figure 67: disappearance of C14 of atomic tests in the atmosphere after Quirk 2007

C14 from the atomic tests disappear with a rate of 6.2% per annum, which gives a half-life of 12 years: it is far from the 100 years!

The life of CO2 in the atmosphere is very important to determine the amount of anthropic which remains in the atmosphere and where the well/pit? is.
Tom V. Segalstad director of the Geological Museum of the University of Oslo:
This assertion by the IPCC that the rate of CO2 residence would be approximately 5 to 20 times longer than that indicated by actual measurements, does not hold and leads the IPCC to utter nonsense because, as a result of exchanges between the atmosphere and oceans, we know that over steady regime, the amount of CO2 in the atmosphere is about 50 times smaller than the one contained in the oceans. Thus, as the Professor Segalsatd:
"The IPCC assumes a doubling of atmospheric CO2, which would mean that the oceans should receive 50 times more CO2 in order to achieve that balance," says Prof. Segalstad. "*This total of 51 times the current amount of CO2 in the air exceeds the known reserves of fossil carbon: carbon that represents more than anything that exists in coal, gas and oil that we can operate on the entire planet.*"
Moreover, the isotopic equilibrium calculations of Prof. Segalstad -a standard technique in science -show that if the CO2 in the atmosphere has a lifespan of 50 to 200 years, as the scientists of the IPCC say, the atmosphere should contain half less CO2 than it does now. Because of this senseless conclusion, the IPCC models assume that half the CO2 should be hidden somewhere in a "missing well." Many studies have attempted to locate this missing well, the quest for the Grail in climate science, without success. *"It is a quest for a mythical CO2 well to explain a life of CO2 not measurable in order to satisfy a hypothetical computer model on CO2 which claims showing that an impossible quantity of fossil emissions is in the process of warming the atmosphere,* "says Prof. Segalstad. "*This is fiction from beginning to end."*

- C7- Sensitivity of climate to CO2

The sensitivity of climate CO2 is measured in increased temperature for a doubling of the climate.

The doubling of CO2 from the pre-industrial era (280 ppm) gives roughly 3°C with feedback, while around 1°C when there is no feedback (White Paper Fencing chap 2 & 3).

Arrhenius in the 19th century had roughly calculated 6 ° C.

Callendar in 1930 had calculated 2 ° C with a bigger effect on the Polar Regions.

The reaction of temperature on the concentration of CO2 is not linear but logarithmic (radiative forcing in W/m2 = 5.35 Ln C/Co, C being the concentration in ppm) and can be roughly approximated by this graph after Luboš Motl (http://motls.blogspot.com/2006/05/climate-sensitivity-and-editorial.html)

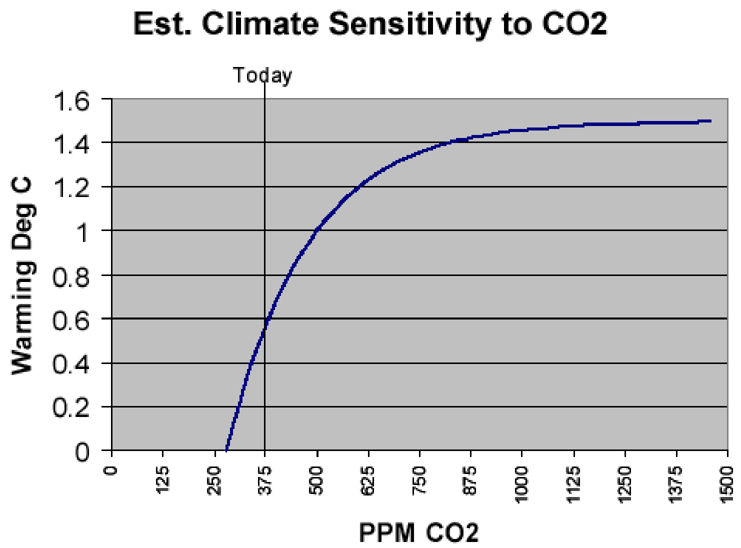

Figure 68: climate sensitivity to CO2

The problem is that the modellers add feedback without much detail in their reports.
It therefore seems clear that high levels of CO2 are not increasing the temperature as much as the public thinks.

- C8- Previsions of fossil fuels production and emissions

The production of fossil fuels (oil, gas and coal) can be modelled with an ultimate 1300 Gtoe (coal 600, petroleum 400, gas 300) with a peak around 2040 if there is no constraints on demand, investment or of political nature.

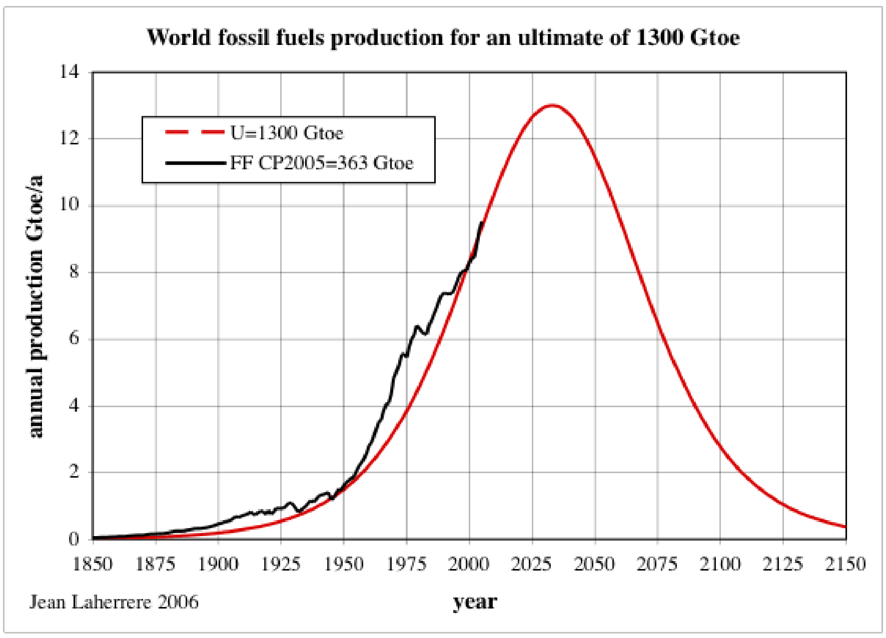

Figure 69: global production of fossil fuels 1850-2150

If we trace this curve over millennia and average over a period of 1 000 years (that's what do the gas bubbles in the ice cores) the result in blue is rather flat and show what the bubble of the Antarctica would be in a few millennia.

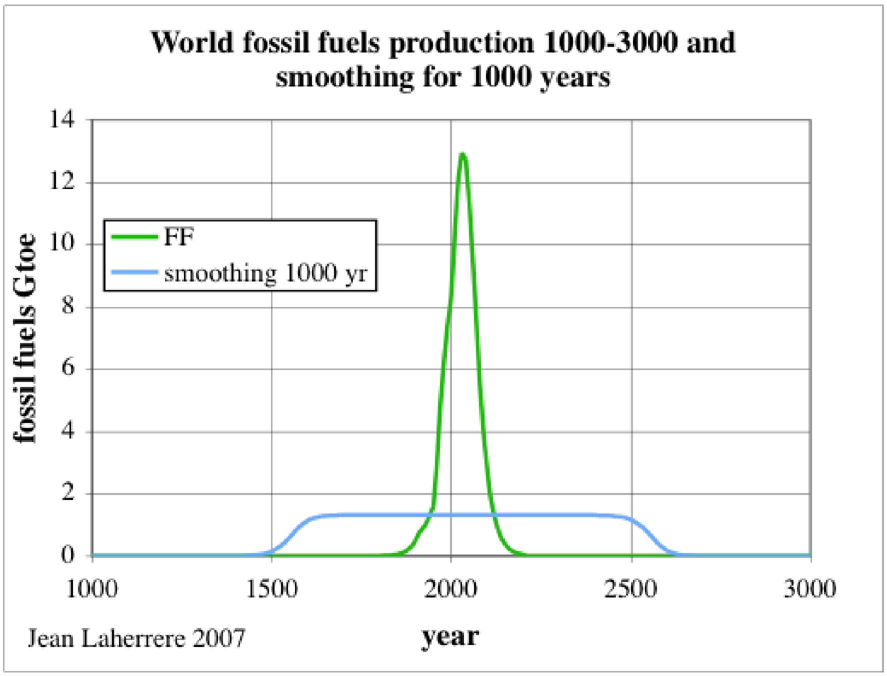

Figure 70: production of fossil fuels 1000-3000, and its average over a period of 1000 years

Anthropogenic emissions of CO2 are highly related to the production of fossil fuels, therefore IPCC also would do well to bear this in mind and to seek the views of producers rather than turn to economists.

- C9- IPCC Scenarios on CO2 emissions

The 40 SRES scenarios (stories) used by the 2001 and 2007 IPCC are unrealistic for CO2 from fossil fuels.

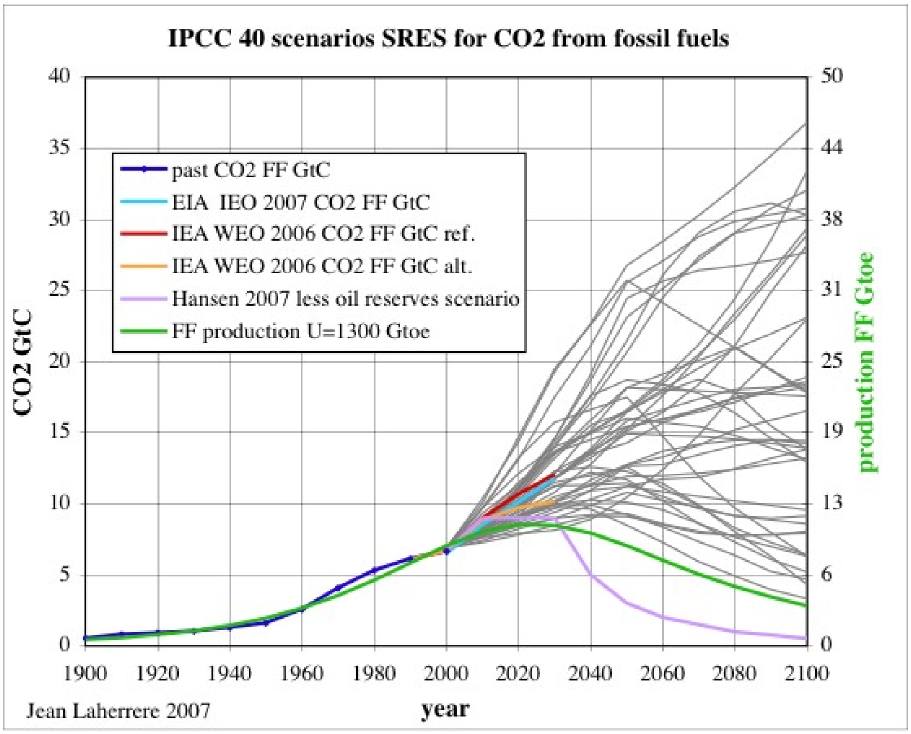

Figure 71: 40 SRES scenarios used by the IPCC 2001 & 2007 for CO2 emissions from fossil fuels with forecasts IEA, EIA, Hansen (less oil) and mine.

The IEA 2006 forecasts are shown in red for the reference (judged unrealistic and unsustainable by Mandil) and orange for the desired alternative. My prediction is in green and the Hansen scenario forecast is in purple under which the oil reserves decline seems too fast.

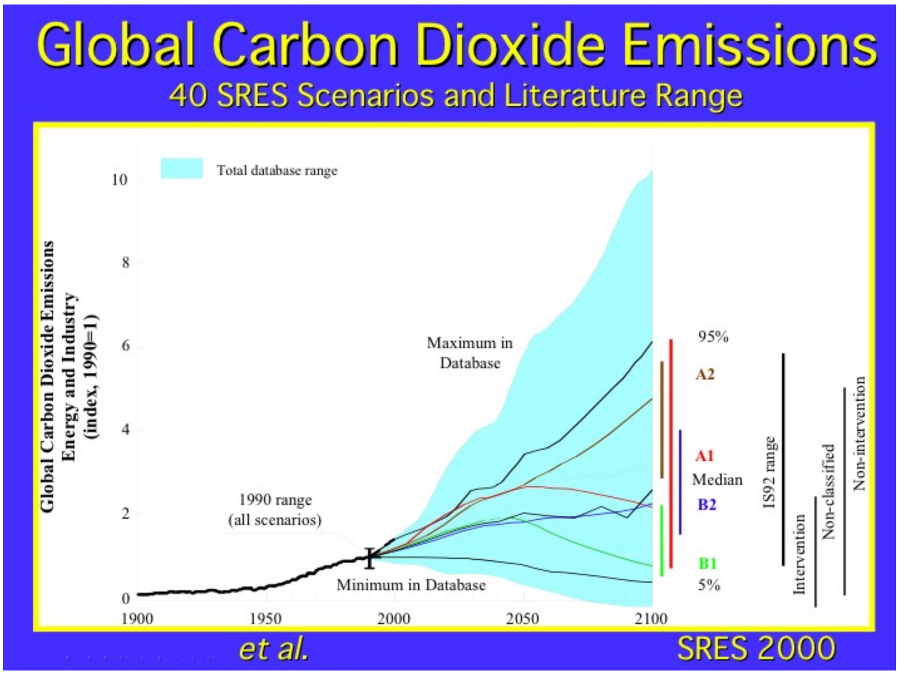

Figure 72: same graph from IIASA

Rutledge (Caltech *2007 "Hubbert's Peak, The Question of Coal, and Climate Change*") shows that his prediction (producer-limited profile) is far lower than the IPCC scenarios in accrued reports.
He mentions that I was the first to recognize the unreality of the IPCC scenarios

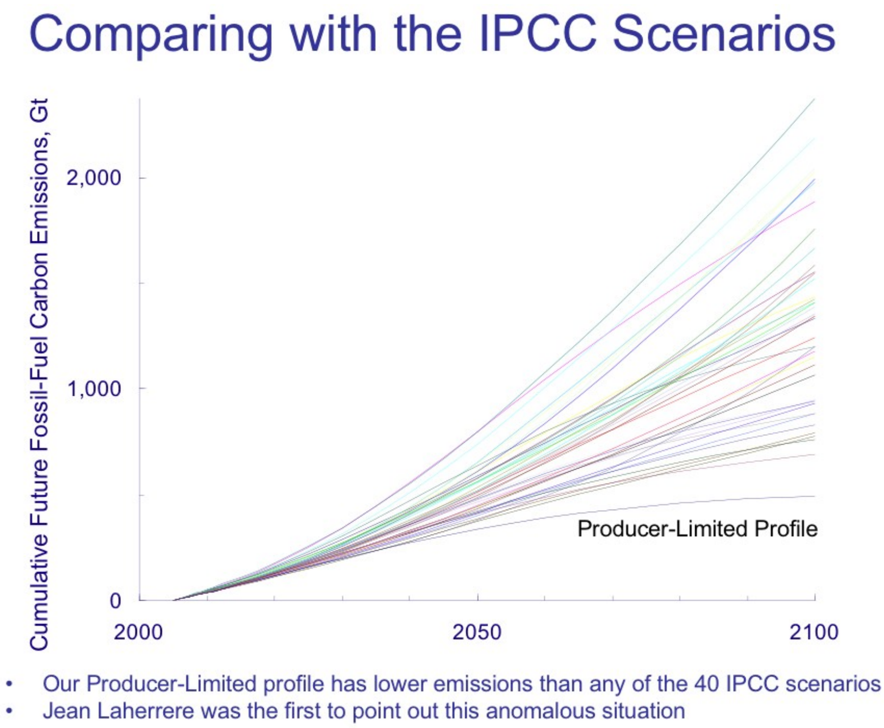

Figure 72: Rutledge forecasting on the accumulated emissions of fossil fuels and IPCC scenarios

Hansen of NASA, one of the first to alert the public about global warming, released a study "*Implications of "peak oil" for atmospheric CO2 and climate*" April 2007 where 1 ppmv ~ 2.1 GtC with equation CO2 (t) = 18 + 14 exp (-t/420) + 18 exp (-t/70) + 24 exp (-t/21) + 26 exp (-t / 3.4) as a function of time, that implies that one third of CO2 remains in the atmosphere after 100 years and 20% after

1000 years (?).
Hansen (& Kharecha) said that the atmospheric CO2 comes from the contribution of fossil fuels and deforestation of the forest.

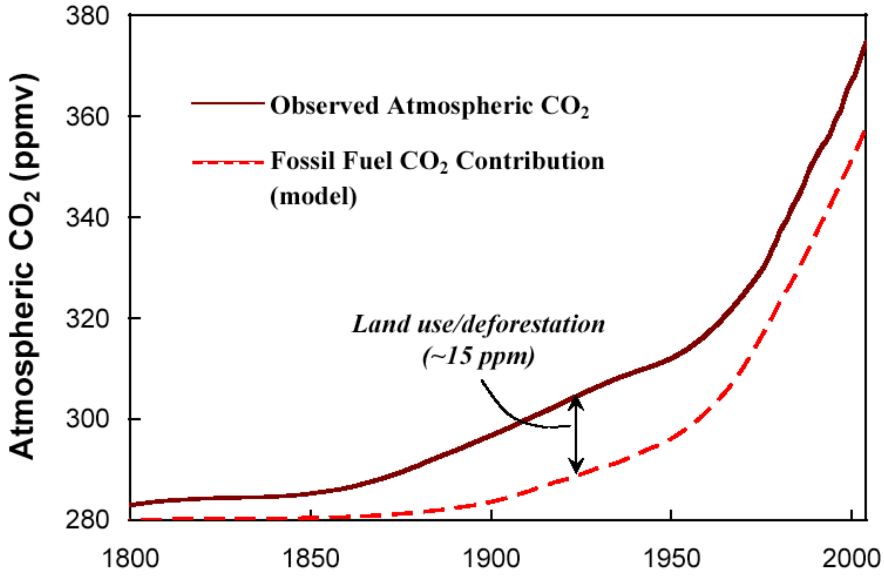

Figure 73: atmospheric CO2 & contribution of fossil fuels 1800-2000 Hansen

Hansen includes 4 scenarios for CO2 emissions:
BAU (a), (b) Coal Phase-out, (c) Fast Oil Use, (d) Less Oil Reserves

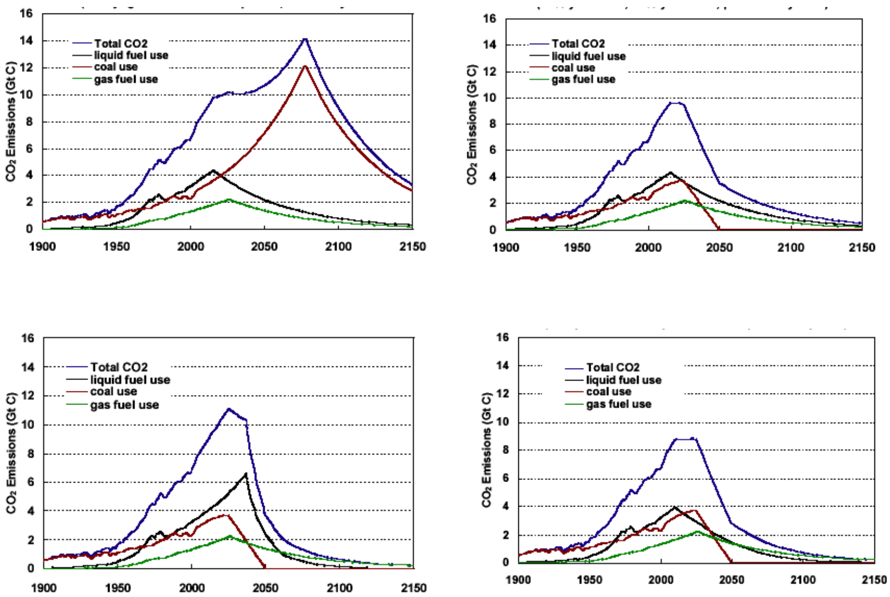

Figure 74: Four scenarios Hansen emissions CO2 1900-2150

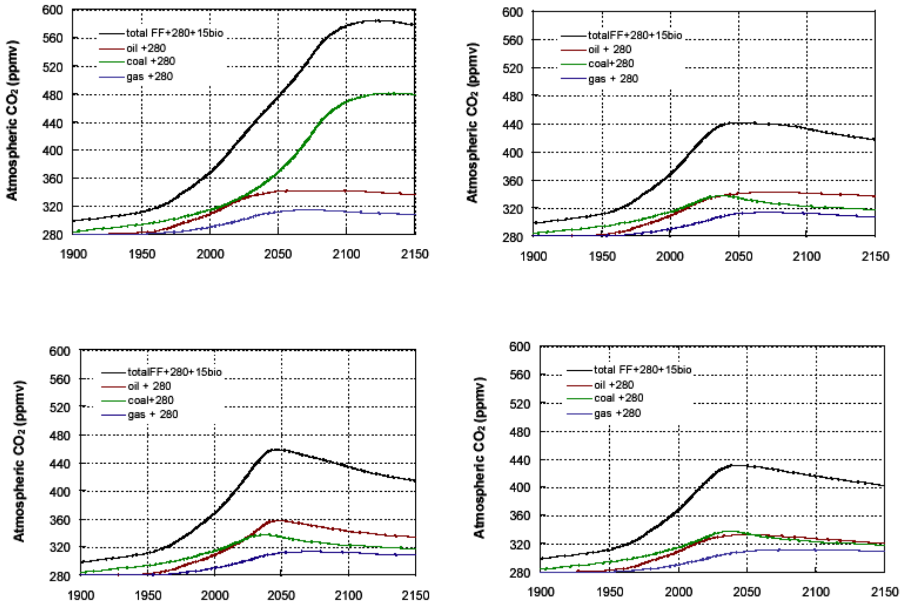

Figure 75: CO2 concentrations of 4 scenarios Hansen

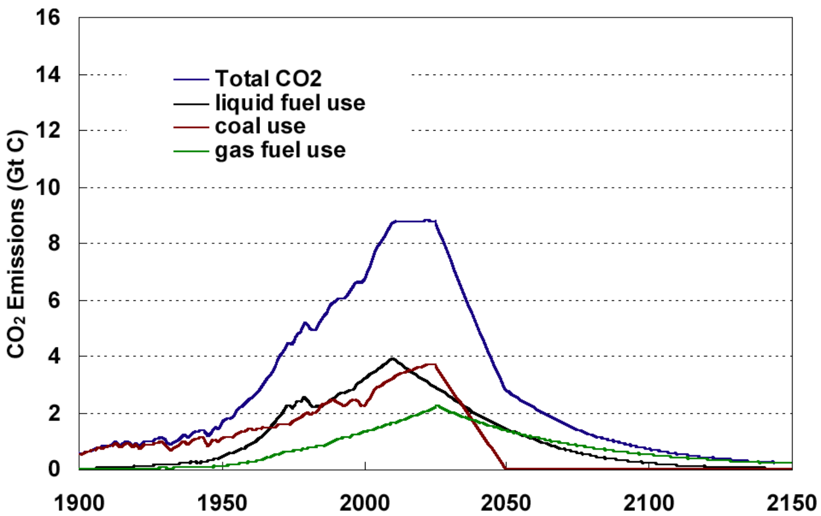

Figure 76: emissions CO2 scenario (d) less oil Hansen 1900-2150

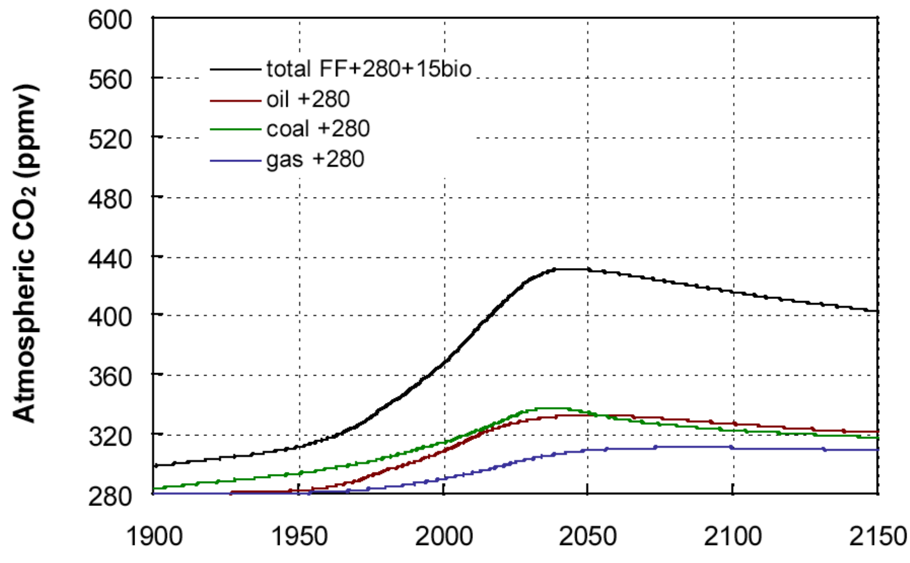

Figure 77: CO2 concentrations of scenario (d) Hansen 1900-2150

The following graph (http://www.globalwarmingart.com/wiki/Image:Carbon_Dioxide_Residence_Time_png) shows the correlation between CO2 emissions and concentration of CO2 in the atmosphere.

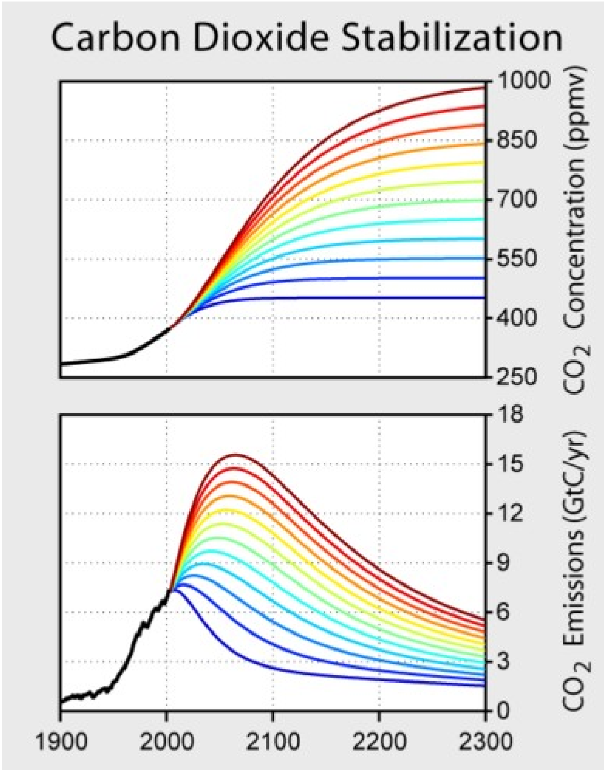

Figure 78: Relationship between CO2 concentrations and emissions CO2 1900-2300

The blue curve corresponds to my prediction leading to a concentration of about 450 ppm in 2100 from this pattern. This is very different from the IPCC forecast!

Ruthledge 2007 comes to the same result of 450 ppm in 2100

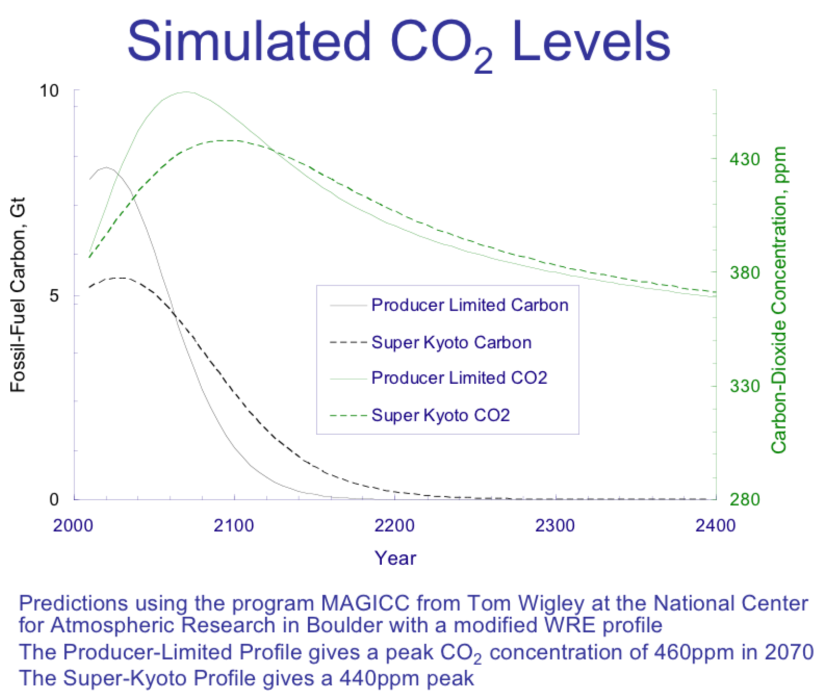

Figure 79: Rutledge scenario emission and concentration CO2

- C10- CO2 and agricultural production and health

The plants feed on CO2 and greenhouses in Holland are being grown by injecting CO2. Of course, precipitations are also involved, but forecasts are even more uncertain. Farming can be improved in some areas and less in others. The assessment by Ipso is presented as positive, but also uncertainty.

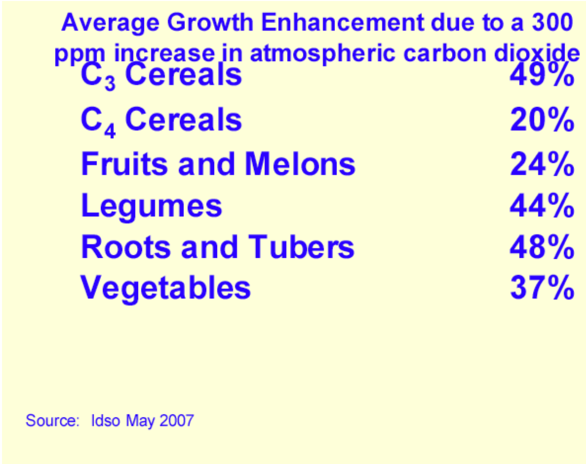

Figure 28: Carbon Dioxide Growth Enhancement by Plant Type

Figure 80: impact of CO2 on vegetation according to Ipso

The Medieval warm period saw the creation of cathedrals, the discovery of Greenland green vines in London and the European skeletons were as great as today. The little ice age saw the Hundred Years War, plague, revolutions and the size of the European skeletons were below the size of those of the 20th century.

Most retired people in the north dream to finish their life in warm countries. Heat is not hell.

- C11-CO2 and temperature

The IPCC models are assuming that temperature increases primarily as a result of increased CO2.
The results of ice cores from Antarctica (those of Greenland are considered unreliable for CO2 because of chemical reactions in the ice) were interpreted unequivocally by all researchers and provide for 800 000 years that the engine was temperature and CO2 followed with a lag of about 600-1 000 years. This shift corresponds to the time taken by the CO2 dissolved in seawater to go into the atmosphere when the solubility decreases with increasing temperature. The oceanic cycle is estimated around 1 000 years.
Wikipedia: *There are great problems relating the dating of the included bubbles to the dating of the ice, since the bubbles only slowly "close off" after the ice has been deposited. Nonetheless, recent work has tended to show that during deglaciations CO2 increases lags temperature increases by 600 + / -400 years.*

Caillon 2003 estimated the delay in 800 years between temperature changes and parallel variations of CO2.

Fig. 4. Vostok records of δ^{40}Ar and CO_2 with respect to gas age (*1*). Atmospheric CO_2 concentration is a combination of new data and published data (*1*, *44*). The age scale for the CO_2 proxy has been shifted by a constant 800 years to obtain the best correlation of the two datasets.

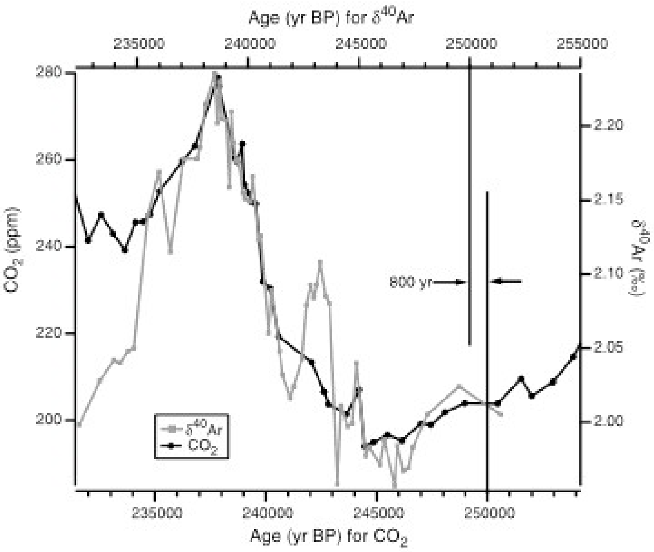

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Figure 81: CO2 following 800 years after temperature variations according to Caillon

However, this result bothers enemies CO2 because CO2 is no longer watch as the main engine of global warming. Loulergue 2007 (Figure 25) took several scenarios including one, which has managed to cancel the delay! Therefore, we can get the result we want with the right black box!

- D - CH4

The forecasts of 10 years ago, on the concentration of CH_4 were on the increase with the growing population with graphs that confuse correlation and causality.

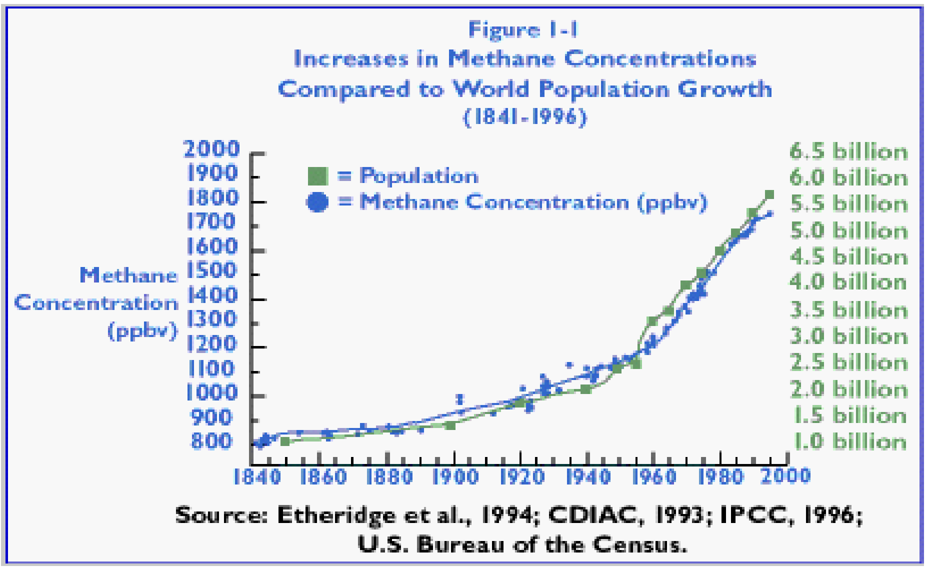

Figure 82: increasing CH_4 air and population 1840-1996

But to a complete surprise, the concentration of CH_4 has been capping for the past ten years.
Initially the slowdown in 1990 is explained by the change in behaviour of the Gas distribution with the collapse in former Soviet Union. But it was recently discovered that forests emit bits of CH_4 and that the slowdown may be in fact due to the deforestation!

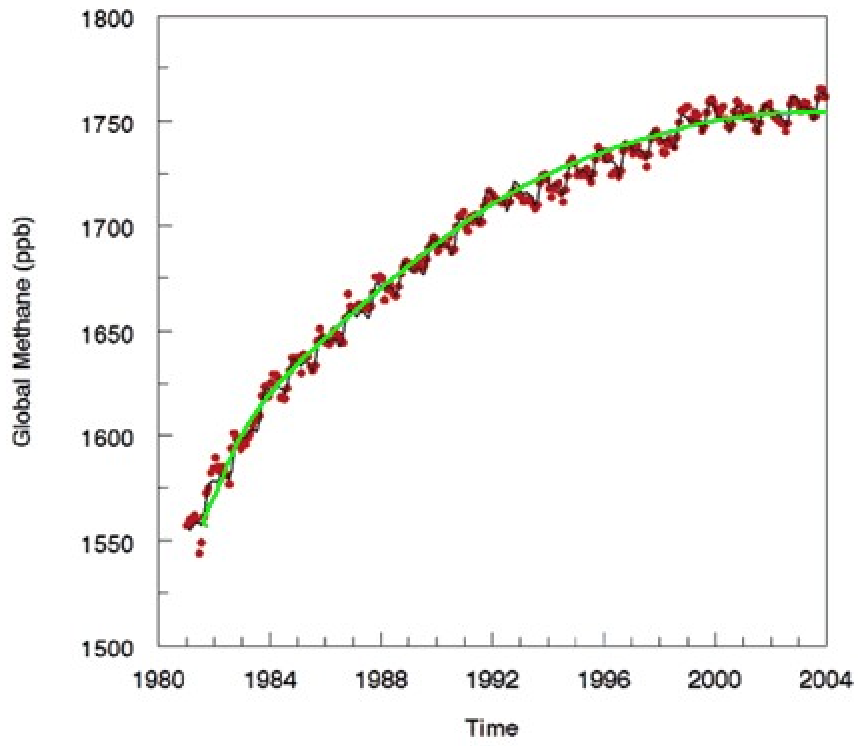

Figure 1. Global methane (CH4) concentration. Adapted from Khalil et al. (2007).

Figure 83: concentration of CH_4 atmospheric 1980-2004 according to Khalil 2007

The concentrations of CH4 vary with geography.

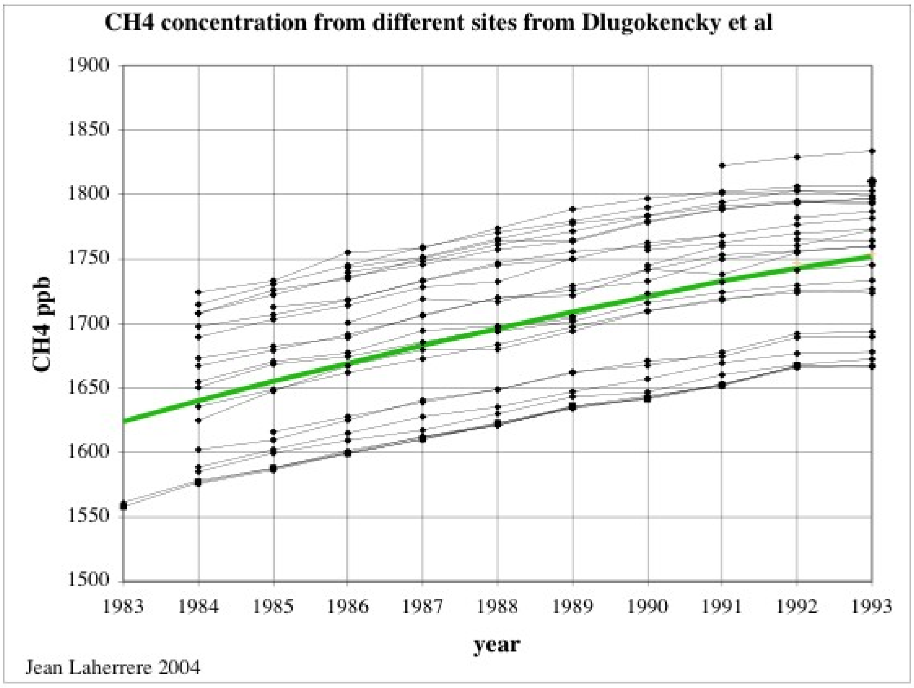

Figure 84: concentration of CH_4 atmospheric following several sites

Methane emissions caused by human activity is largely due to ruminant animals: a cow can emit 500 liter per day, and so for the rice paddies

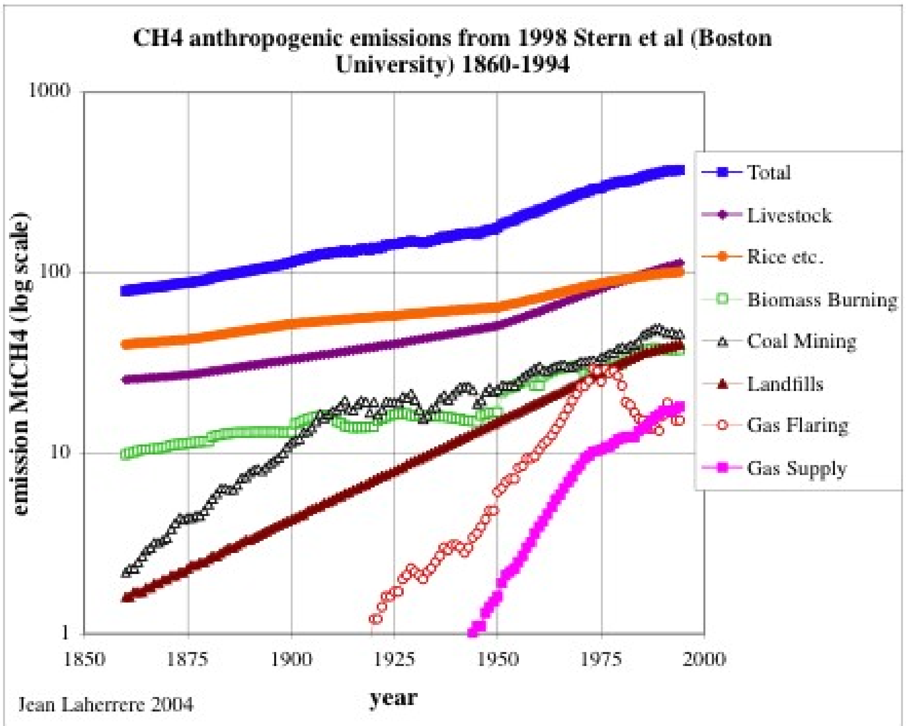

Figure 85: anthropogenic emissions of CH_4 in logarithmic scale

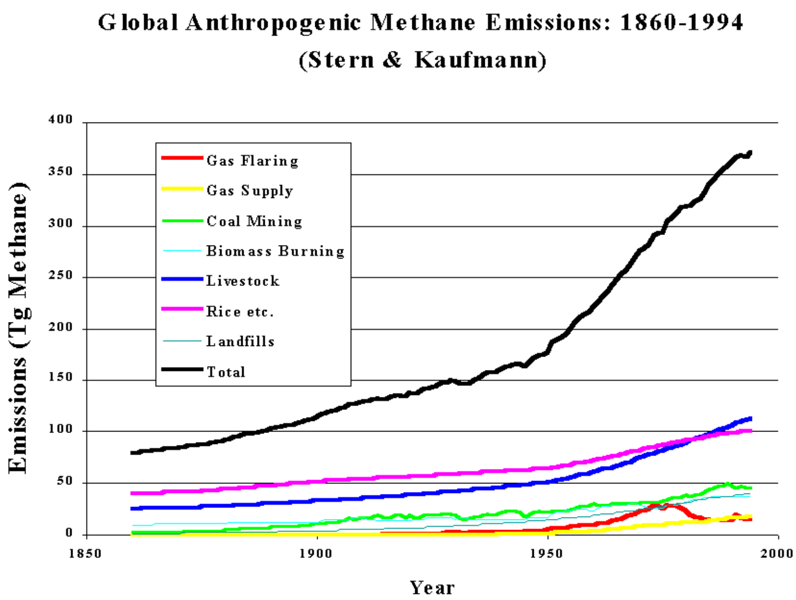

Figure 86: the same scale as normal

The articles that play an important role in ocean hydrates are tubes by former fanciful estimates that put these hydrates in a volume larger than all fossil fuels that have accumulated over 600 Ma while hydrates in ocean sediments are young sediments representing at best a few million years, which seems so impossible. These estimates have been reduced by more than 100 (Solovyov 2004, Milkov 2004, Laherrere WPC 2000). All recent drilling carried out to estimate the potential of hydrates Ocean (Japan, India, China, US) are failures because hydrates are oceanic millimetrically vertically limited and metrically horizontally limited. In addition, they are too deep (> 500 m) to be influenced by variations in surface temperature and sea level

The very important point is that the solubility of methane in deep seas is very poorly understood (a military secret for a long time because of submarines). The ideal gas laws do not apply and some measures show that the solubility of methane at 4 000 m depth is 150 times that of the surface

(Louisiana University 1998). Large amounts can be dissolved in depth.

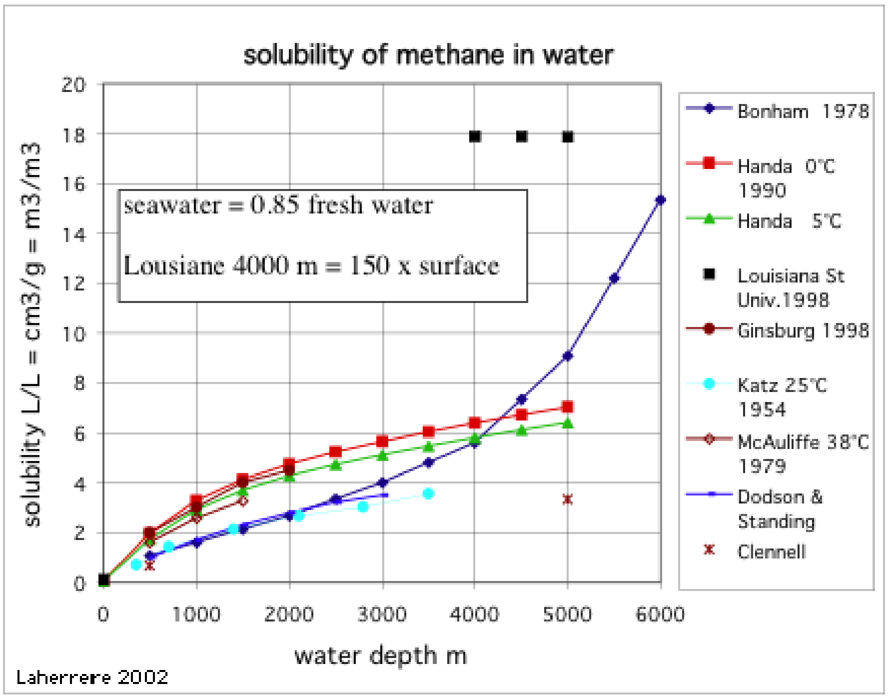

Figure 87: solubility of CH4 depending on the depth of the sea

- E - Aerosols

- E1- emissions SO2

In models of the IPCC, CO2 is modeled as the primary greenhouse effect for warming and SO2 (sulphate) for cooling. Unfortunately, the detail of cooling (negative feedback) is rather cryptic.
There are little synthetic boards that gave details of the explanation for the feedback. Cooling during the Thirty Glorious 1945-1975 when CO2 had the highest growth rate (4.7% / y) is explained by the effect of sulphate.

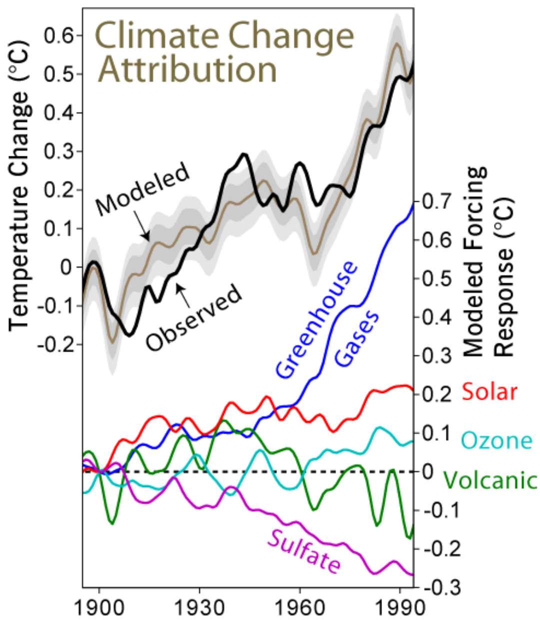

Figure 88: impact of different actors

Hansen 2006 "*Dangerous human interference with climate: A GISS model study*" shows a net forcing from 1880 to 2005 with a radiative forcing due to cracks in stratospheric aerosols (grey volcanoes?) and gently sloping (blue sulphates?) which stops in 1990.
One of the projects to stop global warming is to send in the troposphere quantities of sulphur particles.

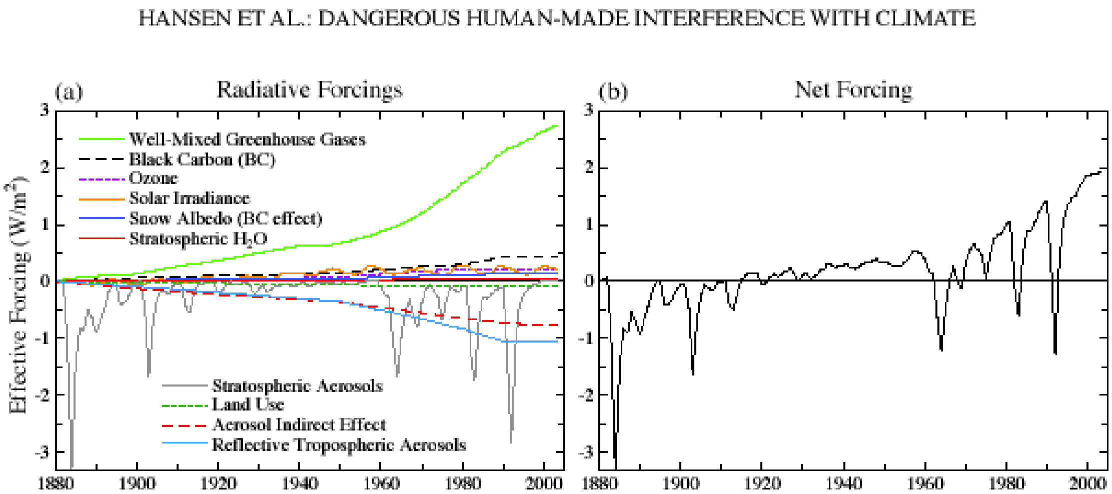

Figure 1. Effective global climate forcings (Fe) employed in our global climate simulations, relative to their values in 1880. Use of Fe avoids exaggerating the importance of BC and O_3 forcings.

Figure 89: radiative forcings according to Hansen

Anthropogenic emissions of CO2 and SO2 showed parallelism from 1900 to 1979 but after the oil shock SO2 decreases while the CO2 continues to climb. However, I do not see from 1940 to 1960 a flat spot as shown in the curves of green and blue Hansen.

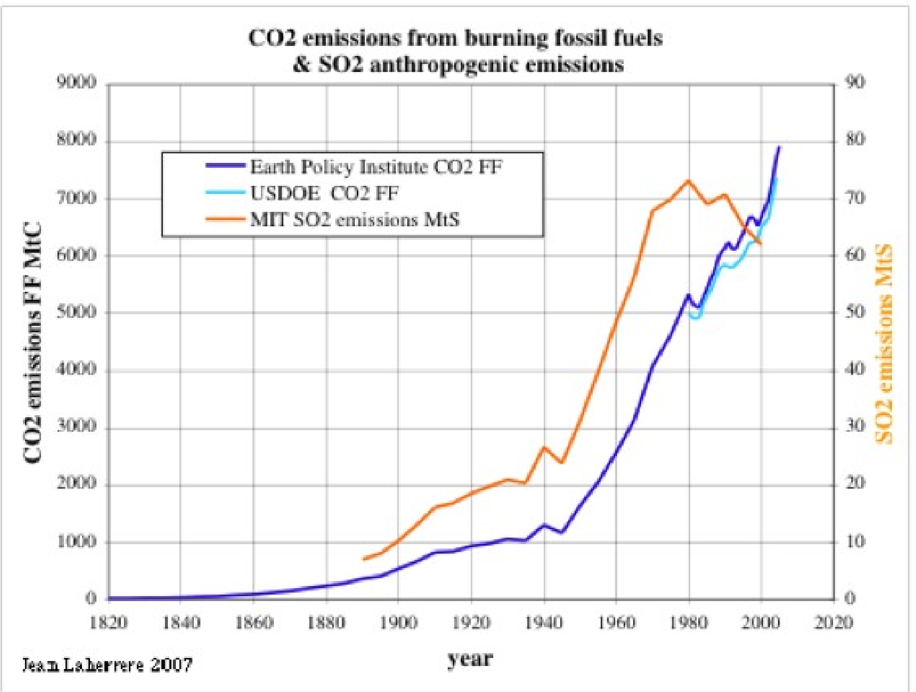

Figure 90: emissions of CO2 from fossil fuels and SO2 anthropogenic

Details of emissions of sulfates is interesting (Smith et al 2004 "*Historical Sulfur Dioxide Emissions 1850-2000: Methods and Results*"), the sources differ in detail and pic.

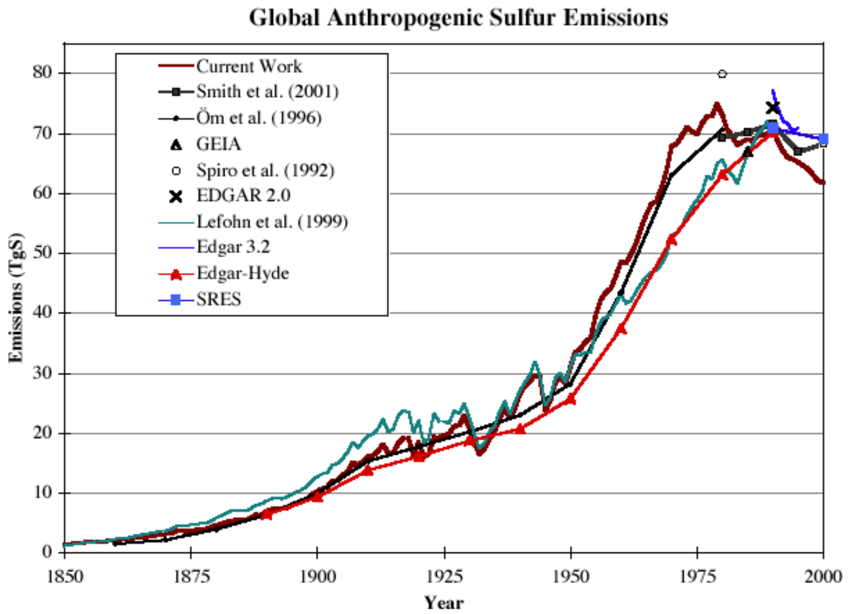

Figure 1–Global sulfur dioxide emissions from this study (thick line) and several other recent estimates (see text). Note that the Lefohn *et al.* estimate does not include all anthropogenic emissions sources. References not shown on the cart are: GEIA (Benkovitz *et al.*1996); EDGAR 2.0 (Olivier *et al* 1996); EDGAR 3.2 (Olivier and Berdowski, 2001); EDGAR-HYDE (Van Aardenne *et al.* 2001); and SRES (Nakicenovic and Swart 2000).

Figure 91: global emissions of anthropogenic sulphate after several authors

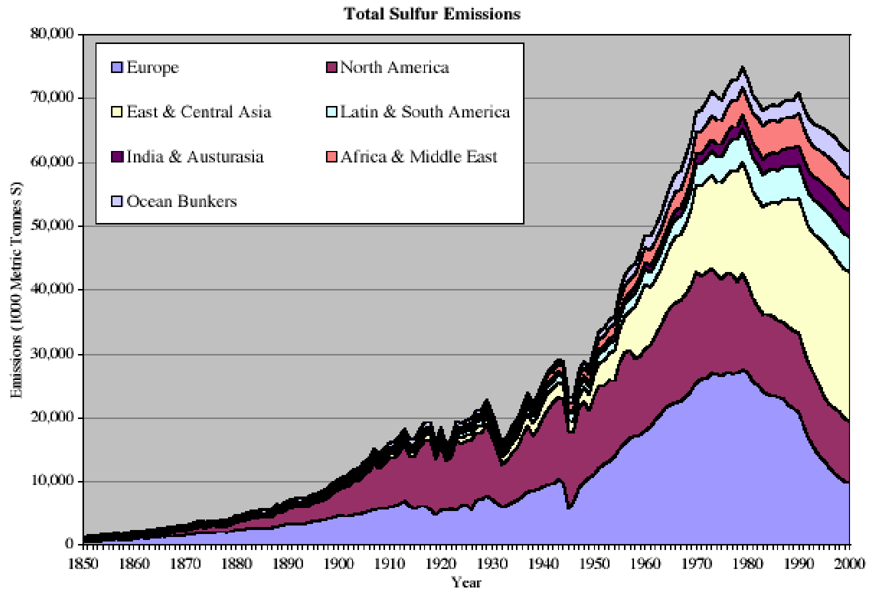

Figure 3–Global sulfur dioxide emissions by meta-region.

Figure 92: global emissions of anthropogenic sulphate by source

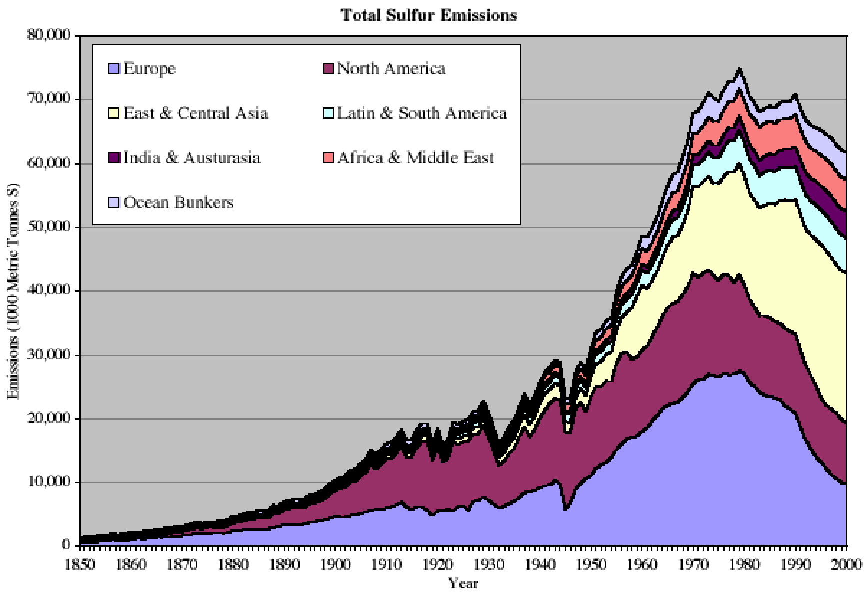

Figure 3–Global sulfur dioxide emissions by meta-region.

Figure 93: global emissions of anthropogenic sulphate by continent

If the rise in emissions of sulphates explains cooling 1945 to 1975, the decline since 1980 may explain much of the warming.

- E2- other aerosols

The "gray cloud" over China must contribute to the cooling so low or to tge warming so high.
Fumes of the many forest fires (very visible on night satellite images) (Black carbon) should have major impacts on aerosols and in particular falling on the snow and facilitating melting, but also on the clouds

The National Geographic map of "Earth at Night" in November 2004 shows wonderfully gas flaring localized (in red) of oil (North Sea, Nigeria, Siberia, etc.) and (yellow) of forest fires which are very extensive and whose effects may not be properly measured or estimated.

I doubt that the IPCC could take into account all these aerosols.

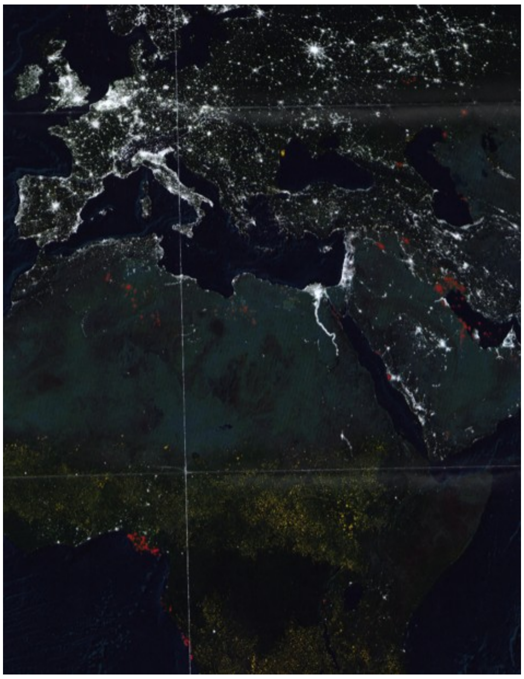

Figure 94: map satellite view at night over North Sea, Central Africa and the Middle East

The CNES Polder satellite records these aerosols but how to introduce them into a model and how to predict? Pollution of China and the burning north of the Gulf of Niger are clearly visible.

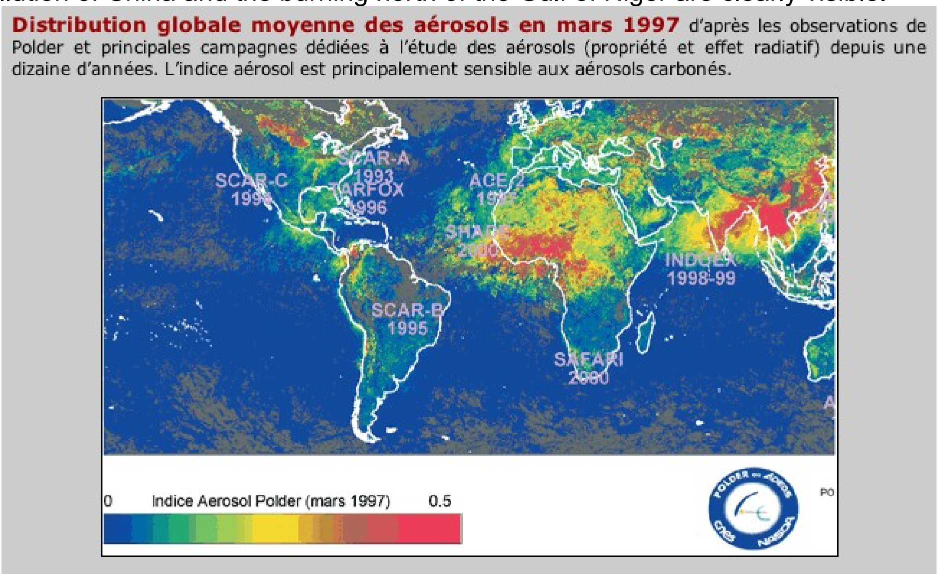

Figure 95: satellite view of aerosols by POLDER CNES in March 1997

Followed Part 3