Remarks on IPCC methodology and conclusions

A preliminary "wording and semantics" remark

Global climate and Local climate

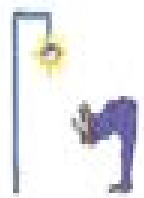
Local climate of an area (even of a wide extension) should not be confused with Global Climate. This confusion arises from the widespread use of the word "Climate" to indicate the totality of major local climates (an hypernym); in this sense climate is used to depict the pattern of the different climate zones (temperate, equatorial, polar, …). The most correct wording should be Global Change of Climate (the English use of anticipated nouns with function of adjective adds to confusion in improper translations).

Vagueness of the key official statement by IPCC

> *"cut in CO_2 emissions should be of the order of 40 to 70 per cent within 2050 in order to have 50 % probability to limit expected temperature increase at to 2 degrees centigrade which is deemed to be the maximum tolerable increase if we want to avoid disasters".*

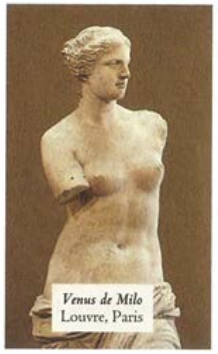
This statement deserves three remarks:

- how can it be accepted that all the phenomena represented in the picture above and all the disastrous consequences mentioned in the right hand side of the picture can be regarded as a single output parameter Global Temperature which is determined by only one causal factor i.e. CO_2 anthropic emissions? That's why
  - the tale of the street lamp appears: a drunk man is looking for the keys lost at the bar under the lamp because the bar is closed and in any case under the lamp there is light



Fabio Pistella 2001 New York Workshop on Climate Change

- and the old joke by Danny Kaye on the reason why Milo Venus is missing her arms is evocated : too much biting ones nails



I am reminded of a very old Danny Kaye† joke, where he and his sidekick were admiring the *Venus de Milo*. His sidekick was biting his nails. "Stop doing that!" says Danny, "Look what happened to her!"

†it might not have been Danny Kaye

Murry Salby *Lecture Hamburg 18 April 2013* **www.youtube.com/watch?v=2ROw_cDKwc0**
Lecture London 17 March 2015 **https://www.youtube.com/watch?v=rCya4LilBZ8**

- the auspicated goal which is "*to avoid disaster*" is far from being certain: it's only foreseen that it will be met with a 50 percent probability; who will embark in a tremendous effort with such a premium probability and what will happen if we after a tremendous effort are in the "bad" probability side? It's a tremendous Russian roulette with three bullets in the gun
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- uncertainty characterizes also the suggested action "*cut in CO_2 emissions should be of the order of 40 to 70 percent* " a huge range of uncertainty close to a factor 2.

How can mankind take serious and responsible decisions on the basis of such an indication based on rough approximation (one effect i.e. global temperature, one cause i. e. anthropic CO_2 emissions) , aiming at a completely uncertain goal (50 percent probability to avoid disasters) and vague in suggested actions (40 to 70 percent cut in CO_2 emissions)?

Global Earth Temperature is a very questionable parameter

Most relevant IPCC statements on hindcasting (i.e. back casting) to evaluate model performances and forecasting are expressed in terms of "Global Earth Temperature" (or "Average Earth Temperature") a parameter used on a yearly base. Its physical or even conventional meaning is really poorly defined [1]:

- physically - or mathematically - it should be an average over time (day-night dependence, season dependence for 365 days) and over space (averaging lands, seas and atmosphere from North Pole to Soul Pole passing through the Equator); should these be sensible (obviously only for forecasting) nevertheless questions would arise about mesh size, number of points their location and so on
- conventionally use is made of proxies (indicators) such as ice cores, tree rings, sub-fossil pollen, boreholes, corals, lake and ocean sediments, and carbonate speleothems[2]. Unfortunately these indicators are in a very limited number, strongly dependent on the site conditions of the site where the sample comes from, in most cases are conditioned by a

[1] The experience of the author as developer of calculation codes for design and operation of nuclear reactors (in particular Boiling Water Reactors) suggest the analogy of representing the behavior of a BWR by means of an average yearly temperature of the reactor that should take into account (fuel pellet temperature, cladding temperature water temperature, steam fraction feedback temperatures on capture resonance neuron energy didtribution with several decisive feedback events; all these varying versus time according to power level but also fission product poisoning burnable poison depletion control rod position and history and so on; very impacting also spatial effects in particular axially due to power shape, control rod movement steam fraction axial variation and so on where accurate space mesh selection is vital.

[2] A speleothem commonly known as a cave formation, is a secondary mineral deposit formed in a cave. Speleothems are typically formed in limestone or dolostone solutional caves.

multiparameter conditions (for instance dendritic ring size depends on temperature and on CO2 concentration as well); moreover their reference date is uncertain and also perturbations can be introduced during years such as modification in CO_2 concentrations in ice cores due to differential solubility effects[3]; all these demands for calibrations and corrections the value of which is comparable with the order of magnitude of the value to be determined.

To make it short, these data are few, cross correlated and local; moreover different scientists give very different formulations and interpretation.

In this context pretending to be capable of predicting values for such a parameter with an accuracy of fractions of centigrade degrees for a time span of decades or even one century seems to be the result of overconfidence.
Regardless of the weakness of the definition of Global Earth Temperature, measured trends do not exhibit temperature increases in the past fifteen years (so called temperature increase hiatus); the statement by IPCC is that measured value must be corrected for El Niño effects and or for shielding effects due to particulate concentrations in the atmosphere in particular in China. One again ad hoc correction through the results of assumption on phenomena and their consequences forcing the outcome of measured data.

Man activities and in particular anthropic CO_2 emissions are not necessarily the guilty

Major objections to such a conclusion are:

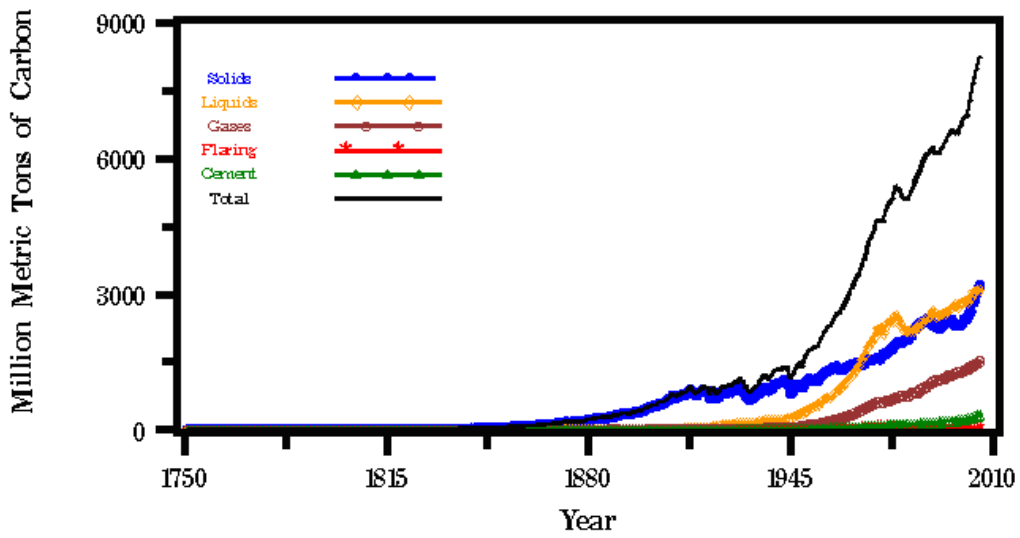
- CO_2 is not the strongest factor acting on greenhouse effect since water vapor is much more impacting; the statement by IPCC is that CO_2 is an enhancing factor of water vapor action; quantification and even direction of this enhancing effect

[3] The CO2 trapped in the ice cores is stored non-conservatively; the older the core the more CO2 has been lost by various dissipative processes. At 400,000 years' “depth” the CO2 is under some 500 atmospheres' pressure. The removal of a core is like uncorking a champagne bottle the CO2 outgassing can be physically heard when a core is extracted. Consequently the ice core data are very likely greatly under-estimating the true CO2 levels. It follows that current levels of CO2, though rising, are low compared to even the past few hundred thousand years.

undergoes severe criticism; however the question remains if water is so important why water concentration in the atmosphere is not given the major attention? On the contrary vapor effect is considered by IPCC as a background that can be disregarded when looking for variations (strangely enough since the background is much stronger than the blamed signal and it undergoes significant variations versus time and other conditions); the so called albedo effect of clouds (reflecting solar radiation) is poorly investigated and misrepresented in the models

- human emissions are only 3 to 5 percent of CO_2 emissions in the atmosphere why should they necessarily be the cause for suspected CO_2 increased concentration in the atmosphere?

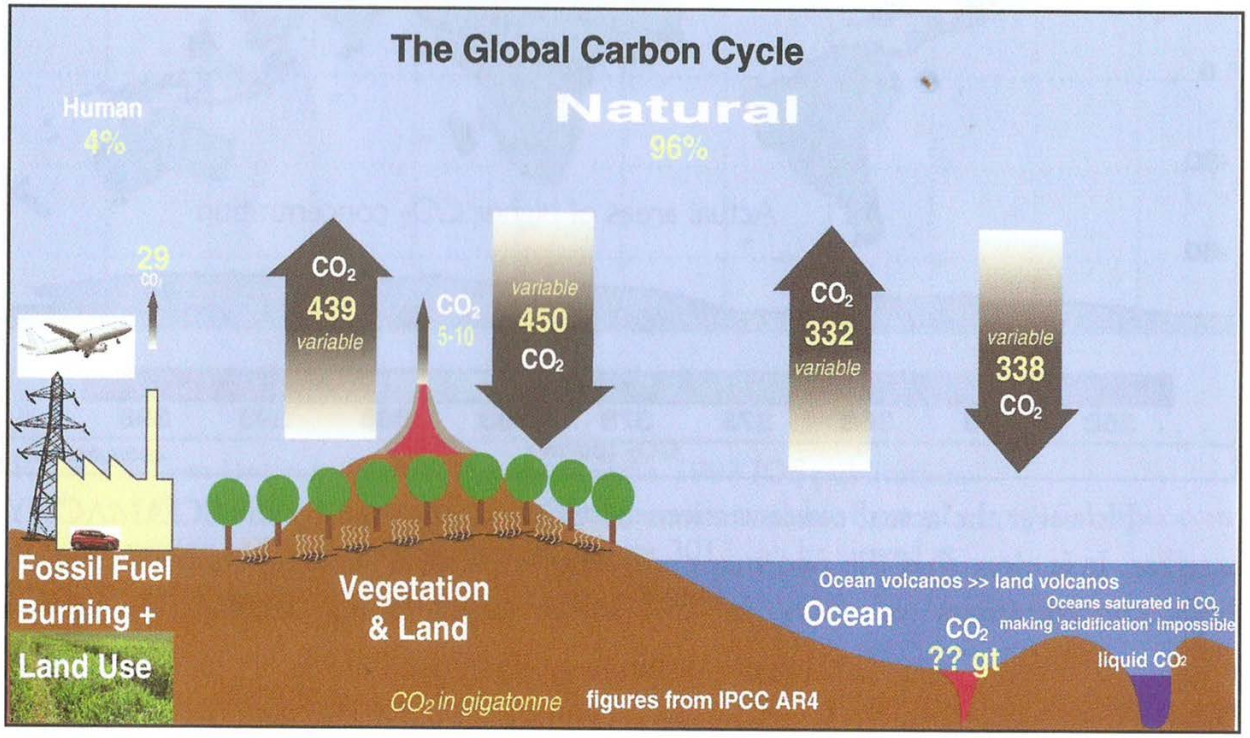
[From David Evans Climate Challenge]



Take note that a factor 3,67 multiplies carbon concentration (or emission) to CO_2 concentration (or emission)

From Murry Salby *Lecture Hamburg 18 April 2013* www.youtube.com/watch?v=2ROw_cDKwc0
Lecture London 17 March 2015 https://www.youtube.com/watch?v=rCya4LilBZ8

As can be seen in the diagram below the human input is small (~ 4%).



- there is some important effect not yet understood (or properly quantified) in CO_2 dynamics in the atmosphere since only half of the CO_2 which is calculated to be emitted yearly is "found" in the atmosphere
- CO_2 distribution in the atmosphere versus time and position in the planet recently measured by NASA satellite OCO2 do not agree with the distribution of man made CO_2 emissions (for instance no-high level concentration over Europe, high concentration in China in non-industrialized areas) while they agree with maps of geophysical activity causing CO_2 emissions

and/or maps of possible CO_2 release from oceans or green area when temperature increases over there. Moreover CO_2 concentration is not markedly different between North and South hemispheres while anthropic emissions are 90 % concentrated in northern hemisphere; the equatorial barrier is tough and only gases and light particulate can cross it ,after a certain delay (hundred years).

- increase of CO_2 concentration versus time matches very well reduction of solar wind intensity
- since 1750 the increase of CO_2 concentration in the atmosphere is continuous but very irregular (some years is three times higher than in other years, whilst anthropic emissions grow lightly but almost regularly each year
- in the years from 1973 to 1986 there was a strong slowing-down in anthropic emissions of CO2 rallentamento whilsy no significant slowing down has been registered in CO_2 accumulation in the atmosphere

Nature of interaction between CO_2 concentration and Global Earth Temperature

In which direction does the correlation take place? The historical sequence illustrating glaciations of the last 400 thousand years show that in general the increase of the average global temperature precedes the increase of atmospheric CO_2 concentration and not vice versa.

CH_4 effects not properly taken into consideration

Also the concentration in the atmosphere of CH4 (almost 25 times more effective than CO_2 as a green house gas) started to grow at the beginning of 1700 when no significant anthropic phenomena were active. More generally, carbon cycle implies not only CO_2, which probably is not the most important factor but also the enormous exhalations of CH_4 almost everywhere with various intensity. The biosphere performs a crucial role of both gases both as a source and as a sink.

Underestimation of geophysical phenomena

The representation in the IPCC model, of geophysical phenomena, besides the volcanic ones, is particularly poor for CO_2 emissions, as already said, for CH4 emissions and for heat release to surface also in connection with ice melting

Revision of solar irradiation

There is evidence that in the last 1000 years solar activity plays a non-marginal role on climate even if solar energy flux reaching Earth has changed very little thus not justifying directly per se any effect on global average temperature. This implies that are active amplification systems not clearly known until now. The most evident final effect is that of the sunspot cycle: everytime sunspots increase and (at the same time) the frequency of their cycle increases, average global temperature increases as well; the reverse is also true.

Poor representation of plants and soil role in the CO_2 , CH_4 and vapor cycles

As shown in a presentation by Paolo Sequi the role of plants and soil is only partially known while there are indications that its impact on their concentration in the atmosphere may be decisive. Of particular importance is the function of microorganisms on the segregation of organic carbon in soil.

Inadequate representation of polar ice caps

It should be noted that the total amount of ice on the Earth is 90% in Antartica and 8% in Greenland.

As discussed by Viscount MONCKTON in Climate Challenge the Antarctic ice cap shows no warming in 35 years (so, technically, there has been no “global” warming); and in recent months the extent of the sea ice surrounding the continent has exceeded the record by a considerable margin. According to Giovanni Gregori (see his contribution in in Climate Challenge) precipitations are increasing over the largest part of Antarctica (the so-called Eastern Antarctica), where the mass of ice-cover is observed to increase. Hence, the glacier at high elevation slide down, and press over the ice sheet at lower altitude, thus favoring a large release of icebergs. Note, however, that ice-sheets are retreating also on a small fraction of Antarctica, due to the large release of friction-heat associated with the increased geodynamic activity.

In the Arctic, where the sea ice has declined, a series of phenomena are taking place. Satellite pictures from OCO2 Nasa satellites show give an almost incredibly clear evidence of an enormous and surprising, “revolutionary”, anomalous CO2 exhalation from a large region on the whole northern polar cap. Some effects are associated with atmospheric circulation. But - according to a large number of other evidences - it is evident that an increase is in progress of endogenous heat-release underneath the whole Arctic cap.

Globally, neither the extent nor the trend in sea ice shows any significant change during the entire satellite era. Before that era, no systematic measurements were possible, but written accounts suggest there was less ice in the Arctic in the 1920s and 1930s than there is today. claiming – as it is often stated – that atmospheric warming causes the detachment of icebergs, has no logical basis.

It’s not true that sea level is rising

As shown by Viscount MONCKTON in Climate Challenge the Envisat satellite, during its entire 8-year run of data from 2004-2012, showed sea level rising at a negligible rate equivalent to just 3.2 cm per century. The GRACE gravitational-recovery satellites show sea level falling from 2003-2008, but an artificial and arbitrary adjustment was made so as falsely to suggest sea level was rising (Cazenave et al., 2009): the “official” sea level record shows sea level rising at a rate equivalent to 30 cm per century, little more than the 18 cm/century in the 20th century: however, intercalibration errors between the various laser-altimetry satellites exceed the total claimed sea-level rise, making this record unreliable.

Again on modelling

Obviously a complete analytical description of the Earth climate system based on physico-mathematical equations is not viable, at least at present. The possible approach is: the identification of subsystems and of the mutual links in terms of proper variables and respective boundary conditions; at the level of each subsystems again analytical description is not viable and use must be made of empirical correlations i.e. ad hoc formulae fitting tables of measured data. That’s the most delicate point because it implies a choice of which phenomenon is caused by which other phenomenon (or more frequently phenomena); delicacy is double: selection of decisive variables, selection of type of relation; when an empirical correlation deals with a well-known physical

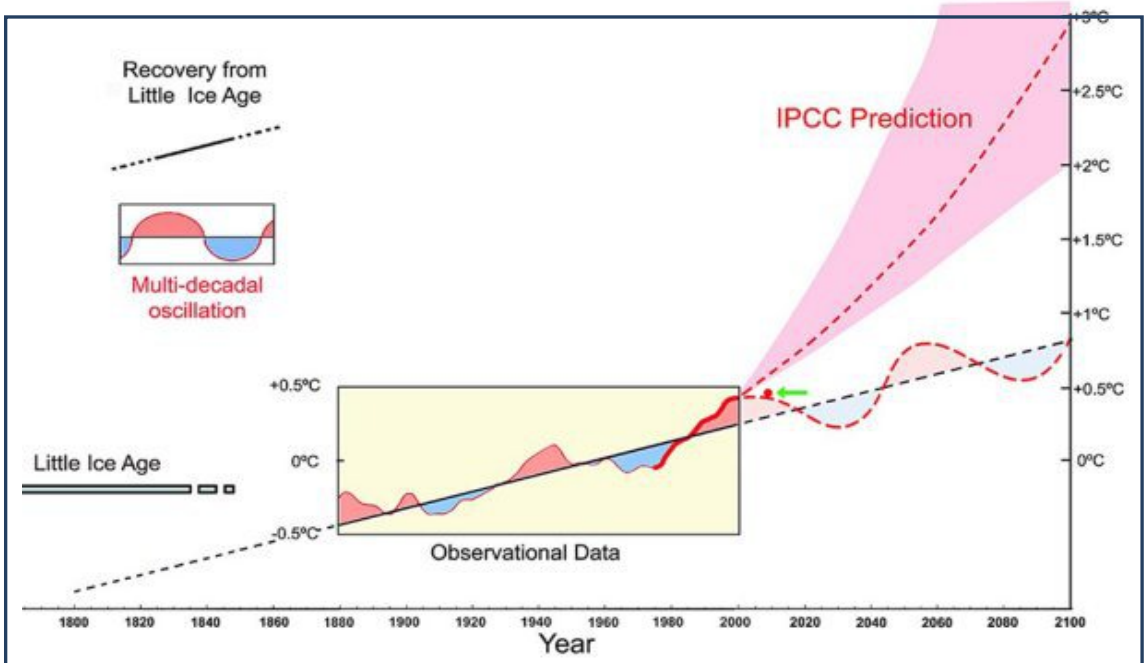
phenomenon such as boiling of heated water the choice is trivial: boiling is caused by heat provided to water. But when dealing with complex circumstances implying a large number of phenomena (a macro system such as Earth in relation with Sun) and it is attempted to correlate multiple complex parameters such as Earth global average Temperature (see above) to a single parameter which is a priori blame to be the cause, the chosen direction of the cause-effect relation is not necessarily right and however the established correlation is valid only within the range where experimental data have been collected (which raises another issue on consistency and homogeneity of different data that contribute to the set used to this purpose: to be useful the different sources of data must fulfill the condition "ceteris paribus"). In this complex modelling effort, experimental calibration is vital: only if extensive experimental campaigns of verification are adequately conducted one can hope that model predictions are useful, obviously within the limits that can only be more restricted than the range of validity of the subsystem correlations utilized. That's why such empirical models should be more exactly called interpolation models. In modelling Global Climate Change this is not the case because calibration on known condition (back-casting, also called hindcasting) is very limited and the forecasting looked for is more extrapolation than interpolation.

Such a representation of limits that condition modelling activity in general, applies also to the course of activities started several decades ago in climate modelling: the first versions of models being developed where not successful in reproducing the trends experienced in the 20th century, so the idea prevailed that there should be something intervening in recent history to modify the picture: and anthropic CO_2 emissions where identified as a candidate guilty; as a consequence of the intrinsic mechanism of empirical correlation synthetized above once you make such a choice the situation becomes frozen and everything is oriented in this direction. If some result of prediction does not fit, it's almost automatic to introduce some adjustment through corrections (which is often far from reality but numerically acceptable due to the huge uncertainty in measured data). Finally models become a self-consistent representation, a fiction which loses more and more connection with reality. [4]

[4] Reference could be made to the Popper analysis of scientific theories (*si parva licet componere magnis* since IPCC climate modelling is far from being a scientific theory) in the sense that no falsification is possible in that context. Suggestions can emerge also from the considerations of Feyerhabend when he underlines that any projected falsification experiment necessarily involves all the theory systems of Science because a contradiction possibly emerging might be the consequence not of the specific aspect being examined but of other errors present in theories that are implicitly affecting readings and interpretation of the present experiment.

A professional response by the model proposer to such a situation is to formulate in terms of probability the prediction of a model which is ill-defined (in the meaning used for mathematical problems); but in such a case (even if it were possible to quantify probabilities in such a situation) what is the information given by the IPCC statement mentioned above: a goal with 50 % probability predicted to be obtainable acting on the cause (CO2 anthropic emissions) to an extent which is uncertain by almost a factor 2 (40 to 70 percent reduction) ?

In the construction of such models wide use is made of numerical techniques such as fitting to analytical functions and data smoothing. When looking for expected long term trends these techniques is viable if variability of data (also improperly named oscillations) is of random nature (for instance uncertainties following a normal distribution) but are particularly misleading when in



from David Evans in Climate Challenge

the presence of periodic variations that should be properly identified and filtered (not through smoothing or least square fitting). In the following figure the example is shown of temperature increase versus time supposedly blamed on CO2 emissions because these are registered increasing versus time as well. In reality the presence of a periodic oscillatory trend with a period much longer than the width of the interval used for fitting. If the empirical model is constructed within the arbitrary assumption that an arbitrarily a priori chosen forcing factor arisen in the short term time interval must be identified, the tail of an independent natural phenomenon having its dynamic behavior (with longer period) may be overlooked and the interpretation of cause-effect correlation completely misunderstood. Once again the "tale of the street lamp" comes to mind.

Instability of basic data and too extensive use of overwhelming corrections to measured data

The case of underestimating CO_2 concentration from ice core has already been mentioned. Another important case is the number of trees which has been recently found to be a factor 4.5 larger than previously estimated (with major consequences not only on the equilibrium between emission removal and storage in CO2 cycle due to plants, but also effects on soil albedo). The point to be stressed is that in some cases variations in basic data cause changes not only on the amount of direction of the effect investigated but even in its direction.

Extensive use of corrections to measured data

The case of sea level rise which is officially announced without underlining that the increase is not directly measured but is the result of a correction added to account for a supposed effect masking the increase to experiments has already been mentioned.

Particularly enlightening is the case of the so called "Temperature increase hiatus": measured data give indications that global warming "stalled" or "paused" during the period between 1998 and 2013. Reconciling the hiatus was a major focus of the 2013 climate change assessment by the Intergovernmental Panel on Climate Change (IPCC): in a first phase "necessary corrections" were introduced by IPCC dealing in particular with El Niño and pollution in China respectively and everybody was satisfied even if the extent of the correction was double than needed. More recently it appeared that the so called hiatus did not exist at all as a

consequence of mistakes in statistical analysis of experimental data. If this is the case what about reliability of data analysis, reliability of corrections, credibility of forecasts pretending to estimate fractions of degree centigrade?

Praise of doubt

The remarks summarized above and many other have been formulated and adequately presented but a sort of censorship generates either silence or verbal aggression by IPCC supporters. On the contrary it should be recognized by everybody that doubt is not only justified but also vital for a fruitful construction of human knowledge, in particular when decisions of tremendous impact on the future of mankind are to be taken according what scientific knowledge recommends.

Bruno Lauzi - Il Dubbio e la Certezza.mp3

References

Wolfgang BEHRINGER Storia culturale del clima. Dall'Era glaciale al Riscaldamento globale

Ernesto Pedrocchi Clima globale e fabbisogni energetici 2015

https://dl.dropboxusercontent.com/u/58476480/Convegno%20Padova%202015.ppt

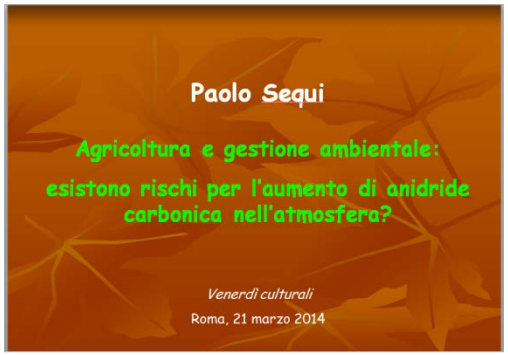
Giovanni Gregori Critiche all'IPCC e interpretazione endogena dell'emissione di CO2 2015

https://dl.dropboxusercontent.com/u/58476480/Giovanni%20Gregori%20-%20Interview_AGW_18nov2015.pdf

Independent Committee on Geoethics 2015 www.geoethic.com

www.PCC15.org

Paolo Sequi Agricoltura e gestione ambientale: esistono rischi per l'aumento dell'anidride carbonica in atmosfera? 2014



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