Peculiar behaviour of Europe in dealing with the so called "global warming" and CO_2 emissions

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Four questions and some proposals

- **Is "global climate change" taking place and can we formulate sound predictions?**
- **Can analysis of the past help to understand present situation, future evolution and expected consequences?**
- **Are human activities responsible for the present episode?**
- **Are we behaving in a rational manner in front of such a situation?**

The proposals .... we will see

Is "global climate change" taking place and can we formulate sound predictions?

The answer to the first part of the question is yes since it is a normal climate dynamic. We can derive it from a set of indications such as: temperatures are rising, snow and rainfall patterns are shifting and more extreme climate events - like heavy rainstorms and record high temperatures - are already taking place.

A complete discussion of such indicators is provided by EPA - US
http://www3.epa.gov/climatechange/science/indicators/

Global warming and global climate change are not equivalent formulations: the first one sounds as if it is granted that something is acting (and CO_2 is automatically evocated as "the guilty")

The pattern is not so clear as many pretend and three dangerously extremist cultural positions must be avoided because they are misleading in the interpretation of events and dangerous in the definition of the response strategy.

A large fraction of climatologist engaged in international research programs are not totally immune from:

hyper trusting on modelling

the reliability of interpretations and hence forecasts is affected by shaky assumptions on decisive parameters such as albedo (of clouds, snow and iced surfaces), fraction of CO_2 trapped in sea organisms, and questionable definition and measurements of Earth average temperature; some caution is suggested also by the experience of the '60s when an alarm was launched due to forecast of what is known as "global cooling" []. The huge increase, since then, in computing capabilities is not matched yet by comparable growth in collection and interpretation of experimental data. Caution is particularly due when – as in this case – models provide probabilities

unjustified catastrophism

consequences predicted by uncertain models are given for granted and next to come; sometimes extent and rate have been dramatized to mobilize public opinion and decision makers; actually this was an explicit choice for S. H. Schneider but cannot be considered as a generalized attitude of climate experts

Public opinion is bewildered not only by the overconfidence and catastrophism of climate specialists but also by ***confusion between meteorological events and climate events*** (many media people and even some meteorologists are blaming on climate change any deviation from seasonal average value of temperature, rainfall and other meteorological parameters).

A list of the negative phenomena foreseen includes:

- increase of Earth's average **temperature**
- influence on the patterns and amounts of **precipitation**
- reduction of **ice** and **snow** cover, as well as **permafrost**
- raise of **sea level**
- increase of the **acidity** of the oceans
- increase of the frequency, intensity, and/or duration of **extreme metereological events**
- shift of **ecosystems characteristics**
- increase threats to **human health**

It should be noted that the last two are foreseen consequences of the other phenomena and that is underestimated (or at least under-communicated) the possibility for some geographic regions e.g. North Canada and Siberia) could benefit of such changes

The first six phenomena coincide with those just mentioned as indicators of the existence of climate change; this should not surprise but it deserves two trivial comments:

- it strengthens in public opinion the perception that drama has already started
- it stresses that the core of the matter is to evaluate the evolution of such predicted phenomena (their extent and their dynamics i.e. rate of development and delay between onset of supposed causes and deployment of consequences); in plain words what matters is how much and when, besides where as already said.

The final remark is quite obvious: description of phenomena is not enough we need to have understood the causes of such phenomena. Only then we can reasonably call effects these phenomena and embark in a prediction of their future evolution. Again, in plain words what matters is why, where how much, and when.

The answer to the second part of the question i. e. "can we formulate sound predictions? " should be suspended until the causes of the phenomena are cleared. The delicate point is that the majority of "those in charge" take a shortcut .

Through a misunderstood recourse to the *Principle of Sufficient Reason* since no other explanation is established, the phenomena are blamed only on CO_2 accumulation - the most visible evidence - and the responsibility is given to man using fossil fuels.

Investigation is focused on CO_2 . Modelling often concentrates on predicting temperature rise effects of CO2 concentration ("word jump" from phenomenon to effect becomes a "logical jump")

Unfortunately declaring that the extent and dynamics of foreseen evolution of climate are still uncertain implies being attacked in the media, being called negationists and blamed for not caring of a general disaster in front of mankind.

If one wants to avoid shortcuts that can deviate from reality, looking back to the past (on both historical and geological scale) can be enlightening.

Can analysis of the past help to understand present situation, future evolution and expected consequences?

The answer is yes.

The available data (from geological and historical sources) show very clearly that climate changes occurred in the past and that there is an **extreme variability** in terms of **extent, timing and rate.**

That's why the present situation can be called an **episode.**

Valuable information is acquired by examining these data.

The "**geological archives**" talk to us through different experimental investigations based on several scientific competences and technologies, among which:

- rock morphology; sediment analysis; deep sea drilling; ice core drilling; palaeobotany including dendrology; palaezoology; nuclear decay and in particular radiocarbon; oxygen isotopic techniques; thermoluminescence.

Valuable information can be acquired by reconstructing a chronology of sea level variation in a given place

As an example of how we can "read" climate variations **from geology** one can consider the case of sea level variations (in the double role of indicator and anticipated effect)

It is well known that the sea level elevation is not homogeneous worldwide since large regional differences result from changes in water salinity and ocean temperature (i.e., from non uniform thermal expansion), self-gravitation and elastic/visco-elastic deformations of the solid Earth in response to water mass redistribution associated with land ice melt.

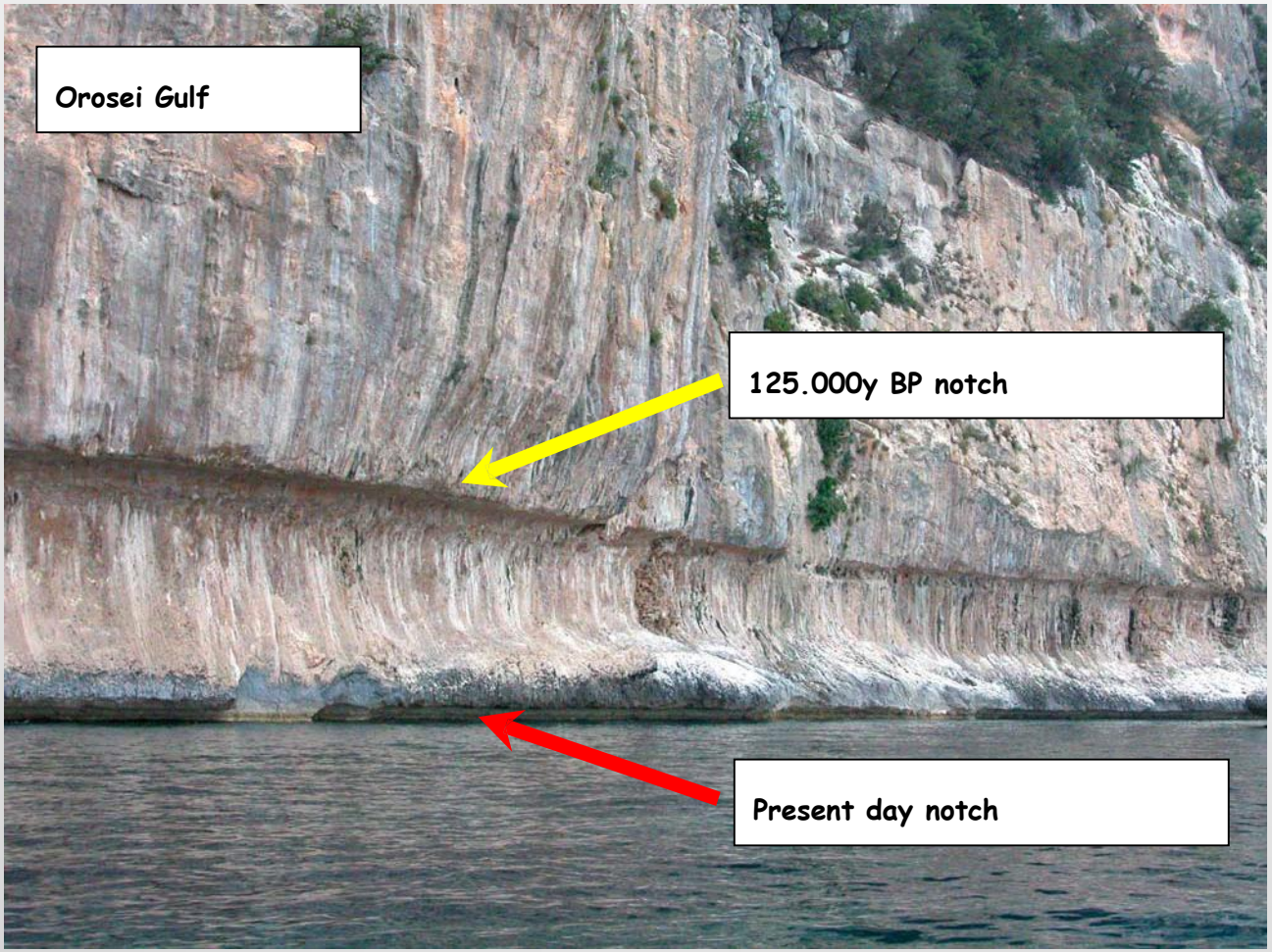
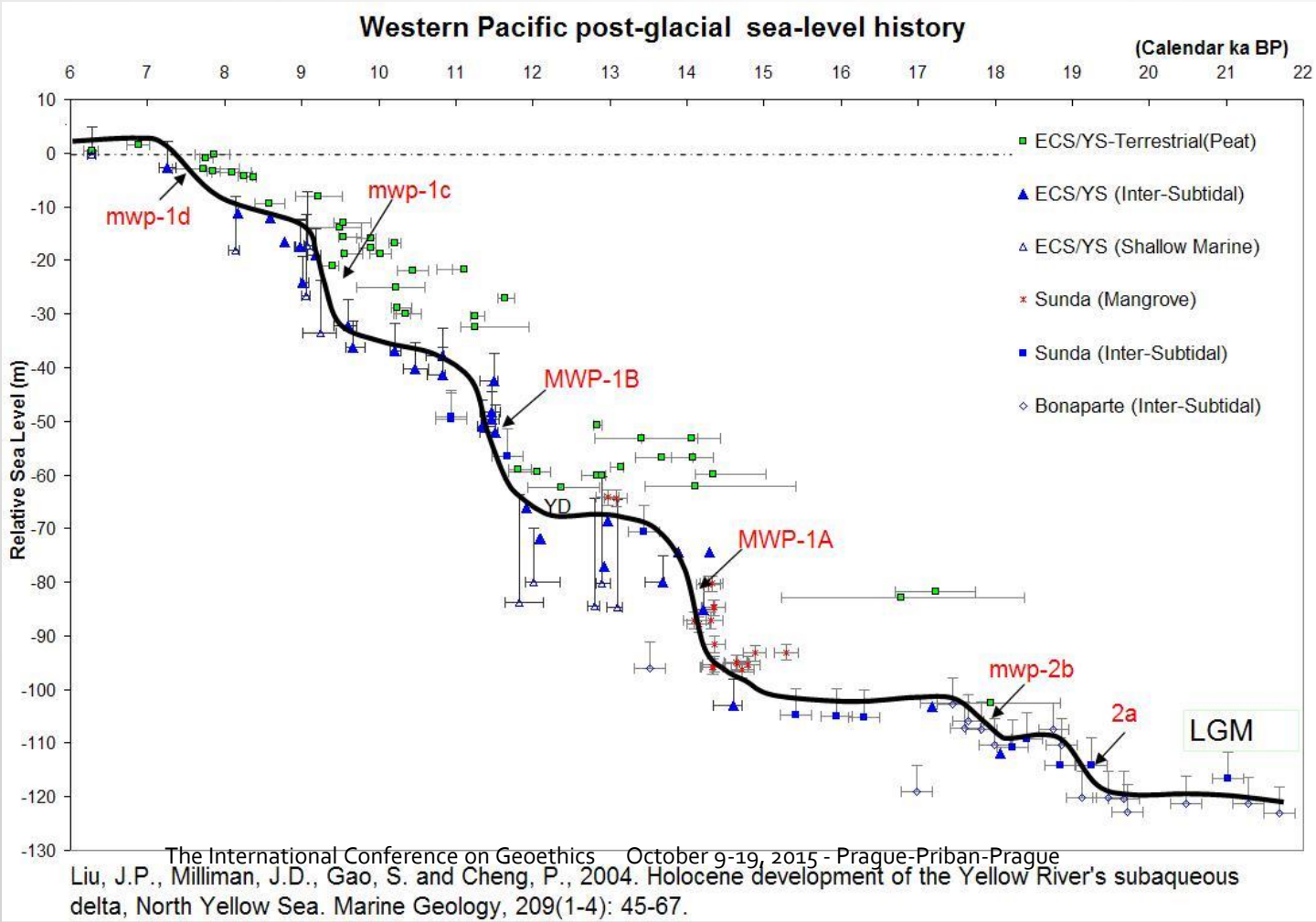


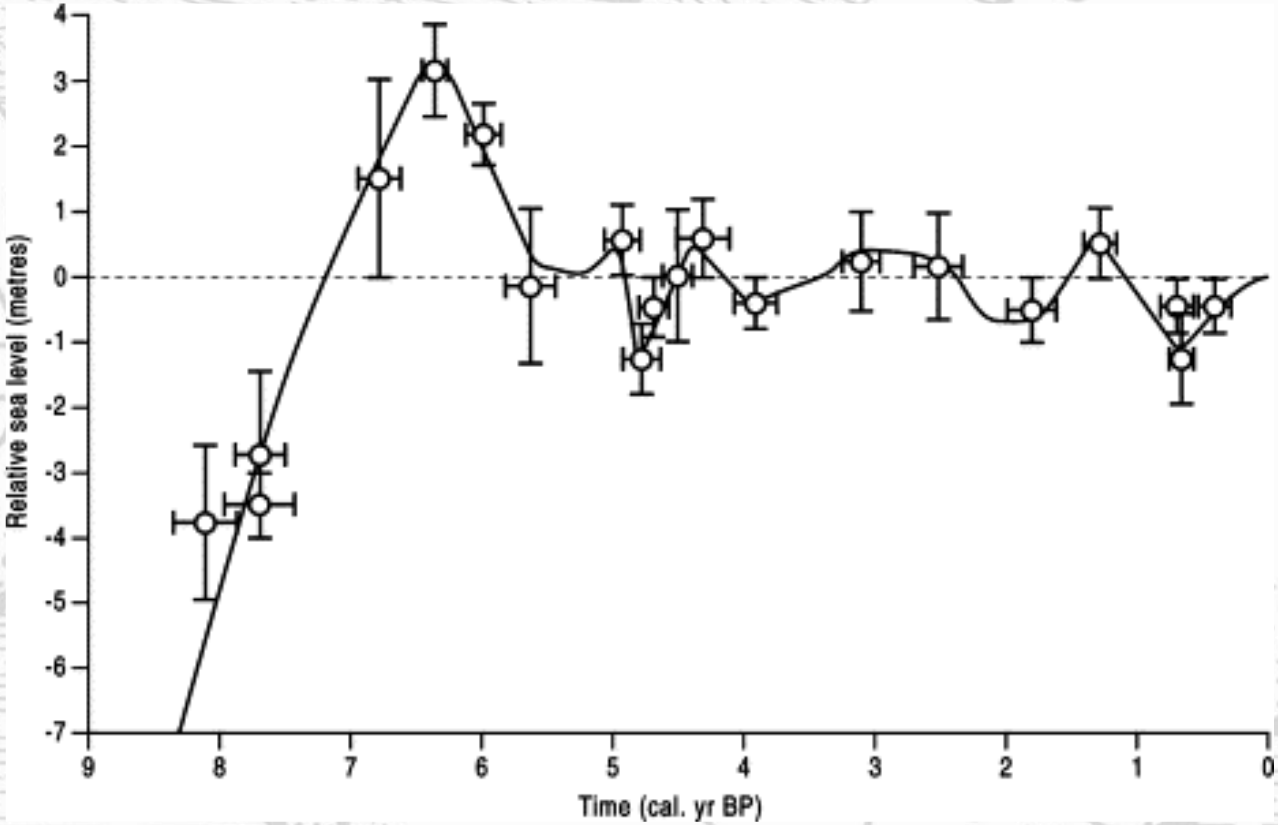
FIG. 2 – MIS5e sea level, marked by a +8m notch, vs. present day sea level along the coastline of Orosei Gulf (Sardinia, Italy)

All of you know also that at the end of the last glaciation, the beginning of Holocene, the sea level was ca 120 meters below the present sea level and the present sea leave is almost the same from ca 6000 years ago. In other words the sea level rising was orders of magnitude higher than the ones we are facing in the last 6000 years.



Liu, J.P., Milliman, J.D., Gao, S. and Cheng, P., 2004. Holocene development of the Yellow River's subaqueous delta, North Yellow Sea. Marine Geology, 209(1-4): 45-67.

South Africa



Holocene sea-level fluctuations inferred from sea-level index points from the southern Langebaan Lagoon salt marsh, South Africa.
Horizontal error bars refer to analytical uncertainty in radiocarbon age calibration (2σ range), and vertical error bars refer to uncertainty in sea level predictions derived from organic matter and shell material indicators (modified from Compton, 2001).

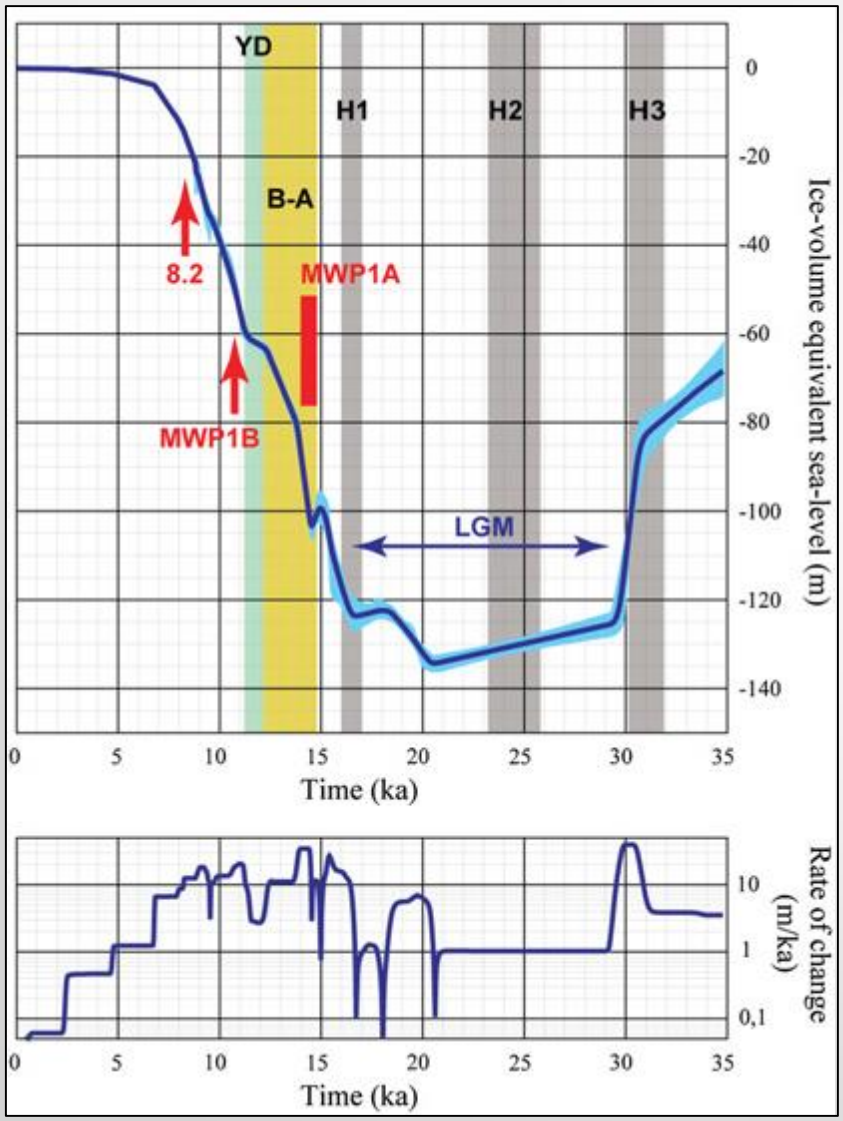


Fig. 4 - Above: The Ice-volume equivalent sea level (e.g. corrected for the isostatic contributions) estimate and its 95% probability limiting values. Also shown are the major climate events in the interval [the Last Glacial Maximum (LGM), Heinrich events H1 to H3, the Bølling-Allerød warm period (B-A), and the Younger Dryas cold period (Y-D)] as well as the timing of MWP-1A, 1B, and the 8.2 ka BP cooling event.

Below: Estimates of sea-level rate of change.

(After Lambeck et al., 2014)

Among the suggestions we can obtain from the above info one is of particular value. We are now in a period of its history when Earth on a century scale is not experiencing unidirectional dynamics and is undergoing oscillations.

The amplitudes of these oscillations are comparable to the outcome of measurements performed in current decades that are interpreted as showing a trend on decade scale.

Consequently blaming measured variations on human activities could be arbitrary since they could well be a natural outcome taking place independently.

Hence sea level variation is to be handled with care as an indicator. Very “delicate” - not to say questionable – are, accordingly, projections on future sea level rise based on such measurements.

Caution is particularly recommended since IPCC projections have uncertainties (1 cm per year at least) of the same order of magnitude as the calculated effect and are labelled by the proposer as having “very low probability”.

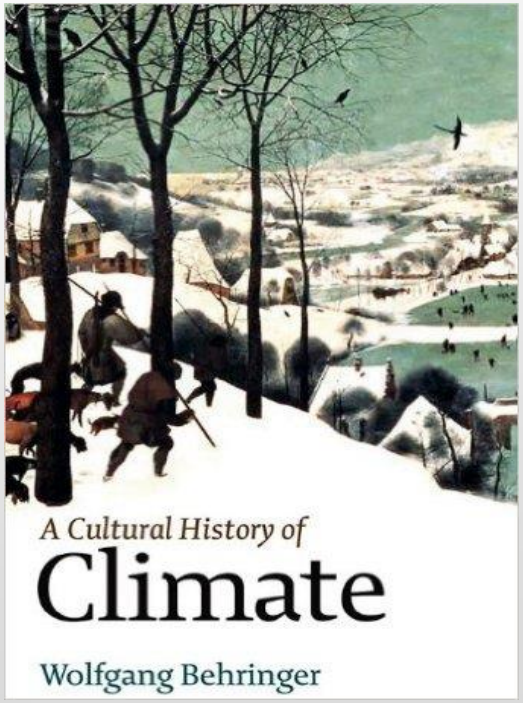
Similar considerations could be applied to indicators in general. It should be agreed that interpretation of indicators is to be handled with care, in particular when using them in calculating forecasts of effects.

At **historical level** evidence of past climate change are strong and numerous. Just to mention a couple of them that are common knowledge for educated people in Western world:

- for imperial Rome, the main source of cereals (freely distributed following the policy of *panem et circenses*) was the Mediterranean coast of Africa (including Egypt, present Tunisia and part of Libya) a region that has experienced in the following centuries sensible desertification effects [1] [2]
- during Middle Age food shortages with dramatic social effects have been experienced as a consequence of long periods of cold climate [3]

Data of this type are well consolidated (they are currently referred to as **"society archives"**), some serious attempt has been made to gather, diffuse and comment them, but both in the general audience and in the community of "climate change professionals" this information is widely disregarded and psycho-analytically removed, giving place to a sort of censorship.

Such attitude started with the work of Wolfgang Behringer and, as we know, is continuing.



History tells us not only about “natural changes” but also about “man made environmental transformations” of the past that in some cases have been dramatic, for their extension and impact.

This was clearly the case when stock rearing, and agriculture later were introduced, but even hunting had played, earlier, its effect on wild animal population.

The action of man modified environment when the regimes of rivers or even their course were changed, when deforestation continued also to use wood as building material and even more when industrialization took place and the number of people and their living standard boomed, a process which is still underway.

These phenomena - from both natural changes and man made changes - are not so different from those predicted by catastrophists.

One lesson history teaches us, in this respect: mankind has always overcome environmental changes through adaptation meant as a combination of :

- modification of traditional previous ways of living and places of living (consider migrations impact in human history)
- interventions on territory (such as deviating rivers or building dams) aimed at making it more suitable for living

More generally, adaptation in the double meaning of changing the environment, the behavior and even, in proper time scale the characteristics of the species (human evolution) can be considered a peculiar property of mankind.

Even if the adaption has taken place favorably at the end, one should not forget that transients have been gone through that were cumbersome and costly in all meanings of this word; these costs have been paid mostly by weak and poor people.

This should be kept in mind when discussing what should be done: people should be the center of attention and choices made accordingly; some declarations about the future of Earth on the contrary seem to follow the recent mythology of Gaia (see Lovelock) deemed as a sort of deity and the only priority .

It cannot be denied that mankind has “chosen” thousands and thousands of years ago to interact strongly with the environment. The real issue in front of us is what type of interaction: the old message was “govern the environment”, the new one is “preserve the environment”. Can we find an optimum in between? An optimum acceptable for everybody, respectful of life in general and of the different components of mankind?

Are human activities responsible for the present episode?

This is the more controversial issue. A preliminary question should be made explicit: “is greenhouse effect causing global climate change?”. The answer - which the catastrophists swear to be absolutely yes - is not so obvious as they pretend it is. The list of suspects includes:

- sun as a source of energy (sunspots, oscillations in Earth orbit)
- composition of Earth atmosphere (green house gases) volcanism

On a scale of hundreds thousands years a role can be played also by

- plate tectonics
- meteorites

As already mentioned present models of recent years evolution do not always give enough attention to sun power variation and within analysis of consequences of green-house gases, other components besides CO_2 are not sufficiently considered including methane a very powerful agent of greenhouse effect whose releases in the atmosphere are poorly quantified and probably significantly underestimated. Also the consequences of large variations in concentrations of water vapor - the most powerful agent - should be better understood in particular in the complex interaction between water and CO_2 . The quantification of the effect of trees (and green zones in general is also to be better investigated)

Among the evidences disregarded one should be given serious consideration in a unbiased evaluation: there is a significant mismatch in the time history of temperature as compared to that of CO_2 concentration http://cdiac.ornl.gov/trends/co2/vostok.html

Some arguments support even the hypothesis of an inversion of cause-effect relation in the dynamics.

Nevertheless most official channels of climatologists , giving rise to a bombastic majority of catastrophists ,have formulated their verdict : global change is due to CO_2 emissions coming from human activities.

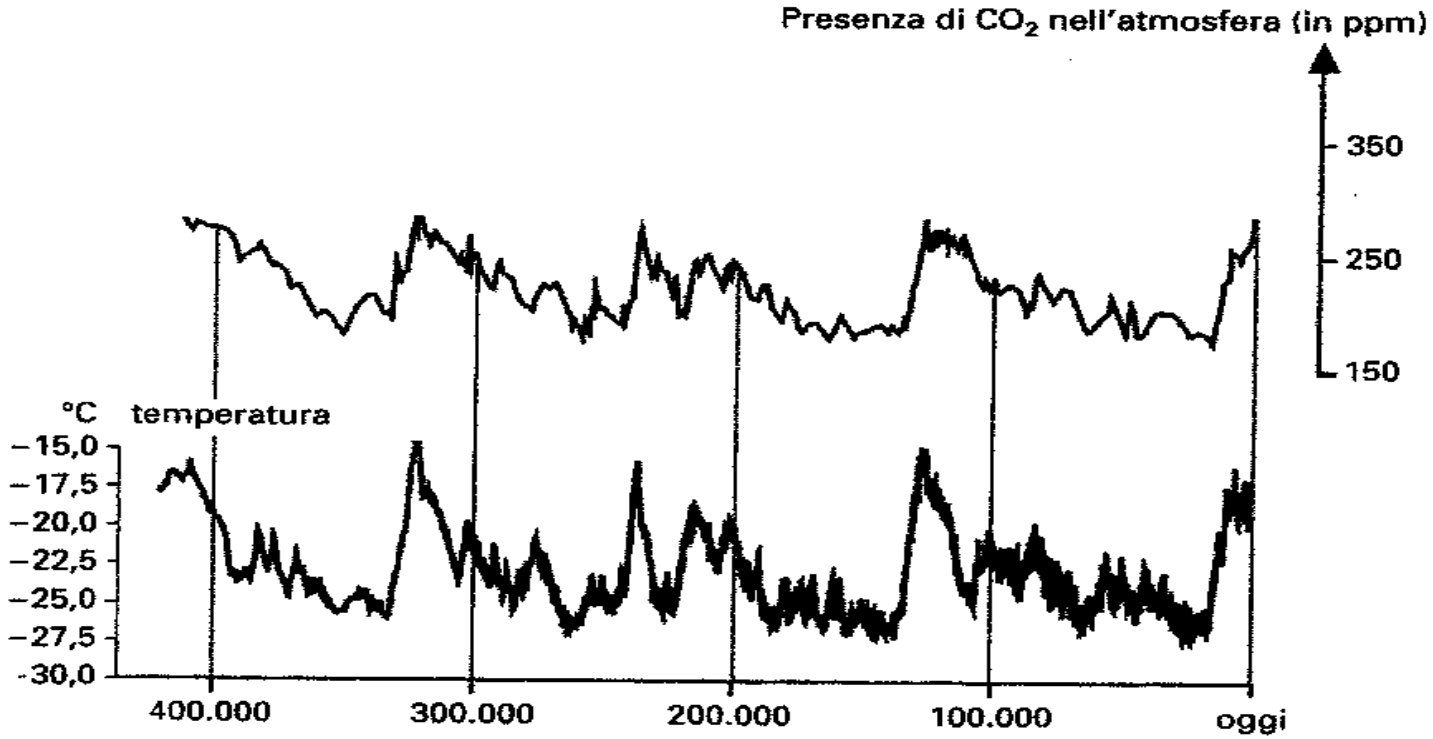


Figura 7
Curva della temperatura e percentuale di diossido di carbonio negli ultimi 420 000 anni. Dati ricavati dalla carota di ghiaccio di Vostok (Antartide). È chiaro che c'è un nesso, ma qual è la causa e qual è l'effetto?

Da Behringer tradurre caption

The reasons why the situation should be considered scientifically controversial are given in a synthetic review of evidences and comments given in Behringer who reports favorably the opinion of Stehr and Stoch that “it’s not clear whether temperatures are the cause of the modified concentrations of CO_2 , or the contrary is true, or both variations are governed by a third process still unknown”

Such a position should be adopted as the starting point to overcome extremist polemics and try to reach consensus on actions to be implemented accordingly. But a veil of neglect has been dropped by media on such documented and equilibrated contribution.

So the answer to our pending question "Are human activities responsible for the present episode" should be: It could be, but it is not certain.

Combining this with the considerations previously exposed, the more consistent statement should become Anthropogenic origin of climate change is possible but not certain. Even less certain are the extent and dynamics of foreseen consequences.

Declaring such an opinion implies an immediate inclusion with special mention in the black list of negationists .

Are we behaving in a rational manner in front of such a situation?

Unfortunately shortage of rationality - which to some extent affects the estimates of potential effects of climate change - becomes prevailing when the issue is **behavior** which means "how do we perceive the situation" and "what should be done". The most common lack of rationality is in the contradiction among perception, declared lines of action, actual lines of action.

Shortage of rationality applies with different extent to climate experts, decision makers, media and public opinion.

The experts

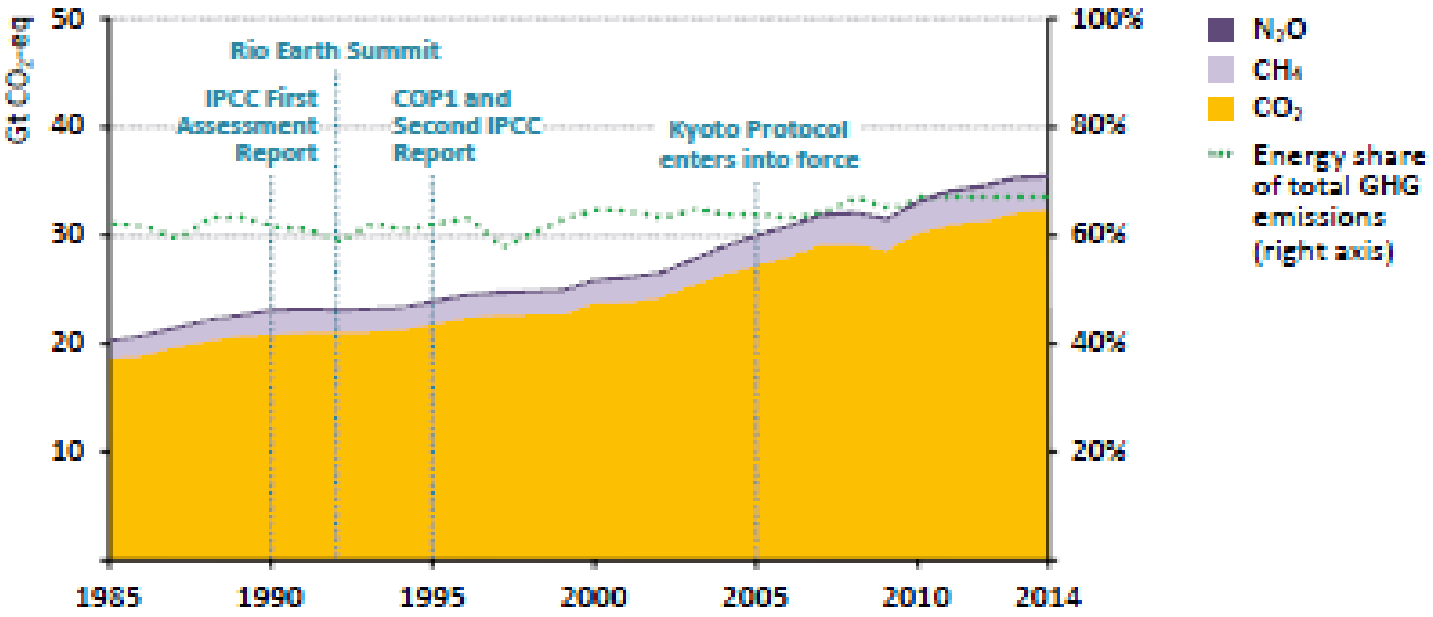
About their perception of climate change (present stage, causes and projected evolution) we have already said.

Their indication is not a simple formulation and definitely much less a simple task to accomplish:

- **cut in CO2 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.**

What are the outcome of 25 years of chattering and in particular of 9 years after the enforcement of Kyoto protocol ?

Figure 1.2 Global anthropogenic energy-related greenhouse-gas emissions by type



Notes: CO_2 = carbon dioxide, CH_4 = methane, N_2O = nitrous oxide. CH_4 has a global warming potential of 28 to 30 times that of CO_2, while the global warming potential of N_2O is 265 higher than that of CO_2.

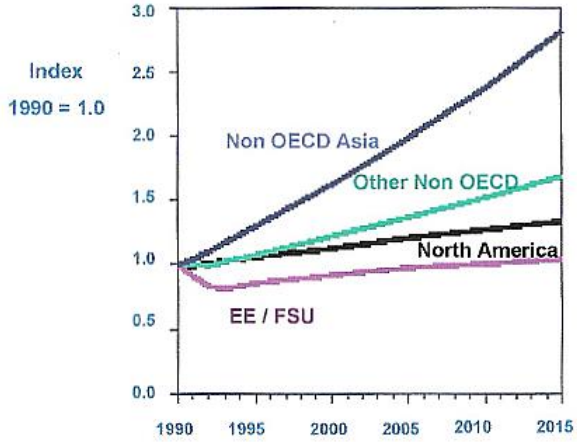
Sources: IEA and EC/PBL (2014).

Since 2001 it was suggested to put attention on the growing economy countries

A viewpoint from outside the IPCC community

Attention should be put on high-impact events that have not taken place yet

Growth in Carbon Emissions by Region 1990 - 2015



Sources: **History (1990):** Derived from Energy Information Administration (EIA), *International Energy Annual 1993* DOE/EIA 0219/93 . **Projections:** EIA World Energy Projection System (1996).

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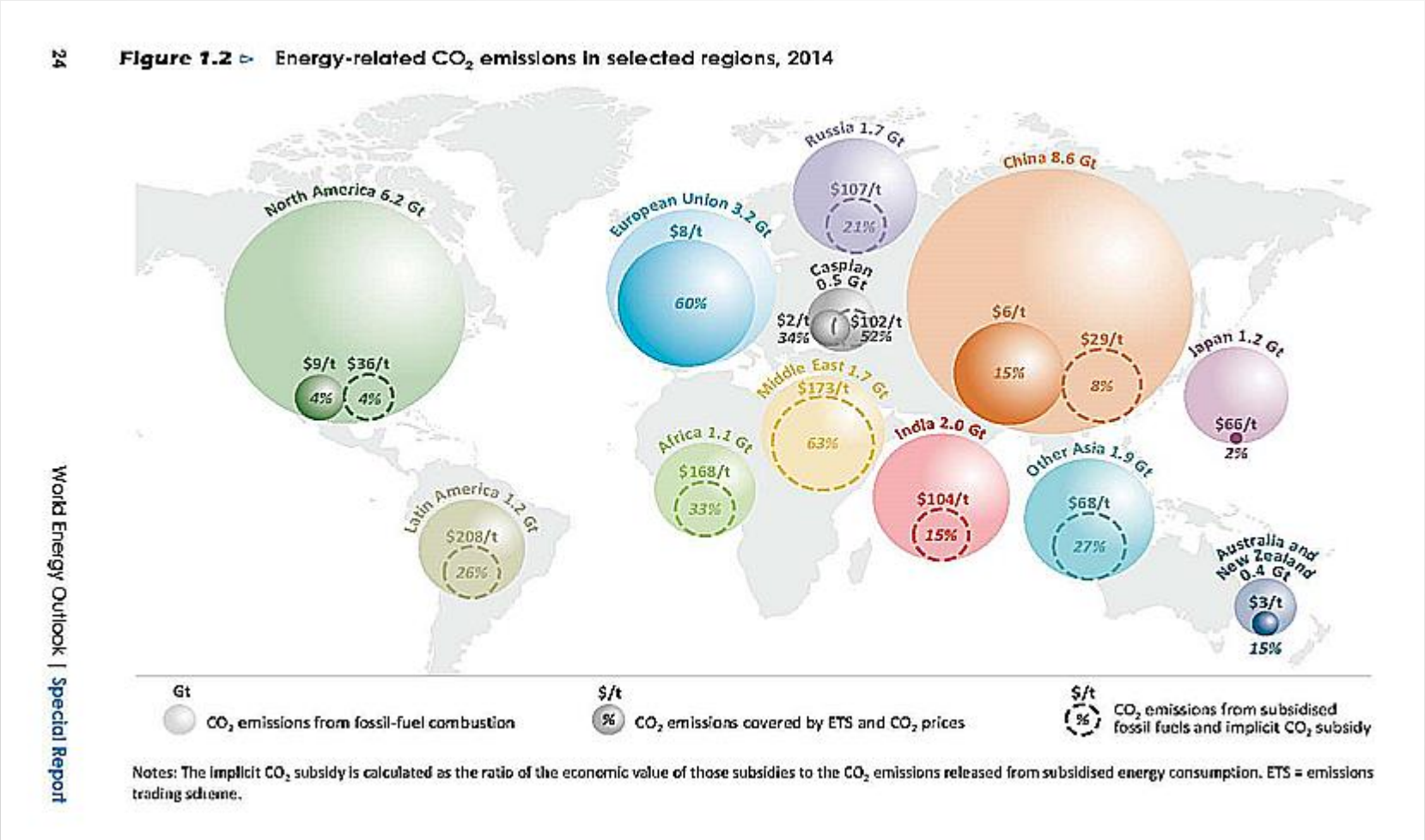
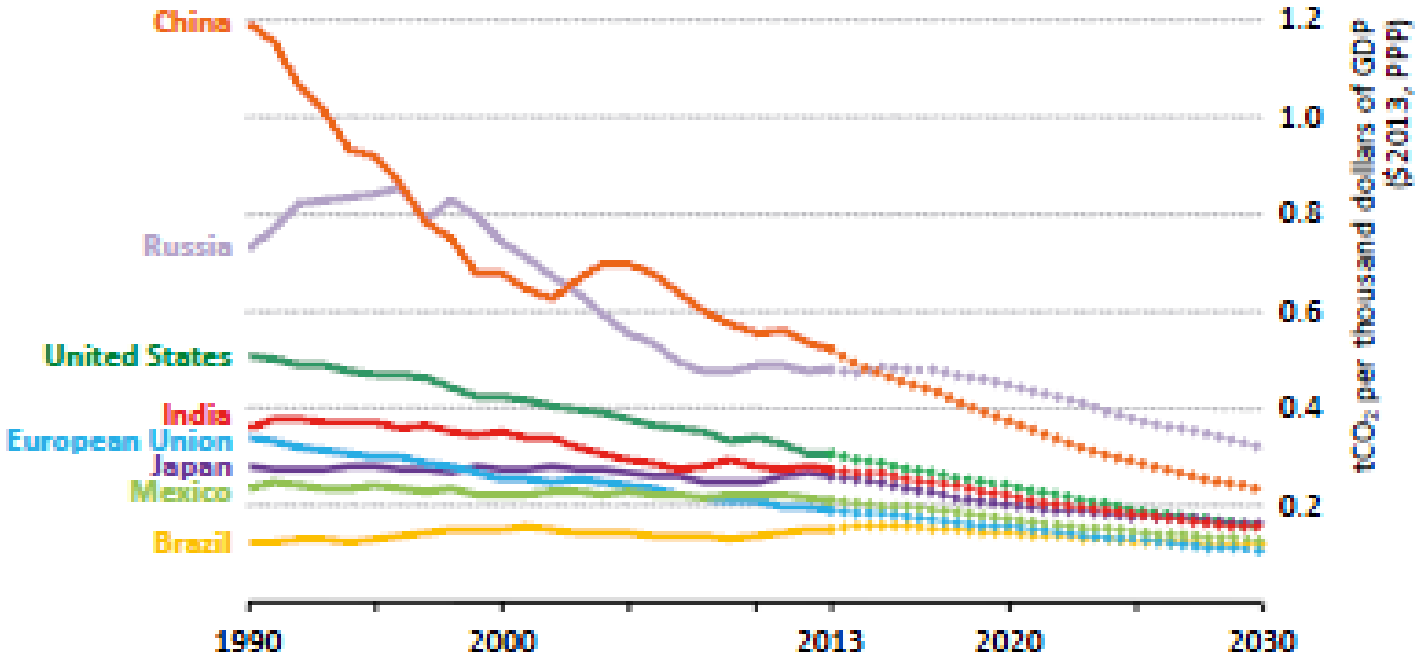
Where CO_2 emissions come from at present



[World Energy Outlook Special Report 2015: Energy and Climate Change]

This is the maximum we can get being very optimistic and not considering the costs

Figure 2.17 ▷ Carbon intensity of the economy by selected region in the INDC Scenario



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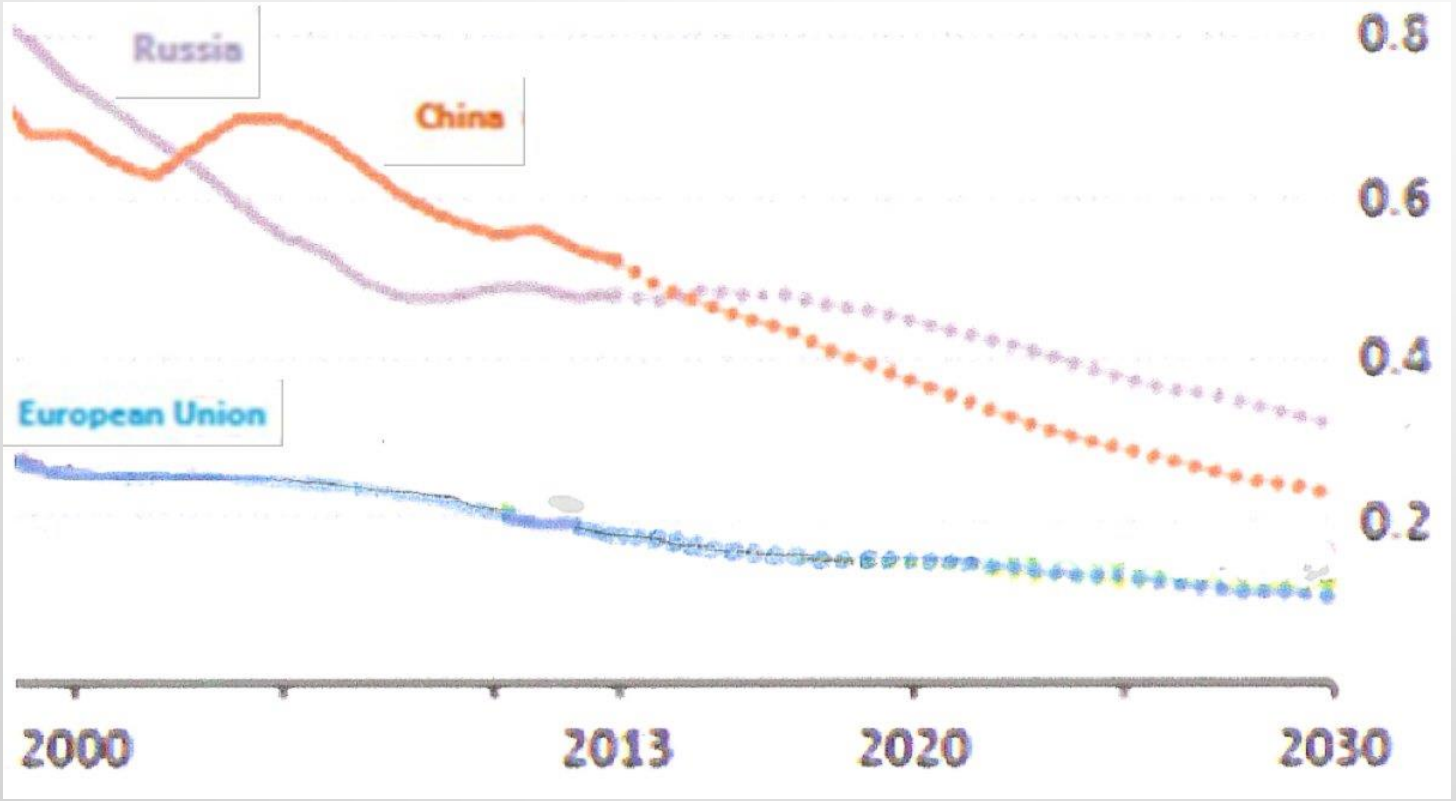
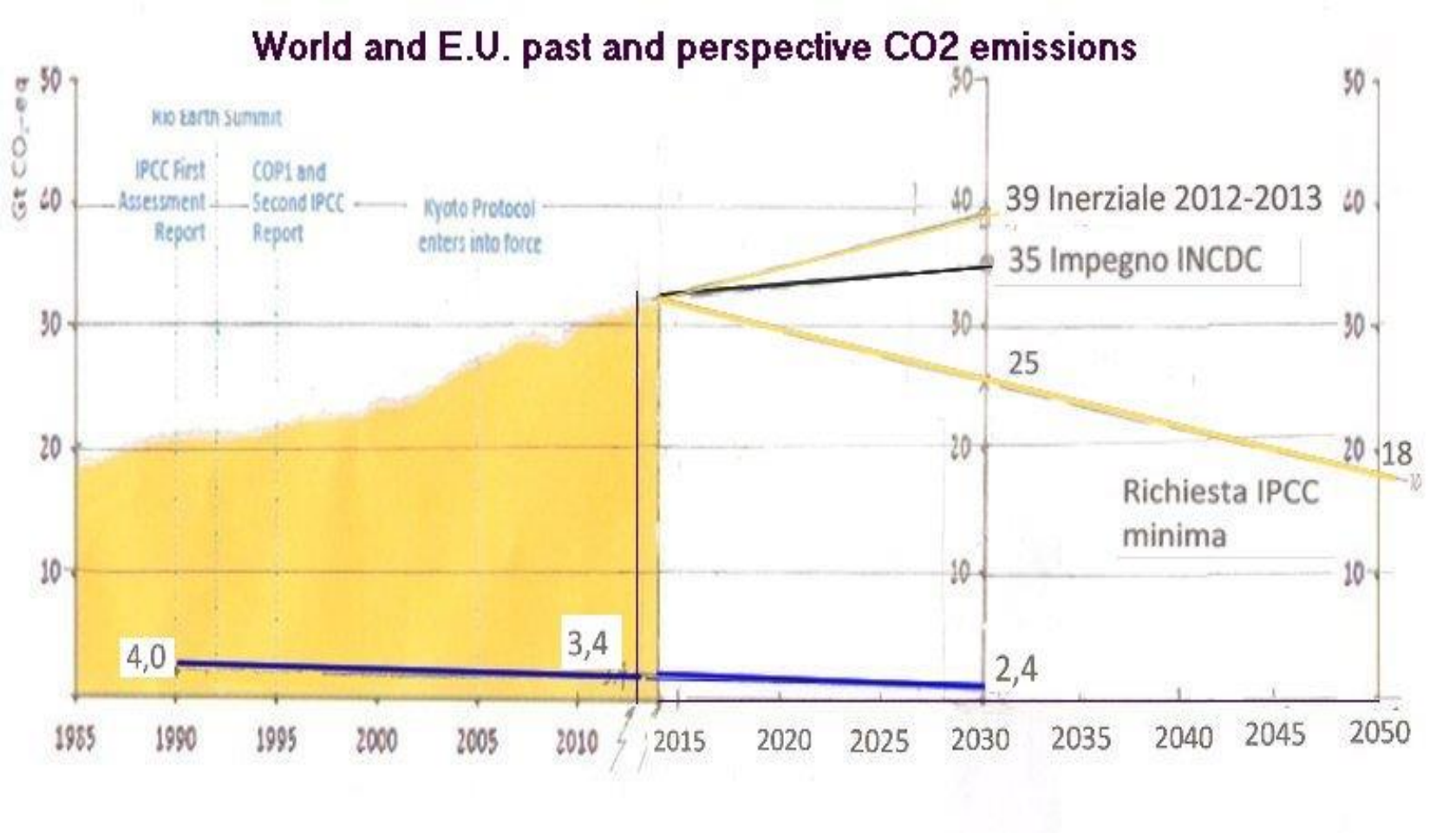


Proiezioni mondo e come si confrontano con desiderata



Looking at what has been shown, we believe that a number of questions could be formulated.

A preliminary consideration: some have sound doubts that climate change is anthropogenic while many believe in the modelling of IPCC experts according to it is due to man CO_2 emissions; should this be true, the reduction targets the decision makers are ready to accept are , following IPCC model, clearly insufficient.

In such a situation is investment on this issue a priority or are there other priorities that should deserve an extraordinary attention and effort such as famine endemic diseases and migrations?

If mankind efforts must be concentrated on the climate change issue because it is "politically correct" to do so, a possible way out of the impasse is to agree on the implementation of actions that are useful in any case following a criterion of cost effective use of resources along two lines:

a. reducing CO_2 emissions

b. limiting the consequences of postulated climate changes on human activities

Coherence between declarations on engagements and concrete actions is a prerequisite to avoid a failure as it has been for all policies uttered but not at all enforced until now, with waste of time and money.
It is time to start to choose actions useful, affordable and that can be widely agreed upon, starting with the really urgent ones.

In other words concrete planned actions and no generic engagement on targets that we have already heard of and have not been fulfilled.

Action line a. Reducing CO_2 emissions:
Implementing efficiency interventions in energy production, transport and end uses, spending money where it is more effective.

Europe is clearly irrelevant - now and in perspective - for CO_2 emissions on world scale; a lot of money has been spent until now in order to obtain reductions of the order of 2 % of present world emissions. It is planned to spend even more to achieve in 2030 further reduction that is hoped will be 2% of the expected emission level at that time. This reduction must be compared with the reduction of 40% to 70% in 2050 (which linearly means for 2030 17% to 30 %) considered necessary by IPCC.

Should we continue to spend this money for CO2 emissions in Europe or it is better to start a serious cooperation spending in those countries that have a very low efficiency of their CO2 emission systems/plants?

Among the reasons:

- more energy is needed there for development and new plants will be built there while Europe is in overcapacity of electric generation
- the well known law of diminishing returns enters into the picture so the unit cost of further efficiency increase is higher for higher efficiency level to start with (like in Europe)

Of course, in this case, investment should be done on a basis of cost/benefit analysis for both sides.

In any case for sure we will reduce the CO2 emission in a quantity **much much much** higher than that obtainable through the same amount of money in Europe.

Last but not least this would be a contribution to the migration issue: investment and opportunities for better life conditions and developments in countries where migrations come from.

Competitive and sustainable renewables; in other words, renewables applications that can survive without extra charges (taxation) on the people.

Nuclear energy, why not?

Renewables and nuclear are the only carbon free sources of energy. The case of France where more than 75 % of its elecricity comes from nuclear power plants should be a benchmark for those that are really convinced that global climate change is caused by CO_2 emissions.

Action line b. Limiting the consequences of postulated climate changes on human activities.

First and very important point to be highlighted is that we have enough time for limiting the consequences of a postulate climate change; in other words, the effects of climate changes will arise not suddenly like for example earthquakes or volcano eruptions.

Because of that:

a) Areas already below sea level are widespread in the world and a series of solid studies, at international level, on the behavior of these areas could be very beneficial in order to start the proper actions in the other areas, at least for the flood and tsunami hazards reduction.

b) Looking at the foreseen new types of meteo-events, starting a series of solid studies aimed at the definition of the engineering measures for the reduction of the effects of this type of events; ex. reduction of landslidings in prone areas and hydraulic engineering measures