

Climate Science: SOME PRINCIPLES

1. Climate Science encompasses many basic disciplines from Science-in-general. Few people have a total grasp of all factors that influence the planet's climate. As a result, specialists sometimes don't see the forest for the trees.
2. Climate has been changing since the earliest geologic times. There are a number of natural cyclic events that are responsible for Climate Change on a variety of time scales. Some of those are interrelated.
3. Approximately from long to short term the main ones are:
 - Tectonic influences which slowly rearrange the distribution of continents and oceans;
 - Orbital cycles (orbit shape, axis inclination, axis wobble), the main drivers of the glaciation events;
 - Oceanic changes (thermo-haline heat transport, ocean current distribution and oceanic oscillations);
 - Solar variations, due to the star's electromagnetic activity, its movements around the barycentre of its system, a variety of long and shorter cycles of changes in intensity and lengths of the 11 year sun spot cycles, determining electro-magnetic solar radiation received on earth, in radiation type as well as in quantity;
 - Cosmic ray cycles of galactic origin, modulated by "solar wind", providing varying amounts of condensation nuclei, thereby affecting global cloud cover;
 - Volcanic eruptions producing vast amounts of particulates.And probably some more.
4. The "Greenhouse" affects the temperature on the earth surface. Without it we would be at $\sim 18^{\circ}\text{C}$ average. 95% of it is water vapour and clouds. CO_2 amounts to about 3% of Greenhouse gases (GHG), or 0.04 % of the atmosphere. Of the approximately 50,000 GigaTons of carbon on the planet, 40,000 GT is in the oceans and only 750 GT in the atmosphere. (It has been as much as 20 times higher in the geologic past.) The human-caused circulation (fossil fuel burning etc) exchanges about 6 GT per year, part of which is absorbed by the oceans. Any additions caused by human activity pale in the light of the massive natural fluctuations. CO_2 has a limited lifetime in the atmosphere.

5. The complexity of influences working on the earth' climate, and the interactions (feedbacks) between those factors make any computer projections hazardous. Climate systems are dynamic and essentially non-linear and do not lend themselves to longer term prognostications with computer modelling.

Water vapour, a major factor in any warming and cooling, is almost impossible to include in the models. The "positive feedback" of water vapour is much in doubt. Backward compatibility of the models has repeatedly failed and one could say that the IPCC's model-based hypothesis has been falsified by the reality of observed evidence over the last twenty five years. Charges have been levelled that scenario modelling in climate programs could be politically self-serving.

5. Since the mid 18th century low temperatures of the Little Ice Age, a gradual warming of 0.8°C/100 years has taken place. That rate has not changed appreciably. What has changed is the heat generated by cities, airports, industrial areas etc (Urban Heat Island Effect). It has increased exponentially, measurable particularly in those inhabited places where many observation stations are normally located. Few "normal" stations are located in deserts or on oceans. Satellite and radiosonde data confirm a rate which is much lower than the one predicted by the IPCC computer simulations based on their GISS land data. There is *no* excessive global warming outside urban areas. There *is* natural global warming, probably in the range of one degree per century, though it must be noted that the "Global Average Temperature" is not a measured entity, but a statistical creation, subject to much computer tinkering and disagreement. One could hold that the level of inaccuracy surpasses the "anomalies" observed or predicted.

6. Carbon dioxide levels from the past do not correlate well with temperatures:

- In the far geologic past there seems to be little connection, but such proxy data can easily be argued either way.
- During the glacial times (four glaciation periods) CO₂ and temperature seem to march in lockstep, but close examination reveals that the temperature moves first and the carbon dioxide follows. There are explanations for that, e.g. the slow expelling of gases from warming ocean surface layers.

- Recent isotope work with Pleistocene sediments on the West Coast and elsewhere and marsh and peat bogs in Scandinavia indicate also strongly that temperature increases and decreases are related to solar cycles and that the carbon dioxide levels follow. Much isotope information is used in this research.
 - In the more recent past, after a warm period in the “dirty thirties”, CO₂ levels increased sharply after the Second World War, while the overall temperature dropped between 1940 and 1975, causing the cooling scare of the late seventies. (Note that most favoured IPCC graphs start in 1975.) This was followed by a warming period in the nineteen eighties and nineties, after which a stand-still period followed.
 - With carbon dioxide levels steadily increasing, no global warming has taken place in more than fifteen years, while temperatures (after having levelled out) have actually dropped significantly in 2007 and 2008.
7. Extreme weather events (hurricanes/cyclones/typhoons) run in approximately 25 year cycles and are related to events such as the separate ocean oscillation patterns. Major influences are the Pacific and Atlantic oceanic oscillations of which the Niño/Niña events are only a part). The Pacific PDO cycles correspond well with the climate swings mentioned under “6” above.
- Predictions of sea level rise, increasing storms, droughts, melting ice caps and what all, are scary scenarios based on computer projections, not on observed data. E.g. Sea levels in the Pacific (Tuvalu records) and the Indian Ocean (Maldives) have been examined. They are not rising.
- Atlantic Hurricane activity has been decreasing.
8. The major consequence of the above is that we believe that the UN has created in the IPCC a politicised organisation which has abused the scientific method to achieve a political objective. The IPCC in turn has created a carbon dioxide bogeyman, for which no scientific evidence exists. The bogeyman is leading the world economy into unneeded trillion dollar size mitigation and sequestration projects in order to protect us from a gas that is a harmless fertiliser of biota.

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SOLAR CONNECTIONS TO PLANETARY CLIMATES

An overview

Climate is a non-linear, dynamic, near chaotic complex, but there are some major natural forces that can be identified and measured.

One relatively well-established mechanism is the Galactic Cosmic Ray flux, which varies slightly as our solar system passes through the arms of the Galaxy (Shaviv & Veizer). This stream of ions, particles and nuclear components is then modulated by the varying 'solar wind' to affect global cloud cover and temperature (Svensmark). The nucleation effect of the GCR particles has been confirmed by CERN.

The sun itself is subject to a number of cyclic oscillations <<http://pubs.usgs.gov/fs/fs-0095-00/fs-0095-00.pdf>> some of which are connected to the GCR process, but most are inherent in the solar system itself.

Orbital forces are exerted on the sun by the larger planets. Planetary conjunctions and oppositions have been suggested as calculable influences. The sun wobbles and describes complex circles around the system's barycentre. It's called the SIM (Solar inertial Movement) and correlates with major earthly temperature changes of the last 1000 years, including the LIA. This is not new. It was developed by Jose in 1965 and many others, including Charvatova, have refined it in recent years; a 179 year cycle has been recognised.

Much of the mechanism remains speculative. A recent series of papers is at <http://www.pattern-recogn-phys.net/special_issue2.html>. The larger planets may also have an influence on the sun's tachocline, the 30,000 km boundary layer between the inner plasma and the outer convection layer, which itself is 200,000 km thick. It has been suggested that the tachocline, may have a pulsating character. The differential rotational movements of layers in the convection zone (expressed in the polar to equatorial path of the sunspots) disturb the convection cells and feed the dual dynamo of the sun, one a poloidal field, the other toroidal (polar/equatorial). Their interplay is exhibited in the full 22-year Hale Solar Cycle, marked by pole reversals. The major pattern of it has a periodic component that seems to control the Grand Maxima and Grand Minima of solar magnetic expression and thus its various influences on earthly climate. (J. Abreu, Ian Wilson, Don Easterbrook).

The latter influence is primarily transmitted through the behaviour of the oceans. The AMO correlates well with solar cycles and the PDO

does so with a delay. Oceanic SST (surface temp) reacts slowly to change and lag times are common.

Here in Western North America, the positive PDO gives us warmer weather. Its 30 year reign is now over and cooler weather will prevail (as in 1940-1970); unfortunately for all of us, we are also at a phase transition point in the solar magnetic fields of the sort that ends the Grand Maximum we have been enjoying. Duhau & deJager are not the only ones to recognise a major transition, possibly to a Solar Grand Minimum that may occupy much of the rest of this century.

In terms of immediate climate consequences, the transition seems also to be connected with the formation of strong Polar Highs, outbreaks of which interfere with the meridional circulation (jet stream) and may set up blocking patterns of Rossby waves from which we have been suffering now for some time, extended hot spells in the summer, cold ones in the winter (Tim Ball).

On a longer time scale, many researchers are studying the nature and mechanisms of the Dansgaard/Oeschger, Heinrich and Bond cycles that are so prominent in the Late Pleistocene and near the boundary of the last glacial period and the beginning of our Holocene interglacial. AMOC reversals, paleobotany and isotope geology form the proxy tools. A major symposium was held in Buenos Aires in 2013 (a Springer Series publication).

The research suffers from lack of funding, which is largely directed to greenhouse gases as a presumed agent for Anthropogenic Climate Change.

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SOME CLIMATE REALISM

Climate science seems to have been taken over by politicians and the media. It is therefore essential to keep the debate alive on scientific principles, rather than popular hype.

This complex amalgam of scientific disciplines, called Climate Science, is replete with uncertainties and controversies. Politicians will proclaim that "The Science is settled", because politicians do not want to deal with uncertainties. As scientists, we know that science is never "settled". Scientific progress thrives on challenges and debate and it is up to science organisations to foster that.

I will list a number of essential aspects where unproven assumptions and uncertainties are playing havoc with attempts to solve the cause(s) of climate change. In the interest of space I must refer the reader for references to two recent summaries of IPCC work from a sceptic's point of view, both available on the web.

The Independent Summary for Policy Makers (ISPM, with more than two dozen references) can be downloaded from:

<http://www.uoguelph.ca/~rmckitri/research/ispm.html>,

1. Even today's surface temperature measurements of the globe are subject to poorly controlled observation locations of the GISS' network, the global distribution of data points (oceans and deserts) and the Urban Heat Island Effect (with its questionable corrections). Computer-messaging of data does not improve the accuracy. Satellite measurements in the recent decennia have improved to a level of being a reliable source, but much of the IPCC's work is based on surface data.

Data from before 1850 are proxy data from a variety of indirect sources and often subject to errors and adjustments.

2. Soft-rock Geologists are familiar with long term climate fluctuations throughout geologic time. The best recorded changes are those of the Pleistocene glacial periods. None of these were due to human causes and Milankovitch provided some useful answers of an astrophysical nature.

In more recent days the saga of Michael Mann's hockey stick and his attempt to show that the 20th century was the warmest ever is well known by now.

It was also an example of unwarranted computer data input, and statistical manipulation. His work has now been disproved and the IPCC has dropped the Mann graph from its reports.

3. Carbon dioxide measurements are only slightly less controversial

than temperature data. Historic levels reported by C. D. Keeling and G. S. Callendar have been challenged by E-G. Beck, who has found earlier dependable wet analyses which exceed the IPCC assumptions of a flat low CO₂ level of 270 ppm before industrialisation took hold. In addition, he found that around 1940 levels were as high as they are now. The preservation of CO₂ gas bubbles in a time-controlled fashion in old ice cores is a matter of great dispute.

4. Svante Arrhenius, father of the greenhouse effect, provided a ready vehicle for the IPCC's Global Warming hypothesis. Atmospheric physicists now know about the logarithmic relationship that limits the ability of the CO₂ molecule to absorb additional heat in its frequency spectrum from radiant heat flow. I.e. the more CO₂ is added, the smaller the additional greenhouse effect. The "doubling of CO₂" assumption of the IPCC is a red herring. The entire field of radiative heat transfer is still hotly discussed by experts.

In any case, water vapour in the atmosphere is – with 95% of the greenhouse volume and some 60% of its effect - a far more dominant greenhouse agent and one we can not control. The effect of the 0.04% CO₂ is quite low.

5. At times (e.g. during the glacial periods) CO₂ and Temperature curves correlate quite well on a small scale. Close examination of – e.g.- the Vostok ice core, shows that an offset of 800 years exists, with the temperature changing before the CO₂ does. This has been found to be likely related to oceanic outgassing, when oceanic surface layers warm from other causes, probably external.

Correlation is not causation and the cores provide no proof for the IPCC principles. During the past centuries, temperatures correlate far better with changes in solar activity than with the smooth steady increase in CO₂. Indeed, there is no point in any record for any duration in which CO₂ precedes temperature increase.

6. Not having adequate observed data to work with, the IPCC has depended heavily on computer simulations. While these exercises are helpful in exploring and testing hypotheses, they can not be considered to provide proof for a scientific theory, indeed not one that is based on a IPCC dogma that human activities will cause catastrophic global warming. Water vapour and clouds are only two of the numerous influences on climate that cannot be properly accommodated in computer programs. Oceanic and astrophysical influences are others. The essence of this is that climate is a multi-faceted, dynamic non-linear problem. Climate realists generally consider that the planet's climate complexities far exceed the capability of computer solutions.

7. What do we observe today? The sea level rise predictions have been lowered in each successive IPCC report and now stand at 2.2 mm/year, a long time isostasy recovery number; the Belgian station at Ostend has measured 1.5 mm/year average for the last 85 years. Long term temperature increases are still well within the realm of natural variation of less than one degree Celsius per century. The catastrophic warming predicted by the IPCC 20 years ago has given no indication of materializing. Since 1998 global temperatures have not increased at all and a slight cooling trend has set in, already more pronounced in the Southern Hemisphere. All this while CO2 levels continue to increase.

8. The IPCC is a political organization, not a scientific one. Its mandate was to investigate Anthropogenic Global Warming, not to investigate all and any causes of Climate Change. As a consequence, the Panel has never seriously investigated any causes of climate changes on the planet other than those caused by human-generated emissions. There are a number of candidates, mostly of a solar, galactic and cosmic nature, which affect this planet and others. Theories abound, but the Panel ignores all of them, by saying – erroneously - that the sun's irradiance variations are insufficient to cause any climate changes. Their computer models do not even include Milankovitch. However, over the last few hundreds of years, the correlations with solar activity have been obvious (Friis-Christensen & Lassen), waiting to be explained by more than radiation. Why does the sun behave as it does? Do the Svensmark Cosmic Ray experiments (which have *not* been debunked as the IPCC maintains, but rather confirmed by CERN) give a clue to global cloud cover variations? Do heavy planets like Jupiter pull the sun out of the barycentre? Is there a link between that and the cyclic solar interior upheavals, as evident by sunspots and flares? How much do planetary conjunctions and oppositions affect solar behaviour?

The science is far from settled, but the political IPCC has caused us to embark on a worldwide scheme to control a rather harmless non-polluting, fertilizing gas, which – incidentally – all seven billion of us exhume at 40,000 ppm.

Foremost in our current debate about the position of scientists vis-à-vis politicians must be to encourage scientific debate, and to be faithful to the scientific method and principles of ethics.

Albert F. Jacobs - Rev. 2016

CLIMATE AND THE SOLAR SYSTEM

The basic IPCC premise of increases in atmospheric carbon dioxide causing run-way global warming is being rejected on the basis of the assumed sensitivity and a misstatement of the atmosphere's energy balance. It has been falsified by the record of empirical observations of the last 20 years. In addition computer simulations do not constitute proof of a scientific theory in any case.

The Sun is the major driver of climate change, both directly and indirectly. Meanwhile, IPCC has studiously avoided to treat the Sun and the solar system with anything more than its incomplete version of the TSI (Total solar irradiance), which shows only very minor variations. However, the influence of the sun and the solar system has been proven to be far more complex.

Research on the ways in which solar activity influences climate change on the planets (including us) has been going on since the mid 1900's and includes:

- * variations in the "solar wind", both in the quantity and the quality (type) of solar radiation received on earth,
- * the behaviour of the solar dual dynamo over the full 22-year solar Hale cycle of polar magnetic reversal,
- * the effects of conjunction and opposition of the major planets orbiting the sun, causing the Sun to corkscrew around the gravity centre of the solar system in a cyclical manner,
- * the influence of the variations in solar radiation on the Galactic Cosmic Ray flux, which affects worldwide cloud cover intensity.

A number of major "connections" has been made. Lack of funding for non-CO2 climate solutions has limited the scope of research.

A full assessment of the solar system's share of the 'music of the spheres' would introduce into the IPCC's programming the need to accommodate complex dynamically interacting parameters, which its computer programs of linear equations are not equipped to handle.

Albert Jacobs -August 2016