Basic Science of a Changing Climate:

How processes in the Sun, Atmosphere and Ocean affect Weather and Climate

the Porto Climate Conference 2018
September 7 and 8, at Porto University

The Conference Volume

of Extended Abstracts

Nils-Axel Mörner, Pamela Matlack-Klein & Maria Assunção Araújo
editors

With the support of **Porto University**

U.PORTO

This Conference

is organized by the Independent Committee on Geoethics (ICG)
as a continuation of the London 2016 Conference
https://www.researchgate.net/publication/306013278

It will be held at the Department of Geography, Arts and Humanities Faculty, Porto University, Porto, Portugal

https://www.portoconference2018.org/
portoconference2018@gmail.com

on September 7 and 8, 2018

(09.00 to 19.00)

Organization Committee:

President:

Maria Assunção Araújo
Department of Geography, Porto University, Portugal
m.a.araujo@netcabo.pt

Secretary General:

Pamela Matlack-Klein
The Portuguese Sea Level Project, Porto, Portugal
(former: Appomattox, Virginia, USA)
pmkdragon@gmail.com

Scientific Committee Advisor:

Nils-Axel Mörner
Independent Committee on Geoethics (ICG),
Former head of Paleogeophysics & Geodynamics at Stockholm University, Sweden
morner@pog.nu

Connections for Media

pmkdragon@gmail.com

The Independent Committee on Geoethics (ICG)

www.geoethic.com

IGC was founded on October 17, 2015, in Prague
at the International meeting on Geoethics.

The principles of ethics – to know what is right and what is wrong – are simple. They are deeply rooted in our cultural heritage and education and personal integrity. To live up to those principles is another thing: here we often fail badly. The ethical principles that refer to nature and natural sciences are covered by the term "Geoethics".

We realize that ethical principles are often violated in Science as well as in Society and Politics. Increasingly, in connection with marketing and lobbying for large projects, ethical principles have become set aside. Backbiting, 'book-burning', career blighting, obstruction in publication and personal attacks have no place in science, where physical laws and observational facts must always be foremost. There are no goals that justify unfair means of fighting "dissidents".

Therefore, there is an urgent need for *an Independent Committee on Geoethics* to promote ethical principles in the Earth and planetary sciences and their correct reflection in social and political life.

International meetings

2015 The International Meeting in Prague & Pribram, October 12-18, organized by Vaclav Nemec.
2015 The Paris Climate Challenge Meeting in Paris, December 1-3, organized by Philip Foster.
2016 The London Conference at Conway Hall, September 8-9, organized by Nils-Axel Mörner. https://www.researchgate.net/publication/306013278
2018 The Porto Conference at Porto University, September 7-8, organized by Maria da Assunção Araújo.

The ICG members also had significant impact at
2016 World Conference on Climate Change, Valencia, October 24-26.
2017 4th Wold Conference on Climate Change, Rome, October 19-21.
2018 5th World Conference on Climate Change, New York, May 23-24.

THE SWORD OF TRUTH

High-level climate conference in Porto, 7-8 September 2018:
a special invitation to WUWT readers

By Christopher Monckton of Brenchley

Following the successful London climate conference of 2016, Professor Nils-Axel Mörner, Pamela Matlack-Klein and Maria da Assunção Araújo are organizing a high-level conference on *The basic science of a changing climate* at the *Facultate de Letras* (Humanities Faculty) in the University of Porto, Portugal, for two action-packed days – Friday 7 September and Saturday 8 September 2018.

The website for the conference is https://www.portoconference2018.org/. Registration fees are 30-130 euros a head – remarkably reasonable for conferences of this quality. Special rates have also been arranged for accommodation.

The keynote opening speaker, Professor Christopher Essex of the University of Western Ontario, will talk on how to check whether the models are getting things right. Piers Corbyn will demonstrate that recent extreme weather in Europe is normal: we've seen it all before. Nils-Axel Mörner will discuss the ocean circulation in the Atlantic and the Gulf Stream oscillation.

Maria da Assunção Araújo and Pamela Matlack-Klein will describe the Portuguese sea-level project. Michael Limburg of EIKE will ask whether we can trust climate time series. Philip Foster will talk about the Nile as a climate engine. Ray Garnett and Madhave Khandekar will discuss solar variability and its likely future effect on global grain yields.

And that's just the Friday morning. In the afternoon, Francois Gervais will reveal how estimates of climate sensitivity have been falling. Your own correspondent will discuss his team's paper, *On an error in defining temperature feedback.* Camille Veyres will reveal 11 facts you need to know to avoid being deceived about global warming. Jamal Munishi will

discuss the connection between equilibrium sensitivity and climate response. Professor Hermann Harde, one of the most knowledgeable of all skeptical scientists, will assess the relative contributions of the Sun and CO_2 to global warming. Hans Jelbring will examine regional greenhouse effects.

On Saturday morning, Piers Corbyn will review the mechanisms of climate change. Henri Masson will analyse complexity, causality and dynamics inside the climate system. Pavel Kalenda and his tream will expound how past levels of solar energy can be calculated from continental rocks. Don Easterbrook will discuss climate change and the cause of Little Ice Ages. Roger Tattersall and Stuart Graham will demonstrate that solar and interplanetary forces, not human activity, rule the climate. Jan-Erik Solheim will show that the length of the solar cycle can be used to predict local climate. Harald Yndestad will present the climate clock. Nils-Axel Mörner will talk about planetary oscillation and sea-level change. Nicola Scafetta will present a better understanding of natural climate variability.

On Saturday afternoon, Tom Wysmuller will reveal how the UNESCO International Geosciences Program (IGSP) sea-level predictions have failed. António Silva will show that present sea-level changes pose little risk to coastlines. Professor Cliff Ollier will dismiss the climate-extremists' fallback position, ocean "acidification", as a myth. Peter Ridd, recently unfairly dismissed by his university for having dared to question the Party Line by pointing out that most coral-reef science was unduly alarmist, will be talking about the Great Barrier Reef, climate change and science. David Block will discuss salt and albedo. Conor McMenemie will analyse the weather effects of the Nile dam. Madhav Khandekar will look at the connection, if any, between recent cold-weather extremes and global warming. Howard Dewhirst and Robert Heath will present their letter to the Geological Society of London. Aziz Adam will consider the politics of climate change. Benoît Rittaud, a formidable French mathematician with a love of the history of the discipline, will lay out some historical cases of erroneous scientific "consensus".

As if this feast of intellectual delights were not enough, there will be a closing *vin d'honneur* featuring port and cheese. Also, there are dark mutterings to the effect that I will play a Schubert piano sonata for the company. Well, you can't have nowt but fun.

The Porto conference – as you can tell from the very low registration fees – is not being run for profit, but purely for the advancement of true science. It will be a first-rate opportunity not only to hear some of the leading climate researchers who do proper science (and one or two who don't) but also to meet them and discuss their work. There are some presentations with whose content I know I am going to disagree, and I shall have the opportunity to let the presenters know my concerns. Niklas Mörner takes the commendably scientific view that all who have something to say, whether or not what they say seems right, should be fairly heard and, if necessary, fairly argued with.

To book your place at the conference and get special rates for accommodation close to the conference venue, go to https://www.portoconference2018.org/. Those who would rather not pay the registration fee in advance can pay at the door on the day, though that will cost quite a bit more than paying now. But the organizers will need to know how many are coming, so please register on the conference website as soon as you can. Looking forward to seeing you there!

From:
https://wattsupwiththat.com/2018/07/18/high-level-climate-conference-in-porto-7-8-september-2018-a-special-invitation-to-wuwt-readers/

Welcome address

What a pleasure to see so many familiar faces and new ones I hope will soon become familiar, to our First Porto Conference on the Basic Science of Climate.
For about 30 years we have been hearing that the "Science of Climate is Settled" there is no need for debate or discussion. This seems to be a common thought pattern for humans, maybe we need to feel confident in what we decide is true. The current AGW/CAGW kind of thinking is nothing new, humans seem particularly susceptible to such manias and this is not the first example and probably won't be the last. What does surprise me is that there are so many educated scientists involved.

Sixty years ago, my 5th grade teacher told the class about a new theory of Continental Drift, that was beginning to get some buzz. She showed us maps that showed an uncanny resemblance to puzzle pieces that wanted to fit together. The more observant among us were captivated and became instant converts to this Continental Drift thing, especially when we learned that there were similar animals, plant, and rocks on both sides!
But this was a new paradigm sixty years ago, and no geologist of repute was going to let it interfere with what they "knew" to be true. But the truth will out, continents do travel around and accepting this made a lot of other things easier to understand.

Science must be viewed as akin to a living organism, growing and changing from year to year, decade to decade. Good science keeps up with these changes, even looks for them and incorporates them into the work. What was true yesterday very possibly will not be true tomorrow thanks to ongoing research and observation. Our knowledge of what is true is constantly changing as we learn more and more about our complicated planet and the creatures and plants that cover its surface.

In Science you can be a dynamic free-thinker or a static slug. The slugs read papers or texts written in the last century or the one before and try to make them true today. The free-thinkers will read those same writings but see where questions are not answered or answered incorrectly and use that as a spring board to a new paradigm.
Even the IPPC agrees that climate is not a simple system but chaotic.

Buried away in a cold basement computer room, there are scientists today who believe completely that if they just stick to the simple diagrams of climate and plug this into their models (with weight given to a single forcing element), a miracle will occur, the computer will crunch the data and change it into a new truth. But what really comes out is the truth the model writer desires and this is not science but a fairytale.

Sixty years ago, continents did not sail around on the Earth's crust and were always exactly in the same positions as when they came into being a few billions of years ago. Today we know this to be nonsense and because we accept this movement, have been able to work out a lot of Earth's puzzles because of that. Today we are going to hear some remarkable new ideas about our climate and what makes it tick. We are going to hear from people who just got curious about something going on in another room where another sort of science was going on and used that to fuse a new paradigm as well as others who have a deep understanding of the history of the planet over its existence. Putting all of this together to find answers is what science should be about.

We have only in our lifetimes had access to computers with the power to show us everything going on around the world in something the size of a chocolate bar. This saves us hours in the library searching out papers and waiting for them to arrive via the mails or InterLibrary Loan. Now we hear a rumor, we start searching, and zowie, there it is, downloading on our screen. We can now access an entire world of papers written by people with different points of view or who have been fortunate enough to observe something vitally important but easy to miss. More importantly, now we can speak with our friends and colleagues around the world and discuss things in real time.

We live in a fantastic world for discovery and it is not necessary to leave home for a span year to sail off on a leaky wooden ship to foreign lands. Now we can do some preliminary research at home, narrow down our focus, and jump on a jet to go see! We can easily arrange to have others meet us in that spot so many eyes can observe and learn, then discuss and formulate a bigger idea.

Cooperation among scientists of different fields of study has never been more important. It is fine to know a lot about a single thing but keeping the brain open to other, unrelated things is how new paradigms come into existence. Everything is connected in some way, be it large or small, and missing that one connection could mean the difference between an exciting new discovery and tired old trash.

Pamela Matlack-Klein

Day-1: September 7

09.00 Opening ceremony

09.30 **Session 1: Changes in Climate and Weather**
Chair: *Pamela Matlack-Klein*

09.30 Christopher Essex: *Climate: Like atomic physics where we are the atoms*
10.20 Coffee break – with posters
11.00 Piers Corbyn: *European weather in the last years – extreme or normal? And the challenges*
11.20 Nils-Axel Mörner: *Atlantic Ocean circulation and Gulf Stream beat*
11.40 Pamela Matlack-Klein & Maria da Assunção Araújo: *Note on the Portuguese Sea Level Project*
12.00 Michael Limburg: *Can we trust time series of historical climate data?*
12.20 Karl Zeller & Ned Nikolov: *Earth + Solar system Data and scientific method = New climate science*
12.40 Ned Nikolov & Karl Zeller & Ned Nikolov: *Implications of semi-empirical planetary temperature model foe a new understanding of Earth's climate history*

13.00 Lunch: break for 1.5 hour

14.30 **Session 2: CO2, Climate Sensitivity and Greenhouse Effects**
Chair: *Jan-Erik Solheim*

14.30 Francois Gervais: *Cooling of climate sensitivity*
14.50 Christopher Monckton: *On an error in defining temperature feedback*
15.10 Camille Veyres: *Eleven facts you must know to avoid being deceived by the AGW*
15.30 Edwin Berry: A fatal flaw in global warming science
15.50 Hermann Harde: *How much CO2 and also the Sun contribute to global warming*
16.10 Hans Jelbring: *Regional greenhouse effects –based on observational evidence*
16.30 Coffee – with posters
17.00 Ray Garnett & Madhav Khandekar: *Increasing cold weather extremes since the new millennium: An assessment with a focus on worldwide economic impacts*
17.20 Albrecht Glatzle: Livestock's role in climate change: Do we need a shift of paradigm? (poster)
17.30 Philip Foster: *Being wrong can have serious consequences /The Nile Climate Engine*

17.40 **Students ask questions**
General discussion-1
Moderators: *Nils-Axel Mörner, Pamela Matlack-Klein & Maria da Assunção Araújo*

19.00 End of Day-1

Climate: Like Atomic Physics where we are the Atoms

Christopher Essex
Department of Applied Mathematics, University of Western Ontario
London, Canada N6A 5B7, Canada, essex@uwo.ca

Climate is widely thought to be fully known. It isn't—not even close. Its best manifestation is in rocks, but our most precise theory for it is meteorological. There is an enormous gap in between. To the worlds in that gap we are what atoms are to us. We can't see it directly any more than we can see atoms, because humans experience only a narrow window of timescales. On timescales too short (fast time), nearly simultaneous and simultaneous become blurred. Too quick tends to be too small also: think of atoms colliding. Ultra-long timescales (slow time) reflect events that we don't see either: think geology. We are naturally biased toward events within our narrow window. What if we could move our window beyond the slow time limit? What would it be like? Many things we are used to disappear, while other previously unseen dynamics and structures emerge. We already know that the relevant physics manifests itself differently on nanoscales, with different appropriate measurables, why would we expect matters to be otherwise on giga-scales of space and time? Through images, videos, and calculations, slow time will be visualized in this talk, to give us a glimpse into a world where people and wind disappear, and water drifts like snow—a world under our noses that no human eye will ever see. Hints will be made throughout about the ingredients for a proper theory for climate, which few realize does not exist. There is no telescope or microscope to view the world in slow time. The best we have to perceive it is in the rocks, mathematics, physics, and our wits.

The Editors' comment:
Please, consult the below paper, which we find excellent and clarifying

Essex, C. & Tsonis, A.A., 2018: Model falsifiability and climate slow models. *Physica* A 502: 554-562.

Abstract: The most advanced climate models are actually modified meteorological models attempting to capture climate in meteorological terms. This seems a straightforward matter of raw computing power applied to large enough sources of current data. Some believe that models have succeeded in capturing climate in this manner. But have they? This paper outlines difficulties with this picture that derive from the finite representation of our computers, and the fundamental unavailability of future data instead. It suggests that alternative windows onto the multi-decadal timescales are necessary in order to overcome the issues raised for practical problems of prediction.

Christopher Essex is Professor of Applied Mathematics at the University of Western Ontario. He is a former director of its Theoretical Physics Program and a former Associate Chair of Applied Mathematics

He did pioneering work on the thermodynamics of photon and neutrino radiation. He made the first correct estimate of the entropy production rate of the Earth, and with D.C. Kennedy and R.S. Berry he computed the first correct peak temperatures for laser radiation. Among many international invitations to speak on these topics, he has taught at the UNESCO advanced school in Udine, Italy, his work was featured at the Joint European Thermodynamics Conference held in Chemnitz, Germany. Professor Essex is co-discoverer with K.H. Hoffmann of the entropy production paradox, arising in the context of anomalous superdiffusion. He also discovered, while a guest of the Vatican, modern mathematics (Sierpinski triangles) embedded in the ancient floor tiles of the Sistine Chapel and elsewhere in the Vatican museum, a discovery he presented at the Pontifical Academy of Sciences.

His work also includes applications of dynamical systems theory, such as chaos cryptography. With Weiguang Yao and Pei Yu, he helped to invent the method of "competitive modes" which has become a standard in the search for chaotic domains of complex dynamical systems. He has also worked on the limits of modelling and computation, among other applications of mathematics. By invitation, he has organized and participated in meetings held in Erice, Sicily of the World Federation of Scientists (WFS), which is based out of CERN. He has co-chaired sessions there with Antonino Zichichi and Nobel Laureate T.D. Lee and he became Chairman of the WFS's Permanent Monitoring Panel for Climate in 2011. In 2012, as Chair, he hosted Dr. Vaclav Klaus, President of the Czech Republic, as a guest of the panel meeting. In 2016 he became Chairman of the Academic Advisory Council of the Global Warming Policy Foundation.

Professor Essex held an NSERC (Natural Sciences and Engineering Research Council of Canada) postdoctoral fellowship at the Canadian Climate Centre to work on its (GCM) climate model. He built his first computer climate model in the 1970's. He held an Alexander von Humboldt Research Fellowship in Frankfurt, Germany. He was a sabbaticant at the Niels Bohr Institute in Copenhagen, Denmark, supported by a Danish National Bank foreign academics program. There he worked on the thermodynamics of the citric cycle in mitochondria, and its connection to fuel cells.

He is an award-winning teacher and a recipient, with Ross McKitrick, of the $10,000 Donner Prize in 2002, for the book Taken by Storm: The Troubled Science, Policy, and Politics of Global Warming, which had a second edition in 2007. That book was a finalist for the 2002 Canadian Science Writers' Book Award. Also, in 2007 he was a featured speaker and panellist at the Chicago Humanities Festival. He is coauthor, with Robert Adams, of Calculus: A Complete Course, 9th edition—a fresh take on applications beyond traditional treatments. He was first appointed by the Canadian Governor General to the governing council of NSERC in 2006 and reappointed in 2009. NSERC is a billion-dollar government corporation that funds fundamental research in Canada. He became the first (US) Phi Beta Kappa Visiting Scholar from a Canadian university in 2012.

Professor Essex has been mentioned by name on the floor of the Canadian federal Parliament; he has a blessing from the Vatican, his work has been cited on the floor of the US Senate, and he has lectured at the British House of Lords. Both Freeman Dyson and the late Leslie Woods personally advised him in the much-misunderstood but crucial art of scientific heresy.

European and world weather in the last years – extreme or normal? – and the challenges

Piers Corbyn
WeatherAction – (**http://bit.ly/2aTfsvR**).
London, England, piers@weatheraction.com

Basic climate changes observed on time-scales of 600Million, 1Million, 10,000yrs, 100 yrs and the dramatic extreme events (heatwaves, supercold, floods, wildfires etc) of recent years and months are reported and discussed.
Failure to explain the real world of the **CO2** approach in observational terms and basic fails of Physics are summarized and the success of other – e.g. **solar** - approaches noted. **True Green versus Fake Green** policies arising from CO2 approaches are put forward (also a Poster).
Contending climate scenarios for the next 20 years are considered – warming, nothing, Mini-Ice-Age, starting of Full-Ice-Age.
The **political / Geo-ethical context** of Climate and other sciences are discussed and **actions** to be taken for evidence-based accountability in science and politics considered (also for session 4).

Atlantic Ocean circulation and Gulf Stream beat

Nils-Axel Mörner
Paleogeophysics & Geodynamics, Stockholm, Sweden, morner@pog.nu
Independent Committee on Geoethics, https://geoethic.com/

During all the Grand Solar Minima in the last 600 years – i.e. the Spörer Minimum 1440-1460, the Maunder Minimum 1687-1703 and the Dalton Minimum 1809-1821 – northwest Europe experienced Little Ice Age climate conditions (Fig. 1; [1]). Cold Arctic water penetrated all the way down to middle Portugal. The Northern branches of the Gulf Stream severely weakened. At the same time, however, the southern branch of the Gulf Stream increased bringing hot equatorial water to the region of Gibraltar and the Canary Islands. This area experienced Little Interglacial climate conditions.

No doubt, we are now heading towards a new Grand Solar Minimum at about 2030-2050 (e.g. [2]). Therefore, we are likely to experience similar climate conditions as were the case during the last Grand Solar Minima; i.e. Little Ice Age conditions in NW Europe [2, 3].

This is a scenario in 100% opposition to the one proposed by the IPCC and agreed upon at the Paris Climate Conference, where global temperature is continually going to rise as a function of atmospheric increase in CO2.

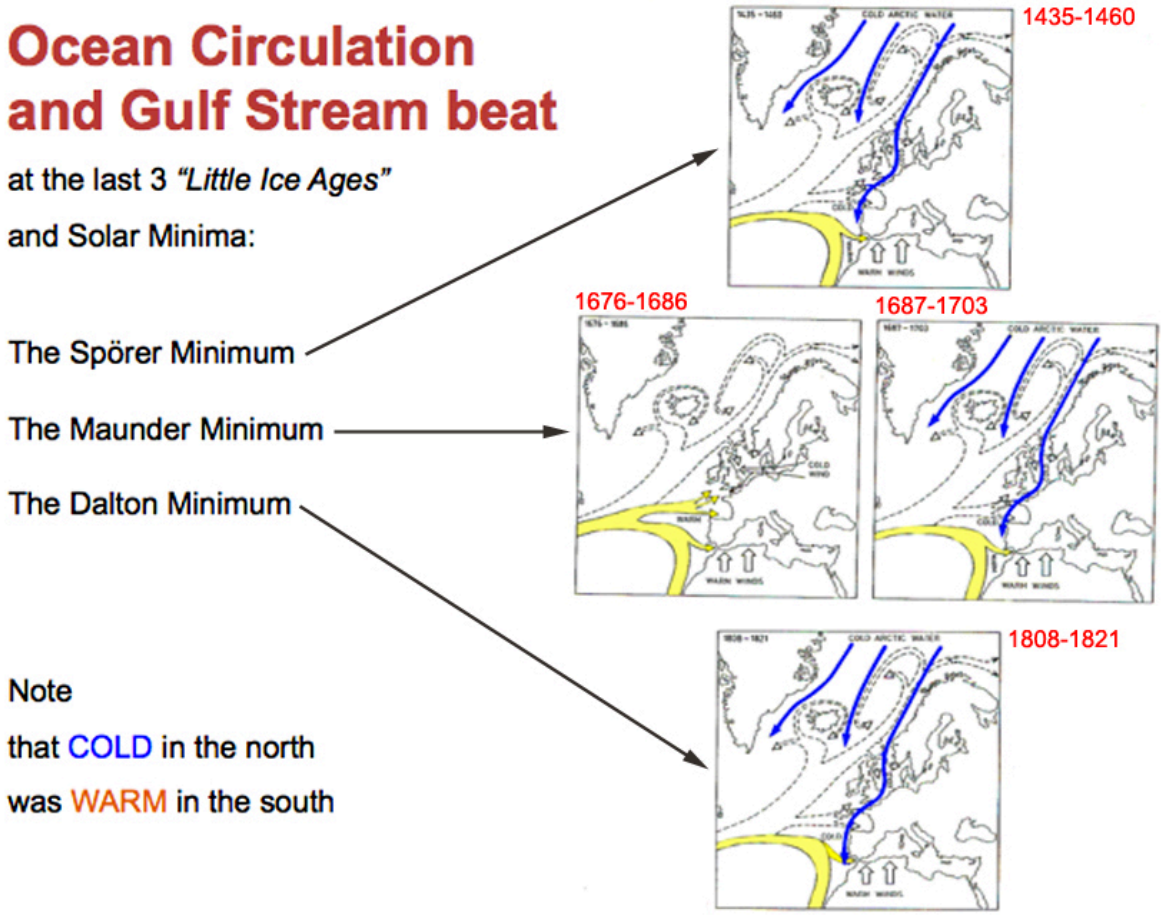


Fig. 1. Changes in Gulf Stream pattern at the last 3 Grand Solar Minima [1, 3].

The forcing function of the changes in Gulf Stream beat is changes in the Earth's rate of rotation (Figs 2-3); speeding-ups at Grand Solar Minima and slowing-down at Grand Solar Maxima, ultimately driven by changes in planetary-solar interaction [1, 3].

The main 3 branches of the Gulf Stream are the Barents Sea, the Bay of Biscay and the Gibraltar branches, the dominance of which are controlled by rotation [4, 1, 3].

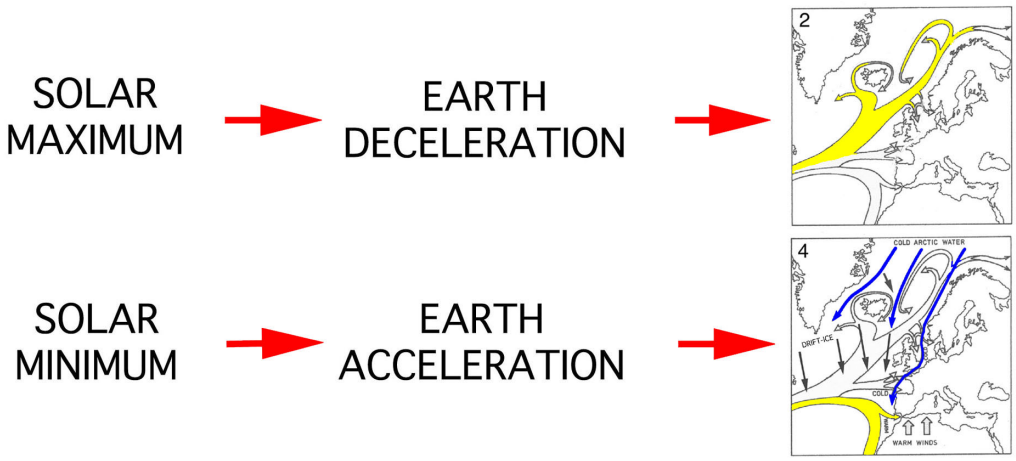


Fig. 2. Changes in the Gulf Stream circulation at Grand Solar Maxima (~1250, ~1570, ~1760, ~1880, ~1930, 1970-2000) and Grand Solar Minima Minima (~1450, ~1690, ~1810, ~1890, ~2040) [1, 3].

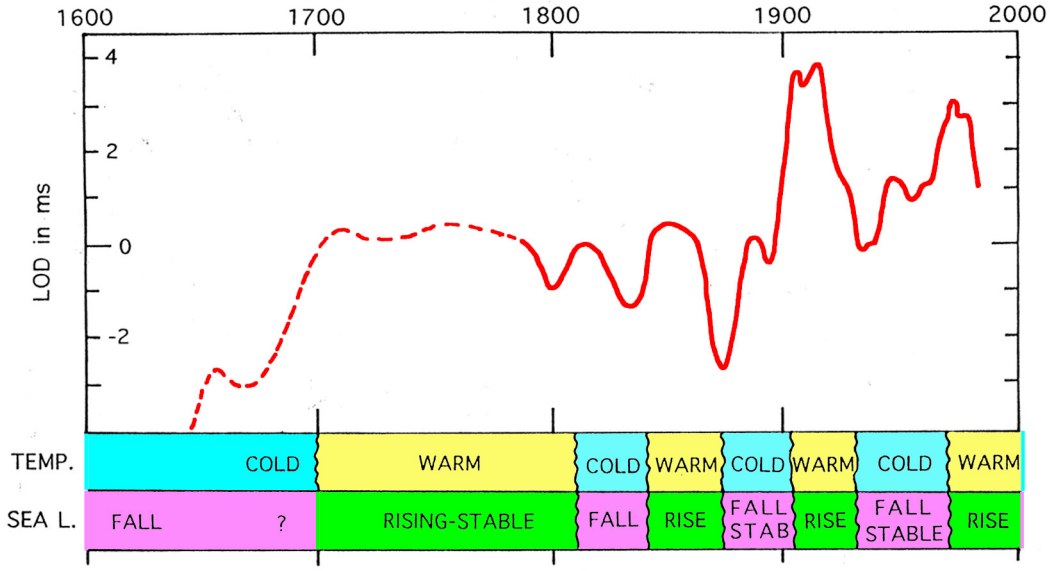


Fig. 3. The changes in Earth's rotation or LOD (down implies acceleration and up deceleration) and corresponding changes in temperature and sea level in the Northwest European region [4, 5]. In southwest Europe, however, the changes in temperature and sea level were rather the opposite.

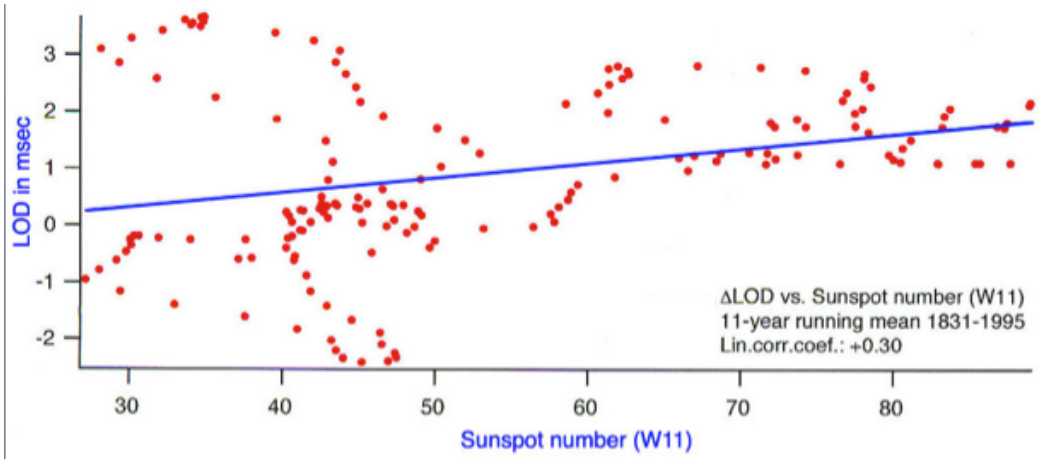


Fig. 4. Despite the fact that rotation is affected by several different factor, there is a correlation between rotation (LOD) and sunspot numbers [1] in support of a solar-terrestrial interaction.

Fig. 5 gives the changes in Gulf Stream distribution and recorded changes in temperature from the Baltic in the north to Gibraltar in the south (red dots in map A, and temperature curves 1-8) during the Maunder minimum [1].

A: 1676–1686 (upper left map)

- The Barents Sea branch decreases and the Bay of Biscay branch increases
- The sites 5 and 6 experience a strong warming (due to intensified Bay of Biscay branch)
- The sites 7 and 8 (fed by the Gibraltar branch) also record warming

B: 1687–1703 (lower left map)

- Cold Arctic water penetrates all the way down to site 6
- Northwest Europe experience Little Ice Age conditions
- The warming in sites 7 and 8 continues
- Southwest Europe/Northeast Africa experience Little Interglacial climatic conditions

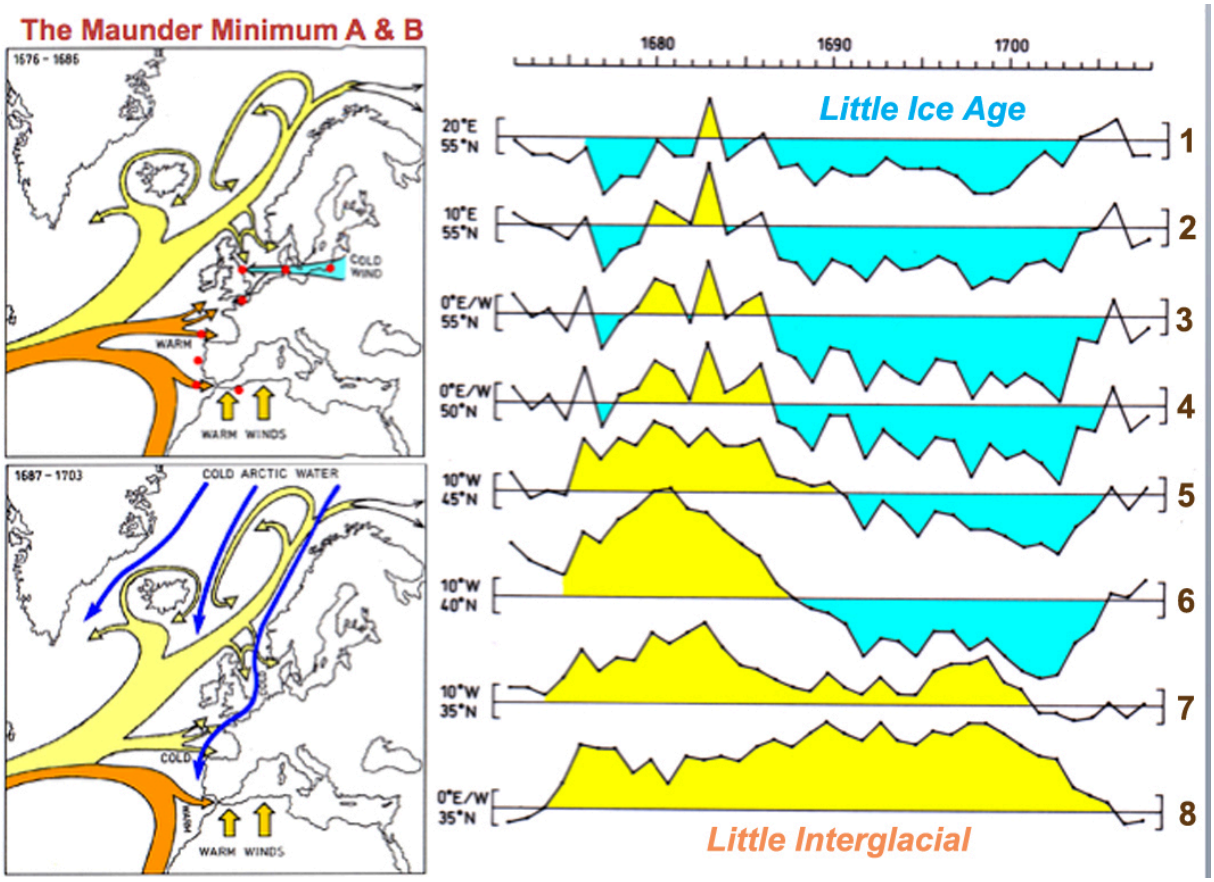


Fig. 5. Climate changes in the North Atlantic region during the Maunder Minimum [1, 2].

Implications for Portugal

The Atlantic coasts of the Iberian Peninsula is, of course, strongly affected by the changes in ocean circulation (here called "Gulf Stream beat") because of the changes in the intensity of the 3 branches of the Gulf Stream.

- At normal conditions, heating by warm equatorial water via the Bay of Biscay branch and via the main Gibraltar branch of the Gulf Stream
- At periods of rotational slowing down of 60-years cycles and Grand Solar Maxima, there is a weakening of the Gibraltar branch and partly also of the Bay of Biscay branch
- At early phases of Solar Minima (Fig. 5), the Bay of Biscay branch intensifies giving rise to extra warm climate conditions in the ocean/land areas controlled by this branch. Also the Gibraltar branch increases.
- At the full phase, cold Arctic water penetrates all the way down to the Lisbon area, with Little Ice Age conditions in the north and Little Interglacial conditions in the south (fig. 5).

This will affect local climate and sea level along the coast from La Coruña area in the north to the Gibraltar area in the south. Those changes are likely to occur both rapidly and differently along the coast (as illustrated in Fig. 6). This is a major task for extended analyses.

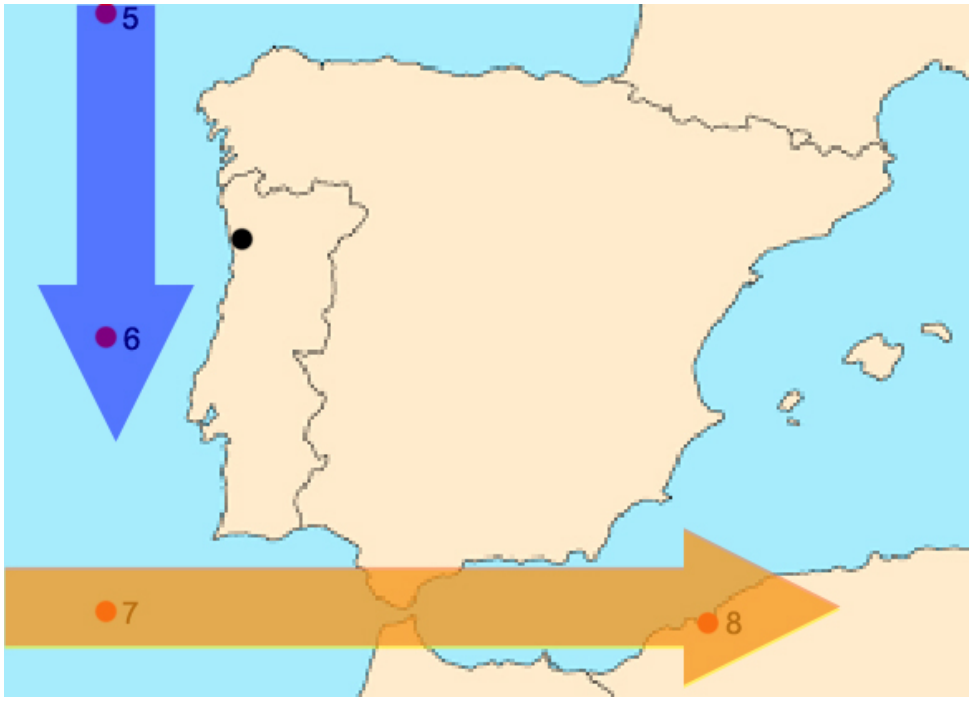


Fig. 6. At Grand Solar Minima cold Arctic water penetrates all the way down to the Lisbon area; Little Ice Age climate conditions prevailed to the north and Little Interglacial conditions to the south.

References

[1] Mörner, N.-A., 2010. Solar Minima, Earth's Rotation and Little Ice Ages in the Past and in the Future. The North Atlantic – European case, *Global Planet. Change*, 72, 282–293.

[2] Mörner, N.-A., 2015. The approaching New Grand Solar Minimum and Little Ice Age climate conditions. *Natural Science*, 7, 510-518.

[3] Mörner, N.-A., 2011. Arctic environment by the middle of this century. *Energy & Environment*, 22 (3), 207-218.

[4] Mörner, N.-A., 1996. Global Change and interaction of Earth rotation, ocean circulation and paleoclimate, *An. Brazilian Acad. Sc.,* 68 (Supl. 1), 77–94.

[5] Mörner, N.-A., 2015. Multiple planetary influences on the Earth. In: *Planetary influence on the Sun and the Earth, and a Modern Book-Burning*, N.-A. Mörner (ed.), Chapter 4, p. 39-50, Nova Sci. Publ.

Note on the Portuguese Sea Level Project

Pamela Matlack-Klein & Maria da Assunção Araújo
Independent Researcher, Vila do Conde, Portugal, pmkdragon@gmail.com
CEGOT, Department of Geography, Porto University, m.a.araujo@netcabo.pt

As there seems to be so much curiosity about the PSLP, we are taking this opportunity to try to explain what it consists of and what we hope to learn over the next few years. The Portuguese Sea-Level Project was conceived after the London Conference, 2016. At that time Professor Araújo presented a paper on tide gauges and sea-level change around the Iberian Peninsula.

We believe that there are many factors affecting sea level around the Iberian Peninsula, including neo-tectonic activity, because Iberia is in the exact crossroads of the Atlantic and Mediterranean tectonic areas. We see both uplift and subsidence at different places along the coast, both of which affect our perception of local sea level.

Coastal erosion is an expensive problem around the world and also in Portugal, dependent on many more things than just the minimal sea level changes that we find in places like Cascais (1,3mm/yr.). One of the biggest causes of coastal erosion is changes in the sediment budget caused by hydroelectric dams on the major rivers. This is further exacerbated by massive coastal constructions designed to protect the coast and the harbors but which that increases the erosion problem down drift, producing a "comb" shaped coastline.

Unfortunately, recent data from PSMSL are not available for Portugal.

Because of that, at the SONEL site the absolute sea level trends don't contain Portuguese stations. Nevertheless, we can see that sea level changes on the Iberia peninsula are mostly connected to land movements recorded by GPS and are quite moderate. The only exception is Cádiz where a GPS 11km away from the tide gauge was used. With this GPS data, SONEL proposes an absolute sea level change of 4.12±0.54 mm/year, that seems quite unlikely!

For Tarifa the combined velocity is 1.96±0.82 mm/year. For Ceuta the combined velocity of 0.62±0.62 mm/year. Considering that these three stations are located quite close in geographical terms, absolute sea level cannot be so different between these three sites.

In Europe, according to SONEL, only Klaipeda, in Lithuania has a reading similar to Cadiz: "combined sea level change": 4.12±0.54 mm/year.

So, the proclamation of a 4mm/yr. at Cascais (Carlos Antunes website) seems quite exaggerated, being based on a *ca* 10yr. series and an erroneous interpretation of the land movements that can be find at SONEL site

We have been examining the entire Portuguese coast, looking for a reliable and simple solution to getting accurate measurements of Sea-Level change. So far, this work is somewhat stymied by the nature of the coast. But we plan to continue working until a solution is found.

Another inquiry we are pursuing is how the coming Grand Solar Minimum will affect the weather and Sea-Level rise or fall in Portugal north of Lisbon. This will require a lot of digging back in history to find out how seriously agriculture was affected during previous Grand Solar Minima. Northern Portugal is heavily agricultural, growing wine grapes, cattle and sheep, livestock feed, fruits and vegetables. The Douro Valley is home to the vineyards that produce Port wine. There are reliable records from the LIA that will give us clues as to what to expect.

websites

http://www.sonel.org/-Sea-level-trends-.html?lang=en
http://webpages.fc.ul.pt/~cmantunes/hidrografia/hidro_mares.html

Can we trust time series of historical climate data?

Michael Limburg
Address, limburg@grafik-system.de

For the purpose of clarity this speech is used to explain the general behavior of anomaly calculation in respect to error propagation. It will be shown that the widely assumed error reduction capabilities of an anomaly model is valid in one special case only, but in general may not reduce the final systematic error – especially in time series – but in most cases increases it.

Further a great variety of potential systematic errors in historical temperature measurement are named here, from which only very few had been so far quantified and could be corrected, but only in part. This is shown also. By knowing this the minimum uncertainty for every annual global mean temperature should be expanded not only to the value described here i.e. with 95 % confidence interval to ± 1.084 °C, but should be at least 3 to 5 times wider. Thus, the average global temperature anomaly for the last 150 years is dissolved in a wide noisy uncertainty band, which is much wider than the whole assumed variation of the 20th century. Therefore every attempt to attribute any possible forcing to that variation remains scientific speculation. The only but very important exception may be the influence of a strong driving force, which oscillates around a given mean. Its oscillating signal might be much more easily discriminated from the uncertainty band described before, due to its repetitive nature.

Limburg, M. (2014). New systematic errors in anomalies of global temperature time-series. *Energy & Environment*, 25 (1), 104-122. https://www.eike-klima-energie.eu/wp-content/uploads/2016/07/E___E_algorithm_error_07-Limburg.pdf

Earth + Solar System Data and Scientific Method = New climate science

Karl Zeller & Ned Nikolov
Independent Researchers, USA
karl.zeller@colostate.edu, ntconsulting@comcast.net

Some climate skeptics argue that the assumption of radiant-heat trapping by a free convective atmosphere suggested by Joseph Fourier, central to the radiative Greenhouse theory of climate, has not been demonstrated experimentally. In fact, Prof. Svante Arrhenius in his 1896 paper[1] after detailing what Fourier and others '*think*', states "*...such experiments have not been made as yet, and, as they would require very expensive apparatus beyond that at my disposal, I have not been in a position to execute them".* Today, 132 years later, the proposed long-wave radiation trapping mechanism still awaits an empirical validation. Yet the international science community has spent billions of Dollars to develop and analyze climate computer models that codify the 19th-Century theoretical conjecture of Fourier, Tyndall and Arrhenius about the atmosphere's ability to retain radiant heat.

We report on the use of actual observations to address Arrhenius' desired experiment. We apply the scientific method[2] by going through the following steps:

1. Ask a question: *Is Earth's climate a special case*?
2. State a hypothesis: *The Earth's climate is a part of a physical continuum spanning a broad range of planetary environments in the Solar System*.
3. Procedure: Apply dimensional analysis[3] to measured planetary data in search of a physically meaningful relationship between planetary temperatures and environmental parameters.
3. Conduct the experiment:
    a. Gather and vet terrestrial and extra-terrestrial NASA data collected over the past 3 decades;
    b. Determine dimensional parameters (Table 1) and create dimensionless products;
    c. Extract meaningful relationships from the dimensionless products;
4. Analyze the results to determine if they support the original hypothesis.
5. Draw logical conclusion and formulate a new theory based on them.

The above scientific method produced new findings[4,5] and a heretofore unbeknown macro-level thermodynamic relationship[5] with unexpected but fundamental implications for the climate theory. In short, long-term mean global planetary temperatures and long-term mean planetary latitudinal temperature gradients are shown to be functions of solar irradiation and surface pressure and surface air density respectively.

Implications of a semi-empirical Planetary Temperature Model for a New Understanding of Earth's climate history

Ned Nikolov & Karl Zeller
Independent Researchers, USA
ntconsulting@comcast.net, karl.zeller@colostate.edu

Nikolov & Zeller (2017) used dimensional analysis with NASA data to discover that, across a broad range of planetary environments in the Solar System, the atmospheric thermal effect (presently known as the "Greenhouse Effect") is a *not* a radiative phenomenon as currently assumed, but a thermodynamic (pressure-induced) phenomenon analogous to adiabatic heating and independent of atmospheric composition. For the first time in the history of climate science, Earth's global temperature has been shown to be a part of a well-defined and highly accurate cosmic continuum determined primarily by TOA solar irradiance and total surface atmospheric pressure with no measurable influence from the so-called "greenhouse gases". These results point to a new paradigm of understanding about planetary climates including Earth's.

Recently Nikolov & Zeller (2018 manuscript in preparation) applied the dimensional analysis method to additional planetary data characterizing latitudinal temperature patterns on the surface of 4 well-studies bodies, i.e. Earth, the Moon, Mars and Titan. The goal was to find common drivers/controllers of the observed meridional temperature gradients (such as between the Equator and the Poles) of disparate bodies. Our study was prompted by the lack of a general theory regarding meridional heat transport and the resulting latitudinal temperature distribution on planets with tangible atmospheres. We found that latitudinal temperature gradients can accurately be predicted (over a broad range of conditions) using near-surface atmospheric molar density and TOA solar irradiance. Since air density is a function of total pressure and the average global surface temperature (as per Gas Law), the meridional temperature gradients ultimately depend on solar irradiance and surface air pressure. Figure 1 shows a 3-D response surface of the Equator-to-Pole temperature gradient produced by the new N&Z model.

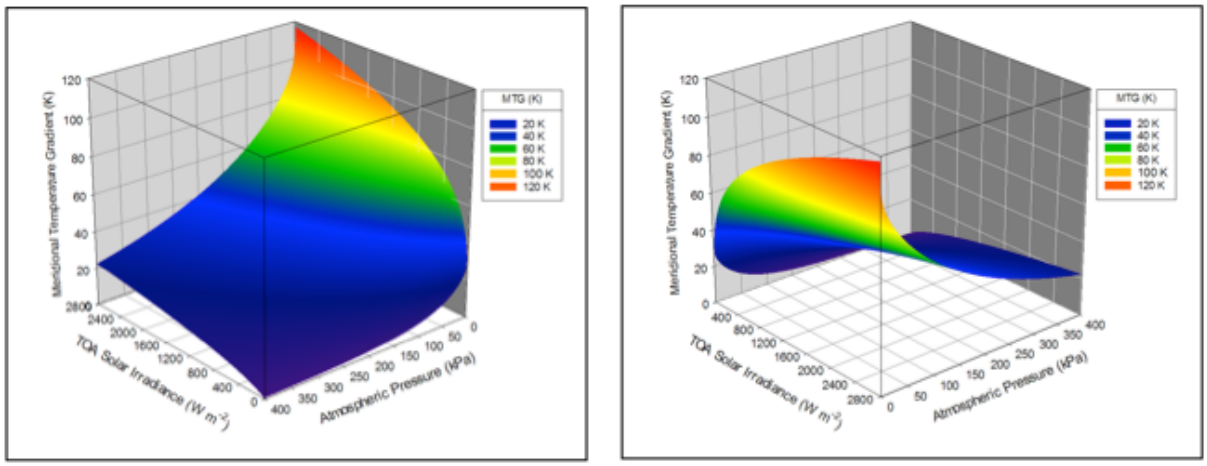


Figure 1. Functional dependence of the Equator-to-Pole (Meridional) surface temperature gradient on atmospheric pressure and TOA solar irradiance according to the new N&Z semi-empirical model.

The semi-empirical model by Nikolov & Zeller (2018) derived from vetted NASA planetary data suggests that equilibrium latitudinal temperatures are independent of atmospheric composition and can only be affected by variations in total atmospheric mass/pressure, TOA solar irradiance, and (to a smaller extent) cloud albedo. These results combined with the current understanding of Earth's orbital dynamics & Sun's stellar

evolution imply that the observed large shifts in Erath's climate during the Cenozoic era are likely caused by changes in total atmospheric pressure. To test this hypothesis, we applied the new N&Z model to two well-studied geological periods: the Last Glaciation (120 – 10 Ky ago) and the early Eocene (56 – 47 My ago). The objective was to try predicting the observed *polar amplifications*, i.e. larger changes in high-latitude temperatures compared to changes in equatorial and temperate-region temperature during these periods. Polar amplification is a *hallmark* of all past climatic variations exceeding a 1.0 K change in global temperature, and has posed an unsurmountable challenge to conventional CO_2-driven climate models. We inverted one of the N&Z model equations to calculate hypothetical pressure changes required to reproduce observed variations of average global surface temperature in the geological record. Using these pressure calculations, we then applied the rest of the N&Z model to predict surface temperatures at several key latitudes (i.e. Equator, 37^o-39^o, 60^o, and the Poles) for these periods. The N&Z model reproduced latitudinal temperature profiles and polar temperature changes during Last Glaciation and the early Eocene significantly better than standard climate models, which simply failed to correctly simulate the observed polar amplification. Figure 2 shows the results obtained for the early Eocene.

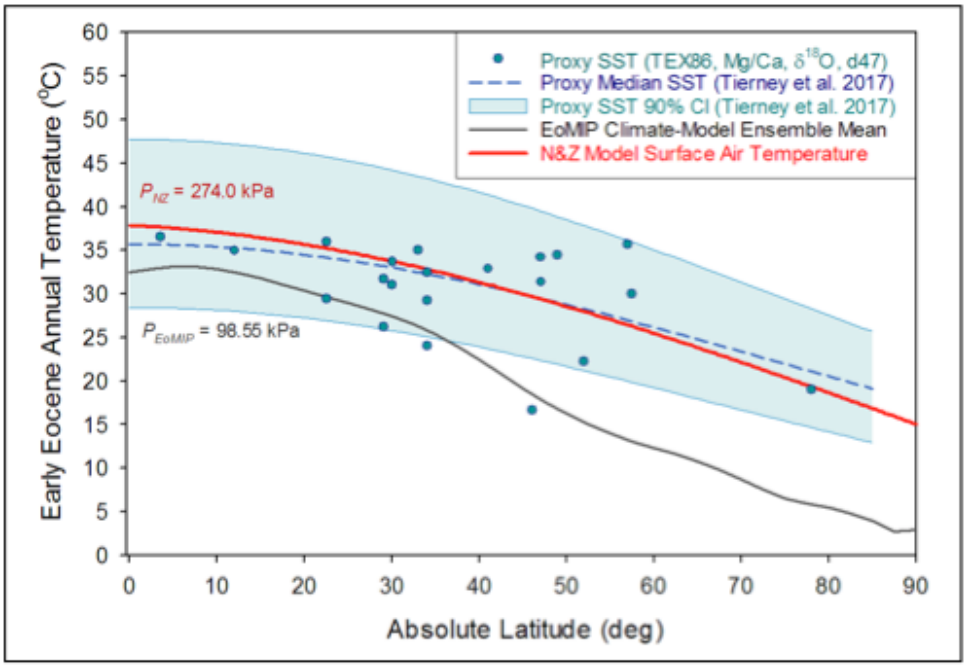


Figure 2. Comparison of latitudinal temperature profiles during the early Eocene predicted by the N&Z model and an ensemble of conventional climate models with proxy-based temperature reconstructions (Tierney et al. 2017).

These findings provide strong indirect evidence that large climatic shifts in Earth's past have likely been caused by variations in total atmospheric pressure. Hence, our atmosphere might be much more dynamic than currently assumed. This is a new paradigm for climate science!

References

Nikolov N, Zeller K (2017) New insights on the physical nature of the atmospheric greenhouse effect deduced from an empirical planetary temperature model. *Environ Pollut Clim Change*, 1:2

Tierney JE, Sinninghe Damsté JS et al. (2017) Eocene temperature gradients. *Nature Geoscience*, 10:538–539. DOI: 10.1038/ngeo2997

Cooling of climate sensitivity

Francois Gervais
Department of Physics, Faculty of Science & Techniques, University of Tour, France
francois.gervais@univ-tours.fr

The author gratefully acknowledges the support by the *Association des Climato-réalistes*.

The burning of fossil fuels has increased, at least for a part, the percentage of CO2 in the atmosphere from 0.03 % to 0.04 % by volume over last 150 years. The impact of this increase upon the temperature of the Earth is evaluated via the climate sensitivity. Two definitions are commonly used: TCR and ECS. TCR, Transient Climate Response, is the estimated warming over a 20 years period centered at CO2 doubling, independent of the initial value since the commonly accepted law is logarithmic. ECS, Equilibrium Climate Sensitivity, is the estimated warming once equilibrium would have been reached. The equilibrium involves oceanic currents and might be reached after several centuries. Figure 1 displays an update of both TCR and ECS climate sensitivity published since 2001 in peer-reviewed scientific journals by different methods. They eventually include water vapor and cloud feedbacks. The spread appears considerable.

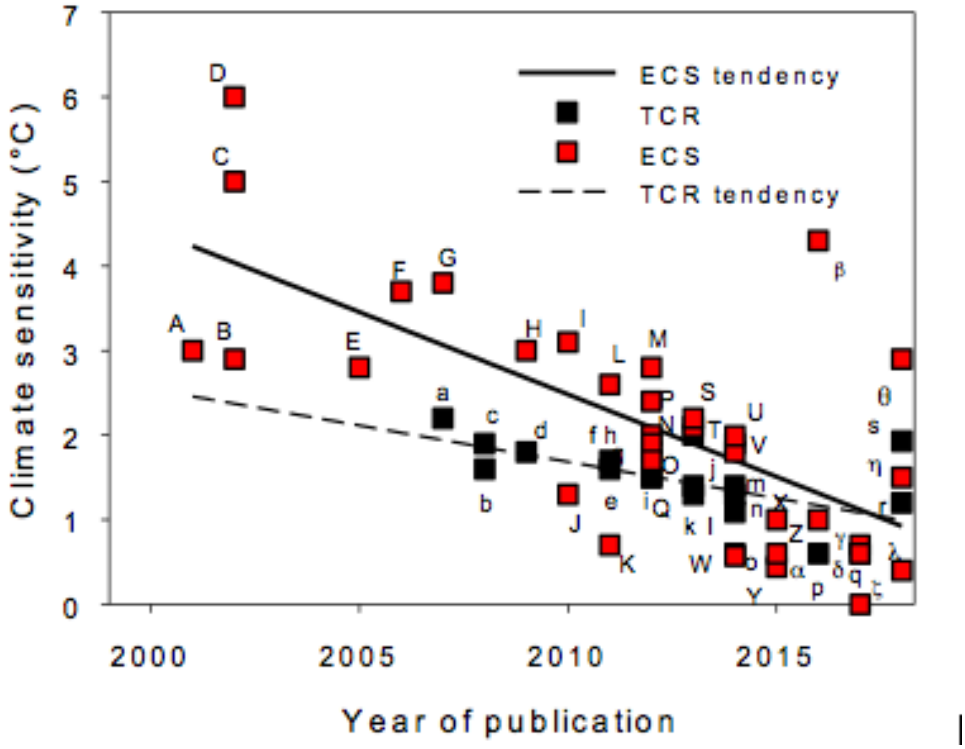


Fig. 1 – Update of compilation of TCR and ECS climate sensitivity versus year of publication, together with a linear regression of each set of results. A: Andronova & Schlesinger 2001, B: Forest et al 2002, C: Knutti et al 2002, D: Gregory et al 2002, E: Frame et al 2005, F: Forest et al 2006, G: Tomassini et al 2007, H: Allen et al 2009, I: Lin et al 2010, J: Spencer & Braswell 2010, K: Lindzen & Choi 2011, L,e: Libardoni & Forest 2011, M: Olsen et al 2012, N,i: Schwartz 2012, O,g: Aldrin et al 2012, P: Ring et al 2012, Q,h: Rojelj et al 2012, R: Aspen 2012, S,k: Otto et al 2013, T,l: Lewis 2013, U: Skeie et al 2014, V: Lewis & Curry 2014, W: Ollila 2014, X,p: Loehle 2015, Y: Soon et al 2015, Z: Monckton et al 2015, a: Kissin 2015, b: Tan et al 2016, g: Bates 2016, d: Abbott & Marohasy 2017, e: Harde 2017, z: Holmes 2017, h: Lewis & Curry 2018, q: Dessler et al 2018, l: Smirnov 2018, a: Stott & Forest 2007, b: Knutti & Tomassini 2008, c: Gregory & Foster 2008, d: Meinshausen et al 2009, f: Padilla et al 2011, g: Gillett et al 2012, j: Harris et al 2013, m: Skeie et al 2014, n: Lewis & Curry 2014, o: Harde 2014, p: Gervais 2016, q: Ollila 2017, r: Lewis & Curry 2018, s: Smooth 2018.

Is Fig. 1 the illustration of what is currently called a « consensus » among climate scientists? Many results actually are disproved by most of the others. IPCC AR5 (2013) considers a range of 1–2.5°C for TCR and of 1.5–4.5°C for ECS. They correspond to values published before 2012. The uncertainty range of IPCC ECS has not evolved since that of the Charney report of 1979 in spite of the supposed progress of modeling and computing resources in the meantime. The key point is that most ECS values published since 2012 are lower than the IPCC ECS mean of 3°C. A linear regression indeed indicates that the tendency of published values shows a « cooling » of 4 % per year for both TCR and ECS. At this rate, this means that it could tend towards zero in 8 more years of future works. Zero climate sensitivity has already been published.

Why this cooling versus time? The answer is presumably because climate modelers and/or reviewers of the manuscript do not appreciate seeing the virtual projections diverging too much from observed real climate. The climate sensitivity published by Rasool and Schneider in 1971 was 0.8°C only. A cooling of the Earth by 0.5°C was observed from 1945 to 1975 in the Northern hemisphere in spite of an increase of 21 ppm of CO2 in the atmosphere during these 30 years. Then a warming was observed and the ECS increased up to a mean of 3°C in the Charney report without any evolution until the IPCC AR5. The cooling tendency in latest published papers is presumably influenced by the pause of temperature experienced since 1998 in the low troposphere and its impressive duration, except for major natural El Niño fluctuations in 1998 and 2015-2016. It looks like that published climate sensitivity parameters actually follow the observed temperatures and their evolution, vanishing when cooling is observed, rebounding when warming takes place, hesitating when temperature levels, whereas they are supposed to forecast the future climate. Another reason for the recent average decrease of published values of climate sensitivity is the even longer plateau of temperature observed in the low stratosphere for a quarter of century. This plateau would not be compatible with a climate sensitivity higher than 0.6°C. On the other hand, the plateau and lowest values of climate sensitivity are consistent with the 100 % infrared absorption of the CO2 atmospheric band at 15 mm measured both (i) below the tropopause, where temperature decreases with altitude, and (ii) above the tropopause where temperature does no longer decrease with altitude. The latest observation invalidates the « weakening of CO2 emission ». The weakening is expected from the definition of greenhouse effect in the Glossary of IPCC AR5, originated from the Manabe convective model. But it is valid only in the troposphere. Conversely, in the low stratosphere where the CO2 absorption is still 100 %, the emission towards space is still fully efficient according to the Kirchhoff law. The emission is not weakened since temperature does no longer decrease with altitude. This is consistent with the temperature plateau observed for a quarter of century.

A climate sensitivity of 0.6°C assumes a radiative forcing of 2.2 W/m2 in case of CO2 doubling and hence a temperature increase DT = 0,9 ln(C/C0). The average yearly CO2 increase in the atmosphere is 2 ppm/408 ppm = 0.5 % per year as observed for two decades. The CO2 increase has even been only 1.6 ppm during the last 12 months (May 2017–May 2018). The average rate of 2 ppm/year combined with a climate sensitivity of 0.6°C would mean a contribution to warming extrapolated to 2100 of DT2100 = 0,9 ln(572/408) = 0.3°C. It would reach 0.5°C with the lowest value of IPCC TCR, 1°C, consistent with the latest tendencies in Fig. 1. Both 0.3° or 0.5°C are inconsistent with any threat. A new paradigm, therefore, is suggested which focus on Earth greening with a benefit for crops yields, thanks to CO2 increase.

1 Gervais, F., 2016. Anthropogenic CO_2 warming challenged by 60-year cycle. *Earth-Science Reviews* **155**, 129-135.
2 Holmes, R.I., 2017. Molar mass version of the ideal gas law points to a very low climate sensitivity. *Earth Sci.* **6**, 157-163.
3 Rasool S.I., Schneider S.H., 1971, Atmospheric carbon dioxide and aerosols: effects of large increases on global climate, *Science* **173**, 138.
4 Goody, R, Yung, Y., 1995. *Atmospheric Radiation: Theoretical Basis*. Oxford University Press.
5 Manabe, S.R., Strickler, R.F., 1964. Thermal equilibrium of the atmosphere with a convective adjustment. *J. Atmos. Sci.* **21**, 361.
6 Gervais, F., 2016. *Tiny CO_2 warming challenged by Earth greening*. Ed. Scholar's Press, Sarrebrücken.

On an error in defining temperature feedback

Christopher Monckton of Brenchley
Science and Public Policy Institute UK, Dyrham, Wiltshire, England
monckton@mail.com

Climatology greatly overstates feedback and equilibrium sensitivity by defining feedback as responsive only to anthropogenic perturbations. However, feedback processes respond to reference temperature, i.e., the sum of emission temperature without the non-condensing greenhouse gases and the direct natural as well as anthropogenic warmings attributable to all such gases. Climatology does not use the mainstream system-gain equation in control theory that models feedback in all dynamical systems. Its variant equation constitutes the difference natural greenhouse warming, is lost The mainstream equation retains this information, permitting accurate derivation of feedback factors at any convenient moment of equilibrium and offering a sound empirical check on feedback factors hitherto derived from modeling or in IPCC (1990, 2013).

Paper submitted:

Christopher Monckton of Brenchley, Willie Soon, David Legates, Matt Briggs, Michael Limburg, Dietrich Jeschke, John Whitfield Alex Henney, James Morrison & Thomas Sheahen (2018). *On an error in defining temperature feedback.*

Eleven facts you must know to avoid being deceived by the AGW

Camille Veyres
France Telecom (retired), *camille.veyres@polytechnique.org*

Summary:
(1) The amount of carbon dioxide in the air in a consequence of the surface temperatures of the inter-tropical zone where most of the out-gassing takes place; it is a consequence (an integral over time) of past temperatures, and hence cannot cause the temperatures; 6% of the CO_2 of the air is anthropogenic and 94% from natural out-gassing.
(2) The so-called greenhouse effect exists only in vacuum and cannot exist in the atmosphere neither on Earth nor on Venus: a polytropic relation between pressure and temperature explains the surface temperatures; the Earth's atmosphere is, due to its water vapor, extremely opaque to thermal infrared and cannot carry heat radiatively outside the water vapor window; the thermal infrared radiation of the troposphere (90% of that of the globe) is controlled by the water vapor content at say 300 mbar; changes of the carbon dioxide content of the air have no effect because water vapor is in control.

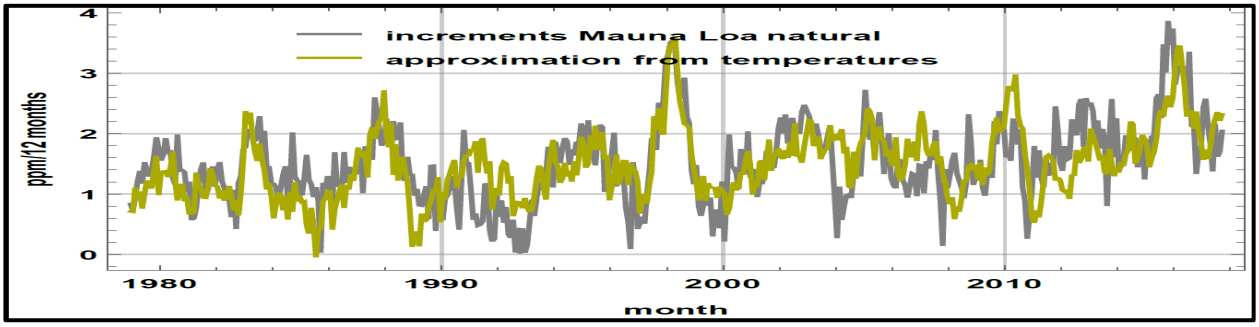
Carbon cycle:
Carbon dioxide is exchanged between oceans (39000 Gt-C), air (850 Gt-C) and vegetation and soils (2500 Gt-C) (figure 6-1 of IPCC-AR5-WG1). Cumulative anthropogenic emissions since 1751, 430 Gt-C, are about one percent of the total. Each year one fifth of the CO_2 of the air is absorbed (discounting the daily respiration of the vegetation) by cold surface oceans (80 Gt-C/yr) and by plants (90 Gt-C/yr). From 1900 to 1999 the global terrestrial photosynthetic primary production increased by 30% [1] as did the absorption by oceans; IPCC figure 6-1 underestimate by a factor three the exchange of carbon between surface ocean and deep ocean.
Fact 1: The partial pressure of the carbon dioxide in sea water is driven by the temperatures and increases by 3.6 times between the border of the ice pack (200 µatm) that sucks CO_2 from the air (400 µatm) and the inter-tropical zone (600 µatm) which belches CO_2 into the air.

Table 1 Partial pressure of CO_2 in sea water; DIC=dissolved inorganic carbon; http://biocycle.atmos.colostate.edu/shiny/carbonate/

DIC µmole/kg	2000	2100	2000	2100	2000	2100	2000	2100	2000	2100
Temperature °C	0°C	0°C	5°C	5°C	15°C	15°C	20°C	20°C	30°C	30°C
$p_{CO2water}$ µatm	**129**	**217**	**162**	**272**	**251**	**419**	**310**	**515**	**464**	**763**

Frauds and obfuscations: Revelle's 1965 report [2], Bolin's papers of the 1960s and IPCC use two main tricks to exclude oceans from the carbon cycle and to conceal the effect of temperatures; with only air and vegetation (no soils!) left, half of fossil fuel stays forever in the atmosphere (the "*airborne fraction*") and half in vegetation. Trick 1: They say there is almost no exchange of carbon between the surface ocean (900 Gt-C) and the deep ocean (Revelle 1965: no exchange; IPCC 1990: 35 and 37 Gt-C/yr; IPCC 2013: 90 and 101 Gt-C/yr). Trick 2: Revelle's equation dp_{CO2}/ p_{CO2} = {8 to 12} d DIC/DIC is said to describe a static "equilibrium" between air and surface ocean.
Fact 2: Quote from [3]: *at temperate latitudes the subduction of dissolved inorganic carbon DIC and to a lesser extent the sinking particles* ***maintain*** *CO2 under-saturation*, **and hence absorption of carbon dioxide from the air.** ***In the tropical band and in the Southern Ocean Dissolved Inorganic Carbon is obducted back to the surface.*** *The* ***275 Giga ton per year supply by obduction*** *and* ***the 265 gigaton per year removal by subduction*** *are 3 to 5 times larger than previous estimates*

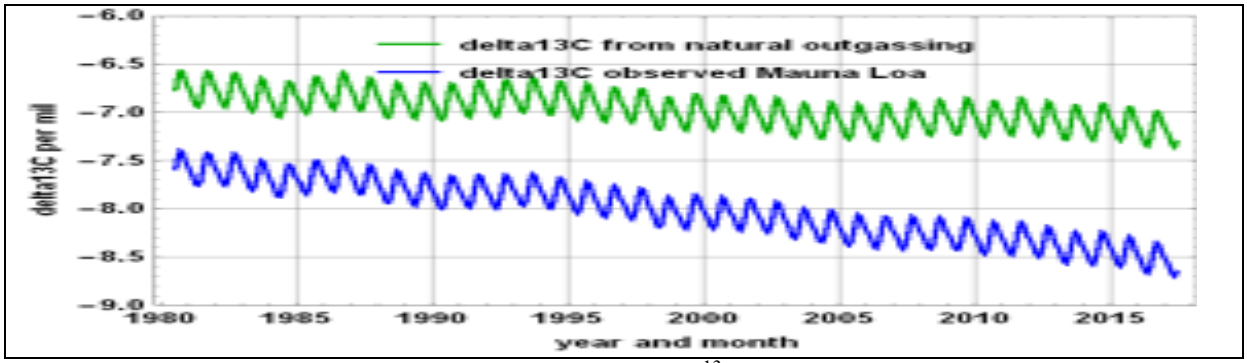
Comments: Revelle's equation or "buffer factor" applies in a bottle with sea water and air but cannot be used globally: ocean water is moving, has surface temperatures between -1.5°C and 33°C and the carbon of the surface ocean is renewed continuously by intertropical obduction and middle latitude subduction.



Fact 3: the CO_2 content of the air is a consequence of past intertropical temperatures, their time-integral. See figure above: the time derivative of the ppm in grey, a linear function of the intertropical UAH-MSU temperature anomaly AT(t) in yellow-green. Hence d[CO_2] (t)/dt = 1.7 (AT(t) – (-0,8°C)). Unit root tests on time-series (Dickey Fuller) require the ppm curve to be derived once w.r.t. time before attempting a correlation with the temperatures. The autocorrelation functions of times series "AT(t)" and "increments at Mauna Loa" are completely different of that of "anthropogenic emissions". Subtraction of linear trends from the time series of the Mauna Loa increments and of the anthropogenic emissions kills any fictious (common "trend") correlation: **R^2 = 0.014** [see professor Munshi's papers].
Hence the ppm are the integral over time of the temperature anomaly of the intertropical zone where outgassing takes place, **a consequence of past temperatures; CO_2 ppm cannot control the temperature.**

Fact 4: As one fifth of the CO_2 content of the air is absorbed every year, the carbon content of the air y(t) is a solution of **dy/dt = f(t) – y(t)/5 or y(t) = 5 f(t) – 5 dy/dt, with f(t) input.** This applies to both components, the natural and the anthropogenic (f(t) = 10 Gt-C/yr) parts of the carbon of the air.
The anthropogenic component of the air is 5 yr x 10 Gt-C/yr – 5 yr 0,4 Gt-C/yr = 48 Gt-C = 23 ppm or 6%; the component from natural outgassing is 94%.
The natural outgassing, since 1958, went up from 62 ppm/yr to almost 80 ppm/yr, while anthropogenic emissions went from 1 ppm/yr to 4.5 ppm/yr. Natural climate cycles drive the temperature that drive the natural outgassing, that provides today's 94% of the CO_2 of the air, and the total CO_2 of the air drives the absorption, always (1/5) of it.

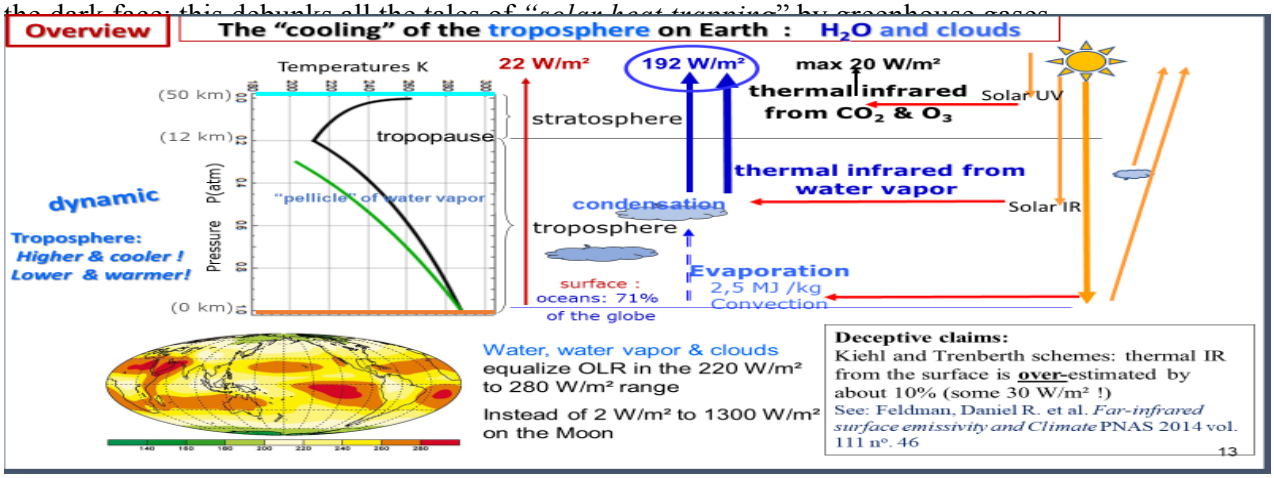
Fact 5: ^{13}C is 1000 (($^{13}C/^{12}C$) /0,0112372 – 1), a linear function of the ratio of the number of atoms ^{13}C and ^{12}C; the ^{13}C of fossil fuels reflects the changing mix of coal, oil and gas; today, only 6% of the atmospheric carbon dioxide is anthropogenic: **6% (-30) + 94% (-7.1) = (-8.5) is the observed ^{13}C.**



The naturally outgassed carbon (green curve) has the $\delta^{13}C$ signature of the ambient air some sixty years before; it displays some ups and downs because during El Niños, more carbon with a more negative $\delta^{13}C$ is released; the $\delta^{13}C$ of the CO_2 in sea water is about 1.5 per mil below that of the air.

Deceptions and frauds: see IPCC FAR (1990) page 14, § 1.2.5 and IPCC AR4 p 139.
Deceptions and frauds: Bern and Hamburg impulse responses: A compartment model is a set of linear equations solved by Laplace transform; its impulse response is a weighted sum of exponential time decays, with, here, eight free parameters tuned to make the convolution of the impulse response with the time series of anthropogenic emissions look like a heavily massaged version of Mauna Loa ppm, with a 100 years 1/e decay time. This is based on the A PRIORI hypothesis that all change of ppm is from fossil fuels. The impulse response for a "airborne fraction" of 50% of fossil fuels that remains forever in the air is half a Dirac! Those tales have been debunked by observations: the doubling of the production of coal between 2000 and 2010 with +40% on anthropogenic emissions had no visible change on the derivative or slope of the Mauna-Loa ppm (grey line on figure above) . In the 2013 IPCC reports, Bern formula disappeared from the WG1 report, but was still used by WG3.
Fact 6: The +31% large historical growth in terrestrial gross primary production during the XXth century is in line with the observed acceleration of the forest stand growth dynamics in central Europe since 1870. [prof. Pretzsch]. Hence, during the XXth century, the +700 Gt-C of the vegetation and soil compartment and the + 220 Gt-C of the atmosphere came from 400 Gt-C released by fossil fuels and 520 Gt-C released by the oceans. The **non-linear transfer of carbon from oceans to vegetation and soils** was properly discussed in 1956 by Eriksson & Welander, a decade before Revelle' report.
Fact 7: The deep ocean carbon turnover time seems to be one or two centuries (270 Gt-C / yr obducted and subducted divided by 38000 Gt-C or by part of it). 60 meters of ice divided by Antarctic precipitations of 5 mm per year is 10 000 years. On a slice of ice-core the paths between different bubbles in the slice and the surface, say 80 meters above, close at different times due to the progressive and random closing of the pores in the firn. The **moving-average time smoothing over millennia** removes all trace of the **oceanic century-long carbon cycles** in the deep ocean. Hence ice cores cannot record century long changes of carbon dioxide in the air; their records below 300 ppm are a consequence of the time averaging by the physics of the closing of the pores. More: splicing the heavily time averaged ice core data to Mauna Loa instantaneous data is a fraud.

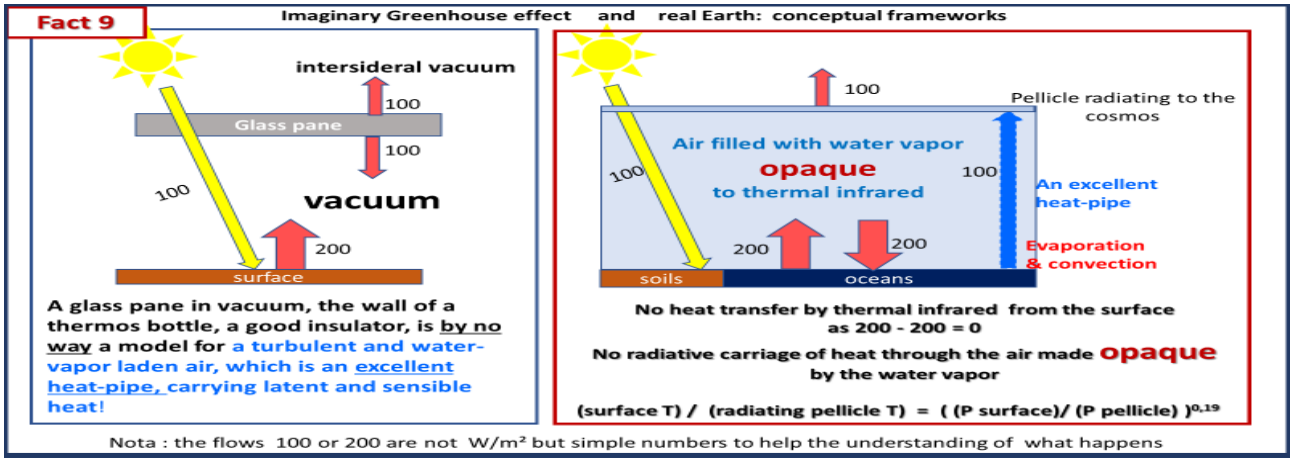
Water vapor and elementary atmospheric physics:
Fact 8: The simple diabatic model d'Q= C_h dT and the barometric relation prove the polytropic relation $\mathbf{T(P)/T(P_0) = (P/P_0)^{R/(Cp- Ch)}}$ **in the troposphere** and the equivalent gravitational $\mathbf{g/(C_p- C_h)}$ temperature lapse rate. On Earth 288 K = 223 K + 10 km x 6,5 K/km = 223 K (1 atm /0,26 atm)^{0,19} while on Venus
735 K = 230 K + 63 km x 8 K/km = 230 K (92 atm /0,1 atm)^{0,17}
Frauds and obfuscations: Radiative heat trapping? No! The tropospheric temperature is an effect of the pressure! A runaway greenhouse effect on Venus? No! It is a straight consequence of the mass of the air, one thousand tons per square meter and of the polytropic relation. There is almost no light from the Sun on the surface of Venus, at most 30 W/m² under the Sun and nil on the dark face; this debunks all the tales of "*solar heat trapping*" by greenhouse gases.



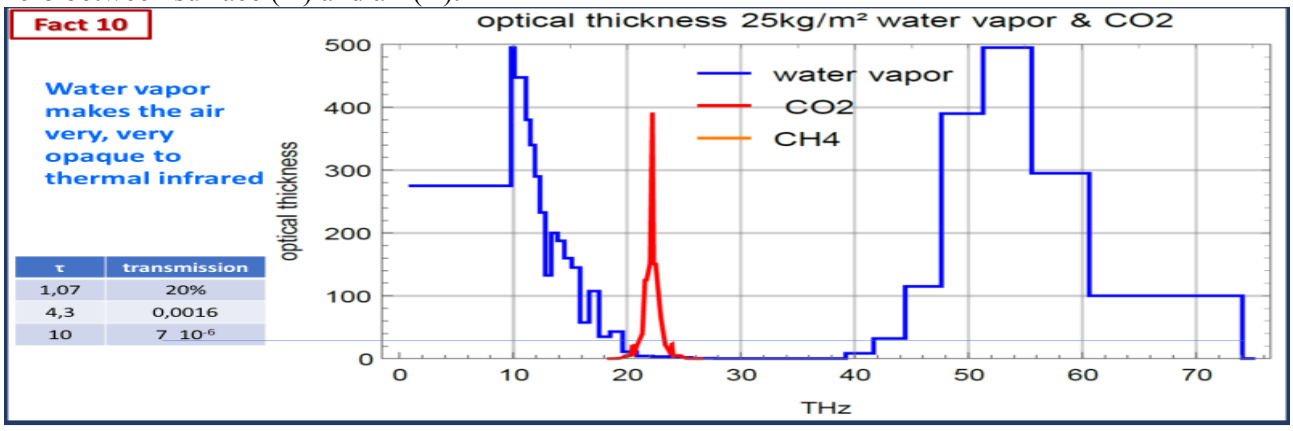
The **diabatic** curve above in black is warmer than the green adiabatic; water vapor absorbs solar infrared and releases heat by condensation. The **tropospheric water vapor and the clouds**

provide the bulk of the global thermal radiation **almost 200 W/m²;** the top or skin of water vapor that radiates from the troposphere toward the cosmos is fed by evaporation-condensation and by convection, not-at-all by radiation from the surface. Stratospheric CO_2 and ozone radiate the heat of solar UV absorbed by stratospheric oxygen and ozone. Surface-to-cosmos: 22 W/m² [4] only escape absorption by water vapor and clouds.

Frauds and obfuscations: the surface is a blackbody (No! Kiehl & Trenberth schemes overestimate by 10% the thermal radiation from the surface); solar heat is released by thermal infrared emission of the surface (No! Only some 22 W/m² of 160 W/m²); the back-radiation of the air warms the surface (No! A heat transfer by thermal infrared radiation between A and B is: **(radiated by A and absorbed by B) minus (radiated by B and absorbed by A)** with is about zero between surface and air)

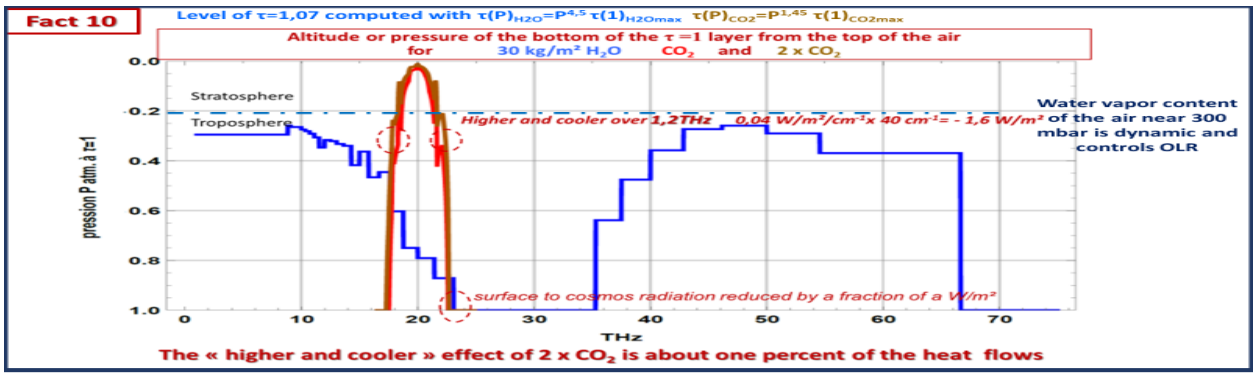


Fact 9: There exist a greenhouse effect, but **only** in vacuum! On the Moon, under the pane with Sun at the zenith, the surface temperature would increase by some 75°C. But on Earth, the turbulent air with water vapor is an excellent heat pipe that carries heat from the surface to the top layer of the tropospheric water vapor; as water vapor is quite opaque the radiative net balance is zero between surface (A) and air (B).



Fact 10: A pellicle or skin of optical thickness 1.07 transmits 20% and absorbs 80% of the incoming thermal infrared; hence it produces about 80% of the thermal infrared radiated by the body. The water vapor window from 28 THz to 39 THz is often closed by clouds.

For an optical thickness of 100 and 30 kg/m², a layer or skin of 300 grams of water vapor, 1 km thick near 9 km and 40 m thick near the surface is the source of 80% of the radiation from the atmosphere.



The lower limit of the radiating layer or skin is pictured in blue for water vapor, red for today's CO_2 ppm, brown for doubled CO_2. CO_2 radiates from the stratosphere except near 18.4 THz and near 21.6 THz. Doubling the CO_2 content of the air pushes the radiating pellicle upward around those two absorption lines from 350 mbar to say 250 mbar, from red to brown, hence a "higher and cooler" effect in the troposphere, that reduces the OLR by some 1.6 W/m² for a test-profile, less than one percent of the water vapor tropospheric OLR.
The blue curve shows that between 200 mbar and 400 mbar water vapor radiates over about 40 THz, almost 40 times the band of tropospheric CO_2 at the same altitude.
Frauds and deceptions: There exist a radiative forcing of 2.5 W/m² from a decreasing OLR due to more CO_2 in the air. 93% of it goes into the oceans
Comments: OLR observed from satellites **increased** since 1979 by 1.1 W/m²/decade; Ocean Heat Content increases by some **0.25 W/m²** since the 1970s. Radiative forcing is like the new clothes of the Emperor, made from nothing: no chemical reaction, no nuclear reaction, only by quackery.

Fact 11: The Water vapor **content** of the air near 300 millibar is dynamic, extremely variable and regulates the Outgoing Longwave Radiation of the globe; the relative humidity is there from 20% to 50%. It wipes out in hours or days any tropospheric effect of more CO_2 in the air.

[1] J. E. Campbell et al. *Large historical growth in global terrestrial gross primary production* *Nature* volume 544, pages84–87 (06 April 2017) http://www.nature.com
[2] http://climateandcapitalism.com/wp-content/uploads/sites/2/2014/06/Presidents-Advisory-Report-on-warming-1965.pdf published by the White House Washington DC Nov. 1965
[3] M. Levy et al. 2013, *Physical pathways for carbon transfers between the surface mixed layer and the ocean interior*, Global Biogeochem. Cycles, 27, 1001–1012, doi:10.1002/gbc.20092
[4] Costa S.M.S., Shine K.P. *Outgoing Longwave Radiation due to Directly Transmitted Surface Emission* J. Atmospheric Sciences, vol. 69, 2012 pp. 1865-1870

A fatal flaw in global warming science

Edwin Berry
Climate Physics LLC, Bigfork, Montana, USA, ed@edberry.com

The United Nations Intergovernmental Panel on Climate Change (IPCC) assumes nature treats human-produced and nature-produced carbon dioxide differently. This assumption is wrong because it violates the Equivalence Principle.

IPCC's basic assumption infects climate models. IPCC's Bern model, a 7-parameter curve-fit to climate model output, predicts human carbon dioxide stays in the atmosphere for a long time, some of it forever. That conclusion is a result of IPCC's basic assumption and it is wrong.

Applying the Equivalence Principle, the Bern model predicts natural emissions will cause a runaway carbon dioxide level that contradicts data. Therefore, IPCC climate models are wrong. IPCC's model cannot simulate the carbon-14 data.

A Model, derived from the continuity equation with outflow proportional to level, accurately simulates the carbon-14 data with no arbitrary curve-fitting parameters.

The Model shows constant carbon dioxide emissions, human or natural, do not add more carbon dioxide to the atmosphere. Rather their inflows set equilibrium levels for atmospheric carbon dioxide.

Using IPCC data, the Model shows present human emissions increase the level by 18 ppm and present natural emissions increase the level by 392 ppm to produce today's total level of 410 ppm.

Any climate change caused by increased CO2 is 96 percent from natural CO2 and only 4 percent from human CO2.

The effect of human emissions is the same as if natural emissions had increased by the same amount and human emissions had remained zero.

The critical scientific questions about climate change are about cause-and-effect:

1. How much do human emissions increase atmospheric carbon dioxide?
2. How much does increased atmospheric carbon dioxide change climate?

This paper focuses on the first question.

Full paper available at:
https://edberry.com/blog/climate-physics/agw-hypothesis/preprint-a-fatal-flaw-in-global-warming-science/

Conclusions

- PCC's basic assumption, that nature treats human carbon dioxide emissions differently than it treats nature's carbon dioxide emissions, is wrong because it violates the Equivalence Principle.
- IPCC's claim, that human carbon dioxide emissions will linger in the atmosphere for hundreds of years and 15 percent will remain forever, is invalid.
- IPCC's claim that human emissions have caused all the rise in the level of carbon dioxide in the atmosphere since 1750, is invalid.
- The Model has no arbitrary curve-fit parameters. Yet, it accurately simulates the carbon-14 data.
- The Model shows human emissions add only 18 ppm and nature adds 392 ppm to produce today's 410 ppm level of carbon dioxide.
- If all human CO2 emissions were stopped, the level of carbon dioxide in our atmosphere would fall by only 18 ppm.
- The effect of human emissions is the same as if natural emissions had increased by the same amount and human emissions had remained zero.

How much CO2 and also the Sun contribute to global warming

Hermann Harde
Helmut-Schmidt-University Hamburg, harde@hsu-hh.de

Although in recent years great progress has been achieved in all fields of climate science, explanations of the observed global warming over the last century, in particular the anthropogenic contributions to this warming are still quite contradictorily discussed. So, calculations of the equilibrium climate sensitivity (*ECS*) as a key parameter and measure for the Earth's temperature increase at doubled CO_2 concentration in the atmosphere diverge by more than a factor of 20 starting at about 0.4°C and ending at more than 8°C. Also the actual assessment report *AR5* [1] of the Intergovernmental Panel on Climate Change (*IPCC*) still specifies this quantity with a relatively wide range of 1.5°C to 4.5°C and classifies the human influence on our climate as extremely likely to be the dominant cause of the observed warming since the mid-20th century.

Since the *ECS* is one of the most important measures for future climate predictions, it is necessary to understand and to discover the large discrepancies between different accounting schemes applied for this quantity. Therefore, in this contribution we retrace the main steps of the IPCC's preferred accounting system and compare this with our own advanced two-layer climate model [2], which is especially appropriate to calculate the influence of increasing CO_2 concentrations on global warming as well as the impact of solar variations on the climate. It describes the atmosphere and the ground as two layers acting simultaneously as absorbers and Planck radiators, and it includes additional heat transfer between these layers due to convection and evaporation. It also considers short wave (*sw*) and long wave (*lw*) scattering processes at the atmosphere and at clouds as well as all common feedback processes like water vapor, lapse rate and albedo feedback, but additionally takes into account temperature dependent sensible and latent heat fluxes as well as a temperature induced and solar induced cloud cover feedback.

Based on extensive line-by-line radiation transfer calculations for the *GH*-gases water vapor, carbon dioxide, methane and ozone we derive the CO_2 radiative forcing as the main parameter in most climate models - also in the *IPCC's* accounting scheme - and additionally we get from these calculations the *sw* and *lw* absorptivities as well as the back-radiated fraction of the atmospheric emission, which are the key parameters in our model. These calculations were performed under clear sky conditions, at regular cloudiness, full overcast, and for three climate zones with different ground temperatures and humidity. With these parameters integrated in our climate model we simulate the Earth's surface temperature and the lower tropospheric temperature as a function of the CO_2 concentration. The temperature increase at doubled CO_2 concentration then directly gives the CO_2 climate sensitivity.

Such simulations reproduce the basic *ECS*-value (without feedback processes), as specified by the *IPCC,* within a few %. Significant differences, however, can be observed with the different feedback effects included. While the lapse rate and albedo influence were adopted from literature, the water vapor feedback is derived from the *sw* and *lw* absorptivity calculations performed for three climate zones with different surface temperatures and humidity. These calculations give a positive feedback of not more than 14 % [3], whereas the *IPCC* emanates from an amplification of 100 %, which after all is 7x larger than our result.

Since our calculations indicate that with increasing CO_2 concentration the air temperature is less rapidly increasing than the surface temperature, the sensible heat flux at the bound of both layers rises with the concentration. As a consequence more thermal energy is transferred from the surface to the atmosphere. Similarly, with increasing surface temperature also evaporation and precipitation are increasing with the ground temperature. Both these effects contribute to negative feedback and are additionally included in the simulations. While the respective contribution due to sensible heat rapidly declines with increasing cloudiness, the

evaporation feedback with an attenuation of *44 %* is the primary stabilizer of the whole climate system. All the more it is surprising, that the *IPCC* obviously did not consider this important effect in *AR5*.

A special situation is found for the influence of clouds on the radiation and energy budget. From global cloud observations within the *International Satellite Cloud Climatology Project* (*ISCCP*) over a period of 27 years it is deduced that the global mean temperature is increasing with decreasing cloud cover. However, it is not clear, if a lower cloud cover is the consequence of the increasing temperature, or if the cloud cover is influenced and at least to some degree controlled by some other mechanism, particularly solar activities. In the first case a strong amplifying temperature induced cloud feedback (*TICF*) had to be considered, this for the climate sensitivity as well as for a respective solar sensitivity (surface temperature response to a solar anomaly of *0.1 %*), whereas in the other case *TICF* would disappear for both sensitivities and only a solar induced cloud feedback (*SICF*) had to be included.

A deliberate approach which mechanism really controls the cloud cover, is derived from model simulations, which additionally include the solar effect and compare this with the measured temperature increase over the last century. These simulations show that the observed global warming can best be explained, when a temperature feedback on clouds only has a minor influence (less than *10 %*). Otherwise the calculated warming would be larger than observed, or *TICF* would have been overestimated. With a solar anomaly of *0.26 %* and dominating *SICF* we deduce a CO_2 climate sensitivity of $C_S = 0.7$ °C and a solar sensitivity of $S_S = 0.17$ °C. The increase in the total solar irradiance (*TSI*) over *100* years then contributes to a warming of *0.44 °C* (*60 %*) and the *100 ppm* increase of CO_2 over this period causes additional *0.30 °C* (*40 %*) in good agreement with the measured warming and cloud cover.

Altogether, we see that the positive feedbacks, originating from clouds, water vapor and albedo are even overcompensated by lapse rate and evaporation feedback. Particularly clouds have two stronger opposing effects on the energy balance, which can neutralize each other or can even have an overall attenuating impact on the *ECS*, dependent on the mechanisms responsible for cloud changes. From these studies we conclude, that all constraints can best be explained by a cloud feedback mechanism, which is dominated by the solar influence, while thermally induced contributions only should have minor influence.

In their scenarios the *IPCC* emanates from the assumption, that the actually observed CO_2 increase is almost exclusively determined by the *4 %* of anthropogenic emissions, while the *96 %* of natural production over a year is considered to be independent of any solar or temperature variations, this in contradiction to paleoclimatic investigations, which show a delay in the CO_2 emission rate to the temperature of about 800 years, and this also in discrepancy to actual observations with a delay of about 9 months. Assuming the more plausible case that the CO_2 increase of *100 ppm* over the last century was caused on the one hand by the *4 %* anthropogenic emissions and on the other hand by a temperature dependent native emission and absorption rate, then the *4 %* just contribute *15 ppm* to the total CO_2 concentration of *380 ppm*. These *15 ppm* represent *15 %* of the *100 ppm* increase over the last century [4]. So, with a CO_2 induced global warming of about *0.3 °C* over the last century not more than *0.05 °C* should be caused by human activities.

[1] Fifth Assessment Report (AR5): T. F. Stocker, D. Qin, G.-K. Plattner et al., Eds., *Climate Change 2013: The Physical Science Basis*, Cambridge University Press, New York, NY, 2014.

[2] H. Harde, *Advanced two-layer climate model for the assessment of global warming by CO_2*, Open Journal of Atmospheric and Climate Change, vol. 1, no. 3, pp. 1–50, 2014.

[3] H. Harde, *Radiation Transfer Calculations and Assessment of Global Warming by CO_2,* International Journal of Atmospheric Sciences, Volume 2017, Article ID 9251034, pp. 1-30 (2017), https://doi.org/10.1155/2017/9251034

[4] H. Harde, *Scrutinizing the carbon cycle and CO_2 residence time in the atmosphere*, Global and Planetary Change 152, pp. 19-26, (2017), http://dx.doi.org/10.1016/j.gloplacha.2017.02.009.

Regional greenhouse effects – based on observational evidence

Hans R. Jelbring
Stockholm, Sweden, hans.jelbring@telia.com

Definitions and some data

Any planet or satellite with a thick atmosphere shows a positive Greenhouse Effect (GE) according to NASA. The average planetary surface temperature and the average longwave radiation flux seen from space have both been measured extensively. This information provides a basis to calculate the planetary (global) GE. Hence, the NASA planetary GE values for Venus, Earth, Mars and Titan are 510, 34, 0 and 10 degrees Kelvin (NASA 2016). It can and should be questioned why the GE differs so much on different planets. A way to answer that question is to calculate several regional GEs (RGE) on earth and study their variations. This is possible since the outgoing longwave radiation (OLR) has been measured carefully during many years by several spacecrafts. It is possible to calculate an average emission temperature for any specific region on earth. Gridded monthly data of both OLR and surface temperature for selected regions averaged over many years is provided by www.cdc.noaa.gov (2009) data, which have been used in this study. It turns out that the RGE values on earth vary between about minus 10 to plus 52 Kelvin depending on several physical factors. The RGEs are calculated during the warmest summer month and the coolest winter month during the years that the NOAA model covers.

Introduction

It is a physical fact that the surface of either Venus, Earth and Titan is warmer than the atmosphere at an average elevation where the absorbed solar radiation is leaving the planet as longwave radiation (OLR). This temperature difference constitutes the true definition of the Greenhouse Effect. Such a definition is solely based on observations and do not indicate the cause of why a GE on Venus is 510K, why it is 34K on earth and 10K on Titan. Hence, the name Greenhouse Effect is a misnomer since it implies that "greenhouse gases" solely are responsible for the observed planetary GE. The only reason to keep the name is that it is so well established. The result presented here strongly supports these statements.

To calculate RGEs over all regions of earth would thus be a great improvement relative the calculation of a global GE according to the NASA method. This is not done in this work but the seasonal and regional monthly OLR values and temperatures at 15 specific regions have been collected. The seasonal RGEs have been calculated using the same NASA methods that are used to calculate the global GE. These regions should be representative and show how different physical conditions are producing RGE values that substantially differ from the crude 34K global value. The achieved RGE values certainly indicate that several physical factors are causing the presented variability of RGE values on earth and it follows that these factors also must influence the global GE and RGE, both on earth and other planets.

Some result and comments: The result is shown in table 1.

- There are good reasons to exclude the Vostok data as an outlier.
- If Vostok is excluded the average summer/winter RGE is 33.5 and 26.5 K.
- The highest value is the summer RGE in Amazonas +52.1 K.
- The lowest RGE value is found during winter at the South Pole.
- The summer and winter RGE values differs least over oceans and along the equator.
- The highest seasonal differences in RGE are found in Australia (inland), Tibet, US plain and the North Pole. These are 13.4, 12.7, 12.4 and 12.4K respectively.
- The summer RGE is higher than the winter one for all regions.
- High altitude in combination with inland seem to favour large seasonal variation in RGE.
- The RGE values were above 34K over the oceans and in equatorial regions.
- The high spread of RGE values from 52.1K to -10K is quite remarkable.

The presented regions in Table 1 are ranked by the highest RGE value during summer. To get an impression of seasonal impact a ratio called OLR ratio has also been calculated. It is simply the maximum monthly summer OLR divided by the minimum monthly winter OLR.

Table 1. Regional Greenhouse Effect, averaged monthly values over several years (in Kelvin)

Region	*summer/winter (K)*				*OLR (W/m²)*	*OLR ratio*	*area*
Amazonas	52.1	46.8	202	223	0.90	0-7S	290-360E
Hawaii	41.2	36.8	230	223	1.03	27-45N	180-200E
Equatorial Pacific	40.6	39.4	256	253	1.01	5S-5N	180-240E
North Pacific	37.7	36.5	230	222	1.04	27-45N	220-240E
Australia	37.5	24.3	285	271	1.05	20-30S	120-140E
North Atlantic	36.5	31.9	270	236	1.14	27-45N	320-340E
US plain	34.6	21.9	270	215	1.26	35-45N	255-265E
Siberia	34.1	16.9	233	158	1.48	60-70N	80-120E
Sahara	30.5	27.3	320	260	1.23	20-30N	0-30E
Tibet	29.4	17.0	247	205	1.20	27-45N	80-100E
Barents Sea	26.3	25.2	227	179	1.27	70-80N	30-50E
Antarctic Sea	25.2	22.8	212	171	1.24	64-66N	0-360E
North Pole	24.2	12.6	221	160	1.38	80-90N	0-360E
Greenland	19.7	11.2	221	157	1.41	70-80N	310-330E
Vostok (South Pole)	-1.0	-10	208	129	1.61	75-85S	0-360E

The treatment of different physical processes will mainly be left to the oral presentation at the Porto conference, but some conclusions are mentioned here.

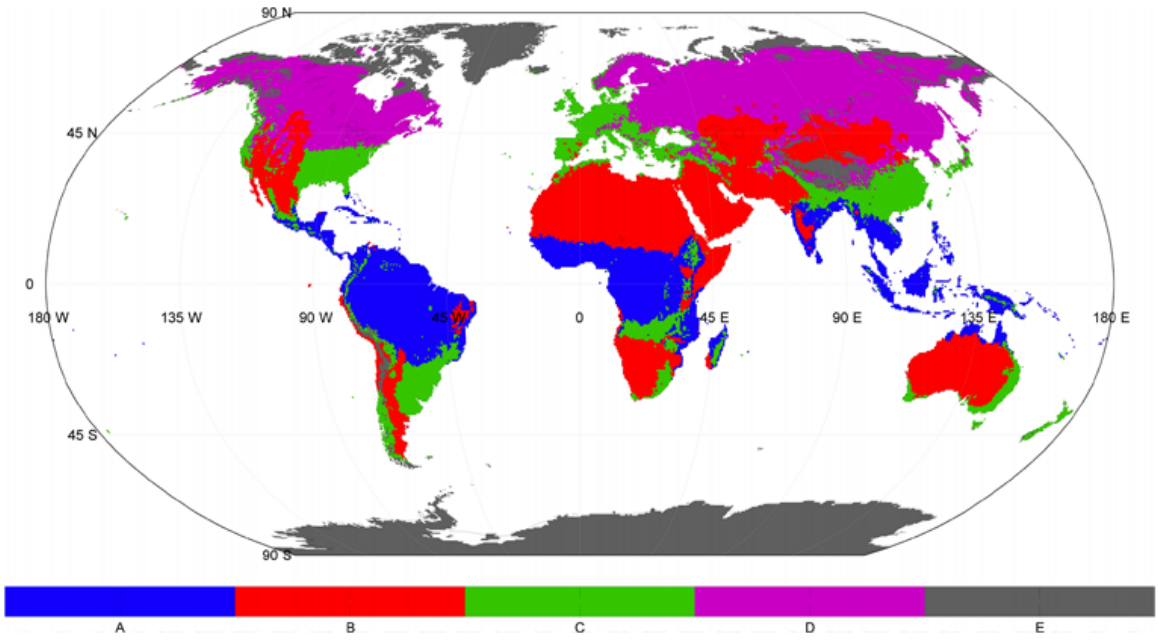


Figure 1. The Köppen (1884) climate classification still works quite well.
It deals with nature, not fantasies.

Conclusions:

- Without doubt water vapor and high temperature affect the RGE values. It is hard to find a more humid area on earth than Amazonas, which has the highest RGE value. A high moisture content over oceans are also increasing and stabilizing RGE values over the seasons as can be seen in Table 1.

- Another important mechanism is the global atmospheric circulation making air to rise at the equatorial area (Intertropical Convergence Zone, ITCZ) and to release condensation energy in high altitude clouds.
- The RGE values are higher than 20K in most regions except in the polar ones. This should be the case since in a hypothetical insulated static atmosphere gravity will induce an adiabatic temperature lapse rate in the troposphere according to first principle physics (Jelbring 2003).
- The only region outside polar areas that has an RGE value below 20K is Tibet during winter. There the atmosphere is thin and cold carrying little water vapor, both factors that are diminishing the RGE values.
- RGE values do vary because of several physical reasons also meaning that the temperature lapse rate on earth deviates from the theoretical (in a static atmosphere) value of -9.8 K/km. The observed value according to the 1976 U.S. Standard Atmosphere is -6.5K/km.
- On Venus, on the other hand the temperature lapse rate is following the theoretical adiabatic one almost exactly from the surface to an altitude around 40 km.
- The result from this work and Jelbring (2003) strongly supports the opinion that the dominating physical process causing GE on planets is the energetic equilibrium state that an atmosphere would tend to reach if it would be totally insulated from its surroundings. This situation is close to persist in Venus´ troposphere.
- Very little solar irradiation is reaching the surface of Venus. If earth´s atmosphere were 90 times as massive it would also have a Global GE around 400-500 K.
- It is very hard to understand how and way any hypothetical CO2 impact could work in the light of the presented large variations in natural RGE when the carbon dioxide concentration is approximately globally constant.

Acknowledgment: The author thanks the few scientists that have reacted in a proper way to my 2003 paper instead of ignoring it for 15 years. No scientist has yet proven its conclusions to be wrong and the author is looking forward to discussing that paper in a serious way also with established climatologists.

References:

1. Gridded climate data bank, www.cdc.noaa, 2009.
2. Jelbring H. R., The Greenhouse Effect as a Function of Atmospheric Mass, *Energy & Environment*, 14, 2-3, 2003.
3. NASA planetary fact sheets, 2016 http://nssdc.gsfc.nasa.gov/planetary/factsheet/(planet)fact.html
4. US Standard Atmosphere, 2016, http://ntrs.nasa.gov/archive
5. Fig 1 (Köppen, 1884): trs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19770009539.pdf, 1976

Increasing cold weather extremes since the new millennium: An assessment with a focus on worldwide economic impacts

E. Ray Garnett and Madhav L. Khandekar
mkhandekar@rogers.com

Since the new Millennium, numerous cold weather extremes (CWE) accompanied by heavy snow falls have been witnessed which have inflicted substantial economic losses worldwide.

Europe witnessed five significantly colder winters in 2002/03, 2005/06, 2009/10, 2011/12 and recently in 2017/18. In January 2007 Bangladesh experienced the coldest wave in 40 years while a year later in 2007/08 China battled the coldest December-February in 100 years. Among some of the notable cold weather extremes in Canada in the last five years have been: several heavy winter snowfalls in eastern Canada during 2015-2017, one of the heaviest snowfalls in recorded history in Vancouver and vicinity during December 2016 and the Calgary (Alberta) floods linked to sudden melting of heavy snow accumulation during the winter of 2013. These and many other such extreme cold events have inflicted heavy economic losses locally as well as on the regional scale in eastern and western Canada.

This paper examines CWE in Canada and elsewhere and assesses their increasing economic impacts, which are becoming comparable to the Hot extremes claimed by the IPCC. The winter of 2013/14 was one of the longest, snowiest in Canada in which the severity was linked by the OECD (Organizations for Economic Co-operation Development) to the smallest GDP growth rate among the G-7 countries, an estimated economic loss of $20 billion. CWE are an overlooked issue in the present climate change debate, which has been focused primarily on Warm Weather Extremes (WWE) like heat waves, floods, droughts and their possible linkage to the warming of the earth's climate. The paper analyzes impact of large-scale atmosphere-ocean circulation patterns and the possible impact of the approaching solar grand minimum on increasing CWE of recent years. Finally, implications of our analysis for projecting future economic losses over Canada and elsewhere are considered.

Livestock's Role in Climate Change: Do we need a shift of paradigm?

Albrecht Glatzle
INTTAS (Initiative for Research and Extension of Sustainable Agrarian Technologies)
Filadelfia, Paraguay, albrecht.glatzle@gmail.com

It is very old wisdom that climate dictates farm management strategies. In recent years, however, we are increasingly confronted with claims that agriculture, livestock husbandry and even food consumption habits are forcing the climate to change. We subjected this worrisome concern expressed by public institutions, the media, policy makers, and even scientists to a rigorous review, cross checking critically coherence and (in)compatibilities within and between published scientific papers. Our key conclusion is: There is no need for anthropogenic emissions of Greenhouse Gases (GHGs), and even less so for livestock-born emissions, to explain Climate Change. Climate has always been changing and even the present warming is most likely driven by natural factors. The warming potential of anthropogenic GHG emissions has been exaggerated and the beneficial impacts of manmade CO_2 emissions for nature, agriculture and global food security have been systematically suppressed, ignored or at least downplayed by the IPCC (Intergovernmental Panel on Climate Change) and other UN (United Nations) agencies. Furthermore, we expose important methodological deficiencies in IPCC and FAO (Food Agriculture Organization) instructions and applications for the quantification of the manmade part of non-CO_2-GHG emissions from Agro-Ecosystems. However, so far, these fatal errors inexorably propagated through scientific literature. Finally, we could not find a clear domestic livestock fingerprint, neither in the geographical Methane distribution nor in the historical evolution of mean atmospheric Methane concentration.
In conclusion, everybody is free to choose a vegetarian or vegan lifestyle but there is no scientific basis, whatsoever, for claiming this decision could contribute to save the planet's climate.

References (a few selected papers)

Glatzle A (2014): Severe Methodological Deficiencies Associated with Claims of Domestic Livestock Driving Climate Change. Journal of Environmental Science and Engineering B 2, 586-601. https://www.researchgate.net/publication/279180649_Severe_Methodological_Deficiencies_Associated_with_Claims_of_Domestic_Livestock_Driving_Climate_Change

Glatzle A (2014): Questioning key conclusions of FAO publications 'Livestock's Long Shadow' (2006) appearing again in 'Tackling Climate Change Through Livestock' (2013). Pastoralism: Research, Policy and Practice, **4**,1 https://doi.org/10.1186/2041-7136-4-1

Glatzle AF (2014): Planet at risk from grazing animals? Tropical Grasslands – Forrajes Tropicales 2, 60−62. https://doi.org/10.17138/tgft(2)60-62

Being wrong can have serious consequences
with a note on The Nile Climate Engine

Philip Foster
Rewd, Hemingford Abbots, Cambridgeshire, England
Organizer of *the Paris Climate Challenge Conference*, 2015
philip.foster17@ntlworld.com

How man-made climate change is used by the EU to oppress poorer countries.

Yet this backfires because it is the EU‘s people that are becoming poorer.

The latest Common Agricultural Policy is to spend 130 billion euro compelling farmers to cut CO2, methane and Nox gases.

"*Maybe they think God does not see!"*
Psalm 94, Ezekiel 8:12.

Philip Foster was the organizer of the Paris Climate Challenge Conference

in association with the
Independent Committee on Geoethics www.geoethic.com
and with the Collectif des Climato Réalistes www.skyfall.fr

The following *Summary Statement* was agreed upon per December 10, 2015:

Over thirty years of intense (and extremely expensive) research has totally failed to produce any evidence that human emissions of CO2 are driving climate. CO2 is not a danger to but a benefit for all life on our planet.

We call on governments, NGOs and universities to stop pursuing policy and dogma based ‘evidence’ gathering.

Further information available on the website: www.pcc15.org

Day-2 September 8

09.30 **Session 3: Forcing functions in Climate Change**
Chair: *Thomas Wysmuller*

09.30 Piers Corbyn: *Mechanisms of climate change*
09.50 Henri Masson: *Complexity, causality and dynamics inside the climate system*
10.10 Pavel Kalenda et al.: *Calculation of solar energy, accumulated in the continental rocks*
10.30 Don Easterbrook (ppt submission): *The cause of Little Ice Ages and climate change*
10.50 Roger Tattersall & Stuart Graham: *Climate change: solar-interplanetary forces – not human activity*
11.10 Coffee – with posters
11.40 Jan-Erik Solheim: *The length of solar cycle as predictor for local climate*
11.00 Harald Yndestad: *The climate clock*
11.20 Nils-Axel Mörner: *Planetary beat and sea level changes*
11.40 Nicola Scafetta: *Toward a better understanding of natural climate variability*

13.00 Lunch: break for 1.5 hour

14.30 **Session 4: Further observational facts, interpretations and geoethics**
Chair: *Karl Zeller*

14.30 Thomas Wysmuller: *The fall of IGCP's sea-level rise*
14.50 António Silva: *Relevance of present sea-level changes to coastal risk*
15.10 Maria da Assunção Araújo: *Greenland: some simple observations on ice retreat and climate evolution*
15.30 Cliff Ollier (ppt submission): *Ocean acidification is a myth*
15.50 Peter Ridd (ppt submission): *The Great Barrier Reef, climate change and science*
16.00 David Block: *Salt and albedo*
16.20 Conor McMenemie: *Nile dam weather effects*
16.40 Coffee – with posters
17.10 Howard Dewhirst and Robert Heath: *Letter to the Geological Society of London*
17.30 Aziz Adam (ppt submission): *The politics of global change*
17.40 Benoit Rittaud: *Some historical cases of erroneous scientific consensus*

18.00 Jim O'Brien: Announcement
General discussion-2
Moderators: *Nils-Axel Mörner & Pamela Matlack-Klein*

19.00 Closing: *Christopher Essex & Maria da Assunção Araújo*

Postlude: Christopher Monckton of Brenchley

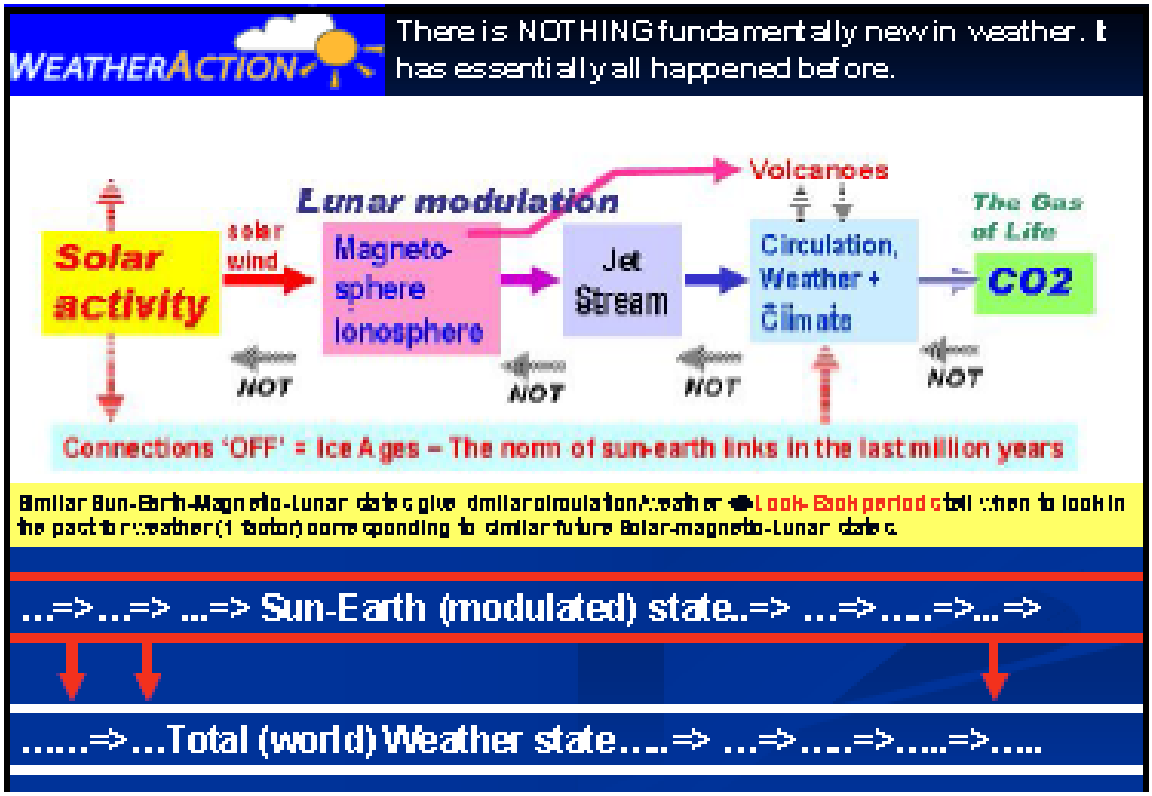
19.30 ***Cheese & Port Mingle***

Mechanisms of weather extremes and climate changes Including long range forecasting

Piers Corbyn
WeatherAction – (**http://bit.ly/2aTfsvR**).
London, England, piers@weatheraction.com

Types of possible (contending) mechanisms of climate change are noted:- **Externally driven** (solar, lunar, etc) and causes (internal solar dynamo, planets etc); **Internal** (CO2, deforestation, dams etc). (Contending) **Agencies** required for sun-earth links including new ideas are considered – e.g.; SolarWind-Earth atmosphere and Sea electro-magnetic connections, Galactic Cosmic Rays, Birkeland currents (under Electric-Universe paradigms.)
The primacy of **Jet Stream** changes in Climate and weather changes and extremes is explained and what moves it is discussed and some examples of the power of WeatherAction's Solar-Lunar Action Technique (SLAT) given.
Potential leaps forward in weather and climate forecasting through **partnerships** in Numerical forecasting and Solar-Lunar Techniques parameters are outlined.

The Editors' note



This excellent image by Piers Corbyn is fundamental both for Day-1 and Day-2 and is therefor reproduced (from London Conference Volume, 2016, p. 55)

Complexity, causality and dynamics inside the climate system

Henri Masson
University of Antwerp, Belgium

This paper is aimed to illustrate alternative methodological approaches for analyzing the Climate System and more particularly, the heat and mass transfer across the ocean-atmosphere interface. The methods proposed contrast with the one imposed by IPCC (anthropogenic greenhouse gases are the only cause of the so-called global warming-change-fluctuations, local equilibrium is always reached and the Navier-Stokes equations are used for describing H&M transfers between cells). The methods presented in this paper belong to scientific disciplines generally and largely overlooked by Climatologists. The author express the hope that this paper will open new research tracks for the Climatology Science and contribute to bringing some realism to the decision making process related to energy transition policies, largely based, at the present time, on unsettled if not fake science, invoked by unethical lobbyists in order to impose their views, and at the end increase the income of the industries they represent, by "screwing" the population on which the authorities impose more taxes, higher energy fees and associated VAT. At the end, this results in a win-win game for lobbyists and governments, the tax-payer and energy user citizen being the looser of the game.

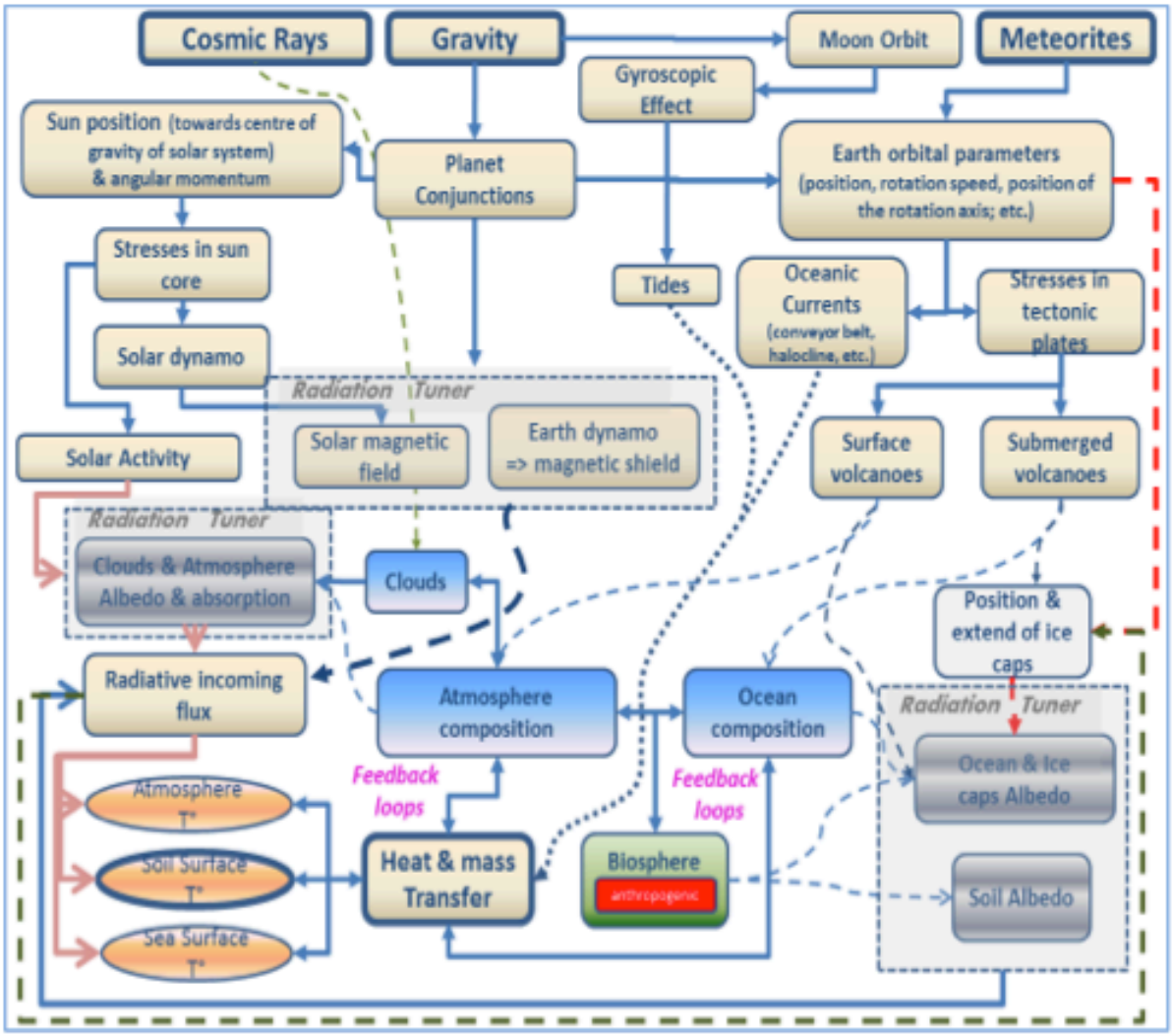


Fig. 1. Meta-models for climate systems.

The meta-model

In this paper, a meta-model (Fig 1) integrating the different hypotheses and sub-models is used to describe the climate system. This meta-model is nothing else than a causal map, without considering the strength and intensity of the hypothetical causal links existing between the "concepts" used in this model, as the system is highly non-linear and could even become dynamically chaotic, in the mathematical meaning of the word (J.C. Sprott, 2009), meaning that a "butterfly effect" is always possible: "*the flap of a butterfly wing in Amazonia may induce a tornado in the US*" (Lorenz, 1963,1980). The links proposed in this meta-model are hypothetical and "falsifiable" (Popper, 2002), but certainly not less credible than the exclusive prevalence of the atmospheric greenhouse hypothesis, on which IPCC reports are based. The structure of the meta-model is obviously open to discussion and modifications (removal of links, addition of new links and concepts, etc.) are expected, if new evidence emerges or new working hypotheses are advanced.

Forcings

IPCC considers other possible drivers of the climate, beside the atmospheric CO2 concentration, as "forcings", actually nothing more than a tuning knob for amplifying the greenhouse effect to the desired level for describing as well as possible the experimental data, without too much success so far. Actually, this consists mathematically in creating a set of feedback loops, that are at the same time, linear, instantaneous and independent of each other (Fig 2.) . Obviously, this is a totally unrealistic oversimplification, that can only be justified as due to hyper-computer capacity constraints in memory and processing time.

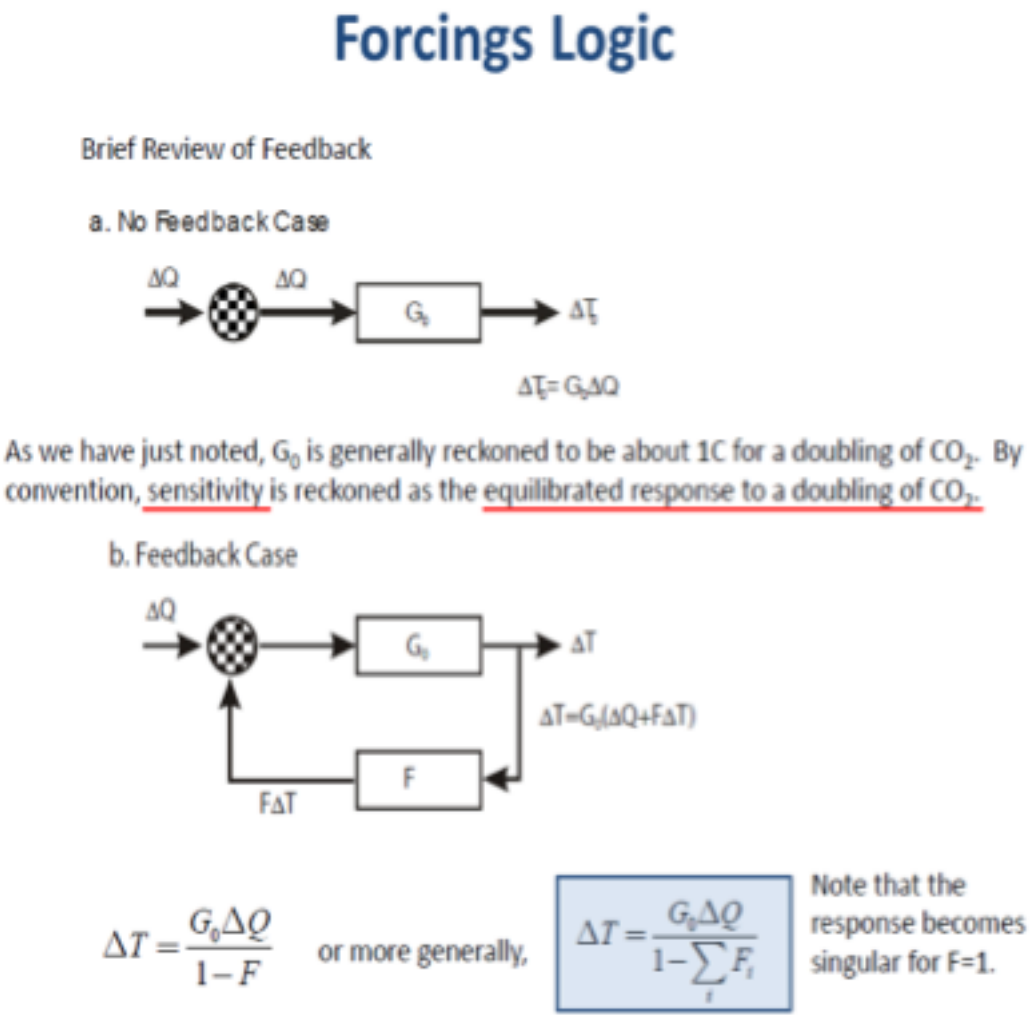


Fig. 2. Forcing logic.

Structural analysis of the meta-model

A basic analysis of the structure (Godet, 2006; Newman et al., 2006; Newman, 2011,) of this meta model reveals that T°, CO2, Ocean -atmosphere Heat & Mass transfer are neither drivers nor effects but "relay" concepts in this model. Relay variables require special attention, as their many incoming and outgoing causal arrows, at times connected to (in)direct positive and negative feedback loops, make their effect highly unpredictable. Trying to control the climate by acting on one of these relay variables, for example trying to control the temperature in the atmosphere by reducing the emissions of anthropogenic CO2, is nothing else than playing the role of an "apprentice wizard" and could lead to either no result at all, except a waste of public money, and /or, on the other end, could result in catastrophic side-effects.

External Drivers of the meta-model

The structural analysis (and the conceptual scope) of the meta model identifies as its true (external) drivers:

- Cosmic rays
- Position of Planets in the solar system
- Fall of meteorites

Obviously, none of these drivers is tuneable by human action, tax or policy.

Causal links

Classically, for finding a linear correlation, time series are compared, data point by data point, taken at the same time; no time delay that could exist between the two time series is taken in consideration.

A slightly more sophisticated method consists in analysing the cross-correlation function and its Fourier transform (the cross power spectrum) (Bendat and Piersol, 1971), the indicator preceding another one being then considered as the cause. One well known example of proceeding this way is given by the analysis of the Vostok ice rods, largely used as argument by climato-realists, because the temperature fluctuations precede the atmospheric CO2 concentration ones by circa 800 years, which is supposed to disprove the global warming theory [1].

The cross-correlation analysis suffers however from a basic weakness: in case of two cyclic (and approximatively periodic) data series, linked but (more or less) phase locked, it is impossible to find the cause and the effect one, the cross-correlation function exhibiting two maxima, separated by the (quasi-)period of the data series, one corresponding to a positive time shift, the other to a negative time shift. According to the order of selection of the two data series, one or the other maximums will come out as the apparent time shift. One faces a kind of chicken and egg problem, and nobody is actually able to tell the direction of the causal arrow.

Also, correlation does not mean causation. The fluctuations of the two indicators could, for example, result, with two different time delays, from a common third causal concept; in our case, considering the temperature and the atmospheric CO2 concentration, this common cause could be the solar activity or even a driver of the solar activity, like the gravity or magnetic fields of the solar system planets, as hypothesized in the meta-model proposed.

However, by analyzing the structure of complex systems, true causal links can, under certain conditions, be identified (Pearl, 2006). Due to the intrinsic structure of the meta-model, it is mathematically impossible to identify formally causal links in it, except for the 3 drivers identified earlier in this paper.

Synchronization & Teleconnections

It is possible that inside a complex system, some concepts influence each other mutually leading to synchronisation and phase locking of the corresponding time series. Firefly flashing synchronisation has been described by such a mechanism (Mirollo & Strogatz, 2006; Ramirez et all., 2018). In such a model, each "concept" is associated to a loading curve, along

which its state increases stepwise each time it receives an impulse signal from another "concept". When it reaches a given threshold, it emits an impulse signal itself, on which the other "concepts" react by increasing stepwise their state, while in the same time, it falls down itself to a minimum state of excitation, before being excited again by other "concepts".
Such a mechanism is illustrated, as a playground, on an Excel spreadsheet available on Dropbox [2].
for 27 sinusoids with adjustable periods, amplitudes and excitation loading curves, and also, independently on Netlogo, a single agent freeware ([3].

Such a synchronization mechanism could explain the phase locking observed among some climate related "teleconnections" [4].

Dynamics of the meta-model

Considerable effort has been made to link the structure and dynamics of complex models to the time series of indicators associated to the "concepts" appearing in complex system models. Neural networks combined with different data mining tools are generally used for that purpose. (Fulcher et al., 2013; Shalizi et all, 2003)
An important issue concerns the identification of an eventual chaotic dynamical signature in the time series. Different approaches have been proposed (Sprott, 2009), the projection of the data points in a Phase Plan being one of the simplest and most used. The Phase Plan analysis corresponding to the temperatures deduced from the Vostok ice core shows clearly a chaotic dynamical signature with two attractors (Figs 3 and 4); El Nino-La Nina data show also a chaotic dynamical signature (Wallis, 1986).

Immediately linked to the existence of a chaotic dynamical signature is the problem of defining the predictability horizon of the data. Analyzing the visibility graph associated to time series is a useful tool for that purpose (Lacasa et all, 2008).
It is known, since the Lorenz equations (Lorenz, 1980) that time delayed equations can switch their regime from exhibiting asymptotic values, periodic damped or not periodic behaviour, multiperiodic behaviour (after "bifurcations") and chaotic behaviour, according to the value given to parameters.

The chaotic dynamical system approach is radically different from considering a deterministic signal combined with some random noise, as done in most of the papers published on Climatology and more particularly in the papers cited in the IPCC reports: the amplitudes of the time series are not distributed "normally" (gaussian bell distribution) around an average value, a linear trend line or a seasonal periodic curve, that authors try to eliminate by "seasonally detrending" the data. For chaotic data, the distribution is multimodal around one or another attractor, as shown on Fig 5, showing the bimodal distribution related to the Vostok data discussed earlier in this paper.

Consequently, the classical approach used in most of the papers cited in the IPCC reports is not mathematically-statistically correct and the confidence intervals advances are meaningless.

[1](https://www.newscientist.com/article/dn11659-climate-myths-ice-cores-show-co2-increases-lag-behind-temperature-rises-disproving-the-link-to-global-warming/).
[2](https://www.dropbox.com/s/c56f6dztg645ow9/Synchronisation%20of%20Oscillators_rel%2001.04.xlsm?dl=0)
[3](http://ccl.northwestern.edu/netlogo/models/Fireflies)
[4](https://www.ncdc.noaa.gov/teleconnections/)

NB: IPCC consider local equilibrium in each cell and the Navier-Stokes equations for linking the cells; I suggest that you never reach local equilibrium and that you must consider the local heat and mass interface transfer between Ocean/Earth and the atmosphere (away from equilibrium), and use a residence time distribution approach to model the dynamics of the system, by using a Markov Chain algorithm (state vector and transition matrix).

Calculation of solar energy accumulated in the continental rocks

Pavel Kalenda
CoalExp, Pražmo 129, Czech Republic, pkalenda@volny.cz

We developed a recursive procedure, which allows estimation of the part of solar energy accumulated in the Earth´s crust and estimation of the halftime of the heat radiation/accumulation parameter. This kind of parameter can show time during which one half of the accumulated energy is released back to space. The theoretical relationships were verified by the long-term pedology measurements.

When we used the Wolf´s numbers as a proxy-solar irradiance parameter for the last 11000 years, we were able to estimate the halftime of the heat parameter of the continental crust. The most probable value of this parameter t1/2 is 270 years, which means that the amount of energy in the whole crust is now at its maximum, because of the anomalously high solar activity starting after the Little Ice Age.

We estimated future accumulated solar energy in the crust based on three scenarios of solar activity. All of the three results show a small increase in accumulated energy until 2060 and after that a smaller or higher drop in accumulated energy, and therefore a decrease in the global surface temperature.

Kalenda, P., Wandrol, I., Frydrusek, K. & Kremlik, V. (2018). Calculation of solar energy, accumulated in continental rocks. *Manuscript*.

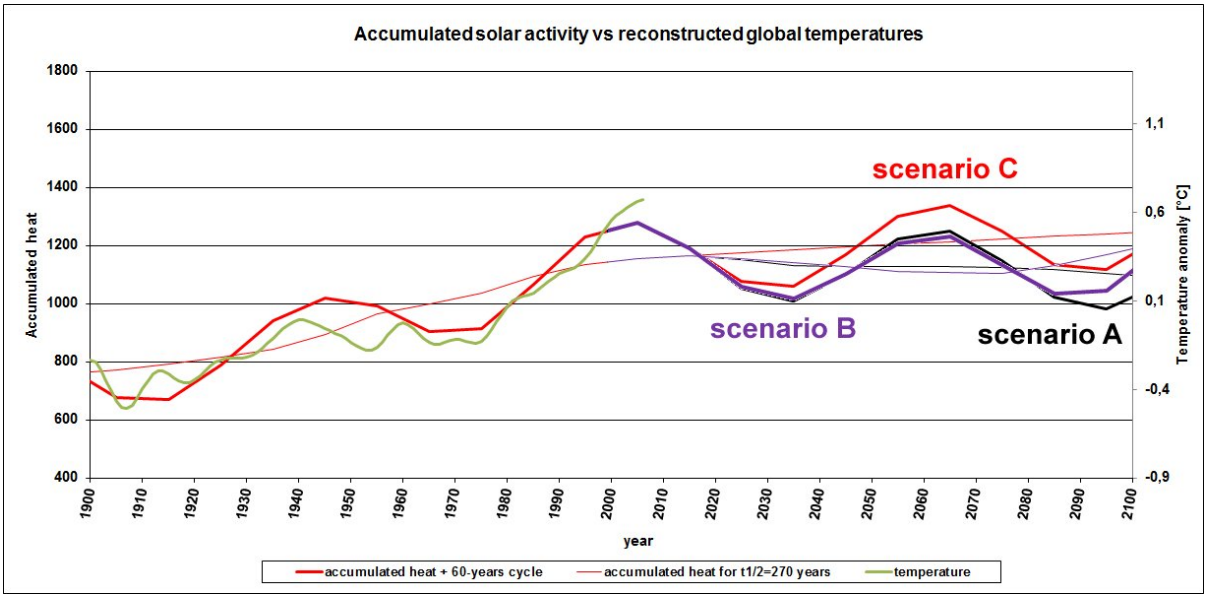


Fig. 1 The development of global temperatures according to scenarios of solar activity A, B and C until 2100 (relative units). Green – real global temperatures according to Mann et al. (2008).

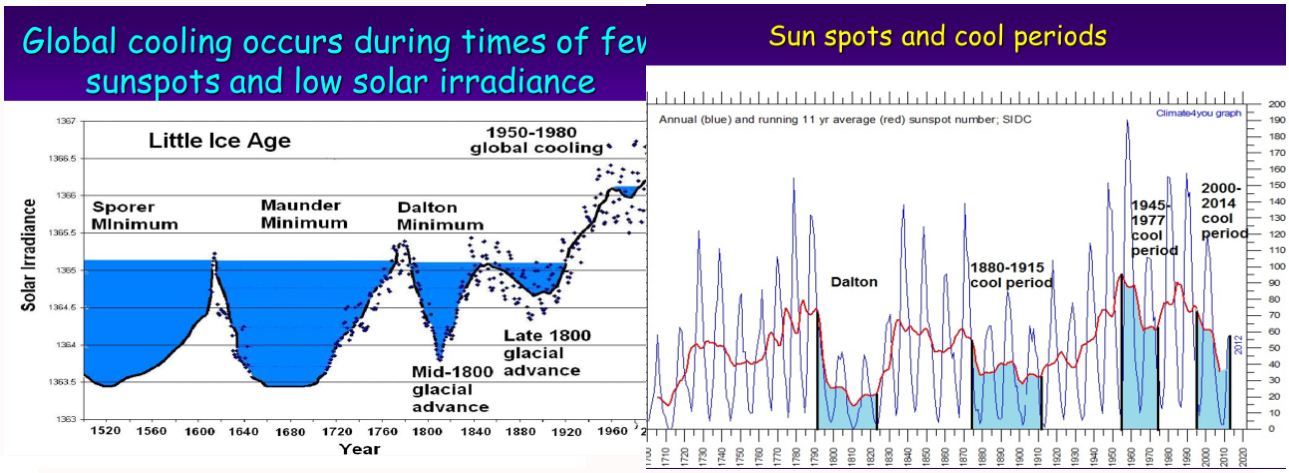
On the basis of the three scenarios of future developments of solar activity over the next 80 years, we have been able to predict the development of future global temperatures or global sea level. It has been shown that the rate of global temperatures increase will slow down (conservative scenario C), or will completely stop (more likely scenarios A and B). The increases in global temperatures until 2100 will not in any case exceed 1.5 ° C, even if people emit CO_2 into the atmosphere in the same way as recently.

The analysis of the development of the heat stored in the continental crust shows that the currently existing climate changes are caused by natural origin, not mankind (Mörner 2015).

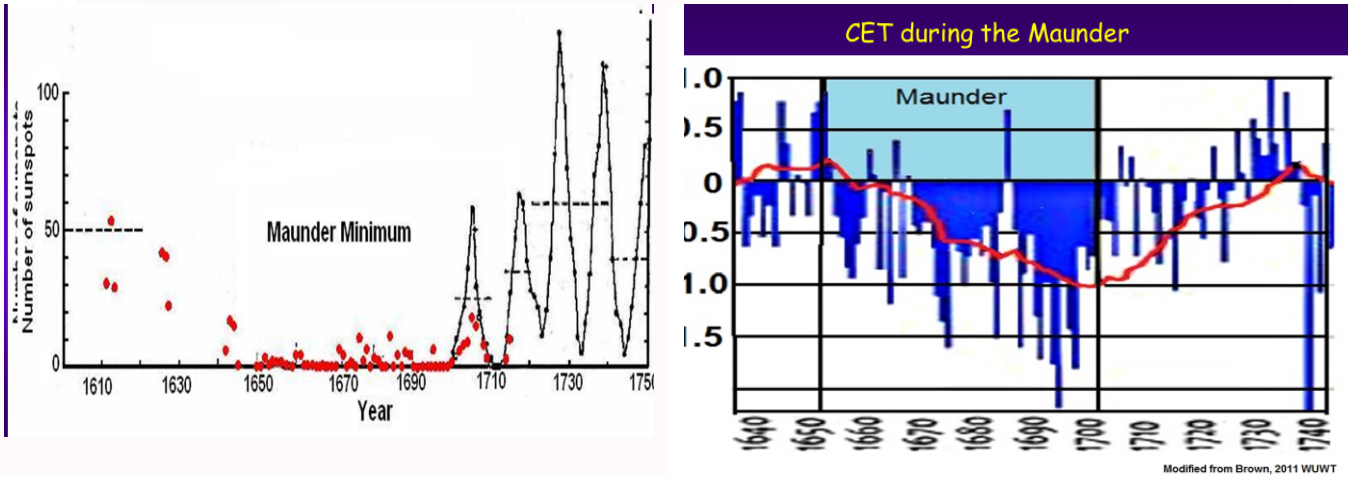
Cause of Little Ice Ages and climate change

Don J. Easterbrook
Dept of Geology, Western Washington University, Bellingham WA, USA
dbunny14@yahoo.com

Ice Ages and other significant climate changes show excellent correlations of global temperature with sunspot activity, total solar irradiance, production of radiocarbon and beryllium isotopes in the upper atmosphere, and cosmic rays entering the atmosphere. Periods of global cooling coincided with changes in these factors during the Oort, Wolf, Maunder, Dalton, 1880–1915, and 1945–1977 Solar Minimums. How are all of these factors interrelated?



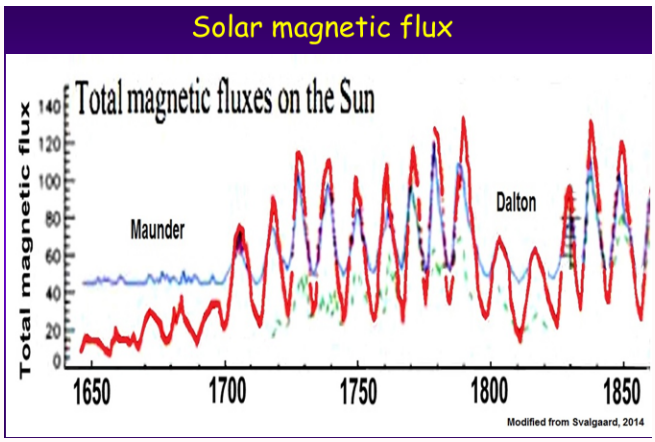
During the devastating cold of the Little Ice Age from 1650 to 1700, sun spot activity on the sun virtually ceased and total solar irradiance dropped. That this was not just a coincidence, is shown by the same thing happening during each of five other cold periods.

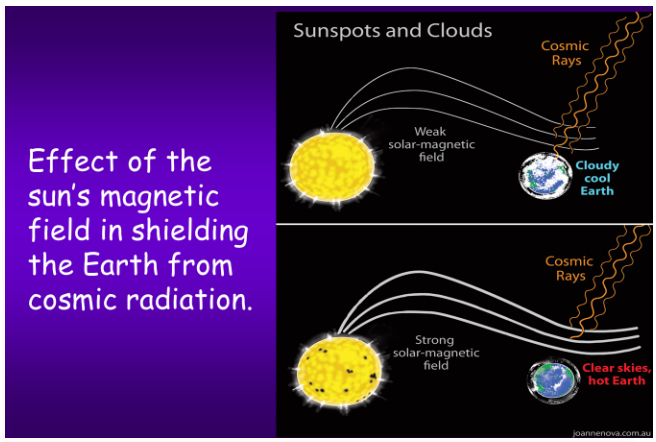


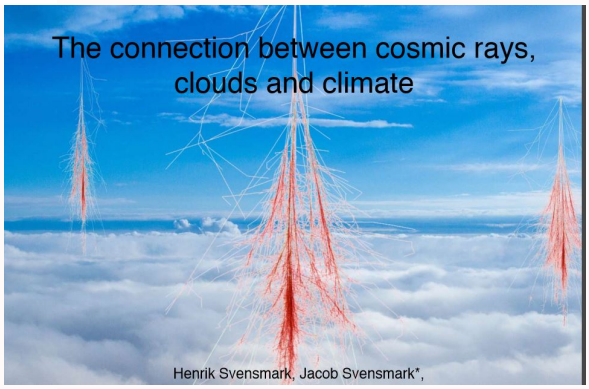
Sunspots were virtually absent during the Maunder Minimum from 1650 to 1700 and temperatures plunged.

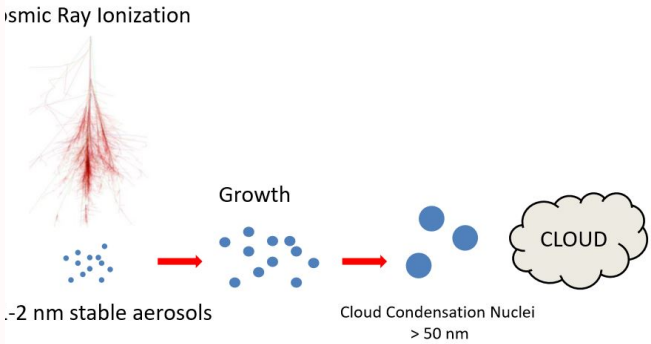
During the Maunder and Dalton Solar Minimums when sunspots vanished, the solar magnetic flux was also very low.

When the solar magnetic field is weak, more cosmic radiation reaches the Earth.

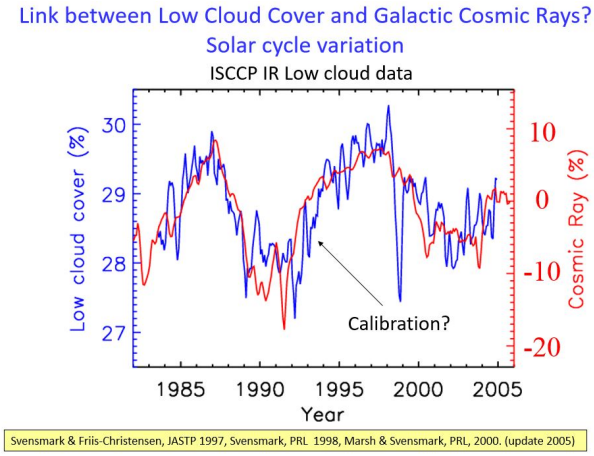


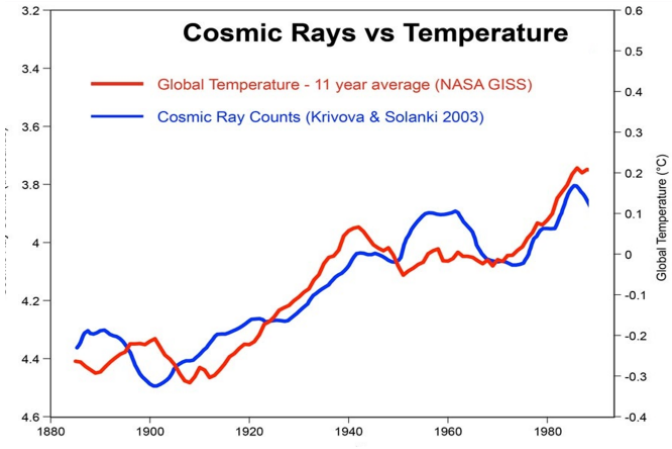




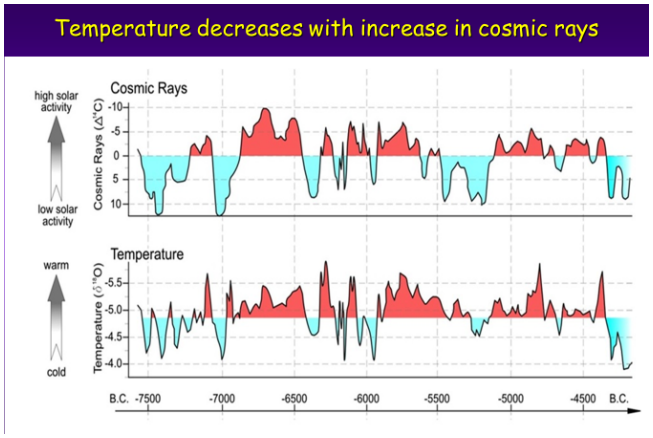


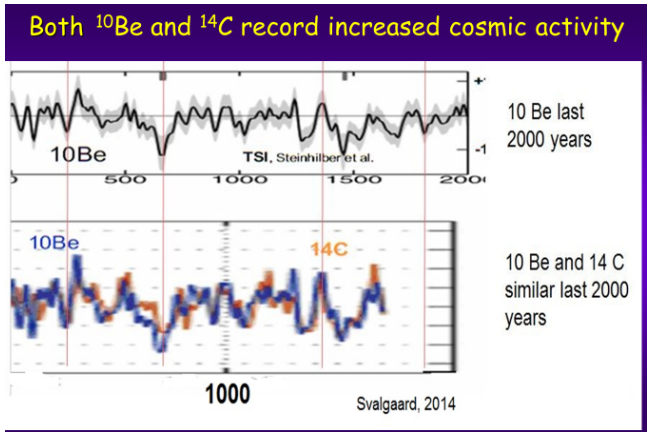
Physicists have long known that cosmic rays passing thru the atmosphere produce ions (charged particles) that serve as nuclei for condensation of water vapor. In 1997, Svensmark and Friis-Christensen published the results of experiments at the Cern nuclear laboratory showing that cosmic rays do indeed generate condensation and suggested that increased cloudiness, produced by ionization in the atmosphere by cosmic rays, causes increased reflection of incoming solar energy and results in enough cooling of the atmosphere to cause climate changes.



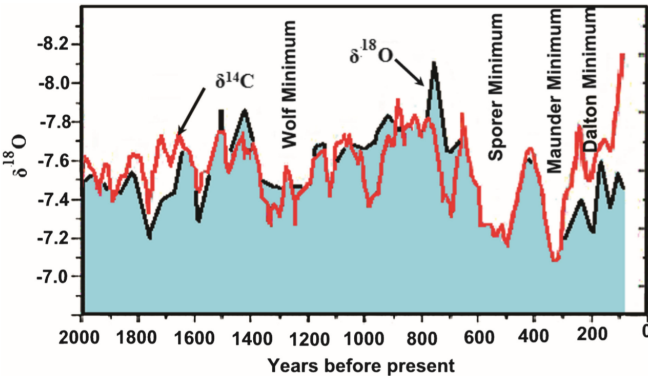


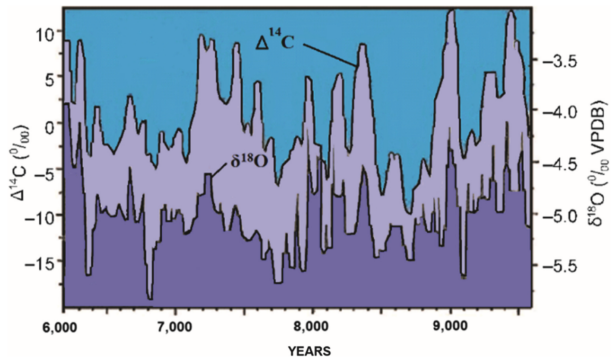
When cosmic radiation is high, low cloud cover increases and temperature declines.



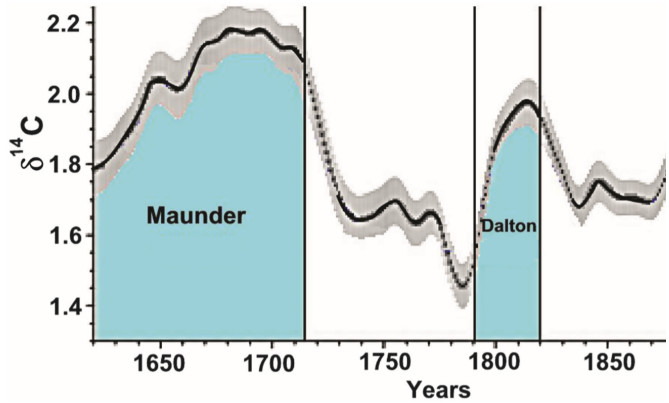


When cosmic radiation is high, low cloud cover increases and temperature declines.

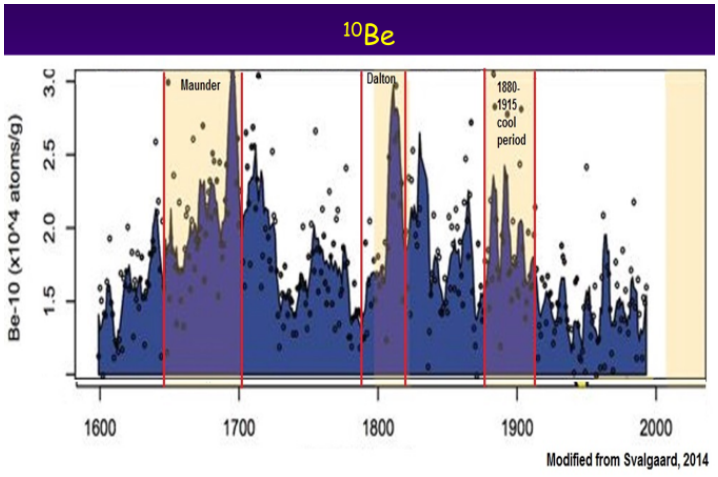




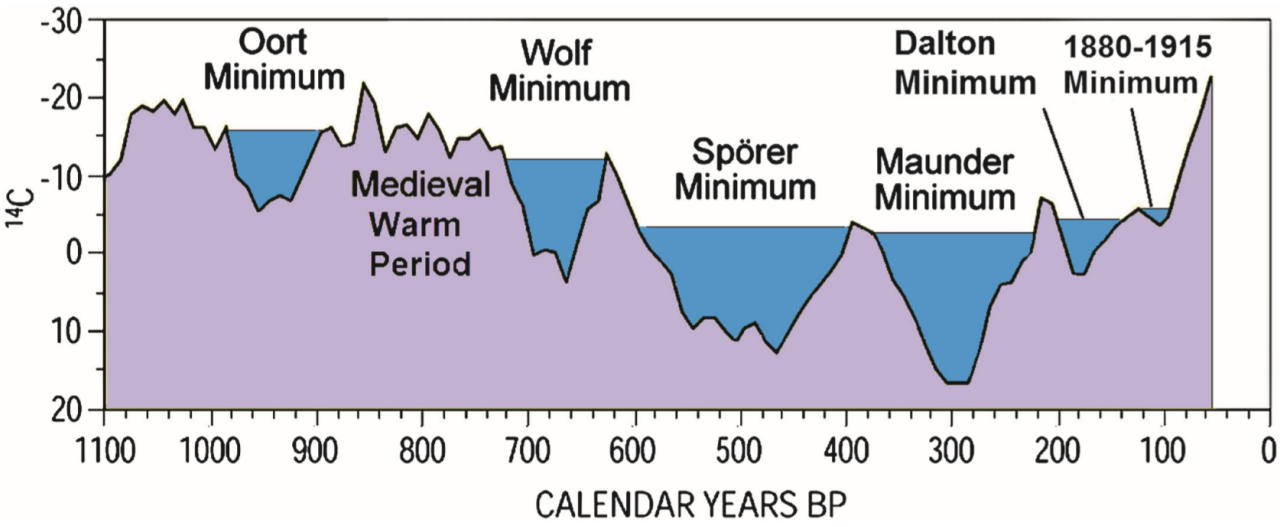
Temperature ($\delta^{18}O$) varies with cosmic radiation ($\delta^{14}C$).



Left: **Cosmic radiation ($\delta^{14}C$) was high during the Maunder and Dalton.**



Right: **Cosmic radiation ($\delta^{10}Be$) was high during the Maunder, Dalton, and 1890-1915 cool periods.**



Cosmic radiation ($\delta^{14}C$) was high during all of the solar minima.

Supplementary information can be obtained from Professor Easterbrook's two benchmark books on *Evidence-Based Climate Science*, Elsevier 2011 and 2016.

Climate change: solar-interplanetary forces – not human activity

Roger Tattersall & Stuart Graham
rog@tallbloke.net

A number of Extra Solar systems have been discovered which exhibit orbitally resonant ratios between their planets' syzygy periods. Three examples are Kepler 223 [1], where interaction indicates resonance has been responsible for planetary migration, Trappist-1 [2] which has eight planets, all in resonant syzygy ratios and HR8799 [3] containing resonant double planet pairs. The motion of 'hot Jupiters' close to their parent stars also appear to affect star-spot production, a phenomenon also apparent in the solar system

These discoveries confirm that similar resonant relationships in our solar system are not unique or unusual. Resonant triplets with 3:2;1 syzygy ratios are found in Jupiter's and Uranus' moon systems, and a 2:3:5 set of ratios are found in Pluto's moon system.
Resonant forces less powerful than those which re-arrange entire planetary systems nonetheless convey significant energies between planetary pairs and groups. Their periodic librations cause changes in orbital eccentricity, obliquity, orbital precession and spin rate. On earth, they produce the Milankovitch cycles, affecting glacial/interglacial periodicities and other longterm climatic cycles.

Jupiter and Saturn orbit in a 2:5 ratio describing a near equilateral triangle with their syzygys during a sixty-year period. This conjunction cycle precesses, completing a revolution every 2400 years, the periodicity of the well known Hallstatt cycle. Earth and Venus have five syzygys every eight years, and their conjunction cycle precesses in 1199 years, the half period of the Jupiter-Saturn pair. The beat period of this period and the well known Jose cycle of ~179 years produces the De Vries cycle of 208.6 years, and is strongly evident in Earth's climatic proxy records, particularly during epochs of solar grand minima.

The Jupiter-Saturn pair exerts a similar magnitude of gravitational pull upon the Earth-moon system as much smaller, but also much closer Venus. Between them their orbital resonances have entrained Earth's lunar cyclicities, which strongly affect short and longterm tidal patterns, with resultant climatic effects.

A simple model constructed using planetary orbital and syzygy periods, and their resonant harmonics well reproduces the reconstructed solar variation derived from the 10be and 14C proxy records. [Fig 1].

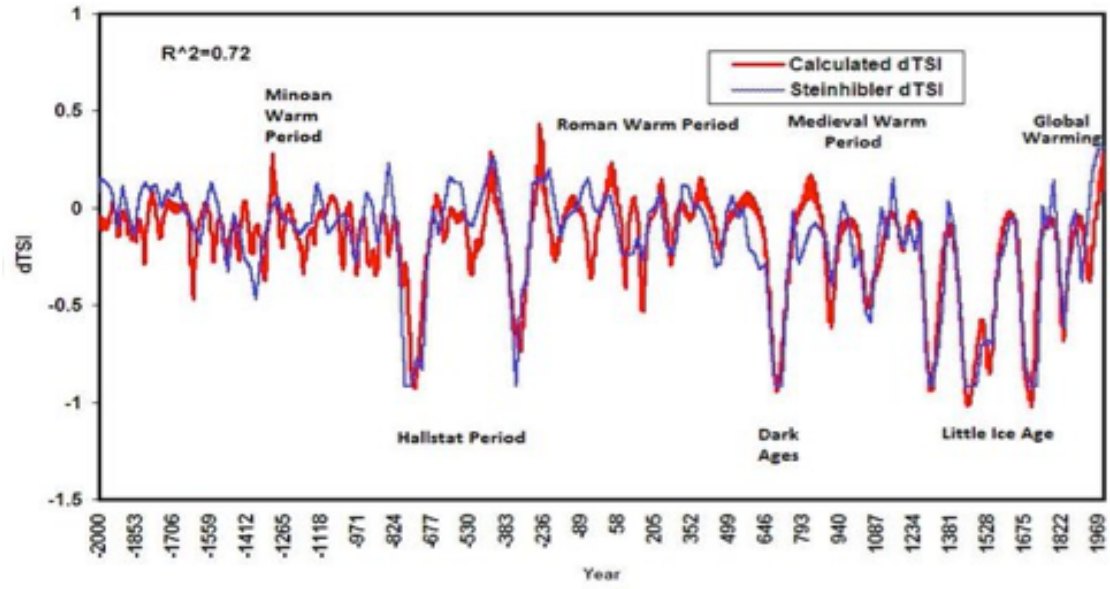


Figure 1: Orbital resonance model in red approximately reproduces the Steinhilber et al 2012 solar TSI reconstruction (R^2 = 0.72).

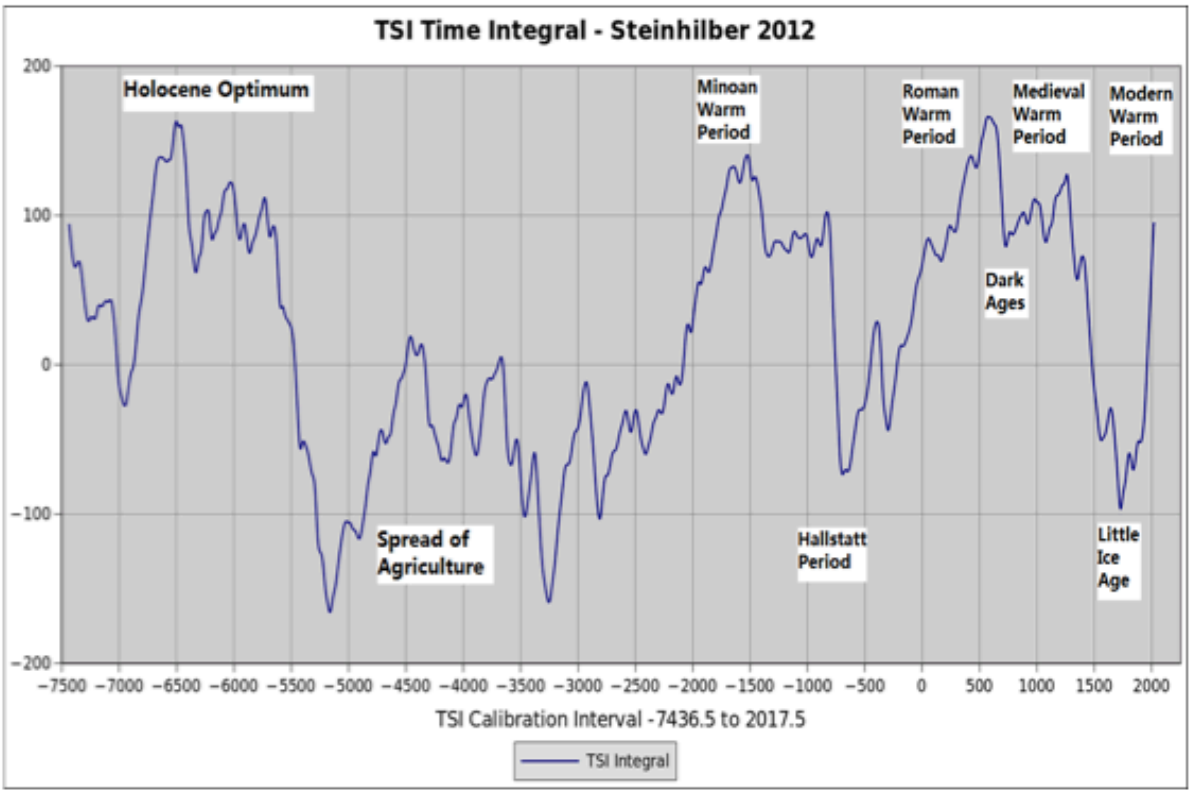


Figure 2: Integration of Steinhilber 2012 solar TSI reconstruction to approximate ocean heat content correlates to warmer and cooler climatic epochs.

References

[1] Sean M. Mills et al, A resonant chain of four transiting, sub-Neptune planets, *Nature* (2016). DOI: 10.1038/nature17445

[2] Rodrigo Luger et al, A seven-planet resonant chain in TRAPPIST-1 https://doi.org/10.1038/s41550-017-0129

[3] Multiple mean motion resonances in the HR 8799 planetary system Krzysztof Gozdziewski, Cezary Migaszewski https://arxiv.org/abs/1308.6462

The length of solar cycle as predictor of local climate

Jan-Erik Solhein
University of Tromsø, The Arctic University of Norway, janesol@online.no

In school we learned that the Energy output from the Sun is a constant, which was called the Solar Constant. Since 1979, it is measured by satellites, and it was found that it varied during a solar cycle. The variation is of the order 0.1%, measured over all wavelengths. Variations in UV can be much higher. Using many solar parameters and proxies it has been possible to estimate the variation of total solar irradiance (TSI) back in time. TSI correlates well with temperature measured in rural areas (1).

The length of solar cycles, determined from counts of sunspots from 1610, has varied between 8 and 15 years, but with an average length of 11.06 years between minima. It was longer than 11.06 years in most of the 19th century, which was a cold century. It was shorter than 11.06 years in the 20th century, which became considerably warmer.

In 1991 Friis-Christensen & Lassen (2) published a landmark paper, which showed a relation between solar cycle length and the mean land temperature of the Northern Hemisphere. This led to a search for a possible mechanism for how the Sun could modulate the climate, and relations between solar wind, cosmic rays and clouds have been investigated with promising results at CERN and in Denmark.

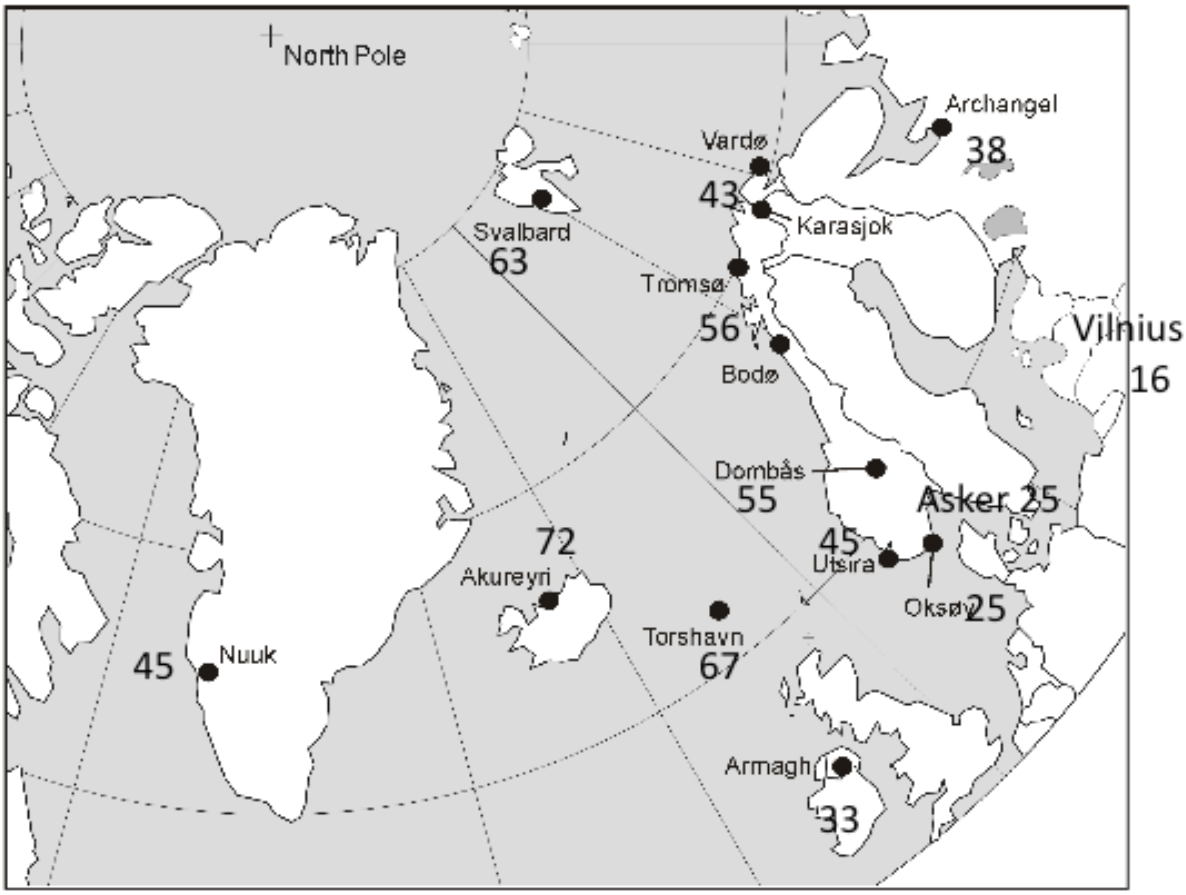


Figure 1. *Stations analyzed. The numbers show the variance (r^2) for a relation between the length of a sunspot cycle and the temperature in the following cycle. We notice the highest variance is found in coastal stations North of Great Britain.*

At high Northern latitudes the heat balance is negative. This part of our planet is loosing more energy to space than the Sun can provide directly. For North Western Europe heat is

provided by the warm Atlantic current. This means we have a climate that is modulated by the Sun, but with a delay of 10-12 years transport time, which is of the same length as a solar cycle. We should therefore find the result of heating in one cycle appear in the next.

In Figure 1 I show the result of an investigation of a relation between the length of the solar cycle and the temperature of in the following cycle (3). An anti-correlation was found: A longer cycle predicts lower temperature the following cycle. Numbers in the figure indicate the variance (r^2) found in this relation, indicating it is higher in the costal stations, which tell us that the ocean current is important for this relation. Since the last solar cycle, which ended in late 2008 was longer than average, this led to a prediction of cooling during the next solar cycle 24. We are now close to the next minimum, and the simple model can be falsified.

Since longer periods may lead to colder climate, we may also ask what governs the length of a solar cycle. Is there a "stable clock" in the Sun, or is it random or forced by some external source as the movement of the planets? In Figure 2 the arrival time of solar minima are shown in related to a signal from a stable clock with period 11.06 years.

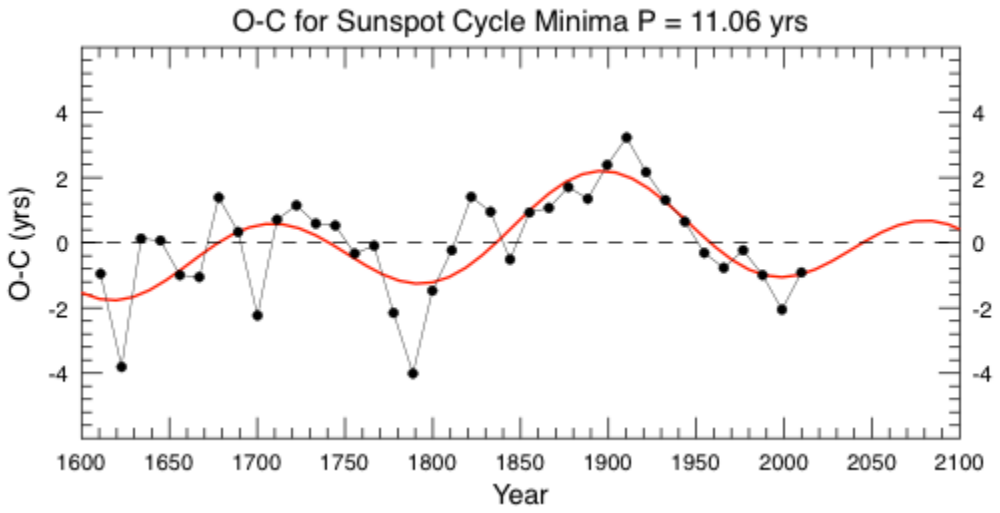


Figure 2. *The observed arrival time of sunspot minima (O) compared with the expected arrival time (C) if all cycles were of the length 11.06 years. The red curve is the result of harmonic analysis with 2 periods. This is explained in the text.*

Figure 2 shows that a series of short cycles from 1720 made the minimum arrive about 4 years early in 1785. This was corrected by a series long cycles until 1900, which resulted in a delay of about 4 years in arrival of the minimum in 1900. Again this was corrected by shorter cycles the next hundred years, making Cycle 22 end two years too early in 1996.

The question now is if the long cycle 23 which became 12.2 years long and ended in 2008.9 is a sign of a series of longer cycles this century. The red curve is the result of harmonic analysis of the time delay of minima. If the modulation is a result of forcing from stable planetary orbits, we can expect a series of longer solar cycles and a colder climate in NW Europe the next decades.

1. W. Soon, R. Connolly and M. Connolly, 2015, Re-evaluating the role of solar variability on Northern Hemisphere temperature trends since the 19th century, *Earth-Science Reviews*, 150, 409-452
2. E. Friis-Christensen and K. Lassen, 1991, Length of the Solar Cycle: An indicator of Solar Activity Closely Associated with Climate, *Science, New Series,* 254, No. 5032, 698-700
3. J.-E. Solheim, K. Stordahl and O. Humlum, 2012, The long sunspot cycle 23 predicts a significant temperature decrease in cycle 24, *Journal of Atmospheric and Solar-Terrestrial Physics*, 80, 267-284
4. J.-E. Solheim, 2013, The sunspot cycle length – modulated by planets?, *Pattern Recognition in Physics*, 1, 159-164

The climate clock
Deep solar minima from 1000 AD to 2200 AD

Harald Yndestad
Norwegian University of Science and Technology, Aalesund, Norway
Harald.Yndestad@ntnu.no

The Climate Clock is a framework for computing stationary periods in the Earth temperature variability, up to 4200 years. The Climate Clock is based on a solar model (Yndestad and Solheim, New Astronomy, 2017) and a solar-lunar model.

The Climate Clock	Oort Minimum	Wolf Minimum	Spører Minimum	Maunder Minimum	Dalton Minimum	1. Next Minimum	2. Next Minimym
1. Period	1208	1385	1562	1709	1797	2062	2209
2. Period	1210	1378	1546	1714	1798	2050	2218
3. Period	1218	1382	1547	1712	1877	2041	2206
Index	10	7	15	5	80	21	14

The Maunder Minimum is the deepest minimum
1. Next Minimum is deeper than the Dalton Minimum

The solar model computes solar minimum and maximum over 4200 years. The figure shows computed deep minima from 1000 A.D. to 2200 A.D. The solar model index shows the solar deep minimum. The index shows we may expect an upcoming Maunder type deep solar minimum, close to 2050 and 2200 A.D. The solar-lunar model computes the interference between forced solar periods and forced lunar-nodal tide temperature periods in oceans, and modifies global temperature variability.

A wavelet spectrum analysis of the Greenland temperature (GISP2-4k) from 2000 B.C., and the global temperature (HadCRUIT4) from 1850, shows a period and phase-locked relation to the solar-lunar model.

Planetary beat and sea level changes

Nils-Axel Mörner
Paleogeophysics & Geodynamics, Stockholm, Sweden, morner@pog.nu

Easterbrook has an hour ago given an excellent account on the Solar-Terrestrial interaction. The planetary beat generating solar variability and changes in the emission of luminosity and solar wind (Fig. 1) was demonstrated in the special issue of Pattern Recognition in Physics 2013 [1] and the Nova book on Planetary-Solar-Terrestrial Interaction 2015 [2].

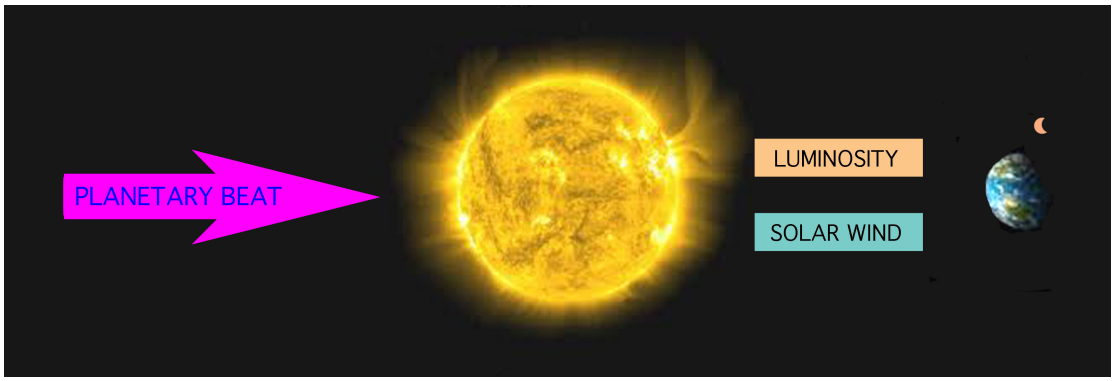


Fig. 1. Planetary-Solar-Terrestrial interaction [1, 2].

This interaction was further developed [3] with respect to the effects on terrestrial variables, and the possible driving functions on terrestrial changes in climate and environments (Fig. 2).

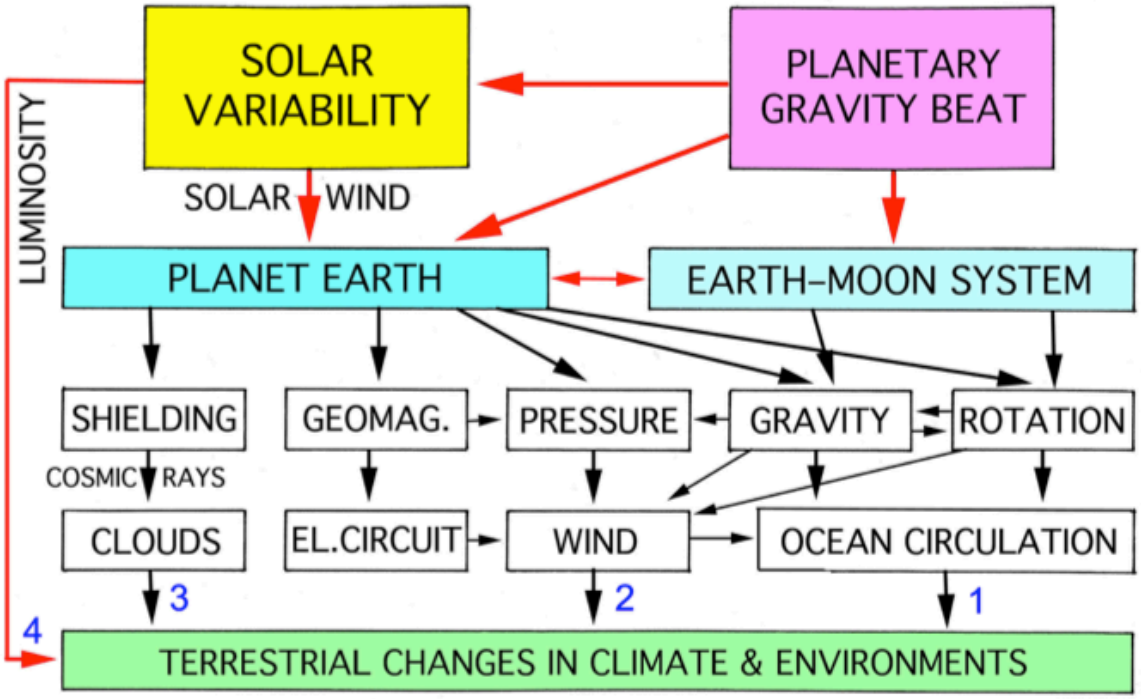


Fig. 2. Planetary beat processes and the spectrum of terrestrial variables affected [2, 3, 4]:

1. Dominant factor according to Nils-Axel Mörner
2. Dominant factor according to Piers Corbyn
3. Dominant factor according to Henrik Svensmark
4. Dominant idea of solar luminosity forcing

From my paper at the London 2016 Climate Change Conference [5] with the four (1-4) main lines of solar-terrestrial forcing. Most probably all four lines are active in affecting Earth's climate changes, sea level changes and other environmental variables.

Sea level changes
The science of sea level changes is complicated and multi-disciplinary and always expands in view of knowledge & interpretation [6-12]. It must be solidly anchored in observational facts in the field – model shortcuts don't pay off. Glacial eustasy and thermal heating are primarily driven by the Sun. Their contribution to sea level change is small [6]. Rotational eustasy has turned out to be the dominant factor over the last 500 years [11, even 8]. Rotational eustasy can only be understood in terms of planetary-solar-terrestrial interaction.

Rotational eustasy and planetary-solar-terrestrial interaction
The Spörer, Maunder and Dalton Grand Solar Minima with associated Little Ice Age climatic conditions were all found to correspond to periods of rotational speeding-ups [13, 3, 4]. The speeding-up at solar minima refers to a total speeding-up of the entire Earth system (not just the hydrosphere), and this must be the effect of the Solar Wind interaction with the magneto-sphere [14, 13, 3, 4, 8]. In response to the general speeding up, the equatorial bulge increases and the polar flattening deepens. The slowing down at solar minima, on the other hand, implies a lowering in the equatorial region and a rise in the polar region.

The ENSO Event Oscillation (EE0)
Even the ENSO events seem to imply the interchange of angular momentum between the solid Earth and the hydrosphere [15, 16, 14, 4], suggesting that they might have an ultimate driving force in planetary-solar terrestrial interaction (as suggested in Fig. 5 below).

The ~60 year Cycle Oscillation (60yCO)
The 60-yr cycle is a fundamental cycle in Earth's climate changes [17]. It is also a fundamental cycle in planetary beat [18] and solar variability [19]. The Gulf Stream beat is dominated by a 60-yr cycle over the last 200 years, driven by changes in the Earth's rate of rotation [14, 13, 4]. The Earth's geomagnetic field variations exhibit a strong 60-yr cyclicity [20, 21]. This implies at that the 60-year cycle must originate from the Solar Wind interaction with the magnetosphere generating changes in rotation, ocean circulation and sea level changes as given in Fig. 2 (line 1). Because lunar tidal components are identified [22], we can be sure that also the Earth/Moon system was affected [8]. This is illustrated in Fig. 3.

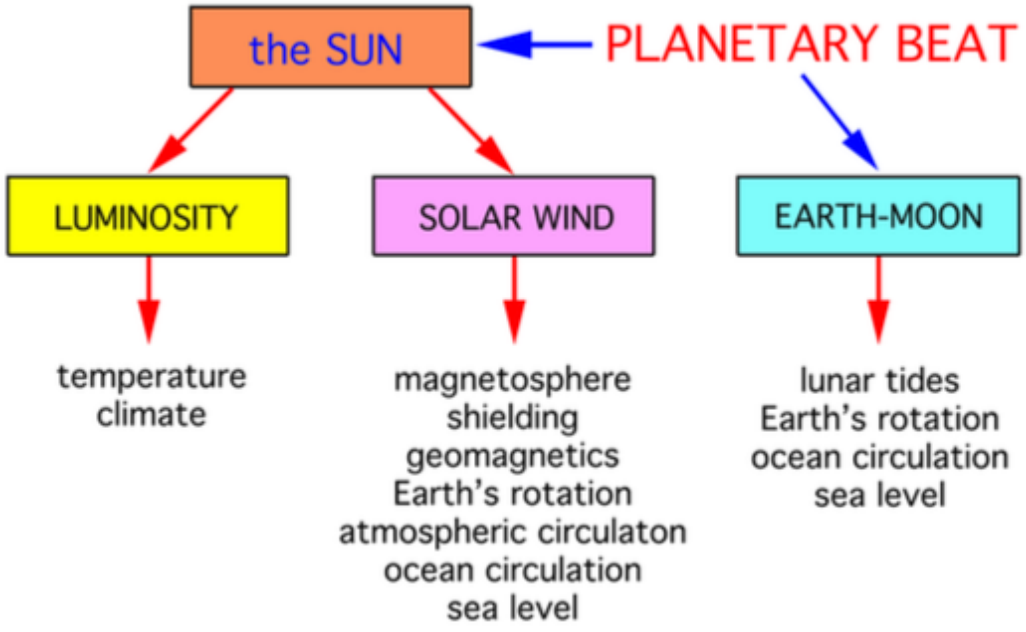


Fig. 3. The triple lines of effects on terrestrial variables
from a planetary beat with a periodicity of about 60 years [8].
(It seems also to apply for other cycles like the 208-yr de Vries cycle
and the ~2400 Hallstatt cycle, and maybe even ENSO events [23]).

The Grand Solar Cycle Oscillation (GSCO)

The alternation between Grand Solar Maxima and Minima must be driven by Planetary-Solar forcing [1, 2, 3, 4, 5, 24]. The Gulf Steam beat and the periods of Little Ice Age climate conditions follow the Grand Solar Cycles oscillations in great details over the last 600 years [13, 25, 26].

The changes in sea level during the last 500 years in the Maldives [27], Bangladesh [28], Goa [10] and the Fiji Islands [12] all provide solid observational facts of high sea levels during Grand Solar Minima (i.e. periods Little Ice Ages) and low sea levels during Grand Solar Maxima [11, also 8]. This is quite opposite to glacial eustasy. Instead, it indicates that, during the last 500 years, rotational eustasy has been the dominant eustatic sea level factor [11]. Rotational eustasy implies horizontal interchanges of water masses; in this case changes between high and equatorial regions as illustrated in Fig. 3.

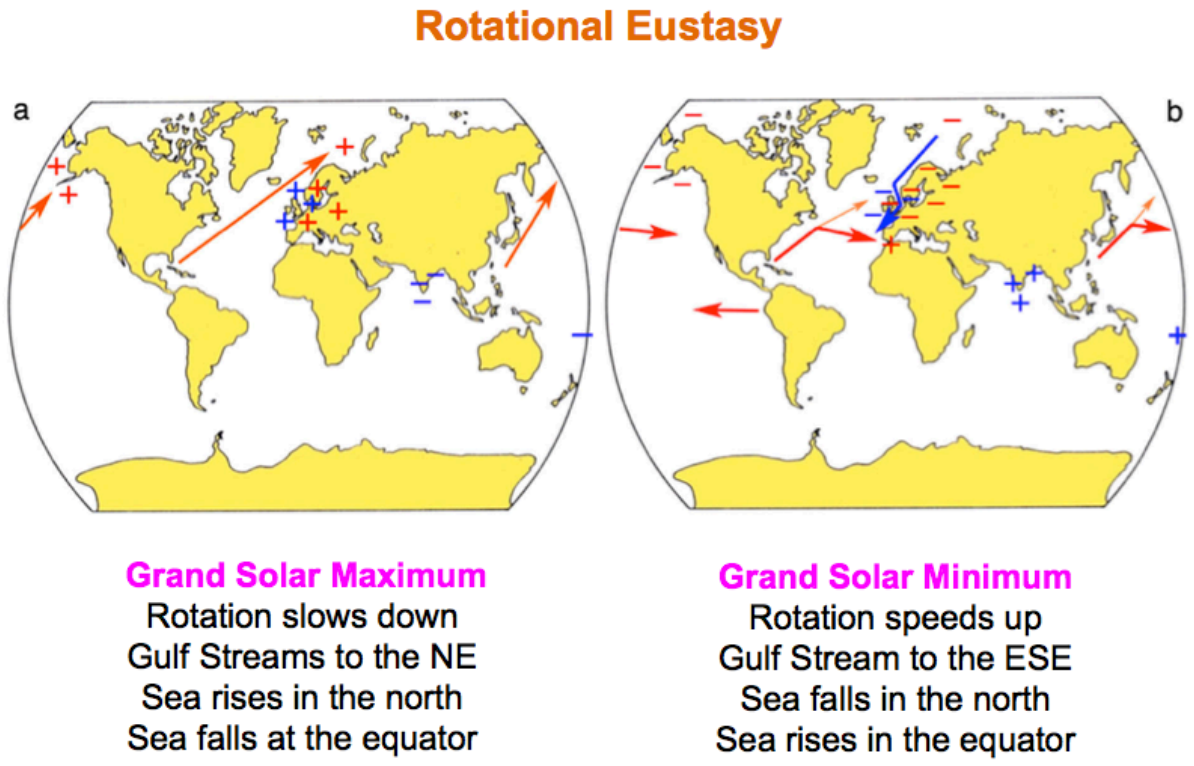


Fig. 4. Rotational eustasy as identified during the last 500-600 years, first presented in [8] and in the present form in [11].

The identification of the Grand Solar Cycles in ocean circulation [13] and predominant global eustatic sea level changes [8, 11] implies that all previous talk about an on-going rapid rise in global sea level (as driven by the IPCC project and its proponents) is nothing but a serious mistake [29, 30, 31, 32]. This implies that sea level changes are natural phenomena [33, 34] – which humans cannot control or do anything about; just have to learn to live with and adapt for (as humans have done through millennia of the postglacial period).

Interpretation in terms of planetary-solar forcing

Fig. 5. illustrates the generation of observed oceanic "oscillations" (EEO, 60yrCO, GSCO) in terms of planetary-solar forcing functions. Pressure, gravity and rotation affect wind and ocean circulation, and ocean circulation generates redistribution of ocean masses and sea level changes on the inter-annual basis (ENSO), on the 60-yr time scale and on the Grand Solar Cycle time scale. The 60yr geomagnetic cycle and the Grand Solar Cycle changes in shielding provide firm evidence of the simultaneous interaction of Solar Wind variations with the Earth's magnetosphere.

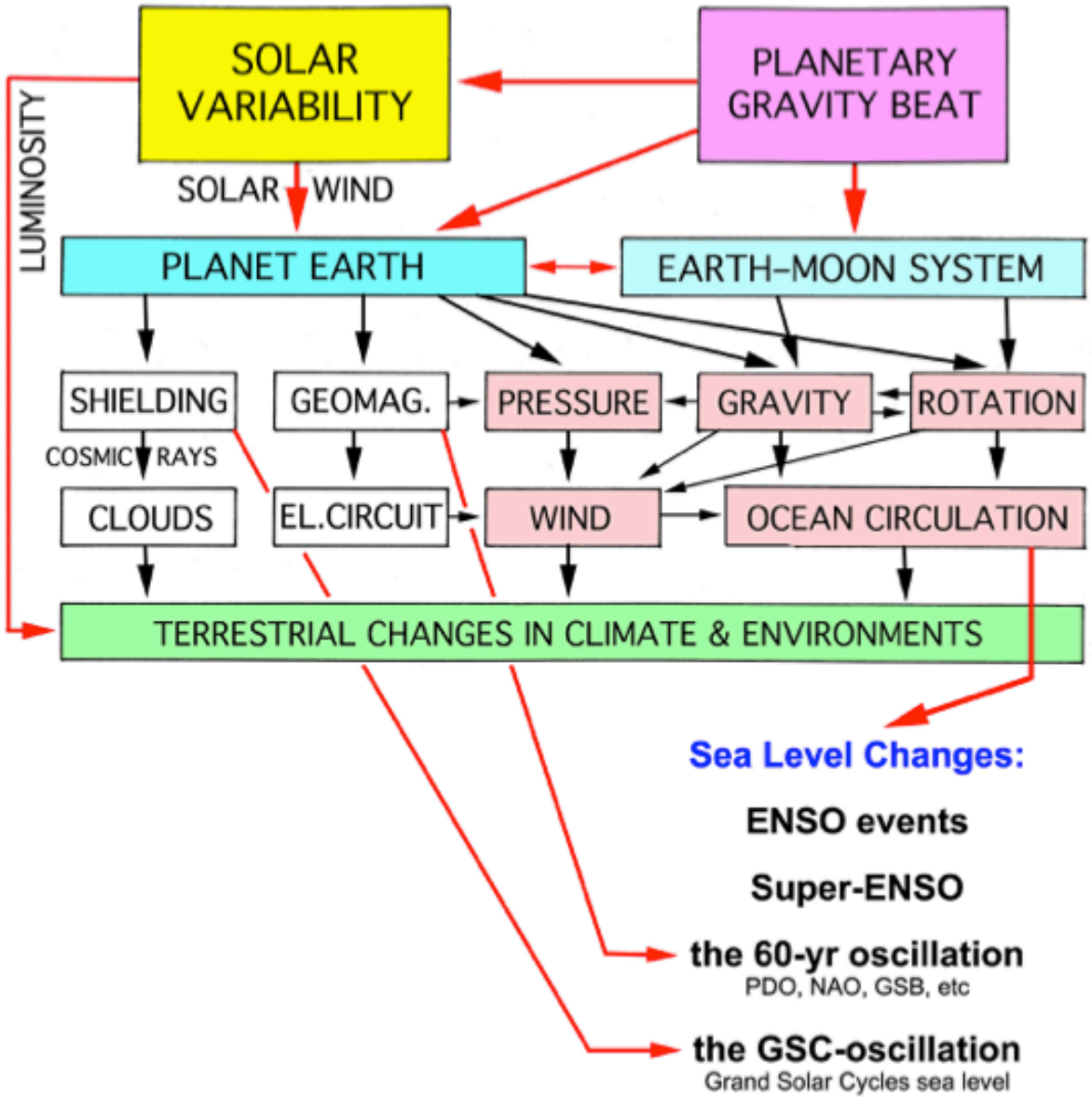


Fig. 5. Ocean level oscillations or horizontal eustasy (rotational eustasy) i.e. the ENSO events, Super-ENSO events, the 60-year cycle and the newly identified Grand Solar Cycle Oscillation must all lead their origin from the integrated changes in the brown boxes driven by Planetary-Solar forces (as further indicated by the geomagnetic factor in the 60-year cycle and the shielding factor in GSCO cycle.

Conclusions

- The ENSO events may, at least partly, be driven by planetary effects on the Earth's rotation (LOD) and ocean circulation (interchange of angular momentum).
- The 60-yr cycle in climate, ocean circulation (GSB, PDO, NAO, etc) and sea level changes can be tied to corresponding changes in planetary beat, solar variability and geomagnetic field changes.
- The Gulf Stream beat (GSB) and the rotational eustatic changes in sea level over the last 500-600 years can be directly linked to observed solar variability (GSC), shielding variations and planetary beat.

With this (Fig. 4), the theory of a planetary-solar-terrestrial interaction [1, 2] has taken an important step forward, also to be the prime forcing function for Earth's rotation, ocean circulation and differential sea level changes over the globe (i.e. rotational eustasy).

By this the threat of a global sea level rise with disastrous effects (as claimed by the IPCC and its proponents) is revealed as deeply incorrect and *The Greatest Lie Ever Told*

References

[1] Mörner, N.-A., Tattersall, R. & Solheim, J.-E., 2013. Pattern in solar variability, their planetary origin and terrestrial impacts. *Pattern Recognition in Physics, Special Issue 1*, 2013. Preface, PRP, 1, 203-204. DOI:10.5194/prp-1-203-2013.

[2] Mörner, N.-A. (Ed.), 2015. *Planetary Influence on the Sun and the Earth, and a Modern Book-Burning*. Nova Science Publishers, New York, 196 pp.

[3] Mörner, N.-A., 2012. Planetary Beat, Solar Wind and Terrestrial Climate. In: *Solar Wind: Emission, Technologies and Impacts*, C. D. Escaropa Borrega & A. F. Beirós Cruz, (Eds), Chapter 2, p. 47-66. Nova Science Publishers.

[4] Mörner, N.-A., 2013. Solar Wind, Earth's rotation and changes in terrestrial climate, *Physical Review & Research International*, 3, 117– 136.

[5] Mörner, N.-A., 2016. An introduction to planetary-solar-terrestrial interaction. In: *New Dawn of Truth. Climate Change: Science & Geoethics*, , N.-A. Mörner (Ed.), p. 10-13, ResearchGate, https://www.researchgate.net/publication/306013278

[6] Mörner, N.-A., 2013. Sea level changes: facts and fiction. *Energy & Environment*, 24 (3-4), 509-536.

[7] Mörner, N.-A., 2014. Deriving the eustatic sea level component in the Kattegatt Sea. *Global Perspectives on Geography*, 2, 16-21.

[8] Mörner, N.-A., 2015. Multiple planetary influences on the Earth. In: *Planetary influence on the Sun and the Earth, and a Modern Book-Burning*, N.-A. Mörner (ed.), Chapter 4, p. 39-50, Nova Sci. Publ.

[9] Mörner, N.-A., 2016. Sea level changes as observed in nature. In: *Evidence-Based Climate Change, Second Revised Edition*, D.J. Easterbrook (ed.), Chapter 12, p. 219-231, Elsevier

[10] Mörner, N.-A., 2016. Coastal morphology and sea level changes in Goa, India, during the last 500 years. *Journal of Coastal Research*, 33 (2), 421-434.

[11] Mörner, N.-A., 2017. Our Oceans – Our Future: New evidence-based sea level records from the Fiji Islands for the last 500 years indicating rotational eustasy and absence of a present rise in sea level. *International Journal of Earth & Environmental Sciences*, 2, 137 (5 pp).

[12] Mörner, N.-A. & Matlack-Klein, P., 2017. New records of sea level changes in the Fiji Islands. *Oceanography & Fishery Open Access Journal*, 5 (3), 20 pp.

[13] Mörner, N.-A., (2010). Solar Minima, Earth's Rotation and Little Ice Ages in the Past and in the Future. The North Atlantic – European case, *Global Planet. Change*, 72, 282–293.

[14] Mörner, N.-A., 1996. Global Change and interaction of Earth rotation, ocean circulation and paleoclimate, *An. Brazilian Acad. Sc.,* 68 (Supl. 1), 77–94.

[15] Mörner, N.-A., 1989. ENSO-events, Earth's roration and global change. *Journal of Coastal Research*, 5 (4), 857-862.

[16] Mörner, N.-A., 1990. The Earth's differential rotation: hydrospheric changes. IUGG & AGU, *Geophysical Monograph*, 59, 27-32.

[17] Schlesinger, M. E. & Ramankutty, N., 1994. An oscillation in the global climate system of period 65–70 years. *Nature*, 367, 723–726.

[18] Tattersall, R., 2013. The Hum: log-normal distribution and planetary–solar resonance. *Pattern Recognition in Physics*, 1, 185-198. doi:10.5194/prp-1-185-2013

[19] Scafetta, N., 2012. A shared frequency set between the historical mid-latitude aurora records and the global surface temperature. *J. Atmos. Sol.-Terr. Phy.*, 74, 145-163.

[20] Braginskiy, , S. I., 1982. Analytical description of the secular variations of the geomagnetic field and the rate of rotation of the Earth, *Geomagn. Aeronomy*, 22, 88–94.

[21] Roberts, P. H., Yu, Z. J. & Russell, C. T., 2007. On the 60-year signal from the core, *Geophys. Astro. Fluid*, 101, 11–35.

[22] Hansen, J.M., Aagaard, T. & Kuipers, A. (2015). Sea-level forcing by synchronization of 56- and 74-year oscillations with Moon's nodal tide on the Northwest European shelf (Eastern North Sea to Central Baltic Sea). *Journal of Coastal Research*, 31 (5), 1041-1056.

[23] Strandberg, P., 2016. Drivers of ENSO variability. In: *New Dawn of Truth. Climate Change: Science & Geoethics*, N.-A. Mörner (Ed.), p. 26-27, ResearchGate; https://www.researchgate.net/publication/306013278

[24] Easterbrook, D.J. 2018. Cause of Little Ice Ages and climate change. *This volume*, p. 41-44.

[25] Mörner, N.-A., 2011. Arctic environment by the middle of this century, *Energy & Environment*, 22, 207–218.

[26] Mörner, N.-A., 2018. Atlantic Ocean circulation and Gulf Stream beat. *This volume*, p. 12-15.

[27] Mörner, N.-A., 2007. Sea Level Changes and Tsunamis, Environmental Stress and Migration Overseas. The Case of the Maldives and Sri Lanka. *Internationales Asienforum*, 38, 353-374.

[28] Mörner, N.-A., 2010 Sea level changes in Bangladesh: New observational facts. *Energy & Environment*, 21(3), 235–249.

[29] Mörner, N.-A., 2007. *The Greatest Lie Ever Told*. P&G-print, 1st ed., 20 pp. (2nd ed. 2009, 3rd ed. 2010).

[30] Mörner, N.-A., 2011. The Great Sea Level Humbug. *21st Century Science & Technology*, Winter 2010/11, 7-17.

[31] Mörner, N.-A., 2017. Sea level manipulation. *International Journal of Engineering Science Invention*, 6 (1), 48-51.

[32] Mörner, N.-A. & Matlack-Klein, P., 2017. Sea level changes in Fiji. Journal of Aquaculture & Marine Biology, 6 (5), 00170, DOI: 10.15406/jamb.2017.0600170

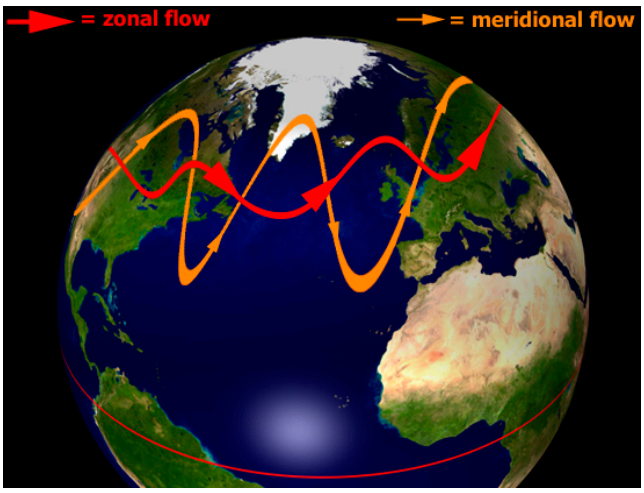
[33] Mörner, N.-A., 2017. Coastal Dynamics. In: *Encyclopedia of Coastal Sciences*, C. Makowski & C. Finkl, eds, Springer. https://doi.org/10.1007/978-3-319-48657-4_374-1

[34] Mörner, N.-A. & Finkl, C., 2017. Coastal Erosion. In: *Encyclopedia of Coastal Sciences*, C. Makowski & C. Finkl, eds, Springer. https://doi.org/10.1007/978-3-319-48657-4_373-1

Towards a better understanding of natural climate variability

Nicola Scafetta
Meteorological Observatory – Department of Science of the Earth, Environment and Resources, Università degli Studi di Napoli Federico II - Naples, Italy
nicola.scafetta@unina.it

Herein I discuss further evidences supporting the claim that natural climatic variability has been underestimated by current general circulation climate models such as the CMIP3 or CMIP5 that have been adopted by the IPCC.



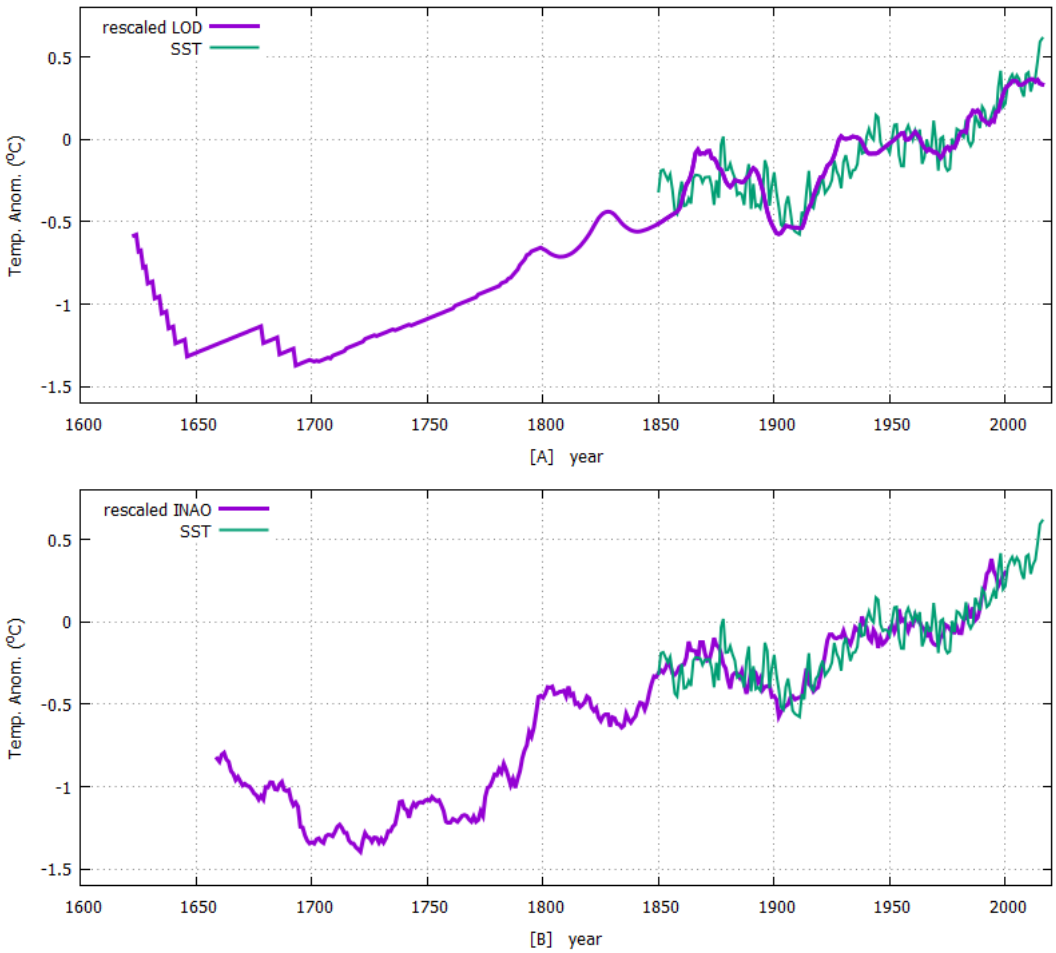
I study the yearly values of the length of day (LOD, 1623-2016) and its link to the zonal index (ZI, 1873-2003), the Northern Atlantic oscillation index (NAO, 1659-2000) and the global sea surface temperature (SST, 1850-2016). LOD is herein assumed to be mostly the result of the overall circulations occurring within the ocean-atmospheric system. LOD is found both theoretically and empirically negatively correlated with the global SST and with both the integral function of ZI and NAO, which are labeled as IZI and INAO. The latter indices are related to the zonal and meridional atmospheric flows that transfer thermal energy from the equator to the poles. The found relation reads:

$$IZI \sim INAO \sim SST \sim -LOD$$

A first result is that LOD must be driven by a climatic change induced by an external (e.g. solar/astronomical) forcing since internal variability alone would have likely induced a positive correlation among the same variables because of the conservation of the Earth's angular momentum.

A second result is that the high correlation among the variables implies that the LOD and INAO records could be adopted as global proxies to reconstruct past climate change. Tentative global SST reconstructions since the 17th century suggest that around 1700, that is during the coolest period of the Little Ice Age (LIA), SST could have been about 1.0-1.5 °C cooler than the 1950-1980 period. This estimated LIA cooling is greater than what some multiproxy global climate reconstructions suggested, but it is in good agreement with other more recent climate reconstructions including those based on borehole temperature data.

If this estimate is correct, then the quasi millennial climatic cycle observed in numerous climatic and solar records would have been significantly larger than previously estimated. This in turns implies that more than 50% the post 1900 warming could have been natural. Implications regarding the climatic quality of the temperature records and the future projections are briefly discussed. Further evidences of an astronomical origin of the 60 and 900-1000 year oscillation are briefly introduced.



(A) SST modelled using LOD and (B) INAO records properly scaled.

References

Mazzarella, A., Scafetta, N., 2018. The Little Ice Age was 1.0–1.5 °C cooler than current warm period according to LOD and NAO. Climate Dynamics, in press.
DOI: 10.1007/s00382-018-4122-6.

Scafetta, N., Mirandola, A., Bianchini, A., 2017. Natural climate variability, part 2: Interpretation of the post 2000 temperature standstill. International Journal of Heat and Technology, 35, Special Issue 1, S18-S26.
DOI: 10.18280/ijht.35Sp0103.

Scafetta, N., Milani, F., Bianchini, A., Ortolani, S.: 2016. On the astronomical origin of the Hallstatt oscillation found in radiocarbon and climate records throughout the Holocene. Earth-Science Reviews 162, 24–43.
DOI: 10.1016/j.earscirev.2016.09.004.

The fall of IPCC's sea level rise

Thomas Wysmuller
JSC Climate Group (NASA Ret.), President colderside.com, USA
tom@colderside.com

CO2 and sea levels have tracked consistently for the past 5,000 years, with sea levels exhibiting a slight but consistent linear rise. During the same period, atmospheric temperatures stayed within a ±2C zone, but ranged up and down with wide swings. Recent examples include the +0.6C Medieval Warm period (500-1100AD), and the -0.6C Little Ice Age (1200-1800AD). At the same time, CO2 has been remarkably linear at 280 ppm, except for a spectacular 43% rise to 400ppm that began in the mid 1800s.

Local sea level effects are dominated by tectonic influences, with uplift and subsidence factors the major long-term drivers; tides and ocean currents have the short-term effects. Tide Gauges have been reliable, but averaging them worldwide leads to bias, as many more are located in areas of subsidence than uplift. Renowned sea-level experts have made this abundantly clear [1,2].

Satellites measuring sea level have not performed as promised; resolution insufficiency and orbital tracking errors compelled adjustments, skewing mostly linear readings in an upward direction that taxes credibility. [3]. No recent projection (IPCC[4], NOAA[5], USNCA[6,7]) appears to have any chance of accuracy; in fact their history has been one outright failure after another, and their American "clones" border upon ludicrousness.

The most recent upward spike (43%) in CO2 from 280ppm in 1880 to 400ppm at present (2018), has not had a validated measurable influence on Sea Level Rise by any metric available, and provided a very uncomfortable inconvenience at the Paris COP21 Climate talks. It was this factor, likely more than any other, that led to provisions in the Paris Accord allowing nations to exit at will, without consequence. [8].

Notes/Comments:

1 Mörner, N.-A., (Winter 2019/2011) "There is No Alarming Sea Level Rise!", 21st Century Science & Technology
2 Mörner, N.-A., (2015) Glacial Isostasy: Regional—Not Global. *International Journal of Geosciences*, **6**, 577-592.
3 Nerem, R. S., *et al*, (2015) CU Sea Level Research Group, U. of Colorado,[http://sealevel.colorado.edu]
4 IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III, 151 pp.
5 NOAA Tech Memo (December 2012) OAR CPO-1. 37 pp.
6 *The Third National Climate Assessment*. U.S. Global Change Research Program, 841 pp. doi:10.7930/J0Z31WJ2.
7 *The Fourth National Climate Assessment*. US GCRP, Vol. 1 [Wuebbles *et al*] 470 pp., doi: 10.7930/J0J964J6.
8 Paris COP21/CMP11 [http://www.cop21.gouv.fr/en]

Tom Wysmuller forecasted weather at Amsterdam's Royal Dutch Weather Bureau after studying meteorology at NYU/Stanford. He worked throughout NASA during the Moon Landings, at Pratt & Whitney, and held insurance industry executive and board positions.

The Polynomial Regression code he produced is used by climate scientists for analysis and modeling. He lectures worldwide on the SCIENCE/DATA needed to understand climate.

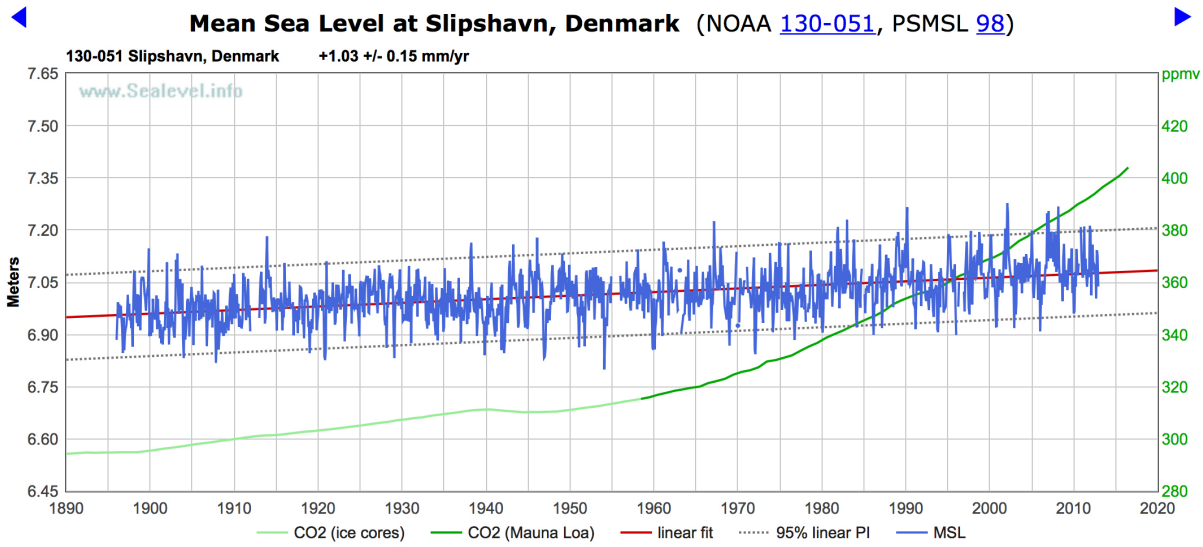
In 2008, Tom was highlighted in the "*50th Anniversary of NASA*" issue of AIAA's "Horizons" magazine. He was the meteorologist on 2012's NASA 49/41; Scientists, Astronauts, Engineers, and Center Directors requesting improvements in NASA's handling of climate issues. He chaired "Water Day" in 2013 at UNESCO-IHE, and was the Oceans Climate speaker at the 2015 Water Conference in Varna, Bulgaria, the 2016 London Climate Conference, & Keynoted the Rome Climate Conference in 2017. He has chaired the Oceanographic Section of Qingdao, China's *World Congress on Oceans*, as their chief Sea-Level presenter.

In reply to the "AGU sea level graph" of July 13, 2018*
https://blogs.agu.org/wildwildscience/2018/07/13/whats-new-in-climate-science-here-you-are/
(reviewed in: https://www.researchgate.net/publication/326410510)

*(and sourced from an earlier (2015) Hansen et al. paper)

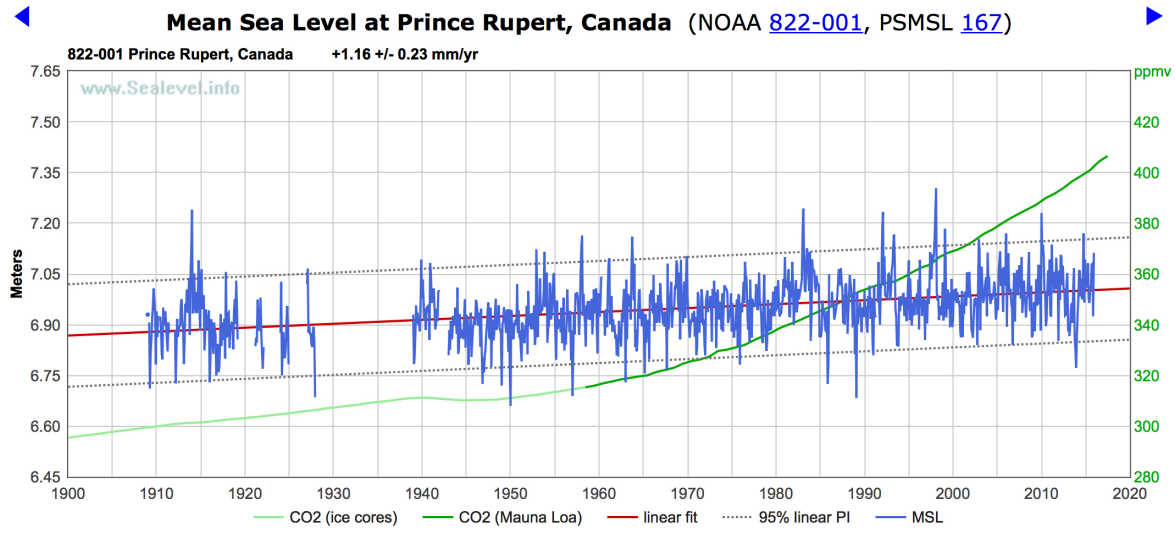
Thomas Wysmuller added "something that is realistically accurate" (1 & 2 below):

(1) The Nyborg graphic below, from a verified tectonically inert zone



The mean sea level (MSL) trend at Slipshavn, Denmark is +1.03 mm/year with a 95% confidence interval of ±0.15 mm/year, based on monthly mean sea level data from 1896/1 to 2012/12. That is equivalent to a change of 0.34 feet in 100 years. (R-squared = 0.242)

(2) The Prince Rupert graphic from another "tectonically inert" zone



The mean sea level (MSL) trend at Prince Rupert, Canada is +1.16 mm/year with a 95% confidence interval of ±0.23 mm/year, based on monthly mean sea level data from 1909/1 to 2015/12. That is equivalent to a change of 0.46 feet in 100 years. (R-squared = 0.166)

The plot shows the monthly mean sea level without the regular seasonal fluctuations due to coastal ocean temperatures, salinities, winds, atmospheric pressures, and ocean currents. By default, the long-term linear trend is also shown, in red, along with its 95% confidence interval. The plotted values are relative to the most recent Mean Sea Level datum established by NOAA CO-OPS.

There is a stunning similarity to both graphs - a sustained multi-decadal rise centering around 1 mm per year. The 95% prediction dotted lines almost guarantee that their solidly linear trends will continue. Notice the lack of relationship to CO2!
Where are the "jumps" in the AGU chart? They are not found in any measured, validated, and verified tide gauge readings anywhere on this planet!

Relevance of present sea-level changes to coastal risk

António Silva
antalvsil@gmail.com

Throughout history, the Coastal Zone has been under growing pressure from Mankind, and recently concern with sea-level is a reality for almost everyone. It is a rare day that a new story of a catastropic concern about SLR is not in the news. But will it really be a risk factor or a hazard? The coastal zone, as "water territory", can be affected by many factors. The effects of rising sea level can contribute to not only changed coastal dynamics, but also fresh water resources (i.e. well fields being intruded by salt water) and, ultimately, Human occupation of the littoral.

To investigate this question, we made a study focused on tide gauge registers of the PSMSL. We studied trends and oscillations of annual mean sea-level, based on global data from selected tide gauges around the globe, with focus on the 21st Century data. The conclusions are shown from a relative hazard perspective.

First, we discuss the hazards related to sea-level variations, then the methodology, which is focused on rates of at least 30 years duration, inter-annual variability, recent trends of the 21st Century, particularly in the last few years, and evaluated extreme values. Finally, criteria were established to classify and map the danger related to sea-level variations (Fig.1), and conclusions extracted.

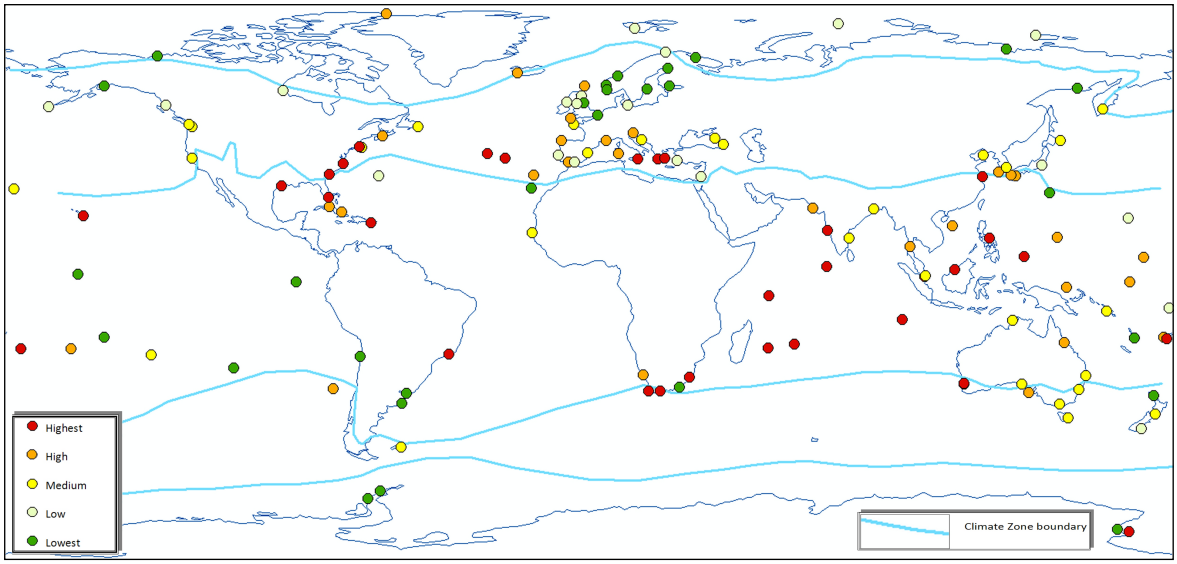


Fig. 1. Map of sea-level variation hazard:

References

Cazenave A., Remy F. (2012) - Sea level and climate: measurements and causes of changes. WIREs Clim Change 2011, 2, pp.647-662

Church, J.; Woodworth, P.; Aarup, T.; Wilson, W. (eds.) (2010) – Understanding Sea-Level Rise and Variability, Wiley, 457p.

Evans, R.(2004), Rising Sea Levels and Moving Shorelines: New tools and techniques show promise for better predictions and decisions about coastline change, Oceanus, 43 (1)

Gregory, J.; Withe, N.; Church, J.; Bierkens, M.; Box, J.; Broeke, M.; Cogley, J. Fettweis, X.; Hanna, E.; Huybrechts, P.; Konikow, L.; Leclerq, P.; Marzeion, B. (2012) - Twentieth-Century Global-Mean Sea Level Rise: Is the Whole Greater than the Sum of the Parts?, Journal of Climate, 26, pp.4476-4499

Kopp, R.; Horton, R.; Little, C.; Mitrovica, J.; Oppenheimer, M.; Rasmussen, D.; Strauss, B.; Tebaldi, C. (2014) - Probabilistic 21st and 22nd century sea-level projections at a global network of tide-gauge sites, Earth's Future 2, pp. 383–406.

Leorri, E.; Mulligan, R.; Mallison, D.; Cearreta, A. (2011) - Sea-level rise and local tidal range changes in coastal embayments: An added complexity in developing reliable sea-level index points, Journal of Integrated Coastal Zone Management 11(3), pp.307-314

Greenland:
some simple observations on ice retreat and climate evolution

Maria Assunção Araújo, GEGOT-FLUP
asaraujo@letras.up.pt

It is common to say that Greenland and Antarctica are losing ice. This is an important issue because if true it could result in a significant sea level rise. CAGW alarmists prey of the fears of the ignorant by spreading frightening stories that both the Greenland Ice Sheets and the Antarctic Ice Sheets are melting rapidly and soon all low-lying coastal areas will be under water.

So, we tried to study Greenland and the surrounding areas. Google Earth offers high-definition satellite images, mostly taken in December every year, thus they are easily compared.

We marked a point at all the places where the land glaciers clearly met the sea. We marked 129 points for December 1984 and 349 points for December 2016. When it was possible, we measured in the GoogleEarth app, the distance between the 2 points. In fig 1 we show a detailed map of the Eastern coastal area of Greenland that shows the methodology we used.

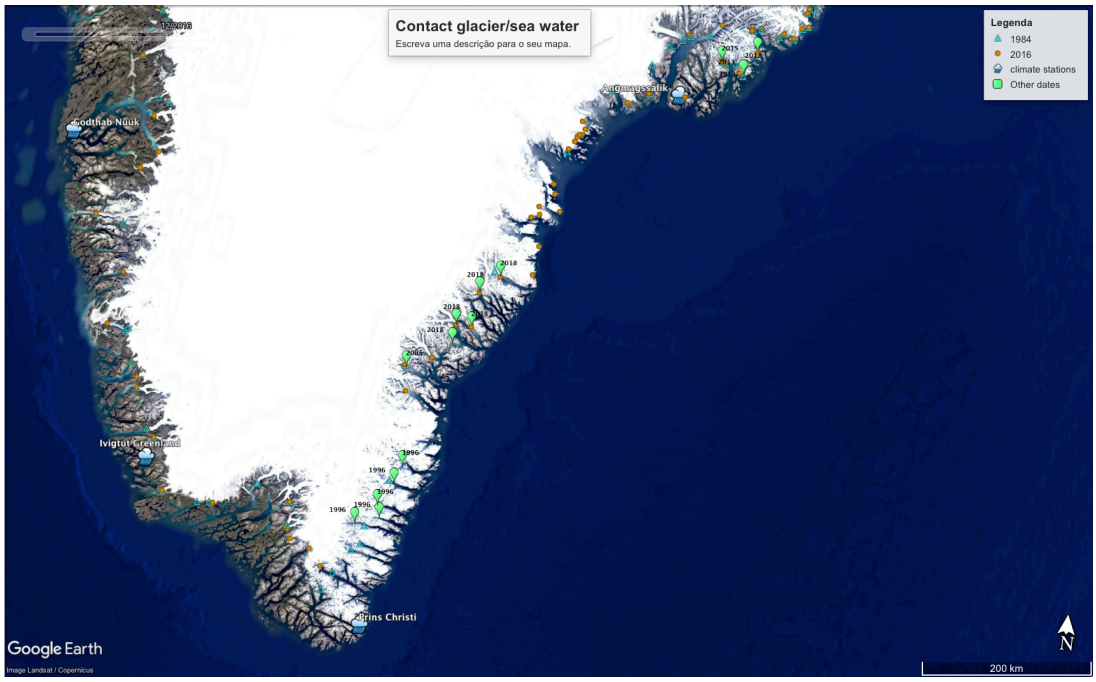


Fig. 1. Google Earth images. The limits between sea-water and continental ice in several years. Studied climate stations position.

We have climatic data since 1880 from the NASA site. Some new stations made their appearance in 1950. In figure 2 it is possible to see several tendencies in the climate data of Greenland: until 1946 there is a general trend for warming. Then, until almost 1990 there was a trend for a lowering of the temperatures. However, the disappearance of some stations and data from new ones make the analysis a bit difficult.

So, we will concentrate on the most continuous data, which came from Angmagssalik in the eastern coast of Greenland, almost at the latitude of the Polar Circle.

Until 1929, there was some warming. Then, the peaks of the higher temperatures began to go down. In 1971 and 1983 the average temperatures were similar to the ones of the end of the XIX century. images shows a retreat of the ice to the approximate position of the 1984 images.

The last years of data are very important to analyze because they are the most prone to alarmist proclamations.

There was, indeed, a rise in temperatures, from the late nineties, with a peak at 2003. Then we see a smaller peak at 2010 and another at 2016. This coincides with the year of the last images, when the position of the ice had retreated from the 1984 position.

If we analyze some other years of the satellite images we get the impression that the 2016 position of the glacier tongues is not very different from the most recent ones: maybe 2016 really means one of the most retreated positions of glaciers since the temperatures don't seem to be going up – on the contrary, as we can see in figure 2, temperatures are declining.

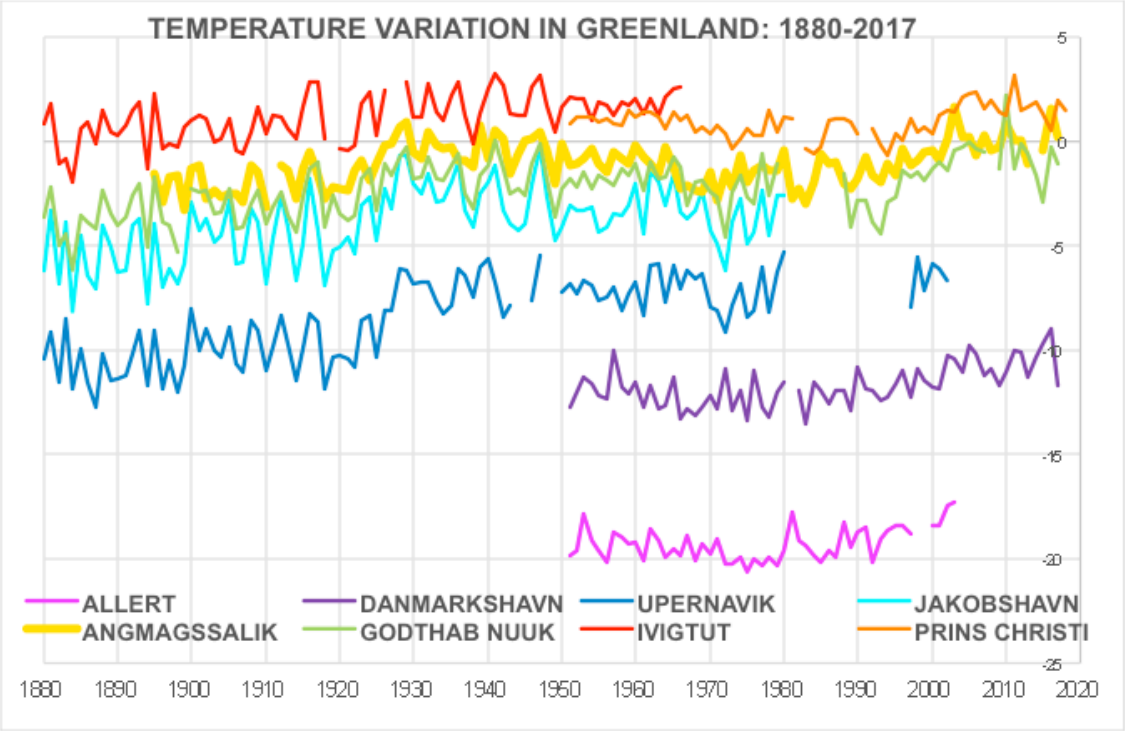


Fig. 2. Climatic data (https://data.giss.nasa.gov/gistemp/station_data/): the most continuous data comes from Angmagssalik (Fig. 3).

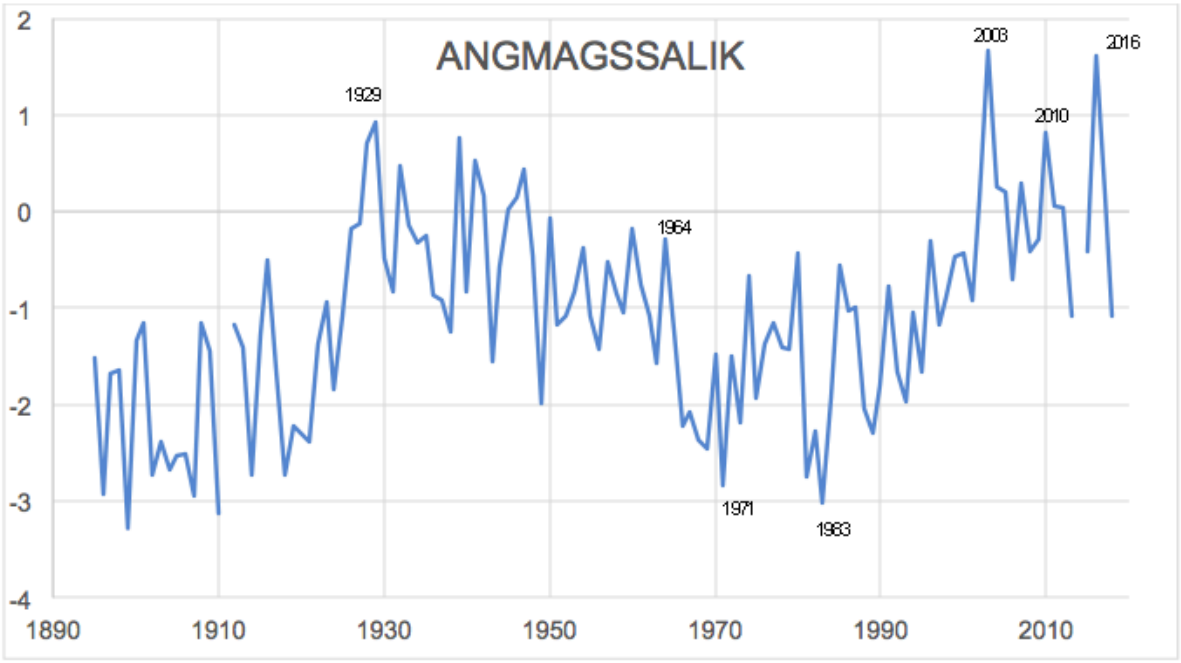


Fig. 3. Angmagssalik climatic data. Some of the most significant years in the graphic are pointed out.

Ocean acidification is a myth

Cliff Ollier, cliff.ollier@uwa.edu.au

A popular hypothesis today is that the world climate is warming, caused by increasing carbon dioxide. There is no proof of this connection, and for the past twenty years carbon dioxide increased while temperature remained the same. Proponents of this hypothesis further claim that increasing carbon dioxide causes the ocean to become more 'acid', which dissolves carbonate and threatens marine life. This is despite the fact that the oceans have been alkaline throughout their existence on Earth.

Limestone formation: Important data on this topic comes from a book about the coast of South Australia, which is dominated by carbonate sands in beaches and dunes. The authors state that "The coastline of South Australia is part of the world's largest aeolianite (dune limestone) temperate sedimentary carbonate province, which extends from western Victoria to north of Shark Bay, Western Australia. The aeolianite deposits attest to the high calcium carbonate bio-productivity of the surrounding continental shelf environments".

The source of the sediment is a subtidal 'carbonate factory' with the prolific growth of calcareous marine invertebrates such as molluscs, bryozoans, echinoids, and foraminifers. Attrition of their remains leads to the formation of sand-sized sedimentary particles of calcium carbonate. Plants such as coralline algae also contribute. In addition to these factories producing fragmental carbonate deposits there are coral reefs where carbonates are cemented together to form huge morphological features.

pH and the meaning of 'acid': 'Acid' is an emotive word to the general public, which is why it is seized upon by the alarmists in their search for yet another scare. In reality increasing CO_2 makes the ocean become 'less alkaline', but never 'acid'. pH is a measure of the amount of hydrogen ion concentration in a solution: it is the log of the hydrogen ion concentration with the sign changed. A pH of less than 7 is 'acid'. This has not happened in the sea for at least the past 600 million years because it would dissolve limestones, and limestone has been deposited in the sea and not re-dissolved in the sea through all that time.

The pH of sea-water can be very variable. Ocean pH varies regionally by 0.3, and seasonally in a particular location by 0.3. Fairbridge found the day-night variation in a coral pool was 9.4 to 7.5. Barnes reported that on the Great Barrier Reef water is pushed onto the front of reefs at around pH 8.1-8.2. It then flows across the reef flat and into the lagoon or back-reef area. The pH of water leaving the reef flat in the daytime is around 8.4-8.5. The pH of water leaving the reef flat at night is around 7.9-8.0. This shift is due to removal of CO_2 during the day because of photosynthesis by reef organisms, notably corals and algae. During the day photosynthesis considerably exceeds respiration but at the night there is only respiration. So at night, addition of CO_2 to the water by respiration of benthic organisms decreases the pH.

Biological abundance and CO2 starvation: Experimental results on land plants show that plants grow better if CO_2 is increased, and greenhouse managers commonly increase the CO_2 artificially to increase crops, often by 30% or more. There is every reason to suppose that marine plants also thrive if CO_2 is increased. People who have saltwater aquariums sometimes add CO_2 to the water in order to increase growth of plants and animals.

Marine life, including the part that fixes CO_2 as the carbonate in limestones, evolved on an Earth, which at times had CO_2 levels many times higher than those of today. Many marine organisms need CO_2 to make their coral skeletons, carbonate shells and so on. Corals also have symbiotic plants within their flesh that use CO_2 in photosynthesis. There is also experimental evidence that carbonate secreting animals thrive in higher CO_2. Herfort and colleagues concluded that the likely result of human emissions of CO_2 would be an increase

in oceanic CO_2 that could stimulate photosynthesis and calcification in a wide variety of corals.

Marine life flourishes where CO_2 is abundant. Walter Stark described the 'Bubble Bath' near Dobu Island, Papua New Guinea. Here CO_2 of volcanic origin is bubbling visibly through the water so that the water is saturated with CO_2. Life flourishes in abundance to make the spot a scuba diver's dream. He reported many measurements of pH in the area and concluded that coral reefs are thriving at pH levels well below the most alarming projections for 2100. Similar sites are known around the world. For example Champagne Reef, a premier diving site in Dominica, is reported to be full of life. These observations throw doubt on the Great Barrier Reef Marine Park Authority prediction that oceanic pH may decrease by as much as 0.4 of a pH unit by 2100 and that this will be disastrous for coral calcification. But oceanic pH would then be about 7.8, which is still alkaline and corals can flourish at this pH. A sample taken next to a *Porites* coral at the "Bubble Bath" measured 7.74. In fact, it is probable that oceanic carbonate fixers are suffering CO_2 starvation. Terrestrial plants grow better with elevated CO_2 levels, and so does marine life.

Geological history of carbonates: Carbonates are part of the big geochemical picture: carbon dioxide originates from volcanic eruptions and calcium in solution is derived from rock weathering. Carbonates are fixed by limestone formation, which sequesters carbon dioxide. There are a few Precambrian limestones, but the explosion of life in the Cambrian was the real start of significant limestone production. The amount of limestone has increased through time and now makes up about 10% of sedimentary rocks. Limestone is insoluble in the sea, but when uplifted it is vulnerable to weathering, especially solution, producing karst landscapes.

Carbonate secreting genera have fossil histories going back millions of years. They have survived both ice ages and very warm periods, and times when CO_2 was ten times current levels. In the ice ages sea level was lower and reefs like the Great Barrier Reef were exposed and dead, but were recolonised as sea level rose. In the geological past different organisms were sometimes important. The Cretaceous Chalk, for instance, consists largely of the carbonate skeletons of single celled algae, the coccoliths.

Contrary to popular belief, at 400 parts per million (0.04 per cent), CO_2 is lower now in the atmosphere than it has been during most of the 550 million years since modern life forms emerged. During the Cambrian period CO_2 was about 10 times higher than it is today. The truth is CO_2 is the most important food for all life on Earth, including marine life. It is the main food for photosynthetic plankton (algae), which in turn is the basis for the entire marine food chain.

Conclusion: Marine life depends on CO_2, and some fix it as limestone. Over geological time enormous amount of CO_2 have been sequestered by living things, so that today there is far more CO_2 in limestones than in the atmosphere or ocean. This sequestration of CO_2 by living things is far more important than trivial additions to the atmosphere caused by human activity.

The 'carbonate factories' described here show that carbon dioxide is vital for the production of limestone. Trying to reduce the carbon dioxide content of the ocean by reducing human emissions is not only futile, but it would have harmful consequences for all the carbonate fixing animals and plants in the ocean. Carbon dioxide in seawater does not dissolve coral reefs, but is essential to their survival.

Bourman, R.P., Murray-Wallace, C.V. and Harvey, N. 2016. Coastal Landscapes of South Australia. University of Adelaide Press, Adelaide. 420pp. Paperback $A 132. Ebook free from University of Adelaide Press. DOI: http://dx.doi.org/10.20851/coast-sa

Starck, W. 2010. Observations on growth of reef corals and sea grass around shallow water geothermal vents in Papua New Guinea. *Quadrant Online,* 15 *March 2010.*

Berner., R.A. and Kothavala, Z. 2001. A revised model of atmospheric CO_2 over Phanerozoic time. American Journal of Science, 301, 182-204.

Herfort, L, Thake, B. and Taubner, I. 2008. Bicarbonate stimulation of calcification and photosynthesis in two hermatypic corals. Journal of Phycology, 44, 91-8.

The Great Barrier Reef, climate change and science

Peter Ridd
Marine Geophysical Laboratory, James Cook University, Australia
peter.ridd@jcu.edu.au

Basic misconception: The whole world knows that the Great Barrier Reef (GBR) is on its last legs and that it is getting worse.
Mass coral death: A story constructed from whole cloth to demonstrate the disaster of global warming, and other human impacts.
Corals: A masterpiece of cooperation and temperature adaptation

- When the coral bleaches, the *zooxanthellae* leave or are ejected by the coral
- Coral will bleach from high and low temperature and many other stressful events
- Bleaching is not a death sentence, it is a strategy for life
- Bleaching often prevents the coral from dying
- Corals are born with no *zooxanthellae*
- They capture them from the water and surroundings

Corals can adept to temperature changes by shuffling *zooxanthellae*

- There are lots of different species of *zooxanthellae*
- Corals have the ability to select *zooxanthellae* from the water around them
- Different species of *zooxanthellae* affect coral growth rates and their susceptibility to bleaching differently
- Some "low octane" species will give resistance to bleaching but corals will grow slowly
- "High octane" *zooxanthellae* will allow the coral to grow quickly but a hotter-than-average year will cause bleaching and possibly even death
- After a coral bleaching, the coral may take on a different species of *zooxanthellae* which will make it less susceptible for temperature in the future
- Short lived species like *Acropora* are more susceptible to bleaching. Live fast, die young and recover quickly.
- Massive corals (like *Porites*) are relatively unaffected by bleaching. They can live for centuries

A major bleaching event occurred in 2016. But the surveys only looked at the shallowest and most susceptible species at water depths of <2 m where water got hottest. We still have no idea what happened in the deeper water. Corals grew deeper than -40 m.

For 99% of the corals of the GBR, there is an 11% increase since the 1940's.

If sea level would rise, there will be far more corals on the "reef flats".

Conclusion:
We must concentrate on using the replication crisis to develop better quality control systems for all of science. Argue less about the science and more about the systems of quality control.
And don't worry about the Great Barrier Reef – It is fine.

This abstract was composed by Nils-Axel Mörner on the basis of Professor Ridd's ppt-presentation

Salt and albedo

A proven "dashpot" solution to either possible threat - climate warming or climate cooling - in a post Holocene period of fluctuating eustatic sea-level uncertainty

David Bloch
M.R.Bloch Salt Archive, commonsalt@outlook.com

Sabkha salt winning has been a critical occupation and an elementof survival for mankind since the beginning of history. The precipitation of thin layers of evaporite salt has been a key technology comparable to the discovery of fire. With modern tools this ancient technology can be employed to incrementally move the mean global Albedo both positively or negatively, by industrially creating a pristine white canopy of salt precipitate or alternatively flood the precipitate to a dark absorbing Naphtol green brine. Ancient Sabkha salt technology has produced such a white canopy in vast expanses of existing uninhabitable endorheic basins. As opposed to Polar snow high indexed albedo regions these basins are within the 'hot" latitudes. These basins have been previously used to produce such a canopy technology.

Academic estimates cite the principle use of Qanat water to have been for domestic irrigation purposes however the human engineering motivation required for building these ancient systems was far greater. The surface crust of an inland Sabkha basin typically is made up of layers of different salts that have re-crystalized and settled or precipitated during the evaporation process of controlled QANAT system flood-waters. Leached Salts dissolve quickly in a desert endorheic basin, and the process can produce purer and more concentrated, layered playa salt cakes. The various dissolved salts leached and crystalised out of the underlying layers were the original ancient engineered design of the Qanat to control basin flooding without destroying the basin salt mirror playa or causing erosion. They were built and operated during certain periods when coastal salt evaporation pans were globally inundated, and salt was catastrophically in short supply.

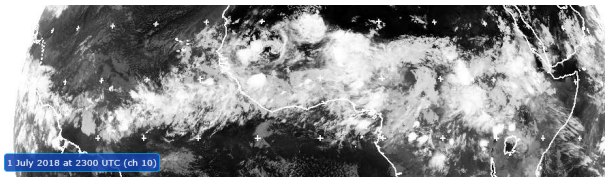
Nile Climate Engine
or
How We Altered one of the Planet's Largest Weather Systems

Conor McMenemie
mcmenemieconor@hotmail.com

Human activity at the beginning of the last century had started a climatic chain reaction resulting in the conditions known as Global Warming (GW) and Climate Change (CC). 3,000 to 6.000 m³/s of water had been evaporated and drawn southward into the Ethiopian Highlands region where it contributed to the conditions promoting the African Easterly Wave (AEW) system JASO. Since this system flows from there 15,000 kms westward, any changes to its frequency affects a number of other climatic systems. This natural evapotransportation event changed in 1902 when part of the annual 26,000 km² shallow, lower Nile flood was stored in a deep water-reservoir at Aswan, reducing the overall evaporation rate. Unwittingly we had struck the Archillies heel of one of the planet's largest weather systems by altering its moisture budget, thus its ability to form these waves. Among other things this allowed for additional heating to the equatorial oceans due to reduced AEW cloud above. This effect became more profound from 1964 with the Aswan High Dam construction.

The most basic climate mechanism is that solar radiation penetrates the body of the equatorial oceans producing a warming effect. The ocean currents driven by the corliolis effect circulate this absorbed solar energy poleward, releasing some of it into the atmosphere and melting polar ice. The equatorial cloud mass within the Intertropical Convergence Zone (ITCZ) partly determines how much solar energy is absorbed and distributed. Within the ITCZ is the AEW system, which forms low pressure troughs followed by a high pressure ridge. About 60 of these waves form in East Africa annually, providing rain and cloud cover up to 15,000 km westward (fig 1).

Fig. 1. Geostationery Satellite Image showing AEW Formations. 0W 0N.



AEW cloud formed in NE Africa partly determines the volume of Sub Saharan rain and mass of cloud cover over the equatorial Atlantic. Image Source:NEODAAS NERC

AEW variability can shows up in the Sea Surface Temperature (SST) data forming a region (here referred to as the Summer Sea) due to this ocean insolation factor (fig 2). This being that the AEW marine stratocumulus cloud mass acts as solar mirrors reflecting incoming solar radiation away from the ocean surface. Varying the cloud mass varies the ΔSST.

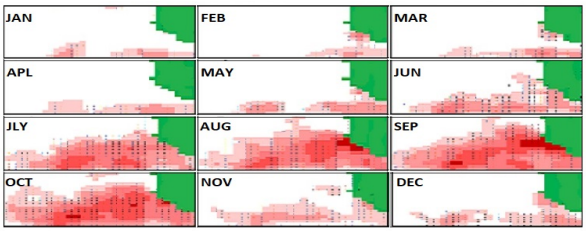


Fig. 2. Summer Sea Monthly SST Anomaly
Summer Sea ΔT.1945 to 1964 mean value. Redscale: 0.1 degree increments above 0.5°C. Data Source: HadlSST1

This Summer Sea warming or cooling effect would have the characteristics of the (A) vector, (B) timeframe, (C) location and (D) magnitude of the AEW above. Figure 2 demonstrates criteria A, B & C for a monthly warming trend (predominantly JASO). Figure 3 shows a decal northern summer (August) view of this warming event spreading westwards from the West African coast into the El Nino Pacific arena. *Although this presentation concentrates upon this heating effect in the Summer Sea, which*

in itself is refined to give a clear image of it rather than portray the true magnitude of the event. a similar yet less clearly defined action takes place in the Gulf Of Guinea.

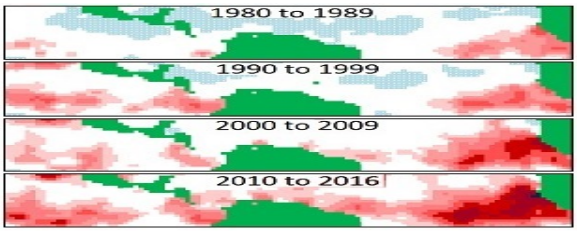


Fig. 3. Equitorial Atlantic and Pacific Decal Anomaly
1945/64 mean. Redscale: 0.1 degree increments above 0.5ºC. Source: HadlSST1

Figure 4 demonstrates the magnitude of this event in **Red:** ºC relative to 1945/64 mean. **Blue:** SST of the south flowing Canary Current used as a base figure for determining the scale of the annual varience. **Black:** (ΔT) the 'true' magnitude SST variability during peak August: Summer Sea (14'N 17'W) *less* Canary Current (23'N 17'W).

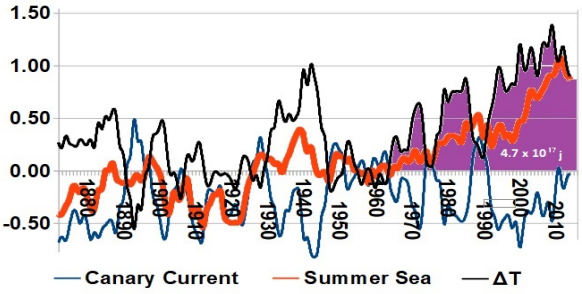


Fig. 4. Summer Sea, Canary Current and their Temperature Difference Anomaly.
Purple area represents the magnitude of the August Canary Current temperature increase between 23'N to 14'N (17W). 1945/64 mean. Source [2]. Source: HadlSST1

The (red) Summer Sea 17'W (SS) anomaly signal can be compared to other indices used in calculating the Global Warming vector. As can be seen in figure 5, apart from the SS preceding the NHMT signal by 10 years, there is no significant difference. Yet the SS signal is produced by an average of 27 watts applied over a 70 day period to achieve a ΔT of 1ºC.

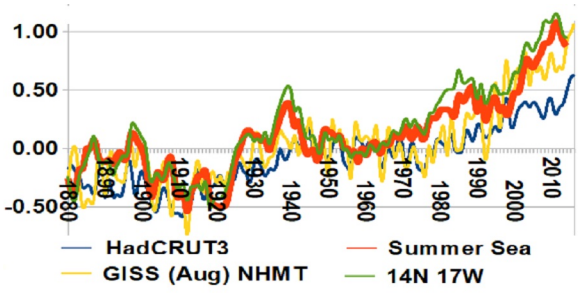


Fig. 5. Global Warming compared to Summer Sea SST Anomaly.
The latter Summer Sea signal starts its ascent from 1964, 10 years prior to Northern Hemisphers Mean Temperature signal (NHMT). 1945/64 mean. The GW signal and that of the Summer Sea are the same. Source: HadlSST1

Having factored in known ocean currents operating in the Summer Sea as well as ocean heat transport (OHT), further evidence of this degradation in the AEW cloud cover can be revealed by refining rainfall data across the Sub Saharan continent for the 20 years before and after 1964. Figure 6 shows the clearly defined sequential reduction across more than 8 degrees of latitude (880 kms). That this can only be achieved by a significant change to the weather system operating at that place and time; AEWs.

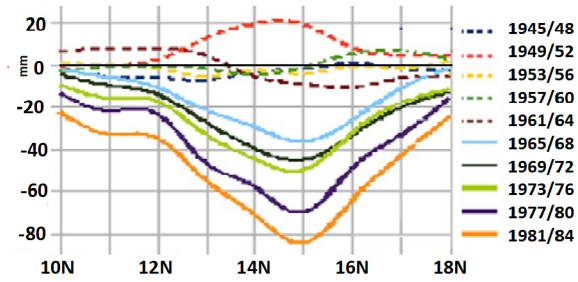


Fig. 6. August Rainfall Anomaly 35E to 17W.
3' lat smoothing, 4 years averages, 1945/46 mean.
This shows a clearly defined sequential degradation in the rain system operating at that location and timeframe. This killed 750,000 Ethiopians in 1984/85. NCAR UCAR. Ds571.0

Although a multitude of conditions affect rainfall in this region; volcanoes, cloud condensation nuclei, surface albedo, Gulf of Guinea, Mediterranean or the Indian Ocean SSTs. None of them have the potential or record of providing the degree or abruptness for this reduction to the whole system as shown in fig 6, yet altering this system will affect most of the aforesaid. The root cause of this effect can be seen refining river flow data for the Blue Nile (fig 7), which is dependent upon the rainfall on the Ethiopian Highlands, a factor of AEW activity.

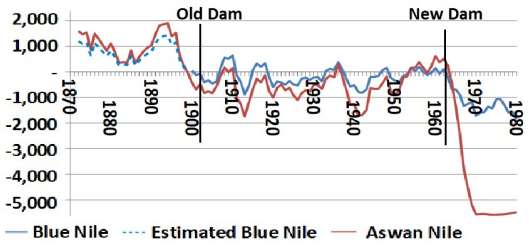


Fig. 7. Aswan and Blue Nile Flow ASO Anomaly
m^3/s. 1945/64 mean
There is a distinct change in the volume and character of the Aswan Nile flow due to dam operations, yet rainfall on the Ethiopian Highlands

This relationship can only exist if the Aswan dam operation is altering the Ethiopian meteorological conditions, which in turn are factor in AEW genesis. This can be seen from the original figure 1 image in relation to the Blue Nile catchment area (fig 8). From this singular engineering project on the Nile at Aswan there forms the Nile Climate Engine, an anthropogenic climatic event of global significance.

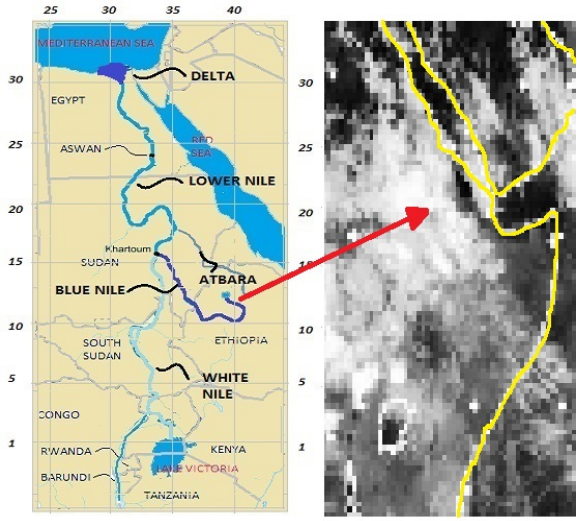


Fig. 8. *Data Source:NEODAAS NERC*

This image demonstrating that the Blue Nile catchment area is the same as that of the region from which many of the the AEWs germinates. That the anthropogenic altering of the rainfall in this specific region, as can be deduced from fig. 7, is indicative of the anthropogenic effects upon the AEW system and all that follows.

An Open Letter to the Geological Society of London, 1st June 2018.

The letter[1] was a response to the gap between false media claims that "*97% of scientists ... agree*" that "*Global Warming*" is "*all our fault*", when global temperature data prove the opposite. The 97% claim is statistically impossible, not least because most of my geoscientist colleagues and friends did not "*agree*", and it seemed highly unlikely that I would be alone in knowing mainly those from the residual 3%. Our enquiries took us to the Position Papers on climate change published by the Geological Society of London (GSL) in 2010[2] and 2013[3] of which many friends and colleagues and I are Fellows. The Position Papers support the claimed consensus for the hypothesis of Anthropogenic Global Warming (AGW) claiming support from the geological record.

It seemed that here was a quandary; the Papers make no mention of dissenting opinions, thus implying a "*consensus*", yet the Society had not, as far as we were aware, canvassed opinions from Fellows. Hence, we asked the Society to have the Position Papers posted on a blog to stimulate questions. This was readily agreed to and the texts soon appeared on the Energy Matters blog[4]. A spirited discussion followed with over 250 posts, which we hoped would lead to an update of the Papers that would at least acknowledge dissenting opinions.

Older scientists find it difficult not to question the tenets of AGW hypothesis because, at university in the 60s, the absolute and irrefutable scientific consensus was that the world was getting colder, cold enough for a new ice age to start. This cooling was blamed by some on nuclear testing, and was called incorrectly, the "Nuclear Winter", and yes, it was "*all our fault*". No survey was taken, but I'm sure "97%" of scientists would have agreed that the world was cooling, so certain was the consensus then; and most major oil companies began designing ice-breaking tankers to bring oil from the Middle East to Europe and North America just as today they are planning for a 'renewables only' future.

Against this background, the present despair over the perils of Global Warming and the urgent need for carbon penalties appears an over-reaction. Ignoring the problem of exactly how one measures the "average" temperature of the world, it does appear to have warmed since the Industrial Revolution (which began during the last stages of the Little Ice Age) by perhaps 1°C; and atmospheric and human emissions of CO_2 have both increased. That human CO_2 emissions alone drive temperature and that either are dangerous, has not been proved.

There have been two distinct periods of strong warming since the Industrial Revolution, the first, between ~1906 and 1943 and was responsible for half of the total 20th century warming, yet human CO_2 emissions were too small to be blamed as a cause; the second, from ~1978 to 1998, was accompanied by accelerating CO_2 emissions. But there were also three periods of cooling – or lack of warming, the Victorian Little Ice Age from ~1880-1906, the "Nuclear Winter" from 1943-1978, and the current "pause", the second two being accompanied by rapidly increasing CO_2 emissions. These contrary scenarios alone suggest that CO_2 cannot be the primary driver of global warming or climate change.

1 https://wattsupwiththat.com/2018/06/15/fellows-of-the-royal-geological-society-pushback-over-climate-position/

2 https://www.geolsoc.org.uk/~/media/shared/documents/policy/Statements/Climate%20Change%20Statement%20final%20%20%20new%20format.pdf?la=en

3 https://www.geolsoc.org.uk/~/media/shared/documents/policy/Statements/Climate%20Change%20Statement%20Addendum%202013%20Final.pdf?la=en

4 http://euanmearns.com/the-geological-society-of-londons-statement-on-climate-change/

The GSL Position Papers claim "*that the only plausible explanation for the rate and extent of temperature increase since 1900 is the exponential*[5] *rise in* CO_2*"* but the IPCC implicitly assign 'natural' causes to the first warming period which ended in 1943, not CO_2. This is critical to the AGW hypothesis, for if CO_2 did not cause the pre-1943 warming, the claimed consensus that Catastrophic AGW is caused by human CO_2 emissions must be mistaken. Such a fundamental difference of opinion should be addressed by GSL, as both cannot be 'correct'.

In addition to accepting the claimed but long discredited '*97% of scientists agree'* meme, the GSL also accepts that Global Warming is causing climate extremes such as accelerating sea level rise, 'hottest year ever', polar melting, more hurricanes, more rain, more drought, more fires, more floods, many of which claims even the IPCC acknowledge as being due to '*natural*' weather phenomena. The Society should be at the vanguard of dispelling such myths wherever possible rather than encouraging them.

Two closely related elements of the GSL statement are also at odds with the evidence: Firstly, that the PETM "*...warming event ... was accompanied by a major release of ... of carbon into the ocean and atmosphere."* Just like the once upon a time correlation between ice age temperatures and CO_2, the geological evidence clearly shows that CO_2 sometimes responds to temperature but does not drive it - or climate change. The GSL's claim that it does, is driven by the AGW hypothesis, not by verifiable evidence that a '*major release'* of CO_2 '*forced*' the sudden PETM temperature rise and then fall.

And secondly, the claim that a "*... decrease in* CO_2 *was probably one of the main causes of the cooling that led to the formation of the great ice sheets on Antarctica;"* is similarly driven – and is similarly without proof. The fact that CO_2 concentrations always follows temperature changes during the Pleistocene strongly suggests that the initiation of the Antarctic Circumpolar Current which insulates the Antarctic from warm equatorial currents, was the primary if not sole driver, with CO_2 following along as usual.

Perhaps the most damaging error, is the failure to define terms accurately. The GSL statement that the "*Greenhouse Effect (GHE) arises because certain gases (the so-called greenhouse gases) in the atmosphere absorb the long wavelength infrared radiation emitted by the Earth's surface and re-radiate it, so warming the atmosphere"* is based on the IPCC AGW hypothesis, not on proof; the contribution of convection and evaporation seem to be excluded from the GHE. The claimed (and very large) differential of 30°C (-18°C to +15°C) which GSL attribute solely to GHGs, is not anywhere proven.

Although not strictly a GSL Position Paper, the Climate Communique of 2015[6], issued jointly by a raft of learned societies, claimed that "***The scientific evidence is now overwhelming …that human activity is largely responsible for this change through emissions of GHGs***"; water vapour, the overwhelming GHG, to which human activity makes only a minuscule contribution, is seemingly by-passed; and the 125 ppm of CO_2 attributed to humanity alone becomes the primary culprit. The scientific evidence – or lack of it, suggests that there is sufficient uncertainty to undermine this Joint claim. What the document also does unfortunately, is create a binding but false consensus which will make any change of position almost impossible – one reason perhaps why the Society should never have issued the Position Papers. Many scientists think that overturning this frozen consensus is the greatest challenge we face, while others are saying "*it is too late to evaluate the evidence for Global Warming, we must act now to stop it*" – dismissing anyone who does not agree as not really scientists; there is no consensus.

These errors are made worse because, like the IPCC statements on climate from which they arise, they fail the scientific method test in not providing a falsifiable hypothesis to be tested, without the results of

---

5 In fact the best fit is polynomial

6 https://www.geolsoc.org.uk/~/media/shared/documents/policy/061543%20Climate%20Communique%20WEB.pdf?la=en

which, any claims of "scientific" consensus or "scientific" validity is not tenable. It is a fascinating insight into the science of climate change to recall that it was early climate forecasters who first discovered what is now called Chaos Theory, which the IPCC has accepted, describing the world's climate system as a '*coupled non-linear chaotic system*", for which "*the long-term prediction of future climate states is not possible'*. Yet they claim that they have been able to do this with their demonstrably failed models, models which are used by governments around the world to set climate policy, and penalise anyone with a so-called carbon footprint.

We wrote the open letter in an attempt to widen the debate because the responses to the blog posts and to a host of email correspondence suggested that the GSL position is unlikely to change, also we were concerned that the blog traffic was somewhat biased, in as much as it was mainly supportive of our concerns, a confirmation bias common to much blog traffic. To date, the letter has been signed by 41 Fellows (present and former) and by another 38 concerned colleagues. While the Society and its governing board have a right to an opinion, they also have an obligation to ensure that the reasonable views of dissenting Fellows are not ignored.

As of the date of this talk the Society had not responded. However, the June 2018 edition of the GSL magazine '*Geoscientist'* in a feature called Soapbox (for publishing mini-rants about favourite topics) and an issue which preceded our letter, Mike Ridd[7] referred to the Position Papers with the plea that many Fellows and other scientists would '*welcome … the kind of debate that the Society used to encourage.*' That this rant was published at all together with some responses for and against is encouraging however, the Society has since advised that further letters will not be published until their current review of the Position Papers is complete. This seems odd as now would be the time to canvas different views? Nevertheless, we hope the Society will think again about what they call the 'consensus' and act on our request for open discussion.

The following are largely responsible for the creation of the letter: David Bodecott; Gary Couples; Howard Dewhirst; Henry Dodwell; Ashley Francis; Graham Heard; Bob Heath; the illustrations/cartoons were cobbled together from the web and serve to illustrate and reflect largely my own views on some of the issues noted in the presentation.

Howard Dewhirst

August 2018

PS:

The large differences in technical opinion about whether or not human CO2 emissions alone are responsible for either Global Warming or Climate Change, suggest some form of Red on Green dialogue is needed to examine the evidence that:

1. Climate Change is largely real, natural, and mostly beyond our control.
2. CO_2 is not the principal driver of temperature and, or climate change.
3. The global carbon cycle has always been balanced until upset by a current net 2 ppm/yr anthropogenic emissions.

---

[7] https://www.geolsoc.org.uk/Geoscientist/Archive/June-2018/Fear-of-controversy

4. Climate data has been manipulated (Climate Gate emails) to artificially support 'global warming' and remove inconvenient truths such as the Nuclear Winter from the public record.[8]
5. The Dickensian Little Ice Age climate of the 19th century and 285ppm CO_2 is a sensible climate benchmark to be targeted by decarbonisation of the planet.
6. The need to limit warming to 2°C ignores the fact that the Eemian Interglacial was ~3-5°C warmer than today, with hippos in Germany, yet CO_2 was only 275ppm, and the eventual fall of CO_2 to 180ppm lagged temperature by up to 14,000 years.
7. Elevated CO_2 during interglacials has never prevented the onset of new ice age, just as the huge albedo at glacial maxima and rock bottom levels of CO_2 never prevented onset of warming, which had to happen before the ice sheets could melt.
8. Climate models fail to model the past or the future, consistently projecting much warmer temperatures than occur and the mid-tropospheric tropical hot spot is not seen on satellite or balloon records.
9. Arctic ice is melting but Antarctic is expanding and while many glaciers are melting, modern glaciers young in age of inception towards the equator, suggesting the Holocene is cooling.
10. CO_2 declined for 150my from ~2500 ppm to 180ppm; thus excluding the Pleistocene Ice Age, CO_2 content of world's atmosphere always higher than today without ill effects; and that below~400ppm C_4 photosynthesis evolved under the pressure of CO_2 starvation.
11. Most climate alarms are false and little more than scaremongering.
12. CO_2 is mainly beneficial, NOT dangerous, but global decarbonisation is.
13. Industrial effluents and plastics, deforestation and overfishing are dangerous– and are being side-lined by the excessive focus on CO_2 emissions.

8 https://thsresearch.files.wordpress.com/2017/05/ef-gast-data-research-report-062717.pdf

The politics of global change

Aziz Adam
Adamm@iinet.net.au

"Climate Change" was never about climate. The political trickery in the name of science has never been fully understood. So, we are holding yet another conference to emphasise the science of climate as if science really mattered, at all. It never did.

Yet, scientific conferences must be held to inform, discuss, debate, and propagate the progress of sciences as it is a prerogative of scholarly and searching scientific minds, and because science is never settled. Minds ever-thirsty for knowledge can't stop seeking it. This is the cultural tradition of the educated, erudite and sophisticated societies.

The United Nations Intergovernmental Panel on Climate Change has challenged the spirit of science so spuriously that not taking them on would simply mean giving in to their politics. Science does not surrender to politics, as veracity does not surrender to mendacity.

Basically, the issue is deeply dipped in Capitalism. We have no qualms about capitalism, but when it tends to go dangerously laissez faire, it needs to be controlled within the limits of fairness.

The dynastic banking empires, with help from monarchies and the church, controlled much of the world before 1914. The two world wars between 1914 and 1945 changed all that. Monarchies today only exist toothless under parliamentary democracies (except the Kingdom of Saudi Arabia) and churches are under a cloud of widespread sex scandals. Imperialism and colonialism have dwindled. Democracy, human rights, gender equality, freedom of speech, of association, of belief, with their usual imperfections and shortcomings are today's forte. Continuing with capitalism to its ultimate goals and aspirations in the 21st century needed adjustments through processes of trial and error. The post-war politics has been these readjustment processes. Environmentalism, with all its attendant paraphernalia including "climate change" is only a part of these processes.

There exists an "international Anglophile network which operates, to some extent, in a way the radical Right believes the Communists act. In fact, this network, which we may identify as the Round Table Groups, has no aversion to cooperating with the Communists, or any other groups, and frequently do so. I know of the operations of this network because I have studied it for twenty years and was permitted for two years, in the early 1960s to examine its papers and secret records.....I believe its role in history is significant enough to be known.[1]"

The speaker of the above quote shows tremendous elf-esteem as an intellectual member of the "insiders". "He feels that the forces of total global control are now sufficiently entrenched so that they can reveal their true identity without fear of being successfully overturned.[2]" That they are unstoppable has already been proven by a train of scandals like climategate, glaciergate, hockey-stickgate, amazongate, and many more simply swept under the carpet as they marched on. What was signed in Paris in 2015 could have been signed in Copenhagen in 2009, what changed? The thinking – a part of the trial and error process. The 'carrot' of a billion dollar per year green fund and 'stick' of manipulated WTO didn't work. They realised that they only needed a signature, a 'yes' of acceptance or approval, to whatever. It couldn't be coerced, so let them come up with what they would like putting their signatures to. Durban in 2011 asked all nations to set their own respective emission reduction targets. It was only symbolic. No one is worrying now about still rising emissions or new coal-fired power stations being built. But they got the signatures.

International bankers set out to remake the world. They were confident that they could buy cooperation with the Socialist-Communist groups with the power of their money. John Ruskin of Oxford persuaded Rhodes-Milner Round Table Groups that the way to federate the world was along Socialist lines, that is, by having all property, industry, agriculture, communications, transportation, education and political affairs in the hands of a small cadre

of financially controlled political leaders who would organise the world and its peoples in a way which would compel everyone to do what was good for the world-society.[3] Institute of International Affairs, Council on Foreign Relations, the Bilderberg Group, the Club of Rome, the Trilateral Group, together with the Round Table Groups and many other Lobby groups, Think Tanks and NGOs have created an intricate mesh of networking where they do their respective parts, and this has finally been facilitated by the UN by creating the Commission on Global Governance.

That's exactly what Agenda 21 proposed, one of the unbinding treaties of 1992 Rio Earth Summit. It has now progressed to Agenda 2030, also called Sustainable Development, a Fabian Socialist blueprint with the goal of abolition of private property, redistribution of wealth under a global government, an 'optional law', but signatory nations are expected to be 'morally obliged' to implement them. Though not legally binding, Sustainable Regulations could be implemented administratively within signatory countries without legislative action, avoiding legal jurisdiction. UNESCO controls this silent bottom-up invasion through its Commission of Sustainable Development (CSD) with colonising units around the world called International Council for Local Environmental Initiatives (ICLEI). It assists municipal councils in implementing Agenda 2030, monitors progress and reports back to CSD. It recommends municipal councils should be able to make their own laws.[4]

The Paris accord is yet to come into effect, but in Australia, Local Environmental Initiatives are already wrecking havoc at municipal council level; residents are at their wit's end not knowing how to react.

Most scientists abhor politics, that is quite understandable, pursuit of science leaves little time for indulging in politics. But Scientists do vote, pay taxes, and become equal victims of any political developments with all other citizens. It is important that they at least be aware of what is happening and confer with their local politicians who they would vote for about what they know and are going to do about it. It may seem unbelievable but a world depicted in George Orwell's *Nineteen Eighty-four*[5] is in the making, we'll know better after 2020 – Citizens Beware!

References:

3. Carroll Quigley, 1966. *Tragedy and Hope : A History of the World in Our Time*. The Macmillan Company; xii+1348pp.
4. W. Cleon Skousen, 1970. *The Naked Capitalist : A Review and Commentary on Dr. Carroll Quigley's Book* : *Tragedy and Hope : A History of the World in Our Time*. Self-published; 144pp.
5. Skousen, 1970, op cit
6. Jonn Smeed, 2013. What is Agenda 21? http://www.galileomovement.com.au/docs/JohnSmeed_Agenda21_Comment.pdf
7. George Orwell, 1948. *Nineteen Eighty-four*. Penguin Books; 268pp.

Some historical cases of erroneous scientific consensus

Benoît Rittaud
Institut Galilée, Université Paris-13, Sorbonne Paris Cité, France
rittaud@math.univ-paris13.fr

Among the objections that arise when one tries to criticize the catastrophic anthropic global warming theory is that there is supposedly no historical example (at least since the beginning of modern science) of any consensual theory among scientists eventually proved to be wrong. In fact, history of sciences provides several cases of erroneous consensus. We will recall some of them and show in which ways they are worth to be compared with the climate issue.

End of oral papers

POSTERS

Posters included:

Karl Zeller & Ned Nikolov: *Unified Theory of Climate*

Albrecht Glatzle: *Domestic livestock and its alleged role in climate change*

Nils-Axel Mörner: *Sea Level Changes*

Viriato Silva and Maria da Assunção Araújo: *Coastal erosion: the case of the beaches of Vila Nova de Gaia. Consequences of the waste-water outlet, Gaia littoral (wastewater treatment plant)*

Alfredo Graça, Joana Campos, Assunção Araújo: *Relative sea level variations: PSML vs GPS data*

Unified Theory of Climate
Expanding the concept of atmospheric greenhouse effect using thermodynamic principles: Implications for predicting future climate change

Ned Nikolov & Karl Zeller
Independent Research Scientists, USA,
ntconsulting@comcast.net, kzeller@colostate.edu

We present results from a new critical review of the atmospheric *Greenhouse* (GH) concept. Three main problems are identified with the current GH theory. It is demonstrated that thermodynamic principles based on the Ideal Gas Law must be invoked to fully explain the Natural Greenhouse Effect, which essence is the boost of global surface temperature above that of an airless planet exposed to the same solar irradiance. We show via a novel analysis of planetary climates in the solar system that the physical nature of the so-called Greenhouse Effect is in fact a Pressure-induced Thermal Enhancement (PTE), which is independent of the atmospheric chemical composition. Hence, the down-welling infrared radiation (a.k.a. *greenhouse*- or *back*-radiation) is a product of the atmospheric temperature (maintained by solar heating and air pressure) rather than a cause for it. In other words, our results suggest that the GH effect is a thermodynamic phenomenon, not a radiative one as presently assumed. This finding leads to a new and very different paradigm of climate controls. Results from our research are combined with those from other studies to propose a Unified Theory of Climate, which explains a number of phenomena that the current theory fails to explain. Implications of the new paradigm for predicting future climate trends are briefly discussed.

Our analysis of interplanetary NASA data including observed surface temperatures found that long-term global mean atmospheric surface temperatures had no meaningful relationships between atmospheric thermal enhancement (ATE) and variables such as total absorbed solar radiation by planets or the amount of greenhouse gases in their atmospheres. However, we discovered that *ATE* was *strongly* related to total surface pressure through a nearly perfect regression fit via the following nonlinear function:

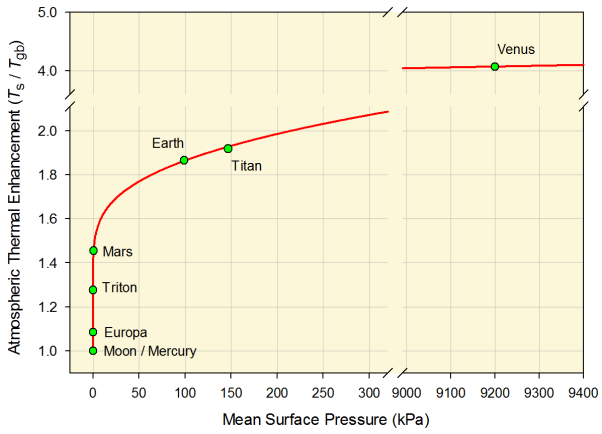


Figure 1. Atmospheric near-surface Thermal Enhancement (*ATE*) as a function of mean total surface pressure (P_s) for 8 celestial bodies using vetted NASA observations to extract an empirical mathematical formula.

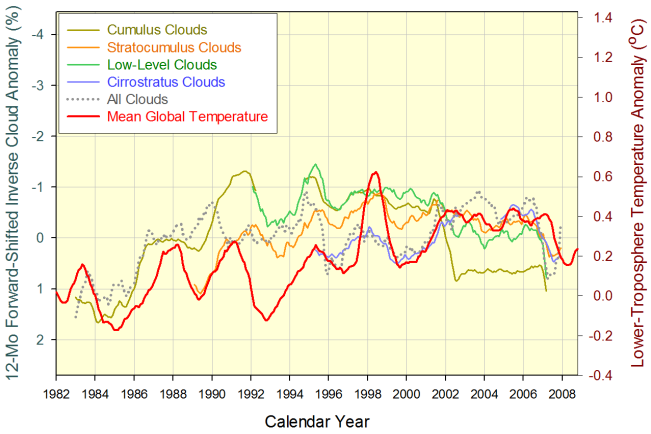


Figure 2. Dynamics of global temperature and 12-month forward shifted cloud cover types from satellite observations. Cloud changes appear to have been the cause for temperature variations during the past 30 years (Nikolov & Zeller, manuscript in prep).

The implications of the above findings (Figure 1) are numerous and paradigm altering. One example is given in Figure 2.

Livestock's Role in Climate Change: Do we need a shift of paradigm?

Albrecht Glatzle
INTTAS (Initiative for Research and Extension of Sustainable Agrarian Technologies)
Filadelfia, Paraguay, albrecht.glatzle@gmail.com

It is very old wisdom that climate dictates farm management strategies. In recent years, however, we are increasingly confronted with claims that agriculture, livestock husbandry and even food consumption habits are forcing the climate to change. We subjected this worrisome concern expressed by public institutions, the media, policy makers, and even scientists to a rigorous review, cross checking critically coherence and (in)compatibilities within and between published scientific papers. Our key conclusion is: There is no need for anthropogenic emissions of Greenhouse Gases (GHGs), and even less so for livestock-born emissions, to explain Climate Change. Climate has always been changing and even the present warming is most likely driven by natural factors. The warming potential of anthropogenic GHG emissions has been exaggerated and the beneficial impacts of manmade CO_2 emissions for nature, agriculture and global food security have been systematically suppressed, ignored or at least downplayed by the IPCC (Intergovernmental Panel on Climate Change) and other UN (United Nations) agencies. Furthermore, we expose important methodological deficiencies in IPCC and FAO (Food Agriculture Organization) instructions and applications for the quantification of the manmade part of non-CO_2-GHG emissions from Agro-Ecosystems. However, so far, these fatal errors inexorably propagated through scientific literature. Finally, we could not find a clear domestic livestock fingerprint, neither in the geographical Methane distribution nor in the historical evolution of mean atmospheric Methane concentration.

In conclusion, everybody is free to choose a vegetarian or vegan lifestyle but there is no scientific basis, whatsoever, for claiming this decision could contribute to save the planet's climate.

References (a few selected papers)

Glatzle A (2014): Severe Methodological Deficiencies Associated with Claims of Domestic Livestock Driving Climate Change. Journal of Environmental Science and Engineering B 2, 586-601. https://www.researchgate.net/publication/279180649_Severe_Methodological_Deficiencies_Associated_with_Claims_of_Domestic_Livestock_Driving_Climate_Change

Glatzle A (2014): Questioning key conclusions of FAO publications 'Livestock's Long Shadow' (2006) appearing again in 'Tackling Climate Change Through Livestock' (2013). Pastoralism: Research, Policy and Practice, **4**,1 https://doi.org/10.1186/2041-7136-4-1

Glatzle AF (2014): Planet at risk from grazing animals? Tropical Grasslands – Forrajes Tropicales 2, 60−62. https://doi.org/10.17138/tgft(2)60-62

Livestock's Role in Climate Change: Do we need a shift of paradigm?

Albrecht Glatzle, INTTAS, Filadelfia, Paraguay albrecht.glatzle@gmail.com

We searched for livestock influence on the climate and found **NONE**

Why?

1) IPCC-defined GHG-dominated global warming forcing components incompatible with reality:

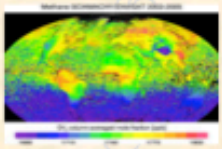
IPCC (2013): Radiative forcing components by far dominated by human GHG-emissions and solar influence on climate change kept tiny. ➔ Impossible to explain the numerous irrefutable prominent preindustrial warm periods.

Reality: 65% of the Holocene was warmer than today, in spite of pre-industrial GHG-levels, as witnessed by tree trunks recovered well above the present day tree lines (Patzel 2014, and Kullman 2017, supported by Alley 2000, Marchal 2005, Fudge et al 2016 and others).

2) CO_2-emissions shown to be beneficial for nature, agriculture and global food security: Desert greening (CSIRO 2013).

>Leaf Area Index (Zhu et al 2016). >Gross Primary Production (Campbell et al 2017). >Agricultural yields (Gaklany 2015).

3) No livestock fingerprint in global Methane distribution:



Geographical distribution…

of **Methane** (ENVISAT 2003-2005)

of **livestock-born Methane** emissions (Wolf et al 2017).

➔**Livestock emissions insignificant for global Methane budget.**

4) Historical rise of methane in the air not livestock-born:

It is instead predominantly fossil-fuel-born (Quirk 2010, Aydin *et al.* 2011, Schwietzke *et al.* 2016).

5) Severe methodological mistakes in IPCC guidelines:

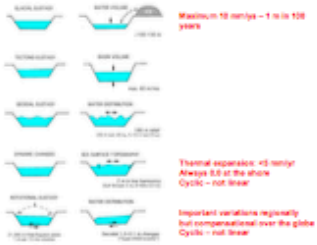
IPCC (2006) provides meticulously instructions how to estimate total non-CO_2-GHG-emissions from managed ecosystems. Emissions from pristine ecosystems are explicitly not taken into account. However, all agro-ecosystems replaced native ones at some stage in history, which also were sources of considerable non-CO_2-GHG-emissions. Total emissions need to be corrected for these baseline emissions. However, the IPCC considers all farm born CH_4 and N_2O emissions as manmade at a 100 % level.
➔ **Systematic overestimation of manmade emissions is the consequence.**

Poster presented at *International Conference on Agricultural Greenhouse Gas Emissions and Food Security – Connecting research to policy and practice*" September 10-13, 2018 in Berlin, Germany.

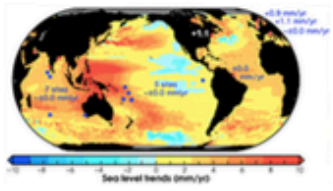
Sea Level Changes

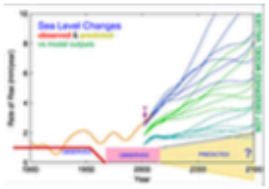
Nils-Axel Mörner
Paleogeophysics & Geodynamics, Stockholm, Sweden, morner@pog.nu

Nils-Axel Mörner **Sea Level Changes**

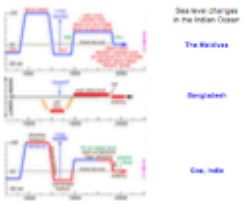


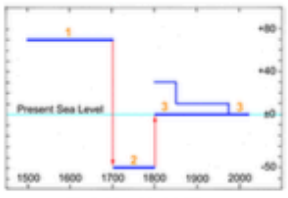
The shore can be deformed up and down due to relative sea level rises and falls. But it may also be deformed laterally due to a number of dynamic factors.
Relative sea level changes are the interaction by crustal movements and sediment compaction (Fig. 2).
Absolute sea level may change vertically as well as horizontally (Fig. 3).

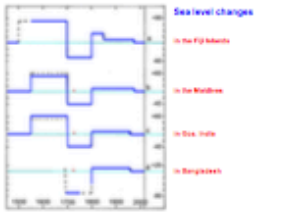




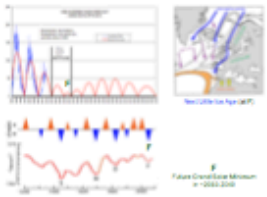
Sea level as observed in nature itself contradicts all talk about a dangerous rapid rise (Figs 4-6) – on the contrary it is estimated to rise by 5 cm ±15 cm up to 2100, which poses no threat at all.







Sea level changes in the Indian Ocean (Fig. 7) and in the Fiji Islands (Fig. 8) are quite similar and indicate the predominance of rotational eustasy in the last 500 years.



Sea Level Changes

are complicated and multi-disciplinary and always expand in view of knowledge & interpretation
It must be solidly anchored in observational facts in the field – model shortcuts don't pay off.
Glacial eustasy and thermal heating are primarily driven by the Sun.
Their contribution to sea level change is small (Fig. 6).
Rotational eustasy of Grand Solar Cycle Oscillations (Fig. 10) is driven by Planetary-Solar forcing (Fig. 11).
This implies that sea level changes are natural phenomena – which humans cannot control or do anything about.

Selected References

Mörner, N.-A., 2013. Sea level changes: facts and fiction. *Energy & Environment*, 24 (3-4), 509-536.
Mörner, N.-A., 2014. Deriving the eustatic sea level component in the Kattegatt Sea. *Global Perspectives on Geography*, 2, 16-21.
Mörner, N.-A., 2015. Multiple planetary influences on the Earth. In: *Planetary influence on the Sun and the Earth, and a Modern Book-Burning*, N.-A. Mörner (ed.), Chapter 4, p. 39-50, Nova Sci. Publ.
Mörner, N.-A., 2016. Sea level changes as observed in nature. In: *Evidence-Based Climate Change, Second Revised Edition*, D.J. Easterbrook (ed.), Chapter 12, p. 219-231, Elsevier
Mörner, N.-A., 2016. Coastal morphology and sea level changes in Goa, India, during the last 500 years. *Journal of Coastal Research*, 33 (2), 421-434.
Mörner, N.-A. & Matlack-Klein, P., 2017. Our Oceans – Our Future: New evidence-based sea level records from the Fiji Islands for the last 500 years indicating rotational eustasy and absence of a present rise in sea level. International Journal of Earth & Environmental Sciences, 2, 137 (2 pp).
Mörner, N.-A. & Matlack-Klein, P., 2017. New records of sea level changes in the Fiji Islands. *Oceanography & Fishery Open Access Journal*, 5 (3), 20 pp.

Coastal erosion: the case of the beaches of Vila Nova de Gaia. Consequences of the waste-water outlet (Gaia littoral)

Viriato Silva and M. Assunção Araújo, CEGOT-FLUP
viriams80@gmail.com – asaraujo@letras.up.pt

1. Several natural phenomena may contribute to coastal erosion. For Bird (1993), about 90% of the world's coastlines are in a process of erosion. However, it is estimated that sea level variation only represents about 10% of the coastal reduction (J.M. A. Dias et al., 1997).

The rise in sea level also forces rivers to encroach on their estuaries in order to reach a new equilibrium profile according to the new sea level. This layer of sediments, in broad estuaries, may represent a non-negligible part of the problem. (M. Araújo, (2002).

It has also been hypothesized that the stock of sediments that the sea dragged on the coast during the Flandrian transgression (Paskoff, 1985, Granja and Carvalho, 1995) has been exhausted.

Of course, the vulnerability of coastal regions to erosion still depends on other factors. One of the most decisive has to do with the geological substrate. In cliffs consisting of poorly consolidated material the erosion is faster than that of granite cliffs or of massive limestones. The tectonic movements, even when they occur in very long-time intervals, interfere and their influence cannot be ignored (Araújo, 2004).

2. Coastal defences and protection efforts are many and varied, in particular through construction of defences like seawalls, breakwaters, jetties and spurs. However, by disrupting the normal development of coastal drift, all transverse works eventually retain sediment at the updrift side of the structure. This retention of sediment will cause a deficit to down drift areas, which usually results in a retreat from the coastline (Araújo, 2004).

Over the past few decades, coastal plans (POOCs) have undertaken the construction of footbridges that allow access to the beaches, while still preserving the vegetation that protects the dunes, and also constructing palisades that can create new dunes. This new environmental awareness took some time to implement. For decades, people have been building clandestine holiday homes in the dunes and other places in the maritime public domain (Araújo, 2004).

3. In the case of the Douro River, it is estimated that about 86% of its capacity to feed the coastal areas of northern Portugal was lost as a result of the construction of hydroelectric dams (Mota Oliveira, 1990). In the case of the Crestuma dam, located very close to the mouth of the river, it resulted in a great reduction in sediment transport capacity.

4. Among the cases of damage caused by human intervention, the Waste-water Treatment Plant, Gaia Litoral, was inaugurated in 2003, which has an underwater extension of 2.5 km, with its final effluent discharged into the sea at a depth of 30 meters. (Fig. 1a, before the waste-water outlet construction) and (Fig. 1c, after its construction).

The block protection to the effluent outlet initiated a strong beach erosion to the south of Madalena beach, and even before the inauguration of waste water plan, in 31/December 1998, a restaurant called Titanic, 3700 meters to the south of the waste-water outlet was partially destroyed at Francelos beach (Fig. 1b).

So, as a conclusion: the combined effect of dam sediment retention and anthropogenic works interfering in littoral drift seems much more important than the sea level rise that is quite small - if existent – in this area of Portuguese coastline.

Fig. 1. (a) An old image of the coastline (1978) with an undisturbed coastline south of Douro mouth (map tilted 90° to the left. (b) The "Titanic" (31/12/1998). (c) The most recent image of this coastline in Google Earth (11/04/2015). The yellow pins mark the location of the sewage outlet and the "Titanic" restaurant.

References

Araújo, M.A., 2004, *Program of Littoral geomorphology*, document for the Aggregation proof presented to FLUP, available at http://web.letras.up.pt/asaraujo/seminario/programa.html. Aula 10: riscos e ordenamento

Bird, E. C. F., (1993) - *Submerging Coasts. The Efects of a Rising Sea Level on Coastal Environments*, John Wiley & Sons, Chichester, 184 p.

Bird, E. C. F., (2001) - *Coastal Geomorphology. An introduction,* J. Wiley & Sons, 322 p.

Dias, J. M. A. *et. al.* (1997) - Evolução da linha de costa, em Portugal, desde o último máximo glaciário até à actualidade: síntese dos conhecimentos, *Estudos do Quaternário,* APEQ, Lisboa, p. 53-66.

Mota-Oliveira, I. B., (1990) - Erosão costeira no litoral Norte: considerações sobre a sua génese e controlo, *Actas do 1o Simpósio sobre a protecção e revalorização da faixa costeira do Minho ao Liz,* Inst. Hidráulica e Recursos Hídricos, Porto, p. 201-221.

Paskoff, R., (2001) - *L'élevation du Niveau de la Mer et les Espaces Côtiers,* Institut Océanographique, Col. Propos, 190 p.

Relative sea level variations: PSML vs GPS data

Alfredo Graça (alfredograca@gmail.com)
Joana Campos (joanamcs17@gmail.com)
Assunção Araújo (CEGOT-FLUP) asaraujo@letras.up.pt

To better understand this paper, it is important to know that since the creation of the Earth (4.6 billion years ago) there have been numerous climate cycles that heat and cool the planet and that the Quaternary (2.6 MA), was a period of continuous climate oscillations. In the first 900 thousand years these oscillations were not very intense and happened at intervals of approximately 41 thousand years. Thereafter these changes became more intense and with periods of approximately 100 thousand years. At the end of the Pleistocene the *Würm glaciation* took place. This glaciation had several sub-stages, such as the *events of Heinrich*, which lasted nearly 750 years and caused a lowering of temperature, and the *events of Dansgaard-Oeschger* that were warmer. There were also the *Bond cycles* that were 1500-year cycles that occurred in the Holocene and may be equivalent to the *Dansgaard-Oeschger events*. Here, the effects of these events and cycles were not only notable for temperature variation but sea level as well.

At the peak of the *Würm glaciation* (18,000 years BP), sea level receded about 120 meters due to the formation of large continental ice sheets (*inlandsis*). For example, in Scandinavia (with thicknesses up to 3km) according to the mechanism of isostasy, this overload made this part of the continent suffer a subsidence, thus causing the forebulge (for example the Netherlands area) to emerge.

At present, the phenomenon is reversing. With the thawing of these immense ice sheets, the pressure which they exerted over Scandinavia was relieved, which has resulted in a gradual rebound and consequent subsidence of the Netherlands area. Thus the "sea level rise" that is observed today in the forebulge areas is partially a result of this phenomenon. This melting affected the entire world, but this effect has intensified in the forebulge areas.

5000 years BP is generally accepted as the chronology of maximum *Holocene Transgression*. In many places (Moura et al., 2007) it corresponds to a sea level a little above the current sea level.

The current level of the sea is due to the end of the *Little Ice Age* that ended in the middle of the XIX century and caused a slight rise of about 12 cm in 150 years (Mörner, 1973).

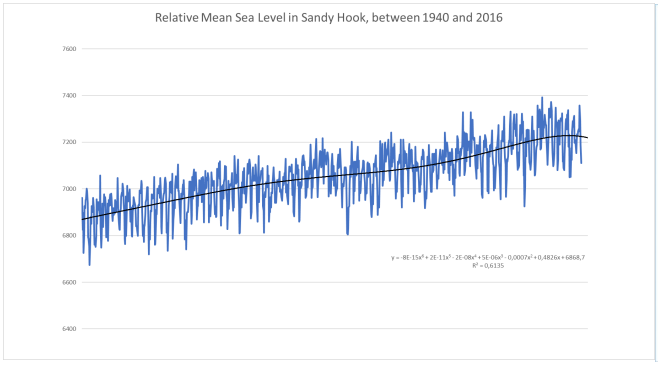
Nowadays, thanks to the contrast between different isostatic situations, there are some differences about sea level in various places.

As can be seen in the charts for Sandy Hook and Grand Isle, figures 1 and 3 are relative to the mean sea level and show a rise of the sea at both locations. In Sandy Hook this climb is progressive, while at Grand Isle, the trend line is slightly more curved at the beginning, showing a descent followed by a more abrupt rise. Looking at figures 2 and 4, where the vertical land movements are observed, there's a slight subsidence of Sandy Hook, whose GPS calculated the speed, in mm per year, of -2.65 +/- 0.27, that is, per year, can sink, at least -2,38mm and, at the most -2,92mm. The Grand Isle GPS shows a defined average calculation of -6.54 +/- 0.48, per year, therefore Grand Isle can submerge at least -6.06mm and, at most, -7.02mm.

In Seldovia and Vaasa it is precisely the opposite case. Figures 5 and 7, relative to sea level, show a very remarkable descent there and Figures 6 and 8, which are relative to the vertical movements, show a rise of the continent. The GPS of Seldovia shows a calculation of 9.39 +/- 1.07, which can increase by at least 8,32 mm/year and a maximum of 10,46 mm/year. The Vaasa GPS shows a calculation of 9.15 +/- 4.37, resulting in a minimum uplift of 4.81 mm / year and a maximum of 13.52 mm / year. Here, the margin of error is considerable, so it is likely that it will be difficult to reach the minimum or maximum points.

In conclusion, it seems that in these cases existing variations are intrinsically linked to the vertical land motions. Plus, the uplift, especially, in Vaasa and Seldovia is to be linked to the isostasy effect resulting from the end of *Würm glaciation.*

Sandy Hook (Connecticut)



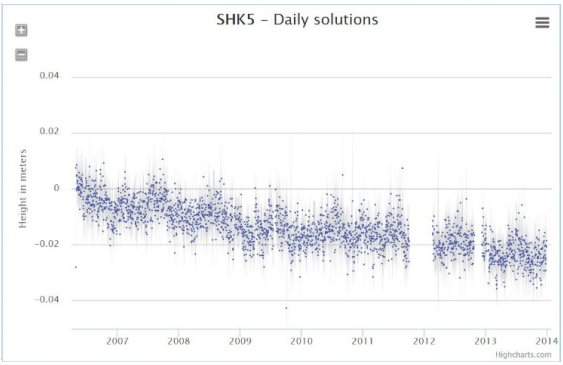
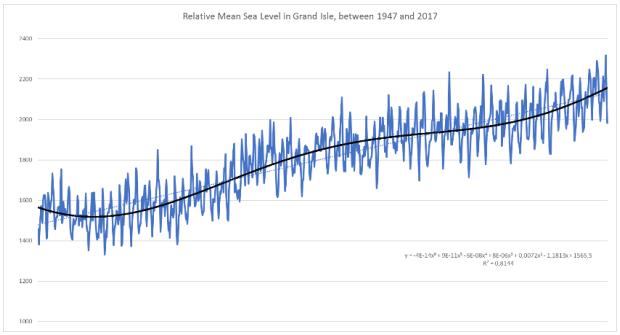


Fig.1- Relative mean sea level in Sandy Hook, between 1940 and 2016
Fig. 2- Vertical land motions, in Sandy Hook, since 2006

Grand Isle (New Orleans)



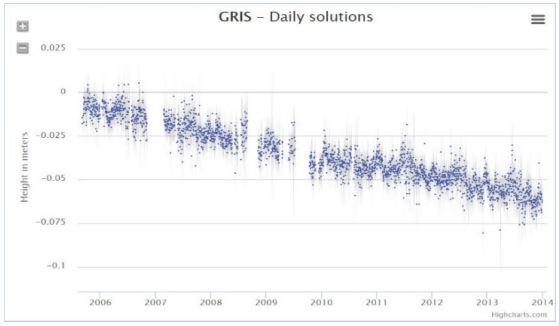
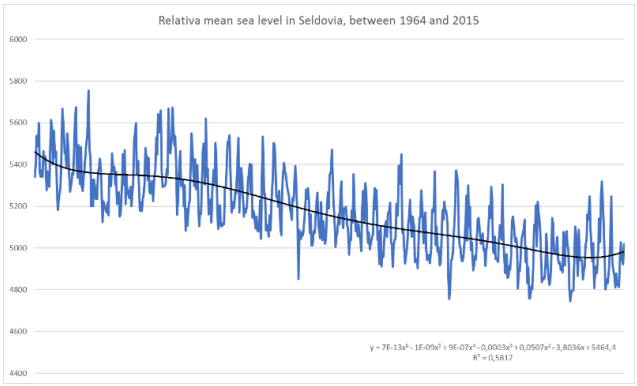


Fig.3- Relative mean sea level in Grand Isle, between 1947 and 2017
Fig.4- Vertical land motions in Grand Isle, between 2006 and 2014

Seldovia (Alaska)



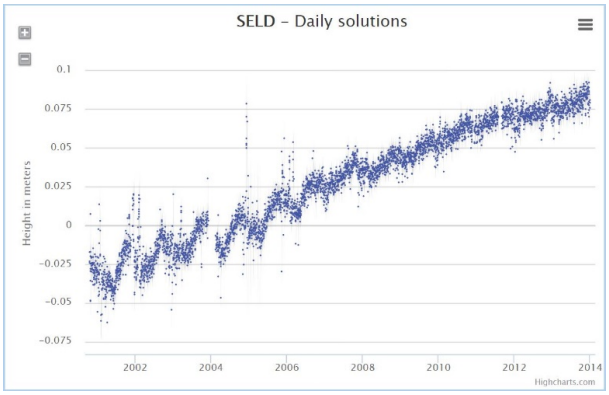
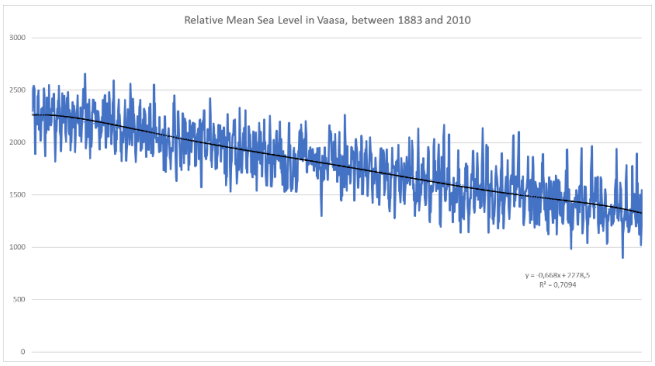


Fig.5- Relative mean sea level in Seldovia, between 1964 and 2015.
Fig.6- Vertical land motions in Seldovia, since 2000

Vaasa (Finland)



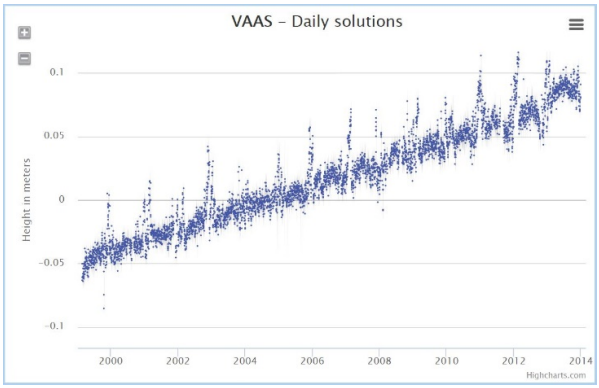


Fig.7- Relative mean sea level in Vaasa, between 1883 and 2010
Fig.8- Vertical land motions in Vaasa, since 1995

Bibliography

Frederikse, T., Jevrejeva, S., Riva, R., Dangendorf, S. (2018). "A Consistent Sea-Level Reconstruction and Its Budget on Basin and Global Scales over 1958–2014."*Journal of Climate* 31: 1267-1280.

Gendt, G. R., S.; Schon, N.; Uhlemann, M.; (2012). "Reprocessed height time series of GPS stations at tide gauges." *Solid Earth Discussions* 4: 1025–1067.

Mörner, N. A. (1973). "Eustatic changes during the last 300 years." *Palaeogeography, Palaeoclimatology, Palaeoecology* 13 (1): 1-14.

Moura D, Veiga-Pires C, Albardeiro L et al. (2007) Holocene sea level fluctuations and coastal evolution in the central Algarve (southern Portugal). *Marine Geology* 237: 127–142.

Watson, P. J. (2017). "Acceleration in European mean sea-level? A new insight using improved tools." *Journal of Coastal Research* 33: 23–38. Coconut Creek (Florida), ISSN 0749-0208.

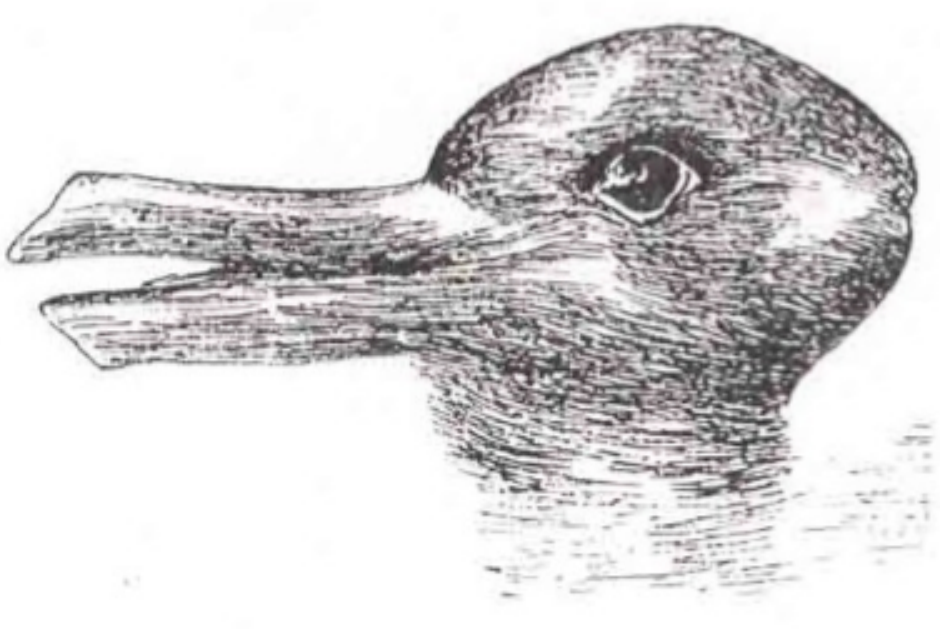
Watson, P.J., 2016. Acceleration in U.S. mean sea level? A new insight using improved tools. *Journal of Coastal Research*, 32(6), 1247–1261. Coconut Creek (Florida), ISSN 0749-0208.

SONEL SITE:

http://www.sonel.org/?lang=en

General Discussions

Day-1 and Day-2 both end with a General Discussion



In true science we must debate even the interpretations of observational facts.
The interpretation of a duck is as true as the interpretation of a rabbit (above).
It is all a matter how we look upon the image.

But if someone comes and claims
that their models indicate that it is a rat,
it is surely totally wrong
and
we have to object

Views & rules for the General Discussions

Nils-Axel Mörner
Scientific advisor of the conference

During these two days, we have experienced a very heavy manifestation of natural driving forces in climate change, in total contrast to the idea of a CO2-driven (AGW) forcing as concluded at the COP21 meeting in Paris 2015.

Normally, there is no open debate between the IPCC-proponents of a CO2-driven (AGW) forcing of climate change and related factors, and the climate realists advocating natural forcing, especially solar forcing of Earth's climate. Only at the 4th World Conference on Climate Change in Rome 2016 and at the 5th World Conference on Climate Change and Global Warming in New York 2018 has there been an open debate between the two opposed groups. Both these debates were initiated and lead by climate realists, however.

Michael Jackson (2016) has spelled it out very well: *But here lies the most fundamental problem in the field of climatic change: the unwillingness to accept alternative views, especially the open recognition of uncertainty and complexity.*

In his 2011 book on Evidenced-Based Climate Change, Don Easterbrook firmly states: *Because of the absence of physical evidence that CO2 causes global warming, the only argument for CO2 as the cause of warming rests entirely in computer modelling.*

At our General Discussions, we must argue – in an open and constructive way – about the pros and cones in different sub-questions as well as in the main question about the role of CO2 in climate change; always with science in the centre.

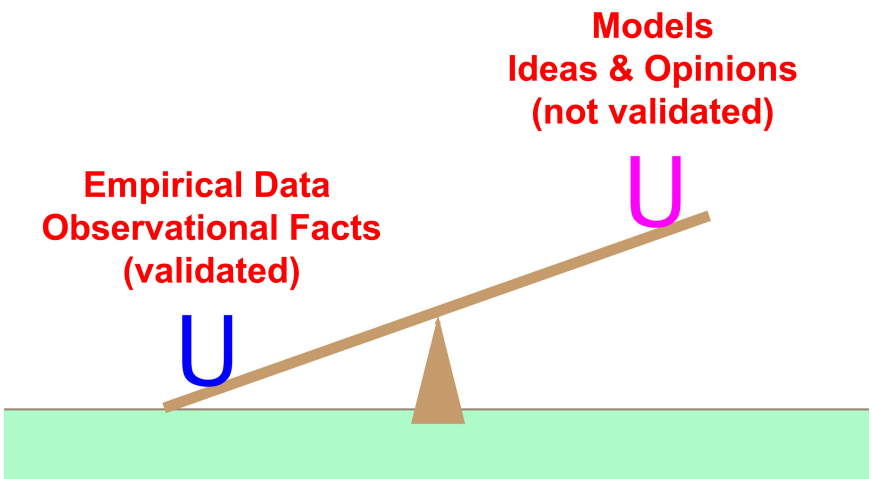
In science you may have to apply certain corrections to a measurement. The reason must be scientific, however. Furthermore, any "correction" must be clearly specified. Over and over again, do we find unspecified "corrections" applied, not for physical reasons, but just for personal conviction. Then "science" has dropped down to "anti-science.

At our General Discussions, we want respect for different opinions as the leading motto in the debate. Don't be so sure, you may debate a "duck-or-rabbit" image. When it comes to various types of falsification (like the application of unspecified "corrections" of subjective character), we may use "the sword of truth", however.

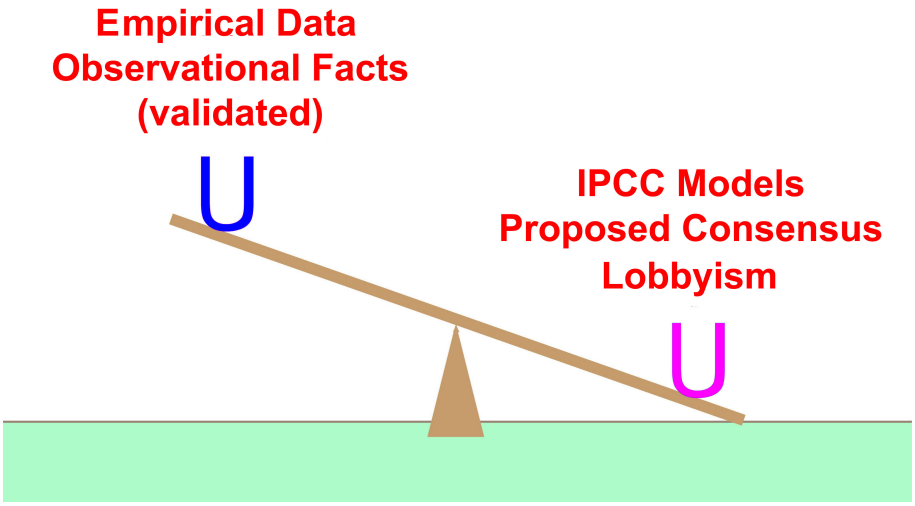
We are seeking an open debate – not an agenda manifestation: Science – not politics.

Have fun – be clever – state your own opinion.

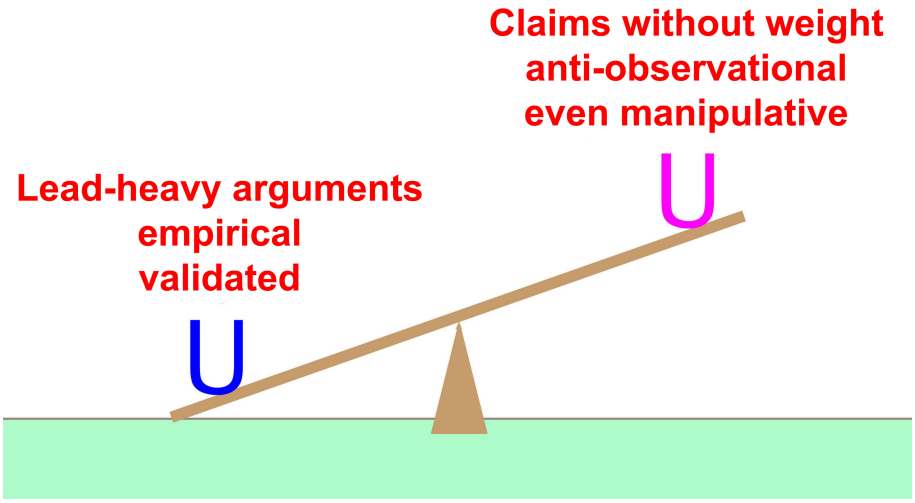
Welcome to speak up.



Empirical data and observational facts should always have the strongest weight in a scientific argumentation.



IPCC and COP21 turned all logic up-side-down
by putting all weight on model outputs
and discriminating empirical data as invalid.



The data presented at the Porto Conference gave the empirical data
the true weight they deserved,
calling for a restoration of scientific balance:

CO2 has little to negligible effect on global temperature
CO2 is a fertilizer, certainly not a pollutant
Climate is primarily driven by solar variability
Sea is not in a rapidly rising mode
Ocean acidification is a myth
Extreme weather is strongly exaggerated

Expected conclusions of the Porto Conference

Summarized by Nils-Axel Mörner

From the Conference Volume of extended abstracts, it seems probable that we may arrive at the following conclusions and statements, to be discussed during the two sessions of General Discussions.

- The study of climate change and sea level changes was earlier subjects with the geological, paleontological and geographical disciplines. This meant a deep anchoring in observational facts. Meteorology was confined to the study and forecasting of weather. It is a scientific tragedy that much work on climate change and sea level variability is now (after the IPCC project commenced in the late 80s) taken over by the meteorological discipline, which has no tradition in historical analyses.
- What we today often term "extreme weather" is by no means extreme and unusual; rather is it a natural characteristic of our weather machinery. Time/event analyses fail to record trends increasing dramatically towards the present.
- CO2 as main driver of climate change is a serious mistake. Indeed, it is based on "an elementary and grave error that have until now provided the pretext for misplaced worldwide concern about climate change". By 2100 temperature is likely not to rice more than 0.3 °C. Human emissions add only 18 ppm and nature adds 392 ppm of today's 410 ppm CO2 in the atmosphere, implying that the temperature effect of human emission is negligible.
- An increased level of CO2 in the atmosphere acts as a fertilizer for the Plant Kingdom; on land as well as in the sea.
- Ocean acidification is a present-day concept not founded in oceanography and geological history. In fact, marine life flourishes where CO2 is abundant. Carbon dioxide in seawater does not dissolve coral reefs, but is essential for their survival. The Great Barrier Reef is, in fact, doing well.
- Variations in total atmospheric pressure were proposed as an alternative explanation to observed changes in climate.
- The Sun and the variations in solar activity with time are, of course, the main drivers of changes in climate and related parameters on Planet Earth. The planetary motions and its effects on the solar variability generate changes in luminosity as well as in solar wind. Solar variability (the solar wind effect on the geomagnetic field and its shielding capacity) is recorded by the changes in atmospheric ^{14}C and ^{10}Be isotope concentrations. A number of cycles are detected, which coincide with the planetary beat on the Sun. There is a clear 60 year cycle which is documented in a large number of earth parameters indicating that is must be driven primarily by solar wind variations (also linked to changes in luminosity). The alternations between Grand Solar Maxima and Grand Solar Minima are especially powerful in climate (warm phases alternation with Little Ice Ages), ocean circulation (e.g. the Gulf Stream penetrating all the way up into the Barents Sea alternating with restriction to low latitudes) and changes in sea level (high sea level in the north and low sea levels in the equatorial region alternating with low sea levels in the north and high sea levels in the equatorial region). Future Grand Solar Minima (with assumed Little Ice Age climatic conditions) are predicted to occur at about 2030-2050 and at about 2080-2100.
- The issue of global warming, climate change and rapid sea level rise is a sad politicization of geoscience with the onset of the IPCC project. Quite correctly, it has been called *"The Greatest Lie Ever Told"*.

Table of Content

NAM-18

https://www.portoconference2018.org/