Tiny CO_2 warming challenged by Earth greening

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Anthropogenic CO_2 warming challenged by 60-year cycle

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ABSTRACT

Time series of sea-level rise are fitted by a sinusoid of period ~60 years, confirming the cycle reported for the global mean temperature of the earth. This cycle appears in phase with the Atlantic Multidecadal Oscillation (AMO). The last maximum of the sinusoid coincides with the temperature plateau observed since the end of the 20th century. The onset of declining phase of AMO, the recent excess of the global sea ice area anomaly and the negative slope of global mean temperature measured by satellite from 2002 to 2015, all these indicators sign for the onset of the declining phase of the 60-year cycle. Once this cycle is subtracted from observations, the transient climate response is revised downwards consistent with latest observations, with latest evaluations based on atmospheric infrared absorption and with a general tendency of published climate sensitivity. The enhancement of the amplitude of the CO_2 seasonal oscillations which is found up to 71% faster than the atmospheric CO_2 increase, focus on earth greening and benefit for crops yields of the supplementary photosynthesis, further minimizing the consequences of the tiny anthropogenic contribution to warming.

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Tiny warming of residual anthropogenic CO_2

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The residual fraction of anthropogenic CO_2 emissions which has not been captured by carbon sinks and remains in the atmosphere, is estimated by two independent experimental methods which support each other: the $^{13}C/^{12}C$ ratio and the temperature-independent fraction of $d(CO_2)/dt$ on a yearly scale after subtraction of annual fluctuations the amplitude ratio of which reaches a factor as large as 7. The anthropogenic fraction is then used to evaluate the additional warming by analysis of its spectral contribution to the outgoing long-wavelength radiation (OLR) measured by infrared spectrometers embarked in satellites looking down. The anthropogenic CO_2 additional warming extrapolated in 2100 is found lower than 0.1°C in the absence of feedbacks. The global temperature data are fitted with an oscillation of period 60 years added to a linear contribution. The data which support the 60-year cycle are summarized, in particular sea surface temperatures and sea level rise measured either by tide gauge or by satellite altimetry. The tiny anthropogenic warming appears consistent with the absence of any detectable change of slope of the 130-year-long linear contribution to the temperature data before and after the onset of large CO_2 emissions.

Two publications included in a list that reaches 2,532 "skeptic" papers published in peer-reviewed literature, listed by *populartechnology.net* and *notrickzone.com*

Magnitude of anthropogenic CO_2 warming toned down

***Natural* climate variability more efficient than *anthropogenic* CO_2 warming**

- **To be compared to 2,458 papers found in Web of knowledge by crossing**

[Anthropogenic] AND [Greenhouse OR CO_2] AND [Warming]

- **2016-2017: 900 "skeptic" compared to 363 AGW**

- **Change of paradigm?**

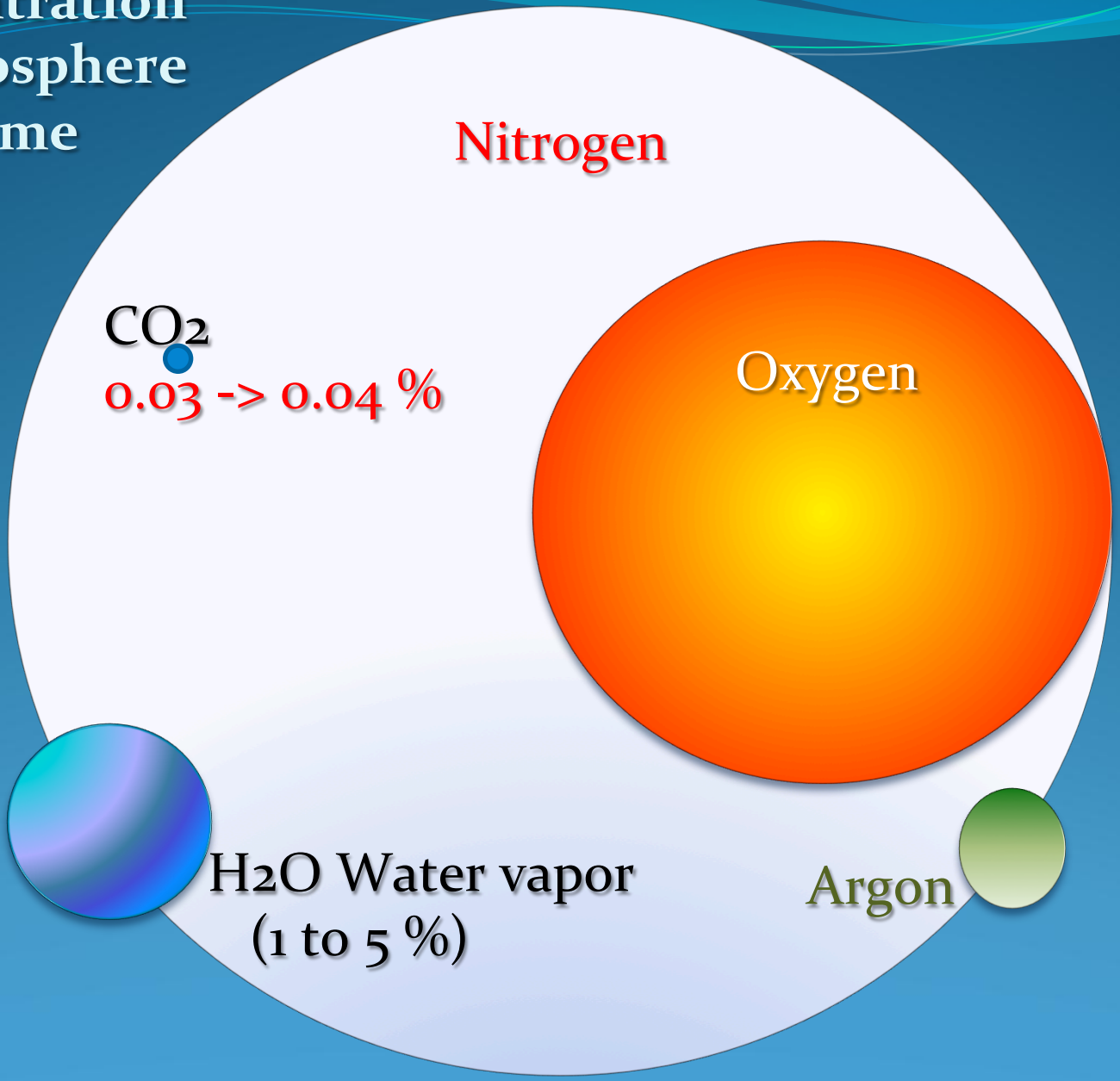
- Drop of climate sensitivity (Earth warming in case of CO_2 doubling) in latest published scientific literature

- Expert Reviewer criticism of Intergovernmental Panel on Climate Change (IPCC) AR5 report

- Natural variability

- Benefit of CO_2: Earth greening and increase of crops yields

Concentration in atmosphere by volume



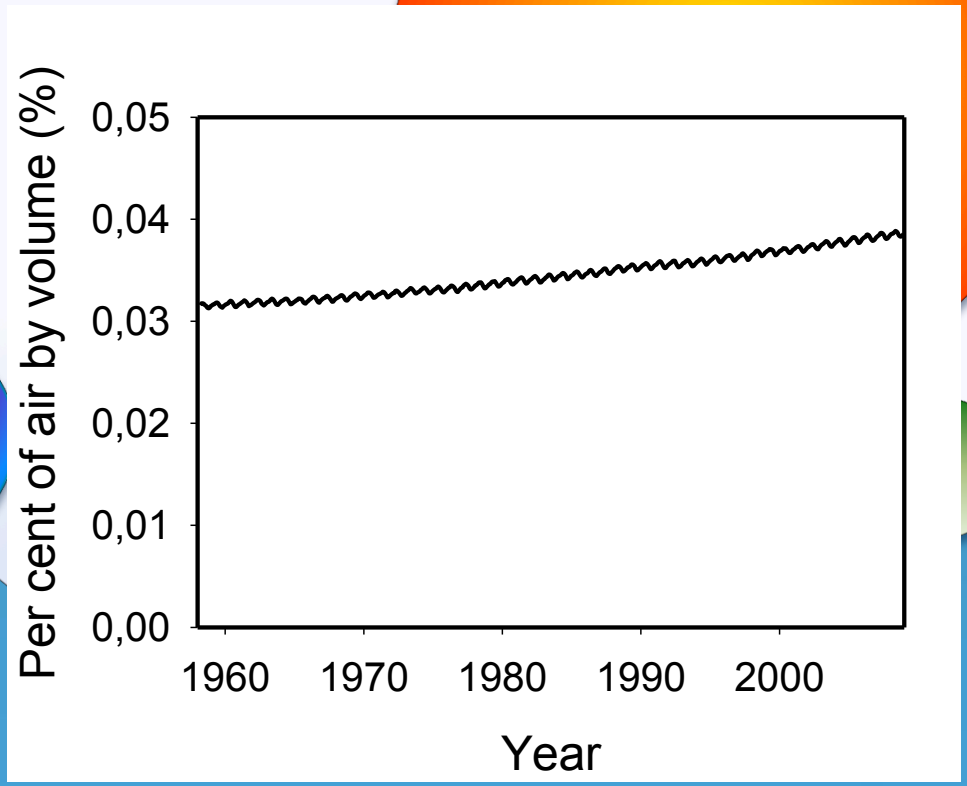
Concentration in atmosphere by volume

Nitrogen

Oxygen

CO_2

0.03 -> 0.04 %

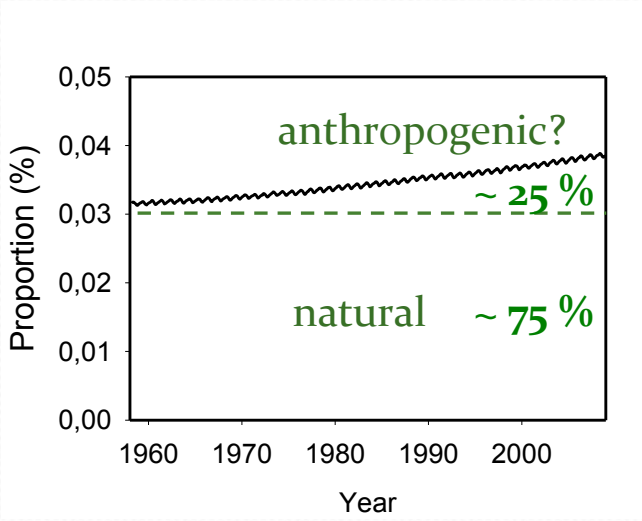


Impact on climate of European policies of reduction of emissions evaluated with the TCR climate sensitivity of IPCC AR5

concentration has doubled in a scenario of concentration increasing at 1% per year. The transient climate response is *likely* in the range of 1.0°C to 2.5°C (*high confidence*) and *extremely unlikely* greater than 3°C. {Box 12.2}

European climate package (~ 20 % of European budget) Since 2009, till 2020:

- Reduce CO_2 emissions by 20 %



20 % x 25 % x 11 % x 1-2.5°C

= 0.005-0.01°C of warming avoided…

Temperature projections of IPCC AR5

Uncertainty: 4.8 – 0.3 = 4.5°C *larger* than the target of 2°C of COPxx

Table SPM.2 | Projected change in global mean surface air temperature and global mean sea level rise for the mid- and late 21st century relative to the reference period of 1986–2005. {12.4; Table 12.2, Table 13.5}

		2046–2065		2081–2100	
	Scenario	Mean	*Likely* range[c]	Mean	*Likely* range[c]
Global Mean Surface Temperature Change (°C)[a]	RCP2.6	1.0	0.4 to 1.6	1.0	0.3 to 1.7
	RCP4.5	1.4	0.9 to 2.0	1.8	1.1 to 2.6
	RCP6.0	1.3	0.8 to 1.8	2.2	1.4 to 3.1
	RCP8.5	2.0	1.4 to 2.6	3.7	2.6 to 4.8

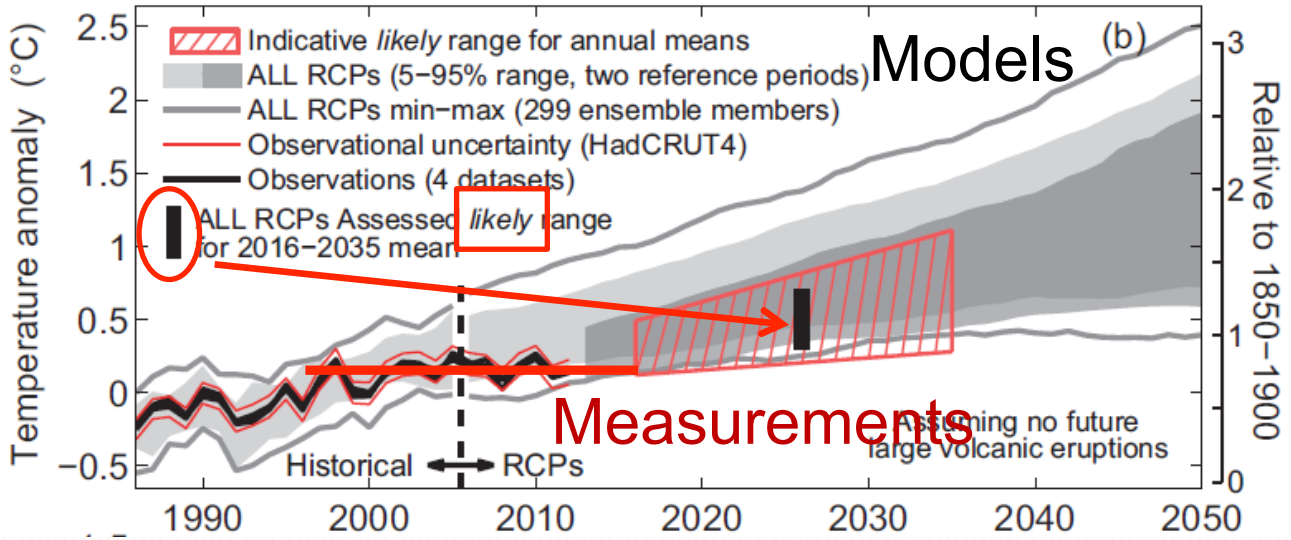
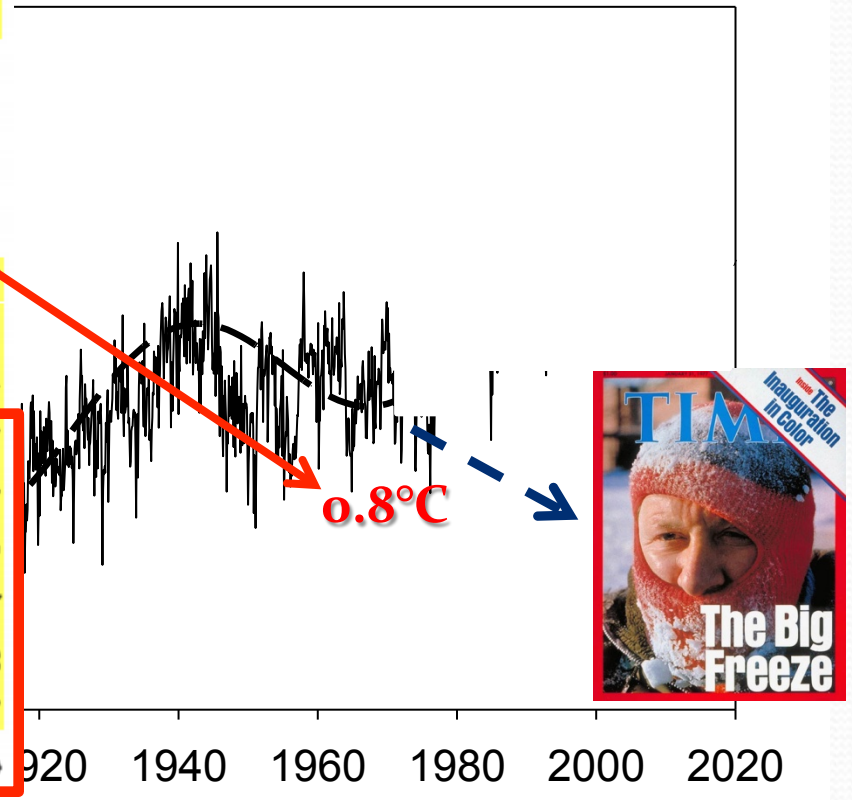


Fig. 11.25b of IPCC AR5

Models essentially play with two tunable knobs
aerosols ↘ « climate sensitivity » ↗

The 15-µm CO2 band saturates

From our calculation, a doubling of CO_2 produces a *tropospheric* temperature change of 0.8°K (*12*). However, as more CO_2 is added to the atmosphere, the *rate* of temperature increase is proportionally less and less, and the increase eventually levels off. Even for an increase in CO_2 by a factor of 10, the temperature increase does not exceed 2.5°K. Therefore, the runaway greenhouse effect does not occur because the 15-μm CO_2 band, which is the main source of absorption, "saturates," and the addition of more CO_2 does not substantially increase the infrared opacity of the atmosphere. But,



Rasool and Schneider, Science 1971

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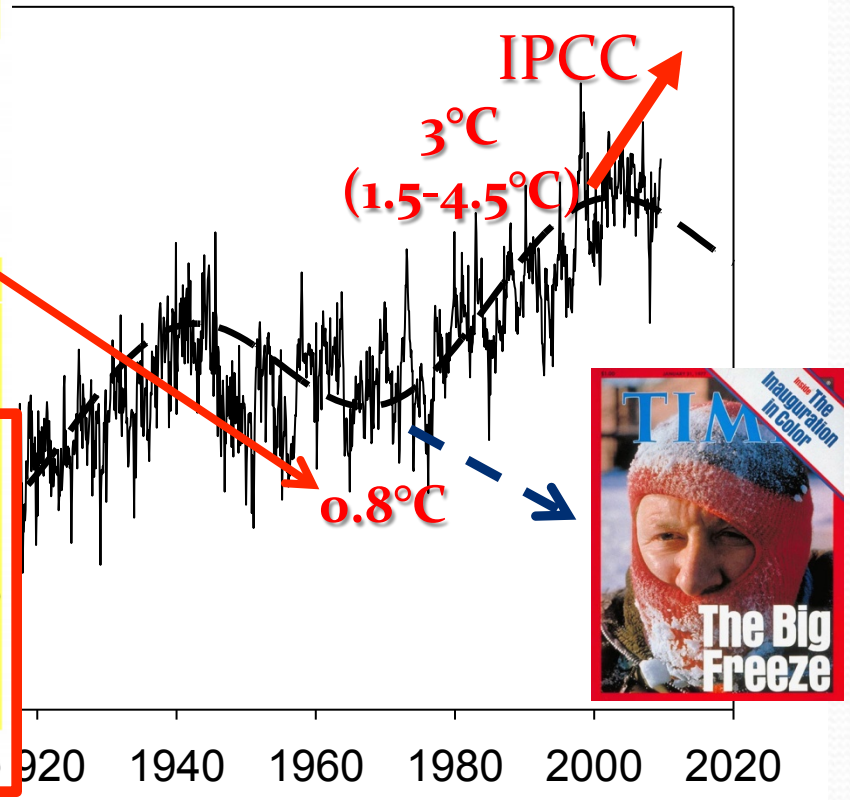


Rasool et Schneider, Science 1971

Are models validated by observations?

Not during the last century where the 1915-1945 increase is missed…

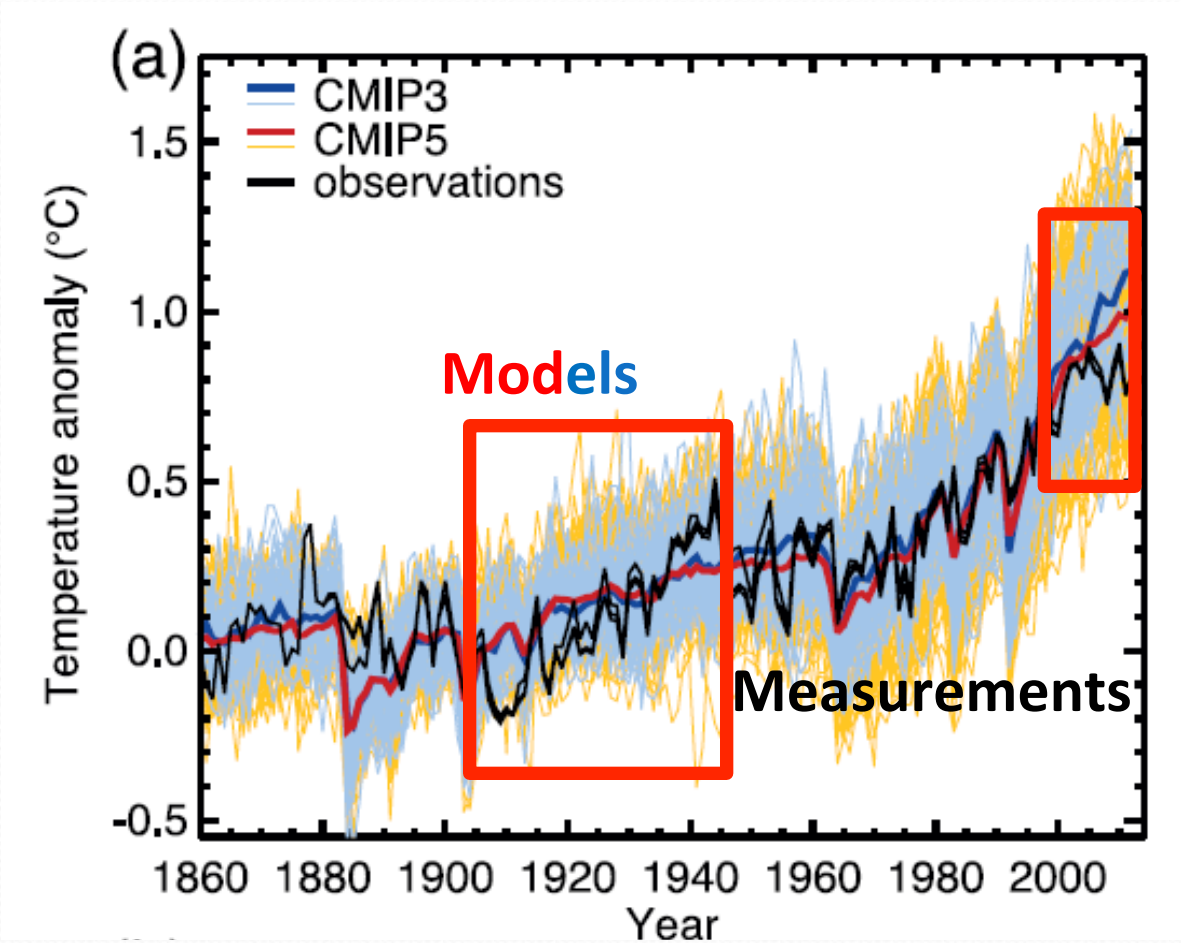


Figure TS.9(a) of IPCC AR5

Models diverge from measurements
Models rule out each other
Consensus?

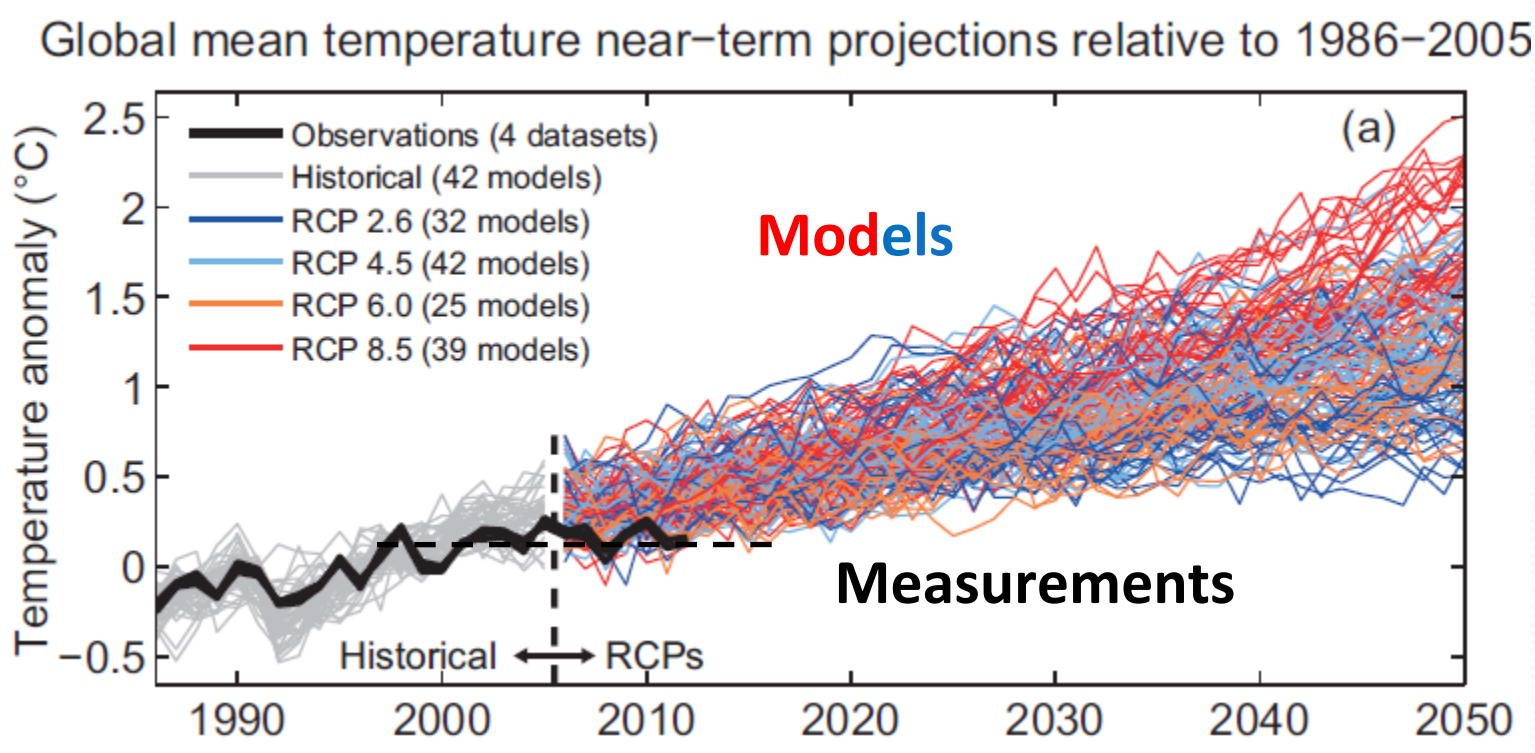


Figure TS.14(a) of IPCC AR5

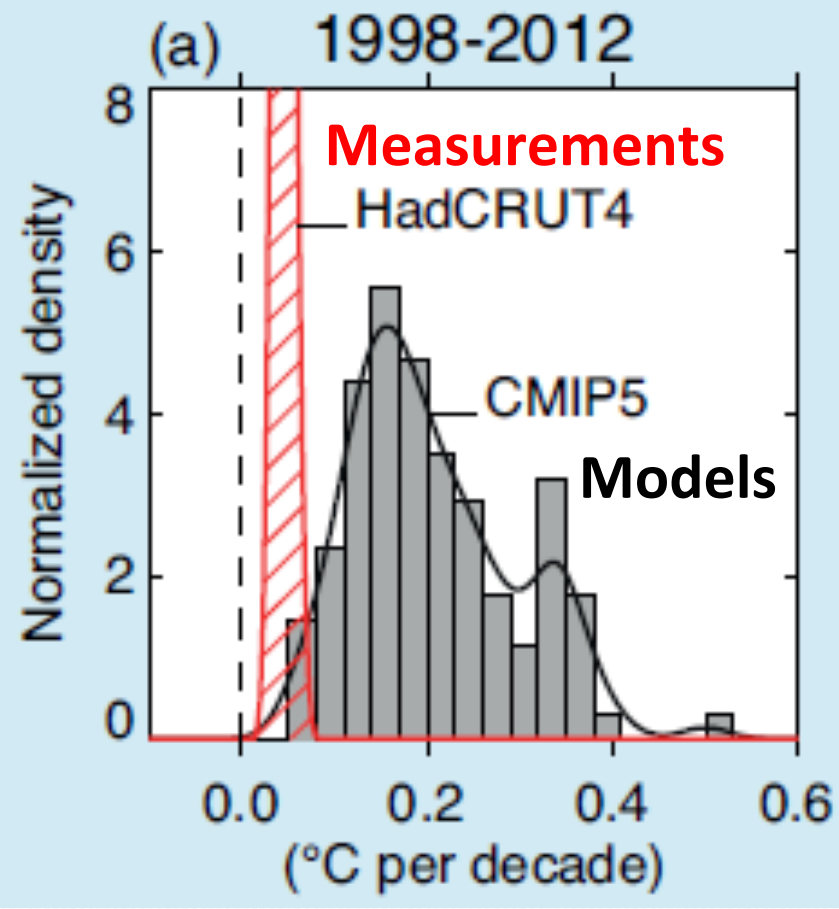


Figure 1(a) of Box TS3 of IPCC AR5

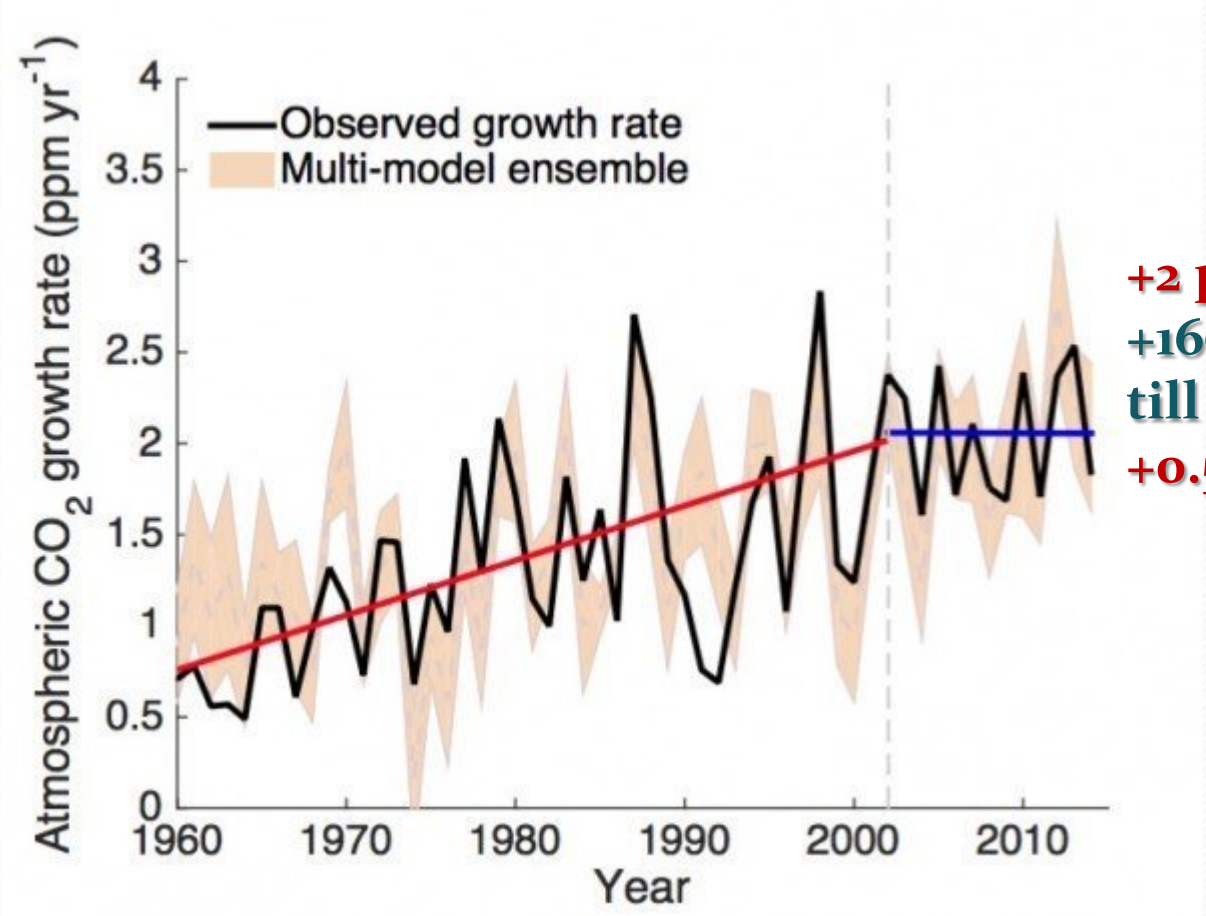
The « pause » in warming is shown by IPCC AR5 itself

No significant warming in a period corresponding to almost 1/3 of total emissions since the beginning of the industrial era

Models run 2 to 10 times too hot

Climate alarmism is not validated

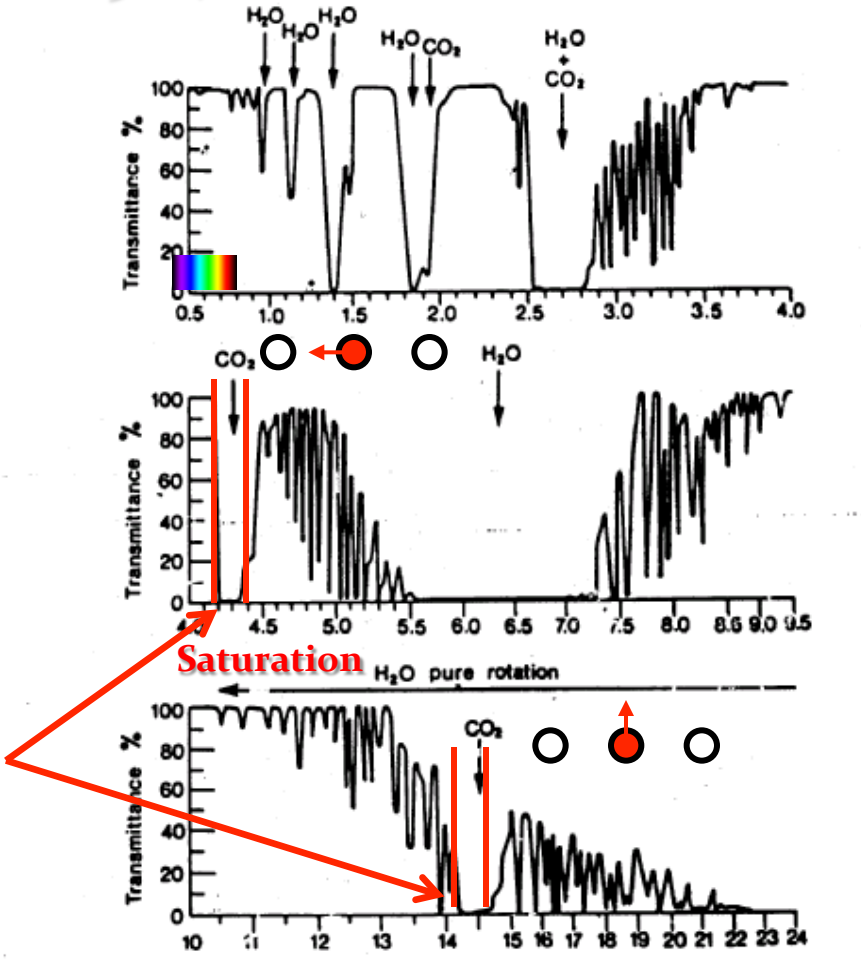
Average increase of CO_2 in air : 2 ppm/year



+2 ppm/year
+166 ppm till 2100
+0.5%/year

Keenan, T.F. *et al*, 2016. *Nature Communications*

CO_2 greenhouse effect is so efficient that it is (almost) saturated (Angström 1900)



Both atomic vibrations of the CO_2 molecule **absorb at 20 et 70 THz** the thermal radiation emitted by the Earth at both these frequencies

1 THz = 1000 billions of oscillations per second

Continuation of rainbow beyond red in the infrared wavelengths (Farmer 1974)

CO_2 greenhouse effect (almost)« saturates »

Harde (2014), Kissin (2015), Abbott & Marohasy (2017), Ollila (2017):
climate sensitivity: **0.6°C**
Radiative forcing $\Delta F = 2.2\ W/m^2$

+ 2 ppm CO2/year

By differenciating the Stefan Boltzmann equation $\sigma T^4 = F_{OLR}$

$$4\,\Delta T/T = \Delta F/F$$

$$\Delta T = T/4 \times \Delta F/F$$

$$\Delta T = 288/4 \times 2.2 \times LN(566/400)/238.5$$

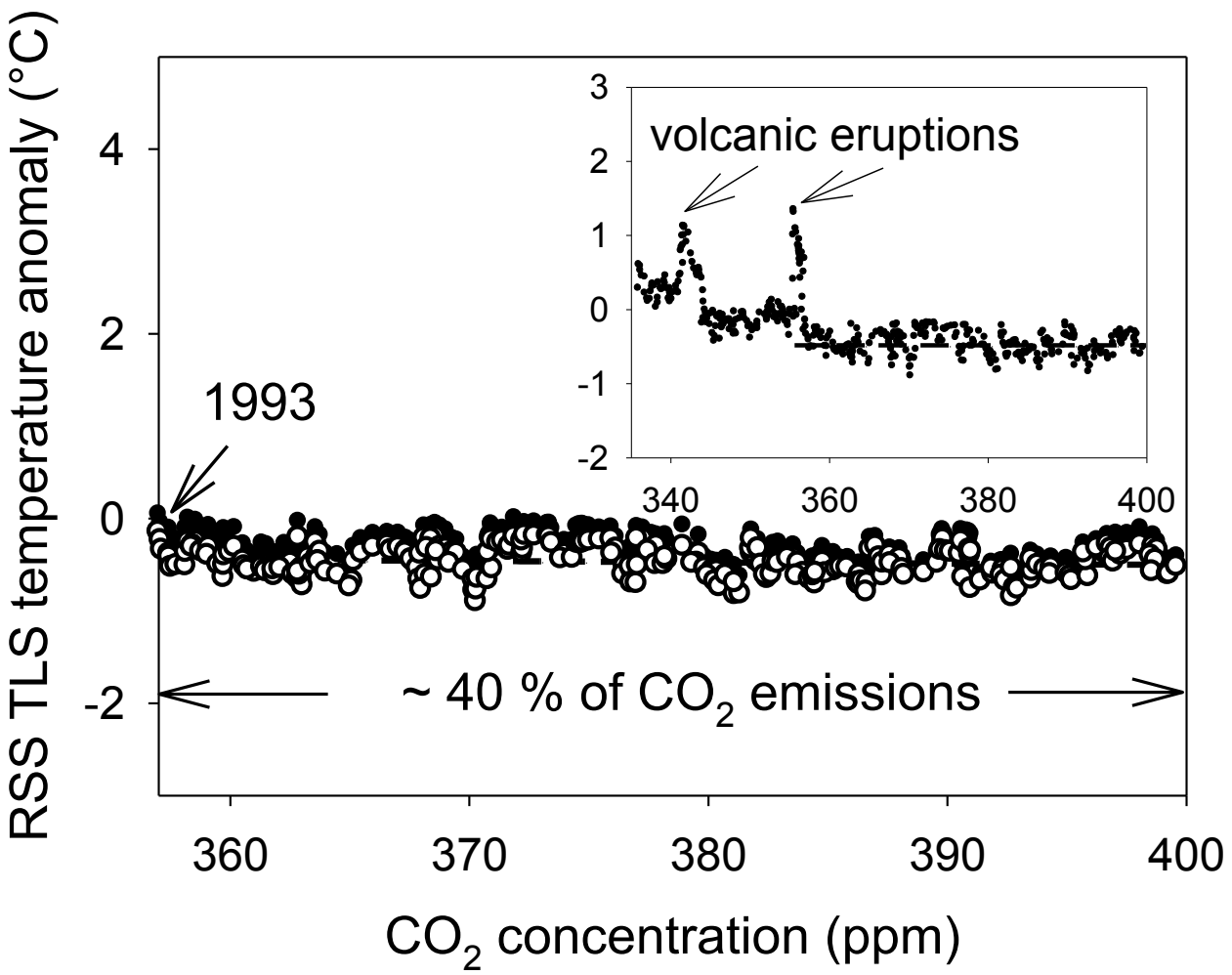
$$\Delta T = +0.2°C \text{ in } 2100$$

From our calculation, a doubling of CO_2 produces a *tropospheric* temperature change of 0.8°K (*12*). However, as more CO_2 is added to the atmosphere, the *rate* of temperature increase is proportionally less and less, and the increase eventually levels off. Even for an increase in CO_2 by a factor of 10, the temperature increase does not exceed 2.5°K. Therefore, the runaway greenhouse effect does not occur because the 15-μm CO_2 band, which is the main source of absorption, "saturates," and the addition of more CO_2 does not substantially increase the infrared opacity of the atmosphere. But,

Rasool and Schneider, Science 1971

Climate sensitivity ≤ 0.6°C is confirmed by « hiatus » since 1993

~ 40 % of all CO_2 emitted since 1900 had **NO IMPACT** on temperature measured independently by satellites in the low stratosphere (~ 17 km) Remote Sensing System (o) and UAH (●)



Theory of Greenhouse effect in the Glossary of IPCC AR5

Greenhouse effect The infrared *radiative effect* of all infrared-absorbing constituents in the *atmosphere*. *Greenhouse gases*, clouds, and (to a small extent) *aerosols* absorb *terrestrial radiation* emitted by the Earth's surface and elsewhere in the atmosphere. These substances emit *infrared radiation* in all directions, but, everything else being equal, the net amount emitted to space is normally less than would have been emitted in the absence of these absorbers because of the decline of temperature with altitude in the *troposphere* and the consequent weakening of emission. An increase in the concentration of greenhouse gases increases the magnitude of this effect; the difference is sometimes called the enhanced greenhouse effect. The change in a greenhouse gas concentration because of *anthropogenic* emissions contributes to an *instantaneous radiative forcing*. Surface temperature and troposphere warm in response to this forcing, gradually restoring the radiative balance at the top of the atmosphere.

Measurements

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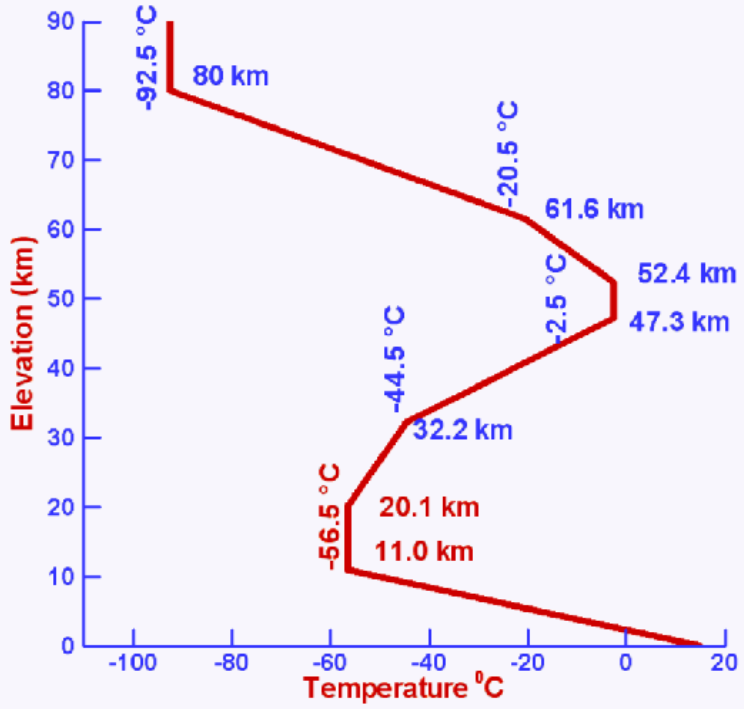
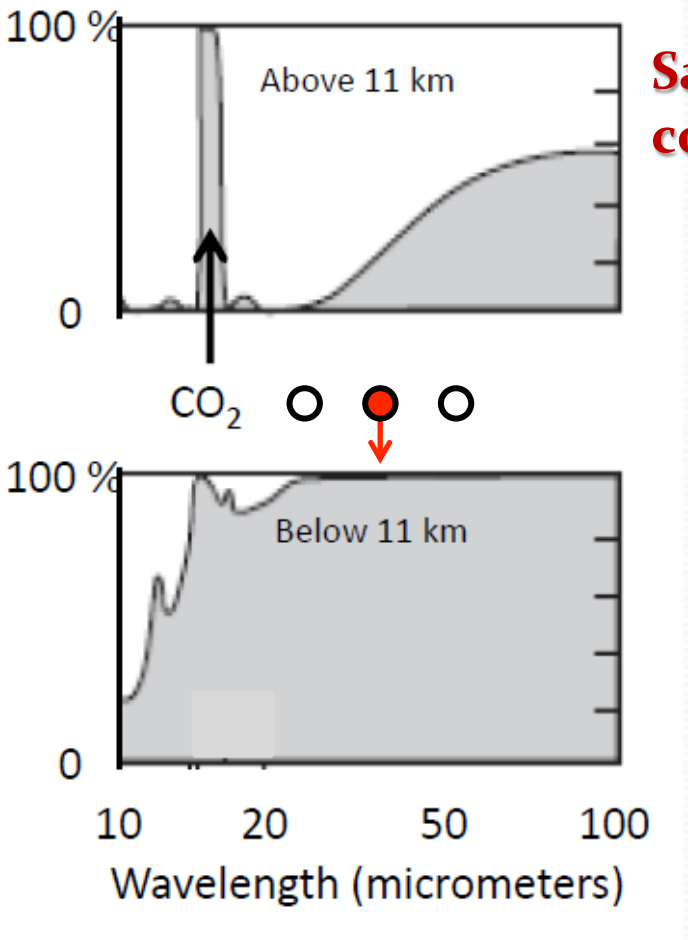


Actually above 11 km, where CO_2 absorption is still 100 %, there is no decrease of temperature and, therefore, no weakening of emission



Saturation confirmed

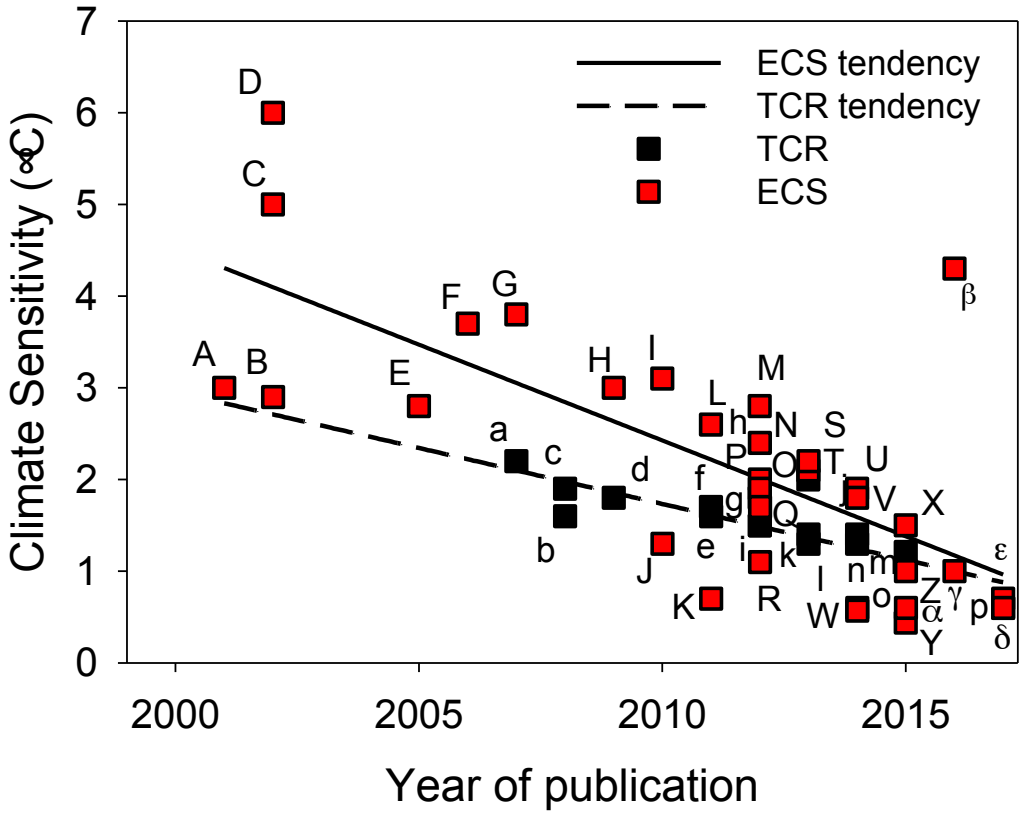
Infrared absorption of atmosphere adapted from Fig. 8.1 of Salby (2012)

In peer-reviewed literature, cooling of climate sensitivity by 10 %/year!

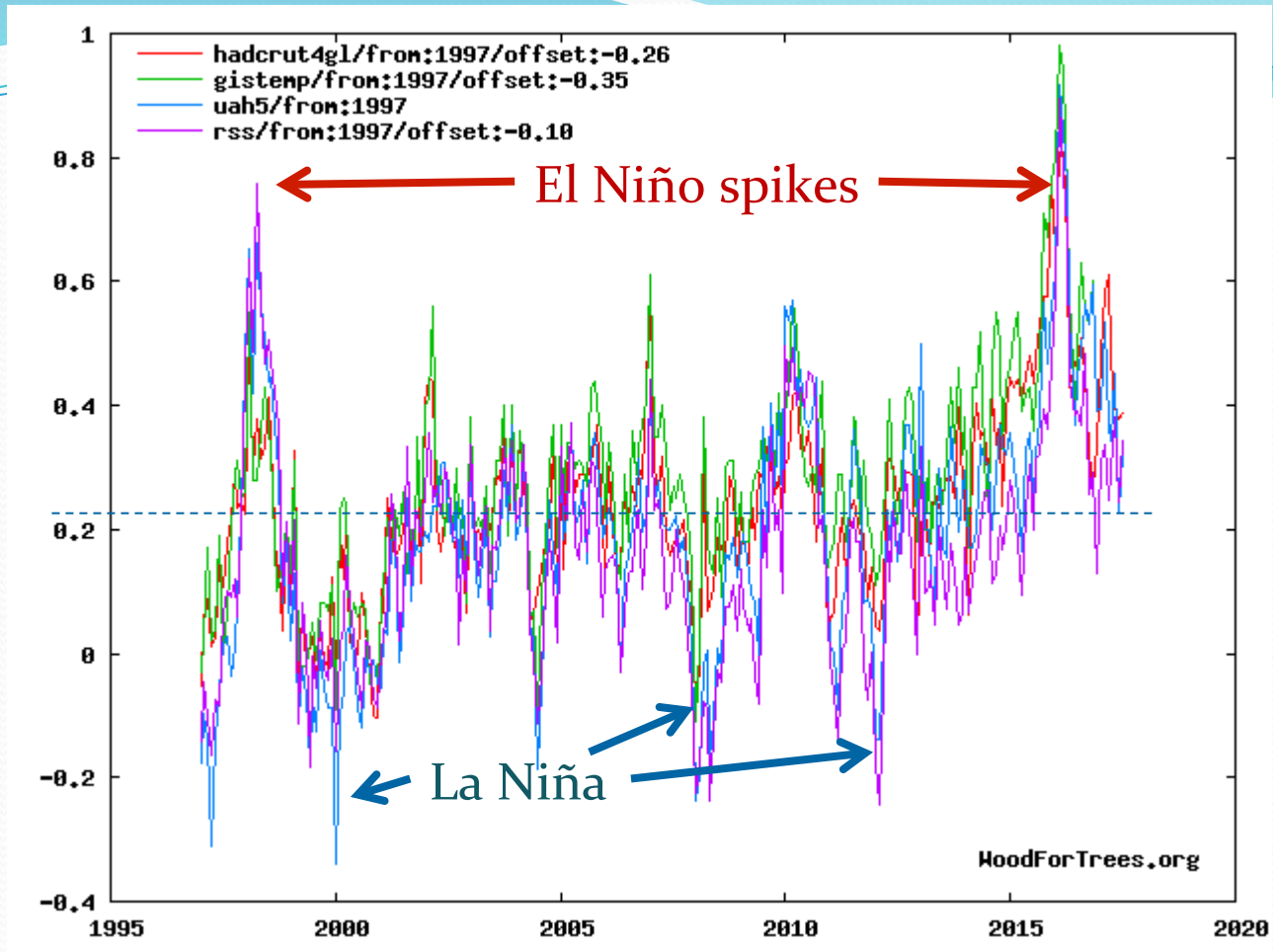
(warming in case of CO_2 doubling) published in peer-reviewed journals

TCR : Transient climate response ECS : Equilibrium climate sensitivity

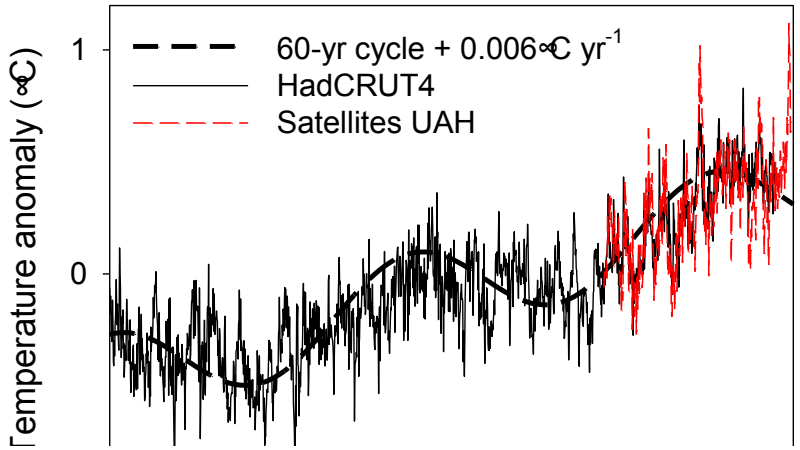
Is it the « alternative » definition of « consensus »?



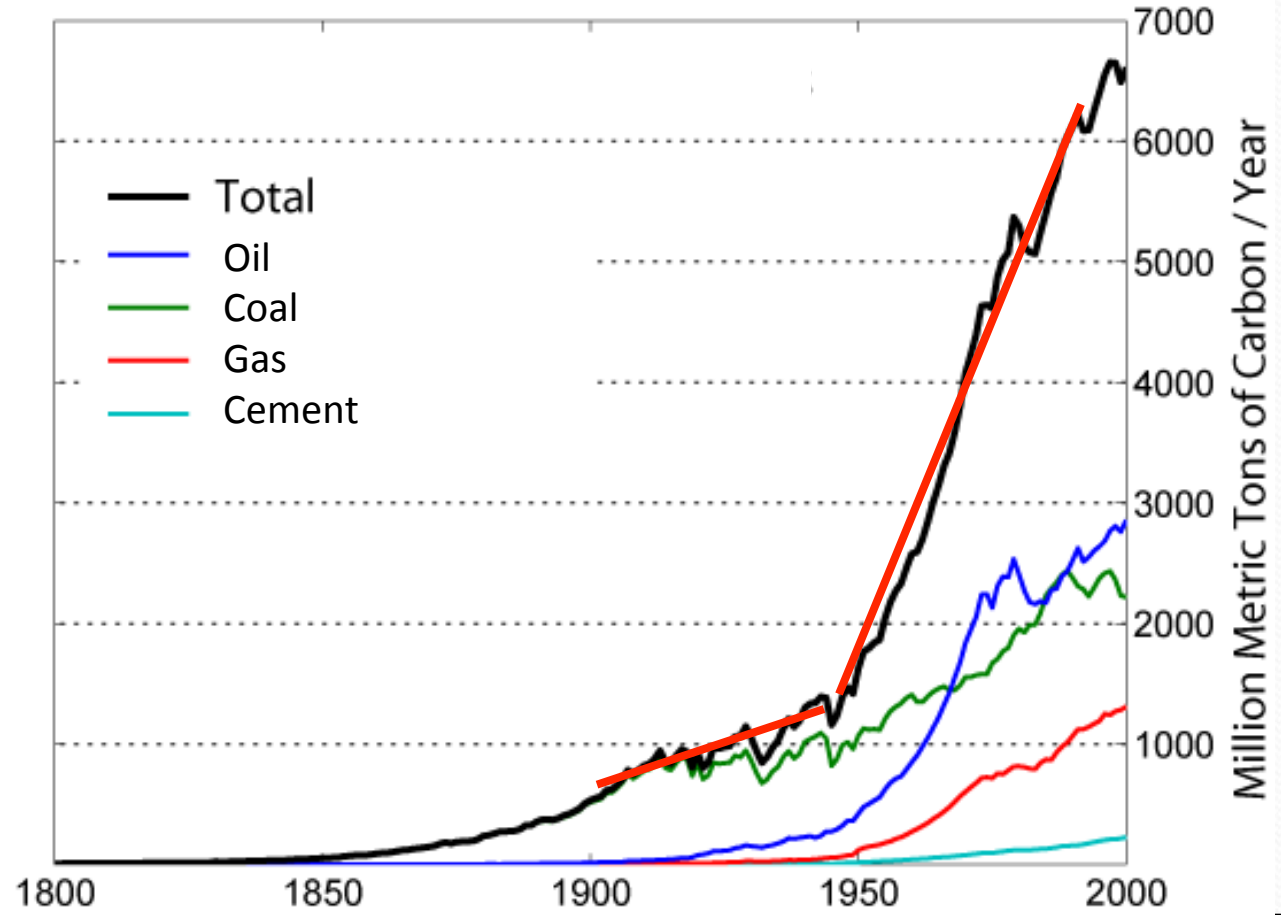
A: Andronova & Schlesinger 2001, B: Forest *et al* 2002, C: Knutti *et al* 2002, D: Gregory *et al* 2002, E: Frame *et al* 2005, F: Forest *et al* 2006, G: Tomassini *et al* 2007, H: Allen *et al* 2009, I: Lin *et al* 2010, J: Spencer & Braswell 2010, K: Lindzen & Choi 2011, L,e: Libardoni & Forest 2011, 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, α: Kissin 2015, β: Tan *et al* 2016, γ: Bates 2016, δ: Abbott & Marohasy 2017, ε: Harde 2017, 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: Ollila 2017.

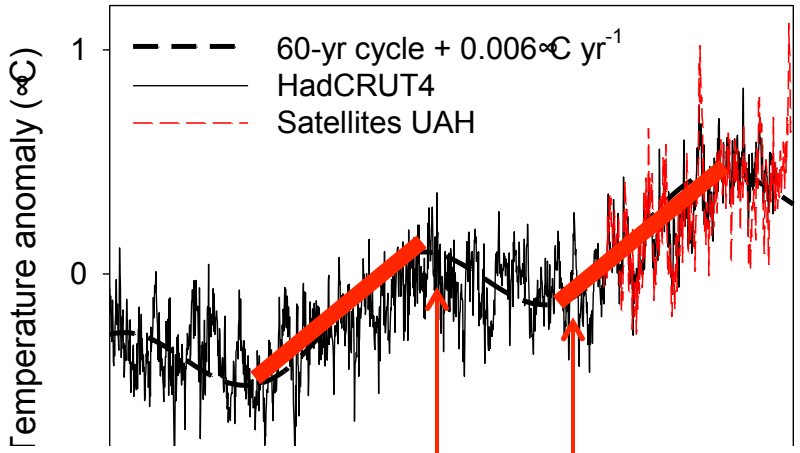


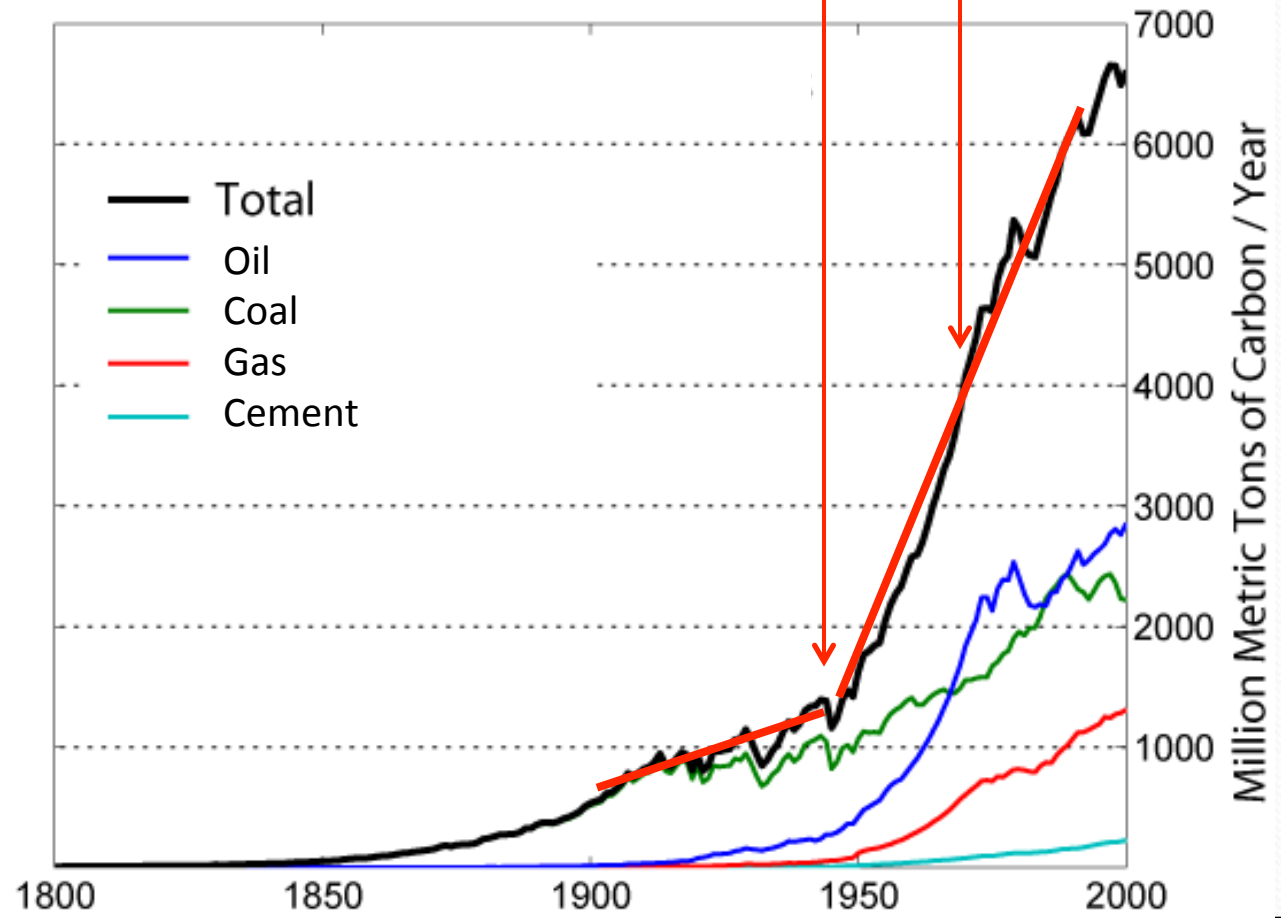
Average weighted temperature of the Earth given by captors or satellites is essentially flat for ~ 20 years, except natural fluctuations



Correlation?



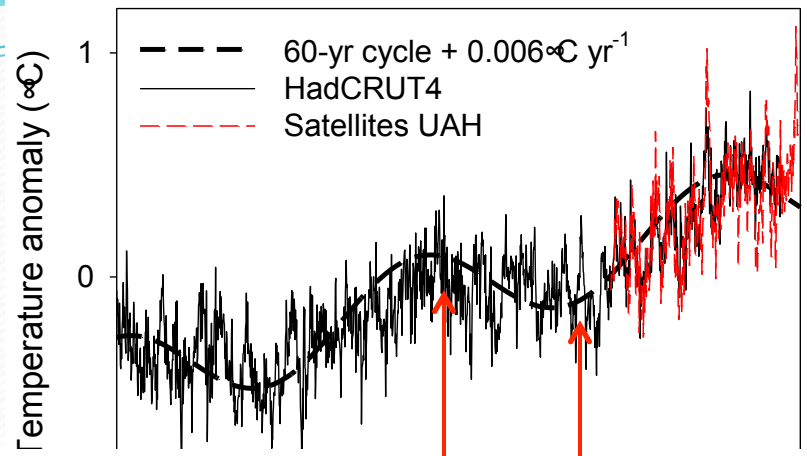


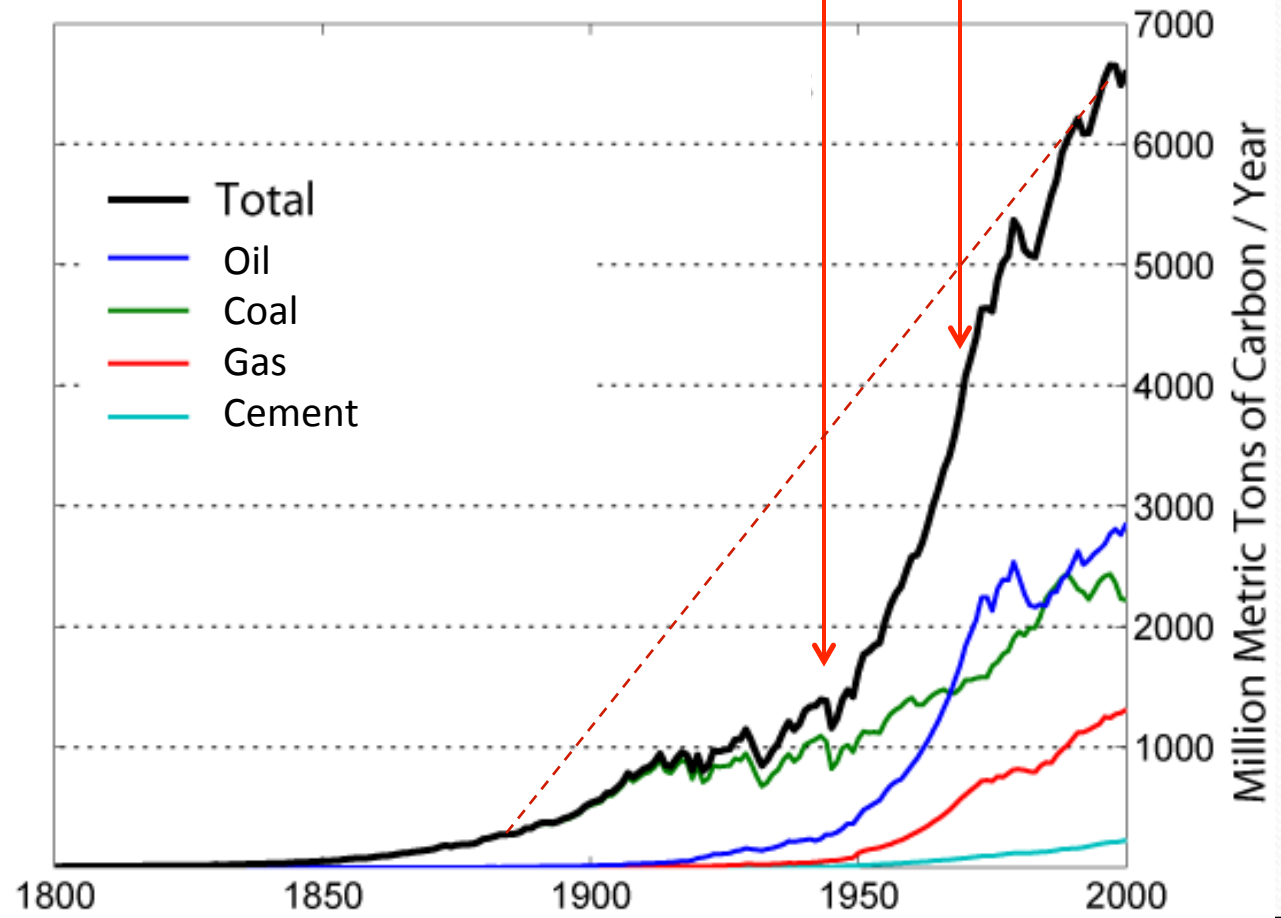


No evidence of correlation of mean Earth temperature (climate) and CO_2 (energy)

Two 30-year temperature increases with the *same* amplitude *unrelated* to *x6* CO_2 increase in the meantime

In between, 30-year cooling unrelated to CO_2 acceleration

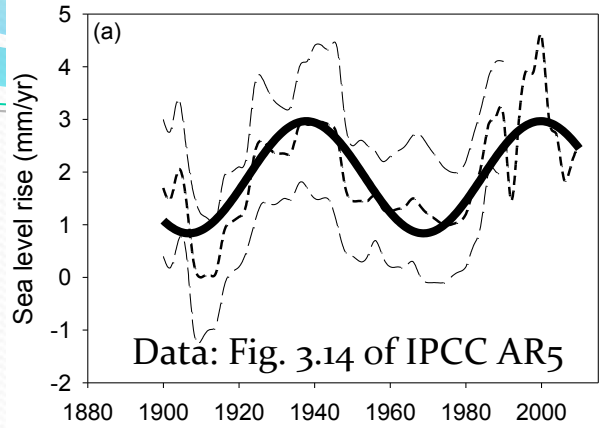


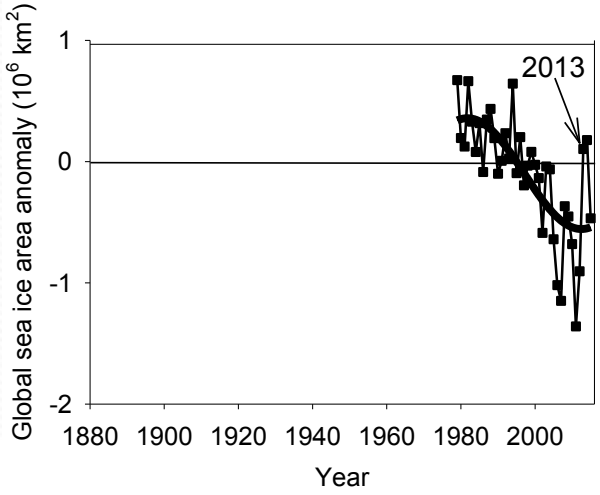


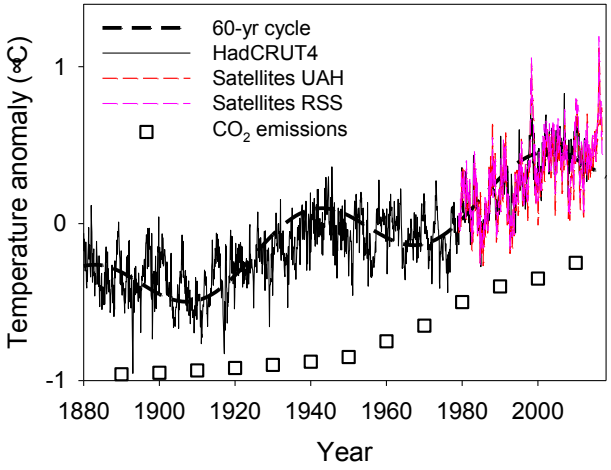
Good fit with a ~ 60-year cycle

No change of slope around ~ 1945 of the 0.006°C/yr linear addition to the ~ 60-yr cycle

The ~ 60-year cycle fits other climate sentinels







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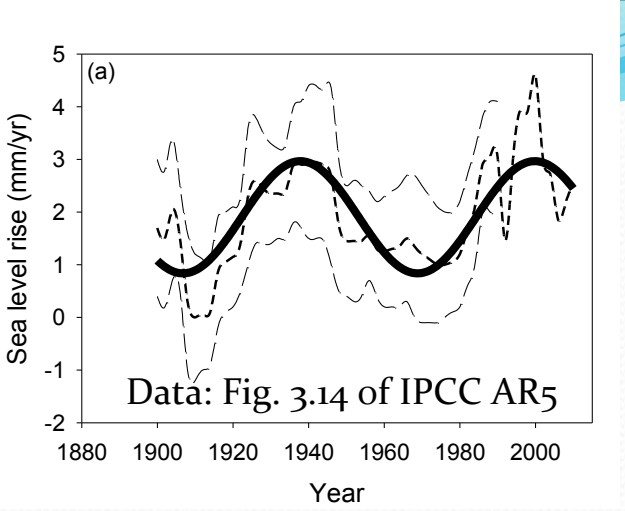
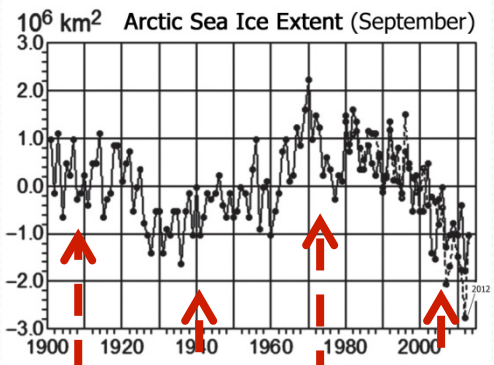
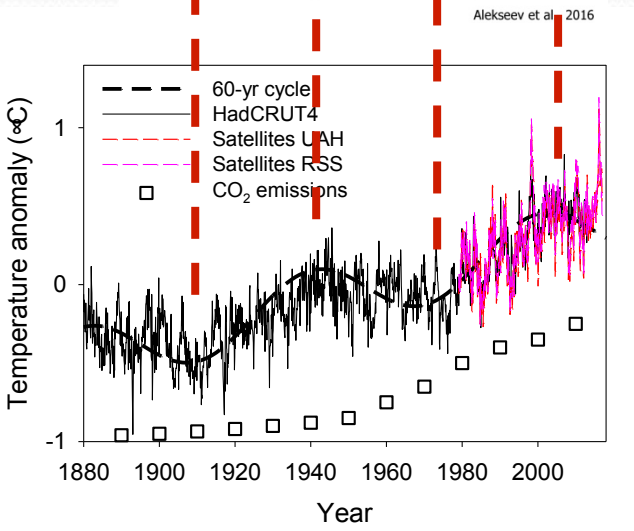
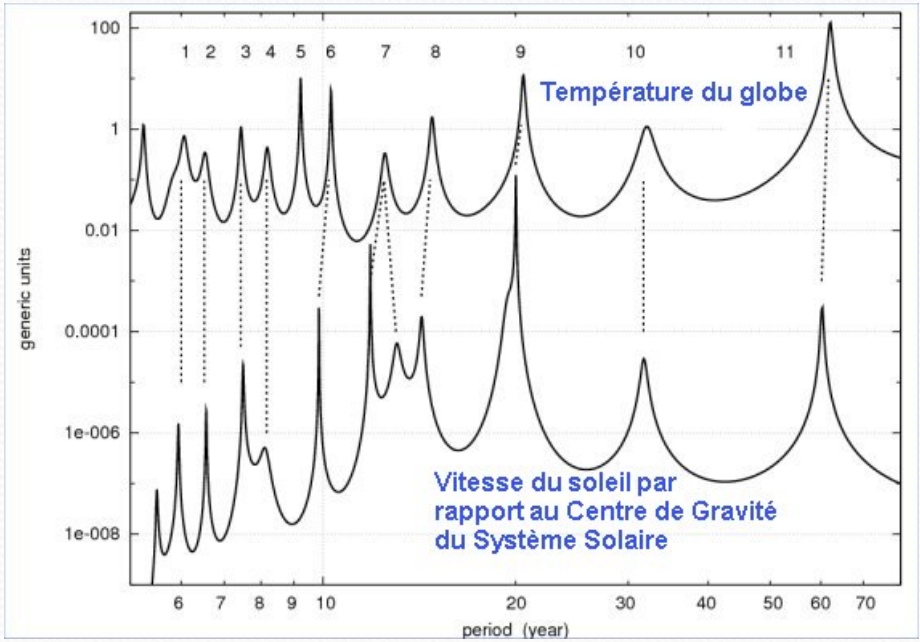






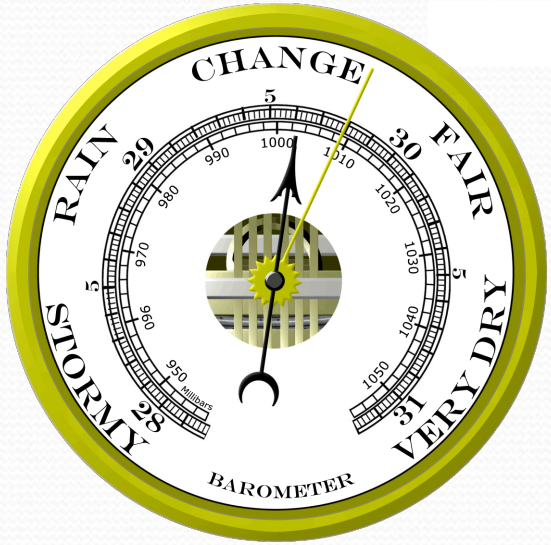
Not a scoop: 60-year cycle reported in many peer-reviewed papers

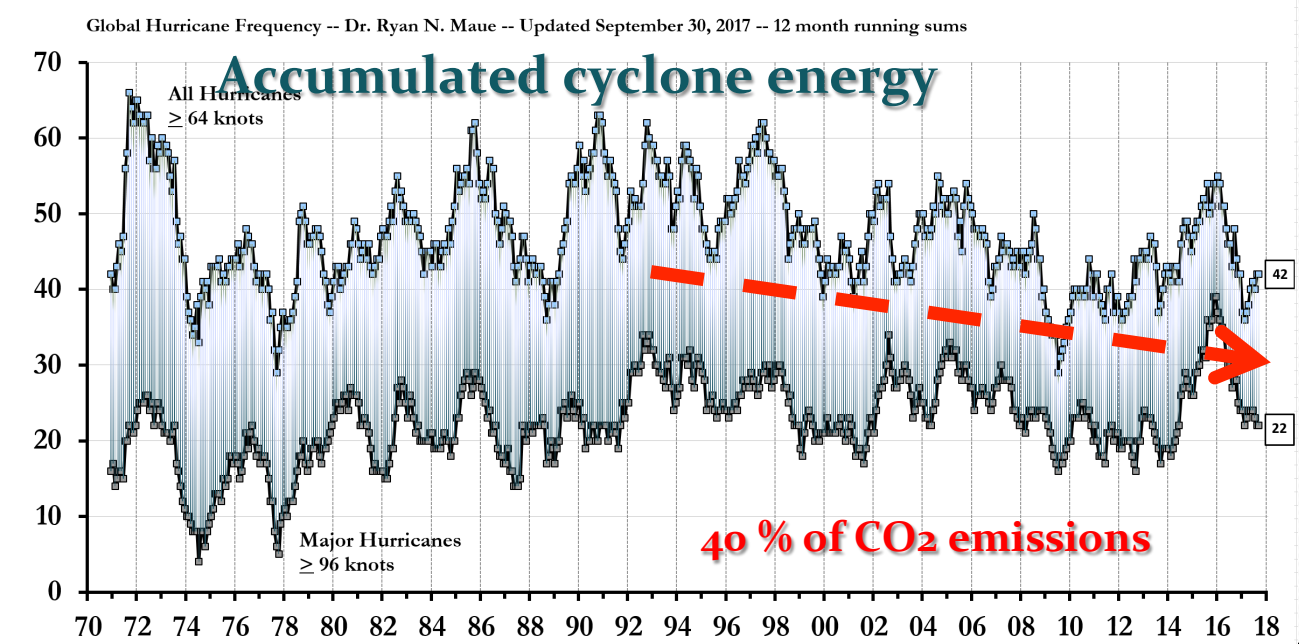
- Schlesinger and Ramankutty 1994, cycle related to Atlantic Multidecadal Oscillation
- Ogurtsov *et al* 2002,
- Klyashtorin and Lyubushin 2003,
- Loehle 2004,
- Zhen-Shan and Xian 2007,
- Carvalo *et al* 2007,
- Swanson and Tsonis 2009,
- Scafetta 2009, 2016, cycle possibly related to planetary "tides" of sun
- Akasofu 2010,
- D'Aleo and Easterbrook 2010,
- Loehle and Scafetta 2011,
- Humlum *et al* 2011,
- Chambers *et al* 2012,
- Lüdecke *et al* 2013,
- Courtillot *et al* 2013,
- Akasofu 2013,
- Macias *et al* 2014,
- Ogurtsov *et al* 2015.

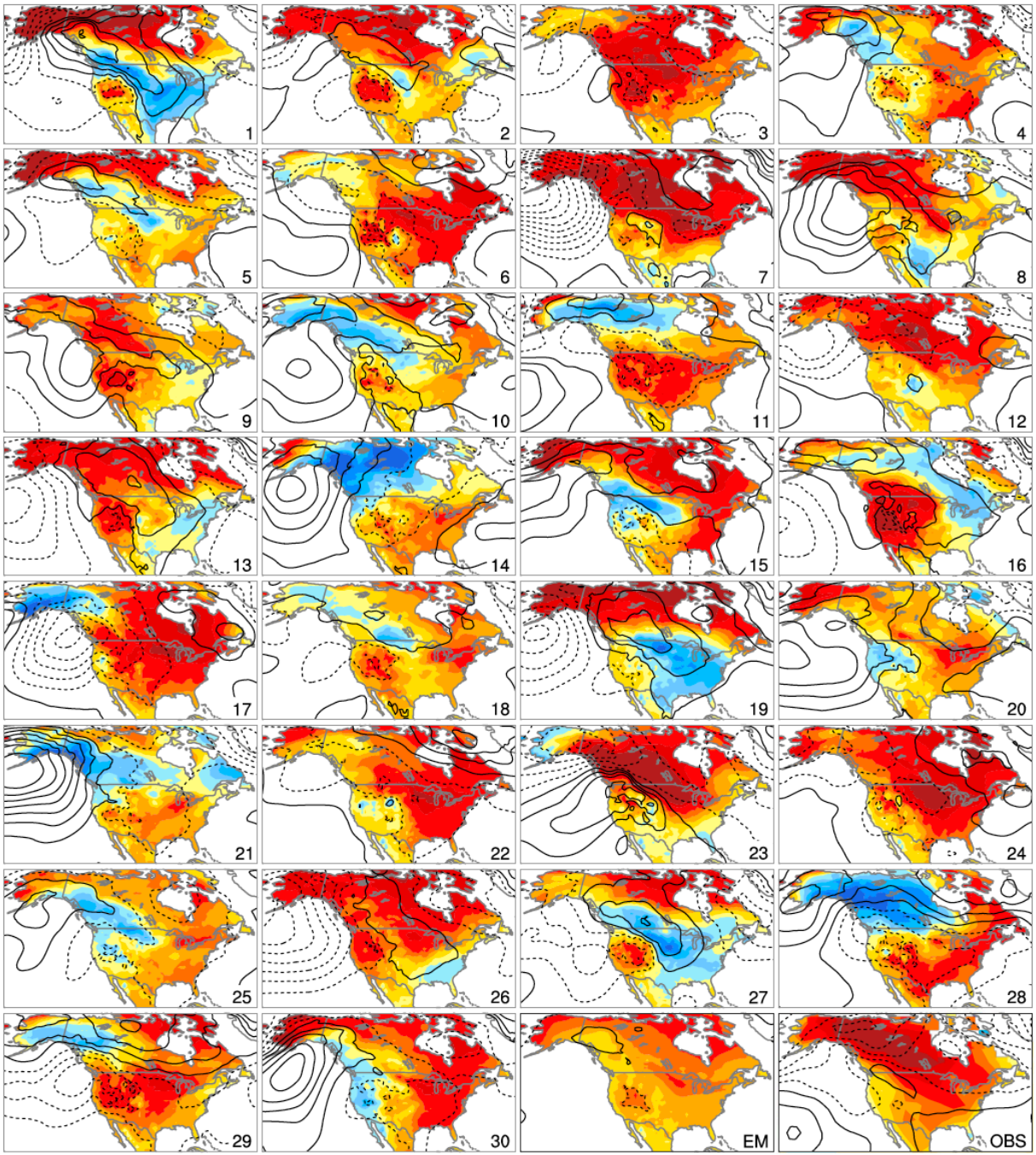


Confusion between barometer and thermometer

For lack of observational evidence of significant warming, the « global warming » wording has been replaced by climate disruption related to extreme meteorological phenomena, brandished as an emotionally claimed « proof » of the effect of the demonized CO_2 which has nothing to do with them as confirmed by IPCC itself.







Chaos dominates climate

NCAR's Large Ensemble reveals staggering climate variability

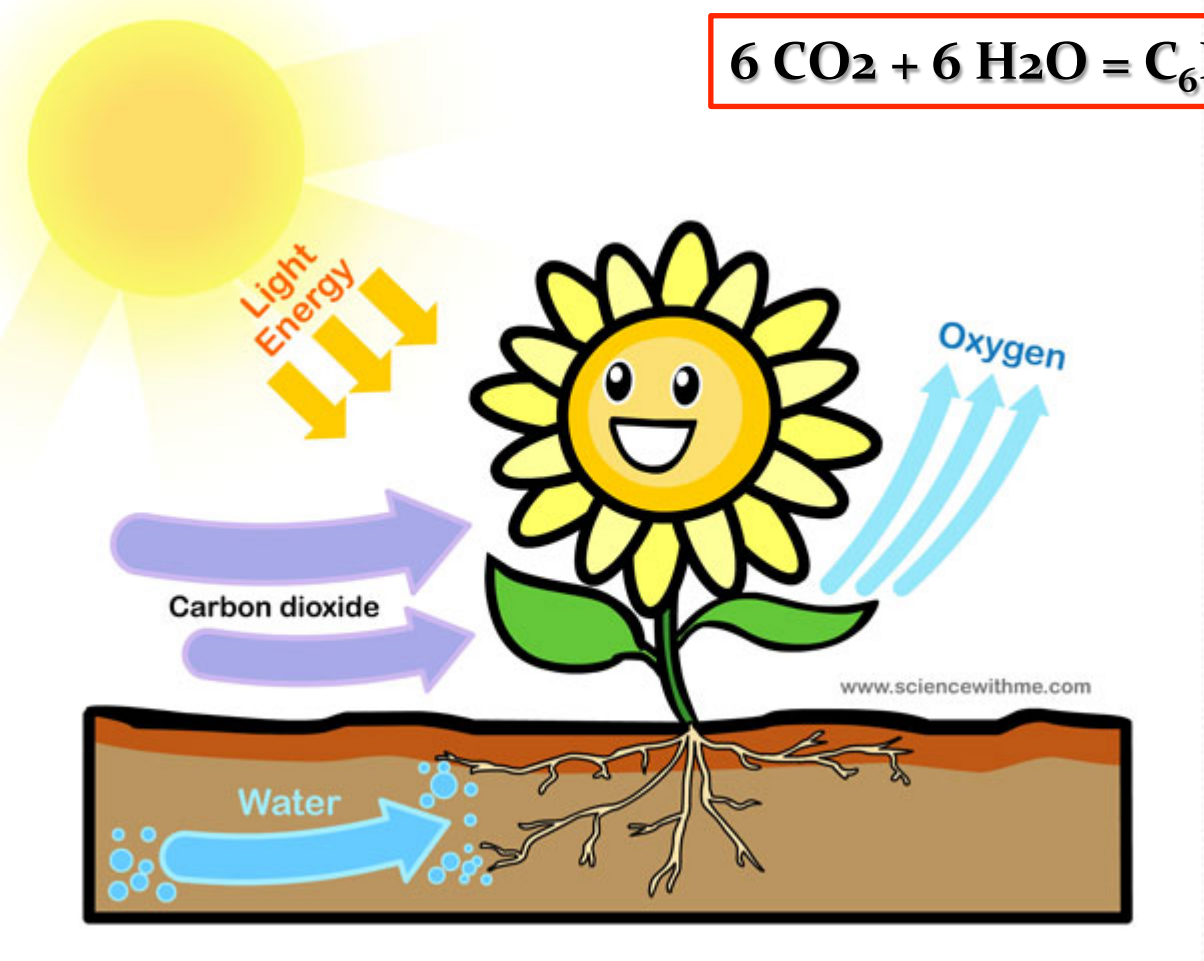
The model's starting conditions were modified so slightly by *adjusting the global atmospheric temperature by less than one-trillionth of one degree*

Validation of climate chaos theory by Edward Lorenz

These strong variations have nothing to do with **CO_2 which is same in each run**

CO_2 is the gas of LIFE, thanks to photosynthesis

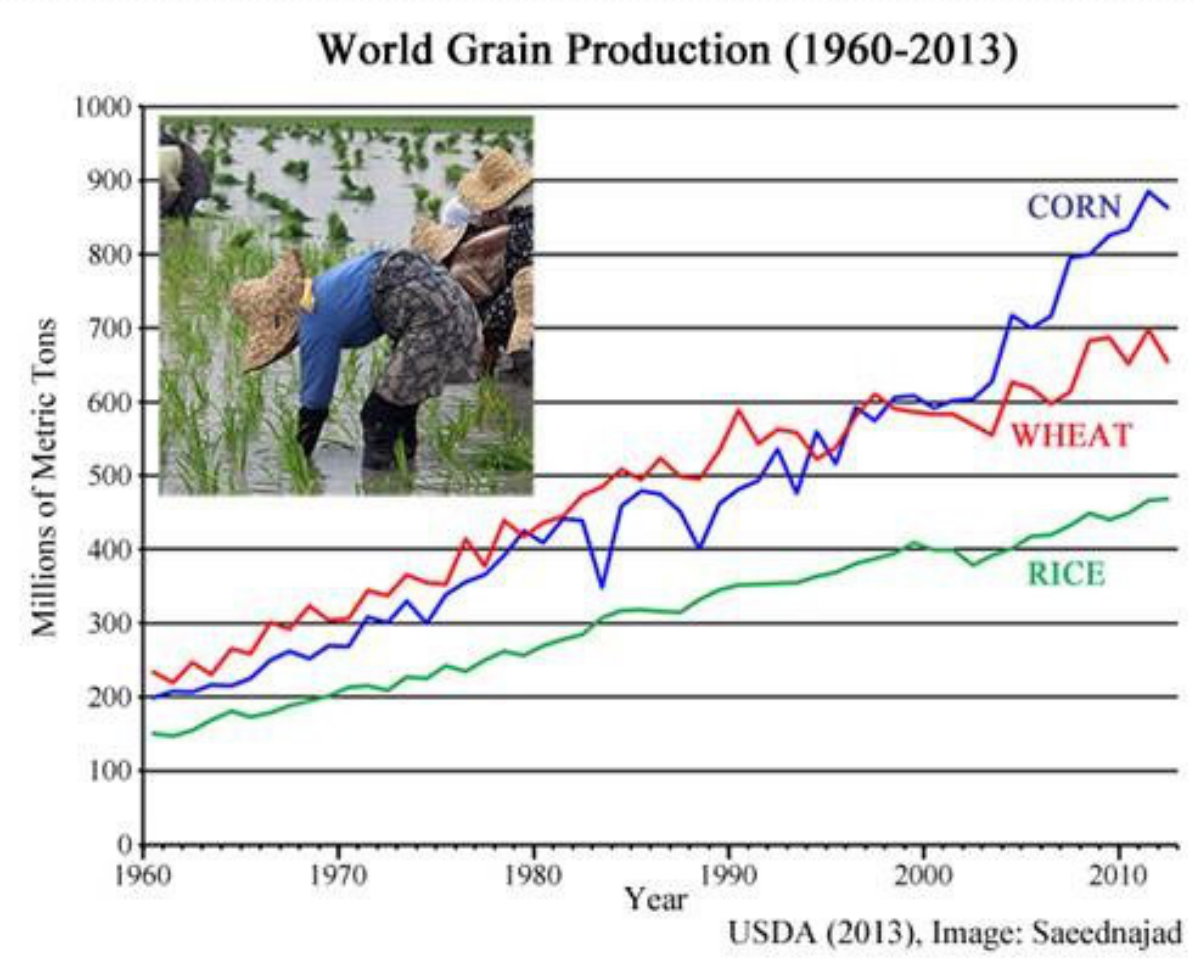
$$6\,CO_2 + 6\,H_2O = C_6H_{12}O_6 + 6\,O_2$$



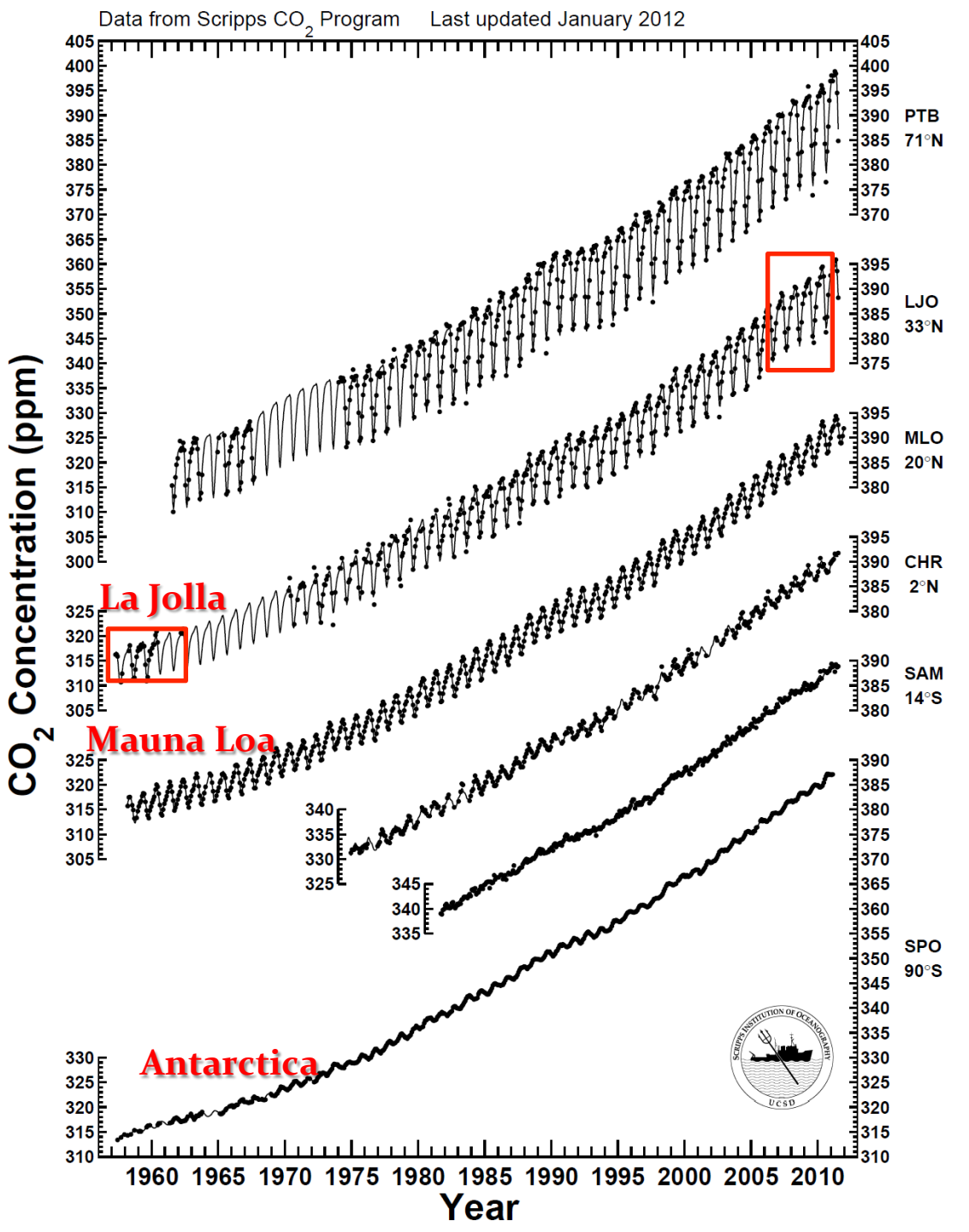
In a greenhouse, increased CO_2 concentration is beneficial to plant growth

385 ppm 535 ppm 685 ppm 835 ppm

Increased CO_2 concentration improves crop yields: benefit of 3000 billions euros since 1961 C. Idso (2013)



Measurements



In the absence of proof of CAGW, consider the benefit of CO_2

Seasonal oscillation of atmospheric CO_2 as a function of latitude

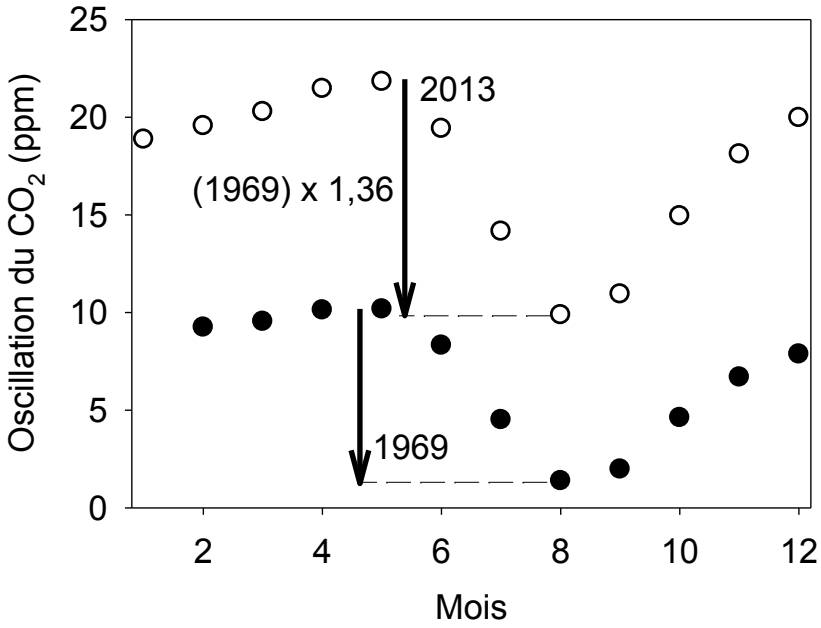
The increase is maximum where there is growing vegetation around like at La Jolla (California)

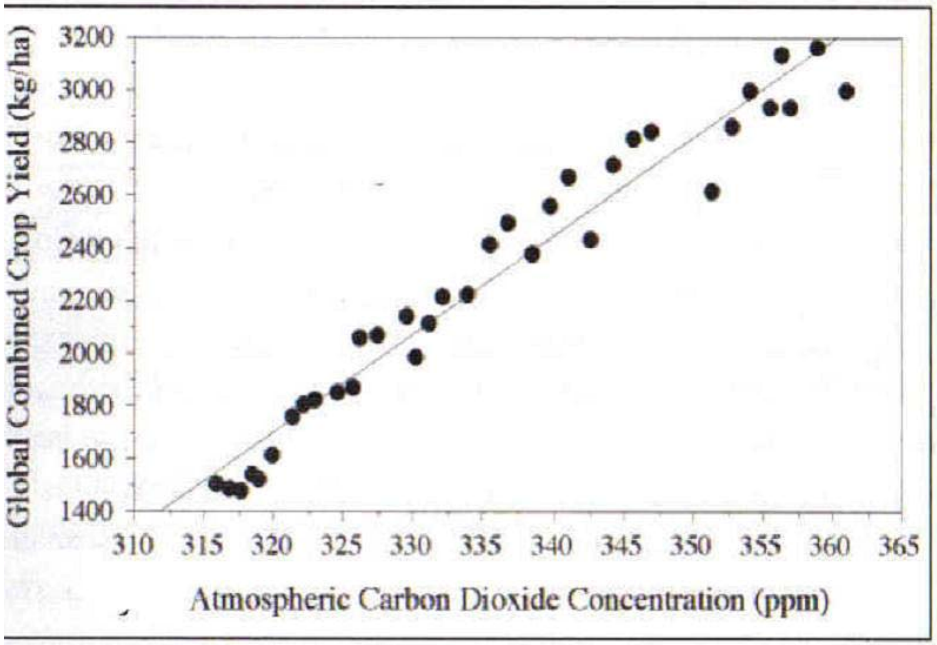
Data from SCRIPPS

An increased concentration of CO_2 – essential and irreplaceable for plant feeding – favors crop yield: Seasonal drop at La Jola increased 71 % more rapidly than CO2 itself!

« Equivalent of a 6th green continent of 18 millions km² »

Zhu *et al* Nature Climate Change (2016)





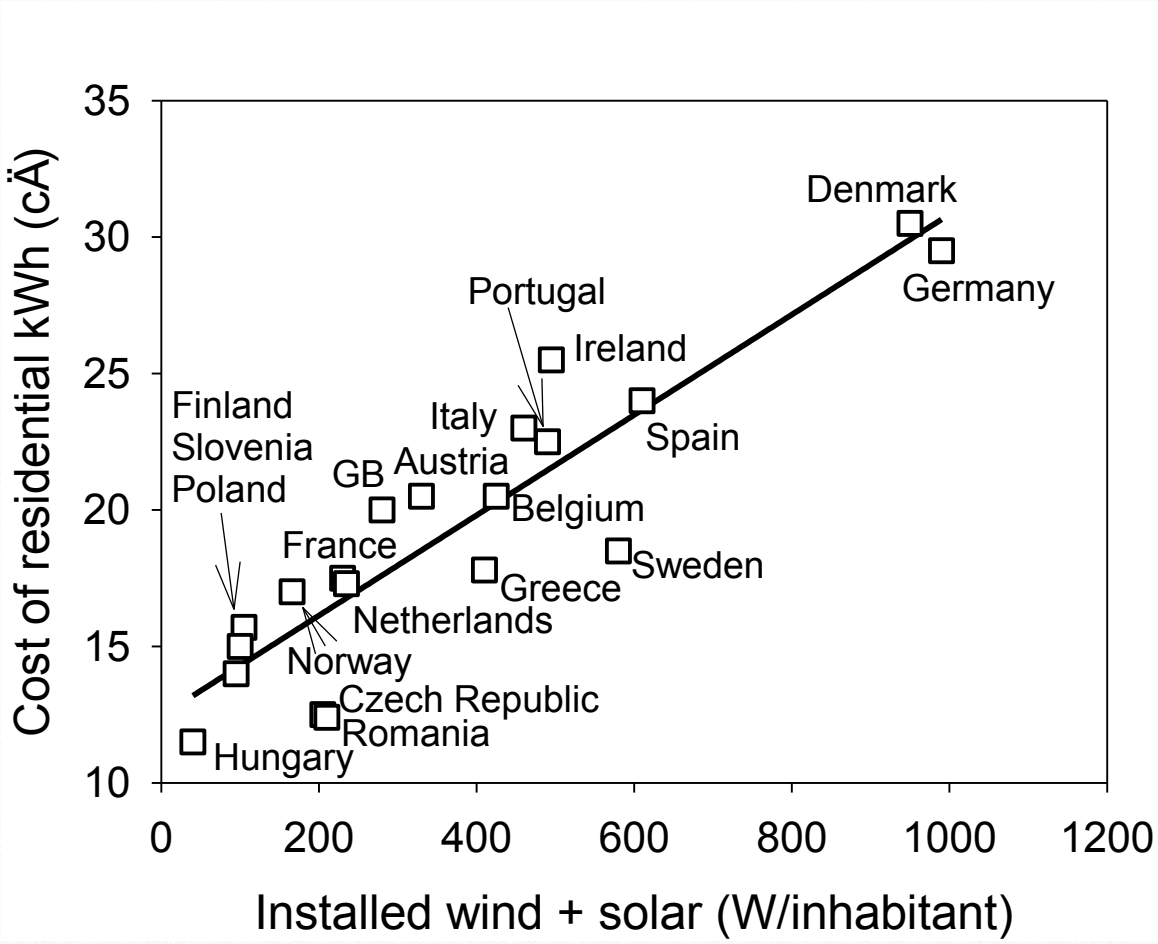
Blick 2009

Confusion of CO_2, gas of Life on Earth and pollutants emitted by burning biomass

- True pollutants are smoke, acrolein, polycyclic aromatic hydrocarbons (**biomass**), small particles
- Responsible for **4.3 millions of premature deaths per year** (WHO)
- « Dirty cooking »: third cause of diseases in the world (mainly women and children) behind heart diseases and cerebrovascular diseases

Will this problem of dirty cooking be suppressed with more expensive intermittent energy?

(Source: Eurostat in 2015)



Earth is growing greener

The 0.01 % increase of CO_2 has helped boost green foliage, plankton, nutritive plants and crops yields

Climate does change in particular with alternative periods of warming and cooling every 30 years

The anthropogenic contributions appears tiny, well below dangerous levels

It would be wise to consume fossil fuels moderately to let an heritage to our great children other than an abyssal debt

Towards a change of paradigm? “Benefit of carbon” to be recognized?

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