

Climate Change - Getting the Science Back on Track

Rotary Club Discussion

Bill Howell, Calgary, 22 May 2007

(slide 6 comparing Beck's atmospheric CO2 to temp added)



I. Introduction - Definitions

Climate Change - is the science of studying climate and the factors that influence it, over all time scales and geographies.

"The climate has been changing for billions of years, it is changing now, and it will continue to change for billions of years into the future.

Furthermore, natural changes in the climate far, far exceed anything that we are speaking of now, both in magnitude and rapidity." [Howell]

Tim Patterson - *"The ONLY constant of climate IS change!"*



I. Introduction - Definitions (cont'd)

The **Kyoto Premise** is

"...the presumption that man-made GreenHouse Gases (GHGs) [have, are, and/or will have] a catastrophic impact on the environment and mankind." [Howell]

In my view, this is the essence of what the public has been led to believe, and the focus is especially strong on CO₂ emissions.

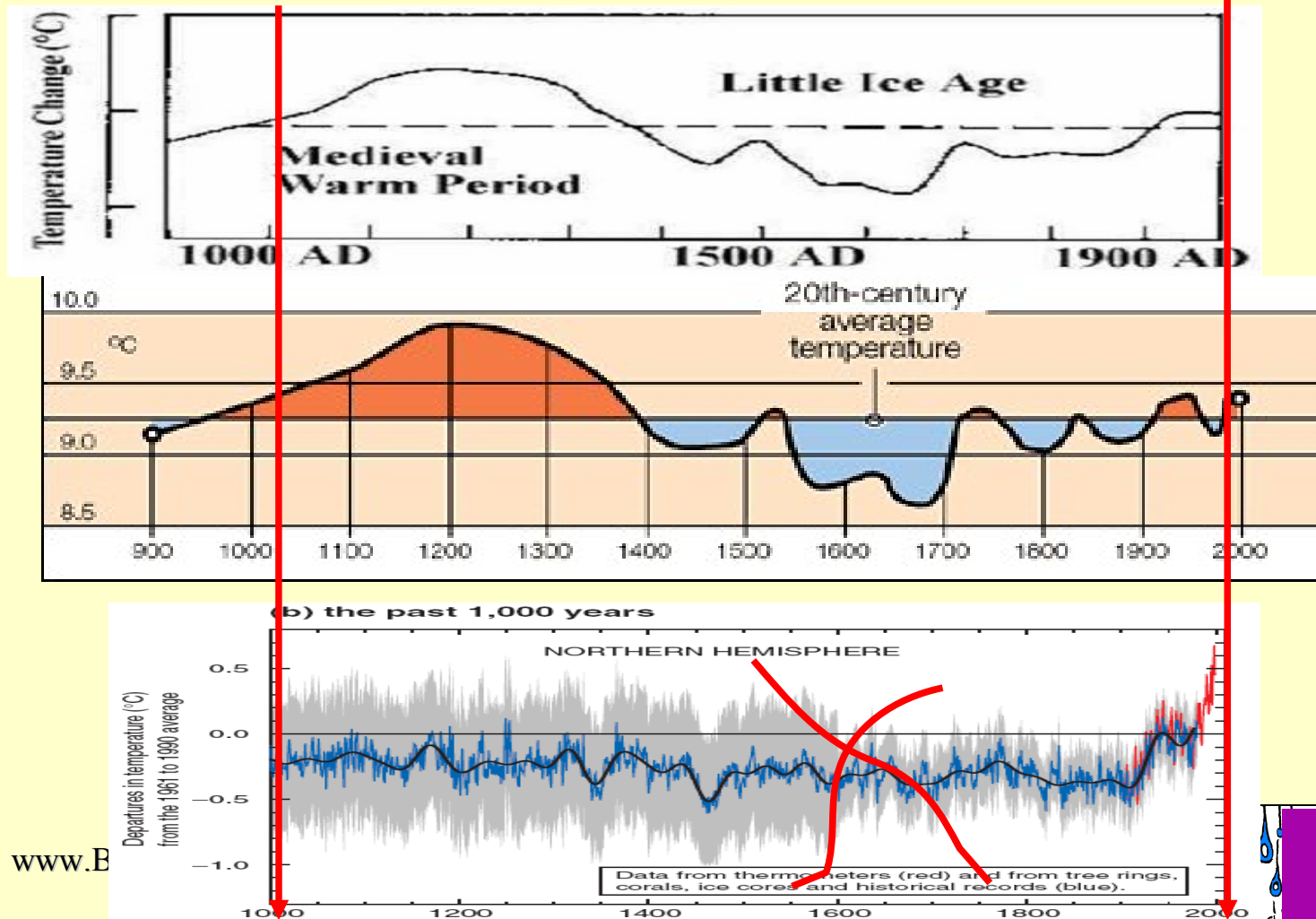
A common problem with scientists - is that many fail to distinguish between the concepts "Climate Change" and the "Kyoto Premise". In other words they often trip up at the very simple, initial stages of analysis.



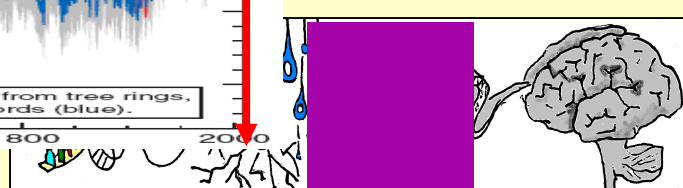
II. The Kyoto Premise

Hockey stick temperatures

Is the "Scientific Consensus" on the hockey stick the greatest fraud in scientific history? (notice the splicing of proxies & modern data)



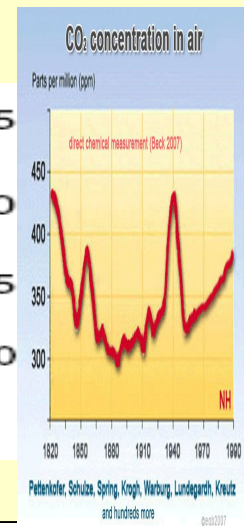
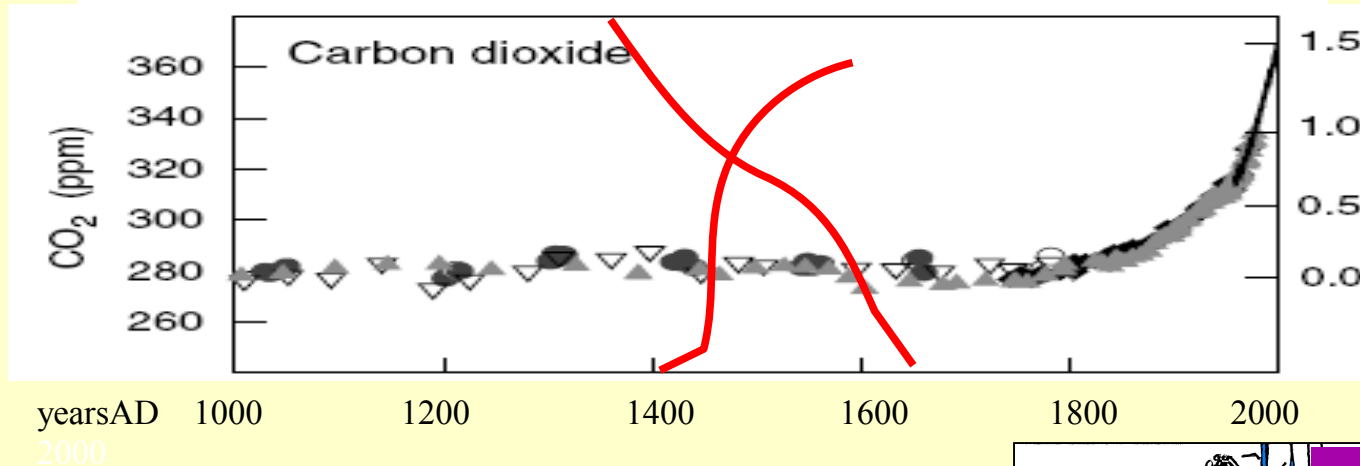
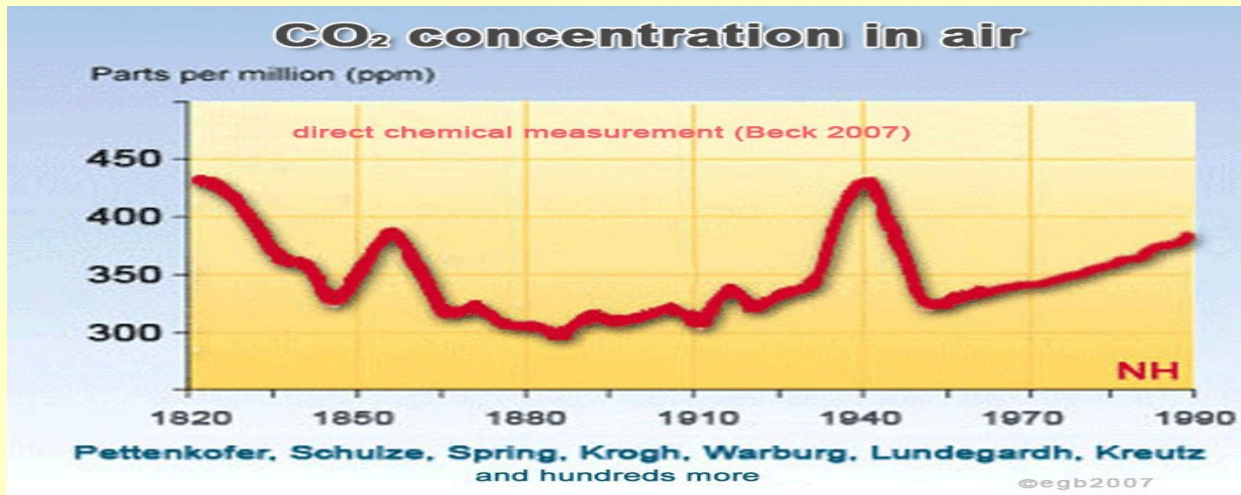
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II. The Kyoto Premise

Disappearing CO₂ concentrations

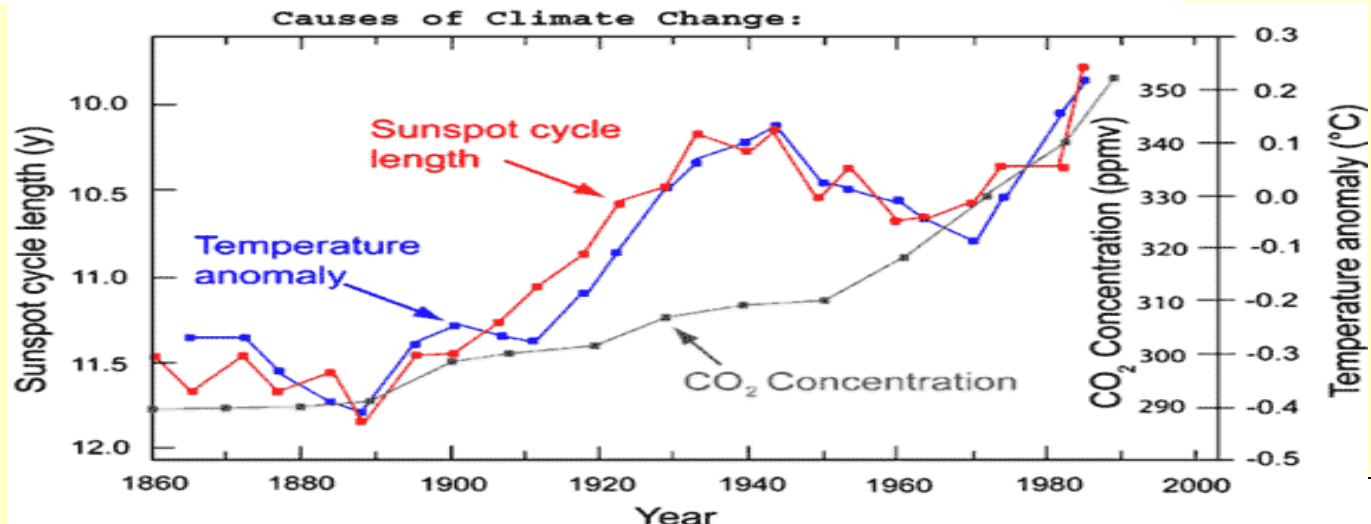
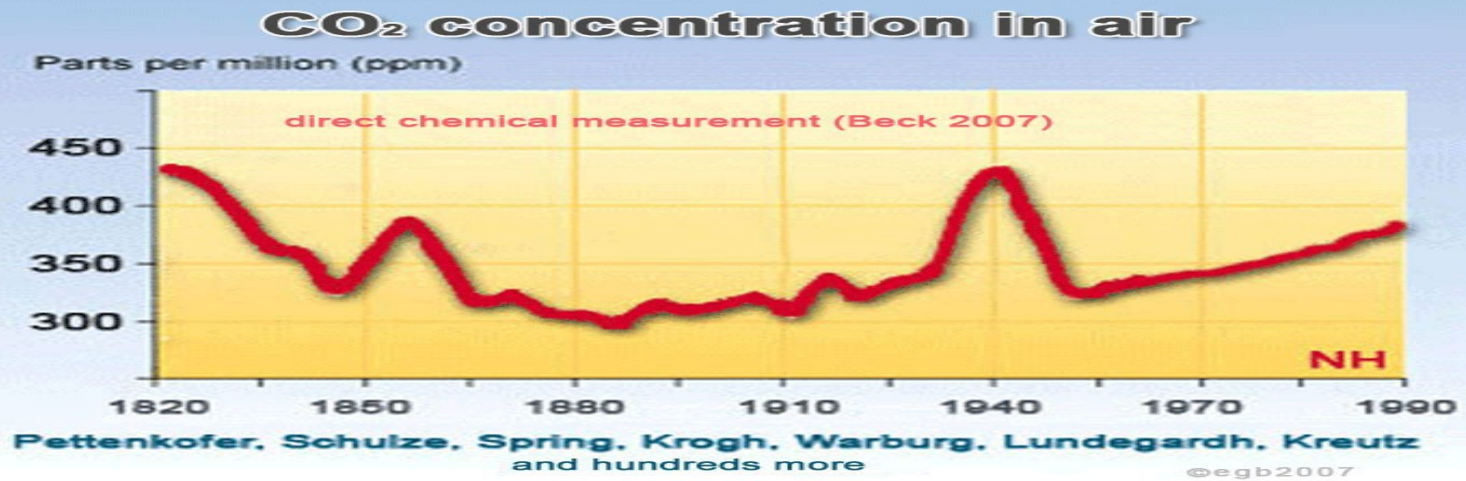
...or is the "Scientific Consensus" on recent CO₂ even worse?



II. The Kyoto Premise

CO₂ is a time-lagged, fuzzy thermometer

Recent temperature trends

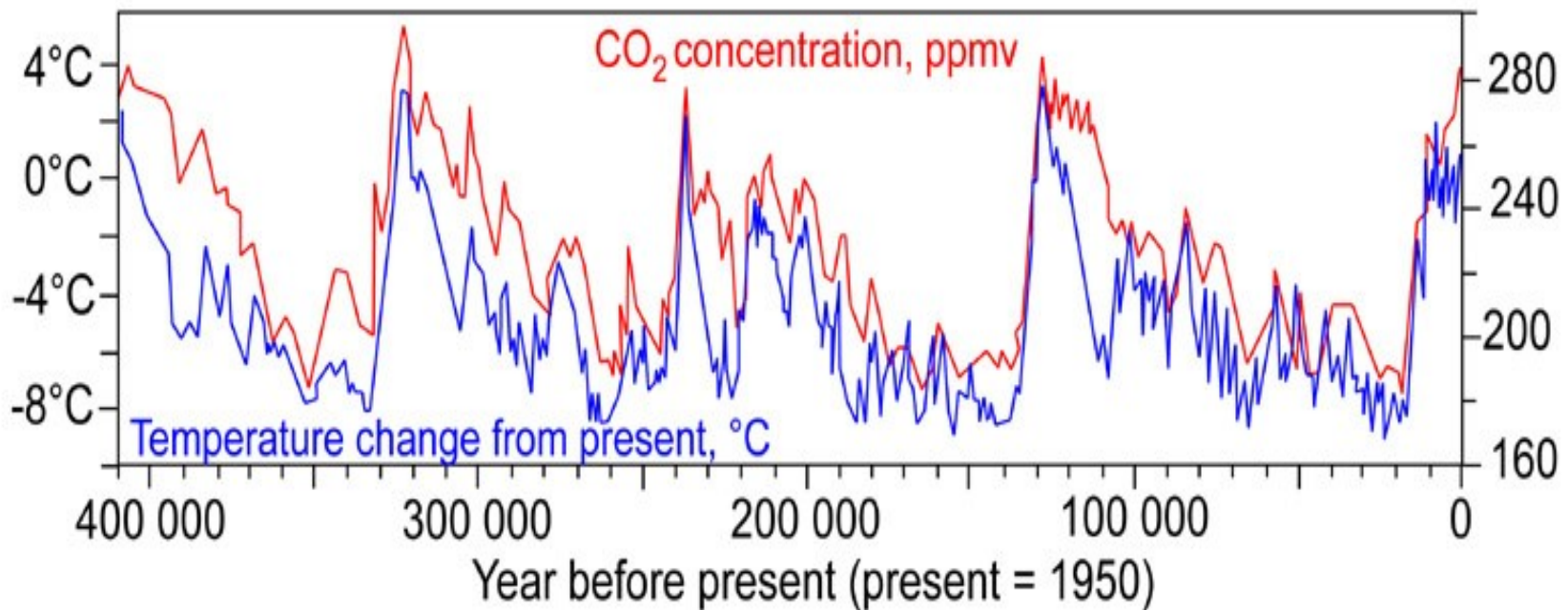


II. The Kyoto Premise

CO₂ is a thermometer - last million years

Al Gore's favourite graph? Why do many scientists have problems with causation?

Temperature and CO₂ levels in the atmosphere over the past 400 000 years
(from the Vostok ice core)



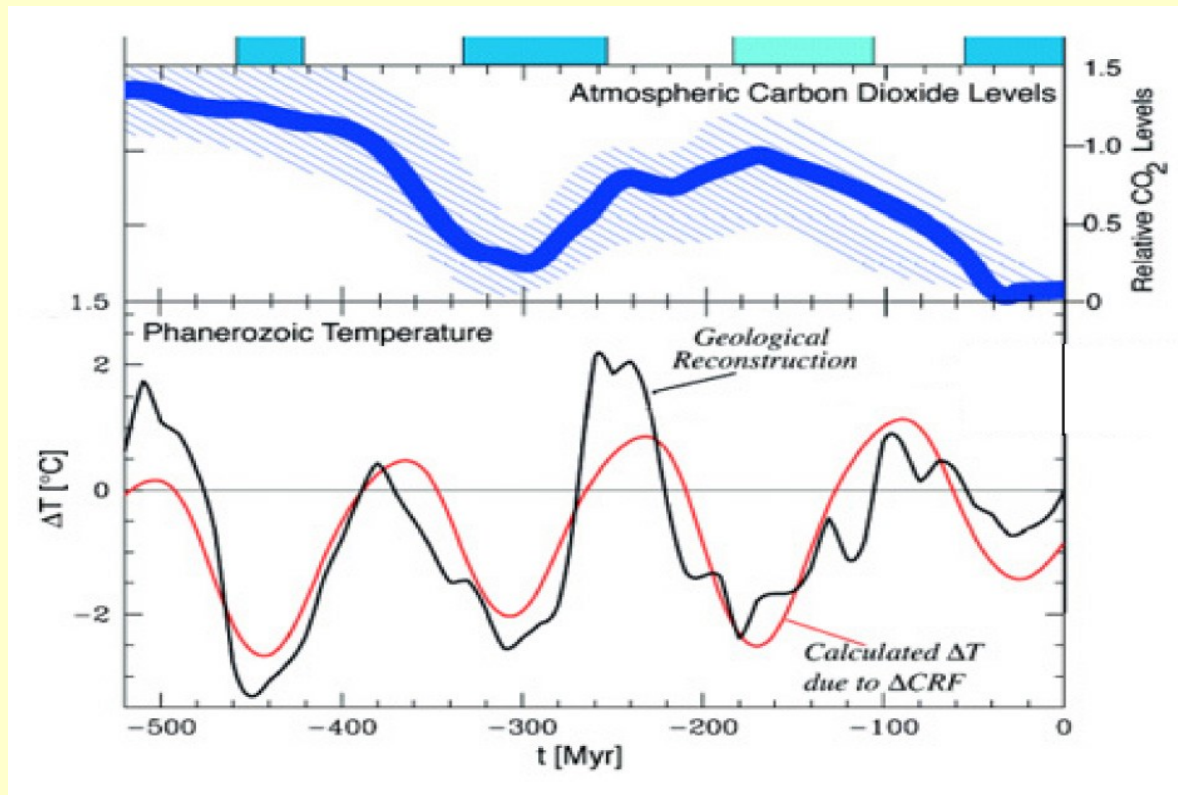
II. The Kyoto Premise

CO₂ not a thermometer - last half-billion years?

Note: Glaciation periods even when CO₂ was 5 to 50 times higher!

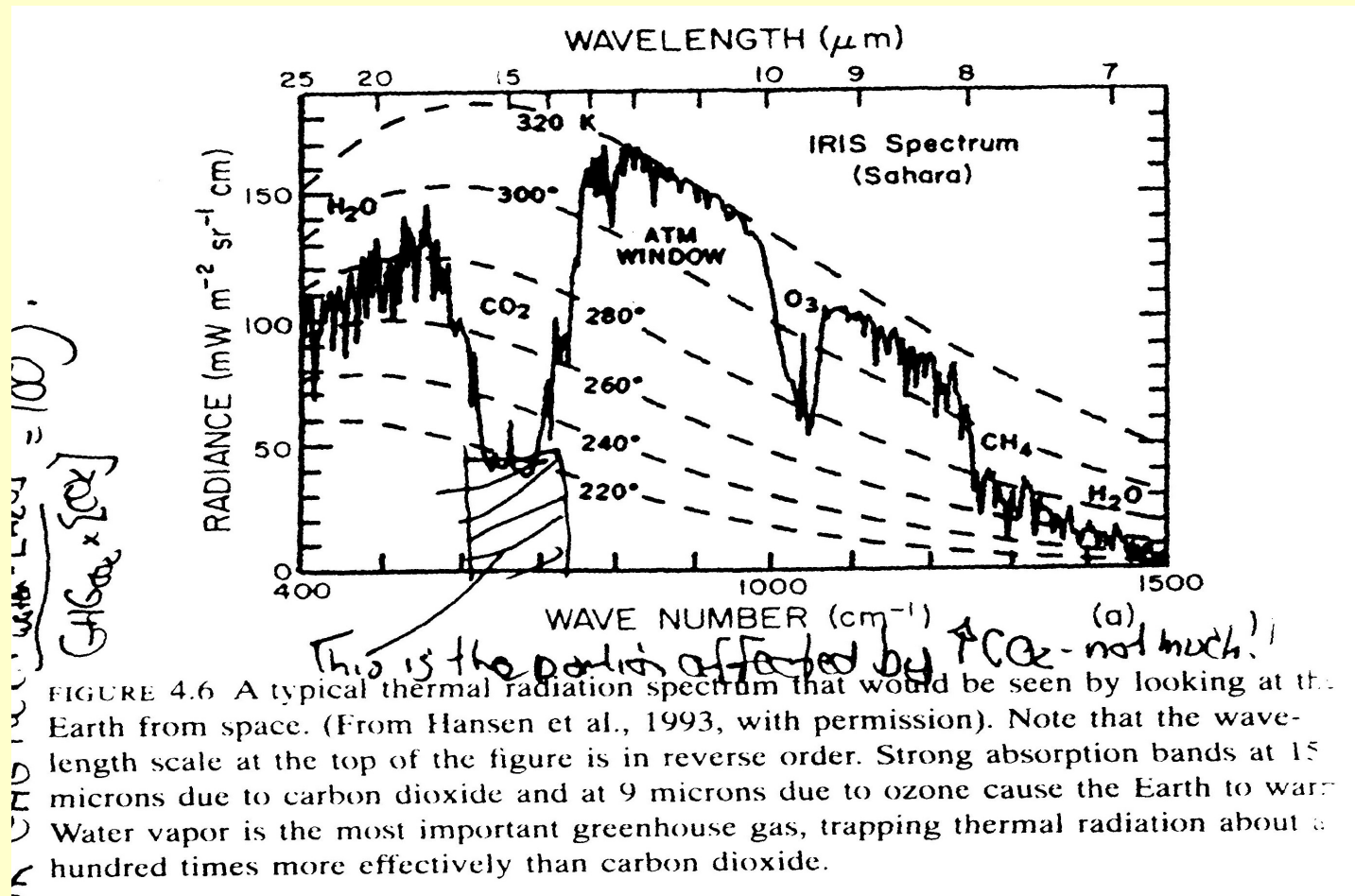
Evolutionary biology has dominated longer term trend

(angiosperm/ gymnosperm, C₃/ C₄ plant vasulature etc etc)



II. The Kyoto Premise

CO₂ as THE major GHG? Nyet

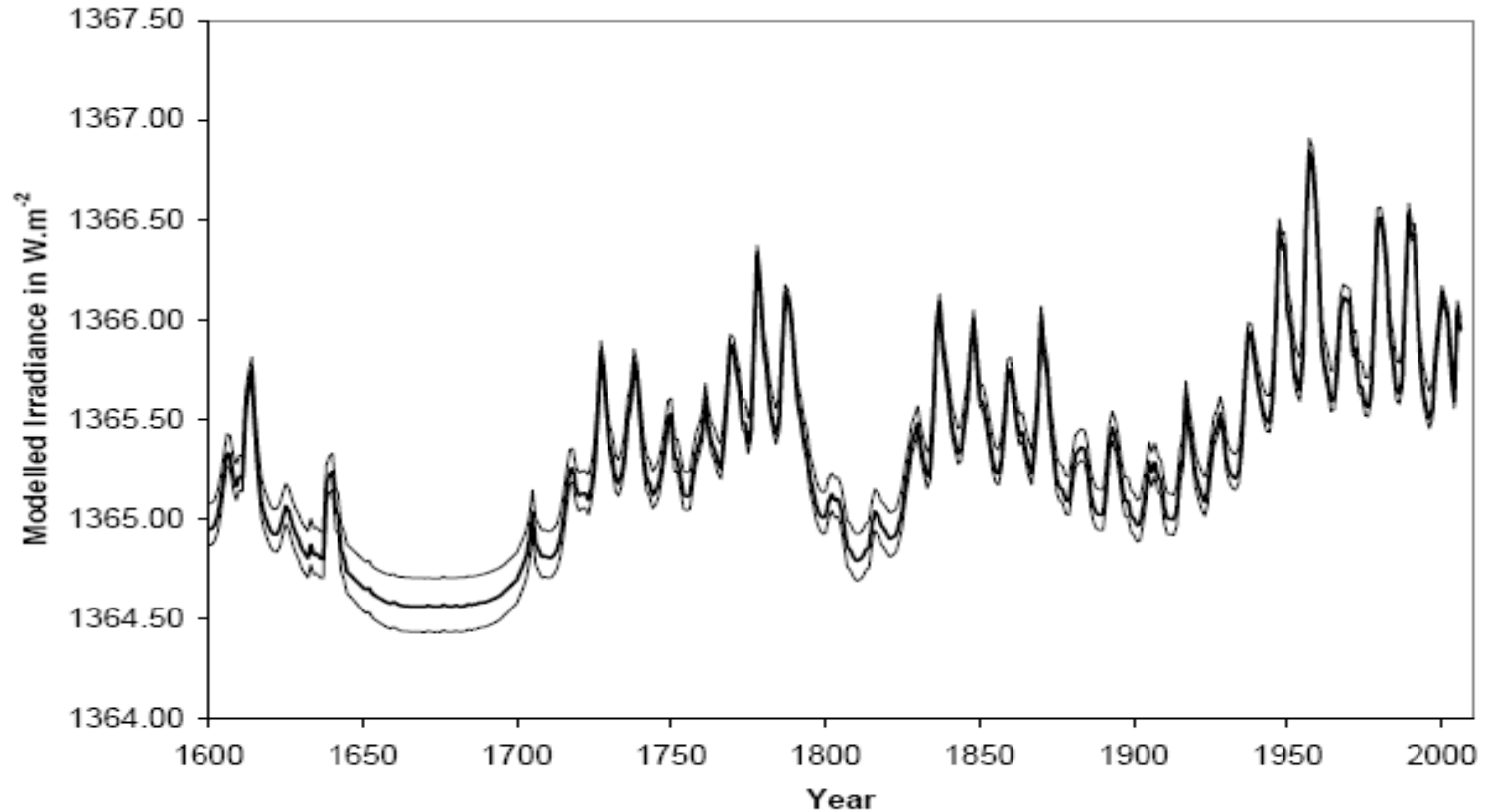


Have you been led to believe that CO₂ is the most important GHG?



It all starts with our Sun

< 0.1 % solar irradiance "normal variability"

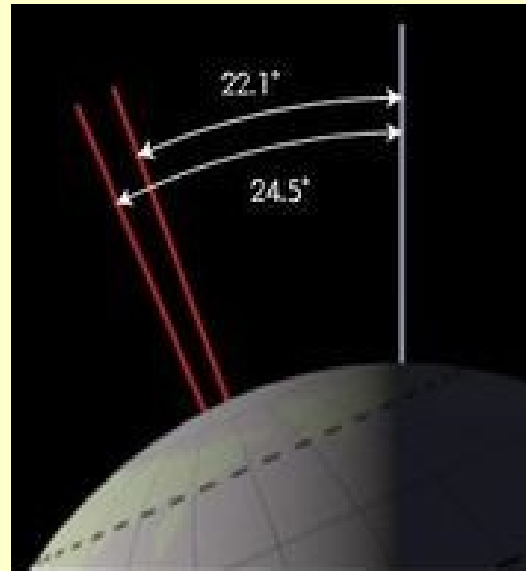


Milankovic cycles of Earth orbital

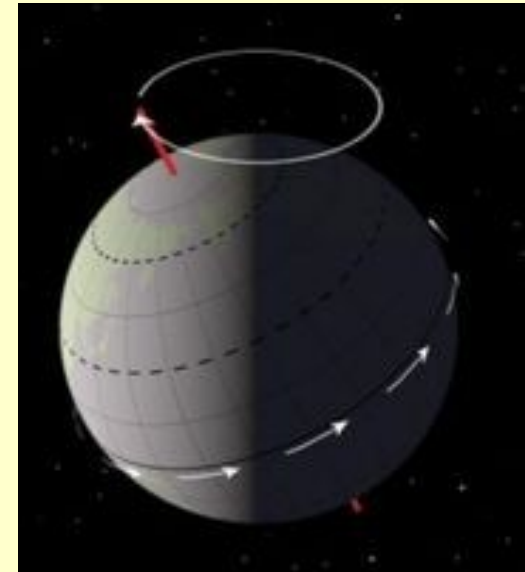
Orbit Eccentricity
(~413 & 100 ky)



Earth Axis Tilt
(~41 ky)



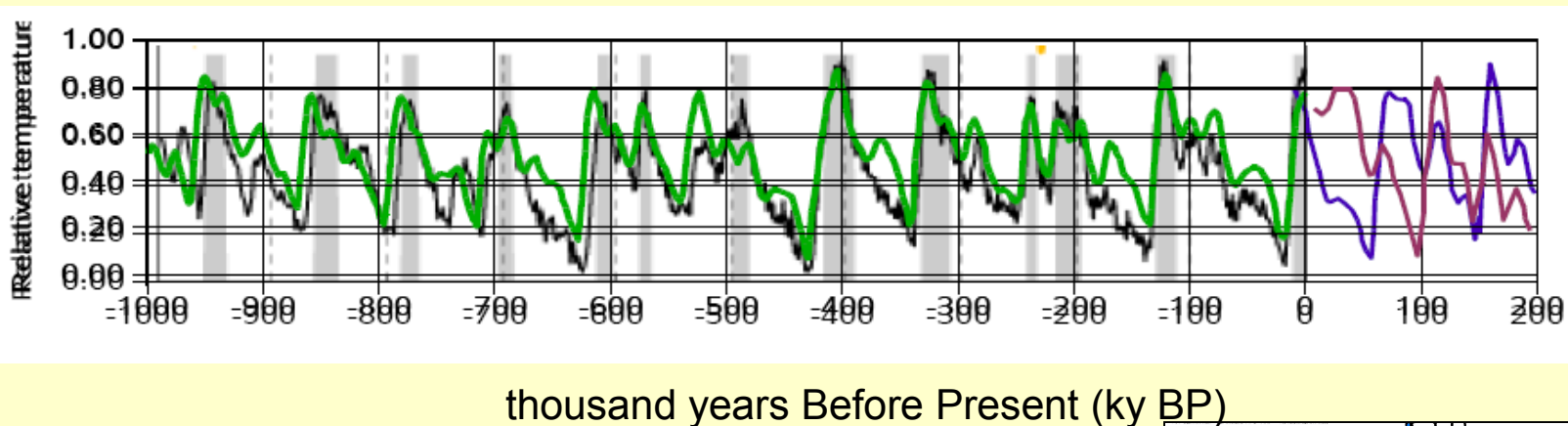
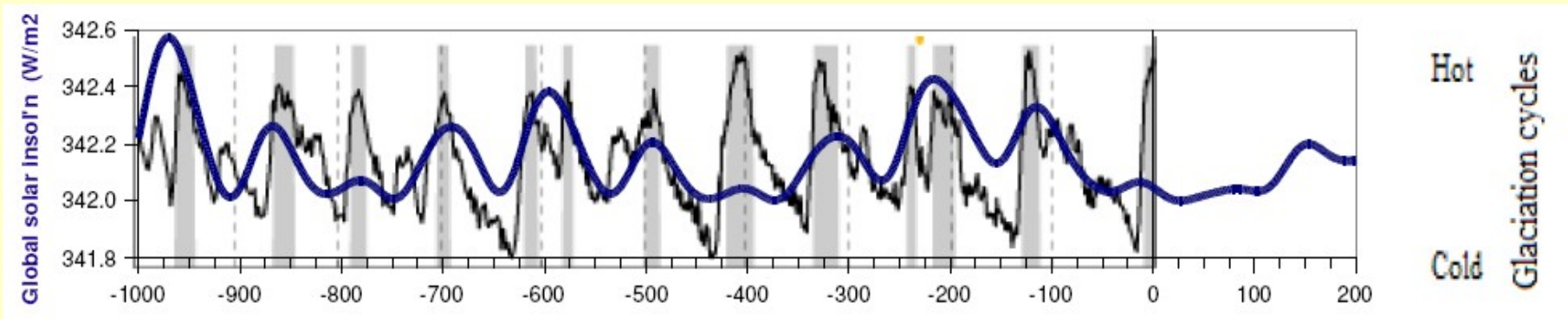
Earth axis precession
(~23 ky)



II. The Kyoto Premise

Milankovic glaciation cycles

Look Ma, no CO₂! Paillard's threshold model.



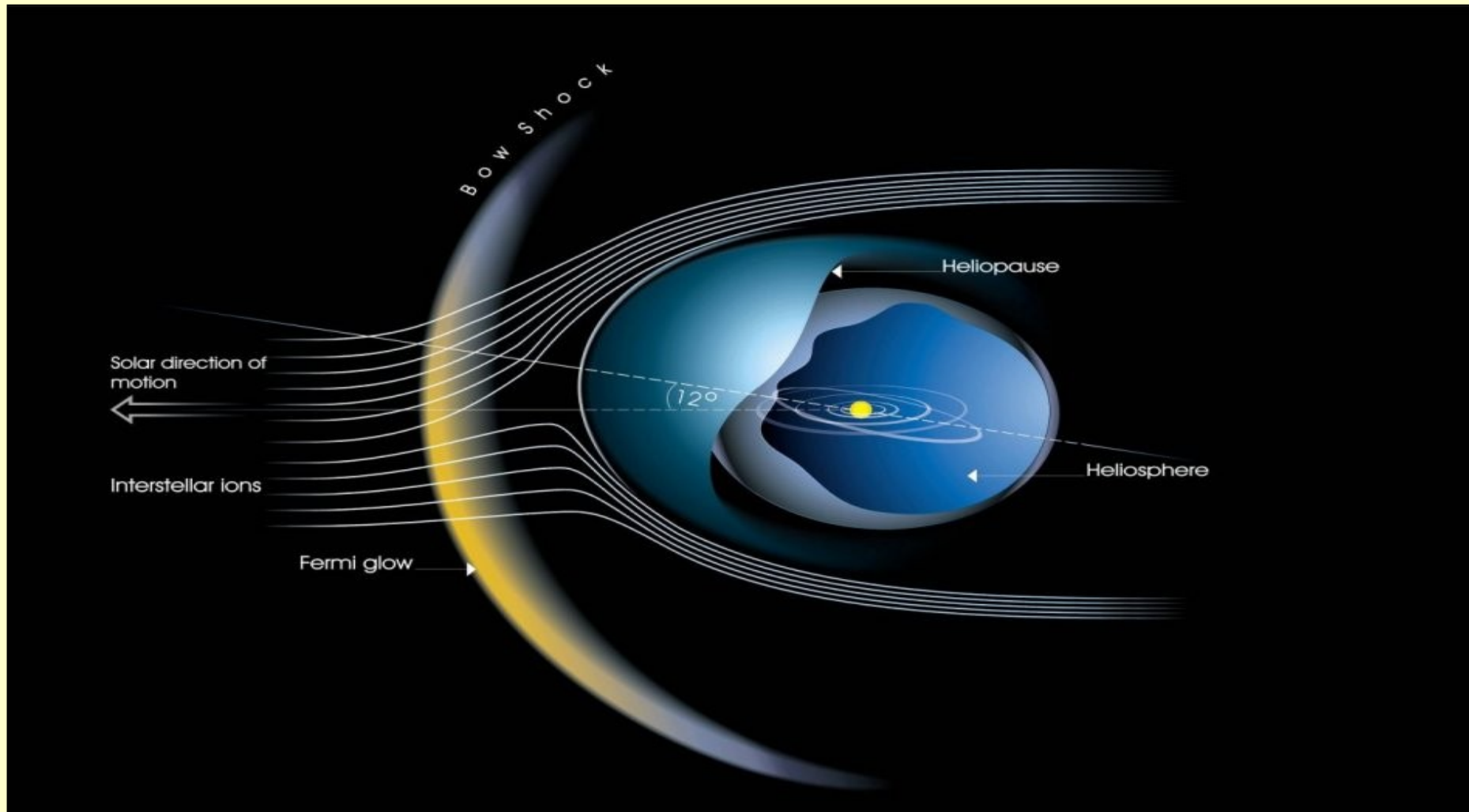
The climate as a system of water cycles

The magic of water

- Green-House Gas (GHG) **#1** !!!
- Atmospheric heat transport across the globe (evaporation/ precipitation)
- Ocean currents around the globe
- Temperature changes seem muted compared to precipitation effects
- **Albedo - water / ice / cloud**



The "Star Trek" theory of climate - Galactic rays



Conclusions

The Kyoto Premise is a poor model of climate change on all time scales and geographies.

Alternative theories can actually fit the data. Many have been around for a LONG time!

Keep It Simple Sam (KISS) - Major mistakes are being made with the initial, simple aspects of climate change. This doesn't bode well for the complex approaches if we keep jumping on science fashions-cults-religions.



Climate Change:

It's the Sun, Stupid!



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II. The Kyoto Premise

A 20 year scientific "fashion-cult-religion"

III. Astronomy, Geology, Evolutionary Biology

Traditional & Modern views of key climate drivers

IV. GHGs, Clouds, Ice Caps, Ocean Currents

Major intermediate climate mediators

V. The Prophecies of the Sun (time permitting...)

VI. Conclusions



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Our Sun - well behaved compared to its brethren

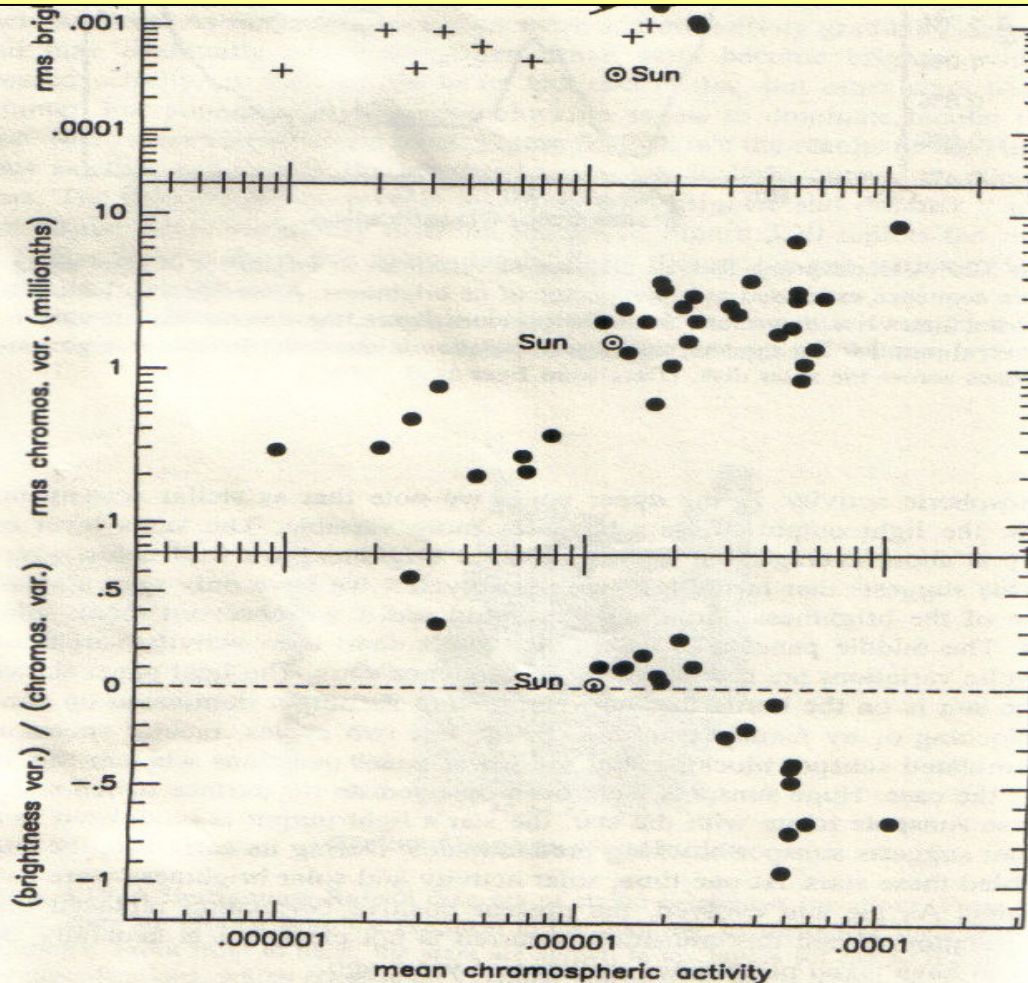


FIGURE 3.21 Variations in stellar brightness, root-mean-square chromospheric variability, and their ratios, all plotted as functions of the mean chromospheric activity. In the lower panel, the sun borders on having its brightness positively correlated with activity for the last two cycles and displaying a possible anticorrelation. (From Lockwood et al., 1992, with permission.)



Back-seat direct climate drivers

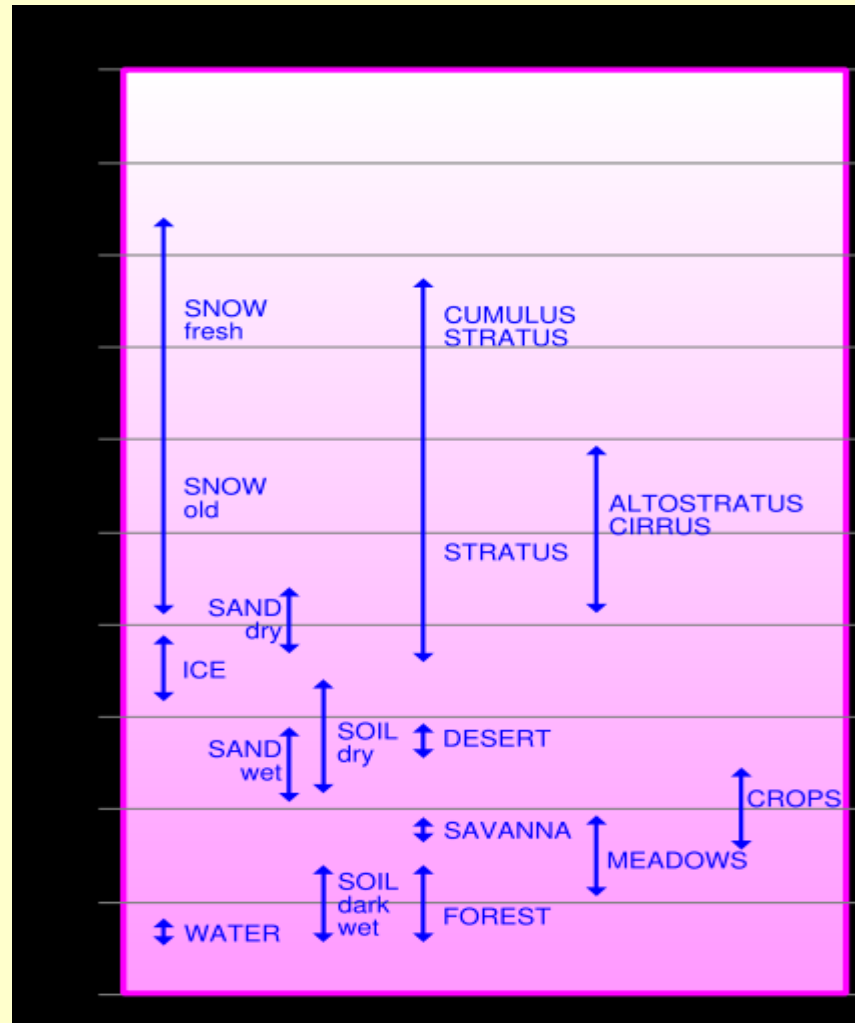
- Massive volcanic eruptions (short-term?)
- "Too small to have an impact?"
 - geothermal variability
- Human activity
 - land clearing
 - urban islands
 - thermal & GHG emissions

(drivers - direct energy inputs)



Albedo - reflection of sunlight

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%



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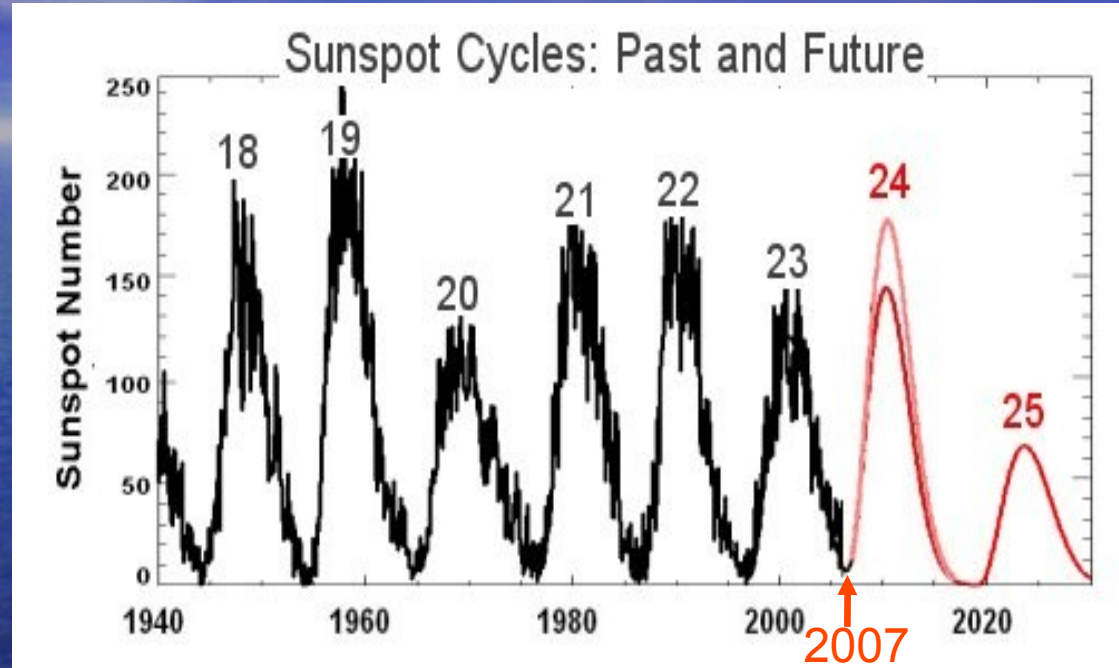
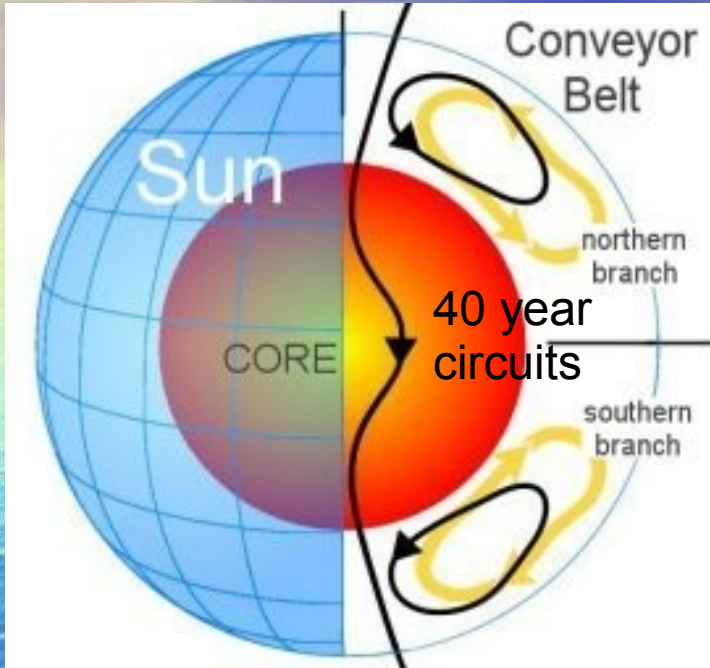
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Solar Cycle 25 To Be Weakest in Centuries



The Sun's Great Conveyor Belt has slowed to a record-low crawl, which has important repercussions for future solar activity.

Normally 1 m/s since 19th century. Now 0.75m/s in N and 0.35 m/s in S.

NASA (physorg.com/preview66581392.html)

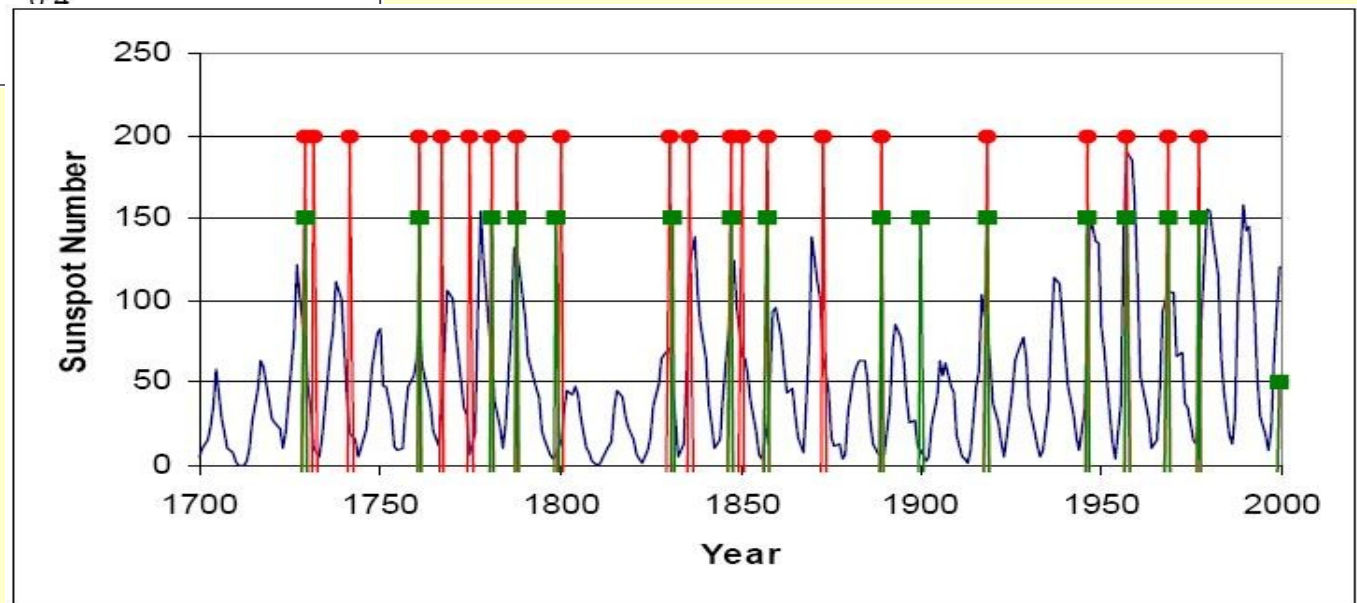
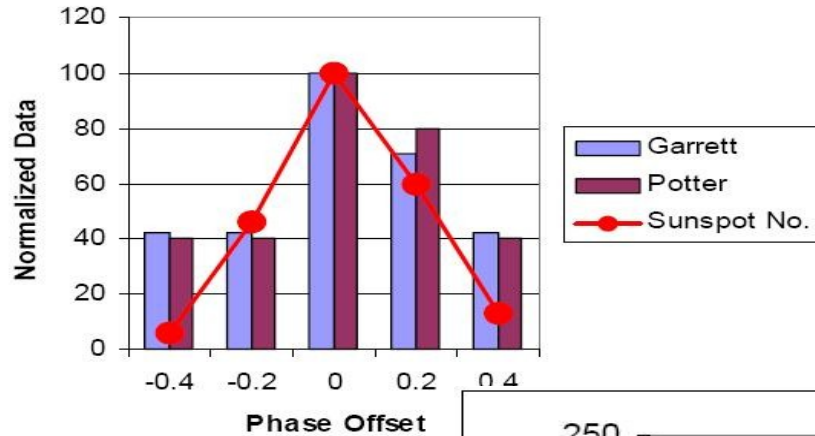
www.BillHowell.ca, 22 May 2007

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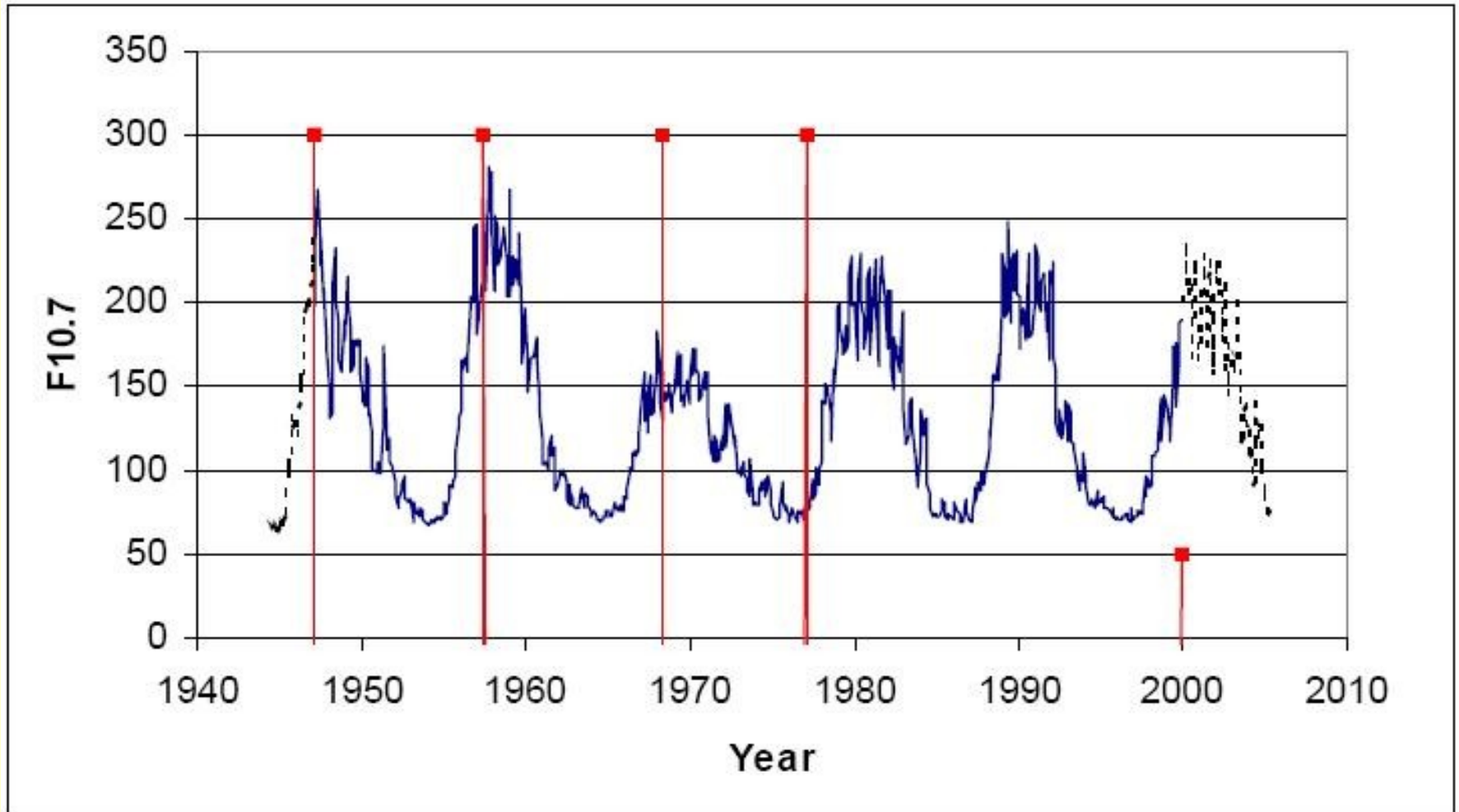
V. The Prophecies of the Sun

Influenza pandemics and solar activity



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Influenza pandemics and solar activity



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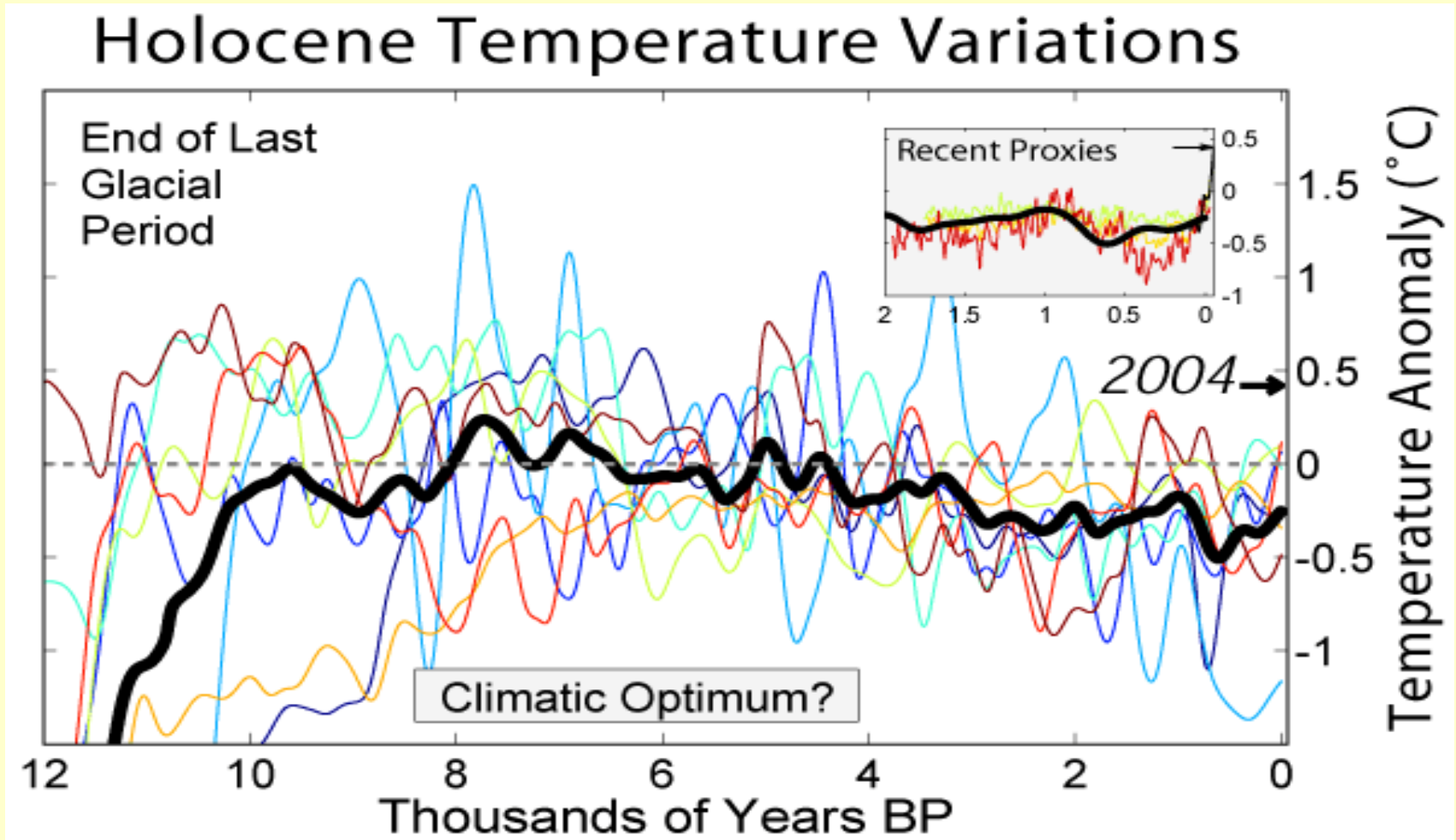
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Temperature - averages versus regions



CO₂ a minor or even insignificant climate driver?

Is there ANY credible and coherent set of data and analysis that even suggests that CO₂ is a serious climate driver, ...

... that is not far better interpreted as showing that CO₂ is merely a function of temperature?

I've been waiting for several years to see this.



CO₂ a minor or even insignificant climate driver?

The GHG effect of CO₂ is close to being "fully utilised", and further increases in CO₂ have less and less effect. Man-made CO₂ emissions are small compared to natural emissions.

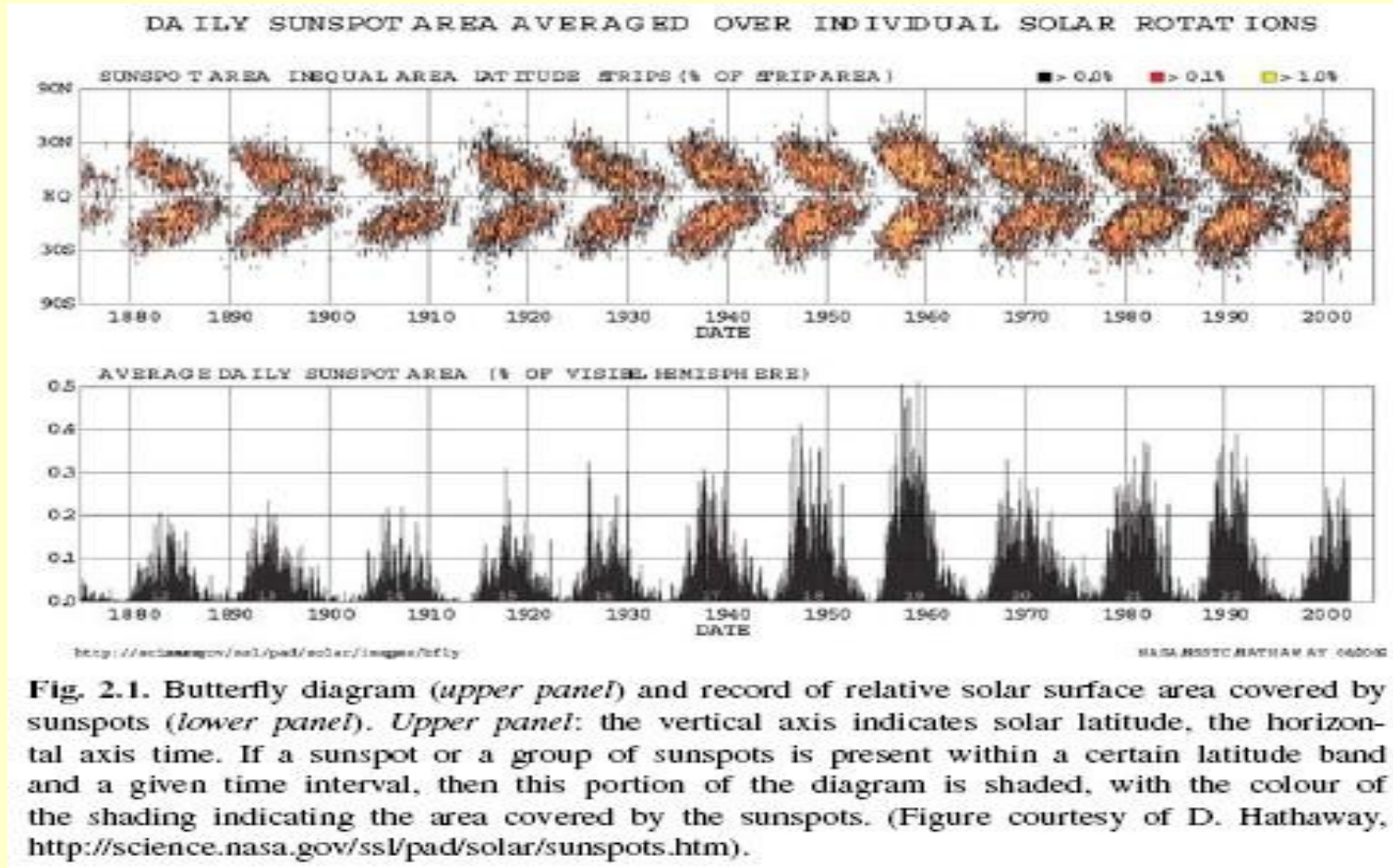
It appears that CO₂ is best described as a function of temperature?

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III. Astronomy, Geology, Evolutionary Biology

It all starts with our Sun



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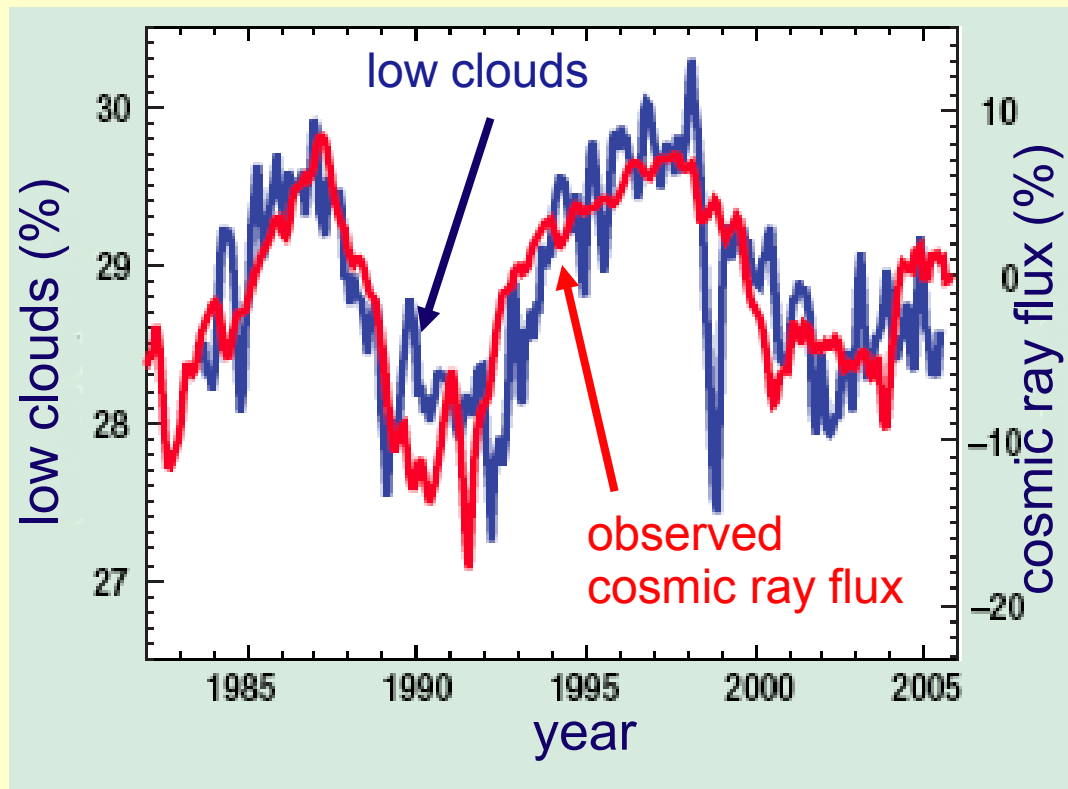
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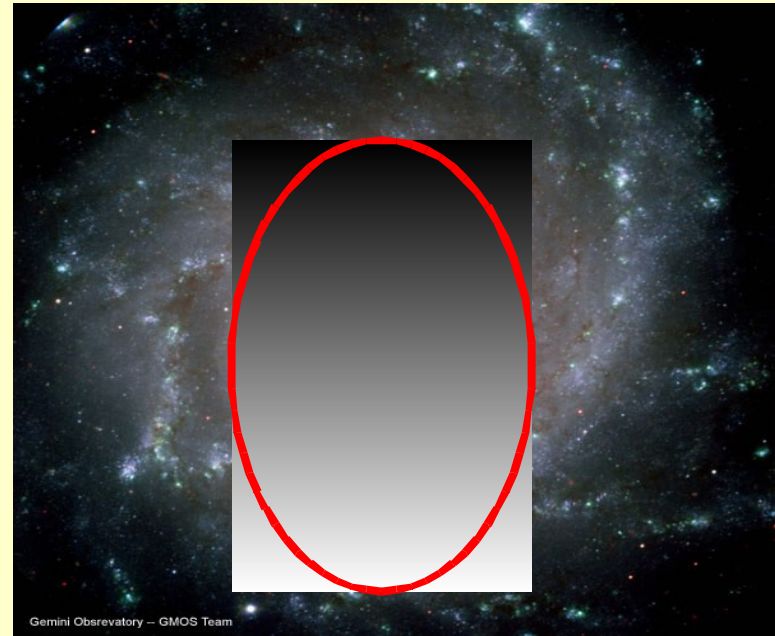
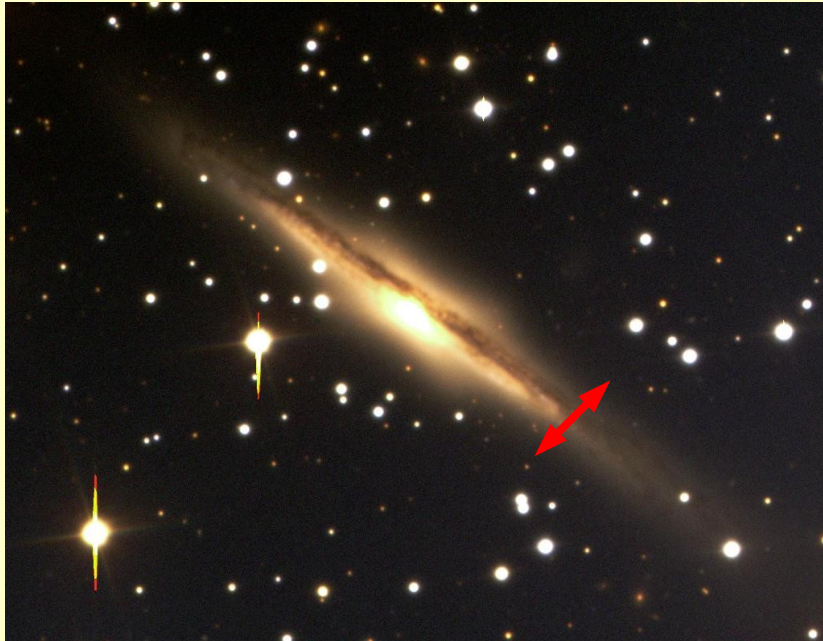
Major intermediate climate mediators

1.7 % variation in low cloud formation between solar maximum and minimum (vs $<0.1\%$ solar irradiance variation)



Milky Way cycles

(I couldn't find top and side photos of our Milky Way... let me know if you find some)



Milky Way cycles

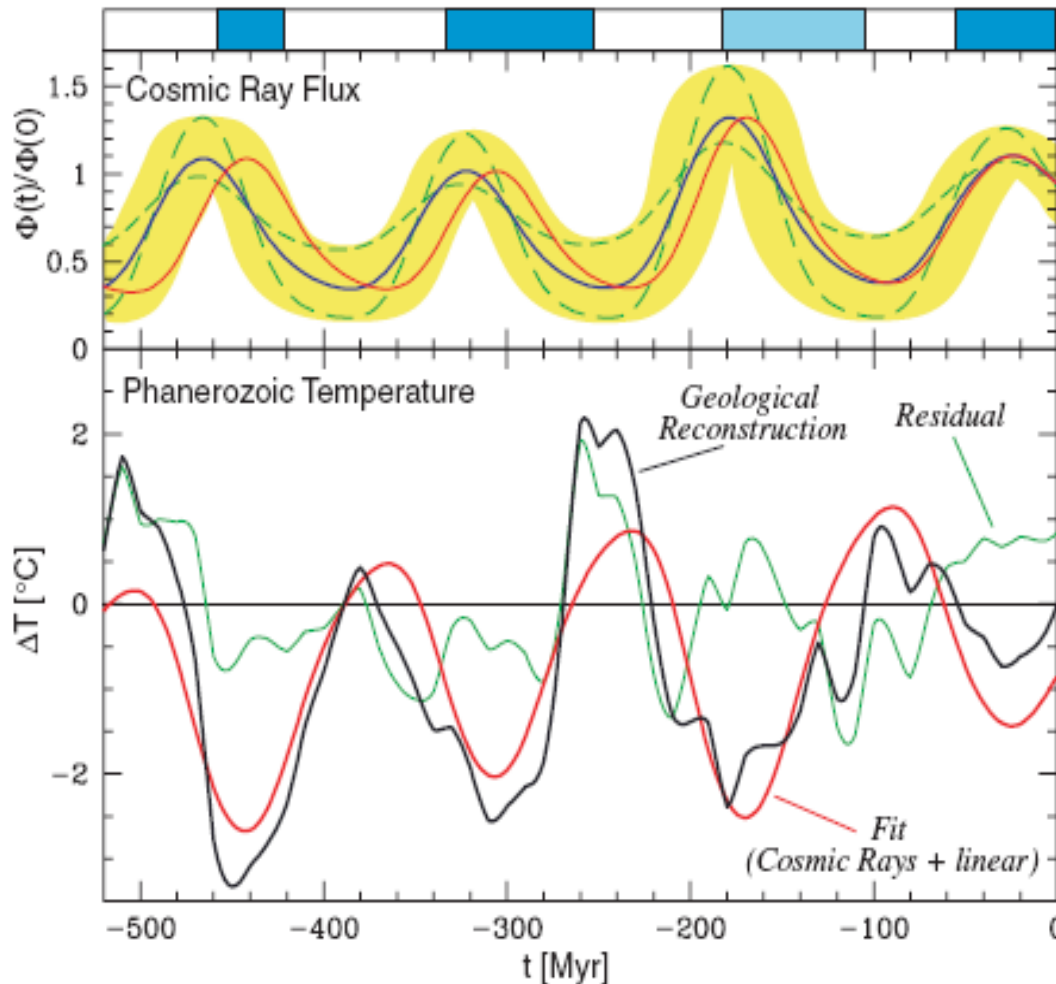
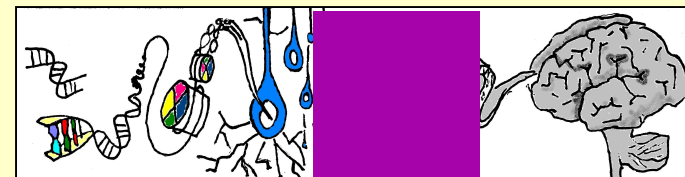


Figure 2. The cosmic ray flux (Φ) and tropical temperature anomaly (ΔT) variations over the Phanerozoic. The upper curves describe the reconstructed CRF using iron meteorite exposure age data (Shaviv, 2002b). The blue line depicts the nominal CRF, while the yellow shading delineates the allowed error range. The two dashed curves are additional CRF reconstructions that fit within the acceptable range (together with the blue line, these three curves denote the three CRF reconstructions used in the model simulations). The red curve describes the nominal CRF reconstruction after its period was fine tuned to best fit the low-latitude temperature anomaly (i.e., it is the "blue" reconstruction, after the exact CRF periodicity was fine tuned, within the CRF reconstruction error). The bottom black curve depicts the 10/50 m.y. (see Fig. 1) smoothed temperature anomaly (ΔT) from Veizer et al. (2000). The red line is the predicted ΔT_{model} for the red curve above, taking into account also the secular long-term linear contribution (term $B \times t$ in equation 1). The green line is the residual. The largest residual is at 250 m.y. B.P., where only a few measurements of $\delta^{18}\text{O}$ exist due to the dearth of fossils subsequent to the largest extinction event in Earth history. The top blue bars are as in Figure 1.



Conclusions

Diversity of opinion and approach is the key
(Wallace - Darwin theory of evolution applied to science, policy and management)

"Scientific Consensus" can be an oxymoron.

STOP, REORIENT, RE-PRIORITIZE

what we are doing. Cut back, reflect and a smaller scale of new funding, institutions, and scientists.

Astronomy, earth sciences, and new modelling approaches.

