The Absurdity of the Conventional Global Warming Narrative.

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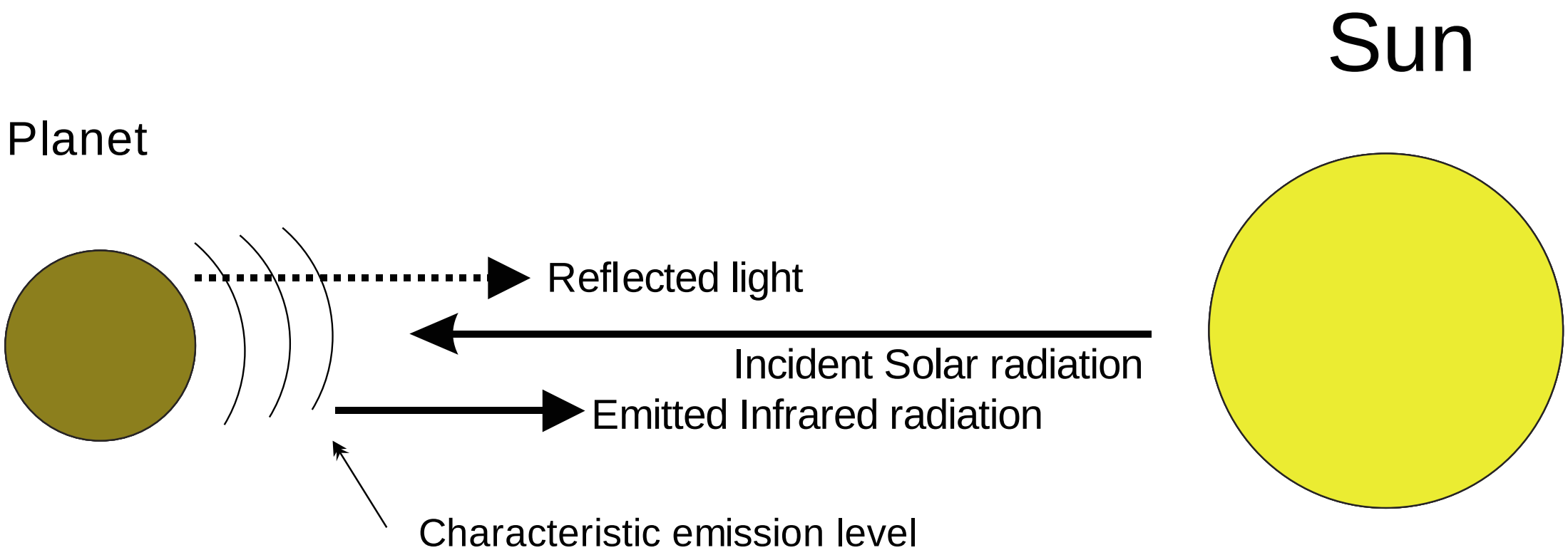
I have intentionally chosen this title because most of us have gone along with the popular narrative without considering whether it is a significant factor in actual climate change. It turns out that it isn't. As usual, capturing the narrative is the goal in propaganda. It certainly has succeeded when it comes to climate alarm.

The Universal ‘Scientific’ Narrative for Global Warming.

The greenhouse effect based on a one-dimensional radiative-convective model.

i. Allows inclusion of CO_2 and the introduction of feedbacks.
ii. Feedbacks are assumed – not derived or observed.
iii. Manabe assumed constant relative humidity which doubled the small impact of CO_2. This won him a Nobel Prize in Physics
iv. The result was still small but it was argued that it was unusual.

The following two slides review this greenhouse narrative.



(The characteristic emission level is that level above which there is sufficiently little greenhouse gas so that infrared radiation can escape to space.)

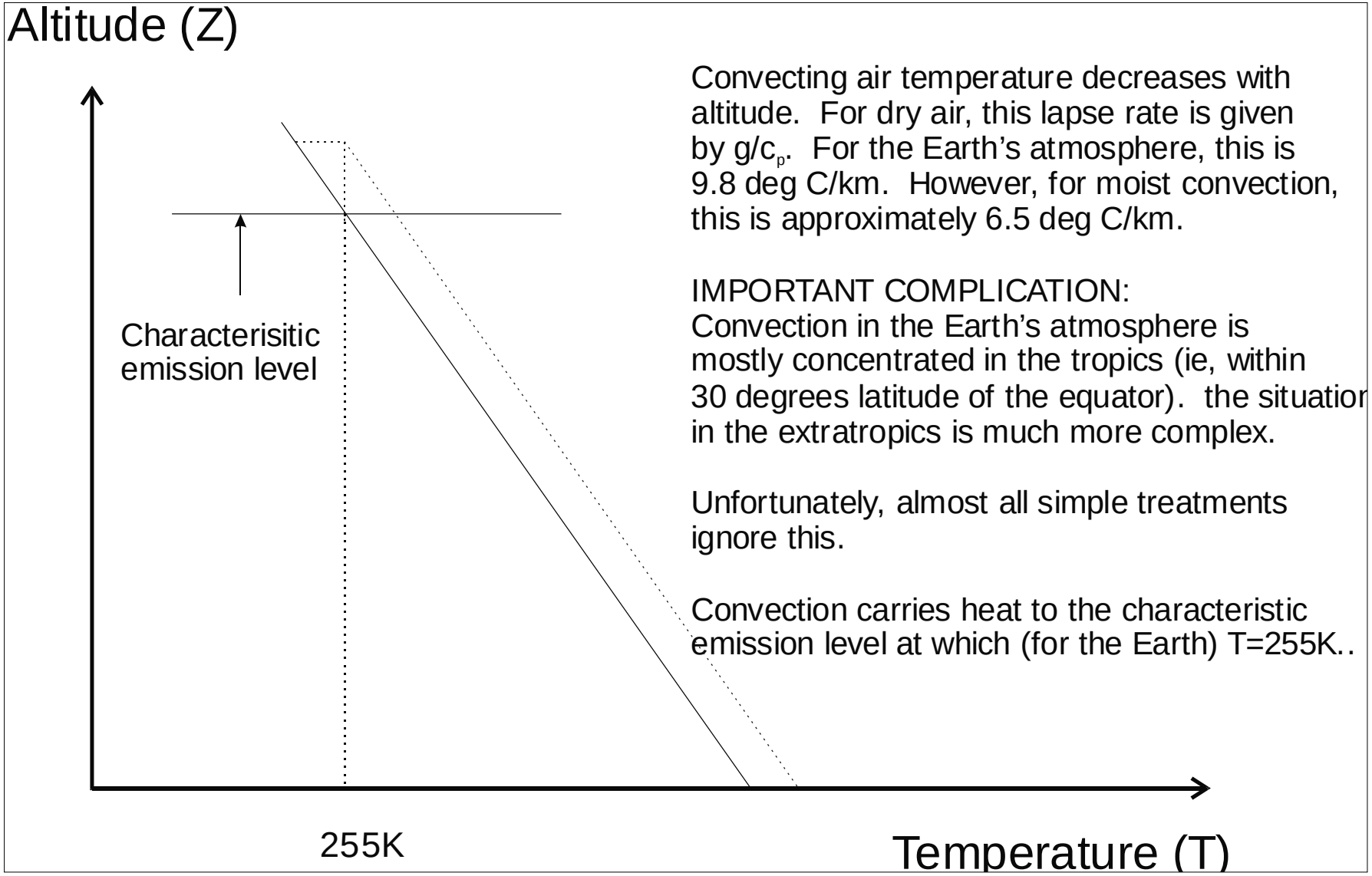
Temperature of planet as seen from space is given balancing net solar irradiation (Incident Solar radiation - Reflected light) with Emitted infrared radiation.

Note that temperature as seen from space is the temperature at the characteristic emission level and NOT the temperature of the planetary surface. Relating the two is at the heart of the greenhouse effect.

Although the planet and the sun look spherical, the numbers represent some sort of average that will, in fact, be applied to a one-dimensional picture. Because of the high temperature of the sun, its radiation is primarily in the visible part of the spectrum. The Earth's much lower temperature causes its radiation to be concentrated in the infrared. Because of the presence of strong infrared absorbing components in the Earth's atmosphere (mostly water vapor and clouds with small contributions from CO_2, ozone and still more minor constituents like methane), emissions cannot reach space until one gets to a level above which there is sufficiently little absorption so as to permit the radiation to escape to space. This level is referred to as the characteristic emission level. The characteristic emission level plays a crucial role in the greenhouse effect. Balance is achieved when the temperature at the characteristic emission level is 255 K.

In order to obtain greenhouse warming, one must consider one more process; namely thermal convection. Radiation alone leads to convective instability wherein the surface is sufficiently warmer than the air above it so as to lead to convection penetrating deep into the atmosphere. Convection in a gas subject to gravity leads to the temperature decreasing at an adiabatic lapse rate. For a dry atmosphere, this is given by g/cp (approximately 9.8 K/km); for a moist atmosphere where condensation accompanies cooling, the situation is more complex, but the associated lapse rate is approximately 6.5 K/km

Here is a quick description of the 1-dimensional greenhouse effect.



Convecting air temperature decreases with altitude. For dry air, this lapse rate is given by g/c_p. For the Earth's atmosphere, this is 9.8 deg C/km. However, for moist convection, this is approximately 6.5 deg C/km.

IMPORTANT COMPLICATION:
Convection in the Earth's atmosphere is mostly concentrated in the tropics (ie, within 30 degrees latitude of the equator). the situation in the extratropics is much more complex.

Unfortunately, almost all simple treatments ignore this.

Convection carries heat to the characteristic emission level at which (for the Earth) T=255K..

Adding greenhouse substances to the atmosphere elevates the characteristic emission level, and forces the surface temperature to increase so as to restore 255K at the new emission level. This is what is referred to as the Greenhouse Effect (in current climate parlance). Claims that this was already understood by Arrhenius or even Fourier are simply wrong. What they did recognize was that greenhouse gases would warm the earth, but they knew nothing about atmospheric convection.

This approach does provide some insights into the differences among the various planets in our solar system, but, as we will see, it is fundamentally inadequate for describing the earth's complex 3-dimensional nature.

Nevertheless, it should be noted that almost all current discussions of global warming are based on this planetary view, largely because of its simplicity. Briefly, one begins with an atmosphere that has a preindustrial value for CO_2, and asks how much warming will be associated with a doubling of CO_2. It turns out that the warming is logarithmic in CO_2 (because the line centers are saturated and only the line wings are involved), so that each doubling is associated with the same warming. The contribution is about 3.5 Watts per square meter or on the order of 2% of the normal flux, and leads to warming of about 1C. This result is not considered controversial. Normally, one might consider 2% to be small since common fluctuations in upper level cirrus, low level clouds, ocean currents, etc. routinely produce this level of variability in the radiative budget, which is to say, consistent with *Le Chatelier's Principle*, the climate system is amply capable of opposing such forcing. Although the gross inadequacy of our understanding of clouds and other factors is openly acknowledged by the IPCC, concerns over global warming are based on what is essentially the assumption that variations in water vapor, clouds, etc. act to amplify rather than oppose the impact of CO_2; i.e., they are assumed to be positive rather than negative feedbacks. ***It is on the egregiousness of these assumptions rather than on the greenhouse effect itself, that most skeptics (including myself) have focused.***

As we have just seen, the focus on the planetary view is understandable. Its particular appeal is to physicists and astrophysicists since it involves a minimum of detail while letting them feel that they have mastered the subject. It also was taken seriously by many of us who should have known better. The reason for this was that even this coarse approach required highly dubious properties for feedbacks and demanded better assessment.

Although the above provides the conventional explanation of the greenhouse effect, most projections refer to large scale models of the atmosphere known as GCMs. The original expansion of this abbreviation was 'General Circulation Model.' However, increasingly, they seem to be referred to as 'General Climate Models.' These models do include much of the complexity of the real atmosphere but they cannot provide the spatial resolution to handle processes like vertical convection (ie, cumulonimbus towers), clouds in general, turbulence, etc. which, as a result, require the use of questionable parameterizations. They do, however, permit the inclusion of arbitrary feedbacks which enable models to produce a wide variety of results. However, even these models do not predict catastrophic changes due to increasing CO_2. Moreover, these models do not adequately describe even the present climate. They do especially poorly at representing natural internal variability of the atmosphere and the oceans, and almost all of them fail to correctly anticipate changes in the commonly used measure of global temperature. Nor do they simulate past climates adequately.

Virtually all critiques of the global warming issue have focused on the feedbacks and the inadequacies of the models and one other matter. That other matter is the claims of various things having changed. I will briefly return to this other matter later.

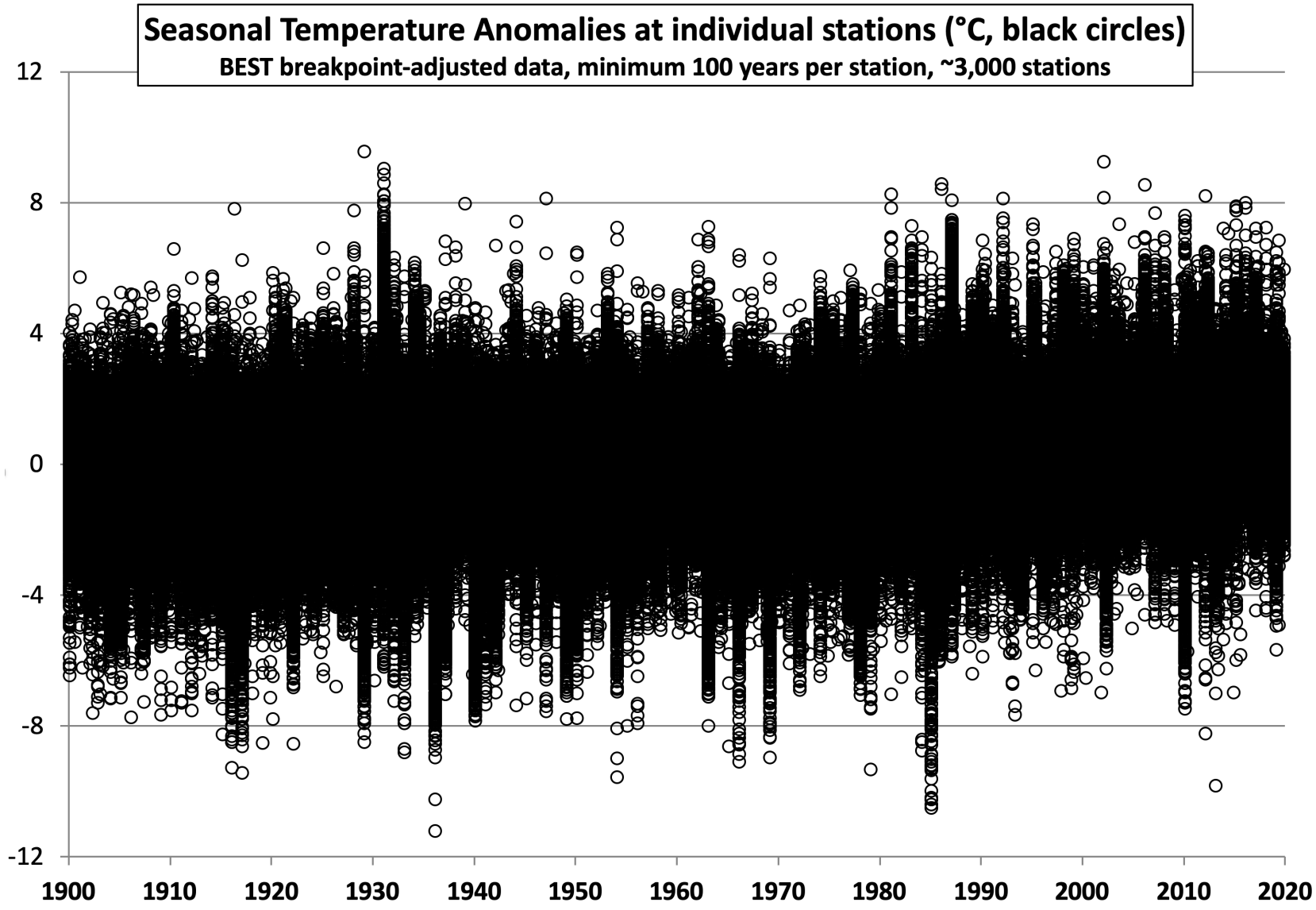
What is wrong with the narrative itself?

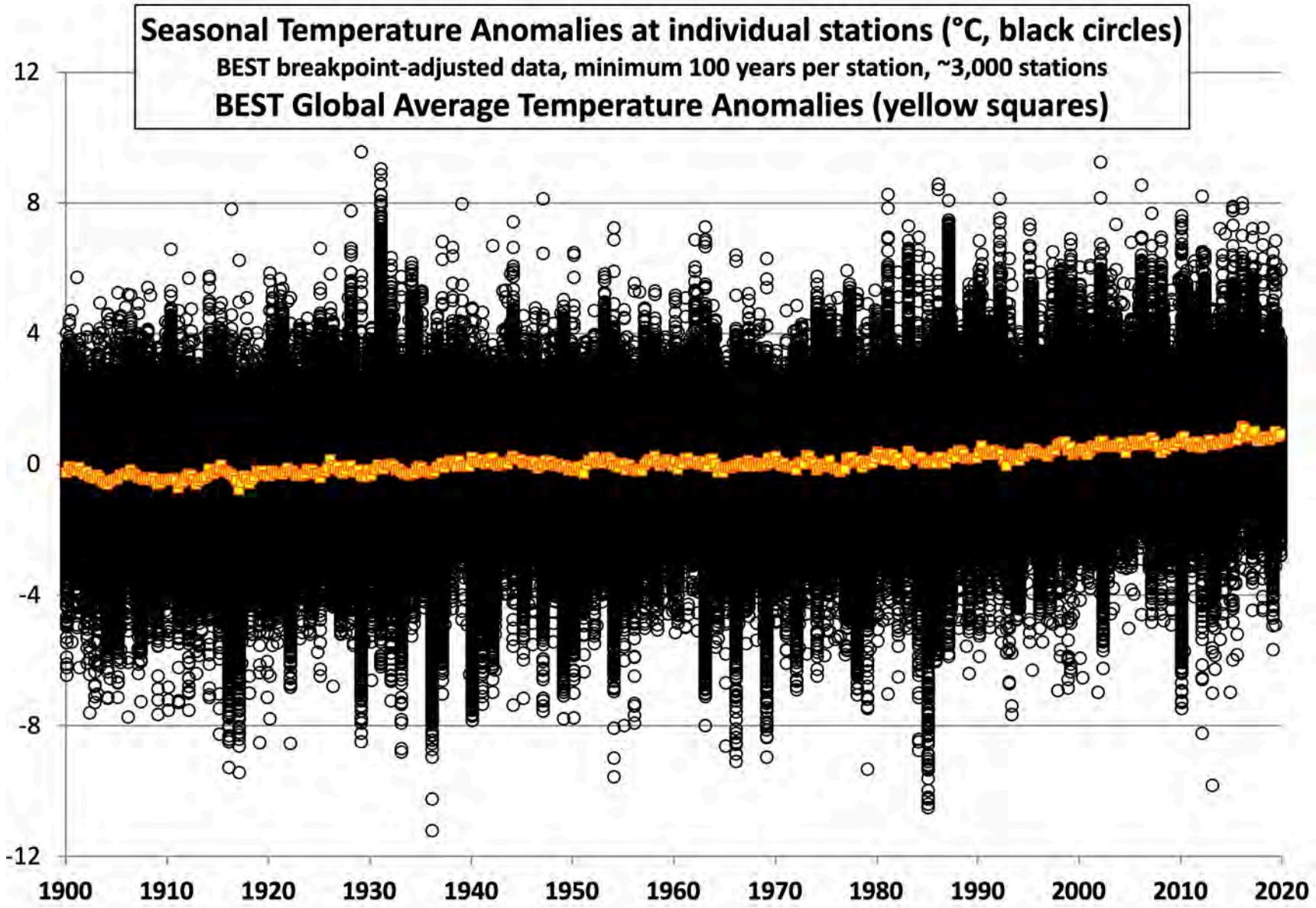
The climate system is not one-dimensional. What exactly is the temperature that it refers to?

Clearly, it is not the average temperature. After all, what does it mean to average Mt. Everest with the Dead Sea. What is used instead is the average anomaly (defined as the deviation from 30 year means at each station). This anomaly is actually the small residue of widely spread data points.

These are the data points used to calculate the average anomaly.

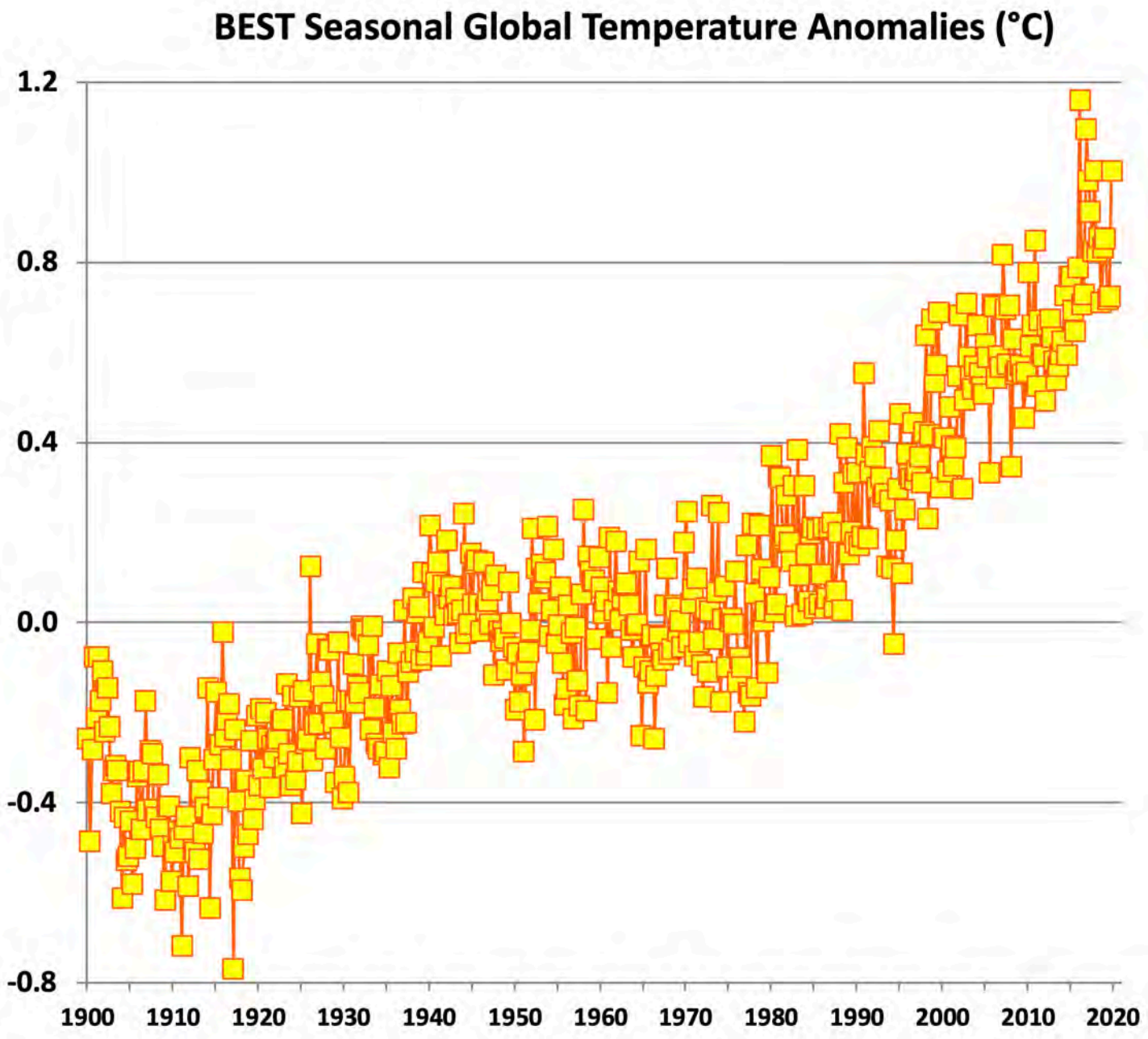
Note the temperature scale. It extends over a range of almost 20C!





The average anomaly is shown by the orange line. Actually, the points were yellow with orange boundaries.

At any particular time, almost as many stations will be cooling as warming since the anomaly is so small.



Here is the average anomaly as you usually are shown. Note that the data points are not shown.

Despite the dramatic appearance of the resulting graph, **we are really still talking about small temperature changes.**

Note that the temperature scale has been expanded by about an order of magnitude in order to give naïve viewers the impression of a large change.

The graph on the right shows how small the ‘warming’ observed is compared to other magnitudes.

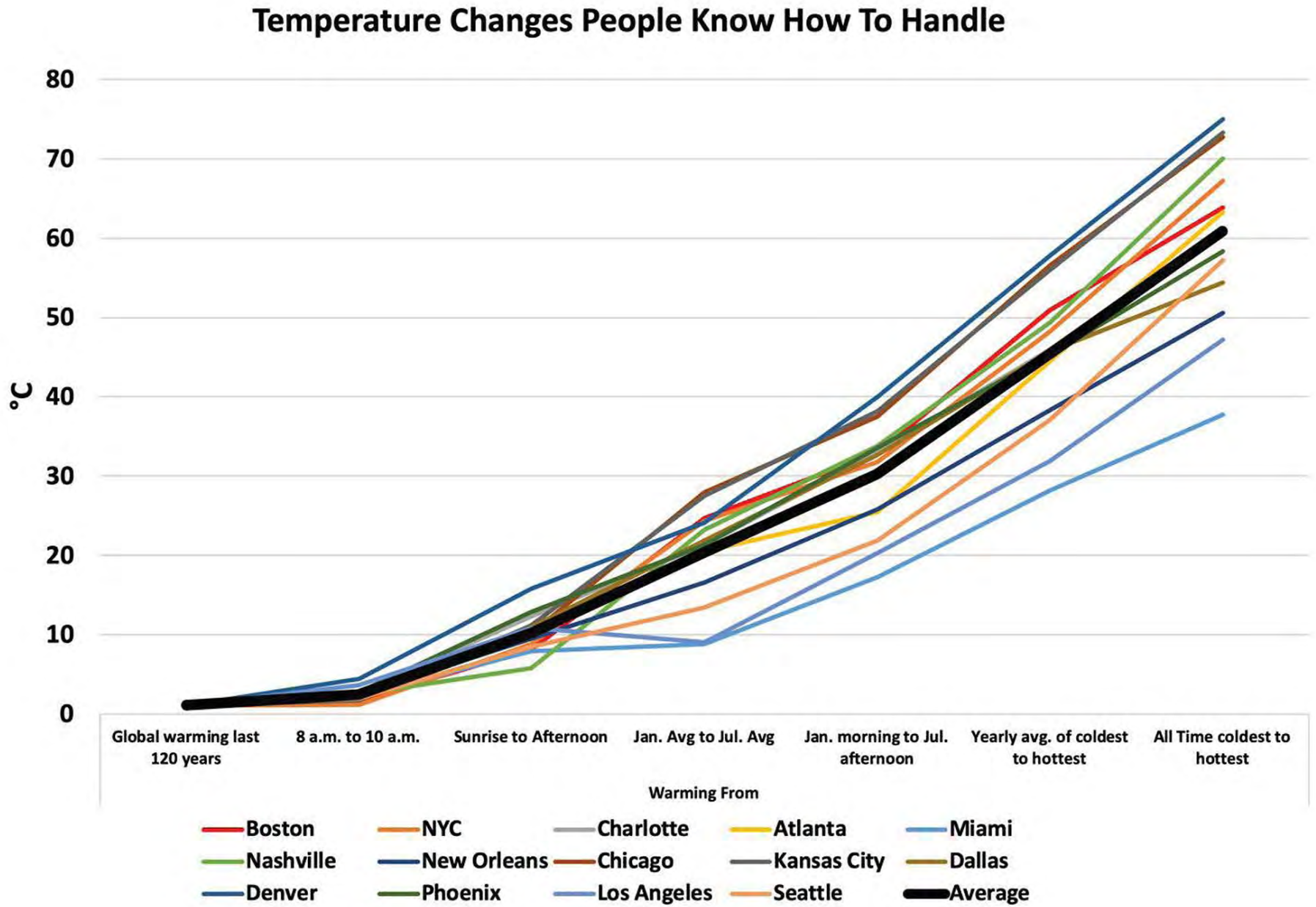


Figure 9. Temperature Changes People Know How to Handle

It may be worth repeating that the Working Group 1 report (ie the part dealing with the science) of the UN's Intergovernmental Panel on Climate Change never suggests that 0.5C will be catastrophic. Indeed it doesn't suggest catastrophes at all.

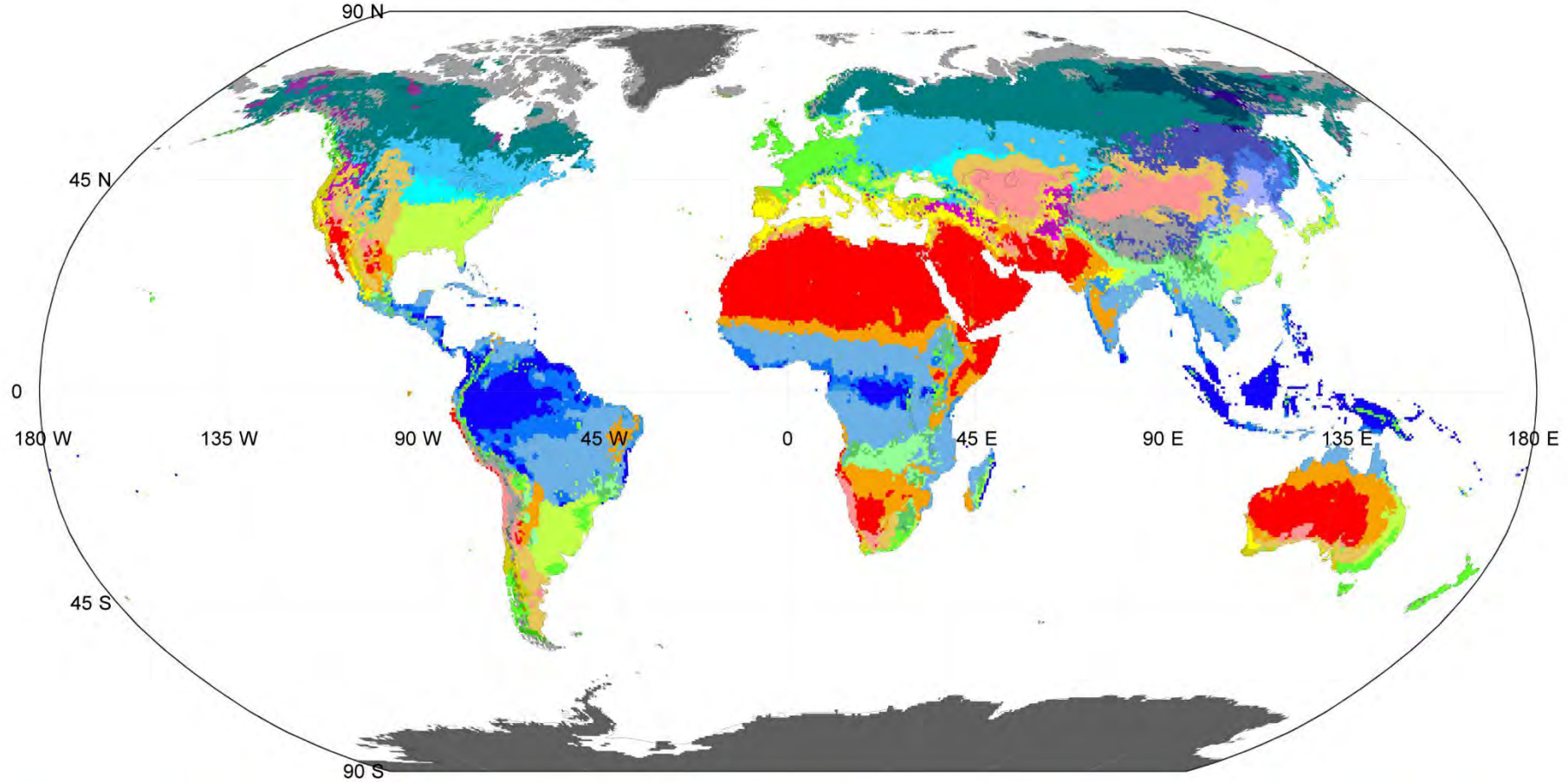
I don't include the Summary for Policymakers that accompanies the WG1 report. This summary is not prepared primarily by scientists. Moreover, it is released about 6 months before the full report in order to allow the report to be brought into consistency with the summary.

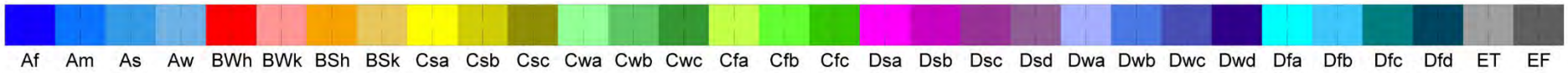
Until the 1970's, the meteorological literature on climate didn't emphasize, or even mention, the greenhouse effect. *Climatology*, Haurwitz and Austin, 1944., *Climate*, Pfeffer ,1955, *Atmosphere, Weather and Climate*, Barry and Chorley, 1970.

Instead, they were concerned with understanding the numerous different climate regimes that were found at present: the Koppen-Geiger classification.

Note the many different climate regimes that characterize the present climate.

World map of Köppen climate classification for 1901–2010





First letter	Second letter		Third letter
A: Tropical	f: Fully humid	T: Tundra	h: Hot arid
B: Dry	m: Monsoon	F: Frost	k: Cold arid
C: Mild temperate	s: Dry summer		a: Hot summer
D: Snow	w: Dry winter		b: Warm summer
E: Polar	W: Desert		c: Cool summer
	S: Steppe		d: Cold summer

Data source: Terrestrial Air Temperature/Precipitation: 1900-2010 Gridded Monthly Time Series (V 3.01)

Resolution: 0.5 degree latitude/longitude

Website: http://hanschen.org/koppen

Ref: Chen, D. and H. W. Chen, 2013: Using the Köppen classification to quantify climate variation and change: An example for 1901–2010. Environmental Development, 6, 69-79, 10.1016/j.envdev.2013.03.007.

Much of the explanation of these particular regimes consists in largely ‘just so’ stories, but that isn’t unusual in the earth sciences. The approach of theoreticians like myself tends to be more mathematical and focused. We try to isolate features like the Hadley Circulations and Stationary Waves. Oceanographers have their own pet features. Milankovich insightfully identified orbital variations in producing cycles of glaciation. Interestingly, none of the approaches is so naïve as to assume that there is some mean ‘temperature’ that determines the numerous features of the Koppen-Geiger picture – as well as a single primary cause like CO_2.

A simplification of this focusses on the tropics-arctic temperature difference. (Budyko-Izrael Picture) Note that this picture shows that the temperature at the equator doesn’t vary much, and that the change in the mean temperature is almost entirely due to changes in the tropics-arctic temperature difference.

By the 1980s, with advances in paleoclimatology, several aspects of climate history emerged with increased clarity. We began to see more clearly the cyclic nature of glaciation cycles of the past million years or so [14]. Warm periods like the Eocene (50 million years ago) became better defined [32]. The data suggested that for both glacial periods and the warm periods, equatorial temperatures did not differ much from present values, but the temperature difference between the tropics and high latitudes varied greatly. The following are the temperature differences:

Eocene:	$\Delta T \approx 20$C [32]
Glacial maximum:	$\Delta T \approx 60$C [5]
Today:	$\Delta T \approx 40$C

The variations in equatorial temperatures were much smaller than the above differences.

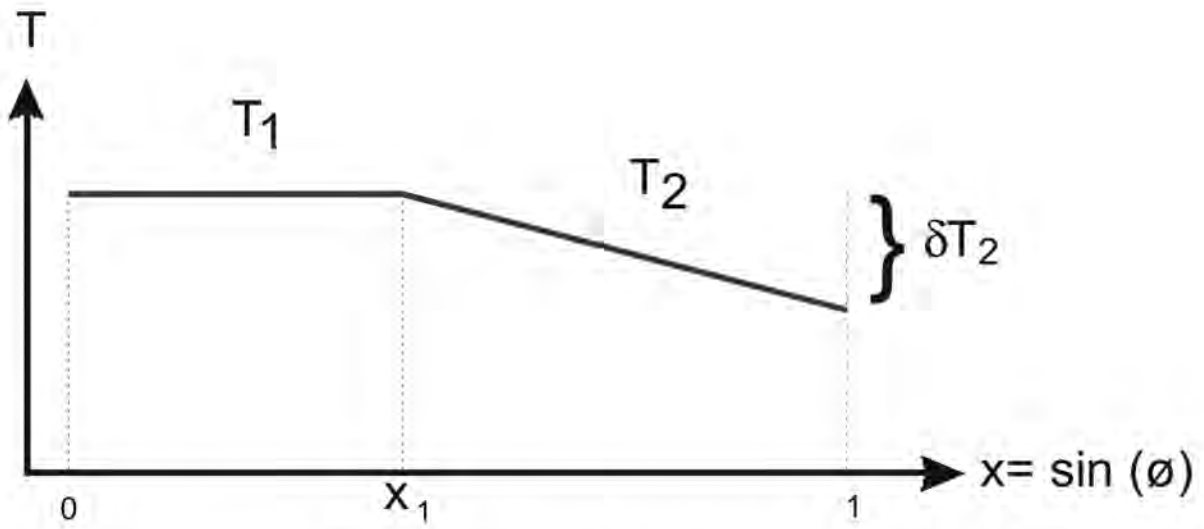


Fig. 2 Simplified picture of meridional temperature distribution between the equator ($\sin(\varphi) = 0$) and the pole ($\sin(\varphi) = 1$). See text for details

$$\Delta\bar{T} = \Delta T_1 - \Delta(\delta T_2)\frac{1 - x_1}{2}$$

In general, variations in ΔT are dominated by $\Delta(\delta T_2)$.

Adherents of today's popular narrative invoke an imaginary 'polar amplification' which some models (to their credit) fail to display. However, the physical basis for this difference is, in fact, well known. It is driven by the heat flux from the tropics to the polar region. There are heat fluxes associated with ocean currents and a number of atmospheric processes. However, the controlling heat flux is primarily due to atmospheric convection associated with what are called baroclinic instabilities. These instabilities are 'controlling' because they work to bring about the temperature distribution that neutralizes the instability. The fact that some of the transport is due to other processes such as oceanic transport and stationary waves simply relieves the need for transport by baroclinic instability. However, baroclinic instability will contribute whatever more is needed in order to neutralize the baroclinic instability.

A better-known example of controlling instabilities is vertical convection due to heating from below. It acts to produce an isothermal region for liquids at laboratory scales and the moist adiabat for tropics. Radiative-convective equilibrium is largely restricted to the tropics. The stability of the tropics suggests negative rather than positive feedbacks since the tropical temperatures remain relatively stable despite the varying heat fluxes from the tropics.

Note that attributing the change in mean anomaly resulting from changes in meridional heat flux to CO2 involves confusing cause with effect.

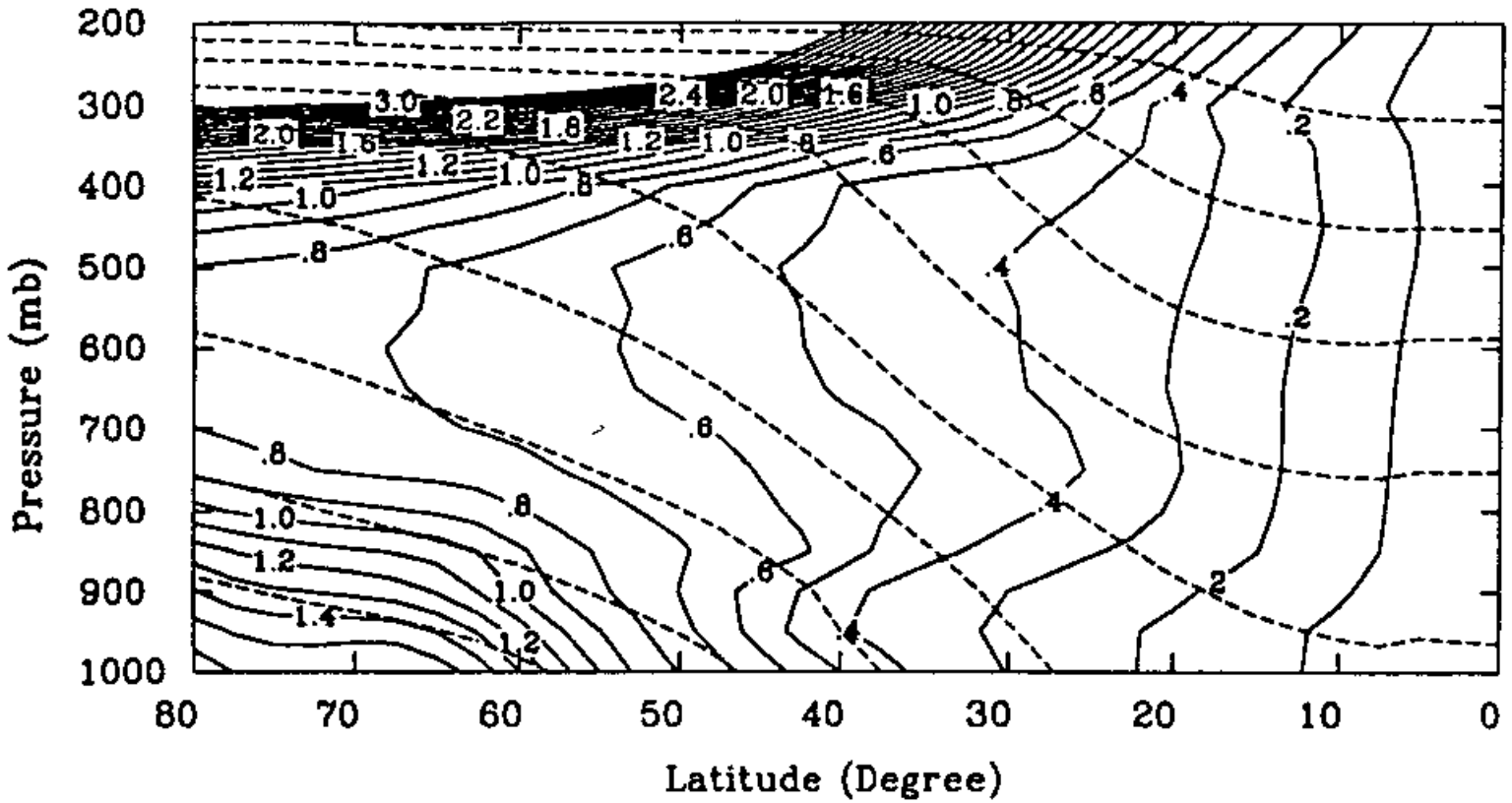
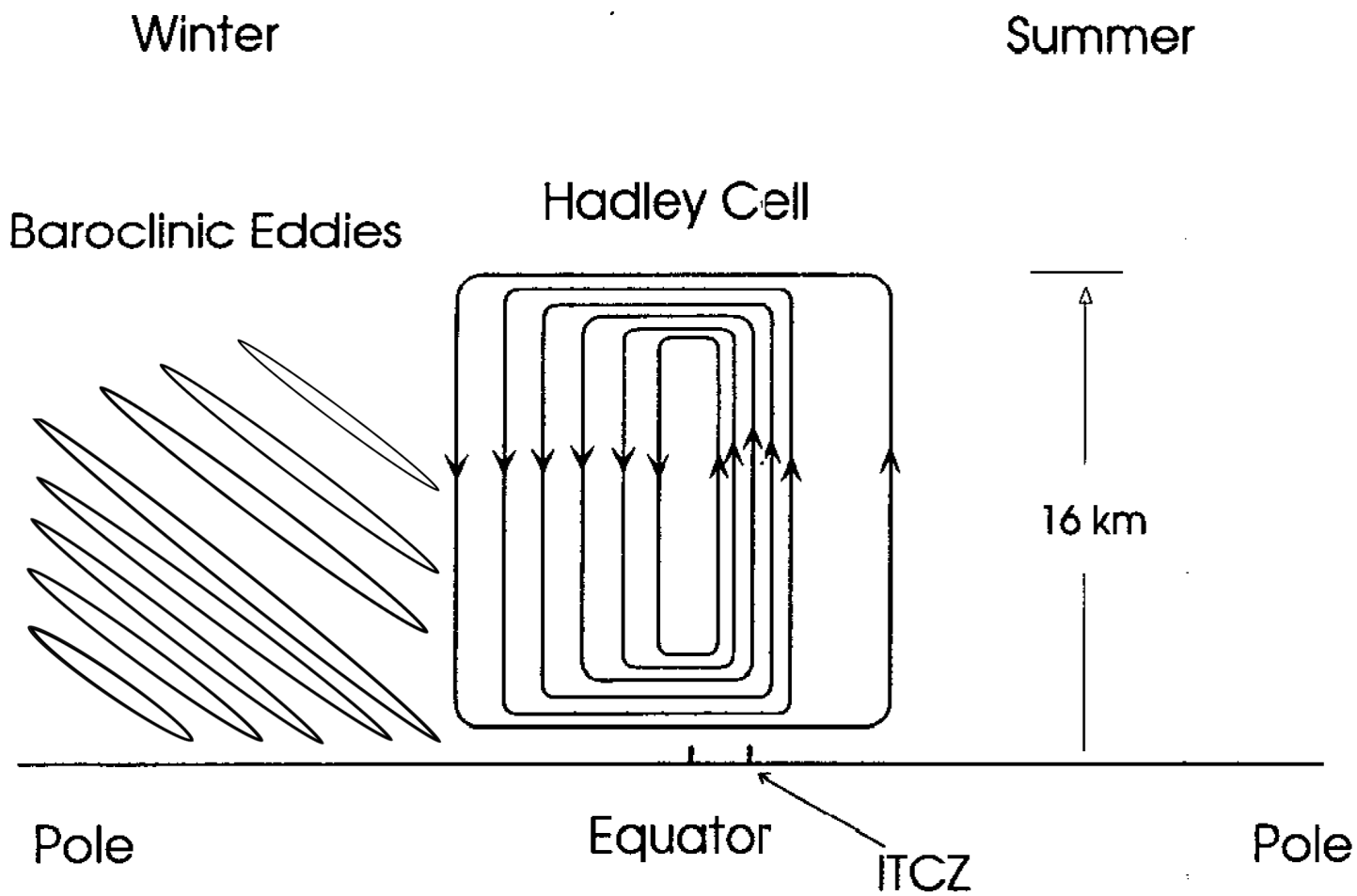


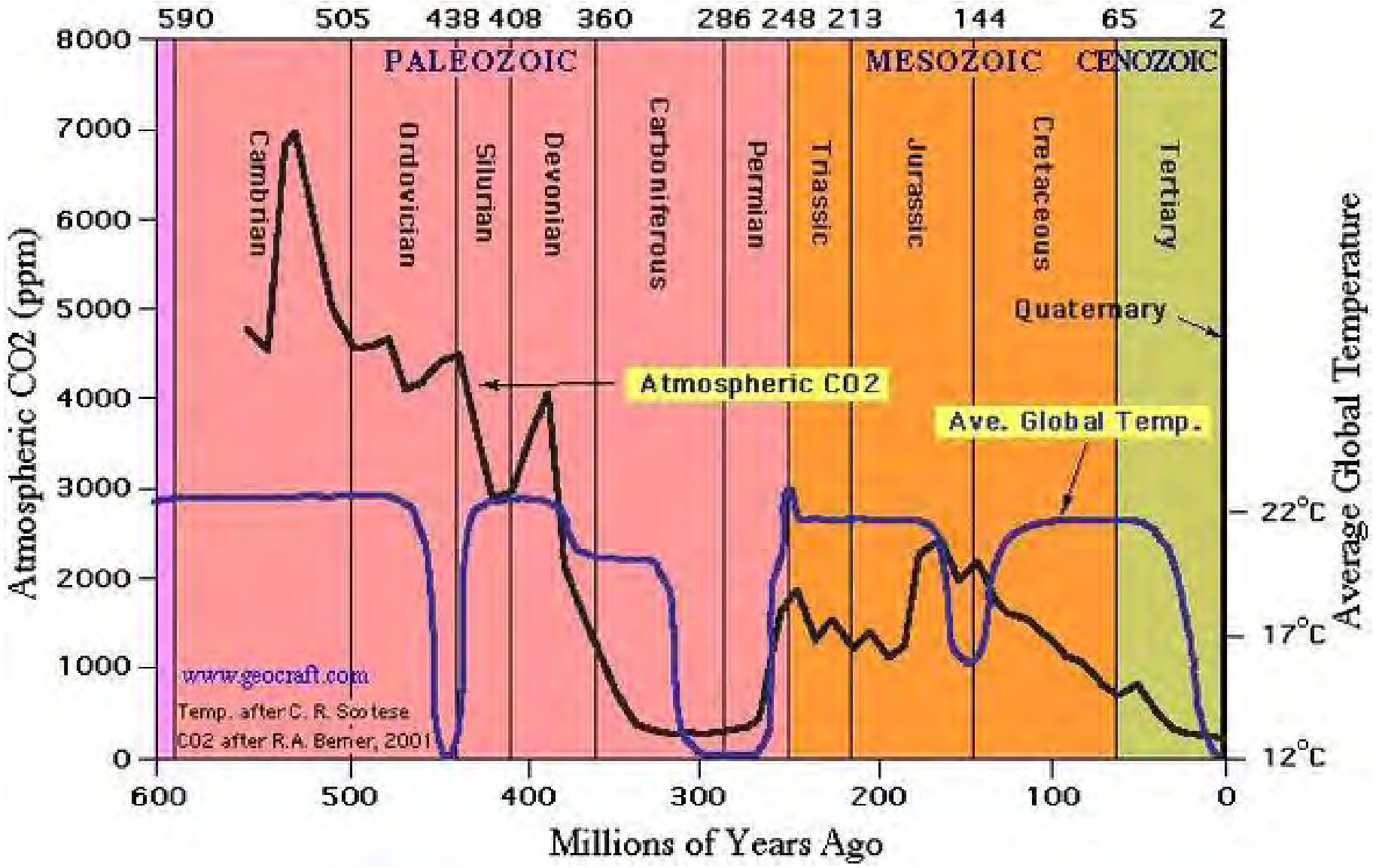
FIG. 2. Potential vorticity and potential temperature distributions in the troposphere for the winter season of the Northern Hemisphere. For clarity, isentropes are not labeled. The contours start from 260 K and end at 340 K with an even interval 10 K. Contours of PV end at 3.0 PVU. (Data source: same as in Fig. 1.)


Winter
Summer
Baroclinic Eddies
Hadley Cell
16 km
Pole
Equator
ITCZ
Pole

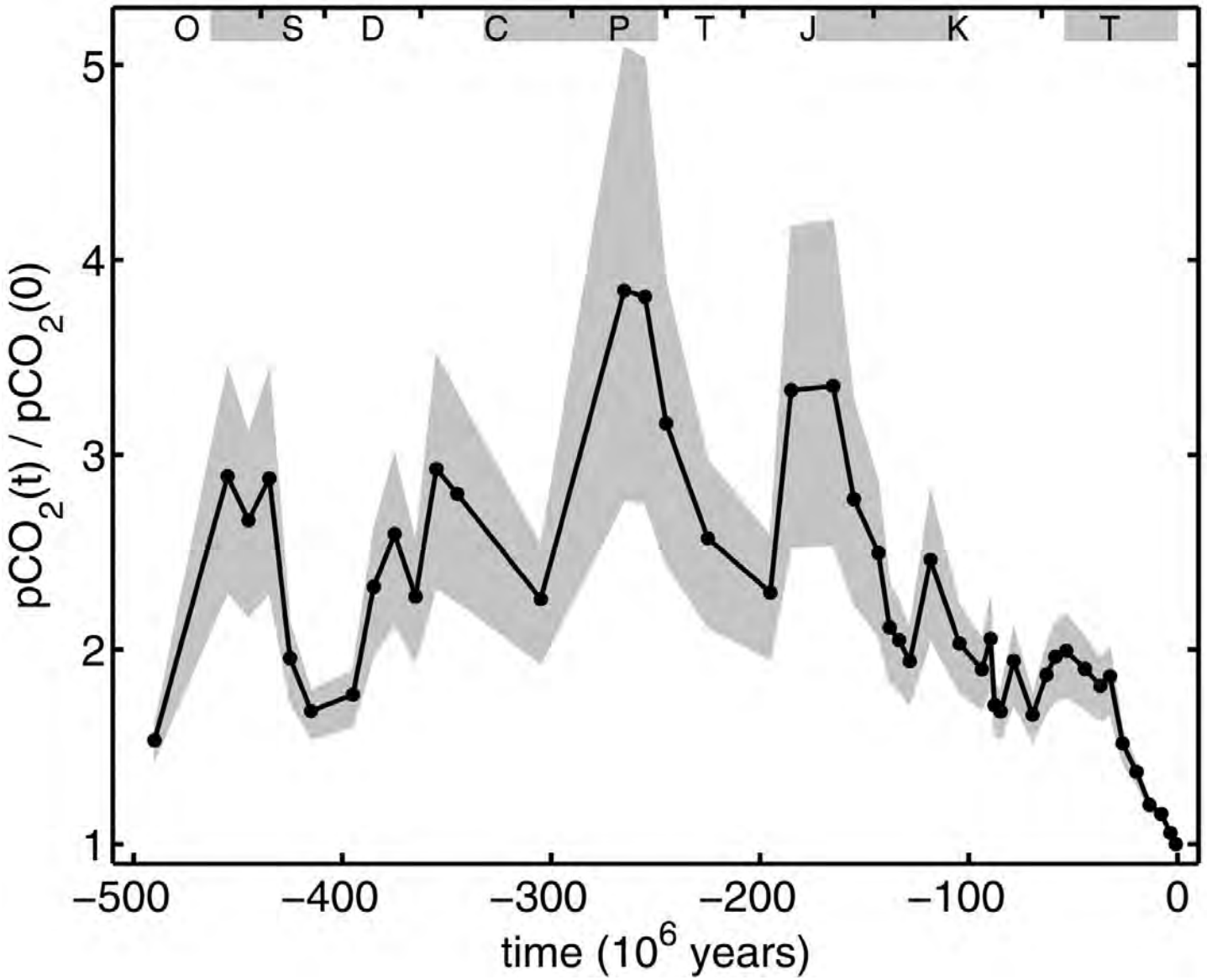
An important question is why does the climate have different tropics-polar temperature differences. Results of studies show that equilibration only determines the temperature difference at the tropopause. This is, in fact, observed to be about 20C which is the difference that characterizes the Eocene. The differences at the surface are associated with the existence of arctic inversions which are in turn associated with the presence of ice, but are currently not fully understood. To be sure, it is possible that radiative forcing plays a role, but changes of about 1-2 watts per square meter due to changes in CO_2 hardly compete with changes on the order of 100 watts per square meter associated with orbital variations.

As already noted, the relative stability of tropical temperatures is suggestive of negative feedbacks. That there are numerous possibilities for such feedbacks has also been noted. The fact that many of these possibilities are designed to provide positive feedbacks within models has little actual basis in observation or theory – despite energetic searches. One negative feedback for which there is substantial evidence is the so-called iris effect wherein upper level thin cirrus clouds (which are powerful greenhouse substances) reduce their coverage as surface temperature increases (Lindzen, Chou and Hou, 2000, Lindzen and Choi, 2018). This mechanism is potentially strong enough to account for the Early Faint Sun Paradox (Sagan and Mullen,1972, Rondanelli and Lindzen, 2010). This paradox refers to observations that suggest that 2.5 billion years ago when solar output is believed to be 30% less than today, the Earth appears to have remained close to the present climate with no evidence of ice. Recall, that doubling CO_2 only produces a 2% perturbation to the radiative budget.

What should be clear is that it is absurd to assume that the complex three-dimensional climate is defined by the small difference of large numbers that is the average temperature anomaly, and that the controlling factor is the small contribution of CO_2. The earth's climate has, indeed, undergone major variations, but these variations offer no evidence of a causal role for CO_2. For the glaciation cycles, CO_2 clearly follows rather than precedes 'temperature.' For earlier variations, there is no suggestion of any correlation at all.



Paleo records are somewhat speculative – especially as concerns CO2.



Here is a different estimate of CO_2 due to Dan Rothman.

However, neither record suggests any correlation with the estimate of the Earth's temperature and both point to much larger concentrations of CO_2 than are currently contemplated.

CO_2 is a particularly ridiculous choice for a 'pollutant.' Its primary role is as a fertilizer for plant life. Currently, almost all plants are starved for CO_2. Moreover, if we were to remove a bit more than 60% of current CO_2, the consequences would be dire: namely death by starvation for all animal life. It would not likely lead to a particularly cold world since such a reduction would only amount to a couple of percent change in the radiative budget. Afterall, a 30% reduction of solar radiation about 2.5 billion years ago did not lead to an earth much colder than it is today in what we earlier referred to as the Early Faint Sun paradox.

The preceding discussion was restricted to relevant physics. It did not address what I referred to earlier as 'the other matter': i.e., the issue of so-called impacts whereby any claimed change in anything is immediately claimed as evidence for the impact of CO_2.

A typical example from the Boston Globe of April 19, 2022 follows:

Despite increasingly urgent international warnings and an onslaught of catastrophic wildfires and weather linked to global warming, fewer Massachusetts residents see the climate crisis as a very serious concern than they did three years ago, according to a new poll.

The inevitable conclusion is that we should be decarbonizing. Such ridiculous leaps of irrational inference go well beyond absurdity, although the common sense of Massachusetts residents is heartening. Unfortunately, the understandable temptation of skeptics to point out that the alleged changes are misrepresented (wildfires have reduced greatly over the past couple of generations), leaves in place the bizarre suggestion that had the changes been real, they had relevant implications for the role of CO_2.

So, where does this leave us?

It leaves us with a quasi-religious movement predicated on an absurd ‘scientific’ narrative and involving disastrous policies.

The policies invoked on behalf of this movement have led to the US hobbling its energy system while lifting sanctions for Russia’s Nordstream2 pipeline designed to bypass the existing pipeline through the Ukraine which is used to supply Germany. It has caused much of the European Union to eliminate fracking and other sources of fossil fuel, thus leaving it with much higher energy costs, increased energy poverty, and dependence on resources from Russia, thus markedly reducing the ability of the EU to effectively oppose Russia’s aggression in the Ukraine; aggression which has led to immense destruction and death in the Ukraine.

And, this is likely only to be the beginning unless we wake up to the absurdity of the motivating narrative.

Thank you for your attention.