# Do More Greenhouse Gases Raise The Earth's Temperature?

## By Stephen Wilde

### The Problem:

That is the critical climate question and the one that I have agonised over most because even if human CO2 only increased the global air temperature permanently by a small amount then over a long enough period of time the effect would accumulate and could be dangerous.

In my various articles to date I have generally accepted in principle that a warming effect would occur but formed the conclusion and expressed the view that any such increase would take many centuries to be noticeable by which time humanity will have solved it's energy problems or have destroyed itself by other means.

However, over time I have come across more and more opinions that the greenhouse effect of the air is not only wrongly described but that also there may be no such thing.

What is certain is that the Earth has a specific temperature although there are serious problems measuring it because one then has to consider the entire planet, not just the air.

Generally, for climate purpose, the Earth's temperature is regarded as the average temperature of the air at any given moment and much scientific effort has been put into ascertaining what it is and how the real world arrives at that temperature for the air.

There are many diagrams and theories that try to balance the inputs and outputs but they are all setting out long term averaged estimates that do not accommodate the changes that occur over time.

Climate models attempt to deal with changes but in my opinion they are woefully incomplete and serve only to be sources of alarm rather than accurate information.

### A Better Description ?

The Earth is at a temperature warmer than it would be if it had no atmosphere.

The same applies to the other planets.

It is implied by some AGW (Anthropogenic Global Warming) proponents that the proportion of CO2 in the air is a critical determinant of temperature but both Venus and Mars have over 90% of their air as CO2 yet their temperatures are very different. Thus I prefer the idea that overall atmospheric density (including air, any surface liquids and any suspended particulates) is the primary determinant with composition being significant but a secondary issue.

The distance from the sun is not such a major factor as regards Venus Earth and Mars.

I have previously conceded the view that the temperature of a planet is a result of the delay in solar energy passing through the planetary system however it is constituted for a particular planet and that is consistent with standard 'greenhouse' theory.

Hence I see it as being clearer to regard a planet and in particular it's atmosphere (in our case air AND water) as a form of 'resistor' in the same way as an electrical resistor will delay the current passing through it and thereby generate heat.

## The implications:

The interesting thing about that analogy of a resistor is that what matters, is both the total volume of energy being put through the resistor (the electric current/flow of solar energy) AND the efficiency of the resistor in slowing down the passage of energy.

I do not doubt that the greenhouse (resistor) effect does exist and that it causes a delay in the transmission of energy with consequent heating. However the temperature of the air around the Earth is set by the combination of both the power of the solar energy reaching the Earth (the electricity supply) and the greenhouse effect (or rather the resistor effect) of the entire atmosphere and at this point readers need to recall my earlier contention that for greenhouse (resistor) purposes the oceans must be included as part of the 'atmosphere'. The truth is that the Earth's atmosphere for the purposes of any resistor effect is comprised of both air and water. Even in the air, water, in vapour form, is a substantial constituent.

The oceans are far more important than the air in causing that resistance on Earth. The proportion of the resistor effect contributed by the air is miniscule.

Now, if the total energy input remains the same then the only way of affecting the temperature permanently via the atmospheric resistor effect (both air and oceans) would be either by increasing the total atmospheric density (including the density of the oceans) or by increasing the proportion of gases in the air that have a stronger resistor effect such as CO2. Keep in mind that the contribution of the air to the entire effect is miniscule let alone the human portion.

The action of CO2 and other such gases does not add extra heat energy to the air. It just further increases the length of time that the heat energy remains in the air before it escapes to space. This is important for what I say later.

Many who fear AGW seem to think that the CO2 effect actually generates new heat that can accumulate within the air to dangerous effect. That is not so. It is just a delaying effect whereby the surface temperature increases until the increase in surface/space temperature differential in turn increases the rate of radiation to space and a new but higher temperature equilibrium is reached. Note that even if such a change in the temperature equilibrium does occur it will not be significant in practical terms from just CO2 and especially not from just human CO2. I explain why later in this article.

As far as I know all the calculations about the anticipated warming effect of more CO2 in the air ignore the massively greater resistor effect of the oceans so that the contribution of the CO2 to the total resistor effect is grossly overstated.

Up to this point I have taken the other possible inputs as stable but the reality is that they are not stable. Over the longer term the sun varies (there is uncertainty as to how much) and in the medium term the oceans vary much more than we previously thought possible in that they can act as net absorbers or net emitters of previously acquired solar energy for decades at a time.

I have already made it clear elsewhere that the additional resistor effect of human CO2 would be insignificant in relation to that from the rest of the air and the oceans together with the varying solar and oceanic heating and cooling effects but we still need to know for sure whether it is significant at all over periods of less than several hundred years because that may be the time we need to solve our energy, pollution, resource and population problems.

## The point of this article:

What if there is a mechanism whereby the small amount of extra warmth from human CO2 could be eliminated naturally?

I have likened the action of the Greenhouse Effect in the air to an electrical resistor.

I have looked at the situation where the energy supply is constant.

The amount of warmth or heat retained in the wire of an electrical resistor also depends on the flow of air past it. The faster the air flow the lower the temperature at which the resistor will stabilise.

Thus it is possible for an increasingly efficient resistor (increasing greenhouse gases in the air) to stay at the same temperature provided there is a mechanism to dispose of the extra heat being generated as the efficiency of the resistor increases. It is important that the heat removal mechanism be able to ramp up in line with the increasing efficiency of the resistor.

If it does so then the resistor will not have any greater heating effect on anything around it as a result of it's increased efficiency due to the fact that the increase in heat is being drawn away.

## Conclusions:

The CO2 and other greenhouse gases in the atmosphere are like a resistor (as are the oceans), not a greenhouse or a blanket as already explained in this earlier article:

The Unifying Theory Of Earths Climate.pdf

As I describe in that article the weather systems on Earth (primarily the jet streams and the high pressure cells either side of them) ramp up their thermal efficiency in tune with the scale of any positive or negative energy input changes from any source including that from human CO2. Just like increasing or decreasing the flow of air across a resistor.

Shifting large volumes of air towards the poles increases radiation of energy to space thus neutralising any warming of the air and shifting large volumes of air towards the equator draws heat from sunshine and oceans thus neutralising any cooling of the air.

The air can only push energy towards space or draw it from the oceans. Air cannot draw energy from space or push it into the oceans.

At this point I should mention the vast energy transfer potential of the latent heats of evaporation and condensation. Huge quantities of energy are taken from water surfaces by evaporation then dumped higher up in the air by condensation to accelerate the expulsion of energy to space. That process is highly variable in scale and speed and is intimately linked to the air circulation that drives weather and climate. It is that process which gives the weather systems an overwhelming power to vary quickly in response to any imbalance between energy flowing into the air from the oceans and into space from the air.

Whether the air warms or cools the weather systems change to cancel it out.

Thus there does seem to be a mechanism whereby the warming effect from human CO2 (indeed all greenhouse gases) could be removed naturally as it arises. The weather systems accelerate the expulsion of the additional energy to space in order to return the energy inputs and outputs of the air to balance.

Greenhouse gases do not create extra heat. Their only effect is to delay it's loss to space so if another process such as a change in the weather systems accelerates the loss of energy to space the effect of the extra greenhouse gases is negated.

It follows that an increase in CO2, water vapour or any other greenhouse gas may not increase any equilibrium temperature of the air because the weather systems change as necessary to redistribute the available energy in the system and accelerate the loss of energy to space. The weather systems seem to be an additional highly efficient and infinitely variable energy dispersal system imposing the temperature SET BY THE OCEANS on the air above it.

Due to that effect of the weather systems acting in conjunction with the hydrological cycle the air does not establish any specific temperature on it's own, nor can it force a change of temperature on the oceans.

A change in the absorption characteristics of the air would have no temperature effect because it would immediately be eliminated by the adjustment in the weather systems to leave the air temperature, set by the oceans, unchanged.

Note that any equilibrium temperature of the whole planet dictated by the resistor effect and the energy flow from the sun is not the same as the sea surface temperatures or the surface air temperatures. The air and the sea surfaces conduct their own complex dance around the planetary temperature equilibrium and no doubt the planetary temperature equilibrium itself constantly dances around with the influence of other variables. Human CO2 would come nowhere in such a large and complex ever varying scenario.

However, despite all that, the weather systems combined with the hydrological cycle and the global air circulation guided by the sea surface temperatures do provide reasonable overall stability for eons at a time by neutralising many potentially disruptive natural and biologically induced variables affecting air temperature.

It is true that a permanent increase in greenhouse gases or a permanent effect from any other input will result in a permanent shift of the jet streams and the air pressure systems but they vary so much from energy increases or decreases from other causes and the chaotic variability of weather that the effect from human CO2 would be insignificant and in any event the temperature change overall would be neutralised whatever the reason for the change.

In fact there may be no such thing as any specific temperature of the air attributable to any particular greenhouse gas or other characteristic of the air because the weather systems always strive to keep the energy budget of the air balanced. The average surface air temperature is always tied to the average sea surface temperature so that the weather systems render any greenhouse warming process in the air ineffective and then leave the oceanic influence in unchallenged control.

The observed changes in air temperature that we notice and measure occur during the process of equalisation and are fully explicable by that process alone.

Such oceanic temperature as now subsists would probably be a historical inheritance from a long past state possibly at the end of the last ice age when it was reset by a combination of changed energy throughput from the sun plus the resistor effect of the oceans and air combined with the then state of the air circulation. The temperature of the entire body of all the oceans can only be changed by truly huge astronomic or geological causes acting suddenly or over millennia. Nothing that humans could ever do (apart from nuclear Armageddon) could ever come close.

Variations in the resistor effect from changes in the air alone would be easily neutralised by the movement of the weather systems towards poles or equator as they continually work to equalise the energy budget of the air.

The energy budget in the oceans operates independently of the air because the sun/sea exchange of energy is so huge. Variations in the supply of heat from the oceans to the air are dealt with by the weather systems in the same way as variations in the resistor effect from changes in the air alone. Due to the hugely greater scale of the oceanic influence there is usually a period of rising or falling air temperatures while the weather systems go about their work of neutralising the variations in oceanic input. Sudden shocks to the system such as volcanic events will take more time to be neutralised.

If the energy budget of the air is maintained in balance by means of the weather systems neutralising changes in the power of the resistor effect in the air alone (more CO2) and changes in energy received from the oceans (ocean cycles) then the only remaining factor requiring consideration at any particular time is total throughput of energy from the sun (the electric current in the resistor analogy).

Most of the time sun and ocean cycles (even those in individual oceans) work against one another and, fortunately they are not usually all in the same phase for long. If they acted in phase for long periods (say, hundreds of years) then in combination sun and oceans could make huge climatic changes as the weather systems strained to contain them.

## Summary:

1) It is proposed that the temperature of the whole atmosphere (air and water) is set by a combination of total energy throughput from the sun and the length of delay in the transmission of that energy through the resistor effect of the oceans and air but the oceans provide by far the dominant resistor effect and the properties of the air are insignificant in comparison.

2) If minor changes in the air attempt to make the air temperature alone diverge from that equilibrium then the weather systems change to modify the energy flow and in due course restore the surface air temperature to match the sea surface temperature set by the oceans.

3) A change in the greenhouse or other energy characteristics of the air is prevented from changing the temperature of the air as long as it is within the power of the weather systems to address it. The power of the weather systems is well able to cope with large variations in oceanic energy output and the variations in the power of the greenhouse effect in the air arising from natural changes in global humidity. Any human effect is insignificant in comparison.

4) The speed and efficiency of the weather and air circulation process stops the average global surface air temperature from ever diverging significantly or for long from the average global ocean surface temperatures. By preventing any persistent build up of temperature differential between air and water it also prevents any changes in air temperature affecting the temperature of the oceans and thereby changing the air temperature by indirect means. Even if the system did not prevent that entirely it would take many thousands of years to have any measurable effect on the oceans at all due to the huge density differential between air and water and the volume of water involved.

5) There are three categories of climate variation:

    a) Chaotic temporary variation otherwise known as weather.

    b) Changes in overall energy input and energy output involving the air alone (from changes in the quantity of greenhouse gases or normal range solar and oceanic variations) that are neutralised by the circulation changes in the air that I have described. Whilst the process is occurring we will observe increases or decreases in air temperatures and movement of the weather systems towards the poles if a warming tend is being neutralised or towards equator if a cooling trend is being neutralised.

    c) Changes in overall energy input and energy output affecting the oceans AND the air that cannot be neutralised by the circulation changes in the air so that they result in major climate shifts such as those between glacial and interglacial epochs. It seems likely that the temperature of the oceans is only changed significantly as a result of events on a very large astronomic or geological scale. Events of a lesser scale leave the air circulation movements in a position to maintain the current temperature both in oceans and air.

6) The addition of extra CO2 by humans would be in category 4b and well within the parameters of the system. Additionally the effect of increasing human CO2 would be slow and incremental so that there would be no lag whilst the systems in the air adjust to it. We would not expect to see any effect on weather or climate other than that the air circulation patterns would be in very slightly differing (but still ever changing) positions than if we had made no difference at all. The difference would be imperceptible amongst the normal climate chaos and the much larger changes caused by solar and oceanic variability.

On the basis of the above I suggest that our extra CO2 emissions make no difference to the global air temperature let alone the temperature equilibrium of the entire planet or even the oceans and an imperceptible difference to the weather systems.

The effect on the temperature of the atmosphere by a human contribution of many multiples of the current CO2 level would be akin to a fly hitting the windscreen of a moving truck.

## Further thoughts:

In the above narrative I have treated the Earth as if it is a single entity akin to one electrical resistor.

It is perhaps helpful to instead regard it as two separate resistors, the oceans being one and the air another.

The efficiency of each resistor varies independently because each has it's own set of internal circulations, the ocean cycles in the seas and the weather systems in the air.

Those circulations change the efficiency (as resistors) of their respective materials separately although the air follows the lead of the oceans.

Thus, when the ocean circulations increase the resistor efficiency of the oceans by slowing the release of energy into the air then the air follows by increasing it's own resistor efficiency by exposing less equatorial air to space. It does that by means of the weather systems moving towards the equator and thereby reducing the size of the equatorial air mass.

When the ocean circulations reduce the resistor efficiency of the oceans by increasing the release of energy into the air then the air follows by exposing more equatorial air to space. It does that by means of the weather systems moving towards the poles and thereby increasing the size of the equatorial air mass.

However the different densities of the oceans and the air make a very large difference to the outcome of the two types of circulation change.

In the case of the oceans the circulation changes are very slow. In the case of the Pacific Ocean it seems that each positive (energy emitting) stage and each negative (energy absorbing) stage can last 30 years making a total cycle of 60 years for the Pacific alone. A complete planetary oceanic cycle involving all the separate ocean cycles would take longer and it seems that all the ocean cycles act out of phase for most of the time and so further complicate the issue.

In the case of the air the circulation changes are very quick. The commencement of changes would be immediate upon a sea surface temperature change being initiated. It seems to take a few months for the jet streams and pressure systems to move noticeably and a few years for them to move substantial latitudinal distances.

The movement of pressure systems is irregular both in latitude and longitude because of the underlying chaotic behaviour of the weather systems but move they clearly do.

It is the speed of the response in the air as compared to the slowness of ocean changes that enables the air to cope with the oceanic changes and thereby keep the temperature of the air and the vigour of the weather systems within bounds amenable to us as inhabitants of the planet.

There is of nevertheless a time lag between the increase or decrease in energy flow from the oceans and the ability of the atmosphere to restore the equilibrium. The length of the lag is related to the scale of the change in oceanic energy emission or absorption and the length of time it takes for the oceanic change to be completed. Bear in mind that the oceanic change is itself irregular as witness the presence of both El Nino and La Nina episodes in both positive and negative phases of the Pacific Decadal Oscillation (PDO).

We observe changing air temperatures together with movements of the weather systems towards the poles or towards the equator during those periods of transition when the air is catching up with the ocean surface changes whether they be warming or cooling.

Additionally it is the speed and flexibility of the circulations in the air that enable it to deal quickly with any other change in resistor efficiency which is limited to the air such as a change in the quantity of greenhouse gases.

Due to the surface air temperature being tied to the sea surface temperature any change in the resistor efficiency of the air will attempt to prevent that equilibrium between sea and air.

It cannot do so because the sea surface temperature will always dominate and so the change in the resistor efficiency of the air can only be accommodated by a change in the air, not by a change in the ocean. Just like an electrical resistor the flow of energy is one way only.

The air responds to a change in it’s own resistor efficiency by changing it’s own circulation patterns to again meet the requirement that the surface air temperature and the sea surface temperature be the same on average globally.

The oceans and the air can be regarded as two separate flywheels with the relative sizes represented by their respective densities and volumes. The small one cannot move the large one but the large one can make the small one move very fast indeed.

It is that disproportionate relationship which makes the air so flexible in neutralising even large changes in the energy output of the oceans. The air can work faster and faster as necessary by moving the weather systems ever closer to the poles or the equator. There is a limit but only catastrophic events will break the system and establish a new equilibrium. Extra greenhouse gases would never be enough. It has to be something big enough to change the average temperature of the entire body of all the oceans.

So, again, any increase in greenhouse gases will result not in a change in air temperature but an imperceptible shift in the air circulation patterns.

Now, how do we clean up that squashed fly of AGW theory?

## Addendum;  The Ocean Skin Effect:

This effect represents the only attempt I am aware of whereby AGW proponents try to get round the problem of having to warm up the oceans before one can significantly warm up the air.

The idea is that instead of warming air the extra CO2 warms just a top layer of molecules on the ocean surface, known as the ocean skin.

The warmer skin then alters the temperature profile just below the surface and reduces the normal flow of energy from ocean to air. Heat is then supposed to build up in the oceans that then warm the atmosphere.

The problem for that idea is that even if it is possible the reduced energy flow from ocean to air merely mimics on a miniscule scale what happens naturally when a negative ocean cycle reduces the flow of energy from ocean to air.

In both cases the air circulation responds in exactly the same way to balance the energy budget of the air.

The weather systems move towards the equator to allow the polar air north of the jet streams to cover a larger oceanic area and thereby draw more heat from the oceans to replace any energy deficit.

A self stabilising system which is as well capable of neutralising any ocean skin effect as it is capable of neutralising negative ocean cycles, positive ocean cycles and any warming of the air by any increase in greenhouse gases.