

Analysing the Greenhouse Effect (GHE) hypothesis

This analysis shows that if the current GHE Hypothesis is correct:

- *The Earth's surface (ES) temperature is already at a maximum value and cannot be increased.*
- *Changes in atmospheric composition can have no further effect on the ES temperature via the GHE.*
- *The GHE cannot create runaway processes or "tipping point" conditions.*
 - ◆ *Only increased Solar Radiation flux can increase the ES temperature*
- *The GHE cannot create a Climate Catastrophe given known current conditions.*
- *If the GHE is false – there is no reason to expect a climate catastrophe or extreme weather.*
- *Either way, there is no reason to consider a climate catastrophe.*

The GHE hypothesis can be described as follows:

1. *Solar flux creates -18C at the Earth's surface (ES)*
2. *ES at a temperature of 18C becomes a source of (mostly infra-red) radiation*
3. *ES radiation flux reaches atmosphere*
4. *Green house gases (GHGasses) absorb and re-emit the ES radiation flux*
5. *Less than 50% of that flux from the GHGasses goes back to the ES, the balance is radiated to space.*
6. *ES absorbs this "back-radiation" flux from the GHGasses*
7. *ES therefore increases in temperature.*
8. *ES subsequently radiates an **increased amount of radiation flux** to the GHGasses.*
9. *GHGasses absorb and re-emit **this newly increased ES radiation flux** (as 4 above)*
10. *Less than 50% of that **newly increased radiation flux** goes back to ES (as 5 above)*
11. *ES absorbs the next iteration of back-radiation flux from GHGasses (as 6 above)*
12. *ES **increases in temperature even more.**(as 7 above) . . and so on . . .*

That appears to lead to an infinite loop creating an ever-increasing energy source and temperature for the ES. There is no separate ES temperature limiting or equilibrium mechanism in play, and it appears to be creating energy out of the ether. However, to better understand if the process is "self-limiting" (as in a convergent series), below is some very simple algebra starting from very simple assumptions.

The limits of the GHE

This is an important issue - the GHE has to be iterative from its basic definition.

The GHE must alternately heat up the ES and the GHGasses in turn until some kind of finality or equilibrium state is reached. It is a subject that has been covered in the literature from time to time, but current searches yield very little. (Water-vapour has the same status: it is credited with being the most powerful Greenhouse Gas, and then never considered further in GHE processes.)

Here is an extract from a relevant article on [Watts](#) by Philip Mulholland that sums up the general thinking:

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Because the intercepted energy flux is being recycled this feed-back loop is an endless sum of halves of halves. It has the mathematical form of a geometric series, and is a sum of the descending fractions in the power sequence 2^{-n} , where minus n is a continuous sequence of natural numbers ranging from zero to infinity.

Equation 1: $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \dots + 2^{-n} = 1$

Equation 1 describes the cumulative effect of the feed-back loop (after an infinite series of additions), where for each turn of the cycle, half the ascending energy flux is passed out to space and lost, and the other half is returned back to the ground surface and then re-emitted. It is a feature of this form of an infinite series that the sum of the series is not itself an infinite number, but in this case the limit is the finite natural number 1.

.....

In this case the limit of **1** creates a **doubling of the total Radiation Flux at the ES.**

The same logic is applied below but for the more general case; it also shows a finite result.

Developing the cumulative limit of the GHE from first principles

Consider the ES (initially at -18C) emitting a nominal flux of F

Assume the GHGasses absorb and re-emit enough radiation to cause the ES to absorb and emit an extra

Fg – where g is the factor dealing with the amplification or attenuation of that radiation from:

- ◆ losses in transmission
- ◆ 50%+ of the re-emitted radiation lost to space
- ◆ losses on absorption at the ES.
- ◆ other losses at the ES before radiation

On the first iteration, the radiation flux at the ES becomes $F + Fg$

On the second iteration, the increased radiation flux Fg is also absorbed and re-emitted by the GHGasses and its effect on the ES is $Fg \times g = Fg^2$.

In turn this Fg^2 will be modified by the same process to Fg^3 and so on.

Every iteration follows the same process, developing the expression for the radiative flux at the ES

$$F(g + g^2 + g^3 + g^4 \dots + g^n \dots etc)$$

Which is a more general version of that in the Mulholland paper above.

The eventual sum is finite as can be seen below

If S is the final radiation flux at the ES

$$S = F(1 + g + g^2 + g^3 + g^4 \dots + g^n \dots etc)$$

$$S = F + F(g + g^2 + g^3 + g^4 \dots + g^n \dots etc)$$

$$S - F = F(g + g^2 + g^3 + g^4 \dots + g^n \dots etc)$$

But $Sg = Fg(1 + g + g^2 + g^3 + g^4 \dots + g^n \dots etc) = F(g + g^2 + g^3 + g^4 \dots + g^n \dots etc)$

replacing $F(g + g^2 + g^3 + g^4 \dots etc)$ gives

$$Sg = S - F \text{ therefore } F = S - Sg$$

$$S = F / (1 - g) \text{ and } 0 \geq g \leq 0.5$$

Notes on the formula

- ◆ g is a defined measure of the all the GHE amplification and attenuation factors in the configuration of the ES and GHGasses, not just the absorption / re-emission mechanism of the GHGasses.
- ◆ The condition $g \leq 0.5$ corresponds to the limit that over half the flux always escapes from the ES to space and elsewhere.
- ◆ This limits the maximum surface radiation to double that of the Solar input (as Mulholland)
- ◆ When $g = 0$ there is no greenhouse effect and $S = F$ as expected.
- ◆ The expression is unusable when $g \geq 1$ as it describes a physical impossibility.

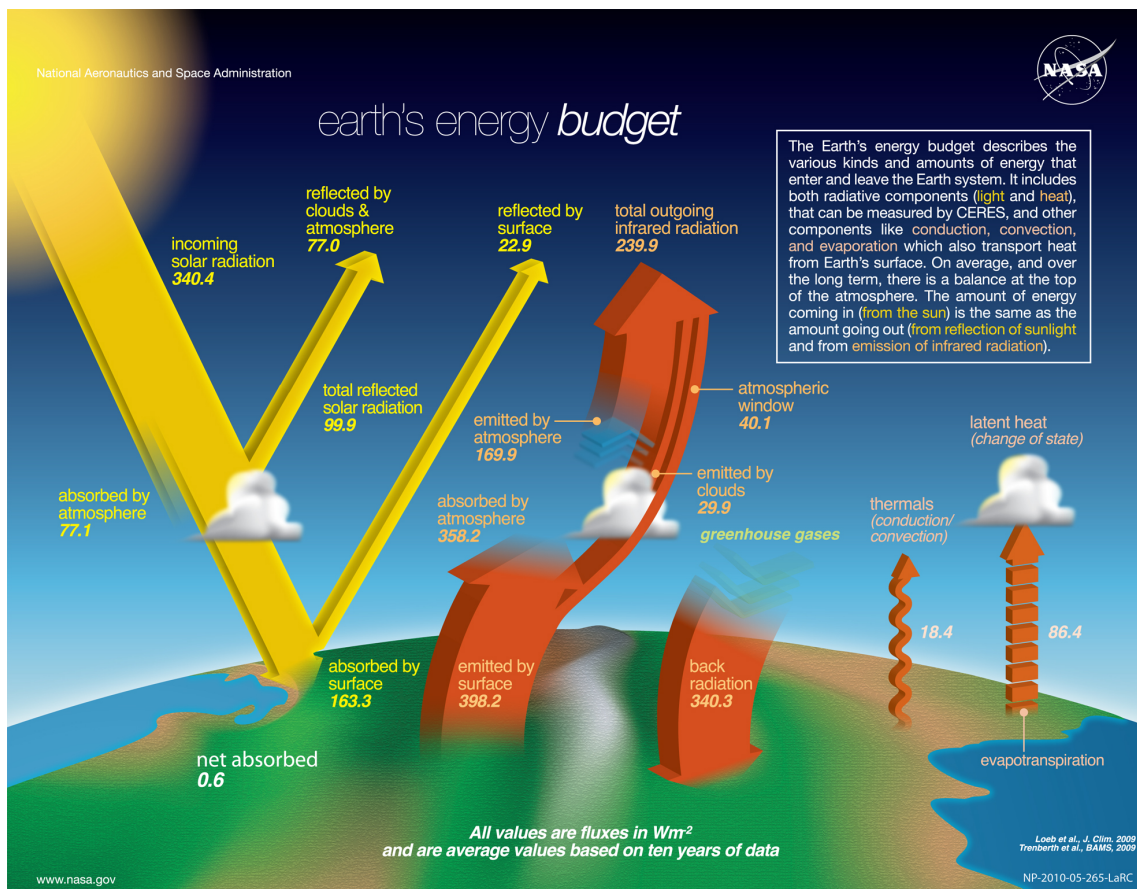
Limits on the above analysis and the GHE in general.

- ◆ Radiation Flux is the only property considered and the assumption that it is an [Extensible](#) property - (Fluxes can be added together arithmetically with no / few exceptions.)
- ◆ No consideration of temperature and the 2nd Law of Thermodynamics for heat flow is made.
- ◆ None of the above processes have ever been demonstrated in a laboratory or witnessed elsewhere in nature.
- ◆ The GHE appears to increase energy (increased temperature) for no input.
No further comment will be made here
- ◆ No other processes are present which either slow or stop the infinite iteration of ES ↔ GHGasses
- ◆ The sometimes mentioned “exhaustion” of GHGasses is not considered.

Summary:

1. The GHE can never become a runaway process.
2. The maximum value for the amplification / attenuation factor g at any instance is 0.5 whether or not it changes with temperature, over time or for other reasons.
3. The maximum GHE total amplification effect is always 2.

Current State of the Atmosphere from NASA



In the above note the “*absorbed by surface*” figure of **163.3** – must be equal to the radiation flux emitted by the ES on the first GHE iteration.

From the analysis, the absolute maximum the GHE can create is $2 \times 163.3 = 326.3$.

However the diagram shows a figure of **398.2** – which means we are well beyond the maximum achievable by the GHE. **398.2 is 18% higher than theoretically possible.**

Assuming the discrepancy is due to measurement errors, the analysis shows we already seeing the maximum the GHE can achieve. **The GHE is already “maxed-out”.**

Conclusions: There is no cause for alarm

- Assuming the GHE hypothesis is correct, we are already experiencing more than the maximum temperature effect it can create. Changes in atmospheric make-up (more water vapour, CO² or methane) would make no difference to the ES temperature.

- The GHE can never create a “tipping point” or runaway process in the ES temperature.

Or

- The GHE is False – and it is not the mechanism that transforms the ES temperature from -18C to +14C and therefore we have no reason to expect a Climate Catastrophe.