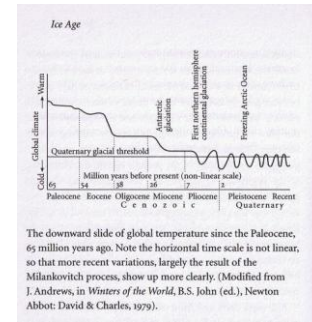


# Climate Hoax, Wien Displacement Law, Hawking Temperature

Treachery is the ninth circle of hell  
Dante's Inferno

The transition from age of the dinosaurs to the cooler present day is the result of Antarctica drifting from the Pacific ocean to the South Pole. There is also a suspected glaciation 650,000 million years ago; however, the more recent Paleocene transition is beyond dispute. Greenhouse gas global warming has no theory and no experimental verification. The only reason we mention this 'climate hoax' is to explore a few things of genuine interest.



## Wien Displacement Law

If an object radiates in a continuous spectrum, the temperature will peak at a specific wavelength. For example, the sun appears yellow and its temperature  $\sim 6,000^\circ\text{K}$ . Let's calculate this wavelength:

$$\begin{aligned}\lambda &= 2.9 \times 10^{-3} / T \\ &= 433 \times 10^{-9}\end{aligned}$$

This is wavelength of the color blue. The sun is actually white (all colors); the color blue is scattered by the atmosphere so that the sun appears yellow. You may wish to try it again with a more accurate value of  $5,778^\circ\text{K}$  (ans. 502 nm).

Reminder:  
Thermodynamic  
calculations are done in  
degrees Kelvin.  
 $0^\circ\text{K} = -273.15^\circ\text{C}$

Consider the carbon dioxide atom which absorbs infrared radiation at  $2.7\text{ }\mu\text{m}$ . For an object to radiate at a wavelength of  $2.7\text{ }\mu\text{m}$ , the temperature should be:

$$\begin{aligned}T &= 2.9 \times 10^{-3} / \lambda \\ &= 1074^\circ\text{K or} \\ &= 801^\circ\text{C}\end{aligned}$$

This is the temperature of molten lava—which is not a terrestrial temperature. Carbon dioxide cannot scatter wavelengths that don't exist.

## Hawking Temperature

Stephen Hawking (1942-2018) applied thermodynamics to the study of black holes. Even though nothing can escape a black hole, Hawking deduced that it would radiate at a certain temperature.



$$T = \hbar c^3 / 8\pi kGM$$

M is a variable which set to 5 times the mass of the sun =  $5 \times 2 \times 10^{30}$  kg.

$\hbar = 1.054 \times 10^{-34}$       Plank's Constant

$c = 2.99 \times 10^8$       Speed of Light

$k = 1.3806 \times 10^{-23}$       Boltzmann Constant

$G = 6.67 \times 10^{-11}$       Gravitational Constant

And so:

Temperature =  $1.2 \times 10^{-8}$  K which is a few billionths of a degree above absolute zero.

Since the temperature of space is about 2.7 K, it will add heat to the black hole. The heat energy will add to mass of the black hole according to ( $E = mc^2$ ) which makes the black hole bigger and colder.