

CLIMATE CHANGE 5

ISOLATING CARBON DIOXIDE and CARBON EMISSIONS *WITHOUT* CONSIDERING WATER VAPOUR/CLOUDS SIMULTANEOUSLY *MUST BE INVALID*

ANYONE who considers CO₂ *without* SIMULTANEOUSLY considering water-water vapour-clouds **must be inherently wrong**. CO₂ does not exist in isolation in the atmosphere! Water vapour is always there at the same time.

- The *major* greenhouse gas WATER is about 20 times larger percentage-wise than other greenhouse gases (CO₂, CH₄, and N₂O) [*Depends on the humidity*]
- Not ALL CO₂ is man made (anthropogenic) [*Certainly <20% is man made*]
- Water-water vapour-clouds *dominate*
- Clouds as structured and aggregated water (and ice) molecules are visibly real, and are often barriers to light/radiant energy (although they may be translucent). Gaseous CO₂ does *not* aggregate, and does not form visible 'cloud-like structures'
- Water can phase change (liquid-gas-liquid) - CO₂ does *not* phase-change in our atmosphere
- Water liquid-gas-liquid phase changes (evaporation and condensation) incur LARGE energy transfer levels; both at sea and cloud level. This does *NOT* occur with CO₂ – a factor often missed in radiation-only considerations!
- Water absorbs infrared energy in the same band widths (or frequencies) as CO₂, but also absorbs/re-radiates at many more frequencies (often overlooked) [*See below*]
- Doubling the CO₂ from say 100ppm to 200ppm does *not* double the temperature rise (non-linear)

CO₂ and water vapour **ALWAYS coexist** in the atmosphere! So *IF* CO₂ increases, and *IF* a temperature rise results, the flow on effect will be for *more* evaporation of water to occur, more water in the atmosphere, and thus a strong 'competitor' for infrared absorption for CO₂. But more than that -- CO₂ and water *are interactive!!* While CO₂ is 'taken up' *only* with radiant energy transfer (water vapour and clouds can do that also), the cloud cover and phase changes are **ADDITIONAL** and highly significant. When a cloud passes on a hot day we feel immediately cooler because clouds are 'solid-like' and form an IR 'barrier'. When a few gaseous CO₂ molecules pass we know no difference because there are no 'CO₂ clouds'.

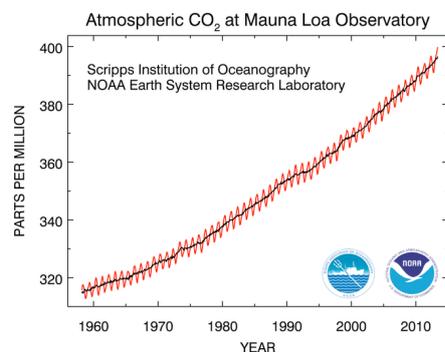
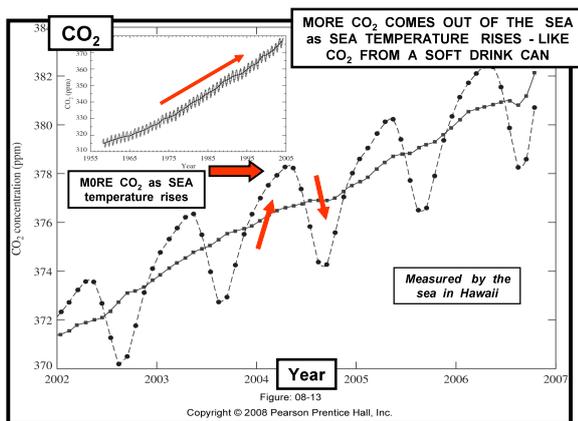
The simple point is this:

IF the greenhouse gas WATER dominates in the atmosphere being about 20 times greater in concentration than CO₂, and if most of the CO₂ in the atmosphere is *naturally* formed, why target CO₂ as the *main* culprit of Climate Change. Most combustion processes produce fine airborne particulates and/or traces of other compounds (sulphur, phosphorus compounds for example). Singling out CO₂ over incomplete combustion processes (forest burn-offs, volcanoes, some coal-burning power plants) is totally unjustified.

A BASIC question is: Does CO₂ cause the temperature to rise, or does the heating of the ocean cause the CO₂ concentration to rise?

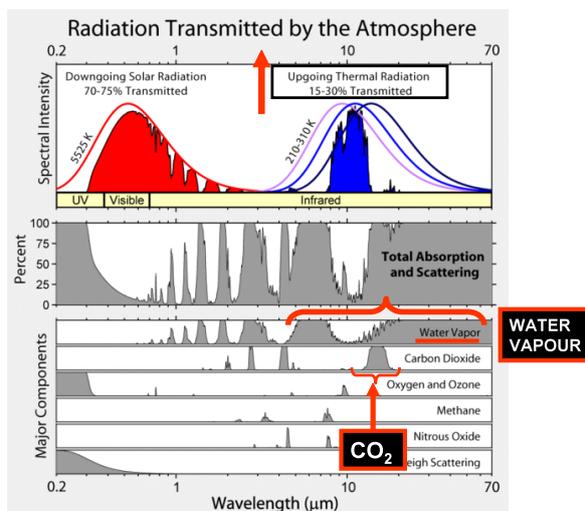
Carbonated drinks consist of CO₂ under pressure. Release the pressure and CO₂ escapes. Leave the can or bottle open and it goes 'flat'. The solubility of CO₂ is both pressure and temperature dependent! So we would expect that as the ocean

surface heats up (say at the tropics) more CO₂ would be released, and as the sea cools more CO₂ will be absorbed. This is exactly what happens. The major CO₂ measuring station is in Hawaii and this cyclical change is clearly observed [See graph below]. But this is only a seasonal ocean SURFACE phenomenon – as over 70% of the world's CO₂ is stored in the ocean depths, with little mixing with the ocean surface layer. Of course in the deeper parts of the sea, the CO₂ can also be in liquid form under pressure. Over 80% of the active volcanoes are subterranean and many of these spew out liquid CO₂ and methane. So we are unwise to attack man-made processes without considering other sources. A real question here is why measure CO₂ on a tropical island surrounded by the largest oceans with the high surface temperatures? It appears not a wise choice, and may be better to measure CO₂ on a continent.



Of course CO₂ absorbs and reradiates infrared IR energy at certain wavelengths or frequencies -- but so does WATER --- but WATER is more effective over a wider range of wavelengths and even competes with CO₂.

[The Earth's radiant IR emissions are in the 5 to 60µm band. CO₂ is active in the 14-16µm range and at a wavelength of 4.2µm. Water has a far broader operating band as shown in the diagram below. This shows that CO₂ is not as significant as commonly propounded]



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