

CLIMATE CHANGE 2

THE PLANET IS SELF-REGULATING, SELF-COMPENSATING, SELF-BUFFERING

THE OFTEN-MISSED VITAL FACTOR IN CLIMATE AND WEATHER CHANGE

The Earth's atmosphere and oceans can **COMPENSATE** for:

1. **Increased CO₂,**
 2. **Increased Temperature, and,**
 3. **Increased Pollution.**
-
1. **Increased CO₂:** IF CO₂ increases either naturally or from man made (anthropogenic) causes, plants and other organisms (algae, cyanobacteria) use light energy from the sun to convert CO₂ from the air plus water (photosynthesis) to produce sugars and organic molecules, liberating oxygen O₂ to our atmosphere. Atmospheric saturation has *not* been reached! Crop yields have increased worldwide over the last decades as the extra CO₂ has helped over and above better horticultural technologies! It is estimated that over 100,000 million tonnes per year of carbon are converted into biomass; with over 70 million tonnes coming from photosynthesis alone. Energy capture is more than 130 terawatts. Over 70% of the CO₂ is stored in the cold depths of the sea (even as liquid CO₂), and the sea is *still alkaline* (>pH 7) showing it is not saturated and has 'room' to store more. With more than 80% of the world's active volcanoes under the sea spewing out liquid and gaseous CO₂ (and methane CH₄), the vast oceans can and do **COMPENSATE**. IT IS CLEAR that our PLANET is SELF-REGULATING with respect to CO₂ CHANGES

 2. **Increased Temperature:** IF the mean Temperature increases (Sun's energy or any other cause like greenhouse gases), the sea and land *surface* temperatures will increase, the local warm air will rise together with the increased water vapour (evaporation), more clouds form, and less direct energy from the sun reaches the earth to compensate (although in some cases the clouds can reradiate energy back to earth, like more 'insulation' at night). The overall effect is the moderating and *buffering* effect of global temperature rises by the clouds of many different sizes, shapes, thicknesses, and structures). Large ocean-current circulations (El Nino / La Nina, Atlantic oscillation) {See A in Diagram} also have immense effects on the variation in evaporation rates in different areas. In fact, recent temperature data from NASA buoys actually show that the mean ocean sea temperature is *not* rising, in fact, slightly declining {See graph below: Argo Buoy, Hadley CRUT3, and MSU Satellite data}. The dynamic thermal interactions and natural and automatic trend toward equilibrium clearly show the ever present degree of natural self-regulation. IT IS CLEAR that our PLANET is SELF-REGULATING with respect to TEMPERATURE CHANGES

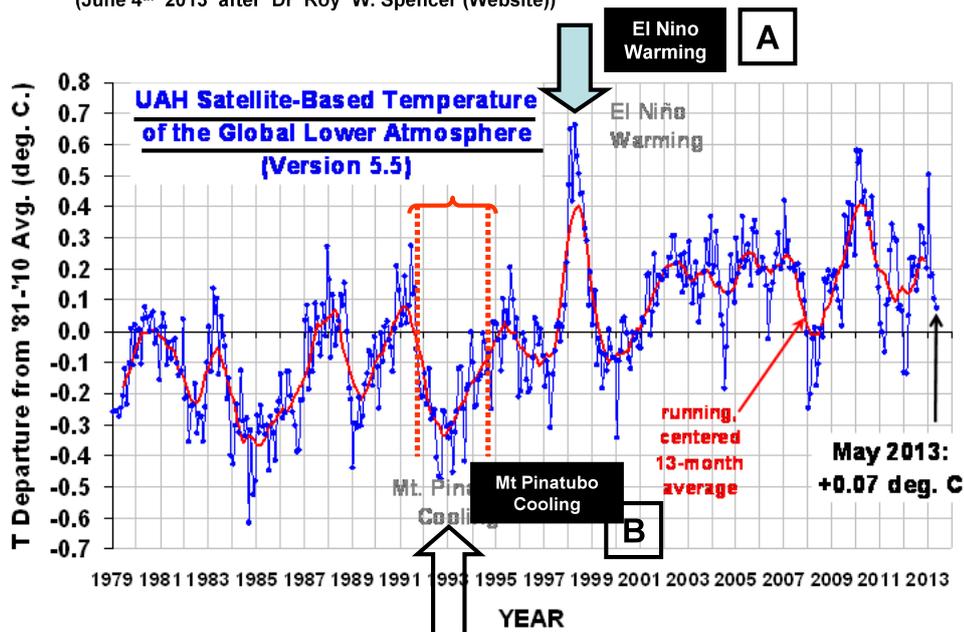
 3. **Increased Pollution:** IF Pollution increases from any cause (anthropogenic combustion, bush fires, burn-offs, volcanoes), particles generated from incomplete combustion, compounds, and complex chemicals will increase in the atmosphere. Although large amounts of small particulate matter can linger in specific geological areas (L.A., Beijing), often vast mass movements of air (winds) disperse and dilute

the concentration. Rain clearly *scrubs* the atmosphere as many can testify to extensively improved horizon visibility after a storm, but large volcanic eruptions can persist for years eg Mount Pinatubo {See B in Diagram} (*Krakatua* also 2001, 2007-8, 2011-12)). Studies show that the atmospheric dynamics compensate to a very high degree. Of course, the earth's population has increased from about 2 to 7 billion in a little over 100 years, so the polluting effluent has grown at a massive rate due to humans, and this is mainly due to incomplete combustion, one of the MAJOR factors affecting climate change. Of course CO₂ has increase enormously too and its greenhouse gas effect is significant. It is more likely that particulate matter like soot particles (discovered recently in Arctic ice) is more significant {see B} than the increase in CO₂ which comes with it (but incomplete combustion is not taxable). IT IS CLEAR that our PLANET is SELF-REGULATING with respect to POLLUTION.

[Please go on the Web and review 'Global Dimming' --- a major factor in atmospheric dynamics and climate/ weather change. The very fact that we have worldwide dimming (light-scattering effects due to particulate emissions from incomplete combustion [man-made, natural fires, deforestation burn-offs, and volcanoes) that fluctuates, shows that this a very significant factor. It also shows that the planet is wrestling to compensate with it]

EARTH'S AIR-OCEAN SELF-REGULATION is certainly not perfect nor uniform worldwide, but it is one of the **KEY FACTORS** in moderating global temperature changes. The planet's self-compensating and buffering effects are amazingly strong because of the additive effects of strong winds producing bulk atmospheric circulation (*even from the Earth's rotation*), plus the massive sea currents like the El Nino / La Nina cycles in the Pacific Ocean [*PDO (Pacific Decadal Oscillation) and in the northern hemisphere NAO (North Atlantic Oscillation)*]. These factors are often overlooked or not considered at all even though they can dominate, and swamp the smaller CO₂ effects!

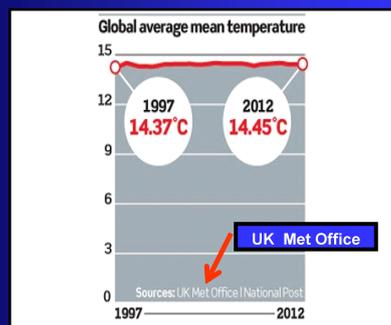
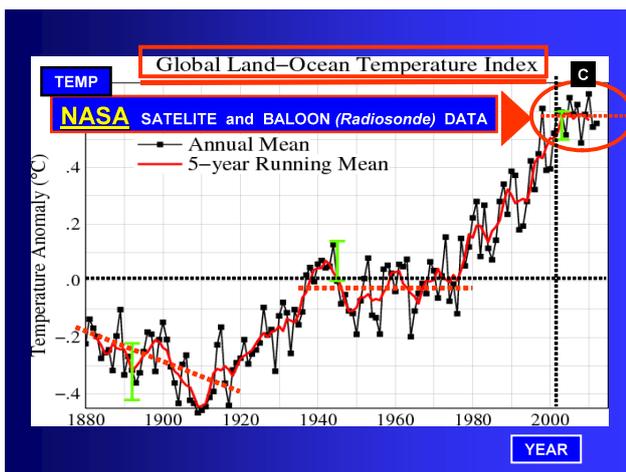
Global Temperature – Lower Tropospheric Anomaly 1979 – 2013
(June 4th 2013 after Dr Roy W. Spencer (Website))



The composition of the atmosphere is absolutely vital in understanding climate and weather changes, and the greenhouse gas **water dominates**. The importance of water

vapour and clouds are clearly noticed on the hot balmy nights in the tropics. In the deserts where often there are few or no clouds, it is extremely hot during the day and extremely cold at night. The moon, our closest neighbour with its water-free, very, very, thin atmosphere (100 molecules/ cm³) reaches *up to* +103 °C during the day and -153 °C at night (or when facing away from the sun). Not only is the Earth's atmosphere an important boundary layer (*insulating and thermally regulating*), but without the greenhouse gases (*mainly* water vapour, but small amounts of CO₂, CH₄, and N₂O), the earth's surface would be about 30°C cooler (*Worldwide Average Temperature is about 14 °C*).

But with CO₂ steadily increasing over the last century there has been virtually **NO** atmospheric warming for more than a decade {See C in Diagram}. In fact the mean global temperature went *down* for more than 30 years (1880-1915), remained constant from 1940 to almost 1980) even when CO₂ was continuously rising {See Figure below}. By contrast there is good harmony between the sun's radiance and the average worldwide temperature over more than 120 years, while the relationship is poor between increasing CO₂ and the average worldwide temperature {See Figure below: *Soon, W. Geophysical Research Letters, 32, 2005*}. In simple terms; temperature does not always rise with increasing CO₂ as often alleged. CO₂ has increased by about 30ppm over the last 15 years with the Global Average Mean Temperature virtually constant as endorsed by the UK Met Office {See published diagram below}. All these facts indicate that CO₂ is NOT the main culprit in weather/climate change.



NOTE: Average Temperature RISE LAST CENTURY 0.8 °C
 Between 1976 - 1998 0.5°C rise BUT = From 1910 - 1940 0.5°C rise

