



Climate Change

&

Weather Trivia

Charles B Samuels

CLIMATE CHANGE

&

AND WEATHER TRIVIA

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CLIMATE CHANGE

& WEATHER TRIVIA

INTRODUCTION

In this work I will make the argument that there is no doubt that Climate Change has occurred, I know this because I have seen species moving into new habitat, the tree-line on mountains getting higher, and certain species moving north. I first noticed this in the 1960s, but the process must have begun long before. However, a problem arises when it is claimed that human-emitted carbon dioxide is the cause of warming.

In a career that spanned over 65 years, all in weather work of one kind or another, I learned many things, but the most important thing is that we are a long way from being able to accurately predict anything related to weather more than a few days in advance.

Ocean currents are closely related to atmospheric systems and like the chicken and the egg, it is not clear which came first. Currents are also affected by salinity, temperature, tides and other factors.

I earned a Department of Commerce Silver Medal for a computer program for collecting and storing weather data and have written a number of articles on radar, sea-ice, and computer programming and one book on sea-ice.

I do not claim to be an expert on climate, however, the hysteria surrounding the Climate Change movement borders on the absurd. The earth has been changing since it was formed and will continue to change until the sun becomes a dying ember. Carbon Dioxide (CO₂) levels have been much greater in the past (see Figure 4) and temperatures have also been much higher. Predictions of catastrophe due to the rise of CO₂ are making unjustified assumptions.

According to the Climate Change cult, CO₂ is the cause of everything bad, forgetting that it is absolutely necessary for every form of life on earth. All plants uptake CO₂ and emit oxygen. The carbon being removed from CO₂ is used to build plant material and evidence exists that increasing CO₂ levels increases plant growth. An excerpt from an article in Nature.com states:

“Since photosynthesis and stomatal behavior are central to plant carbon and water metabolism, growth of plants under elevated CO₂ leads to a large variety of secondary effects on plant physiology. The availability of additional photosynthate enables most plants to grow faster under elevated CO₂, with dry matter production in FACE experiments being increased on average by 17% for the aboveground, and more than 30% for the belowground,

portions of plants (Ainsworth & Long 2005; de Graaff et al. 2006). This increased growth is also reflected in the harvestable yield of crops, with wheat, rice and soybean all showing increases in yield of 12–14% under elevated CO₂ in FACE experiments (Ainsworth 2008; Long et al. 2006)”.

THE EARTH AS A HEAT ENGINE

Four and a half billion years ago the planets and moons of the solar system coalesced from the leftovers from the formation of the sun. At that time the earth was a hot ball of liquid rock and metal. As it cooled a crust formed on the surface, but the interior was still very hot. And so it remains today with convection from the interior heat creating volcanoes and rifts where hot magma flows to the surface causing continental drift and islands in the ocean. This is a giant heat engine driven by the heat of the interior.

Another heat engine is on the surface of the earth and driven by radiation from the sun. As the slightly tilted earth circles the sun, changing amounts of heat are received due to the tilt and voila, we have seasons. This heat engine is extremely complex and to say it is not completely understood is the understatement of the year.

The tropics receive a lot more radiation than the rest of the earth and nature provides mechanisms that move that heat to colder regions of the planet. Ocean currents are a major

factor in moving heat from the tropics to the poles as are atmospheric pressure systems.

EL NINO AND LA NINA

Contrary to what is generally believed, we know very little about how or why the earth's climate changes. It was only in the 1960s that we learned about something as important as El Nino.

El Nino and La Nina are terms for a recurring ocean circulation pattern in the South Pacific. When the sun heats ocean waters in the equatorial pacific, it reaches a point where a current is established which moves the warm water eastward to the South American coast. The result is El Nino and it creates weather patterns that are felt worldwide. Once the heat has dissipated, cooling is established, which is La Nina, and the cycle begins anew.

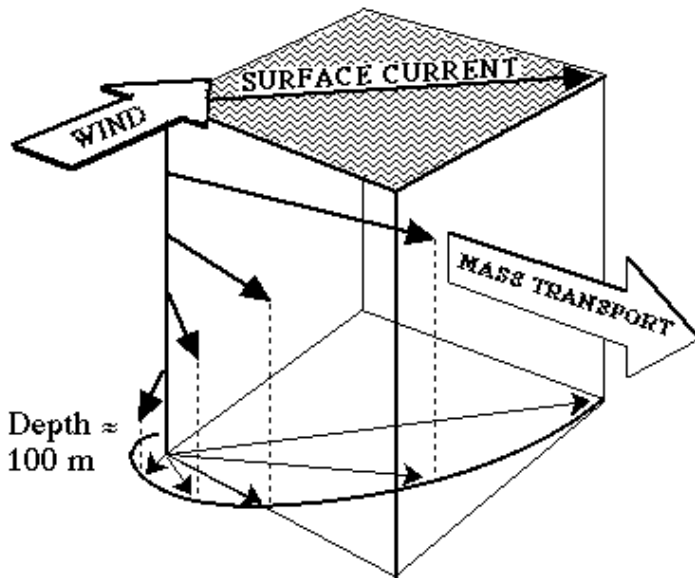
El Nino was "discovered" in the 1960s, even though South American fishermen knew of the phenomenon and named it in the 1600s. El Nino means little boy or the Christ Child, presumably because it occurs in December.

There are many other major currents in the world's oceans; there is one in the North and the South Atlantic, the North and South Pacific and in the Indian Ocean. Due to Coriolis force those north of the equator generally move clockwise and those south of the equator move counter clockwise. This

is the same as the circulation of high-pressure systems and is probably related.

Another great current that moves heat from the tropics is the Gulf Stream which originates in the Gulf of Mexico and moves warm water all the way to Northwestern Russia where it causes Murmansk to remain ice-free during the winter and makes it an important Russian Port.

MANY OCEAN CURRENTS are wind driven, but there is an odd thing about them. Wind-induced ocean currents flow about 25 degrees to the right of the wind direction. In addition, the surface current deflects subsurface currents to the right, which in turn deflects the currents lower down to the right. This phenomenon is known as the Ekman Spiral and is caused by the rotation of the earth.



Ekman Spiral in Northern Hemisphere

Figure 1. Ekman Spiral. In the Southern Hemisphere, the flow direction would be to the left of the wind direction.

Another example of wind driven current is the Beaufort Gyre off the northern coast of Alaska. The Gyre, located in the Beaufort Sea, is a result of high pressure over the Arctic Ocean causing a clockwise flow of air and inducing a similar ocean current, which moves ice around the Gyre.

There are other strange things happening in the area of the Pacific Ocean. Jet aircraft like to catch a ride in the jet stream to save fuel. The graphic below is wind speed at about 34,000 feet, the approximate height of the jet stream. The red spot has winds greater than 135 mph and the spot has been in that same location every winter from 1949 to 2015,

which is the total period of record. Why in that location? Who knows, perhaps it is similar to the great Red Spot on Jupiter. In some years the earth's red spot in the graphic below is elongated or may even move a little to the east, but it is always there. I believe that the location of the spot has something to do with the shape of the Pacific Ocean and the surrounding land masses, but that is just a guess on my part.

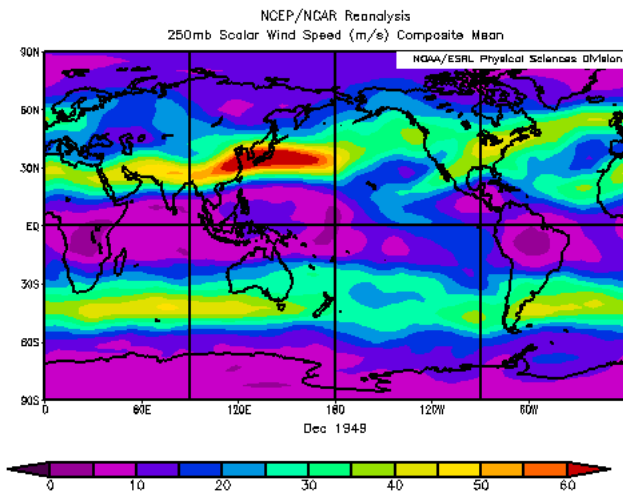


Figure 2. 250mb wind for December 1949.

During the summer the red spot moves to the south of the equator at approximately the same latitude South and a little further east longitude and is there every summer from 1949 – 2015.

There are other oddities such as **The Ridiculously Resilient Ridge**, an area of high pressure over the northwest coast of

the United States and **The Blob**, an area of warm water off the northwest coast. The Blob has greatly weakened in recent months (January 2017).

What we do not know about climate would fill volumes. Unlike other sciences, meteorology and climatology are not conducive to experimentation. However, there are some experiments that could be performed but the climatologists and others would rather argue about the effects of this or that when they could just measure it. Examples of experiments that could be performed are measuring how fast air cools in the presence of low-level clouds and how fast air cools without cloud cover for various humidity levels. Or a device could be built that would transmit long wave radiation through a shutter and the length of time it takes to reach a target at various altitudes would be measured.

THE TRIPLE POINT OF WATER

At 32 degrees Fahrenheit water can exist as a liquid, a gas, and as a solid. It is a well-known fact that the freezing point of water is 32 degrees.

This is one of those well-known science things that are not really true. Water can exist at that temperature but that does not mean it freezes at that temperature. The melting point of ice is also 32 degrees and obviously, it cannot be both melting and freezing at the same time. Actually, water can exist in the liquid state at 50 below zero; it all depends on the

purity of the water. The freezing point of water in the ocean is about 28.4 degrees because of the salt. When water becomes gas, it is said to evaporate, when the ice goes directly to gas it is said to sublimate.

Many people in my home state of Alaska believe that when it is below freezing and fog is present, it is Ice Fog (fog composed of ice crystals). That is not true. Ice fog does not form until the temperature gets to about 25 below zero F. The same thing happens with clouds. Cloud droplets do not become ice until the temperature reaches about 25 below. Low and Middle-level clouds (up to about 20,000 feet) are composed of water droplets and High clouds such as Cirrus are composed of ice crystals.

It is common early in the morning, before much noise is being created and when it is very cold, for a disturbance to cause ice-fog to form. For example, when an airplane starts up, the disturbance in some instances will immediately cause ice fog to form over the whole airport. In other words, the moisture was there in a liquid state but the disturbance or noise caused it to freeze and became visible. In Fairbanks, Alaska where it gets very cold and there is heavy ice-fog you can drive up the hill and get above the fog because you have climbed above the temperature inversion and it has warmed up.

It is quite interesting to watch a thermometer mounted on a small airplane as you come in for a landing on a very cold

day, the temperature may drop 20 or 30 degrees in just a few seconds.

Another interesting phenomenon is Rime Ice. When it is foggy and very cold and air moves the water particles and strikes an object, ice crystals form on the object and can be several inches thick and can be quite beautiful.

HUMIDITY IS THE MEASURE of the amount of water vapor in the air and is expressed as a percentage of what the air can hold, from 0 to 100 percent. In the desert humidity of less than 10 percent is common, whereas in tropical climates 90 percent is common. When the air reaches 100 percent it is said to be saturated and it will form fog or rain will occur.

Dew Point is the temperature at which condensation will occur if other factors are held constant. If the temperature is 80 and the dew point is 70, condensation will occur if the air temperature is lowered to 70. This can be seen when you have a glass of your favorite beverage with ice in it and condensation forms on the outside of the glass. The air around the glass has been lowered to the dew point and the water in the air has condensed on the glass.

Freezing rain occurs from warm air aloft and then falls to a much colder surface where it freezes. Freezing rain is very dangerous to aircraft, trees and power lines. Not to mention driving on icy streets.

FORECASTING THE WEATHER

In the old days, meteorology was said to be an art rather than a science because weather forecasters flew by the seat of their pants and had to know how different weather systems affected their particular area. The practice was to look at past weather maps and find one that was close to the current map and then extrapolate from the old map. Their forecasts were only good for two or three days, at the most.

And then along came Super Computers and Numerical Weather Models. The models attempt to ingest all the observations from satellites, surface and ocean stations, and upper air observations and then interpolate that data to fill in a three-dimensional grid over the entire earth. Known physical laws are then applied to the grid in an iterative manner, perhaps millions of times, to come up with a forecast of conditions in the future. These forecasts are really good for two or three days and then less so for several days. The reason for the inaccuracy, in my opinion, is that the initial state has errors and during the iterations, the errors become larger and larger.

I have created a method of accurately forecasting total yearly precipitation for many cities in the western U.S. The forecast is made using only January data and the forecast is for total precipitation through the end of December. Give me a few hundred thousand and I could probably extend this to other cities. Actually, this method is similar to what was done with past weather maps in the old days, except that a computer does the searching.

There are two areas where meteorology has really advanced and that is in forecasting severe storms and hurricanes. In my opinion, the National Severe Storms Laboratory and the National Hurricane Center do an excellent job.

HEAT ISLAND EFFECT

When we talk about global warming, what does that mean? The growth of cities with concrete and asphalt roadways creates heat islands and most temperature measuring sites are located near big cities at major airports. If the temperature rises in Seattle and stays the same or slightly lowers in Death Valley, is it fair to average the two and call it the average temperature? Well, it is an average, but the rise of temperature in Seattle is a local condition and means nothing to other parts of the world.

To compensate for the heat island effect scientists have been adjusting the actual measured temperature. However, you want to slice it, injecting someone's idea of what the correct temperature is supposed to be into the actual measurement is not a good idea.

These adjustments assume that atmospheric circulation remains constant, but atmospheric circulation does not remain constant. Take for example a measuring site near the ocean or a large lake and it has been determined that the temperature is too high due to heat island effect. If the circulation has changed in recent years to where the air is

moving offshore, it is very different than if it is moving onshore. Or the circulation could have changed to where the air is moving uphill rather than downhill, from forest to grassland, etc. In other words, the idea of adjusting temperatures to fit some scheme is fraught with problems.

One problem of determining the global temperature is the sparse network of observation stations. If you take a recording thermometer and drive across town, the temperature may vary by as much as 10 or 15 degrees. This is especially true in winter, in hilly country, or near large bodies of water.

Politics also gets involved. Many years ago in Anchorage, Alaska the temperature measuring site was moved to the airport and the following winter a number of record cold temperatures were recorded. The City Fathers in their great wisdom did not want Anchorage to be that cold and asked the Weather Bureau, as it was called in those days, to move the recording site to downtown. The Weather Bureau agreed and the recording site was moved. After a few years, it was quietly moved back to the airport.

TEMPERATURE OBSERVATIONAL ACCURACY

Prior to about 1961 mercury or alcohol thermometers were used to measure temperature to the nearest tenth of a degree F. at official weather stations. These thermometers came from the manufacturer with a correction card so that you

would take an observation and then look at the card and apply the correction to the reading. However, the standard practice was to throw the card in a drawer and never look at them again. The National Weather Service began using an electronic device to measure temperature and humidity in about 1961. This was a Rube Goldberg device called the H061 that transmitted data from near the intersection of the runway to the weather office. Why the center of the runway, because jet airplanes need more runway to take off when it is hot. But jet airplanes blowing hot exhaust gasses on the temperature sensor does not improve the accuracy of the measurement.

The H061 measured the temperature and converted it to time with a motor driven cam which was then sent over a pair of wires to the office. The readout first drove the needle up and then down to position it at the correct temperature. The slop between up and down was about one-half degree and the needle was about one-half degree wide making it impossible to accurately measure temperature to less than one degree accuracy.

The level of accuracy at official weather stations is pretty good compared to other sites such as ships at sea, at volunteer stations, and from third world countries.

And now, many years later, scientists are reporting global warming of tenths of a degree. An old saying in computers is GIGO or garbage in, garbage out. My grandmother said it

better when she remarked: “You can’t make a silk purse out of a sow’s ear”.

Prior to the advent of aviation, there were few weather stations in the country. It was only during WW II that weather stations became widespread. Articles have been written using ice cores, tree rings, silt and other means to determine the temperature in the distant past. Such data is extremely suspect. Take for example tree rings: One only has to look at the Pacific Northwest to know that it is precipitation that determines tree growth, not temperature. On the western side of the Rockies is the rain forest and on the eastern side, the land is dry and very sparsely wooded.

GLOBAL WARMING

At one time scientists were paragons of virtue, or so I thought, but I find that even the science community is riddled with liars and thieves. Notice how all the forecasts of calamity are 30 to 50 years into the future. But how can you claim to know what the temperature will be in 50 years when you cannot predict the temperature 10 days into the future. People will say that predicting climate is easier than predicting the weather, but climate is weather and when they issue a forecast of what the worldwide average temperature will be next year to a tenth of a degree and get it right, we can pay attention to what they say.

Let's explore global warming a little further: The Sun is almost the sole source of heat for the surface of planet earth, other very minor sources of heat coming from uranium and other radiating ores in the planet's crust. The earth goes through an ice age about every 100,000 years and the last one ended about 30,000 years ago. Since then drastic changes have been observed in the levels of the ocean, many species have died out, such as the woolly mammoth, and surprise, surprise, the earth continues to warm. According to one theory the Milankovitch Cycles, which are changes in earth's tilt and orbit, are the cause of the ice-ages. Well maybe.

IN ABOUT 1400 AD there was a little ice age when global temperatures fell worldwide, there was ice on the river Thames in winter and the Norse settlements in Greenland failed. The Little Ice Age ended in about 1850.

The reason for ice ages is unknown, but the little ice age coincided with the "Maunder Minimum," which is a period of time when the sun was very quiet with almost no sunspots. There is an old adage that says "just because two events correlate, it does not mean that one causes the other." In other words, just because CO₂ is increasing at the same time that warming is occurring does not mean that they are related and the Maunder Minimum may have caused the Little Ice Age or it may have been caused by something else. The sun is currently going through a quiet period that has not been seen for the last one hundred years. What will it bring? Who knows.

Every time I see some warming pundit on the news claiming that 97 percent of scientists believe that the earth is warming due to carbon emission, it ticks me off. 97 percent of scientists DO NOT believe in the climate change hysteria and almost none believe that disastrous floods, tornados, and hurricanes are more frequent in recent years. If you Google “global warming” on the internet you will find hundreds of articles, some pro global warming and some con. Some are silly.

Another bone of contention is the constant refrain that CO₂ is a heat-trapping gas. Let’s get one thing straight; Carbon Dioxide (CO₂) is NOT a heat-trapping gas. To trap means to capture and hold. CO₂ does indeed absorb long wave radiation, but it, like every other known substance in the universe, discards such heat until it reaches equilibrium with its surroundings. The only exception is a black hole and according to Stephen Hawking, that too leaks.

The question is; how long does it take to reach equilibrium, or how fast does it take to lose that heat? If you look at the diurnal temperature of Mars and the diurnal temperature during clear nights on earth, the answer has to be not very long. If the heat that is absorbed during the day is exactly lost at night then the energy is balanced and there is no net cooling or warming.

Like everything else, CO₂ loses heat through radiation and conduction. If we want to understand such heat loss, we would ask a radiation physicist, not a climatologist.

Climatologists are the bean counters of meteorology, they can tell you anything about what happened in the past. They are statisticians. It is said that there are liars, damn liars, and statisticians.

“If you torture the data enough, nature will always confess”
– Ronald Coase.

Facts are stubborn things, but statistics are more pliable. –
Anonymous.

To understand how an object radiates to a colder object, you only have to sit near a glass window on a winter night and the side of your body facing the window will be cold and the side facing the other way will be warm. If we could levitate a warm object into the air on a cold winter night, we would see that the top of the object is losing heat faster than the bottom because the heat from the bottom is being absorbed by the earth and retransmitted back to the object.

The coldest thing around, as far as radiation is concerned, is outer space and that is where all of the heat from earth ends up. As heat is radiated from the earth it is at least partially absorbed by various gasses and then reradiated, eventually reaching space. The entire argument about global warming centers around how long it takes to reach space.

Here is one scientist’s take on it:

“As we emit more and more carbon dioxide into the atmosphere, the amount of greenhouse gasses in the atmosphere steadily increases, constantly pushing the

radiating level (where the atmosphere loses energy into space) higher and higher.

But, as any meteorologist regularly observes, the atmosphere gets colder as you go higher, decreasing by about 6°C every kilometre. This is primarily a consequence of weather, controlled by the rising and sinking of air masses.

So, as the radiating level rises, it also becomes colder. But a colder radiating level emits less energy into space, tipping the atmosphere's energy balance so that now more energy is being received from the Sun than is being lost to space. As a response, the atmosphere must warm up until the new radiating level is hot enough to re-establish an overall energy balance."

One huge problem with that argument is that the atmosphere only gets colder until you reach the tropopause, it then sharply warms up and becomes almost isothermal. The tropopause is the boundary between the troposphere and the stratosphere. The height of the tropopause varies from about 30,000 feet over the arctic to 60,000 feet over the tropics.

Quoting from a web page ...["org/history/climate/co2.htm"](http://www.org/history/climate/co2.htm).

"Another scientist in Sweden, Knut Ångström, asked an assistant to measure the passage of infrared radiation through a tube filled with carbon dioxide. The assistant ("Herr J. Koch," otherwise unrecorded in history) put in

rather less of the gas in total than would be found in a column of air reaching to the top of the atmosphere. The assistant reported that the amount of radiation that got through the tube scarcely changed when he cut the quantity of gas back by a third. Apparently it took only a trace of the gas to "saturate" the absorption — that is, in the bands of the spectrum where CO₂ blocked radiation, it did it so thoroughly that more gas could make little difference.”

In rebuttal, it states:

“The greenhouse effect will, in fact, operate even if the absorption of radiation were totally saturated in the lower atmosphere. The planet's temperature is regulated by the thin upper layers where radiation does escape easily into space. Adding more greenhouse gas there will change the balance. “

This has proven to be false. The early models predicted that temperatures in the upper atmosphere would increase as CO₂ increased. It has not done so and the global warming alarmists went to great lengths to claim that those upper air measurements are flawed. But the measurements have proven to be accurate.

Now (Jan 2017) the Warmists are claiming that global warming has caused the upper atmosphere to cool. Things are getting really bizarre.

The reason no heating of the upper atmosphere will take place due to increased CO₂ is because in the absence of water

vapor, and there is none or very little in the upper atmosphere, the radiation is free to escape to space.

As everyone who lives in northern climates knows, cloud cover greatly affects temperature when the sun sets. On a clear night, the temperature will drop quickly whereas cloudy nights are much more moderate. The reason for this is that clouds are absorbing the heat from the earth and reradiating part of it back to the earth. It takes several days for air under heavy cloud cover to reach equilibrium with its surroundings. On a clear night, it is a matter of hours. Snow cover is an insulator and moderates the loss of heat from the ground. In my state of Alaska and other northern states, if you go for a long period of time with no snow cover and very cold temperatures, there is a danger of freezing water pipes in the house. In the 1960s when we were living in Anchorage we had a very cold winter with the temperature dropping to near 30 below zero. At that time we had a problem with the propane tank not providing gas to appliances due to the cold reducing the propane vapor pressure. A light bulb on an extension cord and placed on the tank solved the problem.

Things like water vapor and CO₂ absorb radiation at very specific frequencies. Note, water vapor is the gas phase of water and is invisible. The graph below shows the absorption spectrum for water vapor as green, liquid water (clouds) as red and ice is blue. There is a dip in the green line at 4 and 10 microns where water vapor does not absorb radiation. This happens to be the main absorption spectrum of CO₂.

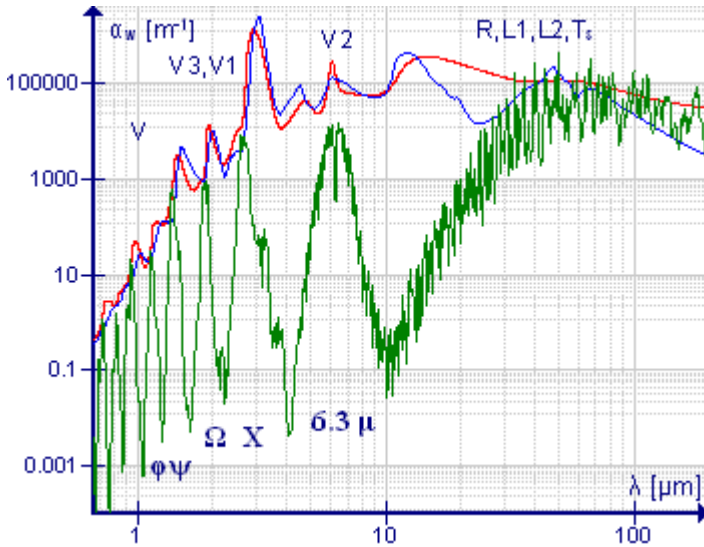


Figure 3. Absorption spectrum for water vapor (green), water (red), and ice (Blue).

Since CO₂ closes two gaps in the water vapor spectrum it is reasonable to suppose that in the presence of water vapor CO₂ would absorb some extra heat. But also note that the blue and red lines have no such gaps, which means that CO₂ will have no effect in the presence of clouds, whether it is water or ice clouds because the radiation in the CO₂ absorption bands is being absorbed by water molecules or ice crystals.

It is unclear to me whether the blue curve would be used for high-altitude clouds, which consist of ice particles. However, from personal experience, I know that high altitude clouds

have little effect on rapid cooling on a cold winter night, probably because they are so thin.

In other words, carbon dioxide, even with a substantial increase, would have little effect when clouds are present or in very dry climates. This can be seen in the temperature of Mars where the diurnal temperature change can go from plus 40 degrees F. during the day to -140 degrees F. at night. It should be noted that the atmosphere of Mars is almost totally carbon dioxide, which has a partial pressure of about 7 millibars, compared to only 4 tenths of a millibar on earth. If CO₂ were really a heat-trapping gas, then Mars should be pretty warm, but it's cold, really cold. There are some scientists that claim that as CO₂ increases, the altitude at which radiation can escape to space also increases. I would like to see some concrete proof of that from experiments where it is actually measured.

There are pro-warming authors that will give very erudite explanations for why CO₂ increases heat. But the proof of the pudding is if they are able to accurately predict future events. Here are some major predictions:

- Senior members of the UN's climate science body admit a claim that Himalayan glaciers could melt away by 2035 was unfounded.
- Arctic Sea Ice will completely disappear by the middle of this decade...It didn't.
- The oceans will rise and wipe out low-lying lands. Didn't happen.

- Acidification of the oceans will destroy all coral colonies and reduce fish stocks. Didn't happen.
- Forecasts of increasing temperatures have not been even close.

The real proof that something is wrong with the warming theories is that for the last 18 years (in 2017) there has been no net warming while CO2 levels have continued to rise. There have been other long periods in the past when the temperature was not rising so there is something going on that is not related to the rise in CO2.

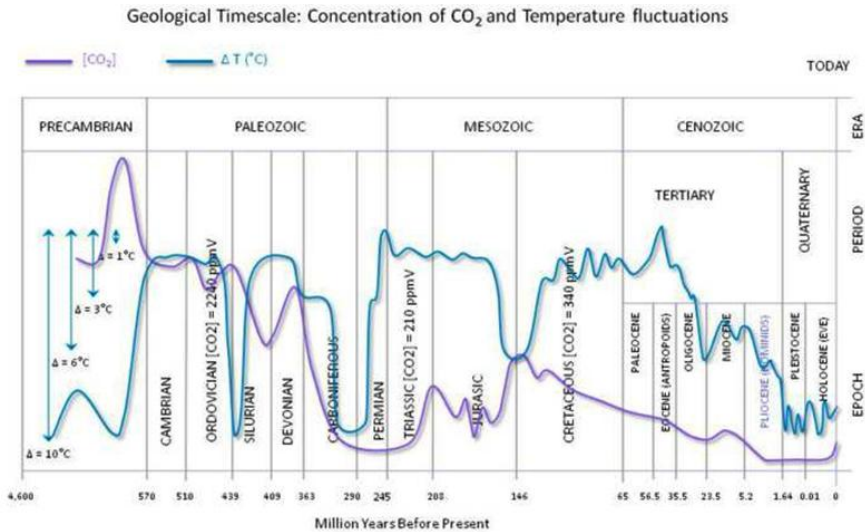
At the time of this writing (Feb. 2017) an article appeared in the Washington Times. An excerpt from that article states:

The climate change debate went nuclear Sunday over a whistleblower's explosive allegation that the [National Oceanic and Atmospheric Association](#) manipulated data to advance a political agenda by hiding the global warming "pause."

In an article on the Climate Etc. blog, [John Bates](#), who retired last year as principal scientist of the National Climatic Data Center, accused the lead author of the 2015 [NOAA](#) "pausebuster" report of trying to "discredit" the hiatus through "flagrant manipulation of scientific integrity guidelines and scientific publication standards."

It is common practice for some scientists to cherry pick the starting and ending points of data to support their point of view. Lately, the claim has been made that CO2 levels are

higher than they have been in the last 400,000 years. While that is true, it is also misleading. Here is a graph of the whole shebang.



1- Analysis of the Temperature Oscillations in Geological Eras by Dr. C. R. Scotese. © 2002. 2- Ruddiman, W. F. 2001. *Earth's Climate: past and future*. W. H. Freeman & Sons. New York, NY. 3- Mark Pagani et al. *Marked Decline in Atmospheric Carbon Dioxide Concentrations During the Paleocene*. *Science*; Vol. 309, No. 5734; pp. 600-603. 22 July 2005.
 Corrected on 07 July 2008 (CO₂: Ordovician Period).

Figure 4. Historical Temperature/CO₂ graph

Note the last 400,000 years is that flat part of the purple curve with the uptick at the end. When you look at the whole record you see that the current CO₂ levels are quite low, as is the temperature record. Also, note that the temperature and CO₂ curves do not follow each other. Looking at this graph it is hard to make the argument that CO₂ causes increased heating.

Another aspect of the global warming mantra is the loss of Arctic Ocean ice. The Warmists have been predicting the

disappearance of sea-ice, but when it suddenly began to increase they changed to saying that it is getting thinner. Another problem with the disappearing Arctic Ocean sea-ice is that the Antarctic sea-ice is increasing, which is another example of the Warmists having no idea of what is really going on.

SATELLITE INSTRUMENTS

Satellites are an important tool in weather forecasting, they fill in data sparse areas and the position of weather fronts can be determined with great accuracy.

There are two types of weather satellites; Polar-Orbiting is one in which the track of the satellite goes from nearly pole to pole about every two hours. The other type is a geostationary satellite and is positioned about 25,000 miles from the earth and appears to be stationary, actually, its orbit is the same as the earth's rotation so it only appears to be stationary.

There are a number of countries that launch weather satellites, Europe, Russia, China, and India. All of these weather satellites have different bands. The AVHRR satellite has five bands, two visual channels, a near infrared channel and two infrared channels.

These channels can be mixed with software to show things not visible in a single channel. The channels can also be mixed to create a false color image.

Most of the satellites also have sounders that detect conditions through the entire atmospheric column.

One of the more interesting instruments on Defense weather satellites is the Special Sensor Microwave Imager (SSM/I). This instrument measures microwaves being emitted from objects on the earth. Yes, microwaves are being emitted by everything and they are just like the microwaves being emitted by your microwave oven. SSMI is very good because it can see through clouds and is used a lot in ice analysis. The only problem is that it has very poor resolution. Resolution refers to the size of the pixel in the image.

- Band GHz Spatial Resolution km x km
19.5 69 x 43
22.2 50 x 40
37.0 17 x 28
85.5 15 x 13

In addition to sea-ice analysis the instrument can be used for the following;

- 10-meter wind speed using the lower channel and above.
- Total water vapor in a vertical column of the atmosphere.
- Total liquid water (clouds) in a vertical column of the atmosphere
- The rate of liquid precipitation.

Even with the poor resolution, it is very good data since it covers almost the entire earth every few hours.

Another satellite is the AVHRR, which stands for A Very High-Resolution Radiometer. Actually, its resolution is quite poor at 1km. The DMSP defense satellite has a resolution of 500 meters and one channel on another satellite has a resolution of 250 meters.

Radar satellites have extremely good resolution and are used primarily in military and rescue operations. Radar resolution, or the smallest object that can be discerned, is dependent on the size of the antenna. Satellite or aircraft radar simulate a large antenna by using the forward motion of the radar itself. I have seen some companies claim that their radar can detect a package of cigarettes in someone's shirt pocket. Aircraft and satellite radar are very good for tracking sea-ice and ocean vessels. However, the problem is that the data is so expensive that only governments and oil companies can afford to use it.

CLOUD COVER

One argument that has raged is whether cloud cover has a negative or positive feedback in global warming. One researcher has shown that in the tropics as the day progresses and becomes warmer, thunderclouds begin to form and by the end of the day when it rains, rapid cooling takes place. Thus

clouds have a negative feedback for global warming, at least in the tropics.

Clouds are classified according to their height in the air;

- Low clouds are Stratus and Cumulus types. Stratus clouds are usually associated with drizzle and light rain. Cumulus types can be broken into two types; Fair Weather Cumulus and Cumulonimbus, which is associated with thunderstorms, heavy downpours, and tornados. Low clouds are generally found at less than 6,500 feet.
- Middle clouds are Altostratus and Altimcumulus and are found from 7,000 to 18,000 feet
- High clouds are Cirrus and Cirrostratus composed of ice crystals and are higher than 18,000 feet.

Noctilucent clouds are really rare and can be seen only during twilight at high latitudes. They are the highest known clouds and occur above 250,000 feet. In all my years of working in weather jobs, I have only seen them once.

A more common cloud is the lenticular cloud. A stationary lens-shaped cloud which forms when high winds flow over mountain peaks. As the wind flows up a mountain slope the temperature decreases until the dew point is reached and a cloud forms.

Wall clouds are associated with thunderstorms. Mammatus are sac-like **protuberances** below large thunderstorms

SEVERE WEATHER

Hail is formed in Cumulonimbus clouds when an updraft lifts rain to above the freezing level. The greater the updraft the larger the hailstones will become. Eventually, the hailstones become so large they overcome the updraft and fall to earth.

Tornados are also formed in Cumulonimbus clouds when large updrafts occur and in my opinion when a severe downdraft is present to spin the funnel. Tornados occur most often in the southeastern quadrant of a low-pressure system.

Hurricanes occur not only in the south Atlantic but also in the Pacific off the coast of Baja California. Such storms are called Typhoons when they occur in the Western Pacific.

Other severe winds are straight line downbursts from thunderstorms that can be almost as damaging as tornados. Another type of downburst is created when high pressure over a plateau is present along with low pressure off the coast. Such winds in Southeast Alaska are called Taku winds when cold air from a high pressure over Canada spills down through fjords and river valleys to the ocean. In Europe, there are Bora or glacier winds, and in southern California, it is called a Santa Ana wind.

There are many such winds in many places in the world and all have regional names; Williwaw, Foehn, Chinook, and Katabatic are just a few of such names.

POLITICALLY CORRECT SCIENCE

The US government's National Science Foundation (NSF) is the major funding source for scientists and universities and funds almost exclusively those scientists espousing the warming theories and if you are a researcher, you have to toe the line if you want to be able to support your family. However, there are some brave souls that refuse to be intimidated.

From the What's UP With That (WUWT) website: "Dr. Judith Curry, a respected climate scientist, has announced her resignation from her tenured position at Georgia Tech. She's had enough of the politics and propaganda that beset climate science."

Dr. Curry explained: *"the deeper reasons have to do with my growing disenchantment with universities, the academic field of climate science and scientists... I no longer know what to say to students and postdocs regarding how to navigate the CRAZINESS in the field of climate science. Research and other professional activities are professionally rewarded only if they are channeled in certain directions approved by a politicized academic establishment — funding, ease of getting your papers published, getting hired in prestigious positions, appointments to prestigious committees and boards, professional recognition, etc."*

"How young scientists are to navigate all this is beyond me, and it often becomes a battle of scientific integrity versus career suicide."

The same politically correct behavior is being forced on major companies, including oil companies. After all who wants to be a pariah or a hated Denier?

An excellent article by Phillip Hunter analyzes the problem of peer pressure and the buddy system. ***”Is Political Correctness Damaging Science?”***

History is replete with politically correct government control. Take the cases of Galileo and Copernicus when the religious establishment shut them up. Or Socrates forced to take poison for being out of touch with the establishment order.

POLITICALLY INCORRECT VIEWS

In an article by Robin Pittwood (Google Robin Pittwood Notrickszone) Robin plotted a graph of Outgoing Radiation and Temperature 1979-2012, as measured by satellite.

Outgoing radiation should increase as temperature increases but if CO₂ is blocking outgoing radiation, as claimed by the warming enthusiasts, then the outgoing radiation will be less and the curves would diverge. Alas, the two curves do not diverge.

Google the following: *“Science Confirmed: Carbon Dioxide & Water Vapor Cool Earth’s Atmosphere”*. In this article, the authors claim that mixing CO₂ and water vapor results in a cooling effect.

I found the following very interesting; “*An Unsettling Look at the Settled Science of Global Warming Part 1*”: Scientific Discussion John Eggert P. Eng.

If you do a Google search on CO2 you will find thousands of articles on those supporting the Global Warming hypothesis and thousands saying it is wrong, so the claim of 97 percent of scientists supporting the notion of CO2 destroying the planet is flat wrong.

CONCLUSIONS

The problem is that global warming is not really a science problem and there is no interest in discovering the facts. It is a movement of the socialist left to create a global government that controls everything from guns to population. Fear mongering is just one of their tools.

Even if CO2 is the cause of global warming, a cure is not really possible. To reduce CO2 production to where no increase occurs would mean mass starvation, no air conditioning, no automobiles and no chemical industry. The claim that green energy would eliminate all of our problems is nonsense. After all the billions of government dollars spent on solar cells and wind farms, they amount to just a few percent (13.4%) of total energy production.

We live on cheap and abundant energy and until a suitable replacement comes along, we must use fossil fuels.

Consider the fact that all fossil fuels being used were at one time growing plants and animals with an atmosphere that contained much higher CO₂ levels than now exist. Check out Figure 4.

That concludes my rant on various aspects of Climate Change. I hope you learned something interesting.

PUBLICATIONS

Alaska's Icy Seas – eBook 2017 Charles Samuels

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Simulated Sea Ice Data. American Meteorological Society 4th Conference on polar met. and ocean. Igor Appel and Charles B. Samuels. 1995.

Improvement of Ice Information Support Using a Combination of Remote Sensing and Numerical Modeling. 3rd Circumpolar Symposium on Remote Sensing of Arctic Environments. 1994. Igor Appel and Charles Samuels

Sea Ice-Edge Enhancement Using Polar-Orbiting Environmental Satellite Data. Thomas F. Lee, Susan Atwater, and Charles Samuels. Weather and Forecasting, Vol 8, No. 3, September 1993. American Meteorological Society.

An Operational Report on the Use of Radar for Hail Detection. Charles B. Samuels and Francis E. Poag, Jr. NWS, Southern Region Radar Training Note. 1978.