## Two Theories

September 17, 2014

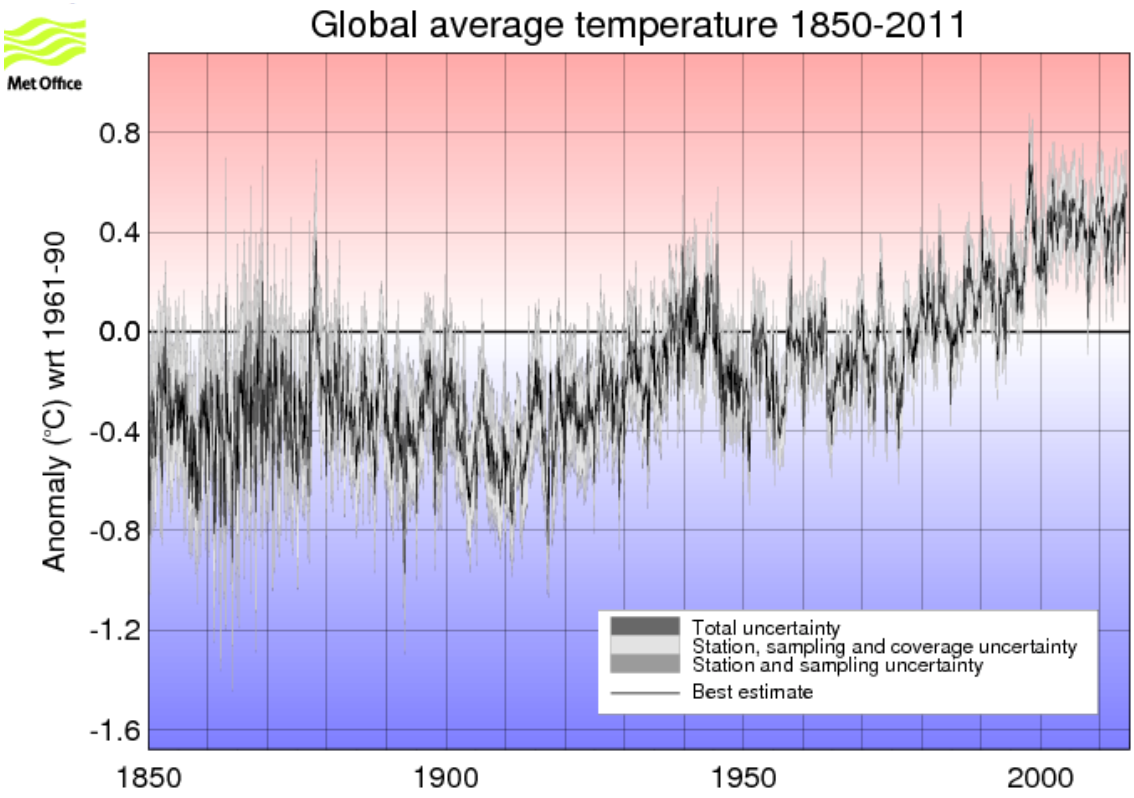
Climate changes for the past 100 to 200 years have been of great recent interest in political circles which in turn pushes the science community for answers. So there is a fairly small group of climate scientists and others who have also taken an interest in this subject. The focus of this small group has generally been on the last 60 or 70 years due to a noticeable and well measured rise in atmospheric $CO_2$ that is allegedly blamed mostly on humans. The rise in $CO_2$ is thought to have increased recent global temperatures. This even though all previous geologic evidence shows that atmospheric $CO_2$ rises only after temperature rises. There now is a theory that this human caused atmospheric $CO_2$ is actually warming the planet and over the next decades will reach alarming temperature levels.

However, there is now an alternate theory that natural 60 year ocean based cycles are the main driver of climate. Both theories can now be seen in the light of the data.

Testing this $CO_2$ theory in the past was done by correlating global increases in $CO_2$ with a rise in global temperature. The nature and especially the magnitude of mechanism that is powerful enough to noticeably drive global average temperatures up is somewhat obscure even though it is claimed that $CO_2$ is the powerful greenhouse gas (GHG) causing this strong radiative heating of the atmosphere.

By taking the record of $CO_2$ increase from the 1950s when it was approximately 300 ppm until now when it has topped 400 ppm we can see that in spite of that steady increase in atmospheric $CO_2$ the corresponding global temperature was anything but a steady increase. For three decades in the 50s, 60s and early 70s global temperature anomalies were flat. For the next 25 years until the late 90s temperatures did increase. And now for a couple of decades temperatures are again flat. There seems to be very little connection between steadily increasing $CO_2$ concentrations in the atmosphere over the past almost 70 years except for a brief 25 years of that time. In fact there seems to be some sort of periodic cycle embedded in the temperature record.

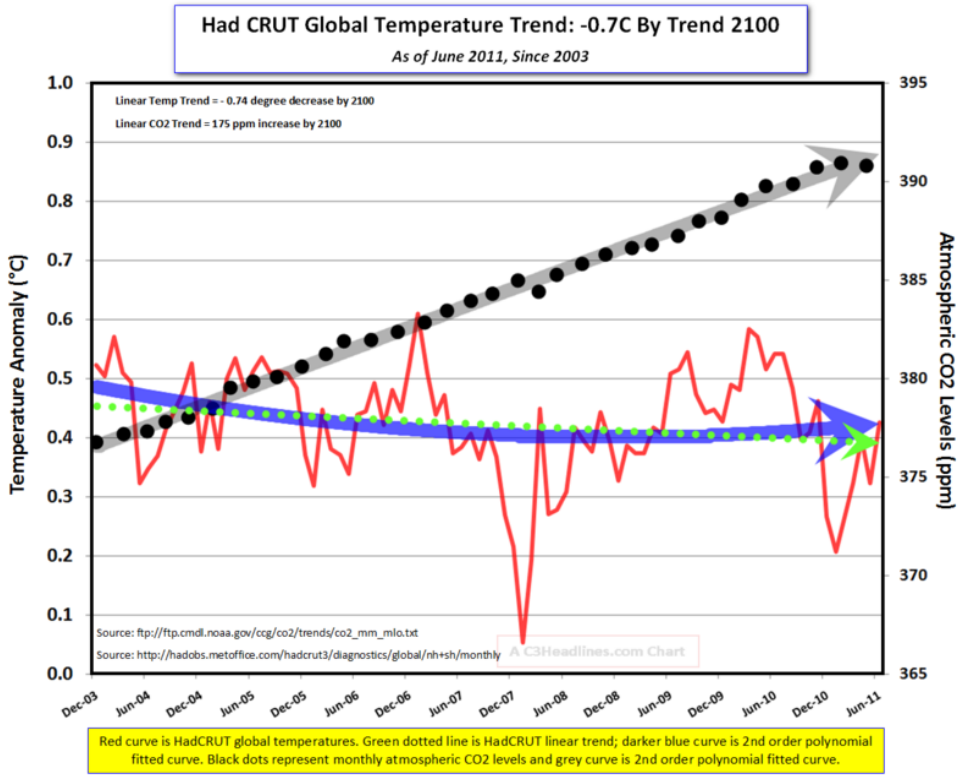
Why, if there is a direct link from atmospheric $CO_2$ concentration to global temperature increase, do we not see any temperature increase for 45 of those years? If $CO_2$ is seriously driving global temperatures there should be a much more direct and dramatic effect than for just a short 25 year period. And how dramatic is less than 0.5° C? And why if we look at past trends and patterns should we not expect the global average temperature anomaly to be back to 0 by 2030? That would equal a total delta global temperature for this whole 180 year period as only 0.4° C.




The largest issue is the exact nature of the long term effects of the growing concentration of $CO_2$ on the global temperature. The claim is that it will likely become "alarmingly" warm. "Alarmingly warm" seems to be a somewhat arbitrary term since some proponents of this theory say that there will be at least a 2° C increase in the next 86 years and some say that it will be twice that. It is really not clear where these numbers come from and for more than 20 years now, no one has found a way to validate them. Somewhere in this theory, the $CO_2$ effect is tied to water vapor and clouds when discussing the Greenhouse Gas (GHG) effect but again it is not made clear how or exactly what the interactions might be and why $CO_2$ might be the stronger influence. I would agree

that various forms of water are very influential in long term climate effects but the theory that is based on natural cycles does not require that we completely understand the water influence at this time in order to validate this new theory.

I also agree that there may be a very minor GHG effect from future atmospheric $CO_2$ increase but the counter theory about future climate effects has much more to do with natural cycles and very little to do with human produced $CO_2$. I am not even inclined to argue the finer points of human emissions and increasing atmospheric $CO_2$ since I can find no clear relation of the increased atmospheric $CO_2$ to climate effects. The alarmist $CO_2$ theory should stand on it's own or not. Arguments of why there is a several decade temperature pause while atmospheric $CO_2$ concentrations continue to rise seem to me to be apologies for a failed theory. I look for increasing effects on global average of temperature due to $CO_2$ and I cannot see them at all in the following graphic:



In fact in this case the effects seem to be negative. If this theory really does work it should show some sort of global average temperature increase during the period shown in the figure.

The theory of natural cycles does not require that it show clear global effects since discrete ocean regions are the primary drivers and they are not necessarily synchronized. And all the regional patterns do have similar 60 year cycle lengths. Pacific and Atlantic regional effects can be seen from those patterns. In the case of a well mixed GHG such as $CO_2$, I *would* expect to see average global temperatures to somehow follow global $CO_2$ concentrations in a timely way if there is any sort of direct cause and effect relationship. Once again the previous figure's data do not indicate this.

I welcome anyone who supports the $CO_2$ GHG theory as a reason for alarming climate change to explain why the data in the previous figures do not support their theory. In fact since I am not exactly sure what their theory is and I would welcome a concise but complete description of the theory so that I might understand how it might apply to past, present and future climate activity.

This alternate natural cyclical theory indicates that long term climate activity that is driven primarily by global average ocean surface temperature trends and secondarily by global average atmospheric temperature trends with periods of at least 60 years will produce similar climate patterns. There are proxy data sets that show that some of these cyclical patterns occur over the past many100s of years. These climate patterns include long term temperature and precipitation patterns and long term humidity and cloud variations. Also climate patterns can be seen in variations of storm activity (hurricanes, snow, ice, tornadoes and high winds). This theory is primarily based on naturally occurring 60 year cycles such as the Pacific Decadal Oscillation and the Atlantic Multidecadal Oscillation. Other shorter term patterns such as the El Nino Southern Oscillation as well as less understood ocean circulation patterns also have influences on the climate system. One of the chief drivers to all these activities is the sun even though it is not clear yet exactly how the heat flow mechanisms operate. And there are some poorly understood timing and modulating effects involved in this process. However, it is clear that all of these elements are natural activities with an imperceptible human involvement.

The last graphic above shows a slight decrease in global temperature that is occurring during a cooling trend in the north Pacific and can be predicted to continue to drop due to an expected additional cooling trend in the north Atlantic that is now in the beginning stages. There is a large amount of data that supports this naturally based 60 year ocean and atmosphere temperature cycle theory. On the other hand the data graphically found in the last chart above clearly shows that the GHG $CO_2$ theory with dramatic increases in atmospheric $CO_2$ has no positive affect on global temperature as that theory indicates must occur. This real world data negates the $CO_2$ theory and regardless of how plausible or elegant the theory might be, the data shows that it is wrong. This conclusion will be dramatically proven if global average temperatures drop by 0.4° C or more in the next 20 years.